Department for
Business, Energy
& Industrial Strategy

QUALITATIVE RESEARCH WITH CONSUMERS AND OPERATORS OF HEAT NETWORKS

Report

BEIS Research Paper Number 2018/25

December 2018

HEAT NETWORKS QUALITATIVE RESEARCH

A report for BEIS by Centre for Sustainable Energy (CSE)

Acknowledgements

This independent research report was produced by Nicky Hodges, Daisy Goaman and Karen Smith from Centre for Sustainable Energy.

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 respondents for their time and assistance with this research to Professor Janette Webb, for her insightful feedback as peer reviewer, as well as to members of the project Steering Group. BEIS research managers, Patrick Abbey, Philip Cole and Liam Fleming provided support and guidance.

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Executive Summary

Introduction

Heat networks supply heat from a central source to consumers via a network of pipes. District heat networks supply heat and hot water to multiple customers in multiple buildings whereas communal heat networks supply a single building. Heat networks are managed by heat providers, who may engage contractors to undertake operations, maintenance, repair, metering or billing services. This research looks at public-led and private-led district heat networks which serve domestic users living on housing estates or new housing developments in England and Wales.

There is currently limited regulation of the sector: The Heat Network (Metering and Billing) Regulations (2014, as amended) set out requirements for heat metering and for fair, transparent billing based on actual consumption. General consumer protection law also applies. Heat Trust is a voluntary, industry-led customer protection scheme for the district heating sector, which also provides an independent dispute resolution service through the Energy Ombudsman. The Competition and Markets Authority (CMA) completed a market study into the heat networks market. It recommended establishment of a regulatory body to: introduce heat network consumer protection standards equivalent to those for gas and electricity customers; improve transparency in the agreements between customers and heat network operators; make consumers aware of what they are paying; and protect customers from poorly designed, built and operated heat networks.

This research aims to further understanding of the experiences of heat network consumers and operators, in order to help inform work on a future market framework for heat networks. Research questions explored a range of aspects of heat network delivery and their effects on consumer satisfaction and consumer protection.

Methodology

This qualitative research follows on from the Heat Networks Consumer Survey (HNCS).[1] It provides additional depth and insights to support understanding of the survey findings about consumer experiences of heat networks. Forty telephone interviews and six focus groups were conducted with district heating consumers. Twenty telephone interviews were also conducted with heat network providers and other actors involved in the delivery of district heating schemes in England and Wales.

The research was designed to explore areas of consumer dissatisfaction and their experiences of making complaints. Consequently, the findings are likely to reflect a more negative than average picture of heat network consumer experience.

[1] HNCS is a large-scale postal survey conducted by Kantar Public on behalf of BEIS to quantify consumer experience of heat networks in England and Wales in 2017. Available from: https://www.gov.uk/government/publications/heat-networks-consumer-survey-consumer-experiences-on-heat-networks-and-other-heating-systems

Key Findings

Consumer protection responsibilities

The roles and responsibilities of heat network operators in ensuring consumer protection appear to differ across heat networks. For example, private heat network operators suggest that their consumer protection responsibilities depend on the type of contractual arrangement that they have with developers and landlords. In many cases, consumers are unclear on divisions of responsibility, particularly between landlord/property manager and heat network provider.

Most public sector providers interviewed described their responsibilities in relation to heat network users in ways that suggest these are enmeshed with their responsibilities as landlord/property manager to tenants and leaseholders. In public-led schemes (where the landlord is also the operator), the responsibility for maintenance and repairs was generally well understood by consumers. Across both public-led and private-led schemes, the study encountered a variety of in-house and sub-contracting responsibilities for metering, billing, operations, maintenance and repairs and customer services.

Amongst private-sector operators, Heat Trust was most frequently referenced as providing the framework for their complaints handling approach, including access to the Energy Ombudsman. Public-sector led scheme operators mostly reported managing complaints via their organisation's general internal complaint handling schemes.

Operational efficiency of the network

Owners and operators report deploying various approaches to guard against the risks of poorly designed or installed schemes negatively impacting on the future cost efficiency, reliability and value for consumers (e.g. improved sign-off procedures; in-house design supplement). Building Management Systems are widely used to monitor operational efficiency.

None of the providers interviewed recalled passing on the additional costs of inefficient performance to customers. Several public sector providers claimed not to have passed on the costs of major refurbishment works to consumers, explaining that repairs had been paid for from general organisational reserves. Private providers highlighted that an energy service company (ESCO) model protects consumers against potentially high costs of underperformance.

Service interruptions

Periodic planned interruptions were accepted by consumers as a necessary part of network maintenance, most consumers were satisfied with the frequency and handling of these interruptions to their service. Although some consumers were frustrated with experiences of unplanned outages, especially where they felt their provider had not acted promptly and/ or had not kept them updated.

Billing

There was variability in the amount consumers reported being billed and the frequency with which they were provided bills. Most preferred to receive regular bills or statements. Some consumers also felt being locked into buying their heat supply from a specific supplier is inherently unfair. Consumers who said they were not properly informed about the likely costs of district heating before moving in also said their pricing is not fair.

Information provision

Consumers do not always understand or recall the information provided to them about heat networks. Information provided as part of a larger welcome pack can be missed and in-person demonstrations were preferred by some consumers. It appears that information provision could be improved when people are at the stage of buying or renting homes that are connected to heat networks.

Consumer rights and complaints

Most consumers in the research had limited accurate awareness of their rights. The handful of consumers who had tried to complain felt they had very limited rights. Most consumers were unsure of how to pursue a complaint, though expressed confidence they could find out should they need to. Some felt there was no point in making a complaint because the heat supplier has a monopoly therefore no motivation to resolve the problem. Of the consumers who had made complaints, there were some instances of negative experiences and perceptions of operators as being unhelpful. Several consumers mentioned their resident association as a helpful source of support.

Influences of consumer satisfaction

Reliability, control of heating and water, and speed and effectiveness of repair services all had a large impact on how satisfied consumers were. Consumers that had experienced confusion over who is responsible for repairs within their homes and some of the issues mentioned above (perceived unfair billing, unplanned outages and inadequate information provision) expressed dissatisfaction with their heating systems.

Chapter 1: Introduction

This research was commissioned by the Department for Business, Energy and Industrial Strategy (BEIS) to provide evidence in support of future policy making concerning heat networks. It focuses on district heat networks and provides qualitative findings intended to add to and inform interpretation of quantitative findings from the Heat Network Consumer Survey (HNCS)[2] conducted in 2016/17.

Background

Heat networks in the United Kingdom (UK)

Heat networks supply heat from a central source via a network of pipes. District heating systems are a form of heat network that supply heat and hot water to multiple customers in multiple buildings. This research explores the experience of residential district heating consumers, living on housing estates or new housing developments in England and Wales. It also explores the experience of heat providers and other actors involved in the delivery of district heat networks.

Older district heating schemes in the UK were mainly developed by local authorities, serving housing estates; many of these are still in operation, though some are now aging and require upgrading. There are a growing number of newer systems serving new developments in London and other cities, encouraged by planning as a means of achieving targets for decarbonisation. The Clean Growth Strategy[3] set out plans to build and extend heat networks across England and Wales. BEIS established its Heat Network Delivery Unit (HNDU) in 2013 to provide support for local authorities through grant funding and guidance to develop heat network project development. BEIS' £320 million Heat Network Investment Project provides grants, loans and other support for heat networks.

Delivery models and roles

There are a range of delivery models and operational structures for heat networks. This report follows the typology set out in recent BEIS guidance, which identifies private-led, public-private shared leadership or public-led (local authority or housing association) schemes or community companies.[4]

[2] HNCS is a large scale postal survey conducted by Kantar Public on behalf of BEIS to quantify consumer experience of heat networks in England and Wales in 2017. Available from: https://www.gov.uk/government/publications/heat-networks-consumer-survey-consumer-experiences-on-heat-networks-and-other-heating-systems

[3] Clean Growth Strategy (2017) set out UK Governments plans to decarbonise economy through the 2020s. https://www.gov.uk/government/publications/clean-growth-strategy

[4] Gibbons et al, 2016, Heat Network Detailed Project Development Resource: Guidance on Strategic and Commercial Case. BEIS.

Private-led schemes: a private sector company (typically an energy service company (ESCO[5])) is responsible for design, financing, building, asset ownership and operation. The land ownership and property development may be a separate developer, including a local authority or housing association. Public-private shared leadership are schemes involving shared governance and funding roles, with a private ESCO typically responsible for asset ownership and operation. In the interest of safeguarding anonymity, reporting of findings relating to public-private shared leadership schemes are integrated with findings relating to private sector schemes.

Public-led schemes: a local authority or housing association is responsible for design, financing, building, owning and operation. Certain operational responsibilities may be contracted out, from metering to all operational activities. Where appropriate, there is contextual reporting of whether the lead body is a local authority or a housing association. However, for the most part, these are reported together as public-led, to safeguard anonymity.

Community company (CoCo): a community body will be central to the governance of the scheme, as well as potentially being the generator and undertaking the sale of heat. In some cases, the Community Body may undertake a number of other roles. No focus groups or operator interviews were conducted with consumers or operators of such schemes. A couple of interviewees (an operator and a consumer) mentioned examples of schemes which may fit this model, in that residents have a decision-making role in how their scheme is run.

Current and future regulation of the sector

There is currently limited regulation of the heat network sector. The sector is governed by general consumer protection legislation and EU driven Heat Network (Metering and Billing) Regulations were introduced in 2014 requiring heat suppliers to issue accurate bills based on actual rather than estimated consumption. Bills must be issued at least once a year, or twice a year if the customer is being billed annually, include an explanation of how the bill was calculated, and specify which charges are fixed and which are variable.

Heat Trust, a voluntary customer protection scheme, provides a set of customer service standards for registered heat networks. Over 50 mainly new heat networks are registered to Heat Trust. The standards dictate:

- Consumers receive heat supply arrangements' information packs and clear bills.
- Service is restored 24 hours after any unplanned outages; compensation should be paid to consumers if this is breached.
- Additional support is provided to vulnerable consumers.
- Complaints should be resolved within an eight-week timeframe and consumers can access the Energy Ombudsman.

[5] Energy Service Company (ESCo) is a structure that produces, supplies and manages the delivery of decentralised energy to a 'whole site' development.

In its market sector final report[6] published in July 2018, the CMA found that the sector has features of natural monopolies and identified the need for a public sector regulatory body to be established to:

- Introduce consumer protection for heat network consumers equivalent to that for gas and electricity consumers.
- Improve transparency and ensure there are clear agreements between customers and heat network operators.
- Ensure consumers are aware of what they are paying.
- Protect consumers from poorly designed, built and operated heat networks by preventing developers from using cheaper options, that end up being paid for by the customer over the longer-term, in order to meet planning regulations.

BEIS, as the government department responsible for heat network policy, is actively considering the CMA's findings. In doing so, it has sought to develop an independent body of evidence to better understand the experience of heat network consumers and operators.

Aims and Objectives

This research aims to build an evidence base to support BEIS' policy team understanding of the experience of heat network consumers and operators. BEIS prioritised the following research questions for investigation via qualitative research.

Research questions for interviews with heat network operators and owners

- What are the roles and responsibilities in terms of customer protection of those involved in the heat network and how does this work in practice?
- Do consumer expectations and the expectations of operators align or misalign?
- How is operational efficiency of the network monitored against design performance expectations?
- How are consumer protection standards ensured? And how does this work in practice?
- What is the process for managing complaints?

[6] CMA (2018) Heat networks market study Final report. Available at: https://www.gov.uk/cma-cases/heat-networks-market-study#final-report. [last accessed 20.09.2018]

Research questions for interviews with heat network consumers

- What drives users' overall satisfaction and why?
- What are consumer experiences of system outages?
- How does metered consumption impact behaviours?
- How consistent are the frequency and price of bills and what are consumer experiences and preferences of this?
- What are seen as the characteristics of a 'fair' billing methodology and why?
- To what extent are consumers aware of their rights?
- How well do consumers understand their complaints procedure?
- What are consumer experiences of making complaints and their outcomes?
- Is information provided to the consumers understood? How could it be improved?

Methodology

Research design

This qualitative research follows on from the Heat Networks Consumer Survey (HNCS) to provide additional depth and insights which support understandings of the survey findings concerning consumer experiences of heat networks. Forty telephone interviews and six focus groups were conducted with district heating customers. Twenty telephone interviews were also conducted with a variety of actors involved in the delivery of district heating schemes in England and Wales.

Consumer interviews

The consumer interviews were conducted during the summer of 2018. The sample of 40 consumers was drawn from a list of 260 HNCS respondents who had given consent for future contact. Respondents were asked to complete an interview then or at a convenient time for a call back. Each interview lasted approximately 20 minutes. Basic information from the HNCS was used to achieve a balanced sample of consumers across a range of district heat networks, in terms of delivery model, age of building (as a proxy for age of heat network), metering arrangement and Heat Trust status. The achieved consumer interview sample is shown in **Error! Reference source not found.**. Where individual consumers gave consent, their responses from the HNCS were joined to their interview responses to identify patterns in the experience of consumers in heat networks with given characteristics. Two consumers did not give consent for their HNCS responses to be accessed by CSE.

Table 1: Profile of consumers interviewed. Source: HNCS, 2017[7]

Heat Trust	Count	% (n=38)
Not registered	34	89%
Registered	4	11%

Heat Metered	Count	% (n=35)
Non metered use	21	60%
Metered use	14	40%

Heat provider	Count	% (n=37)
Private	13	35%
Local Authority	10	27%
Housing Association	8	22%
Don't know	6	16%

Region	Count	% (n=38)
London	13	34%
South West	6	16%
South East	5	13%
East of England	4	11%
Yorkshire and The Humber	4	11%
East Midlands	3	8%
West Midlands	2	5%
North West	1	3%

Year property built	Count	% (n=33)
Before 2000	22	67%
After 2000	11	33%

Consumer focus groups

The focus groups were conducted with groups of consumers: three from private-led schemes and three from public-led schemes. Consumers attending focus groups were different individuals to those who participated in telephone interviews. Each focus group was attended by four to seven participants. Participants were offered a £20 shopping voucher as an incentive to attend. Most participants were recruited from amongst HNCS respondents served by the same scheme. A few participants were recruited via local social media groups and posters on noticeboards at sites. Four focus groups were held in the evening and two in the daytime.

All of the private-led schemes associated with focus groups were built after 2000 and are individually metered. The public-led schemes associated with focus groups are all older schemes built before 2000, two of which do not have individual property metering.

Though not formally recorded, there was diversity in terms of age, gender, employment status, income, and disability status across the focus group participants. In two of the

[7] The no. of responses does not always equal <38 due to non-responses to questions in the HNCS survey.

groups, one or two individuals were particularly knowledgeable about the technical side of how their heat network is operated, including one person who works in the energy sector.

Interviews with heat network delivery actors

Telephone interviews were conducted with 20 individuals involved in heat network delivery regarding consumer protection roles, responsibilities and practices across a range of private-sector led and public-sector led schemes.

Table 2 below provides a breakdown by primary role type of the interviewee and their organisation. Most of the private operators and three housing associations have oversight or operational responsibilities for multiple heat networks. They described differing forms and extent of involvement for different heat networks.

Table 2: Breakdown of heat network delivery interviews

Main heat network delivery role of interviewee/their organisation	Number of interviewees
Landlord or property manager	3
Public owner / operator	7
Private operator (mix of owners and operations & maintenance contractors)	7
Metering-only or metering and billing contractor	3

Contact details were found from a range of sources including email contacts from the Regulatory Database of heat networks known to BEIS, internet searching and CSE's professional networks, including through the Heat Trust acting as intermediary. Interviews were conducted over the phone at pre-arranged times. Most interviews lasted between 45 minutes and an hour.

Actors involved in the delivery of schemes were selected to allow comparison between provider and consumer perspectives for schemes where focus groups were held. The range of interviews captured perspectives from the following parties for heat networks: local authority; housing association; commercial energy services companies (ESCO); estate management company; and contractors involved in design, build, operation, maintenance, metering and billing. No private developers were interviewed. The scope of responsibility of individuals interviewed ranged from oversight for multiple district heating schemes nationally to backroom metering support. Interviews covered exploration of a wide range of consumer protections, as covered in the Heat Trust rules as well as pricing and issues at design and installation stage that affect the consumer experience in operation.

Analysis

All interviews and focus groups were recorded and transcribed. Transcripts were analysed using qualitative analysis software. The coding was structured in line with the research

questions. Coding was conducted by one researcher and checked by a second researcher. Case classification of consumer attributes (using information from the HNCS) was used to group interviews and reference in analysis. Case classification of operator interviews was used to link interviews relating to the same heat network and to aid analysis of public- and private-led networks. A set of framework matrices was produced for each set of interviews and for the focus groups using automated summaries of coded text. In preparing thematic summaries, researchers referred to both the automated summaries and the full transcripts. In writing up the report, researchers drew on the thematic summaries and full transcripts.

Limitations

The research findings should be interpreted in the context of the following limitations.

Sampling

The sample of consumers interviewed and attending focus groups may be biased towards consumers who have experienced problems with their heat service or provider. Most of those sampled for the focus groups were contacted following participation in the Heat Network Consumer Survey. A few participants were accessed through convenience sampling, this may lead to over-representation of those that have experienced issues with their heat network. Telephone interviews were conducted both during the day and the evening to catch people working full time. However, the sample is still likely to over-represent people who are not working and have time to conduct a 20-minute interview with no prior notice or incentive.

Some operators invited to interview declined or did not respond. It is possible that operators who feel they have a high standard of consumer service and protection are more likely to respond. The lack of access to a comprehensive list of providers, with up to date contact details and information is also likely to have resulted in bias towards larger and better-known providers, including Heat Trust members.

Accuracy of information

The accuracy of information provided by consumers and operators is a potential limitation of the research approach.

Interviews with providers covered a range of topics, so individual interviewees were unable to answer some questions. Despite findings being anonymised, it is also possible that operators, in the knowledge that the research was commissioned by BEIS, shared information to give a positive image of themselves and may have withheld information that could make them appear less favourably.

Structure of the report

The main findings are structured around five chapters:

- Chapter 2 looks at oversight and overall responsibility for system operation and performance, primarily drawing on evidence from operators and others involved in the operation of the heat network.

- Chapter 3 explores the technical service provided and consumer experience, exploring issues with heating and hot water service, controls, system outages and fault reporting and resolution.

- Chapter 4 explores metering, billing and pricing, including how bills are calculated, information provided on bills and consumer perceptions of fair billing and pricing.

- Chapter 5 focuses on provision of information to consumers, including information provided before moving in, on moving in and consumer understanding and perceptions of the accuracy of the information provided to them.

- Chapter 6 focuses on complaints procedures and consumer experiences of making complaints, views and awareness of consumer protection standards.

- Chapter 7 rounds up key findings in response to the research questions.

Chapter 2: Oversight and overall responsibility for system operation and performance

This chapter mainly draws on interviews with operators and others involved in the operation of the heat network to address research questions on their roles and responsibilities in terms of consumer protection, including how this works in practice. For contextual information, a high-level summary of the split of consumer-related roles and responsibilities across the schemes where focus groups took place is provided in Table 2.

Table 2: Division of roles / responsibilities in heat network delivery

Heat network	Customer service	Maintenance & repairs (M&R)	Metering	Billing
Public-led 1	In-house	Contractor	Contractor	In-house
Public-led 2	In-house	In-house	In-house	In-house
Public-led 3	In-house except metering	In-house	Contractor	In-house
Private-led 1	Operator / contractor (M&R) & contractor (billing)	Contractor	Contractor	Contractor
Private-led 2	Operator (landlord re building)	In-house	In-house	In-house
Private-led 3	Operator (landlord re building)	In-house, with limited use of individual contractors	In-house	In-house

Overall responsibility and oversight

Overall responsibility for older public-led individual district heating networks is in some cases the role of a single individual or in-house team with upward accountability for performance to a head of team and financial oversight via the organisation's overall governance. Amongst those cases investigated, sub-contracting was minimal – including 'back-office' metering services (with billing services retained by the provider) or outsourcing of maintenance and repair services. Some schemes have been run and

maintained by the same team over many years, whilst others had lost a dedicated post, resulting in a loss of continuity, in-house expertise and oversight. In the case of one district heating network where delivery responsibility has been transferred to a non-profit management, accountability is both to the landlord and to residents, via resident engagement mechanisms. Interviewees representing local authority and housing association providers did not identify their respective ombudsmen as particularly engaged with district heating issues.

Housing associations with multiple heat networks (both district and communal heating) reported some centralisation of services, but with a mix of arrangements for in-house or subcontracted maintenance, repairs, metering and billing activities across their portfolio of housing schemes served by heat networks. For instance, one major housing association reports that on some heat networks, repairs and maintenance is done in-house whilst on others, it is sub-contracted. Likewise, it has a range of subcontractor and in-house arrangements for metering and billing across its portfolio. It also has housing schemes where the heat network is operated by an ESCO, with all responsibilities delivered by the ESCO or its subcontractors. One housing provider reported a recent decision to create a dedicated post to oversee the various heat networks across their growing housing portfolio, including older networks inherited as a result of housing association mergers and networks in new build developments: this decision is intended to improve oversight.

Amongst those interviewed, several private providers described having in place an organisational governance structure providing oversight of heat network performance, whilst they also explained that they report to their client (which could be a developer, landlord or estate management company) regarding performance. An estate manager identified a reliable service, regular contact between the heat network manager and the estate manager, low levels of consumer complaints, a lack of ‘showstopper’ problems and operator’s responsiveness to problems as markers of satisfaction with the provider’s overall performance. One provider reported consumer complaints as a standing agenda item in fortnightly reporting meetings with the client.

Private sector providers distinguished the extent of their readiness to deliver depending on the contractual responsibility they take on, with several operators differentiating between their role on networks where they act as an ‘ESCO’ and their role on networks where they act as an operational and maintenance contractor. This was most clearly illustrated by one interviewee, for whom, in the role of operational and maintenance contractor, what they are prepared to do is “defined by the terms of contract to the developer client and what they are prepared to pay for”, whereas in the role of ESCO they are prepared to “go the extra mile” in the interests of the consumer. The provider described how during a period of bad weather at an ESCO-led scheme, arrangements were put in place for engineers to be on site overnight to prevent or resolve outages whereas as an operational and maintenance contract, they would first have sought agreement from the client that they would pay for anything which is not part of the agreed contract.

In interviews, both public- and private-led providers referred to their use of competitive procurement (including of metering, billing, operations and maintenance, maintenance and repairs, customer services) as a means to achieve best value, improve the quality of the service and better meet the needs of consumers for a responsive and easy to use service. The use of short term (2-3 year) contracts was seen as a way to avoid getting stuck with an underperforming provider.

Where lead providers subcontract roles, they report efforts to ensure a consistent identity or brand so that consumers know who to contact. Some undertake billing themselves to keep brand consistency whereas others who use a billing agent try to make it clear that whilst they are the provider, billing queries should be addressed to the billing body. Public-led providers in particular rely on their visible presence in the area – and often their combined role as landlord - to ensure consumers are clear on who their heat provider is.

Performance monitoring and cost

Interviewees highlighted multiple ways to monitor the performance and cost of heat networks. Building management systems were a widely identified and valued tool for monitoring performance, to achieve improved efficiency and for early detection of problems to be acted on before any consumers are affected. Key Performance Indicators (KPIs) are also reportedly widely used for monitoring purposes, though the most specific (and only widely referenced) KPI named was flow and return temperature. Operators of older public sector schemes talked about the importance of the expertise of staff with long experience of the network's operation. In contrast, one non-profit operator explained how new management of an older public scheme had led to improved monitoring of performance and significant improvements in operational efficiency, with cost savings passed on to consumers. Providers of multiple schemes reported their use of centralised control rooms to monitor performance across schemes, using this to maximise efficiency and to plan maintenance and repair.

Within the public sector, routine systematic collection of customer feedback about the heat service appears to be limited. One social housing provider felt the importance they give to consumer feedback via regular tenant surveys distinguished them from others in the sector. Collection of customer feedback is reportedly more common amongst private-led schemes, via customer satisfaction surveys, quarterly meetings with a local representative body or at annual open days. It was not fully explained how this consumer feedback was used, but one provider gave examples of quick fixes and strategic changes made in follow-up to consumer feedback to improve service responsiveness. Lead providers for both public and private schemes felt they had a strong understanding of areas of consumer dissatisfaction and that people who are satisfied with their heating system are less likely to provide feedback.

Design, installation and operational performance

Operator interviews included discussion of how operational efficiency of the network is influenced by the design and installation stages of heat network delivery. Operators involved in both, old and new schemes agreed on how significantly the design and installation of the heat network –and of the building itself – influences the operational performance.

Providers operating new schemes emphasised the importance of the design and install quality in determining the future cost efficiency, reliability and value for consumers of new schemes. There was a shared preference amongst private sector providers for being involved in the design and build through to operation, to the point of this being a condition of taking on the ESCO role. One provider explained that this enabled "a more holistic view

of the operation", whereas in adopting a scheme installed by others, "you operate as best you can within the constraints you've got".

From the interviews with private providers – and larger housing association providers – a picture emerged of various means by which they have tried to learn from their past experience to guard against the risks of operating poorly designed or installed schemes. These included seeking to be engaged early enough to influence the design and install (though with a recognition that this is up to developers); taking installation in-house as an ESCO rather than subcontracting it; tightening up their checking and sign off procedures prior to adoption of a scheme, including by appointment of an approved consultant to undertake commissioning rather than relying on sign-off by the design and installation contractor. Some providers reported having gone further: one private provider reported that they will now only act as an ESCO for schemes where they have been involved in the design and build. One social housing provider reported having developed their own in-house design supplement which they require to be followed by contractors for all their new developments. In the first operational development where this had been followed, it was reported to be performing well against design expectations.

A handful of providers operating schemes explained steps taken to seek redress where they had encountered problems that they believed were due to issues at design and install stage. They reported some occasions of successfully challenging the design and build contractor of schemes, requiring them to undertake recommissioning and snagging to address problems (e.g. with insulation and open valves) within the warranty period. However, in cases where the problem had been identified or arisen outside the warranty period, a social housing provider reported absorbing the costs of additional rectifications, rather than passing it on to consumers.

One problematic area identified concerns the design and build of elements of the structure of new housing by developers that can affect the performance of district heating and hot water. These include under-sized radiators, complicated heating programmers, and the choice of low flow taps, showerheads and cooling systems. Suppliers reported instances where consumer dissatisfaction directed at the heat supplier was a result of developer decisions, where the resolution of problems can prove lengthy or outside the control of the provider. An example of this is where a consumer's dissatisfaction with high heating bills was diagnosed by the heat provider as due to under-sized radiators, causing the heating to stay on because the desired room temperature could not be attained. It proved time consuming for the case to be resolved – it involved the heat provider collecting diagnostic data to prove this was the case to the developer, who then replaced the radiators.

Private operators drew attention to how a business model where the ESCO owns and operates the heat network means that the ESCO itself accepts the risks of major repair costs, such as in the case of a major pipe leak, and from under-performance of the heat system, thereby protecting the consumer from these financial risks. One private provider noted their use of a price calculator which includes a performance adjustment. This was presented as a measure built into their charging model which serves to protect consumers from over-paying where the system does not achieve the promised level of efficiency. Two private operators contrasted this with private developments where there is an operations and maintenance contractor, in which case, consumers may directly share the risks of potential major costs, such as repair of a major leak or retrofits to address design-related problems.

Older schemes and renewal

Providers in this study who are responsible for operating older public schemes described how the age and historic design of the heat network, the condition of the building fabric and historic underinvestment affects the performance and cost of the heating system. Most of the public sector providers interviewed reported having undertaken major capital investment works to improve the efficiency of housing stock served by heat network, the heating system and/or the heat centre. All those concerned reported that the costs of such works are not passed on to consumers – some reported these costs were paid for out of organisational reserves (not solely from the income from heat network customer bills), though in some interviews the source of funding was not fully explored or clarified. Public sector providers of older schemes said that they either had passed on, or they aimed to pass on, subsequent efficiency savings to consumers in the form of reduced bills. Public sector providers acknowledged that inefficiently run schemes result in the cost either being passed on to the consumer or the scheme running at a loss. The use of income from combined heat and power (CHP) centres is one means used by public sector providers to subsidise the district heating costs for domestic consumers.

Chapter 3: System performance and controls

This chapter reports operators' and consumers' views and experiences of heat networks performance and controls.

Heating controls

Who is responsible?

In private-led schemes, heat providers take responsibility for supply up to the heat interface unit (HIU) and meter, including for routine maintenance and long-term replacement of the HIU. Radiators, underfloor heating, programmers and thermostats are identified as the responsibility of the developer within the warranty period of new homes – and of the landlord or managing agent's facilities management team, the home owner themselves or the social housing provider beyond that time. The defects liability period (the period after a property has been constructed during which the contractor remains liable under the building contract for dealing with any defects which become apparent), is identified as a 'bit of a grey area', in recognition of which one private ESCO provider reports 'actively taking the lead to try and take the aggravation away from the resident'. Similarly, providers acknowledge that it can be confusing for consumers to understand that the heating controls within the home are not the responsibility of the heat provider. One provider reports providing:

> *"a demarcated diagram in the residential supply agreement along with a written description of what we're responsible for and what we're not responsible for"*
>
> *Private-led scheme lead provider*

Providers also reported using telephone diagnostics where there is a problem that may relate to the controls and then directing consumers to their housing provider or own plumber, but also report that in some cases they will try to help over the phone or send an engineer anyway, even where they recognise it is not their responsibility.

All the public sector providers identified their responsibility as extending to heating controls and radiators within individual properties, though some providers have in-house teams to undertake repairs and others subcontract their repairs and maintenance service.

Consumer experience of heating controls

Whilst most consumers who participated in this research are generally satisfied with the level of control they have over their heating, some consumers are unable to turn their heating down or off, exposing them to problems of overheating. This is largely consistent with the HNCS that found 14% of consumers were dissatisfied with their level of control, and that limited control was commonly associated with overheating. Limited control over

heating was particularly associated with older properties, including where there are no controls within the home, or where controls are broken or stuck. Generally, the level of control is an important driver of consumer satisfaction with the heating service.

Focus group participants who reported having limited or no heating controls described experiencing overheating. In one older scheme where heating controls are centralised, so residents can't turn their own heating on or off, they generally expressed satisfaction with the levels of warmth and felt that problems of overheating only tended to arise temporarily in the transition between seasons.

> *"On the negative side sometimes when the transitions of seasons, when they still have the heating on, the flat can get unbearably hot and it's only when you get the really coldest of coldest days that you even vaguely feel a little chilly, but it's still 24 degrees inside the flat. I'm just used to it being very hot."*
>
> *"I'd say my average is probably about 26 or 27."*
>
> *Residents at public-led scheme*

In several focus groups, participants reported average temperatures to be generally warm. Some participants said they sometimes found it uncomfortably hot and suggested that they would keep their windows open as much as possible, dress very lightly and/or simply adjust to warmer temperatures. A few consumers had the use of cooling systems but chose not to use them due to high running costs.

> *"I open the windows. I'm on the 13th floor so I can get a fair breeze. I've got a couple of large fans here that help as well. It's more a question of cooling the place down. I've never had trouble heating it up"*
>
> *Unknown tenure in pre-2000 property*

Most consumers who lived in newer schemes reported having the ability to control the temperatures within the home, including in different parts of the home. Some consumers described the communal areas, such as corridors, getting very warm and having limited control over the heating in those areas.

Hot water service

Amongst the consumers involved in this research, many reported problems with hot water not being hot enough, being scalding hot, taking too long to get hot or being inconstant temperatures. Hot water taking a long time to heat up, or being unreliable, was an issue experienced by consumers in two of the focus groups of private-led schemes. Participants in one group recalled being told that up to two and a half minutes is an acceptable time to run water until it gets warm. Consumers expressed dissatisfaction with explanations provided by the heat providers and the water wastage whilst it heats up, particularly since their water is metered.

Fault reporting and resolution

In both public- and private-led schemes included in this study, fault reporting was mostly described by providers as mainly via a customer call line. Some offered 24/7 or an out of hours service, with a customer service centre responsible for redirecting to the appropriate team or raising an automated alert or call out. Private-led scheme operators and public operators using sub-contractors described using a diagnostics procedure to correctly direct the problem in-house or to another party, such as the housing provider, buildings facilities management or their repairs and maintenance contractor. Some, but not all, public sector providers offer a Freephone service. Public-led schemes report rapid response times in line with internal standards, whereas private-led schemes report response times in line with Heat Trust. Providers also report responding to different forms of reporting, including online, in person to an onsite office, or via social media. Larger providers report using an app-based system that enables monitoring of fault reporting: from logging and assigning a job through to customer confirmation that they are happy with the resolution.

Maintenance and repair

Across the public- and private-led heat network operators interviewed, the research revealed a mix of in-house delivery and contracting of maintenance and repair services. Lead operators tend to report that their choice, whether in-house or subcontracting, was intended to improve the quality of service for consumers. However, from the consumer feedback, it seemed hard to identify any patterns in satisfaction with the service.

A few consumers reported confusion around which organisation is responsible for fixing certain issues that they identified as related to their heating or hot water. The examples given included instances of disputes between heat providers and housing associations over responsibility, leaving consumers with unresolved problems or feeling they had not received the information they need. Such problems were discussed in two of the focus groups at private-led schemes. One participant recalled having struggled to get a broken thermostat fixed due to a disagreement between the heat provider and housing association.

> *"What happens is always that they come from [heat provider] and they always try to push responsibility to [social housing provider] who is the owner of the flat basically. Then we have this ping-pong between them. 'It's your fault,' 'No, it's not my one,' and then we are in the middle and I'm like, 'Okay, who is gonna fix the issue?' We had problems and we had to wait one week, two weeks, and it's long. The customer service is failing on both sides. That's the problem."*
>
> *Participant at private-led scheme*

Private providers, in interviews, demonstrated awareness that consumers can be left feeling confused by such situations. Private providers' explanations of how they respond in such situations indicated some inconsistency, sometimes sticking firmly to their contractual boundaries to insist that the social housing provider deals with problems to do with a faulty radiator, whereas in some other cases describing their customer service desk attempting to help consumers set their thermostat, despite that being the responsibility of the housing

provider. Such instances of going beyond contractual responsibilities were given to show a willingness to help the consumer out and maintain a good relationship.

Planned system outages

Both public and private sector providers reported that they timetable planned outages to avoid winter and periods of peak usage. They all said they give consumers prior notice to minimize disruption. Providers of older public-led schemes with significant back-up capacity reported that they had minimal need to undertake planned shutdowns.

Advice on how to minimise heat loss and facilities to provide temporary heaters were reported as ways to minimise disruption during planned system outages. Some public sector providers mentioned their preference to use noticeboards and door drops rather than emails or mail outs to provide advance notice to consumers of any planned outages. Amongst private providers, their use of noticeboards and door drops were also mentioned as means of advising consumers of planning outages, as well as use of mail outs or via an in-home display. The reported length of notice periods varied – one public sector provider stated a minimum 48 hour notice period. Some private sector providers reported providing a minimum notice of 5-7 days or 'in line with Heat Trust', whilst one private provider reported sending out a letter a month in advance and a further letter 3 days beforehand.

Across interviews and focus groups most consumers accept that planned outages are sometimes necessary to maintain heat networks, particularly newly operational networks. They are happy that operators have taken adequate steps to reduce inconvenience, including providing adequate notice and planning maintenance at times to reduce impact on consumers. This research suggests that planned outages are currently being effectively managed.

Unplanned system outages

Some public sector providers and some private sector providers reported few or no unplanned system outages in the last year, citing their access to significant back-up capacity. In one case, a provider had installed generators to address historic problems of frequent power cuts, enabling them to minimise risks of loss of supply, including minimising the extent of impact and duration of any incident. Providers acknowledged that unplanned interruptions could arise on live development schemes. The most frequently reported instances were diggers going through pipework causing a leak or area-wide electricity outages causing an interruption to the heat centre. Private sector providers and public providers of multiple heat networks reported various measures in place to use if needed: step-by-step response process; communications plan using multiple channels to inform consumers, compensation for outages exceeding certain duration, and temporary heating for vulnerable consumers. Several public providers emphasised making sure consumers are told about interruptions as quickly as possible via various means, including via the presence of a site office and word-of-mouth sharing. All public providers also said they held supplies of temporary heating to provide to consumers if needed. Both public and private sector providers referred to their building management systems as a key way of avoiding or minimising the duration of any unplanned system outages.

Most consumers interviewed report either no unplanned outages or outages for short periods of time -less than three hours. Some reported never having experienced any unplanned outages over many years of living in their home or of only hearing of outages after the event without feeling any consequences because the problem was already fixed. This supports the claims of providers to use building management systems and back-up capacity to minimise the frequency or impact of outages.

Some consumers reported unplanned outages to be an ongoing problem affecting them. These were most commonly home owners in properties built after 2010. This is inconsistent with the HNCS, which reported outages to be more common in older properties. Awareness of the causes of outages varied. Some consumers in new developments which are still being built said that they understood that such outages tend to be due to construction workers damaging pipes. Other reasons for outages mentioned by consumers across different heat networks included leaking pipes, airlocks in the system and design problems that had not yet been resolved (included the size of pipes). Other consumers were unaware of the causes. Consumers experience of the times taken to fix problems vary: some experience multiple outages in the morning that are generally fixed by that evening and others have experienced longer term outages lasting up to weeks or months.

Consumer satisfaction with heat providers' response to unplanned outages is reported to be heavily influenced by the communication they receive about the issue. Where consumers receive little or no information regarding the expected length of the outage, the cause, or measures being taken, consumers are much more dissatisfied than those who feel they are kept updated. Dissatisfaction with their heat provider's response was more acutely felt and more frequent amongst consumers on private-led new developments. Some felt they could no longer trust information they were given by the heat supplier. Some consumers said they preferred to rely on their residents' association as a more reliable source of information than their heat provider.

> *"There have been times where it's been off for like three days. I think the frustrating part is they don't send out any communications to say the heating is down for this or that reason, they don't tell us anything. They just do whatever they want to do, whenever they want to do it, as it suits them."*
>
> *Part owner in property newer than 2010*

Consumers (those interviewed by telephone) on public-led heat networks mostly reported experiencing no outages or infrequent short outages. Those who had experienced outages were generally satisfied with the responsiveness of the maintenance and repair service. There was a pattern of consumers mentioning their appreciation of being able to access regular updates from staff at a site office.

Discussions within the focus groups similarly revealed consumer's strong desire for timely and regular communication about unplanned outages. Focus group participants at two of the private-led developments agreed that outages were relatively common soon after the development was built, and when building work was ongoing. The group from one of the schemes found that the response from the heat provider was initially poor. Following a change of maintenance contractor, however, they felt more satisfied with the response to unplanned outages, because the new maintenance contractor kept them well-informed about progress, including visiting door to door to provide an update:

"The [maintenance] guy came around on our street - there's six houses… and he came around ringing all the doorbells saying, 'We know there's an outage. Don't try and take a bath,' and he asked us to tell the neighbours. Our neighbours both work. [The maintenance contractor] had sent somebody around, and I thought that was good service. I thought how different that is from [heat supplier] who, when you phone them, it's, 'Your message is important to us. We'll call you back in a year or so if we think about it.'

Participant at a private-led new development

Whereas the evidence from provider interviews and consumer interviews indicated that unplanned outages are relatively rare on public-led networks, participants at each of the three focus groups at schemes served by public-led heat networks described experiencing outages lasting two days or more. Participants at two of those schemes said they were satisfied with how the provider had responded, recalling that the provider communicated information to consumers using notices and letter drops and provided portable heating for vulnerable residents, including families with young children. At the other public-led scheme, participants described an outage that lasted over a week which they said left multiple blocks with no heating. The group expressed dissatisfaction with the response from the heat provider: they recalled receiving no communication during the outage and having to buy their own electric heaters, use extra blankets and even stay with relatives to cope during the period of outage. Some said they had called vulnerable neighbours out of concern for their health.

We couldn't get an answer as to what was going on. Someone said there was a back-up system that was supposed to come into operation… but I don't know whether that's hearsay, but yeah… we never got an explanation as to why the system was down.

Participants at a public-led scheme

When asked about this version of events, the heat provider stated that they were unaware of any period of complete heating outage over the period in question. They mentioned that there had been some incidents where the heating would not have been as hot as they expected but claimed that issues were resolved quickly.

Chapter 4: Metering, billing and pricing

This chapter explores practices of metering and billing and pricing of heat networks, both from the perspective of operators and consumers. It addresses questions of consistency of billing frequency and amounts, and consumer preferences regarding billing arrangements.

Metering

Who is responsible?

Many providers sub-contract metering services, often in combination with billing, though some retain in-house responsibility for billing. This includes responsibility for replacement of faulty meters and for addressing queries, particularly relating to prepayment meter topping up. Private sector providers serving a range of schemes report a range of metering arrangements, with efforts to retrofit non-metered schemes. Some providers of older public-led schemes have newly introduced individual metering or building level metering in line with the Heat Network (Metering and Billing) Regulations 2014. Where individual metering is not possible, the approach used to assign charges to properties was criticised as unfair by participants in one focus group, on the basis that it took no account of the likely differences in usage by different size households in similarly sized flats.

Several providers expressed a preference for smart metering, with their reasons including that it enables automated meter readings to be used to produce accurate bills, and smart meter displays offer a more engaging way for customers to view their consumption. Prepayment metering was also mentioned favourably by many providers (both public and private) as a means of minimising the operator's exposure to risk from unpaid bills; a mechanism for recovering debt from consumers; and as a way of providing greater visibility and control to (particularly low-income) residents over their consumption.

Providers reported that issues with non-communication of automated readings in areas with poor mobile coverage remain a challenge which affects the ability to get automated readings, which can lead to consumer frustration with inaccurate bills. One provider said they had set up an online portal where the consumer can input their actual read to overcome this problem.

Consumer perspectives on metering

Consumer interviews also revealed an array of metering and billing arrangements across schemes. Newer schemes tend to be metered and billed on actual use, whereas some older schemes do not have individual metering, though consumers also reported recent changes to the metering.

Consumers expressed mixed views on metering. Most unmetered consumers expressed a preference for paying a flat rate, though some consumers believed that they, or others, were less inclined to make efforts to reduce heat use when not metered. Whilst this was mostly presented as a positive aspect of flat rate bills reducing worry and underheating, some mentioned that it can lead to wasteful behaviours.

Two of the focus groups at older public-led schemes had undergone recent changes to metering arrangements, both designed to offer greater visibility of their usage via an in-home display or online. Participants in both focus groups said they didn't know what information they can access through the new metering solution, some saying they were never shown and do not understand the leaflet provided with it.

Pricing and tariff calculations

Older public-led schemes included in this research covered several which have shifted from charging a flat rate for heating regardless of usage, to pricing which factors in the costs of running the heating system as well as individual consumption. In schemes where individual metering is not possible, providers report having adopted alternative systems that allocate costs according to property size and location, with allowances made for communal losses and more exposed dwellings. Public schemes are increasingly moving towards separate calculations of standing charge to cover running costs and unit cost for heat.

Larger housing association providers and private sector providers mostly use a standing charge and unit cost, comparable to standard utility bills. Explanations of how the unit cost of heat and the standing charge are calculated varied. A social housing provider explained that the price paid for bulk energy, the heat loss of the building and the efficiency of the system will drive the price, which is reviewed on a 12-monthly basis. One private provider explained that for their ESCO-run heat networks, the unit cost pricing is set in relation to a cost comparator, with reference to the Big Six and uSwitch to make sure that the tariffs are less than or equal to the comparator. The standing charge was explained as directly related to the cost to serve and the investment model, which will vary between schemes. Providers recognised the standing charge to be a key area of consumer dissatisfaction, where they compare it to a gas standing charge. The higher standing charge is justified in terms of the additional costs of the maintenance and replacement costs of the heat network. Private sector providers note the Heat Trust's heat calculator as a useful tool. For one scheme, the public landowner acts as an external quasi-regulator who approves the tariffs, with a formula that requires a price drop if the price of gas drops.

Two private sector providers reported paying business rates as a cost that does get passed on to consumers which is included in the standing charge but is not made visible in information to consumers on how their bill is calculated. Both identified this as a grey area which can vary according to the local authority.

Two private sector providers also noted cases of private rental tenants disputing their obligation to pay for standing charge costs relating to repair and replacement of their heat network. One provider identified this as the responsibility of the landlord, with which they refused to engage:

> *"from our perspective that is a third party dispute between the tenant and the landlord and they need to come to some sort of agreement as to who pays the charges within that property"*
>
> *Private sector provider – multiple schemes*

Some public schemes reported charging different amounts to tenants and leaseholders. Private sector providers reported negotiating tariffs with social landlords on district heating schemes, so that:

> *"typically the tenant would pay 30% of the standing charge and the landlord would pay 70% and we would bill the landlord separately for that"*
>
> *Private sector provider – multiple schemes*

Most providers reported reviewing pricing annually, though there were examples of prices being fixed for two years or of being reviewed every six months.

Billing or payment method

Who is responsible?

Providers report a variety of billing or payment methods, with responsibility retained in-house or subcontracted to a metering and billing provider. Whilst some providers have a single billing method, even across multiple schemes, other providers offer differing arrangements within and across schemes. Smart pre-payment is increasingly used across private and public schemes, with customers receiving an annual statement and visibility of spend, usage and top-ups via a display.

In relation to the older public-led schemes included in this research, a variety of different frequencies of billing were reported, including annual, twice yearly or quarterly billing. The providers concerned also reported a variety of payment options available to consumers on the same heat network or across heat networks, including by paying in instalments as part of the rent for tenants, direct debit, pre-payment or various other methods. Billing information for credit customers is reportedly provided at differing frequency across schemes, including in response to quarterly or annual statements. Providers and billing agents for newer public-led and private-led schemes mostly reported offering a choice of payment methods, including direct debit and prepayment methods.

Costs and payment methods

A large variation of billing and payment methods was found in consumer interviews. Consumers pay annually, quarterly, monthly or weekly. Heating and hot water is sometimes including in a rent package, service charge or as a separate bill. Some consumers pay using pre-payment meters, either going to a local shop or post office or topping up online.

The costs of heating and hot water, as reported from consumer recall, varied considerably. Not all consumers were able to recall how much they paid – those that provided a figure did so without reference to an actual bill, leaving scope for inaccurate recall of actual costs: the annual amount paid for heating and hot water (from consumer recall) varied from just over £1 a week (ie £52 a year), to over a £1000 a year. Reported payment methods also varied across the focus groups. Consumers from all three of the newer private-led schemes were predominantly paying by monthly direct debit. Consumers from one public-led scheme mainly used prepayment meters; another paid a set amount in weekly rent payments then received a bill or rebate once a year based on their actual

usage and consumers from the third scheme said that it was possible to pay using a range of payment methods.

‘Fair’ metering, billing and pricing

Attitudes to the fairness of charging based on metered usage varied amongst those, mainly from older public-led schemes, who historically have paid flat charges. Some consumers believe that bills should be based on metered use to prevent low users subsidising higher users and to discourage wasteful usage. Others interviewed, particularly those living in sheltered housing, believe that it is fairer to pay the same because even people who used their heating less still benefit from other peoples’ heating.

> *“Yeah, it’s fine, because we’re all getting the same service, so we’re quite happy with it.”*
>
> *Consumer in sheltered housing*

Consumers on low incomes and older people said they appreciate the certainty about how much they have to pay and feel that a flat price avoids the risks of under-heating. Particularly well-informed leaseholders in one focus group living in a public-led scheme where individual metering is not technically possible and costs are allocated using a formula, thought that the formula was unfair to some households. No tenants from the scheme attended the focus group and so their views were not reflected in the discussion.

Consumers who pay bills that are comparable to, or cheaper than, gas central heating are more likely to think the billing is fair. Perceived fairness of the cost of bills is also linked to consumers’ trust in their heat provider. All three of the focus groups at private-led schemes included at least one participant who had queried perceived high costs with the heat provider. At one of those schemes in particular, multiple consumers said they had challenged the perceived high prices and were not satisfied with the response from their provider. They did not believe the heat provider to be transparent. Participants at another private-led scheme explained that they felt their bills were fair because they believed their heat supplier to be transparent and were provided with explanations for price increases.

> *"I was gonna say I quite like the fact that I’ve never felt like I’ve had to go after them to get records. They always send through the bills. [Management company] ups its rates by 3 per cent each year and I got a letter as well, ‘We’re gonna increase by such and such this month. This is due to such and such.’ I liked that they were being a bit honest about it. It wasn’t more than CPI, or it was about 3 per cent again. It was one of those things where it’s like, I can get it if it’s CPI inflation.*
>
> *Participant at private-led scheme*

In interviews and focus groups, consumers said that they felt the monopoly held by heat suppliers is unfair for consumers who cannot change supplier or switch to a better deal in the same way they can electricity or gas supply. Participants in one focus group suggested that resident bodies should be able to choose a new supplier. Consumers also observed that heat providers seem to have no incentive to find the best deal for their fuel supply, as they pass costs onto their customers who have no choice but to pay them.

"The thing we've noticed is that the managing company and the freeholder are not making sure they're getting the best deal with the utilities company for heating, they don't seem to have any incentive to go out and find the best deal."

Owner-occupier supplied by a private-led scheme

Consumers who recalled negative interactions with their heat supplier or did not believe them to be transparent also tended to perceive their billing calculations as unfair whereas those consumers who recalled positive interactions or expressed trust in their supplier also tended to perceive the billing to be fair.

One consumer, who was supplied by a community company in which residents have shares and some involvement in decision making, was satisfied the company would try to get the best deal for member residents.

"The bottom line is it's all a bit of a mystical art in the sense that they're buying gas on our behalf on a block and they've got to try and make the best deal possible. My gut feel is, as a management body, that they do a bloody good job on most things and I bet you they are very astute in the way that they negotiate on our behalf. Whether they could do better is I suppose the burning question. I don't know."

Owner-occupier in community company-led scheme

Consumers expressed a preference for regular billing. Those who had received unexpected high bills believed their situations to be unfair. Consumers who are billed infrequently are more likely to be surprised by a large bill. In one example, a consumer explained that their social housing provider had not passed on bills from the heat supplier promptly, resulting in the consumer receiving an unexpected, high one-off bill covering a long period of time from moving into the property. In another case, a leaseholder received a very large bill from the social housing landlord to pay for heating costs. The local authority was the heat supplier, but unlike tenants who pay for their heating bills in weekly rent payments, as a leaseholder there was no payment arrangement in place. The consumer recalled receiving a large bill and described the effect for her:

"If I wasn't working, I would be frightened of the bill coming in. … Luckily, I earn enough to pay it, but as a single mum I'm lucky. If I didn't, I'd be probably evicted or something, because I couldn't afford to pay it. I'm not excessive with my consumption of these things, but to be charged that much money. No, that's too much. If I was on benefits like I was when my son was little, I could never have afforded it. It would have been horrendous and such a worry."

Leaseholder on public-led scheme

Chapter 5: Information for consumers

This chapter explores issues of responsibility for providing information to consumers, and addresses questions of whether consumers understand the information provided to them, consumer preferences about what information is provided, timing of information provision and method of information provision.

Information provided before moving in

Providers in this study, particularly for new schemes, report complaints from new residents that they haven't been sufficiently briefed about the heating system before moving in, with possible risks of mis-selling by developers. They identify the importance of consumers being properly informed about the heat supply, supplied with a copy of the contract and tariff information prior to the decision to purchase or rent a property, and for social landlords to include heat bills in affordability checks for new tenants. Providers identify this stage as the responsibility of the developer sales team, property manager, conveyancing solicitors, private sellers, landlords and social landlords. Beyond providing information to the relevant third parties, providers do not consider themselves in a position to directly engage with the consumer at this point. One provider reports providing pre-sales fact sheets to developers, and social landlords with key information about the heat network and costs to pass on to incoming occupiers, but that 'probably only 60% of these bodies actually do that', with private sales being an even harder group to engage, due to their lack of a long term relationship with the end-user.

Amongst consumers included in this research, trust in heat providers, and satisfaction with the heat supplier appears to be heavily influenced by the accuracy of information provided at the point of sale. Where consumers believe they have been misled they are more likely to be dissatisfied with their supplier and complain. When consumers perceive the supplier to be transparent from this stage they are more likely to be satisfied with the service.

Focus group participants at two of the private-led schemes were very unhappy with information provided to them at the point of sale. They believe they were mis-sold their properties on the premise the standing charge would decrease, whereas it has actually increased. In interviews, consumers expressed similar views, claiming they were given incorrect information about the system and expected size of bills before they moved in. Some consumers, particularly in newer private-led schemes, express strong mistrust of information provided to them before moving in.

> *"We were sold a very good story about how it was going to be half the price of normal fuel, how efficient it was going to be, but unfortunately, from day one we found out straight away that it wasn't going to be"*
>
> *Consumer in a new private-led scheme*

In contrast, focus group participants at a private-led scheme, who all agreed that district heating was explained at the point of sale by either the estate management company or their social housing providers expressed satisfaction with their supplier and a readiness to

accept slightly higher prices because they believe the information provided to them to be accurate.

> *"You're warned about it. When you go in they say, 'You cannot change heating providers. Are you sure about this? Before you sign."*
>
> *"They've obviously gotten complaints before about it, so they're very clear when you sign."*
>
> *"When we were signing our housing contract and paying, not the deposit, but saying, 'Yes, we would like to have this place and here are all our details and here's where you can do credit checks.' They were like, 'Just to be clear, you cannot change heating providers,' and they were super clear about it."*
>
> *"It's actually in the contract itself. There is a section for it"*
>
> *"You can't rent a property unless you sign that agreement".*
>
> *Participants at a private- led scheme*

From consumer accounts, there appears to be little consistency in which party conveys information about heating systems before they move in. Different developers or landlords for the same scheme appear to differ in the content and accuracy of information about heating systems and expected costs. In a focus group at a private-led scheme, a social housing tenant reported being told by the housing provider that the property had gas central heating before moving in, whereas those who had brought properties privately had been told that it was a cheaper, more environmentally friendly form of heating, though not all of them realised that it was district heating or understood what that meant.

Information provided when moving in

Providers on new schemes (private- and public-led) widely reported providing a welcome booklet for new residents on moving in. Typical contents mentioned include information about the tariff and standing charge, contact information, change of tenancy procedure, maintenance and service arrangements, metering and billing, FAQs and energy efficiency advice and information about heat networks. Private sector providers mostly said they do not provide information on heating controls, whereas in public-led schemes, providers generally report efforts having been taken to show consumers how to use programmers and other heating controls. One good practice example is where the contracted maintenance and repair provider's tenant liaison officer visits new tenants on moving in, and after a week, to check tenants understand how to use their programmer. The same scheme is now designing their own illustrated information leaflet on how to use the programmer, for housing staff to use in explaining to new tenants and to leave with them.

The evidence from consumers indicates considerable variation in the information provided when moving in. Many consumers in the research reported receiving a welcome pack when they moved into their homes including instructions on how to use their heating system. Others recalled being given a demonstration in person. Some recalled receiving

little or no information and relying on neighbours and social media as a source of information. Those who recalled being given a demonstration of their heating system or had information explained in person were generally appreciative and indicated that they preferred to receive information face-to-face.

In one of the private-led schemes focus group, participants recalled being confused by their systems when they moved in. All agree that would like more instruction on how to use the system. Participants had variously sought advice from new neighbours, used a local Facebook group, or called out engineers in their efforts to understand how to use the system. One person recalled being given a 'walk-around' when buying a new build which included a face-to-face demo of the heating controls: unlike others in the group, they were satisfied with the information provided and felt confident using the controls.

At a different private-led scheme, focus group participants, who were all young professionals, expressed satisfaction with the instructions provided to them, even though they described the programmers as extremely complicated to operate. They felt satisfied with the information and support provided to help them use it, which they said included being given a booklet as part of a welcome pack, and videos showing how to set the programmer. They also mentioned there is a site office they can visit for more information and that if they request an engineer from the heat provider, an engineer will visit the property and set it for them. Participants also mentioned the existence of a residents' social media group where information and advice about the system is shared. However, despite being satisfied with the support provided, at least one member of the group had struggled to set the programmer, ignoring the available guidance.

Gaps and information wanted

Participants in focus groups at two of the private-led schemes agreed they would like more information specific to their heating schemes. Both schemes were new (post 2000) and are impacted by changes to the network as more of the housing development is built out and connected to the network. They don't trust the information provided to them by their heat providers and would like more information about how changes will impact the performance and costs of the network. They currently gain a lot of their information through hearsay and do not see their heat providers as transparent.

Interviews revealed other issues arising from consumers lacking necessary information, for example, one owner occupier in a new development paid £400 for maintenance services as they had not realised at the time that this should be covered as part of their service charge to the estate management company.

Chapter 6: Complaints and consumer rights

This chapter reports back on operators' accounts of their complaints procedures and practices for ensuring consumer protection. It also reports consumer perspectives on their experience of making complaints and their awareness and views on their consumer rights.

Complaints procedure

Public and private providers emphasised that they try to resolve problems early – even ahead of consumers noticing, in the case of technical faults - so that complaints do not escalate.

Several public providers claimed that their initial time to take action in response to a resident-reported fault with the heat supply is immediate or within 2-3 hours. One public provider stated that they consistently meet their target time for responding to and fixing a technical fault within 24 hours. Public sector providers mostly described following a generic in-house complaints procedure to log, acknowledge, respond to and feedback on complaints, including an escalation procedure and the responsibilities and timescale for doing that. The local authority and housing ombudsman are not seen as particularly involved in handling district heating issues. Certain providers seek to handle and resolve complaints within a single team.

Private sector providers also mostly described an in-house complaints procedure for handling queries and complaints. Some providers emphasised a single channel (telephone or email) whereas others reported receiving complaints through a variety of channels, including phone, email, social media and – for some schemes – in person. All of the private providers mentioned taking steps to understand the nature of the problem and who it falls to, including redirection to other parties. Operators with Heat Trust registered networks highlighted their complaints procedures as being in line with the requirements of the code – they also claimed that they seek to apply the same standards for those schemes they operate that are not registered to the Heat Trust – though acknowledging that final resort to the Energy Ombudsman would not apply. Heat Trust members reported very few complaints being escalated to the Energy Ombudsman over the last year, noting that they do keep logs of complaints. Several private sector providers noted that members of staff receive training in complaints handling procedures. One of the most clearly set out explanations of the complaints handling process noted: an initial 24 hour response (or immediate if urgent); response by phone, backed up with a letter "to make sure the conversation is clear"; directing complaint to correct party to deal with it; respond every three days "to ensure they're kept up to speed and aware that we are dealing with it"; weekly reporting of live and closed complaints to client; closed cases "signed off by two senior managers to be sure that it's satisfactory and the client is happy with the resolution" and closed complaints held on internal system. Client here (as elsewhere in the report) refers to the developer, housing association rather than the individual who made the complaint.

Awareness of complaints procedure

Consumers' awareness of complaints procedures is generally low. The consumers who have made complaints are generally much more aware of their rights.

Most consumers interviewed who have not made a complaint have little knowledge of any formal complaint procedure that their heat provider has. When asked how they would make a complaint, many consumers do not separate a complaint with a more general query and say they would call the operator through normal communication channels. When asked what they would do if their issue was not resolved through normal communication channels, some consumers who have not had problems said they are unsure. Some have faith in their provider that such a situation will not arise. Similar views were found amongst focus group participants who had not made complaints. Participants in two of the private-led schemes could not recall the details of the complaint procedure but said they were aware the details are available on the heat provider's website and in their welcome pack should they need to make a complaint.

Experience of complaining

Consumers interviewed who had lodged complaints about their heat network had complained about outages, high bills, and not being provided with adequate information before purchasing expensive equipment or maintenance services. One consumer lodged a complaint in order to get a response to a billing query that the heat provider had not responded to.

Some consumers felt that raising complaints would not help them because they didn't trust their heat provider to resolve their problem. In one focus group, participants stated that they felt powerless due to the inability to switch provider.

> *"The development is completely tied in for, what, 80 years or something weird like that? Apart from electricity, we cannot go anywhere else for our heating or hot water supply. We are completely stuck in and no matter how many complaints we make I can't see it having any influence because [our heat supplier] now have got a customer for 80 years because that's how long they're going to have this contract for."*
>
> *Participants at private-led scheme*

Another reason consumers in focus groups and interviews had not made formal complaints about problems was the long process of contacting their heat supplier, citing long waits on the phone or suppliers not replying to emails. Some of those who had made complaints were not happy with the way they had been dealt with, reporting that they had to be persistent for the operator to listen to their concern. One leaseholder on a public-led scheme reported having complained about an unexpectedly high bill. They found the process difficult but said it had resulted in the bill being reduced. Similar experiences were described by consumers in two of the focus groups at private-led schemes.

> *"When you queried it, how was that experience?"*
>
> *"It was difficult, and I felt like they were doing me a favour as opposed to having recognised there was a problem. Yeah, it was not an easy process.*

They lost the email that I first sent them, said they'd not received it, and then I resent it to prove that I had in fact sent it at the time. No, it wasn't straightforward, it was a pain, and I came away thinking - I'm quite robust when I complain about things, but I was thinking if somebody wasn't as robust as me, they'd probably have given up and paid it."

Leasehold on public-led scheme

Whilst some individual consumers reported having made complaints directly with the heat supplier, more had chosen to pursue complaints as a group or through a resident body. Those with such access to the support of a representative body were generally very appreciative of them and felt more able to raise complaints with their support.

Where consumers are not satisfied with outcomes of complaints, some have considered legal action. This step is generally only considered feasible as part of a group due to the high associated costs. One consumer who had no water supply in a new development said they are part of a residents association who have resorted to legal action after reportedly having no hot water supply or heating for three months over the winter. They felt the heat supplier's response was inadequate – the consumer said that at the time residents were provided with temporary portable heating and showers, and were subsequently offered £200 compensation. The consumer went on to explain that the private provider had asked residents from each property to contribute £10,000 towards the cost of fixing the issue.

Few consumers reported having taken their complaints to third parties to help them resolve problems. Where consumers had reported turning to third parties for help, only one found their problem resolved. One focus group participant who has complained to Ofgem said they had asked them for more information that their heat supplier has yet to supply them. Another focus group participant took their concerns to Citizens Advice but said that the advisor had not had the expertise to help. Most consumers interviewed could not confidently name an organisation that they could turn to for help if they were dissatisfied with their heat supplier.

Heat Trust consumers' experience

Most consumers interviewed were unaware of the Heat Trust. Five of the 40 consumers interviewed were served by registered schemes. When asked if they knew about it, two of the five said they thought their heat network was covered by Heat Trust but they weren't sure. The others didn't know. Two of the focus groups held at private-run schemes were Heat Trust registered. When specially asked about the Heat Trust, no participants were aware of it. However, some individuals from these groups were aware of the Energy Ombudsman.

Most consumers interviewed who had complained were not served by providers covered by the Heat Trust. Those who had complained, and were covered by Heat Trust, benefitted from the scheme rules ensuring they received compensation for outages and access to an ombudsman. Despite this, these consumers remained dissatisfied with their experiences of complaining. A focus group participant who had been referred to the ombudsman was frustrated that they were unable to help and believed that they needed further education and training. In this case the member of the ombudsman team the consumer spoke to had said they did not know what a district heating network is. Another consumer served by a Heat Trust registered supplier received compensation after

complaining about outages but believes the heat provider was not transparent initially in admitting the length of the outages.

> *"You called up and registered the fact that there was no hot water and they just said someone will be around, but I think there were a couple of times where people took them to court because they said that they had come and fixed it within 24 hours, but they hadn't and there were logs of the site office registering them coming in after that period etc. They were always trying to claim innocence all the time and it felt like they were never willing to accept any responsibility. It was very much us and them."*
>
> *"You said a few other people in that area, they took them to court because they hadn't fulfilled their obligations of what they said they were going to do in terms of being there within 24 hours?"*
>
> *"Yeah, which meant that they then had to compensate everybody £30."*
>
> *Consumer in Heat Trust registered private-led scheme*

Consumer awareness of rights

Consumer awareness of their rights and heat network regulation varied: whilst generally awareness was low, it was higher amongst those who had complaints. Most focus group participants assumed their rights, including access to an ombudsman, were the same as those of other gas and electricity customers.

Consumers that reported greater knowledge about their rights also suggested that they had gained this knowledge following an issue with their heating supply or billing. Most respondents who were more knowledgeable about their rights following an issue expressed frustration at a lack of consumer protection. For example, one consumer who had received an unexpectedly large bill had since learned more about the differences in regulation of heat networks and standard energy suppliers.

> *"The first I heard about it was when I spoke to my neighbours. The whole industry needs to be regulated, for starters, and this is where it becomes really tricky, because the housing association is not an energy provider, I cannot challenge them on anything. For example, when they sent me that backdated bill for a year and a half, if they were a regulated energy provider I would have been able to challenge it and say, the law says you have to do it within 12 months, anything after 12 months you cannot bill, but because they are not, I don't have a choice. All the rules and regulations that apply to energy providers don't apply to them, so at the moment they can do whatever they want to do, they can charge us whatever they want to charge us.*
>
> *Part-owner in new private-led development*

Consumers in new properties who believe they have been mis-sold properties based on inaccurate information at the point of sale are similarly frustrated about the lack of protection and believe the sector needs to be more regulated to protect them, with bodies in place to engender good and to support consumers in disputes with their heat supplier.

Consumer protection standards

Heat Trust

Providers with schemes registered to the Heat Trust identified it as valuable in providing independent guidance on consumer protection. Providers also used it as a demonstration of the operator's commitment to consumer services and accountability through access to the Energy Ombudsman. The added protections for vulnerable customers are also identified as important. Providers also noted the added value for them of providing clarity around responsibility for compensation between the operator and the housing developer. Heat Trust registered providers remarked on the lack of protections in relation to the question of pricing as problematic for the reputation and growth of the sector.

Whilst no public sector providers are currently signed up to the Heat Trust, several of those involved in this research said they had considered joining. Some expressed reservations about whether public sector heat providers arrangements for managing district heating schemes are sufficiently strong for them to feel confident to sign up to such compliance standards. Others expressed reservations about whether the Heat Trust's requirements in terms of required response times, faults resolution and compensation offered an improvement on existing arrangements.

Vulnerable consumer identification

Heat Trust members reported having a vulnerable customers list so that consumer-facing teams, such as maintenance and repairs teams and billing team, are aware of potential issues. Providers vary in how they identify vulnerable customers: by relying on their client to provide a list, or through a registration pack – or both. Typical measures are holding a stock of standby plug in heaters which can be provided to vulnerable customers in case of any service interruption. Sensitivities around GDPR were reported to have limited the amount of detail shared by developers with providers about the nature of vulnerability of consumers recorded as vulnerable.

A private sector operator, who feels they go above and beyond what is required in their support to vulnerable consumers, noted that they work closely with social workers and the housing provider to offer additional support.

Attitudes to future regulation and growth of sector

Amongst both private and public sector providers interviewed there was support for increased regulation to protect the interests of consumers in the context of a natural monopoly situation. Many of those interviewed indicated that there is a need for regulatory standards to increase transparency around billing, improve schemes' efficiency, demonstrate value for money, and improve complaints resolution processes.

Chapter 7: Conclusions

This chapter responds to the priority research questions, identifying what the evidence from consumer interviews, consumer focus groups and operator interviews tells us about consumer protection issues relating to heat networks, both from the perspective of consumers and operators. The balance of findings likely reflects a more negative than average picture of district heat network consumer experience, in part from questions explicitly seeking to identify forms of consumer dissatisfaction and experiences of making complaints; and in part from likely self-selection bias in focus group and consumer telephone interviews.

Research questions for interviews with heat network operators and owners

What are the roles and responsibilities in terms of customer protection of those involved in the heat network and how does this work in practice?

Larger private operators involved in delivery of multiple heat networks nationally differentiated the scope of their responsibilities for consumer protection depending on the form of contractual arrangement. Where they act as energy service companies (ESCOs), such providers described taking on overall responsibility for operation and a broader and more pro-active scope for responding to consumers, whereas for those schemes where they are engaged as a contracted operations and maintenance (O&M) provider only, they described their scope to respond to consumers as more tightly defined dependent on the specific contractual agreement with the client developer or landlord. Private operators (whether acting as ESCOs or as contractors) described their responsibility for consumer issues as extending up to the heat interface unit: heating controls, radiators, taps and showerheads within the property were identified as the responsibility of the property owner.

Most public sector providers interviewed identified their responsibilities in relation to heat network users in ways that suggest these are enmeshed with their responsibilities as landlord/property manager to tenants and leaseholders, with their responsibility including elements of the heating system within the property. However, larger social housing providers said they had differing arrangements (including involving ESCOs and sub-contractors) at different networks across their national portfolio of housing developments.

Both public and private operators reported that the performance of heat networks was subject to oversight within their own organisation’s governance hierarchy. Private operators also mentioned accountability to their client (e.g. developer or housing provider).

Metering, billing and maintenance

The research findings identified a variety of in-house and sub-contracting arrangements used for metering, billing, operations, maintenance and repairs and customer services. Competitive procurement was widely identified by lead providers as a means used to improve the capacity and quality of the service for the benefit of consumers. On the other

hand, some lead operators said they had retained or taken back in-house responsibility for undertaking certain of these services, including with the aim of improving the quality of service for consumers.

Whilst those operators and sub-contractors interviewed all broadly indicated that they are clear on their respective roles and responsibilities, evidence from both operator and consumer interviews suggested that in many cases consumers are unclear on divisions of responsibility, particularly between landlord/property manager and heat network provider.

In public-led schemes where the landlord is also the operator, the responsibility for maintenance and repairs of heating controls and radiators within the home was generally well understood by consumers, either as delivered by an in-house team or a sub-contractor body that also covered other housing-related maintenance and repairs. Most consumers appeared satisfied with getting repairs fixed. Levels of consumer understanding and confidence of how to use heating controls varied widely. Many public-led providers reported efforts to help educate consumers on how to use their heating controls, though with effectiveness considered to be variable.

Pre-sale or rental information provision

The research indicated that an area that may not be working well for consumer protection concerns practices at pre-sales/pre-letting and at move-in, with a number of parties involved (heat providers, developers, landlords, solicitors). Evidence from both consumer and operator perspectives indicate that some consumers are not properly informed at this stage. Private providers indicated this was more straightforward for new sales but harder for onward sales and private letting.

Private providers interviewed mostly saw their responsibility as making relevant information available via the landlord, developer or other third party. Despite the claims of providers to make information available in various forms for consumers, from consumer accounts, their attention is not always drawn to this information and it is not presented in a way that they find easy to understand.

Providers emphasised the responsibility of other parties involved in sales or letting to pass on information and make consumers aware that their heating and hot water will be supplied by district heating – and what that means. Amongst private providers, views ranged from optimism to frustration about how far other parties are fulfilling their responsibilities. In interviews, some operators identified poor consumer understanding prior to moving in (particularly to private-led schemes) as having a knock-on negative effect on customers' subsequent relationship with their heat provider. Consumer evidence would suggest that providers also bear responsibility for the lack of understanding of the consumer prior to moving in. The evidence indicates varied approaches and levels of effort by private providers to help consumers understand and navigate these arrangements.

How is operational efficiency of the network monitored against design performance expectations?

Operators of newer heat networks emphasised the importance of the design and installation quality in determining the future cost efficiency, reliability and value for consumers of new schemes, with a strong preference to be involved from the earliest stages. Providers reported deploying various approaches to guard against the risks of

poorly designed or installed schemes (e.g. taking installation in house, improved/independent sign-off before adoption; in-house design supplement).

One problematic area identified by heat providers concerns the design and build of elements of the structure of new housing by developers that can affect the performance of the district heating and hot water (e.g. under-sized radiators, complicated programmers, low flow taps/showerheads).

Most providers interviewed made reference to their use of Building Management Systems to monitor operational efficiency.

How are additional costs or rectifications managed?

None of the providers interviewed suggested that they pass on the additional costs of inefficient performance to customers. One provider mentioned their price calculator includes a performance adjustment to protect consumers from paying increased bills as a result of underperformance against the promised system efficiency.

Several public sector providers claimed not to have passed on the costs of major refurbishment works to consumers, explaining that repairs had been paid for from their organisational reserves. Public providers said they aimed to, or had been able to, pass on consequent efficiency savings to consumers in the form of bills staying the same or lowered.

Several private providers highlighted that an ESCO model protects consumers against potentially very high replacement costs of damaged or failed equipment and from increased costs associated with underperformance. One consumer reported their private heat network provider has sought contributions from users to cover the cost of rectifications.

How are consumer protection standards ensured? And how does this work in practice?

Providers with schemes registered to Heat Trust referenced the guidance on consumer protection, and access to the Energy Ombudsman. These providers said they find the Heat Trust useful as a source of guidance, particularly for vulnerable customers and in providing clarity around the division of responsibilities between the heat network operator and the housing developer/landlord.

No public sector providers are currently signed up to Heat Trust. Some of those interviewed expressed reservations about whether arrangements within the public sector for managing heat networks are sufficiently strong for them to feel confident to sign up to such standards. Others considered their own arrangements offer stronger consumer protection than Heat Trust requirements.

Heat Trust members reported having a vulnerable customers list so that consumer-facing teams, such as maintenance and repairs teams and billing team, are aware of potential issues and can act accordingly.

What is the process for managing complaints?

Public-sector led scheme operators mostly reported relying on their organisation's general internal complaint handling schemes. When asked, public sector providers recognised the theoretical availability of the local authority or housing ombudsman but the research didn't identify cases where either of these bodies had been involved in a heat network related complaint. Several public sector operators expressed their opinion that there is a sector wide need for improving arrangements to protect consumer rights.

Private-sector operators reported a variety of complaints handling approaches: Heat Trust was referenced by several private providers as providing the framework for their complaints handling approach. Operators of Heat Trust registered schemes – and in a few instances, consumers on Heat Trust registered schemes – referenced the Energy Ombudsman as part of the process for managing complaints.

Research questions for interviews with heat network consumers

This summary of findings in this sub-section is based on evidence from the consumer interviews.

What drives users' overall satisfaction and why?

Reliability and control of heating and water emerge as important drivers for consumer satisfaction among those involved in this research. Speed and effectiveness of repair services also drove satisfaction. The majority of consumer participants shared an appreciation of the reliability of their heating, but there were some notable exceptions where consumers had experienced prolonged or recurrent issues with their hot water or heating service.

Overall, most consumers seemed satisfied with how quickly their maintenance and repair provider take action in response to their raising a technical problem. However, there were some notable exceptions to this – across consumers in both public- and private-led schemes. Some consumers described delays to problems being resolved due to a lack of clarity over who was responsible – in a few cases, the landlord/managing agent and heating provider reportedly disagreed over who was responsible.

Other factors that appear to drive consumer's satisfaction include experience of outages and suppliers' responses, perceived fairness of billing and information provision.

What are consumer experiences of system outages?

Nearly all consumers involved in the research accepted that periodic planned interruptions to service are a necessary part of network maintenance. Most consumers felt that planned outages were infrequent, that their provider communicated adequately about planned maintenance activities and made efforts to minimise disruption.

By contrast, extended or recurrent unplanned outages emerged as a source of strongly felt dissatisfaction for a minority of consumers involved in the research. Consumer frustration

was particularly high where the consumers felt providers had not acted promptly to resolve problems or had not kept them updated.

How consistent are the frequency and price of bills and what are consumer experiences and preferences of this?

The billing methods and costs of heat varied greatly amongst consumers interviewed. There is a clear preference for regular bills or statements. Consumers who have received unexpectedly high bills perceive their situations to be extremely unfair.

What are seen as the characteristics of a 'fair' billing methodology and why?

For those consumers who pay a flat rate for their heating or who have experienced a change from flat rate charging to metering by usage, opinions are split over which is preferred and/or fairer. Some feel a flat rate helps to reduce worry about unexpected bills whereas others believe paying for their own metered use is fairer, particularly where they feel their neighbours are wasteful.

Other characteristics of fair billing identified by consumers include: a price that is comparable with, or less than, alternatives; transparency around costs and increases; and regular billing. However, many consumers interviewed weren't particularly aware of the amount they pay or how their bill is calculated and struggled to express a view on what constitutes fair billing.

Consumers who said they were not properly informed about the likely costs of district heating before moving in also said their pricing isn't fair whereas those who felt they had been sufficiently informed before they moved in generally considered that their pricing is fair.

Some consumers felt strongly that the fact of being locked into buying their heat supply from a specific supplier is inherently unfair, because it means that they are unable to avoid paying costly bills, have limited or no choice of tariff and don't have the same option to switch supplier as with a conventional gas or electricity supplier.

Is information provided to the consumers understood? How could it be improved?

The most widely reported way to provide written information is as part of a welcome pack. The evidence from operators and consumers indicated that some consumers do not recall or understand this information. Those consumers who recalled receiving in-person explanations or demonstrations of how to use their heating system expressed an appreciation of this approach. There was mixed experience of consumers with smart meter displays understanding how to use information from them.

Some consumers involved in the research felt they were not properly informed about the district heating system and costs before they purchased or rented their property. Those affected felt strongly that this was an area where there need to be improvements for residents considering buying or renting a property on a heat network.

To what extent are consumers aware of their rights?

From the consumer interviews and focus groups, most consumers had limited accurate awareness of their rights. From what they said, it seemed that some assumed their rights were equivalent to the rights of gas and electricity consumers. The handful of consumers who reported having made a complaint expressed surprise and frustration at their limited rights and opportunities for redress.

Consumers served by Heat Trust registered schemes were mostly not aware of Heat Trust by name, though some mentioned aspects of their provider's consumer service which correspond to Heat Trust requirements.

How well do consumers understand their complaints procedure?

Most consumers did not distinguish between making a complaint and raising a query or reporting a technical problem with their heat supplier. Consumers involved in this research generally said they knew how to raise a query or report a technical problem, but many were less sure of available arrangements for making a complaint if a problem was not resolved to their satisfaction.

Do consumers use Citizens Advice and why/why not?

Minimal evidence emerged of consumers having used Citizens Advice to support them in making a complaint about their heat service. No meaningful responses were elicited in interviews and focus groups about why consumers hadn't used Citizens Advice.

What are consumer experiences of making complaints and their outcomes?

Consumers reported having lodged complaints about outages, high bills, and not being provided with adequate information when, or before, moving in. Those who reported having made a complaint recalled the experience in negative terms, typifying the process as difficult and their heat supplier as unhelpful.

Local representative bodies, such as residents' associations, were mentioned by a spread of consumers as a form of support used to get their voice heard towards getting their problems resolved and to access redress.

Consumer reports of complaint resolution were mixed: one consumer reported success in getting a high bill reduced; several reported as yet unresolved problems.

How/where do consumer expectations and the expectations of operators align or misalign?

Consumer-reported experiences misalign with operator accounts of how well operators respond to unplanned outages. Consumers said they expect to be kept well informed and outages to be resolved promptly. Provider accounts suggest this is generally the case. Despite this, some consumer reported experiences of prolonged or recurrent technical problems and unsatisfactory responses by their operator.

Amongst some private-led schemes, there appears to be a key misalignment between consumer expectations about who is responsible for resolving problems relating to their

heating and operator views of their responsibility as ending at the heat interface unit, with the developer/property owner responsible for heating system elements within the property. There is some recognition of this amongst private providers.

The report revealed instances of leaseholders in majority social rented housing schemes reported being belatedly passed on a very large bill covering an extended period of time, by the housing provider (freeholder) from the heat provider.

The research revealed examples of private rented tenants paying for repair and replacement elements of the heat network service charge that would otherwise be the responsibility of their landlord. A heat provider said that they regarded this as an issue between the landlord and the tenant. This misalignment affecting private rental tenants contrasts with the situation for social housing: social housing providers and heat providers negotiate arrangements so that the social housing provider pays part of the heat service charge for their rental properties served by the heat network.

Consumer and operator views and experiences of information provision and understanding align in recognising that information provided is not always understood by consumers.

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