# Heat Networks Delivery Plan

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# Content

# Ministerial Foreword

One of the biggest challenges Scotland faces in tackling climate change is decarbonising our homes and buildings. To meet our target of 75% emissions reductions by 2030, over 1 million homes and the equivalent of 50,000 non-domestic buildings need to be converted to use zero emission heating systems. Our Heat in Buildings Strategy, published last year, identified heat networks as a key strategic technology for meeting this goal.

The Heat Networks (Scotland) Act 2021 sets ambitious targets for the amount of heat to be supplied by heat networks – 2.6 Terawatt hours (TWh) of output by 2027 and 6 TWh of output by 2030 – 3% and 8% respectively of current heat supply. To meet these targets, we need to significantly increase our use of heat networks across Scotland, and build a heat networks sector which delivers clean and affordable heat, develops local supply chains, and contributes to a resilient energy system.

Last year we published a draft version of this plan, seeking feedback on several aspects of our policy programme and regulatory framework. I was pleased with the level of engagement in this consultation, with stakeholders from across the sector sharing their experiences and providing valuable insights.

This Heat Networks Delivery Plan incorporates that feedback and outlines the steps that the Scottish Government will take to accelerate the development of heat networks across Scotland, contributing to our climate change and fuel poverty targets.

Over the course of this Parliamentary Session we are allocating £300 million to a new Heat Network Fund to enable and support the development of new, and expansion of existing, heat networks in Scotland. We will also launch a new Heat Networks Support Unit to work with both public and private sector organisations to design and bring forward heat network projects ready for capital investment.

We will work with local government to put in place Local Heat and Energy Efficiency Strategies which identify areas particularly suitable for heat networks, and to designate heat network zones for development.

To underpin and help further unlock the growth of heat networks in Scotland we will implement the Heat Networks (Scotland) Act 2021 putting in place a functioning regulatory regime by early 2024. We will continue to work with the UK Government as we implement the Heat Networks (Scotland) Act in order to ensure alignment and interoperability between the Scottish and UK regulatory systems.

The Heat Networks Delivery Plan sets out the actions we are taking, but we do not have all the powers necessary to drive the growth of heat networks whilst protecting customers. The UK Government must urgently bring forward its proposed market framework for heat networks in order to put in place the much needed consumer protection in the sector. Recent volatility in global natural gas markets further underscores the urgency of UK Government action in this reserved policy area where heat network customers are currently lacking protection.

Growing the heat networks sector in Scotland will be challenging: they are big infrastructure and take time to develop. But heat networks are, and will be, an important and integral part of the solution to cutting emissions from heating our homes and buildings. We must all rise to the challenge.

**Patrick Harvie MSP**
**Minister for Zero Carbon Buildings, Active Travel and Tenants' Rights**

# Executive Summary

## Introduction

Heat networks are an established technology and are common in the Nordic countries and across much of Northern Europe. In Scotland they are currently less common and at present there are an estimated 1,080 heat networks supplying heat to domestic and non-domestic properties.

This Plan sits in the context of wider heat decarbonisation policy, in particular, the Heat in Buildings Strategy, which highlights that over the coming years the Scottish Government proposes a focus on the no and low-regrets strategic technologies, of which heat networks is one.

## Ambition and targets

The Heat Networks (Scotland) Act 2021 (the 2021 Act) sets targets for the amount of heat to be supplied by heat networks, requiring this reaches 2.6 Terawatt hours (TWh) (3% of current heat demand) by 2027, and 6 TWh (8% of current heat demand) by 2030. Beyond this, Scottish Ministers are required to set a target for 2035. This target will be consulted on in early 2023, and confirmed by 1 October 2023.

Heat networks will form an important part of Scotland's overall heat decarbonisation programme. Scenarios broadly estimate emissions savings to be between 1.1 and 1.19 $MtC0_2e$ per year in 2030.

We are committed to ensuring that heat in buildings programmes align with our fuel poverty targets. As such, we will work with the Scottish Fuel Poverty Advisory Panel to ensure that the Heat Networks Delivery Plan (HNDP) supports efforts to eradicate fuel poverty and does not adversely impact those in or at risk of fuel poverty.

## Regulatory regime

Building assessment reports (BARs) will be required for public-sector non-domestic buildings and certain other non-domestic buildings, to assess their suitability for heat network connection. This will feed into the review and designation of heat network zones – which are areas particularly suitable for heat network development and operation.

The introduction of heat network licensing could potentially help to build trust in the market, and heat network consents will be introduced to ensure that

heat networks meet local and national objectives. Additionally, the 2021 Act introduces heat network permits, building on the designation of heat network zones by providing the permit authority with the power to issue permits within these zones. We are proposing permits be awarded via competition to a single, winning bidder thereby providing exclusivity for a specified number of years.

The 2021 Act also introduces transfer schemes, ensuring continuity of supply for consumers and enabling a smooth transition between operators in the event that an operator ceases to trade. This will be consulted on alongside consents and key network assets provisions.

We will publish a Local Authority Cost Strategy prior to the regulatory system becoming operational in 2024, and will work with local authorities and stakeholders to ensure the provision of relevant resources in order for local authorities to meet their duties under the 2021 Act.

From the time that the legislative framework is in place in 2024, we will require the vast majority of heat for new heat networks, and additional plants for extensions, to be provided from low and zero emissions heat sources. However, in the near term a small percentage of annual heat provided through some new networks may need to be sourced from natural gas for the purposes of peaking and backup.

We are proposing that licence holders will have to prepare and implement a Heat Network Decarbonisation Plan between 1 and 3 years of a licence being granted. We will commission work to test and develop an approach to these plans in 2022.

Consumer protection remains reserved to the UK Government, who will appoint Ofgem as heat networks regulator under the Great Britain-wide Heat Network Market Framework. We continue to work with the UK Government to ensure consumer protection and licensing can both be dealt with by Ofgem in Scotland.

**Guiding development**

Our First National Assessment, which will be published soon, has taken the first steps to identify potential heat network zones across Scotland, where heat networks can be considered a suitable long-term solution. To guide the development of heat networks within zones, we are adopting a Building Connection Hierarchy which prioritises the connection of existing buildings based on their heat demand and ownership, allowing for flexibility as appropriate.

Recognising that sufficient levels of demand assurance are a gap within the overall picture of heat networks, we are proposing several measures to support confidence in future revenues for investors. Specifically, we will introduce a New Build Heat Standard requiring new buildings consented from 2024 to install only zero direct emission heat sources, and, subject to devolved competence, bring forward regulatory proposals to require the installation of zero or very near zero emissions heating systems in existing buildings. In addition, we will consult in 2022-23 on a series of phased targets for all publicly owned buildings to meet zero emission heating requirements by 2038. We remain committed to consulting on proposals, subject to devolved competence, to address the issue of demand assurance. In doing so, we will consider the UK Government's proposals to mandate connection to heat networks in England.

**Wider policy framework**

Recognising that unused recoverable or waste heat is not fully utilised in Scotland, within the next 12 months we will make available to local authorities further information on the availability of surplus or waste heat, to support the identification of heat network zones and development of Local Heat and Energy Efficiency Strategies (LHEES). Additionally, as an initial step to increase use of waste heat, we will consider introducing a requirement for potential heat suppliers to provide information about recoverable heat when formally requested to provide it by a relevant authority or licenced heat network operator. This should support the use of heat offsite, after any onsite needs are accounted for. This year we will work with stakeholders, and as relevant, consult on information provision and any further measures needed to increase the utilisation of surplus or waste heat via heat networks.

Unlocking investment in the supply chain must start with clear demand for its products and services. Heat networks will create new demands on supply chains in Scotland, and to better understand this challenge we commissioned research by the Energy Saving Trust to identify Scottish skills gaps and training needs. We have also partnered with Scottish Renewables and Skills Development Scotland to undertake an assessment of workforce growth and transitions.

The Non-Domestic Rates (District Heating Relief and Renewable Energy Generation Relief) (Scotland) Amendment Regulations 2021 introduced a 90% relief from non-domestic rates until 31 March 2024 for new networks run from renewable sources, helping to support the business case for new networks by reducing their operational costs. This is additional to the existing

50% relief for all heat networks, which is guaranteed to remain in place until 2032.

**Capital programmes and delivery mechanisms**

It is essential that we invest in the development of a project pipeline in order to accelerate the development and growth of heat networks in Scotland. To begin to develop a stronger project pipeline we will soon publish maps and data from the First National Assessment of Potential Heat Network Zones. This will be supplemented by the work of local authorities on LHEES and heat network zoning.

To assist with the development of a long-term pipeline for capital investment, we recently announced our £1 million Heat in Buildings Development Funding Invitation. It will provide resource funding to stimulate and accelerate the development of a pipeline of zero emissions heat projects for buildings, including heat networks, across Scotland. This funding is a forerunner to establishing a fuller Heat Networks Support Unit later this year, which will become part of the National Energy Agency in due course. This will be a key mechanism for supporting the development of a pipeline of projects by co-ordinating support to identify and nurture opportunities to install new heat networks or expanding and decarbonise existing heat networks. In addition, we will support communities to engage, benefit and participate in heat networks through our Community and Renewable Energy Scheme.

The Scottish Government will publish quarterly updates through our Heat Network Fund to demonstrate the current pipeline of projects coming through Scottish Government programmes, providing a form of investment prospectus.

Over this parliamentary session, we will invest £400 million to support the development of large-scale heat infrastructure, such as heat networks. Our £300 million Heat Network Fund launched in February 2022 is part of this new suite of delivery schemes. It offers long-term support to enable the delivery of heat networks by making capital grant funding available to public and private sector organisations. It provides funding for new zero emission heat networks, including communal heating systems, the expansion of existing heat networks and the decarbonisation of existing fossil fuelled heat networks.

We are committed to establishing a National Public Energy Agency to accelerate the transformational change in how we heat and use energy in homes and buildings. To achieve this, the Agency will have a remit to raise public understanding and awareness, coordinate delivery of investment, and

coordinate national, regional and local government delivery of heat decarbonisation and energy efficiency rollout. We will establish the Agency first as a virtual agency by September 2022, and transition to a dedicated body by September 2025. We will set out the role of the Agency in delivering support for heat networks as part of the transition process.

**Monitoring and reporting**

As required by the 2021 Act, the HNDP will be reviewed every 2 years, and we will report on the heat output of heat networks as well as emissions savings. To support this, data reporting requirements for heat networks will be developed as part of work on the regulatory regime. These will be consulted on in due course. We are also proposing that several other key parameters are monitored to further our understanding of the heat network sector as it develops. Consultation respondents were generally supportive of data collection though burdens were noted and support mechanisms suggested.

# Chapter 1: Introduction

Last year the Scottish Parliament passed the Heat Networks (Scotland) Act 2021 (hereafter referred to as the "2021 Act") creating for the first time in Scotland, and the United Kingdom, legislation intended to support and encourage the development of communal and district heat networks.

Heat networks are an established technology and are common in the Nordic countries and across much of Northern Europe. In Scotland they are currently less common and at present[1] there are an estimated 1,080 heat networks supplying heat to domestic and non-domestic properties. Around 30,000 homes and 3,000 non-domestic properties are connected to heat networks. The latest figures suggest that heat networks in Scotland supply upwards of 1.18 TWh of heat.

**What is a heat network?**
Heat networks, as defined under the 2021 Act, include both district and communal heating:

- a district heat network is defined as a network by which thermal energy is distributed from one or more sources of production to more than one building
- a communal heating system is a system by which thermal energy is distributed from one or more sources of production to one building comprising more than one building unit

A heat network, despite its name, can provide both heating and cooling. Heat networks operate at a range of temperatures: third and fourth generation systems generally provide hot water at between 60 and 100 degrees Celsius and fifth generation systems generally operate at temperatures of up to 45 degrees Celsius. They can also provide steam for industrial processes.

Heat networks, depending on their fuel source, can help reduce greenhouse gas emissions. They can also, in certain circumstances, reduce energy bills helping to tackle fuel poverty. As such heat networks have an important role to play in meeting the targets set out in the Heat in Buildings Strategy[i], including contributing to ensuring that at least 1 million homes, and the equivalent of 50,000 non-domestic buildings are connected to zero emission heating systems by 2030.

[1] The latest available figures are based on 2018 data.

How big a role heat networks will have, beyond the 2030 target of the 2021 Act, will depend on a number of factors including location and viability relative to other zero emission solutions. However, the report Opportunity Areas for District Heating in the UK[ii] estimated that by 2050 heat networks may be suitable for providing up to 15 TWh of heat in a year (central scenario). By comparison, 13.7 TWh of total demand from buildings in potential heat network zones was identified through the First National Assessment[2]. These estimates are likely to represent the upper bound of potential with further detailed assessment – both technical and socio-economic – required to identify viable heat network projects that are competitive against alternative zero emission heating systems within areas of heat network potential.

Heat networks are a heat supply technology and can be powered by a range of different technologies. For example, they can use heat generated from gas or biomass fired boilers or combined heat and power (CHP) engines, or from electrically driven heat pumps. They can also use recovered or waste heat such as from industrial processes, data centres or from Energy from Waste facilities. The design of heat networks enables new heat sources to be added in the future. As such, heat networks are a low or no regret technology and compatible with both electrification and hydrogen scenarios for heat supply in the future. Heat networks can also have an important role in balancing wider energy networks, helping to store energy and make use of constrained renewable electricity generation.

Section 93 of the 2021 Act requires Scottish Ministers to prepare a heat networks delivery plan, to be laid in Parliament no later than 1 April 2022, setting out how the provisions of the 2021 Act, and any other supporting policies, will contribute to increasing the use of heat networks in Scotland. Specifically, a heat networks delivery plan must set out:

- the approach the Scottish Minsters intend to take to increase the use of heat networks in Scotland
- how the Scottish Ministers propose to meet the targets specified
- how output from heat networks will be measured
- how the deployment of heat networks will contribute to meeting emission reduction targets

This document fulfils this requirement. A draft Heat Networks Delivery Plan was subject to public consultation between 15 November and 13 December 2021.

[2] For further details, including outputs using other assumptions, see the First National Assessment, to be published soon on www.gov.scot

Where appropriate this document refers to the analysis of consultation responses received. In total 48 responses were received to the consultation. Further detail can be found in the consultation analysis report[iii] which has been published alongside this document.

The consultation document contained two parts – Part 1 (draft Heat Networks Delivery Plan) and Part 2 (Heat Network Policy Proposals). Responses to Part 1 have informed the development of the final Heat Networks Delivery Plan. Responses to Part 2 will inform the ongoing development of the Scottish Government's policy and delivery framework for heat networks.

## Wider heat policy

This Plan sits in the context of wider heat decarbonisation policy, in particular, the Heat in Buildings Strategy[iv], which highlights that over the coming years the Scottish Government proposes a focus on the no and low-regrets strategic technologies, of which heat networks is one. Detail on the other technologies and the approach to those can be found in the Strategy.

# Chapter 2: Ambition & targets

## Ambition

Our ambition is for a heat networks sector that:

- delivers affordable clean heat supporting delivery of emission reduction and fuel poverty targets
- develops local supply chains and attracts new public and private investment
- contributes to the development, and operation, of an integrated and resilient energy system

## Targets to 2027 and 2030

The 2021 Act sets statutory targets for the amount of heat to be supplied by heat networks, requiring the combined supply of thermal energy by heat networks to reach 2.6 TWh of output by 2027 and 6 TWh of output by 2030. This is 3% and 8% respectively of current heat demand[3] [4]. As heat networks can provide heat to homes, workplaces and industry the targets could be met with a range of outcomes in terms of the numbers of these types of buildings and processes that are connected.

The targets are broadly equivalent to 120,000 and 400,000 average gas using homes being connected to heat networks for 2027 and 2030 respectively. Multi-building heat networks are generally anchored around large non-domestic buildings, which account for a significant portion of the heat supplied. As such it is anticipated that the number of homes connecting to heat networks up to 2030 will be lower, with a significant proportion of connections being to non-domestic buildings, which are more suitable as anchors and early customers of heat networks. The number of domestic connections would be expected to rise once heat networks are established and being further developed.

[3] Total domestic, industrial and commercial non-electrical heat demand.

[4] The Climate Change Committee estimated in 2015 that with government support, heat networks could provide 18% of UK heat demand by 2050 in a least-cost pathway to meeting UK carbon targets.

**Box 1: What is an anchor load?**
Buildings with a large, reliable and long-term demand for heat, often with a stable and constant use profile, can act as anchors for a developing district heating network. Examples include hospitals, swimming pools and high-density housing. These anchor loads allow such district heat networks to operate efficiently and provide the potential to extend the network to smaller existing heat users in the area.

The First National Assessment identified a maximum of 13.73 TWh/yr of heat demand that could be supplied by heat networks, under stringent conditions requiring a high density of heat. As shown in Table 1, the First National Assessment found that over 80% of identified heat demand in zones was attributed to non-domestic buildings. It also found that over 65% (an estimated 9.30 TWh/yr) of the total identified heat demand in zones could be attributed to anchor loads alone.

**Table 1: Properties in potential heat network zones identified by the First National Assessment under stringent conditions (with a high density of heat)**

| Property type | Number of properties | Heat demand (TWh/yr) |
|---|---|---|
| Domestic | 77,660 | 2.16 |
| Non-domestic | 33,785 | 11.10 |
| Unattributed | 3,458 | 0.50 |

*Note: Unattributed property type includes buildings that could not be identified as either domestic or non-domestic from the data held.*

To further illustrate the impact that the number of non-domestic buildings connecting to heat networks has on the number of domestic properties required to connect we have developed a series of simple scenarios, based on the outputs of the First National Assessment (see Chapter 1). They each assume a proportion of anchor loads[5], other non-domestic properties and domestic properties connect across potential zones identified in the First National Assessment.

The scenarios are intended to be illustrative only and are not a statement of ambition. Real world deployment will be guided by detailed heat network zoning, feasibility studies and business case development.

Table 2 below shows three scenarios, all capable of meeting the 2030 heat network target. Across all three scenarios there is a high number of non-domestic connections. These connections are important as they help to

[5] The First National Assessment sets a threshold of at least 500MWh of heat per year for its definition of an anchor load.

ensure a more balanced load throughout the course of the day helping to ensure efficient network operation.

In reality, as noted above, the type and number of buildings connecting will be dependent on detailed feasibility studies and business cases. It is likely that the number of residential properties connecting will be higher. Initially this will be guided by the Local Heat and Energy Efficiencies Strategies (LHEES)[6] and Heat Network Zones designated by local authorities.

**Table 2. Heat Network Deployment Scenarios highlighting a range of connections dependent on proportion of non-domestic buildings connecting.**

| Scenario | Number of properties connected | | Heat demand (TWh) |
|---|---|---|---|
| | Domestic | Non-domestic | |
| A (Anchor loads + 60% of flats) | 19,231 | 1,140 | 6.01 |
| B (Anchor loads + 30% of all domestic properties) | 16,461 | 1,066 | 6.01 |
| C (Anchor loads + 70% of buildings with heat demand in interval [250 - 500) MWh/yr + 60% of flats) | 17,438 | 1,734 | 6.02 |

*Note: "properties" refers to the number of properties of that type identified within a potential zone as identified in the First National Assessment. Scenarios do not have connections in the same number of potential zones, nor do they have connections in all potential zones identified under the stringent conditions.*

## Future target setting

The 2021 Act requires Scottish Ministers to set a target for 2035, in addition to the 2027 and 2030 targets. Respondents to the Draft HNDP consultation suggested a number of wider considerations in setting the 2035 targets including progress toward the 2027 heat networks target as well as toward wider heat decarbonisation targets including energy efficiency. Respondents also raised concerns that by 2030 the best opportunities for heat networks may have been taken.

We will consult on a proposed 2035 target in early 2023, which will be informed by the First National Assessment of Potential Heat Network Zones

[6] LHEES and accompanying Delivery Plans will drive area-based planning and delivery of the heat transition. They will act as a prospectus for where government funding and private investment for heat decarbonisation should be targeted. We have worked in partnership with COSLA to develop a statutory duty on local authorities to produce LHEES, so that Strategies and Delivery Plans are in place for all local authority areas by the end of 2023.

(see Chapter 4) and work carried out to develop LHEES. We will set the 2035 target by 1 October 2023. Chapter 7 sets out how we intend to measure the targets set and to begin to improve monitoring of these.

## Contribution to emission reduction targets

Emissions reductions as a result of expansion and development of heat networks will vary depending on:

- the buildings they supply, including whether they are existing or new, and whether the heat network is replacing existing fossil fuel heating systems and
- the heat source(s) of the heat network the building connects to.

As set out in the Heat in Buildings Strategy and Chapter 3 below, from the point that the heat network legislative framework is in place, new heat networks, and any additional heat plant for extensions of heat networks, will need to be powered predominantly using low and zero emissions sources of heat such as heat pumps or sources of surplus or waste heat. Therefore, we would expect them to generate significant emissions savings, beyond those from gas-fired networks often using CHP which under the current system may be installed. To provide an example of this, assuming that heat pump powered heat networks replaced 6 TWh of heat from individual gas boilers in homes the savings are broadly estimated to be 1.1 $MtC0_2e$ per year in 2030[7]. Scenarios (as above) where a high proportion of the heat is provided to non-domestic properties broadly estimate emissions savings to be between 1.18 and 1.19 $MtC0_2e$ per year in 2030[8].

[7] Source: A Scottish Government estimate using BEIS' 2018 energy and emissions projections for grid emissions intensity, 8% distribution losses and a co-efficient of performance of 2.7.
[8] Emissions savings would vary further with other scenarios where connecting buildings have a greater variety of incumbent heating systems.

# Chapter 3: Regulatory regime: Heat Networks (Scotland) Act 2021

In February 2021, the Scottish Parliament unanimously passed the 2021 Act which is a first of its kind in the United Kingdom. It aims to accelerate the deployment of heat networks in Scotland through the introduction of a regulatory system aimed at boosting confidence in the sector and providing greater certainty for investors.

The 2021 Act introduces:

- **building assessment reports** (BAR): a requirement relating to non-domestic buildings to assess their suitability to connect to heat networks. This applies to the public sector and may, with secondary legislation, extend to other non-domestic buildings
- **heat network zones**: requiring the review and designation of areas particularly suitable for heat network development and operation across Scotland
- **heat network licences**: regulating the market so that homes and businesses are supplied by solvent, fit and proper operators, while requiring networks to be developed and maintained to high standards
- **heat network consents** to build or operate heat networks: including creating a bespoke system of scrutiny for new networks, to ensure that they can contribute to climate change and fuel poverty targets, before they are consented for development
- **heat network permits**: attracting new, and lower cost investment in the sector by awarding these long-term permits to develop and operate in the most opportune areas. This will help provide some longer term assurance about the customer base available
- **powers for licence holders**: granting new rights for heat network operators – such as wayleaves, compulsory purchase, road works and surveying rights – to reduce the costs and time involved in construction and maintenance
- **a heat networks assets schedule and transfer scheme**: require heat networks to have a scheme in place to transfer operational rights to a third party to ensure sustained supply, if and when needed

The 2021 Act also includes a number of wider aspects, such as targets and reporting covered in other chapters.

We will work with the heat networks sector and local government as we develop detailed regulations and aim to put in place a functioning regulatory system, subject to public consultation, by early 2024.

## Driving growth

Overall the 2021 Act provides a clear signal to the heat networks market, property developers and the wider heat supply industry that heat networks are set to become a core component of the nation's heat supply. It acts as a central point of focus.

Beyond that, each of the 2021 Act's provisions is a building block for growth. Licensing could help better govern and de-risk the sector as well as provide rights to heat network operators which would be similar to those of other utilities, thus helping to reduce costs; zoning and consenting will guide development to the most strategically viable locations; and permits will provide long-term certainty to operators. Table 4 over the page provides a summary of how each provision will support growth of the sector.

## Implementing the 2021 Act

The 2021 Act is comprehensive in coverage and is intended to provide a flexible framework which can grow in line with the sector, being adapted over time as required. As such, on day one we do not envisage needing to switch on all provisions and expect the full regulatory regime to take time to fully establish as the sector grows.

Taking into account the feedback from the consultation, we plan to bring forward regulation in four packages to establish a functioning regulatory regime for heat networks in Scotland. Table 3 below sets out broad timelines for consultation.

**Table 3: Packages of development of regulatory regime under the 2021 Act**

| Package | Aspects of act covered | Consulting in |
|---|---|---|
| 1 | building assessment reports & heat network zoning | Summer 2022 |
| 2 | consenting and key heat network assets | Early 2023 |
| 3 | permitting and local authority cost strategy | Early 2023 |
| 4 | licencing and powers of licence holders[9] | Early Summer 2023 |

More detail on each of these aspects is set out below.

[9] There are powers available within the 2021 Act to assist licence holders in the development and maintenance of their heat networks (such as statutory undertaker rights).

**Table 4: How does the act support growth of the heat networks?**

| | |
|---|---|
| Building assessment reports | ✓ Support growth by providing vital data for heat network zoning and initiate consideration for connection to a heat network by non-domestic buildings |
| Heat network zones | ✓ Identify the opportunity areas to parties interested in developing a heat network<br>✓ Ensure that heat networks are developed in most appropriate areas to maximise benefit for investors but more importantly to drive the prices down for its users |
| Heat network licences | ✓ Improve users' trust in heat networks<br>✓ Ensure that existing heat networks move to zero carbon heat generation in a gradual and managed way so that they are part of our net zero future<br>✓ Provide certainty to investors that only fit and proper companies operate heat networks in Scotland |
| Heat network consents | ✓ Through community engagement reports ensure local communities are aware of and influence any plans for heat network development which can support securing future users for heat networks<br>✓ With scrutiny of proposed projects ensure that they are in line with local and national objectives therefore flagging up any challenges in the process and supporting them to rectify any problems in the application process which should minimise costs of new developments in later stages |
| Heat network zone permits | ✓ Support growth by providing an exclusive access to consumer base within a heat network zone which will help with securing sufficient heat demand to use economies of scale and drive down the cost of investment<br>✓ Help in driving investment to high opportunity areas and increasing the speed of heat network deployment in Scotland |
| Powers for licence holders | ✓ Level the playing field with other utilities, by ensuring heat networks have the same powers as other regulated entities |
| Assets schedule and transfer scheme | ✓ Ensure transparency of responsibilities in an event of heat network ceasing to operate which should provide certainty to the potential customers who rely on security of heat supply |

**Building assessment & zoning**

To be efficient, economically viable and deliver value for money, heat networks need to be well located. This means being in areas with sufficient heat demand and density to enable optimal performance. It also means securing appropriate connections to "anchor" the network and provide a degree of demand certainty.

In order to identify appropriate anchor buildings (see Chapter 2) and inform heat network zoning, Part 5 of the 2021 Act places a requirement on persons either owning or with interest in a non-domestic building to prepare a building assessment report, to consider the viability of connecting the building to a heat network and then assess the period for which any system providing thermal energy to the non-domestic building is expected to continue to operate effectively and efficiently.

Part 3 of the 2021 Act requires the review and designation of areas particularly suitable for heat network development and operation across Scotland.

Together Parts 3 and 5 of the 2021 Act are a key first step in developing a long term project pipeline for heat network development in Scotland and as such we believe they should be introduced prior to other elements of the regulatory package in the 2021 Act.

There was an extremely high level of support from respondents to the consultation on the Draft HNDP to our proposal to extend building assessment reports to non-public sector non-domestic buildings.

We will bring forward detailed proposals for consultation on building assessment reports, including proposals for which buildings will require them, and heat network zoning by Summer 2022, for introduction in early 2023. This will include draft regulations if appropriate. We will also develop Guidance for building assessment reports and consult on this in 2022.

In addition, we have shared a technical methodology for developing LHEES with local authorities, which will be updated to ensure it includes relevant requirements from the 2021 Act for reviewing areas that may be suitable for heat network development. We have worked in partnership with COSLA to develop a statutory framework for LHEES[v] that places a duty on local authorities to produce Strategies and Delivery Plans. We will publish guidance setting out how to produce an LHEES, which will be based on the technical methodology and developed in consultation with local authorities. During

2022 we will develop and consult on further guidance for the designation of heat network zones, building on any LHEES guidance.

**Licensing, consenting and permitting**

Licensing and consenting will be the mainstay of the regulatory system for heat networks in Scotland, helping to ensure a high quality and efficient service as well as ensuring that networks are well sighted and aligned with the delivery of both national and local objectives.

Licences will be required by companies wishing to develop and operate heat networks in Scotland. A single licence will be required per company operating in Scotland. Consents will be needed for each individual heat network. It is anticipated that both licences and consents will be required by both new and existing networks, with exemptions and abeyances in place to ensure the system is proportionate.

Through the introduction of a heat network licensing system, the Scottish Government will introduce requirements in relation to quality of service, transparency of information and minimum technical standards, as well as establishing a mechanism to identify, monitor and enforce any requirements.

We are currently working with the UK Government to agree common technical standards for development and operation of heat networks across Great Britain.

Heat network permits are intended to help de-risk investment by providing a degree of certainty with regards to the likely customer base. It is envisaged that permits would be awarded, following a competition, to a single, winning bidder providing exclusivity for a specified number of years.

We sought views on aspects of licensing, consenting and permitting during the consultation on the draft version of this Plan. Responses to that will contribute to the development of detailed proposals which we will bring forward for consultation by early 2023 (for consenting and permitting) and early Summer 2023 (for licencing). The aim is to have established these processes including a licensing authority by early 2024.

**Transfer schemes**

As heat networks grow, more customers will be reliant on them for their heat and, as such, an appropriate framework to ensure continuous service for users needs to be put in place.

The 2021 Act introduces a power for the Scottish Ministers to make a transfer scheme under certain circumstances. The transfer scheme would allow the specified third party (such as a local authority or person appointed by the Scottish Ministers) to operate a heat network following the former operator ceasing to do so. Transfer schemes will be crucial both in terms of ensuring continued supply in the event an operator ceases to operate but also to enable the smooth transition of networks between operators where the network is subject to a heat network zone permit.

Transfer scheme provisions can sometimes be referred to as "supplier of last resort" provisions. However, the 2021 Act would only cover certain circumstances and, therefore, is not comparable to powers available in other regulated sectors.

The development of this transfer scheme will be integral to work on the consents system (including provisions in respect of the register of key network assets). The transfer scheme will be in addition to any provisions relating to insolvency provided for in UK legislation. These elements of the heat networks regulatory system will be consulted on in early 2023.

**Local authority cost strategy**

We will prepare a strategy setting out the costs to local authorities in relation to their duties under the 2021 Act. The final strategy will depend on the full detail of the regulatory system. As such, we will publish a final Local Authority Cost Strategy in line with our timetable set out above and before the regulatory system commences operation in early 2024.

We will work with local authorities and relevant stakeholders to ensure that appropriate resource is provided in order to deliver the ambitious provisions of this 2021 Act, such as heat network zoning.

## Decarbonising existing heat networks

As set out in the Heat in Buildings Strategy, from the point that the heat network legislative framework is in place, new heat networks, and any additional heat plant(s) for extensions of heat networks, will need to be powered using low and zero emissions sources of heat, bar potentially a percentage of back up and peaking heat (see next section of this Chapter).

However, many existing heat networks will continue to use fossil fuels as their main source of heat. These systems will need to decarbonise over time in order for us to live within our emission limits.

Pathways and timescales for decarbonising systems will vary between systems, but planning and advanced preparation will be important. As such, we propose that licence holders who operate existing networks in Scotland will be required to prepare and then implement a Heat Network Decarbonisation Plan. The Plan would set out the journey each network will take to reduce greenhouse gas emissions in line with the emission reduction targets – covering both efficiency improvements and replacement of heat sources where these are not already low and zero emission. These could also potentially be expected to consider the impact of these changes on consumer costs – a factor in the depth and rate of fuel poverty.

We propose that Heat Network Decarbonisation Plans should be produced and approved within an appropriate period of time. This may be anything between 1 and 3 years of a licence being granted depending on the size of the network and key relevant circumstance. Plans will include milestones for making significant reductions in emissions by 2030 and 2035.

A large majority of consultation respondents referred in some way to cost being the key challenge facing the decarbonisation or efficiency improvement of existing networks. Upfront costs of network decarbonisation were highlighted as a concern as these might be passed onto customers. In response to this, the recently launched Heat Network Fund (see Chapter 6) will provide grant support for a range of heat networks projects including the decarbonisation of existing fossil fuel heat networks. The Heat Networks Support Unit, once established, will include support for projects decarbonising existing networks.

To support the preparation of Heat Network Decarbonisation Plans, in 2022 we will commission work to test and develop an approach to developing such plans, with a view to piloting them in due course.

## Low and zero emissions requirements of new heat networks

We have previously set out in our Heat in Buildings Strategy and Draft Heat Networks Delivery Plan that from the time that the legislative framework is in place, new heat networks, and additional plants for extensions, will need to be powered using low and zero emissions heat sources. Heat from sources such as surplus or waste heat, electric heat pumps, solar thermal or plant using low carbon or green hydrogen would be considered low and zero emissions.

However, feedback from existing networks that are aiming to deliver zero emissions systems has highlighted that for many such networks it is currently

necessary to include fossil fuel back-up systems, which in some cases also provide heat at times of peak demand on the networks.

Therefore, in order to ensure that networks can remain resilient and affordable, we will require that, from the point that the regulatory system is in place in 2024, the vast majority of heat for new networks is to be provided from low and zero emission sources. However, in the near term a small percentage of annual heat provided through some networks may need to be sourced from natural gas for the purposes of peaking and backup. The exact percentage will be determined on a case by case basis and the need will have to be evidenced, while showing other options have been explored. New networks would be expected to have a plan as to how that percentage is expected to reduce over time, with significant progress made by a set year. This could for example be by 2035.

We will commission independent advice to support the preparation of guidance on this issue. We would also propose to keep this under review considering the impact of any such approach.

We do not expect to provide the same leeway to extensions to existing networks as existing heat plant(s) may act as back-up. Therefore new heat sources in existing networks will all need to be low or zero emissions.

## Consumer protection

Robust consumer protection is needed to ensure that Scottish consumers experience an equitable energy system in which all consumers have clear access to redress. Strong consumer standards will be important for heat network consumers who are locked in over the long term to a single supplier and unable to easily switch as is currently the case for gas and electricity.

Respondents to the consultation were overwhelmingly supportive of universal consumer protection irrespective of scheme size or ownership.

The 2021 Act does not provide consumer protection powers as these remain reserved to the UK Government. The UK Government has committed to legislating to implement heat networks regulation and to do so at the earliest possible opportunity. The UK Government's expectation is that all domestic and micro-business consumers of heat networks should have ready access to information about their heat network, a good quality of service, fair and transparently priced heating and a redress option should things go wrong. The UK Government has set out that Ofgem will be the heat networks regulator under the Great Britain-wide Heat Network Market Framework and

that the Energy Ombudsman should take the role of the independent ombudsman service.

Both the Scottish and UK governments have agreed that alignment between the two regulatory systems is desirable. Our aim is for consumer standards introduced under the UK's Heat Network Market Framework to be incorporated into the Scottish regulatory system seamlessly. Ofgem seem best placed to act as the regulator under both Scottish and UK legislation. We continue to work with the UK Government to ensure consumer protection and licensing can both be dealt with by Ofgem in Scotland.

In the meantime, we will continue to use our capital funding programmes (see Chapter 6) to increase the number of heat networks in Scotland. We will require as a condition of grant funding that schemes, where possible and appropriate, are registered under the Heat Trust[vi]. Projects will be required to submit as part of their application that they will meet the expected level of service and quality alongside information on the complaints process. The Heat Trust is a stakeholder-led customer protection scheme which sets a common standard in the quality and level of customer service expected from heat suppliers. It provides an independent process for settling complaints between customers and their heat supplier through the Energy Ombudsman. The standards of service have been designed to be comparable to those required by electricity and gas suppliers.

As we develop regulations to implement the 2021 Act, we will engage with consumer-facing organisations including advice bodies, the Energy Consumers Commission and, following its establishment, Consumer Scotland in order to gain insight on the experience of consumers of heat networks. This will help inform our engagement with the regulator and other key stakeholders and ensure that any issues for consumers are fed in quickly. Additionally, we are working with the UK Government so that the Heat Networks Consumer Survey provides an understanding of consumer concerns and operating experiences for the first time in Scotland. The results of this work are expected to be published in Summer/Autumn 2022.

# Chapter 4: Guiding development

Heat networks are not a suitable solution for all areas. To date the establishment of district heating has been reliant on new buildings, and suppling heat to existing 'anchor loads' (see Chapter 2).

Heat networks are most suited to areas of high heat demand, which are often associated with denser urban settings and/or areas of high industrial use. Newer fifth generation heat networks may be suitable for lower density areas.

## Identifying areas suitable for heat networks

The Opportunity Areas for District Heating Networks in the UK report[vii] uses geospatial modelling to identify areas where there may be economic potential for heat networks. This analysis estimates that heat networks could provide around 15 TWh of heat per year in Scotland by 2050. This is likely to be the maximum potential.

The First National Assessment of Potential Heat Network Zones[10] has further developed our understanding of the suitability of heat networks in Scotland. This assessment provides a high level initial assessment at a national level, identifying potential heat network zones (where heat networks are a potential long-term solution) based on linear heat demand and key anchor loads. This First National Assessment follows the early stages of the LHEES methodology, but does not incorporate local authority held data or local insight that impact on potential zones identified. The outputs relevant to a local authority's area have been provided to each local authority to support the development of their LHEES and any designation of heat network zones under the Heat Networks (Scotland) Act 2021.

The LHEES methodology and any guidance relating to the LHEES statutory duty will be updated to ensure that in following it local authorities can fulfil the requirement to consider whether one or more areas in its area is likely to be particularly suitable for a heat network[11].

As noted above (Chapter 3) we will supplement the LHEES guidance and develop a more detailed assessment to determine whether an area is

[10] To be published soon on www.gov.scot

[11] The 2021 Act states "Each local authority must carry out a review to consider whether one or more areas in its area is likely to be particularly suitable for the construction and operation of a heat network." Details of what must be considered in the review for heat network zoning is set out in more detail in Part 3 (Sections 47, 48) of the 2021 Act.

particularly suitable for a heat network to support local authorities in designating heat network zones.

## Building Connection Hierarchy

Within zones it will be important to encourage and prioritise the connection of key anchor buildings, which can enable the efficient operation of a heat network, helping to reduce customer costs and enabling the extension of the network over time to other nearby buildings.

**Box 2: Scottish non-domestic buildings**.
These vary significantly in size[12]. Non-domestic buildings with a floor area greater than 1,400m$^2$ account for over half the stock by floor area and 9% by number of buildings; and buildings over 2,500m$^2$ account for 26% by floor area and only 3% by number. The average area of non-domestic stock is estimated to be 444m$^2$.

To guide the development of heat networks we have adopted the following Building Connection Hierarchy, which prioritises the connection of existing buildings based on their size, heat demand and ownership. A previous version of the Building Connection Hierarchy was proposed in the Draft HNDP as a tool to help steer delivery on the ground and in certain instances useful as part of a prioritised or tiered policy or regulatory approach, though this will not always be appropriate. Respondents to the consultation were generally supportive of the hierarchy, however suggested a number of alternations and considerations. This included that local flexibility may be required in its application. Respondents also indicated a preference for a heat demand threshold or a proxy for this, over a size threshold.

The Hierarchy has been designed to support the development of heat networks. Respondents also suggested a needs based approach could be part of or sit alongside this hierarchy, to support those buildings with more limited zero emission heating options. For many historic or traditional buildings and some multi-ownership buildings heat network connection may offer the most appropriate or feasible zero direct emission heating solution. While this has been included, it is on the basis that it does not delay the development of heat networks.

The Hierarchy has been updated in light of these comments and when used should take into account the need for flexibility. New buildings within a heat network zone should connect to a heat network where available and appropriate.

[12] Source: Analysis by Scottish Government using Non-Domestic Analytics.

**Table 5: District heat network development: Building Connection Hierarchy***

| Priority | Non-domestic*2 | | Domestic*3 |
|---|---|---|---|
| 1 | New Buildings (with a heat demand) | Existing public sector non-domestic buildings (above a certain heat demand*4) | Residential buildings with high heat demand. Highest priority for highest heat demand such as large groups of homes already on communal heating, large multi home or multi tenancy domestic buildings*5 and retirement homes. |
| 2 | Existing Commercial or Third Sector non-domestic buildings (above heat demand threshold*4) | Existing public sector non-domestic buildings (below heat demand threshold*4) | |
| 3 | Existing Commercial / Third Sector (below heat demand threshold). Possible priority for multi tenancy or multi ownership or historic or traditional buildings*5 | | |
| 4 | All other heat using buildings in heat network zones that are not already served by zero emission heating or for which there is no fuel poverty increase in doing so. | | |

**Building Connection Hierarchy – Interpretation and Points of Note**

* This Hierarchy applies only to buildings in a heat network zone, buildings that do not already have a zero emission heating system and that are not soon to be demolished.

*2 Particular flexibility may be required around long term contracts for energy supply, energy performance contracting or novel financing arrangements such as Private Finance Initiative (PFI) Non-Profit Distributing Model, and Pubic Private Partnerships (PPPs).

*3 Where this does not adversely impact those at risk of fuel poverty. Higher priority for those that support the eradication of fuel poverty.

*4 Where heat demand cannot be used a size threshold may be an acceptable alternative.

*5 The inclusion of multi ownership buildings (rather than those with one organising entity such as a social landlord) and historic and traditional buildings is included only where this does not risk the timely delivery of the heat network.

## Draft National Planning Framework 4

The Draft Fourth National Planning Framework (NPF4)[viii], which details our long term plan for what Scotland could be in 2045, was laid in Parliament in November 2021. Alongside Parliamentary scrutiny of the draft, we are running a consultation[ix], which is open until 31 March 2022. The consultation seeks views on draft policy on heating and cooling.

## Demand assurance

We know that one of the key barriers to heat network development is demand assurance, with investors needing a long-term, secure customer base to confidently invest.

As set out in the Heat in Buildings Strategy we will, subject to legal competence, introduce a regulatory framework to require the installation of zero or very near zero emissions heating systems in existing buildings off the

gas grid from 2025 and on the gas grid from 2030. This is in addition to proposals to require new buildings consented from 2024 to install only zero direct emissions heat sources.

We will also consult in 2022 on a series of phased targets for all publicly owned buildings to meet zero emission heating requirements by 2038.

In order to secure the development of heat networks and in order to meet our statutory heat network targets it will be important that these regulatory requirements drive the development of, and connection to, heat networks in designated heat network zones. As we take forward these consultations in 2022 we will consider how best to ensure that the proposed regulatory requirements are compatible with our heat network targets.

In the Draft HNDP we asked for views on the right approach to demand assurance. Some respondents expressed the view that mandatory approaches such as mandatory connection can be interpreted as a problem in today's society, with some respondents suggesting ways this could be made fairer. There was support for mandatory connections from large and publicly owned buildings to provide demand assurance for heat network development. There were more mixed views on mandatory connections for the residential sector – some suggested larger residential buildings or groups of buildings with existing communal heating or undergoing renovation should be required to connect.

We remain committed to consulting on proposals, as far as is possible within our legal competence, to:

- introduce mandatory connections with a focus on large non-domestic heat users and publicly-owned buildings; and/or
- use new powers under section 15 of the Non-Domestic Rates (Scotland) Act 2020 which could potentially be used to de-risk investment and drive net zero behaviour, including connections to heat networks.

In developing proposals we will pay particular attention to fairness aspects and will consider whether buildings of all types already on heat networks should be in scope or not. We will also consider UK Government proposals to mandate connection to heat networks in designated areas in England to assess their applicability in Scotland and fit with our proposed wider approach to building regulation. Subject to legal competence, we will consult on proposals during 2022.

# Chapter 5: Wider policy framework

## Contribution to eradicating fuel poverty

Heat networks can, under certain conditions, help to reduce expenditure on heating. The Competition and Markets Authority (CMA) found that up to 90% of heat network customers enjoy similar, or lower, bills than those with standard gas boilers[x] and heat networks can cut both emissions and bills. The CMA analysis compared customers of heat networks, which were almost exclusively gas-fuelled, with households using individual gas boilers. We will undertake further analysis to more fully understand the expected running costs of heat networks supplied by zero emission or surplus sources of heat.

Respondents to the Draft HNDP identified alleviating fuel poverty whilst moving to heat networks, and low carbon heating more generally, as a challenge. Some respondents were keen to point out that fuel poverty is a complex issue with a number of different drivers, and that low carbon heating technologies are not the only means of addressing it. A small number of respondents did, however, frame the heat transition as a potential opportunity to address fuel poverty. In particular energy efficiency retrofit of the existing building stock was routinely raised by respondents across questions as essential to reducing heat demand and fuel poverty.

The cost of operating a heat network, and thence the costs passed onto consumers, in part relate to the wholesale cost of any energy input for the heat source. As such the operating costs can fluctuate along with gas and electricity prices, where these sources of energy are used. There are examples[13] of heat networks in Scotland and further afield which use a mix of heat sources and large scale storage to reduce customers' heat costs.

Efficiency and therefore operating costs can also be affected by the temperature of the network – with lower temperature networks generally loosing less heat. Improved energy efficiency of connected buildings can therefore be a factor in lowering network operating temperatures and reducing operating costs.

The Heat in Buildings Strategy[xi] has set out guiding principles to ensure alignment of heat in buildings programmes with fuel poverty objectives[14]. We

[13] Examples include heat networks in Lerwick, Skagen, 8 others in Denmark associated with solar thermal and large scale storage including in Silkeborg.
[14] See Chapter 2, Contribution to eradicating fuel poverty section.

will use these principles in developing regulation and to guide the operation of our capital programmes.

Our Fuel Poverty Strategy[xii] was published on 23 December 2021 and sets out actions to tackle each of the four drivers of fuel poverty: poor energy efficiency of the home; high energy costs; low household income; and how energy is used in the home.

We will work with the Scottish Fuel Poverty Advisory Panel, appointed by Ministers in December 2021, as we bring forward regulation under the 2021 Act so that it supports efforts to eradicate fuel poverty and to ensure it does not adversely impact those in or at risk of fuel poverty. Furthermore, we will work with the Advisory Panel to identify where heat networks could help to reduce the depth and rate of fuel poverty, contributing to meeting our ambitious targets.

## Waste and surplus heat

As we transition to a net-zero economy it will become increasingly important that we use resources efficiently. This includes maximising the use of surplus or waste heat, which at present goes unused. A recent ClimateXChange study[xiii] identified a waste heat potential of about 1,677 GWh across some 932 sites in Scotland, including from distilleries, wastewater treatment facilities, bakeries and many other sectors.

Surplus or waste heat is rarely fully utilised in Scotland, even though heat recovery can significantly increase the overall energy efficiency and energy recovery of facilities. We wish to see the opportunities fully explored for cost effective heat recovery and its use offsite, once onsite usage has been taken into account.

Information is key to facilitating this process. Some respondents to the consultation on the Draft HNDP cited a better understanding of the potential of waste heat sources as necessary and some raised the issue of access to waste heat. One respondent suggested that waste heat sources should be mandated to connect to an available network and another that they be required to supply heat.

Energy from Waste (EfW)[15] facilities are among the largest single sources of surplus or waste heat in Scotland. Currently there are 8 EfW facilities under

[15] EfW is the process of creating energy, in the form of electricity and/or heat, from incinerating waste, specifically residual (non-recyclable) waste – see: Scottish Environment Protection Agency - energy from waste

construction or in operation in Scotland, with a further facility in Westfield, Ballingray in Fife expected to begin construction soon. Since 2014 all EfW facilities have been required to prepare detailed heat and power plans in order to identify opportunities for local use of heat from the facility.

There are examples of surplus or waste heat use at Lerwick, Grangemouth, Shawfair in Midlothian and Torry in Aberdeen. However, significant amounts of heat go unused at some of these and other facilities. A key reason that heat is not recovered is that there are insufficient commercial opportunities to incentivise recovery, in particular the lack of potential heat customers and absence of an adjacent heat network. Equally, there are no legal requirements and limited incentives to recover and use surplus or waste heat.

As an initial step, we will consider introducing a requirement for potential heat suppliers – for the type of heat source where heat can be cost effectively recovered and supplied – to provide information when formally requested to provide it; and that this information be shared with relevant authorities and relevant licenced heat network providers.

We will also engage with the UK Government on its equivalent proposals[xiv] which include powers to require:

- owners of heat sources (such as thermal power stations and industrial and commercial sites which could be used to supply heat networks) provide information to a Zoning Coordinator.
- heat sources to connect to a heat network (provided it is technically and economically viable).

This year we will work with stakeholders to further develop proposals for consultation on the provision of information on potential waste heat sources and any further measures considered necessary to increase the utilisation of surplus or waste heat. This consultation will include which potential heat suppliers would be in scope of any proposals.

We will also make available to local authorities, by Winter 2022/23, further information on the availability of surplus or waste heat to support the identification of heat network zones and the development of LHEES.

## Skills and supply chain

Unlocking investment in the supply chain must start with clear demand for its products and services. Our investment of at least £1.8 billion for heat and energy efficiency projects over the course of this Parliament, as outlined in

the Heat in Buildings Strategy, aims to strengthen demand and support an increase in jobs and skilled workers.

We will work with industry to co-produce a new 'Heat in Buildings Supply Chain Delivery Plan' later in 2022 specifically focussed on strengthening the broad supply chains needed to deliver at the pace and scale we need. We will continue to work with the sector to support the development of skills and the supply chain for heat networks that some respondents to the consultation on the Draft HNDP suggested was needed.

Around 60 companies in Scotland are active in the heat networks sector, the majority of whom are civil engineering and construction contractors, most of which are large contractors that offer heat network contractor services as part of a range of construction services[16].

The Climate Emergency Skills Action Plan (CESAP) sets out immediate actions to support the development of skills needed to meet the climate change challenge. Through CESAP we have established a Green Jobs Workforce Academy for existing employees, and those who are facing redundancy, to assess their existing skills and undertake the necessary upskilling and reskilling they need to secure green job opportunities as they emerge.

New skills and supply chains will be needed as we scale up the development of heat networks in Scotland. The Energy Saving Trust (EST) report "Heat Network Skills in Scotland"[17], published in May 2020, identified skills gaps in the heat network supply chain, notably:

- project management of heat networks, delivery and operation
- heat network design
- installation and optimisation of heat networks
- technical operation and maintenance.

To build on this work, and to better understand potential skills gaps, we have partnered with Scottish Renewables and Skills Development Scotland to undertake a "Heat in Buildings Workforce Assessment Project". This project will help us to better understand the timing of required workforce growth across the heat and energy efficiency sectors, including the heat network industry. This will help us plan how best to support people transitioning into key roles.

[16] Source: as yet unpublished research for Scottish Enterprise by Delta EE
[17] Research to help the supply chain - Energy Saving Trust

It will be important to ensure that the workforce and skills needed to develop, operate and maintain heat networks are available right across Scotland. This will include improving access to the necessary skills and trades in our most remote and island communities, and ensuring local authorities have the necessary skills and expertise to drive development of heat networks.

In addition, in developing technical standards (see Chapter 3), the long-term intention is to develop standards against which certification can take place. This may provide additional opportunities for further qualifications in Scotland.

## Non-domestic rates

To help support and encourage investment in green heat networks the Non-Domestic Rates (District Heating Relief and Renewable Energy Generation Relief) (Scotland) Amendment Regulations 2021 introduced a 90% relief from non-domestic rates until 31 March 2024 for new networks run from renewable sources. This is in addition to the existing 50% relief that is in place for all heat networks. This relief is guaranteed to continue until 2032.

These reliefs help to support the business case for new networks by reducing their operational costs.

We note that the non-domestic rates reliefs were welcomed by some respondents to the consultation with some of those suggesting extending to the 2030s. We will continue to monitor the use of reliefs by heat networks and make adjustments as necessary.

Concerns about the valuation methodology generally applied to district heat networks has been raised in the past. Valuations are carried out by Scottish assessors who are independent of the Scottish Government, based on existing statute and case law. Appeals may be made to independent valuation appeal committees.

# Chapter 6: Capital programmes and delivery mechanisms

## Project development

Currently there is a weak and undeveloped pipeline of heat network projects. In order to accelerate the growth of heat networks in Scotland investing in the development of a project pipeline is essential.

To begin to develop a stronger project pipeline we will soon publish maps and data from the First National Assessment of Potential Heat Network Zones. This builds on the report "Opportunity Areas for District Heating Networks in the UK" and will further be supplemented by the work of local authorities on LHEES and heat network zoning (see Chapters 2 and 3). The Scottish Government will publish quarterly updates through our Heat Network Fund to demonstrate the current pipeline of projects in development that are receiving support through Scottish Government programmes. Together the outputs of the First National Assessment and the ongoing quarterly reporting form an initial heat networks investment prospectus.

Consultation responses to the Draft HNDP suggested a wide array of potential pre-capital support that may be helpful including knowledge sharing, supporting engagement with the private sector as well as expertise, advice and technical services.

We launched our £1 million Heat in Buildings Development Funding Invitation to assist with the development of a long-term pipeline for capital investment. This will provide resource funding to stimulate and accelerate the development of a pipeline of zero emissions heat projects for buildings, including heat networks, across Scotland. This funding is a forerunner to establishing a fuller Heat Networks Support Unit later this year. The support unit will be a key mechanism for supporting the development of a pipeline of projects. It will co-ordinate support across the public and private sectors to identify and nurture opportunities to install new heat networks or expand and decarbonise existing heat networks. This support will offer enhanced pre-capital support including the provision of:

- options appraisals and feasibility
- business cases
- financial expertise
- technical expertise
- legal expertise
- project management
- procurement expertise

In order to support knowledge sharing, as part of the formal closure of the Low Carbon Infrastructure Transition Programme (LCITP) in April 2022 information will be disseminated sharing details about a number of the projects that have been funded, 14 of which have been heat networks receiving over £40 million of funding. We will also establish a heat networks forum of heat network operators and associated practitioners.

We will support the development of community engagement and ownership or co-ownership of small heat networks where these are appropriate with a tailored package of support, handholding and advice, through our Community and Renewable Energy Scheme (CARES), delivered by Local Energy Scotland.

## Capital support

We launched the new £300 million Scotland's Heat Network Fund in February 2022. It offers long-term support to enable the delivery of heat networks by making capital grant funding available to public and private sector organisations. Projects will be required to demonstrate that their heat network can provide heat at an affordable cost to consumers and can support the eradication of fuel poverty.

Scotland's Heat Network Fund provides funding for the following types of projects across Scotland:

- new zero emission heat networks, including communal heating systems
- expansion of existing heat networks, with requirements to install additional zero emission generation
- decarbonisation of existing fossil fuelled heat networks

Existing heat networks supplied by gas combined heat and power (CHP) may apply for a loan to extend their heat network, with grant funding available for zero emissions systems which alongside future regulation will encourage conversion away from fossil fuel systems.

We will seek to drive value for money and financial sustainability and encourage private investment. The Fund takes a 'toolbox' approach to financing heat projects, deploying a variety of financing mechanisms to provide tailored support. These financing mechanisms will include grants, repayable assistance and loans.

The new scheme is flexible, matching levels of support required, the maturity and risk of technologies and the commercial needs of projects.

Scotland's Heat Network Fund will remain open to applications throughout the year and over the course of the parliamentary session. Funding will be awarded on a competitive basis against the funds criteria and will be available until the total fund value has been reached.

The Heat Network Fund website[xv] provides details including objectives, eligibility criteria, conditions of funding and the application process.

We will continue to offer supplementary financial support to local authorities, social landlords, SMEs and energy service companies (ESCOs) with fewer than 250 employees through the District Heating Loan Fund (DHLF). The DHLF provides low interest unsecured loans with repayment terms up to 15 years. In addition, local authorities will be able to access funding via the Green Growth Accelerator[xvi] model.

## Green Growth Accelerator

The Green Growth Accelerator (GGA) programme, launched in June 2021, provides a catalyst for public and private investment in low carbon infrastructure projects across Scotland. The programme builds on the current Growth Accelerator model and aims to unlock £200 million of low carbon capital investment that supports our transition to net zero. The GGA is a revenue financial model in which a local authority commits to deliver defined, measurable outcomes that are enabled or underpinned by investment in infrastructure and is designed to incentivise local authorities to drive transformative change.

The Scottish Government is working closely with COSLA, local authorities and the Scottish Futures Trust to learn from a group of pathfinder projects and will consider the applicability of the funding for heat networks moving forward.

## Building level support

For individual property owners wanting to connect to a nearby heat network, interest free and low cost loans are available from both Home Energy Scotland and the Energy Efficiency Business Support Service, subject to eligibility. Support is also available through the Community and Renewable Energy Scheme for community buildings to connect to a nearby heat network.

Additionally we have recently announced that the Social Housing Net Zero Heat Fund has launched a development call, to support Registered Social

Landlords (RSLs) to produce investment grade business plans. Connection to an existing heat network would be an eligible project. Reflecting the fabric first theme raised by many respondents during the consultation on the Draft HNDP, and supporting social landlords to meet the Energy Efficiency Standard for Social Housing, we have also extended the fabric first energy efficiency only funding for RSLs until 30 March 2024, with a condition that homes benefiting from this support install or connect to zero emissions heating by 2032.

We are supportive of the deployment of zero emission heat measures such as heat pumps, and at the same time keen that Scottish Government investment in the decarbonisation of heat supports and does not undermine the viability of strategically important heat network zones. In most cases within a zone we expect a connection to a heat network will be the best solution to make homes and non-domestic buildings warm and less expensive to heat in the long term.

We will continue to review the interaction between the different schemes of support available, including our own programmes, to ensure that these enable the best delivery option for communities, as well as individual households and businesses.

## National Public Energy Agency

We are committed to establishing a National Public Energy Agency to accelerate the transformational change in how we heat and use energy in homes and buildings. To achieve this, the Agency will have a remit to raise public understanding and awareness, co-ordinate delivery of investment, and coordinate national, regional and local government delivery of heat decarbonisation and energy efficiency rollout. We will establish the Agency first as a virtual agency by September 2022, and transition to a dedicated body by September 2025. We will set out the role of the Agency in delivering support for heat networks as part of the transition process.

# Chapter 7: Monitoring and reporting

## Review of the Delivery Plan and reporting progress against targets

As required by the 2021 Act, we will review the Heat Networks Delivery Plan and report every 2 years on the heat output of heat networks and emissions savings.

In order to underpin this national review and progress towards targets, heat network operators will need to report key information to the licensing authority. Data reporting requirements will be developed as part of work to develop the regulatory system and will be subject to consultation in due course. We will work with the sector to ensure these requirements are proportionate and do not put an undue burden on heat network operators.

## Monitoring the wider heat networks sector

As the heat network sector develops in Scotland it will be important that we gather data and insights to better understand wider aspects of the heat network market and opportunities around it. We believe additional to reporting on heat produced and circulated by heat networks, it would be valuable to monitor a number of other key parameters, including:

- heat connected to and available to networks but not used
- distribution losses
- heat being used by heat network customers
- number of connections (customers) – domestic and non-domestic

Furthermore, to ensure heat networks effectively integrate into the wider energy system, and to identify additional opportunities for integration and efficiency we believe it would be valuable to understand:

- linear heat densities of networks: an important feedback loop for assumptions on viable heat networks and identification / review of heat network zones
- storage capacity on heat networks: for understanding the role that heat networks play in providing an integrated low emission energy system, in particular in reducing peak electrical demand (and the associated generation and transmission costs of this)
- pipework (length, geolocation): providing an indication of the overall spread of heat networks, potential maintenance associated with it, etc. It is also important for heat network operators and other

development organisations to be able to accurately locate pipework through appropriate electronic geographic information
- operating temperatures (flow and return): which can have an impact on distribution losses, if and how a heat source can be used, requirements for substations and subnetworks, and the ability to (or amendments in order for) buildings to connect
- the parasitic electricity consumption (electricity consumed to pump water around heat networks) identifying additional (non-heat) energy losses from heat networks.

Responses to the Draft HNDP consultation were generally supportive of data collection, noting that it could:

- enable the ongoing development and efficient operation of the heat networks market in Scotland, including opportunities for integration;
- help improve the Scotland Heat Map; and
- support the development of public sector climate change strategies and reporting.

Respondents to the consultation noted that currently data in the sector is poor and that improving data standards and data availability would require significant support, including financial and resourcing support. Learning from countries with developed heat networks markets was also suggested as useful.

A number of different types of respondent highlighted the burden of data collection, some noting that additional burdens on operators would likely have cost impacts on end users/customers. Integration into existing data collection practices and automated data collection processes were also suggested as valuable and potentially a route to reducing the burden.

Respondents identified data missing from the proposed list which fell into the following four categories: project data; end user/customer data, including pricing structures; energy data; and other data, including number of jobs.

## Data for reporting and monitoring

There are limitations to the data currently available on heat networks. There are a number of potential options for improving the data used to report against targets – both heat networks targets and their contribution to greenhouse gas emission reduction targets – as well as wider monitoring of heat networks in Scotland. These include surveys on heat networks and non-domestic buildings and options related to existing and future regulatory

systems[18]. The quality of these data may vary and will be available potentially at very different times.

As a starting point we will work with our delivery partners to survey heat network operators to support the provision of key data for some of the largest sites in Scotland, improving centrally held data during 2022.

Where possible we will seek to embed collection of wider networks sector data into the regulatory system provided by the 2021 Act, and in developing this regulatory system we will consider ways to reduce the burden of such reporting on the sector. Where this is not possible, we will work with the UK Government and key stakeholders to develop routes to report on and monitor the market.

In our onward work to improve data on the heat networks market we will consider in more detail the responses to the Draft HNDP.

As appropriate, key heat networks data will be included as part of our ongoing programme of improvement to the Scotland Heat Map.

[18] This could include the Heat Networks (Metering and Billing) Regulations, the 2021 Act (and secondary legislation to be developed) and any regulations resulting from UK Government proposals on the Heat Networks Market Framework.

# Chapter 8: Impact assessments and Strategic Environmental Assessment

Alongside the Heat in Buildings Strategy (HBS) and during the passage of the Heat Networks (Scotland) Bill (the Bill), a series of impact assessments, including a Strategic Environmental Assessment, were developed and published. Specifically these were:

- equality impact assessment (EQIA) for the HBS[xvii] and for the Bill[xviii]
- islands communities impact assessment (ICIA) for the HBS[xix] and for the Bill[xx]
- fairer Scotland duty (FSD) for the HBS[xxi] and for the Bill[xxii]
- child rights and wellbeing impact assessment (CRWIA)for the HBS[xxiii]
- business and regulatory impact assessment (BRIA) for the HBS[xxiv] and for the Bill[xxv] and
- strategic environmental assessment (SEA) – environmental report[xxvi] [19].

We will assess whether there is need for additional impact assessments beyond those carried out for the Heat in Buildings Strategy and the Heat Networks (Scotland) Bill as we progress work to implement individual provisions of the Heat Networks (Scotland) Act and the wider policy and delivery framework on heat networks.

As we deliver the HNDP we will take these impact assessments and the associated mitigating actions into account. We will give due regard to equalities, and shall not unfairly discriminate based on any protected characteristics, or particular challenges faced as a result of geography or connectivity (such as on islands).

[19] The post adoption statement for the HBS SEA will be published soon and made available through the SEA Database.

# Annex A: Summary of actions we will take

| **Ambition and Targets** |
|---|
| • We will consult on a heat networks target for 2035 in early 2023. This will be set by 1 October 2023. |
| **Regulatory Regime** |
| • We will consult on building assessment reports and heat network zoning proposals, regulations and guidance in Summer 2022.<br>• We will consult on proposals and regulations for consenting and key heat network assets in early 2023.<br>• We will consult on proposals and regulations for permitting in early 2023.<br>• We will consult on proposals and regulations for licensing and powers of licence holders in early summer 2023.<br>• In 2022, we will commission work to test and develop an approach so that existing heat networks can develop Decarbonisation Plans, which we propose should be mandatory. We will publish a Local Authority Cost Strategy prior to the regulatory system becoming operational in 2024, and will work with local authorities and stakeholders to ensure the provision of relevant resources in order for local authorities to meet their duties under the 2021 Act.<br>• We will implement the Heat Networks (Scotland) Act 2021 to put in place a functioning regulatory regime by 2024. |
| **Guiding Development** |
| • We will update the LHEES methodology and related guidance to ensure that it fulfils the requirement to consider whether areas are particularly suitable for a heat network.<br>• We will develop a more detailed assessment to help local authorities determine whether an area is particularly suitable for a heat network ahead of designating a heat network zone.<br>• We will introduce a new Build Heat Standard requiring new buildings consented from 2024 to install only zero direct emission heat sources.<br>• Subject to devolved competence, we bring forward regulatory proposals to require the installation of zero or very near zero emissions heating systems in existing buildings.<br>• We will consult in 2022-23 on a series of phased targets for all publicly owned buildings to meet zero emission heating requirements by 2038.<br>• Subject to devolved competence, we will consult on proposals to address the issue of demand assurance. In doing so, we will consider the UK Government's proposals to mandate connection to heat networks in England. |

**Wider Policy Framework**

- We will work with the Scottish Fuel Poverty Advisory Panel to ensure that the Heat Networks Delivery Plan (HNDP) supports efforts to eradicate fuel poverty.
- We will make available to local authorities further information on the availability of surplus or waste heat, to support the identification of heat network zones.
- We will work with stakeholders, and as relevant, consult on information provision and any further measures needed to increase the utilisation of surplus or waste heat via heat networks.
- We will work with industry to co-produce a new 'Heat in Buildings Supply Chain Delivery Plan' later in 2022, and we will continue to work with the sector to support the development of skills and the supply chain for heat networks.

**Capital Programmes and Delivery Mechanisms**

- We recently announced our £1 million Heat in Buildings Development Funding Invitation to assist with the development of a long-term pipeline for capital investment. This funding is a forerunner to establishing a fuller Heat Networks Support Unit later this year.
- We will establish a heat networks forum of heat network operators and associated practitioners.
- We will publish quarterly updates through our Heat Network Fund to demonstrate the current pipeline of projects.
- We will support the development of community engagement and ownership or co-ownership of small heat networks through our Community and Renewable Energy Scheme (CARES), delivered by Local Energy Scotland.
- We will invest £400 million to support the development of large-scale heat infrastructure, such as heat networks. Our £300 million Heat Network Fund launched in February 2022 is part of this new suite of delivery schemes.
- We will continue to offer a relief of 90% on Non-Domestic Rates for new networks run from renewable sources until 31 March 2024 and a 50% relief for all heat networks until 2032.
- We will establish a National Public Energy Agency, first as a virtual agency by September 2022, to accelerate the transformational change in how we heat and use energy in homes and buildings. The Agency will transition to a dedicated body by September 2025.

**Monitoring and reporting**

- We will review the HNDP every 2 years, and we will report on the heat output of heat networks as well as emissions savings.
- We will develop data reporting requirements for heat networks as part of work on the regulatory regime.

# Annex B – Glossary of Terms and Acronyms

**Third, fourth and fifth generation heat networks -** Third and fourth generation systems generally provide hot water at between 60 and 100 degrees Celsius and fifth generation systems generally operate at temperatures of up to 45 degrees Celsius.

**Anchor load -** Buildings with a large, reliable and long-term demand for heat, often with a stable and constant use profile, can act as anchors for a developing district heating networks. These anchor loads allow district heat networks to operate efficiently and provide the potential to extend the network to smaller existing heat users in the area.

**BAR -** Building assessment report

**CESAP -** Climate Emergency Skills Action Plan

**CHP -** Combined heat and power

**CMA –** The Competition and Markets Authority

**COSLA -** Convention of Scottish Local Authorities

**DHLF -** District Heating Loan Fund

**EfW -** Energy from Waste

**ESCO -** Energy service company

**EST -** The Energy Saving Trust

**GGA -** Green Growth Accelerator

**GW -** A unit of power equal to 1,000,000,000 watts

**GWh -** A unit of energy equal to 1,000,000,000 watt hours

**Heat network -** Heat networks, as defined under the 2021 Act, include both district and communal heating:

- a **district heat network** is defined as a network by which thermal energy is distributed from one or more sources of production to more than one building

- a **communal heating system** is a system by which thermal energy is distributed from one or more sources of production to one building comprising more than one building unit

Heat networks can provide heating, cooling, or steam for industrial processes.

**LCITP -** Low Carbon Infrastructure Transition Programme

**LHEES -** Local Heat and Energy Efficiency Strategies – strategies which aim to establish area-based plans and priorities for systematically improving the energy efficiency of buildings, and decarbonising heat.

**Ofgem -** The Office of Gas and Electricity Markets – a non-ministerial department of the UK Government, which acts as the independent regulator of the UK energy market.

**SME -** Small and medium-sized enterprises

**Terawatt (TW) -** A unit of power equal to 1,000,000,000,000 watts

**Terawatt hour (TWh) -** A unit of energy equal to 1,000,000,000,000 watt hours

**UK -** The United Kingdom

**Watt hour (Wh) -** A unit of energy (or work) equal to the energy of one watt operating for one hour, equivalent to 3600 joules

**Watt (W) -** An international standard unit of power, defined as one joule per second. Being a small unit, it is usually used as a multiple such as kilowatts, megawatts, gigawatts or terawatts

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