

Title: Heat networks regulation – Consumer protection consultation impact assessment IA No: DESNZ025(C)-23-CG RPC Reference No: N/A Lead department or agency: Department for Energy Security and Net Zero Other departments or agencies: N/A	Impact Assessment (IA)	
	Date: 4 August 2023	
	Stage: Consultation	
	Source of intervention: Domestic	
	Type of measure: Secondary Legislation	
Contact for enquiries: Heatnetworks@energysecurity.gov.uk		

Summary: Intervention and Options **RPC Opinion: N/A**

Cost of Preferred (£m, 2022 prices, 2024 present value)

Total Net Present Social Value: 596.7	Business Net Present Value: -251.0	Net cost to business per year: 14.1	Business Impact Target Status Qualifying provision: 70.3

What is the problem under consideration? Why is government intervention necessary? Heat networks will be integral to decarbonising heat, especially in a ‘Net Zero’ world. In response to a market study by the Competition and Markets Authority (CMA), this regulation aims to strengthen consumer protections, improve service quality and standards and address the disparities with other utilities. Prior to market framework legislation the heat network market had minimal regulation, and some consumers faced consumer detriment (outlined in the 2017 Heat Network Consumer Survey, 2018 CMA market study and Heat Network Consumer and Operator survey published at the same time as this consultation). This is especially important as heat networks have the characteristics of a local natural monopoly, meaning that consumers do not have the option to switch away from providers offering poor value for money.

Heat network operators do not have equivalent statutory powers as other utilities do such as gas. This restricts operators in developing and maintaining networks, increasing costs, time scales, and investment risks, which may act as a barrier to growth. Regulation seeks to allow heat networks to access these statutory powers, in line with other utility companies, promoting improved consumer welfare and market growth.

A previous consultation in 2020 sought feedback on policy options for regulating heat networks and an impact assessment (IA) was published alongside this. In 2022, a final stage impact assessment containing further analysis was published as primary legislation, providing for heat network regulation, and was introduced through parliament as part of the Energy Bill. A second consultation on the Heat Networks Market Framework is now being launched to seek further feedback on consumer protections and pricing ahead of secondary legislation. Extra rights and powers for operators will also be consulted on but this is currently planned for Autumn 2023 alongside Heat Networks Zoning. The scope of this impact assessment covers the expected impacts of establishing a heat network regulator and implementing the proposed measures included in this consultation, plus the impact of extra rights and powers. The decision to include extra rights and powers within the scope of this Impact Assessment has been made as they are planned to be introduced alongside consumer protection measures and the areas have significant overlap. Due to the complex nature of Heat Network Zoning, this will be covered by a stand-alone Impact Assessment published alongside the Zoning consultation. Further consultations after the Autumn 2023 consultation are planned to consult on further measures such as step-in arrangements, technical standards, and carbon emissions limits. These measures are not in scope of this impact assessment as they are expected to be introduced at a later date but will be covered in an updated impact assessment published alongside the future consultation.

What are the policy objectives and the intended effects? There are three components of the regulation in scope of this IA. A) Specifying a heat network regulator and their powers, including powers to take enforcement action. B) Define standards and consumer protection measures which heat network operators must comply with. C) Define the statutory powers to be given to regulated heat networks (rights and powers), to bring them in line with other utilities. The intended effect of A) and B) is to reduce or eliminate the consumer detriment currently faced by some heat network consumers and reduce negative externalities in heat network operation. The intended effect of C) is to provide parity between heat networks and other utilities, thus reducing the potential investment risk of heat networks. The expected result of these three components together, is to allow for the efficient provision of heat networks to customers while maintaining a fair level of consumer outcomes. This legislation also intends to provide the necessary regulation to facilitate sustainable growth of the sector.

These intended effects seek to deliver long term results in shaping and expanding the heat network market. Significant growth to the heat network sector has also been identified by the Climate Change Committee as playing a key role in reaching 2050 net zero targets. For this reason, a 30-year appraisal period has been used to capture the full long term policy effects.

What policy options have been considered, including any alternatives to regulation? There are two overarching options assessed in this IA, a continuation of existing market arrangements (Counterfactual) and establishing a heat network regulator. The preferred option is to establish a heat network regulator and define the required rights and powers. To operate in the market, a heat supplier must be authorised by the regulator, with optional licensing to gain extra rights and powers. All heat suppliers will be required to comply with the standards and consumer protection requirements set out in this impact assessment, when supplying heat to domestic and microbusiness consumers. Many of these standards and requirements are proposals which are not yet confirmed. Feedback is being sought on many of these measures within the consultation this impact assessment accompanies.

Will the policy be reviewed? It **will** be reviewed. If applicable, set review date: Secondary legislation
Final Impact Assessment

Does implementation go beyond minimum EU requirements?		Yes			
Is this measure likely to impact on trade and investment?		Yes			
Are any of these organisations in scope?	Micro	Small	Medium	Large	
	Yes	Yes	Yes	Yes	
What is the CO ₂ equivalent change in greenhouse gas emissions? (Million tonnes CO ₂ equivalent)		Traded: N/A		Non-traded: N/A	

I have read the Impact Assessment and I am satisfied that, given the available evidence, it represents a reasonable view of the likely costs, benefits, and impact of the leading options.

Signed by the responsible:



Date: 26/06/23

SELECT SIGNATORY

Summary: Analysis & Evidence Policy Option 1: Establishing a Heat network Regulator

FULL ECONOMIC ASSESSMENT

Price Base Year	PV Base Year	Time Period Years	Net Benefit (Present Value (PV)) (£m)		
2022	2024	30	Low: 371.9	High: 801.7	Best Estimate: 596.7
COSTS (£m)		Total Transition	Average Annual (excl. Transition)		Total Cost (Present Value)
Low		3.0	10.1		183.1
High		3.5	22.7		401.4
Best Estimate		3.4	15.6		278.8

Description and scale of key monetised costs by ‘main affected groups’:

Monetised costs include the costs to establish and run the regulatory body and the associated costs to business to be compliant with regulatory requirements. Over a 30-year appraisal period, the central regulatory costs from the secondary stage legislation are estimated to be £215.7m (discounted) for developing and managing the regulatory regime and monitoring and reporting prices. The additional costs on heat network operators to be compliant is estimated to be £63.1m (discounted). This includes the administrative cost to heat network operators arising from compliance with the regulation (e.g., the cost of applications, familiarisation and dissemination, licensing). Further detail on these proposals is set out in the main body of the impact assessment. Additional costs of compensation payments for outages from operators to consumers is estimated at approximately £8.1m for 2024 (undiscounted) subject to policy development, but this has been excluded from the NPSV calculation in line with Green Book guidance as these compensation payments are economic transfers. However, there is a distributional impact from these compensation payments in the cost incurred by heat network operators and the benefit gained by heat network consumers. We have therefore included transfer payments in the EANDCB to capture the cost incurred by operators and reflect this distributional impact. In addition, we expect these payments to fall significantly over the appraisal period as heat network operators look to avoid paying compensation by improving the reliability of their heat supply, reducing the frequency and duration of outages. Though our cost/benefit estimates of various metering policy proposals are monetised, due to significant uncertainty in the number of meter installations expected from each proposal they have also been excluded from the NPSV calculation.

Changes from estimates provided in the Final Stage Impact Assessment for Primary Powers are driven by

- Updated estimates for regulator set up and running costs
- Updated estimates for administrative costs to business
- Monetised estimates for a compensation regime included
- Monetised estimates for billing transparency costs included

Other key non-monetised costs by ‘main affected groups’: There may be additional costs incurred by heat suppliers due to the need to address any compliance and enforcement issues raised by the regulator. These costs have not been included as they are highly uncertain and would be avoidable through compliance with the regulatory requirements. Though compliance costs to businesses have been estimated, the specific cost of billing transparency improvements has not been valued at this stage. The cost of metering policy changes is the capex of installation, the opex of running a meter, and for open class heat networks there is the cost of undertaking the cost-effectiveness assessment. All costs of metering are incurred by the heat supplier but could be passed on to consumers through higher prices. Estimates of metering costs have been made but not included in the cost benefit analysis due to significant uncertainty over the preferred option at this stage.

BENEFITS (£m)	Total Transition		Average Annual	Total Benefit (Present Value)
Low	0.0		45.5	773.2
High	0.0		57.9	984.8
Best Estimate	0.0		51.5	875.5

Description and scale of key monetised benefits by ‘main affected groups’: The associated monetised benefits with implementing regulation over a 30-year appraisal period relate to:

- £847.7m (discounted) in benefits to consumers, through reduced length and frequency of outages driven by the penalties for outages placed on operators. This has been informed by service levels observed from networks subject to voluntary regulation.
- Billing changes that are expected to improve transparency and allow consumers to make better informed decisions about their heat consumption. Applying results from academic and industry research, we estimate a benefit of £20.8m (discounted), driven by consumption reductions generating bill savings, carbon savings, and air quality benefits.
- Extra rights and powers that are expected to deliver benefits to operators who choose to register for them. Only a small proportion of these benefits have been monetised, relating to the reduced administrative

costs of £7.0m (discounted). The true value of these benefits is expected to be significantly higher as it has only been possible to monetise certain administrative savings, rather than benefits such as the reduced barriers and risk to heat network development. This contributes to the negative business net present value which does not account for these unmonetized benefits.

Other key non-monetised benefits by ‘main affected groups’:

Significant non-monetised benefits that we expect to be realised relate to:

- Extra rights and powers expected to reduce the cost, time and risk in developing and managing heat networks. These rights and powers relate to street works, access rights, permitted development, rights to lay pipes under roadways, and linear obstacle rights.
- Investment and industry growth encouraged through extra rights and powers bringing Heat Networks in line with other utilities.
- Pricing transparency and powers for intervention by the regulator that will allow for unfair pricing to be identified and addressed. Though evidence from the Heat Network Consumer and Operator survey suggests there is not widespread unfair pricing in the sector, it identifies a minority of customers that face very high bills. Identifying and addressing cases of monopolistic pricing will reduce consumer detriment and deadweight welfare loss in the market.
- The reduction of other forms of consumer detriment including overheating and complaints handling.
- Social benefits from protections for vulnerable customers.
- Metering heat networks gives consumers more control over their usage and allows for billing based on usage, which combined incentivises energy usage reductions generating bill savings, carbon savings, and air quality benefits. Smart functionality improves energy usage reductions by providing consumers with more information, partly using IHD's which also improves access to meters for vulnerable consumers, and partly by providing suppliers with data on heat flows which can help identify network inefficiencies that can be improved, generating greater bill savings, carbon savings, and air quality benefits.

Key assumptions/sensitivities/risks	Discount rate (%)	3.5
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There is uncertainty associated with the final scope and approach to regulation in this analysis due to it being at consultation stage. The impact of uncertainties around cost and benefit assumptions have been analysed as part of the sensitivity analysis and though a significant range of NPSVs are reached by altering these assumptions, even under a pessimistic scenario, net positive value is expected.

A key area of uncertainty which has significant impact on value for money is the size of the heat network market and future market growth. The current level of regulation in this area means there is uncertainty around the size of the market, with the current estimate likely being an underestimate. There is also uncertainty around the future rate of growth of the market. Heat networks are considered vital in the delivery of net zero and multiple policies and investment programmes are in place to encourage the growth of the heat network sector. This impact assessment excludes market growth as a direct result of the heat network zoning regulation to avoid double counting the impacts captured by the upcoming heat network zoning IA, and instead assumes a central estimate of 3.6% per year for general growth of the market. This is based upon the limited information available on growth of the sector to date. Given the uncertainty in this assumption and its significant impact on costs and benefits, scenario analysis has been conducted to produce appraisal results under a range of market growth rates. The results of this are set out in the sensitivity analysis section and show that the value of this regulation increases with market size, but even under a 0% market growth scenario a positive net impact is expected.

BUSINESS ASSESSMENT (Option 1)

Direct impact on business (Equivalent Annual) £m:			Score for Business Impact Target
Costs: 15.5	Benefits: 1.5	Net: 14.1	70.3

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Executive Summary

1. A heat network is a distribution system of insulated pipes that takes heat from a central source and delivers it to a number of domestic or non-domestic buildings. Heat networks are a crucial aspect of the path towards the cost-effective decarbonisation of heat and achieving net zero by 2050. In the right circumstances, they can reduce bills, support local regeneration and can be a cost-effective way of reducing carbon emissions from heating. Heat networks have the potential to provide around 20%¹ of the UK's heat demand in a least-cost pathway to net-zero, up from 3% today².
2. The Competition & Market Authority (CMA)³ released a market study on heat networks in 2018. The CMA set out several recommendations for the regulation of heat networks. This is a recommendation that the Department for Energy Security and Net Zero agrees with. This impact assessment supports the primary legislation proposal to regulate the heat network market. This includes quantified estimates of the cost of establishing the regulator and the costs to business of being compliant with the requirements. In addition, a quantitative assessment of the potential impact of the proposed powers has been included.
3. Relative to non-heat network customers, heat network customers do not have the same level of consumer protections. This can mean lower levels of transparency and quality of service, instances of disproportionately high pricing, and no mandatory compensation regime for outages. In addition, unlike other utilities, heat network developers/owners lack the same rights and powers, which can make developing and operating a heat network more burdensome.
4. The Heat Network Market Framework aims to mitigate these issues by introducing greater consumer protections and drive forward the growth of the market by ensuring heat network developers can gain access to extra rights and powers.
5. Where possible the impacts of the market framework regulation have been monetised. Under the central scenario, the total cost is £278.8m (discounted) and the total benefit is £875.5m (discounted), giving an NPSV of £596.7m for the regulation. The costs include the set-up and ongoing costs of the tripartite regulatory structure and the cost to heat network operators in the form of familiarisation and compliance. The benefits include reduced outages through the incentivisation structure of the compensation regime, extra rights and powers for heat network developers, and a bill saving, carbon saving, and air quality benefit from improved billing transparency. Further detail of the analysis is explained in this impact assessment.
6. The proposed heat network regulatory arrangement is a tripartite structure consisting of Ofgem as the core regulator, Citizens Advice as the consumer advocacy body and the Energy Ombudsman as the independent dispute resolution body. Across a 30-year appraisal period, the additional primary and secondary total cost of funding these organisations are estimated to be £215.7m (discounted), accounting for the implementation of different aspects of the regulation and anticipated market growth. The additional estimated costs to businesses to be compliant with the core requirements of the regulation is £63.1m (discounted), including costs associated with familiarisation, applications, reporting and additional administrative costs.

1 Independent Assessment: The UK's Heat and Building Strategy, Climate Change Committee, Table 2.1, pp. 22, <https://www.theccc.org.uk/wp-content/uploads/2022/03/CCC-Independent-Assessment-The-UKs-Heat-and-Buildings-Strategy.pdf> (March, 2022)

² <https://www.gov.uk/government/publications/net-zero-strategy>

³ CMA Market Study on Heat Networks < <https://www.gov.uk/cma-cases/heat-networks-market-study> >

7. There are expected to be significant benefits which could be enabled through the HNMF, ensuring consumers are protected as the market grows. Although, this will depend on how the proposed regulatory powers will be used, which will be subject to further policy development and consultation at secondary legislation stage.

Table 1 – Summary of quantified analysis

Cost/Benefit	Explanation	Estimate over 30-year appraisal period (£m, discounted)
Cost		
Tripartite regulatory body set-up	To establish the tripartite regulatory body of Ofgem, Citizens Advice, and the Energy Ombudsman.	3.4
Tripartite regulatory body ongoing costs	To develop and manage the regulatory regime, and monitoring and reporting prices.	212.3
Heat network operators complying with HNMF regulation	For heat network operators to be compliant with the new HNMF regulations (inc. authorisation, licensing, audits, complaints, reporting).	63.1
Benefit		
Compensation regime – reduced heat outages	Introduction of compensation regime incentivises heat network operators to avoid penalties by improving reliability of heat supply, reducing frequency and duration of outages (estimated using monetised value for lost hour of heat).	847.7
Billing transparency – consumer usage reduction	Improved billing transparency allows consumers to make more informed decisions about their usage, leading to a reduction in consumption on average. This results in a bill saving, and as less fuel is burnt in heat generation there is a carbon saving and air quality improvement also.	20.8 (Bill saving = 10.9, Carbon saving = 9.6, Air quality improvement = 0.3)
Extra rights and powers – reduced regulatory burden for heat network operators	Provision by license of development rights and powers to heat network operators, reducing barriers and risks to network construction or expansion. Only a small portion of these benefits have been monetised (administrative savings) but the benefit is expected to be significantly higher.	7.0 (Granting wayleaves instead of easements = 3.1, Granting licences over permits for street works = 3.9)
Totals		
Business Net Present Value	The discounted sum of the value of all benefits that directly impact businesses, less all costs that directly impact businesses, in each year of the appraisal period (2024-2053).	-270.8

Net Present Social Value	The discounted sum of the value of all benefits, less all costs, in each year of the appraisal period (2024-2053).	596.7
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Problem under consideration

8. The heat network market currently has minimal regulation⁴ unlike other utilities such as gas and electricity. This means that currently heat network consumers do not benefit from the same levels of protection as gas and electricity consumers. Further to this, organisations involved in the development and operation of heat networks do not have the same rights and powers as their gas and electricity counterparts, despite both delivering similar and vital services.
9. A 2017 market study⁵ by the Competition and Markets Authority (CMA) found that, though many heat network consumers are supplied heat at comparable consumer standards to the wider energy sector, a significant proportion experience poor service, such as 37% of heat network consumers experiencing a loss of heating in the last 12 months compared to 24% of non-HN consumers. The report recommended that the sector should be regulated by a public-sector body which has statutory powers to set regulation, monitor compliance, and enforce against heat network operators that do not comply with the regulation. Subsequent research in the 2022 Heat Network Consumer and Operator Survey has shown that though some improvements have been made to service quality has improved, there is still a discrepancy between heat networks and non-heat networks. This is detailed in the “Quality of service and compensation regime” section of the impact assessment.
10. The Department for Energy Security and Net Zero agrees with the findings of the CMA to regulate heat networks to ensure adequate protections for all heat network consumers, support market growth, and decarbonise at the required rate to meet our 2050 Net Zero target. The government is proposing to establish a regulatory framework for heat networks which protects consumers, improves standards, and drives forward the growth and decarbonisation of the heat networks market.

Rationale for intervention

11. Several market failures and barriers have been identified in the heat network market which contribute to inefficiencies, drive poorer consumer outcomes and limit the deployment of heat networks to below the socially optimal level.
 - **Monopolistic characteristics** – In the right circumstances, heat networks can offer the most cost-effective provision of heating and/or cooling. It is most efficient for one supplier to supply the market, or in this case supplying the heat to a pool of consumers. However, once connected it is often not possible or feasible for a customer to disconnect or be excluded. This could lead to instances where consumers face detriment and have little recourse to remedies, as the network is a natural monopoly. This may mean heat networks are able to provide poorer services and extract rents from consumers, above what is efficient and equitable.
 - **Incentives** – In conjunction with the monopolistic characteristics, heat networks are often developed by for-profit organisations without full representation of the future customers. The CMA’s market study suggested that developers could have an incentive to be myopic and try to minimise the up-front costs to the detriment of consumers, either through lower standards or recovering additional costs through future consumer bills.

⁴ With the exception Heat Network (Metering and Billing) Regulations 2020 < <https://www.gov.uk/guidance/heat-networks> >

⁵CMA Market Study on Heat Networks < <https://www.gov.uk/cma-cases/heat-networks-market-study> >

- **Information Failures** - Heat network customers can often face incomplete information and a lack of transparency. When a customer joins a heat network, they often are unfamiliar with the heat network's characteristics, which can prevent them from making informed decisions. Once a customer has joined, they may also face a lack of transparency in billing; customers may not be aware of how their bills are broken down and why they are paying what they are.
- **Development/maintenance barriers** - Organisations involved with the development and maintenance of heat networks currently have fewer rights and powers, relative to other energy utilities. This can make building, maintaining, and expanding networks more challenging and burdensome. In-part, this could contribute to poorer service standards and a lower level of heat network deployment than would be socially optimal.
- **Equity issues** – In comparison to other utility providers, heat network consumers are not given the same level of protection. This is compounded by the fact that networks tend to serve more older consumers⁶. This may mean heat network customers are disproportionately impacted by instances of consumer detriment, with little recourse to protection.

Policy objective

12. Regulation has two objectives which seek to address these market failures:

- **Consumer protection:** Ensure heat network consumers receive adequate levels of protection by implementing consumer protections against disproportionate prices and unreliable heat supply, as well as promoting transparency of information.
- **Support growth:** Accelerate heat network deployment by providing statutory rights and powers which make it cheaper and quicker to build and expand heat networks. Growth of the heat network market has been identified by the Climate Change Committee as a key factor in decarbonising heat to meet net zero targets.

Description of options

13. There are two overarching options assessed in this IA: a continuation of existing market arrangements (Option 0: Counterfactual) and establishing a heat network Regulator (Option 1: Preferred).

- **Option 0:** (Counterfactual): Continuation of existing market arrangements.
- **Option 1:** (Preferred) Establish a heat networks regulator and define the required rights and powers. To operate in the market, a heat supplier must be authorised by the regulator, with optional licensing to gain extra rights and powers.

14. Several other approaches to regulation were considered in the previous consultation stage IA, with the equivalent of option 1 being retained as the preferred option. For simplicity only the two options listed above are discussed in the main body of this IA. The reasons for this were covered in the previous final stage IA for primary legislation.

Non-Regulatory options

15. There are a few non-regulatory initiatives which partially address issues created by the heat networks market being unregulated. For example, the Heat Trust⁷, which launched in November 2015, established a voluntary, industry-led consumer protection scheme for heat networks that guarantees quality of service standards for approximately 11% of heat network consumers. Separately, the Heat Networks Code

⁶ Heat Network Consumer and Operator Survey 2022

⁷Heat Trust < <https://www.heattrust.org/> >

of Practice⁸(CP1), launched in 2015, defines minimum technical standards for the design and construction of heat networks. Although these are welcome initiatives, heat suppliers are under no obligation to join and/or comply.

16. The international comparison of heat network regulatory frameworks⁹ commissioned by the Department for Energy Security and Net Zero identified both regulated and unregulated regimes. The report highlights Germany and Finland as examples of largely unregulated regimes but notes that in both countries the competition authorities can step in on competition issues. The report suggested that an unregulated sector may not meet the needs and expectations of UK consumers.
17. When evaluating non-regulatory approaches, they were deemed not viable to achieve the policy objectives. As the requirements would not be enforceable, this approach would be unable to provide the required level of consumer protections and support to the industry. The limited number of heat network suppliers signed up to Heat Trust suggests that rules on consumer standards will need to be mandated to ensure those standards are achieved across the market. This view is supported by engagement with heat suppliers not registered with the Heat Trust. Without regulation it would not be possible to provide equivalent consumer protections to heat network customers as those not on heat networks such as domestic gas customers.
18. Furthermore, the CMA's market study recommended that government should install a statutory regime whereby there is a sector regulator. This recommendation is supported by the government and is further reinforced by responses to both the CMA's market study, and the previous Heat Networks Market Framework consultation¹⁰. Therefore, non-regulatory options have not been considered further in this IA.

Counterfactual

19. The counterfactual scenario is a continuation of existing arrangements where the heat network market is subject to Heat Network Metering and Billing Regulations (HNMBR). The heat network market currently has limited self-regulation and industry standards, such as voluntary membership of Heat Trust and the industry led CP1 technical standards applying to some new builds. In the absence of future government action, it is likely these initiatives would continue and possibly grow. An indicative scenario of growth in voluntary Heat Trust membership forms the counterfactual for this IA, more details can be found in Annex A.
20. A continuation and possible expansion of voluntary initiatives is likely to be insufficient to remedy consumer detriment issues or satisfy the CMA's recommendations. As a result, the CMA could still choose to launch a market investigation and use its order making powers to remedy some of the concerns directly. Whilst this would result in some issues being addressed, it is not expected to be the most efficient approach and would not address the more systemic issues faced in the market such as the difference consumer protections between heat network and domestic gas consumers.
21. Given the anticipated growth in the heat network market, if left unaddressed, there is a risk that consumer detriment could grow. In addition, heat network developers would continue to face the same issues when developing and maintaining heat networks if they continue to lack certain rights and powers introduced with the HNMF. In the longer

⁸Developed by the Chartered Institution of Building Services Engineers (CIBSE) and the Association for Decentralised Energy (ADE) <<https://www.cibse.org/knowledge/knowledge-items/detail?id=a0q3Y000001MrmGQAT>>

⁹ The International Review of Heat Network Market Frameworks by BEIS <https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/863937/international-review-of-heat-network-market-frameworks.pdf>

¹⁰ The Heat Networks Market Framework Consultation <<https://www.gov.uk/government/consultations/heat-networks-building-a-market-framework>>

term, this could also act as a bottle neck to growth in the market, potentially limiting deployment.

Option 1: Establishing a Market Framework (Preferred option)

22. Under this option, a heat network regulator would be established and would be given the powers necessary to regulate the market, as set out below. The preferred regulatory model for the heat network market is general authorisation with an optional licence for rights and powers. Under this option, every heat supplier and heat network operator must notify to the regulator to be authorised to operate in the market. An authorised entity will need to comply with consumer protection rules for domestic and microbusiness consumers under the HNMF.¹¹ In addition, heat suppliers that want additional statutory undertaker rights and powers to build or extend heat networks can apply for a licence granted by the regulator.

23. This option has been selected to reflect the structure of the heat network market and reduce unnecessary administrative burdens, whilst enabling the benefits of licensing where required. Table 2 provides an overview of the key regulatory powers associated with the HNMF.

Table 2 – Summary of key regulatory powers

Regulatory powers	Scope	Description
Authorisation	All heat suppliers and operators in Great Britain	All heat suppliers and heat network operators will be required to be authorised by the regulator to operate in the market.
Transparency & Quality of service	Heat networks supplying domestic or microbusiness consumers in Great Britain	Introducing minimum requirements on transparency of information, pre and post property transaction, and quality of service standards to ensure a reliable supply of heat to consumers.
Pricing	Heat networks serving domestic or microbusiness consumers in Great Britain.	The regulator will have powers to collect pricing data, conduct investigations into instances of disproportionately high prices, and intervene when there is evidence of systemic issues on pricing or cases of significant consumer detriment.
Metering and Billing	Heat networks serving domestic or microbusiness consumers in Great Britain.	Introducing minimum requirements on the transparency and accuracy of billing to better inform consumer usage decisions and reduce consumer detriment from inaccurate billing. Furthermore, requirements for meter installation are to be reformed, looking to increase the level of metering to further improve availability of usage-based billing, and better align energy saving incentives, whilst considering cost-effectiveness and technical feasibility of installation.
Licensing	Optional for developers and operators in England and Wales.	Heat network developers and heat network operators will have the option of applying for a licence to be granted statutory rights and powers.
Extra rights and powers	Heat networks which choose to obtain licenses in England and Wales.	Provision of extra rights and powers to licensed networks will lead to cost and time savings in the development, extension, and maintenance of networks.

¹¹ All domestic and microbusiness consumers will be protected by consumer protection rules. We are considering whether certain small and medium sized enterprises should also have the option to be protected and are leaving that option open in primary legislation. This IA is based on our current policy position of consumer protections applying to all domestic and microbusiness consumers.

Summary of preferred option and implementation plan

24. The preferred option is to establish a Heat Networks Market Framework in legislation, with a heat network regulator being given powers to enforce regulatory requirements. The proposed approach is a tripartite structure akin to the retail energy sector consisting of Ofgem as the core regulator, Citizens Advice as the consumer advocacy body and the Energy Ombudsman as the independent dispute resolution body. We expect the three organisations to work collaboratively, to share expertise and market intelligence and to regulate the heat network market efficiently. The proposed roles and responsibilities are detailed in Table 3 below:

Table 3 - Proposed governance structure of the HNMF

Responsibility in the HNMF	
Ofgem	Administering the authorisation and licensing regimes. Market monitoring, compliance, and the enforcement of consumer protection rules, including price transparency and interventions. Further responsibilities are anticipated relating to future measures outside of the scope of this consultation and impact assessment. These responsibilities will be covered in a future consultation stage impact assessment.
Citizens Advice	Advocacy and advice for heat network customers. Administer an Extra Help Unit to support consumers in vulnerable circumstances. National awareness campaigns. Reporting systemic issues to the tripartite group. The remit for Citizens Advice will be England and Wales. It is proposed that Consumer Scotland will provide a similar role covering Scottish heat network customers.
Energy Ombudsman	Provide domestic and micro business heat network consumers with access to its independent dispute resolution service. Work with regulated entities to advise on how to reduce volumes of complaints. Reporting systemic issues to the tripartite group.

25. Primary legislation is being implemented for the Heat Networks Market Framework through the energy bill. This establishes the roles of the heat network regulator (Ofgem), consumer advocacy body (Citizens Advice), and independent dispute resolution body (Energy Ombudsman). Secondary legislation will provide for these entities' objectives, the entities' functions and duties, and the powers they will need to perform them. No impacts are incurred from this primary legislation, as reflected in the primary legislation final stage impact assessment¹². Any cost estimates outlined in the body of the IA reflect the impacts expected from the regulation at secondary legislation stage.

26. We intend for secondary legislation and authorisation conditions to set out in detail the rules and conditions which must be met to be compliant with regulation. This will include setting standards, requirements, and rules which the heat network market will need to comply with and which the regulator will have powers to enforce. This impact assessment accompanies a public consultation on the policy approaches for secondary legislation to ensure stakeholders can provide views on policy design. The scope of this impact assessment is to cover the elements included in the accompanying consultation.

27. A further public consultation is planned to seek views on further elements of secondary legislation such as minimum technical standards and carbon emissions limits. An updated impact assessment will be published alongside this to show the expected impacts of these measures. The planned future impact assessments on the Heat Network Market Framework legislation are:

- A further consultation stage impact assessment published alongside a future consultation seeking feedback on areas of the heat network market framework such as technical standards and carbon emissions limits. This impact assessment will provide analysis on the expected impacts of the measures being consulted on.

¹² <https://bills.parliament.uk/publications/47261/documents/2122>

- A final stage impact assessment covering the expected impact of heat network market framework secondary legislation. This will factor in feedback from both consultations.

Table 4 – Indicative implementation timeframe

Year	Activity
Prior to introduction of secondary legislation	Current consultation is concluded, feedback is considered, and a government response is issued. A further consultation is conducted including minimum technical standards, step in rights and future decarbonisation targets.
Year 0	Secondary legislation introduced and passed. Ofgem set-up phase: developing the data solution for the authorisation and licensing regimes and to support compliance work; policy development; market monitoring; market engagement.
Year 1	Regulation enters into force - Ofgem becomes operational as regulator. A transition period of 12 months commences, within which all existing heat suppliers and heat network operators need to notify to the regulator to have authorisation. The Energy Ombudsman and Citizens Advice begin to perform their functions under the HNMF.
Year 2	The transition period ends, with heat suppliers and heat network operators subject to regulatory requirements on certain aspects of consumer protection (e.g., transparency of information) and Ofgem conducting market monitoring and compliance work for these requirements. Heat network developers and operators will have the option to apply for additional licensing for rights and powers. This is also when any changes to metering policy are most likely to be introduced.
Year 3	All heat suppliers in scope of the HNMF will be expected to comply with the framework requirements. Continued phasing in of regulatory requirements, such as pricing, technical standards, and step-in rights. The regulator is expected to face additional costs related to compliance and enforcement activities, including auditing, as well as the recurring costs highlighted above.
Longer-term	Regulator will have powers to amend conditions of authorisation so changes to regulatory requirements may happen to reflect the growth and decarbonisation of the market and Ofgem's learning from regulating the market. Carbon emission limits come into force, likely in the early 2030s.

28. We are taking a flexible approach to regulation; this is particularly important given the nascent state of the heat network market and the growth and decarbonisation we expect to see out to 2050. The regulator will have powers to amend conditions for authorisation. This means that as the market grows and evolves and Ofgem develops more experience of regulating the market, rules on consumer protection can be amended and supplemented to reflect market changes and increased regulatory knowledge.
29. The phasing in of aspects of the HNMF will also allow for the exploration of different approaches to regulation, in consultation with key stakeholders such as industry and consumer groups. Consumer protection rules will be developed and expanded over time to allow for flexibility and ensure regulation can take into consideration the development of the market and key learnings.

Approach to analysis

30. To assess the impact of establishing a heat network regulator, a cost-benefit analysis has been undertaken. Not all costs and benefits were possible to monetise, and impacts have only been included for the measures included in this consultation, plus the impacts of extra rights and powers for heat suppliers. Extra rights and powers

impacts have been included as these are expected to be introduced alongside consumer protections measures. A further impact assessment is planned to be published alongside an additional consultation covering a wider scope.

31. A monetised assessment has been completed for the following costs using a Standard Cost Model (SCM)¹³:

- Establishing a regulator and its running costs.
- Businesses complying with core elements of the regulation.
- Transfer payments incurred by heat network suppliers from the introduction of a compensation regime.
- Extra rights and powers' (access rights and street works) costs to businesses.

32. A monetised assessment has also been completed for the following benefits:

- Reduction in the number of hours consumers face outages because of the compensation regime.
- Improved billing transparency allowing customers to reduce unnecessary heat demand.
- Administrative cost saving benefits to businesses from extra rights and powers (access rights and street works).

33. A qualitative assessment of the possible impacts of the proposed regulatory powers has also been included for the following sections below. This includes an indication of the scale of the issues the powers intend to address and discussion over where the likely cost and benefits could fall:

- Costs to businesses to implement improved billing transparency.
- Certain costs and benefits from extra rights and powers like permitted development, linear obstacle rights and rights to lay pipes under roads.

34. These costs and benefits are compared against the counterfactual scenario (Option 0). This provides an indication of the expected costs and benefits that arise from the preferred option. The impacts are considered over a 30-year appraisal period. All monetised impacts are presented in 2022 prices and where specified are discounted in accordance with the HM Treasury Green Book¹⁴. A 2024 base year has been used to reflect the timing of the final policy decision, ensuring the discounting adjustment is applied effectively.

35. This approach has been adopted to reflect the stage of policy development, data availability, and difficulty monetising the benefits of regulation. The qualitative assessment of the impact of proposed powers has been included to provide a sense of the benefits these are envisioned to bring. However, the impact will be dependent on how these powers are used by a future regulator, which will be subject to future policy development in secondary legislation.

Evidence sources

36. Key sources of evidence used for the impact assessment:

- **Heat Networks (Metering and Billing) Regulations (HNMBR) notifications:** The most recent data available at the time of analysis was used which covered around 14,000 heat networks in the UK. The assumptions derived from this source include the current structure of the UK heat network market, estimated number of heat suppliers and the

¹³ Activity cost = price x quantity = (tariff x time) x (population x frequency)

¹⁴ Green book guidance on how to assess and evaluate policy <<https://www.gov.uk/government/publications/the-green-book-appraisal-and-evaluation-in-central-government>>

current number of final customers, which have been used to assess the likely future burden on the regulator and industry.

- **CMA market study:** Evidence and data from the CMA market study has been used to strengthen the evidence base, alongside setting out the CMA recommendations.
- **The responses from the 2020 ‘Heat networks: building a market framework’ consultation¹⁵:** The responses from the consultation have been used for future development of the policy and analysis of the expected impact of the HNMF.
- **Heat network consumer survey 2017¹⁶:** The survey has been used to provide a range of consumer detriment indicators.
- **Heat network consumer and operator survey 2022¹⁷:** This survey has been used to provide updated consumer detriment indicators, the reported outages which informed the compensation regime analysis and responses to billing related questions have been used in billing transparency analysis. This survey will be published alongside this consultation.
- **Heat Trust data:** Membership data is used to inform the counterfactual scenario assumptions as well as inform some assumptions that fed into both the regulator and business costs estimates. Outage data is also used for the compensation regime analysis.
- **Ofgem, Citizens Advice and Energy Ombudsman:** The estimated cost of regulation has been informed by evidence and insights from these three organisations based on their expertise in the gas and electricity market.
- **2022 Ofgem-BEIS Price Survey data:** This survey has been used to compare the costs between heat networks and consumers with gas boilers following the substantial rise in energy prices in 2022.

37. A review of these data/evidence sources has confirmed they are the most appropriate sources for the analysis undertaken. Where evidence gaps have persisted, we have relied on appropriate proxy assumptions and/or evidence from the consultation. Although there are several key uncertainties and evidence gaps which have been more challenging to manage, a wide range of sensitivities have been tested for the quantified analysis supporting this IA, and the remaining evidence gaps have been flagged throughout the IA. Recognising the importance of improving our understanding of the heat network market in order to develop the most appropriate regulatory policies, we are currently undertaking a number of work packages to update/fill remaining evidence gaps which will be used to inform further policy development.

Estimated costs

38. Indicative costs for the impact of the regulation at primary and secondary stage has been estimated for both the counterfactual and regulatory scenarios. These costs pertain exclusively to the cost of establishing a regulator and the cost to business of being compliant with the requirements. An overview of the costs included is below. Full details on the assumptions used can be found in Annex A – Estimated Cost Assumptions.

39. The regulator incurs set-up costs as well as business-as-usual operating costs. These are set out below:

¹⁵ The Heat Networks Market Framework Consultation <<https://www.gov.uk/government/consultations/heat-networks-building-a-market-framework>> and Government response document https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1043640/heat-networks-market-framework-consultation-govt-response.pdf

¹⁶ Heat Network Consumer Survey (HNCS) <<https://www.gov.uk/government/publications/heat-networks-consumer-survey-consumer-experiences-on-heat-networks-and-other-heating-systems>>

¹⁷ Heat Network Consumer Survey (HNCS) <<https://www.gov.uk/government/publications/heat-networks-consumer-survey-consumer-experiences-on-heat-networks-and-other-heating-systems>>

- **Set-up costs:** This will involve the creation of the regulatory framework as well as the systems to manage it, such as setting up a database. It is assumed that these costs take place in the first year of the appraisal period.
- **Operational costs:** This will involve the running of the regulatory regime. The costs to the regulator will relate primarily to compliance, auditing, monitoring the market and enforcement.

40. Heat suppliers and operators are expected to incur costs associated with the requirements of the regulation. Given the stage of policy development only the expected core requirements of the regulation have been included. These are set out below:

- **Familiarisation and dissemination** - Reading and understanding new regulatory requirements and guidance. This familiarisation is assumed to happen at a heat supplier level with dissemination at a heat network level.
- **Authorisation/Licensing application** – All heat suppliers in the scope of the regulation will be required to submit an authorisation application to the regulator and they may also choose to apply for an optional license which is expected to be more time consuming.
- **Reporting** – Reporting is expected to be a minimum requirement of the regulation to gather the information necessary to monitor and regulate the market, this is expected to take place at the heat network level and is assumed to not require new or specialist IT to complete. The frequency of reporting has not yet been finalised.
- **Additional administrative costs** – There is expected to be some additional administrative requirements related to dealing with complaints from consumers and preparing the required documentation for audits. The aggregated cost across the market has been estimated, but in practice, these costs will only be borne by organisations subject to complaints and/or audits.

41. The regulator and costs to business estimates account for the implementation timeframe and anticipated growth in the market. This has been done by phasing in the costs associated with regulatory activities and therefore the associated resource. To account for the anticipated growth in the market, aspects of these costs have been scaled in line with the anticipated growth across the appraisal period. The details on this analysis can be found in Annex A – Estimated Cost Assumptions.

42. There may be additional costs incurred by heat suppliers due to the need to address any compliance and enforcement issues raised by the regulator. These costs have not been included as they are highly uncertain and would be avoidable through compliance with the requirements. Furthermore, there may be further regulatory requirements placed on heat networks which will be set out by the regulator. The impacts of any additional requirements will be considered during the policy development and future secondary legislation impact assessments.

Counterfactual

43. The estimated counterfactual costs assume the continuation and growth of voluntary market arrangements. To estimate this, we have forecasted Heat Trust membership over a 30-year appraisal period based on the growth in membership over the last 6 years¹⁸, and in the central case this leads to around 139,000 customers covered by the Heat Trust by the end of the appraisal period. Heat Trust membership fees have been applied to estimate the total running costs of the scheme. There are no set up costs included as these are sunk costs.

¹⁸ Based on the annual reports from the Heat Trust < <https://heattrust.org/annual-reports-v2> >

44. There are also expected to be costs to business in the counterfactual. All the costs to business have been adjusted to reflect the current requirements of Heat Trust membership and only apply to the networks which are members of the Heat Trust. In addition, we have included the costs associated with the 4-year reporting that all networks are required to submit as part of the heat network metering and billing notifications. Please see Annex A – Estimated Cost Assumptions for more details.

Table 5 - Overview of total option costs over the 30-year appraisal period (Discounted, £m, 2022 prices)

		Option 0: Counterfactual	Option 1: Establish a Regulator
Regulator	Set up	0.0	3.4
	Operating	18.1	230.4
Heat network operator	Familiarisation and dissemination	0.0	1.7
	Authorisation/Licensing application	0.0	0.6
	Compliance with regulation including reporting	53.5	109.3
	Admin (Audits, complaints)	0.9	5.7
Total		72.5	351.1

Note: these costs have been rounded and discounted so may differ from elsewhere in the IA. The counterfactual costs for “Familiarisation and dissemination” and “Authorisation/Licensing application” are rounded to zero but are not zero.

EANDCB

45. This IA has considered the costs and benefits that are generated to business from setting up a regulator, defining consumer protections, granting rights and powers, and compensation payments for outages. Costs and benefits to business can be considered direct or indirect. An impact is considered ‘direct’ if it arises directly from the implementation of the measure. The Department for Energy Security and Net Zero assesses these direct impacts using the standard methodology to calculate the annual net direct costs for business (Equivalent Annual Net Direct Costs to Business, or EANDCB).

46. All costs presented in this IA are considered direct and all costs are expected to directly impact businesses, except for regulatory set up costs given these are government funded. Compensation payments are economic transfers and so are excluded from the NPSV calculation, however, they do have a distributional impact as the cost incurred by heat network operators is a benefit gained by heat network consumers. Therefore, compensation payments for outages are considered a direct cost and included in the EANDCB calculation. The EANDCB of the preferred option in the central case are valued at £14.1m (discounted) per year over the 30-year appraisal period.

Cost recovery

47. Responses to the consultation stage IA highlighted concerns over the estimated regulatory costs and their financial impact if they were recovered from heat network consumers alone. Given the relatively small size of the current heat network consumer base, even relatively low costs of regulation would lead to a large consumer burden. We have worked with industry and the tripartite group to review the cost estimates and

investigate other cost recovery options. This resulted in the development of a range of alternative cost recovery options, which were consulted on between December 2021 and February 2022¹⁹.

48. Following the conclusion of this work, the costs of heat network market regulation will now be recovered across gas and electricity consumers, as well as heat network consumers. This proposal reduces the average estimated annual impact per heat network consumer from £12.20 to £1.78, whilst increasing the average charge for gas and electricity consumers by around £0.18 annually. This would mean all energy consumers pay comparable amounts as a consequence of the regulation. Please see Annex A – Estimated Cost Assumptions for more detail on this analysis.
49. In addition to recovering the cost of funding the regulator, there could be additional costs passed through to consumers due to the costs to businesses. However, as these estimates do not account for any costs saving to business through the provisions such as extra rights and powers, this is expected to be an overestimate. The additional costs are expected to be borne by heat network suppliers, who are assumed to pass through 100% to heat network consumers. If the costs are recovered in this way, the estimated average impact would be £3.52 per customer per year.
50. Furthermore, the proportion of these costs that are passed on to consumers is expected to vary, for example consultation with local authorities and housing associations suggest the amount passed to consumers may be limited. However, this would not change the overall cost, only where costs are recovered. In addition, many of the organisations which own or operate heat networks will have a wider consumer base, over which costs could be recovered. For example, an energy company which operates a heat network may have a wider pool of energy consumers they may choose to recover these costs from, or an organisation like an office, which owns or operates a heat network as part of the business, may be able to recover these additional costs over their wider business consumer base. Therefore, this is likely to be an upper bound estimate of the impact costs to business could have on consumers.

Assessment of Regulatory Benefits

51. The regulator will have the powers set out above, the impact of these powers will depend on how they are used, which will be detailed in future legislation. For this IA, we have set out an overview of the potential impacts and provided a sense of scale where data has allowed.

Table 6 – Summary of Regulatory powers impact

Powers		Heat Network Consumers	Heat Network Suppliers
Quality of service and compensation regime	Setting minimum requirements on quality of service aims to address areas of service where heat network customers report greater levels of detriment. This is expected to bring significant consumer benefits to those consumers who currently have limited protections. As heat network customers are unable to switch suppliers in cases of poor service, a compensation regime is proposed to ensure there is		

¹⁹ Cost Recovery Consultation on Heat Networks Regulation <<https://www.gov.uk/government/consultations/recovering-the-costs-of-heat-networks-regulation>>

	<p>incentive for heat network operators to invest in providing a good quality service.</p> <p>Furthermore, customers will be able to escalate complaints to the Energy Ombudsman to address poor quality of service. Additional protections will be introduced to ensure vulnerable customers are prioritised.</p>		
Metering and billing	<p>Setting requirements on billing transparency aims to overcome information failures and inefficiencies. Heat network customers report lower levels of billing transparency than non-heat network customers. Improving billing will allow customers to make more informed decisions about their heat consumption.</p> <p>Reforming metering policy to increase levels of metering across the heat network market seeks to further improve consumer welfare around billing and properly align energy saving incentives. The policy proposals aim to increase the prevalence of billing based on usage, ensuring billing is fair. Moreover, metering (particularly smart metering) provides users with usage feedback, which alongside billing based on usage provides consumers with a strong energy saving incentive.</p> <p>Smart meters can also help heat network operators to identify network inefficiencies, facilitating efficiency improvements that generate greater energy savings and improved service provision.</p>		
Pricing	<p>There is evidence that some heat network consumers are charged very high prices, relative to both typical heat network and typical non-heat network consumers. These consumers have little or no option to change supplier. The regulation will enable investigation to be carried out and intervention if deemed appropriate. Over time this is expected to improve the understanding of these instances and reduce their prevalence across the industry. This is expected to require suppliers to report on pricing and they may be required to adjust their pricing if deemed disproportionate. In instances where pricing is altered, this would represent a transfer of these costs from consumer to supplier, and therefore would need to be managed carefully.</p>		
Rights and powers	<p>The access to rights and powers is expected to reduce the burden associated with deploying and maintaining heat networks. This is expected to reduce the time and cost associated with these activities, for example there is estimated to be a net saving of around £450 per street works application. Consumers are also expected to benefit from improved maintenance and overall benefits associated with heat networks. In addition lower capital costs can translate to lower standing charges for consumers. These powers will be a key enabler of growth in the sector.</p>		

Note: Green = expected positive impact, Amber = small impact or uncertain, Red = expected negative impact.

Quality of service and compensation regime

52. Quality of service regulations are being consulted on in the accompanying consultation. Currently there is minimal regulation on these areas in the heat network market compared to other markets such as gas. The intention of the regulation is to ensure heat network customers receive comparable levels of consumer protections as non-heat network customers.
53. The regulator will introduce minimum requirements on transparency pre and post transaction (before and after moving into a property on a heat network) and minimum service quality standards to safeguard consumers. This aims to ensure that heat networks provide heat reliably and appropriately, as well as ensuring better arrangements for complaints handling, billing processing and information transparency at all stages.
54. These standards are expected to lead to a range of consumer benefits such as access to redress; and a reduction in hassle costs from making complaints or getting information about the heat network. This is also expected to enable heat network operators to be able to evaluate and benchmark their provisions against others in the sector, which could encourage industry to improve standards. There could be some costs associated with any requirements placed on heat networks, however, these are envisioned to be relatively inexpensive and would bring standards to a broad parity with the gas and electricity sector. Feedback on these areas is being sought through consultation.
55. The BEIS 2017 heat network consumer survey¹⁹ (HNCS) suggested that heat network consumers were as satisfied with their heating systems as non-heat network consumers. However, the survey found there were several areas where heat network customers could face lower service quality. The recent 2022 HNCOS shows some improvements; however, heat network service quality is still lower than non-heat network consumers in many of these areas. This goes some way to providing a sense of the scale of the issues in the market and therefore the possible benefits the regulation could unlock, summarised in [Table 7](#).
56. Since the 2017 HNCS, service quality has improved, with improvements in over 80% of the reported indicators. There is however still a discrepancy between heat networks and non-heat networks. The data shows that heat network consumers are more likely to experience loss of heating, with 50% reporting at least one instance where they have lost heating compared with 29% for non-heat network consumers.

Table 7 - Heat Network Consumer and Operator Survey, indicators of service quality

Indicator		Heat network (2017)	Non-Heat network (2017)	Heat network (2022)	Non-Heat network (2022)
Quality of service standards	Does the property have a device to programme what time your heating comes on (for example, a thermostat with a timer).	35%	62%	61%	66%
	Experienced overheating in last 12 months	39%	22%	41%	33%
	Reason for overheating: Lack of control	23%	19%	22% ²⁰	7%

²⁰ Lack of control includes inability to turn off heating and turn down heating, both leading to property being too warm.

Reason for overheating: Can't turn heating off	11%	7%	8%	1%
Loss of heating at least once in the last 12 months	37%	24%	50%	29%
Complained or had reason to	32%	26%	33%	28%
Satisfied with complaint resolution	45%	55%	39%	48%

Note: This is not the complete list of indicators

57. In addition, research carried out by the CMA and Which?²¹ found that consumers generally have low awareness of the heating technology prior to moving into to a property. This suggests that consumers are not sufficiently informed about the characteristics of heat networks when moving into a property and this could therefore restrict their ability to make informed decisions. In the absence of comparable standards to other regulated utilities, this also limits their ability to challenge heat networks on their practices.
58. This provides an indication of several of the issues faced by heat network consumers and, while regulations alone are not expected to completely resolve these issues, the comparison with non-heat network consumers who operate in a regulated market suggest that there are achievable improvements which can be made.
59. The 2020 Heat Network (Metering and Billing) Regulations also include several requirements on metering and billing based on consumption, the outcomes of which will not be reflected in the 2017 HNCS. The additional impact of any future transparency and service standards will depend on where these requirements go further than the amended regulations.

Compensation Regime

60. The regulator will also have powers to implement a compensation regime, allowing consumers to receive compensation payments, following certain conditions from operators. Network operators will likely be liable to pay compensation for consumer outages, making and keeping appointments, support for customers in vulnerable circumstances and meter issues. This is intended to incentivise heat network operators to take steps to reduce sources of consumer detriment and bring the heat network market in line with the gas and electricity market.
61. We expect the most significant impact to be from outages. While the details of a compensation regime have not been finalised and feedback is being sought through consultation, it is likely they will be informed by the heat, gas, and electricity compensation regimes.
62. The intended impact of a compensation regime is to transfer some of the cost of outages from the consumers to suppliers. This will increase incentives for heat network suppliers to invest in reducing the frequency and length of outages.
63. The length and frequency of outages in the counterfactual 'no compensation regime' market has been estimated using data from the 2022 HNCOS and scaled up to the rest of the market. We have then used data from the voluntary scheme, the Heat Trust, to model the factual scenario of the market under a compensation regime. The Heat Trust

²¹ Study carried out by Which? <<https://www.which.co.uk/policy/housing-utilities/363/turning-up-the-heat-getting-a-fair-deal-for-district-heating-users-which-report>>

enforces compensation payments based primarily on the gas distribution market compensation regime. We have adjusted for other factors that are likely to lead to fewer outages from Heat Trust networks (Heat Trust memberships are only granted to networks that meet certain standards).

64. From this analysis, it is estimated that the number of hours consumers will face an outage of heat and hot water will reduce by around 20 million annually or 63% of the current number of outages. The value of a lost hour of heating is highly uncertain, but under our central assumption we expect the annual benefits to come to around £32.9m (undiscounted) once the entire market has adopted the compensation regime and adjusted its behaviour, rising to £82.5m (undiscounted) by the final year of the appraisal period (2053). It is also estimated that if the frequency of outages continues in line with market trends, approximately £8.1m (undiscounted) will be made in compensation transfer payments in 2024, subject to policy development. However, we expect this number to fall significantly over the appraisal period as heat network operators look to avoid making compensation payments by improving the reliability of their heat supply, reducing the frequency and duration of outages.

Billing Transparency

65. The regulator will introduce minimum requirements on transparency pre and post transaction (before and after moving into a property on a heat network). This aims to ensure billing processing and information transparency at all stages, allowing for more informed consumer decisions.
66. The 2017 Heat Network Consumer Survey identified significantly lower billing transparency for heat network customers. In the 2022 Heat Network Consumer and Operator Survey, most measures had improved but a discrepancy from customers not on heat networks remained. Regulation seeks to bring heat networks more closely in line with other forms of heating.

Table 8 - Heat Network Consumer and Operator Survey, indicators of billing transparency

Indicator		Heat network (2017)	Non-Heat network (2017)	Heat network (2022)	Non-Heat network (2022)
Transparency	Billed based on actual usage	27%	53%	38%	51%
	Receive any form of billing	62%	81%	70%	84%
	Bill includes heat usage	30%	61%	52%	64%
	Bill includes unit costs	28%	57%	52%	61%
	Bill includes standing charges	26%	47%	43%	54%
	Reported receiving too little information	20%	14%	28%	17%

Note: This is not the complete list of indicators

67. In addition, research carried out by the CMA and Which?²² found that consumers generally have low awareness of the heating technology prior to moving into a property. This suggests that consumers are not sufficiently informed about the characteristics of heat networks when moving into a property and this could therefore

²² Study carried out by Which? <<https://www.which.co.uk/policy/housing-utilities/363/turning-up-the-heat-getting-a-fair-deal-for-district-heating-users-which-report>>

restrict their ability to make informed decisions. In the absence of comparable standards to other regulated utilities, this also limits their ability to challenge heat networks on their practices.

68. Furthermore, as outlined in the “Rationale for intervention”, heat network customers can often face incomplete information and a lack of transparency in billing. In the 2022 Heat Network Consumer and Operator Survey, 28% of heat network customers reported receiving too little information in their heating bills, compared to 17% of the non-heat network customer comparison group. This approximates an 11% disparity in the transparency of billing between the heat network and non-heat network markets. Regulating for the provision of clearer and more frequent billing information addresses this market failure of information asymmetry, improving consumer welfare.
69. Billing is the main communication channel between customers and their heat network and so ensuring the information is accurate, clear, and encountered frequently is critical to the consumer welfare and heat consumption decisions of heat network customers. This intervention seeks to improve the clarity and accuracy of heat network bills, alleviating the 11% disparity and aligning heat network and non-heat network customers, which allows customers to make better informed decisions about their heat consumption.
70. The current proposal is to ensure heat network customer bills include the heat cost charged, the customer’s energy consumption, a breakdown of the bill calculation upon request, and links to websites providing advice on energy efficiency improvement measures, with further informational content details outlined in the consultation supporting documents. Moreover, billing information must be issued monthly and promptly for meters with automatic meter reading functionality (AMR).
71. This regulation will allow heat network customers to make better informed decisions about their heat consumption. With increased billing transparency and frequency consumers will have greater cost visibility and spending awareness, causing them to reduce their heat consumption, on average across the domestic heat network market. We recognise that not all heat network consumers will have the necessary controls to reduce their consumption following the introduction of enhanced billing.
72. Smart meters have demonstrated the impact improved billing transparency can have on energy consumption in the UK and academic studies have shown reductions in energy consumption resulting from billing improvements comparable to those proposed for heat networks. Based on academic and industry evidence, a 2% reduction in heat consumption has been assumed.²³
73. We estimate a 2% consumption reduction generates a bill saving for heat network customers, totalling £19.2m (undiscounted). The reduction in heat consumption also means less fuel is burnt in heat production, generating an estimated monetised carbon saving of £14.6m (undiscounted) and air quality benefit of £0.4m (undiscounted). Overall, we estimate regulating for more transparent billing produces a total monetised benefit of £34.3m over a 30-year appraisal period (undiscounted).

23 Darby, S. “Literature Review for the Energy Demand Research Project”, Environmental Change Institute, University of Oxford, 2010.

Increased energy consumption feedback on bills has delivered usage savings ranging from 0-10%. Reflecting the concordance of the proposed HNMF billing regulations with the various studies and their respective energy savings rate, and the inherent uncertainty in estimating a savings reduction from enhanced billing, a more conservative savings rate estimate of 2% has been selected.

Pricing

74. Historically, the 2017 HNCS and the CMA market study both concluded that heat networks typically offer a lower or similar consumer cost in comparison to other forms of heating. The 2017 HNCS found that heat networks were around £100 cheaper per year on median average than non-heat networks. However, both studies also found evidence of high pricing for a significant minority of the market. Furthermore, in the primary stage final impact assessment we carried out illustrative analysis on how the estimated costs of individual gas boilers compared to the estimated heat use and heat charge of around 22,000 domestic customers on 445²⁴ gas powered heat networks, collected by Kantar as part of the CMA's market study. The results of this also showed heat networks to generally be cheaper than gas boilers but again identified several outlier networks charging very high rates. Illustrative analysis has been repeated but using updated data captured in early 2022. Though the sample size was limited, this showed similar results again of generally lower prices for heat networks but with several outliers.
75. The 2022 Heat Network Consumer & Operator Survey captured price data between March and July 2022, though this was self-reported by customers rather than direct tariff data. This showed heat network customers typically reported lower heat bills and were less likely to perceive those costs had increased in the last year than non-heat network customers. However, it is important to note that this data was collected before significant price rises in Autumn/Winter 2022 and before government energy support schemes began. As with the previous analysis a wide range was observed, showing that a subsection of heat network customers pays much higher bills than the average.
76. Recent rising wholesale energy costs have put pressure on consumers and suppliers across the energy market. Heat network consumers are at greater risk of higher tariffs as they are not protected by the Ofgem domestic energy price cap, as operators purchase energy with commercial contracts. The full extent of this impact has not been reflected in these data sets as they have all been captured prior to quarter 3 of 2022. More recent evidence from industry suggests heat network prices have risen significantly since the previously discussed data was collected.
77. Based upon these findings and the fact heat network customers are not able to change tariffs, the priority of price regulation will be to allow outlier pricing to be identified and addressed. To ensure heat network consumers pay a fair price for heating, the regulator will have powers to:
- Require heat networks to disclose information relevant to the price paid by consumers
 - Conduct investigations into heat networks where prices appear to be disproportionate compared to a range of benchmarks and analyses
 - Intervene when there is evidence of systemic issues on pricing or in cases of significant consumer detriment.
78. The regulator will be responsible for the development of what information will be disclosed, the definition of what constitutes disproportionate pricing, and the process for conducting investigations and interventions. However, it is anticipated basic pricing information will need to be reported, allowing networks with similar characteristics to be compared and to identify instances of disproportionate prices.

²⁴ The data from 20 Heat Networks was excluded for data quality reasons

79. **Transparency benefits:** The regulator's presence with these powers is expected to impact the pricing behaviour of heat network operators as it allows them to be compared to others in the market and introduces the potential for the regulator to investigate them. Furthermore, greater price transparency could allow operators to evaluate their prices relative to other networks, potentially leading to network operators reviewing their prices.
80. **Transparency drawbacks:** An unintended consequence of increased transparency and/or a benchmarking approach to identifying disproportionate pricing could potentially lead to current and future heat networks anchoring their prices on or within these implied ranges. This could lead organisations to both decrease and increase prices charged. Although this effect could be mitigated through policy design, it would still lead to a situation where prices are assessed to be fair. In addition, respondents to the previous consultation suggested they were aware of instances of disproportionately low pricing where the revenues do not cover the costs of operating the networks.
81. How effective the future regulator will be at reducing these instances of disproportionate pricing is uncertain. In addition, it is important to note that a saving to consumers will represent forgone revenue to heat network operators. Therefore, it will be vital for the regulator to build an understanding of what is driving these disproportionate prices and consider the operating model, before ascertaining the appropriate measures/ intervention.
82. The operational model of the network will also impact on the ability to adjust pricing. For example, it is common practice in certain segments of the market to run a cost-recovery model, in which only the costs of running the networks are recovered through consumer bills. In this circumstance, a heat network operator may have little practical ability to reduce prices without simply transferring this burden to the operator/owner, at least in the short term. In these circumstances, alternative forms of consumer detriment alleviation and support for heat networks may be more appropriate.

Extra rights and powers

83. Heat networks, unlike other utilities (such as electricity, gas, and water), do not have statutory powers to carry out roadworks and other activities which are essential to the construction and maintenance of their networks. For example, utilities companies can excavate the roadway via a permit system, rather than applying for individual licenses for each individual excavation as is required of heat networks. This lack of powers prevents sector growth as it inhibits developers to build networks at scale or expand existing networks due to the extensive processes, they must go through to be able to carry out an expansion or development.
84. This means that heat networks often experience longer delays for construction, maintenance, and repair than comparable services. This has a dual effect:
- This leads to uncertainty in the market as it increases the risk of delays, which could increase the amount of idle capital and labour and thus increases costs. This uncertainty could lead to reduced investment in heat networks.
 - Delays in maintenance and repair may increase consumer detriment because of longer outages for consumers and a poorer quality of service.
85. Given that heat networks provide an essential service, there is justification for giving them equivalent powers to other utilities to improve consumer outcomes. There is likely

to be the additional benefit of increasing certainty for suppliers in the heat network market which may promote greater investment both on a domestic and international scale. Discussions with local authorities and industry have also suggested that implementing schemes which help heat networks carry out development through a less extensive process will attract operators as it increases confidence and reduces risk. While the extra rights and powers are anticipated to be benefits for both existing and new heat networks, it is expected that these will be of the most use for the development of new networks.

86. Responses from the initial consultation presented evidence which supports the provision of extra rights and powers to licensed networks, suggesting it would likely lead to time and cost saving when developing or maintaining a heat network. Further discussions with local authorities and groups who operate with heat networks have reinforced the proposed rights and powers for heat networks. Responses to HNCOS (2022) showed 9% of heat network and 19% of heat network operators were likely to apply for optional licensing to access extra rights and powers. Using the information we had received from local authorities and surveys, we have attempted to monetise the benefits of the rights and powers where possible in Table 9 along with a qualitative assessment where there may be further benefits which will be realised as a reaction to the use of rights and powers.

Table 9 - Overview of extra rights and powers

Assessment of impact	
Access rights	Industry engagement indicated that negotiations required to access land can often lead to delays, landowners charging excessive prices or even refusing access. It is also suggested that these delays can last up to a year, and lead to costs of up to £200k in some case studies, made up of legal, planning and design costs. This power aims to prevent excessive costs and delays as it aims to enable developers to purchase access to land at market value, if necessary, through the land tribunal. This power will also allow developers to make use of easements instead of wayleaves, which are types of access agreements. Easements are longer lasting and less expensive, suitable for heat networks due to the longer lasting pipework, whereas wayleaves tend to only grant access for 10-15 years, respondents from the consultation also agreed this would mainly be used to install/maintain pipes. The use of easements will result in an estimated cost saving of £5.4m (undiscounted) over our appraisal period. This saving is derived from the difference in application cost of easements and wayleaves.
Street works	Heat networks can make use of standardised permits from local authorities rather than licenses which are currently applied for. The use of permits as opposed to licenses is expected to result in an average cost saving of £454 for each permitted operator and £6.9m (undiscounted) for industry over a 30-year appraisal period, assuming they apply once a year. This is because the current way of attaining a mandate to be able carry out street works requires a Section 50 License, which can be more costly and a longer process due to the extensive information needed, whereas a statutory undertaker would be able to apply through an online portal which speeds up the process as they are already authorised as an undertaker. Respondents from the consultation reported difficulties and delays when applying for a license, suggesting approval can take up to 8-12 weeks. The use of permits is expected to both reduce these delays as well as the cost difference in applications of permits and licenses.
Rights to lay pipes under roadway	The legal right to lay and keep assets under roadways can be complicated and represent significant costs and delays for developers. While this power will not remove the scrutiny behind granting developers with the ability to lay and keep assets under roadways, they are expected to place operators and developers in

	a much better position to reduce the uncertainty and costs of developing networks. This has been reinforced through interactions with heat network operators who have quoted cases where engagement with the highway authorities led to many lost hours and unconventional processes which resulted in delays and additional costs.
Permitted development rights	Permitted development (PD) rights are a national grant of planning that enables certain developments to be carried out without the need of specific planning permission. However, these permissions are subject to limits and conditions and certain developments will still require planning permission regardless. Engagement with local authorities indicates that heat network developments tend to be part of a wider planning permission application. However, licensed networks would still be able to make use of these rights to be able to install and maintain heat networks, without the need for planning permission, which is expected to both reduce delays and improve the rate at which networks are developed. Our engagement with local authorities who have implemented Local Development Orders (LDO), which essentially imitate the effect of permitted development, but to a smaller scale, have stated that it has reduced the frequency and complexity of applications, and attracted developers to invest within their local authority as it reduces risk of costs and boosts confidence of developers. Ultimately, PD will reduce the burden of planning permission applications for local authorities as well as heat network developers, leading to admin cost savings.
Linear obstacle rights	Heat networks are typically located in built up areas, and consequently, developing heat networks frequently involves crossing infrastructure such as railway lines, tramways, or canals. Occasionally these “linear obstacles” prevent the expansion of networks as operators find that negotiating and agreeing with the relevant asset owners is highly time consuming and often too difficult, making it not worth ones while to cross a linear obstacle, but to instead plan around it as suggested by industry engagement. This power will give developers greater certainty and allow them to cross linear obstacles, when necessary, subject to there being no safety or practical reason for denying crossing by the asset owner. Respondents have suggested that this power will be particularly beneficial to shortening the process of expanding and constructing heat networks.

87. These extra rights and powers are expected to make developing and maintaining heat networks easier, which in turn could lead to additional costs associated with the development/maintenance of networks, for example more frequent road disruptions. However, any additional costs would need to be balanced against the benefits of works being more efficient, less delayed, and the overarching benefits heat networks can bring. This has not been quantified as there is a lack of information on the amount of street work delays, the length of delays in street works, and the costs that are involved in this disruption.¹

88. The number of organisations who will apply for licenses is uncertain, however, we have estimated that around 100 licenses are applied for based on the number of heat suppliers who own over 10 heat networks with at-least one district heat network. Local authorities have been excluded as they already have access to these rights and powers. This is a simplifying assumption based on the rationale that district heat network operators are more likely to seek these extra rights and powers, given the size of the networks they operate. This has been tested in the consultation. In practice, organisations are only expected to apply for a license if they gain sufficient benefits to overcome the associated administrative costs.

89. We have estimated the cost to business of applying for a license and to the regulator for processing the request. The cost of a license will be defined by the future regulator, but at a minimum is expected to cover the regulators administrative costs. The cost of a license in the gas and electricity markets is currently set to a level which covers the administrative costs of the regulator's operations.²
90. All organizations who apply for licensing will be subject to additional checks and clearance to ensure they can appropriately manage the extra rights and powers, for example increased financial checks. This will mitigate the risk that these organizations misuse these rights and powers. In addition, many of the organisations will already have experience in dealing with these types of developments. Furthermore, the regulator will have the right to remove licensing and authorisation if deemed appropriate.
91. The total benefit of the extra rights and powers regulation is estimated to be £12.3m (undiscounted) over a 30-year appraisal period. One of the main benefits comes from street works (£6.9m, undiscounted) which is aiming to reduce delays and costs through using standardised permits rather than licenses. The other main benefit comes from access rights (£5.4m, undiscounted) which will decrease the delays and costs associated with accessing land, enabling developers to make use of easements instead of wayleaves, which are longer lasting and less expensive.

Changes to metering regulation

92. This section sets out the anticipated benefits and necessary costs associated with changes to metering regulation. The purpose of this intervention is to ensure billing is fair and the incentives for energy savings are properly aligned.
93. A preferred option has not been identified at this stage due to significant uncertainty in estimating the number of meter installations expected from each policy proposal, and therefore the net benefits are not included in the overall NPSV. Instead, a range of meter installation levels to assess potential cost-benefit outcomes. Monetised costs and benefits for metering will be included in the NPSV for the final stage impact assessment.
94. The Department for Energy Security and Net Zero is consulting on several aspects of metering regulation, seeking views on reforms to the 2020 Amendments of the 2014 Heat Network Metering and Billing Regulations (HNMBR) and on proposals for smart metering. This includes rethinking the building class system for designating meter installation requirements, the operational standards of meters, and the use of smart meters, for heat networks.
95. The policy objectives are:
- To increase the use of heat meters, with smart meters as default unless considered unreasonable
 - To ensure heat meters are accurate and meet agreed standards while in operation
 - To establish the rules and expectations for installation as proportionate, considering technical feasibility and costs
96. This impact assessment focuses on potential cost-benefit outcomes of changes to the open class and cost-effectiveness tool (CET) assessment. Buildings in the open class currently take a CET assessment to determine their metering requirements. The CET assessment designates metering requirements based on technical feasibility and cost-

effectiveness, with a view to ensuring installation costs do not exceed the benefits derived from metering.²⁵ Meters can reduce heat consumption (saving energy), give consumers more information and control over their usage, and produce better data to guide future analysis and policy. All three reforms seek to increase the number of metered open class buildings.

97. The proposed reforms are:

- Remove open class entirely
 - i. This places all open class buildings in the viable class, which requires metering
- Reform open class to only consider technical feasibility
 - i. Requires all heat networks to install meters where physically possible
- Amend CET assessment parameters to reflect updated energy savings rate
 - i. The energy savings from meters is higher than previously thought. The CET assessment currently undervalues the saving, therefore underestimating the number of buildings that should meter. This change would increase the number of networks required to install meters.

98. **Costs:** The costs of heat meter installation can vary from network to network due to several factors (e.g. ease of access, extent of retrofit required, economies of scale). The cost is incurred by the heat network operator, but this may be passed on to consumers through higher prices. Current estimates for an approximate range of installation costs are summarised in the Table 10.

²⁵ Greater detail on the building classes and CET assessment - <https://www.gov.uk/guidance/heat-networks>

Cost	Cost (£)	Explanation
Smart meter installation	£400-800	Smart meters are more advanced than AMR meters, sending more frequent and accurate readings, supplemented with in-home displays.
Meter installation (AMR)	£300-700	Automated Meter Reading (AMR) meters allow for remote meter readings to be sent to the heat supplier. AMR meters can possess some smart functionality allowing for greater information feedback to the consumer.
HCA installation	£200-600	A heat cost allocator (HCA) is a calibrated instrument fitted to a domestic radiator to inform the user of energy usage. An open class building on a heat network is required to install HCA if it is cost effective and technically feasible, and not cost effective or technically feasible to install a heat meter, following a CET assessment.
OpEx	£15-40 / year	Operating expenditure – the cost of running a meter. Cost from meter data management.
CET assessment undertaking	£15-40 / dwelling	The cost to heat suppliers of undertaking the CET assessment to determine their metering requirements.

Table 10 – Summary of metering cost to heat network operators

99. **Benefits:** Currently, consumers in unmetered open class buildings have minimal ability to monitor their heat usage and are not billed based upon the amount of heat they use. This removes the ability and incentive for customers to monitor their heat usage. Individual metering would mean consumers can be charged based upon their heat usage, incentivising consumers to reduce their heat usage and see this reflected in lower bills. Moreover, metering provides more accurate usage information, allowing consumers to make more informed decisions about their usage, reinforcing the energy saving incentives. Meters have been shown in continental Europe to reduce heat consumption of heat networks by between 10 and 30%, due to improved heat flow data and behavioural changes by customer. Energy savings mean less fuel is used in generation, translating into bill savings, carbon savings, and air quality benefits.

100. In addition, the Department for Energy Security and Net Zero are in favour of all meters having greater smart functionality (beyond automated meter reading (AMR) technology) and are welcoming views on this as part of the consultation. There are

several mechanisms by which smart meters work to reduce heat consumption beyond that of traditional meters, generating greater bill savings, carbon savings, and air quality benefits. They can produce a further layer of incentive by providing greater information feedback, partly through in-home displays (IHD's), giving consumers greater scope to monitor their usage. Smart meters can also provide heat network operators useful data on heat flows to identify network inefficiencies, which can then be improved, reducing consumption at the wholesale level. Evidence from the gas and electric smart meter rollout indicates smart meters can provide a 2-3% uplift on these savings.²⁶

101. Taking an example heat network supplying 30 domestic dwellings in 2025 and an average annual domestic heat consumption per dwelling of 7,000 kWh, we get a total of 210,000 kWh of heat supplied. Assuming standard thermal efficiency of 84% and network losses of 21%, this converts into 316,456 kWh of source fuel burnt. Taking a 20% energy use reduction following meter installation, this heat network would save 63,291 kWh of fuel. Using the Green Book's fuel price series, carbon values, and air quality damage costs, this fuel saving converts into an annual bill saving of £1,503 (£50.10 per dwelling, assuming heat network operators pass this benefit through to consumers), a monetised carbon saving of £3,182, and a monetised air quality benefit of £104.²⁷

102. If all 30 dwellings had installed smart meters we approximate an additional 2.5% usage reduction, saving 64,873 kWh of fuel. This would be expected to generate a bill saving of £1,691 (£56.36 per dwelling), a monetised carbon saving of £3,580, and a monetised air quality benefit of £117.

103. **Cost/Benefit Assessment:** Extending the example above, using the median cost of meter installation from Table 10, the upfront cost for a heat network supplying 30 domestic dwellings would total £15,000. From a net social impact perspective, it would take 10 years of consumer bill savings to socially offset the cost of meters to operators. However, significantly, over these 10 years the meter installations would be generating additional societal benefits of £32,796 in carbon savings and air quality improvements. In the smart meter example, it would take 10.7 years to socially offset the cost of meters through consumer bill savings, in which £39,355 of carbon saving and air quality benefit would be generated.

104. In addition, we have assessed the impact of the policy options across the heat network market by looking at the total cost/benefit outcomes over a 30-year appraisal period. We have estimated the costs and benefits based on the total increase in meter installations expected from the policy but recognise there is significant uncertainty around these conclusions. The outputs suggest that all policy options offer good value for money, producing net benefits overall. Under our assumptions, removing the open class would lead to the greatest increase in metering and therefore the largest net benefit (approx. £362-421m, undiscounted), followed by CET assessment based on technical feasibility (approx. £242-355m undiscounted), and increasing the savings parameter the smallest (approx. £103-238m), undiscounted). If all installations were of

²⁶ Includes smart meter energy saving information of 3% for electricity and 2.2% for gas credit - <https://www.gov.uk/government/publications/energy-security-bill-factsheets/energy-security-bill-factsheet-smart-metering>

²⁷ Green Book supplementary guidance: valuation of energy use and greenhouse gas emissions for appraisal - <https://www.gov.uk/government/publications/valuation-of-energy-use-and-greenhouse-gas-emissions-for-appraisal>

smart meters, we estimate an uplift in benefit of £45m (undiscounted), on average across all policy option scenarios.

Table 11 – The net benefit of policy options that increase meter installations on heat networks

Policy Option	Proportion of unmetered open class buildings required to meter (%) ²⁸	Net benefit (£m)	Net benefit (£m) (Smart meter)
Remove open class	Meter: 80-95% HCA: 5-17.5%	£362- £421m	£414m - £480m
CET assessment based on technical feasibility	Meter: 50-75% HCA: 5-17.5%	£242m - £355m	£282m - £408m
Increase energy savings parameter of CET	Meter: 20-45% HCA: 5-17.5%	£103m - £238m	£125m - £279m

105. Table 11 shows the outputs of the analysis. It indicates that increasing meter installations on domestic open class buildings generates an increasing net benefit. There is an uplift in net benefit when all new open class installations are of smart meters, caused by the increased energy usage savings they generate. Moreover, we expect additional savings from a smart meter roll out that also included retrofitting traditional meters with greater smart functionality.

106. Importantly, in this analysis the calculation for net benefit is largely driven by the number of meter installations. This means more meter installations equates to increased net benefit, which though the case in many circumstances, this will not be the case for all heat networks.

107. There is variation between each open class building and its feasibility and affordability of meter installation, meaning that meter installation will not provide a net benefit for all buildings on an individual basis. Overly stringent metering requirements could result in forcing some buildings to install meters where it is highly cost-ineffective or technically infeasible, due to excessive installation costs or insufficient energy savings. This could place undue financial pressure on such networks potentially resulting in strain on service provision, poorer outcomes and greater consumer detriment.

108. In addition, although overall we expect energy consumption and bills to fall, individual higher heat consumers could see their bills rise. A proportion of higher heat consumers will be vulnerable consumers, and it is essential we safeguard against any vulnerable consumer detriment. Therefore, the Heat Network Market Framework is also introducing measures around payment difficulty and disconnection to protect vulnerable consumers.

²⁸ Heat networks undertake the CET assessment to determine whether they are required to meter. Then, HCA requirements are designated to the networks not required to meter, if appropriate. This is the reason in the "Remove open class" scenario it appears the total proportion of buildings required to meter could exceed 100%. In the upper bound case, the HCA requirement is 17.5% of the 5% of buildings that were not required to meter.

109. There is significant uncertainty in what proportion of unmetered open class buildings would find it too cost ineffective or technically infeasible to generate a net benefit. Given the relative effectiveness of the policy options under consideration is dependent on this, we are unable to identify a preferred policy option at this stage. We are seeking views through the consultation to clarify with greater precision and reliability the impact of the metering proposals. Furthermore, we expect the procurement of richer datasets around heat network metering to be forthcoming, improving the rigour of future analysis ahead of the final stage Heat Networks Market Framework impact assessment.
110. In summary, current analysis suggests that increasing metering installation is likely to produce a net benefit (with an uplift for smart metering) but there is need for caution around overly stringent requirements to avoid placing unfair financial burdens on some heat networks where it is highly cost ineffective or technically infeasible. Feedback gathered through the consultation will help inform future policy development in this area.

Wider impacts

Interactions with other policy

- **Further Heat Network Market Framework measures-** Further measures beyond the scope of this impact assessment are planned to include minimum technical standards, extra rights and powers for heat network operators, step-in rights, carbon emissions limits and consumer protection. These will be consulted on at a later date and an updated impact assessment will be produced alongside this. These policies will drive changes in the heat network market which have not been captured in this analysis, but these interactions will be reflected in the impact assessment associated with the consultation on these measures.
- **Heat Network Zoning (HNZ)** - Aims to establish zones where some types of buildings will be required to connect to a heat network, thereby increasing the growth rate of the heat network sector. This policy is currently under development. A future heat network zoning policy is predicated on market wide regulations provided under the HNMF. Social research carried out during policy development indicated that the lack of regulation is one of the key concerns from social housing providers and consumers.²⁹ As HNZ is expected to lead to significant growth in the market, all new and expanding heat networks will be subject to the requirements of the HNMF, thus increasing the scale of regulatory activity. The cost to regulate the additional heat networks created due to zoning has been excluded from this impact assessment to avoid double counting since this will be included in the impact assessment due to be published alongside an upcoming Heat Network Zoning consultation. Further to this, there may be extensions and/or additional regulation required for networks in zones, however this will be subject to future development. This impact assessment analysis assumes a baseline growth rate of 3.6% based on past growth of the market. Since the future market growth rate is uncertain the analysis has been repeated for multiple growth scenarios and presented in the sensitivity analysis section.
- **Heat Network (Metering and Billing) Regulations (HNMBR)** – The regulations place requirements on heat networks to notify the Secretary of State of their existence, install metering devices, and bill based on consumption, if cost-

²⁹ Heat network zoning social research, Department for Energy Security and Net Zero, <https://www.gov.uk/government/publications/heat-network-zoning-social-research>, 2023

effective. There is significant overlap with the HNMF, specifically on billing and transparency standards. HNMBR is expected to be revoked with rules around metering and billing being incorporated into the market framework and the future regulator assuming responsibility; however, the practicalities will be subject to future policy development.

- **Heat network investment schemes** – Government schemes to encourage investment in heat networks such as the Heat Network Efficiency Scheme and Green Heat Network Fund are seeking to improve heat network standards and encourage market growth. Faster market growth increases the net value expected from the HNMF. Though additional market growth due to government schemes has not been explicitly factored into the central scenario, analysis has been produced under a range of growth scenarios to show the expected impact of faster growth. This is shown in the sensitivity analysis section.
- **Other regulators and bodies** – The regulator established under the HNMF will be expected to work alongside other sector regulators and bodies. This includes the members of the tripartite regulatory structure and the Environment Agency, the Competition and Markets Authority, and the Regulator of Social Housing. Interactions between regulators will be considered during future policy development.
- **Wider interactions with the energy sector** – The analysis in this impact assessment does not assume an increase in market growth as a direct result of the regulation, however implementing regulation is believed to have an enabling function in allowing the sector to grow. Growth of the heat network market over time is expected to drive reductions in demand for high carbon individual heating systems such as gas boilers. Low carbon heat networks are expected to form an important part of the decarbonisation of heat, along side other low carbon heating technologies.

Equalities assessment

111. An equality impact assessment of the policy has been carried out. The HNMF will indirectly affect all customers on heat networks. The equality implications will be kept under review to consider further relevant evidence as it becomes available. The evidence for the equality assessment has been based on the current population who are on heat networks. This assessment found:
112. Due to the nature of heat networks, being mainly an urban technology and appropriate for multi-tenancy buildings, they tend to serve more vulnerable, urban, and elderly consumers³⁰.
113. The HNCOS (2022) found that 29% of heat network consumers are retired, compared to the national average of 18.6%, suggesting a greater number of elderly people use heat networks.
114. This regulation aims to alleviate consumer detriment issues, which have been outlined throughout this IA. All heat network consumers will benefit from the improved protections including those with protected characteristics. This support will be delivered through the regulatory structure, which will be made up of Citizens Advice, Ofgem, and

³⁰ Heat Networks Consumer Survey (2017) <

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/665447/HNCS_Results_Report_-_FINAL.pdf >

the Energy Ombudsman. The differing bodies will allow for a point of contact for those who are vulnerable and experiencing issues with heat networks. The regulatory structure will be required to record the issues of those who are vulnerable and addressing it through bodies such as the Energy Ombudsman.

115. The impact of the regulation on fuel poverty has also been assessed. Analysis of the English housing survey suggests that there is currently a lower portion of consumers connected to heat networks in fuel poverty. These consumers will benefit from the protection put in place by the regulation and could possibly benefit from reviewed heat network charges due to the elements of the regulation focused on pricing, which would impact their fuel poverty status.

Jobs impact

116. The HNMF will directly support jobs within the future regulatory structure, providing jobs with Ofgem, Citizens Advice and the Energy Ombudsman. In total, there are estimated to be an average of 138 full time equivalents (FTE) employed by these organisations annually over a 30-year appraisal period. There will also be jobs supported by any external consultants contracted by the regulator, such as for auditing heat networks. In addition, there will be jobs supported from heat suppliers to process the requirements of the regulation, with the equivalent of 156 FTE jobs expected in the first year of the regulation and an average of 126 FTE jobs in the following years of the 30-year appraisal period³¹.

117. There is also expected to be indirect jobs supported by the development of heat networks. In addition, future requirements such as for billing and minimum technical standards could support more jobs in billing and technical organisations.

118. In terms of where these jobs will be located, for the regulatory role this will be dependent where Ofgem, Citizens Advice, and the Energy Ombudsman base their operations, which hasn't been specified at this stage. The regional distribution of jobs supported within the heat network industry are likely to follow a similar distribution to the location of heat networks, which are currently spread across the UK.

Small and Micro Business Assessment (SaMBA):

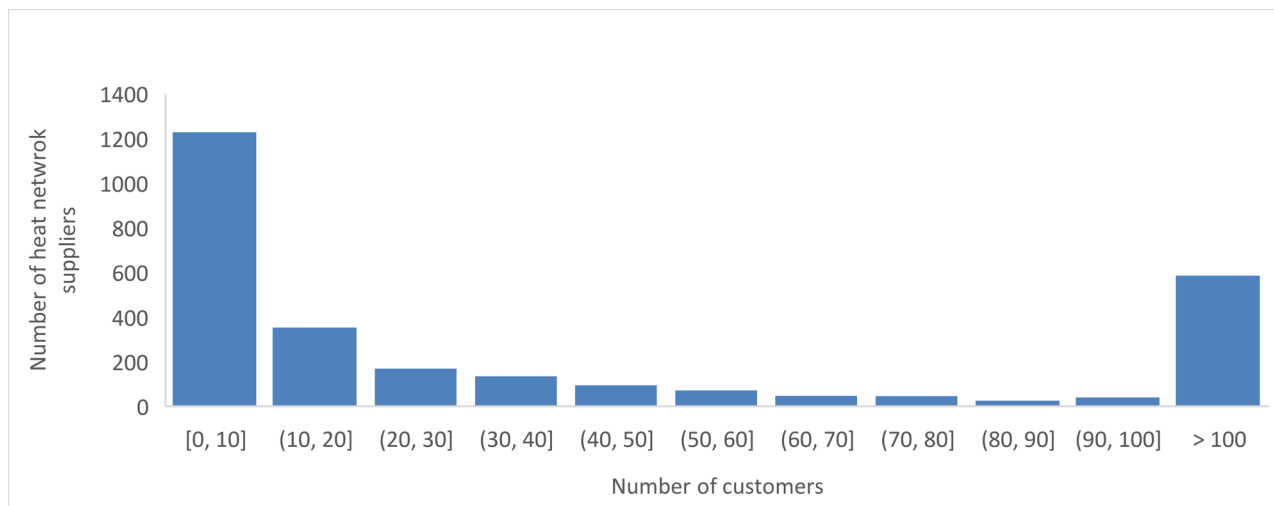
119. The HNMF will impact two types of small and micro businesses (SMBs):

- Firstly, micro businesses connected to heat networks will benefit from the regulation set out above and consumer protections will extend to both domestic and micro business consumers. Approximately 8% of heat network customers are non-domestic, however data is not available to accurately determine the proportion of these which are small or micro businesses. No significant additional costs are expected to be placed on businesses who are heat network customers due to this regulation. Micro business heat network customers will also benefit from consumer protections.
- Secondly any business, including small or micro businesses, involved with the development, operation, management, or supply of heat through a heat network, will be expected to comply with the relevant regulatory requirements.
- This section will focus on the second category of SMBs affected, as this is where a potential negative impact is expected. Positive impacts on micro businesses through consumer protections will take the form of the benefits set out earlier in the impact assessment.

³¹ FTE equivalent has been calculated based on the estimated time required to undertake the Regulatory activities based on the assumption that full time employees work 261 day a year and 7.5 hours a day.

120. The make-up of the heat networks market is varied and there is uncertainty around the exact scale and make up of the sector. The most recent available version of data collected through HNMBR is the most comprehensive dataset available at the time this analysis was conducted but is not a complete register of all heat networks. HNMBR data shows there to be approximately 14,000 heat networks that are in scope of regulation, around 12,000 of these are communal networks (serving one building) and around 2,000 are district heat networks (serving multiple buildings). In total there are around 2,800 suppliers³². The number of heat networks and customers per supplier is unevenly distributed (as shown in figure 1).

Figure 1 – Heat supplier by total consumer numbers



121. Most heat networks in the Heat Network Metering and Billing Regulations (HNMBR) data have relatively few customers, with 81% of heat network suppliers supplying fewer than 100 consumers, and with 86% owning fewer than ten heat networks. However, this does not necessarily mean these heat suppliers are small and micro businesses³³ as they may manage a heat network alongside other business functions. For example, a large shopping centre may employ many people but have few registered heat customers. The data collected through the HNMBR does not cover the size of heat network operators, and therefore it is not possible to be exact in this estimation.

122. For the analysis below, the distribution of business sizes has been extrapolated from 2017 HNCS responses on the number of employees. When matched with Companies House business size definitions, this suggests that 23% of heat network businesses were micro, 21% were small, and 56% were medium/large. The following analysis then assumes the ratio of generation and the number of heat networks per business are directly proportional to these ratios. This gives an average number of heat networks per business as 1.14, 1.33 and 6.8 for micro, small and medium/large businesses respectively.

123. Further analysis from the 2022 HNCOS showed 19% of operators employed fewer than 10 employees suggesting they are a micro business a 20% employed between 10 and 49 employees suggesting they are a small business. This shows the proportion of operators, but not the proportion of heat networks or the proportion of heat demand operated by SMEs. Further analysis showed that 11% of these operators with fewer than 49 employees identified were local authorities or other government/public bodies. This suggests that at least some of the suspected SMEs identified in the survey were not SMEs. A further 46% of the suspected SMEs identified were operated by housing

³² Based on analysis of: Energy Trends, Experimental Statistics on Heat Networks (2018) < <https://www.gov.uk/government/publications/energy-trends-march-2018-special-feature-article-experimental-statistics-on-heat-networks>. > Heat suppliers in this context are defined as the organisation who submitted the notification.

³³ Micro business is defined as having up to 10 employees, small business has up to 49 employees. According to Companies House: < <https://www.gov.uk/annual-accounts/microentities-small-and-dormant-companies> >

associations, facility management companies, energy service companies (ESCOs) or charities/NGOs. These types of entities may have had a heat network workforce below 49 employees but with a larger overall workforce. This suggests that the true proportion of small and micro heat network operators may be smaller than the figures suggested by survey data.

124. The main costs placed on businesses through this regulation are:

- **Staff resource required in complying with regulatory requirements-** Staff resource costs may have a disproportionate impact on small and micro businesses as a smaller workforce may make these requirements harder to fulfil. For example, quarterly or annual reporting of information to the regulator may be a greater burden relative to available resource for a heat supplier with less than 10 employees compared to a heat supplier with over 50 employees. This is expected to be offset somewhat as small and micro businesses are likely to operate a smaller number of heat networks and therefore have a relatively smaller resource burden from compliance. Efforts to mitigate staff resource burden on small and micro businesses are described in paragraph 124.
- **Compensation payments to be paid to customers for disruptions to heat supply-** Compensation payments are expected to be paid on a per customer basis meaning the cost of outage compensation will scale depending on the number of customers a heat supplier has. This reduces the risk of disproportionate costs to small and micro businesses.

125. It is not appropriate to fully exempt small and micro businesses from the issues the HNMF aims to overcome, given customers on these networks make up a large proportion of the known consumer base. A full exemption would result in a large portion of these consumers not receiving the benefits of the regulation. A threshold was considered during the first consultation, but BEIS (now the Department for Energy Security and Net Zero) received clear feedback this was not preferable. However, DESNZ has considered the impact on SMBs from the policy in the following ways:

- **Optional licensing-** The preferred option is authorisation with optional licensing. This only requires organisations that desire extra rights and powers to obtain a licence, reducing the regulation burden on smaller entities.
- **Spreading the cost of regulation-** The cost of regulation is going to be spread across heat network, gas, and electricity bills, significantly reducing the financial burden on small and micro businesses.
- **Outcomes and principles-based regulation-** Small networks will be able to comply with regulation in proportionate and cost-effective ways, providing outcomes for consumers are met. Where possible, small networks will be able to continue existing established practices that already achieve minimum standards.
- **Templates and guidance-** Particularly in the early years of regulation, we want to ensure that entities in the sector not familiar with complying with consumer standards and procedures have access to guidance and best practice. We are exploring the issuing of guidance on areas such as pricing and market-led step-in, and templates for establishing billing regimes, complaints handling processes, and heat supply contracts.
- **Phasing in of regulation-** Consumer protection rules will be phased in to help the sector gradually adjust to regulatory requirements.
- **Lighter touch regulatory engagement-** Ofgem is exploring approaches to engaging with the sector that can be tailored to smaller networks. Feedback on regulation of small heat networks is being sought through the accompanying consultation.

126. There may be some additional impacts on SMBs by the regulations, such as design consultants or metering and billing companies who often work with or for heat networks. For example, the transparency measures introduced by the regulation may provide more trade for metering and billing companies with heat networks. These impacts have not been assessed as they are expected to be indirect and are uncertain at this stage.

Trade implications of measure

127. The proposed regulatory powers do not place any direct requirements on trade and investment activities. However, the presence of a regulator, requirements placed on heat suppliers, and provision of extra rights and powers, could lead to an impact on investment. These are discussed below:

- All UK heat suppliers will be required to be authorised to comply with the regulation and this requirement will not differ between domestic and foreign businesses. This will require current and future heat suppliers to be aware of this requirement and make the necessary notification/application. However, this is not expected to be overly burdensome and therefore the impact is not expected to be significant. The regulator will provide greater clarity and insight into the market to help ease this process.
- Heat networks currently provide around 2-3% of UK heat demand; this could increase to around 20% in line with a cost-effective decarbonisation pathway. The regulatory framework is expected to be a key enabler of this growth by providing the necessary consumer protection, greater confidence in the industry, and extra rights and powers. This is expected to have a positive impact on market growth and therefore investment. Market intelligence suggests that some European firms and investors have expressed interest in the UK market once it is suitably regulated.

128. When considering the impact on competition and monopolies, the HNMF is not expected to establish a small number of suppliers or hinder competition within the industry. Regulation could have an indirect impact on future market structure as there may be some consolidation as the market develops and heat suppliers are required to adhere to the regulation. This impact has not been quantified at this stage.

129. Overall, the net impact of the HNMF on trade and investment is expected to be positive. However, it has not been possible to attribute investment or trade impact directly to the HNMF as it is part of a wider enabling package of policy and market support under the Heat Networks Transformation Programme. In practice, the impact will depend on how the proposed regulatory powers are used and the response from the industry. The Department for Energy Security and Net Zero's understanding of this impact is expected to improve as the policy develops, and through monitoring and evaluation once a regulator is established. Future elements proposed to be part of the market framework, but not within scope of this impact assessment, such as minimum technical standards may have trade impacts. These will be covered in a future impact assessment when these policies are consulted on.

Key Limitations, Risks and Uncertainties

130. The analysis presented in the IA provides an indicative cost and benefit estimate for regulating the heat network market, cost to business, and a sense of scale of the potential impact of the regulatory powers. However, there are several key uncertainties which should be considered alongside this:

- **Size and future growth of the heat network market** - These estimates use inputs from the Heat Network (Metering and Billing) Regulations (HNMBR) dataset, which contains data from network level notifications. Since this data was not collected for these purposes, several assumptions have been made to derive the number of heat suppliers, networks, and customers in scope. In addition, this data is self-reported and was collected between 2014 and 2017, so may not reflect the number of heat networks

operating now. There is also a risk that a large number of small heat networks exist which have not been captured in the data set. This is the most recent available data at the time the impact assessment is being produced. Furthermore, there is significant uncertainty around forecasting the future growth of the market over a 30-year appraisal period. To show the impact of this in the appraisal, multiple growth scenarios have been modelled in the sensitivity analysis section. Though the NPSV for regulation increases as the market growth rate increases, even under a 0% growth rate a positive NPSV is expected.

- **Estimated compliance and enforcement cases** – Linked to the points above, there is currently insufficient information to robustly estimate the future regulatory case load for the regulated heat network market. Therefore, we have used the gas and electricity market as a proxy. In practice, the case load could vary significantly depending on how regulation is implemented and the response from the market. This is mitigated partially through the development of scenarios; however significant uncertainty remains.
- **Market composition** – In addition to the size of the market, it is uncertain how the structure of the market may change over time. As the heat network market grows it is possible that there could be consolidation as the market matures. This could mean that although the heat network market may grow in terms of customers, the number of entities in the market may contract, which could lead to regulatory efficiencies. However, larger heat suppliers can also add to the size and complexity of cases, therefore the net impact is uncertain.
- **Monetised impact of regulatory powers:** The impact assessment has estimated previously unquantified impacts in monetary terms, however there is a degree of uncertainty in the assumptions used to calculate these impacts. The sensitivity analysis section sets out the impacts of varying these assumptions to produce a range of NPSVs. Even under pessimistic assumptions and a 0% growth rate regulation is expected to have a net positive effect.
- **Non-monetised impacts of regulatory powers:** Though costs and benefits have been estimated in monetary terms where possible, there are still multiple areas which are non-monetised due to insufficient data, such as the full benefit of pricing regulation and extra rights and powers. These costs and benefits have been explained but not quantified so do not appear in the NPSV. Future impact assessments will seek to quantify more costs and benefits.
- **Cost recovery** – Several simplifying assumptions have been made to provide indicative customer level cost impacts. The estimate represents the average annual cost per consumer over a 30-year appraisal period. This is sufficient to provide an indication of the impact of different cost recovery options considered in the consultation. In practice, costs may not be recovered evenly across all consumers. However, the difference between options is still expected to be at a similar order of magnitude, given the size of the gas and electricity consumer base.

Sensitivity analysis

131. This analysis explores the sensitivity of monetised cost and benefit outputs to variations in key inputs. Scenario building and key input variation test the impact of varying assumptions in the CBA analysis on the NPSV estimate.
132. We have tested the sensitivity of the NPSV to market growth, the reduction in outages expected from heat networks following the introduction of a compensation regime, resource requirement for regulator functioning and heat network operators to comply with regulation, fuel prices, carbon values, and air quality damage costs. We found the NPSV to be reasonably sensitive to market growth and heat network outage levels, but otherwise resilient.
133. To test the sensitivity of market growth we built three growth scenarios and for the compensation regime outages we have undertaken a break-even analysis. The other

assumptions made have a minor impact in isolation and so we have built a further three scenarios that test the impact these minor assumptions have in conjunction and reflect best and worst-case scenarios (high optimism and low optimism assumptions). The assumptions comprising these scenarios are heat outage levels, regulator and business compliance resource requirements, fuel prices, carbon values, and air quality damage costs.

134. A scenario with more optimistic market conditions would test the impact of tilting assumptions towards producing high benefits and low costs (a greater NPSV), and with less optimistic market conditions tilting assumptions towards producing low benefits and high costs (a smaller NPSV). In this analysis, optimism does not necessarily mean societally desirable. An assumption is optimistic when it produces a higher benefit or lower cost than its central estimate, such as higher fuel prices in the context of bill savings, however higher fuel prices are unlikely to be a societally desirable outcome.
135. Combining the three growth and three optimism scenarios, we can test degrees of optimism in wider market conditions within low, central, and high growth scenarios. Table 12 shows the nine NPSV's that result from this, where the low growth, low optimism scenario can be considered a worst-case scenario for the performance of the HNMF regulation. Crucially, it is comfortably positive at £97.1m (discounted), suggesting the HNMF is very likely to represent good value for money.
136. **Market Growth** - The heat network market growth rate is expected to be positive and continue to be so over the appraisal period, however there is significant uncertainty around the precise value, particularly across time. Throughout the IA, we have assumed a central estimate of 3.6% based on an analysis of baseline growth rate using HNMBR data. We have then tested a low growth scenario (0%) and a high growth scenario (6.1%, based on the Climate Change Committee's sixth carbon budget expectations).
137. The low growth scenario is improbable, but even under less optimistic market conditions is still positive (£97.1m, discounted). Significantly, we have good reason to think the heat network market is growing and will continue to grow over a 30-year appraisal period. Firstly, the market has seen significant investment (partly through Government funded schemes such as HNIP, HNDU, and GHNf), and combined with the introduction of Heat Network Zoning, further investment projects, the direction of the market, and the market framework itself, there is good reason to expect a positive market growth rate, and consequently a net benefit from the HNMF.
138. Secondly, the market receives meaningful attention, such as the Climate Change Committee expressing their view that heat networks will play a critical role in achieving the UK's 2050 net zero commitments, indicating continued investment is likely. Therefore, our expectation is the deliverance of significantly better value for money and a greater NPSV of £596.7m for this regulation (central growth and market conditions) and could see this rise to £1477.1m (high growth and optimistic market conditions). Essentially, value for money improves with greater market growth and more optimistic market conditions.
139. **Compensation Regime Outages** - We expect the compensation regime to incentivize heat network operators to reduce heat outages to avoid financial penalties. The Heat Trust (~10% of heat networks) has a compensation regime in place and these networks experience a substantially lower frequency and duration of outages, and so we used Heat Trust levels of outages to model future outage levels on all heat networks following compensation regime implementation. We have tested this assumption by adjusting the extent to which all future heat networks will mirror current Heat Trust heat networks levels of outages, over the 30-year appraisal period.

140. The central scenario uses a 90% adjustment, implying future heat networks reduce outages 90% of the way towards Heat Trust levels following compensation regime implementation. In our worst-case scenario (low growth and less optimistic market conditions) we reduced future outages 80% of the way towards current Heat Trust levels, and the overall NPSV remained positive at £97.1m (discounted).
141. Given the magnitude of the compensation regime benefit, we have investigated this assumption further by conducting a break-even analysis. This identified at what Heat Trust outage reduction level the overall NPSV becomes negative (the costs of the HNMF outweigh the benefits). In other words, by how much do we require future heat networks to reduce outage levels by, accounting for all other costs and benefits, in order for the HNMF regulation to be good value for money.
142. We identified that heat outage reductions would need to be as low as 27% towards Heat Trust levels for the overall NPSV to become negative. We expect heat outage reductions to be much closer to Heat Trust levels than the break-even point of 27%. The Heat Trust, a body of heat networks with a compensation regime in place, experiences substantially lower levels of outages than the wider market. This is partly due to the incentive structure of the regime, where operators seek to avoid financial penalties by improving the reliability of heat supply, resulting in fewer outages. Introducing the compensation regime to the wider market will apply this incentive to all heat networks.
143. **Fuel saving adjustments** - The billing transparency benefit is derived from a fuel saving following a consumer usage reduction. This fuel saving translates into a bill saving, carbon saving, and air quality benefit. To test the sensitivity of our assumptions we can adjust the price of fuel and the value society places on carbon emissions and air quality. We have used the low, central, and high estimates of Long Run Variable Cost's (LRVC's) of fuel, carbon values, and air quality damage costs, all following HMT Green Book guidance.
144. We found the overall NPSV to be relatively insensitive to variations in our billing transparency assumptions. We have included these assumptions as part of the wider market conditions in our optimism scenario building, where because billing is a benefit low estimates are considered low in optimism and high estimates, high in optimism.
145. **Resource requirements** - There is some uncertainty around the resource requirements involved in carrying out the regulatory function of the HNMF, and for heat network operators to comply with the regulation. In isolation, varying the components of resource requirement (e.g., wage costs, Full Time Equivalent's required) by ~50% either side of the central estimate did not impact the NPSV significantly. We have included the input variations in the optimism scenario building, whereas costs the high estimates are low in optimism and the low estimates are high in optimism.
146. **Scenario Building** - Across all growth scenarios, and degrees of optimism in wider market conditions, NPSV's are positive, strongly indicating the market framework regulation is good value for money. In summary, value for money improves with greater heat network market growth and more optimistic market conditions (less intensive resource requirement for regulator and operator compliance, higher fuel prices (for fuel saving benefit), a greater societal valuation on carbon emissions and air quality, and heat networks responding to the compensation regime penalty avoidance incentive).
147. The worst case scenario of 0% market growth and less optimistic market conditions still produces an NPSV of £97.1m, suggesting robustly the benefits of the HNMF

regulation outweigh the costs. The marked range in NPSV's reflects the uncertainty around several key inputs (primarily future market growth and heat outage levels) and the highly beneficial potential of the HNMF beyond the unlikely worst case scenario. The analysis indicates an expected NPSV of £596.7m (central growth, central market conditions).

Table 12 – Estimated NPSVs under a range of market growth and wider market conditions scenarios

NPSV (£m)		Optimism		
Growth		Low	Central	High
	Low	97.1	371.9	789.6
	Central	228.2	596.7	1145.5
	High	345.0	801.7	1477.1

Monitoring and Evaluation

148. To ensure an ongoing view the market and individual heat network compliance with authorisation conditions, Ofgem will put in place a monitoring programme. Information will be gathered to gain an ongoing understanding of customer experiences and the levels associated compliance with regulation. This programme will allow for ongoing assessment of how regulation is impacting the market and where issues are emerging. This will run alongside any technical monitoring covered in future technical standards regulation undertaken by the Code Manager.
149. An on-going reporting and intelligence gathering process is proposed which will include regular, mandatory reporting by heat networks across a range of metrics. Data reporting by heat networks to Ofgem will be mandatory, underpinned by legislation and associated authorisation conditions. This data will be complemented by regularly reported intelligence from stakeholders including Citizen's Advice, Extra Help Unit, Ombudsman, Consumer Scotland in line with the regulatory framework, more widely through charity groups and local organisations, together with other intelligence.
150. We note it might not be applicable or proportionate for some segments of the market to report against all the suggested metrics so we will consider segmentation across the market to determine if monitoring metrics should vary. Some customer protection metrics will not be applicable for heat networks serving non-domestic customers. The type of heat network that is registered at authorisation will help inform this.
151. Alongside the wider monitoring and compliance regime, financial monitoring will be vital in identifying early issues and risks of heat network failure, but it needs to be proportionate. The consultation seeks feedback on a financial monitoring proposal based on the approaches used in gas and electricity networks and retail where basic financial data and declarations will be required across heat networks. Where a network is riskier and or there is a high impact if they were to fail, it may be proportionate to request further information.
152. Feedback is being sought in the consultation on the current plans for monitoring including the proposed monitoring metrics below:

- General - type of network, type (domestic/non-domestic), number of customers.
- Metering (total numbers, type including numbers of prepayment meters, installation – ability to install smart meters assessment) Financials – capital, debt, investment (+ future plans), trading and hedging. Continuity plan.
- Billing (payment method, frequency)

- Pricing and tariffs (tariff structure, average price, reliability – alongside wider technical reporting to the Code Manager)
- Customer protection and service – number of vulnerable customers and recorded on Priority Services Register, number of customers in payment difficulty, number of complaints, number of complaints, referred to the Ombudsman, number of contacts (by contact channel), average speed of answer.
- Interruptions – frequency, length, Guaranteed Standards of Performance payments made

153. Data will be required to be reported at each individual authorised level. General information will be required at the point of authorisation, when there is a material change and confirmed annually. We expect other metrics will be reported either quarterly or annually, through the digital platform and will undertake regular assessments of the information provided. It may not be appropriate for all authorised heat networks to report all metrics given the range of size and type. A schedule of the frequency of ongoing information provision and guidance on the expected monitoring metrics and definitions will be provided. We will review our approach to monitoring pricing, including the reporting metrics, following our upcoming pricing consultation.
154. There will also be proactive ad hoc requests for information from segments of the market or from individual heat networks as part of compliance action where we consider there is a priority area that needs addressing or where we perceive there to be a risk of poor customer outcomes. More generally we expect heat networks to be open in their dealings with the regulator and self-report any potential areas of non-compliance and actions they will take to address them.
155. Over time we are considering implementing approaches to help ensure there is an effective monitoring regime where heat networks provide accurate and timely data in line with requirements, including the issuing of penalties for late/inaccurate reporting.
156. Monitoring will serve operational purposes in ensuring compliance with regulation but will also provide an ongoing view of the impact of regulation in the market against the policy aims, enabling swift action to be taken where policy aims are not being met and thorough evaluation. Evaluation questions include:

- To what extent have the regulations achieved the aims?
- To what extent are the impacts additional to what would have happened without them?
- How effective was the delivery of the amendments?
- To what extent is this offering value for money?
- Are there any lessons going forward for how heat networks are regulated?
- How has the design of the regulation influenced the impacts that were achieved?
- How has the policy been delivered, what worked/ didn't work?
- What have the costs and benefits of the regulation been?
- How has the regulation impacted consumers and the heat network industry?

Annexes

A – Estimated Cost Assumptions

This annex outlines the assumptions behind the estimated regulator costs, cost to business, the counterfactual, and how costs are assumed to be recovered.

Regulation Cost Estimate

Below is an overview of the approach taken to estimate regulatory costs. This approach is consistent with the approach taken in the recent consultation on cost recovery³⁴, where full details can be found in the technical annex of the consultation.

A standard cost model approach has been used to estimate the regulatory costs of the preferred option. An overview of the methodology used is as follows:

- A) Current market** - The current size of the heat network market in scope of regulation was estimated using the HNMBR notification data. There is uncertainty in this data about the current size of the market, with a risk that a significant number of small networks not captured. The impact of the size of the market has been tested through analysis of the growth rate, explained in section C.
- B) Identify regulatory activities and estimate the resource** - The members of the tripartite group used the outputs on market size from step A to estimate a range of required resource, which have been used as the key inputs to this cost modelling. This includes the number of full-time equivalent (FTE) staff by seniority, consultancy, and overhead costs. These estimates were then further refined following scrutiny from the Department for Energy Security and Net Zero and key stakeholders including industry and other regulatory bodies. The ONS statistics use average Civil Service pay to calculate the cost of the required FTE.³⁵ These costs were then inflated by 21.8% to account for non-wage costs, in line with RPC guidance.³⁶
- C) Profile and scale resource requirements** – To account for the anticipated growth, illustrative annual growth rates have been constructed based on the available evidence, detailed in Table 13. Sensitivity testing has shown that the future growth rate of the market plays a much larger role in the conclusions of the analysis than the estimate for the current size of the market.

Table 13 - Estimated heat network deployment under different growth scenarios

Heat network deployment	2053 (TWh)	Annual growth rate %	Source
Low	18	0%	Heat networks experimental statistics ³⁷
Central	51	3.6%	Analysis of baseline growth rate of market using Heat Network Metering and Billing notification data
High	103	6.1%	CCC's sixth carbon budget ³⁸

³⁴ Recovering the cost of heat networks. < <https://www.gov.uk/government/consultations/recovering-the-costs-of-heat-networks-regulation> >

³⁵ Civil Service median salaries by grade, 2019 < <https://www.gov.uk/government/statistics/civil-service-median-salaries-by-uk-region-and-grade> >

³⁶ RPC guidance on implementation costs, 2019 < <https://www.gov.uk/government/publications/rpc-short-guidance-note-implementation-costs-august-2019> >

For simplicity, wage costs have been set constant across the appraisal period.

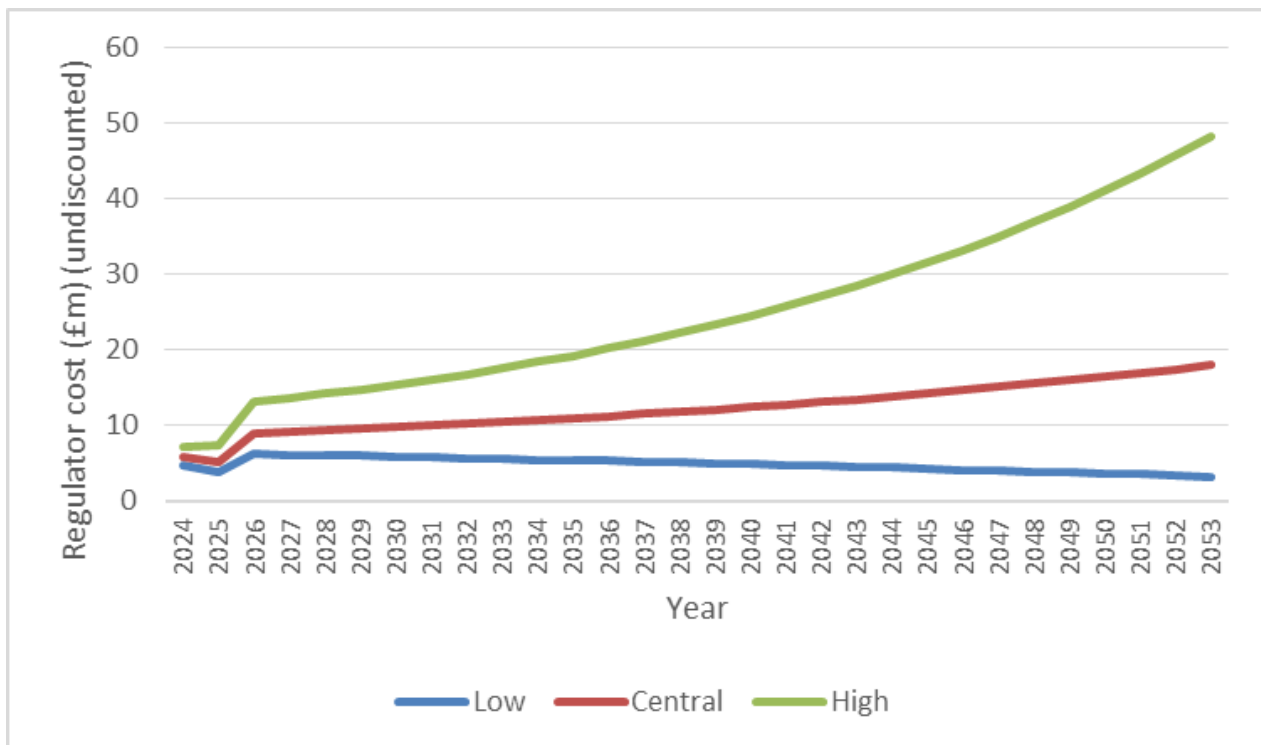
³⁷ <https://www.gov.uk/government/publications/energy-trends-march-2018-special-feature-article-experimental-statistics-on-heat-networks>

³⁸ CCC's 6th Carbon Budget report, 2020 <<https://www.theccc.org.uk/wp-content/uploads/2020/12/Sector-summary-Buildings.pdf>>

Results

The analysis suggests that set-up costs are expected to be between £3.0 - £3.5m (undiscounted) in the first year. Figure 2 shows the annual operating costs of heat network regulation, where the average would be between £4.7m and £25.0m, with a central estimate of £12.1m (all undiscounted). The sensitivity scenarios used are low growth with low cost assumptions central growth with central cost assumptions, and high growth with high cost assumptions. The reason for the wide range is driven largely by the growth of the market assumption. How large the market grows will have a significant impact on the future cost of regulation. Operating costs are taken from the factual scenario and so represent the full cost and not the difference in cost between the factual and the counterfactual (between the scenario with intervention and the business-as-usual scenario). Please note this result will differ to those presented in the main body of the IA due to discounting.

Figure 2 – Regulator cost over a 30-year appraisal period



Note: these costs have been rounded and therefore may differ from elsewhere in the IA.

Costs to business estimates

The costs to business with the methodology below calculating the following:

- A) **Identify requirement:** The expected requirements to be placed on heat network organisations was based on consultation with Ofgem, response to the consultation, and the current policy ambition.
- B) **Estimate the frequency and resource** – The number of hours required by businesses to comply with various areas of the regulation was estimated through consultation with Ofgem and a comparison with the Heat Trust requirements. The frequency of requirements is based on current policy ambition.
- C) **Costing** - To estimate the implied costs of undertaking these activities, these tasks are assumed to be carried out by an estimate manager and an internal business

consultant split 75:25 respectively. Hourly wage costs have been informed by ONS statistics.³⁹

- D) **Aggregate costs** - The costs to business were summed across all activities to provide an aggregated costs for the whole market per year.

Table 14 – Cost to business assumption overview (central case)

Assumption	Level	Duration (hour)	Rate (£/hour)	Cost (£)	Frequency
Familiarisation & dissemination	Heat supplier	9.5	27	257	One-off
Authorisation application	Heat supplier	3	27	81	One-off
License application	Heat supplier	24	27	648	One-off
Annual reporting set up	Heat network	7.5	27	203	One-off
Annual reporting	Heat network	7.5	27	203	Annual
Audits	Heat supplier/networks	4	27	108	Annual (500 per year)
Complaints	Heat supplier	0.5	27	14	Annual

Counterfactual Cost Estimates

We have assumed that for the counterfactual scenario, the only form of regulation in the heat network market is the voluntary Heat Trust. The implied cost of Heat Trust membership over the appraisal period was estimated using the following methodology:

- A. **Estimate future growth** – The reported growth in Heat Trust membership was used to derive the observed trend in growth between 2016 to 2020⁴⁰. This trend was then applied to the current Heat Trust membership to produce an illustrative growth scenario over a 30-year appraisal period. Under the low sensitivity, the growth rate was reduced by 50% and under the high sensitivity this growth rate was increased by 50%.
- B. **Estimated regulatory costs** – The current Heat Trust membership and Energy Ombudsman costs were then used to estimate the counterfactual regulatory costs, as summarised in Table 15.

Table 15 - Additional costs under the counterfactual

Area	Level	Cost	Frequency
Connection cost	Per Heat Trust customer	4.6	Annually
Joining fee	Per Heat Trust network	100	One-off
Audits	20% of Heat Trust networks	108	Annually

³⁹ Earnings and hours worked, region by occupation by two-digit SOC: ASHE Table 3

<<https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/earningsandworkinghours/datasets/regionbyoccupation2digitsoca/shetable3>>

⁴⁰ Heat Trust Annual Reports < <https://heattrust.org/annual-reports-v2> >

Energy Ombudsman FCR Fee	75% of EO complaints	170	Annually
Energy Ombudsman Upheld Fee	25% of EO complaints	400	Annually

C. **Costs to business** were then calculated in a similar way to the factual case. Though – apart from HMBR annual reporting – costs for a given area of regulation were multiplied by the projected number of heat networks/suppliers that will join the Heat Trust (as opposed to all heat networks). The differences are summarised in Table 16 below.

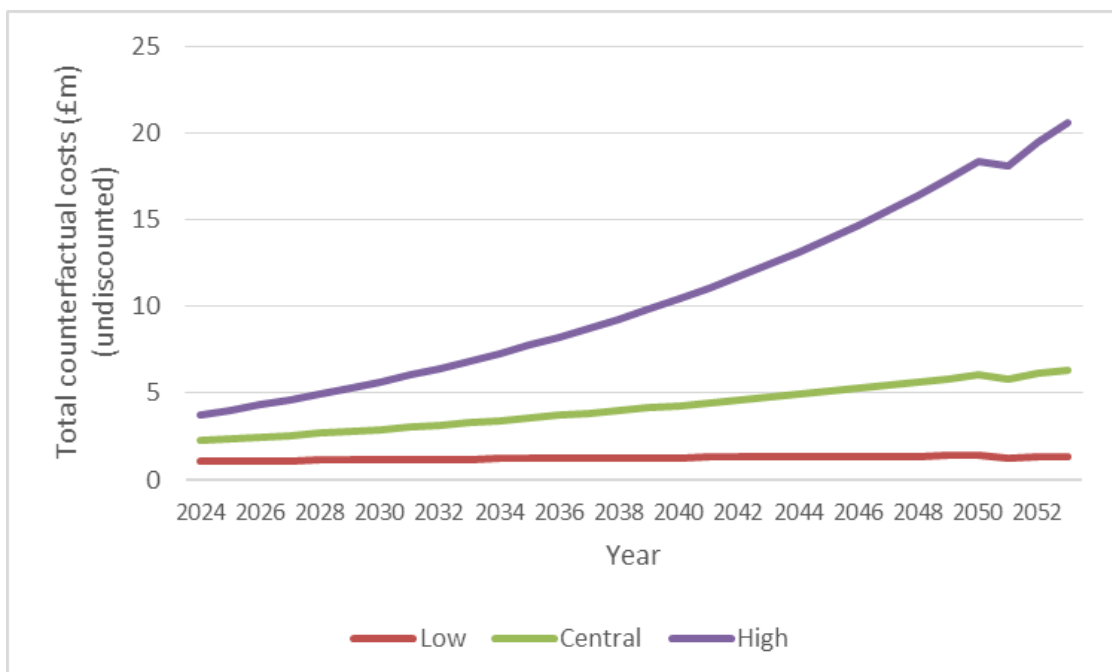
Table 16 - Additional costs to business under the Counterfactual

Area	Level	Cost (£)	Frequency
Annual Reporting	Per Heat Trust heat network	203	6 Months
HMBR Annual Reporting	Heat network (all)	406	Every four years
Annual Reporting Set-Up	Per Heat Trust heat network	203	One-off
Complaints	2% of all heat network customers	14	Annually
Authorisation	Per Heat Trust supplier	81	One-off
Familiarisation & Dissemination	Per Heat Trust supplier	257	One-off

Total counterfactual costs

Figure 3 shows total annual counterfactual costs of regulation for the heat network market, comprised of set-up and ongoing costs to the regulator and costs to business. The average cost over a 30-year appraisal period is £1.3m (low), £4.2m (central), and £10.5m (high) (all undiscounted). The sensitivity scenarios used are low growth with low cost assumptions, central growth with central cost assumptions, and high growth with high cost assumptions.

Figure 3 – Counterfactual costs over a 30-year appraisal period



Note: these costs have been rounded and therefore may differ from elsewhere in the IA.

1. Cost Recovery Estimates

Regulator ongoing costs

To estimate the average potential bill impact under different cost recovery options, Ofgem and Citizens Advice's annual regulatory costs are divided by the number of consumers captured under a given option. For this analysis, it is assumed that heat network, gas, and electricity suppliers pass 100% of the cost of regulation through to their entire consumer base. Energy Ombudsman costs are expected to be recovered directly through fees from heat suppliers and therefore have not been included in the cost socialisation analysis below.

These estimates reflect the preferred option in the current consultation on cost recovery and should therefore be viewed as indicative. In the preferred option, the ongoing running costs of the heat network regulator are spread across all gas, electricity, and heat network consumers. This has been estimated using assumptions on the current size of the energy market and the costs of running Ofgem's current regulatory activities, summarised in Table 17.

Table 17 - Estimated annual cost of regulation and size of markets

	Heat Networks ⁴¹	Gas	Electricity	Total
Regulatory costs (£m)	12.2 (Excluding EO)		91 ⁴²	103
Customers (million)	1.0 (average over next 30 years with central growth rate scenario)	25 ⁴³	32 ^{44F}	58
				£1.78

Note: These costs have been rounded and therefore may differ from elsewhere in the IA.

The consumer level impact was calculated by dividing the total cost of regulating all heat network, gas, and electricity consumers by the estimated number of consumers. This results in an estimated impact of £1.78 per heat network customer. This would also raise the annual cost for gas and electricity customers from around £1.60 to £1.78, to account for the additional costs of regulating the heat network market. This proposal reduces the average estimated annual impact per heat network consumer from £12.20 to £1.78, whilst increasing the average charge for gas and electricity consumers by around £0.18 annually.

Costs to business recovery

The cost recovering the costs to business have also been estimated, assuming 100% cost recovery. This has been calculated by dividing the total additional estimated cost due to requirements of the regulation by the total number of heat network customers. For simplicity, an average has been calculated across a 30-year appraisal period and the inputs to this calculation are summarised in Table 18.

Table 18 - Costs to business recovery overview

	Total
Average Additional cost to business (£m)	£3.52m

⁴¹ This estimate represents the 10-year average of ongoing costs to Ofgem and Citizens Advice under the central scenario and the number of Heat Networks customers scales with market growth and will therefore differ from table 2. This cost estimate excludes Energy Ombudsman costs which is estimated to be around £0.5m per annum under the central scenario (10-year average)

⁴² Ofgem's Licence fee income, 2021 - 22, < <https://www.ofgem.gov.uk/publications/ofgem-annual-report-and-accounts-2021-22> >

⁴³ Regional and local authority gas consumption statistics, 2021, < <https://www.gov.uk/government/statistical-data-sets/gas-sales-and-numbers-of-customers-by-region-and-local-authority> >

⁴⁴ Regional and local authority electricity consumption statistics, 2021, < <https://www.gov.uk/government/statistical-data-sets/regional-and-local-authority-electricity-consumption-statistics> >

Average Heat network customers (million)	1m (average over next 30 years with central growth rate scenario)
Cost per customer	£3.52

Note: these costs have been rounded and therefore may differ from elsewhere in the IA.

This results in an average annual cost per customer of £3.52 in the central scenario. However, this is expected to be a pessimistic estimate for two reasons. Firstly, not all heat suppliers are expected to pass 100% of these costs onto their customers. Secondly, the number of heat network customers is based on the number of dwellings or units to which they supply heat, however, this doesn't account for the wider potential consumer base of non-domestic units.