Heat Networks Zoning Social Research

Final report

June 2022

Acknowledgements

This independent research report was produced by Nicky Hodges, Martin Holley, Karen Smith, Dr Sarah Becker, Nick Stromberg and Lydia Schmidt, from the Centre for Sustainable Energy (CSE); Kelly Greer, Lautaro Alvarez, Dr Caroline Sejer Damgaard, Steph Hacker from ACE Research at the Association for Decentralised Energy (ADE); and Liz Warren and Rachael Mills from SE2. Qa Research administered the survey on behalf of CSE.

The views expressed in this report are those of the authors, not necessarily those of the Department for Business, Energy & Industrial Strategy (nor do they reflect government policy).

We are grateful to all those who participated in workshops or responded to the survey for their time and assistance with this research as well as to those who helped with signposting us to potential workshop invitees.

Any enquiries regarding this publication should be sent to us at: [add team email address].

Contents

Executive Summary

Introduction

This report presents the findings of social research undertaken to inform the development and implementation of future Heat networks zoning policy. Heat network zoning is recognised as an important policy tool to accelerate heat network development to support heat decarbonisation of buildings.

The research assessed the views, attitudes and perspectives of stakeholders who may be affected by heat network zoning policy in England, including local authorities, building owners and residents. The research had five objectives:

- Engage with a representative sample of building types and asset owners within potential heat network zones in the six cities included in the study: Bristol, Birmingham, Greater Manchester, Leeds, Newcastle and Nottingham.
- Identify key considerations underpinning attitudes towards heat decarbonisation (such as choice, cost, responsibilities and carbon).
- Seek views on being part of a local solution versus an individual building solution to heat decarbonisation.
- Determine attitudes towards being mandated or encouraged to connect to a heat network and views on what information and evidence stakeholders would need to support heat network zoning.
- Identify what building owners and residents consider to be important concerns, risks and opportunities of heat network zoning.

These informed the study methodology (summarised below).

Methodology

The research consisted of two phases – the first phase comprised of online deliberative workshops and the second phase was a postal survey.

In total, twelve online workshops (four introductory and eight deliberative) were conducted with the following groups in the six cities:

- Local authorities
- Social housing providers
- Social housing tenants and homeowners
- Private sector non-domestic building owners
- Public sector non-domestic building owners

- Housing developers

Introductory workshops aimed to explain to participants what Heat networks are and their relevance for heat decarbonisation and gave them an opportunity to ask questions ahead of the deliberative workshops. The introductory workshops were offered to, but not attended by, all participants and therefore some explanatory elements were also built into the deliberative workshops. The deliberative online workshops addressed key questions about heat network zoning, developing and challenging the participants' views on the issue. In total, 36 participants took part in the introductory workshops and 40 in the deliberative workshops. There was markedly greater participation from social housing residents compared to the other sample groups.

The second phase comprised of postal surveys tailored to each of four sample groups[1], with responses from:

- 67 respondents from private sector non-domestic buildings with large (≥100 MWh/year) annual heat load
- 112 respondents from private sector non-domestic buildings with small (<100 MWh/year) annual heat load
- 337 domestic owner-occupiers[2]
- 125 social housing tenants and 48 homeowners in the social housing sector.[3]

A full methodology and all materials used in this research are presented in the Technical Annex that accompanies this report. Full anonymised survey results can be found in the accompanying data tables.

Results and Findings

Social Housing

Social housing resident respondents were generally found to be supportive of their landlord switching to a heat network as a potential way to decarbonise how their homes are heated, though some expressed concerns about potential disruption during installation and connection or where they had heard about problems with existing and older heat network schemes. Addressing fuel poverty; better health, a safe and reliable heat supply and achieving carbon savings were identified as important benefits.

From the survey, the top three things social housing tenant respondents wanted to know more about were easy to control heating (71%), repairs done quickly (70%) and yearly heating costs

[1] The sample groups were chosen with consideration to government proposals around which buildings are required to connect to a heat network within a heat network zone. All new buildings, large public sector buildings, large non-domestic buildings and large domestic buildings which already have communal heating or are undergoing major refurbishment are required to connect.
[2] Excluding ineligible respondents to this survey that rent privately, under shared ownership or live rent-free in another's property.
[3] Excluding ineligible respondents to this survey that rent privately, under shared ownership or live rent-free in another's property.

being the same or less than their current heating type (67%). Homeowners in the social housing sector[4] identified the same top three priorities as social housing tenants, but also wanted assurance that service charges would be reasonable. Consumer protection measures, including being able to speak to their supplier over the phone and having a clear complaints process were identified as important by over 90% of respondents amongst social housing residents (tenants and homeowners). Workshop and open-ended survey responses mentioned the importance of good customer service, good performance and concerns that major problems might arise, with specific mentions made of the cladding crisis.

Social housing provider participants in workshops were broadly supportive of Heat networks. They raised concerns around the upfront costs of changing to a heat network system, consumer protection and disruption during construction and installation. They identified mixed tenure arrangements (freehold and leasehold properties within blocks of social housing) and buildings having more than one housing provider as barriers to adoption of a heat network. They identified a need for new consumer protection regulations to drive change. They considered that clear communications to residents about Heat networks and their benefits will be key to overcome resistance to change.

Owner-occupied homes

Owner-occupier buildings represent most of the domestic building stock in England. Owner-occupier survey respondents reported high levels of concern about climate change. Fewer than half the survey respondents had previously heard of Heat networks. Over 80% of respondents identified a safe and reliable heating supply, bills the same or cheaper than gas, lower costs to reduce fuel poverty and use of low or zero carbon heat sources as important wider benefits of Heat networks. Survey respondents said they wanted clear, upfront information about the cost to connect their home, assurances that it will not affect the saleability or value of their home and robust information that Heat networks are the lowest cost low carbon heat option for their home. Concerns about connecting included initial costs and not being able to switch supplier. Domestic owner-occupier respondents identified the costs they would be willing to cover as running costs, installation and replacement costs, with few willing to cover enabling and energy system costs.

Private non-domestic buildings

Most respondents stated they were concerned about climate change and 38% reported having formal plans in place to reduce their environmental impact. Most respondents did not know their building's EPC rating and only around a third of all non-domestic respondents had previously heard of Heat networks. Despite this low level of prior awareness, 72% of the private non-domestic sample group indicated that they would be likely to connect voluntarily to a heat network. Lower heating bills (95%), cost-effective heat decarbonisation (93%) and increased building comfort (86%) topped the list of perceived direct benefits of connecting to a heat network.

[4] 'Homeowners in the social housing sector' refers to respondents to the social housing survey who self-reported their tenure as a freeholder or leaseholder in the survey.

Non-domestic building owners and occupiers wanted clear information about their share of upfront costs as well as information about timelines. Private sector non-domestic respondents were concerned about performance and reliability as well as potential disruption. They identified incentives and regulation as key to the successful implementation of heat network zones. There was evidence of varied levels of trust in local authorities to oversee and deliver local heat network zones.

Local authorities and public sector buildings

Local authorities are likely to be key partners in overseeing the delivery of heat network zones whilst public sector buildings with large heat loads may serve as anchor loads[5] for Heat networks. Representatives of these stakeholder groups took part in workshops but were not included in the survey phase.

The workshop findings suggest local authorities see themselves playing a strategic role in planning and overseeing heat network zoning, whilst also raising concerns about insufficient capacity within the public sector to deliver against the scale of the challenge. However, in the survey only 58% of private sector organisations agreed that they trusted their local authority to oversee heat network zones and local councils were ranked second and fourth, respectively, for being the most trusted source of information on Heat networks by social housing residents and domestic owner-occupiers.

Local authority and public sector building owners expressed support for the designation of areas as heat network zones. They identified connecting new developments and social housing as more straightforward than connecting privately owned buildings, with concerns about the complex ownership arrangements, including international investors, in the private sector.

Local authority representatives identified the scale of investment needed and the available timescale to deliver Heat networks at scale as key challenges. They wanted to know more about central government funding to deliver zoning policies. Workshop participants expressed doubts about the readiness of local leaders to look beyond short-term financial risks and reputational worries to oversee delivery of heat network zoning. Local authority representatives said that any zoning policy should be legally robust, offer guidance around retrofit, and be supported by other legislation, like gas boiler bans. They suggested the following would help to set expectations:

> *"…give building asset managers and the investment cycle an early heads-up that this is something that's coming your way." (Local authority representative)*

Clear, effective communication was identified by participants as important to support delivery of heat network zoning. Views differed around the need for mandatory connections, with some local authority representatives considering mandating an essential dimension of heat network zoning policy whilst other participants from the public sector felt that if a compelling economic

[5] Anchor loads are buildings with significant and consistent heat demands, which offer specific advantages in connecting to Heat networks and often are among the first to be connected.

case for heat network zoning with genuine low carbon credentials is developed, this would avoid the need for mandated connections.

Conclusions

In this conclusion section, we answer the research questions based on the findings. We caveat conclusions where available evidence is compromised by small sample sizes.

Do local authorities, building owners and residents understand heat decarbonisation and why it is necessary to decarbonise heat?

In workshops, local authority officers and public building owners demonstrated understanding of heat decarbonisation and its urgent necessity to achieve net zero targets. Survey results showed that non-domestic organisations and private and social housing domestic groups all recognise the importance of tackling climate change. However, there was low understanding of heat decarbonisation options among domestic owner-occupiers and owners of non-domestic buildings.

Both the workshop and survey findings showed that public and private sector building owners want to know that Heat networks offer the best value, most feasible way to decarbonise heat. The findings also show that local authorities, building owners and residents want to know that connecting to Heat networks will contribute towards net zero targets.

The overall results support a conclusion that heat decarbonisation is viewed as an important and attractive potential benefit of heat network zones amongst these different stakeholder groups (once they are made aware of these benefits). However, limited awareness of Heat networks amongst building owners and residents may hold back agreement that Heat networks are a potential way to decarbonise. Building owners and residents indicated that they want to be satisfied that Heat networks offer a cost-effective way to achieve heat decarbonisation.

To what extent would local authorities and eligible buildings in a Heat network Zone support zoning and connection to the heat network? Does this vary between building types?

“Eligible buildings” refers to those buildings likely to be required to connect as part of a zoning policy. The government consultation, in its proposals for heat network zoning, identified these to include all new buildings, large public sector buildings, large non-domestic buildings and large domestic buildings which already have communal heating or are undergoing major refurbishment[6].

Workshop and survey findings indicate that local authorities and the owners and occupiers of eligible buildings support heat network zoning where they are satisfied that a heat network is

[6] Proposals for heat network zoning. Accessed at: https://www.gov.uk/government /consultations/proposals-for-heat-network-zoning. 21/06/2022

the best and most cost-effective solution for decarbonisation in each area, compared to other low-carbon alternatives.[7]

The survey also identified that support is likely to be conditional on:

- Introducing heat network regulation
- Clear information being available about upfront costs, the connection process and timelines, security of supply, operation, and maintenance arrangements
- How associated costs are shared.

Evidence from workshops suggests that local authorities are more supportive of making connections to a heat network mandatory for new developments, large public buildings and social housing but have concerns about mandating connections for privately owned buildings.

Areas of pushback against mandatory connection which emerged from this research include:

- An argument that instead of a requirement to connect, there should be a strong demonstration of the economic case, low carbon credentials and suitability of a heat network for a given area so that it is an attractive option in its own right.
- Cases where insulation and other energy efficiency retrofit requirements for a building would mean a heat network connection would not be economically viable.

What are the views of domestic owner-occupiers and owners of non-domestic buildings that are currently out of scope of proposed requirement to connect?

The survey findings indicate that amongst both domestic owner-occupiers and private non-domestic buildings with small heat loads, 73% of respondents in both cases are willing to consider connecting to a heat network voluntarily, subject to their being satisfied that connecting to a heat network offers the best and most cost-effective solution for decarbonisation compared to other low-carbon alternatives.

What challenges do eligible buildings associate with creation of a Heat network Zone and subsequent connection to the heat network?

The four main types of challenges identified are: practical barriers; financial costs; user experience and regulation of the sector; and negative public attitudes, including doubts about lifecycle carbon emissions of Heat networks.

Practical barriers

Concerns about disruption, were raised in workshops with different stakeholder groups and in survey responses, particularly amongst social housing residents.

[7] There was too small a sample size to gauge views of developers and public sector building owners.

Eligible building owners and occupants identify disruption within the home, building and local vicinity as a challenge associated with creation of a heat network zone and subsequent connection. When making comparisons about alternative options for decarbonising heating in residential and non-domestic buildings, this should include consideration of the likelihood, scale and duration of disruption affecting residents and businesses in the affected area.

The workshops with social housing providers highlighted that the pepper-potting of freehold and leasehold properties within social housing estates or blocks may raise challenges for connection to a heat network. 90% of leaseholder respondents identified their expected contribution towards the connection costs as an important concern.

Financial costs

Survey responses by building owners showed a variety of concerns about upfront and ongoing costs, including concerns about fair sharing of costs.

User experience and regulation of the sector

The evidence from workshops showed that eligible building owners are concerned about the largely unregulated state of the heat network sector, centring around accountability of designers, builders, operators and suppliers, fears about unfair pricing, poor customer service and inadequate complaints processes.

The survey findings showed that non-domestic private sector building owners and occupiers are concerned about performance and reliability; increased costs; potential disruption and not being able to choose or change their heat network supplier.

Negative public attitudes

The workshops and open-ended responses to the survey showed that accounts of poor consumer experiences from older, inefficient Heat networks may harm public support for Heat networks. Relatively weak levels of trust in local authorities to oversee and deliver heat network zoning, as evident in the private non-domestic survey responses, present potential challenges to the delivery of Heat networks. Both workshop and survey results illustrate that eligible buildings want clear and effective communication about Heat networks.

What challenges do local authorities foresee with Heat network Zones and what do they consider is needed to ensure their successful implementation?

Local authority workshops revealed worries about the scale of financial costs involved for local authorities and a desire for information about what central government funding will be made available to them. The workshops also revealed concerns about tight timescales, weak supply chains in the UK, and insufficient local authority capacity to deliver the scale of work required. They raised concerns about the extent to which local authority leaders and financial controllers can overcome embedded cultural concerns about reputation and financial risks to take the necessary lead on new heat network zones. In workshops with local authorities and social landlords, we were told that local authorities, as social landlords, were also concerned to protect vulnerable residents from possible financial harm or harm due to disruption.

Evidence from the local authority workshops indicate that they consider the following to be needed to ensure successful implementation of heat network zones: effective financing arrangements; supporting legislation (e.g., a gas boiler ban); supportive planning policy; a legally defensible zoning policy; clear guidance around retrofit; and transparent arrangement for sharing the associated costs.

Amongst tenants and homeowners in the social housing sector, what considerations should be taken into account to minimise resistance to heat network connection?

An important message to emerge from the survey results was that overall levels of existing awareness and direct experience of Heat networks are low among social housing tenants and homeowners in the social housing sector. Information should be provided by trusted sources: survey responses indicate that well-known non-government organisations, the local council and national government and regulatory bodies, in descending order, are trusted as sources of information, whilst energy suppliers are least trusted. Feedback from residents with experience of living with a heat network was additionally identified as a valued way for residents to feel more confident about them.

The workshop and survey results suggest that, once informed about Heat networks, social housing tenants are likely to support their housing provider switching to a heat network. Homeowner concerns about the fairness of upfront costs they are asked to bear should be taken into account.

A longer list of considerations to minimise resistance amongst social housing residents, based on the workshop and survey findings, is provided in Chapter 6: Conclusions.

Who should cover the costs associated with heat decarbonisation and the implementation of Heat network Zones?

The research does not provide conclusive findings about who should cover the costs associated with heat decarbonisation and heat network zones. The findings do show this is a salient consideration which is likely to influence acceptance of Heat networks. More reliable findings may be achieved once more detail is available around the various types of costs involved. The discussions also revealed that views on ‘who should pay’ may be influenced by stakeholders’ views on the stated objectives, ownership arrangements and how a given heat network is run.

The interest of a majority of social housing resident survey respondents in individual metering suggests that some social housing residents would be willing to pay for running costs, provided they are affordable. In workshops, social housing residents also cited the example of landlords typically paying installation and replacement. This suggests that some social tenants would see these costs as the responsibility of the landlord.

The survey findings showed that:

- Social tenants expect responsibilities for paying costs to align with their own understanding of current arrangements, so they cover running costs, and their landlord covers installation and replacement costs.
- Owner-occupiers and homeowners in the social sector expect to pay towards running costs but vary in their willingness to cover installation and replacement costs. Financial assistance towards upfront costs, particularly for vulnerable and low-income customers, may be demanded.
- Private non-domestic building owners and occupiers expect costs to be allocated in a fair and transparent way, with building owners bearing some share of the costs alongside taxpayer contributions.

The workshop findings with public sector actors indicate that these stakeholders are likely to favour public taxation to recover the costs associated with the implementation of heat network zones on the basis that the public would share the benefits. However, these discussions were hampered by concerns that there was insufficient available information to fairly answer the question. This suggests that further information about costs and how these will be shared out will be an important consideration.

Chapter 1: Introduction

The Department for Business Energy and Industrial Strategy (BEIS) commissioned social research to inform the development and implementation of Heat networks zoning policy.

The project was led by the Centre for Sustainable Energy (CSE), working in partnership with ACE Research at the Association for Decentralised Energy (ADE) and SE2 Limited, while Qa Research administered the survey and produced data tables. The research took place between April and December 2021.

Aims and objectives

The overarching aim of this social research was to inform the development and implementation of heat network zoning policy by assessing the views, attitudes and perspectives of stakeholders who may be mandated to connect to Heat networks in future. It followed feasibility activity in six cities as part of the Cities Decarbonisation Delivery Programme (CDDP) (see below).[8]

The research had several sub-aims:

- Engage with a representative sample of building types and asset owners that may fall within potential heat network zones across the six cities.
- Identify key considerations underpinning attitudes towards heat decarbonisation (such as choice, cost, responsibilities, and carbon).
- Seek views on being part of a local solution versus an individual building solution to heat decarbonisation.
- Determine attitudes towards being mandated or encouraged to connect to a heat network and seek views on what information and evidence stakeholders would need to support heat network zoning.
- Identify what building owners and residents consider to be important concerns, risks and opportunities of heat network zoning.

Research questions

The key research questions (RQs) addressed by this project were:

- RQ1: To what extent would local authorities and eligible buildings in a heat network zone support zoning and connection to the heat network? Does this vary between building type?

[8] The 6 cities are Bristol, Birmingham, Greater Manchester, Leeds, Newcastle, and Nottingham.

- RQ2: What challenges do eligible buildings associate with creation of a Heat network Zone and subsequent connection to the heat network?
- RQ3: What challenges do local authorities foresee with Heat network Zones and what is needed to ensure their successful implementation?
- RQ4: Amongst tenants and leaseholders in social housing properties, what considerations should be taken into account to minimise resistance to heat network connection?
- RQ5: What are the views of owners of buildings that are currently out of scope?

In addition, two further research questions were considered during the analysis of results:

- RQ6: Do participants understand heat decarbonisation and why it is necessary to decarbonise heat?
- RQ7: Who should cover the costs associated with heat decarbonisation and the implementation of Heat network Zones?

Background

Heat networks offer a cost effective, technically viable infrastructure solution for decarbonising the heat required in UK buildings and industry. At present, most of the 14,000 Heat networks operational in the UK use gas as their fuel supply.[9] In future, both new and existing Heat networks can be connected to a low carbon form of heat generation with minimum disruption to large numbers of consumers. These low carbon forms of heat generation include large heat pumps, waste heat supplies and geothermal sources.

Heat networks can also serve wider energy system needs through helping to balance the electricity grid. Their ability to offer price stability and lower costs for households means they can help tackle fuel poverty and alleviate the health impacts associated with living in cold homes. They are also a tool for urban regeneration, boosting local economies through jobs created in their construction and operation, and transforming local organisations such as social housing providers or local authorities into local energy providers.

The current UK heat network policy landscape

Heat networks have been recognised as a low or no regrets decarbonisation solution for some time[10]. The government's *Net Zero Strategy: Building Back Greener,* [11] *Heat and buildings*

[9] BEIS (2018) *Energy Trends: March 2018, special feature article – Experimental statistics on Heat networks*. Available at: https://www.gov.uk/government /publications/energy-trends-march-2018-special-feature-article-experimental-statistics-on-heat-networks

[10] Element Energy and E4tec (2019) *Cost analysis of future heat infrastructure Options Report for National Infrastructure Commission. Available at:* https://nic.org.uk/app/uploads/Element-Energy-and-E4techCost-analysis-of-future-heat-infrastructure-Final.pdf

[11] HM Government (2021) *Net Zero Strategy: Building Back Greener*. Available at: https://assets.publishing.service.gov.uk/government /uploads/system/uploads/attachment_data/file/1033990/net-zero-strategy-beis.pdf

strategy[12] and *Opportunity areas for district heating networks in the UK*[13] report highlight their importance, particularly for dense urban areas. In addition, BEIS' *Transforming heating: an overview of current evidence*[14] re-emphasised the need for substantial, short-term growth in Heat networks.

The Committee on Climate Change's (CCC) analysis of alternative UK heat decarbonisation pathways[15] indicates that, to stay within our carbon budgets, 18% of heat supplied to buildings would need to be delivered through Heat networks by 2050. Heat networks also feature substantially in all National Grid ESO *Future Energy Scenarios*[16], with an expectation that up to five million homes will be connected to Heat networks by 2050.

Heat network zoning and the regulatory environment

Heat network zoning is recognised as an important tool to help support accelerated heat network development. Alongside the announcement of a new Heat network Transformation Programme (including a Green Heat network Fund focused on delivery of lower carbon heat supply solutions to Heat networks and a Heat network Efficiency Scheme (HNES) Demonstrator to support performance improvements to existing schemes), the UK government's *Energy White Paper: Powering our Net Zero Future*[17] committed to supporting local authorities to designate new heat network zones at the latest by 2025. BEIS' latest *Heat and buildings strategy* noted Heat networks as a "proven scalable option for decarbonising heat" and expanded on The Heat networks Transformation Programme.[18]

In addition, BEIS went out to consultation in 2020 for views on its preferred approach to regulation of Heat networks through *Heat networks: building a market*[19]. This highlighted the potential for greater use of zoning, concession arrangements, and the use of planning requirements to encourage or enforce connection. The exact approach and powers associated with designated zones remains to be determined: BEIS went out to public consultation on

[12] BEIS (2021) *Heat and buildings strategy*. Available at: https://www.gov.uk/government /publications/heat-and-buildings-strategy
[13] BEIS (2021) *Opportunity areas for district heating networks in the UK - National Comprehensive Assessment of the potential for efficient heating and cooling*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1015585/opps_for_dhnnca_hc.pdf
[14] BEIS (2018) *Clean Growth – Transforming Heating*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/766109/decarbonising-heating.pdf
[15] CCC (2018) *Analysis of alternative UK heat decarbonisation pathways*. Available at: https://www.theccc.org.uk/publication/analysis-of-alternative-uk-heat-decarbonisation-pathways/
[16] National Grid ESO (2020) *Future Energy Scenarios*. Available at: https://www.nationalgrideso.com/document/173821/download
[17] HM Government (2020) *Powering our Net Zero Future*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/945899/201216_BEIS_EWP_Command_Paper_Accessible.pdf
[18] BEIS (2021) *Heat and buildings strategy*. Available at: https://www.gov.uk/government /publications/heat-and-buildings-strategy
[19] BEIS (2020) *Heat networks: building a market framework*. Available at: https://www.gov.uk/government/consultations/heat-networks-building-a-market-framework

proposals for heat network zoning in England in October 2021[20] (see below). The introduction of heat network zones is expected to require new primary legislation.

Last year, Scotland made into law the Heat networks (Scotland) Act 2021 to support the growth of Heat networks in Scotland.[21] The Act introduces a new consent system, new rights for heat network developers and operators and a new licensing system to drive up standards and so improve consumer confidence in Heat networks.

Research into regulatory frameworks and options for heat network zoning

There is a growing body of evidence exploring regulatory frameworks and options for heat network zoning. Research undertaken by Frontier Economics for the CCC[22] recommended a local zoning approach with additional powers for local authorities, removal of competing subsidies, and requirements to connect for new-build and public buildings where cost-effective. More recent research from ClimateXChange[23] and BEIS[24] highlights the importance of heat network zoning and the role of mandatory connections within policy to provide investment assurance.

In 2020, the ADE published *Heat and Energy Efficiency Zoning: A framework for net zero for new and existing buildings*[25], a policy paper drafted in consultation with its members and external stakeholders to help set out the key issues and questions associated with zoning policy.

BEIS activity

The BEIS Heat networks Team, in collaboration with key stakeholders, are actively working to develop a heat network zoning policy for England by 2025 which will be informed by a Heat network Zoning Pilot Project. This pilot will be undertaken in 2022 across circa 28 cities and towns in England and will focus on four main work-stream areas: 1. Policy, 2. Data, 3. Methodology and 4. Implementation.

Heat network Zoning Policy and the main Pilot Project have been informed by preliminary zoning investigation work conducted in 2020/21 across six cities (Birmingham, Bristol, Greater

[20] BEIS (2021) *Proposals for heat network zoning*. Available at: https://www.gov.uk/government /consultations/proposals-for-heat-network-zoning
[21] Heat networks (Scotland) Act 2021. Available at: https://www.legislation.gov.uk/asp/2021/9/section/1/enacted
[22] Frontier Economics (2015) *Overcoming Barriers to District Heating*. Available at: https://www.theccc.org.uk/wp-content/uploads/2015/11/Frontier-Economics-for-CCC-Research-on-district-heating-and-overcoming-barriers-Annex-1.pdf
[23] ClimateXChange (2018) *Lessons from European regulation and practice for Scottish district heating regulation.* Available at: https://www.climatexchange.org.uk/research/projects/lessons-from-european-regulation-and-practice-for-scottish-district-heating-regulation/
[24] BEIS (2020) *International Heat networks: market frameworks review*. Available at: https://www.gov.uk/government /publications/international-heat-networks-market-frameworks-review
[25] The ADE (2020) *Heat and Energy Efficiency Zoning: A framework for net zero for new and existing buildings*. Available at: https://www.theade.co.uk/assets/docs/resources/Heat_and_Energy_Efficiency_Zoning_A_framework_for_netzero_for_new_and_exisiting_buildings-min.pdf

Manchester, Leeds, Newcastle and Nottingham) as part of the Cities Decarbonisation Delivery Programme (CDDP) during 2020/21.

The results of both the Heat network Zoning Pilot Project and this research will inform wider heat network zoning policy development in England.

Heat network stakeholders' attitudes, views, and perceptions: a summary of key research

In framing and designing this specific study into heat network zoning, the project team conducted a brief literature review of a range of research covering consumer attitudes and behaviour change, barriers to and actors involved in Heat networks.

However, there is very limited existing UK evidence of stakeholders' attitudes, views, and perceptions on heat network zoning due to this being an emerging policy area. International research brings some insights from other European countries' use of zoning policies, but these are predicated by being set in a policy environment and amid social attitudes which may be different to those of the UK.

The research considered by the team has been summarised below.

Zoning and mandated connections

General barriers to Heat networks have been explored in some detail in various social research studies before but without any specific focus on heat network zoning as a policy tool.

Research into barriers to deployment of district heating networks[26] delivered interviews with 63 stakeholders across 44 existing, planned and failed (planned but did not proceed) heat network schemes. Several interviewees called for connections to be mandated for public buildings to reduce connection risk.

A large-scale qualitative study in 2016 by Sheffield Hallam University explored the role of actor-networks in the early-stage mobilisation of low carbon Heat networks[27] in five cities, four of which were subsequently involved in the CDDP study[28]. One of the key policy recommendations was a call for a strengthening of planning authorities' resources and powers to mandate connections.

[26] Department of Energy & Climate Change (2013) *Research into barriers to deployment of district heating networks*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/191542/Barriers_to_deployment_of_district_heating_networks_2204.pdf

[27] Ambrose, A., Eadson, W., and Pinder, J. for Sheffield Hallam University, (2016) *The role of actor-networks in the early stage mobilisation of low carbon Heat networks.* Available at: https://shura.shu.ac.uk/12415/40/Ambrose-RoleActor-Networks%28VoR%29.pdf

[28] The cities involved in the Pioneer Cities project were Leeds City Region, Greater Manchester City Region, Newcastle upon Tyne, Nottingham and Sheffield.

District heating: Delivering affordable and sustainable energy[29] focused specifically on the experiences, benefits and barriers to Heat networks amongst social housing providers (SHPs) and their tenants across England and Wales. With Heat networks' monopoly status, and the disproportionately higher numbers of low income and vulnerable householders living in social housing, the research examines SHPs' attention to affordability, sustainability and regulatory drivers when deploying Heat networks in their housing stock.

The research features several case studies, including schemes in London in which developers had installed new Heat networks or connected to existing ones in response to London Plan policies, which require developers to prioritise connections to existing or planned decentralised energy networks by means of a heating hierarchy. The report recommended revising national and local planning policies to support the growth of Heat networks and encourage suitable connections to wider networks.

Consumer attitudes, views and perceptions

The *Heat networks Consumer Survey*[30] for BEIS found that heat network consumers were just as satisfied with their heating systems as non-heat network consumers. Issues of dissatisfaction arose around control, interruptions, billing and perceptions of over-pricing. Subsequent qualitative research with consumers and operators of Heat networks[31] explored the experiences and views of stakeholders of existing heat network schemes around these areas of concern. A clear message from the research was support amongst both consumers and operators for increased regulation to protect consumer interests due to Heat networks being a natural monopoly.

Citizens Advice's *Consumer Expectations of Regulation: Heat networks*[32], which used focus groups with consumers of existing heat network schemes across the UK to understand attitudes towards Heat networks, similarly concluded that all consumers wanted reliable, affordable heating and good service.

The UK Climate Assembly final report, *The path to net zero*[33] illustrated that when presented with data and explanations of technologies, the public understood the pros and cons of different options for decarbonising heat in homes (including heat pumps, hydrogen and Heat networks). Whilst 80% of participants agreed that Heat networks should be a part of how the

[29] Changeworks, (2017) *District heating: Delivering affordable and sustainable energy – research report.* Available at: https://www.changeworks.org.uk/sites/default/files/District_heating_delivering_affordable_and_sustainable_energy_report.pdf
[30] BEIS (2017) *Heat networks Consumer Survey*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/665444/HNCS_Executive_Summary_-_FINAL.pdf
[31] BEIS (2018) *Qualitative Research with Consumers and Operators of Heat networks*. Available at: https://www.cse.org.uk/downloads/reports-and-publications/fuel-poverty/insulation-and-heating/energy-justice/building-performance/qualitative-research-with-consumers-and-operators-of-heat-networks-dec-2018.pdf
[32] Citizen's Advice (2018) *Consumer Expectations of Regulation: Heat networks*. Available at: https://www.citizensadvice.org.uk/Global/CitizensAdvice/Energy/Energy Consultation responses/Citizens Advice Heat networks V2.0 (2).pdf
[33] Climate Assembly UK (2020) *The path to net zero: Full report*. Available at: https://www.climateassembly.uk/recommendations/index.html

UK gets to net zero, there was also overwhelming emphasis on choice: over 94% agreed that areas should be able to choose the technologies best suited to their needs.

BEIS' quarterly Public Attitude Tracker in December 2020[34] indicated that under three in ten people (28%) have currently heard of Heat networks, but amongst those that have heard of them, six in ten (60%) would be likely to join one if given the opportunity. This suggests substantial work remains in raising awareness of Heat networks and their benefits amongst local consumers as part of the development of local heat network zoning policy.

The Energy Systems Catapult Smart Systems and Heat programme undertook consumer research looking at household heating choices and the implications for decarbonisation[35]. This study found that consumers are attracted by the idea of buying a service, like a warm home, instead of buying kilowatt hours (kWh) of fuel but they also want to feel able to trust energy service providers to simplify the solutions for heating upgrades.

Conclusions

The literature review indicates that heat network consumers generally have positive attitudes to Heat networks. Consumers expect to be able to rely on a network to provide affordable heat and want better regulation of the natural monopoly sector. There remains an important challenge to raise public awareness of Heat networks.

From a heat network developer and supplier perspective, stakeholders are keen to support the deployment of Heat networks to meet affordability, sustainability, and regulatory drivers. Recommendations from previous research have called for a strengthening of planning authorities' resources and powers to mandate connections to reduce connection risk.

This social research report provides new evidence about stakeholder attitudes to heat network zoning, crucially including the views of homeowners and social renters living in buildings which are not currently on a heat network, but that could be connected to one in the future. Therefore, this research looks to explore the desirability of Heat networks and understand the barriers and opportunities as part of heat network deployment in heat network zones, which will then inform the development and implementation of future Heat networks zoning policy.

Methodology

This research consisted of three main activities:

- The development of a sampling approach to explore a wide range of views and experiences from key identified stakeholder groups

[34] BEIS (2021) *Public Attitudes Tracker (December 2020, Wave 38, UK).* Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/959601/BEIS_PAT_W36_-_Key_Findings.pdf

[35] Energy Systems Catapult (2018) *SSH1: How Can People Get The Heat They Want At Home, Without The Carbon?* Available at: https://es.catapult.org.uk/report/ssh1-how-can-people-get-the-heat-they-want-at-home-without-the-carbon/

- Deliberative workshops and surveys with stakeholder groups.
- Analysis and synthesis of results.

A full methodology and all materials used in this research are presented in the Technical Annex that accompanies this report.

Research participants

Participants were recruited from six trial cities - Birmingham, Bristol, Leeds, Manchester, Newcastle and Nottingham – and the stakeholder groups detailed in Table 1.

Research phase	Stakeholder group represented
Deliberative workshops only	Local authority representatives Landlords or managers of public sector non-domestic buildings Housing developers Social housing providers
Deliberative workshops and survey	Social housing tenants Homeowners in social housing sector Private sector non-domestic buildings with ≥100 Megawatt hour (MWh) annual heat load – building owner or occupier Private sector non-domestic buildings with <100 MWh annual heat loads – building owner or occupier
Survey only	Domestic owner-occupier

Table 1: Stakeholder groups in each research phase

The deliberative workshops enabled small-group discussion amongst individuals with similar circumstances or professional backgrounds. A lack of contact information prevented the inclusion of domestic owner-occupiers in the deliberative workshops within the study timeframe. However, this group was included within the surveys to enable the collection of larger numbers of responses from owners and occupiers of both domestic and non-domestic buildings. Other stakeholder groups were too small for a survey to be appropriate.

Sampling approach

Preliminary heat network zoning investigation work undertaken as part of the CDDP produced a dataset of buildings in Birmingham, Bristol, Greater Manchester, Leeds, Newcastle, and Nottingham. These buildings were identified as potentially eligible to connect to Heat networks in possible heat network zones within those cities. The data fields included property addresses, annual heat load, building use and housing tenure for each building. We used this dataset to as a sampling frame for the survey and to identify potential invitees for the deliberative workshops. For the surveys, random samples of addresses were drawn for each of the main sample groups resulting in a combined set sample of 14,500 domestic and non-domestic addresses.

Fieldwork

Deliberative workshops

We invited individuals from target stakeholder groups to facilitated workshops to explore participants' knowledge and attitudes to Heat networks. At an hour-long introductory workshop participants were given headline information on climate change and heat decarbonisation, Heat networks and zoning policy. This gave participants a chance to gain sufficient understanding, ask questions and gain some familiarity with others ahead of their subsequent participation in a two hour-long deliberative workshop. These were organised by stakeholder group, bringing together people with a shared 'identity' in terms of how they would potentially be involved in a heat network. Table 2 shows the number of workshop participants recruited by stakeholder group. There were four introductory workshops across all six groups. Further detail on workshop recruitment figures is provided in the Technical Annex.

Stakeholder group	Number of deliberative workshops	Number of participants
Local authorities	2	11
Social housing providers	1	6
Social housing tenants and homeowners	3	15
Private sector non-domestic building owners	1*	3
Public sector non-domestic building owners	1	3
Developers	1*	2
Total	8	40

Table 2: Workshop recruitment figures

* Due to small numbers, one deliberative workshop was held for private sector non-domestic building owners and developers together.

Stakeholder surveys

Survey questionnaires were tailored for each of the four sample survey groups (see Table 3) to collect quantitative data about knowledge and attitudes to Heat networks. The question development drew on the workshop findings and questions used in previous related wider research, including rolling consumer attitudes surveys. The survey pack for each sample group comprised an invitation letter, privacy notice, participant information sheet and eight-page postal questionnaire, with a push-to-web link address provided in the cover letter. Table 3

shows the number of survey responses for each stakeholder group. Further detail on survey response statistics is provided in the Technical Annex.

Survey	Stakeholder group	Number of responses	Response rate
1	Private sector non-domestic buildings with large (≥100 MWh) annual heat loads	67	2%
2	Social housing tenants	125[36]	5%
2	Social housing homeowners	48	5%
3	Private sector non-domestic buildings with small (<100 MWh) annual heat loads	112	3%
4	Domestic owner-occupiers	337[37]	7%

Table 3: Survey response statistics

Analysis and reporting

Workshop summaries for each stakeholder group were written up from notes, saved poll results and video recordings. Thematic summaries drew on these summaries. Data Ts showing the anonymised survey results for each sample group are published alongside this report. Due to the small total number of responses, the results from the large and small annual heat load non-domestic surveys were combined. Results with statistically significant differences in responses by large and small non-domestic buildings were reported separately as were responses to questions which only applied to one of the groups. At an interim workshop, BEIS staff had an opportunity to hear about and ask questions about findings and identify areas of interest to cover for heat network policy development.

[36] 150 participants identified as tenants. Of these 150 participants, 125 identified as renting from a council/housing association. A further 25 participants identified as renting from a private landlord and another four were recorded as having shared ownership, or as living rent free in another person's property. Therefore, 29 cases were excluded from the analysis due to being out of scope of this research.

[37] The following participants responded to the owner-occupier survey but were excluded from the analysis in Chapter 3:15 households who self-identified as private renters, 4 social housing tenants, 1 shared ownership and 1 living rent-free in another person's property.

Limitations

Uneven recruitment by city across the different stakeholder deliberative workshops was a limitation of this research. Low numbers of public sector building owners, developers and private sector building representatives participated in the workshops. This means the views of those who participated in the workshops may not reflect the full range of views of the wider stakeholder groups represented or differences in experience and views in each of the cities. The workshop findings are still useful in highlighting some of the issues requiring further research and policy attention.

The numbers of survey responses, particularly for private sector non-domestic buildings and social housing residents, were low. The low numbers of responses and self-selection bias of respondents, particularly for non-domestic buildings and for homeowners in the social sector limits the generalisability of the findings within proposed heat network zones. However, the survey findings are still useful in highlighting areas of interest for further research and consideration by policy makers.

This study did not collect data on the views of private landlords regarding heat network zoning. There is different legislation concerning the private rented housing sector so we agreed with BEIS that it would be better to investigate the views of private landlords in the domestic sector separately.

Structure of the report

The main findings are presented by sector and type of building for connection to a heat network. Each chapter reports findings from the workshop and the survey (if applicable) with discussion of what the research highlights for policy attention.

- Chapter 2: Social Housing
- Chapter 3: Owner-occupied homes
- Chapter 4: Private non-domestic buildings
- Chapter 5: Local authorities and public sector buildings

These are followed by a complete set of conclusions. A technical annex accompanies this report.

Chapter 2: Social Housing

Context

There are 4.19 million households in social housing in England, with 2.4 million located in cities[38]. shows the number of social housing and leaseholder property addresses across the six trial cities. Whilst social housing dwellings only comprise 17% of dwellings in England, a high proportion of dwellings connected to Heat networks are social housing tenure[39,40]. Therefore, social housing is likely to be a target for both the development and refurbishment of heat network projects.

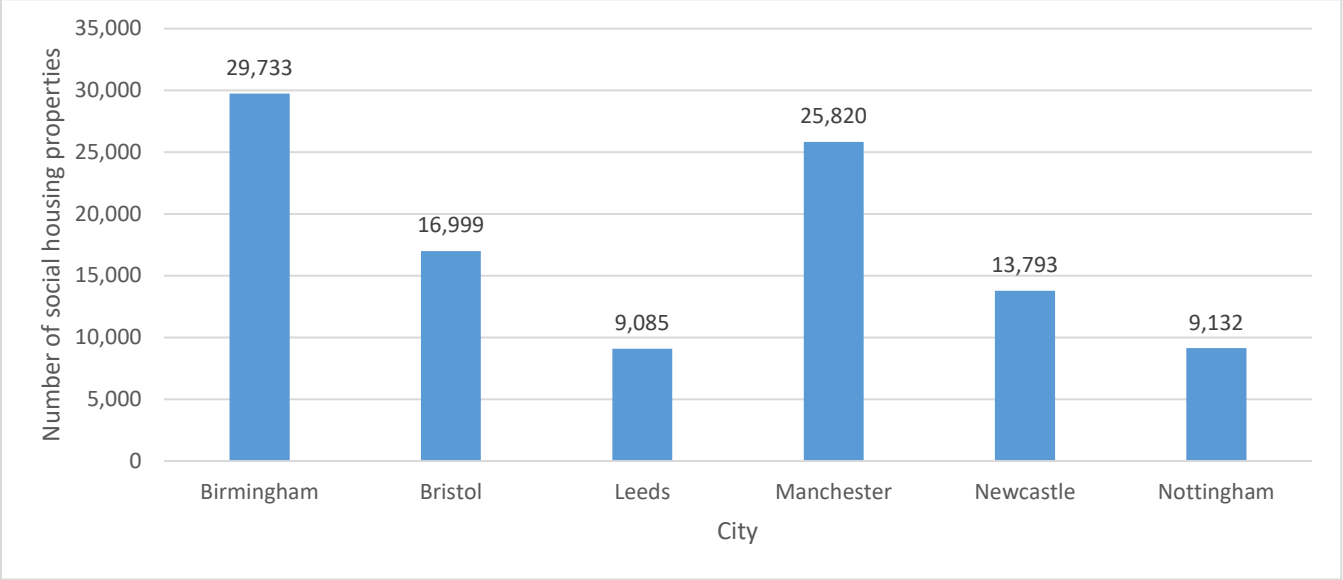

Figure 1: Number of social housing properties across the six trial cities

Existing research shows that around 300,000 social housing units are connected to Heat networks, representing two-thirds of all domestic heat network connections[41]. Heat network customers in social housing are less likely to have individual meters. The Heat network (Metering and Billing) Regulations[42] introduced requirements which has led housing providers to install individual meters where feasible.

[38] CSE internal analysis. Owner occupied status sourced from Experian data and buildings were counted as being in a city if within local authority classification.
[39] ONS (2022) Subnational estimates of dwellings and households by tenure, England: 2020. Available at: Subnational estimates of dwellings and households by tenure, England - Office for National Statistics (ons.gov.uk)
[40] BEIS (2017) *Heat networks Consumer Survey*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/665447/HNCS_Results_Report_-_FINAL.pdf
[41] CMA (2018) *Heat networks market study: Final report*. Available at: https://assets.publishing.service.gov.uk/media/5b55965740f0b6338218d6a4/heat_networks_final_report.pdf
[42] Gov.uk (2014) *Heat network (Metering and Billing) Regulations*. Available at: https://www.gov.uk/guidance/heat-networks

A key challenge in relation to Heat networks in social housing is fuel poverty. As of 2021, 23% of all fuel poor households in England live in social housing: around 730,000 households[43]. The majority of these households live in homes with an energy efficiency rating of Band D[44]. The government's fuel poverty strategy for England[45] aims to ensure that as many fuel poor homes achieve a minimum energy efficiency rating of Band C by 2030.

Another issue is "pepper-potting". Social housing is often understood to be concentrated into blocks all managed by a single provider. This view of social housing as homogenous can lead to assumptions that it should be relatively easy (compared to, for example, the owner-occupied sector) for social housing providers to improve the energy efficiency, or decarbonise the heating, of their housing. The reality is more complex. Through the Right to Buy scheme, introduced in 1980, 2.2 million homes in England have been transferred to private ownership[46][47]. One of the impacts of Right to Buy is that housing tenure is now "pepper-potted" through estates or blocks; blocks are a mix of social rented, owner occupied (both freehold and leasehold), and privately rented. This makes retrofit or infrastructure projects more complex in terms of consultation, cost allocation and project management and delivery. In many cases, leaseholder relationships remain between the resident and the social housing providers, which set out how responsibilities and costs should be allocated.

There are around 1,700 social housing providers in Great Britain[48], with stock ranging from fewer than 10 homes to more than 50,000. There is a diversity of expertise and capacity to address energy efficiency and decarbonisation. Some larger providers have in-house capacity to manage projects, but few have dedicated heat network teams.

Workshop findings

Attitudes towards Heat networks

Almost all participants in the introductory workshops felt that climate change was an extremely urgent issue. There was broad shared enthusiasm for Heat networks as an attractive option for decarbonisation, but only after participants had been provided with information about Heat

[43] BEIS (2021) *Annual fuel poverty statistics report:2021*. Available at: https://www.gov.uk/government /statistics/annual-fuel-poverty-statistics-report-2021
[44] Committee on Fuel Poverty (2021) *Committee on Fuel Poverty: Interim Report July 2021*. Available at: https://assets.publishing.service.gov.uk/government /uploads/system/uploads/attachment_data/file/998436/committee-on-fuel-poverty-interim-report-2021.pdf
[45] BEIS (2021) *Sustainable warmth: protecting vulnerable households in England*. Available at: https://www.gov.uk/government /publications/sustainable-warmth-protecting-vulnerable-households-in-england
[46] Gov.uk (2021) *Live tables on social housing sales*. Available at: https://www.gov.uk/government /statistical-data-sets/live-tables-on-social-housing-sales.
[47] The Right to Buy in England was extended to social housing tenants as part of the Housing and Planning Bill in 2016. The Right to Buy was abolished in Wales and Scotland in the late 2010s.
[48] 1,624 in England (Register of Social Housing: https://assets.publishing.service.gov.uk/government /uploads/system/uploads/attachment_data/file/1027024/RP_statistic_2020-21_briefing_note_v1.0__FINAL_.pdf); 36 in Wales (Welsh government : https://gov.wales/registered-social-landlords); and 505 in Scotland (Scottish Housing Regulator: https://www.housingregulator.gov.scot/landlord-performance/national-reports/covid-19-dashboards/full-quarterly-returns-data-set-from-all-landlords-from-april-2021)

networks. Participants expressed recognition of the need to decarbonise heat supplies, and that Heat networks are an important way to do so.

> *"It's either Heat networks or something else; status quo is not an option." (Social housing provider)*

Social housing residents participating in the workshop expressed a positive attitude towards Heat networks and the idea of being connected to one.

Views on suitability of Heat networks for social housing

In their respective workshops, social housing providers and residents alike considered that Heat networks are a suitable option for social housing and felt generally supportive and positive about connecting to a heat network.

In workshops with local authority representatives, most participants considered that social housing is an ideal candidate for heat network zoning. Most agreed that the potential for economies of scale in zoning could help to deliver savings to vulnerable residents in fuel poverty.

Concerns about suitability of Heat networks for social housing included the issue of mixed tenure, challenges of the low density and geographical spread of social housing in some areas and reservations about choosing a whole-building solution over a property-specific solution (i.e. heat pumps).

Views on potential benefits and challenges of connecting to a heat network

Social housing provider participants identified the main benefits of connecting to a heat network as addressing fuel poverty, improving wellbeing and safety, and achieving carbon savings in the social housing sector.

Considering improved safety, social housing provider participants identified the safety of Heat networks as a benefit as compared to in-home gas boilers or electric storage heaters. This group also highlighted that enhanced safety could lead to savings to landlords through reduced compliance costs (e.g. reduced need for gas safety checks).

Social housing resident participants identified a range of potential benefits from being on a heat network including lower fuel bills and benefits for climate change, air quality and the environment. They also felt that Heat networks could provide a wake-up call to energy suppliers about price increases since summer 2021, as well as helping to make residents more aware of how they use energy.[49]

[49] More recently, there has been press coverage of the effects of rising gas prices on Heat networks. https://www.theade.co.uk/assets/docs/nws/ADE_Briefing_-_Options_for_HN_customers_during_gas_crisis_v1.2_.pdf

Social housing providers and residents in the workshop identified the current lack of regulation as a key barrier to heat network uptake. They also highlighted the general disruption caused by installing a heat network.

Social housing resident participants identified concerns about cost and that many residents are resistant to change as challenges to the readiness of social housing residents to connect to a heat network. Some said they were distrustful of claims that Heat networks would be cheaper and perform to a good energy-efficiency standard, contributing to worries about change and their readiness to trust claims about the promised benefits of Heat networks. Some resident participants expressed concerns about metering and billing arrangements not being made sufficiently clear to residents. In discussions about potential challenges, participants in the residents' workshops voiced concerns about disruption to homes during installation, not having a choice over their supplier and worries about the adequacy of consumer protection arrangements.

> *"Whoever your company is, if you're cheesed off with them, you can move onto someone else. We lose that. If you sign up, you lose that. Where do you go?" (Social housing resident)*

In their respective workshops, social housing providers, social housing residents and local authority representative participants raised concerns that actual or perceived poor energy performance of connected buildings, such as those lacking insulation, could be a significant barrier to the success of a potential heat network. Social housing provider and resident participants stressed that historic bad press around older, inefficient systems, problems with poor billing or lack of individual heating controls, has harmed the public reputation of Heat networks. They identified that, combined with more a general resistance to change from residents, the variable reputation of older existing Heat networks may mean some providers and residents may not support having their buildings connected to new Heat networks.

Views on encouraging support for connecting social housing to a heat network

Social housing provider participants considered that it is important to communicate clearly about Heat networks and their benefits to consumers to achieve their buy-in and overcome resistance to change.

Both social housing providers and residents in the workshop considered that clear communication with residents about what connecting to a heat network will mean for them would encourage support. Participants in both workshops felt that such communication should begin as early as possible and continue through the various stages of connecting social housing to a heat network. When asked about what sort of things residents would want to hear about, responses across the workshops included metering and billing arrangements, security of supply, maintenance and repairs responsibilities and advice for residents on how to operate any in-home controls associated with the heating and hot water to their home. Other suggestions of ways to build trust and support included social housing provider staff training and having an independent third party play a role in ensuring good practice and effective communications.

User experience was identified by both social housing providers and residents in the workshop as a factor shaping support for connecting social housing to a heat network. In their respective workshops, participants from both groups highlighted that adjusting to a new way of using heating would be difficult for some heat network customers.

Resident participants were sceptical about the quoted figure that heat network customers would be £100 better off compared to consumers with individual gas boilers[50]. This group wanted more detail about what costs this calculation included.

Views on the role of the local authority

Participants in the social housing provider workshop recognised that local authorities are likely to have important roles to play both in strategic planning of Heat networks and as potential heat network owners and suppliers. There was a broadly shared view that local authority ownership of Heat networks would be a key supporting factor towards gaining building owners' consent to connect to a heat network. Social housing providers in the workshop also identified local authorities as having a vital role in ensuring sufficient funding is accessed to cover the costs associated with connecting to a heat network. However, participants also mentioned that local authorities across the country have varying resources, capacities, and capabilities to steer the planning and delivery of heat network zoning in their area. The discussion also highlighted that large social housing providers will need to work with multiple local authorities nationally.

Views on funding, costs and who should pay

Social housing providers in the workshop raised concerns about the cost of connecting to a heat network for households, especially those with newly installed heating systems. Social housing provider participants also shared the view that social housing residents should not bear the installation and replacement costs for a mandated solution.

Social housing resident workshop participants discussed whether costs should be directly borne by landlords, fully or partially passed on to residents or publicly funded. In one workshop, participants suggested that the landlord should take on the installation and maintenance costs for Heat networks, based on their understanding of the current arrangement, whereby their landlord pays for gas boiler installation, maintenance, and replacement costs. Social housing residents were opposed to funding heat network costs through council tax.

> *"Sticking it on council tax – that's never doing to go down well…" (Social housing resident)*

[50] Refers to a finding in the Heat networks Consumer Survey (2017) which suggested that "heat network consumers paid, on average, around £100 less for their heating and hot water compared with non-heat network consumers".

Views on mandatory connections

Most participants in the social housing provider workshop supported mandatory connections. However, this support was subject to certain conditions. Some participants felt that appropriate incentives for connecting would need to be offered. Some wanted a guarantee that connecting to a heat network would be the lowest carbon and cheapest heating provision option. There was consensus that strengthened regulation of the sector would contribute to greater support for the introduction of mandatory connections.

> "*Without regulation, mandatory connection is still a non-starter." (Social housing provider)*

Some participants noted the need for exemptions for less suitable older buildings where it would not be economically viable to undertake the necessary retrofit work to make them suitable to connect.

Social housing residents participating in the workshops were not asked their views on mandatory connections as any requirement would apply to the building owner rather than its occupants.

Views on regulation of sector

Social housing providers in the workshop identified the current lack of regulation of Heat networks as the single most important barrier to heat network development, uptake of heat network connections and support for heat network zoning.

Resident participants were also concerned about a lack of robust regulation in the heat network sector. Social housing providers and residents in the workshop both voiced concern that this could lead to customers suffering from unfair pricing or inadequate support and accountability when repairs were needed. There was also agreement that the 'lock-in' to a natural monopoly heat supplier would be unpopular with a lot of end-users.

Retrofit requirements

Social housing provider workshop participants considered it important to better understand the energy efficiency of older buildings before undertaking retrofit works so that connecting to a heat network brings real performance and cost saving benefits.

Social housing provider participants mentioned that coordination and collaboration between different building owners and others involved in retrofitting presents an important challenge requiring consideration.

Social housing resident participants drew on anecdotal examples from reported experience of poorly insulated buildings connected to Heat networks. These included an example where heat transfer through poorly insulated party walls caused problems for neighbours.

Survey results

There were 125 survey responses from social housing tenants[51] and 48 from respondents who identified themselves as owning the leasehold or freehold to their social housing properties. Due to the limited number of respondents in the homeowners group, a few results have been presented with caveats even though they are not statistically significant but are important to understanding the social housing group.

Attitudes to climate change and Heat networks

Social housing tenants

Social housing tenant survey respondents were asked how concerned they were about climate change. Eight in ten reported that they were either very (45%) or fairly concerned (36%). This aligns with reported levels of concern across the UK population (80%)[52].

When social housing tenants were asked about their overall view of Heat networks, based on their existing knowledge, 26% reported a positive view and 7% reported a negative view of them. Awareness of Heat networks amongst social housing tenants was fairly low: one third (34%) of social housing tenants said they had never heard of Heat networks and a further 16% answered 'don't know'. After being given more information on Heat networks, six in ten (62%) social housing tenants said that they would support their housing provider switching to a heat network, whilst just over one in ten (12%) were opposed[53]. One social housing tenant commented in response to an open question in the survey: *"Fantastic idea! It's about time we were doing this."*

One in ten social tenant respondents reported that they had ever lived in a home connected to a heat network. This is aligns with industry-reported data on rates of social housing connected to a heat network[54].

Homeowners in the social sector

The limited number of social housing survey respondents who identified themselves as homeowners had high levels of concern about climate change: 94% of respondents reported being very or fairly concerned.

---

[51] 29 respondents did not fall into either the social housing tenant or homeowner stakeholder group as they reported being private renters, having shared ownership, or as living rent free in another person's property. These respondents were removed from the analysis due to being ineligible.

[52] BEIS (2021) *Public Attitudes Tracker (March 2021, Wave 37, UK*). Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/985092/BEIS_PAT_W37_-_Key_Findings.pdf

[53] Survey respondents were instructed to assume that should their housing provider switch to a heat network, they would pay no more than at present and that the heat supply would be from renewable sources.

[54] ADE analysis of data from the Office of National Statistics indicates that 1.6% of all UK dwellings are connected to a heat network (ONS (2021) *Families and Households in the UK: 2020*. Available at: https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/families/bulletins/familiesandhouseholds/2020). Industry data produced by National Housing Maintenance forum shows that as much as 10% of the housing stock of some social housing providers are on a heat network (National Housing Maintenance Forum (2020) *Heat network (Metering and Billing) Regulations 2014 – Amendments November 2020*. Available at: https://www.nhmf.co.uk/article/heat-network-metering-and-billing-regulations-2014-amendments-november-2020).

The results from homeowners in the social sector were very similar to those of tenants: awareness was generally low but those who expressed a view on Heat networks were mainly positive and when asked if they would be supportive of their housing provider switching to a heat network after being given more information about Heat networks, a majority were supportive.

Information needs and trusted sources of advice

Survey respondents were asked about what they would want to know more about to feel confident that connecting to a heat network was the right choice for their home. As shown in Figure 2, the three most common responses from social housing tenants were: easy-to-control heating (71%), repairs are done quickly (70%) and yearly heating costs are the same or less than for current heating system (67%). Homeowners in the social sector also rated these same three topics as those they would like to know more about. In addition, homeowners wanted to know more about reasonable service charges, uninterrupted heat supply and fairly shared costs. Irrespective of tenure, those resident in social housing would like to know more about whether heating would be metered.

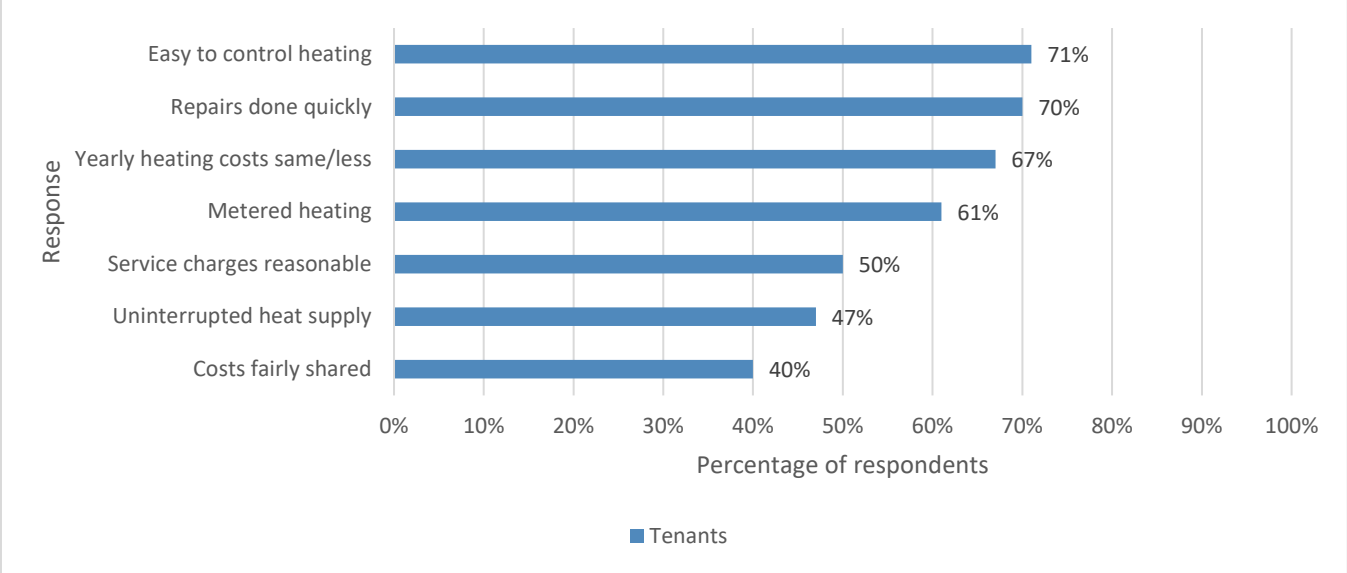

Figure 2: What social housing tenants would want to know more about to feel confident about connecting their home to a heat network

Survey respondents were also asked who they would trust to provide information and advice about connecting to a heat network.

Amongst social housing tenants in the survey, non-government organisations e.g. Energy Saving Trust (40%), the local council (37%), or national government e.g. BEIS, Ofgem (32%) were most trusted. Homeowner respondents said that they would most trust both national government and non-government al organisations as well as a government -backed advice service to provide information about connecting to a heat network. Energy suppliers were the least trusted type of organisation to provide such information and advice in responses by social housing tenant and homeowner respondents.

One social housing tenant commented that it *"…would promote confidence to hear/see feedback from groups who have experienced the conversion and who have experienced the heating system for some years."*

Current heating systems and suppliers

Social housing tenants

Nearly two-thirds of social housing tenant respondents (62%) said they used a gas boiler as the main method to heat their home. One in ten also said they used electric radiators to heat their home.

Just under half (47%) of social tenant respondents said that they had switched energy providers in the past, in line with the UK average[55]. Just under half (48%) of social tenant respondents agreed that they want to be able to switch their heating and hot water supplier.

Homeowners in the social sector

71% of social homeowners reported that they had switched suppliers at any time in the past, significantly more than the proportion of social housing tenants (Figure 3).

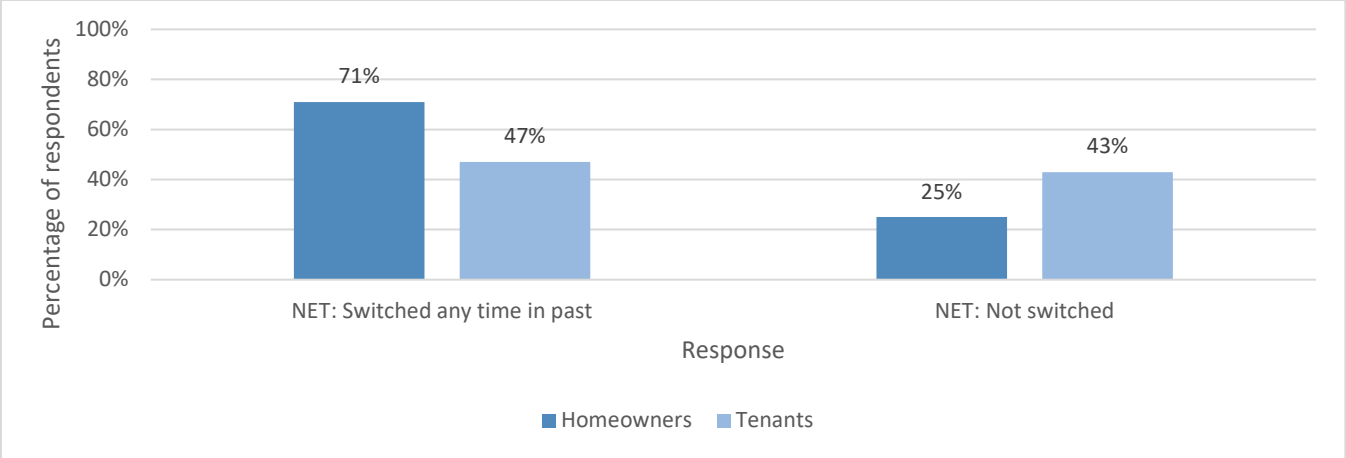

Figure 3: Rates of switching energy provider across the social housing sample

Benefits of connecting to a heat network

Social housing tenants in the survey were asked to rate the importance to them of a list of benefits of Heat networks. The benefits rated most frequently as very or fairly important were lower heating costs to help to reduce fuel poverty (79%) and a safe and reliable heat supply (78%).

The benefits rated most as very or fairly important by social homeowners were a safe and reliable heat supply (96%), heating bills were the same or lower (90%) and lower heating costs to help reduce fuel poverty (90%). One homeowner also commented that it would be a benefit if Heat networks were *"transparently managed to protect consumers from unfair practices."*

[55] Ofgem (2021). *Household Consumer Perceptions of the energy market*. Available at: https://www.ofgem.gov.uk/sites/default/files/2021-06/consumer_perceptions_of_the_energy_market_q1_2021_v1.pdf

These findings reflect evidence from workshops suggesting that social housing stakeholders (residents and providers) rated the following issues as important: addressing fuel poverty, improving health, wellbeing and safety for residents and achieving carbon savings in the social housing sector.

Results also highlight the importance of lower costs as benefits of Heat networks. A strong majority of both social homeowners and tenants ranked similar or lower heating bills as a key benefit of Heat networks. This is supported by survey results showing that social housing respondents have low household incomes and the high levels of concern about energy affordability. These survey findings fit with findings from the workshops with social housing providers, who identified potential fuel bill savings for residents as an important benefit, helping to address fuel poverty. These findings suggest that support for Heat networks in the social housing sector is likely to be dependent on raising confidence in fuel cost savings.

Concerns about connecting to a heat network

Social housing tenants

Survey respondents were asked to rate how important potential concerns about connecting to a heat network were for them (see Figure 4). The concern rated as very or fairly important by most social housing tenants was regulation of Heat networks (81%).

Disruption was also identified as an important concern by social tenant respondents. This includes both potential disruption within their homes (79%) and disruption within the building and local area (74%) during installation.

Not having a choice of supplier for heating and hot water was also an important concern for social housing tenant respondents (74%). One social housing tenant also commented that: *"My greatest fear is that I am stuck with one supplier and cannot go into the open market to get the best price."*

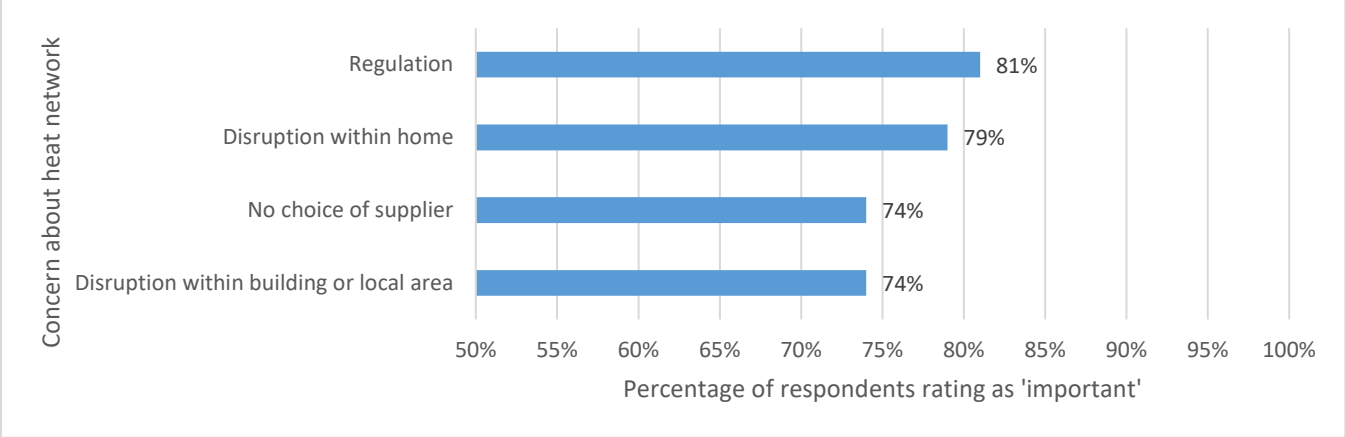

Figure 4: Importance of different concerns around Heat networks according to social housing tenants

Footnote to chart:[56]

Homeowners in the social sector

Amongst homeowner respondents the item most frequently identified as of potential concern about connecting to a heat network was about regulation (94%).

Disruption (both in the home and building/local area) and not having a choice of supplier were also identified as an important concern by homeowners. The latter reflects high self-reported rates of switching amongst this group.

Ninety per cent of leaseholders stated that how much leaseholders will be expected to contribute towards the connection costs where their home is in a building where the freeholder is a social housing provider was an important concern for them.

Two-thirds of homeowners in the social housing sector identified not having a choice about connecting to a heat network as an important potential area of concern[57].

Several homeowners wrote comments presenting their concerns about potentially harmful consequences for homeowners of connecting their home to a heat network, in terms of financial and performance outcomes:

> *"Concern about being locked in to a heat network at exorbitant prices, with a poor or unreliable service and vulnerable to exploitation by government /supplier and not being able to do anything about it or having to bail it out if things go wrong. Concern about what effect this might have on the value of my property."*

Homeowner comments identified the importance of receiving "a lot more advice and information" and effective regulation to protect the interests of consumers.

The research findings show key concerns for the social housing sector to be around consumer protection and disruption during construction and installation. Careful planning, engagement and effective communication may be potential ways to reduce potential concerns about Heat networks across the social housing sector. Results showing worries about not being able to switch heat and hot water supplier gives further importance to the need for good consumer protection.

Homeowner concerns about the costs of connecting to Heat networks suggest that attention around ensuring transparency, fairness and clear communication around costs is important.

Social housing providers and tenant concerns raised in workshops about the impact that the energy efficiency of connected buildings could have on the performance of the heat network point to the inter-relationship between social housing provider investment planning and heat network planning.

[56] Figures on chart equal the total of 'very important' and 'fairly important' responses. Other response options were 'not very important', 'not at all important' and 'don't know'.
[57] Note this figure is not statistically significant.

Views about mandatory connections

Whilst most social housing tenants and homeowners in the social sector said they would support their housing provider switching to a heat network, this does not represent explicit support for mandatory connections.

The workshop findings indicated that social housing providers have mixed views on mandatory connections. Of those who were supportive, this was subject to appropriate regulation and incentives in place. The workshops also revealed concerns about the economic viability to retrofit older buildings.

The finding that most homeowners in the social housing sector expressed concern about not having a choice about connecting to a heat network indicates that they are less likely to support mandatory connections.

Views about customer service and consumer protection

Respondents were asked about the importance of a range of consumer protection and customer services related to heat suppliers. Around 9 out of 10 social housing tenants and homeowner respondents rated issues such as billing frequencies/ options and being able to speak to a supplier over the phone as important for them.

Social tenant respondents said that it was important that estimated annual bills are provided by their supplier (90% of respondents), that there is a clear complaints process in case of any problems (89%) and that a choice of billing frequencies is available (88%).

Notably, all (100%) of homeowner respondents said that it was important to have a clear complaints process.

Arrangements for supporting residents as end users of Heat networks

Social housing providers' inputs during workshops indicated that communicating clearly about Heat networks and their benefits to residents will be important to achieve buy-in. The findings highlight the importance of a clear communication package about the connection process, metering and billing, security of supply, responsibilities for maintenance and repairs and how to operate controls. Support and training for social housing providers are also identified as important to help embed good practice. The survey results show that effective regulation is likely to be important to ensure that heat network residents receive a fair price, transparent (metered) billing, good customer service and quick repairs when any issues arise.

Social housing tenants suggested that as a landlord currently pays for the installation and replacement of a gas boiler, so the landlord should take on the installation and maintenance costs for district heating. This view was shared by social housing providers who agreed that social housing residents should not bear the installation and replacement costs for a mandated solution.

Role of local authorities

The research findings show that the role of local authorities is recognised by and important to social housing providers. Social housing providers felt that local authorities are likely to have important roles to play in developing, funding and managing Heat networks and favoured local authority ownership of networks. This suggests that local authority ownership would help to encourage housing providers to accept mandatory connections.

As many social housing providers manage properties across the country and must engage with different local authorities, the finding that social housing providers recognised different local authorities have different resources, capacities and capabilities suggests that relationship building between local authorities and social housing providers would be a key mechanism for supporting the transition to Heat networks.

Chapter 3: Owner-occupied homes

Context

There are 14.74 million owner-occupied households in England, with 6.53 million located in cities[58]. Figure 5 shows the number of domestic owner-occupied property addresses across the six trial cities. Domestic owner-occupiers make up 65% of the total population of England and Wales[59], and 20% of total heat network consumers[60]. As owner-occupied households represent the majority of building stock, connecting these households to Heat networks could be an effective way of reducing carbon emissions within heat network zones. However, connection for this group is assumed to be voluntary rather than a requirement for most existing domestic owner-occupier buildings, though some domestic owner-occupier properties already connected to existing communal or district heating systems or undergoing major renovation may be subject to a requirement to connect. Therefore, it is important to understand what would assist in encouraging owner-occupiers to connect.

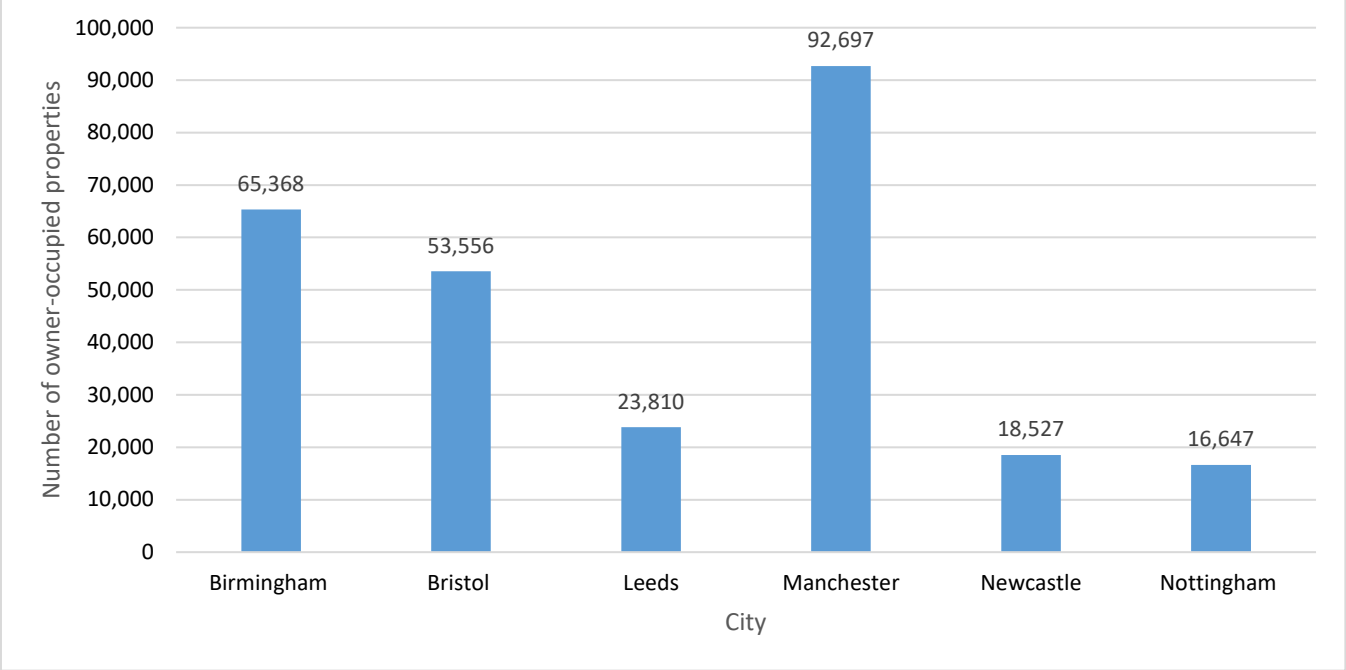

Figure 5: Number of owner-occupied homes across the six trial cities

[58] CSE analysis (2021) Owner occupied status sourced from Experian data and buildings were counted as being in a city if within local authority classification
[59] Ibid
[60] Ibid

Survey results

There were 337 responses in total to the survey from owner-occupied households. There were a further 15 households who self-identified as private renters in the survey who responded to this survey and were excluded from the analysis below. [61]

Attitudes to climate change and Heat networks

Survey respondents were asked how concerned they were, if at all, about climate change. 92% of domestic owner-occupier respondents said that they were concerned, with over half (56%) reporting that they were very concerned. This is higher than the 2021 UK average of 80% of the public reporting concern about climate change[62].

Survey respondents were also asked about their previous experience of Heat networks. Only 3% (n=11) of survey respondents had previously lived in a home on a heat network. Fewer than half (45%) of respondents said that they had heard of Heat networks prior to the survey. This was lower awareness than for other forms of heating systems, such as electric storage heaters (93%) and ground source heat pumps (74%), but more than hydrogen heating (32%).

When asked, based on their existing knowledge, about their overall view of Heat networks, almost two-thirds (65%)[63] of respondents did not report either a positive or negative view. 28% of respondents viewed Heat networks as positive.

The survey results reported above, showing that most domestic owner-occupier respondents are concerned about climate change, fits with wider public attitude survey findings[64]. The results indicate that owner-occupier respondents recognise the relevance of heat decarbonisation for addressing climate change. However, the finding that more than half of respondents have never previously heard of Heat networks and nearly all respondents have no direct experience of living in a home with a heat network, suggests that there are poor levels of understanding amongst owner-occupier respondents of how Heat networks can contribute to heat decarbonisation. Furthermore, 82% of owner-occupier respondents identified the ability of Heat networks to use low or zero carbon heat sources as an important wider benefit of Heat networks. This suggests that better information about Heat networks could encourage owner-occupiers to identify Heat networks as a valued technology to decarbonise private homes.

Information needs and trusted sources of advice

Respondents were asked what they would want to know more about to feel confident about connecting their home to a heat network. The results are summarised in Figure 6.

[61] In addition to these 15 private renters, a further 6 participants that completed the survey were excluded from the analysis due to ineligibility (4 social housing tenants, 1 shared ownership and 1 living rent-free in another person's property).
[62] Ibid
[63] These survey responses included: never heard of Heat networks before today (35%), neither positive nor negative view (19%) and don't know (12%).
[64] Ibid

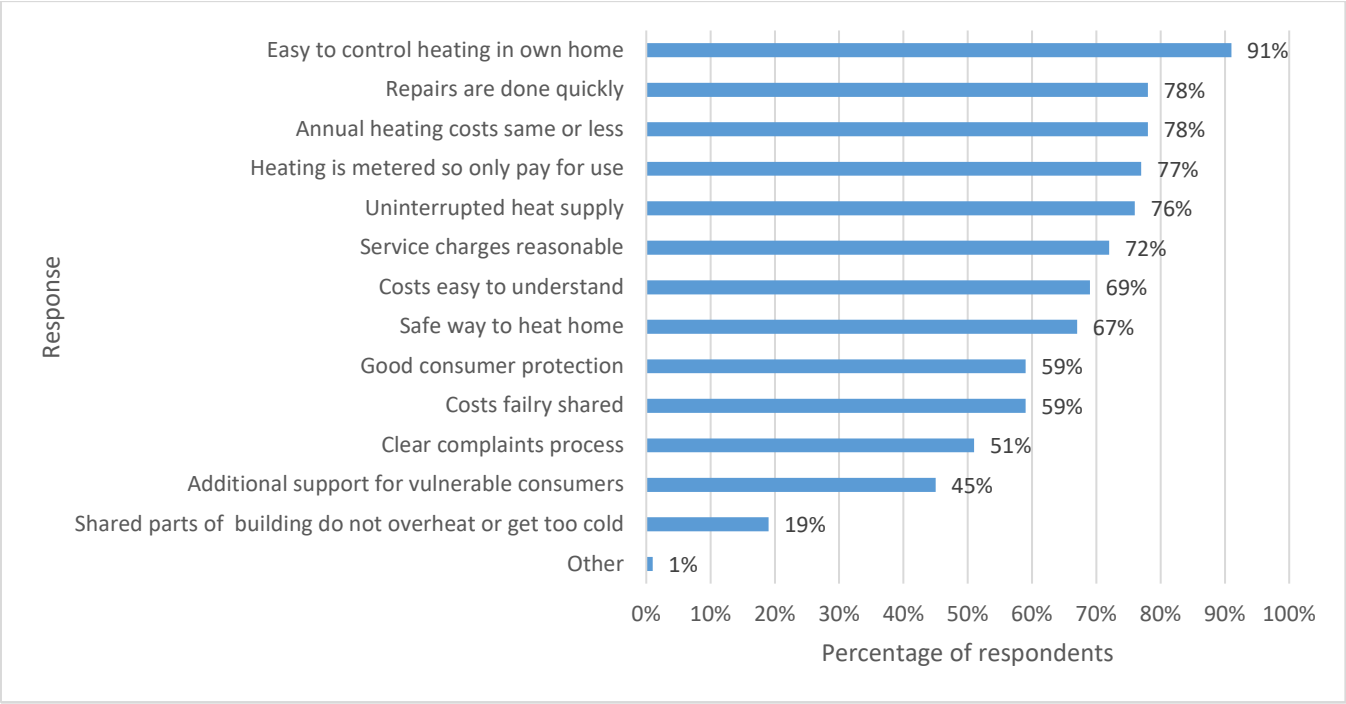

Figure 6: What domestic owner-occupier respondents would want to know more about to feel confident about connecting their home to a heat network

Owner-occupier respondents wanted to know more about the ease of controlling heating in their own home (91%), annual heating costs remaining the same or less (78%) and repairs being done quickly (78%). Other common responses included a metered heat supply (77%), an uninterrupted heat supply (76%) and reasonable service charges (72%).

When asked about who they would most trust to provide information and advice about connecting to Heat networks, the most frequently identified responses were non-government organisations e.g. Energy Saving Trust (55%), national government e.g. BEIS, Ofgem (53%) and government -backed advice services e.g. Simple Energy Advice Service (50%). Three respondents made written comments expressing a preference to receive information and advice from a neutral source of information. One said that they would like to hear from "*…someone with nothing to gain from a heat network – otherwise it's not unbiased.*"

Over three quarters (78%) of owner-occupier respondents said that they would prefer to learn more about connecting to a heat network by using the internet, websites or online webinars. The next most frequently identified methods were direct mail (50%) and videos (e.g. YouTube) (38%).

Heating and attitudes to changing their heating supplier

The majority (94%) of owner-occupier respondents said they use gas central heating to heat their homes, higher than the UK-wide figure of (85%), reflecting that the sample live in cities where most homes are connected to the gas network.[65] Three quarters (75%) of owner-occupier respondents reported having switched their gas or electricity supplier at some time in

[65]Ibid

the past, with 34% having switched in the last year. For comparison, 18% of the UK public reported switching in the last year.[66] 70% of respondents also agreed with the statement: "I want to be able to switch my heating and hot water supplier".

Respondents were asked which statements came closest to their views about when they would consider changing their heating system. Over two-thirds (69%) of owner-occupiers said they would only consider replacing their existing system if it stopped working or started to deteriorate, whilst over a quarter (29%) said that they would consider replacing their heating system while it is still working. If they were to replace a working heating system, however, 45% of respondents said that a more environmentally friendly heating system would be their most important consideration in switching. In addition, 39% ranked saving money on bills as their most important consideration.

Benefits of connecting to a heat network

Respondents were asked to rate the importance of different identified wider benefits of Heat networks. The results are summarised in Figure 7. The four benefits that were ranked as most important were a safe and reliable heat supply (83%), lower costs to reduce fuel poverty (83%), using low or zero carbon heat sources (82%) and bills the same or cheaper than gas (80%). The creation of local 'green' jobs was ranked as important by the lowest proportion of respondents (72%), although this was still almost three quarters of the respondent group. Five respondents also left a comment generally relating to the environmental benefits of Heat networks. One said that Heat networks would be: *"…an important contribution towards tackling climate change which will ultimately impact everyone."*

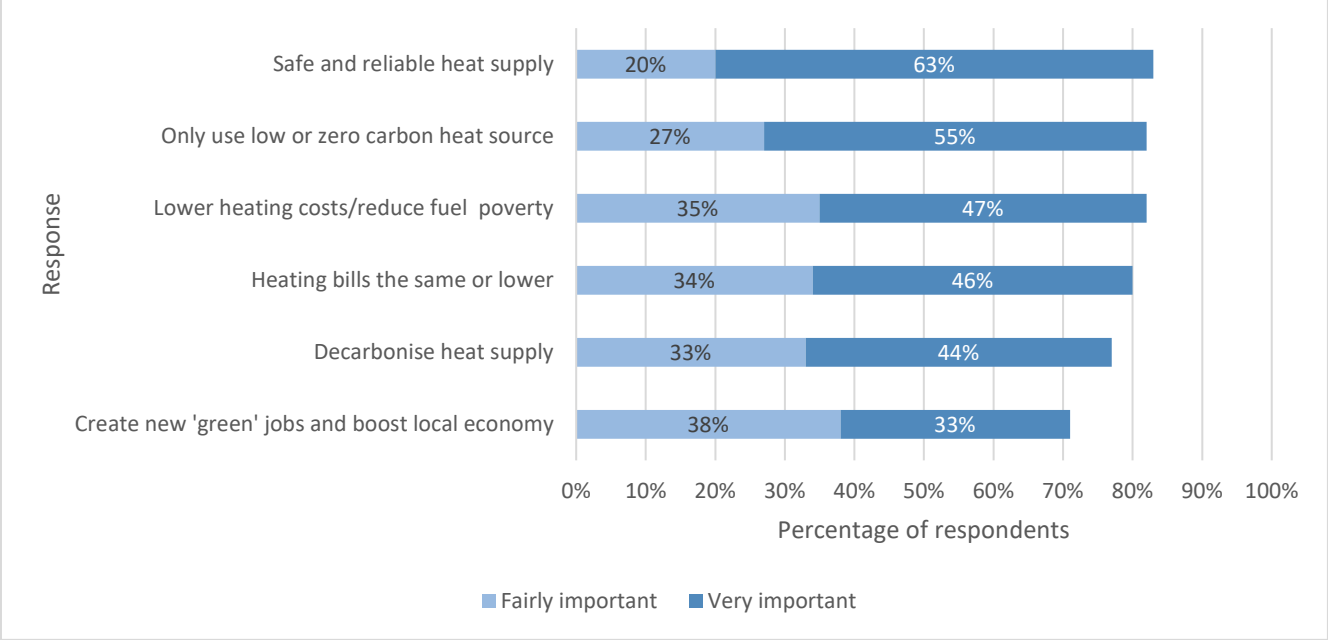

Figure 7: Importance of different benefits of Heat networks according to owner-occupiers

[66] Ofgem (2021) *Household Consumer Perceptions of the energy market*. Available at: https://www.ofgem.gov.uk/sites/default/files/2021-06/consumer_perceptions_of_the_energy_market_q1_2021_v1.pdf

Concerns about connecting to a heat network

Respondents also rated the importance of three possible areas of concern around connecting to a heat network. The results are summarised in Figure 8. Potential disruption within the home was ranked as important by the highest proportion of respondents (80%), followed by not being able to switch supplier (71%) and disruption within the building or local area (68%).

Given the opportunity to report any further areas of potential concern, 15 respondents also commented that they were generally concerned about costs in relation to Heat networks. Several of these comments were specifically linked to the lack of choice of supplier: *"The fact there would be no option to swap providers is my biggest issue linked to cost - how are we to trust a supplier to keep costs low, when they have absolutely no competition locally or any incentive to keep costs down?"*

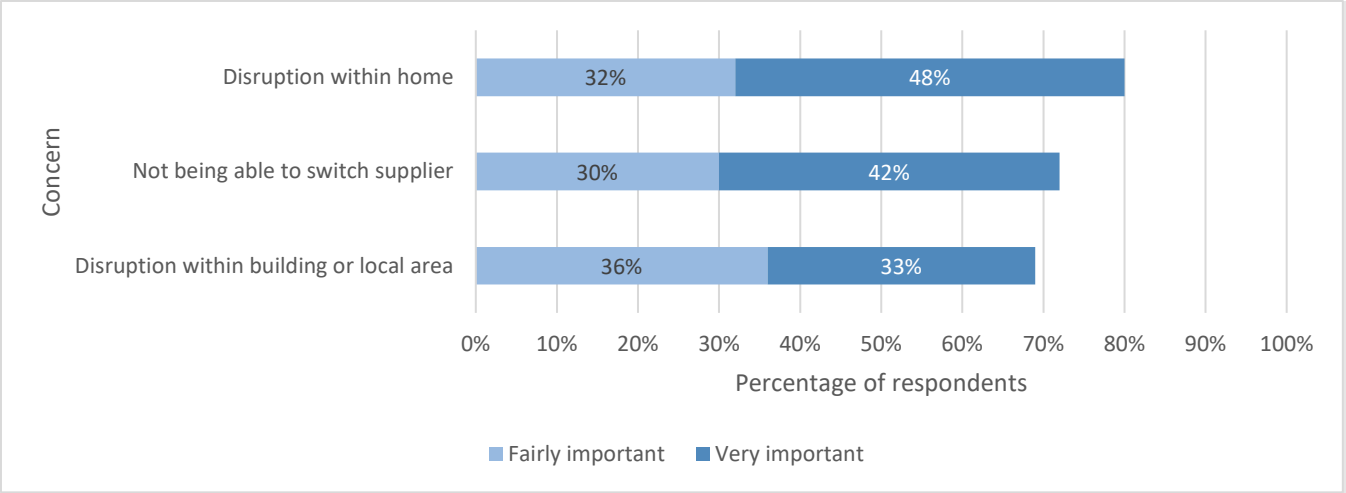

Figure 8: Importance of different concerns around Heat networks according to owner-occupiers

These findings show that attention is needed about how to minimise disruption and address resident concerns about the potential risks of disruption associated with heat network installation. Reported concerns around the general costs of connecting to a heat network suggest that careful thought should be given to how costs are allocated and communicated to domestic owner-occupiers. Owner-occupier concerns about no longer being able to switch will also need to be addressed to overcome this potential barrier to connecting to a heat network.

Encouraging connection to a heat network

Owner-occupier respondents selected the three most important considerations that would encourage them to connect to a heat network. The results are summarised in Figure 9. The three considerations that were ranked highest were: clear, upfront information about the cost to connect their home (68%), assurances that it will not affect the saleability or value of their home (68%), and robust information that Heat networks are the lowest cost low carbon heat option for their home (60%). Four respondents also commented that a lack of disruption would be important to them. One wanted: *"Minimum amount of personal administration, hassle and effort – maximum efficiency and effectiveness of changeover."*

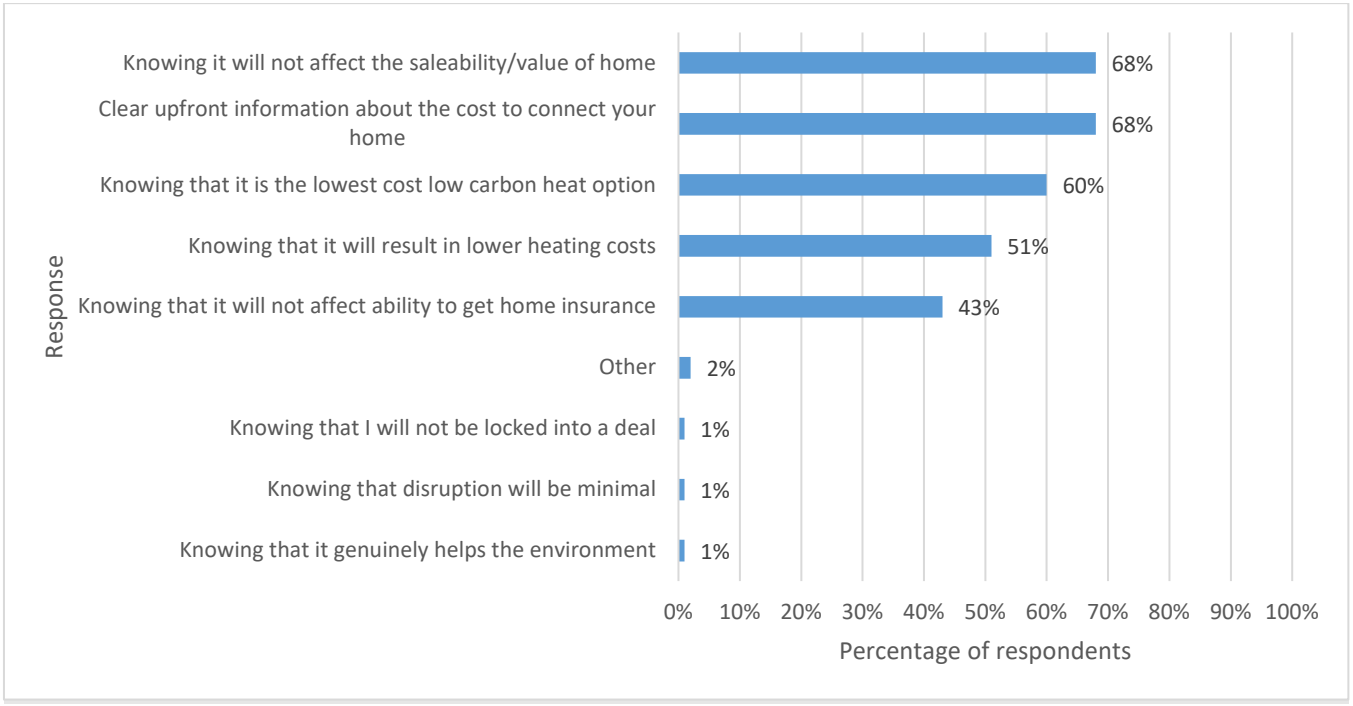

Figure 9: Considerations that would encourage owner-occupier respondents to join a heat network

Respondents were then asked to rate how likely they would be to join a heat network if they were given the opportunity (Figure 10). Almost three quarters (73%) of respondents said that they would be either very (19%) or fairly (54%) likely to join a heat network. The remaining respondents (27%) said that they were either not very or not at all likely.

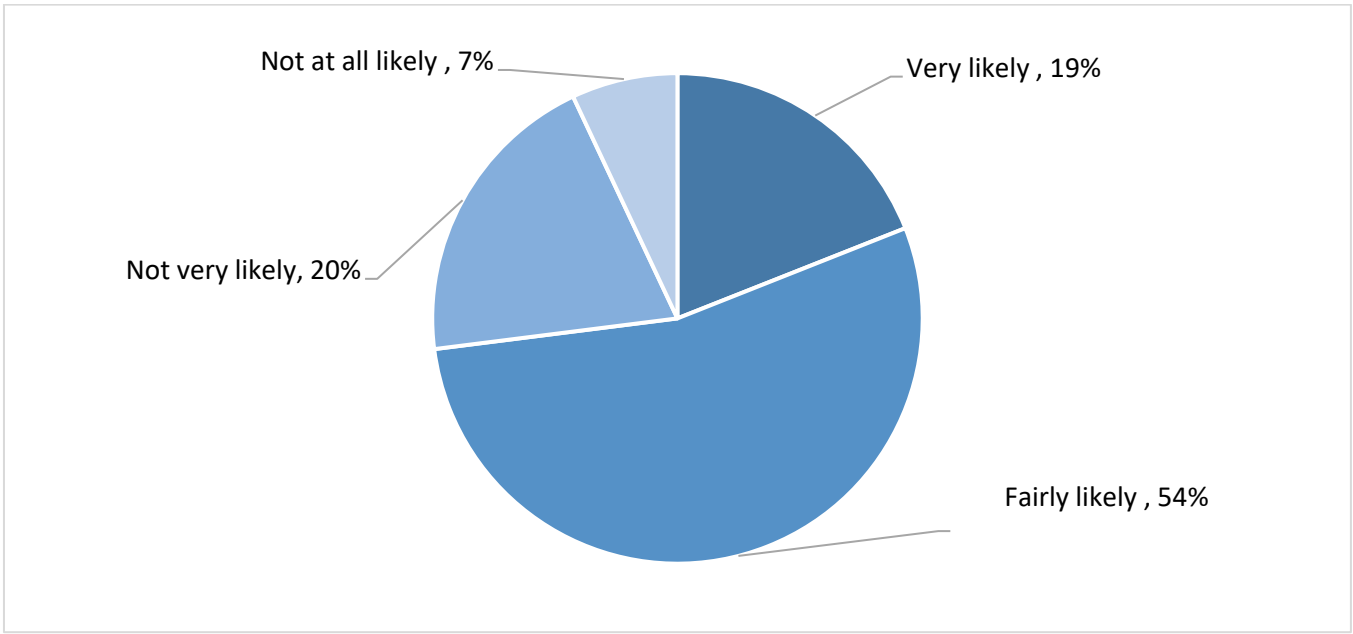

Figure 10: Likelihood of owner-occupier respondents to join a heat network if given the opportunity

Views on paying for Heat networks

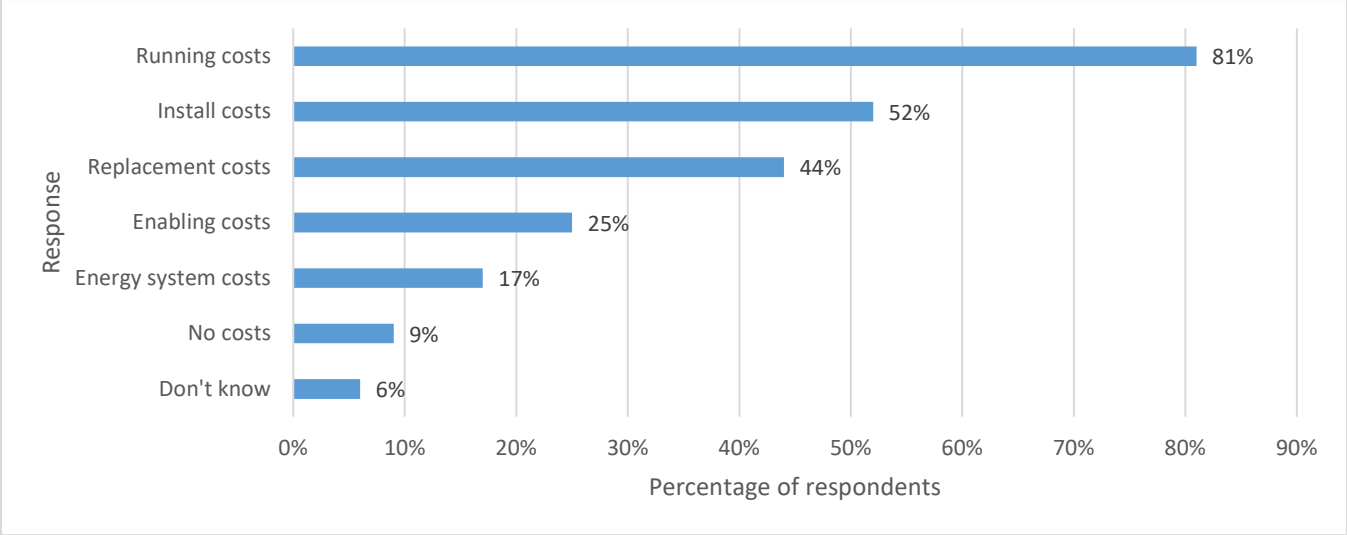

Figure 11: Heat network costs towards which owner-occupier respondents would expect to contribute

Respondents were asked about the costs that they would expect to have to contribute to paying if they were connected to a heat network. As shown in Figure 11, four in five respondents (81%) expected to have to contribute towards running costs. Roughly half expected to contribute to paying installation (52%) or replacement (44%) costs. Only a quarter (25%) expected to contribute to enabling costs and 17% expected to contribute to energy system costs. Finally, 9% of domestic owner-occupier respondents said that they didn't expect to contribute to any costs.

These findings suggest that most domestic owner-occupiers expect to contribute towards running costs but are less likely to expect to contribute to the installation; replacement or enabling costs for connecting to a heat network. These findings suggest that further attention will be needed around how the costs of connecting to a heat network are communicated and around how different costs are assigned.

Other considerations

At the end of the survey, respondents were given the opportunity to contribute any additional comments on the potential for the heating and hot water supply to their home to be provided via a heat network in the future. 26 respondents said that they would need more information about Heat networks. One said that: *"It is difficult to fully answer these questions without a better understanding of the subject."*

Chapter 4: Private non-domestic buildings

Context

There are 2.6 million private non-domestic properties in England[67], with 1.2 million of these located in cities[68]. The total number of private non-domestic buildings in our sample frame across the six trial cities is reported in Figure 12, including the number of both large (heat demand ≥100MWh) and small (heat demand <100MWh) non-domestic properties for comparison[69].

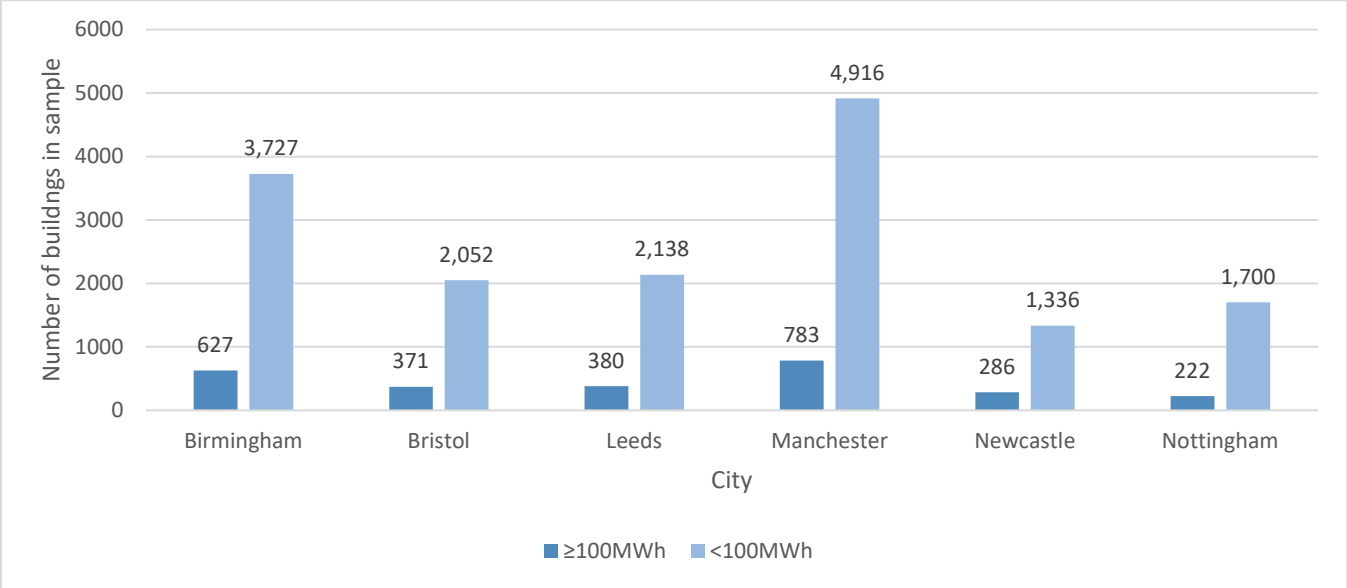

Figure 12: Number of private non-domestic buildings in sample frame

There are approximately 38,300 private non-domestic customers connected to Heat networks in the UK, distributed across approximately 33,300 commercial customers, 4,700 retail customers and 320 light industrial customers[70], making up 8% of total heat network consumers. However, the non-domestic sector (including the public sector) makes up 46% of heat network heat demand. As private non-domestic sector connections frequently cover many users and high heat loads[71], this is an important sector for heat network development. While non-domestic buildings with large annual heat loads within a heat network zone would likely be mandated to connect to a heat network, connection is expected to be voluntary for smaller

[67] Valuation Office Agency (2021) *Non-domestic rating: stock of properties including business floorspace*. Available at: https://www.gov.uk/government /statistics/non-domestic-rating-stock-of-properties-including-business-floorspace-2021

[68] CSE internal analysis. Building status sourced from Experian data and buildings were counted as being in a city if within local authority classification.

[69] CSE internal analysis of data supplied from CDDP.

[70] The ADE (2021) *What is district heating?* Available at: https://www.theade.co.uk/resources/what-is-district-heating

[71] The ADE (2018) *Heat networks in the UK*. Available at: https://www.theade.co.uk/assets/docs/resources/Heat%20Networks%20in%20the%20UK_v5%20web%20single%20pages.pdf

non-domestic buildings with low annual heat loads. It is therefore important to understand factors influencing small non-domestic building owners and occupiers to connect to a heat network, and to understand important concerns and needs of the owners and occupiers of non-domestic buildings with large heat loads, to enhance compliance and avoid alienating these key actors in the energy (and heat network) system.

Workshop findings

Five participants took part in a workshop focusing on the private non-domestic sector, including two housing developers, and three private non-domestic building representatives. Participants either held energy or sustainability roles or owned buildings connected to district heating networks. One participant had no prior knowledge of Heat networks, whereas another had direct prior experience of being mandated to connect a building to a heat network.

The workshop discussions indicated broad support amongst private non-domestic stakeholders for heat network zoning, relative to other options for heat decarbonisation. Considerations around corporate responsibility emerged from discussion as a potentially important motivating factor for private non-domestic building owners and occupiers to connect to Heat networks.

However, the workshop discussions suggest that mandatory connections may be perceived as too ‘black and white’: participants in the workshop emphasised that a zoning system must allow for consideration of the complexity of businesses’ individual heating requirements, with a potential role for market-based solutions rather than formal mandates. Participants discussed the potential to incentivise connections or use market signals to encourage connection instead of mandating connections.

> *“Once you start using that word, mandatory, you will get push back.” (Private sector building representative)*

In a poll conducted during the workshop, most participants were neutral on the issue of mandatory connection of certain public buildings in a heat network zone.

Moreover, there was broad agreement amongst workshop participants that appropriate incentives and accompanying regulation of the heat network market will be critical to support customers and ensure customer protection and security of supply.

Similar as for other participant groups, the need for clear communication and information on Heat networks was identified as important for private non-domestic actors. Clear and transparent information about and justification of heat network zones based on their suitability and cost effectiveness compared to other decarbonisation solutions was repeatedly emphasised during the workshop.

> *“From our perspective as a developer, there are concerns around the cost: certainly for us around the install, but also for the end user and how you sell that to them.” (Developer)*

Regarding costs and responsibilities to pay, a consensus view emerged that who should pay depends on the objectives and ownership of any heat network scheme, and whether it is operated for profit or as a public, not-for-profit initiative. The participants considered that if a connection is mandated, the final customer should not be responsible for covering the connection/installation costs. A lease model was suggested for the heat user interface, to accommodate rapid technological developments in this area.

Survey results

A total of 179 survey responses were received from private non-domestic respondents, of which 67 were in private sector non-domestic buildings with annual heat load ≥100 MWh, and 112 were in private sector non-domestic buildings with annual heat load <100 MWh.

Existing heating arrangements and energy use

Amongst non-domestic survey respondents, most rely mainly on gas (68%) and/or electricity (57%) for their existing heating arrangements. One large non-domestic respondent reported an existing connection to a heat network.

The majority (76%) of respondents were not able to provide the Energy Performance Certificate (EPC) rating for their building. Of those that did know their EPC rating, most reported an EPC rating of D or below.

Eighty per cent of all non-domestic respondents stated that their business pays a fair amount or a lot of attention to the costs of heating their building. Furthermore, 84% stated that it is somewhat, moderately or very important for their business to have the ability to switch heating or hot water suppliers. Seven in ten respondents (71%) reported having switched energy supplier in the past.

The most commonly reported approach to system replacement, across all non-domestic respondents, is to wait until the existing system breaks down or starts to deteriorate.

Attitudes to climate change and Heat networks

Most respondents (87%) said they were either very or fairly concerned about climate change.

A sizeable minority said their business has formal plans to reduce their environmental impact, with larger non-domestic actors more likely to have such plans in place (49% of non-domestic organisations with large heat load buildings compared with 32% of those in small heat load buildings).

As can be seen in Figure 13, there was low overall awareness of Heat networks amongst non-domestic respondents. Only 35% of all respondents had personally heard of Heat networks or district heating as a commercial heating solution.

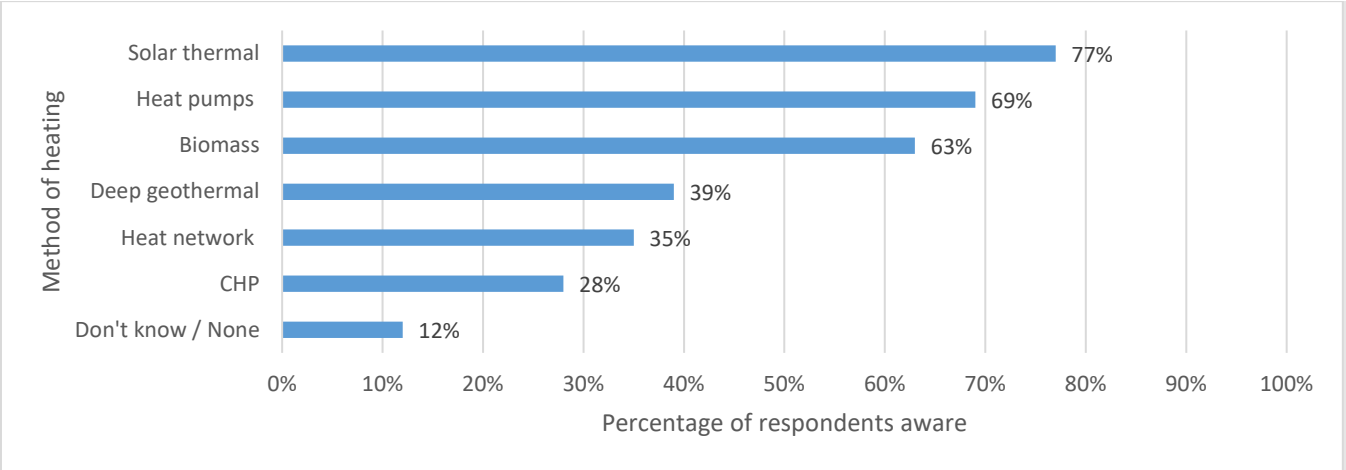

Figure 13: Awareness of commercial heating systems among private non-domestic actors

Information needs and trusted sources of advice

In order to feel confident that a heat network would be an appropriate solution for their building, there was a general appetite amongst non-domestic respondents for more information around all themes mentioned in the survey (see Figure 14).

The top three most important areas around which respondents would like more information were: costs; maintenance and repair arrangements; and suitability of a heat network relative to other alternatives. Information around costs and suitability of Heat networks are themes that recur amongst this group. One respondent commented that, if connecting their building to a heat network, they would like to know more about a *"…re-sell implication."*

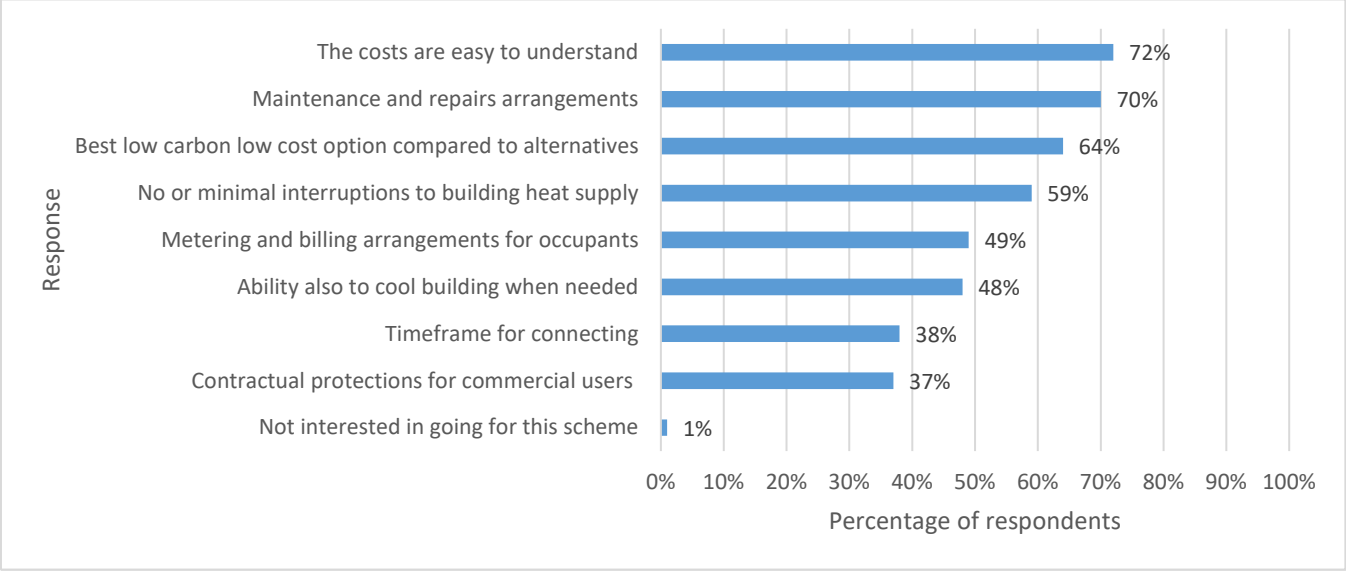

Figure 14: What private non-domestic respondents would want to know more about to feel confident about connecting to a heat network

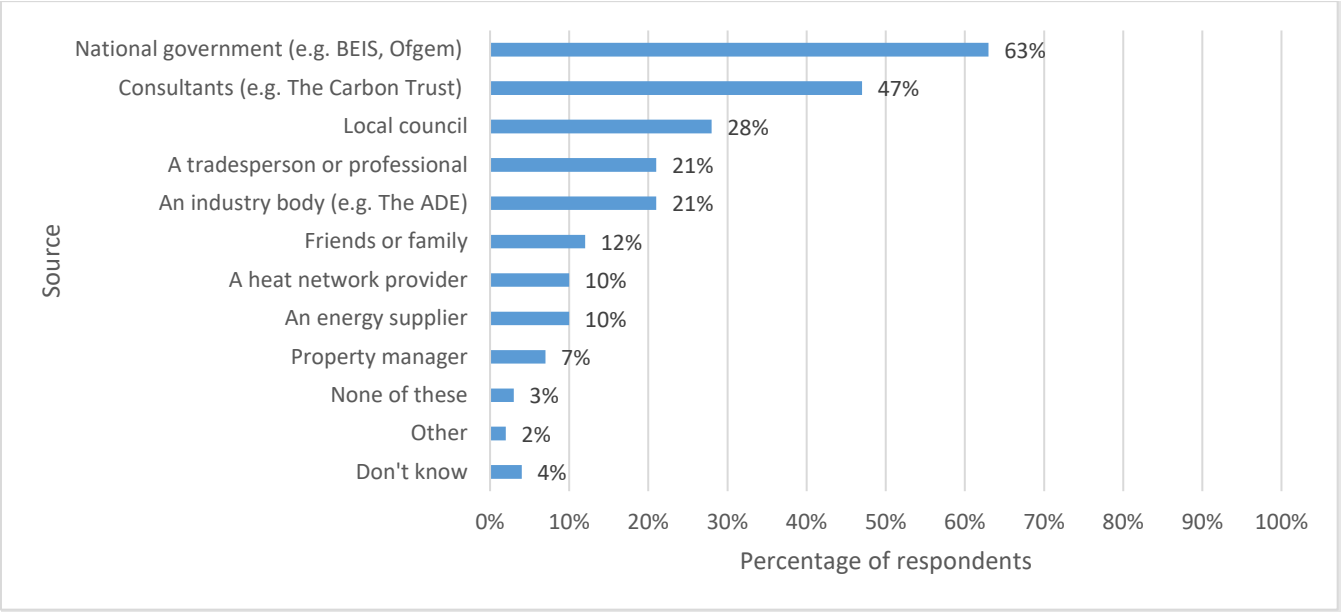

Figure 15: Trusted sources of information for non-domestic actors

Non-domestic respondents said they are most likely to trust information coming from national government (including BEIS and Ofgem) (63%), as well as consultants (e.g. The Carbon Trust) (47%) and to a lesser extent, local councils (28%), as shown in Figure 15.

Building owners and occupiers were also asked how important it was to have clear information about the share of upfront installation, enabling and connection costs that their business would be expected to cover. A majority of the non-domestic respondents (93%) ranked this as very or fairly/moderately important.

Non-domestic respondents were also asked to list what would help with financial planning considerations. The most frequently mentioned were clear timelines (45%) and clear costs (37%). One respondent (a building Energy Manager) commented that their support for heat networks would increase if there was: *"…financial assistance to upgrade building fabric and secondary heating system."*

Views on connecting to a heat network

Respondents were asked what they considered were the most important benefits of heat networks – directly to their business, and indirectly, in terms of wider benefits to society. As shown in Figure 16, the most important direct benefits were lower heating bills (95%), closely followed by decarbonisation (93%), improved building comfort (86%), and meeting their business's net-zero targets (78%). The wider benefits that were considered most important were: tackling climate change, provision of cheap sources of low carbon heating and use of waste heat (each mentioned by 91% of respondents); with meeting government climate targets; cost effectiveness and job creation also broadly considered important added benefits.

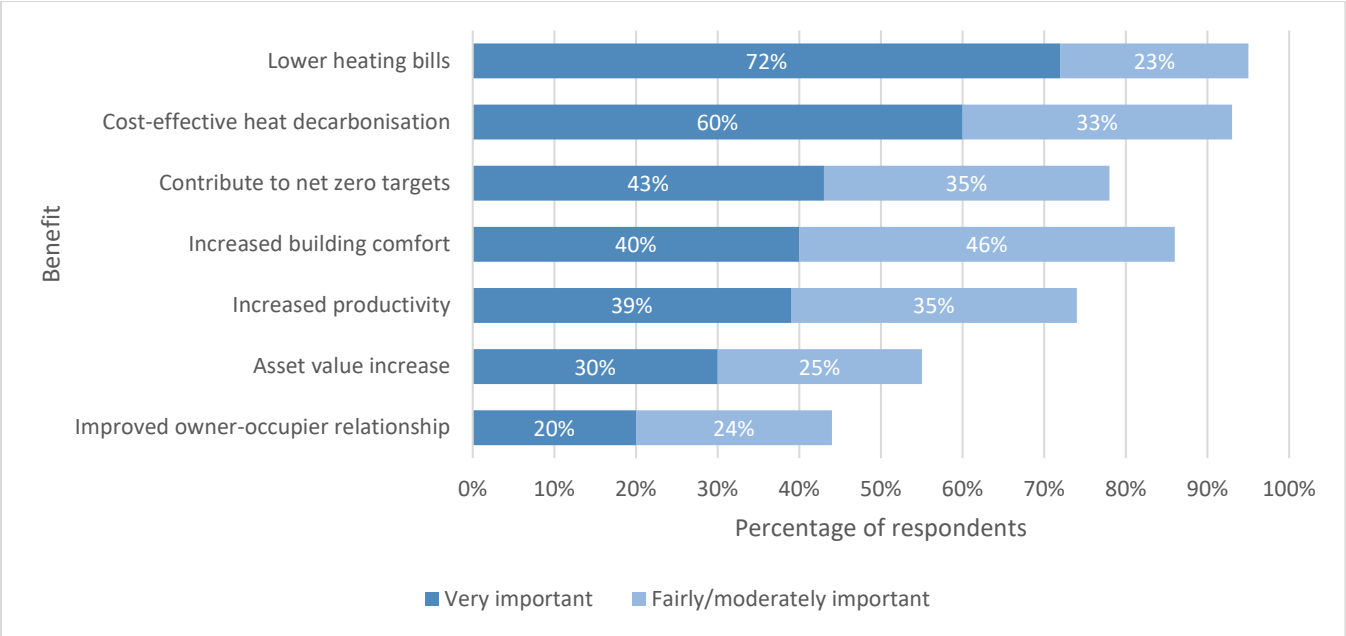

Figure 16: Private non-domestic views on direct benefits of Heat networks to their business

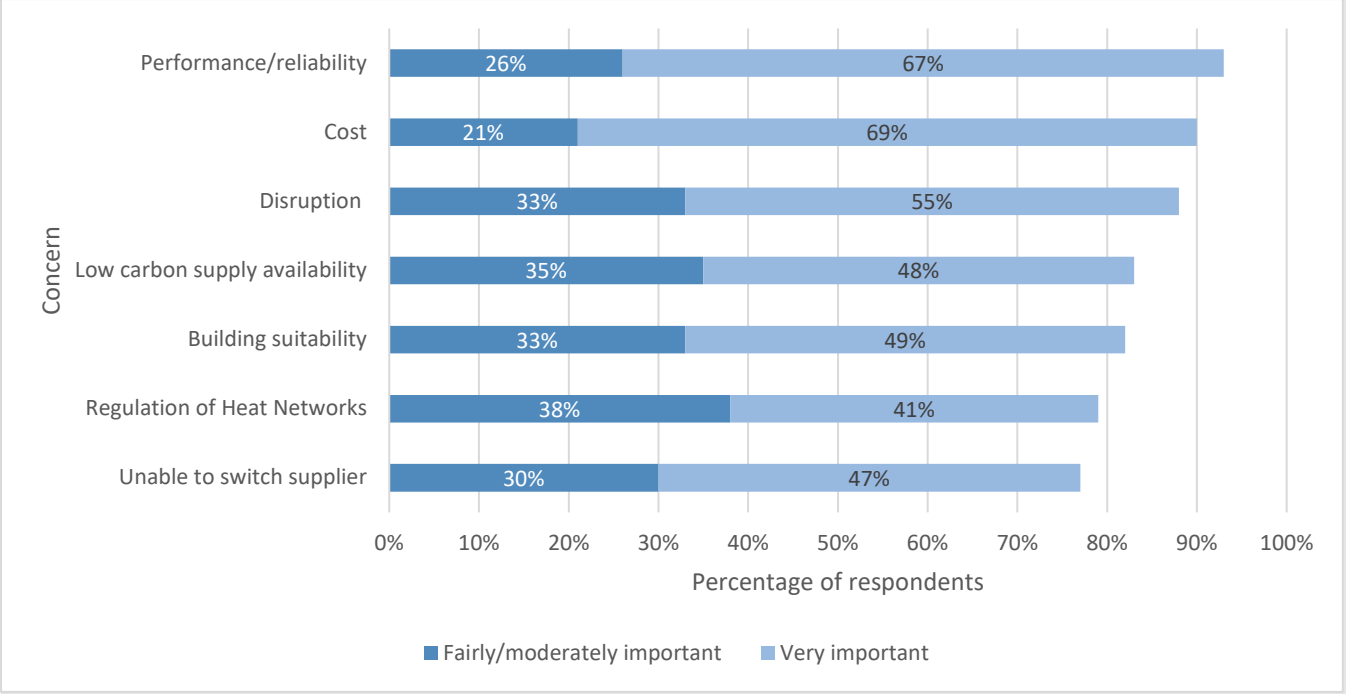

Figure 17: Private non-domestic concerns around Heat networks

While respondents recognised several benefits of Heat networks, they also identified many areas of concern as very or fairly important to them and their business, including performance and reliability; cost; and disruption caused by connecting to a heat network, as shown in Figure 17.

Non-domestic survey respondents were asked the extent to which they agreed that 'I trust my local authority to oversee/deliver heat network zones in this area'. Only 58% of respondents agreed with this statement and 31% disagreed.

Nonetheless, a majority of both large (69%) and small (73%) non-domestic respondents stated that they would be fairly or very likely to accept an invitation to connect their building to a heat network.

Although not many respondents gave reasons for not wishing to connect, around a quarter (24%) of respondents expressed a preference for individual solutions. A few respondents reported being unwilling to commit to a long-term contract and a few wrote in comments expressing concerns about potential associated costs: one said they were put off by the prospect of: *"…significant cost of connection and internal infrastructure - ongoing operational costs and maintenance are likely to be expensive."*

Mandated connections

Survey responses indicate broad support across large non-domestic respondents for mandated connection of eligible buildings to a heat network[72]. When presented with brief information about mandated connections, approximately three quarters (73%) were either supportive or strongly supportive.

Views on paying for the costs of connecting to a heat network

Respondents were asked who they think should contribute to five different categories of costs associated with Heat networks, namely: install costs, running costs, replacement costs, enabling costs and system costs. Available response options were taxpayers, building owner, leaseholder or tenant.

Installation and replacement costs

There was broad agreement amongst the different tenure types (building owner, leaseholder, or tenant) that building owners should contribute across all cost categories, with over half of each type of respondent identifying the building owner as responsible for installation or replacement costs.

Running costs

Respondents tended to indicate their own tenure type as responsible for contributing to running costs. This pattern of responses likely reflects an acceptance or assumption that the building occupier (whether building owner, leaseholder, or tenant) should cover the running costs, as most respondents were the building occupiers themselves.

Enabling costs

Across all three tenure types, the most frequently given response was that building owners should contribute to enabling costs.

[72] Only large non-domestic participants were asked about support for mandated connections, as small non-domestic actors are unlikely to be subject to mandatory connection.

System costs

Across all tenure types, there was a fairly equal split within each type between those who felt taxpayers should contribute and those who felt building owners should contribute.

Discussion of findings

Understanding of heat decarbonisation and climate change

The findings across the private non-domestic buildings sample indicate both high levels of concern about climate change and a business interest to reduce environmental impact, including decarbonising heat supplies. Whilst a sizeable minority of private non-domestic actors had existing formal environmental business plans and net zero targets, most of this sample group either did not know their building's EPC rating or reported an EPC rating of D or below. This finding suggests that whilst there is an existing interest for private non-domestic actors to reduce their environmental impact, there is reduced awareness around the energy efficiency of existing properties. The findings also indicate low existing levels of awareness of Heat networks amongst non-domestic building owners and occupiers.

Support for heat network zones

Despite low levels of prior awareness of Heat networks, the private non-domestic sample group expressed broad support for zoning, particularly relative to other methods of heat decarbonisation. Private non-domestic actors recognised corporate responsibility as a motivating factor supporting heat network zones, and the finding that the majority were likely to accept an invitation to connect shows support for connecting to a heat network zone.

Benefits of connecting to a heat network

The finding that cost, decarbonisation, improved building comfort and meeting businesses' net zero targets were all important benefits of Heat networks for the private non-domestic group suggests a range of recognised advantages of connecting which may be persuasive amongst non-domestic building owner. The findings show that private non-domestic actors are interested in both direct and indirect benefits of connecting their buildings to a heat network.

Concerns about connecting to a heat network

The survey results show that performance and reliability; increased costs; and potential disruption were rated as the main areas of concern for the sample group indicates that more information is needed around the process and experience of connecting private non-domestic buildings to a heat network.

Although rated lower in importance than other concerns, 77% of non-domestic organisations also said that not being able to switch suppliers was a concern. Therefore, concerns around this could be potentially reduced if this group were provided with more information.

Successful implementation

The successful implementation of heat network zones would depend upon clear communication which addresses the concerns and most salient issues for private non-domestic sector. This research found that the main areas of concern or interest were suitability and cost effectiveness of connecting to a heat network; the costs of heating existing buildings as well as a desire for more information around Heat networks in general (particularly around: costs, maintenance and repair arrangements). Increased awareness and access to information concerning Heat networks would support the successful implementation of heat network zones for this group.

Views on paying for Heat networks

The finding that the costs of Heat networks would depend on objectives and ownership for this sample indicates openness to different funding and costing options. Though, private non-domestic actors broadly agreed that the final customer should not be responsible for connection and installation costs. Building owners were recognised as having an important role to play in contributing to all costs associated with heat network zoning, including from building owners themselves. The findings also indicate that the private non-domestic sample recognised the potential role of taxpayer contributions to enabling and installation costs. The results further show that there was variation across views concerning the running costs of Heat networks, and that clear information on costs and timelines is important for this sample group.

Views on mandatory connections

The findings indicate broad support for mandated connections across the sample group, however it was also suggested that zoning systems need to consider the complexity of individual heating requirements for businesses. The workshop results also indicated that encouraging, rather than mandating, connections may be more popular for private non-domestic building owners.

The role of local authority

The survey findings that non-domestic actors have limited trust in local authorities to oversee and deliver local heat network zones suggests that either trust in local authorities needs to be improved, or a different stakeholder group would be more attractive to deliver heat network zones for the non-domestic public building sample.

Chapter 5: Local authorities and public sector buildings

This chapter discusses the results from both phases of the research and what they mean for policy and practice in terms of the role of the local authority and connecting public sector non-domestic buildings as part of heat network zones. It primarily draws on the results of the workshops but also on survey responses regarding attitudes of other stakeholders towards the role of local authorities in heat network zoning.

Context

There are 127,010 non-domestic public sector buildings in England, with 56,860 of these in cities. Figure 18 shows the number of public sector non-domestic buildings across the six trial cities[73]. In 2018, there were 7,438 heat network connections in universities, hospitals and other public buildings (and light industries). This makes up less than 2% of the total UK heat network connections[74]. However, as public sector non-domestic properties typically cover many users and high heat loads - and often serve as anchor loads for Heat networks - this is a key sector to hear from regarding further heat network development.

Local authorities across the trial cities will likely be key partners in the implementation of any heat network zones. It is therefore important to understand both their views on zoning, and the views of other stakeholders on the role of local authorities within this process.

Figure 18: Number of public sector non-domestic buildings across the six trial cities

[73] CSE analysis (2021) using data supplied from CDDP.
[74] The ADE (2018) *Market Report: Heat networks in the UK.* Available at: https://www.theade.co.uk/assets/docs/resources/Heat%20Networks%20in%20the%20UK_v5%20web%20single%20pages.pdf

Workshop findings

Workshop participants

Local authority participants took part in two workshops and included officers with an energy, climate change or sustainability role (8), planning role (2) or finance role (1).

One workshop was held with landlords or managers of public sector non-domestic buildings (public sector building representatives). Three participants for this workshop represented two health trusts and one university.

Existing knowledge and awareness of Heat networks

There was a high level of existing knowledge and awareness of Heat networks amongst both local authority and public sector building representatives. Several participants from both groups had professional experience of Heat networks. More generally, both local authority and public sector building representatives also demonstrated a strong understanding of heat decarbonisation and its relevance to climate change. In a poll conducted during their workshops, most local authority representatives rated the importance of heat decarbonisation of buildings as a very important priority towards achieving city-wide net zero targets. All participants within these groups recognised the threat of climate change and the significant contribution that heating buildings makes to the total carbon emissions mix of the UK. As a result, public sector actors are likely to be concerned that new Heat networks are a genuinely low carbon option and do no use a fossil-fuel heating supply.

Support for heat network zones

Overall, local authority and public sector building representatives expressed support for the designation of areas as heat network zones, with broad agreement that the zones could bring major benefits.

> *“If there was a low carbon heat network within the city - that would be really desirable for us.” (Public sector building representative)*

The workshop findings also indicate that improved enforcement is seen as a key benefit of introducing a zoning policy, making it easier for local authorities to mandate connection to a network.

Local authority representatives were also asked about the extent of their support for heat network zones for different building types. There was a unanimous view that connecting new developments to a prospective heat network zone would be more straightforward than connecting older buildings. A crucial factor mentioned included the costs and disruption associated with replacing existing heating systems and retrofitting older buildings to ensure they were suitable for connection.

Local authority representatives saw social housing as an ideal candidate for heat network zoning. Most agreed that the potential for economies of scale in zoning could help to deliver

savings to vulnerable residents in fuel poverty. Nevertheless, one officer suggested council housing departments may prefer to install individual heat pumps rather than a Heat networks as a low-carbon heating option for social housing residents. Another attendee highlighted that in some settings, the geographical scattering of social housing developments could present a potential barrier to efficient connection.

There was consensus amongst local authority representatives that the private non-domestic sector would present some challenges in terms of heat network connection. In particular, they voiced concerns that international asset owners are likely to prioritise achieving a profit on their investment over contributing to achieving the UK's decarbonisation targets. Participants agreed that the zoning methodology should be robust and defensible in case of legal challenge. One officer raised the point that corporate responsibility could be a powerful motivating factor for businesses to support connection within a prospective zone.

Most local authority representatives agreed that appetite to decarbonise was strong within the public sector, but tight margins could prove an obstacle to connection in some cases. One participant also highlighted that the potential for heat network zones to deliver cooling, as well as heating, could be an important advantage in certain public sector settings like hospitals or care homes.

Views on what appeals about Heat networks

Local authority and public sector building representatives discussed several key benefits of heat network zones. They agreed that decarbonisation was the most obvious attraction of heat network zones. This was linked to the achievement of regional or organisational net-zero goals (e.g. the Bristol One City Plan[75] or Greener NHS[76] targets). Both groups also said that the alleviation of fuel poverty could be another significant advantage of heat network zones. They felt this could be achieved through economies of scale passing on savings to vulnerable consumers. Local authority representatives considered that the creation of heat network zones would ensure it was easier to enforce connection to a heat network.

Views on potential challenges of connecting to a heat network

Local authority and public sector building representatives highlighted various key challenges associated with implementing a heat network zone in their area.

Disruption

Both groups saw disruption as a key potential issue. This could negatively impact residents or commuters, especially where extensive enabling retrofit or road digging will be necessary (local authority representatives) or hospitals, where maintaining constant heat supply is vital (public sector building representatives).

[75] Bristol One City (2021*) Bristol One City Plan.* Available at: https://www.bristolonecity.com/wp-content/uploads/2021/06/Bristol-One-City-Plan-2021-2050-1.pdf; https://www.england.nhs.uk/greenernhs/a-net-zero-nhs/

[76] NHS (2021) *Greener NHS*. Available at: https://www.england.nhs.uk/greenernhs/

Funding

Several local authority representatives were uneasy about the scale of investment needed to support the rollout of new Heat networks in zones. This group felt that, now, most local authorities would not have the resources to overcome implementation costs and challenges. They asked whether new Heat networks in zones would be funded privately or publicly and whether designated cities would be offered funding from central government.

Public sector building representatives raised the issue of the costs of connecting to a heat network in buildings with relatively new existing heating systems.

Lack of local capacity

Local authority representatives agreed that there was a lack of resources and experience within local authorities and supply chains, whilst public sector building representatives also identified a lack of heat network expertise in the public sector.

Carbon intensity

Both local authority and public sector non-domestic representatives raised doubts about whether Heat networks would be a genuinely low-carbon option in zoning areas. Both groups feared that if the energy sources used in the new Heat networks in zones are not low-carbon, Heat networks could entrench fossil fuels like gas in the UK energy system, jeopardising their ability to meet local and national net zero targets.

> *"…if it was a gas-fired one [heat network], and that didn't align with our carbon ambitions, there would be a bit of an incompatibility there." (Public sector building representative)*

A local authority representative raised questions about the embodied carbon within the infrastructure of new Heat networks.

Heating control

Public sector building representatives expressed concern about certain buildings (for example, intensive care units in hospitals), requiring localised control over room temperatures. They questioned whether this would be possible when connected to a heat network.

Negative existing public attitudes

Local authority workshop participants recognised that bad press around older, inefficient systems had given Heat networks a negative reputation with the general public and said that this could present as an obstacle to the rollout of new Heat networks.

Local authority conflicts of interest

Local authority representatives also discussed some potential internal conflicts of interest that could arise from the implementation of new Heat networks in zones. Most agreed that there was a culture of conservatism/short-termism present amongst the senior management and

councillors of many local authorities which could lead to conflict regarding the reputational and financial risks associated with heat network zones.

A Head of Finance present at the workshops also suggested that local authority financial teams would be unlikely to support new heat network zones given the lack of funding and staff resource at most local authorities. Other key areas of potential conflict were identified as: consumer vulnerability (social/housing teams will be wary of putting vulnerable residents at risk through heat network connection) and delivery (this will require coordination between multiple different local authority bodies).

Successful implementation

Discussion amongst local authority and public sector building representatives at the workshops also considered what would be needed to overcome the challenges and conflicts they associated with implementing heat network zones.

Financing arrangements

Participants from both groups agreed that finding a financing arrangement that could cover costs effectively and fairly was crucial to implementing heat network zones. Both groups felt that any new financing arrangement should attempt to balance the various costs involved with zoning with different stakeholders and their capacities to pay. Local authority representatives also suggested that there should be direct funding for local authorities or for residents in designated heat network zones.

Effective policy and regulation

Both local authority and public sector building representatives felt that central government had an important role to play in setting out effective heat network zoning policy and regulation. Local authority representatives said that any zoning policy should be legally robust, offer guidance around retrofit, and be supported by other legislation, like gas boiler bans. This would help to set expectations, especially around costs, and encourage cooperation between key stakeholders.

> *"…give building asset managers and the investment cycle an early heads-up that this is something that's coming your way." (Local authority representative)*

One local authority planning officer also highlighted that any new heat network zone should be combined with relevant updates to planning policy, especially in situations where connections would be mandated. This would help to ensure that new developments that are mandated to connect are ready to be supplied when the heat network is switched on. Several other local authority attendees agreed that aligning planning policies in this way would help facilitate coordination between the local supply chain, including transport, highways, and developers.

Public sector building representatives expressed a need to better understand the energy efficiency of their buildings before undertaking retrofit works on existing and older buildings, to be able to maximise the benefits of connecting to a heat network. For non-domestic public

sector participants, clear direction on how to retrofit hospital buildings was paramount to successful implementation.

Building local capacity

There was a consensus amongst local authority participants that building capacity within trial cities would be key to effective implementation. This could include support from central government to build technical skills and to share experience and learning between other local authorities. Learning from other countries with more experience of Heat networks (for example, Sweden) was another popular suggestion. Local authority participants also stressed that training to address the skills gap within the broader heat network supply chain would be essential.

Communication

Winning support from relevant stakeholders was raised by several local authority participants in relation to successful implementation. They suggested this would be aided by clear and timely communication of any zoning policy and methodology. Participants also agreed that positive press for any new zones would be important. They felt that with low public awareness of Heat networks, positive momentum is needed to gain public buy-in. They were concerned that stories about disruption or lack of regulation or consumer protection could prove harmful.

Timing of installation

Public sector building representatives suggested that installations should be done in the summer months when demand is lowest, especially where heat provision is paramount to health and wellbeing, particularly in health settings. Participants suggested that this would encourage connection to a heat network within a heat network zone and aid successful implementation.

Views on funding, costs and who should pay

Local authority and public sector building representatives agreed that different costs would need to be met by different stakeholders. Local authority representatives felt that taxes would be best suited to covering upfront capital costs, whilst more ongoing costs could more easily be met by heat network customers.

> *“I would certainly favour taxpayer funding the initial investment, with tenant or consumers funding the ongoing maintenance with the unit rate changed.” (Local authority representative)*

Public sector building representatives highlighted that different building types would need different funding strategies. For public sector buildings, for instance, in which the public would benefit from a well-heated building, they suggested that the public should pay for connection through general taxation. Representatives from both groups who had worked with Heat networks before also warned that costs should be forecast realistically. In their experience, networks could be more costly to run in practice than initially expected.

Views on mandatory connections

Local authority participants felt that mandated connections would be essential to maximising the efficiency of any new Heat networks in zones. In their experience working with Heat networks before, it was difficult to persuade all types of building to connect voluntarily, which limited overall network efficiency. In situations where connections would be mandated, some local authority participants also raised the importance of any new heat network zones being combined with accompanying updates to planning policy.

Public sector building representatives suggested that if the economic case and low carbon credentials of Heat networks were proven then it would be attractive and there would not be a need to mandate connections. These participants also raised concerns around being mandated to connect to a heat network with a fossil-fuel source or to an inefficient system as this would not align with public sector net-zero targets.

Views on regulation of sector

Public sector building representatives suggested that there needs to be improved regulation of the heat network sector and that better regulation of the heat network market will also help achieve good performance and accountability.

Public sector building representatives highlighted that heat network zoning policy for the non-domestic public sector should provide a supportive framework for existing efforts to arrange for nearby private sector buildings to connect to existing public sector Heat networks, easing some of the associated logistical burden for their organisations.

Public sector building representatives referred to having ‘ambitious’ targets for their own buildings, such as Building Research Establishment Environmental Assessment Method (BREEAM), but that this has been driven by internal priorities rather than by regulation. Participants in this group said that net zero building policy in general is often not designed with their buildings (hospitals) in mind and therefore is seen to lack applicability to health trusts. Participants were concerned about an apparent lack of active enforcement of the Minimum Energy Efficiency Standards (MEES) and felt that stronger enforcement of regulations would be necessary.

The role of the local authority

The workshop participants’ own knowledge provided a demonstration of existing experience and expertise important to planning heat network zones and delivering Heat networks. However, the discussions raised concerns about insufficient capacity within the public sector to deliver against the scale of the challenge.

Other workshop participants’ views on role of the local authority

In the workshops, other stakeholder groups also discussed the potential role of local authorities in the rollout of new heat network zones.

Social housing providers felt that local authorities would be central to the successful rollout of zoning. As well as contributing to the strategic planning of new zones, they felt that local authorities could provide an important route to funding to cover connection costs. Both social housing providers and social housing residents also proposed that local authority ownership of Heat networks could be beneficial. This could encourage landlords to accept mandatory connections, and make costs easier for tenants, with the potential for heating costs to be included in rent charges. Nonetheless, social housing providers also recognised that large providers would have to work with multiple different authorities nationally, and that different authorities would have different levels of capacity to support zoning.

Public sector building representatives, private sector non-domestic building representatives and developers all felt that local authorities would be important in ensuring effective communication around the development of new heat network zones. In particular, they suggested that local authorities should spell out the benefits of Heat networks as a low-cost, low-carbon option, and ensure that the logistics of connecting were communicated clearly and in good time.

Survey results about the role of the local authority

The survey sample groups were asked about their trust in local authorities around heat network zones.

About six in ten (58%) non-domestic survey respondents said they trusted local authorities to oversee and deliver heat network zones. In each of the surveys, only about one third of non-domestic, social housing and owner-occupier respondents stated that they trusted local authorities to provide information, advice or recommendations about connecting to a heat network.

Taken together, these findings suggest that there is currently an imbalance between the importance of the role to be played by local authorities in heat network zoning, and a lack of internal capacity and external trust in authorities to deliver zoning.

Chapter 6: Conclusions

This concluding chapter presents summary answers to seven overarching research questions as set out in Chapter 1: Introduction, including a round-up of responses to questions which applied across different stakeholder groups.

Do local authorities, building owners and residents understand heat decarbonisation and why it is necessary to decarbonise heat?

In workshops, local authority officers and public building owners demonstrated understanding of heat decarbonisation and its urgent necessity to achieve net zero targets. However, the research with other groups (public sector professionals than amongst private non-domestic building owners, domestic owner-occupiers and social housing tenants) highlighted a more limited understanding of the necessity of heat decarbonisation and options available. For example, under half of non-domestic building respondents said their business has formal plans to reduce their environmental impact and only 35% of non-domestic respondents had heard of Heat networks, indicating low understanding of heat decarbonisation options. Similarly, fewer than half of domestic owner-occupiers told us they had heard of Heat networks before, indicating low awareness of this heat decarbonisation solution.

The private sector non-domestic buildings, social housing residents and domestic owner-occupiers survey results showed that all groups recognise the importance of tackling climate change. Evidence from both workshops and surveys also indicates that local authorities, building owners and residents all recognise decarbonisation as one of the key benefits of Heat networks. Nonetheless, findings suggest that public and private building owners want to know that Heat networks offer the best value, most feasible way to decarbonise heat.

The overall results support a conclusion that heat decarbonisation is viewed as an important and attractive potential benefit of heat network zones amongst these different stakeholder groups (once they are made aware of these benefits). However, limited awareness of Heat networks amongst building owners and residents may hold back agreement that Heat networks are a potential way to decarbonise. Building owners and residents indicated that they want to be satisfied that Heat networks offer a cost-effective way to achieve heat decarbonisation.

To what extent would local authorities and eligible buildings in a Heat network Zone support zoning and connection to the heat network? Does this vary between building types?

“Eligible buildings” refers to those buildings likely to be required to connect as part of a zoning policy. The government consultation, in its proposals for heat network zoning, identified these to include all new buildings, large public sector buildings, large non-domestic buildings and

large domestic buildings which already have communal heating or are undergoing major refurbishment[77].

The workshop findings indicate that local authorities are likely to broadly support zoning to make it easier to mandate the connections of different buildings to Heat networks. However, such support is likely to be conditional on their being satisfied that Heat networks demonstrably offer the best and most cost-effective solution for decarbonisation in each area, compared to other low-carbon alternatives. Local authorities said they thought that the case for mandating connections to Heat networks was strongest for new developments, large public buildings, and social housing. Workshop participants said they expected it be harder to enforce a requirement for private sector buildings to connect. Local authority workshop participants foresaw that owners of older buildings, when faced with costly retrofit requirements to connect, are likely to resist a requirement to connect on grounds of economic viability.

There is insufficient evidence to conclude the extent of support amongst developers or public sector building owners for zoning and connection to the heat network.

The survey findings indicate that the owners of private non-domestic buildings with a large heat load would support connection to the heat network. However, the survey responses also indicate that support for heat network zoning is conditional on sufficient justification of Heat networks as the best and most cost-effective solution for decarbonisation in each area, compared to other low-carbon alternatives.

The findings suggest that support is also likely to be conditional on:

- Introducing heat network regulation
- Clear information being available about upfront costs, the connection process and timelines, security of supply, operation, and maintenance arrangements
- How associated costs are shared.

Areas of pushback against mandatory connection which emerged from this research include:

- An argument that instead of a requirement to connect, there should be a strong demonstration of the economic case, low carbon credentials and suitability of a heat network for a given area so that it is an attractive option in its own right.
- Cases where retrofit requirements for a building would mean a heat network connection would not be economically viable.

What are the views of domestic owner-occupiers and owners of non-domestic buildings that are currently out of scope of proposed requirement to connect?

A majority (73%) of domestic owner-occupiers surveyed said they would be very or fairly likely to join a heat network voluntarily. The survey results showed that domestic owner-occupiers want to know that the connection costs are fair and affordable, that connecting to a heat

[77] Proposals for heat network zoning. Accessed at: https://www.gov.uk/government /consultations/proposals-for-heat-network-zoning. 21/06/2022

network offered the lowest cost low carbon option available to them and that it will not affect the saleability or value of their home. The survey responses showed that fewer than half of owner-occupiers expected to contribute to installation or enabling costs.

Almost three quarters (73%) of small heat demand non-domestic building survey respondents stated that they would be fairly or very likely to accept an invitation to connect to a heat network. These findings indicate that private non-domestic buildings with small heat loads are willing to consider connecting to a heat network voluntarily, subject to their being satisfied that connecting to a heat network offers the best and most cost-effective solution for decarbonisation compared with other low-carbon heating alternatives. Other priority needs identified include information around costs and timelines, maintenance and repair arrangements, and assurance of supply security.

What challenges do eligible buildings associate with creation of a Heat network Zone and subsequent connection to the heat network?

The four main types of challenges identified are: practical barriers; financial costs; user experience and regulation of the sector; and negative public attitudes, including doubts about lifecycle carbon emissions of Heat networks.

Practical barriers

Concerns about disruption, were raised in workshops with different stakeholder groups and in survey responses, particularly amongst social housing residents. The workshops included concerns that the requirements of certain buildings (e.g. hospitals) for precise room-by-room heating control may not be met by a heat network.

The workshops with social housing providers highlighted that the pepper-potting of freehold and leasehold properties within social housing estates or blocks may raise challenges for connection to a heat network. The mix of self-reported tenure types amongst responses to the social housing survey (which was targeted at addresses identified as primarily social housing tenure) supports this concern, which also reflects available data about leaseholder properties in the social housing sector. 90% of leaseholder respondents identified their expected contribution towards the connection costs as an important concern.

Financial costs

Survey responses by building owners showed a variety of concerns about upfront and ongoing costs, including concerns about fair sharing of costs.

User experience and regulation of the sector

The evidence from workshops showed that eligible building owners were concerned about the largely unregulated state of the heat network sector, centring around accountability of designers, builders, operators and suppliers, fears about unfair pricing, poor customer service and inadequate complaints processes.

The survey findings showed that non-domestic private sector building owners and occupiers are concerned about performance and reliability; increased costs; potential disruption and not being able to choose or change their heat network supplier.

Negative public attitudes

The workshops and open-ended responses to the survey showed that accounts of poor consumer experiences from older, inefficient Heat networks may harm public support for Heat networks. Relatively weak levels of trust in local authorities to oversee and deliver heat network zoning, as evident in the private non-domestic survey responses, present potential challenges to the delivery of Heat networks. Both workshop and survey results illustrate that eligible buildings want clear and effective communication about Heat networks.

Doubts about the full lifecycle carbon emissions of Heat networks, as mentioned in workshops, demonstrate potential threats to confidence in heat network zoning which must be addressed with sufficient information.

What challenges do local authorities foresee with Heat network Zones and what do they consider is needed to ensure their successful implementation?

Local authority workshops revealed worries about the scale of financial costs involved for local authorities and a desire for information about what central government funding will be made available to them. In workshop, they told us they foresee challenges regarding tight timescales, weak supply chains in the UK, and insufficient local authority capacity to deliver the scale of work required. They raised concerns about the extent to which local authority leaders and financial controllers can overcome embedded cultural concerns about reputation and financial risks to take the necessary lead on new heat network zones. In workshops with local authorities and social landlords, we were told that local authorities, as social landlords, are also concerned to protect vulnerable residents from possible financial harm or harm due to disruption.

Evidence from the local authority workshops indicate that they consider the following to be needed to ensure successful implementation of heat network zones: effective financing arrangements; supporting legislation (e.g. a gas boiler ban); supportive planning policy; a legally defensible zoning policy; clear guidance around retrofit; and transparent arrangement for sharing the associated costs.

Amongst tenants and homeowners in the social housing sector, what considerations should be taken into account to minimise resistance to heat network connection?

An important message to emerge from the survey results was that overall levels of existing awareness and direct experience of Heat networks are low among social housing tenants and homeowners in the social housing sector. Information should be provided by trusted information sources: survey responses indicate that well-known non-government organisations, the local council and national government and regulatory bodies, in descending order, are trusted as sources of information, whilst energy suppliers are least trusted.

Feedback from residents with experience of living with a heat network was additionally identified as a valued way for residents to feel more confident about them.

The workshop and survey results suggest that, once informed about Heat networks, social housing tenants are likely to support their housing provider switching to a heat network. Homeowner concerns about the fairness of upfront costs they are asked to bear should be taken into account.

Other considerations to minimise resistance amongst social housing residents, based on the workshop and survey findings, are:

- Customer protection around unfair pricing, repairs arrangements, straightforward access to customer support including via the telephone, effective complaints procedures, provision of annual bill estimates and a choice of billing frequencies.
- Training provision for social housing provider personnel.
- Measures to minimise disruption within the home during installation.
- Measures to mitigate disruption in the building or local area during building works.
- Clear communication about the connection process, metering and billing, security of supply, responsibilities for maintenance and repairs.
- Easy-to-use home heating controls for an unfamiliar form of heating.
- Bills remain the same or lower than previously. This is particularly important for tenants, who are most likely to worry about bills.
- Addressing concerns about not being able to switch supplier.

Who should cover the costs associated with heat decarbonisation and the implementation of Heat network Zones?

The research findings do not provide conclusive findings about who should cover the costs associated with heat decarbonisation and heat network zones. The findings do show this is a salient consideration which is likely to influence acceptance of Heat networks. More reliable findings may be achieved once more detail is available around the various types of costs involved. The discussions also revealed that views on ‘who should pay’ may be influenced by stakeholders’ views on the stated objectives, ownership arrangements and how a given heat network is run.

The interest of a majority of social housing resident survey respondents in individual metering suggests that some social housing residents would be willing to pay for running costs, provided they are affordable. In workshops, social housing residents also cited the example of landlords typically paying installation and replacement. This suggests that some social tenants would see these costs as the responsibility of the landlord.

The survey findings showed that:

- Social tenants expect responsibilities for paying costs to align with their own understanding of current arrangements, so they cover running costs, and their landlord covers installation and replacement costs.
- Owner-occupiers and homeowners in the social sector expect to pay towards running costs but vary in their willingness to cover installation and replacement costs. Financial assistance towards upfront costs, particularly for vulnerable and low-income customers, may be demanded.
- Private non-domestic building owners and occupiers expect costs to be allocated in a fair and transparent way, with building owners bearing some share of the costs alongside taxpayer contributions.

The workshop findings with public sector actors indicate that these stakeholders are likely to favour public taxation to recover the costs associated with the implementation of heat network zones on the basis that the public would share the benefits. However, these discussions were hampered by concerns that there was insufficient available information to fairly answer the question. This suggests that further information about costs and how these will be shared out will be an important consideration.

This publication is available from www.gov.uk/beis

If you need a version of this document in a more accessible format, please email saber@beis.gov.uk. Please tell us what format you need. It will help us if you say what assistive technology you use.