Public Audit Committee

11th Meeting, 2024 (Session 6), Thursday, 28 March 2024

Decarbonising heat in homes

Introduction

1. At its meeting today, the Public Audit Committee will take evidence from the Scottish Government's Director-General Net Zero on the Auditor General for Scotland's (AGS) Decarbonising heat in homes report, which was published on 1 February 2024.

2. The Committee previously took evidence from the AGS on the report on 29 February 2024. A copy of the report can be found in the **Annexe.**

3. The Committee will decide any further action it wishes to take after the evidence session today.

Clerks to the Committee,
25 March 2024

Annexe

Decarbonising heat in homes

AUDITOR GENERAL

Prepared by Audit Scotland
February 2024

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Accessibility

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Audit team

The core audit team consisted of Rebecca Seidel, Derek Hoy, Fiona Brannigan and Lorna Rofe, under the direction of Cornilius Chikwama.

Key messages

1 The Scottish Government has a long-standing commitment to improving how we heat our homes, initially with a focus on improving energy efficiency. Scotland's statutory emissions reduction targets, set in 2019 in response to the climate emergency, require the achievement of stretching goals. This includes reducing emissions from heating homes as much as possible by 2045, which will need the majority of households to change their heating systems. The scale of the challenge of reducing emissions from heating homes is huge and there are several risks to success. Unless the scale and pace of activity significantly increase the Scottish Government's ambition will not be met.

2 The Scottish Government spent almost two years building a team to deliver its Heat in Buildings Strategy, which was published in 2021. This was due to resource constraints, but the Scottish Government would have benefited from addressing its capacity needs sooner. During these two years, the team prioritised developing and consulting on the regulatory framework that is needed to deliver the ambitions in the strategy. The Scottish Government had filled key posts by early 2023 and has since made good progress in establishing programme management arrangements and getting ready to implement the regulations. It now needs to set out a clear plan of the action it will take to support the large-scale change in how we heat our homes.

3 Reducing emissions from heating homes is a complex process and involves a range of stakeholders and partners. The Scottish Government is working to create the right conditions to enable households to make the changes needed but faces significant risks. Success hinges on many pillars including raising public awareness, providing appropriate advice and financial support to homeowners, securing public and private finance, and growing supply chain capacity. Much of this work is at an early stage and needs to be advanced before legislation on how we heat our homes, which the Scottish Government is currently consulting on, is passed by the Scottish Parliament.

4 The Scottish Government currently estimates it could cost the public sector, businesses and households £33 billion in total to deliver its full Heat in Buildings Strategy. The final cost will be influenced by several factors that are difficult to predict, including inflation, the price of heating systems and the impact of new legislation. The Scottish Government has committed £1.8 billion of public money over the current parliamentary term to delivering the strategy. Given the competing spending priorities faced by the Scottish Government, it must carefully consider how much public money to invest in this area and how to maximise its impact and ensure value for money. It also needs to consider how it can help to enable the private sector to roll out funding and finance mechanisms that will support people to make the necessary changes to how they heat their homes.

Recommendations

The Scottish Government should:

- finalise governance arrangements for the Heat in Buildings Strategy programme as soon as possible and keep these under review to ensure they remain fit for purpose (paragraph 32)
- produce a delivery plan for its Heat in Buildings Strategy by the end of 2024, which includes:
  - clear actions that are aligned with the ambitions, targets, budget and regulations for a just transition to decarbonised heating in homes
  - timescales for delivery
  - clarity on the roles of the Scottish Government and its partners
  - the anticipated impact of these actions (paragraph 35)
- identify the staff numbers and skills needed to deliver the Heat in Buildings Strategy programme in the medium term, taking into account the resource requirements of the delivery plan (see above) (paragraph 31)
- clarify how it will use public money in the short and long term to support the delivery of its Heat in Buildings Strategy objectives, while achieving value for money (paragraph 61 and 65)
- respond to the recommendations from the Green Heat Finance Taskforce stage two report in autumn 2024, and work with the private sector to help create the conditions to roll out funding and finance mechanisms to help homeowners comply with new regulations on heating their homes (paragraph 64).

Background

1. The Scottish Government declared a climate emergency in 2019 and the Scottish Parliament passed the Climate Change (Emissions Reductions Targets) (Scotland) Act 2019 in October of that year. The Act introduced a new target of **net zero** greenhouse gas emissions by 2045. It also set interim targets of a 75 per cent reduction by 2030 and a 90 per cent reduction by 2040 (relative to 1990 levels).

2. In 2020, the Scottish Government published an update to its 2018 Climate Change Plan.[1] It set out the Scottish Government's policies and proposals that would be delivered across a range of sectors to achieve the increased ambition in the Climate Change (Emissions Reductions Targets) (Scotland) Act 2019. This included policies and proposals for reducing emissions in homes and non-residential buildings, which are a significant contributor to total emissions.

3. Scotland has around 2.5 million occupied **homes** and they contribute 15 per cent of the country's overall greenhouse gas emissions. Most of those emissions are generated by heating, as most of Scotland's homes still rely on fossil fuel systems for heating. Mains gas is by far the most used fossil fuel for heating homes (Exhibit 1, page 7).

4. Decarbonising heat in homes, by switching from fossil fuel powered heating systems to renewable energy heating systems, will make a significant contribution to meeting Scotland's statutory emissions reductions targets. The Scottish Government's approach for buildings (including homes) is focused on a mass switch away from polluting heating systems, such as fossil fuel boilers, to **clean heating systems** by 2045.

5. The energy efficiency of Scotland's housing stock varies because of differences in the age and type of buildings and the materials used to construct them, but generally it could be much improved. Better energy efficiency reduces the amount of energy used to heat homes, which can save money and reduce emissions from heating systems. The Scottish Government plans to scale up its work on improving the energy efficiency of the housing stock. Switching to clean heating systems and improving energy efficiency is likely to be more difficult for some properties, for example older properties, tenement buildings, or properties in remote locations.

Net zero

The process where emissions are cut to as close to zero as possible with any remaining emissions re-absorbed from the atmosphere. Net zero means there is a balance between the amount of carbon emissions we put into the atmosphere and the amount of emissions we take out.

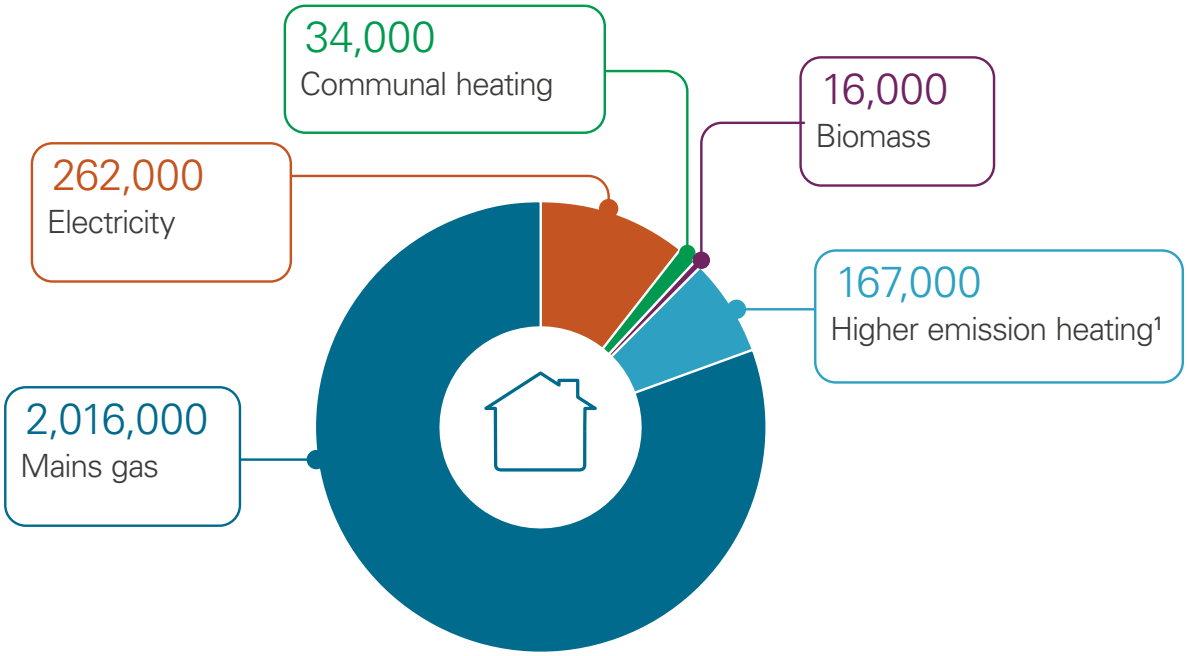
Homes

For this report, we consider homes to be individual residential properties. We do not include communal residential buildings, such as university halls of residence or care homes.

Clean heating system

Heating system that does not produce any greenhouse gas emissions at the point of use.

Exhibit 1.
How Scotland's 2.5 million homes are heated



Note: 1. The higher emission heating total is comprised of 129,000 oil, 20,000 solid mineral fuel and 18,000 Liquefied Petroleum Gas (LPG) bulk or bottled.

Source: Scottish House Condition Survey 2019

6. The Scottish Government published its Heat in Buildings Strategy (HIBS) in 2021.[2] It sets out the actions the Scottish Government will take in the buildings sector to meet its commitment to reduce emissions. Its approach to decarbonising heat in homes is framed around three key areas: regulatory change, delivering significant investment and supporting supply chain growth. It commits to doing this while maximising economic opportunities and achieving a **just transition**, including addressing **fuel poverty**. The Scottish Government launched a consultation on proposals for a Heat in Buildings Bill in November 2023.[3] The Bill would make new laws applicable to heating systems that can be used in homes and commercial buildings, and on energy efficiency standards.

Just transition

Seeks to ensure that the benefits of a transition to a green economy are shared widely, while also supporting those who stand to lose economically, be they regions, industries, communities, workers or consumers.

Fuel poverty

A fuel-poor household is one where more than 10 per cent (20 per cent for extreme fuel poverty) of net income is required to pay for its reasonable fuel needs after housing costs have been deducted; 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.

About this report

7. The Scottish Government has set a pathway towards decarbonising heat in buildings. It is at a crucial stage as it moves its focus from predominantly improving energy efficiency to also targeting greenhouse gas emissions reductions. While the HIBS covers all building types, this audit focuses on the Scottish Government's approach to decarbonising heat in homes. It looks at:

- the Scottish Government's objectives for decarbonising heat in homes
- progress made to date in decarbonising heat in homes
- what still needs to be done, the investment required and the opportunities and barriers to success.

8. Our findings are based on evidence from the following sources:

- interviews with Scottish Government officials
- interviews with some of the delivery partners for the Scottish Government's energy efficiency improvement schemes
- a review of the Scottish Government's Heat in Buildings Strategy, the consultation on proposals for a Heat in Buildings Bill and related documents and strategies
- a review of the Scottish Government's governance, risk management and monitoring arrangements for the Heat in Buildings programme
- a review of reports from other scrutiny bodies and stakeholders, including the Climate Change Committee, on the Scottish Government's work to decarbonise heat in buildings.

9. We have also considered the findings from our 2023 report, How the Scottish Government is set up to address climate change goals.[4]

1. The Scottish Government's objectives

Achieving the Scottish Government's objectives will be challenging

10. The HIBS sets out a pathway to help reach Scotland's net zero target by reducing emissions from heating homes as much as possible by 2045. The Scottish Government's objectives are clear, but it faces several challenges in trying to achieve them, related to costs, timescales, technical issues and stakeholder involvement. It is working to:

- phase out fossil fuel boilers and other high-emission heating systems and facilitate a full-scale transition to clean heating systems by 2045
- improve the energy efficiency of Scotland's housing stock to maximise the effectiveness and efficiency of clean heating systems
- achieve a just transition to decarbonised heating in homes and a significant reduction in the number of households living in fuel poverty.

11. The HIBS includes the following targets:

- A 68 per cent reduction in emissions from buildings by 2030 against a 2020 baseline (as set out in the Climate Change Plan Update).
- At least 22 per cent of heat in buildings to be directly supplied from renewable sources by 2030 (provisional target – see paragraph 57 for an update on this target).

12. In its 2022 annual progress report on reducing emissions in Scotland, **the Climate Change Committee (CCC)** said it would be very challenging to meet the objectives the Scottish Government set out in its HIBS.[5]

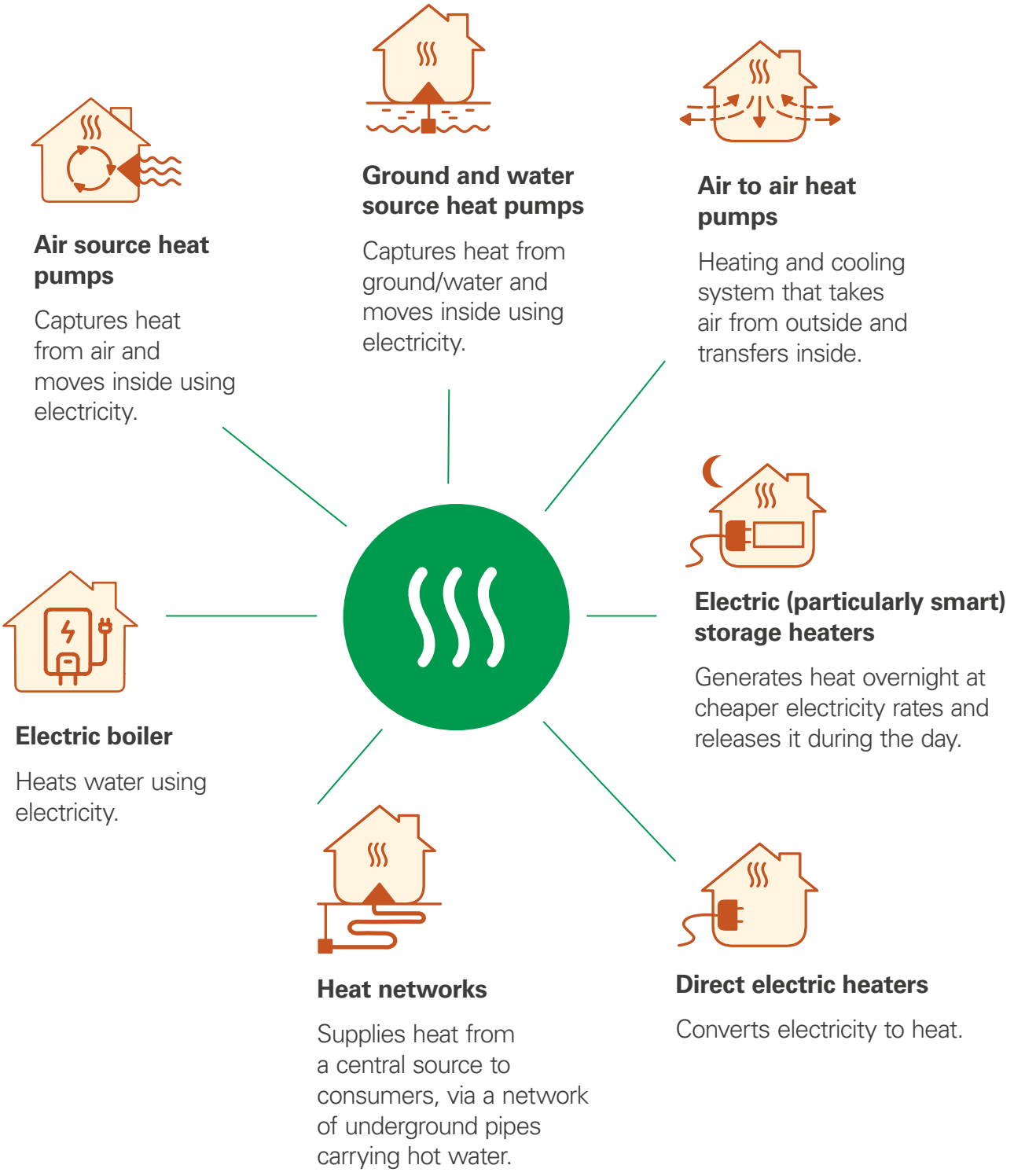
The Scottish Government is now placing more emphasis on measures to reduce emissions

13. The Scottish Government has been working to help people heat their homes more efficiently since 2009, with a focus on reducing fuel poverty. Its focus widened following the introduction of statutory emissions reduction targets for Scotland in 2019. The need to achieve these targets is reflected in the Scottish Government's ambition for a mass switch to clean heating systems and away from polluting heating systems, such as gas boilers. There are several types of clean heating systems available (Exhibit 2, page 10).

The Climate Change Committee (CCC)

The UK's independent adviser on tackling climate change. The CCC has a statutory obligation to monitor government progress in reducing greenhouse gas emissions. It also monitors progress in responding to climate risks and opportunities.

Exhibit 2.
Examples of clean heating systems



Source: Audit Scotland

14. The Scottish Government does not favour the use of any one clean heating system. There is considerable potential for innovation in clean heating technology to develop further in the coming years. But installation rates remain low. Taking heat pumps as an example, only around 23,500 heat pumps had been installed in Scotland by November 2023 (paragraph 38 and Exhibit 5, page 18).

15. Energy efficiency measures will continue to be an important part of decarbonising heat in homes to support the switch to clean heating systems. Consequently, the Scottish Government will continue its long-standing work on improving energy efficiency in homes (paragraph 45) and aims to introduce new legislation to help achieve this (paragraph 51).

The Scottish Government has committed to achieving a just transition to clean heating systems and reducing fuel poverty

16. The HIBS commits to a just transition to clean heating systems. This means the Scottish Government must make sure that decarbonising heat in homes does not worsen existing inequalities across socio-economic groups and regions. The Scottish Government is targeting some initiatives at specific groups. For example, the grant scheme for installing clean heating systems awards £1,500 more per household to those living in rural and remote communities. The Scottish Government has also allocated a £200 million fund to support decarbonisation of social housing over the current parliamentary term.

17. The HIBS outlines a range of actions the Scottish Government will take to help people make informed choices on their heating needs. These include publishing a public engagement strategy, developing marketing campaigns and growing its advice services.

18. The Scottish Government's consultation on proposals for a Heat in Buildings Bill (paragraph 56) reaffirmed its commitment to a just transition. It states that its proposals would only apply where it was affordable, fair and feasible for households to make changes. It will consider exemptions from regulations for certain groups, such as those living in fuel poverty or child poverty, the elderly, the disabled, low-income households and rural properties. It also states that financial support for those in most need will remain a high priority.

19. Alongside reducing emissions from heating homes, the Scottish Government remains committed to reducing fuel poverty. Fuel poverty is experienced across wide sections of the population. But specific groups, such as the elderly or those living in remote and rural communities or social housing, could be more likely to experience fuel poverty.

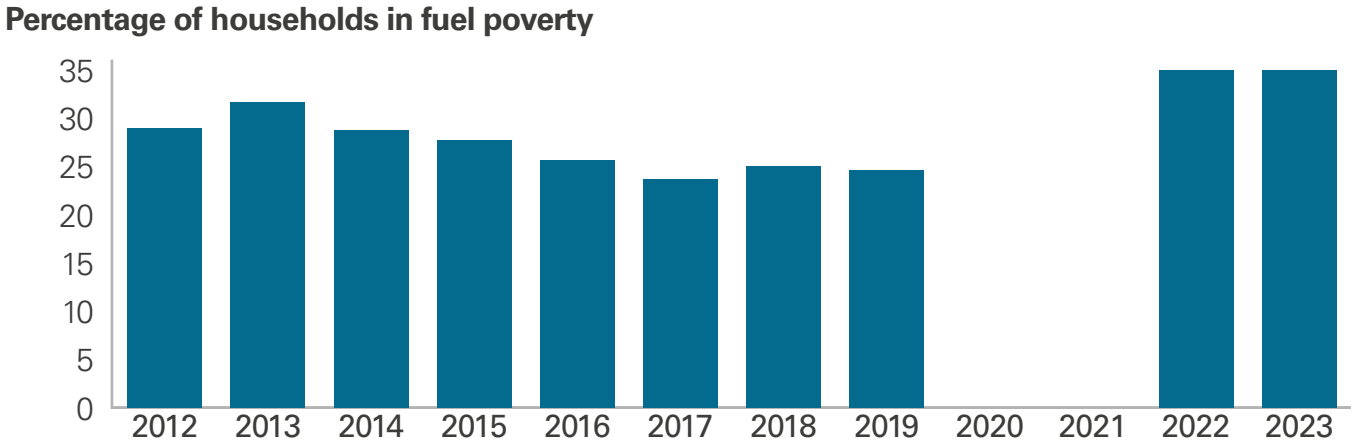
20. Scotland's statutory targets for fuel poverty state that by 2040, no more than five per cent of households will be fuel poor, no more than one per cent will be in extreme fuel poverty and the **fuel poverty gap**

Fuel poverty gap

The additional income that would be needed to bring a household out of fuel poverty.

will be no more than £250 (in 2015 prices). But the cost-of-living crisis and rising energy prices have driven an increase in the percentage of Scottish households living in fuel poverty, from 24 per cent in 2019 to an estimated 35 per cent in 2023 (Exhibit 3).

Exhibit 3.
The number of households in fuel poverty from 2012 to 2023



Notes:
1. No data is available for 2020 as the survey was not completed due to the Covid-19 pandemic.
2. For 2021, the survey is not comparable to previous years due to changes in methodology and issues with the representativeness of the sample.
3. The figures for 2022 and 2023 are estimates based on scenario modelling derived from the 2019 Scottish House Condition Survey. Figures for these years represent a snapshot from October rather than a full year average.

Source: Scottish House Condition Survey

21. The HIBS contains a set of guiding principles to ensure alignment with the Scottish Government's fuel poverty objectives. These sit alongside a range of actions to try to reduce fuel poverty while also reducing emissions, including scaling up existing energy efficiency schemes (Appendix 2, page 35).

22. The Scottish Government has committed to decarbonising heat in homes in a way that does not further disadvantage vulnerable groups, and to continue efforts to reduce fuel poverty. Public funding can make a vital contribution to support targeted groups to change how they heat their homes and avoid fuel poverty. The Scottish Government has outlined several measures in its HIBS aimed at delivering a just transition, but it is too early to say if they will be enough to meet this objective.

Decarbonising heat in homes is a complex process

23. The process of decarbonising heating in homes is not straightforward and success rests on several key pillars and stakeholders (Exhibit 4, page 14). None of these pillars in isolation will be enough to deliver the transformation needed and there are complex interdependencies between them. The Scottish Government sees regulation to comply with specific standards for heating homes as the main pillar, within its powers, that will create the certainty required for the other pillars to grow.

24. The Scottish Government recognises that it cannot deliver its HIBS ambitions alone. It has a key role in coordinating and supporting activity in this complex area, working with a wide range of partners and stakeholders to secure investment, build infrastructure and develop a supply chain. Stakeholders include the public, delivery partners for HIBS schemes, private sector investors, industry and the UK Government.

25. The Scottish Government has a complex role to coordinate activity across these stakeholders. It needs to create the right conditions to enable them to play their part and support people to make the changes needed to their home.

26. The Scottish Government is aware of the opportunities that come with working in partnership with other stakeholders and is seeking to maximise the benefits from doing so. It is not developing its plans in isolation and has sought input from the public and other stakeholders. It has carried out several public consultations to inform the development of its policies in this area (Appendix 1, page 34). A consultation on proposals for a new Heat in Buildings Bill was launched in November 2023 and will run to March 2024.

27. As well as consulting with stakeholders, the Scottish Government has also looked at how other countries are tackling heat decarbonisation. It commissioned a review of international heat and energy efficiency policies.[6] This has helped to inform its approach to its HIBS programme, including how it intends to use regulation to drive changes in how we heat our homes.

The Scottish Government is putting in place the internal building blocks to progress its objectives

28. The Scottish Government requires effective arrangements to manage the HIBS programme successfully. This includes implementing actions in agreed timescales and within the resources available, mitigating risks to delivery, and monitoring and reporting on progress. This is especially important given the need to manage activity across a wide range of stakeholders. We highlighted how the Scottish Government is developing these arrangements for its wider climate change ambitions in our 2023 report, How the Scottish Government is set up to address climate change goals.

Exhibit 4.

The main pillars and stakeholders required to achieve the decarbonisation of heating in homes

Pillar 1: Regulation

- Provides clarity on the changes people need to make to how they heat their homes
- Stimulates demand for clean heating systems and energy efficiency measures, creating the need for investment, infrastructure development and supply chain growth. Without these pillars, people will not be able to comply with regulations
- Scottish Government and UK Government legislation will influence heat decarbonisation in Scotland.

Pillar 2: People

- The Scottish Government and its delivery partners must support people to understand, accept and comply with regulations
- People will rely on investment from the Scottish Government and private sector to provide the funding and finance options needed to comply with regulations
- People will rely on infrastructure development, such as increased electricity grid capacity, to support the changes to how they heat their homes
- People will rely on supply chain growth so that industry can provide the materials and workers needed to design, manufacture, install and maintain clean heating systems and energy efficiency measures.

Pillar 3: Investment

- Investment is needed from the Scottish Government and private sector
- Investment is required to provide people with funding and finance to make the necessary changes to their homes
- Investment is required to support infrastructure development
- The supply chain requires investment to grow and meet the demand that should be generated by regulations.

Pillar 4: Infrastructure

- Industry cannot deliver clean heating systems systems for people without the necessary infrastructure improvements
- The capacity of the electricity grid needs to increase to meet rising demand from people to power their clean heating systems
- The UK Government has a key role in infrastructure development.

Pillar 5: Supply chain

- Industry must scale up to ensure the workforce and materials are available to design, manufacture, install and maintain clean heating systems and energy efficiency measures for people, and to improve energy infrastructure
- The Scottish Government and UK Government have a role to play in supporting industry to scale up.

Stakeholders: Scottish Government, UK Government, Scottish Government's delivery partners, private sector investors, industry

Pillars Stakeholders

Source: Audit Scotland

29. The Scottish Government was initially slow to build capacity in its core HIBS programme team given resource pressures across government and a temporary recruitment freeze. An internal independent review of the HIBS programme in June 2022 raised concerns about staff capacity and highlighted the need for programme management expertise.

30. The Scottish Government carried out a workforce planning exercise in late 2022, in which all directorates under the Director General Net Zero identified the staff required to deliver key work programmes within the available budget. Key roles, including a programme director, an additional deputy director for the HIBS programme and a finance lead, were identified and all staff were in place by early 2023. The Heat in Buildings team also absorbed and adapted some existing Scottish Government functions and teams, including staff from the Better Homes Division and Building Standards Division. In total, the Heat in Buildings team had around 125 staff by the end of 2023.

31. Given the pressing timescales it is working towards, the Scottish Government would have benefited from addressing its capacity needs sooner. The number and skills of staff required to deliver the HIBS programme will change over time. The Scottish Government will need to keep this under review and consider whether it can build its capacity to the level needed alongside competing priority areas.

32. While the team was at limited capacity, it prioritised developing and consulting on the HIBS and accompanying regulatory framework (Appendix 1), and on continuing to oversee the Scottish Government's grants and loans schemes (Appendix 2). Key roles were filled by early 2023, and the team has since made good progress in establishing programme management arrangements, including developing a comprehensive approach to risk management. It is also putting in place improved governance arrangements to provide oversight and coordination of activity across the programme, although they are still to be finalised.

33. A critical part of good programme management is the regular monitoring of performance and resources to ensure delivery of policies and projects within agreed timescales and budgets. There are monitoring arrangements in place for the current energy efficiency improvement schemes outlined in Appendix 2. In November 2023, the Scottish Government published a monitoring and evaluation framework to support internal and public reporting of progress across the whole HIBS programme.[7]

34. The framework is designed to track progress against the HIBS and to show the impact of HIBS policies and programmes on emission reductions and wider outcomes. The framework will inform the Scottish Government's annual public reports on progress towards the HIBS and will align with its Climate Change Plan monitoring report. The Scottish Government has identified some data gaps that will make reporting on

some areas challenging, such as heat networks and skills. It intends to continue to refine the framework and incorporate further data in future reporting as it becomes available.

35. Now that the Scottish Government has built capacity and is close to finalising its governance and monitoring arrangements, it should produce a clear delivery plan for the HIBS. This should include clear actions that are aligned with the ambitions and targets for a just transition to decarbonised heating in homes, timescales for delivery, clarity of roles, and the anticipated impact of these actions.

2. Progress to date

The Scottish Government must significantly increase the scale and pace of activity to achieve a full switch to clean heating systems by 2045

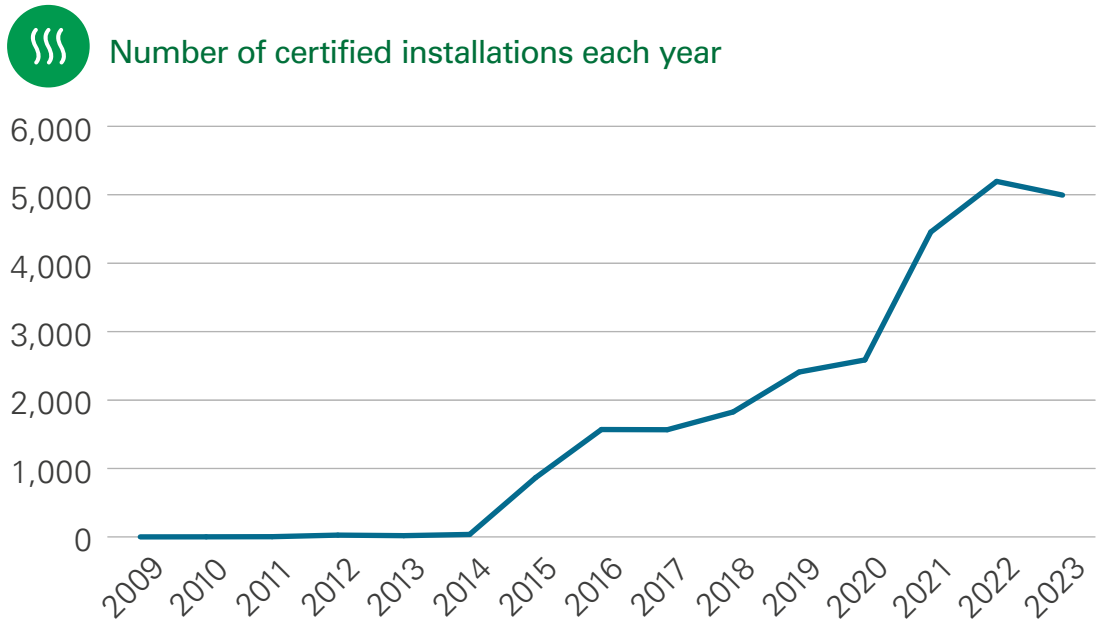
36. The Scottish Government set targets for a 68 per cent reduction in emissions from buildings by 2030, and a provisional target of at least 22 per cent of heat in buildings to be directly supplied by renewable sources by 2030. For housing, the Scottish Government estimated that meeting these two targets would require decarbonising heating in at least 1.17 million additional homes by 2030.

37. This was an extremely ambitious aim. The most ambitious scenario in the **CCC's 6th Carbon Budget** suggests 1.2 million homes in Scotland could have low carbon heating systems by 2034, compared to the HIBS ambition of 1.17 million by 2030.[8]

38. The HIBS stated that to meet the 2030 targets, clean heating system installations between 2021 and 2026 would need to reach a total of 124,000 and annual installation rates would have to peak at over 200,000 in the late 2020s. Current installation rates are significantly below these rates. The first certified clean heating system installations were carried out in 2010. Since then, just under 26,000 clean heating systems have been installed. Installation rates have increased most years since 2010 (Exhibit 5, page 18), but there were still only just over 5,000 certified installations in total in 2022.

39. In its consultation on proposals for a Heat in Buildings Bill, the Scottish Government has stepped back from its aim of 22 per cent of heat in buildings to be directly supplied by renewable sources by 2030 (paragraph 57). In announcing the consultation, the Minister for Zero Carbon Buildings, Active Travel and Tenants' Rights also stated that the scale of change needed to convert over one million homes to clean heating is not achievable by 2030 under the timelines proposed for new regulations. The Scottish Government will need to consider what this means for achieving its statutory 2030 interim emissions reduction target.

Exhibit 5.
Clean heating system installation rates



Source: Microgeneration Certification Scheme Dashboard

40. Carbon emissions from heating homes decreased from 7.7 **MtCO2e** in 1999 to 6.2 MtCO2e in 2021. (Exhibit 6, page 19). To help reach Scotland's net zero target by 2045 they need to decrease at a much faster rate. A mass switch to clean heating systems can help to achieve that target, but installation rates must increase significantly. Part 3 of this report highlights several barriers that the Scottish Government and other stakeholders must overcome for installation rates to reach the level needed.

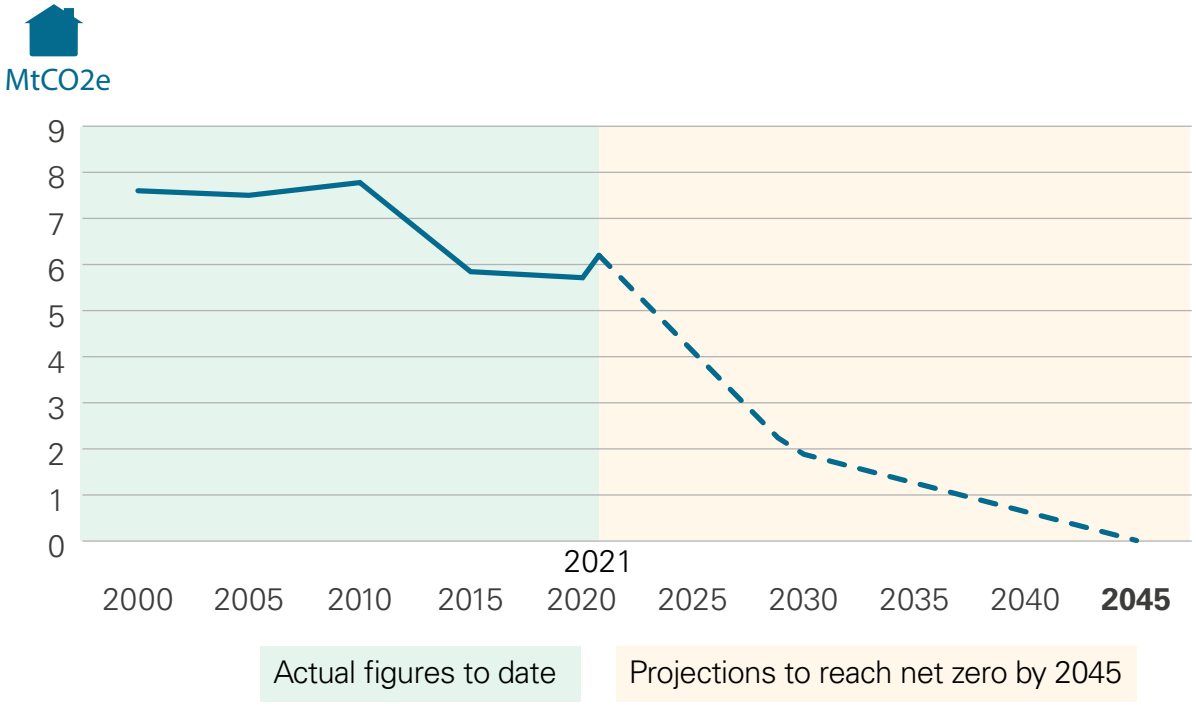
41. Heat networks also play an important role in the Scottish Government's approach to decarbonising heating in homes. Heat networks (also known as district heating) supply heat from a central source to consumers, via a network of underground pipes carrying hot water.

42. The Scottish Government has set targets to increase the combined supply of thermal energy by heat networks, which is currently 1.4 **terawatt-hours**. It aims to reach 2.6 terawatt-hours of output by 2027, 6 terawatt-hours of output by 2030, and 7 terawatt-hours of output by 2035. The Heat Networks (Scotland) Act 2021 introduced powers to regulate the heat networks market in Scotland.

MtCO2e (metric tons of carbon dioxide-equivalent) is a unit of measurement for carbon emissions. This measurement considers multiple greenhouse gases, including carbon dioxide, methane and nitrous oxide.

Terawatt-hours (TWh) is a unit of energy representing one trillion watt hours. TWh are used to measure quantities of heat and electricity produced, especially where using large amounts of energy.

Exhibit 6.
Carbon emissions from heating homes



Note: 2021 data has been included to illustrate the increase in emissions during the Covid-19 pandemic. 2021 is also the last year for which data is available.

Source: Scottish Energy Statistics Hub

43. An estimated 34,000 homes are currently connected to heat networks, and these are predominantly fuelled by gas. Heat networks will not contribute to reducing emissions until they are no longer powered by fossil fuels. Having the heat network infrastructure in place means the buildings connected to a network can all switch to zero emissions heating simultaneously by converting the energy source for the network.

44. Building the infrastructure for heat networks will be a long-term project and is unlikely to contribute to reducing emissions in the short term. The Scottish Government considers homes connected to heat networks to have a clean heating system as the emissions are not generated at the point of consumption.

Energy efficiency in Scotland's homes has improved but more must be done

45. The Scottish Government has a long-standing commitment to improving energy efficiency in homes. It has invested in a range of schemes to support households to improve energy efficiency. These schemes include direct support to install energy efficiency measures such as wall and loft insulation; financial support, such as grants and loans; and information and advice services.

46. The Scottish Government currently operates several energy efficiency improvement schemes (Appendix 2). These are now included in the programme of work to implement the HIBS, with the Scottish Government working to scale them up and shift their focus more towards reducing emissions. The Scottish Government has established good working relationships with a range of partners to deliver the schemes.

47. The most recent HIBS progress report, in October 2023, reported that in 2022/23 the Scottish Government's current schemes resulted in:

- a spend of £170 million
- 138,000 households assisted through Home Energy Scotland advice service
- over 8,000 fuel poor households made warmer
- over 5,100 clean heating systems installed in homes.

48. Over the last ten years the Scottish Government has provided support to a significant number of households through these schemes (Appendix 2). Households have benefited from information and advice, the installation of energy efficiency and heating improvement measures, and financial support in the form of grants and loans.

49. Overall, there has been good progress in improving the energy efficiency of Scotland's homes. For example, the percentage of relevant homes with at least 200mm of loft insulation has increased from 27 per cent in 2009 to 65 per cent in 2019.[9] This is still short of the aim in the Scottish Government's Climate Change Plan that 70 per cent of lofts in the residential sector will have at least 200mm of insulation by 2020. That aim may increase to 270mm under the proposed new energy efficiency standard outlined in the Scottish Government's consultation on proposals for a Heat in Buildings Bill. In 2019, 59 per cent of homes had some form of wall insulation, up from 46 per cent in 2009. This was just short of the Scottish Government's aim of 60 per cent by 2020.[10]

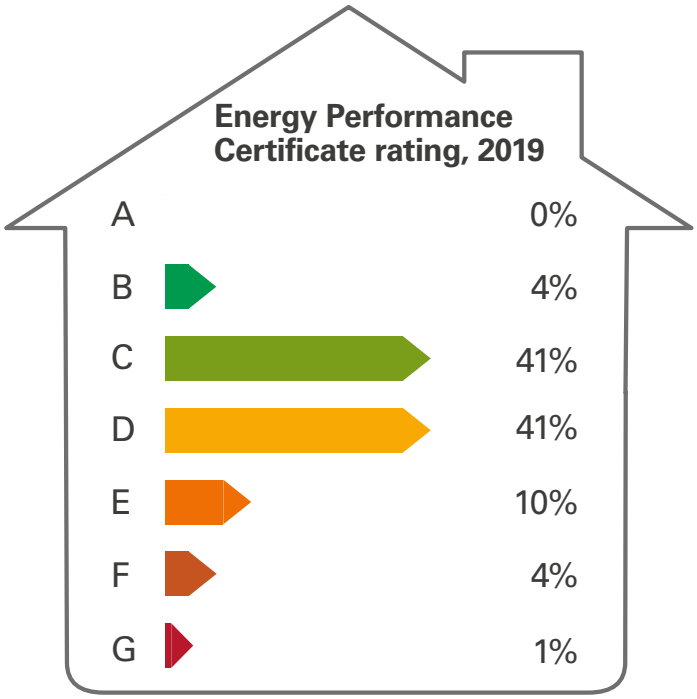
50. Funding energy efficiency improvements is not the sole responsibility of the Scottish Government. Private households can undertake energy efficiency improvements at their own expense, although this is difficult to quantify as data is not available solely on privately owned homes.

51. The Scottish Government wants to continue to improve energy efficiency as a key factor in reducing emissions from heating homes. It set a target in the HIBS for all homes in Scotland to achieve a minimum energy efficiency standard by 2033, with private landlords expected to meet the standard by 2028. The consultation on proposals for a Heat in Buildings Bill proposes that a property will meet the standard if it has an **Energy Performance Certificate (EPC)** rating equivalent to at least band C, or if a specific set of energy efficiency measures have been installed.

52. The latest available data from 2019 shows that 41 per cent of houses had an EPC rating of at least band C (Exhibit 7). There is a significant gap to close despite the progress made to date in improving energy efficiency. Further action is needed to close this gap, but much of the easier work to improve energy efficiency has been done. Factors such as the age, type and condition of properties all contribute to the scale of the task to improve energy efficiency.

An **Energy Performance Certificate (EPC)** shows how energy efficient a property is. A higher rating means the energy bills for that house are likely to be lower. By law, an EPC is needed whenever a property is built, sold or rented.

Exhibit 7.
Energy performance of Scotland's homes



Note: Percentages do not add up to 100% due to rounding.

Source: Scottish House Condition Survey 2019, using SAP 2009 v.9.93 methodology

53. The priority now placed on emissions reductions has changed the nature of the Scottish Government's energy efficiency schemes. Grants and loans are now focused on measures that reduce emissions. Fossil fuel boilers, for example, will have a diminishing role in these schemes.

54. There is a clear shift in the Scottish Government's approach to heating homes, with more emphasis on reducing emissions. But its work to improve energy efficiency in homes remains vital to that ambition. The Scottish Government has invested significantly to improve energy efficiency over a long period. But the EPC ratings target set out in the HIBS means that much more needs to be done. The Scottish Government is scaling up its existing energy efficiency schemes, but it is too early to know if that will be enough to meet the target.

3. The path to decarbonised heating

Further delays to new regulations would be a significant risk to progress

55. The Scottish Government is developing new legislation covering the type of heating systems that can be installed in our homes and the energy efficiency rating our homes must reach. Exhibit 8 (page 24) outlines the regulatory framework that the Scottish Government is developing under its HIBS.

56. The Scottish Government issued a public consultation on proposals for a Heat in Buildings Bill in November 2023, which will run until March 2024. The Bill would be the central piece of primary legislation for phasing out polluting heating systems in existing privately owned homes. This will sit alongside other existing and new legislation covering areas such as heat networks, EPC reform, new build housing and social housing.

57. The consultation on proposals for a Heat in Buildings Bill proposes new legislation requiring home buyers to switch to a clean heating system by the end of a specified period following the purchase of the property. The consultation paper also outlines a proposed change to two of the ambitions set out in the HIBS:

- to introduce a new single date of 2028 to begin phasing out the installation of polluting heating systems for both on-gas properties (was 2030) and off-gas properties (was 2025)
- to make provision within the Bill to replace the target for 22 per cent of heat in buildings to be directly supplied from renewable sources by 2030 with a new or amended target.

58. It has taken longer than expected to launch the consultation on proposals for the Bill and the timeframe for laying the Bill in Parliament has already been pushed back several times. There is also a risk that, once laid, it may take a long time for Parliament to pass the Bill. There is also uncertainty over what, if any, amendments may be made.

59. There have been delays in implementing some other legislation. Implementation of the EPC reform legislation was originally scheduled for 2022 but is now expected in winter 2023/24. Any delay to implementing legislation increases the likelihood of the Scottish Government not meeting statutory emissions reduction targets in 2030 and beyond.

Exhibit 8.
Proposed timeline for HIBS regulatory framework

Source: Audit Scotland

The Scottish Government faces difficult decisions to maximise the impact of public funding in delivering the HIBS programme

60. The Scottish Government estimated in its HIBS that it will cost around £33 billion to decarbonise heat in buildings by 2045. The final cost will be influenced by several factors, many of which are difficult to predict. This includes inflation rates, the future price of clean heating systems and the impact of proposed new legislation. The Scottish Government is currently reviewing the estimated total cost and will conclude that exercise once it has more certainty over the content of the Heat in Buildings Bill.

61. Over the course of the current Parliament (to 2026) the Scottish Government has committed to allocate £1.8 billion for its HIBS programme (Exhibit 9, page 26). This is a significant public investment. Decisions on future public investment will be made in the context of limited public resources and competing spending priorities. The Scottish Government should be clear on how much public money it can afford to invest and how best to use it to achieve its HIBS objectives while achieving value for money.

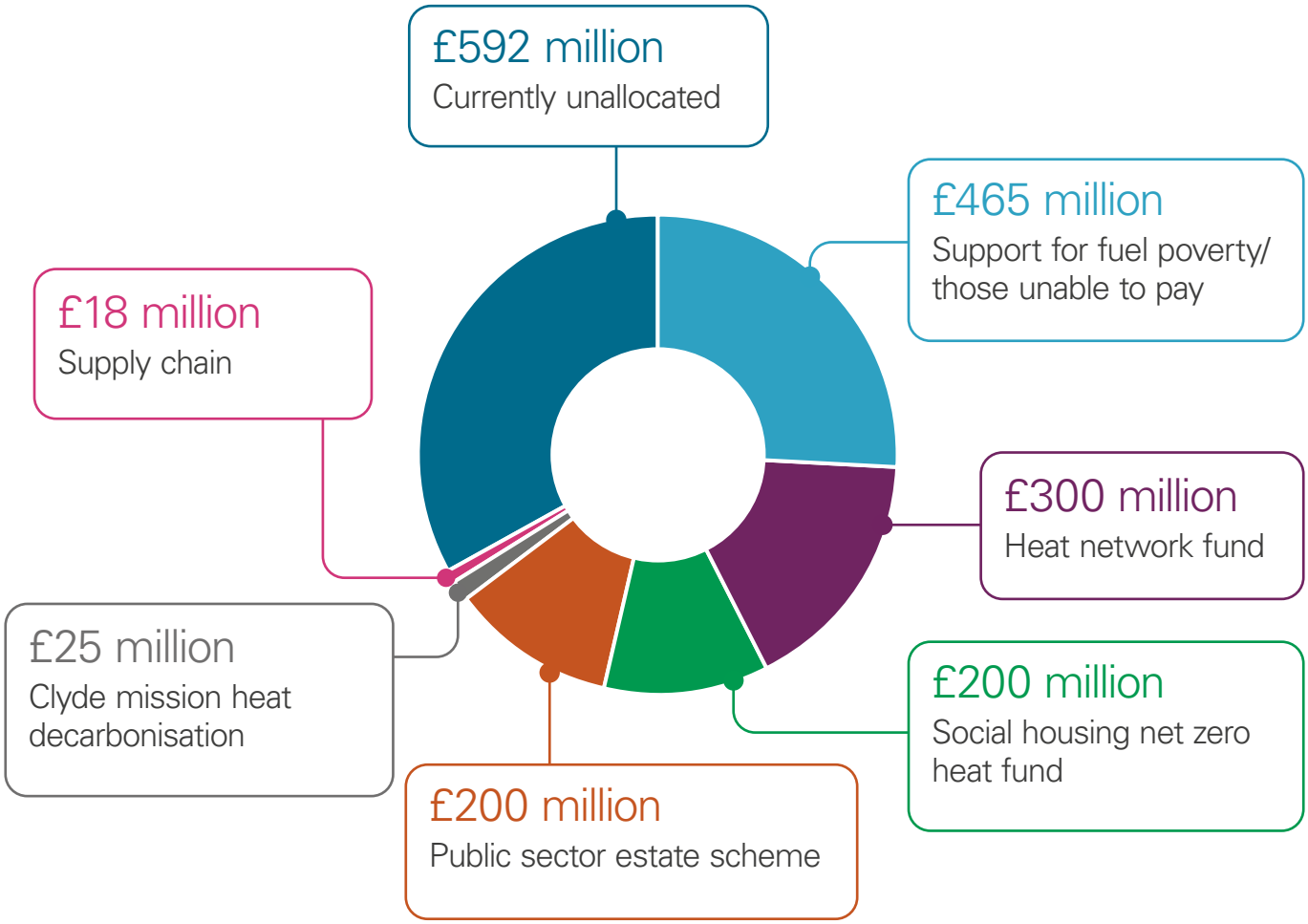
62. Given the scale of spending required, the Scottish Government recognises the full cost of decarbonising heat in homes will not all be publicly funded and significant investment from both the private sector and individual households will be required.

63. The Scottish Government is investigating ways to leverage in private investment, to help provide finance and funding for individual households and to develop the supply chain and infrastructure needed. It set up a Green Heat Finance Taskforce at the start of 2022. This is a partnership approach between the Scottish public sector, heat decarbonisation experts and the financial sector. Its aim is to explore potential new innovative financing mechanisms for both at-scale and individual level investment.

64. The Taskforce published its first report in November 2023. It found the financial market for supporting the decarbonisation of heat in homes is in its early stages. Due to the complexities of decarbonising heat in homes (Exhibit 4, page 14) and lack of demand to date, there is a higher perceived risk to these investments, which is preventing market growth. The report states that the Scottish Government, in partnership with others, needs to instil confidence in the market for green finance products. Financing solutions exist, but the market needs certainty and there needs to be greater consumer awareness of the products available.

65. The cost of delivering the Scottish Government's HIBS programme will be substantial. The Scottish Government must consider whether its plans represent value for money, both for the public funds it allocates and the households who need to invest in their properties, and will create the right conditions for private investment.

Exhibit 9.
The Scottish Government has committed £1.8 billion to its HIBS programme over the current parliamentary term



Source: Scottish Government

New regulations on heat in homes could put added pressure on public finances

66. Installing clean heating systems and meeting energy efficiency standards will come at a cost to households. Currently it would cost more on average to install and run a clean heating system compared to a fossil fuel boiler. The cost of installing and running a clean heating system is expected to decrease over time if the technology becomes more widely used.

67. The Scottish Government has committed to achieving a just transition to decarbonised heating and has statutory targets to reduce fuel poverty. The transition to decarbonised heating must not negatively impact vulnerable individuals or result in more households living in fuel poverty.

68. Demand is already growing for support with energy efficiency improvements from existing delivery schemes due to rising energy costs. Of the £1.8 billion the Scottish Government has committed to allocate for its HIBS programme over the course of the current parliament, £465 million is allocated to support schemes to reduce fuel poverty and support those unable to pay. The Scottish Government expects its current schemes to become oversubscribed and demand for financial support with clean heating system installations is likely to grow as new legislation comes into force.

69. The Scottish Government must consider the growing demand for support when making decisions on unallocated resources within its current £1.8 billion commitment, and beyond the end of this parliamentary term in 2026. It faces difficult choices in deciding how much public money it can invest in supporting people to decarbonise the heating in their homes alongside other competing priorities.

The Scottish Government is working to improve public awareness of the changes that households will need to make

70. The Scottish Government has identified a lack of public awareness or acceptance of the changes needed to decarbonise heating as a significant risk to progress. The public will require clear communication on what any new regulations mean for how they heat their homes, and information and advice on the options available to them to make the necessary changes to their homes.

71. The Scottish Government has a long-standing commitment to provide people with information and support in this area. For example, Home Energy Scotland, set up in 2008, provides advice and information to help households reduce their fuel bills and manage their carbon footprint.

72. The Scottish Government published a public engagement strategy[11] for its HIBS programme in December 2023 to guide engagement work over the remainder of the parliamentary term (to 2026). The strategy outlines how the Scottish Government intends to collaborate with stakeholders and partners to raise public awareness of energy efficiency and clean heating systems. This includes:

- helping people understand what changes are required and why, and ensuring they know where and how to access advice and support
- exploring opportunities for people to inform Scottish Government decisions and share experiences and learning
- establishing a Strategic Public Engagement Delivery Partnership during 2024 to coordinate activity across partners.

73. The Scottish Government has an important role in ensuring the public get the support they need to make informed decisions on how to

heat their homes. To help do this, the Scottish Government has carried out work to better understand people's attitudes and experiences in relation to clean heating and energy efficiency standards. This includes the specific issues faced by different property types. It has also commissioned research into how to communicate effectively on the heat transition.

74. The HIBS includes a commitment to create a new national agency, called Heat and Energy Efficiency Scotland, by 2025. Part of its role will be to ensure householders have access to the advice and information they need to understand which types of clean heating systems are most suitable for their property and to make the necessary changes to their homes.

75. These are positive developments, but they are at an early stage, and it is important that the Scottish Government knows whether they are effective. It has identified indicators to help monitor progress against the outcomes in its public engagement strategy. This is designed to feed into the wider monitoring and evaluation framework for the HIBS programme (paragraph 33). The Scottish Government plans to evaluate the impact of its public engagement strategy in 2026 and the findings will inform future activity.

Developing a supply chain and skilled workforce for decarbonised heat will be challenging

76. The planned scale and rate of clean heating system installation to meet the Scottish Government's ambitions will require a considerable increase in the number of systems being manufactured and installed. This creates huge demand for staff trained to manufacture, design, install and maintain the systems. It will take time for that demand to be met. For example, Scotland currently has only around 200 accredited air source heat pump installers compared to 8,700 gas installers.[12]

77. While there is a forecast gap in the workforce, many of the core trades and professions required already exist in Scotland. But there are many barriers preventing the sector from retraining and upskilling at the pace and scale necessary.

78. Companies have reported that the funding schemes for retraining and upskilling are complex and challenging for smaller companies to apply for. Some companies are reluctant to invest in or enter the market because of a lack of confidence or certainty. UK-wide companies face later timescales in the larger UK market (Exhibit 11, page 31). Furthermore, older workers may be reluctant to learn new skills, opting in some cases to leave the sector.

79. The Scottish Government published its Supply Chain Delivery Plan in November 2022.[13] It outlines a range of actions to help scale up industry to meet the anticipated demand. These include:

- launching a new £17.6 million Green Innovation Support Programme
- developing plans for a new Green Heat Manufacturing Hub in Scotland
- undertaking a refresh of the Climate Emergency Skills Action Plan, setting out an approach to planning for Green Heat Skills
- launching a new mobile centre for heat pump training, and delivering two local skills planning pathfinder projects for heat decarbonisation skills
- incorporating supply chain development in the Scottish Government's approach to procurement
- launching a new programme of engagement for heat and energy efficiency installers
- exploring the potential for a new supplier-led subsidy scheme to be delivered in Scotland.

80. In December 2022, the CCC said it was not clear if the actions in the Supply Chain Delivery Plan would deliver the skilled workforce required and that further work was required to ensure policies and funding were sufficient.[14] Implementation of the plan is at an early stage but is crucial to achieving the HIBS objectives. Many of these actions require a long lead-in time and the Scottish Government should prioritise activity in this area.

The Scottish and UK governments must collaborate to address challenges with energy infrastructure and pricing

81. Most clean heating systems are powered by electricity. The demands on the energy grid will increase if clean heating system installations happen at the pace and scale required to meet the Scottish Government's emissions reduction targets. Overall capacity of the grid needs to be improved to remove blockages. These include long wait times for households to be connected to an energy distribution network operator, which is one of the biggest barriers faced by clean heating system installers.

82. Electricity prices per unit are currently higher than gas prices per unit. This could act as a significant barrier to consumer uptake of electricity-powered heating technologies. Energy prices also have implications for the financial support the Scottish Government will need to provide to ensure the move to clean heating systems does not result in more households living in fuel poverty.

83. Many of the powers to address the challenges with energy grid capacity and energy pricing, along with other powers relevant to decarbonising heat, are reserved to the UK Government. Exhibit 10 (page 30) shows the relevant powers devolved to the Scottish Government and those reserved to the UK Government.

Exhibit 10.
Key devolved and reserved powers relevant to decarbonising heat in homes

Key devolved powers (Scottish Government)

Energy
- Heat
- Regulation of heat networks

Buildings
- New buildings
- Building standards
- Planning
- Housing
- Social housing
- Energy efficiency

Environment
- Greenhouse gas emissions and air quality
- Pollution control

Key reserved powers (UK Government)

Energy
- Oil, gas, electricity, coal and nuclear energy
- Pricing gas/electricity
- Energy companies
- Grid capacity
- Electricity infrastructure

Industry
- Supply chain
- Restriction of fossil fuel boilers
- Finance providers regulations
- Installer accreditations
- Competition
- Product standards
- Consumer protection

Tax
- VAT

Note: This is intended to provide a simplified picture of the split of devolved and reserved powers, but in many cases there will be some detailed aspects of powers that fall between both governments.

Source: Audit Scotland

84. The timescales in the UK Government's Heat and Buildings Strategy are later than those in the Scottish Government's HIBS and the proposed timescales set out in the consultation on proposals for a Heat in Buildings Bill.[15] The Scottish Government and UK Government both intend to phase out fossil fuel heating systems, but the Scottish Government aims to do so sooner (Exhibit 11).

Exhibit 11.
Contrasting Scottish Government and UK Government timescales

Scottish Government	UK Government
HIBS: Phasing out the need to install new or replacement fossil fuel boilers in off-gas properties from **2025**	Heat and Buildings Strategy **(HABS)**: Phasing out the installation of new oil boilers from **2026**
HIBS: Phasing out the need to install new or replacement fossil fuel boilers in on-gas areas from **2030**	**HABS:** Phasing out the installation of new natural gas boilers from **2035**
Heat in Buildings Bill consultation paper: Reconfirms that the use of polluting heating will be prohibited after **2045** and proposes that those purchasing a home end their use of polluting heating systems within a fixed period following completion of sale (timescales for implementation to be confirmed)	**Updated UK Government policy:** Phasing out the installation of new oil boilers and new natural gas boilers from **2035**
New Build Heat Standard (NBHS) will prohibit the use of direct emission heating systems in new buildings applying for a building warrant from 1 April **2024**	UK Government policy is to prohibit the installation of fossil fuel heating in new buildings given consent consent from **2025**

Source: Audit Scotland

85. The differences in timescales present a risk to how quickly the Scottish Government can implement changes, as clean heating technology and supply chains are likely to develop in line with UK Government timeframes. The UK Internal Markets Act 2020 stipulates that goods for sale in one part of the UK must be available for sale in all other parts of the UK. The Scottish Government may be limited in how quickly it can shape the market to aid transition to cleaner heating technologies in Scotland.

86. In September 2023, the audit offices of the four UK nations reported that effective working relationships and close engagement between the UK and devolved governments will be vital to achieving the overall aim of net zero.[16] The Scottish Government and UK Government will need to collaborate to overcome shared challenges and deliver their ambitions to decarbonise heating in homes.

87. Significantly reducing emissions from heating homes is complex and success hinges on many pillars. The consultation on proposals for a Heat in Buildings Bill sets out the new laws the Scottish Government wants to introduce to help meet the ambitions in its HIBS. However, it is not yet clear what new regulations will look like once they are passed by the Scottish Parliament. We would expect the Scottish Government to use the consultation responses to identify potential scenarios and work with stakeholders and partners to progress activity to support compliance with new regulations as soon as they are passed.

Endnotes

1 Update to the Climate Change Plan 2019-2023, Scottish Government, December 2020.

2 Heat in Buildings Strategy, Scottish Government, October 2021.

3 Delivering net zero for Scotland's buildings: A consultation on proposals for a Heat in Buildings Bill, Scottish Government, November 2023.

4 How the Scottish Government is set up to address climate change goals, Audit Scotland, April 2023.

5 Progress in reducing emissions in Scotland: 2022 report to Parliament, Climate Change Committee, December 2022.

6 International heat and energy efficiency policy review, ClimateXchange, May 2023.

7 Heat in buildings monitoring and evaluation framework, Scottish Government, November 2023.

8 The Sixth Carbon Budget: The UK's path to Net Zero, Climate Change Committee, December 2022.

9 Scottish House Condition Survey, Scottish Government, 2019.

10 Ibid

11 Heat transition: public engagement strategic framework, Scottish Government, December 2023

12 The MCS Data Dashboard.

13 Heat in Buildings supply chain delivery plan: Towards an industry for green heat, Scottish Government, November 2022.

14 Progress in reducing emissions in Scotland: 2022 report to Parliament, Climate Change Committee, December 2022.

15 Heat and buildings strategy, UK Government, October 2021.

16 Approaches to achieving net zero across the UK, Audit Scotland, Audit Wales, National Audit Office, Northern Ireland Audit Office, September 2023.

Appendix 1

Scottish Government consultations on the HIBS programme

- Consultation on Scotland's Energy Efficiency Programme (January to May 2017)
- First Heat and Energy Efficiency Strategies and District Heating Regulation Consultation (January to April 2017)
- Private rented housing energy efficiency standards consultation (April 2017)
- Second Heat and Energy Efficiency Strategies and District Heating Regulation Consultation (November 2017)
- Energy Efficient Scotland Route map (May 2018) Energy Efficient Scotland Consultation (May to July 2018)
- Energy Efficiency Standard for Social Housing 2 (EESSH2) Consultation (May to July 2018)
- Energy Efficient Scotland: the future of low carbon heat for off gas buildings: call for evidence (March 2019)
- Energy Efficient Scotland: consultation on further development of the programme (2019)
- Energy Efficiency (Private Rental Property) (Scotland) regulations 2019: consultation (2019)
- Improving Energy Efficiency in Owner Occupied Homes: consultation (2019)
- New Build Heat Standard: Scoping consultation (December 2020)
- Draft Heat in Buildings Strategy: consultation (February 2021)
- Consultation on skills requirements (February to April 2021)
- Domestic Energy Performance Certificates Reform (July to October 2021)
- Draft Heat Networks Delivery Plan (November 2021)
- Regulation of energy efficiency in non-domestic buildings: call for evidence (December 2021)
- New Build Heat Standard: Part 2 (July 2022)
- Heat in Buildings Public Engagement Strategy (November 2022)
- Domestic Energy Performance Certificates Reform (July to October 2023)
- Heat networks consultation (December 2022 to March 2023)
- Energy Strategy and Just Transition Plan (January to April 2023)
- Social housing net zero standard (November 2023 to March 2024)
- Heat in Buildings Bill (November 2023 to March 2024)

Appendix 2

Current HIBS delivery schemes

Home Energy Scotland

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 a number of support packages including Home Energy Scotland grants and loans, and private rented sector loans.

Delivered by Energy Saving Trust.

Achievements between 2013 and 2023:

- supported 995,782 households through either advice, referral to fuel poverty schemes, access to funding and financial support for energy efficiency and heating improvement measures.

Home Energy Scotland Grants and loans

Grants and interest-free loans for a range of energy saving, bill-reducing, low-carbon technology from loft insulation to heat pumps. Grants of up to £15,000 (or £18,000 if you live in a rural or island area) to help fund energy-efficiency home improvements and clean heating systems, including central heating, radiators, heating controls, draught-proofing and insulation. Further funding on top of the grant is available as interest-free loans. Operates on a first-come first-served basis. The householder is responsible for arranging and managing the work.

Delivered by Energy Saving Trust.

Achievements between 2013 and 2023 (across all Scottish Government grant and loan schemes):

- 49,121 customers in total
- 4,295 customers with energy efficiency improvements
- 8,591 customers with heating measures other than gas boilers
- 2,248 customers with gas boilers
- 30,473 customers where heating and/or energy efficiency measures have been installed.

Area Based Schemes (Superseded Home Energy Efficiency Programme Scotland Area Based Schemes)

Provides 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 finance and private investment. Area Based Schemes are effective in delivering large numbers of improvements to mixed tenure, multi-occupancy properties (eg, flats, terraces, council estates/projects).

Delivered by local authorities.

Achievements between 2013 and 2023:

- provided support for 117,000 households
- funded or part funded 113,332 energy efficiency measures
- funded or part funded 10,038 heating improvement measures
- of these, 365 were clean heating systems.

Continued

Warmer Homes Scotland

Fuel poverty scheme which enables eligible households to receive energy efficiency and heating improvements. The scheme delivers insulation and heating measures including an increasing amount of air source heat pumps. A new contract went live in October 2023, with an increased focus on insulation and clean heating systems.

Delivered by Warmworks.

Achievements between 2013 and 2023:

- provided support for 32,747 households
- funded 37,340 energy efficiency measures
- funded 29,281 heating improvement measures
- of these, 3,902 were clean heating systems.

Source: Scottish Government

Decarbonising heat in homes

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