

Draft Heat in Buildings Strategy - Achieving Net Zero Emissions: Consultation

Partial Business and Regulatory Impact Assessment

1. Title of proposal

Heat in Buildings Strategy : Achieving Net Zero Emissions in Scotland's Buildings – Consultation

2. Purpose and intended effect

2.1 Scope

This partial Business and Regulatory Impact Assessment (BRIA) accompanies the Scottish Government's draft Heat in Buildings Strategy.

The draft Heat in Buildings Strategy provides an update to the Energy Efficient Scotland Route Map (2018) and the Heat Policy Statement (2015) and brings together ambitions for energy efficiency and heat decarbonisation into a single strategy outlining how we will reduce greenhouse gas emissions from homes, workplaces and community buildings across Scotland in line with our statutory climate change and fuel poverty targets.

This document provides an indicative assessment of the impact of the strategy on various parties and sectors within the Scottish economy.

2.2 Objective

The draft Strategy sets out how we plan to transform Scotland's homes and workplaces so they are warmer, greener and more efficient.

The draft Strategy:

- establishes a set of principles that will underpin our policies and actions on energy efficiency and heat.
- sets out strengthened action to deliver on our national infrastructure priority for energy efficiency.
- considers whole-system energy issues and how these are to be managed over the course of the transition.
- outlines the scale of the economic opportunity presented and identifies the measures necessary to realise this and to ensure a just transition.

The draft Strategy 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, the draft Strategy commits to building the evidence base to reduce uncertainties on the right pathway to a net zero future for Scotland's buildings.

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, 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.

Heat in Buildings Outcomes

1. The costs of heating our homes and businesses is affordable and those occupying them have a high comfort level.
2. We have reduced our demand for heat and poor energy efficiency is no longer a driver of fuel poverty.
3. The systems we use are smart and resilient and provide us with a reliable source of heat.
4. 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.
5. Our indoor and outdoor spaces are filled with cleaner air.
6. Our heating systems enable and efficiently use Scotland's renewable energy resources.
7. Electricity and non-electrical fuels are produced from sustainable sources in a way which is consistent with net zero emissions and biodiversity targets.
8. Our heating systems enable the flexible and stable operation of our energy networks.

These 'heat in buildings' outcomes, aligned with our national outcomes within the National Performance Framework¹, will guide our decision making and support the development of a holistic, people centred approach to the transition ahead.

National Outcomes

- *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 health 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

¹ <https://nationalperformance.gov.scot/>

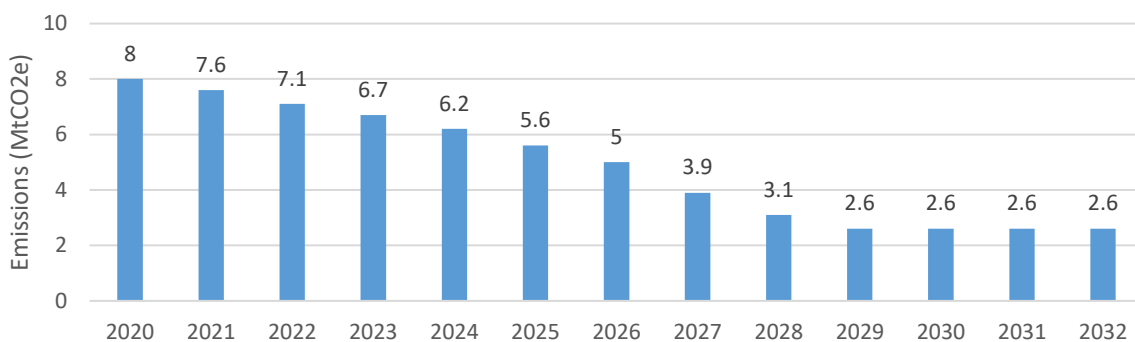
This draft Strategy is aligned with wider policy development within the Scottish Government across the areas of Housing, Energy, and Climate Change. The actions it sets out align with the Buildings chapter of the Climate Change Plan Update, see below and are reflected in our Housing to 2040 Strategy², which also presents 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. Scotland's Energy Strategy Position Statement³ takes into account the whole system issues raised by the draft Heat in Buildings Strategy and our wider net zero climate targets.

3. Context

3.1 Climate Change Targets

The Climate Change (Emission Reductions Targets) (Scotland) Act 2019 increases Scotland's ambition to reduce greenhouse gas emissions, including a target for net-zero emissions by 2045, and interim targets for reductions of 75% and 90% by 2030 and 2040 respectively. In response the Scottish Government updated its Climate Change Plan in December 2020,⁴ setting out how the accelerated targets will be achieved. The Climate Change Plan update sets out emissions envelopes for the Buildings sector (covering both domestic and non-domestic buildings) as shown in Figure 1. Using a 2020 baseline, this represents a 68% reduction to 2030.

Figure 1. Scotland's Climate Change Plan 2018-2032 (2020 update), Emissions Reduction Pathway for Buildings



² <https://www.gov.scot/publications/housing-2040-2/>

³ <https://www.gov.scot/publications/scotlands-energy-strategy-position-statement/>

⁴ *Securing a green recovery on a path to net zero: climate change plan 2018–2032 – update* <https://www.gov.scot/publications/securing-green-recovery-path-net-zero-update-climate-change-plan-20182032/>

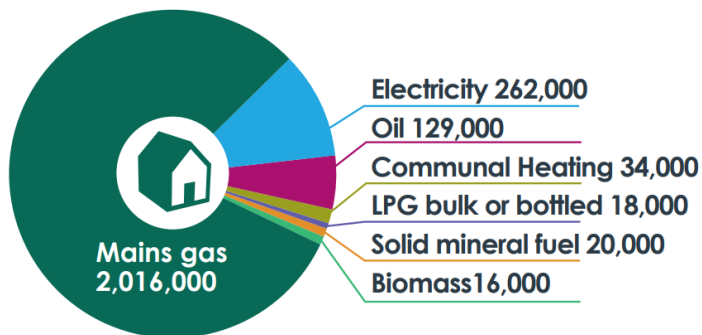
Sector-level emissions envelopes run to 2032. In order to achieve our economy-wide net-zero target, by 2045 all of our homes and buildings will need to significantly reduce their energy use and use a zero emissions heating system.

3.2 Heat supply and emissions across residential housing

Figure 2 shows that the vast majority of Scottish homes rely on fossil fuel boilers; 81% of Scottish homes use mains gas, 5% use heating oil, and a further 2% use LPG or solid mineral fuels. Together these high carbon fuels account for an estimated 88% of the Scottish residential fuel mix, none of which are compatible with our net zero emissions ambition.

Figure 2– Main heating fuel across Scottish housing, 2019

Primary Heating Source for Scottish Homes (numbers of homes)



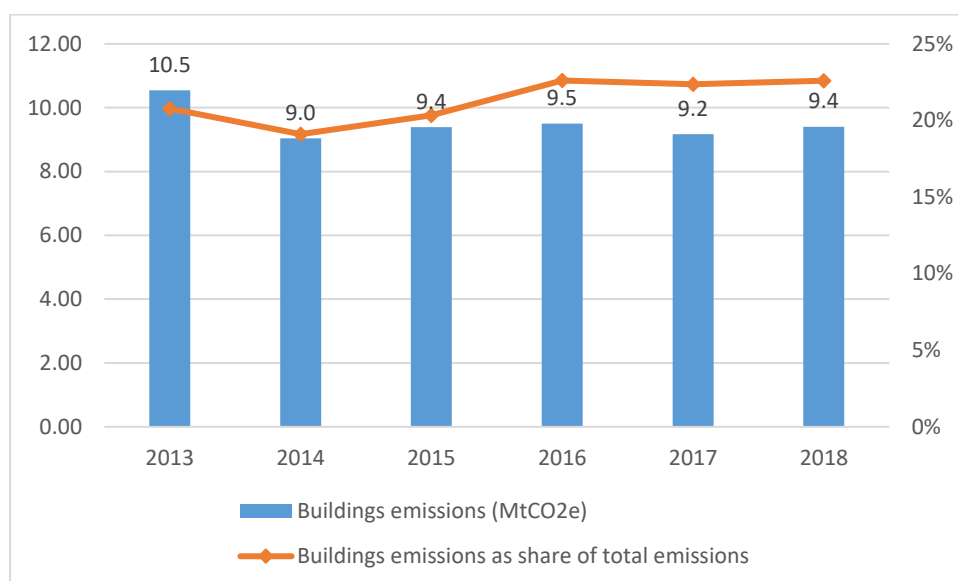
Only around 11% of households have a renewable or very low emissions heating system, such as a heat pump, biomass boiler or electric storage heating⁵.

The Energy Saving Trust estimate that over half of non-domestic properties already use low or zero emissions sources, mainly electrical. However, the non-domestic stock varies significantly in size, and some of the largest non-domestic buildings are more likely to have mains gas systems⁶.

⁵ An estimated 34,000 homes are connected to heat networks, however these are predominately fuelled by gas and not considered renewable/zero emissions.

⁶ Source: Unpublished analysis by the Energy Saving Trust (EST)

Figure 3 Greenhouse Gas Emissions from Buildings, 2013 to 2018



Source – GHG inventory⁷

Emissions from the Buildings sector have decreased from 10.5 MtCO₂e in 2013 to 9.4 MtCO₂e in 2018. Yet given reductions in emissions across other sectors of the economy, most notably power supply, the share of total emissions from the Buildings sector has increased slightly from 20.8% in 2013 to 22.6% in 2018.

To meet the interim statutory targets set out above, around 50% of homes, or over 1 million households, will need to convert to zero emissions heating systems by 2030. At the same time, we will need to convert a further 50,000 of Scotland’s non-domestic properties to zero emissions sources of heat⁸.

Currently around 3,000 renewable heating systems are installed in Scotland’s homes per year⁹ (primarily heat pumps, with a smaller number of biomass and solar thermal installations). The draft Heat in Buildings Strategy sets out that meeting the emissions reduction envelope requires the rate of zero emissions heat installations to rapidly grow, reaching at least 64,000 homes per year in 2025, with the rate peaking at over 200,000 new systems per annum in the late 2020s. This must be accompanied by significant demand reduction through improvements to energy efficiency and growth of blending green gas in the grid.

3.3 Fuel Poverty Targets

The Fuel Poverty (Target, Definition and Strategy) (Scotland) Act 2019¹⁰ requires that by 2040 no more than 5% and 1% of all households in each local authority should suffer from fuel poverty and extreme fuel poverty respectively¹¹. In 2019,

⁷ [Greenhouse gas emissions 2018: estimates - gov.scot \(www.gov.scot\)](https://www.gov.scot/publications/greenhouse-gas-emissions-2018-estimates/pages/10/index.aspx)

⁸ 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.

⁹ [Renewable-Heat-in-Scotland-2019_new.pdf \(energysavingtrust.org.uk\)](https://www.energysavingtrust.org.uk/renewable-heat-in-scotland-2019-new.pdf)

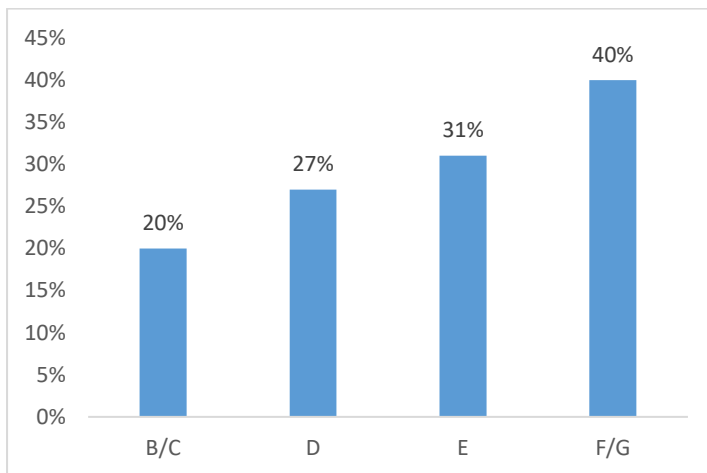
¹⁰ <http://www.legislation.gov.uk/asp/2019/10/enacted>

¹¹ 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

24.6% of all households were living in fuel poverty and 12.4% were living in extreme fuel poverty.

Energy efficiency is one of the four main drivers of fuel poverty, the others being income, energy prices and how energy is used in the home. Figure 4 shows that 40% of households living in the least energy efficient properties (rated EPC F or G) were in fuel poverty in 2019, compared with 20% of households in B/C-rated properties. We want our all homes to be as energy efficient as possible, meeting a minimum standard equivalent to EPC C, in order that we can remove poor energy efficiency as a driver of fuel poverty.

Figure 4 Fuel Poverty rate in all tenures, broken down by EPC band of dwelling – 2019



Source: Scottish House Condition Survey 2019 ¹²

3.4 Energy efficiency

As figure 5 shows, 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 points¹³. In 2019, 45%¹⁴ of Scotland's homes were rated EPC C or better, with social housing generally more energy efficient (56% of homes having attained EPC C) than the private sector (41%).

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.

¹² The data presented is based on the new fuel poverty definition as at Stage 2 of the Bill process.

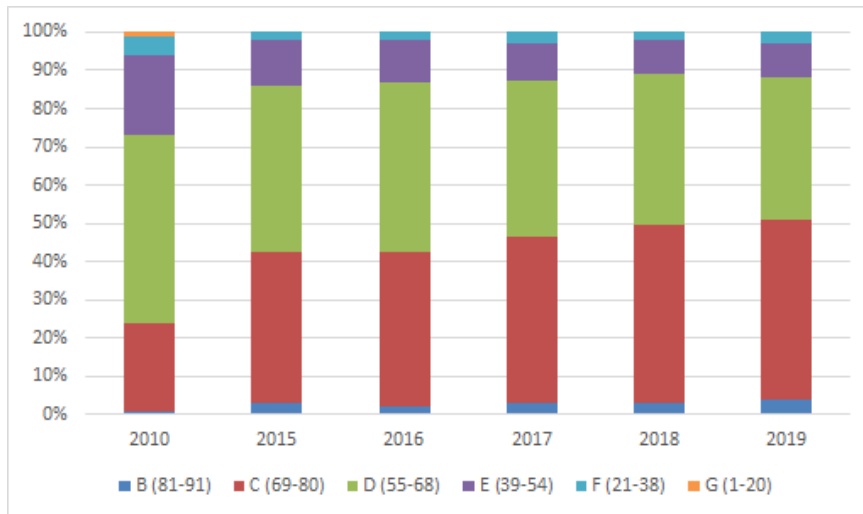
The first official measurement of fuel poverty, fully compatible with all elements of the Act, requires additional data to be collected and the production of a new Minimum Income Standard for remote rural, remote small town and island areas. 2020 Scottish House Condition Survey fieldwork was suspended on March 17th due to the effects of COVID-19 and the restrictions around travel.

Therefore it may be 2021 or later until all additional information is collected to fully account for all of the elements of the new definition in the SHCS fuel poverty estimates.

¹³ Based on SAP 2009.

¹⁴ Based on SAP 2012, RdSAP v9.93.

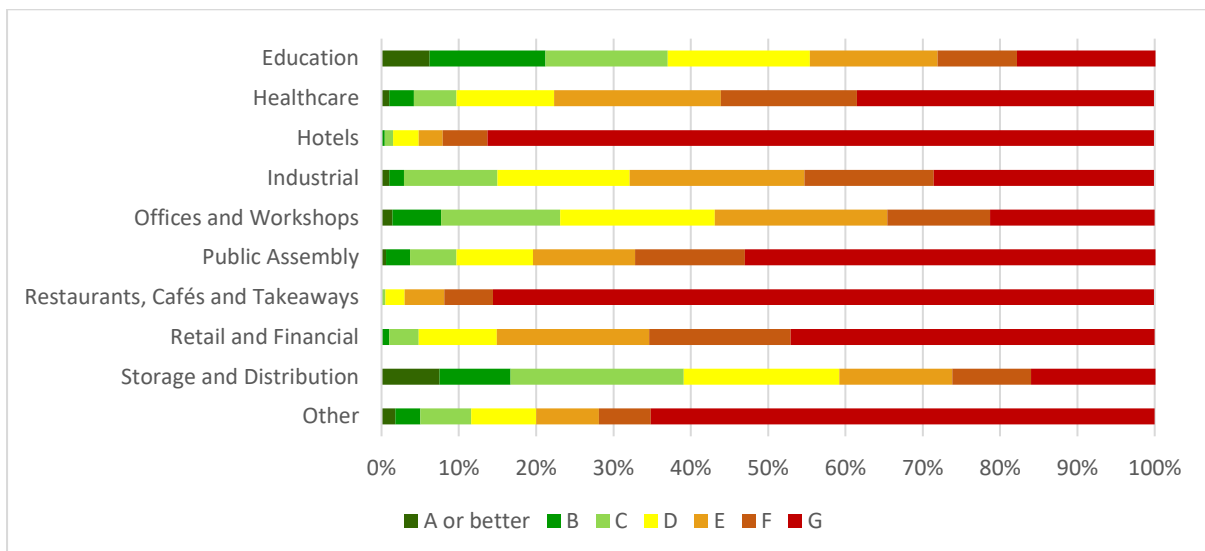
Figure 5 Distribution of the Scottish Housing Stock by EPC Band (SAP 2009), 2010 and 2015 to 2019



Source: [Scottish House Condition Survey: 2019](#) Table 17.

Our non-domestic buildings are hugely diverse and analysis shows that almost three in four of all non-domestic premises have a current EPC rating of E or worse with only 5 percent rated B or better.¹⁵ This varies significantly by building type, as shown in Figure 6.

Figure 6: Non-domestic building types by EPC band (as of 2017)



More progress must be made across both residential and non-residential buildings. Reducing heat demand through fabric measures is key to minimising the operating costs of zero emissions heating systems, while also minimising the demand on the electricity grid.

¹⁵ [Scotland's non-domestic energy efficiency baseline: report - gov.scot \(www.gov.scot\)](#)

4. Rationale for Government Intervention

We need to reduce the demand for heat in buildings through the installation of fabric efficiency measures, and transition heating systems to zero emissions technologies. This section briefly describes why the presence of market failures means it is unlikely we will achieve the scale of decarbonisation at the pace required to meet our climate change targets in the absence of government intervention.

4.1 Negative Externalities

The harmful greenhouse gas emissions resulting from the continued combustion of fossil fuels imposes a wider cost on society, including the cost of climate change adaptation and those associated with natural disasters and biodiversity loss resulting from rising global temperatures. These wider costs are not reflected in the price of carbon intensive fuels such as natural gas and heating oil. Therefore, action is required to align private incentives with societal goals.

4.2 Distributional impacts

The transition to zero emissions heat will require additional investment over and above a business-as-usual scenario. How additional costs are distributed depends on a range of factors including the energy market framework, taxes and subsidies, the technologies deployed, and those displaced.

Two significant distributional risks arise which require government intervention:

- Impacts on low-income households, particularly those experiencing or vulnerable to fuel poverty. Government intervention will be necessary to ensure those unable to pay increased energy costs are not harmed or left behind in the energy transition.
- Fairness between those who make the transition early (and so potentially face higher lifetime costs) and those who do so later. In the absence of government intervention, building owners / occupants may resist converting to zero emissions heat on grounds that delay could expose them to lower lifetime costs.
- Access to the benefits of low carbon, smarter technologies, for instance lowered costs though integrating energy storage or taking part in demand side response, may be uneven due to varying ability to pay upfront costs, digital literacy or resilience to risks. Government intervention may be needed to ensure that appropriate access is available.

4.3 Imperfect information

Evidence suggests a significant proportion of consumers are not aware of the contribution of their fossil fuel-based heating system to Climate Change¹⁶.

Furthermore, challenges in quantifying reductions in fuel bills following energy efficiency measures or the health impacts of heat and energy efficiency can lead to inaction amongst homeowners and landlords even where the private net benefit is

16 [Net Zero: A Consumer Perspective - Energy Systems Catapult](#)

positive. Empirical evidence suggests that consumers can have difficulties when evaluating consumption decisions where the costs are imposed up front but the benefits are realised over a longer time horizon.

4.4 Immature market for zero emissions heating systems

Early adopters may face limited choice between market participants for zero emissions technologies due to current low annual volumes of zero emissions heat installations. Government interventions is needed to grow levels of demand for zero emission heating technologies. This will give installers confidence to invest in the equipment and skills necessary to deliver the rollout of low and zero emission heat, whilst also achieving economies of scale and learn-by-doing effects.

4.5 Coordinating collaborative efforts

The transition to low and zero emissions heat requires coordinated action across building owners, network operators and energy generation/production facilities, which markets in their current form are unable to deliver. The need for coordination is particularly acute in the case of mixed and multi-tenure buildings. Certain fabric measures such as cavity and solid wall insulation in multiple occupancy buildings require mutual consent and collective efforts from each household.

5. Consultation

5.1 Strategic Heat Decarbonisation Policy Board

Development of the Heat in Buildings Strategy has been supported by a Strategy Heat Decarbonisation Policy Board, comprising of Scottish Government Officials from the following Directorates:

- Directorate for Housing and Social Justice (Better Homes Division);
- Directorate for Chief Economic (Officer for the Chief Economic Advisor-Economic Analyses);
- Directorate for Local Government and Communities (Buildings Standards, Planning and Architecture)

The policy board also included representatives from the following government agencies and partners:

- Highlands and Islands Enterprise,
- Scottish Enterprise
- Scottish Futures Trust.

5.2 External Advisory Group

The Strategy has also been supported by an External Advisory Group. Drawing on a breadth of stakeholder knowledge and expertise, research, project and case study lessons, the Group have advised on the key issues and potential options for decarbonisation of heating in Scotland. The following organisation were represented on the External Advisory Group:

- Association for Decentralised Energy
- Changeworks
- Citizens Advice Scotland
- Convention of Scottish Local Authorities (COSLA)

- Energy Savings Trust – Local Energy Scotland
- Energy Savings Trust
- Energy UK
- Existing Homes Alliance
- Highlands and Islands Enterprise (HIE)
- The Industrial Biotechnology Innovation Centre (IBiolC)
- Ofgem
- Oftec
- Scottish Futures Trust (SFT)
- Scottish Gas Networks
- Scottish and Northern Irish Plumbing Employers Federation (SNIPEF)
- Scottish Power Energy Networks
- Scottish Renewables
- Scottish and Southern Energy
- Strathclyde University
- World Wide Fund for Nature Scotland (WWF Scotland)

5.3 Public Consultation

A public consultation on the draft Strategy was launched on the 5th February 2021 and will run until 30th April 2021. To support this consultation, we held a series of engagement events (on a virtual platform) with key stakeholders. This included specific engagement with business, communities, individuals, network operators, local authorities and the supply chain sector.

In addition, the draft Heat in Buildings Strategy builds on previous energy efficiency and heat decarbonisation policy processes, each of which have been informed by public consultations. The most recent was “The future of low carbon heat for off gas buildings: a call for evidence” in March 2019¹⁷. This consultation remained open for three months and closed in June 2019. While the consultation focused on heat decarbonisation in buildings that do not currently use mains gas, many of the responses are of relevance to the wider challenge of heat decarbonisation. It should be noted that the consultation results, whilst relevant to the issues outlined, pre-dated the Scottish Government’s adoption of the 2045 net zero target and strengthened interim targets, so responses may not fully reflect stakeholders’ views as to what is needed to deliver these strengthened ambitions. A summary of the evidence received was published in 2019.¹⁸

6. Options

Option 1 – Business as Usual (no regulation)

The continuation Scottish Government programmes including Warmer Homes Scotland, Area Based Schemes, the Low Carbon Infrastructure Transition Programme, CARES, and the Home Energy Scotland loan and cash back mechanism at recent funding levels, alongside UK Government support mechanisms such as the Clean Heat Grant and Green Gas Support Scheme. This is likely to

¹⁷ <https://www.gov.scot/publications/energy-efficient-scotland-future-low-carbon-heat-gas-buildings-call-evidence/>

¹⁸ <https://www.gov.scot/publications/future-low-carbon-heat-gas-buildings-analysis-responses-call-evidence/>

result in static deployment rates. Currently, around 3,000 renewable heating systems are installed per year (equivalent of around 0.1% of homes). To deliver our emissions reduction targets, deployment rates will need to reach at least 64,000 per year by 2025, and more than 200,000 yearly installations at the peak of the transition.

Option 2 – A combination of regulatory, economic and behavioural change initiatives as part of a cohesive strategy (the Heat in Buildings Strategy)

Introduce non-regulatory measures to boost public engagement and enhance support for households and businesses through consumer advice and advocacy and a range of financial mechanisms, whilst targeting supply chain and skills development to support the transition and maximise economic opportunities. This will pave the way for a coordinated programme of regulations beginning to take effect from 2025, providing certainty to the market and greater assurance that legislated targets are met.

The Heat in Buildings Strategy sets out the Scottish Government's approach to reducing emissions from heat across a range of policy and delivery actions. By bringing this range of interventions together it presents a coherent package aimed at tackling the challenges of heat decarbonisation and keeping costs as low as possible.

The key components of this package are:

- Local Heat and Energy Efficiency Strategies, to provide an area-based long-term framework for planning, delivery, coordination (e.g. with network investment) and potentially triggering regulation.
- Expanding Scottish Government support to almost £1.6 billion over the next five years, with a focus on four key priorities (1) supporting those least able to pay, (2) investing in strategic technologies in low- and no-regrets areas, (3) showcasing Net Zero leadership and (4) innovation and demonstration.
- Working towards a long-term market framework, including development of new finance mechanisms and work to align financial incentives around zero emissions heating choices.
- Working with the supply chain on a new action plan to ensure skills and supply chains are adequate to deliver the transformation needed across our buildings and energy systems, maximising the economic benefits to Scotland by building local supply chains, maximising local job creation, and ensuring a just transition.
- Development of a regulatory framework for zero emissions buildings providing certainty and clear end-points to building owners and across supply chains. Regulations will require buildings to reach minimum energy efficiency standards (equivalent to EPC C), with a backstop date of 2035. We will bring forward proposals to require installation of low or zero emissions heating systems in existing buildings from 2025, with a backstop date of 2045.
- Working with network companies, Ofgem and UK Government to ensure the wider energy system is able to supply the energy needed for heating buildings in Scotland through the transition.

- Working more broadly with the UK Government to ensure coherence across reserved and devolved areas, including regulations, investment and market mechanisms, customer protection, product standards, taxes, levies, data access and GB wide schemes.
- A public engagement strategy and action plan to enable people to actively participate in shaping the decisions that affect them, and support to enable communities across Scotland to play a role in the developing heat transition.

7. Sectors and groups affected

Transforming the way we heat our homes and buildings will touch the lives of almost everyone in Scotland. Unlike the decarbonisation of our electricity system, the transition to zero emissions heating systems will directly affect people's everyday lives as we upgrade and roll out new heating technologies and energy efficiency measures to homes, workplaces and community buildings across Scotland.

The following sectors and groups have been identified as being affected by the proposals.

7.1 Building owners and occupants (including households, businesses, and public bodies)

Upgrading the energy efficiency and switching to alternative heating systems will have widespread impacts, though the scale and character of these impacts will vary across different buildings and different zero emissions heat options.

Fabric and heating system upgrades may be disruptive. Disruption may arise from insulation, installation or reconfiguration of an internal distribution and radiator system, ventilation, and replacement of heating, cooling and cooking appliances. In instances where this is required new or upgraded connection to network infrastructure may also require excavation of outdoor space and streets. The extent of disruption will vary from case to case. The draft Strategy identifies a need for over a million homes and 50,000 non-domestic buildings to adopt zero emissions heat by 2030, and that the strategic technologies available in the near term are predominantly replacement of fossil fuel boilers with electric heat pumps and heat network connections. A significant proportion of buildings in Scotland will therefore undergo some disruption over the 2020s.

Social housing has already made significant progress, but additional investment will be needed as landlords work towards the Energy Efficiency Standard for Social Housing to 2032 (ESSH2). We will bring forward the review of ESSH2 to 2023, to respond to the gathering pace of decarbonisation as a priority for change across all housing, how that affects what social landlords are being asked to do, and how it makes a difference to local heating strategies and shared tenure housing. We will also establish a Zero Emissions Social Housing Task Force (ZEST), which will act independently of government, advise on requirements in social housing to meet net zero targets and, longer-term, inform what is required in the private rented and owner occupier sectors.

The cost faced by building owners in upgrading energy efficiency and installing zero emissions heat will depend on how measures are funded and financed. In the near term financial support is available under GB-wide and Scotland-specific programmes. The Scottish Government has committed to investing almost £1.6bn in heat and energy efficiency programmes over the next parliament, building upon, expanding and improving existing programmes. The first two priorities identified above will directly support building owners manage upfront costs:

1. Supporting those least able to pay: expanding our domestic energy efficiency programme to support more households eliminate poor energy efficiency as a driver of fuel poverty and accelerate the deployment of zero emissions heat across Scotland's social housing stock.
2. Investing in strategic technologies in low or no regrets areas. Targeting at-scale deployment of strategic technologies and maximising private investment through the successor to the Low Carbon Infrastructure Transition Programme.

Aligned with these priorities, the draft Strategy proposes to continue Scottish Government loan and cashback schemes for households and SMEs through to 2023.

The draft Strategy identifies a need to mobilise and work in collaboration with the private sector to leverage investment beyond that provided by the public sector. A new Green Heat Finance Taskforce will be established in 2021, and the draft Strategy commits to setting out options for future financing and delivery in 2023. In addition, the draft Strategy reiterates the Scottish Government's commitment to a public energy company, which could adopt innovative business models such as "Heat as a Service". These options will be subject to further impact assessment as appropriate as they are developed.

The impact of changing heating systems on running costs in the medium- to long-term will be influenced by tariffs available in the energy market. At present, the difference in gas and electricity prices is partly a result of policy costs, such as social and renewable electricity obligations, being recouped primarily through electricity bills. Powers to shape gas and electricity tariffs are reserved to the UK Government. In its recent Energy White Paper, the UK Government committed to begin a strategic dialogue on affordability and fairness. The outcome of this process will potentially have a significant impact on the relative running costs of using fossil fuels and zero emissions heating. The draft Strategy underscores the importance of the market evolving so as not to disincentivise switching to zero emissions systems, and to reduce the risk of tension between our climate change and fuel poverty targets.

7.2 Supply chains business

The heat and energy efficiency sectors in Scotland currently generate an annual turnover of £2.4 billion, with full-time equivalent employment of around 13,000. Of these, zero emissions heating manufacturing is estimated to employ around 2,000 people, and design, manufacture and installation of energy efficient products 8,200 people¹⁹. We estimate that as investment in zero emissions heat and energy

¹⁹ [Low carbon and renewable energy economy estimates - Office for National Statistics \(ons.gov.uk\)](https://ons.gov.uk)

efficiency ramps up towards the late 2020s, it is likely to support around 24,000 jobs each year as investment reaches its peak.²⁰

To meet the increased demand for zero emissions heating we will need to grow the skills base in Scotland across the following areas:

- Building assessment
- Manufacture and installation of energy efficiency measures
- Manufacture, installation and servicing of heat pumps
- Design, installation and servicing of heat networks
- Ancillary services including smart heating controls, support services, innovation and financing
- Delivery, conversion, maintenance and servicing of hydrogen ready boilers, if this becomes a relevant technology in the next decade.

The draft Strategy commits to building local supply chains, maximising local job creation, and ensuring a just transition. A new supply chain action plan will aim to deliver these objectives across the zero emission heating supply chain activities above, as well as others that may be identified.

Transitioning to zero emissions will displace jobs in the fossil fuel heating sector over time. The impact on these sectors will depend on the extent to which firms and employees can switch to supplying and servicing zero emissions heating systems. The supply chain action plan will consider opportunities for this, for example enabling existing gas and oil boiler installers to offer expert knowledge on alternative systems.

7.3 Local authorities

Local authorities will be affected in various ways beyond their role as building owners/occupants.

- Implementation of LHEES. We continue to work with local authorities and COSLA on the development of LHEES methodologies. We believe the LHEES should be developed on a statutory basis, and are committed to resourcing their development accordingly.
- Potential role in enforcement of regulations. As we strengthen our framework for heat and energy efficiency regulation, we will work with local government to identify where responsibility for enforcing standards should lie.
- Role in supporting deployment, including building on our Area Based Schemes and our developing approach to heat network support, which will facilitate local authorities achieve their own fuel poverty and net zero ambitions.

8. Costs and Benefits

This section provides a qualitative assessment of the draft Heat in Buildings Strategy (option 2) as compared with BAU (option 1). Given the proposed option comprises a comprehensive policy package, covering both regulatory and non-regulatory action most of which is in the early stages of development, it is not possible to provide a

²⁰ The jobs estimate is derived by applying the type 1 construction sector employment effects multiplier. Scottish Government. (2020), Supply, Use and Input-Output Tables, (Scottish Government), URL: <https://statistics.gov.scot/data/input-output>

detailed quantitative appraisal of the costs and benefits at this stage. Each regulatory element will go through its own consultation phase, accompanied by a respective BRIA.

8.1 Qualitative Assessment

The following provides a brief qualitative assessment of the two options against relevant criteria arising from the policy objectives and outcomes presented above.

Climate Change mitigation

Option 1 (do nothing) will not achieve the levels of deployment of energy efficiency or zero emissions heat required to achieve emissions reductions for the Buildings sector and thus wider Climate Change objectives. This is due to a combination of supply and demand constraints, including a lack of public engagement, misaligned incentives, underdeveloped supply chains and skills gaps which taken together suggest the continued deployment of zero emissions heat will be limited and an ongoing reliance on fossil fuelled heating systems. Through a coordinated approach, including regulatory and non-regulatory action, Option 2 (the Heat in Buildings Strategy) provides a framework to drive the required deployment and ensure emissions targets are met, aiming to decarbonise over 1 million homes and 50,000 non-domestic buildings by 2030.

Fuel Poverty reduction

The draft Heat in Buildings Strategy recognises reaching emissions reduction and fuel poverty targets simultaneously is challenging, but we are committed to ensuring we decarbonise in a manner that does not increase the rate or depth of fuel poverty. Zero emissions heat can be more expensive than use of a modern efficient fossil fuel boiler. The draft Heat in Buildings Strategy addresses this issue through a number of actions, including:

- Expanding domestic energy efficiency programmes to support more households to eliminate poor energy efficiency as a driver of fuel poverty, accelerate deployment of zero emissions heat and target our interventions where it does not have a detrimental effect on fuel poverty.
- Committing to phasing out support for fossil fuel boilers under Scottish Government programmes by 2024 where this is not detrimental to our fuel poverty objectives.
- Continuing to work with energy retailers toward ensuring households have access to suitable tariffs, encouraging energy retailers to develop new tariffs tailored to zero emissions heating systems; and pressing for pre-payment meter customers to have access to similar tariffs to direct debit customers and to benefit from smart meters.
- Examining the cost-effectiveness of onsite power generation and storage to reduce bills and enable zero emissions heat.
- Calling on UK Government to rebalance environmental and social obligation costs on energy bills to help unlock deployment and ensure a fair settlement for consumers.

Economy

Analysis suggests the heat transition, through investment in the deployment of energy efficiency and zero emissions heat, could significantly benefit the Scottish economy through employment opportunities. In particular, it is estimated that as many as 24,000 jobs could be supported by the roll out of zero emissions heat at the peak of the transition, with up to 1,200 jobs supported for each £100 million invested²¹. Under Option 1, without further action investment and deployment will remain marginal and the extent of the economic benefits outlined will not be realised. In contrast, Option 2, through coordinated regulation and non-regulatory support schemes, will provide certainty to the market and drive deployment, securing and maximising economic opportunities. By promoting innovation and skills development, not only will the Heat in Buildings Strategy provide high quality jobs, it may also position Scotland to take advantage of export opportunities. It is important to note, however, the potential for displacement such that the level of positive net impact on jobs may be more limited, and that while certain sectors are likely to benefit from the transition (energy efficiency, and low and zero emission fuels and technologies), others may see a reduction in their market (high carbon fuels and technologies). However, existing firms may be able to switch from supply associated with fossil fuel to zero emissions, and policy development will seek to ensure barriers to entry are minimised. 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, and work with industry bodies to enable existing gas and oil boiler installers to offer expert knowledge on alternative systems.

Deliverability and quality

Without additional direct government intervention and the certainty and clarity provided by proposed regulation, it is unlikely that the zero emissions heat sector will have sufficient incentives to invest in developing supply chains and upskilling their workforce to match the deployment levels required to meet emissions reduction objectives, which are far higher than current rates. This could lead to lower standards, with poor performance resulting from misspecification, particularly in the case of heritage or other hard-to-treat buildings where a specialised skillset may be required. Therefore, Option 1 poses risks in terms of deliverability and quality, which are addressed specifically under Option 2, in the Heat in Buildings Strategy, which sets out how we will engage with the UK Government, skills delivery partners and the supply chain to ensure the necessary skills, quality assurance, accreditation and standards are in place to support deployment and drive high standards.

Affordability and Value for Money

The upfront costs of installing a zero emissions heating system is often significantly higher than replacing incumbent fossil fuel boilers, and as noted above, may lead to increased fuel bills. Therefore, there are affordability concerns associated with the

²¹ Type 1 construction sector employment effects multiplier applied to 2021 prices. Scottish Government. (2020), Supply, Use and Input-Output Tables, (Scottish Government), URL: <https://statistics.gov.scot/data/input-output>

mass deployment of zero emissions alternatives required to meet emissions reduction objectives, however steps can be taken to ensure affordability and value for money. As the zero emissions heat market is relatively immature, there may be opportunities for economies of scale as demand increases and businesses can increase the efficiency of their production processes, leading to lower costs for consumers. Under Option 1, without kick-starting deployment at scale, it is unlikely that these efficiencies will be realised. There may also be increased running costs associated with misspecification where skills and standards are not in place, or where energy efficiency and zero emissions heat are not considered in tandem, potentially leading to suboptimal outcomes. Option 2, by taking a holistic view to energy efficiency and zero emissions heat, whilst targeting skills and embedding standards, is more likely to lead to cost-effective outcomes for households and businesses. Furthermore, the Strategy commits to establishing a Green Heat Finance Taskforce to explore potential new and value for money innovative financing mechanisms for both at-scale and individual level investment. Our holistic approach to heat in buildings reflects our broader commitment to taking a whole system view, and will support identification of least cost options and coordination efficiencies.

The heat transition will necessarily require significant investment, and by putting in place both regulatory and non-regulatory, there is increased likelihood of attracting private sector investment, while putting in place mechanisms to support those less able to pay. Taking a more strategic, less piecemeal approach, allows a more accurate assessment of how costs are recovered to ensure costs are borne fairly across society and that benefits accrue appropriately.

Population and Human Health

Option 1 will not deliver significant changes to health outcomes. Option 2, through the deployment of energy efficiency, may provide health benefits through improvements to thermal comfort and in particular reducing the depth and incidence of fuel poverty. Furthermore, switching away from fossil fuel heating systems may have additional benefits in terms of reducing pollution and improving air quality.

8.2 Quantitative Assessment

This section provides estimated costs and benefits of the transition to zero emissions heating as set forth in the draft Heat in Buildings Strategy. As the specific policies outlined in the draft Heat in Buildings Strategy are still in the early stages of development, this is necessarily a preliminary assessment. All figures should be treated as indicative and viewed in the light of current uncertainties around key aspects of the transition.

The changes to our buildings and energy systems that are needed to eliminate emissions from heating comprise both capital investment and ongoing costs. Different pathways and options have different balances as to where these costs arise in the system. For example, heat pumps have a high building-level capital cost relative to other zero emissions heat systems, while hydrogen concentrates a higher

proportion of capital costs upstream in networks and hydrogen production facilities²² How heat consumers are exposed to these costs, e.g. whether through bills, upfront costs, or taxes, depends on policy choices, energy market frameworks and new business models (such as heat-as-a-service). This diversity in potential outcomes further underscores the rationale for this impact assessment to take a broad qualitative approach, with quantitative assessment deferred to more specific policy development.

Our analysis indicates that to remain within the Buildings sector emissions envelopes published in the recent Climate Change Plan update, over 1 million households and around 50,000 non-domestic buildings will need to convert to a zero emissions heating system by 2030, with the remainder converting by 2045 at the latest. The draft Strategy identifies strategic technologies for the near term while acknowledging that other options may be cost effective in the longer term, and proposes to handle this uncertainty by targeting deployment of strategic technologies in low and no regrets areas.

We estimate that the total cost of converting our building stock to zero emissions by 2045 is in the region of £33 billion, with additional investment required to upgrade energy networks and ensure sufficient energy generation capacity. This is significantly more than the estimated £5 billion that would be spent over the same period on boiler replacements under a business-as-usual scenario. We also anticipate that, under the current market framework and electricity pricing structure, zero emissions heat could result in increased running costs for some, however this may be partly or fully offset by higher system efficiencies, energy efficiency and targeted support where appropriate. While cost projections are subject to considerable uncertainty, the finding that low and zero emissions heating is likely to add whole-system lifecycle costs relative to the incumbent system is robust, reflecting a wider range of estimates.²³

Residential Buildings: Upfront building-level costs

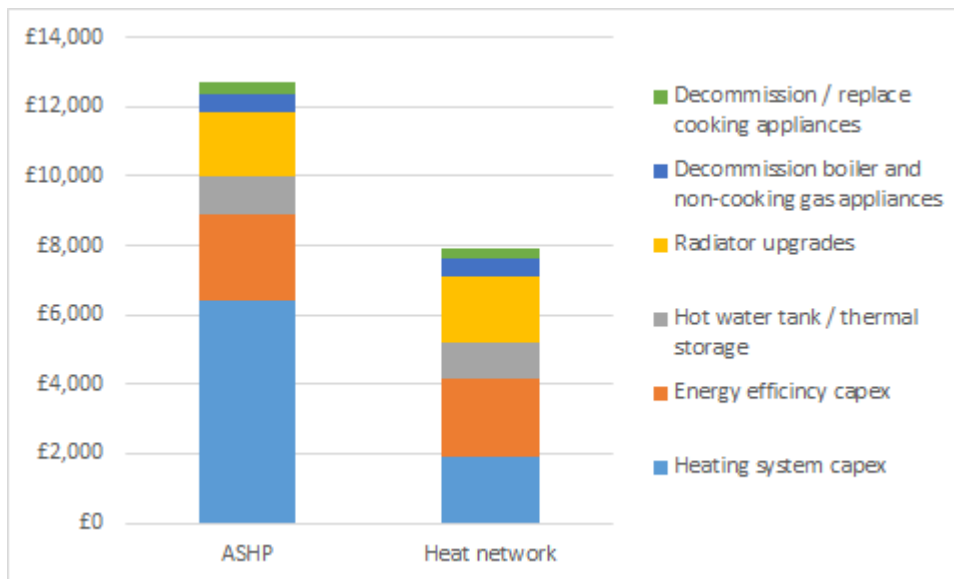
The draft Strategy identifies heat pumps and heat networks as strategic zero emissions heating technologies available in the near term, and underscores the importance of deploying them to buildings / areas that are no- or low-regrets.

Figure 7 shows capital costs for converting a home from a fossil fuel boiler to either an air source heat pump or a heat network connection. Including fabric upgrades the building-level cost of converting to use an ASHP is just over £12,000, and for connection to a heat network just under £8,000. By comparison, replacing a fossil fuel boiler (and not upgrading fabric) costs in the region of £2,000 to £3,000.

²² Imperial College Centre for Energy Policy and Technology 2016 "Comparing the impacts and costs of transitions in heat infrastructure" <https://www.imperial.ac.uk/media/imperial-college/research-centres-and-groups/icept/Heat-infrastructure-paper.pdf>

²³ Energy Research Partnership 2017 "Transition to Low Carbon Heat" <https://erpuke.org/project/low-carbon-heat/>

Figure 7: UK-average capital costs to convert from fossil fuel boiler to zero emissions heating (2020 estimate).



Source: Element Energy (2020) "Development of trajectories for residential heat decarbonisation to inform the Sixth Carbon Budget" study for the Committee on Climate Change.²⁴

Residential Buildings: Operating costs

The impact of converting a home from fossil fuel heating to a zero emissions system depends on property characteristics such as build form, occupancy levels, and fabric efficiency. The retail cost of energy supply across different vectors is also relevant. The draft Heat in Buildings Strategy identifies the role of environmental and social obligation costs (levies) in shaping the relative costs of different options. The development of UK Government policy in this area, along with future evolution of wholesale and other system prices, means forecasting future relative operating costs challenging. Therefore, this section considers the impact on fuel bills of adopting strategic zero emissions heat technologies under current market conditions.

When switching to a heat pump, most, although not all, of the higher unit (per kWh) cost of electricity as compared with fossil fuels such as gas can be offset by the greater efficiency of the heat pump compared to a fossil fuel boiler. Any remaining increase in fuel costs can then be offset by reduced heat demand due to fabric improvements (where technically feasible), potentially supplemented by microgeneration technologies. Modelling undertaken using the National Household Model shows that for the vast majority of Scottish dwellings that are currently using fossil fuels and which are below the equivalent of an EPC C, modelled fuel costs can fall where a heat pump is installed along with fabric measures, supplemented in some cases by solar PV or thermal. Conversely, properties currently using fossil fuels that have already attained the equivalent of an EPC C may have fewer options

²⁴ <https://www.theccc.org.uk/publication/development-of-trajectories-for-residential-heat-decarbonisation-to-inform-the-sixth-carbon-budget-element-energy/>

to offset the increase in fuel costs due to change in heating system. This latter group comprises around half of homes that use gas and around 8% of homes that use oil.²⁵

Running costs when using a heat network are more difficult to generalise, as they are dependent on the configuration of the network infrastructure (and hence capital cost that are recovered through bills) and the particular heat sources used. Heat networks are best suited to high density areas where per-connection network costs can be minimised. Larger networks are able to generally supply at lower cost, due to their lower average cost of development and operation, driven by factors such as more consistent demand, storage potential, renewable usage and available business models. Evidence collated by KPMG to inform the Heat Networks (Scotland) Bill Business and Regulatory Impact Assessment²⁶ suggests that heat networks could provide bill savings, potentially ranging up to 36%, with a medium potential saving of around 17% or 1.29 p/kWh in 2019. While further work is needed to estimate the range of heat network operating costs faced by users should networks extend to lower density areas, in this partial BRIA we assume they will generally be lower than levelised costs of alternative zero emissions options, as this represents an efficient resource allocation.

Non-Domestic Buildings costs

Figure 8 shows the estimated levelised costs associated with zero emissions heating options for non-domestic buildings, alongside equivalent costs for gas and oil boilers. These are presented on a £ per MWh basis. This is because the size, use and therefore energy demand of non-domestic buildings varies significantly and to a much a greater extent than residential buildings. As such, average costs are unlikely to provide an accurate representation of the cost of zero emissions heat in the non-domestic sector.

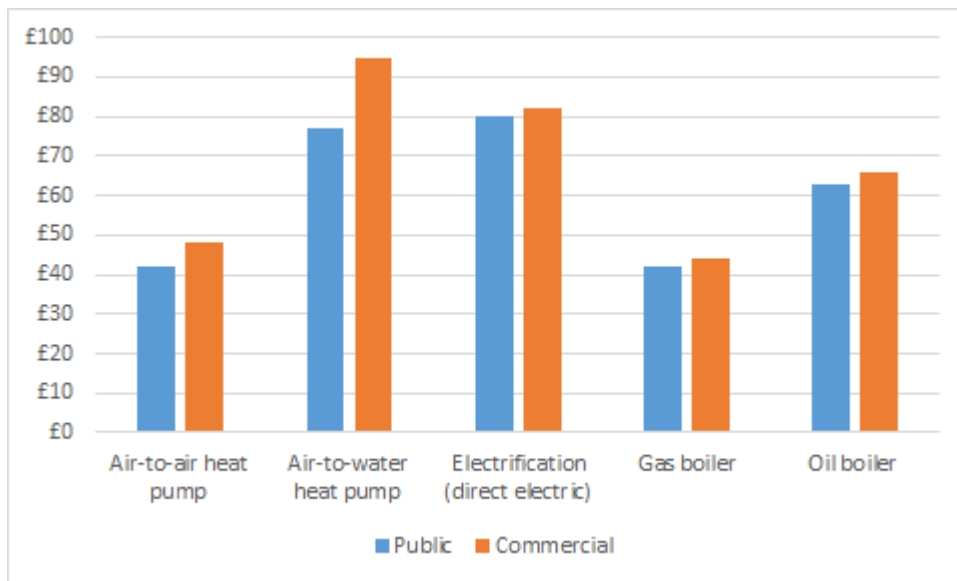
The levelised²⁷ costs of an air-to-air heat pump are similar to those of gas boilers at around £40-50/MWh. They present a potential saving in comparison to oil boilers, which are around £60-70/MWh. Air-to-water heat pumps are more expensive than both gas and oil boilers, at £77/MWh for public buildings and £95/MWh for commercial buildings, reflecting high upfront capital costs. Direct electric heating is also more expensive, at around £80/MWh, reflecting high fuel costs.

²⁵ See Table 22 in [Scottish house condition survey: 2019 key findings - gov.scot \(www.gov.scot\)](http://www.gov.scot)

²⁶ <https://www.gov.scot/binaries/content/documents/govscot/publications/impact-assessment/2020/03/heat-networks-scotland-bill-business-regulatory-impact-assessment/documents/heat-networks-scotland-bill-business-regulatory-impact-assessment/heat-networks-scotland-bill-business-regulatory-impact-assessment/govscot%3Adocument/heat-networks-scotland-bill-business-regulatory-impact-assessment.pdf>

²⁷ This is the smoothed cost over the technology lifetime for an installation in a given year, incorporating assumptions on capex, opex, fuel costs and efficiencies of each technology.

Figure 8: Levelised cost of energy for heat technologies in the non-domestic Buildings sector (£/MWh)



Source: CCC Sixth Carbon Budget. Note: costs of capital of 3.5% assumed for public sector and 7.5% assumed for commercial

Network and other costs

It is likely that the majority of heat demand that will need to convert to zero emissions heating by 2030 will switch to electric systems, either individual heat pumps or heat networks drawing heat from large scale heat pumps. In the wider context of policy initiatives to decarbonise other sectors such as transport and industry, there is significant potential for increased electricity demand in the future. This could have implications for both electricity generation capacity and distribution networks. Therefore, there is likely to be costs associated with increasing capacity and reinforcing networks. Given the electricity system's role in decarbonising services other than heat, the sharing and apportionment of these additional costs to zero emissions heat is difficult to specify. Due to the significant complexity and interdependencies, a robust estimate of these costs is not available currently. However we have committed in the draft Strategy to carry out research to better understand generation and network requirements.

9. Scottish firms impact test

The objectives of the draft Heat in Buildings Strategy will have two broad categories of impact on firms in Scotland:

- Impacts on firms in the energy industries and zero emissions heat supply chains
 - Switching buildings from fossil fuel heating systems to zero emissions will reduce demand for the manufacture, installation and maintenance of fossil fuel heating systems, and in the extraction, refinery and supply of these fuels. Demand for zero emissions heating technologies will increase. On balance, it is likely that the net effect on employment will be positive with more jobs created in manufacturing and services than are displaced. The Scottish Government has commissioned a study of

the economic impacts of the heat transition which will be published ahead of the final Heat in Buildings Strategy.

- The impact on individual firms involved in heating technology supply chains will depend on the extent to which they switch technology focus.
- The development of a market for zero emissions heating systems in Scotland on a faster timescale than the rest of the UK has potential to build competitive advantage for firms active in Scotland to then deliver products and services in the rest of the UK.
- Impacts on firms as owners / occupants / users of buildings.
 - The transition to zero emissions heat will likely on average create a net lifecycle cost at building level relative to continuing the use of incumbent fossil fuel technologies. The size of this cost (and hence firms' competitiveness with others not facing equivalent costs) will be dependent on developments across energy markets, reserved energy policy, financing options and subsidies.

For this partial BRIA, these impacts have been judged qualitatively. This reflects the high-level strategic nature of the draft Heat in Buildings Strategy and the dependence of impacts on future decisions.

10. Competition Assessment

Will the Measure directly or indirectly limit the number or range of suppliers?

The transition to zero emissions heat will alter the market for heating systems, energy efficiency and energy. However, this need not have a detrimental impact on the number or range of suppliers as existing firms are likely to be able to switch from supply associated with fossil fuel to zero emissions, and policy development will seek to ensure barriers to entry are minimised, and firms are supported to switch to ensure a just transition

Will the measure limit the ability of suppliers to compete?

The draft Strategy proposes development of regulations that would place restrictions on some suppliers to continue to supply certain products (e.g. fossil fuels or fossil fuel boilers). These regulations are subject to further policy development and consultation, which will allow a fuller assessment of the impact of specific proposals.

Will the measure limit suppliers incentives to compete vigorously?

There are no measures in the draft Heat in Buildings Strategy which limit suppliers' incentives to compete vigorously by either incentivising suppliers to coordinate their behaviour, exempting suppliers from competition law, or introducing or amending an intellectual property regime.

Will the measure limit the choices and information available to consumers?

The draft heat in Buildings Strategy proposes a comprehensive regulatory framework which when introduced may limit the choices of heating systems to zero emissions heating systems, and within that limit choice further to certain types of zero emissions heating system depending on various factors including location, local infrastructure availability and proximity to the gas grid.

Regulations requiring installation of zero emissions heating systems will limit choices available to consumers, though by supporting development of zero emissions

alternatives, such as heat network connections or hydrogen, that are currently unavailable to individual consumers (for example, due to infrastructure limitations), the total range of options available need not reduce in all cases. Development of regulations will be accompanied by further Business and Regulatory Impact Assessments of the specific proposals as they develop.

The draft Strategy commits to scaling up advice services and the development of further public engagement, enabling people to actively participate in decisions that involve them. Information about options will form an important part of this activity, and will potentially identify additional policy measures needed to ensure consumers are able to make informed choices.

11. Consumer assessment

Does the policy affect the quality, availability or price of any goods or services in a market?

Yes, the draft Heat in Buildings Strategy will effect a change in the way we heat our homes and businesses. Specific impacts on quality, availability and price are dependent on interacting factors, and will be assessed as more detailed policies are developed. The draft Heat in Buildings Strategy aims to provide certainty, signalling to the market the need to upscale to meet future demand. Measures are consulted on to ensure the quality of good and services is maintained alongside rising demand.

Does the policy affect the essential services market, such as energy or water?

Yes. The draft Strategy aims to ensure the costs of heating our homes and businesses is affordable and those occupying them have a high comfort level, as the systems supplying heat transition to zero emissions.

Does the policy involve storage or increased use of consumer data?

No impact on the storage or increased use of consumer data identified.

Does the policy increase opportunities for unscrupulous suppliers to target consumers?

Yes, a significantly increased installation rate for insulation, low or zero emissions technologies and heat networks increases the risk that customers will have poor experiences, either through poor installations or poor service, or will be victim to criminals who take advantage of the increased activity to commit fraud or other crimes. There is precedent in previous schemes where bad actors exploited customers, poor quality installs were not 'made right' and consumer confidence in energy efficiency programmes was significantly damaged.

Work will be undertaken to develop and encourage the adoption of standards that ensure good quality advice exists to help consumers make informed decisions, ensure that installers meet required standards and that there are adequate redress procedures and assistance in place for when things go wrong.

Does the policy impact the information available to consumers on either goods or services, or their rights in relation to these?

No negative impact identified.

Does the policy affect routes for consumers to seek advice or raise complaints on consumer issues?

No negative impact identified.

12. Test run of business forms

No new forms will be introduced.

13. Digital impact test

Not yet known.

14. Legal aid impact test

No impact identified. The Strategy itself will not create a new procedure or right of appeal to a court or tribunal, any change in such a procedure or right of appeal, or any change of policy or practice which may lead people to consult a solicitor. The regulation of heating systems may create such procedures, but that impact will be assessed as the Scottish Governments' approach to regulation is further developed.

15. Enforcement, sanctions and monitoring

The draft Heat in Buildings Strategy proposes to strengthen the regulation of energy efficiency and introduce new regulation for heating. While this will have implications for enforcement, sanctions and monitoring, those dimensions of the strengthened regulatory regime will be the subject of future policy development and an accompanying BRIA, and so cannot be assessed at this stage.

16. Implementation and delivery plan

The Strategy sets out both near term and longer term actions out to 2045. The Strategy will evolve to reflect latest thinking and developments in the UK, Europe and elsewhere in the world. The strategy will be reviewed 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.

17. Summary and recommendation

This partial BRIA lays out the rationale behind the Heat in Buildings Strategy. The consultation will be used to shape and finalise the strategy. The final BRIA will be informed by the consultation responses.

18. DECLARATION AND PUBLICATION

I have read the partial Business and Regulatory Impact Assessment and I am satisfied that, given the available evidence, it represents a reasonable view of the likely costs, benefits and impact of the leading options. I am satisfied that business impact has been assessed with the support of businesses in Scotland.

Signed:



Paul Wheelhouse
Minister for Energy, Connectivity and the
Islands



Kevin Stewart
Minister for Local Government, Housing
and Planning

Date: 24 March 2021

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