

REPORT TO SUSTAINABILITY COMMITTEE – 19 MAY 2021

DRAFT HEAT IN BUILDINGS CONSULTATION

1 Reason for Report

- 1.1 The purpose of this report is to note the response to the consultation on the Draft Heat in Buildings Strategy published by the Scottish Government.

2 Recommendations

The Committee is recommended to:

- 2.1 Note the response to the consultation on the Draft Heat in Buildings Strategy published by the Scottish Government.**

3 Purpose and Decision Making Route

- 3.1 The “Draft Heat in Buildings Strategy” was issued for consultation by the Scottish Government. The responses were required to be submitted by 30 April 2021. The timescale for response did not permit an opportunity for approval by this Committee in advance therefore the response was submitted following consultation with the Chair, Vice Chair and Opposition Spokesperson of this Committee. In accordance with the Scheme of Governance, the consultation response is now being reported to this Committee for noting.

4 Discussion

- 4.1 The draft strategy outlines the actions and proposals required to achieve a target of zero carbon emissions from all buildings in Scotland by 2045. It recognises the need for a step-change in approach using both current and future frameworks to drive uptake of zero emission heating systems.
- 4.2 This consultation offered Aberdeenshire Council the opportunity to get early visibility of these proposals and offer input in the form of questions, concerns and additional information. The responses included as **Appendix 1** are an amalgamation of responses received from a number of teams across all Council Services. The consultation document is included as **Appendix 2**.
- 4.3 The cost of implementation of the plan within the proposed timeline will be high – estimated at £33billion for the whole country. Whilst a proportion of the required capital for Aberdeenshire Council would come from the existing funding model it is not clear where the additional funding required will come from to meet the ambitious targets and timelines.
- 4.4 In addition, significant concerns remain around the impact on fuel poverty. Realistically most users will switch from fossil fuels to electricity – which would

incur higher ongoing fuel costs at current pricing structures. The capital cost of upgrades also has the risk of being unaffordable to a significant section of the population.

- 4.5 The consultation focusses on the transition to green gas and hydrogen without providing confidence or certainty around timescales and extent. This requires rapid resolution as moving to green gas/hydrogen requires a very different strategy to heat pumps. If this is not managed correctly by Scottish Government, this has the potential to undermine the overarching strategy.
- 4.6 Once responses have been analysed by the Scottish Government, it is likely that subsequent consultations on smaller parts of this document will be issued for further discussion.

5 Council Priorities, Implications and Risk

- 5.1 All Council's Priorities are relevant to this report.

Pillar	Priority
Our People	Education Health & Wellbeing
Our Environment	Infrastructure Resilient Communities
Our Economy	Economy & Enterprise Estate Modernisation

- 5.2 Key principles such as responsible finances; climate and sustainability; tackling poverty and inequalities; and economy will be affected if the proposals are implemented.
- 5.3 There are no risks or implications associated with the response to this consultation document.
- 5.4 An equality impact assessment is not required for this response to a consultation.
- 5.5 There are no staffing, financial or sustainability implications to this response.

6 Scheme of Governance

- 6.1 The Committee is able to note this item in terms of Section S.1.1b of the [List of Committee Powers in Part 2A](#) of the Scheme of Governance as this is a response to the Scottish Government regarding climate change issues.
- 6.2 In terms of Section A.22 of the [List of Officer Powers in Part 2B](#) of the Scheme of Governance the relevant Chief Officer may submit a response to an external consultation on any policy matter where the timescale for responding does not permit an opportunity for approval by the appropriate committee. Any response submitted under this delegated power shall be made following consultation with

the Chair and Vice Chair and main Opposition Spokesperson of the appropriate policy committee, where possible, and shall be reported to the next committee meeting.

Ritchie Johnston
Director of Business Services

Report prepared by Brian Smith, Engineering Services Manager
Date 7 May 2021

List of Appendices

Appendix 1 - Draft Heat in Buildings Strategy Consultation Response
Appendix 2 - Draft Heat in Buildings Strategy Consultation

Appendix 1 - Heat in Buildings Strategy Consultation Responses – April 2021

Executive Summary:

The “Draft Heat in Buildings Strategy” published by the Scottish Government outlines the actions and proposals required to achieve a target of zero carbon emissions from all buildings in Scotland by 2045. It recognises the need for a step-change in approach using both current and future frameworks to drive uptake of zero emission heating systems.

This consultation offered Aberdeenshire Council the opportunity to get early visibility of these proposals and offer input in the form of questions, concerns and additional information. The responses in the document below are an amalgamation of responses received from a number of teams across all Council Services.

The cost of implementation of the plan within the proposed timeline will be high – estimated at £33billion for the whole country. Whilst a proportion of the required capital for Aberdeenshire Council would come from the existing funding model it is not clear where the additional funding required will come from to meet the ambitious targets and timelines.

In addition, significant concerns remain around the impact on fuel poverty. Realistically most users will switch from fossil fuels to electricity – which would incur higher ongoing fuel costs at current pricing structures. The capital cost of upgrades also has the risk of being unaffordable to a significant section of the population.

The consultation focusses on the transition to green gas and hydrogen without providing confidence or certainty around timescales and extent. This requires rapid resolution as moving to green gas/hydrogen requires a very different strategy to heat pumps. If mishandled by Scottish Government, this has the potential to undermine the overarching strategy.

Once our responses have been analysed it is likely subsequent consultations on smaller parts of this document will be issued for further discussion.

16/04/2021

Sandy McDowall

Senior Energy Manager

AMALGAMATED RESPONSES (N.B. the different versions of the published material have different numbering on the questions. This appears to be related to a duplication of Q2 as Q4 in the PDF).

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

Aberdeenshire Council welcomes and broadly supports the pathway to net zero and decarbonisation.

The pathway currently has a number of gaps, ambiguities, and uncertainties – however it is accepted that this consultation is attempting to address this.

The scale of the ambition requires radical change to current norms – this is a massive barrier to overcome in the proposed timescale. It requires access to funding and knowledge which do not exist in a scale that matches the ambition, and the Strategy does not fully address how this will be quickly overcome.

There are concerns that the strategy may encourage a drive towards technological “dead-ends” with no discussion on how to track or actively manage this over time as options become clearer, and as technology and financial models mature.

The strategy requires further development to ensure there is a framework which will track the positive change over time.

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

This strategy document may lead to confusion around what specific targets are and possibly lead to the belief that these definitively achievable within the timescale. More focus should be placed on known gaps in the strategy and how to bridge them.

It may highlight that some buildings are “unfixable” and will never reach the standards – without providing much guidance on how this might be tackled. This will place bigger burden on sectors where historic underinvestment and older building stock are more prevalent.

Risk of criminalisation for those that chose not to act, or act outwith the regulations. The strategy must ensure people are encouraged to act, enabled to act, and supported in implementing the most appropriate technical solutions.

People on the existing gas network may wait for Hydrogen/Green Gas rather than switching to other technologies such as heat pumps. The current strategy places quite a large assumption on hydrogen and green gas technologies reaching full, widespread and affordable technical and commercial viability. The Strategy needs to acknowledge this act/wait dilemma and provide appropriate direction and support.

This pathway will possibly force double investment – people who are required to upgrade equipment as a result of current legislation may have to replace that equipment within its expected lifespan to meet future regulations.

Risk of fuel poverty as people may lose access to cheaper fuel options (e.g. gas) – incurring a double penalty of forced capital investment and increased ongoing cost. This is especially relevant to houses which may be “unfixable”.

Building owners may find it more attractive to move to new, efficient buildings rather than upgrading the old buildings. This may leave a legacy supply of underutilised, inefficient buildings – this may drive property values at both ends of the spectrum. At its extreme this could stratify society into those who can afford an efficient building versus those who cannot, which could become a major barrier to decarbonisation.

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

“Low regret” is highly contextual. Whilst it is expected that the majority of consumers will prefer a narrow range of solutions, the strategy needs to consider how it can support the different needs borne of geography and sector that may tend those consumers towards certain technologies.

The strategy needs to consider how information is made accessible to non-expert domestic and commercial customers so high-quality decisions can be made – reducing risk of installing the “wrong” technology.

The strategy should retain sufficient flexibility so that no technology with decarbonisation potential is excluded – whilst providing high-quality information to support appropriate decision making. If the strategy seeks to streamline technology choice (e.g. to ensure markets are large enough to sustain commercial viability) the rationale must be transparent and supported with good scientific and economic assessment.

A process for rapid independent validation of emergent technologies should be considered so good solutions can be integrated into existing decision-making matrices.

An early step should be to identify areas likely to benefit from hydrogen/green gas versus those that are unlikely to. This would allow lower-risk investment in areas where the expected long-term energy mixes are more predictable. Clarity around whether existing gas (becoming green or hydrogen) pipeline networks are likely to grow, shrink or remain the same would be a significant driver of technology selection (e.g. install hydrogen capable boilers versus convert to air-source heat pumps).

4) What are your views of any unintended consequences from this pathway?

This appears to be a duplication of Q2

5) What function should a new heat target serve?

The heat target is useful as a national metric for tracking progress and defining strategy and regulation. At a local or individual level such targets may 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.

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

Aberdeenshire Council believes any strategy needs to directly address how to prevent increases in fuel poverty, and enable further reductions in fuel poverty. The strategy should include mechanisms for capital support for uptake of new technology for vulnerable groups, including support to understand the ongoing costs of new equipment.

7) Do you agree that a new heat target should apply to heat in buildings, distinct from industrial heat?

All sectors must play their part in working towards national targets. Whilst targets and strategies for industrial heat will have different frameworks, results should still be reported. This will allow national heat to be fully understood and allow strategies to be developed that place equal burden on all to achieve decarbonisation.

8) What form should a new heat target take and why?

The targets need to be addressed from multiple angles to best inform strategy. Total heat used, emissions from heat and relative to floor area (buildings) and output(industrial).

Total national emissions from heat (tCO₂): ultimate measure of success – overall target is zero.

Total national heat consumption (kWh): Even if zero emissions is achieved this is a measure of efficiency and becomes an indicator of effectiveness of application.

Buildings: Heat and emissions per square meter – provides a more sector-specific measure of success.

Industrial: Heat and emissions per unit output – provides a more sector-specific measure of success.

9) At what level should the target(s) be set and for what date?

Targets should be set to SMART objectives and should be flexible enough to account for geographical differences (which may preclude certain technical solutions).

The Scottish Governments' commitment to a 'Just Transition' is laudable and critical. The targets must ensure that tenants are not penalised through

switching to a high-cost fuel (e.g. electricity) and have to pay for all the 'improvements' through their increased rent as well as direct costs. Public engagement strategy is key and needs to be flexible to respond to the needs of individual groups. Low-income households are not usually early adopters but will be forced into this situation if landlords are to meet their energy efficiency targets. It is key that this transition is carefully managed to prevent unintended increases in fuel poverty.

The target frameworks need to include provisions for targets to be changed in response to unintended behaviour and to be updated as the technology landscape develops.

(N.B. Duplication of Q9 numbering matches numbering of questions in .pdf version of consultation)

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?

Provide an appropriate regulatory framework to drive uptake whilst providing good-quality information to support decision making. Ensure economic drivers remain in balance - e.g. costs of change need to be attractive whilst penalties (costs, tax or social) on those who cannot change must not be punitive.

The ambition of the strategy will require a step-change in understanding at an individual and leadership level. This needs to be supported with awareness campaigns and easy access to good-quality, independent information (i.e. not technology supplier led).

This has the added challenge of placing expectations on all individuals to act whilst acknowledging that some of those individuals may be unable to act for economic reasons. Any statutory requirements must consider both acute fuel poverty and the "squeezed middle" who may not have access to funding support but will also struggle to fund upgrades directly.

The ongoing development of the strategy will require continuous monitoring of outcomes and experiences.

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 strategy is the responsibility of the Government. Local Authorities have the opportunity to develop exemplar/demonstration projects - additional funding support may be required to facilitate this. In addition, Local Authorities can act as an access point to unbiased, good quality technical information (which should be developed nationally with government support). Within

Aberdeenshire Council this would require additional human resource to develop and implement, which sits outwith current budget and resource planning.

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).

It must be recognised that this strategy requires significant capital investment by all sectors of the domestic and non-domestic markets at levels that are not trivial. The timescale of the strategies for retro-fit are likely to require investment sooner than a normal lifecycle replacement. This has significant potential to discriminate against those that cannot access the capital required for upgrades. In addition, the on-going operating costs of net-zero technologies need to be understood as it risks putting people into fuel poverty – especially where moving from gas to electricity.

There are also concerns around the EESSH2 requirement to achieve EPC band B by 2032 vs a wider national target of band C by 2030. This is likely to pass-through capital costs onto rent costs and combined with higher fuel costs will result in above-inflation increases. This is exacerbated by uncertainty over when hydrogen/green gas will become widely available.

Widespread stakeholder engagement will reduce the risk of unintended discrimination.

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

Yes – if households are pushed further into fuel poverty, and where household budgets are moved to pay for capital upgrades rather than welfare.

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

Continue to raise awareness of the impartial advice services available throughout Scotland (such as SCARF, Home Energy Scotland, Local Energy Scotland and Zero Waste Scotland) to ensure the public and organisations are well informed on what is available to help them improve energy efficiency and live more comfortably in their homes. Adequately resource these organisations to be able to meet the ambition and scale of the strategy.

Aberdeenshire Council would seek to continue to work closely with these organisations to support implementation of the strategy.

Create and promote independent, unbiased resources to support decision-making.

Over time, the strategy should be developed to take account of actual consumer experiences.

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

Whilst there is currently a good range of funding and advice already available, there needs to be a more integrated approach to linking this advice and funding to the strategy to accelerate uptake of decarbonisation technologies.

Attractive funding options should be available and easily accessible to any customer (domestic or non-domestic) who wishes to finance appropriate upgrades. Access to funding should be equitable.

Advice should ideally be free and consistent across all sectors. Targeting particular sectors such as Landlords for additional support may help with the Just Transition to Net Zero without penalising vulnerable groups.

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?

There is an opportunity for closer collaboration between supporting bodies to ensure end-users can access the right information first time. Provide flow-charts and awareness of support options to help customers know where to turn. This may require some consolidation of existing services.

Provide longer-term funding and award projections to allow for better planning for support resources.

Ensure visibility of statutory regulations is available as early as possible to guide decision making, planning and resource allocation.

Ensure all guidance is accessible and presented in plain language.

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?

Information should be freely available on the specific technologies and where they are applicable. These should also be tenure specific.

Approved installer schemes should be developed and procurement frameworks should be developed to identify lowest regret options.

Rogue traders and scams should be actively traced and eradicated. Public awareness campaigns of these issues will help self-policing.

Consideration should also be taken to support early adopters if they need to consider a change to an alternative technology at a later date as technology options and markets mature.

17) Do you have views on whether we should adopt the use of the UK government's Trust Mark quality assurance framework?

A Trust Mark scheme would be useful in addressing concerns around scams and rogue traders. However, using a UK-wide scheme may introduce confusion where the devolved regions are operating to different strategies and frameworks. As such a similar Scotland specific scheme may be more appropriate – whether as part of the existing Trust Mark entity or completely separate.

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?

Make existing frameworks such as Warmer Homes Scheme more accessible to a wider range of claimants. Support low-income households to move to more efficient technologies that will not increase their ongoing fuel costs.

Raise awareness of support options with guidance on which ones to use for particular circumstances. Consider consolidation of support schemes to improve accessibility.

Raise awareness of funding packages which could cover 100% of costs for those low-income households. Widen the criteria for those who can access financial support. Increase options for those in social housing.

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?

Whilst the logic of a rapid move away from fossil fuels is clear – the obvious replacement is not. Areas which may transition to hydrogen and green gas would benefit from a move to a hydrogen capable boiler – which are not widely available yet. Moving to an alternative such as a heat pump, may negate a move to hydrogen at a later date and undermine the economic viability of a hydrogen network. Clarity needs to be provided as early as possible for the gas network transition timelines and extents, so this can be integrated into capital planning. This will allow a better understanding of which locations may have to switch from gas to electricity and therefore be more at greater risk from fuel poverty. Where the technology options are clear, the current costs may be prohibitive.

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?

As Q18 and:

Support within the strategy should be focussed on areas which will provide the biggest benefit for lowest risk first. Ongoing analysis and sharing of results to help inform ongoing decision making to ensure appropriate solutions are implemented in each case. Strategy should continue to develop in line with positive and negative feedback.

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

Models for zero-emission heat currently focus on having sufficient end users within a defined area. This is challenging to develop on an incremental basis, so lends itself most to new developments. Where incremental change is required, or there is insufficient population density this route will be challenging without a significant shift in motivation. This could be supported with dedicated specialists who could be engaged to help communities coordinate how to implement and fund community heat networks.

The strategy needs to accept this will probably not work in largely rural regions like Aberdeenshire so consideration on how to make these work with fewer participants who are less concentrated would support uptake. This will also help clearly define where the line between heat networks versus stand-alone solutions sits.

We do not believe Communities can be expected to act in sufficient volume without significant external input and ongoing support. Clarification around Heat Zones is required to understand scope, definition and extend and obligation to monitor performance.

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?

Whilst communities may recognise the need for transition, they are unlikely to have the knowledge or expertise to implement local heat to the scale envisioned. There must be a clear framework on how to implement such projects to ensure they are fair and transparent to all members of a community and between communities. This could be supported by dedicated specialist personnel to act as project managers/advisers.

A partnership approach will ensure community's needs are met with positive outcomes.

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

Community anchor organisations will play a key role in this transition. Utilising their local knowledge and reputations with the local communities to help build public trust, awareness, and knowledge to support implementation.

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 strategy does not appear to bias against island and remote communities, however any provision developed to support the strategy must recognise that the needs of these communities will be very different to urban areas and must have appropriate support mechanisms. There will be a greater need for individual rather than networked solutions.

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

For the LHEES provision to be in place by 2023 requires significant resource, finance, guidance, regulation and engagement – this will be challenging for local authorities without Government support. For this process to be most effective, it is also critical that the questions raised earlier around hydrogen and green gas scope and timescales are addressed and widely communicated as early as possible so investment can be targeted on the most appropriate technology.

26)Do you agree with the approach to LHEES set out above? If not, please give reasons to support this.

Aberdeenshire Council broadly agrees with the LHEES approach, but any new regulations developed for the strategy must dovetail with it.

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?

Bringing the development of heat network infrastructure in line with other utilities would be a welcome step, accepting that the generation facility will still need planning permission.

Relaxation of controls on benign micro-renewables would be welcomed.

From a landlords' perspective having to apply for permission to install energy efficiency improvements currently adds a significant time delay and additional cost. It is likely that if the aspirational targets within this document are to be

achieved the planning system would struggle to cope with the influx of applications. An increase in permitted development would be welcomed. That increase should reflect the regional and sectoral differences identified above.

28) In your view, is there further action that can be taken to ensure that our electricity systems are ready to heat decarbonisation? If yes, please provide further information.

Given the scale of investment that will be required can we have confidence that there will be equitable delivery of the necessary infrastructure to allow the "all Scotland" strategy to be implemented? Reliance on the UK Government to continue to support the development of Scotland's renewable electricity pipeline would seem to be a risky strategy, particularly in the context of the current "independence" debate. Other sources of investment are likely to be needed.

There are huge barriers to improvement currently due to the constrained electricity network - an individual can install PVs etc unimpeded however a landlords' trying to upgrade their stock is thwarted due to scale. There requires to be a cultural shift in how applications are made and dealt with by the Distribution Network Operators (DNOs), administration is excessive, costly, and complex. Considerable benefit would arise from streamlining these processes.

The most significant barrier is that the network itself is constrained preventing the installation of quick win technology such as Net Zero heating and Photovoltaics. In large areas of rural Scotland upgrading is not possible due to grid constraints preventing a Just Transition and preventing the aspirational targets in this document being achieved.

The Government should consider funding grid upgrades to prevent the cost being passed unfairly to some customers whilst others incur little or no cost for specific projects. This should focus on reducing the cost of connections between the end users and their local substations. Constraints between generators and sub-stations should be dealt with separately.

29) What are your views on the charges 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.

Greater sharing of the discussion with the DNOs and of the new Heat Electrification Partnership will assist landlords in setting their strategic Investment decisions. If the step-change outlined in the document is to be achieved the pace of change required by the DNOs is rapid and the costs for these changes should not be passed onto the landlords willing and otherwise able to make the transition to Net Zero homes.

Flexible tariffs are also going to be essential to maximise benefit of storage. The ease of access to these should be investigated rather than having to use

specialist companies (aggregator) to undertake a bidding service at a blind auction with DNOs. The system requires simplification to enable easy access to these markets and also the opportunity for other tenures in the same area to join forces to provide a greater offering of storage and supply at times of peaks and troughs.

For grid connections, the first connector carries the burden of cost of local infrastructure upgrades. Subsequent connectors in the vicinity get the benefit. This often requires a large project with economies of scale to break this deadlock – addressing this cost bottleneck will accelerate development.

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 Government needs to consider how to fund core energy network infrastructure upgrades, to prevent these costs being passed through to those who can least afford it – either as a capital cost or ongoing higher fuel cost.

Provide mechanisms to allow those who are “off-grid” to have cost parity with those who are “on-grid” – for both installation and on-going costs.

Provide means tested funding support for capital investment.

A partnership approach will ensure community’s needs are met with positive outcomes.

31) What are your views on the changes set out above for the gas networks?

It is critical that timescales and confidence are provided on the hydrogen and green-gas roll-out so electrification to meet short-term targets doesn’t undermine gas/hydrogen grid viability in the future. Organisations like Aberdeenshire Council are making investment decisions today, that will affect achievement of 2030 and 2045 targets. Given the ambition of the strategy but lack of clarity, this is introducing uncertainty that is likely to delay decisions and achievement of targets.

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.

Given the current extent of technical development of blended green gas and hydrogen what will the “gas” grid look like in 2030? Will it be bigger or smaller, where will it grow or contract? This will remove the risk of upgrading to the “wrong” technology in the short-term. This information will allow stakeholders to begin to articulate their expected development plans, which will then reinforce whether “gas” grid development projections are appropriate.

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 biomass and thermal borehole at Hill of Banchory provides a clear model that these technologies can be applied today in multiple locations across Aberdeenshire.

A lack of vision of major housebuilders results in their unwillingness to "step out of the box" unless required to by regulation or significant incentive. This unwillingness could be mitigated by having specific 3rd-party resource dedicated to developing wider networks off the back of housing developments or other large building projects by pulling stakeholders together.

34)What evidence can you provide on the potential for heat derived from the energy from waste to qualify as low or zero emissions?

Energy from waste appears attractive but can suffer fuel supply issues due to the strict way their fuel streams are rightly regulated. This introduces risk to these projects if their preferred fuel stream becomes unavailable. If tied to a heat network, the whole network becomes at risk, which in turn risks a need to have fossil fuel back-up. What does the back-up look like in a zero-emission world – and does this remove Energy from Waste as a viable solution?

35)What views do you have on mechanisms to support this and the use of wider sources of waste heat?

Waste heat is often "low grade" which minimises its potential. Focus should be on maximising efficiency, which will reduce heat waste. Waste heat should be considered in the context of its future rather than current availability so recovery of residual waste heat can be more effectively targeted.

Any new-build (domestic or non-domestic) should have waste heat recovery mandated where heat waste is above a certain level (to be defined).

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?

There must be support for more or expanded Social Enterprise ESCo's to manage new heat networks on a not-for profit model. Alternatively or additionally create a national ESCo to perform the same roll where there is no capability at a local level.

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?

Support for early adopters is welcomed but it likely to be required beyond 2023. A focus on Covid recovery is likely to divert resources in the short-term.

Without clarity on hydrogen and green gas scope and timescales there is a risk people will wait for clarity before investing – incentives to act early must be sufficient to overcome this, without undermining a future adoption of green gas technology.

LHEES will be in place by 2023 so a lot of support is required to enable/encourage the transition in line with the Heat Zones. Ending support at that critical time does not sound ideal if take-up is to be maximised in line with the ambitious targets set out in this strategy.

38)Do you agree with the strategic funding priorities set out above?

The funding priorities do not appear to reflect the scale nor urgency of the strategy which may result in slower uptake than the step-change that is required?

The priorities stated here do not appear to address the funding gap required for core grid infrastructure to support both increased local electricity capacity and transitions to hydrogen or green gas. This would raise concerns that it is expected these costs will be passed through to the end-users which increases the risk of fuel poverty.

39)In your view, should equal funding be allocated across these priorities or should certain priorities be weighted in terms of impact for Scotland?

As identified previously, the specific needs of different geographies and sectors is significant within Scotland. The priority should be on funding technology development and assessment so each sector has access to the most appropriate technical solutions. Once these assessments are complete funding support can be balanced to support those limited to higher cost options whilst returning maximum possible overall decarbonisation. No group should be penalised for funding if particular technical solutions are not viable for them.

40)What are the opportunities and challenges we face in maximising our £1.6 billion investment?

This investment can kick-start uptake but must be targeted on the best value for money (e.g. efficiency vs decarbonisation), whilst meeting our obligations to tackle fuel poverty.

Significantly higher values are required to meet the ambition of the strategy. Without additional funding, uptake will be slower as investment will follow a normal lifecycle rather than accelerated investment.

There is a risk of disconnect between those making decisions (e.g. landlords) and those that must live with the outcomes (tenants). Strategy and Frameworks must account for this.

41)What are your views on the role of government funding over the next five years? For example, should it be focussed towards significant increases in the value of renewable heat and energy efficiency measures installed or more targeted at specific priority groups or technologies?

The funding should be targeted towards low-risk investments whilst also de-risking higher regret options (as proof of concept). It should provide clarity around the transition from gas to help decision making, including how to address the impact of higher ongoing fuel costs to those that make the transition – especially where fuel poverty is a concern.

42)What are your views on how we can use our funding to leverage and encourage private sector and other forms of investment?

Funding that supports de-risking projects and clarity on long-term expectations of market direction (where possible) will allow private investors to ensure they will get a return where profit making - or not have to prematurely re-invest as private homeowners.

Fund investigations to inform Legislative change to ensure minimum high-quality standards are applied in all sectors.

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 Home Energy Scotland, and Zero Waste Scotland services are very effective delivery programmes but could be more effectively linked with other funding sources (HEEPS ABS and ECO) delivered by Local authorities so that when a customer calls the services all options can be explored on the same journey. Within ABS schemes it would be beneficial to allow some flexibility and relax some qualifying criteria for private landlords in order to alleviate the impact on neighbouring occupiers in blocks of flats.

Where under-investment has occurred in non-domestic buildings it may be due to lack of available funding. Changing expectations without addressing the funding gap is unlikely to support achieving the targets. This would be

particularly difficult in the public sector where the costs cannot be passed on or easily dissipated.

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.)

Possibly more pilot schemes similar to the EES pilots, where there's a "hand-holding" service available to those not able to pay, to ensure inclusion and less drop off during the customer journey. It's essential that all customers have access to information and support to fully understand the process.

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 Danish model is interesting but would need significant oversight to ensure it remains affordable for both the customers and suppliers and the behaviour of suppliers is strictly regulated. Should it look beyond heat pumps? If it is too successful it could undermine transitions to green gas/hydrogen. How would obligation be transferred when people move property?

There are concerns that increased costs associated with capital investments will have to be passed through to tenants in rents and increased fuel costs. This is of particular concern with regards to fuel poverty targets.

Any legislation which puts further pressure on capital budgets will be difficult to support unless additional funding is made available.

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?

Where investment decisions are held by a building owner but the ongoing costs are borne by a tenant (irrespective of whether the capital costs are passed through) there is a risk of people having change imposed upon them without full control of the outcomes. If capital costs are passed through this issue become magnified.

In the public sector this can be mitigated through additional Government funding. In the private sector passing through reasonable costs must be expected and permitted. This will increase the requirement for funding to support fuel poverty at the most vulnerable end of the market.

Allowing investors (domestic or commercial) easy access to low-cost finance would help those who can afford it to spread the costs over time with minimal risk. Frameworks need to consider how to deal with affordability if peoples' circumstances change during a lease or loan period – possibly though a student loan style repayment model that varies with income?

47)What financing mechanisms are needed to encourage investment from householders, businesses, and the private sector?

Payback periods are important in justifying business plans - but do not allow carbon savings to be included. The development of a model / mechanism that allows cost and carbon to be considered would be helpful. Appropriate incentives to invest.

Easy, simple access to loans and grants. Make energy reporting within mortgage markets compulsory – with built-in mechanisms to reward efficiency and drive improvement rather than accept status quo.

Variable loan payback mechanisms as income changes (student loan-style) would de-risk worry around long-term affordability of investments.

48)What are your views on the regulatory actions set out in the proposed regulatory framework?

We should welcome the fact that the proposed standard will not allow for offsetting on new buildings. How will this be handled where retrofit may not allow zero emissions to be achieved at a local level (Rural/Island communities)?

Revision to the building standards is welcome but should remain under constant review to ensure it remains appropriate in what will be a very rapidly changing market.

Long term certainty is critical for private investment and to enable Landlords to plan their strategic investment strategies. How will this differ from EESSH2? A number of the targets set out in this document do not align to EESSH2 and to move from 2032 to achieve Net Zero by 2045 is unrealistic due to the lifecycle of the associated components. An urgent review of this is required and we support the proposal to bring forward the review of EESSH2.

Legislation will help to ensure we meet the targets - but needs to be developed and issued for consultation quickly.

The proposal to base assessment on EPCs with trigger points on heating upgrades, rental, sale and redevelopment risk missing homes where none of these trigger points are met. Should there be a mandatory 10-year limit if the trigger points are not met?

Compliance for organisations like Aberdeenshire Council is limited by our available budget. If any mandatory regulation will increase our costs it must be reflected in additional funding from central Government or will pose a direct threat to other Council services.

49)What are your views on the timeframes set out for the application of the regulation set out above?

Whilst the timeframes appear reasonable, time does need to be included for adequate consultation and sign-off to final regulations.

50)What are your views on the timeframes set out for the application of the regulation set out above?

Requiring existing home-owners to comply with a Minimum Energy Efficiency standard by 2035 will be very challenging and will probably require substantial fiscal support. Not all existing homes can be improved to the EPC C rating or minimum level of fabric energy performance proposed, although the insight into "natural points where changes happen to a building" is an interesting perspective. The paper correctly identifies the challenges associated with mixed tenure / mixed use buildings.

51)What other mechanism/support may be required to ensure that regulation is fair and equitable for all?

The regulations should not penalise those that cannot afford to act. Where owners cannot afford to act in line with the regulation, there should be appropriate support to help.

How does the strategy intend to deal with regulatory non-compliance?

52)What are your views on the plans set out to maximise the economic benefits to Scotland from the heat transition?

The plans potentially rely too much on funding rather than changing the economic system conditions to support improvements.

There isn't enough certainty of the future direction for businesses.

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?

This would be difficult to develop without a clear development timeline on things like green gas/hydrogen. Technology-specific milestones could encourage unintended behaviour with undesirable outcomes.

54)Is there anything further that can be done to ensure that Scotland realises the economic opportunity available from the heat transition?

Work with the UK government to give businesses clarity over the coming economic system conditions (e.g. taxation levels).

Ensure that the economic system conditions (e.g. taxation levels) support positive changes

Support investment in sectors to deliver the strategy.

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?

Ensure frameworks, strategy and targets provide as much certainty to businesses to allow planning, investment and growth.

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?

There are opportunities for the public sector to plan-ahead and assess the feasibility of how to meet heat transition targets and then to provide feedback on the viability of options.

Given the predicted expense involved it may be more difficult to support local businesses and supply chains as the focus could be on up-front costs.

57)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?

Gas boilers will need to be repaired and maintained for a number of years. It is important that a skilled gas engineer workforce is maintained whilst the skill-base is also expanded on hydrogen capable boilers and heat pump maintenance and installation.

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?

Reluctance to train for a market that does not yet exist. Reluctance to try to secure work in a new market (e.g. heat pumps) at the detriment of existing customers (e.g. gas).

59)How can we support the development of more opportunities for young people?

Support development of accredited training courses for the applicable technologies.

60)To what extent do you agree with the issues identified must be addressed jointly by the UK and Scottish governments to unlock delivery in Scotland?

It is critical that the UK and Scottish Governments work together to ensure that the biggest levers in the economy (e.g. taxation) support any strategies.

The scale of the interaction required to achieve the proposed transition strategy is very wide, and there has to be some risk that many of the actions identified for the UK government will not be delivered as they pursue their own national strategy.

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?

Aberdeenshire Council has no additional response to this question.

62) Do you agree with our proposals for a monitoring and evaluation framework? If not, please state your reasons and suggested improvements.

Aberdeenshire Council agrees with the need for a monitoring and evaluation framework. To be effective monitoring must have a method for assessing all properties regularly or there is a risk that estimates may hide underlying target failures.

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?

All results should be reported regularly, and lessons learned should be rapidly incorporated to ensure frameworks and legislation remain appropriate to driving the intended behaviour.

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?

Clarify if there are any conflicts with EESSH2 standards – and resolve conflict to reflect the intended outcomes. Do not stop gas boiler installations until alternatives are available that support moving to green gas/hydrogen. This will allow easier management of fuel poverty issues. Consider how local authorities will fund and resource the increased quantity of upgrades.

ADDITIONAL

65) What are your views on the accuracy and scope of the information used to describe the SEA environment baseline set out in the Environmental Report?

Aberdeenshire Council has no response to this question.

66) What are your views on the reasonable alternatives set out in the Environmental Report?

Aberdeenshire Council has no response to this question.

67)What are your views on the predicted environmental effects as set out in the Environmental Report?

Aberdeenshire Council has no response to this 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?

Aberdeenshire Council has no response to this question.

69)Is there any further information you wish to provide on the content set out in this draft Strategy?

Aberdeenshire Council has no response to this 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?

Aberdeenshire Council has no response to this question.

Draft Heat in Buildings Strategy

Achieving Net Zero Emissions in Scotland's Buildings Consultation

February 2021



Contents

Ministerial Foreword	2
Executive Summary	6
Chapter 1 Introduction	12
Chapter 2 A 2045 Pathway for Scotland's Homes and Buildings.....	18
Chapter 3 People.....	33
Chapter 4 Place	49
Chapter 5 Preparing our Energy Networks	59
Chapter 6 Kick-starting Investment in the Transition	77
Chapter 7 Working Towards A Long-Term Market Framework.....	91
Chapter 8 Developing a Regulatory Framework for Zero Emissions Buildings..	101
Chapter 9 The Economic Opportunity	117
Chapter 10 Working with the UK Government.....	133
Chapter 11 Monitoring, Evaluation and Future Decision Making	140
Annex A Summary of Actions	143
Annex C Summary of Scottish Government Delivery Programmes	161
Annex D Summary of GB Wide Funding for Heat and Energy Efficiency	170
Annex E Members of the Heat Decarbonisation External Advisory Group	173
Annex F Responding to this Consultation	174

Ministerial Foreword



Reducing emissions from our homes and buildings is one of the most important things we can do to help end Scotland's contribution to climate change. Over the next 24 years we will transform Scotland's homes and workplaces so they are warmer, greener and more efficient. This draft Strategy, which updates both the Energy Efficient Scotland Route Map and the Heat Policy Statement, sets out how we will achieve that ambition.

Even as we address the damaging climate change impact of our homes and buildings, we must continue to tackle the social inequalities that are all too prevalent in our housing sector. In particular, we must redouble our efforts to end fuel poverty and the blight of unaffordable heating. There is a tension between our climate objectives and our commitment to ending fuel poverty, as many zero emissions heating systems are more costly to install and can be more expensive to run than high emissions alternatives. We are clear that this must be overcome and remain steadfast in our commitment to supporting those least able to pay in this transition, and in protecting those who are most vulnerable to any increase in costs.

Our homes and workplaces account for around 21% of Scotland's total greenhouse gas emissions. We can and must make very significant progress towards eliminating emissions from the way we heat our buildings over the next decade and reduce them to zero by 2045. Transforming our homes and workplaces will be immensely challenging, requiring action from all of us, right across society and the economy.

Today, as well as relying on fossil fuels for warmth, we know that many of our buildings are inefficient and hard to heat. This can lead to high energy costs which can put households into fuel poverty and present unnecessary financial burdens for businesses and the public sector. As we transform our homes and workplaces we will continue to take action to improve energy efficiency as much as we can; ensure energy costs in future are affordable and that our actions continue to lift people out of fuel poverty.

Decarbonising our homes and workplaces means a fundamental shift for almost all of us. We have already made good progress on energy efficiency, with 45% of homes now achieving EPC C or better, and we now need to accelerate efforts to build on this and reduce our demand for energy. At the same time, 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. And we must do so in a manner that protects those in or at risk of fuel poverty from increased energy bills and that avoids placing a burden on those least able to pay for the transition.

These heating solutions are not new – they are widely used in other European countries and are now gaining a growing share of the market here in Scotland – but for many of us, they remain unfamiliar. As we deliver this Strategy, we will increase public engagement, building on our existing advice services and taking steps to raise awareness and understanding of these new technologies. We will work with local government to put in place Local Heat & Energy Efficiency Strategies, setting out a plan for all areas of Scotland, and work with local communities to design tailored solutions, matched to local circumstances.

The impacts of COVID-19 are profound and the challenges we face as a country to recover from it are unprecedented. The pandemic has affected every aspect of our lives, with thousands of people losing their jobs and businesses in distress; as well as a fundamental shift in how we live and work in our local communities, towns and cities. At the onset of the pandemic, we paused our heat in buildings delivery schemes and took the difficult decision to delay the introduction of minimum energy efficiency standards for privately rented homes. We took the decision to delay significant capital investment via our new Heat Transition Deal, instead focussing our efforts on developing a robust pipeline of new projects ready for capital investment in future years.

Over the next Parliament we will make available almost £1.6 billion for heat and energy efficiency projects across Scotland, helping to secure delivery against our targets, providing a much-needed stimulus to the heat and energy efficiency sector, and contributing toward a longer-term green recovery. We are seeking views as part of the consultation on this draft Strategy on how we can maximise the impact of this investment to help deliver our objectives.

We estimate that the total investment required to transform our homes and buildings is likely to be in excess of £33 billion. This cost cannot be borne by the public sector alone. We will establish a new Green Heat Finance Task Force to identify innovative solutions to maximise private sector investment, and find new ways to help individuals and organisations spread the upfront cost of investing in making their properties warmer, greener and more efficient.

This investment will generate significant opportunities for communities across Scotland. We will continue to flex our delivery programmes to support local jobs and create opportunities for young people. We will also expand our work with the supply chain, via initiatives such as our Heat Pump Sector Deal, to create new investment opportunities and create and support high value, local jobs.

To underpin and provide the certainty and assurance to secure this investment we will bring forward a framework of regulations setting clear standards for property owners across all tenures and buildings types. We will build on existing standards already in place, extending them to cover all properties and requiring action on both energy efficiency and zero emissions heating. Our consultation for a 2024 Zero Emissions Heat Standard for new buildings is a major first step.

There are no silver bullets or easy solutions to the heat in buildings challenge. We must use all the tools available to increase awareness, secure delivery and provide the certainty that individuals and the sector need to take action. This draft Strategy sets out our planned actions and further proposals to strengthen our approach. It also sets out the actions we need to see by the UK Government to bring forward strategic decisions on the future of the gas network and to reform the energy market, create fairer pricing supporting net zero, and protect consumers.

The changes needed to make our homes and buildings fit for a net zero future will touch on all our lives and are likely to require us all to take action. Therefore, it is only right that everyone in Scotland has an opportunity to shape our Heat in Buildings Strategy. We are seeking your views on this strategy: the pathway, the technologies, the means by which we will protect those in or at

risk of fuel poverty, the regulatory framework, the support and delivery schemes, and actions to maximise the economic opportunities. We have posed questions throughout the document and we look forward to hearing your views. The responses to this consultation will also inform the forthcoming revision of the Fuel Poverty Strategy.

The feedback to the consultation will be considered by an incoming Scottish administration following the Scottish Parliament elections in May this year. An incoming administration should not delay in publishing a final Heat in Buildings Strategy or in considering new legislation to underpin it. In the meantime, the Scottish Government will continue to take steps to support delivery through our successful Energy Efficient Scotland delivery schemes and the Low Carbon Infrastructure Transition Programme, and continue to work with colleagues in Parliament to secure the passage of the Heat Networks (Scotland) Bill.



Paul Wheelhouse

Minister for Energy, Connectivity and
the Islands



Kevin Stewart

Minister for Local Government,
Housing and Planning

Executive Summary

As part of ending Scotland's contribution to climate change, the way we heat our buildings needs to change. This draft Strategy sets out actions and proposals for transforming our buildings and the systems that supply their heat, ensuring all buildings reach zero emissions by 2045.

Our strategic approach to the heat transition will ensure we meet both our climate change and fuel poverty commitments. Both commitments have interim targets hence a large share of the change we need to see by 2045 must be delivered in the 2020s. Meeting these targets simultaneously poses challenges, especially as many zero emissions heating systems are more costly to install and can be more expensive to run than high emissions equivalents. We acknowledge the inherent tensions between achievement of our fuel poverty and climate change ambitions, and are seeking your views through this consultation on ways in which these tensions can be resolved. We remain committed to a fabric first approach through all our programmes, supporting fuel poor households to make their homes more energy efficient and helping to ensure energy bills are more manageable in the short term. We will take a careful and measured approach to introducing greater levels of support for fuel poor households to install zero emissions heating systems such as heat pumps, and continue to put the needs of households themselves at the heart of all our schemes.

Transformation of our buildings and energy markets at the scale and pace required is unprecedented. As highlighted by the Climate Change Plan update, the imperative to make progress means we must learn as we go. This includes delivering heat and energy efficiency solutions in settings we know are low regrets; ensuring low income and vulnerable households are able to afford to keep their homes warm; and rapidly developing the evidence base to resolve uncertainties where they exist.

This draft Strategy presents actions and further proposals that the Scottish Government will take. It also sets out the actions that we need the UK Government to take to ensure a smooth and just transition in Scotland. We are seeking your views on these proposals through a series of consultation questions throughout the document.

The transition to zero emissions heating systems will directly affect everyone and it will require individuals and organisations to take direct action. We are

therefore offering everyone the opportunity to help shape the decisions we take.

The Path to Net Zero

Energy efficiency is critical across all pathways and technologies and is critical to unlocking deployment of zero emissions heating systems. Higher levels of energy efficiency will also help to reduce requirements for energy network upgrades and running costs helping to ensure that energy bills are affordable. We are therefore aiming to reach high standards of energy performance across all buildings whatever heating systems they use. For homes this will mean achieving energy efficiency levels broadly equivalent to an EPC rating of Band C.

There is no single technology that will deliver zero emissions heating in Scotland; the most cost-effective pathway will require several different approaches. The key low and zero emissions heating solutions available today are heat pumps and heat networks, and early progress must be made - deploying them in buildings for which they are the right long-term solution. Longer term, hydrogen may have an important role to play and our Hydrogen Policy Statement and Hydrogen Assessment, published in December, set out our ambitions in hydrogen deployment in Scotland. In this Strategy we commit to keep the option of hydrogen open where it represents a potential cost-effective solution, whilst also making progress with technologies that are ready to deploy in the near term. We will take forward work to understand the potential for hydrogen for heat, including identifying those buildings and areas where hydrogen is most likely to be the best option for delivering our targets.

Achieving emissions reductions in buildings will require by 2030 over 1 million homes and an estimated 50,000 non-domestic buildings to convert to using zero or low emissions heating systems. We are committed to taking action to rapidly scale up deployment rates so that at least 64,000 homes install renewable heating systems per year by 2025, and possibly many more.

People

The transition to zero emissions heating will directly affect people's everyday lives as buildings are upgraded and new heating systems are installed in homes, workplaces and community buildings across Scotland. To ensure we jointly deliver our fuel poverty and heat decarbonisation objectives, in the final version of this Strategy, we will publish a set of guiding principles to underpin our commitment to no one being left behind, and implement these across our

programmes. We will continue to build the evidence base on the interactions between our fuel poverty and climate commitments, and apply that knowledge to our policy design and to our programmes, mitigating any risk of unintended consequences, and tracking progress and learning by doing in order to adjust immediately where unintended consequences nevertheless arise. As we further develop each of the actions set out in this Strategy we will undertake an assessment of the impact they will have on fuel poverty and will only take forward actions where they are found to have no detrimental impact on fuel poverty, unless additional mitigating measures can also be put in place.

In order to support people as we accelerate the transformation of our building stock, we will expand our support offer on energy efficiency and zero emissions heating, including continuing to offer interest-free loans with cashback, and growing our advice services and support to access funding and finance.

We will implement a public engagement strategy and action plan for heat decarbonisation to enable people to actively participate in shaping the decisions that affect them, and will use Local Heat & Energy Efficiency Strategies to help ensure locally-tailored solutions.

Place

Local Heat & Energy Efficiency Strategies (LHEES) will provide a long-term framework for taking an area-based approach to planning and delivery of the heat transition, including through zoning linked to regulation. LHEES will also form a basis for local public engagement and will be in place for all local authority areas by the end of 2023.

We will ensure the planning system enables and encourages the deployment of low and zero emissions heating, including the networks they require. We will make it a requirement for Local Development Plans to take into account LHEES and identify new and existing heat networks and associated ancillary infrastructure.

A Long-Term Investment Framework

Over the course of the next Parliament, the Scottish Government will invest almost £1.6 billion of capital funding in heat and energy efficiency. We want to see the right level of investment in our energy infrastructure over the coming decade, to enable delivery of the heat transition and ensure communities can access affordable zero emissions heat. We will build the evidence base on how and where investment is needed, and work to understand the options for

how this will be funded and financed, with the aim of attracting private investment in appropriate circumstances and enabling domestic and non-domestic property owners to invest in the heating systems and energy efficiency of their homes and business premises.

Private investment must also drive progress alongside public funding. We will establish a new Green Heat Finance Task Force and will work in partnership with the private sector to leverage the scale of investment needed and to develop innovative approaches to financing heat decarbonisation and energy efficiency.

Our delivery programmes will provide the initial stimulus for the mass move from fossil fuel reliant systems to low and zero emissions heating for over two million homes and 100,000 non-domestic properties by 2045, and will support significant energy efficiency improvement across all buildings.

A Regulatory Framework for Zero Emissions Buildings

We are working with industry, energy network companies and the regulators to put the right enablers in place for the heat transition in Scotland. This includes a new Heat Electrification Partnership with the electricity network operators and work with the gas networks on greening Scotland's gas grid. We will also build the evidence base on where hydrogen is most likely to play a role for heating.

The 2018 Energy Efficient Scotland Route Map set out our intention to use regulation to support the transformation of our buildings. Requirements on building owners to upgrade energy efficiency and install zero emissions heating systems will be an essential underpinning for driving deployment.

By 2025, we will therefore develop a new regulatory framework for zero emissions heating and energy efficiency. The framework will build on our existing commitments to extend regulation for minimum energy efficiency standards to include requirements, where possible within our legal competence, to install and use zero emissions heating systems. This will ensure that all buildings are energy efficient by 2035 and use zero emissions heating and cooling systems by 2045. Multi-tenure or mixed-use buildings will be given until 2040-45 to improve both their energy efficiency and install a zero emissions heat supply, given the complexity involved in coordinating works and recovering costs between multiple owners, likely necessitating a 'whole building intervention' simultaneously covering energy efficiency and heat supply improvements. Some buildings or areas may be required to comply with standards earlier.

This approach will complement the requirements we will put in place for new buildings to have zero emissions heating systems from 2024. For non-domestic buildings we will consult on a phased approach to requiring energy efficiency levels and zero emissions heat supply across new and existing buildings. Mixed-use and multi-tenure buildings like tenements have their own challenges and we will develop a separate regulatory approach to ensure they are energy efficient and use zero emissions heat.

Heat networks will play an important role in the heat transition. The Heat Networks (Scotland) Bill will build confidence among consumers and attract investment for development. A new regulatory regime for heat networks will be operational by the end of 2023. In order to support the delivery of Scotland's climate change targets, new heat networks will need to be powered using renewables or other low or zero emissions sources of heat. From 2023 we will only consent renewable and low or zero emissions heat networks.

Economic Opportunity

Seizing the significant economic opportunity from the heat transition in Scotland and beyond will involve a significant ramp up of the capability and capacity of supply chains in Scotland. The scale of transformation means there will be opportunities for existing market participants across the energy efficiency and heating sectors, as well as new entrants to these markets. We will use our investment in, and regulation of, heat networks to stimulate the development of new heat networks and the extension of existing networks. We will see increased rates of installation of energy efficiency measures, potentially supporting 1,200 jobs for every £100 million invested. Our targeted support for innovation will support companies with a high growth potential, boosting the economy and creating jobs. Overall, we estimate that as many as 24,000 jobs could be supported each year in Scotland by the roll out of low and zero emissions heat.

We will work with industry to review our existing supply chain support and address any gaps identified. We will act on the recommendations of the Heat Pump Sector Deal advisory group and we will develop a new supply chain programme. We will promote PAS 2035/30 and MCS standards to ensure that installations are good quality and fit for purpose, and propose to integrate our Scottish installer skills matrix with these installer standards. We will work with skills delivery partners to ensure that there are sufficient training opportunities and to ensure that there are career pathways for those who wish to enter the sector.

Working with the UK Government

A broad suite of energy market reforms is needed, including changes to the ways in which policy levies are applied to energy supply and new safeguards to share the cost of the transition fairly across consumers. These measures span reserved and devolved areas, and we will work with the UK Government to secure the outcomes that are necessary for Scotland's heat transition. We will also work with the UK Government to ensure we have all the powers we need to take action and to secure UK action that supports the pace of change needed and protects consumers in Scotland.

Chapter 1 Introduction

This draft Strategy outlines the steps we will take to reduce greenhouse gas emissions from Scotland's homes, workplaces and community buildings and to ensure that we remove poor energy performance as a driver of fuel poverty. The focus of this draft Strategy is on energy demand for space and water heating in homes, workplaces and community buildings. The draft Strategy does not cover heat used in industrial processes. Our support and approach to industrial decarbonisation is summarised in the recent Climate Change Plan Update.

Building on the policies and actions set out in the [2020 Climate Change Plan Update](#), this Strategy sets out a pathway to zero emissions buildings by 2045 and details a series of near-term actions to put us on a clear path towards this, as well as a range of further, longer-term commitments to accelerate and further scale the transformation of the nation's building stock.

Our Vision:

**“By 2045 Our Homes and Buildings are Warmer,
Greener and More Efficient”**

This Strategy provides an update to the [2018 Energy Efficient Scotland Route Map](#) and the [2015 Heat Policy Statement](#), and brings together our ambitions on energy efficiency and heat decarbonisation into a single framework. It establishes a set of principles that will underpin our policies and actions on energy efficiency and heat. It sets out strengthened action to deliver on our National Infrastructure Priority for Energy Efficiency. It considers whole-system energy issues and how these are to be managed over the course of the transition. The draft Strategy outlines the scale of the economic opportunity presented and identifies the measures necessary to realise this and to ensure a just transition, one in which the benefits of the transition are shared and no one is left behind. Securing a just transition is crucial so that we take the people of Scotland with us, and continue to protect the most vulnerable during this transition.

The Climate Change (Emissions Reduction Targets) (Scotland) Act 2019 set legally binding targets for us to achieve net zero greenhouse gas emissions by 2045, with interim targets requiring a 75% reduction by 2030, and 90% by 2040.

Our statutory fuel poverty targets are similarly ambitious requiring that in 2040 no more than 5% of households are fuel poor, no more than 1% are in extreme fuel poverty and the fuel poverty gap is no more than £250 (in 2015 prices)¹. It is therefore imperative that, as we take action to cut emissions from Scotland's homes, we do so in a way that supports and enables the eradication of fuel poverty. Later this year we will build on the actions already set out in our draft Fuel Poverty Strategy with the publication of a final Fuel Poverty Strategy setting out how we will eradicate fuel poverty, including action across all four drivers – income (earnings and benefits), energy costs, poor energy efficiency, and how energy is used in the home.

For the majority of us, fossil fuels that contribute to climate change, such as mains gas and heating oil are the main source of heating. Today 45% of Scotland's homes have a good level of energy performance, equivalent to EPC Energy Efficiency Rating Cⁱ. It is estimated almost three in four of all non-domestic properties have a current EPC of E or worse with only 5% EPC B or better.ⁱⁱ To meet our net zero targets we must reduce and ultimately remove emissions from heating our buildings and upgrade our homes and workplaces to make them more energy efficient, comfortable and affordable to heat.

Achieving our goals will require major changes in our physical infrastructure, including energy networks and generation. Over the course of the next Parliament, the Scottish Government will invest almost £1.6 billion of capital funding in heat and energy efficiency to underpin and help secure the accelerated rollout of both energy efficiency and zero emissions heat measures. A substantial proportion of this investment will be targeted at supporting those least able to pay for the transition, including those in fuel poverty.

Additional private investment will be required to secure delivery over the longer term and will require innovative approaches to securing the necessary investment, which cannot be met by public funding alone. This draft Strategy considers the funding and finance routes already available and where further work is needed – with a new Green Heat Finance Taskforce to support this. In

¹ A household is defined as being in fuel poverty if, in order to maintain a satisfactory heating regime, total fuel costs necessary for the home are more than 10% of the household's adjusted net income (i.e. after housing costs), and if after deducting those fuel costs, benefits received for a care need or disability and childcare costs, the household's remaining adjusted net income is insufficient to maintain an acceptable standard of living. The remaining adjusted net income must be at least 90% of the UK Minimum Income Standard to be considered an acceptable standard of living with an additional amount added for households in remote rural, remote small town and island areas. If more than 20% of net income is needed, the household is defined as being in extreme fuel poverty.

preparing this draft Strategy and our Route Map for delivery, we have drawn on the work of the Infrastructure Commission for Scotland which recognised the importance of a system-wide approach to identifying the phasing of infrastructure investments, and incentive support mechanisms, to accelerate the pace and scale of decarbonisation.

Transforming Scotland's building stock will create numerous opportunities for investment, regeneration as well as the realisation of wider social, environmental and health outcomes. As we accelerate our efforts to make our homes and non-domestic properties warmer, greener and more energy efficient we must lock-in and secure a **wider set of outcomes** that will benefit Scotland's people and places. These 'heat in buildings' outcomes (see following page), aligned with our **National Performance Framework**, will guide our decision making and support the development of a holistic, people centred approach to the transition ahead.

This Strategy will guide our decision-making and support the scaling up and acceleration of action to retrofit our homes and non-domestic properties over the course of this decade. Delivery of the Strategy will require collaboration with a wide range of stakeholders, from SMEs and community groups to local authorities and network companies.

It focuses on the near-term actions over the first half of this decade that will set us on a path consistent with our statutory climate change and fuel poverty targets. To prepare for further accelerated action beyond 2025 and to ensure decisions are fully evidenced, we will continue to build the evidence base to reduce uncertainties on the right pathway to a net zero future for Scotland's buildings.

This draft Strategy is aligned with wider policy development within the Scottish Government in Housing, Energy, and Climate Change. The actions it sets out will be reflected in our Housing to 2040 Strategy, which will also present further details on how our housing can support achievement of our net zero ambitions, whilst also delivering against wider objectives. Transforming our homes and buildings will also have an impact on our wider energy systems and this will be happening at the same time as action in other sectors to reduce emissions. We will update the Scottish Energy Strategy this year, taking into account the whole system issues raised by this draft Heat in Buildings Strategy and our wider net zero climate targets.

OUTCOMES

National Performance Framework

Economy

We have a globally competitive, entrepreneurial, inclusive and sustainable economy

Environment

We value, enjoy, protect and enhance our environment

Poverty

We tackle poverty by sharing opportunities, wealth and power more equally

Health

We are healthy and active

Fair work and business

We have thriving and innovative businesses, with quality jobs and fair work for everyone

Communities

We live in communities that are inclusive, empowered, resilient and safe

Heat in Buildings Strategy

The cost of heating our homes and businesses is affordable and those occupying them have a high comfort level.

We have reduced our demand for heat and poor energy efficiency is no longer a driver of fuel poverty.

The systems we use are smart and resilient and provide us with a reliable source of heat.

We have a secure supply chain with high value, local, sustainable jobs across Scotland and people have been helped to transition to new, secure jobs as part of a just transition.

Our indoor and outdoor spaces are filled with cleaner air.

Our heating systems enable and efficiently use Scotland's renewable energy resources

Electricity and non-electrical fuels are produced from sustainable sources in a way which is consistent with net zero emissions and biodiversity targets

Our heating systems enable the flexible and stable operation of our energy networks

This Strategy is a draft for consultation. You will find consultation questions at key points throughout this document requesting feedback on different elements of the draft Strategy, and summarised in Annex B. We invite you to respond to these questions by 30th April 2021. Information on how to respond to this consultation is provided in Annex F. We will use the consultation responses we receive to further develop the Strategy before a final version is published later in 2021.

The Strategy is structured as follows and poses questions focused on:

- **A 2045 Pathway for Scotland's Homes and Buildings** – the trajectory we must take to meet our net zero ambitions, including consultation on a new low and zero greenhouse gas emissions heat target
- **People** – taking the people of Scotland with us, and ensuring that we address fuel poverty and that the most vulnerable in society are protected as heating systems are replaced
- **Place** – ensuring our actions are tailored to Scotland's communities, resources, built environment and designated places
- **Preparing our Energy Networks** – ensuring our energy networks are robust and fit for the future
- **Kick-starting Investment in the Transition** – how we will invest to stimulate the transition
- **Working Towards a Long-Term Market Framework** – taking action to ensure that the heat transition can be enabled by a stable, long term market framework
- **Developing a Regulatory Framework for Zero Emissions Buildings** – to underpin our delivery and provide certainty
- **The Economic Opportunity** – growing our supply chain to meet the rising demand, and ensuring that Scotland maximises the economic benefits of the transition
- **Working with the UK Government** – agreeing the steps the UK Government must take to ensure and enable delivery
- **Monitoring, Evaluation and Future Decision Making** – monitoring our progress

We recognise that the costs and opportunities of this will fall differently on different groups of people. Therefore, a **Business and Regulatory Impact Assessment (BRIA)** is being undertaken to support the development of this Strategy. This will support the identification of action which minimises and balances cost and burdens across consumers, businesses and the third sector. A draft BRIA will be published during the consultation phase of this draft Strategy and finalised alongside the final version of the Strategy.

As we deliver the policies set out in the draft Strategy, we will give due regard to equalities, and shall not unfairly discriminate based on any protected characteristics, or particular challenges faced as a result of geography or connectivity (such as on islands), and we will encourage improved access to decarbonisation. An **Equality Impact Assessment**, **Islands Impact Assessment**, and **Fairer Scotland Impact Assessment** are being undertaken in conjunction with this draft Strategy and the requirement for a **Child Rights and Wellbeing Impact Assessment** will also be determined through our stakeholder engagement on this draft Strategy.

These assessments form a critical part of our ability to predict and therefore mitigate negative impacts on different groups in society. Combined with our commitment to enhance our evidence-base on the interactions between fuel poverty and heat decarbonisation, these impact assessments will provide a strong foundation on which to build our policies, future regulation and programmes. Completed Impact Assessments will be published alongside the final version of this Strategy.

A **Strategic Environmental Assessment** has also been undertaken to identify where the policies and proposals set out in this draft Strategy may have significant – positive or negative - environmental effects. The **Environmental Report** will be published during the consultation phase of the draft Strategy and seeks views on the possible significant environmental effects, as well as on the actions identified to mitigate any adverse effects or to enhance and maximise positive impacts. Consultation questions have been included within the Environmental Report to help shape respondents' views on the Strategic Environmental Assessment.

We are undertaking an **Islands Impact Assessment** as part of the finalisation of this Strategy. We know that our island communities face unique challenges, including energy and supply chain constraints and costs. In addition, a number of our island communities are not connected to mainland energy grids and face unique challenges in their efforts to reduce emissions. We will also publish an Islands Energy Strategy in 2021 with a focus on resilience and sustainability of island energy systems for the future, and on supporting islands' transition to net zero emissions. As we develop and deliver this Strategy, we will ensure that we appropriately consider the challenges facing our island communities and how they can be reflected in the delivery programmes we take forward to support the heat transition.

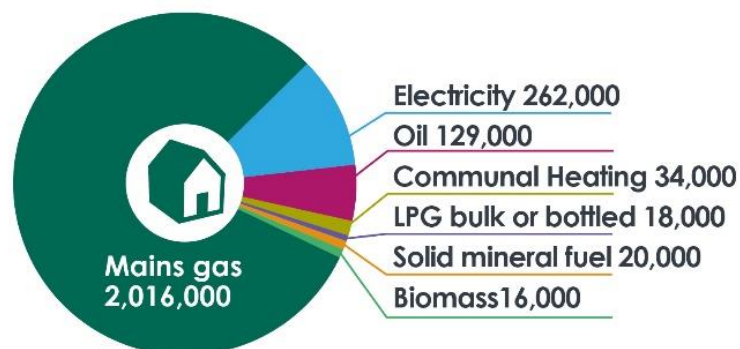
Chapter 2 A 2045 Pathway for Scotland's Homes and Buildings



To meet our 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 Updateⁱⁱⁱ, emissions for homes and non-domestic buildings combined will have to fall by 68% by 2030 as compared to 2020.

Today there are around **2.5 million** occupied dwellings in Scotland and we expect the vast majority of them still to be occupied in 2045^{iv}. They account for **15%** of Scotland's total greenhouse gas emissions^v.

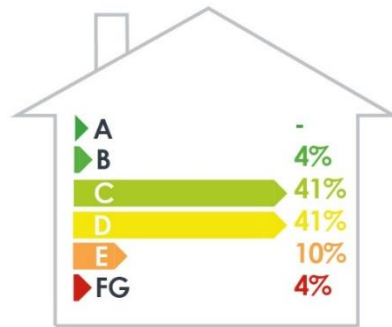
The vast majority of our homes use mains gas as their **primary heating fuel** (approx. 2 million). Over 450,000 homes do not use gas as their primary heating fuel. Just over half of homes not using mains gas use electric heating, such as traditional storage heaters, with around 170,000 using high emission fuels such as heating oil, LPG or high carbon solid mineral fuels such as coal^{vi}.



Breakdown of primary heating fuel vs number of homes (source Scottish House Condition Survey^{vii}, 2019)

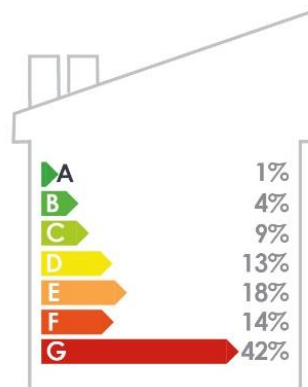
Only around 11% (approx. 278,000) of households have a **renewable or very low emissions heating system**, such as a heat pump, biomass boiler or electric storage heating^{viii}. This does not include those currently connected to a heat network, as these are predominately fuelled by gas. An estimated 34,000 homes are connected to **heat networks**^{ix}.

The **energy efficiency of Scotland's homes** is improving. Since 2010, the share of the most energy efficient dwellings (rated EPC C or better) has increased by 27 percentage points^x. In 2019, 45% of Scotland's homes were rated EPC C or better, with social housing generally more energy efficient (56% EPC C or better) than the private sector (41%)^{xi}.



Energy efficiency of Scotland's homes by EPC rating (source ^{xii} Scottish House Condition Survey, 2019)

There are approximately 220,000 **non-domestic buildings** in Scotland^{xiii}, including around 23,000 buildings in public ownership^{xiv}. They account for 6% of Scotland's total greenhouse gas emissions^{xv}. Our non-domestic properties are hugely diverse and analysis of **energy efficiency levels** shows that almost three in four of all non-domestic premises have a current EPC of E or worse with only 5 percent EPC B or better^{xvi}.



Energy efficiency of Scotland's non domestic properties by EPC rating (source^{xvii} Scotland's Non Domestic Energy Efficiency Baseline, 2018)

We know that over half of our non-domestic properties are already heated using **low or zero emissions sources**, but also that they vary significantly in floor area and energy use and some of the largest non-domestic buildings are more likely to have gas heating systems^{xviii}. For non-domestic buildings not using gas heating, electric heating, Heating Ventilation and Air Conditioning (HVAC) systems are a common alternative, as are oil systems.

The Journey to Net Zero

Scale of the Challenge

By 2045, emissions of greenhouse gases from heating our homes and buildings will have all but disappeared, with demand for energy reduced and space and water heating provided by zero emissions alternatives.

It is essential that homes and buildings achieve a good standard of energy efficiency, and that poor energy efficiency is removed as a driver of fuel poverty. We want our homes to be as energy efficient as possible, meeting a minimum standard equivalent to EPC C at least, where technically feasible and cost-effective, by 2035.

There will be some circumstances where this is not possible. In such cases, we would expect these properties to achieve the highest standard possible, installing those measures recommended by the EPC assessment as being technically feasible and cost-effective for that building.

Energy Performance Rating – Aligning with Net Zero

To ensure that the energy performance rating included on Energy Performance Certificates (EPCs) aligns with our net zero objectives we will reform the EPC assessment process before using it as the standard by which properties will be measured. Through this reform we are proposing to revise the metrics which underpin the EPC, so that they provide information to building owners on measures needed to improve energy efficiency, an appropriate zero emissions heating supply, and the cost of heating following these improvements. We also want these reforms to remove anomalies within the current metrics (as advised by the CCC^{xix}), which at present in some circumstances can disincentivise installation of zero emissions heating systems (see Chapter 8 on Regulation for more details of our revised approach).

Improving the energy performance of buildings is essential to unlock the rollout of zero emissions heating. Energy efficiency measures alone will not reduce emissions enough to meet our emission reduction targets, but they

are a critical precursor to deployment of many zero emissions systems and are vital to supporting households and businesses to reduce their energy costs today. Energy efficiency remains at the core of our heat in buildings policies and programmes, and a fabric first approach continues to be the mainstay all our fuel poverty interventions.

In order to meet our interim climate targets and ensure long-term delivery of our net zero objectives, **by 2030 around 50% of homes, or over a million households**, will need to convert to a zero or low emissions heating system. Reducing emissions from homes will mean converting the vast majority of the **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. **By 2030, we will also need to convert an estimated 50,000 of Scotland's non-domestic properties to zero emissions sources of heat².**

To meet the ambition for energy efficiency and zero emissions heat deployment set out above, we need to quickly ramp up the number of installations of low and zero emissions heating systems being installed per annum. Currently around 3,000 renewable heating systems^{xx} are installed in Scotland's homes per year. As set out in the Programme for Government, our ambition is - as a minimum - to see the rate of low and zero emissions heat installations in new and existing homes and buildings double every year from the current baseline to at least 64,000 homes fitted in 2025, with the installation rate expected to peak at over 200,000 new systems per annum in the late-2020s.

While new buildings represent only a small part of the decarbonisation challenge, we cannot add any new emissions because of the rapid decarbonisation efforts needed to reach net zero. We will require new buildings, starting with new homes consented from 2024, to use zero direct emissions heating, and also feature high levels of fabric energy efficiency to reduce overall heat demand so that they do not need to be retrofitted in the future.

² In practice, this number will depend on the sequencing of non-domestic conversion due to the significant variation in size and energy consumption of our non-domestic buildings.

Low and Zero Emissions Heating Systems

In this draft Strategy by low and zero emissions heating systems we currently mean systems that have zero direct greenhouse gas emissions such as individual electric heat pumps and connection to heat networks, or electric systems such as storage heaters, and systems that have very low emissions such as those that use hydrogen³.

Buildings connected to existing heat networks, powered using natural gas, will be considered to be future proofed and net zero ready. However, these heat networks will need to decarbonise by 2040-45 and new heat networks consented from 2023 will need to use heat from low or zero emissions sources, such as surplus or waste heat, or be powered using low carbon or green hydrogen, including via the latest "fifth generation" heat networks. Bioenergy, for example in the form of biomass, bio-heating oil, bio-propane, where they come from net zero compatible and sustainable sources, are included as low emissions systems, but likely to have a more limited role. This list of low and zero emissions heating systems will be kept under review.

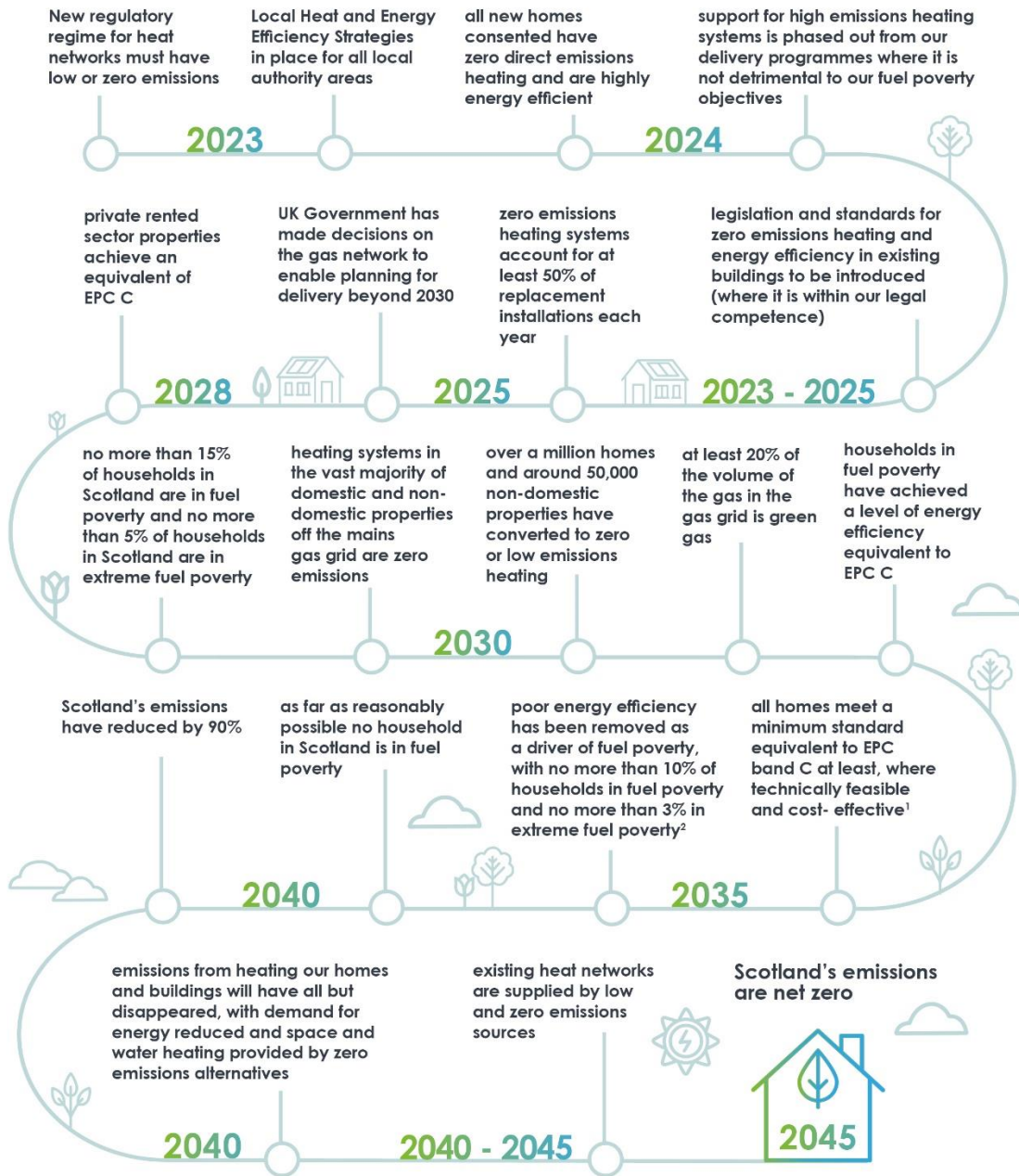
We will also need to see increased use of biomethane, low carbon and green hydrogen in the mains gas network in order to reduce the emissions intensity of the gas network by 2030. **By 2030, we would like at least 20% of the volume of the gas in the gas grid to be green gas.** To ensure compatibility with our net zero targets and wider sustainability objectives, it will be important that biomethane is sourced from sustainable and net zero sources. Similarly, hydrogen will need to come from low carbon or renewable sources and be compatible with longer term plans for the gas network.

Questions

1. To what extent do you support the pathway set out for achieving the 2045 net zero target and the interim 2030 target?
2. What are your views on any risks of unintended consequences from this pathway?

³ Pending further evidence on combustion of hydrogen for heat, we assume there may be very low levels of greenhouse gases emitted at point of use.

THE JOURNEY TO NET ZERO



¹ (where for homes it will not be technically feasible or cost-effective to meet a standard equivalent to EPC band C. In such cases, we would expect these properties to achieve the highest standard possible, installing those measures recommended by the EPC assessment as being technically feasible and cost-effective for that building.

² and, in any event, no more than 5% of households in Scotland are in fuel poverty and no more than 1% of households in Scotland are in extreme fuel poverty, and the median fuel poverty gap is no more than £250 adjusted for 2015 prices.

Strategic Technologies to 2030

Recent research for the Scottish Government found that there are low and zero emissions heating options available for all domestic dwellings^{xxi} and, in order to make progress now against our net zero ambitions we must begin accelerating and scaling up the deployment of already tried and tested measures such as energy efficiency, and primary heating system technologies where they are known to be **no or low regrets**. Therefore, over the next decade we propose the **following no and low regrets strategic technologies**:

No and Low Regrets Strategic Technologies



We will continue to prioritise action on **energy efficiency**. To deliver regulations to support the installation of cost-effective 'energy efficiency first' improvements in all buildings (e.g. roof, windows, wall and floor insulation); 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 (district heating and communal heating systems) in areas deemed suitable.

These are the technological solutions where cost uncertainty is low and we already understand (a) the costs of installation and (b) running costs for consumers. A focus on no and low-regrets interventions will also help to tackle poverty by improving energy performance and bring significant wider benefits. Other technologies are likely only to become available at scale in the longer term, or will have a more limited role in decarbonising our buildings.

Subject to the safety and commercial case being established we expect to see increased blending of **hydrogen** with natural gas into the mains gas network and may also see 100% hydrogen becoming available in parts of the gas network towards the end of the decade. Blended into the gas network, hydrogen helps to reduce emissions if produced from low carbon or green sources. 100% hydrogen may be particularly appropriate in certain locations, where there is local supply (for example from abundant renewable electricity) or where industrial demand creates economies of scale. Increased availability of hydrogen for heat will have implications for the suitability of hybrid heat pump systems, which may be cost-effective solutions in conjunction with hydrogen, and we will keep this under review.

However, constraints in the near-term availability of hydrogen, coupled with a need to establish the standards and safe systems for its use, repurpose the gas network and replace household appliances, means that decarbonised gas is unlikely to play a large part in reducing emissions before 2030.

We agree with the UK Committee on Climate Change's recommendation that **bioenergy** resources should only be used where their carbon reduction impact is maximised or where alternative options are not available. Bioenergy, for example in the form of biomass, bio-heating oil, bio-propane (a replacement for LPG) might still have a small role for home heating if displacing fossil fuels in off-gas-grid areas, or where electric heating or heat pumps are unsuitable. Biomethane injection into the gas grid will also play a role. **We will publish a Bioenergy Update in the first quarter of 2021** and will establish an Expert Working Group to consider and identify the most appropriate and sustainable use of bioenergy resources within Scotland. This will inform a Bioenergy Action Plan which we will publish in 2023.

Hybrid systems combine two or more heating technologies, often a heat pump and a boiler, ideally both of which should have zero emissions in the long run. Hybrids may afford system-level flexibility advantages and lower building-level costs in certain circumstances. At present, however, uncertainties in the scale and distribution of these potential advantages, as

well as the need for further evidence on the availability and role of decarbonised fuels for heating, mean it is too early to prioritise deployment of hybrids. We will keep this position under active review as the evidence base develops.

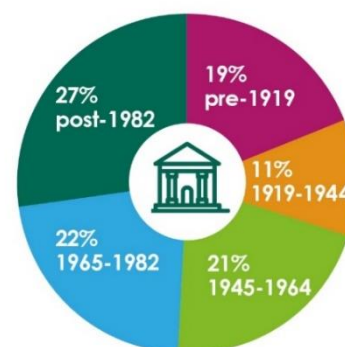
Other technologies such as deep geothermal are less well developed in Scotland but could have a role to play in particular communities and areas in Scotland. We will continue to explore the potential for such solutions. Solar thermal technologies tend to be most appropriate as a complement to a primary zero emissions heating technology such as a heat pump. Solar thermal is discussed below.

Analysis undertaken for non-domestic buildings in Scotland, to be published in Spring 2021, shows that **low and zero emissions heating technologies are applicable to a large proportion of the non-domestic building stock**, however enabling works such as upgrading distribution systems (installing larger-sized pipes and new heat emitters to accommodate lower flow temperatures) and increasing site electricity capacity may often be needed.

Overall, we recognise some properties may be more constrained in terms of technology options available, limited by location and property type, proximity to the gas network, impact on the fabric of historic buildings, space constraints, and capacity of the electricity grid.

Scotland's traditional buildings

Scotland has a high proportion of traditional buildings, with around a fifth of Scotland's homes built before 1919.^{xxii} Scotland has over 650 designated conservation areas and around 47,000 listed buildings.^{xxiii} Around 10% of the Scottish housing stock is listed or located in conservation areas^{xxiv}.



We are undertaking further research to consolidate evidence on **heat pump performance in situ** across Scotland where data exists. This will consider how performance can be maximised in the Scottish climate, identify best practice and areas where further innovation and development may be required to address constraints. This research will be published in March 2021, and will be

used to inform future policy and where relevant reflected in the design of our delivery programmes.

For **traditional and heritage buildings**, we recognise that more bespoke technological approaches, including skilled design and construction, may be required. We will work with stakeholders, including Historic Environment Scotland, to develop more solutions to transition Scotland's historic buildings to zero emissions heating while respecting and preserving the special characteristics of our buildings and places, and where needed continue to build our evidence base and the guidance available for the heat transition in these buildings and areas, including in our approach to regulation (see Chapter 8).

To ensure that we tailor forthcoming policies and support to our diverse **non-domestic building stock** we are taking action to further improve the evidence base including work to develop a database of the non-domestic buildings stock in Scotland.

We know that a minimum level of **energy efficiency** is an important prerequisite and is needed to underpin the rollout of zero emissions heating across all technology scenarios. To better understand the role of energy efficiency levels in unlocking the deployment of zero emissions heating systems in different types of building stock, we will undertake further modelling and analysis which will inform future delivery and regulatory programmes. This will be underpinned by reforms to Energy Performance Certificates, and their underpinning methodologies, taking into account our fuel poverty and climate objective, as set out in Chapter 8. We will consult on this by Summer 2021.

As outlined above there are a range of technology solutions to reducing emissions from our homes and buildings. A number of factors will affect which buildings would be most suitable for any given technology, including the building's characteristics and the local network infrastructure that it has or will have available (electricity, gas and heat) as well as the likelihood that an area may have access to low carbon or green hydrogen in the future. As such it will be important that this transition happens in a planned way, guided by Local Heat & Energy Efficiency Strategies, as set out in Chapter 4.

Cooling

Some buildings also require energy for cooling. At present, this is more relevant for non-domestic properties, such as hospitals, larger open plan offices, hotels and retail units. As our climate changes we are likely to experience increased temperatures, with warmer winters and hotter summers becoming more common. As a result, we are likely to see an increased demand for cooling in the future. We recognise that it will be important to understand the need for, and role of, zero emissions technologies that can also provide cooling, such as reversible heat pumps. By 2023, we will take forward research to look at cooling needs of our building stock to inform future policy development in this area.

Cooking

Many buildings use the same fuel for heating and cooking, particularly natural gas. When buildings switch away from using fossil fuel boilers, decisions on cooking appliances may also need to be made. **As we accelerate deployment of strategic heating technologies, we will ensure our programmes support households and non-domestic building users to also transition to new cooking appliances, where appropriate.**

Secondary technologies

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 solar thermal, micro wind and photovoltaic (PV) generation as well as a variety of storage technologies such as electric batteries, thermal water stores or, more recently developed technology such as heat batteries. Solar thermal can supplement hot water supply during summer months whilst technologies such as micro wind or solar photovoltaic panels can contribute towards electrical requirements for zero emissions heating.

We will undertake further analysis in 2021-22 to fully understand the role of secondary technologies, such as solar panels and thermal and battery storage to better understand their role in heat decarbonisation and potential to provide a cost-effective option for reducing end user bills.

Thermal storage

For many zero emission heating systems thermal storage is required to ensure efficient operation, particularly in terms of hot water supply. Heating system thermal storage typically comes in two forms, hot water storage tanks of various sizes or newer more compact heat batteries which occupy less space and may be suitable where space is limited. Thermal storage can allow for multiple heat inputs from a range of zero emissions technologies, help consumers access cheaper off-peak tariffs and maximise the impact of on-site generation.

The popularity of combi-boilers that provide instantaneous hot water has led to the removal of thermal storage in many homes and buildings. Retrofitting thermal storage is likely to be challenging as the space once occupied has now often been repurposed. More compact heat batteries have real potential to support retrofit thermal storage.

Thermal storage is also likely to have an important role in the operation of heat networks, helping to optimise operation and potentially reduce running costs.

Overall, be it thermal storage in individual properties or larger scale thermal storage connected to a heat network, thermal storage systems can enable the decoupling of heat production and heat use. They can support the flexible operation of smart energy networks and can help to maximise benefits, including helping to reduce the need for electricity network upgrades (see Chapter 5) with potential to reduce bills.

Strategic Technologies and the Scottish Building Stock Summary of Further Research

- We will undertake further analysis in 2021-22 to fully understand the role of secondary technologies, such as solar panels and thermal and battery storage to better understand their role in heat decarbonisation.
- We will publish a review of evidence on heat pumps in Scotland, in the first quarter of 2021. We are undertaking further research to consolidate evidence on heat pump performance in situ across Scotland where data exists. This research will be published in March 2021, and will be used to inform future policy and where relevant reflected in the design of our delivery programmes.
- Analysis undertaken for non-domestic buildings in Scotland, to be published in Spring 2021, shows that zero emissions heating technologies are applicable to a large proportion of the non-domestic building stock, however enabling works such as upgrading distribution systems (installing larger-sized pipes and new heat emitters to accommodate lower flow temperatures) and increasing site electricity capacity may often be needed.
- We will undertake further modelling and analysis during 2021-22 to better understand the role of energy efficiency in unlocking the deployment of zero emission heating systems, which will inform future delivery and regulatory programmes.
- We will keep the role of Hybrid system under active review as the evidence base develops.
- We will undertake research by 2023 to understand the potential cooling needs of Scotland's building stock, which will inform future policy development in this area.

Questions

3. What are your views on our assessment of strategic technologies in low and no regrets areas to 2030?
4. What are your views on any risks of unintended consequences from this pathway?

New Heat Target

To help monitor and track our progress we are proposing to set a new Heat Target in the final version of this Strategy. We have included consultation questions below to gain input as to how that target should be framed and what it should encompass to help provide the certainty needed to individuals, businesses and communities and the wider supply chain.

A new target must support delivery of the deployment pathway for reducing emissions in buildings as set out above and in the update to the Climate Change Plan. It must also drive emissions reductions commensurate with our net zero and interim climate change targets.

We are proposing that a new target should be focused on heat in buildings, and should no longer include industrial process heat. This focus will enable a new target to better measure and track low and zero emissions heat deployment and reduced demand for heat through improved energy efficiency in buildings, and recognises that industrial decarbonisation is a largely distinct process.

A new target must also be compatible with our statutory fuel poverty targets, including the interim fuel poverty targets. We are seeking views on how a heat target could be designed that does this. We want to ensure that delivery against a new target is achieved in a way that neither exacerbates existing fuel poverty rates nor pushes more people into fuel poverty.

A target could be designed as a roll-over of the existing target, which measures renewable heat. Other options include setting a target based on the proportion of heat demand delivered by **low and zero greenhouse gas emissions technologies**. This would have the benefit of including electrically powered systems and low carbon and green hydrogen, which are not zero emissions today but which will be a vital part of reducing emissions from buildings to zero by 2045. A further option would be to focus the target on deployment rates for particular technologies, or on numbers of high emissions heating systems that need to be replaced.

As set out in Chapter 5, we will also set a new ambition for heat network deployment in the final version of this Strategy, taking into account the findings of the National Comprehensive Assessment (NCA) of the potential for heat networks, which will publish later in 2021. We will keep this ambition for heat networks under review and update it once the first round of heat network zoning has taken place at the end of 2023.

Our previous heat target, set out in the Renewable Heat Target and Action Plan^{xxv}, was expressed in terms of total non-electrical heat demand met by renewable heat. Whichever new target is set in the final Strategy, we will continue to measure progress using this existing metric, for comparability.

We will continue to report on progress towards targets in an annual renewable and low GHG emissions heat target report.

Questions

5. What function should a new heat target serve?
6. How do you think a new heat target should account for the need to deliver against our statutory fuel poverty targets?
7. Do you agree that a new heat target should apply to heat in buildings, distinct from industrial heat?
8. What form should a new heat target take and why?
9. At what level should the target (s) be set and for what date?

Chapter 3 People

Transforming how we heat our homes and buildings will touch the lives of almost everyone in Scotland. It will involve changes in our homes, places of work and community buildings as we upgrade and roll out new heating technologies and energy efficiency measures.



People must be at the heart of this transition. We are committed to a just transition to net zero which means working with people, businesses and communities across Scotland to ensure they have a clear role in decision making, can access support and advice, and to help ensure that the burden of paying for the transition is spread fairly. We will also put in place the necessary protections, within our powers, to protect our most vulnerable citizens and to ensure that there are clear routes for redress when things go wrong.

Just Transition

The transition to net zero emissions will transform our society and economy, therefore the manner of our transition will be crucial. If we plan and prepare, building consensus about our collective future through dialogue and engagement, then we can ensure Scotland benefits from the opportunities of net zero. The transition can realise green jobs, a better environment and a healthy economy that supports our wellbeing. Failure to plan risks abrupt shifts, the loss of key industries and jobs, and deepening inequalities. This is why Scotland has committed to a just transition to net zero.

A just transition puts people, communities and places at the heart of our approach to climate change action. It ensures we work together in order to capture opportunities, tackle existing inequalities and exclusion, whilst anticipating and mitigating risks to those worst impacted so no one is left behind. As the pace of the transformation increases, the need for a collaborative just transition becomes ever more important. This approach is at the heart of Scotland's ambitions to move to a wellbeing economy that prioritises society's wellbeing as the core aim of our economy.

Taking people with us

The impact that heating our homes and workplaces has on our climate is not well recognised, and in the past people have been encouraged to install modern, efficient gas systems as a way to reduce emissions. Recent research suggests that only 49% of people identified gas central heating as contributing to harmful climate change emissions, and fewer than 20% of people said they would consider switching to a zero emissions heating system, with fewer than 2% having done so already.^{xxvi}

The transition will affect us all. So, it will be important that we are all involved in the decisions about how our homes and buildings are to be transformed and how the transition is managed. This will need to be underpinned by increasing awareness of energy efficiency and zero emissions heating systems, open and transparent decision making and an inclusive, people centred approach.

Building on the objectives and guiding principles of our draft Public Engagement Strategy for Climate Change^{xxvii}, we will take this a step further to develop and begin implementing a bespoke public engagement strategy for heat in buildings, with a 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 actively participate in shaping the development of Scottish Government policy and incentives as well as local level heat and energy efficiency planning; and
- promoting the support that is on offer from both the Scottish and UK governments to maximise take up over the 5 years of this strategy.

We will take steps to ensure that everyone, including owner occupiers, tenants, private and social landlords, SMEs and communities, has the opportunity to help shape the decisions we take at a national and local level on how we heat our homes and buildings in the future. We will consult extensively with stakeholders and citizens as we develop the regulations and delivery programmes proposed in this draft strategy.

We will learn from the practices used as part of Scotland's Climate Assembly^{xxviii}, a citizens' assembly that is considering what measures are needed to achieve our emissions reduction targets. We will respond to the Climate Assembly's recommendations and take action on them as we further develop this draft strategy.

To support public engagement, we will simplify our branding to make our schemes easier to identify and navigate, helping to build trust and awareness. To ensure that we take an inclusive approach, we will identify and support disengaged and vulnerable groups, ensuring that support is available to all of society and we will give due regard to equalities, and shall not unfairly discriminate based on any protected characteristics.

Summary of action we will take:

1. Building on the Climate Change Public Engagement Strategy, we will develop and begin implementing a bespoke public engagement strategy for heat in buildings in 2021.
2. We will respond to the Climate Assembly's recommendations and take action on them as we further develop this draft strategy.
3. By 2023, we will have simplified our branding to make our schemes easier to identify and navigate, helping to build trust and awareness.
4. We will identify and support disengaged and vulnerable groups, ensuring that the heat transition is accessible to all of society, and we will give due regard to equalities, and shall not unfairly discriminate based on any protected characteristics.

Questions

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?
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?
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 characteristics (age, disability, sex, gender reassignment, pregnancy and maternity, race, sexual orientation, religion or belief).
12. In your opinion could any of the proposals set out in this strategy have an adverse impact on children's rights and wellbeing?

Helping people make informed choices

Ultimately the success of the transition depends upon a variety of interventions individuals make in their homes and that organisations make in properties that they own or lease. We want individuals and organisations to see energy efficiency and low and zero emissions heating as a positive choice, know what the options are, and know where they can get help and trusted advice.

We will retain the support and advice services currently operating as Home Energy Scotland and Energy Efficiency Business Support at the core of our delivery schemes. Together they provide free and impartial advice on energy efficiency, energy saving and zero emissions heating to households, businesses and other organisations across Scotland. The public sector can access similar support via the Public Sector Project Support Unit. Third sector and community organisations can access support via the Community and Renewable Energy Scheme (CARES).

As we accelerate the transformation of Scotland's homes and workplaces, we will invest in growing our advice services and adapt and improve them so that they continue to meet the needs of the Scottish public. As an initial step we will improve our digital presence and the advice and support that can be accessed online. We will also extend the support on offer via Home Energy

Scotland and Energy Efficiency Business Support to provide more in-depth and targeted support for households and SME businesses installing zero emissions heating systems. Our delivery programmes are discussed in more detail in Chapter 6.

We will learn lessons from and build upon successful marketing campaigns such as Greener Scotland and existing programmes, such as Home Energy Scotland and Energy Efficiency Business Support. We will also relaunch and expand our Green Homes Network so that people can learn from households, businesses and organisations who have already taken action to make their property warmer, greener and more efficient.

Summary of action we will take:

5. We will invest in growing our advice services so that they continue to meet the needs of the Scottish public. This includes improving our digital presence and extending the support on offer to provide more in-depth support for installing zero emissions heating systems.
6. We will expand our Green Homes Network so that people can learn from other householders, businesses and organisations who have already made the transition to warmer, greener and more efficient buildings.

Questions

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

Consumer Protection

Consumer organisations have highlighted consumer protection and mis-selling in the zero emissions and energy efficiency sector as an area of current and growing concern as the rate of installations increases, and have highlighted the opportunity to improve reporting and redress systems for consumers. In the worst cases consumers have been victims of scammers who actively set out to deceive them, incurred significant costs and ended up with measures that are of poor quality or dangerous.

Consumer protection is reserved to the UK Government, with only powers over consumer advocacy and advice devolved to Scottish Ministers. We are therefore currently unable to create a statutory consumer protection framework for heat and energy efficiency.

However, positive steps have been taken by Home Energy Scotland, Trading Standards Scotland and others to raise awareness of scams, and support consumers to find reputable installers, but there is an ongoing requirement to monitor and address the identified issues to mitigate the risk of harm to households.

In Chapter 9 we propose adopting the latest retrofit standards to ensure consumers receive high quality work carried out by skilled operatives. We are also considering the use of the UK Government endorsed TrustMark quality assurance framework which includes a Consumer Code and Consumer Charter.

More generally, we will publish our Scams Prevention Strategy in the coming weeks, which will set out actions we will take with partners to improve public awareness, data sharing and enforcement to help protect consumers in Scotland against scammers.

As we design new heat and energy efficiency policies, regulations and delivery schemes, we will aim to create the necessary environment to allow exemplary practice to become the norm and to ensure that confidence in energy efficiency and zero emissions heat measures is not undermined by poor or illegal practice. We will work closely with consumer groups to continuously monitor and identify potential issues and take mitigating action where they arise.

The independent Energy Consumers Commission, which will be incorporated into Consumer Scotland once established, will have an important role

monitoring the consumer impacts of the rollout of energy efficiency and zero emissions heating and representing energy consumer interests. We will work with the Energy Consumers Commission and Consumer Scotland and a range of Scottish consumer representative organisations to ensure that issues of consumer detriment are identified and addressed, focussing on consumer understanding, accessibility, costs, redress, and support for vulnerable consumers. Specifically, we will work with energy companies, the Energy Consumers Commission and others to explore how best to engage energy consumers to help them understand their energy needs and the longer-term benefits of different heating types.

The Heat Networks (Scotland) Bill will regulate the heat networks market for the first time. This will include the introduction of a licensing system which will place conditions on operators to provide this essential service in line with the interests of network users. The UK Government has also confirmed that it intends to legislate in 2021 to introduce minimum consumer standards across the heat networks market, including in Scotland. We support the UK Government's intention to legislate in this area and introduction of Ofgem as a regulator of the sector. To enable alignment of regulatory regimes we have written to the UK Government to request that its legislation provides powers for Scottish Ministers to amend the functions of Ofgem so that it may act as the licensing authority for Scotland under the provisions of the Bill. This would only be used should that be the consensus view following consultation.

Summary of action we will take:

7. We will work closely with consumer groups to continuously monitor and identify potential issues and take mitigating action where they arise.
8. We will work with the Energy Consumers Commission and Consumer Scotland and a range of Scottish consumer representative organisations to ensure that issues of consumer detriment are identified and addressed, focussing on consumer understanding, accessibility, costs, redress, and support for vulnerable consumers.

Questions:

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

Addressing Fuel Poverty

Today in Scotland, a quarter of households are in fuel poverty⁴ with around half of these living in extreme fuel poverty. The median fuel poverty gap⁵ in 2019 was £700 in 2015 prices. The Fuel Poverty (Targets, Definition and Strategy) (Scotland) Act 2019 requires that by 2040, as far as reasonably possible no household in Scotland is in fuel poverty and no more than 5% of households in Scotland are in fuel poverty and no more than 1% of households in Scotland are in extreme fuel poverty, and the median fuel poverty gap is no more than £250 adjusted for 2015 prices (see figure overleaf). Therefore, as we scale up deployment of energy efficiency measures and zero emissions heating systems, we must also redouble our efforts to tackle fuel poverty so that we achieve our fuel poverty targets.

We know that the prevalence of fuel poverty is higher in remote rural (43%) and remote small towns (34%)^{xxix}. One important reason for this is that not all of these households have access to the gas network, since the fuel poverty rate for homes with electricity as their primary heating fuel is 43% compared to 22% for gas^{xxx}. The majority of households using electricity in Scotland, whether in urban or rural settings, currently rely on traditional emitters such as storage heaters.^{xxxi}

⁴ The fuel poverty rate is 24.6% (613,000 households), while the extreme fuel poverty rate is 12.4% (311,000 households). Scottish Government, Scottish House Condition Survey, 2019, Table 30, URL: <https://www.gov.scot/collections/scottish-house-condition-survey/> (last accessed: 20/01/2021).

⁵ The annual amount that would be required to move the household out of fuel poverty, adjusted to 2015 prices.

FUEL POVERTY TARGETS

IN THE YEAR **2040**, AS FAR AS REASONABLY POSSIBLE
NO HOUSEHOLD IN SCOTLAND IS IN FUEL POVERTY

No more than **15%** of households in Scotland are in fuel poverty

The median fuel poverty gap is no more than **£350**.

No more than **5%** of households in Scotland are in extreme fuel poverty

2030

No more than **10%** of households in Scotland are in fuel poverty

The median fuel poverty gap is no more than **£300**.

No more than **3%** of households in Scotland are in extreme fuel poverty

2035

No more than **5%** of households in Scotland are in fuel poverty

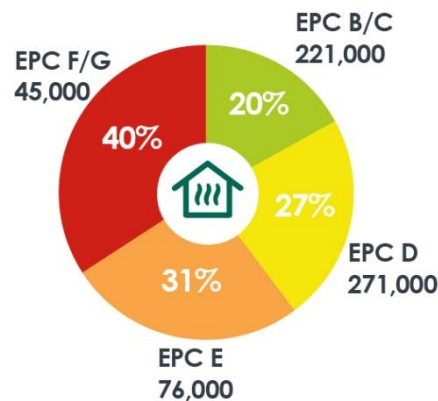
The median fuel poverty gap is no more than **£250**.

No more than **1%** of households in Scotland are in extreme fuel poverty

2040



Homes with higher levels of energy efficiency tend to have lower rates of fuel poverty (See figure below)^{xxxii}, although a high level of energy efficiency does not guarantee that a household will be removed from fuel poverty, due to other drivers of fuel poverty such as low income and high fuel prices. Even where a household remains in fuel poverty after extensive retrofit, the enhanced energy efficiency can reduce the depth of their fuel poverty and provide them with improved levels of comfort.



Fuel poverty rate in Scotland's homes in all tenures, broken down by EPC band of dwelling (Source^{xxxiii}, Scottish Government House Condition Survey, 2019)

As set out in the 2018 Energy Efficient Scotland Route Map we believe that homes with households in fuel poverty should reach higher levels of energy efficiency. We want to see homes with fuel poor households improved so they reach an energy efficiency rating equivalent to EPC C by 2030 and equivalent to EPC B by 2040.

These targets for fuel poor homes will guide our national and area-based delivery programmes. This will mean maximising the level of improvement possible within limits affordable to the public purse.

As we transform our homes and buildings over the next two decades it will be imperative that we do so in a way that continues to help eradicate fuel poverty and protect our most vulnerable citizens. It will also be important that we protect, and wherever possible, enhance the competitiveness of Scottish businesses.

We will continue to build the evidence base on the interactions between our fuel poverty and climate commitments, and apply that knowledge to our policy design and to our programmes, mitigating any risk of unintended consequences, and tracking progress and learning by doing in order to adjust immediately where unintended consequences nevertheless arise. As we further develop each of the actions set out in this strategy we will

undertake an assessment of the impact they will have on fuel poverty. We will only take forward actions where they are found to have no detrimental impact on fuel poverty, unless additional mitigating measures can also be put in place.

In the final version of this Strategy, we will publish a set of guiding principles to underpin our commitment to no one being left behind, ensuring our approach neither increases the fuel poverty rate nor increases the depth of existing fuel poverty.

In the nearer term in order to protect those in fuel poverty, we will reshape and target our energy efficiency and heat programmes. We will continue to use our delivery programmes to target support to fuel poor households, to maximise the number of households in fuel poverty achieving a level of energy efficiency equivalent to EPC C by 2030 and EPC B by 2040.

The Competition and Markets Authority found that up to 90% of heat network customers face similar, or lower, bills than those with standard gas boilers^{xxxiv} and heat networks can cut both emissions and bills.

There are examples of projects delivered through our existing energy efficiency and heat schemes, that have provided zero emission heating systems and improved insulation that reduced both carbon emissions and fuel bills. For example, for some properties, heat pumps can help reduce bills where they are replacing older, more inefficient oil and gas heating systems. Increasingly there is also the option to deploy heat pumps alongside other measures such as solar PV or battery storage to help further reduce electricity bills.

However, when a heat pump replaces a modern, efficient gas boiler, the greater efficiency of the heat pump may be insufficient to offset the higher price of electricity and the household's running costs may therefore increase⁶.

High standards of energy efficiency can help to reduce the overall demand for energy, and alongside energy saving behaviours can help to ensure running costs remain affordable. We will continue to take an energy efficiency first approach as it enables the rollout of low and zero emissions heating, as well as being an important factor in tackling fuel poverty.

⁶ A typical modern condensing gas boiler has an efficiency of 0.9, compared to 2.4 for an air source heat pump and 3.4 for a ground source heat pump.

Case Study: Heat Pump installation in Orkney

An increasing number of heat pumps are being installed to address fuel poverty through our Warmer Homes Scotland programme. Feedback received from households suggests many are benefiting from consistently warmer homes, and in some cases cheaper bills, when switching from predominantly old electric storage heaters to air source heat pumps.

An example is Mr K from Orkney. Mr K was living with an inefficient heating system that was very expensive to run despite it not even heating the whole house. Mr K knew he could not afford to keep paying the bills every month. With help from Home Energy Scotland, Mr K accessed support for installing a heat pump.

Mr K has already noticed a difference in his bills and quality of life:

“Our bills have decreased by half since we installed the air source heat pump and this will save us around £1000 a year, maybe even more. We are also warmer and we are living in a comfortable home where you don't have to wear coats in the house to keep warm. People actually come to our house to visit us now because it's so warm and their home is cold, so they visit us to keep warm and have a cup of tea. It's a magical system, more people should know about this and the impact it could have on older people's lives.”

We remain committed to phasing out funding for fossil fuel heating systems by 2024, where it is not detrimental to our fuel poverty objectives and we will take a “low and zero emissions heating system first” approach (see Chapter 6) and take steps to increase the number of zero emissions heating systems installed through Warmer Homes Scotland and our Area Based Schemes, with delivery targeted at those households who can benefit most from installing a heat pump or connecting to a heat network.

Our advice and support programmes will continue to support energy efficiency measures, and for those households requiring additional support these services will continue to provide help on tariff switching, energy behaviours and make onward referrals to ensure that all households receive the support for which they are eligible. Being on the right energy tariff can have a significant impact on bills.

Taking a 'Low and zero emissions heating system first' approach

Households will be offered a low or zero emissions heating systems in the first instance, but we will avoid installing these systems in households where it would push them into fuel poverty or worsen the depth of fuel poverty. Where installing a zero emissions heating system would have a detrimental effect on fuel poverty we will support the household to install energy efficiency measures and in the short term (up to 2023) will support the installation of a replacement fossil fuel system under our Warmer Homes Scotland scheme. Following further research, if appropriate, we will look to maximise opportunities to install secondary technologies, enabling measures such as solar PV and thermal storage to help reduce running costs in order to further support the deployment of low and zero emissions heating systems.

Our Home Energy Scotland advice service already provides a tariff switching service, in partnership with Citrus Switch, and we will continue this service in future. We will continue to work with energy retailers to ensure that households have access to tariffs suitable for their individual circumstances. We will also encourage energy retailers to develop new tariffs tailored to zero emissions heating systems and continue to press for reforms so that customers with pre-payment meters are able to access similar tariffs to direct debit customers and can benefit from smart meters to access the low and zero carbon technologies that these can unlock.

Energy tariffs which reward flexibility are another route to helping to keep costs of heat down and are also likely to have an important role in enabling a smart and responsive energy system. Flexible tariffs can offer lower per unit prices during periods where supply outstrips demand, with higher prices in times of peak demand. Flexible energy tariffs, when combined with thermal or battery storage, microgeneration and energy efficiency, can help to reduce bills by decoupling heat use from heat production, and encourage heating use to avoid peak times. We will work with energy retailers and encourage them to introduce tariffs compatible with zero emission heating systems, which help consumers maximise the benefits.

To ensure that the most vulnerable consumers are supported during this transition we will work with network companies to ensure vulnerable households moving to heat pumps are identified in distribution network operators' vulnerable customer strategies, in order that these customers' needs can be prioritised in the event of any loss of service.

We will conduct analysis to consider the distributional impacts of decarbonising our homes and buildings and further quantify the impact of making our homes and buildings warmer, greener and more efficient on those on lower incomes and those in or at risk of fuel poverty and look at options to mitigate negative impacts which can be brought forward over the longer term.

Small-scale renewable generation and storage, including solar thermal and photovoltaic (PVs), thermal and battery storage could potentially provide a source of energy and flexibility for consumers, helping to reduce bills and tackle fuel poverty. We have supported a number of projects which have set out to demonstrate the role of domestic scale renewable generation and storage in alleviating fuel poverty. During 2021-22 we will evaluate these projects to understand further the cost-effectiveness of this system-based approach. If shown to be cost-effective and capable of delivering both fuel poverty and emissions reduction objectives we will consider, if appropriate and affordable within available budgets, adjusting our delivery programmes so that they can offer a wider set of micro-renewable and storage measures to be deployed in combination with energy efficiency and zero emissions heating measures.

Summary of action we will take:

9. We will publish guiding principles to underpin our commitment that no one is left behind in the heat transition, ensuring our approach neither increases the fuel poverty rate nor increases the depth of existing fuel poverty and ensures that those on lower incomes or in or at risk of fuel poverty are protected from any negative impacts. This will include the effective design and targeting of our fuel poverty and heat in buildings programmes.
10. We will continue to build the evidence base on the interactions between our fuel poverty and climate commitments, and apply that knowledge to our policy design and to our programmes, mitigating any risk of unintended consequences, and tracking progress and learning by doing in order to adjust immediately where unintended consequences nevertheless arise.
11. We will continue to prioritise energy efficiency measures through our delivery programmes, as this will enable the roll-out of zero emissions heating, as well as help to tackle fuel poverty.
12. We will take action through our delivery programmes to maximise the number of homes with households in fuel poverty achieving a level of energy efficiency equivalent to EPC C by 2030 and EPC B by 2040.
13. We will take a zero emissions first approach in our delivery programmes and will phase out funding for fossil fuel heating systems by 2024, where it is not detrimental to our fuel poverty objectives.
14. We will work with energy retailers to ensure households have access to the right tariffs, that tariffs tailored to zero emissions heating systems are available, and continue to press for customers with pre-payment meters to access similar tariffs to direct debit customers.
15. We will commission further analysis during 2021-22 to consider the distributional impacts of decarbonising our homes and buildings and quantify the scale of impact on those in or at risk of fuel poverty or on lower incomes and look at options available to Scottish Government to mitigate these impacts.
16. During 2021-22 we will conduct research to understand the cost effectiveness of thermal, electrical storage and rooftop solar PV to support households to reduce bills, and where this proves effective consider support for them through our existing delivery mechanisms.

Questions

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?
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?
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?

Chapter 4 Place



As we transform our homes and buildings by making them more energy efficient and installing low and zero emissions heating, we will need to consider our local surroundings and resources, whether in dense urban or suburban areas or smaller rural towns and villages or in our remote and island communities. As such, the transition to zero emissions buildings may look different in different communities and 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. Our Local Energy Policy Statement^{xxxv} sets out clear principles to guide local energy planning and community engagement.

Communities

Communities in Scotland have a strong legacy of engagement in, and ownership of, energy projects, much of which has been based on a strong desire to improve local circumstances by utilising these positive business models to support community led development projects, whilst also championing the climate change agenda.

We believe that communities, large and small, will play an important role in driving forward the transformation of the nation's building stock, not only working to solve local energy challenges but being powerful advocates for local change, motivating volunteers and local champions to take action.

Communities can play an important role in planning, identifying and delivering projects on heat and energy efficiency; demonstrating technologies and approaches to a wider audience. This may include decarbonising community assets such as halls and community centres, or community ownership or co-ownership of communal heating solutions, such as heat networks. Our new CARES programme will focus further on supporting communities to work together to address and champion heat decarbonisation on a local level. Through CARES we will work to understand further the models and solutions most appropriate for communities in Scotland.

Case Study: Community Heat – The Coalburn One Stop Shop.

The Coalburn One Stop Shop in Lanarkshire is the hub of the local community, providing a Post Office, ATM, cafe, function rooms, local food and second-hand shops. It hosts a range of activities such as councillor surgeries, committee meetings, parties, flower arranging and dance



classes. It is owned and run by the Coalburn Miners' Welfare Charitable Society and has provided a service to the Coalburn community since 1925, used by approximately 3,500 people per month. They decided to look into lower running costs to help the centre to become more self-sufficient in managing finances. With support from the Scottish Government CARES programme, they replaced an existing oil boiler and wet heating system with a new air to air heat pump, saving them £1,419 on their annual fuel bills.

Image of Coalburn One Stop Shop – Community Heat- Provided by Local Energy Scotland – Energy Savings Trust (January 2021)

Alongside our CARES support, we will also explore the opportunity to integrate heat decarbonisation in emerging community climate action initiatives such as Climate Action Towns and Community Climate Action Hubs, where there are real opportunities for citizens to shape the future development of their communities.

We will also work in collaboration with the Scottish Cities Alliance and the seven cities on the opportunities to accelerate activity at pace to ensure the Scottish cities cumulatively play their role in meeting our heat decarbonisation and energy efficiency ambitions whilst maximising the economic and well-being outcomes across cities.

Summary of action we will take:

17. We will explore the opportunity to integrate heat decarbonisation in community climate action initiatives such as Climate Action Towns and Community Climate Action Hubs.
18. We will support communities to work together to address, and champion, heat decarbonisation through the new CARES programme and work to understand further the models and solutions most appropriate for communities in Scotland.
19. We will work in collaboration with the Scottish Cities Alliance and the seven cities on the cities' ambitions for low and zero emissions heat (in particular heat networks), supporting delivery by 2030 of a pipeline of projects.

Questions:

21. What are your views on how we can support place-based deployment of zero emissions heat within our delivery programmes?
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?
23. What role do you think community anchor organisations could play in supporting the heat transition?
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?

Local Heat & Energy Efficiency Strategies

At the heart of planning a place based, locally-led and tailored approach will be Local Heat & Energy Efficiency Strategies (LHEES). Once in place these local strategies will provide a framework for taking an area-based approach to heat and energy efficiency planning and delivery.

LHEES will set out the long-term plan for decarbonising heat in buildings and improving their energy efficiency across an entire local authority area. For each local authority area, the strategies will draw on a consistent, data-driven methodology to:

- set out how each segment of the building stock needs to change to meet national objectives, including achieving zero greenhouse gas emissions in the building sector, and the removal of poor energy efficiency as a driver of fuel poverty;
- identify heat decarbonisation zones, and setting out the primary measures for reducing emissions within each zone, with a view to zones acting as a potential trigger for regulation in the future if required (see Chapter 8); and
- prioritise areas for delivery, against national and local priorities.

LHEES and their development processes will provide an important platform to consider both local community and wider national infrastructure issues. LHEES will form the basis for local public engagement and involvement in decision making at the local level, and will be developed through extensive engagement with local communities. We will set out further guidance to ensure the involvement of local communities in decision making about the heat transition in their local area as part of the development of Local Heat & Energy Efficiency Strategies

LHEES will support planning for the energy networks and over time will become an important evidence base for both the electricity Distribution Network Operators (DNOs) and Gas Distribution Network (GDN), and will support the Local Area Energy Planning approach being considered by the regulated energy networks sector. They will act as an investment prospectus at both the national and local level, guiding our delivery programmes, and signalling potential areas of investment to market actors.

We are working with Zero Waste Scotland to develop draft guidance and a methodology to underpin and support the development of LHEES. This guidance builds on and takes into account learning from the recent LHEES

pilots. Once the final phase of LHEES pilots completes early this year we will commission a full evaluation of the LHEES pilot programme to support future rollout, and test out the full LHEES methodology in partnership with Local Authorities in 2021/22, including through early work on zoning that can be scaled up in 2022/23.

Case study: Glasgow City Council

Glasgow City Council was one of the first local authorities to trial the local heat and energy efficiency strategy approach. Their early strategy was part of a series of pilots in 2018 aimed at testing different approaches. The project was a critical building block in developing our understanding of what is involved in producing a strategy. Glasgow was ambitious from the start, seeking to trial a city-wide approach, rather than target a specific geographical area. Glasgow has a history of strategic planning, through initiatives such as its Energy & Carbon Masterplan, and LHEES was seen as a natural evolution.



Having declared a climate emergency in 2019, Glasgow set its own ambitious targets to be a carbon neutral city by 2030 and to achieve net zero emissions by 2045. Glasgow's pilot LHEES was an important foundation for the city's ambition and has allowed the council to begin work on a full LHEES for the city. This will set out a long-term vision for Glasgow's built environment and how the city's homes, businesses and public buildings will be decarbonised, while addressing fuel poverty, stimulating inclusive economic growth, and building social justice. Glasgow's strategy will be coupled with a short term, agile action plan to ensure action starts now to address the significant net zero challenges facing the city.

Image of the Glasgow Science Centre provided by Glasgow City Council (January 2021)

We want Local Heat & Energy Efficiency Strategies and Delivery Plans to be in place for all local authority areas by the end of 2023. We believe that LHEES should be developed on a statutory basis and are committed to resourcing their development accordingly. We see huge potential from the consistent and comprehensive LHEES coverage across Scotland that will be delivered by putting LHEES on a statutory footing, and will continue to work with COSLA to find a way forward. A consistent approach to LHEES for all parts of Scotland will help to ensure that collectively, LHEES Strategies act as a national plan for reducing emissions from our buildings and removing poor energy efficiency as a driver of fuel poverty. The Strategies will be core to providing the evidence base, on an area-by-area, spatially-explicit basis, to underpin targeted energy efficiency and heat investment and deployment decisions at scale. Ultimately, the zones that will be established in LHEES Strategies can serve as the basis for triggering action under programmes and regulation, and we want to ensure LHEES develop into a robust foundation for decision-making.

LHEES Delivery Plans will provide a strong basis for action for local communities, government, investors, developers and wider stakeholders, pinpointing areas for targeted intervention and early, low-regrets measures.

We will consult on the draft LHEES methodology with a view to introducing legislation to establish LHEES on a statutory basis so that they are in place for all local authority areas by the end of 2023.

We will work with local authorities to ensure that the development of LHEES is appropriately resourced and will look to create a centralised resource that local authorities can draw on to support access to the data and analysis needed to underpin authority-wide strategies.

The Heat Networks (Scotland) Bill (as introduced) places a duty on local authorities to consider the designation of heat network zones. Should local authorities choose to designate heat network zones, we propose that LHEES should be the primary means by which these zones will be documented, ensuring LHEES is the principal vehicle for heat planning for all technologies on an area basis. The Bill makes provisions for this duty to be exercised by Scottish Ministers on behalf of local authorities to ensure widespread identification of zones across Scotland.

Summary of action we will take:

20. We will commission a full evaluation of the LHEES pilot programme in 2021-22.
21. We will consult on the draft LHEES methodology and guidance with a view to introducing legislation to establish LHEES on a statutory basis so that they are in place for all local authority areas by the end of 2023.
22. We will use LHEES Delivery Plans to target support for deployment and to help identify early areas for low-regrets action.

Questions:

25. What is your view on the timescales proposed for LHEES?
26. Do you agree with the approach to LHEES set out above? If not, please give reasons to support this.

Scotland's Planning System

In the past, the planning system has helped determine the spatial pattern of our heat supply, largely linked to proximity to the gas network. In more recent years it has helped to encourage low carbon development. In the future we will ensure planning policies support the significant reductions in emissions from buildings that we need to see. This is not just about new development – our existing buildings and places will need retrofit solutions and we will enable and encourage deployment of energy efficiency measures and low and zero emissions heating, including by facilitating the development of the networks they require.

National Planning Framework and Scottish Planning Policy

Currently Scottish Planning Policy (SPP) (2014), states that development plans should seek to ensure that an area's full potential for electricity and heat from renewable sources is achieved, in line with national climate change targets, giving due regard to relevant environmental, community and cumulative impact considerations.

As we revise our National Planning Framework, which in future will incorporate the Scottish Planning Policy, we will look to provide stronger support for sustainable, low and zero carbon developments including ways to actively facilitate decarbonised heating and electricity generation and distribution. Potential policy changes set out in the recently published NPF4 Position Statement include:

- Introducing new policies that address a wider range of energy generation technologies for example for electrical and thermal storage, and hydrogen.
- Setting out a more practical and outcome-focused approach to accelerating a transition to low and zero emissions heating in buildings, including by linking with wider policies for green and blue⁷ infrastructure and vacant and derelict land and properties and ensuring that Local Heat and Energy Efficiency Strategies inform local development planning to ensure a single coherent approach to heat planning across Scotland.
- Encourage new buildings to connect to existing heat networks, where located in a Heat Network Zone, wherever feasible; and, encouraging

⁷ green and blue infrastructure is to be understood as all natural and semi-natural landscape elements such as parks, rivers., gardens, streams and sustainable urban drainage ponds (SUDS).

applications for energy from waste facilities to provide a connection to a heat network, taking into account the practical considerations involved.

Permitted Development Rights

The Planning system covers a wide range of development, however minor and uncontroversial developments are often granted Permitted Development Rights. This allows small alterations to be carried out without the need to submit an application for planning permission. For homes Permitted Development Rights are already granted, to some extent at least, for a range of technologies including:

- Biomass heating systems
- Ground and water source heat pumps
- Air source heat pumps

For non-domestic properties Permitted Development Rights^{xxxvi} are in place and allow in many instances for the installation of a range of low and zero emissions heating technologies, including solar panels and ground and water source heat pumps.

We are in the process of reviewing Permitted Development Rights, though the phasing of that programme has been affected by COVID 19. Potential extension of existing Permitted Development Rights for heat networks and micro-renewable technologies are part of that programme.

While Permitted Development Rights 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 Permitted Development Rights 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.

Listed Buildings, Conservation Areas and World Heritage Sites

Scottish Planning Policy also seeks to promote the care and protection of the designated historic environment and ensure change is sensitively managed to avoid adverse impacts on the fabric and setting of these assets.

As set out in Chapter 2 we will work with stakeholders, including Historic Environment Scotland, to develop approaches and solutions to transition Scotland's historic buildings to low and zero emissions heating while respecting and preserving the special characteristics of our buildings and places.

Summary of action we will take:

23. We will set out further guidance to ensure the involvement of local communities in decision making about the heat transition in their local area as part of the development of Local Heat & Energy Efficiency Strategies.
24. Through National Planning Framework 4 we will look for opportunities to strengthen planning policy to enable and encourage energy efficiency and low and zero emissions heating.
25. We will include low and zero emissions heat networks and micro-renewable technologies in the review programme for Permitted Development Rights.

Questions

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?

Chapter 5 Preparing our Energy Networks



Decarbonising heat will substantially change the way we use our existing energy infrastructure and influence where we may need to develop new infrastructure such as heat networks and additional generation capacity. Our energy networks will need to have the capacity to transport and distribute increasingly low carbon energy – electricity or green gases - for heat from where it is produced to where it is needed. We will be transforming the way we heat our homes and non-domestic buildings at the same time as we decarbonise transport and industry. It will be important that we can consider and manage these impacts in the round. We will update the Scottish Energy Strategy this year, taking into account the whole system issues raised by our net zero climate targets.

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. As set out in Chapter 2 these systems will likely be either individual heat pumps or green heat networks, some of which will be powered using large-scale heat pumps. Transitioning this number of properties to electric heating systems will substantially increase the demand on our electricity system.

It will be critical to ensure that sufficient renewable electricity generation is available, at the right times and in the right places. Wider policy initiatives to decarbonise other sectors, including transport and industry, will increase electricity demand still further. Although Scotland's electricity generation is already largely decarbonised, we need to understand the generation capacity necessary to meet future demand, as well as an indication of where in Scotland renewable generation will be located and how it will be delivered to consumers. We will undertake this analysis during the first half of 2021 and set out further details in our refreshed Energy Strategy to be published later this year.

As electricity policy and regulation is a reserved area, action from the UK Government to ensure that renewable electricity generation is properly supported and enabled will be crucial. We will continue to seek assurances

from the UK Government and energy regulator on the measures that they will take to ensure that this need is met.

Electrifying a significant proportion of our heat over the course of this decade will substantially increase the amount of energy that our local electricity distribution networks need to deliver to buildings. There will be places right across Scotland where network owners will need to reinforce cables and upgrade the substations that serve our neighbourhoods and buildings, and do so in a way that coordinates with plans for conversion to electric heating. As set out in our networks vision statement^{xxxvii}, an integrated approach to future systems planning will be crucial.

We understand that the cost of this investment could be significant, especially when coupled with the impact on electricity networks of increased electrification of transport. At present, there is a great deal of uncertainty on these costs and more work is needed to reduce that uncertainty. It is also important to understand how these costs will be met, who will pay and what the impact may be on consumer bills. We will undertake work in 2021 - 2022 to explore the potential network investment costs of the heat transition for Scotland, to provide greater clarity on the likely range of costs, and likely impacts on consumers, to help inform further decision-making.

There will also be increasing value in energy storage. This includes large scale energy storage such as hydro systems and large-scale battery storage but also heat storage in heat networks, building-scale batteries and thermal storage. These tools could help balance the use of electricity for heat in buildings ensuring that networks are not overloaded and help to keep consumer bills affordable. During 2021 we will undertake research into the role of energy storage in supporting the electrification of heat. In particular we will undertake work to look at the role of energy storage in buildings and heat networks.

We are working closely with the Distribution Network Operators (DNOs) on the issues above. We have engaged the Energy Networks Strategic Leadership Group on the challenges we face in terms of securing network investment. However, in order to take our collaboration with the DNOs further we are setting up a new **Heat Electrification Partnership** with them to work together to understand the scale, pace and location of network investment needed, build the evidence for the right investment decisions for Scotland and ensure compatibility with delivery and deployment plans.

As well as gathering evidence on areas such as storage, through this new partnership we will investigate and invite demonstration projects which allow

us to model the real time network impact of heat pump deployment, energy storage and demand management.

We are also working closely with Ofgem to better understand how the electricity networks will be affected by our policy and statutory targets, and the changes that will be needed as a result of these impacts. The evidence gathered through our collaboration as part of the Heat Electrification Partnership will inform DNO's business planning in the run up to the next price control, RII0-ED2, which covers the period 2023 - 2028.

As Local Heat & Energy Efficiency Strategies (LHEES) are rolled out for all local authority areas in Scotland, they will provide a long-term platform for considering local circumstances in developing electricity network business plans, and support this necessary co-ordination of resources and development.

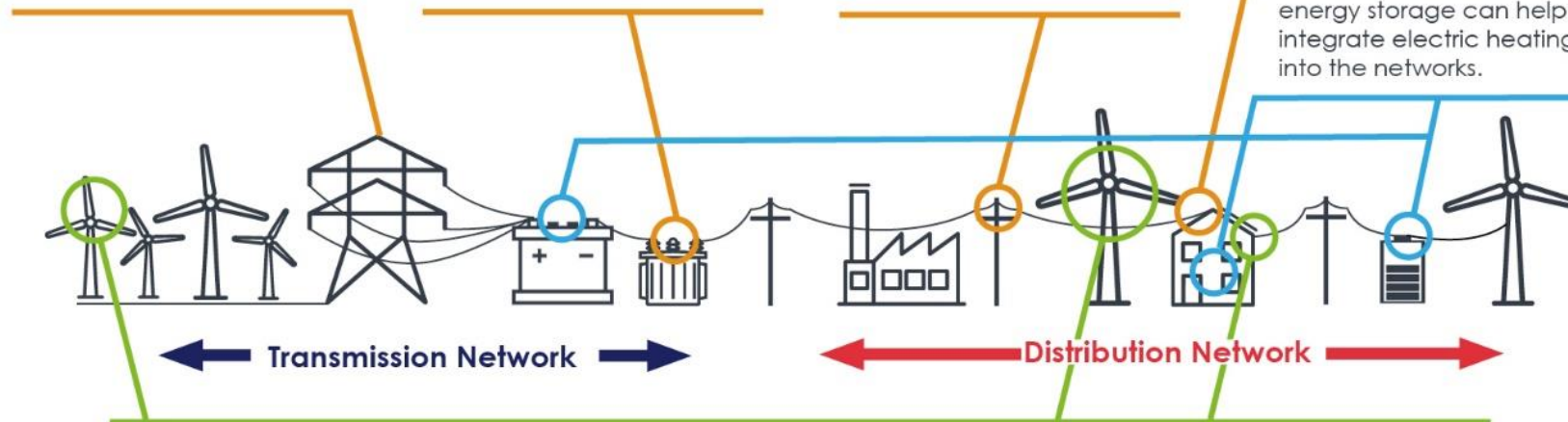
The **national transmission network** will play a critical role transporting renewable electricity from large scale generation to demand including demand for electric heating.

The **higher voltage parts** of the **distribution network** need to be developed strategically and flexibly to support increased demand.

Local, **low voltage parts** of the **distribution network** need substantial upgrades to accommodate electric heating. Investment will need careful coordination with the role out of zero emission heat.

Some **customer connections** will need upgrading to supply electric heating along with EV charging.

Energy storage including batteries and thermal energy storage can help integrate electric heating into the networks.



Renewable electricity generation will need to continue to grow to meet the additional demand created by electric heating. This will include large scale renewable generation such as offshore wind along with local generation connected to the distribution network.

Summary of action we will take:

26. We will update the Scottish Energy Strategy this year taking into account the whole system issues raised by our net zero climate targets.
27. We will carry out analysis during 2021 to understand generation and network requirements, in terms of the scale and location of the demand that heat electrification could bring.
28. We will ask the UK Government to continue to provide the support needed to develop Scotland's renewable electricity pipeline needed to meet a decarbonised future for heat.
29. We will undertake work in 2021 - 2022 to explore the potential network investment costs of the heat transition for Scotland, to provide greater clarity on the likely range of costs, and likely impacts on consumers, including those in, or at risk of, fuel poverty and help inform further decision-making.
30. During 2021, we will conduct research into the role of energy storage in heat networks and buildings in reducing consumer costs, and minimising network impact.
31. In 2021 we will set up a Heat Electrification Partnership with Scotland's electricity network operators to ensure that the upgrades required are delivered when and where they are needed and ensure that the LHEES framework informs this.
32. We will investigate demonstration projects through our delivery programmes strategic priorities to allow us to model real time network impact of heat pump deployment, smart-enablement, energy storage and demand management.
33. Throughout 2021, and beyond, we will continue to engage Ofgem to ensure that there is a framework to support the energy network companies – both gas and electricity – in reflecting the Scottish Government targets and ambitions as set out in this draft Strategy.

Questions

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.
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.
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?

Gas networks

Scotland's mains gas network currently delivers a secure supply of energy to domestic consumers and businesses. Around 81%^{xxxviii} of homes and approximately 30%⁸ of non-domestic buildings use mains gas for heating. Non-domestic buildings using mains gas tend to be larger and therefore mains gas accounts for a greater proportion of energy use in this sector. Currently, the gas supplied via the mains gas network is predominantly natural gas, a fossil fuel composed mainly of methane.

To meet our emissions targets, we will need to reduce significantly and eventually phase out our use of natural gas, and by 2030 at least 1 million domestic and non-domestic properties will have to have switched to zero emissions sources of heating. away from high carbon heating such as gas.

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.

Green Gas Support Scheme

The UK Government is consulting on a new Green Gas Support Scheme, which it proposes to run for 4 years from autumn 2021. Under UK Government proposals, the scheme will:

- Use an adapted version of the tariff mechanism employed on the Non-Domestic Renewable Heat Incentive. The tariff lifetime for successful applicants is proposed to be 15 years.
- Support biomethane injection in to the gas grids, which is expected to contribute 21.6MtCO₂e of carbon savings over its lifetime.
- Be funded via a Green Gas Levy on suppliers, which we anticipate will be passed on in full to consumers.

Blending decarbonised gases with natural gas delivers near-term emissions reductions and helps to build supply systems that over time may be able to fully displace natural gas. In 2019, an estimated 1.5% of Scottish gas consumption is accounted for by biomethane blended into the gas grid^{xxxix},

⁸ Based on provisional modelling of the non-domestic building stock.

up from 0.3% in 2015. Over this decade we need to see an increasing blend of biomethane used in our gas networks. We will work with the UK Government and project partners in Scotland to maximise investment under the UK's Green Gas Support Scheme.

Hydrogen is capable of being blended with methane as a fuel for heating. To be low or zero carbon, hydrogen needs to be produced either from the reformation of methane (with CO₂ emissions captured), or from renewable electricity, via electrolysis. The gas industry is currently testing options for blending hydrogen into the gas network up to a limit that can be safely used in existing appliances. Using an increased blend of hydrogen (up to 20% by volume) has the potential to reduce carbon emissions from gas use by up to 8%. We will work with the Gas Network Operators and the UK Government to explore opportunities for increasing the blend of hydrogen in the gas network. We will continue to keep under review the benefits and cost-effectiveness of increased blending of hydrogen into the gas network, including in terms of the wider energy system. The Scottish Government [Hydrogen Policy Statement](#) sets out our wider vision for the role of hydrogen in Scotland.^{x1}

Longer term, should demonstration and safety case trials prove successful, conversion of parts of the network to carry 100% hydrogen could play an important role in reducing emissions from buildings to very near zero. Hydrogen may be particularly appropriate in certain locations, where there is local supply (for example from abundant renewable electricity) or where industrial demand creates economies of scale.

Regulation of the gas network is a matter for the UK Government and as such the Scottish Government is unable alone to drive decision-making at the pace required to meet targets in Scotland. We are working with Scottish Gas Networks (SGN) and National Grid Gas Transmission on a project to understand the scope for accelerated gas decarbonisation in Scotland, and the timeline over which evidence will be available to resolve uncertainties. This work will be published later in 2021 and will inform the final version of this strategy.

Case Study: H100 Fife 100% Hydrogen Project

Scottish Gas Networks (SGN) is partnering with other UK gas operators on a world-first demonstration of a 100% hydrogen energy system, to evidence the role that hydrogen can play in decarbonising heat. The project will construct and operate a hydrogen network in Fife able to service around 300 houses. This will be of UK-wide significance, offering validation of the evidence base carried out by the UKG in their Hy4Heat Programme.⁹

The project will connect with the existing 7MW wind turbine situated off the coast of Leven in Fife to directly supply power to the electrolyser for hydrogen production, evaluating the opportunity for grid integration systems between renewables and hydrogen production, and demonstrating the business case that offshore wind can offer for production of hydrogen at scale.

The Scottish Government provided £6.9 million support towards the cost of this £27.7 million project. The bulk of remaining funding has been awarded by Ofgem with other funders including, SGN, Cadent, Northern Gas Networks, and Wales and West Utilities. H100 Fife is recognised as a key building block in the strategic 'Gas Quality Decarbonisation Pathway' set out by UK gas distribution network operators and adopted by the Energy Networks Association.

Over the next decade we need to see increased demonstration of hydrogen for heat including the testing of appliances in homes and businesses, and trials of increased blends of hydrogen in the existing gas distribution network (through recently upgraded polyethylene pipes). We welcome the UK Government's commitment to trialling hydrogen for heat and its support for industry to begin a Neighbourhood trial by 2023 and a large Hydrogen Village trial by 2025, as well as its longer-term ambition to see a Hydrogen Town before the end of the decade. However, to unlock delivery at scale and to meet our climate targets, key strategic decisions on the gas network are required by 2025 to drive planning for delivery beyond 2030. It is essential that UK Government accelerate decisions on the future of the gas network

⁹ UK Government, Department for Business, Energy & Industrial Strategy, Hy4Heat, 2018, URL: <https://www.hy4heat.info/> (last accessed: 20/01/2021).

and if relevant, develop regulations and product standards to support these (see Chapter 10 for details).

The trialling of 'hydrogen-ready' boilers and appliances that are readily convertible to hydrogen is underway through the Hy4Heat programme, and a number of boiler manufacturers have developed prototype boilers that are hydrogen-ready and are designed to be able to run on the current gas system yet also be quickly configured to run on 100% hydrogen. We welcome the recent UK Government commitment to consult this year on the case for encouraging or mandating hydrogen-ready boilers, as announced in the Energy White Paper. We look forward to working with the UK Government to ensure the boiler market can develop rapidly in readiness for a future decarbonised gas grid.

Constraints in the near-term availability of both hydrogen and biomethane, coupled with a need to establish the standards and safe systems for hydrogen gas use, repurpose the gas network and replace household appliances, means that decarbonised gas is unlikely to play a large part in meeting our emissions reduction before 2030.

It will be important that this transition happens in a planned way so that piecemeal deployment of heat pumps and heat networks does not undermine the socio-economic case for converting parts of the gas network to 100% hydrogen in the future. To better understand these issues and to identify strategic areas most and least likely to have access to low carbon or green hydrogen in the future, we will work with a range of stakeholders including network companies, local authorities and delivery partners, as well as drawing on our energy systems modelling capacity and geospatial data. This evidence will support the development of LHEES Strategies, which in themselves will help to provide clear strategic direction for local authority areas. We will begin this analysis in 2021, which will be updated as further evidence becomes available during the first half of the decade.

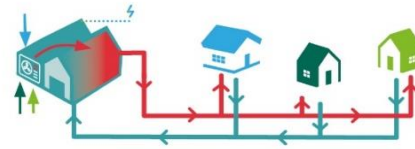
Summary of action we will take:

34. Throughout 2021 build on our work with SGN and National Grid Gas Transmission to provide evidence on the role gas decarbonisation can play in meeting our targets, and a timeline for resolving uncertainties.
35. Working with stakeholders, including network companies, local authority and delivery partners, we will undertake analysis in 2021 - 2022 to identify strategic areas most and least likely to have access to low carbon or green hydrogen in the future.
36. Work with the UK Government to ensure that the Green Gas Support Scheme meets the needs of Scotland, and minimises the impact of the Green Gas Support Scheme Levy on end user costs, especially in relation to fuel poverty levels.
37. We will 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.

Questions

31. What are your views on the changes set out above for the gas networks?
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.

Creating the conditions to secure growth of Heat Networks in Scotland



Heat networks are a tried and tested technology used extensively in across Europe. Currently heat networks supply only 1.5% of heat in Scotland¹⁰, but are a key strategic technology for reducing emissions from heating our homes and buildings. Heat networks are a low regret option as they are agnostic of fuel sources and are capable of being changed over time. For example, some heat networks are powered by high emissions Combined Heat and Power (CHP) systems but in the future could be switched to water source or ground source heat pumps should this prove cost effective.

Currently we estimate that heat networks have the potential to supply between 7 - 12% of Scotland's heat demand. However, working with the UK Government, we are currently refreshing the National Comprehensive Assessment of the potential for combined heat and power and district heating and cooling in the UK (NCA), which is due to be published in the first quarter of 2021. Once the NCA is published, and the data for Scotland is available, we will set a new ambition for heat network deployment in Scotland, aligned with our new low carbon and zero emission heat target, which will be adopted in the final version of this Strategy. Development of credible, deliverable targets will be of great value to efforts to build and support a Scottish supply chain to support the growth of heat networks.

We continue to support the deployment of heat networks in Scotland. The centrepiece of our efforts is our Heat Networks (Scotland) Bill which we introduced to the Scottish Parliament last year. The Bill, if passed by the Scottish Parliament in Spring 2021^{xli}, will:

- regulate the market through a licensing system so that homes and businesses are supplied by solvent, fit and proper operators, while requiring networks to be developed and maintained to high standards,
- create a bespoke system of scrutiny for new networks, to ensure that they can contribute to climate change and fuel poverty objectives, before they are consented for development,
- require heat networks to have a scheme in place to transfer operational rights to a third party to ensure sustained supply, if and when needed,

¹⁰ Unpublished statistics from the Department for Business, Energy and Industrial Strategy (BEIS) heat metering and billing collection.

- require the identification of optimal areas for heat network development across Scotland – Heat Network Zones – including by drawing on information obtained through a new requirement on the public sector to assess the suitability of its own estate to connect to heat networks,
- attract new, and lower cost investment in the sector by awarding long-term Heat Network Permits to develop and operate in the most opportune areas. This will provide assurances over the customer base available, and enable borrowing to be repaid in line with the long-lived nature of the heat networks infrastructure, and
- grant new rights for heat network operators – such as wayleaves, compulsory purchase, road works and surveying rights – to reduce the costs and time involved in construction and maintenance.

We are already preparing the regulations that will result from the Bill, so that, subject to Parliament passing the Bill, the new regulatory regime will be operational by the end of 2023. As with the Bill, we will work with our Heat Networks Working Group in preparing the Regulations. The working group's membership may be refreshed to ensure we have the necessary skills and expertise to inform what will be detailed secondary legislation.

In addition, we are committed to working with the UK Government to develop technical standards for the heat networks sector that build on existing good practice and apply across the UK. We jointly commissioned the British Standards Institute (BSI) to undertake a pre-standardisation project in order to identify whether new technical standards are needed, and if so, where gaps exist. The recommendations from the BSI's Report will form a foundation for future decisions to develop robust technical standards for the heat networks sector.

We will continue to support the development of heat networks in communities across Scotland through our funding and delivery programmes such as the Low Carbon Infrastructure Transition Programme (LCITP), the District Heating Loan Fund (DHLF) and the Local Energy Challenge Fund (LECF) (see Chapter 6).

Case study: Glenrothes Energy Network

Fife Council and RWE received financial support of £8.6 million through the Scottish Government's Low Carbon Infrastructure Transition Programme (LCITP) to develop and deploy a low carbon heat network in Glenrothes. The project uses heat produced from the RWE-owned Markinch biomass combined heat and power plant and comprises an energy centre, thermal storage and a distribution network.



The award-winning project, which officially opened on 24 April 2019, is supplying reliable, low carbon heat to a range of customers in Glenrothes town centre including the Fife House Complex, Rothes Halls and the sheltered housing accommodation at Jubilee Grove. The £24 million scheme is an exemplar of partnership working to achieve emissions reductions and has potential for expansion in the future.

Image of Markinch Biomass combines Heat and Power plant provided by Fife Council (January 2021)

To help create the right financial conditions for green heat networks to succeed we will shortly lay Regulations to create a 90% relief from **non-domestic rates** until 2024 for networks run from renewable sources. This goes beyond the existing 50% rate-relief that is already in place for heat networks, which we will shortly introduce Regulations to guarantee until 2032. These rate reliefs help to support the business case for new networks by reducing their operational costs at the same time that revenue support for new schemes under the UK Government's Renewable Heat Incentive (RHI) comes to an end.

We cannot rely on public investment alone to fund the development of heat networks in Scotland. It is imperative that we create a sustainable and investible market for heat networks. The Heat Networks (Scotland) Bill, along with our proposed 2024 New Build Heat Standard, already includes many of the key ingredients to make heat networks an attractive proposition for investors. We know that investors need confidence in future revenues and in

order to create this demand assurance securing key anchor buildings¹¹ is vital. Later this year we will consult on detailed proposals to:

- require anchor buildings in the non-domestic sector to make adaptations to become 'heat network ready' to connect, and
- use the non-domestic rates system to encourage such buildings to go on to use a local heat network.

These changes would provide the substantial, long-term and secure customer bases needed, and along with wider sector regulation will enable commercially viable heat networks to develop at the scale needed to meaningfully contribute to Scotland's climate change targets.

New heat networks will need to be powered using low and zero emissions sources of heat, for example from heat pumps or surplus or waste heat. When regulation of the heat network sector is implemented (from 2023) we will only consent heat networks with low and zero emission heat sources when regulation of the heat networks sector begins. This will mean that gas CHP may not be used in new heat networks in Scotland, unless new, credible evidence emerges that such systems can provide the needed emissions savings beyond 2023^{xlii}. From that time, existing, fossil fuel powered heat networks will be required to decarbonise upon replacing their heat generation assets. The remainder of our fossil fuel based existing networks will be required to decarbonise by 2045 at the latest as required by our climate change targets.

We will provide support to existing schemes by working in partnership with the sector to develop Decarbonisation Plans and to trial their implementation, subject to Scottish Government budgets.

There are two significant examples in Scotland of heat being used from energy from waste (EfW) plants, with Shetland Heat Energy & Power being one of the largest networks in Scotland and a new network being developed to provide heat to Shawfair Town from Millerhill in Midlothian.^{xliii}

Such projects have been instrumental in the growth of heat networks in Norway. It is important that we learn from this, given the scale of the challenge in Scotland's buildings sector. We have already set out in Scotland's Fourth National Planning Framework: Position Statement^{xliiv} that a potential change to planning policy will be to encourage applications for

¹¹ A building can be described as an "anchor load" if its heating need is both substantial and steady to ensure basic heat demand which, in turn, will stabilise the heat network and provide stable income stream for the business.

energy from waste facilities to provide a connection to a heat network. Alongside this, we will consult in 2021-2022 on whether there is need for further regulatory measures or support measures to increase the utilisation of waste or surplus heat, for example from Energy from Waste plants, to be supplied and/or used through heat networks.

To help identify and build a pipeline of heat network projects we will develop a Heat Network Investment Prospectus in 2021, which builds on the NCA, to identify key strategic opportunities for heat network development in the 2020s. This investment prospectus will help to guide our capital investment and will underpin the development of LHEES.

Heat networks are technically complex infrastructure projects requiring a range of specialist expertise. In order to drive projects forward, this year we will re-establish the Heat Networks Partnership to act as a key mechanism for supporting the development of a pipeline of projects across Scotland, co-ordinating support across the public sector, identifying and nurturing opportunities for new heat networks and considering the options for decarbonising existing fossil fuel powered networks.

Summary of action we will take:

38. Consult on the use of sections 44 and 63 of the Climate Change (Scotland) Act 2009 to introduce mandatory connections for large and publicly-owned buildings in next Parliament.
39. Introduce a requirement through the 2024 New Build Heat Standard for new buildings being constructed to connect to existing heat networks, when they are located within a Heat Network Zone.
40. Consult on how new powers under section 15 of the Non-Domestic Rates (Scotland) Act 2020^{xlv} could be used to de-risk investment and drive net zero behaviour, including connections to heat networks.
41. Develop a set of common technical standards for development and operation of heat networks across Great Britain which will help support the development of skills and the sector's supply chain.
42. Create a new District Heating Relief of 90% to 2023/24 for new District Heating networks powered by renewable sources, waste heat or energy from waste.
43. Include heat networks in our ongoing programme of reviewing Permitted Development Rights (PDR) and, subject to the findings, lay Regulations.
44. We will consult in 2021-2022 on whether the need for further regulatory measures or support measures to increase the utilisation of waste or surplus heat, for example from Energy from Waste plants, to be supplied and/or used through heat networks.
45. Publish a Heat Network Investment Prospectus during the next financial year that will demonstrate the size and location of heat network opportunities across Scotland, as well as information on the decarbonisation requirements of existing networks in Scotland.
46. Repurpose the Heat Network Partnership in 2021 with a refreshed membership and remit focussed on pipeline development and subsequent delivery.

Questions

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?
34. What evidence can you provide on the potential for heat derived from energy from waste to qualify as low or zero emissions?
35. What views do you have on mechanisms to support this and the use of wider sources of waste heat?
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?

Chapter 6 Kick-starting Investment in the Transition



Transforming Scotland's homes and buildings over the next 24 years 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. We will target our funding to support the most vulnerable and to strike the right balance to ensure fairness, particularly between those who make the transition early (and so potentially face higher lifetime costs) and those who, because, for example, infrastructure is not available, transition much later. To do this we will target our interventions through our delivery programmes so that they do not have a detrimental effect on fuel poverty and will build in additional support where required to ensure people can continue to enjoy warm homes that are affordable to heat.

Alongside raising awareness of the scale of the transition needed for our building stock, improving quality and consumer trust in the supply chain will be an important part of this journey. We will use our investment to drive up quality and work with the sector to put in place and make it as easy as possible for people to make the changes, and secure the action needed over the next decade to transform our building stock.

Delivering Early and Significant Progress

Investing in energy efficiency and zero emissions heating is not new for the Scottish Government. We have successfully funded heat in buildings delivery programmes for a number of years (see table of current delivery programmes below and in annex for more detail), supporting those living in fuel poverty, and encouraging others, including small and medium businesses and the public sector, to retrofit their properties to reduce their energy costs and emissions. We have also supported large scale low carbon energy infrastructure projects, including a number of heat networks across Scotland.

Summary of Scottish Government Delivery Schemes

Domestic support	<p>Home Energy Scotland</p> <p>Free, independent advice on energy efficiency and low and zero emission heating. Also acts as a referral scheme for the Warmer Homes Scotland scheme. Portal for accessing number of support packages including HES loan, PRS loan, cash back incentives, equity loan pilot and Warmer Homes Scotland.</p> <p>Delivered by Energy Saving Trust.</p>	<p>Warmer Homes Scotland</p> <p>Fuel Poverty scheme which enables eligible households to receive energy efficiency and heating improvements. Primarily delivers heating measures including an increasing number of heat pumps. Recently extended grant levels of increase support for heat pumps.</p> <p>Delivered by WarmWorks.</p>
	<p>Energy Efficient Scotland – Area Based Schemes (ABS)</p> <p>Provide energy efficiency improvements to households in or at risk of fuel poverty living in their own home or a private rented property, leveraging Energy Company Obligation (ECO) finance and private investment. ABS is effective in delivering large numbers of improvements to mixed tenure, multi-occupancy properties (e.g., flats, terraces, council estates/projects).</p> <p>Delivered via local authorities.</p>	<p>Home Energy Scotland Loans and Cashback</p> <p>Interest free loans and cashback (grant) for eligible energy efficiency measures. Up to 40% cashback (grant) up to £4,000 for energy efficiency measures and up to 75% cashback (grant) up to £7,500 for renewable heating systems. Operators on first come first served basis. Householder is responsible for arranging and managing work.</p> <p>Delivered by Energy Saving Trust.</p>
Business Support	<p>Energy Efficiency Business Support Service</p> <p>Free advice and support package to Scottish SMEs to help improve energy efficiency and decarbonise heating in their premises.</p> <p>Delivered by Zero Waste Scotland.</p>	<p>Energy Efficiency Business Support SME Loan and Cashback</p> <p>Low-cost loans and cashback (grant) for eligible energy efficiency measures for SME businesses. Business can receive a grant worth up to £20,000 for energy efficiency and renewable heat measures.</p> <p>Delivered by Energy Saving Trust</p>
Communities and Public Sector	<p>The Community and Renewable Energy Scheme (CARES)</p> <p>Advice and funding support to community groups and other eligible organisations seeking to explore their renewable energy options.</p> <p>Delivered by Energy Saving Trust under the Local Energy Scotland brand</p>	<p>Public Sector Non-Domestic Energy Efficiency Framework</p> <p>Energy Performance Contract Framework designed for larger public sector projects. Improvement measures are financed via savings.</p> <p>NDEE Support Unit supports project delivery.</p>
Multi-sector support	<p>Low Carbon Infrastructure Transition Programme</p> <p>Provides a range of support, from expert advice to financial support to assist the development and delivery of private, public and community low-carbon projects across the country. Includes capital support for heat networks and support for social landlords for heat decarbonisation.</p> <p>Delivered in house with support from Project Partners including SFT and Zero Waste Scotland.</p>	<p>District Heating Loan Fund</p> <p>Loan fund for district heating projects open to local authorities, social landlords, SMEs and ESCOs with fewer than 250 employees. Depending on loan value may require co-investment.</p> <p>Delivered by Energy Saving Trust.</p>

As outlined in Chapter 3, we will continue invest in our Home Energy Scotland and Energy Efficiency Business Support advice services, improving our digital presences and extending the support to provide more in-depth support.

We will also take action to deepen the level of public engagement through simplification of our branding to make the delivery landscape easier to navigate and expansion of the existing Green Homes Network so that people can learn from those who have already made the transition to zero emissions heating.

Scaling up delivery – aligning support to strategic priorities

We recognise our delivery programmes must now move to a new phase; one capable of supporting deployment at an unprecedented scale. Our delivery programmes – and auxiliary support – will need to underpin the mass move from fossil fuel reliant systems to low and zero emissions heating in tandem with achieving a good standard of energy efficiency across all buildings.

To achieve this, we will use our £1.6 billion investment to build upon, expand and improve existing programmes, and bring forward new mechanisms where necessary and maximise investment from other sources. We recognise there are choices to be made around how best to maximise the impact of our funding. We will need to strike a balance between supporting the vulnerable and ensuring that they are not left behind in the transition and making demonstrable and sustained progress in those areas where we have most ground to cover, such as increasing the absolute volume of zero emissions heat installations.

What we have set out in this draft Strategy is an indicative prioritisation of our available capital funding over the lifetime of this Strategy. We propose to expand existing delivery programmes to focus on accelerating deployment against the following **four strategic priorities** with £465 million to support those least able to pay through our domestic energy efficiency programmes and over £1 billion to support heat decarbonisation and energy efficiency across our other strategic priorities.

We know the importance of targeting government funding where it can best have impact and unlock barriers to transforming our building stock. A balance will be needed on how best to split our investment between energy efficiency measures and heat installations as well as the level of intervention needed to act as catalyst to decarbonise at the scale and pace needed and to stimulate more private investment. We are actively seeking views on

how to balance our priorities and the opportunities and challenges we face in investing almost £1.6 billion over the next five years.

Strategic Priorities

1 - Supporting those least able to pay

We will expand our domestic energy efficiency programmes to support more households to eliminate poor energy efficiency as a driver of fuel poverty and accelerate the deployment of zero emissions heat across Scotland's social housing stock. We will target our intervention so that it does not have a detrimental effect on fuel poverty and will build in additional support where required to ensure people can continue to enjoy warm homes that are affordable to heat.

3- Showcasing Net Zero leadership and share learning through early adoption in key areas of focus

Supporting market growth in heat technologies by growing demand and customer base to help scale and attract further private investment through our successful domestic and SME cashback schemes, developing a new support programme to enable those households and SME businesses - who want to - to take early action, and investing in the retrofit of public sector buildings to showcase zero emissions buildings and to act as a catalyst for wider action.

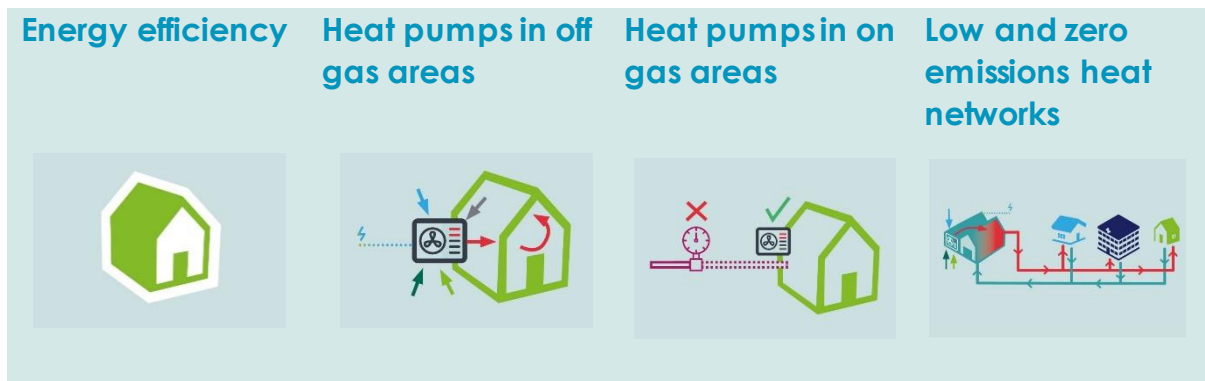
2- Investing in strategic technologies in low or no regrets areas

We will target at scale deployment of strategic technologies and will seek to maximise private investment through the aggregation of demand. This investment will be targeted through the successor to the Low Carbon Infrastructure Transition Programme (LCITP), the District Heating Loan fund (DHLF) and community-focused schemes such as CARES, including dedicated support for islands and remote communities.

4- Investing in innovation and demonstration to drive forward competitive advantage

We will need to continue to innovate and demonstrate in order to develop the business models, finance and technology to meet the needs of the future, and to overcome existing barriers in zero emissions heat deployment. We will support innovation and demonstration in strategic areas such as electrification, hybrid systems and network impact and in the more challenging aspects of decarbonisation such as multi-tenure buildings.

Our investment will continue to be underpinned by a place-based focus for our programmes as Local Heat and Energy Efficiency Strategies are rolled out, to ensure alignment with LHEES designations of heat decarbonisation zones, and to support locally-driven Delivery Plans. We will take early action to strategically plan deployment and delivery with a focus on the no and low regrets areas and strategic technologies identified earlier in this strategy (see Chapter 2)



Supporting home owners, landlords and tenants

We believe support for early adopters will be essential if we are to deliver our targets. We propose to continue to offer interest-free loans accessed via Home Energy Scotland, with an additional proposed commitment to run our cashback scheme, with an opt-in monitoring programme, until at least 2023 to help households overcome the upfront cost of taking early action.

We will continue to monitor the success of these schemes, and undertake user research and market testing to understand the need for other products which may support and smooth the consumer journey including the option for a self-funded pre- and post-installation service. We will take an evidence-based approach to the development of proposals for supporting self-funding households over the longer-term, and as we move into a regulatory framework. We are currently evaluating the area-based equity loans pilot and any future equity scheme will be considered in light of this evaluation.

Supporting those least able to pay

We have already committed in the Programme for Government 2020 to guaranteeing our existing capital commitment for domestic energy efficiency programmes as well as committing an additional £55 million to support work to eliminate poor energy efficiency as a driver of fuel poverty. Over the next five years, this will mean directly investing £465 million in domestic energy efficiency. We propose to continue delivery of energy efficiency investment to support fuel poor households in order to make homes warmer and cheaper to heat and to reduce the impact of any increased running costs from zero emissions systems, including recognising the distinct challenges faced by island, rural and remote communities and seek to improve targeting so that we can reach more households in fuel poverty.

Over the next five years, it is our intention that our **Area Based Schemes** will increase their reach to support higher numbers of households in or at risk of fuel poverty, prioritising those in greatest need (that is, the least energy efficient) and those in the highest emitting properties – in order to maximise reductions in emissions. As well as prioritising insulation measures, through our Area Based Schemes we propose to deliver an increased number of ‘whole house’ retrofits to fuel poor households and will adopt a ‘zero emissions first’ approach (outlined in Chapter 3: People) in improving heating systems.

The **Warmer Homes Scotland** contract is due to end in September 2022 and we propose to replace it with a new and enhanced 7-year national scheme which will continue to have support for fuel poor households at its heart. We propose that the new scheme will embed increased support for zero emissions heating, enabling a zero emissions first approach (outlined in Chapter 3: People) and we will consider if it should also be designed with scope for expansion to support a wider range of households in the future.

Support for Non-Domestic and Small & Medium Sized Enterprises

We support Small and Medium Sized Enterprises (SMEs) via our **Energy Efficiency Business Support service** (formerly Resource Efficient Scotland) and **SME Loans** to take action to reduce their energy use and cut emissions. SME businesses can continue to access free and impartial advice and support as well as low-cost loans to help spread the upfront cost of investing in energy efficiency and zero emission heat. We propose to continue to run our **SME loan cashback** schemes until at least 2023 to help reduce the cost of investing. In order to understand the support and investment SME businesses

need to secure an accelerated rollout of energy efficiency and zero emission heating systems we will consult and work with the sector to develop new policies and proposals for SMEs.

Larger businesses and organisations can access support on the open market to invest in decarbonising their property assets. Many larger organisations already have strong corporate social responsibility policies which are driving low carbon decision making, with many organisations retrofitting their properties to reduce running costs and cut emissions. During 2021, we will ensure that our work on regulations and finance consider how to drive early action so that this segment of the market can help lead the way and support and develop enhanced supply chains in Scotland.

Supporting Communities

Scotland is already recognised as an exemplar when it comes to our approach to supporting and investing in community energy. We want to continue to support communities to take the necessary steps to transform their assets so that they are ready for a net zero Scotland. The next CARES contract period is due to commence in April 2021, and will run until March 2025, and will have a greater focus on supporting heat decarbonisation in community-led projects and supporting community engagement in Local Heat and Energy Efficiency Strategies (LHEES).

We propose to extend our financial support for our most remote rural and island off-grid communities, ensuring that security of supply is maintained and decarbonised – acting across electricity, heat and energy efficiency – helping to transition these communities to a net zero future.

Case study : Decarbonising heat and cooking on the Small Isles and Shetland

There are 93 inhabited islands in Scotland, with a population of 103,700^{xlvi}. The Islands of Rum, Eigg, Muck, Canna, Foula and Fair Isle are some of our smallest islands and all completely 'off-grid, not connected to the national electricity or gas networks. **These remote islands have set forward an ambitious vision^{xlvii} to reduce emissions associated with space and water heating by 80%, and to reduce the volume of fossil fuels used for cooking by 50%, all by 2025.** In order to deliver on this progressive vision these islands will initially target those using higher carbon systems. The islands will also look at ways to renovate and retrofit existing buildings to make them more energy efficient, helping to meet the ambitious vision.



Image of houses on the Isle of Eigg, provided by the Eigg Electric (December 2020)

Public sector

The public sector must demonstrate its commitment to transforming Scotland's buildings by taking early and sustained action to decarbonise the public sector estate and improve the energy performance of all public buildings. Over the next Parliament, we will invest at least £95 million in the Scottish public sector estate to improve and reduce energy use and install zero emissions heating systems. We propose to bring forward **a new Scottish Green Public Sector Estate Scheme during 2021** - which will draw together capital grants, loans, and other revenue funding mechanisms and incorporate and build upon our existing Non-Domestic Energy Efficiency Framework - as the main government-led capital funding mechanism to support leadership for heat decarbonisation right across the public sector. As an example, the **Scottish Government's Learning Estate Strategy** has a

greener and more sustainable learning environment as one of their core outcomes.

The Scottish Government Learning Estate Strategy

[The Scottish Government Learning Estate Strategy](#) sets out a range of outcomes we want to see from our investment in school buildings. One of these outcomes is an energy efficiency target that learning environments should be greener and more sustainable, contributing to Scotland's net zero greenhouse gas emissions commitment. Our energy efficiency target for schools replaced or upgraded through the £1 billion Learning Estate Investment Programme (LEIP) is highly ambitious at 67 kWh per square meter, per year. This target is not just ambitious on paper, we will be following up with local authorities to ensure that the targets are achieved in practice, once the schools are in use.

At scale support

Since its launch in 2015, we have used our highly regarded **Low Carbon Infrastructure Transition Programme (LCITP)** to make technical expertise and financial support available to innovative low carbon infrastructure projects which have potential for replication. This approach has led to the successful delivery of a number of renewable heat projects including the Queens Quay heat network in Clydebank, which utilises heat from the River Clyde, and a new heat network in Stirling, which harnesses energy from waste water and supplies heat to nearby public buildings and businesses.

As the current LCITP programme draws to a close in 2021, we must now consider how its successor can become the primary mechanism for deploying zero emissions heat at scale, co-ordinating our support for the roll-out of heat networks and heat decarbonisation infrastructure. To achieve this, we must make a financial commitment to the successor programme which matches the ambitions we need it to deliver - LCITP and its successor programme will invest £400 million over the next five years in large-scale heat decarbonisation infrastructure. Alongside this significant capital commitment, our future programme must effectively blend government support, including newer financial mechanisms such as the Green Growth Accelerator, with co-financing from the private sector to deliver our

ambitious emissions reduction targets whilst delivering value for money and future financial sustainability for these schemes.

We also propose that the successor to the LCITP will maintain a focus on innovation and demonstration by creating a dedicated funding stream in the successor programme to allow us to more flexibly support further innovation in strategic areas such as electrification and hybrid systems and tackle more challenging aspects of decarbonisation such as multi-tenure buildings and whole building retrofit. We will work with stakeholders to design and develop the successor programme offering a comprehensive package of financial and wider support to large-scale heat decarbonisation projects. The Low Carbon Infrastructure Transition Programme (LCITP) – Call for Evidence will inform the development of a future programme. This will be published soon and is the first stage of this dialogue with the sector and other partners.

Social Landlords

Twenty-four percent^{xlviii} of Scotland's domestic dwellings are social housing. In the second half of 2020, we launched the **Social Housing Net Zero Heat Fund**, to support social housing landlords across Scotland to take forward projects to deploy zero emissions heat, improve energy efficiency and reduce fuel poverty. We propose to extend this funding until 2026 and we will work with the sector to assess impact of funding to date and ensure that our funding effectively supports further acceleration of the decarbonisation of our social housing stock. We will also consider how this financial support for zero emissions heating will work in tandem with our domestic energy efficiency programmes.

We propose to also continue to support affordable housing providers who wish to install zero emissions heating systems in homes delivered through our **Affordable Housing Supply Programme** ahead of regulatory requirements in 2024.

Utilising UK Government Funding

As a result of our sustained investment since 2009, Scotland has been successful in leveraging significant additional investment from UK Government funding programmes, such as the Energy Company Obligation (ECO) and the Renewable Heat Incentive (RHI). See Annex D for Summary of GB wide funding schemes.

The UK Government has extended the Domestic RHI until 31 March 2022, when it will be replaced by the Clean Heat Grant Scheme. This replacement scheme is expected to be available GB-wide, subject to the consent of UK and Scottish Ministers, and we will work with the UK Government to ensure that the scheme supports delivery in Scotland and that it is compatible with Scottish Government delivery schemes so that they can support its delivery.

The recently published Energy White Paper indicates that the Energy Company Obligation scheme will continue beyond 2022. The Scottish Government will continue to seek to maximise the impact of this funding in reducing energy bills for fuel poor households and enabling increased progress with decarbonisation of heating systems.

We will design Scottish Government delivery programmes and advice services so that they continue to maximise the contribution from UK Government funding. We will also continue to press the UK Government to provide more funding for energy efficiency and zero emissions heating via GB-wide schemes, including working with UK Government to identify a more progressive way of funding these programmes.

Summary of action we will take:

47. We propose to expand existing delivery programmes to focus on accelerating deployment over the next 5 years against the following four strategic priorities: (1) those least able to pay, (2) investing in strategic technologies in low or no regrets areas, (3) showcasing Net Zero Leadership and share learning through early adoption in key areas of focus and (4) investing in innovation and demonstration to drive forward competitive advantage.
48. We will offer interest-free loans for heat and energy efficiency technologies via Home Energy Scotland, with an additional commitment to run our cashback scheme until at least 2023 to help households overcome the upfront cost of taking early action.
49. We will undertake user research and market testing to understand the need of further products which may be needed to support and smooth the consumer journey including the option for a self-funded pre- and post-installation service.
50. We will evaluate the area-based equity loans pilot and consider any future equity scheme in light of this evaluation.
51. We will continue delivery of energy efficiency investment to support fuel poor households in order to make homes warmer and easier to heat and to reduce the impact of any increased running costs from zero emissions systems, including recognising the distinct challenges faced by island, rural and remote communities, and seek to improve targeting so that we can reach more households in fuel poverty.
52. Over the next five years, our Area Based Schemes will increase their reach to support higher numbers of households in or at risk of fuel poverty. We will deliver an increased number of 'whole house' retrofits to fuel poor households and will adopt a 'zero emissions first' approach in improving heating systems.
53. We will procure a new, enhanced, Warmer Homes Scotland to begin in 2022, which will support for fuel poor households at its heart, and embed increased support for zero emissions heating, adopting a zero emissions first approach.
54. We will support SME businesses via our Energy Efficiency Business Support service (formerly Resource Efficient Scotland) and SME Loans to take action to reduce their energy use and cut emissions. We will continue our new SME loan cashback schemes until at least 2023.
55. We will expand our Green Network for Businesses, so that SMEs can learn from people, businesses and organisations who have already made the transition to warmer, greener and more efficient buildings.

56. We will continue to run our SME loan cashback schemes until at least 2023 to help reduce the cost of investing. In order to understand the support and investment SME businesses need to secure an accelerated rollout of energy efficiency and zero emission heating systems we will consult and work with the sector to develop new policies and proposals for SMEs.
57. Throughout the next 5 years, we will support communities to take the necessary steps to transform their assets so that they are ready for a net zero Scotland through our new CARES programme.
58. We will extend our financial support for our most remote and islanded off-grid communities, ensuring that security of supply is maintained and decarbonised – acting across electricity, heat and energy efficiency – helping to transition these communities to a net zero future.
59. We will bring forward a new Scottish Green Public Sector Estate Scheme during 2021 - drawing together capital grants, loans, and other revenue funding mechanisms - as the main government-led capital funding mechanism to support leadership for heat decarbonisation right across the public sector.
60. We will work with stakeholders to design and develop the successor LCITP programme through the forthcoming Call for Evidence
61. We commit to extending the Social Housing Net Zero Heat Fund until 2026 to further accelerate the decarbonisation of our social housing stock, and consider how this financial support will work in tandem with our domestic energy efficiency programmes to deliver a comprehensive approach to decarbonising our social housing stock.
62. We will support affordable housing providers who wish to install zero emissions heating systems in homes through our Affordable Housing Supply Programme, ahead of regulatory requirements in 2024.
63. We will design Scottish Government delivery programmes and advice services so that they continue to maximise the contribution from UK Government funding.
64. We will also continue to press the UK Government to provide more funding for energy efficiency and zero emissions heating via GB-wide schemes, including working with UK Government to identify a more progressive way of funding these programmes.

Questions

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?
38. Do you agree with the strategic funding priorities set out above?
39. In your view, should equal funding be allocated across these priorities or should certain priorities be weighted in terms of impact for Scotland?
40. What are the opportunities and challenges we face in maximising our £1.6 billion investment?
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?
42. What are your views on how we can use our funding to leverage and encourage private sector and other forms of investment?
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?
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.)

Chapter 7 Working Towards A Long-Term Market Framework

This draft Heat in Buildings Strategy sets out a proposed long term policy framework, supported by ambitious targets on climate change and fuel poverty, a stretching deployment pathway for energy efficiency, as well as low and zero emissions heating, a significant capital funding commitment over the next Parliament to kick start and accelerate deployment, and proposals to create a regulatory framework to underpin delivery and provide future certainty to the market (Chapter 8).

However, we know that to grow the market for energy efficiency and low and zero emissions heating over the long term we must transform public attitudes and make these technologies a positive choice. As we scale up deployment over the course of this decade it will be important that this transformation is underpinned by an appropriate market framework, which 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.

Investing in net zero

We estimate that the total cost of converting our building stock to zero emissions by 2045 is in the region of £33 billion¹². This estimate includes the costs of upgrading the energy efficiency of domestic and non-domestic properties and replacing their heating systems with zero emission alternatives. Further investment will also be required to upgrade our energy networks and ensure sufficient energy generation capacity (as identified in Chapter 5). However, it is important to bear in mind that this is the gross cost; even without decarbonisation, the building stock would require significant investment as heating systems and fabric elements reach the end of their lifespans. For example, it would cost around £5 billion to replace existing fossil fuel heating systems in the domestic sector on a like for like basis.

We expect the annual building level investment required will rise gradually throughout the early 2020s, peaking in the region of £2 – 2.5 billion in the late

¹² Cost expressed in real terms (today's prices). Note that it is possible that as technology develops and the market scales up, real costs could fall over time. By way of comparison, there have already been very significant falls in the costs of renewable electricity generation.

2020s, before falling throughout the 2030s as transformation of the building stock nears completion and our economy wide net zero emissions target is reached.

We recognise that higher up-front costs compared to fossil fuel incumbent systems can be a barrier and for some individuals, businesses and organisations, the cost of upgrading their home or workplace may be prohibitive, preventing them from taking action.

Building level investment

The costs of upgrading individual homes, workplaces and community buildings will vary driven by the building type, materials, existing levels of energy efficiency and type of heating systems being replaced. We know that the average cost of installing a heat pump is currently around £10,000, with approximately an additional £2,000 for energy efficiency measures. This compares to around £2,500 for replacing a fossil fuel boiler^{xlix}. However, the cost of conversion to zero emissions heating systems is likely to vary significantly across different properties.

Some properties which are already energy efficient and using zero emissions heating systems may require little or no investment. For other properties, the costs will be lower than the typical £10,000 to £12,000 set above because other types of zero emissions heating systems, such as heat networks, will offer a more cost-effective solution than heat pumps. However, there will also be properties where for a variety of reasons, such as constraints on technology options available, location, property type, impact on the fabric of historic buildings, space constraints, and capacity of the electricity grid, the cost will be higher than £10,000 to £12,000.

During 2021-22, we will take action to undertake further analysis and modelling to better understand the expected costs of upgrading different property types to the proposed standards, to help guide investment decisions, including shaping our existing and future delivery programmes.

As set out in Chapter 6 we currently offer a range of support to help individuals, SME businesses and the public sector overcome the upfront costs, including grants as well as interest-free and low-cost loans to help overcome

the upfront costs of investing. However, we know that for many, taking on more debt to fund upgrades is just not possible, and we must find new ways to help secure the upfront investment required to transform the nation's building stock. The sheer scale of investment needed means it cannot be fully funded by the public purse alone.

Alongside public funding and investment by individual households and businesses we need to see increasing levels of private finance, and investigate innovative finance mechanisms and business models, to meet the total investment need.

New Finance Mechanisms

Public sector funding from the Scottish Government, UK Government, local authorities or investment from new institutions like the Scottish National Investment Bank will be a part of the solution to deliver the scale of transformation needed by 2045, but private investment – whether that be from homeowners, landlords or business paying for their own properties or from the institutional investment community providing financing for large scale infrastructure - must drive progress. We must mobilise and work in collaboration with the private sector to leverage the scale of investment needed and to develop innovative and new approaches to financing heat decarbonisation and energy efficiency measures.

We will establish a Green Heat Finance Taskforce in early 2021. This Taskforce will forge a new partnership approach between the Scottish public sector, heat decarbonisation experts and the financial sector, working with organisations including the Scottish Futures Trust and the Green Finance Institute, to explore potential new and value for money innovative financing mechanisms for both at-scale and individual level investment.

The Green Heat Finance Taskforce will make recommendations on the range of approaches that the Scottish Government - working in collaboration with the private sector - should bring forward to support the scaled growth in private capital needed and, where possible, pilot innovative solutions to attract investment. This will build on the rich evidence base already developed by the UK Climate Change Committee, the Coalition for the Energy Efficiency of Buildings and others and could include looking at opportunities to expand already tried and tested models such as Public-

Private Partnerships¹³ or Regulated Asset Based-type models¹⁴ to fund large scale infrastructure including heat networks, as well as new emerging and established business models for households and business such as Heat as a Service, Energy Performance Contracting, green mortgages and salary sacrifice models.

To complement this work, we will also consider how our local tax powers, such as council tax and non-domestic rates, could be used to incentivise or encourage the retrofit of buildings. We will commission further analysis to identify potential options, to be implemented from the middle of the decade where appropriate, subject to consultation and public engagement.

We have already begun some of this innovative financing work. The Scottish Government is a member of the advisory council for the European Energy Efficiency Mortgage Initiative¹ working to create a standardised energy efficient mortgage that can help bridge the renovation gap through use of low-cost private sector financing.

Linking the mortgage market to energy performance and emissions can help to drive change over time and help to encourage positive consumer choice. We welcome the UK Government's proposals to require lenders to disclose the average EPC performance of properties on their mortgage portfolio and to adopt a voluntary target of meeting a portfolio average of EPC C by 2030. This will help to create a market for new mortgage products helping to secure further private investment into the sector. To ensure that this approach is consistent with our net zero objectives we urge the UK Government to ensure reform of the EPC framework for the rest of the UK, in parallel with our commitment for Scotland, so that EPCs at UK-level do not drive investment in fossil fuel heating systems – taking steps similar to those we are proposing in Chapter 7.

¹³ Public private partnerships (PPPs) are arrangements typified by joint working between the public and private sector. PPPs can take a variety of forms but the basic concept uses private sector finance and expertise to provide services or infrastructure. They can take the form of a contract with the public sector with a unitary payment made for the services or infrastructure paid by the public sector; a free-standing project with services or infrastructure paid for those who benefit, or a joint venture where some public investment is needed to enable the project to go ahead.

¹⁴ A Regulated Asset Based (RAB) model is a type of economic regulation typically used in the UK for monopoly infrastructure assets such as water, gas and electricity networks. The company receives a licence from an economic regulator, which grants it the right to charge a regulated price to users in exchange for provision of the infrastructure in question. The regulated return helps secure private finance.

We are developing a new pilot for use of guarantees with mortgage providers as an effective route to market for financing emission reduction measures. This could support lenders offering additional low-cost finance to borrowers, particularly at key trigger points when borrowers are buying, re-mortgaging or improving their properties.

Securing long-term and low-cost private investment will require us to create new revenue streams to repay the upfront private capital investment that is being made. The UK Green Deal was an example of this, and was intended to help households cover the upfront cost of investing in energy efficiency through 'on-bill' financing. However, the UK's Green Deal scheme failed to secure sufficient take up - owing to high interest rates, low levels of quality assurance and consumer protection and lack of regulation to drive uptake. Building on the lessons from the UK Green Deal, our Green Heat Finance Taskforce will also consider how we can create these new revenue streams, for example by use of our local tax and charging powers or by utilising powers that are already provided for in the Scotland and Energy Acts. We will consider how to use these powers alongside our planned approach to regulation.

We will explore opportunities for other market actors, such as suppliers, retailers and manufacturers to drive investment in zero emission heating and energy efficiency. We will work with the UK Government to explore options for new market mechanisms to drive investment and innovation so that an increasing share of heat comes from low and zero emission sources. These options may include new obligations on market actors, product standards and innovation funding, some of which may cut across reserved and devolved competencies.

We will also look closely at proposals in Europe to bring natural gas for domestic heating and heating oil into the EU Emissions Trading System, as a mechanism to drive investment to reduce emissions, and consider whether these proposals are suitable and workable in a UK context, working with the UK Government and other devolved administrations as part of the proposed review of the scope of the new UK Emissions Trading Scheme.

New Business Models

We remain committed to delivering our ambition of a **public energy company** to support efforts to meet our climate change and fuel poverty targets, and to help to promote economic development. We have recently commissioned independent advice on the concept of providing '**Heat as a Service**'. The Heat as a Service model has similarities with the way in which

many consumers choose to lease a mobile phone or car, with the upfront ownership costs of a new low or zero emission heating system being recouped over a period of time through regular payments, sometimes including operating and maintenance costs. We will continue to explore how this model might support our heat decarbonisation agenda by enabling consumers to purchase or run low or zero emission heating systems, while delivering the energy outcomes consumers want.

Case study: Danish Heat as a Service Scheme

The Danish Energy Agency introduced a boiler scrappage scheme in 2020 to encourage Danish consumers to adopt heat pumps via a 'Heat as a Service' subscription business model. In this model, consumers pay an up-front fee to cover some of the installation and equipment costs, then a fixed price per unit of heat delivered and a monthly payment for the heat pump and maintenance. The minimum subscription period is 10 years. The Danish Energy Agency defined the pricing structure and allow providers to adjust the up-front fee, price per unit of heat and monthly payment, depending on their business model.

Four energy service providers were selected from an open tender to provide, finance, install, operate and maintain heat pumps for consumers. The scheme is intended to encourage market competition, recognising that the businesses that can install, operate and maintain the heat pumps most efficiently will be able to offer consumers the lowest prices.

The scheme is still in its initial stages, but early findings are that more heat pumps have been installed than would have been without the scheme, consumers have been offered a new way of installing heat pumps without buying or leasing, and energy companies have said they would not have offered a subscription scheme without the Danish Energy Agency led scheme.

To do this, we will undertake market and consumer research to understand when and where Heat as a Service could be used in Scotland and consider different routes for bringing this concept to market. We will update the Outline Business Case for the public energy company as appropriate. We will also build on engagement with the Danish Energy Agency to understand how this model has been developed and rolled out in Denmark. In the final

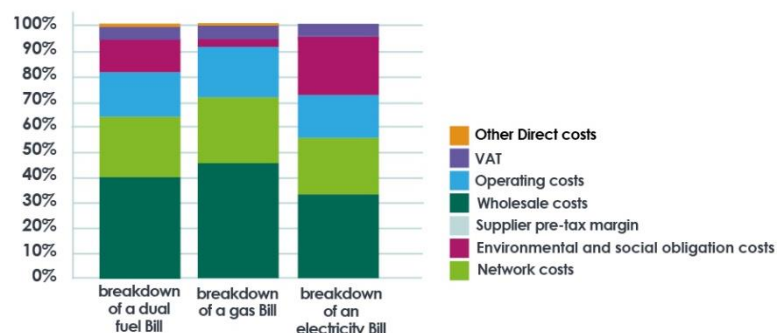
version of this strategy, we will set out whether Heat as a Service can have a role in supporting heat decarbonisation in Scotland, and if so, our plan for realising this.

Creating Favourable Market Conditions

As we undertake the necessary transformation of our homes and buildings, we also want to ensure that the **energy market** evolves to support decarbonisation and allows energy bills to remain affordable for households and businesses alike.

Currently, primarily due to the relatively low cost of gas in comparison to electricity, in some situations zero emissions heating systems can be more expensive to run than fossil fuel systems like gas and oil. The impact that installing a zero emissions heating system will have on energy bills is dependent on a number of other factors, including the design and quality of system itself, user operation, the system it is replacing, and the energy efficiency of the property in which it is installed. Wider system costs, for example upgrading energy networks, will also likely have an impact on consumer bills and we will undertake further analysis on this issue.

Electricity prices are currently 4-5 times greater than gas^{li}, having risen by around 35% in real terms from December 2010 to December 2019, whereas gas prices remained virtually unchanged in real terms over this period^{lii}. There are a number of reasons why electricity costs more than gas, including wholesale and generation costs as well as policy costs, such as social and renewable electricity obligations, which are recouped through charges and levies placed on consumer bills. Historically, the majority of these policy costs have been added to electricity bills, with comparatively little added to consumer gas bills. The figure below outlines the make-up of energy bills, and illustrates that around 23% of an electricity bill is made up of environmental and social obligation costs, compared to around 2% of a gas bill.^{liii}



Breakdown of GB gas and electricity energy bills. (Source^{liv}: Ofgem, 2021)

As we accelerate deployment of a wider range of heating systems, it is important that the market evolves with it so as not to disincentivise households from switching to zero emissions systems and to reduce the risk of tension between our climate change and fuel poverty targets. The current imbalance of gas and electricity costs is incompatible with our net zero objectives and acts to disincentivise take up of zero emissions heating technologies. We agree with the recommendation, from the UK's Climate Change Committee, for action to address this imbalance.

We do not have the levers to control energy prices, such as reforming the energy market or restructuring the various levies and charges that are added to energy bills. These powers remain reserved to the UK Government. We have commissioned research to understand whether rebalancing of levies and charges between electricity and gas supplies might impact the deployment of low and zero emissions heat in both domestic and non-domestic settings in Scotland. The research will be published this Spring.

We welcome the UK Government's commitment as set out in its recent Energy White Paper^{iv} to publish a call for evidence this year to begin a strategic dialogue between government, consumers and industry on affordability and fairness. We urge the UK Government to quickly progress this work so that a fair settlement for energy consumers can be achieved which unlocks our just transition to a net zero economy. We will work with the UK Government as it progresses this call for evidence to ensure that any reforms that may emerge do not disadvantage Scottish consumers and that they fit with and enable delivery of both our more ambitious climate targets and fuel poverty targets.

Summary of action we will take:

65. In 2021-2022, we will commission independent analysis and modelling to better understand the expected costs of upgrading different property types to the proposed standards, to help guide investment decisions.
66. Establish a new Green Heat Finance Taskforce in early 2021 to provide advice and recommendations to Scottish Government on potential new financing models and routes to market.
67. Set out options for future financing and delivery in 2023, with a view to implementing these new mechanisms from 2025 where applicable and allowed within our legislative competence.
68. Work with the UK Government to design new market mechanisms that can secure and accelerate delivery.
69. We will undertake scoping work during 2021 to understand how the Heat as a Service model might support our decarbonisation goals, including commissioning market and consumer research.
70. We will consider how our local tax and charging powers, such as council tax and non-domestic rates, could be used to incentivise or encourage the retrofit of buildings, alongside our planned approach to regulation. We will commission further analysis to identify potential options, to be implemented from the middle of the decade where appropriate, subject to consultation and public engagement.
71. We will work with the UK Government as it progresses its call for evidence on affordability and fairness to ensure that any reforms do not disadvantage Scottish consumers and that they fit with and enable delivery of our more ambitious climate targets.
72. We will publish research on the impact of rebalancing consumer levies on electricity and gas bills.

Questions

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?
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?
47. What financing mechanisms are needed to encourage investment from householders, businesses and the private sector?

Chapter 8 Developing a Regulatory Framework for Zero Emissions Buildings



Principles of our approach

To underpin our investment and provide long-term certainty to the sector and home owners, landlords, owners of non-domestic premises and the public sector, we will introduce new regulations to set standards for zero emissions heating and energy efficiency, where it is within our legal competence, between 2023 and 2025. 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. This chapter sets out our proposed approach for the introduction of these regulations for both new and existing buildings, including: reforming the assessment process and metrics underpinning Energy Performance Certificates; standards for existing homes; standards for existing non-domestic buildings; and standards for mixed-use and multi-tenure buildings.

Energy efficiency and zero emissions heating investments are long term decisions that require certainty and clear end-points. Regulations will help provide that certainty and also help build supply chain confidence to invest in training, skills and new projects. In this way, regulation can help to lower the costs of the transition¹⁵.

We will introduce regulation in a way that is proportionate and which considers the health and wellbeing of Scotland's people, including continuing to target the eradication of poor energy efficiency as a driver of fuel poverty and ensuring our actions have no detrimental impact on fuel poverty, unless additional mitigating measures can also be put in place. We will ensure sufficient periods of transition to allow people and the market to adjust and prepare for new standards coming into force, and tailor our

¹⁵ In 2019 the Scottish Government ran a call for evidence on the future of low carbon heat for off gas buildings. Respondents saw policy and regulation as having a key role in supporting deployment of low carbon heat in off-gas buildings, particularly to provide stability and certainty to the market. Scottish Government, The future of low carbon heat for off gas buildings: a call for evidence, 2019, URL: <https://consult.gov.scot/better-homes-division/the-future-of-low-carbon-heat/> (last accessed: 20/01/2021).

delivery mechanisms to set out a clear path of support and advice for individuals and organisations.

We will consider what legislation is needed to meet these regulatory ambitions, including bringing forward new primary legislation in this area if required, pending further policy development and securing agreement with the UK Government on any necessary devolution.

Alongside our regulatory approach, we are developing our delivery programmes to support the acceleration towards net zero emissions for buildings (as set out in Chapter 6: Kick starting investment in the transition).

Summary of action we will take:

73. We will introduce regulation in a way that is proportionate and which considers the health and wellbeing of Scotland's people.
74. We will ensure sufficient periods of transition to allow people and the market to adjust and prepare for new standards coming into force.
75. We will tailor our delivery support to set out a clear path of support and advice for all those affected.
76. We will consider what legislation is needed to meet these regulatory ambitions, including bringing forward new primary legislation in this area if required, pending further policy development and securing agreement with the UK Government on any necessary devolution.

New Buildings

To ensure that new buildings are fit for the future and do not require retrofitting in the future to achieve zero emissions, the Scottish Government is currently developing regulations which will require new buildings consented from 2024 to use zero emissions heating (and cooling). This will initially apply to new homes - with similar requirements to be phased-in from 2024 for new non-domestic buildings. In parallel, we are reviewing the energy efficiency standards set by building regulations to ensure that Scotland's future buildings are highly energy efficient, in line with our wider net zero ambitions.

Our proposals will ensure that, from 2024, where there is an installed heating system contained within the curtilage of a new building, it will be required to produce zero direct greenhouse gas emissions at the point of use¹⁶. We envisage that at present, electrical heating or heat supplied by heat networks would produce no direct greenhouse gas emissions at point of use, but we recognise that there are other technologies which could produce a similar outcome and are seeking evidence on this.

We published our initial Scoping Consultation on the [2024 New Build Heat Standard](#)¹⁶ on 9 December 2020, and we are welcoming evidence and stakeholder input as we look to further develop the Standard. We are also seeking evidence on the impact of introducing these requirements earlier than 2024 if feasible. In addition, stakeholders will also have a further opportunity to contribute through a Technical Consultation in 2021 – which will set out, in greater detail, issues such as compliance, enforcement, and calculation methodologies.

As above, we are undertaking work in parallel with development of the New Build Heat Standard, to review energy standards set through building regulations, to deliver further improvements in building energy performance. This will include very high levels of building fabric performance in our new homes, avoiding the need for costly retrofit in the future, contributing towards removing poor energy efficiency as a driver of fuel poverty, and making homes more affordable to heat.

For new public sector buildings, we have developed the **Net Zero Carbon Public Buildings Standard**, working with the Scottish Futures Trust and other public sector partners. This new standard will be progressively applied to new build and major refurbishment projects across the public sector from early 2021. The voluntary Standard has been adopted by Scottish Ministers and we are working with our wider public sector partners to support application of the Standard to projects, helping public sector bodies to meet their commitments to reach net zero. We will publish the Standard in early 2021. This will feed into work to introduce regulation and mandatory standards across the non-domestic sector more widely from 2023-25 onwards.

¹⁶ As set out in our Scoping Consultation on the 2024 New Build Heat Standard, 'Zero direct emissions from heating and cooling' will ensure that no greenhouse gas emissions are produced from the heating or cooling system contained within a building at the point of use. In contrast, the concept of net zero greenhouse gas emissions allows for additional measures to be used to 'offset' any greenhouse gas emissions produced, or otherwise associated with energy use at the building. This Standard will not allow for offsetting.

Summary of action we will take:

77. Develop and bring into force the 2024 New Build Zero Emissions from Heat Standard, requiring new buildings to have zero direct emissions heating systems.
78. Review energy standards within current building regulations to deliver further improvement in energy efficiency and emissions reductions in new buildings, in 2021 and 2024.
79. Publish the Net Zero Carbon Public Buildings standard in early 2021 and work to introduce regulation and mandatory standards across the non-domestic sector more widely from 2023-25 onwards.

Existing homes

In responding to the challenge of net zero, we recognise that our proposed regulatory framework needs to go further than previously set out in the 2018 Energy Efficient Scotland Route Map.

Following feedback from recent Energy Efficient Scotland consultations and advice from our External Advisory Group we are revising our approach and developing a regulatory framework for energy efficiency and heat supply that will:

- reform the assessment process and metrics underpinning Energy Performance Certificates (EPCs) so that standards are effective, meeting the demands of both climate change targets and fuel poverty targets.
- address both heat decarbonisation - to the extent that our powers allow - and energy efficiency, where previously our regulatory approach was centred on energy efficiency alone.
- increase clarity and pace by regulating to ensure that all buildings across all tenures achieve a good level of energy efficiency by 2035 and use zero emissions heating (and cooling) by 2045¹⁷, with more

¹⁷ Multi-tenure or mixed-use buildings under certain circumstances may be given until 2040-45 to improve both their energy efficiency and install a zero emissions heat supply, depending on the complexity involved in coordinating works and recovering costs between multiple owners, which may necessitate a 'whole building intervention' simultaneously covering energy efficiency and heat supply improvements.

ambitious delivery for households in fuel poverty. This brings forward the target end date for energy efficiency standards by 5 years and proposes to introduce standards for heating, not previously included in the Energy Efficient Scotland Route Map.

Energy Performance Certificates

Energy Performance Certificates (EPCs) and the methodology behind these are the backbone of our existing standards. The UK Climate Change Committee (CCC), the Scottish Government's own EPC Assessment Short Life Working Group, and responses to recent consultations on the setting of standards across various tenures and for off gas grid properties, have all recommended a need to reform EPCs so that they can be effectively used as the basis of regulation and to ensure that they drive the energy efficiency and heat decarbonisation measures needed for our net zero objectives.

The CCC recommends^{ivii} that the EPC framework should be reformed and improved to ensure it drives the energy efficiency measures needed, as well as the installation of zero emissions heating. To do this, we need an EPC framework that helps building owners understand:

- The measures required to improve the energy efficiency of their property, so as to reduce the demand for heat and ensure that poor energy performance is not a driver of fuel poverty.
- The changes needed to the heating system so that it is zero emissions.
- The impact of these changes on running costs.

To be a useful tool for property owners, EPCs need to set out clear property-level recommendations on the measures needed to reduce demand for energy and reduce emissions to zero. For EPCs relating to properties in mixed-tenure and mixed-use buildings, it will be important that they recommend the necessary communal works to retrofit the whole building. It will be important that EPC recommendations are tailored and appropriate to the property, and are in line with the heat zoning set out in the area's Local Heat & Energy Efficiency Strategy.

EPCs for domestic property currently include two ratings: an Energy Efficiency Rating and an Environmental Impact Rating. The former is currently an energy cost rating based on energy demand; the latter is based on carbon emissions. The Energy Efficiency Rating is the primary rating in use; is relatively well known; is included in adverts for property; and is currently the basis of our

energy efficiency standards. The current Energy Efficiency Rating can be improved by installing a cheaper to run fossil fuel heating system, such as replacing electric storage heaters with a gas or oil boiler. Conversely, installing a zero emissions system could lead to a worsening of the rating^{lviii}. As such the current system is not compatible with our zero emissions objectives. However, simply adopting the Environmental Impact Rating as the basis of our regulatory approach would not be compatible with our statutory fuel poverty targets.

We are therefore considering reforming the existing EPC so that it includes three indicators as a basis for future standards:

- *an indicator for energy efficiency* (which will recommend to building owners the measures needed to reduce demand for heat, as appropriate to their building type and fabric; and will also show the measures needed to remove poor energy efficiency for fuel-poor households);
- *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);
- *an indicator for cost of heating* (which will inform building owners and tenants of the impact of the energy efficiency and heat emissions measures on their energy bills).

As we reform the EPC system it will be important that it continues to fulfil its original intentions, as well as enabling strengthened action, including as a regulatory tool, on emissions and fuel poverty. As we do this, it will be important to ensure a degree of equivalence for energy efficiency so that the trajectory for energy efficiency improvements required remains broadly the same in the reformed system as we have already proposed.

We will consult in detail on proposed reforms to Energy Performance Certificates, which will underpin our proposed regulatory framework, later this year.

Energy Efficiency and Zero Emissions Heat

We are already committed to taking action across all tenures to address the energy efficiency of existing homes. Our proposals for a regulatory framework for decarbonising homes, as set out here, build on and update the regulatory framework set out in our 2018 Energy Efficient Scotland Route Map.

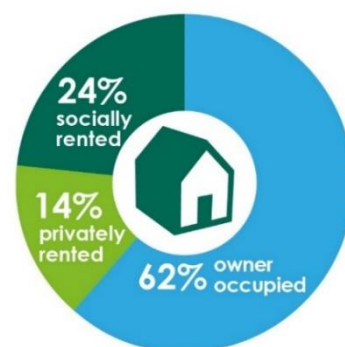
The framework we set out in 2018 focussed only on energy efficiency. We now need to strengthen this framework so that it covers both energy efficiency and zero emissions heating, so that it is aligned with our net zero emissions targets while continuing to support progress on eradicating fuel poverty.

We will strengthen our proposed regulatory framework to the extent that our powers allow and, where required, will seek additional powers from the UK Government to enable this. We propose that our strengthened regulatory framework requires properties to achieve a good level of energy efficiency by 2035, equivalent to EPC C for homes, and have zero emissions heating systems by 2045 at the latest¹⁸.

Details are set out below for a proposed new all-tenure zero emissions heat standard, as well as minimum energy efficiency standards for private-rented, owner-occupier and social housing. We will also develop a bespoke approach to regulating for improvements in mixed-tenure and mixed-use buildings.

Tenure of Scotland's homes.

62% of all homes in Scotland are owner occupied, 24% are social rented and 14% are private rented.^{ix} Just over one third of Scottish households live in flats, which are often found in mixed-tenure and mixed-use buildings, where residents include owner occupiers and private and social renters, and commercial premises occupy the ground floor.



¹⁸ Multi-tenure or mixed-use buildings under certain circumstances may be given until 2040-45 to improve both their energy efficiency and install a zero emissions heat supply, depending on the complexity involved in coordinating works and recovering costs between multiple owners, which may necessitate a 'whole building intervention' simultaneously covering energy efficiency and heat supply improvements.

All Tenure Zero Emissions Heat Standard

We will bring forward regulation proposals to require installation of zero or very near zero emissions heating systems in existing buildings from 2025.

It is proposed that compliance with a new zero emissions heat standard be phased in with all buildings needing to meet this standard no later than 2045. It may be appropriate to have an earlier backstop date for certain types of properties or areas. This could for example apply in the 'low regrets' areas of activity, such as where heat network zones have been identified and a heat network is available, or in high emissions properties, such as those that currently use heating oil or coal as their primary heating fuel.

In consulting on these proposals, we would expect these regulations to use the same or similar trigger points as those applying to energy efficiency standards, on which we have previously consulted (see below). We would seek to consult during 2022 on a proposed standard and any legislation needed to underpin this.

Private Rented Housing Minimum Energy Efficiency Standard

Twenty percent of private rented housing has a poor EPC rating (of E, F or G) compared to just 6% of social housing and 17% of owner-occupied^{ix}. To tackle the low energy performance in the private rented sector and help to make the heating bills of those living in those homes more affordable we have been committed to the introduction of regulations to ensure properties in the private rented sector reach an EPC D by 2025 and have trailed this standard for the past 3 years. However, we recognise that the private rented sector has been significantly affected by the ongoing COVID-19 pandemic, with emergency legislation needed to prevent evictions, support tenants and landlords and protect the broader sector. As a result, and to reflect the need to reduce pressure on the sector, the formal process to bring these regulations forward has been paused.

Our commitment to improving the energy efficiency of this sector remains. In line with the direction provided by the CCC^{xi} we will introduce regulations requiring private rented sector properties to meet a minimum standard equivalent to EPC C, where technically feasible and cost-effective, by 2028. Any intermediate steps to reach this standard between now and 2028 will take cognisance of the pressure faced by the sector as a result of the Covid-19 pandemic.

Owner-Occupied Private Housing Minimum Energy Efficiency Standard

We will set out and consult on detailed proposals for introducing regulations for minimum energy efficiency standards for all owner-occupied private housing. It is envisaged that these will be set at a level equivalent to EPC C where it is technically feasible and cost-effective to do so. This will apply at key trigger points. We propose to introduce regulations from 2023-2025 onwards, and all domestic owner-occupied buildings should meet this standard by 2035. This brings forward the previously proposed backstop from 2040 to 2035. Where it is not technically feasible or cost-effective to achieve the equivalent to EPC C rating, we propose that a minimum level of fabric energy performance through improvement to walls, roof, floor and windows, as recommended in the EPC, would apply.

Social Housing Minimum Energy Efficiency Standard

Social housing is already paving the way for energy standards. The first milestone, the Energy Efficiency Standard for Social Housing (EESH1) was due to be met in December 2020. The Scottish Housing Regulator reports that 87% of social rented homes were already meeting this milestone as of the end of March 2020.

In June 2019, the Minister for Local Government, Housing and Planning agreed a second EESH2 milestone for all social housing to meet, or be treated as meeting, EPC B, or be as energy efficient as practically possible, by the end of December 2032. We will seek the agreement of social housing stakeholders to bring forward the review of EESH2 to 2023, with a view to strengthening and realigning the standard with wider net zero requirements so that we can work in partnership with social housing to lead the transition to zero emission buildings and avoid the need for further retrofit in the future.

Mixed-tenure and mixed-use buildings

Mixed-tenure or mixed-use buildings¹⁹ make up a significant share of Scotland's building stock. Such buildings could include a mixture of owner occupied, private rented and social housing, and also non-domestic uses, or simply multiple ownership within the same tenure. We recognise the

¹⁹ The term mixed use here refers to more than one use in the same building such as domestic and any non-domestic use or retail and office use in the same building.

challenges that common works present to mixed-use, tenement and mixed-tenure buildings, and that this often presents a barrier to installing energy efficiency and zero emissions heating measures unless property owners act together.

Local Heat & Energy Efficiency Strategies (LHEES) (Chapter 4: Place) will go some way to supporting delivery in these areas, by making it clearer to building owners the measures most likely to be appropriate in their building and the surrounding area. However, LHEES alone are unlikely to provide the certainty to households, organisations and developers that changes will occur, making it more difficult to plan and make investments.

For mixed-tenure or mixed-use buildings, it may be more helpful for energy efficiency and heat standards to apply to the whole building rather than to individual properties or units, such as individual flats or ground floor commercial premises within a tenement.

We will consult on a regulatory approach for mixed-tenure buildings which would see them required to reach a good level of energy efficiency, equivalent to EPC C rating, where technically feasible and cost effective, and install a zero emissions heating supply by 2040-45²⁰. In consulting, we will consider if there are circumstances under which certain households or owners of other buildings are exempt or have a longer period of time to meet standards.

We propose that specific backstop dates for both energy efficiency and heat in individual building blocks or areas would be determined by their date of zoning (see below section on Regulatory Trigger Points and Area-Based Regulation) – reflecting the need for coordinated measures for example through ‘whole building retrofit’. Therefore, this could see some buildings required to comply with zero emissions standards ahead of 2045. This approach to zone-based regulation for mixed-tenure and mixed-use buildings will be guided by Local Heat & Energy Efficiency Strategies, ensuring a careful phasing to improve this whole portion of the building stock, year-by-year. We will introduce regulations from 2023-25 onwards, with an expectation that all of these buildings should meet this standard by 2040-45.

²⁰ Multi-tenure or mixed-use buildings under certain circumstances may be given until 2040-45 to improve both their energy efficiency and install a zero emissions heat supply depending on the complexity involved in coordinating works and recovering costs between multiple owners, which may necessitate a ‘whole building intervention’, simultaneously covering energy efficiency and heat supply improvements.

To facilitate the common works that will be essential for decarbonisation of these buildings, such as connection to heat networks or whole building insulation, we will consider bringing forward primary legislation to support this.

Historic Buildings

We will work with Historic Environment Scotland to consider what specific provisions or exemptions may be needed within regulations to take account of buildings which are designated as listed or in conservation areas, in meeting requirements for decarbonisation of their heat supply and reducing their demand for heat.

Summary of action we will take

80. We will consult on a reformed EPC assessment process to better align with wider net zero objectives whilst meeting our fuel poverty obligations by summer 2021.
81. We will bring forward proposals for regulating, to the extent that devolved powers allow, to require the installation of zero or very near zero emissions heat in existing buildings from 2025, with a backstop of 2045.
82. We will bring forward regulations requiring private rented sector properties to achieve an equivalent to EPC C by 2028.
83. We will consult on detailed proposals to introduce regulations from 2023-2025, to require owner occupied private homes to meet a minimum level of energy efficiency (equivalent to EPC C) by 2035.
84. We will seek the agreement of the social housing sector stakeholders to bring forward the review of EESSH2 to 2023 with a view to strengthening and realigning the standard with net zero requirements so that social housing leads the transition to zero emission buildings.
85. We will consult on introducing regulation to require mixed tenure and mixed-use buildings such as tenements to reach a good level of energy efficiency (equivalent to EPC C where technically feasible and cost effective), and to install a zero emissions heating supply by 2040-45, including provisions on ensuring cooperation between building owners to carry out works and recover costs.
86. We will work with Historic Environment Scotland to consider what specific regulatory provisions or exemptions may be needed within regulations for buildings designated as listed or in conservation areas. (this also applies to non-domestic buildings as below)

Existing Non-domestic buildings

Since 2016, regulations^{lxii} have required non-domestic buildings over 1000 m² on sale or rental to a new tenant to carry out an assessment to determine and implement modest energy efficiency improvements. Owners have the option of either implementing the measures identified or lodging a Display Energy Certificate reporting annual energy use.

As set out in the 2018 Energy Efficient Scotland Route Map, we will introduce regulations which will expand and tighten requirements so that they cover all non-domestic buildings. We will do this by placing requirements on owners to reduce demand for heat through energy efficiency improvements, and install a zero emissions heating supply, within the extent of our powers. Regulations will be introduced from 2023 to 2025, with backstops applying to all non-domestic buildings between 2035 and 2045.

In the Energy Efficient Scotland Route Map 2018, we proposed that regulations be phased in, starting with the largest buildings with the scope of the regulations increasing over time so that by 2045 all non-domestic buildings would be improved. A phased approach is likely to remain appropriate. We will consult on our proposed regulatory framework for non-domestic buildings, including trigger points, backstop dates, compliance and enforcement, during 2021-22.

Public sector buildings

We are committed to showing leadership in the 23,000 public sector buildings^{lxiii} in Scotland. This means that the public sector needs to act more rapidly and in advance of the introduction of further regulations for new-build and existing non-domestic buildings.

We expect public sector leadership to include the early phase-out of all fossil fuel based heating systems in the public estate at the earliest feasible dates. The Scottish public sector should take a zero emissions-first approach to heating system replacement, with new or replacement heating systems designed to be compliant with public bodies duties set under Section 44 of the Climate Change Act and the net zero declarations made by public sector organisations. To further support public sector leadership, we will develop guidance for minor refurbishments and heating system replacements in the public sector.

Summary of action we will take

87. Develop and introduce strengthened regulation for non-domestic buildings, which builds on existing requirements under Section 63 of the Climate Change (Scotland) Act, to ensure they reduce demand for heat and install a zero emissions heating supply; and launch a consultation on these proposals.
88. We will develop guidance for minor refurbishments and heating system replacements in the public sector.

Regulatory Trigger Points and Area-Based Regulation

There are a range of natural points where changes happen to a building. These could be used as triggers at which regulation could come in to force including:

- change of tenancy (when a property is empty);
- point of sale;
- major refurbishment;
- replacement or installation of a new heating system.

In many cases standards triggered at the individual property level will be appropriate. However, in circumstances where there are common or shared issues across an area it may be more appropriate to require action across a defined area, for example:

- in areas where there is a common building fabric type or construction archetype;
- in areas where there are mixed-tenure or mixed-use buildings requiring common works; or
- in areas where a communal or area-based heat solution, such as heat networks or hydrogen network, is identified through zoning by a Local Heat and Energy Efficiency Strategy²¹, requiring action to be taken across multiple buildings in tandem.

²¹ This could include for example heat network zones as set out in the Heat Networks Bill.

As we develop our regulatory approach for buildings we will consult on area- or zone-based triggers to complement those at the individual property level. For some of these triggers, such as sale of a property or identification of a heat zone, an appropriate grace period^{lxiv} may be needed so as not to place an undue burden on individuals and in some cases achieve changes more cost-effectively.

Zoning may also be important as a means of ensuring action by building owners who have otherwise not received triggers to take action at an individual property level (for example properties that have not been sold or changed tenancy), ahead of the final compliance dates for the regulations (i.e. 2035 for energy efficiency; 2045 for zero emissions heating). Again, appropriate time would be needed to notify building owners, to allow compliance, and to allow phasing of works for the supply chain, to avoid potential last-minute bottlenecks ahead of backstops.

As set out in Chapter 6, we will also consider how we could use our local tax and charging powers, alongside our planned approach to regulation.

Summary of action we will take:

89. We will consult on area or zone-based triggers to complement those at the individual property level.

UK-Wide regulation

We know that introducing regulation to require changes to the way in which our buildings are heated will impact on the current operation of the heating market, which is currently dominated by fossil fuel (high emission) heating systems. Whilst regulating for emissions, heat and energy efficiency is a largely devolved matter, the regulation of energy markets, fossil fuels, consumer protection and competition are reserved to the UK Government. As such, there is a risk that in exercising devolved powers we cut across into areas that are reserved to the UK Government. Given that the UK Government faces the same challenge to decarbonise heat in buildings that we face, we will work with them to enable us to introduce regulation for zero emissions heating across the entire building stock from 2025 at the latest.

Questions

48. What are your views on the regulatory actions set out in the proposed regulatory framework?
49. What are your views on the timeframes set out for the application of the regulation set out above?
50. What are your views on how our Delivery Programmes could support compliance with regulation?
51. What other mechanisms/support may be required to ensure that regulation is fair and equitable for all?

REGULATORY PROPOSALS AND STANDARDS

	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045
PRIVATE RENTED HOUSING (PRS)	Consult and legislation				Minimum EPC C with all new tenancies			All to comply																	
OWNER OCCUPIER	Consult and legislation				At trigger point buildings required to: achieve a good level of energy efficiency, equivalent to EPC C rating (where not technically feasible/cost-effective, minimum levels of Fabric Energy Performance of walls, roof and windows to be met)										All to comply*										
OWNER OCCUPIER AND PRS					(Within scope of devolved powers) install a zero emission heating supply such as electricity, heat network, or over time potentially 100% hydrogen to allow time for gas grid to decarbonise.																				All to comply*
SOCIAL HOUSING	EESHS 2		Review	Standard requiring a good level of energy efficiency, equivalent to EPC B where technically feasible and cost effective							All to comply														
MULTI TENURE / MIXED USE	Consult and legislation				Standard requiring a good level of energy efficiency, equivalent to EPC C where technically feasible and cost effective																All to comply*				
					(within scope of devolved powers) installation of zero emission heating system such as electricity, heat network, or over time potentially 100% hydrogen to allow time for gas grid to decarbonise.																				
NON DOMESTIC BUILDINGS	Consult and legislation				More challenging energy improvement targets to reduce demand for heat and ensure zero emissions heat supply to apply at trigger points.																				All to comply*
PUBLIC SECTOR BUILDINGS	Application and roll out of Net Zero Carbon Public Buildings Standard for new and major refurbished buildings																								
ALL NEW BUILDINGS	Consult and legislation			New consents to use zero emissions heating and achieve a very high level of energy efficiency																					

* Backstops could be set earlier for example for zones for zero emissions heating.

Chapter 9 The Economic Opportunity



Developing Scottish Supply chains – the net zero opportunity

Transforming our buildings by making them more energy efficient and converting them to zero emissions has the potential to make a significant economic contribution and represents a sizeable opportunity for Scottish businesses over the next 24 years. The proposals and actions set out in this draft Strategy provide a clear set of signals to the market, helping to give clarity and confidence to companies to invest for the transition.

As set out in Chapter 6: Kick Starting Investment in the Transition, it is estimated that the total investment in buildings alone required to meet our net zero targets for buildings will be in the region of £33 billion. This figure does not include the potential opportunity to invest in servicing the demand from wider UK and international markets.

Based on our estimated deployment pathway we estimate that annual investment will need to rise gradually throughout this decade, peaking at around £2-2.5 billion towards the end of the decade.

By introducing regulatory standards covering all buildings, ensuring they improve their energy efficiency and install zero emissions heating systems, we are providing clarity and certainty to the supply chain between now and 2045.

Our investment in, and regulation of heat networks will stimulate both the development of new heat networks and the extension of existing ones. This will provide high quality, sustainable green jobs across Scotland's towns and cities in such areas as specialist design and architecture, equipment manufacturing, civil engineering, and maintenance. Alongside the creation of jobs related to heat networks, the investment will also be a stimulus for increased rates of energy efficiency measures, which we estimate could support up to 1,200 jobs for every £100 million invested in decarbonising our building stock^{lxv};

Our support for further demonstration of hydrogen, smart heating technologies and electricity network innovation will create opportunities across the wider energy system supply chain. Our targeted support for

innovation will support companies with a high growth potential, boosting the economy and creating jobs.

Overall, we estimate that as investment ramps up towards the late 2020s, as many as 24,000 jobs could be supported each year in Scotland by the roll out of zero emissions heat^{lxvi}.

We want to ensure that the economic opportunities that the heat transition creates, are captured by Scottish businesses through a strong, healthy and diverse supply chain capable of meeting the demand from across Scotland, and beyond, whilst still maintaining high levels of services and quality for consumers and businesses.

We are committed to building local supply chains, maximising local job creation, and ensuring a just transition. We will work with Scottish businesses so that they can play a significant part in the transformation of Scotland's homes and buildings.

Case study: Manufacturing Heat Pumps in Scotland - Mitsubishi Electric Air Conditioning Systems Europe Ltd

Mitsubishi Electric has a long association with Scotland, being based in Livingston since 1979. The Livingston manufacturing campus produces a range of air source heat pump technologies, marketed under Ecodan. The Livingston campus currently operates within a footprint of 54,000 thousand m² across 5 separate production sites and employs circa. 1,400 people, with a doubling in the number of employees over the last 6 years.

Image of Mitsubishi plant in Scotland, sourced from Mitsubishi (January 2021)



We have a strong foundation on which to build, with the heat and energy efficiency sectors in Scotland currently generating an annual turnover of £2.4

billion and supporting around 13,000 full-time equivalent jobs servicing today's demand.²²

The opportunity presented by the heat transition will require a further step change in the capability and capacity of supply chains in Scotland; one that needs to begin now to be capable of meeting the forecast demand, and one that presents real opportunities for both existing market participants, as well as new entrants.

Ramping up supply chain support

To realise the economic opportunities associated with decarbonising Scotland's homes and buildings, it will be critical to secure and maximise investment in supply chains in Scotland. Developing new supply chains is a key element of our National Mission for Jobs which will deliver new, high quality and green jobs.

As set out in the Programme for Government, we want to see – as a minimum – the rate of renewable heat installations in homes and buildings double every year from a current baseline of 3,000 domestic installations per annum in 2020 to 64,000 homes fitted in 2025 – a cumulative total of around 124,000 homes. We recognise that setting medium term credible aspirations for deployment of categories of heating technology can build confidence and support investment across supply chains. We welcome views on the role technology specific milestones could play in ramping up supply chain capacity, and how best to set them.

We are already working with the Heat Pump Sector to develop a new Heat Pump Sector Deal in Scotland. An expert working group has been set up to make recommendations to the Scottish Government by Summer 2021 on how industry and Government can work together to set a clear pathway for accelerated deployment of heat pumps, and to consider how innovation can improve the consumer experience of heat pump technology whilst maximising economic opportunities across Scotland. We will respond to those recommendations in the final version of this Strategy.

We recognise the significance of this opportunity for the construction industry and will work with our partners, Scottish Futures Trust and the Construction

²² Of these, zero emissions heating manufacturing alone is estimated to employ around 2,000 and 8,200 people are estimated to work in the design, manufacture and installation of energy efficient products such as wall insulation and energy efficient doors and windows.

Leadership Group, to engage with the sector on the opportunity presented by the heat transition.

Through our existing **Sustainable Energy Supply Chain programme** and our economic development agencies - Highlands and Islands Enterprise, South of Scotland Enterprise, Scottish Enterprise and Scottish Development International- we will work to raise awareness amongst the supply chain, and continue to provide valuable tailored business support, as well as attract new entrants and inward investment.

The Sustainable Energy Supply Chain programme is funded by the Scottish Government and administered by Energy Saving Trust. Since 2013 it has provided support and assistance for businesses in Scotland to help them participate fully and effectively in the supply chain for energy efficiency and micro-generation measures and installations. Over 4,000 people have benefited so far from the support provided by the programme.

In 2020, Scottish Enterprise, supported by Scottish Government, published a directory of companies with expertise in zero emissions heat on the Scottish Industry Directories website. The directory lists 402 companies with a base in Scotland, categorised by geography and their area of expertise, as well as providing a brief description of what they offer and a link to their website. The directory provides an opportunity for the supply chain to market their products, and will help developers and consultants to source more resource for projects from Scottish suppliers.^{lxvii}

To augment our existing programme, we will **develop an action plan**, specifically focussed on strengthening the broad supply chains needed to deliver energy efficiency and zero emissions heat in buildings.

Through this, we will work with industry to co-create an action plan which will:

- Clarify the scale and nature of the supply chain opportunities;
- Identify market barriers faced by the supply chain;
- Review the supply chain sector support in place, and identify any gaps in provision;
- Identify mechanisms to ensure the supply chain is aware of UK and Scottish market stimulation programmes, such as the Renewable Heat Incentive, GB-wide replacement schemes and Scottish Government funding programmes such as our low-cost loans and cashback;

- Ensure that the supply chain is aware of the proposed timetable for introduction of regulatory standards and expected compliance dates, so that it can plan with certainty for delivery to support building owners to meet these standards;
- Set out the actions that the public sector and industry can take to address barriers and fill gaps identified in order to deliver on our targets, as well as secure the economic benefits in Scotland;
- Identify global opportunities and set out mechanisms for supporting export potential, and consider requirement for inward investment;
- Include a specific focus on developing local supply chains, attracting inward investment, and securing local jobs, particularly in our islands and remote communities;
- Consider the energy efficiency and zero emissions heat sector within the Scottish Government's Supply Chains Development Programme.

Supply Chains Development Programme (SCDP)

The 2020 Programme for Government set out a commitment to establish a Supply Chains Development Programme. This overarching Supply Chains Development Programme (SCDP) will bring together supply chain development work across key sectors of the economy, where we see genuine sustainable economic potential. It will:

- take the learning from the experience of working on PPE during the COVID pandemic;
- use public sector procurement as a catalyst for supply chain development in areas of strategic interest;
- bring together the strengths of our economic development agencies - Highlands and Islands Enterprise, South of Scotland Enterprise, Scottish Enterprise and Scottish Development International – as well as the National Manufacturing Institute Scotland and other key agencies;
- target existing and prospective suppliers based in Scotland, to enhance their fitness to compete for public contracts;
- help to secure best value for taxpayers and help Scottish suppliers to grow and compete globally; and
- contribute to delivering the National Mission for Jobs.

The supply chain development work identified within this draft Heat in Buildings Strategy will form an early priority of the overarching SCDP.

Exporting our capabilities

Building strong and competitive Scottish supply chains will not only be critical to unlocking the high-volume delivery required later in the decade but also offers the potential to compete in markets outside of Scotland. Our ambitious wider net zero targets and well-developed supply chain will present opportunities to generate exports earnings from overseas markets through utilising our expertise, technology and skills. We will work with Scottish Development International to understand more about the potential for generating export growth through Scotland establishing itself as a centre of technical expertise and manufacturing excellence.

Supporting innovation

Innovation, in terms of products, services and business models, will be required to meet our ambitious targets for transforming Scotland's homes and buildings. Fostering and incubating this innovation in Scotland will help to create further economic opportunities for Scottish businesses. We will work with our partners, including our Enterprise Agencies and the National Manufacturing Institute for Scotland, to create a forward looking and proactive Research and Development community focussed on creating solutions to help decarbonise Scotland's homes and buildings.

We are developing a new framework of support for innovation across Scotland's energy sector, including a specific workstream on heat and energy efficiency. To underpin this, we will launch a call for evidence in early 2021. This call will seek views on how best to maximise Scotland's world-leading research talent and facilities for energy innovation. We will respond to the call for evidence by publishing a new market support framework for innovation by the end of 2021.

Case study: Innovation in our supply chain- supporting heat decarbonisation through innovative heat batteries.

Sunamp is a Scottish company that designs and manufactures thermal batteries using phase change material that cuts fuel costs and carbon emissions by storing available energy from renewable and non-renewable sources as heat and releasing it to deliver hot water and space heating on demand.

Their heat batteries are up to four times smaller and more efficient than conventional hot water cylinders, freeing up space in homes and saving energy. The patented technology, developed in collaboration with University of Edinburgh, also has wide applications in commercial, industrial and automotive settings.



Scottish Enterprise has supported Sunamp from its inception, with a total of £2m invested to date via R&D and commercialisation grants, and is now working with the company to develop a heat battery factory with the potential to produce 500,000 heat batteries per year for Scottish, UK and export markets. Scottish Government funding has enabled the installation of heat batteries in over 800 Scottish homes. The technology has been eligible for support through Home Energy Scotland loans since 2018, acknowledging the role of thermal storage in the decarbonisation of heat.

Through these made-in-Scotland products, Sunamp aims to transform how we generate, store and use heat in order to make a significant impact on tackling climate change both in Scotland and beyond.

Image of Cupboard Comparison showing space saving using water cylinder. Provided by Sunamp (January 2021)

Summary of action we will take:

90. In 2021, on final publication of this Strategy, we will respond to the recommendations from the heat pump sector deal expert advisory group.
91. We will work with our partners Scottish Futures Trust and the Construction Leadership Group to engage with the sector on the opportunity presented by the heat transition.
92. Through our existing Sustainable Energy Supply Chain programme and our economic development agencies - Highlands and Islands Enterprise, South of Scotland Enterprise, Scottish Enterprise and Scottish Development International – we will continue to raise awareness amongst the supply chain, and continue to provide valuable tailored business support that will attract new entrants and inward investment.
93. We are undertaking work to better understand supply chain linkages for the heat transition across the Scottish economy. This work will identify gaps in the supply chain and the extent to which these could constrain future deployment. We are taking a whole-system view and will consider interactions with other economic sectors.
94. We will work with partners to build on our existing Sustainable Energy Supply Chain programme.
95. Early in 2021 we will initiate a new supply chain action plan specifically focussed on the development of energy efficiency and zero emissions heat in the buildings supply chain in Scotland.
96. We will work with Scottish Development International to understand more about the potential for generating export growth through utilising Scotland's technical expertise and manufacturing capabilities.
97. In early 2021, we will set out a call for evidence on a new framework of support for innovation across Scotland's energy sector. We will respond to the call for evidence by publishing a new market support framework for innovation by the end of 2021.

Questions

52. What are your views on the plans set out to maximise the economic benefits to Scotland from the heat transition?
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?
54. Is there anything further that can be done to ensure that Scotland realises the economic opportunity available from the heat transition?
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?
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?

Equipping Scotland's workforce with zero emissions heat skills for the future

To ensure a smooth rollout of zero emissions heating and energy efficiency we need to have the right skills, in the right place and at the right time. The availability of skills is not only needed to enable the rollout, but also to build and maintain consumer trust. Careful planning will therefore be needed to ensure that a workforce is in place, and suitably skilled, ready to meet growing demand for a range of zero emissions heating systems and energy efficiency measures.

To meet the demand, we will need to grow skills in building assessment; the manufacture and installation of energy efficiency measures, manufacture, installation and servicing of heat pumps, the design, installation and servicing of heat networks, as well as ancillary services such as smart heating controls and support services that include innovation and financing. We will also need to think ahead about ensuring that we have skills in place to deliver hydrogen ready boilers, and their subsequent maintenance and servicing, if this becomes a relevant technology in the next decade.

Whilst the installation of energy efficiency measures will create new jobs, the transition to zero emission heating systems is likely to displace jobs in the fossil fuel heating sector over time. In order to ensure a just transition, it will therefore be important that those currently working in the fossil fuel heating sector, for example, gas heating engineers, have opportunities to retrain and reskill.

As we develop our Supply Chains Development Programme we will work with industry bodies, such as SNIPEF and BESA to consider opportunities for retraining and dual qualifying the existing heating sector workforce. As part of a just transition, this will enable existing gas and oil boiler installers to offer expert knowledge on alternative systems.

Community anchor organisations (see case study below) are one example of where local jobs in the heat and energy efficiency sector can be realised, whilst playing an important role in local reskilling and capacity building, providing essential opportunities across the breadth of Scotland. To support this, we will ensure that these community anchor organisations are considered within our Supply Chains Development programme.

Case study: Community anchor organisations providing local reskilling and capacity building employment opportunities in heat and energy efficiency sector - Kyle of Sutherland Development Trust.

Community anchor organisations (CAO's) play a key active role in providing services within their community. Controlled and owned by local people they are well placed and networked to work collaboratively, engaging with volunteers and other active local voluntary and statutory organisations, business, partnerships and

stakeholders, and can respond to challenges and opportunities as they arise. Offering local leadership, they work to represent the views and interests of the community. CAO's may also own a range of community assets, many of which are income generating.



Kyle of Sutherland Development Trust (KoSDT) is a community anchor organisation - a charitable trust and a social enterprise set up in 2011 to deliver economic and social projects, to support community development, and to seek inward investment. KoSDT currently employs 14 staff, a significant number in this remote and rural area, and has acted as a springboard for young local graduates into further careers within the public and private sector across Scotland.

During the last few years, KoSDT has delivered several projects with a focus on energy efficiency and reducing heat demand. These include a number of projects aimed at reducing carbon through home energy efficiency measures, winning the Energy Award at the Climate Challenge Fund (CCF) Awards (pictured). One of their projects, Greening Kyle, a 2-year project funded by the Scottish Government through the CCF, realised a saving of £56,000 on fuel bills across the area and lifted 30% of clients out of fuel poverty.

Image of Kyle of Sutherland Development Trust receiving Energy Award at the Climate Challenge Fund (CCF) (sourced November 2021)

Our Delivery Programmes also maximise the opportunities for skills and employment benefits. Our Warmer Homes Scotland programme delivered over 1,000 training opportunities, 119 trade apprenticeships and created 611 new jobs from 2015-2020. This approach will be integrated into the procurement of a new national Energy Efficiency scheme which will replace Warmer Homes Scotland from September 2022.

In 2018 we convened a Short Life Working Group to consider the quality assurance requirements needed for energy efficiency and zero emissions heating. The Group made 19 recommendations to the Scottish Government covering quality, skills, consumer protection, procurement and non-domestic premises and we consulted on these recommendations in 2019. Respondents to this consultation noted their broad agreement, or agreement in principle, with the recommendations, which were described as welcome, relevant and comprehensive.

When asked about the recommendation to have a quality mark in Scotland, respondents indicated that since any Energy Company Obligation (ECO) work in Scotland has to be carried out by a business that is registered with TrustMark and has demonstrated compliance with PAS 2030 and PAS 2035, it would make sense for the supply chain in Scotland to be aligned with these requirements. Furthermore, establishing separate standards for Scotland could make it difficult for Scottish contractors to work elsewhere in the UK, and vice versa. Rather than establish a separate scheme, it was concluded that there should be a single assurance process and an agreement which confers approval on one scheme that meets the core standards of another.

As a consequence, we will adopt the UK PAS 2035/30 standards for our delivery programmes, which will ensure that installers of energy efficiency measures are suitably skilled to undertake the required works. These standards cover the entire energy efficiency retrofit process in homes, from initial assessment and design, through to installation and evaluation. We will also consider using the UK government endorsed TrustMark quality assurance framework to ensure compliance with these standards.

TrustMark

TrustMark^{lxviii} was established in 2005 and operates within a Master Licence Agreement issued by the UK Government's Department for Business, Energy and Industrial Strategy (BEIS). TrustMark lists 'approved' trades for home improvements and recently in 2019 broadened their remit to include energy efficiency installers.

A TrustMark approved energy efficiency installer must:

- Be certified to the BSI installer standards (PAS 2030) and be compliant with with BSI retrofit standards (PAS 2035).
- Comply with the TrustMark Code of Conduct and Customer Charter.

For microgeneration, including heat pumps, we already require measures installed under our schemes to be installed by an MCS certified installer. Together, PAS 2035/30 and MCS standards will ensure that installations are both good quality and fit for purpose.

To ensure these standards are tailored to the needs of the Scottish market, we have developed an installer skills matrix which we propose to integrate within the PAS 2030 and MCS installer standards by summer 2021. This will provide more clarity on the qualifications required, as well as the different routes for achieving these. We will soon be consulting on the detail of the skills requirements outlined above.

We will provide increased support to Scottish colleges for training and retraining for jobs in the energy efficiency and zero emissions heating sectors, including capital investment for colleges to buy equipment.

Heat networks are not covered by the PAS 2035/30 or MSC Standards and as complex large-scale infrastructure, it requires its own bespoke skills across design, development, operation and maintenance^{lxix}. As the heat industry grows there may be opportunities for redeployment from other sectors. We are working with partners to develop at least two accredited training courses, to be delivered by universities and colleges in Scotland. We expect these courses to be on offer from 2021.

As the skills requirements set out above are adopted, and demand for energy efficiency and zero emission heating grows, we will work together with Skills Development Scotland (SDS), the Scottish Qualifications Authority (SQA) and the Energy Skills Partnership (ESP) to ensure that there are sufficient

training opportunities to ensure that there are career pathways for those who wish to enter the sector. We will also work with our partners to develop new qualifications for energy efficiency and zero emissions heat as may be appropriate.

The **Climate Emergency Skills Action Plan (CESAP)**, published in December 2020 identifies construction, including building retrofit as a priority area for the net zero transition, and proposes immediate and longer-term actions to support people to reskill, retrain and access the growing number of good, green jobs. CESAP recognises the call made by the Climate Change Committee for a step change in the development of zero emissions skills in construction, as well as the increased demand in professional level skills such as planning, design, surveying as well as management. There will also be a requirement for specialist knowledge and skills around retrofit, zero emission heating systems and heat networks for professional, technical and craft roles. Upskilling of existing roles and reshaping of training will be needed across new build and retrofit, as well as for growing demand for digital construction skills and leadership skills across the sector.

We will continue to drive delivery of the skills and jobs actions above through the CESAP delivery, including the new **Green Jobs Workforce Academy** and the **Green Jobs Skills Hub**. These will support both employees and employers to access the information and support they need to reskill and retrain for green job opportunities of the future.

As we develop our **Supply Chains Development Programme** this year, we will set out a more detailed profile of the likely demand for skills and how it is likely to change over time. We will also consider what further support is needed to enable individuals to train in the sector, drawing on insights from our Affordable Housing Supply Programme evaluation. Ensuring that young people can access training opportunities and apprenticeships will be critical to grow the sector. We will continue to use our government-led programmes, such as Warmer Homes Scotland, to support apprenticeships, and will look to expand this further through our existing funding programmes.

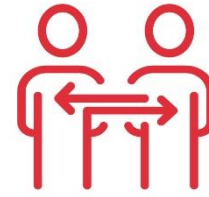
Summary of action we will take:

98. We will work with industry bodies, such as SNIPEF and the BESA to consider opportunities for retraining and dual qualifying the existing heating sector workforce.
99. We will consult on proposals for Scottish skills requirements for energy efficiency, low and zero emissions heating systems, microgeneration and heat networks in 2021.
100. We will continue to work together with Skills Development Scotland (SDS), the Scottish Qualifications Authority (SQA) and the Energy Skills Partnership (ESP) to ensure that there are sufficient training opportunities and to ensure that there are career pathways for those who wish to enter the sector. We will also work with our partners to develop new qualifications for energy efficiency and low and zero emissions heating as may be appropriate.
101. Provide increased support to Scottish colleges for training and retraining for jobs in the energy efficiency and low and zero emissions heating sectors, including capital investment for colleges to buy equipment.
102. With partners, we will develop at least two accredited training courses, to be delivered by universities and colleges in Scotland. We expect these courses to be on offer from 2021.
103. Throughout 2021, we will continue to build evidence in support of the wider skill requirements necessary for installing low and zero emissions heating systems in the buildings sector, including the timings of when skills are required, how best to support the transition opportunity from other industries, support training of young people and the provision of local jobs across Scotland, as well as the development of apprenticeships in this area.
104. We will continue to use our government led programmes, such as Warmer Homes Scotland, to support apprenticeships, and will look to expand our support for apprenticeships through our existing funding programmes.

Questions

57. In recognition of the proposals set out in the forthcoming skills consultation what further action can be taken to support skills development in Scotland over the lifetime of this strategy?
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?
59. How can we support the development of more opportunities for young people?

Chapter 10 Working with the UK Government



Transforming our building stock requires a step-change in deployment rates, supported by 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, while others, including many aspects of energy policy, remain reserved to the UK Government and, as a consequence, we need UK Ministers to take decisions that facilitate Scotland's meeting of pathways set out in the Climate Change Plan Update.

We believe that emissions from buildings cannot be reduced to zero in a fair and just way through action only within devolved competence. A broad suite of energy market reforms is needed, including reviewing the future role for the gas network, changes to the ways in which policy levies are applied to energy supply and new safeguards put in place to share the cost of the transition fairly across consumers. Energy generators, as well as network and supply companies need to be better incentivised to deliver zero emissions heat solutions, and investment from the UK Government and the private sector needs to be significantly ramped up.

The changes we need to see in heating are not limited to Scotland. These changes are critical to delivering the UK's collective climate change commitments. A collaborative approach, which enables Scotland to move ahead of the rest of the UK in some areas, will enable new and innovative approaches to be tried and tested, such as Local Heat & Energy Efficiency Strategies, from which other nations and regions in the UK can learn. As such it is imperative that the Scottish and UK Governments work together to take action and deliver the change needed.

Regulation of heating systems in buildings

As set out in chapter 8, we intend to develop regulations to ensure that all buildings, across all tenures are energy efficient by 2035 and use zero emissions heating (and cooling) by 2045. We will exercise existing devolved powers to achieve this as far as possible, but to be effective, this approach needs complementary action in areas reserved to the UK Government. For example, our proposals will ensure the successful operation of our proposed

2024 new build standard, which is paralleled by the UK Government's Future Homes Standard for England.

We are also asking the UK Government to amend the Gas Act 1986 to stop the extension of the gas grid to new properties. Following the UK Government's plans announced in the December 2020 Energy White Paper, to consult on ending gas grid connections to new homes, we are seeking urgent discussions with the UK Government to understand the full implications of any amendments to the Gas Act 1986 - particularly around how this could support the implementation of our New Build Heat Standard in 2024.

New investment, innovation and market mechanisms

We will work with the UK Government to explore options for new market mechanisms to drive investment and innovation, to drive an increasing rate of deployment of low and zero emissions heating. These options may include new obligations on market actors, product standards and innovation funding, some of which may cut across reserved and devolved competencies.

We will work with the UK Government to ensure that any future changes to the heating market supports a fair distribution of the costs of transition across building owners, consumers and market actors such as suppliers, retailers and equipment manufacturers. This should be combined with continued protection for vulnerable consumers and the fuel poor.

The whole energy system: gas network, electricity generation

We are 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. We also see a compelling case for a continued programme of demonstration for hydrogen and funding for Carbon Capture Usage and Storage (CCUS).

We will work with the UK Government to ensure the powers it holds to develop Scotland's renewable electricity pipeline are exercised to best effect. This will be critical to ensure that generation capacity is adequate to meet demand, arising from the increasing role of electricity in heat and transport across both Scotland and the UK.

Ofgem's statutory obligations need to be updated to include Ofgem enabling the delivery of net zero and interim statutory greenhouse gas emission targets, and to secure appropriate and much needed network

investment. These obligations must recognise targets that apply to Scotland and Wales, as well as the UK. We seek to ensure there is a framework to support the energy network companies – both gas and electricity – that enables more flexible investment for infrastructure improvements in delivering heat decarbonisation.

Heat network customer protection

We have asked the UK Government to ensure that forthcoming UK heat networks legislation creates powers for the Scottish Government to appoint a regulator of its choosing, to enforce both UK-wide heat network consumer protection and the Scottish regulatory framework being introduced by the Heat Networks (Scotland) Bill. This should include new powers for Scottish Ministers to extend the remit of Ofgem, in relation to heat networks only, so that Ofgem can act in this capacity if desired by Scottish Ministers. We have asked for this to be clarified during the passage of our Heat Networks (Scotland) Bill, but this remains unclear at the time of writing.

Hydrogen-ready boilers

We are asking that, should evidence and decisions on the gas grid support a significant role for hydrogen in heating, and should they prove affordable, the UK Government revise product standards for gas boilers, requiring them to be hydrogen-ready, and to work with the Scottish Government on this and the subsequent regulation of such appliances. We welcome the recent UK Government commitment to assess the case for encouraging or requiring the installation of hydrogen-ready boilers and will work with the UK Government on this assessment, ensuring that the interests of Scottish consumers and our regulatory and policy landscapes are taken into account.

Taxes and levies

We are requesting that the UK Government commit to working constructively with the devolved administrations. It is critical that we work together to ensure that the distribution of costs of heat decarbonisation is fair, and that the outcomes from the Net Zero Review and any subsequent policy measures provide the right financial incentives for households and businesses to choose energy efficiency and zero emissions heating technologies, whilst supporting the eradication of fuel poverty.

We welcome the UK Government's commitment, as set out in its recent Energy White Paper, to publish a call for evidence this year to begin a

strategic dialogue between government, consumers and industry to establish a framework for affordability and fairness. Within this work we urge 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, and help to unlock the deployment of low and zero emissions heating. We urge the UK Government to quickly progress this work so that a fair settlement for energy consumers can be achieved which accelerates our transition to a net zero economy.

We would also like to see changes to the VAT regime so that all energy efficiency and renewable heat retrofit installations receive reduced or zero VAT rate. Reducing the VAT rate on retrofit has been shown in other countries to incentivise uptake and helps to reduce the cost for households and businesses who may otherwise struggle to make such an investment.

We will also look closely at proposals in Europe to bring natural gas for domestic heating and heating oil into the EU Emissions Trading System, as a mechanism to drive investment to reduce emissions, and consider whether these proposals are suitable and workable in a UK context, working with the UK Government and other devolved administrations as part of the proposed review of the scope of the new UK Emissions Trading Scheme.

Bioenergy

As set out in chapter 2 we see a limited role for bioenergy in heating, in line with advice from the UK's Climate Change Committee. However, we recognise for a small number of buildings that bioenergy, in particular bio heating oil, bioLPG and biomass, may represent the only practicable option for heat decarbonisation. We are therefore urging that the UK Government work with the Scottish Government and key stakeholders 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. Enforcing these criteria alongside the Scottish Government's wider approach to regulation of heat in buildings, may require UK legislation or devolution of specific powers to Scotland.

Schemes that operate across Great Britain (“GB wide schemes”)

As a result of our sustained investment since 2009, Scotland has been successful in leveraging significant additional investment from GB-wide funding programmes, such as the Energy Company Obligation (ECO) and the Renewable Heat Incentive (RHI).

The Scottish Government will continue to seek to maximise the impact of GB wide funding, to support faster progress with decarbonisation of heating systems and continued progress in improving energy efficiency, addressing one of the drivers of fuel poverty.

Energy Company Obligation

The recently published Energy White Paper indicates that the Energy Company Obligation scheme will continue beyond 2022. The Scottish Government will continue to seek to maximise the impact of this funding in reducing energy bills for fuel poor households and enabling increased progress with decarbonisation of heating systems.

We urge the UK Government to review levy funding for the Energy Company Obligation and the Warm Homes Discount and work with Scottish Ministers so that these can be brought together into a single Combined Levy to establish a single, flexible Scottish Fuel Poverty scheme, as provided for in the Scotland Act. This will support low-income households with higher energy costs, and help fund necessary energy efficiency improvements and the switch to zero emissions heating.

Clean Heat Grant (CHG)

The proposed Clean Heat Grant is a welcome first step in introducing a replacement for the Renewable Heat Incentive (RHI). However, we believe that the scope of the scheme should be extended, or complementary schemes introduced, to ensure there is continued support for larger scale projects, as currently available under the RHI. We also urge the UK Government to increase the total level of funding available across the two years of the scheme so that it can act as a true stimulus, driving the deployment of low and zero emissions heating systems and helping support the growth of supply chains in the sector.

Low and zero emissions measures can cost more to install in our remote rural and island communities. The flat grant level proposed does not recognise the likely cost differences that exist across the UK and it also limits technology choice. We believe that the flat grant level should be revisited, and increased where possible, to provide greater flexibility and help households and businesses overcome the upfront cost of investing in zero emission heating.

Access to Data

To support our analysis, planning and delivery, we are also requesting that the Scottish Government is provided with full access to data relating to low and zero emissions heat installations in Scotland resulting from all UK schemes, including innovation and funding schemes, as well as other relevant data collections. We are seeking amendments to any legislation which prevents the provision of this data.

We therefore call on the UK Government to:

- amend the Gas Act 1986 to stop the extension of the gas grid to new properties;
- work with us to identify and develop options for new market mechanisms to drive investment, innovation and deployment of low and zero emissions heating;
- work with us to ensure a fair distribution of the costs of the transition; and to put in place the right financial incentives for households and businesses;
- accelerate decisions on the role of hydrogen and the future of the gas network, and to ensure timely updates to relevant regulations;
- amend Ofgem's statutory obligations to include a duty to enable delivery of statutory greenhouse gas emission targets across all administrations in the UK;
- ensure that forthcoming UK heat networks legislation creates powers for the Scottish Government to appoint a regulator of its choosing, to enforce both UK-wide heat network consumer protection and the Scottish regulatory framework being introduced by the Heat Networks (Scotland) Bill;

- work with us on product standards for gas boilers, for example requiring them to be hydrogen-ready;
- rebalance environmental and social obligation costs on energy bills to help unlock deployment and ensure a fair settlement for consumers;
- amend the VAT regime so that all energy efficiency and renewable heat retrofit installations receive a reduced or zero VAT rate;
- work with the devolved administrations under the proposed review of the new UK Emissions Trading Scheme, to consider how it could drive investment to reduce heat emissions;
- explore the role for different bioenergy fuels in buildings and, as appropriate, develop sustainability and other appropriate criteria;
- review levy funding for the Energy Company Obligation and the Warm Homes Discount and work with Scottish Ministers to bring these together into a single Combined Levy to establish a single, flexible Scottish Fuel Poverty scheme; and
- extend the scope of the Clean Heat Grant, increase the total level of funding available, and increase the flat grant level to recognise likely cost differences across different communities.

Questions

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?
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?

Chapter 11 Monitoring, Evaluation and Future Decision Making



Monitoring and Evaluation

In order to ensure we are on track to achieve our long-term vision and track progress towards milestones, we will be monitoring and evaluating delivery. Monitoring and evaluation will allow us to adapt and flex our approach where necessary.

As well as looking at **outputs, including policy and programme interventions**, we will be monitoring and **measuring outcomes**, capturing the impact 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, we will publish a **monitoring and evaluation framework**, setting out:

- a comprehensive framework for monitoring progress against the objectives set in this draft Strategy covering homes, work places, public sector buildings and other non-domestic buildings; and
- a range of output and outcome indicators, linked to our outcomes (Chapter 2), 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.

We will build in evaluation to our delivery programmes, such as Warmer Homes Scotland, our Area Based Schemes, the replacement to the Low Carbon Infrastructure Transition Programme and CARES, to ensure lessons are learned and inform future approaches and rollout.

Our work should be based on and driven by clear evidence and data. As such we will be reviewing available data, identifying where any gaps exist and where we can draw on existing evidence, ensuring we have the most accurate baseline for our building stock. We will also curate exemplars of excellence and best practice, to inform future decisions on targets, regulations and delivery, as well as project and programme design.

It will be important that our Heat in Buildings Strategy stays current and reflects the latest thinking and developments in the UK, Europe and elsewhere in the world. As such, we will review the strategy in the mid-2020s, making any adjustments required and setting out more detailed actions to accelerate and drive progress through the second half of the decade to 2030.

Future Decision Making

Transforming Scotland's homes, workplaces and community buildings is a shared endeavour. We set out earlier the importance of working with individuals and communities, to secure this transition in a way that works with, and for, people. Local government will be a key partner in achieving delivery on the ground. We will continue to work with COSLA to strengthen and integrate governance arrangements on heat and energy efficiency, to ensure effective delivery over the long term.

As we continue to develop and deliver the national Heat in Buildings Strategy, we will draw on findings from Scotland's Citizens Assembly for Climate Change, and continue to seek advice from our stakeholders and advisors via our External Advisory Group (see Annex E for membership). This group is made up of a wide range of stakeholders representing different interests, including networks, consumers, supply chains and delivery partners.

One of the most important things we have heard to date is the need for certainty. This is needed to allow people and businesses to plan and phase investments and work pipelines. We know that uncertainty arising from changing priorities, targets and milestones, as well as support mechanisms, can slow down progress.

In order to overcome this, we have already committed to a 5-year capital budget for our heat and energy efficiency programmes and will, during the next Parliament, bring forward regulations across energy efficiency and heating systems, setting the long-term statutory requirements for buildings to become zero emissions.

Summary of action we will take:

105. Publish a monitoring and evaluation framework to accompany the publication of the final strategy.
106. We will build in evaluation to our delivery programmes, to ensure lessons are learned and inform future approaches and rollout.
107. We will continue to work with COSLA to strengthen and integrate governance arrangements on heat and energy efficiency to ensure effective delivery over the long term.

Questions:

62. Do you agree with our proposals for a monitoring and evaluation framework? If not, please state your reasons and suggested improvements.
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?
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?

Annex A Summary of Actions

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

- We will undertake further analysis in 2021-22 to fully understand the role of secondary technologies, such as solar panels and thermal and battery storage to better understand their role in heat decarbonisation.
- We will publish a review of evidence on heat pumps in Scotland, in the first quarter of 2021. We are undertaking further research to consolidate evidence on heat pump performance in situ across Scotland where data exists. This research will be published in March 2021, and will be used to inform future policy and where relevant reflected in the design of our delivery programmes.
- Analysis undertaken for non-domestic buildings in Scotland, to be published in Spring 2021, shows that zero emissions heating technologies are applicable to a large proportion of the non-domestic building stock, however enabling works such as upgrading distribution systems (installing larger-sized pipes and new heat emitters to accommodate lower flow temperatures) and increasing site electricity capacity may often be needed.
- We will undertake further modelling and analysis during 2021-22 to better understand the role of energy efficiency in unlocking the deployment of zero emission heating systems, which will inform future delivery and regulatory programmes.
- We will keep the role of Hybrid system under active review as the evidence base develops.
- We will undertake research by 2023 to understand the potential cooling needs of Scotland's building stock, which will inform future policy development in this area.

Chapter 3 - People

1. Building on the Climate Change Public Engagement Strategy, we will develop and begin implementing a bespoke public engagement strategy for heat in building, in 2021.
2. We will respond to the Climate Assembly's recommendations and take action on them as we further develop this draft strategy.
3. By 2023, we will have simplified our branding to make our schemes easier to identify and navigate, helping to build trust and awareness.

4. We will identify and support disengaged and vulnerable groups, ensuring that the heat transition is accessible to all of society, and we will give due regard to equalities, and shall not unfairly discriminate based on any protected characteristics.
5. We will invest in growing our advice services so that they continue to meet the needs of the Scottish public. This includes improving our digital presence and extending the support on offer to provide more in-depth support for installing zero emissions heating systems.
6. We will expand our Green Homes Network so that people can learn from other householders, businesses and organisations who have already made the transition to warmer, greener and more efficient buildings.
7. We will work closely with consumer groups to continuously monitor and identify potential issues and take mitigating action where they arise.
8. We will work with the Energy Consumers Commission and Consumer Scotland and a range of Scottish consumer representative organisations to ensure that issues of consumer detriment are identified and addressed, focussing on consumer understanding, accessibility, costs, redress, and support for vulnerable consumers.
9. We will publish guiding principles to underpin our commitment that no one is left behind in the heat transition, ensuring our approach neither increases the fuel poverty rate nor increases the depth of existing fuel poverty and ensures that those on lower incomes or in or at risk of fuel poverty are protected from any negative impacts. This will include the effective design and targeting of our fuel poverty and heat in buildings programmes.
10. We will continue to build the evidence base on the interactions between our fuel poverty and climate commitments, and apply that knowledge to our policy design and to our programmes, mitigating any risk of unintended consequences, and tracking progress and learning by doing in order to adjust immediately where unintended consequences nevertheless arise.
11. We will continue to prioritise energy efficiency measures through our delivery programmes, as this will enable the roll-out of zero emissions heating, as well as help to tackle fuel poverty.
12. We will take action through our delivery programmes to maximise the number of homes with households in fuel poverty achieving a level of energy efficiency equivalent to EPC C by 2030 and EPC B by 2040.
13. We will take a zero emission first approach in our delivery programmes and will phase out funding for fossil fuel heating systems by 2024 where it is not detrimental to our fuel poverty objectives.

14. We will work with energy retailers to ensure households have access to the right tariffs, that tariffs tailored to zero emissions heating systems are available, and continue to press for customers with pre-payment meters to access similar tariffs to direct debit customers.
15. We will commission further analysis during 2021-22 to consider the distributional impacts of decarbonising our homes and buildings and quantify the scale of impact on those in or at risk of fuel poverty or on lower incomes and look at options available to Scottish Government to mitigate these impacts.
16. During 2021-22 we will conduct research to understand the cost effectiveness of thermal, electrical storage and rooftop solar PV to support households to reduce bills, and where this proves effective consider support for them through our existing delivery mechanisms.

Chapter 4 - Place

17. We will explore the opportunity to integrate heat decarbonisation in community climate action initiatives such as Climate Action Towns and Community Climate Action Hubs.
18. We will support communities to work together to address, and champion, heat decarbonisation through the new CARES programme and work to understand further the models and solutions most appropriate for communities in Scotland.
19. We will work in collaboration with the Scottish Cities Alliance and the seven cities on the cities' ambitions for low and zero emissions heat (in particular heat networks), supporting delivery, by 2030, of a pipeline of projects.
20. We will commission a full evaluation of the LHEES pilot programme in 2021-22.
21. We will consult on the draft LHEES methodology and guidance with a view to introducing legislation to establish LHEES on a statutory basis so that they are in place for all local authority areas by the end of 2023.
22. We will use LHEES Delivery Plans to target support for deployment and to help identify early areas for low-regrets action.
23. We will set out further guidance to ensure the involvement of local communities in decision making about the heat transition in their local area as part of the development of Local Heat & Energy Efficiency Strategies.
24. Through National Planning Framework 4 we will look for opportunities to strengthen planning policy to enable and encourage energy efficiency and low and zero emissions heating.

25. We will include low and zero emissions heat networks and micro-renewable technologies in the review programme for Permitted Development Rights.

Chapter 5 – Preparing our Energy Networks

26. We will update the Scottish Energy Strategy this year taking into account the whole system issues raised by our net zero climate targets.
27. We will carry out analysis during 2021 to understand generation and network requirements, in terms of the scale and location of the demand that heat electrification could bring.
28. We will ask the UK Government to continue to provide the support needed to develop Scotland's renewable electricity pipeline needed to meet a decarbonised future for heat.
29. We will undertake work in 2021 - 2022 to explore the potential network investment costs of the heat transition for Scotland, to provide greater clarity on the likely range of costs, and likely impacts on consumers, including those in, or at risk of, fuel poverty and help inform further decision-making.
30. During 2021, we will conduct research into the role of energy storage in heat networks and buildings in reducing consumer costs, and minimising network impact.
31. In 2021 we will set up a Heat Electrification Partnership with Scotland's electricity network operators to ensure that the upgrades required are delivered when and where they are needed and ensure that the LHEES framework informs this.
32. We will investigate demonstration projects through our delivery programmes strategic priorities to allow us to model real time network impact of heat pump deployment, smart-enablement, energy storage and demand management.
33. Throughout 2021, and beyond, we will continue to engage Ofgem to ensure that there is a framework to support the energy network companies – both gas and electricity – in reflecting the Scottish Government targets and ambitions as set out in this draft Strategy.
34. Throughout 2021 build on our work with SGN and National Grid Gas Transmission to provide evidence on the role gas decarbonisation can play in meeting our targets, and a timeline for resolving uncertainties.
35. Working with stakeholders, including network companies, local authority and delivery partners, we will undertake analysis in 2021 - 2022 to identify strategic areas most and least likely to have access to low carbon or green hydrogen in the future.

36. Work with the UK Government to ensure that the Green Gas Support Scheme meets the needs of Scotland, and minimises the impact of the Green Gas Support Scheme Levy on end user costs, especially in relation to fuel poverty levels.
37. We will 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.
38. Consult on the use of sections 44 and 63 of the Climate Change (Scotland) Act 2009 to introduce mandatory connection for large and publicly-owned buildings in next Parliament.
39. Introduce a requirement through the 2024 New Build Heat Standard for new buildings being constructed to connect to existing heat networks, when they are located within a Heat Network Zone.
40. Consult on how new powers under section 15 of the Non-Domestic Rates (Scotland) Act 2020¹ could be used to de-risk investment and drive net zero behaviour, including connections to heat networks.
41. Develop a set of common technical standards for development and operation of heat networks across Great Britain which will help support the development of skills and the sector's supply chain.
42. Create a new District Heating Relief of 90% to 2023/24 for new District Heating networks powered by renewable sources, waste heat or energy from waste.
43. Include heat networks in our ongoing programme of reviewing Permitted Development Rights (PDR) and, subject to the findings, lay Regulations.
44. We will consult in 2021-2022 on whether the need for further regulatory measures or support measures to increase the utilisation of waste or surplus heat, for example from Energy from Waste plants, to be supplied and/or used through heat networks.
45. Publish a Heat Network Investment Prospectus during the next financial year that will demonstrate the size and location of heat network opportunities across Scotland, as well as information on the decarbonisation requirements of existing networks in Scotland.
46. Repurpose the Heat Network Partnership in 2021 with a refreshed membership and remit focussed on pipeline development and subsequent delivery.

Chapter 6 – Kick-starting Investment in the Transition

47. We propose to expand existing delivery programmes to focus on accelerating deployment over the next 5 years against the following four strategic priorities: (1) those least able to pay, (2) investing in strategic technologies in low or no regrets areas, (3) showcasing Net Zero Leadership and share learning through early adoption in key areas of focus and (4) investing in innovation and demonstration to drive forward competitive advantage.
48. We will offer interest-free loans for heat and energy efficiency technologies via Home Energy Scotland, with an additional commitment to run our cashback scheme until at least 2023 to help households overcome the upfront cost of taking early action.
49. We will undertake user research and market testing to understand the need of further products which may be needed to support and smooth the consumer journey including the option for a self-funded pre- and post-installation service.
50. We will evaluate the area-based equity loans pilot and consider any future equity scheme in light of this evaluation.
51. We will continue delivery of energy efficiency investment to support fuel poor households in order to make homes warmer and easier to heat and to reduce the impact of any increased running costs from zero emissions systems, including recognising the distinct challenges faced by island, rural and remote communities, and seek to improve targeting so that we can reach more households in fuel poverty.
52. Over the next five years, our Area Based Schemes will increase their reach to support higher numbers of households in or at risk of fuel poverty. We will deliver an increased number of 'whole house' retrofits to fuel poor households and will adopt a 'zero emissions first' approach in improving heating systems.
53. We will procure a new, enhanced, Warmer Homes Scotland to begin in 2022, which will support fuel poor households at its heart, and embed increased support for zero emissions heating, adopting a zero emissions first approach.
54. We will support SME businesses via our Energy Efficiency Business Support service (formerly Resource Efficient Scotland) and SME Loans to take action to reduce their energy use and cut emissions. We will continue our new SME loan cashback schemes until at least 2023.
55. We will expand our Green Network for Businesses, so that SMEs can learn from people, businesses and organisations who have already made the transition to warmer, greener and more efficient buildings.
56. We will continue to run our SME loan cashback schemes until at least 2023 to help reduce the cost of investing. In order to understand the

support and investment SME businesses need to secure an accelerated rollout of energy efficiency and zero emission heating systems we will consult and work with the sector to develop new policies and proposals for SMEs.

57. Throughout the next 5 years, we will support communities to take the necessary steps to transform their assets so that they are ready for a net zero Scotland through our new CARES programme.
58. We will extend our financial support for our most remote and islanded off-grid communities, ensuring that security of supply is maintained and decarbonised – acting across electricity, heat and energy efficiency – helping to transition these communities to a net zero future.
59. We will bring forward a new Scottish Green Public Sector Estate Scheme during 2021 - drawing together capital grants, loans, and other revenue funding mechanisms - as the main government-led capital funding mechanism to support leadership for heat decarbonisation right across the public sector.
60. We will work with stakeholders to design and develop the successor LCITP programme through the Call for Evidence
61. We commit to extending the Social Housing Net Zero Heat Fund until 2026 to further accelerate the decarbonisation of our social housing stock, and consider how this financial support will work in tandem with our domestic energy efficiency programmes to deliver a comprehensive approach to decarbonising our social housing stock.
62. We will support affordable housing providers who wish to install zero emissions heating systems in homes through our Affordable Housing Supply Programme, ahead of regulatory requirements in 2024.
63. We will design Scottish Government delivery programmes and advice services so that they continue to maximise the contribution from UK Government funding.
64. We will also continue to press the UK Government to provide more funding for energy efficiency and zero emission heating via GB-wide schemes, including working with UK Government to identify a more progressive way of funding these programmes.

Chapter 7 – Working Towards a Long Term Market Framework

65. In 2021-2022, we will commission independent analysis and modelling to better understand the expected costs of upgrading different property types to the proposed standards, to help guide investment decisions.

66. Establish a new Green Heat Finance Taskforce in early 2021 to provide advice and recommendations to Scottish Government on potential new financing models and routes to market.
67. Set out options for future financing and delivery in 2023, with a view to implementing these new mechanisms from 2025 where applicable and allowed within our legislative competence.
68. Work with the UK Government to design new market mechanisms that can secure and accelerate delivery.
69. We will undertake scoping work during 2021 to understand how the Heat as a Service model might support our decarbonisation goals, including commissioning market and consumer research.
70. We will consider how our local tax and charging powers, such as council tax and non-domestic rates, could be used to incentivise or encourage the retrofit of buildings, alongside our planned approach to regulation. We will commission further analysis to identify potential options, to be implemented from the middle of the decade where appropriate, subject to consultation and public engagement.
71. We will work with the UK Government as it progresses its call for evidence on affordability and fairness to ensure that any reforms do not disadvantage Scottish consumers and that they fit with and enable delivery of our more ambitious climate targets.
72. We will publish research on the impact of rebalancing consumer levies on electricity and gas bills.

Chapter 8 – Developing a Regulatory Framework for Zero Emissions Buildings

73. We will introduce regulation in a way that is proportionate and which considers the health and wellbeing of Scotland's people.
74. We will ensure sufficient periods of transition to allow people and the market to adjust and prepare for new standards coming into force.
75. We will tailor our delivery support to set out a clear path of support and advice for all those effected.
76. We will consider what legislation is needed to meet these regulatory ambitions, including bringing forward new primary legislation in this area if required, pending further policy development and securing agreement with the UK Government on any necessary devolution.
77. Develop and bring into force the 2024 New Build Zero Emissions from Heat Standard, requiring new buildings to have zero direct emissions heating systems.
78. Review energy standards within current building regulations to deliver further improvement in energy efficiency and emissions reductions in new buildings, in 2021 and 2024.

79. Publish the Net Zero Carbon Public Buildings standard in early 2021 and work to introduce regulation and mandatory standards across the non-domestic sector more widely from 2023-25 onwards.
80. We will consult on a reformed EPC assessment process to better align with wider net zero objectives whilst meeting our fuel poverty obligations by summer 2021.
81. We will bring forward proposals for regulating, to the extent that devolved powers allow, to require the installation of zero or very near zero emissions heat in existing buildings from 2025, with a backstop of 2045.
82. We will bring forward regulations requiring private rented sector properties to achieve an equivalent to EPC C by 2028.
83. We will consult on detailed proposals to introduce regulations from 2023-2025, to require owner occupied private homes to meet a minimum level of energy efficiency (equivalent to EPC C) by 2035.
84. We will seek the agreement of the social housing sector stakeholders to bring forward the review of EESSH2 to 2023 with a view to strengthening and realigning the standard with net zero requirements so that social housing leads the transition to zero emission buildings.
85. We will consult on introducing regulation to require mixed tenure and mixed-use buildings such as tenements to reach a good level of energy efficiency (equivalent to EPC C where technically feasible and cost effective), and to install a zero emissions heating supply by 2040-45, including provisions on ensuring cooperation between building owners to carry out works and recover costs.
86. We will work with Historic Environment Scotland to consider what specific regulatory provisions or exemptions may be needed within regulations for buildings designated as listed or in conservation areas. (this also applies to non-domestic buildings as below)
87. Develop and introduce strengthened regulation for non-domestic buildings, which builds on existing requirements under Section 63 of the Climate Change (Scotland) Act, to ensure they reduce demand for heat and install a zero emissions heating supply; and launch a consultation on these proposals.
88. We will develop guidance for minor refurbishments and heating system replacements in the public sector.
89. We will consult on area or zone-based triggers to complement those at the individual property level.

Chapter 9 - The Economic Opportunity

90. In 2021, on final publication of this strategy, we will respond to the recommendations from the heat pump sector deal expert advisory group.
91. We will work with our partners Scottish Futures Trust and the Construction Leadership Group to engage with the sector on the opportunity presented by the heat transition.
92. Through our existing Sustainable Energy Supply Chain programme and our economic development agencies - Highlands and Islands Enterprise, South of Scotland Enterprise, Scottish Enterprise and Scottish Development International – we will continue to raise awareness amongst the supply chain, and continue to provide valuable tailored business support, that will attract new entrants and inward investment.
93. We are undertaking work to better understand supply chain linkages for the heat transition across the Scottish economy. This work will identify gaps in the supply chain and the extent to which these could constrain future deployment. We are taking a whole-system view and will consider interactions with other economic sectors.
94. We will work with partners to build on our existing Sustainable Energy Supply Chain programme.
95. Early in 2021 we will initiate a new supply chain action plan specifically focussed on the development of energy efficiency and zero emissions heat in the buildings supply chain in Scotland.
96. We will work with Scottish Development International to understand more about the potential for exporting our Scottish capabilities overseas.
97. In early 2021, we will set out a call for evidence on a new framework of support for innovation across Scotland's energy sector. We will respond to the call for evidence by publishing a new market support framework for innovation by the end of 2021.
98. We will work with industry bodies, such as SNIPEF and the BESA to consider opportunities for retraining and dual qualifying the existing heating sector workforce.
99. We will consult on proposals for Scottish skills requirements for energy efficiency, low and zero emissions heating systems, microgeneration and heat networks in 2021.
100. We will continue to work together with Skills Development Scotland (SDS), the Scottish Qualifications Authority (SQA) and the Energy Skills Partnership (ESP) to ensure that there are sufficient training

opportunities and to ensure that there are career pathways for those who wish to enter the sector. We will also work with our partners to develop new qualifications for energy efficiency and low and zero emissions heating as may be appropriate.

101. Provide increased support to Scottish colleges for training and retraining for jobs in the energy efficiency and low and zero emissions heating sectors, including capital investment for colleges to buy equipment.

102. With partners, we will develop at least two accredited training courses, to be delivered by universities and colleges in Scotland. We expect these courses to be on offer from 2021.

103. Throughout 2021, we will continue to build evidence in support of the wider skill requirements necessary for installing zero and emissions heating systems in the buildings sector, including the timings of when skills are required, how best to support the transition opportunity from other industries, support training of young people and the provision of local jobs across Scotland, as well as the development of apprenticeships in this area.

104. We will continue to use our government led programmes, such as Warmer Homes Scotland, to support apprenticeships, and will look to expand our support for apprenticeships through our existing funding programmes.

Chapter 10 - Working with the UK Government

We call on the UK Government to:

- amend the Gas Act 1986 to stop the extension of the gas grid to new properties;
- work with us to identify and develop options for new market mechanisms to drive investment, innovation and deployment of low and zero emissions heating;
- work with us to ensure a fair distribution of the costs of the transition; and to put in place the right financial incentives for households and businesses;
- accelerate decisions on the role of hydrogen and the future of the gas network, and to ensure timely updates to relevant regulations.
- amend Ofgem's statutory obligations to include a duty to enable delivery of statutory greenhouse gas emission targets across all administrations in the UK;
- ensure that forthcoming UK heat networks legislation creates powers for the Scottish Government to appoint a regulator of its choosing, to enforce both UK-wide heat network consumer protection and the

Scottish regulatory framework being introduced by the Heat Networks (Scotland) Bill;

- work with us on product standards for gas boilers, for example requiring them to be hydrogen-ready;
- rebalance environmental and social obligation costs on energy bills to help unlock deployment and ensure a fair settlement for consumers;
- amend the VAT regime so that all energy efficiency and renewable heat retrofit installations receive a reduced or zero VAT rate;
- work with the devolved administrations under the proposed review of the new UK Emissions Trading Scheme, to consider how it could drive investment to reduce heat emissions;
- explore the role for different bioenergy fuels in buildings and, as appropriate, develop sustainability and other appropriate criteria;
- review levy funding for the Energy Company Obligation and the Warm Homes Discount and work with Scottish Ministers to bring these together into a single Combined Levy to establish a single, flexible Scottish Fuel Poverty scheme; and
- extend the scope of the Clean Heat Grant, increase the total level of funding available, and increase the flat grant level to recognise likely cost differences across different communities.

Chapter 11 - Monitoring, Evaluation and Future Decision Making

105. Publish a monitoring and evaluation framework to accompany the publication of the final strategy.

106. We will build in evaluation to our delivery programmes, to ensure lessons are learned and inform future approaches and rollout.

107. We will continue to work with COSLA to strengthen and integrate governance arrangements on heat and energy efficiency to ensure effective delivery over the long term.

Annex B Summary of Consultation Questions

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

1. To what extent do you support the pathway set out for achieving the 2045 net zero target and the interim 2030 target?
2. What are your views on any risks of unintended consequences from this pathway?
3. What are your views on our assessment of strategic technologies in low and no regrets areas to 2030?
4. What function should a new heat target serve?
5. How do you think a new heat target should account for the need to deliver against our statutory fuel poverty targets?
6. Do you agree that a new heat target should apply to heat in buildings, distinct from industrial heat?
7. What form should a new heat target take and why?
8. At what level should the target (s) be set and for what date?

Chapter 3 - People

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?
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?
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).
12. In your opinion could any of the proposals set out in this strategy have an adverse impact on children's rights and wellbeing?
13. What further action can we take to support people to make informed choices on the energy efficiency and heating options available to them?
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?

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

Chapter 4 - Place

21. What are your views on how we can support place-based deployment of zero emissions heat within our delivery programmes?
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?
23. What role do you think community anchor organisations could play in supporting the heat transition?
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?
25. What is your view on the timescales proposed for LHEES?
26. Do you agree with the approach to LHEES set out above? If not, please give reasons to support this.
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?

Chapter 5 – Preparing our Energy Networks

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.
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.
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?
31. What are your views on the changes set out above for the gas networks?
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.
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?
34. What evidence can you provide on the potential for heat derived from energy from waste to qualify as low or zero emissions?
35. What views do you have on mechanisms to support this and the use of wider sources of waste heat?
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?

Chapter 6 – Kick-starting the Investment in the Transition

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?
38. Do you agree with the strategic funding priorities set out above?
39. In your view, should equal funding be allocated across these priorities or should certain priorities be weighted in terms of impact for Scotland?
40. What are the opportunities and challenges we face in maximising our £1.6 billion investment?

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?
42. What are your views on how we can use our funding to leverage and encourage private sector and other forms of investment?
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?
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.)

Chapter 7 – Working Towards a Long Term Market Framework

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?
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?
47. What financing mechanisms are needed to encourage investment from householders, businesses and the private sector?

Chapter 8 – A Regulatory Framework

48. What are your views on the regulatory actions set out in the proposed regulatory framework?
49. What are your views on the timeframes set out for the application of the regulation set out above?
50. What are your views on how our Delivery Programmes could support compliance with regulation?
51. What other mechanisms/support may be required to ensure that regulation is fair and equitable for all?

Chapter 9 – The Economic Opportunity

52. What are your views on the plans set out to maximise the economic benefits to Scotland from the heat transition?
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?
54. Is there anything further that can be done to ensure that Scotland realises the economic opportunity available from the heat transition?
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?
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?
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?
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?
59. How can we support the development of more opportunities for young people?

Chapter 10 – Working with the UK Government

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?
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?

Chapter 11 – Monitoring, Evaluation and Future Decision Making

62. Do you agree with our proposals for a monitoring and evaluation framework? If not, please state your reasons and suggested improvements.
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?

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?

ENVIRONMENTAL REPORT CONSULTATION QUESTIONS

Consultation Questions have been included within the Environmental Report to help shape respondents views on the Strategic Environmental Assessment.

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?

66. What are your views on the reasonable alternatives set out in the Environmental Report?

67. What are your views on the predicted environmental effects as set out in the Environmental Report?

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?

General questions

69. Is there any further information you wish to provide on the content set out in this draft Strategy?

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?

Annex C Summary of Scottish Government Delivery Programmes

Domestic advice and support

Supporting domestic consumers – Home Energy Scotland - Delivered by Energy Saving Trust.

Free, independent advice on energy efficiency and low and zero emission heating. Also acts as a referral scheme for the Warmer Homes Scotland scheme. Portal for accessing number of support packages including HES loan, PRS loan, cash back incentives, equity loan pilot and Warmer Homes Scotland.

The commitment to provide a free and impartial advice service was set out in the EES route map in May 2018 and has formed part of the foundations of our work on energy efficiency from the outset. Advice is provided independently and free of charge and considers all aspects of energy efficiency including energy saving, keeping warm at home, reducing energy bills, renewable energy, lowering carbon footprint and income maximisation. The advice helps those in, or at risk of falling into fuel poverty and the service acts as the referral mechanism for customers to access grants, tailored advice and practical delivery of measures, such as Warmer Homes Scotland. Over the next 5 years research will help inform us of the best form of service to provide, taking account of likely increases in demand, changes in the way people access information, and reacting to changes to government grant and loan schemes to help people achieve their aims.

HES Loan and Renewable Heating Incentive (cashback)

We have recently introduced a further incentive via the Home Energy Scotland (HES) Loan Scheme by offering owner occupiers up to 75% in cashback towards the installation of renewable heating systems (capped at £10,000). This incentive will make the uptake of renewable heating more attractive. We also offer cashback on HES loans for energy efficiency measures, and have recently increased the rate of this incentive from 25% to 40%. A monitoring programme is also offered to support consumers to monitor performance and efficiencies of their zero emissions heating solution.

Equity Loan for energy efficiency and essential repairs

In January 2017, the Scottish Government launched an area-based pilot equity loan scheme to assist owners to carry out energy efficiency and essential repairs in participating council areas. The pilot will continue to be open to those who qualify until March 2021. The equity loan pilot allows homeowners (including private landlords in certain circumstances) to borrow up to £40,000 from the Scottish Government for eligible works (energy efficiency measures, heat loss reduction measures and repairs) and repay when the home is sold or ownership transferred. The loan is available for properties in Council Tax bands A to C or for properties in all council tax bands where the owner is in receipt of qualifying benefits. An evaluation of this pilot is currently being undertaken and any future equity

Private Rented Sector Loan (PRS)

This Scottish Government funded loan helps landlords improve the energy efficiency of the properties and meet minimum standards. The loan is administered by Home Energy Scotland (HES). It is available to registered private landlords for improvements to domestic dwellings which are listed on the Scottish Landlord Register, are not a holiday or second home, are registered with the Scottish Assessors Association as paying domestic council tax rates, is not under construction, and is currently occupied by at least one tenant or will have at least one tenant in place within 30 days of the payment of the loan. It

scheme will be considered in light of the realignment of the Energy Efficient Scotland with the Government's decarbonisation of heat and climate change targets to support the focus for low and zero emissions heat options moving forward.

provides loans of up to £15,000 split across works to include solid wall insulation, heating systems, gas connection, some glazing, insulated doors, some roof insulation, and some loft, floor and cavity wall insulation. Funding is also available for up to two home renewable systems per property, worth up to £17,500 in total, plus an energy storage system up to a max of £6,000.

SME advice and support

Supporting SME's – the Energy Efficiency Business Support Service - Delivered by Zero Waste Scotland

Free advice and support package to Scottish SMEs to help improve energy efficiency and decarbonise heating in their premises.

Substantial, free advice and support offering to Scottish SMEs to help them understand how to improve energy efficiency and decarbonise heating in their premises. The two main offers of support are an initial energy opportunities assessment which identifies where and how energy savings can be made and a comprehensive report including a site visit to highlight possible improvements, further advice and funding. Once SMEs have been through the Energy Efficiency Business Support Service, they can apply for interest free SME loans up to a maximum of £100,000 with cashback incentives also available.

SME Loan Scheme and Cash back

We have recently introduced a further incentive via the SME Loan Scheme by offering SMEs up to 75% in cashback towards the installation of low and zero emissions heating systems (capped at £10,000). This incentive will make the uptake of low and zero emissions heating more attractive to SMEs. We also offer cashback on SME Loans for energy efficiency measures, and have recently increased the rate of this incentive from 15% to 30% (capped at £10,000). We will continue to explore further opportunities to incentivise our offer to SMEs and are actively considering what kind of advice, support and financial offering would help us deliver at scale to this sector of the economy.

In total SMEs can apply for a maximum of £20,000 in cashback grant funding.

Supporting communities

The Community and Renewable Energy Scheme (CARES) - Delivered by the Energy Saving Trust under the Scottish Government Local Energy Scotland Brand

Advice and funding support to community groups and other eligible organisations seeking to explore their renewable energy options.

CARES was established in 2010 as a successor to the Scottish and Community Household Renewable Initiative. Since its inception, CARES has offered funding of over £51 million and supported over 600 projects to develop, own or take a stake in local renewable energy projects across Scotland. CARES provides advice and funding support to community groups and other eligible organisations seeking to explore their renewable energy options. CARES, delivered under the Scottish Government brand of Local Energy Scotland, aims to support the delivery of the Scottish Government community and locally owned energy targets and its shared ownership ambition.

In the post Covid-19 green recovery period and beyond, decarbonisation will be a key driver for community led activity at a local level, recognising this, CARES will incorporate a greater degree of flexibility and increased partnership working in offering enhanced and tailored packages of advice and support to projects focusing on decarbonisation and supporting community involvement in Local Heat and Energy Efficiency Strategies (LHEES). The new CARES contract is due to commence in April 2021 – March 2025, aligning with the period of this strategy and will have a greater focus on supporting heat decarbonisation in local communities and supporting community engagement in Local Heat and Energy Efficiency Strategies (LHEES).

Supporting fuel poor areas

Energy Efficient Scotland – Area Based Schemes (ABS) - Delivered via Local Authorities

Provide energy efficiency improvements to households in or at risk of fuel poverty living in their own home or a private rented property, leveraging Energy Company Obligation (ECO) finance and private investment. ABS is effective in delivering large numbers of improvements to mixed tenure, multi-occupancy properties (e.g., flats, terraces, council estates/projects).

Since 2013 the Scottish Government has invested over £373 million in our Area Based Schemes (ABS), providing energy efficiency and zero emissions heating measures to over 100,000 households across Scotland. Local schemes are designed and delivered by councils, in conjunction with energy companies and local delivery partners, providing improvements to households in or at risk of fuel poverty living in their own home or a private rented property. ABS projects prioritise help for 'harder to treat properties' requiring solid wall or complex cavity wall insulation. ABS funding also helps leverage Energy Company Obligation (ECO) finance and private investment to maximise reductions in CO2 emissions and cost savings for households. Taking advantage of economies of scale and shared costs, ABS has proved extremely cost-effective in delivering large numbers of

improvements to mixed-tenure, multi-occupancy properties (e.g. flats, terraces, council estates/projects).

Over the next five years, our ABS funding will continue to target areas with higher numbers of households in or at risk of fuel poverty, prioritising those in greatest need (i.e., the least energy efficient properties). We will build upon the expertise and experience of local delivery partners in delivering projects that benefit entire communities, reflecting local needs and conditions. As well as prioritising insulation measures - fabric first - we will deliver more 'whole house' retrofits to fuel poor households as ABS projects. We will adopt a 'zero carbon first' approach in improving heating systems and ensure that households continue to benefit from warmer homes, reduced energy costs and CO2 emissions.

Supporting fuel poor households

Warmer Homes Scotland - Delivered by Warmworks Scotland LLP on behalf of the Scottish Government

Warmer Homes Scotland is a fuel poverty scheme which enables eligible households to receive energy efficiency and heating improvements. Primarily delivers heating measures including an increasing number of heat pumps.

We have invested more than £124 million in our Warmer Homes Scotland Scheme since its launch in September 2015 helping more than 20,000 households throughout Scotland. Warmer Homes Scotland is the Scottish Government's flagship fuel poverty scheme which offers each eligible household a bespoke package of measures that takes account of both the needs of the property and the needs of the household. Through Warmer Homes Scotland we have made available low and zero emissions heating systems and new insulation measures particularly beneficial to rural and remote communities not served by the gas grid. These include: ground source heat pumps, micro-wind, micro hydro, micro-CHP (Combined Heat and Power) systems and 'Q-Bot' - an underfloor

insulation system installed by a robot. Additional enabling measures introduced under the scheme include extraction of failed cavity wall insulation, asbestos removal and the installation of fuel storage tanks and low energy lighting. Currently, households who receive improvements through the scheme are expected to save over £300 per year on their energy bills. It also supports skills development and training opportunities in the supply chain through the Employment and Skills plan embedded into the contract. Since Warmer Homes Scotland commenced in September 2015 there has been a steady increase in the installation of Air Source Heat Pumps being installed. Changes have recently been made to the scheme to further incentivise zero emissions heating measures to help meet Scotland's climate change targets. The Warmer Homes Scotland contract is due to end in September 2022 and delivery of a national scheme to fuel poor customers will be included in the new Energy Efficient Scotland national scheme. Work is underway to procure the new scheme with heat decarbonisation and energy efficiency at the heart of the offer to help fuel poor households reduce their fuel bills through the installation of energy efficiency measures and zero emissions heating options.

Public sector support

Public Sector Non-Domestic Energy Efficiency (NDEE) Framework

Energy Performance Contract Framework designed for larger public sector projects. Improvement measures are financed via savings. NDEE Support Unit supports project delivery.

The Scottish Government launched the Non-Domestic Public Sector Energy Efficiency (NDEE) Framework and Project Support Unit in March 2016.

This framework has been designed to support Public and Third Sector organisations procure Energy Efficiency retrofit work. The economies of scale and standardised approach offered by the pan public sector framework is attractive to both the public sector and private sector - offering both better solutions and better value for money. 32 projects are currently in progress or have completed using the Frameworks across Local Authority, University, College and NHS estates.

Projects at tender stage and beyond have, to date, committed circa. £27.5 million towards energy conservation measures providing 'guaranteed' annual energy cost savings of circa £3.3 million, and future use of the framework will support decarbonisation of the public sector estate.

Salix

Interest free loan funding from Scottish Government is available to the public sector in Scotland through Salix Finance to improve the energy efficiency of existing buildings, with over £50 million invested since 2008.

Multi-sector support

Low Carbon Infrastructure Transition Programme

Delivered in house with support from Project Partners including Scottish Future Trust and Zero Waste Scotland.

Provides a range of support, from expert advice to financial support to assist the development and delivery of private, public and community low-carbon projects across the country. Includes capital support for heat networks and support for social landlords for heat decarbonisation.

Launched in 2015, the Low Carbon Infrastructure Transition Programme (LCITP) is a collaborative partnership led by the Scottish Government, working with Scottish Enterprise, Highlands and Islands Enterprise, Scottish Futures Trust and Zero Waste Scotland. The Programme aims to stimulate commercial interest and investment and maximize Scotland's vast potential in the low carbon sector whilst contributing to the positive progress of the Scottish Government in reducing Scotland's greenhouse gas emissions.

Since 2015, the LCITP has awarded over £58 million of grant funding to 28 low carbon demonstration projects across Scotland which encourage replications and wider uptake of innovative renewable technologies.

This intervention, which is co-funded by the European Regional Development Fund, focuses on supporting the acceleration of low carbon infrastructure projects across the public, private and community sectors to develop investment grade business cases to help projects secure public and private capital finance. The LCITP and District Heating Loan Fund together have invested around £66 million in renewable heat since 2013. Further information is available on the Scottish Government website

District Heating Loan Fund - Delivered by the Energy Saving Trust

Loan fund for district heating projects open to local authorities, social landlords, SMEs and ESCOs with fewer than 250 employees. Depending on loan value may require co-investment.

Annex D Summary of GB Wide Funding for Heat and Energy Efficiency

Domestic Renewable Heat Incentive (RHI)

The GB wide Domestic Renewable Heat Incentive (Domestic RHI) is a UK Government financial incentive to promote the use of renewable heat.

Successful applicants to the scheme receive quarterly payments for seven years for the amount of clean, green renewable heat their system is estimated to produce.

The scheme opened in April 2014, and will run until 31 March 2022, having recently been extended by a year with only minor changes to the scheme. These include allowing those who commissioned their plant on or after 1 March 2019 to apply for accreditation up until the closure of the scheme, rather than within 12 months of the commissioning date.

Currently 19% of installations accredited under the Domestic RHI are located in Scotland.

Non-Domestic Renewable Heat Incentive (NDRHI)

The GB wide Non-Domestic Renewable Heat Incentive (RHI) is a UK government environmental programme that provides financial incentives to increase the uptake of renewable heat by businesses, the public sector and non-profit organisations.

Eligible installations receive quarterly payments over 20 years based on the amount of heat generated. The scheme is scheduled to close on 31 March 2021.

While some changes have been made with regards to tariff guarantees and some commissioning deadlines extended beyond the closure of the scheme, no payments will be made beyond 31 March 2021. Applicants who commission after the closure of the scheme on 31 March 2021 will receive a shorter payment lifetime.

Currently 19% of installations accredited under the Non-Domestic RHI are located in Scotland, more than its pro-rata share.

Clean Heat Grant Scheme (in development)

The UK Government has announced the Clean Heat Grant Scheme, which will begin in April 2022 and run for 2 years until March 2024.

The Scheme is intended to provide a £4,000 flat-rate technology neutral upfront grant to successful applicants. It will fund heat pumps, and biomass where a heat pump is not suitable, up to 45kw in capacity via a voucher mechanism. £100 million funding will support the scheme.

Green Gas Support Scheme (in development)

The UK Government has also announced the Green Gas Support Scheme, which will run for four years from autumn 2021. The scheme will support biomethane injection in to the gas grid and is expected to contribute 21.6MtCO₂e of carbon savings over its lifetime. The scheme is to be funded by the Green Gas Levy, and will use a tariff mechanism similar to the Non-Domestic RHI.

Energy Company Obligation (ECO)

The Energy Company Obligation (ECO) is a UK Government programme to deliver energy efficiency measures across Great Britain (GB). The legislation obliges eligible energy providers to deliver energy efficiency improvements to help fuel poor households to reduce the cost of heating their homes (HHCRO or the Help to Heat Cost Reduction Obligation). ECO is funded through a charge on the energy bills of all customers of regulated energy companies with over 250,000 customers.

As of December 2020, BEIS report that 287,996 households in Scotland have received ECO finance (13.4% of GB); or an average of 118 measures per 1000 households (compared to 81 in Wales and 77 in England). The council with the highest reported number of ECO measures per household (number of measures per 1000 households) in GB is the Comhairle nan eilean siar (Western Isles council).

Warm Home Discount (WHD)

Warm Homes Discount is a GB wide scheme that provides an annual one-off discount on electricity bills paid by energy companies between September and March. Currently the Warm Homes Discount is worth £140 and the costs of the discount are applied to all household bills.

In 2017-18 Scottish households represented around 10.9% of WHD recipients compared with 9.2% of all households in Great Britain. Two groups are eligible: a "core" group where the household receives the Guarantee Credit element of Pension Credit (income under £167.25 for a single pensioner or £255.25 for a couple); and a "broader" group on a low income as set by suppliers - some households receiving income related benefits must be included on a 'first come, first serve basis'.

9.6% of all rebates were to the overall 'core' group in Scotland (117,020 Scottish households) and 12.5% to the 'broader' group (121,425 Scottish households).

Annex E Members of the Heat Decarbonisation External Advisory Group

This policy has been developed in consultation with the Heat Decarbonisation External Advisory Group which comprises the organisations listed below:

Association for Decentralised Energy
Citizens Advice Scotland
COSLA
Changeworks
Energy Saving Trust
Energy UK
Existing Homes Alliance
Highlands and Islands Enterprise
IBIOC
Oftec
Ofgem
Scottish and Southern Energy Networks
Scottish Renewables
Scottish Enterprise
Strathclyde University
Scottish Futures Trust
SNIPEF
Scottish Gas Networks
Scottish Power Energy Networks
WWF Scotland
Zero Waste Scotland

Annex F Responding to this Consultation

We are inviting responses to this consultation by 30th April 2021.

Please respond to this consultation using the Scottish Government's consultation platform, Citizen Space. You can view and respond to this consultation online at – <https://consult.gov.scot/energy-and-climate-change-directorate/heat-in-buildings-strategy/>

You can save and return to your responses while the consultation is still open. Please ensure that consultation responses are submitted before the closing date of 30th April 2021.

If you are unable to respond online, return your response, including the Respondent Information Form (see 'Handling your Response' below) to:

Heat Strategy unit
Scottish Government
5 Atlantic Quay
Glasgow
G2 8LU

It would be helpful to have your response by email or using the electronic response form. The electronic response form can be accessed at the following website address: – <https://consult.gov.scot/energy-and-climate-change-directorate/heat-in-buildings-strategy/>

You can also email your response to heatinbuildings@gov.scot

Handling your response

If you respond using Citizen Space – <https://consult.gov.scot/energy-and-climate-change-directorate/heat-in-buildings-strategy/> you will be directed to the Respondent Information Form. Please indicate how you wish your response to be handled and, in particular, whether you are happy for your response to be published.

If you are unable to respond via Citizen Space, please complete and return the Respondent Information Form included in this document. If you ask for your response not to be published, we will regard it as confidential, and we will treat it accordingly.

All respondents should be aware that the Scottish Government is subject to the provisions of the Freedom of Information (Scotland) Act 2002 and would therefore have to consider any request made to it under the Act for information relating to responses made to this consultation exercise.

Next steps in the process

Where respondents have given permission for their response to be made public, and after we have checked that they contain no potentially defamatory material, responses will be made available to the public at – <https://consult.gov.scot/energy-and-climate-change-directorate/heat-in-buildings-strategy/>

If you use Citizen Space to respond, you will receive a copy of your response via email.

Following the closing date, all responses will be analysed and considered along with any other available evidence to help us. Responses will be published where we have been given permission to do so.

Comments and complaints

If you have any comments about how this consultation exercise has been conducted, please send them to:

heatinbuildings@gov.scot

Scottish Government consultation process

Consultation is an essential part of the policy-making process. It gives us the opportunity to consider your opinion and expertise on a proposed area of work.

You can find all our consultations online: <http://consult.scotland.gov.uk>.

Each consultation details the issues under consideration, as well as a way for you to give us your views, either online, by email or by post.

Responses will be analysed and used as part of the decision-making process, along with a range of other available information and evidence. We will publish a report of this analysis for every consultation. Depending on the nature of the consultation exercise the responses received may:

- indicate the need for policy development or review;
- inform the development of a particular policy;

- help decisions to be made between alternative policy proposals; and
- be used to finalise legislation before it is implemented.

While details of particular circumstances described in a response to a consultation exercise may usefully inform the policy process, consultation exercises cannot address individual concerns and comments, which should be directed to the relevant public body.

Next steps

The Scottish Government will review responses to the consultation and the issues raised during engagement with stakeholders to inform development of the final version of the Heat in Building Strategy.



Title

RESPONDENT INFORMATION FORM

Please Note this form **must** be completed and returned with your response.

To find out how we handle your personal data, please see our privacy policy:

<https://www.gov.scot/privacy/>

Are you responding as an individual or an organisation?

Individual

Organisation

Full name or organisation's name

Phone number

Address

Postcode

Email

The Scottish Government would like your permission to publish your consultation response. Please indicate your publishing preference:

Information for organisations:

The option 'Publish response only (without name)' is available for individual respondents only. If this option is selected, the organisation name will still be published.

If you choose the option 'Do not publish response', your organisation name may still be listed as having responded to the consultation in, for example, the analysis report.

- Publish response with name
- Publish response only (without name)
- Do not publish response

We will share your response internally with other Scottish Government policy teams who may be addressing the issues you discuss. They may wish to contact you again in the future, but we require your permission to do so. Are you content for Scottish Government to contact you again in relation to this consultation exercise?

- Yes
- No

END NOTES

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