

Title: Heat Networks Future Market Framework IA No: BEIS023(C)-19-CG RPC Reference No: RPC-4427(1)-BEIS Lead department or agency: Department of Business, Energy and Industrial Strategy (BEIS) Other departments or agencies: N/A	Impact Assessment (IA)
	Date: 06/02/2020
	Stage: Consultation
	Source of intervention: Domestic
	Type of measure: Primary legislation
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Summary: Intervention and Options **RPC Opinion:** Not Applicable

Cost of Preferred (or more likely) Option (in 2016 prices)			
Total Net Present Social Value (2018 prices)	Business Net Present Value	Net cost to business per year	Business Impact Target Status
-£97m	-£71.7m	£8.3m	£41.6m

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. This regulation aims to respond to a market study by the Competition & Market Authority (CMA), by strengthening consumer protections, improving service quality and standards, and addressing disparities with other utilities. The heat network market is not currently regulated, and some consumers face consumer detriment (outlined in the Heat Network Consumer Survey (HNCS) and CMA market study¹). This is especially important as heat networks have the characteristics of a monopoly, meaning they have market power which can allow them to provide poor services with little consumer recourse. Heat networks also do not have equivalent statutory powers as other utilities, which may act as a barrier to growth, therefore this regulation sets out to give heat networks these statutory powers.

What are the policy objectives and the intended effects?
 There are three components of this regulation. A) Specifying a heat network regulator and their powers, including power to levy fines and take enforcement action. B) Define consumer protection measures to be given to heat network consumers and enforced by the new regulator. C) Defining 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, whilst 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 provide more certainty and clarity in the heat networks market, which should lead to higher levels of growth and investment.

What policy options have been considered, including any alternatives to regulation? Please justify preferred option (further details in Evidence Base)
Counterfactual (Do Nothing): Continued voluntary regulation without government intervention.
Option 1 (Minimum): This option sets up a regulator and all heat networks that supply a domestic customer must get authorised, and this authorisation specifies consumer protections.
Option 2: This option sets up a regulator and all heat network suppliers that supply a domestic customer must get a licence to operate, which specifies consumer protections and rights and powers to be given to heat networks.
Option 3: Option 3 builds on Option 1 but requires suppliers over a certain threshold to get a licence, which offers rights and powers and is more burdensome in specifying requirements for consumer protections. This option offers similar benefits to Option 2 but at a lower burden.
Option 4 (Preferred): This option builds on Option 1, as all heat networks must get authorised, but those suppliers who would like rights and powers can apply for a licence to access these powers. This option is less burdensome than Option 2 and 3, whilst supplying its benefits.

Will the policy be reviewed? It will not be reviewed. **If applicable, set review date:** N/A

Does implementation go beyond minimum EU requirements?	No			
Is this measure likely to impact on trade and investment?	Yes			
Are any of these organisations in scope?	Micro Yes	Small Yes	Medium Yes	Large 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 SELECT SIGNATORY: _____ Date: _____

¹ CMA Heat Networks Market Study (2018) /assets.publishing.service.gov.uk/media/5b55965740f0b6338218d6a4/heat_networks_final_report.pdf

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Summary: Analysis & Evidence

Policy Option 1

Description: Option 1 is the minimum implementation option in responding to the CMA's recommendations.

FULL ECONOMIC ASSESSMENT

Price Base Year:2018	PV Base Year:2018	Time Period Years:10	Net Benefit (Present Value (PV)) (£m)		
			Low: -£70m	High: -£108.5m	Best Estimate: -£88.7m

COSTS (£m)	Total Transition (Constant Price) Years	Average Annual (excl. Transition) (Constant Price)	Total Cost (Present Value)
Low	Optional	£7.1m	£71.1m
High	Optional	£11m	£109.7m
Best Estimate	N/A	£9m	£89.9m

Description and scale of key monetised costs by 'main affected groups'

The key monetised costs are associated with the regulator and industry. The regulator will incur both ongoing and one-off set up costs from being introduced into the market. Over the 10-year appraisal period, the regulator will incur approximate discounted costs of around £61.2 million for developing the regulatory regime, managing the regime, monitoring reporting and monitoring prices respectively.

Heat network operators will incur costs from being under the regulatory regime. Over the 10-year appraisal period, they will incur approximate discounted costs in aggregate of around £28.7 million for: authorisation applications, familiarisation costs with the regulation, general compliance costs and complaints handling.

Other key non-monetised costs by 'main affected groups'

N/A

BENEFITS (£m)	Total Transition (Constant Price) Years	Average Annual (excl. Transition) (Constant Price)	Total Benefit (Present Value)
Low	Optional	Optional	Optional
High	Optional	Optional	Optional
Best Estimate	N/A	N/A	N/A

Description and scale of key monetised benefits by 'main affected groups'

N/A

Other key non-monetised benefits by 'main affected groups'

The benefits of this regulation have not been quantified at this stage due to insufficient data, however it is expected that the numerous benefits will be significant and on balance with the expected costs. Option 1 sets out to address consumer detriment faced by some consumers as a result of being on a heat network, therefore the key benefits to consumers will be in terms of lower prices and higher quality of service provided.

More generally, it is expected that the market could also benefit from this intervention by reducing consumer resistance to heat networks (via reducing consumer detriment) and increasing certainty in the market by having a single statutory regulatory body rather than the current voluntary arrangements.

Key assumptions/sensitivities/risks

Discount rate

3.5%

The key assumption around costs of the regulator, is that the regulator will recover its costs with the authorisation applications heat networks submit. It is also assumed that 100% of regulation costs are passed on to heat network consumers - this has been assumed as a simplifying assumption.

It is also assumed that the number of heat networks in the market equals the number that have notified to the OPSS rather than the number outlined in the smaller quality-assured 'Heat Networks Experiment Statistics (2018)'. This will be tested in the sensitivity analysis.

As a simplifying assumption, this IA appraises only the impacts of this proposed regulation on the current stock of heat networks, and does not consider new heat networks.

BUSINESS ASSESSMENT (Option 1) [In 2016 prices, 2017 present value]

Direct impact on business (Equivalent Annual) £m: 7.5			Score for Business Impact Target (qualifying provisions only) £m: 37.7
Costs: £7.5m	Benefits: 0	Net: £7.5m	

Summary: Analysis & Evidence

Policy Option 2

Description: All heat network suppliers with a domestic customer must obtain a licence.

FULL ECONOMIC ASSESSMENT

Price Base	PV Base	Time Period	Net Benefit (Present Value (PV)) (£m)		
Price Base Year:2018	PV Base Year:2018	Time Period Years:10	Low: -£95.6m	High: -£148.5m	Best Estimate: -£121.9m

COSTS (£m)	Total Transition (Constant Price) Years	Average Annual (excl. Transition) (Constant Price)	Total Cost (Present Value)
Low	Optional	£9.7m	£97.2m
High	Optional	£15m	£150.4m
Best Estimate	N/A	£12.4m	£123.6m

Description and scale of key monetised costs by 'main affected groups'

The key monetised costs are associated to the regulator and industry. The costs of Option 2 are higher than Option 1, since the licensing regime is more burdensome in scope than authorisation due to for example more stringent reporting requirements.

The regulator will incur both ongoing and one-off set up costs from being introduced into the market. Over the 10-year appraisal period, the regulator will incur approximate discounted costs of around £72.2 million for: developing the regulatory regime, managing the regime, monitoring reporting and monitoring prices respectively.

Heat network operators will incur costs from being under the regulatory regime. Over the 10-year appraisal period, they will incur approximate discounted costs of around £51.3 million for total licence applications, familiarisation costs, general compliance costs and complaints handling.

Other key non-monetised costs by 'main affected groups'

The rights and powers may increase the amount of street disruption. This street disruption will incur a cost to those using those streets on which construction, maintenance or repair work is being undertaken.

BENEFITS (£m)	Total Transition (Constant Price) Years	Average Annual (excl. Transition) (Constant Price)	Total Benefit (Present Value)
Low	Optional	N/A	£0.4m
High	Optional	£0.1m	£0.7m
Best Estimate	N/A	£0.1m	£0.6m

Description and scale of key monetised benefits by 'main affected groups'

As with Option 1, it is expected that the overall benefits of Option 2 will be large and outweigh the costs. Benefits that are unique to Option 2 and have been quantified are the inclusion of rights and powers.

Street works permits will save heat network operators and the government approximately £300,000 over the 10-year appraisal period compared to the counterfactual. In addition to this figure, easements and permitted development will save heat network operators and the government approximately £200,000 and £100,000 respectively.

Other key non-monetised benefits by 'main affected groups'

The benefits outlined in Option 1 will also accrue in Option 2 and therefore will not be outlined here. However, unique to Option 2 will be increased consumer detriment alleviation and market certainty caused by the inclusion of rights and powers within Option 2. The former will occur as heat networks can better maintain their network, whilst the latter will occur as there will be less inherent risk in constructing and operating heat networks.

Key assumptions/sensitivities/risks

Discount rate

3.5%

The same key assumptions in Option 1 have been made in Option 2.

Unique to Option 2 is the quantity of heat network suppliers that have been assumed to use the rights and powers. This has been determined by assuming that non-Local Authority heat networks suppliers with over 10 heat networks will apply for these powers. This is based on the type of supplier expected to apply for these powers and analysis conducted on the OPSS dataset. This has been tested in the sensitivity analysis.

BUSINESS ASSESSMENT (Option 2) [In 2016 prices, 2017 present value]

Direct impact on business (Equivalent Annual) £m: 10.4			Score for Business Impact Target (qualifying provisions only) £m: 52.1
Costs: £10.4m	Benefits: £0m ²	Net: £10.4m	

² Zero as below the hundred thousand round threshold

Summary: Analysis & Evidence

Policy Option 3

Description: Option 3 builds on Option 1, as heat network suppliers over a certain threshold must obtain a licence.

FULL ECONOMIC ASSESSMENT

Price Base	PV Base	Time Period	Net Benefit (Present Value (PV)) (£m)		
Price Base Year:2018	PV Base Year:2018	Time Period Years:10	Low: -£89m	High: -£137.8m	Best Estimate: -£112.8m

COSTS (£m)	Total Transition (Constant Price) Years	Average Annual (excl. Transition) (Constant Price)	Total Cost (Present Value)
Low	Optional	£9.1m	£90.5m
High	Optional	£14m	£139.7m
Best Estimate	N/A	£11.4m	£114.5m

Description and scale of key monetised costs by 'main affected groups'

Option 3 extends Option 1 by requiring that heat networks supplying over a certain number of customers obtain a licence. All the costs incurred in Option 1 will be incurred in Option 3, in addition to the unique costs of the requisite licence in this option. Only the unique costs to Option 3 are outlined in this box.

Over the 10-year appraisal period, the regulator will incur approximate discounted costs of £6.2 million for developing the requisite licence, managing the licence and monitoring reporting respectively.

Heat network operators will incur costs from this requisite licence also, above the costs incurred in Option 1. Over the 10-year appraisal period, they will incur approximate discounted costs of £18.4 million for total licence applications, familiarisation costs and general compliance costs.

The total quantified costs of Option 3 include the costs of Option 1 and the unique costs of Option 3. The costs over the appraisal period are approximately £114.5 million. This is formed of £67.4 million in regulator costs and £47.1 million in costs to heat network operators.

Other key non-monetised costs by 'main affected groups'

Option 3 will incur the same non-quantified costs as outlined Option 2.

BENEFITS (£m)	Total Transition (Constant Price) Years	Average Annual (excl. Transition) (Constant Price)	Total Benefit (Present Value)
Low	Optional	N/A	£0.4m
High	Optional	£0.1m	£0.7m
Best Estimate	N/A	£0.1m	£0.6m

Description and scale of key monetised benefits by 'main affected groups'

Option 3 will incur the same quantified benefits as outlined Option 2.

Other key non-monetised benefits by 'main affected groups'

Option 3 will incur the same non-quantified benefits as outlined in Option 2.

Key assumptions/sensitivities/risks

Discount rate (%)

3.5%

The same key assumptions in Option 1 have been made in Option 3.

Since Option 3 includes a slightly different assumption to Option 2 and 4 around the threshold for licensing, it has been assumed that heat networks suppliers with over 2,000 customers will get licensed. This is based on a reasonable assumption of the type of supplier that will need to get the licence and analysis of the OPSS dataset. The impact of this will be tested in the sensitivity analysis.

As a simplifying assumption it has been assumed that all the heat networks that want rights and powers in Option 2 and 4, will apply for the licence in Option 3. This will be tested in the consultation.

BUSINESS ASSESSMENT (Option 3) [In 2016 prices, 2017 present value]

Direct impact on business (Equivalent Annual) £m: 9.7			Score for Business Impact Target (qualifying provisions only) £m: 48.3
Costs: £9.7m	Benefits: £0 ³	Net: £9.7m	

³ Zero as below the hundred thousand round threshold

Summary: Analysis & Evidence

Policy Option 4

Description: Option 4 goes beyond Option 1, by allowing heat networks suppliers access to a rights and powers licence.

FULL ECONOMIC ASSESSMENT

Price Base	PV Base	Time Period	Net Benefit (Present Value (PV)) (£m)		
Price Base Year:2018	PV Base Year:2018	Time Period Years:10	Low: -£76.8m	High: -£118.7m	Best Estimate: -£97m

COSTS (£m)	Total Transition (Constant Price) Years	Average Annual (excl. Transition) (Constant Price)	Total Cost (Present Value)
Low	Optional	£7.8m	£78.4m
High	Optional	£12.1m	£120.5m
Best Estimate	N/A	£9.9m	£98.7m

Description and scale of key monetised costs by 'main affected groups'

Option 4 extends Option 1 by allowing heat network suppliers that want rights and powers to apply for a licence. Therefore, all the costs incurred in Option 1 (£89.9 million) will be incurred in Option 4, in addition to the unique costs of the rights and powers licence. Only the unique costs to Option 4 are outlined in this box.

Over the 10-year appraisal period, the regulator will incur approximate discounted costs of around £3.8 million for developing the rights and powers licence, managing the licence and monitoring reporting respectively.

Heat network operators will incur costs from using the rights and powers licence. Over the 10-year appraisal period, they will incur approximate discounted costs of £5 million for total licence applications, familiarisation costs and general compliance costs.

The total quantified costs of Option 4 include the costs of Option 1 and the unique costs of Option 4. Therefore, over the appraisal period the total costs are approximately £98.7 million. This is formed of approximately £65 million in regulator costs and approximately £33.6 million in costs to heat network operators.

Other key non-monetised costs by 'main affected groups'

Option 4 will incur the same non-quantified costs as outlined Option 2.

BENEFITS (£m)	Total Transition (Constant Price) Years	Average Annual (excl. Transition) (Constant Price)	Total Benefit (Present Value)
Low	Optional	N/A	£0.4m
High	Optional	£0.1m	£0.7m
Best Estimate	N/A	£0.1m	£0.6m

Description and scale of key monetised benefits by 'main affected groups'

Option 4 will incur the same quantified benefits as outlined Option 2.

Other key non-monetised benefits by 'main affected groups'

Option 4 will incur the same non-quantified benefits as outlined in Option 2.

Key assumptions/sensitivities/risks

Discount rate 3.5%

The same key assumptions in Option 1 have been made in Option 4. As in Option 2, the same assumption has been made about those who will make use of the rights and powers licence.

BUSINESS ASSESSMENT (Option 4) [In 2016 prices, 2017 present value]

Direct impact on business (Equivalent Annual) £m: 8.3			Score for Business Impact Target (qualifying provisions only) £m: 41.6
Costs: £8.3m	Benefits: £0m⁴	Net: £8.3m	

⁴ Zero as below the hundred thousand round threshold

1. Executive Summary

1. Heat networks are a system of insulated pipes that connect multiple buildings (District heating) or a single multi-tenanted building (Communal heating) to a heat source⁵. There are approximately half a million consumers on around 14,000 heat networks in the England and Wales, of which around 2,000 are district heat networks, and 12,000 are on communal heat networks⁶. The large majority (around 92%) of heat network consumers are classed as residential.
2. The Clean Growth Strategy (CGS)⁷ released in 2017, sets out the UK's strategy for decarbonisation, outlining the important role that heat networks could play in decarbonisation the UK's heating. The Committee on Climate Change (CCC) recommendation that the UK should aim for 'net-zero' carbon emissions by 2050⁸ also highlighted the role that heat networks could play in meeting this target.
3. The Competition & Market Authority (CMA) released a market study on the heat networks market in mid-2018⁹. The CMA set out a number of recommendations for the regulation of heat networks. This impact assessment (IA) supports a consultation to respond to the recommendations and introduce a regulator into the market. In particular, the regulation sets out to:
 - a) Specify a heat networks regulator and their powers;
 - b) Define consumer protection measures to be given to heat network consumers;
 - c) Define rights and powers¹⁰ to be given to heat networks.
4. Four options for regulating the heat networks market are appraised in this IA. The preferred option addresses the recommendations of the CMA and defines rights and powers to be granted to heat networks, at the lowest cost. Many of the wider benefits of the regulation have not been quantified in this analysis. Despite the Social NPV of the IA looking negative, it is expected that including the impact of non-quantified benefits, the recommended option within this IA will have a net benefit to society over the counterfactual and over the minimum implementation option¹¹.

2. Problem under consideration

5. This regulation aims to address a number of consumer protection related issues in the heat networks market and respond to the CMA's market study, which recommended the establishment of a statutory regulatory regime with the power to regulate on matters affecting the consumer and operator outcomes.
6. This regulation sets out to address three specific issues in the heat networks market:
 - **Regulator:** The heat networks market does not currently have a statutory regulator.
 - **Consumer Protection:** Some heat network consumers suffer consumer detriment as a result of being supplied by heat networks.

⁵ The Heat Network (Metering and Billing) Regulations 2014 define heat (or cooling) networks as the distribution of thermal energy in the form of steam, hot water or chilled liquids from a central source of production through a network to multiple buildings or sites for the use of space or process heating, cooling or hot water. Communal heating, where there is a single heat source within a single multi-tenanted property, does not meet this definition.

⁶ 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>

⁷ Ibid

⁸ This recommendation was mandated into law by the UK government in mid-2019.

⁹ CMA Heat Networks Market Study (2018)

https://assets.publishing.service.gov.uk/media/5b55965740f0b6338218d6a4/heat_networks_final_report.pdf

¹⁰ Which are the new statutory powers to be given to regulated heat networks, which will give them the powers of, for example, permitted development.

¹¹ The options are outlined in more detail in Section 5. The impacts of this IA are outlined in more detail in Section 7.

- **Rights and powers:** Heat network operators are disadvantaged compared to other utilities (e.g. electricity, gas and water), by not having the same statutory powers.

7. These issues are set out in more detail below.

Regulator:

8. The heat networks market currently has only some voluntary standards and limited regulation:

- The Heat Trust offers members consumer protections¹², whilst the Chartered Institution of Building Service Engineers (CIBSE) code of practice specifies technical standards. However, membership and enforcement are uneven. Indeed, the Heat Trust currently provides protection to approximately 10% of all residential consumers served by heat networks.
- The Heat Network (Metering and Billing) Regulations¹³ give some limited powers to the Office for Products Safety and Standards (OPSS) to regulate the notification, metering, and billing of heat networks¹⁴.

9. Internationally, there are different approaches to regulation of heat networks markets. The Netherlands and Norway both have official regulators, whilst Finland and Germany are self-regulated¹⁵ as the UK currently is.

- In Finland, Finnish Energy, which is a trade association whose member companies comprise 98% of heat network sales, organises its own regulation. Finnish Energy publishes information on prices, costs and supply interruptions, and develops standards and codes. The Finnish Competition Authority provides some oversight on abuse of power and can intervene when there are substantial consumer complaints.
- In Germany, the German AGFW (Energy Efficiency Association for District Heating, Cooling and CHP) has developed codes and standards for a range of issues, from metering to pipes. The market (as in Finland) has oversight from the Competition Authority on competition issues, however unlike in Finland, Federal law defines standard terms and conditions for supply of heat networks.

10. For Finland and Germany, the absence of a national regulator has been filled by industry-led initiatives and governance. This works especially well given the high proportion of public ownership and rented accommodation. Germany, in particular, has a large proportion of consumers renting accommodation¹⁶, meaning that the buyers of heat from heat networks are building-level owners rather than individual consumers. This gives German consumers greater bargaining power than in the UK, because building level owners are easier to contact than in the UK case.

11. In the UK, industry-led initiatives have not reached the same extent as in Germany or Finland, and the UK market is therefore meaningfully different from these markets in structure and development. A self-regulating approach in the UK (which is currently employed), therefore leads to disparities in consumer outcomes between different heat networks. Whilst some heat networks operate in a comparable fashion to other heat providers, others provide a sub-par service. A continuation of self-regulation therefore is unlikely to be able to give consumers the same level of confidence as independent oversight from a dedicated regulator.

¹² Although the Heat Trust covers general consumer protections, it does not cover pricing issues.

¹³ The Heat Network (Metering and Billing) Regulations 2014: <http://www.legislation.gov.uk/ukSI/2014/3120/contents>

¹⁴ However, although this regulation covers notification, metering and billing, its primary purpose is to drive energy efficiency rather than consumer protections.

¹⁵ BEIS, CAG Consultants (March, 2019), International Heat Networks: https://beis.gov.sharepoint.com/:w:/r/sites/beis2/224/_layouts/15/Doc.aspx?sourcedoc=%7B0E5EF8B8-229C-4ED3-98A8-4D2F33291961%7D&file=ICHNMR%20Final%20Report.docx&action=default&mobileredirect=true

¹⁶ OECD report (2011) – ‘The evolution of homeownership rates in selected OECD countries: demographic and public policy influences’ <https://www.oecd.org/eco/growth/evolution%20of%20homeownership%20rates.pdf>

Consumer Protection:

12. The CMA's 2018 market study on heat networks focused on the consumer detriment issues consumers faced as a result of being on a heat network. It was followed up by the Heat Network Consumer Survey (HNCS)¹⁷ to further understand consumer experiences of being on a heat network. Both the studies outline the issues which exist in the market, without going into detail on the scale of the problem. The broad issues outlined in the market study are pricing and quality of service.

Pricing:

13. Whilst on average consumers on heat networks pay slightly less than non-heat network consumers for comparable heating services to those on gas, some networks provide poor value for money, with prices exceeding comparable heat providers.

- The HNCS¹⁸ found that the mean average price reported was similar on heat networks and domestic gas systems, however the median price was on average £100 less for heating and hot water compared with non-heat network consumers. The difference between the average mean and median price is caused by the presence of pockets of heat network consumers paying very high bills. The HNCS found that in some cases consumers were paying more than £1,000, or even £2,000, per year in their total bills¹⁹.

Quality of service:

14. Pricing information is often opaque, inconsistently provided and varies in form significantly between networks.

- The CMA market study outlines that 'about a third of complaints refer to irregular bills, a third complain about inaccurate bills, and a significant proportion complain about being billed for heat consumption when they believe they are not using so much heat, or any heat and hot water'.

15. Information is often difficult and costly to attain from operators.

- The CMA market study outlined that consumer agents are available only for a small number of hours and that different businesses involved in the heat network pass responsibility between themselves, meaning extra time is spent trying to contact those responsible.

16. Consumers face difficulties getting compensation.

- The HNCS²⁰ found that a relatively high proportion of heat network consumers either complained or had a reason to complain, 32% compared with 26% of non-heat network consumers. However, for those consumers who did complain, they were less likely to be satisfied with the how the complaint was resolved compared to those not on a heat network.

17. Consumers face under- and over- heating, as well as inconsistent heating.

- The HNCS²¹ found that a 37% of heat networks consumers experienced a loss of heating in the last 12 months, compared to only 24% of those not on heat networks, and heat network consumers have a similar experience with having more over-heating than those not on heat networks.

Overall:

¹⁷ Heat Networks Consumer Survey (2017)

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

¹⁸ Ibid

¹⁹ This high total price may be driven by a number of causes, as outlined in section 3.

²⁰ Heat Networks Consumer Survey (2017)

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

²¹ Ibid

18. These consumer detriment issues provide clear justification for more uniform and enforced consumer protections, to ensure parity of services across heat networks and with comparable heat providers.

Rights and powers:

19. Heat networks, unlike other utilities (e.g. 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 heat networks must.

20. 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 will lead to reduced investments in heat networks.
- Delays in maintenance and repair, may lead to longer outages for consumers and a poor-quality service. Thus, increasing consumer detriment.

21. Given that heat networks provide an essential service (in supplying heat), there is a clear justification for giving them equivalent powers to other utilities to improve consumer outcomes. There is likely also to be the additional benefit of increasing certainty for suppliers in the heat network market. This may in turn ensure greater investment.

3. Rationale for intervention

Monopoly:

22. Once a customer connects to a heat network, then the heat network can demonstrate monopolistic characteristics, insofar as it is more costly to have multiple suppliers of a good/service (in this case heat), than to have a single supplier. In general, monopolies are characterised by high initial costs and economies of scale, such that the more a supplier produces the lower its costs will be. Therefore, there is a first-mover advantage in monopoly markets, such that after overcoming initial costs of construction, the supplier has lower average cost of production compared to potential competition. Thus, it is the case that it is most efficient for one supplier to supply the market, or in this case it is most efficient for one supplier to continue supplying the household with heat²².

23. Due to being the sole provider of the heating where present, consumers either have to demand the service from the monopoly supplier or go with either a) a sub-optimal replacement (an electric heater), although they may still be liable for network costs or b) an expensive replacement of the heat network supply infrastructure, which is rarely a realistic option. This can lead to some consumers facing consumer detriment with little recourse, as the heat network has structural power. This can allow the heat network to provide poor services and extract rents²³ from consumers, above what is efficient and equitable.

24. Due to the nature of the market, there is currently little opportunity to increase competition to reduce the monopoly's power, in order to remedy the issue. Therefore, this regulation sets out to specify a regulator in order to enforce that the heat networks operator does not extract rents or abuse its sole provider power by providing a poor service.

Information Failure:

Imperfect or asymmetric information:

²² Due to the nature of heat networks being a local heating solution, heat networks therefore constitute a monopoly within their locality.

²³ A rent is a return in excess of the resource owner's opportunity cost, where an opportunity cost is the cost of the next best alternative foregone.

25. Information failure can result when one party in a transaction has incomplete information (i.e. they do not have all the information) or when one party knows more than the other (asymmetric information). Consumers on heat networks often have incomplete information²⁴ at two stages in their tenancy of a property connected to a heat network:

- *Pre-transaction*: when consumers move into a new property that is served by a heat network, it is often the case that consumers do not know a) that they are moving onto a heat network and b) what this entails for heating their homes.
- *Post-transaction*: when consumers are in a property served by a heat network, it is often difficult to obtain information about the heat network including how billing has been formed or what recourse there is for problems (including how to get compensation).

26. This information failure both pre- and post- transaction can have a negative impact on some consumers' experiences of heat networks. For example, consumers may not know that their bills are too high since billing is unclear or they may be ignorant to the fact they are entitled to compensation for poor service.

27. The proposed regulation sets out to define consumer protections. This is likely to have two broad impacts on heat network information provided:

- *Availability*: it is expected that more information will be provided by heat networks, both with and without request by heat network consumers.
- *Clarity*: the information that will be provided will be clearer and more comparable across heat networks.

28. By increasing information availability and clarity, heat network consumers will be able to take appropriate action (if required), challenge their suppliers and have more understanding of the costs of their heating.

Moral hazard:

29. The CMA's market study outlines that there can be an element of moral hazard between heat network developers and consumers. Developers may, in some cases, have an incentive to be myopic and try to minimise the upfront costs of developing heat networks, to the detriment of consumers whose heat is supplied by a heat network. This issue is being looked at in future and is outside the scope of this consultation.

Equity issues:

30. Due to the nature of heat networks; being mainly an urban technology and appropriate for multi-tenancy buildings, heat networks tend to serve more vulnerable and elderly consumers²⁵ than comparable heat sources:

- *Elderly*²⁶: 44% of heat network consumers were retired, whilst the wider population proportion was 14%. Furthermore, in heat network households, 44% had at least one person aged 65 or older.

²⁴ Whilst the main information failure in the heat network market is incomplete information, asymmetric information may also pose a problem if consumers apply for compensation but are inadequately informed about their rights.

²⁵ Heat Networks Consumer Survey (2017)

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

²⁶ Ibid pg17

- Vulnerable²⁷: The HNCS outlined that 40% of those on heat networks met one of their conditions for being a vulnerable consumer²⁸, whilst 27% were considered to be financially struggling²⁹.

31. Thus, it is especially important to correct market failures in the heat networks market, as this can have a disproportionate benefit due to the number of disadvantaged consumers. This legislation sets out to provide consumer protections universally for all heat network consumers. This should bring standards up to parity with other heating providers and have a disproportionate benefit to those disadvantaged.

4. Policy objective

32. This regulation has three components which relate exactly to the three problems in the market specified. The regulation therefore sets out a package of measures to specify a market framework for the heat networks market, in order to address these market failures. The three components of the regulation are:

- a) Specify a heat networks regulator and their powers;
- b) Define consumer protection measures to be given to heat network consumers;
- c) Define rights and powers to be given to heat networks.

a) Specifying a heat networks regulator and their powers

33. The heat networks market is currently unregulated. This consultation will present the options for regulating the market, as well as specifying who the proposed regulator will be. It is proposed that this regulator will be Ofgem given their expertise in the energy market from regulating the gas and electricity markets.
34. This regulation proposes to regulate different types of heat networks differently. The regulation covered in this consultation will apply only to heat networks who supply heat to domestic customers only, and those who supply both domestic and non-domestic customers³⁰. The latter is to ensure that all domestic customers are covered and protected under this regulation, to reduce consumer detriment.
35. Heat networks that supply heating and cooling to non-domestic consumers only will be subject to a reduced, and potentially different, set of requirements (to be defined at a later date and therefore out of the scope of this impact assessment). It is assumed that domestic consumers are less able to negotiate specific prices and terms of service for their connection than non-domestic consumers, and therefore heat networks with domestic consumers should be subject to a different set of requirements.
36. The options to be presented in the consultation and in this impact assessment cover four different potential regulatory models for the heat networks domestic market. The analysis will compare the costs and benefits of models where: every heat network is authorised; where every supplier of heat networks need a licence to operate; and possible combinations of authorisation and licensing systems. These will be explained in more detail in section 5. The exact powers of the regulator under the different models will vary slightly and are also explored in section 5 of the IA.

b) Defining consumer protection measures for heat network consumers

²⁷ Ibid pg17

²⁸ Conditions: Long term health problems, caring responsibility for someone with long term health problems, hearing/visual impairment, received extra support or assistance from gas or heating supplier, help in reading or understanding energy bills, relocation of prepayment meters to ensure they can be safely used, or priority in an energy emergency.

²⁹ Determined by agreement with the statement 'keeping up with my heating and hot water costs is a bit of a struggle'

³⁰ Only the domestic heat networks for the mixed heat network suppliers are covered by the regulation.

37. This regulation sets out to address consumer detriment by ensuring clear consumer protections exist universally for heat network consumers and that the regulator has the power to enforce these protections.
38. In particular, this regulation will give the regulator powers covering various consumer protection issues including: pricing, pre- and post-contractual transparency and quality of service standards expected of heat networks. More detail on the regulator's proposed powers can be found in the consultation.

c) Defining rights and powers to be given to heat networks

39. This regulation sets out to give heat network operators the same powers as equivalent utilities. As a result, the areas proposed to be included in the legislation are:
- **Permitted Development:** Statutory utilities control and develop large areas of physical infrastructure. To avoid having to apply for planning permission for each extra extension of a network, many statutory utilities are given the right to develop some parts of their infrastructure without planning permission. This regulation proposes to give heat networks the same ability to develop parts of their infrastructure without planning permission.
 - **Street works:** Heat networks will have equivalent statutory rights to excavate a roadway as other utilities. This means they can apply for general Local Authority (LA) permits rather than licenses for individual excavations.
 - **Wayleaves and access rights:** Heat networks will have the right to compulsorily purchase easement rights across private land. Permanent access rights to the land can be registered at the Land Registry Applications, if landowners do not accept the price offered then the compensation level is determined by the Land Tribunal.
 - **Linear obstacle rights:** Heat networks will be granted rights to ensure that heat networks can request access over land owned by statutory undertakers (e.g. network rail or the canals and rivers trust)³¹.
 - **Rights to lay pipes under highways:** Classifying licensed heat networks as entities with ability to lay and maintain pipes beneath any roadway (equivalent to water and gas utilities).

5. Description of options

40. There are four options to be assessed in this IA, against the counterfactual. Each option in the IA is described at a Great Britain wide level:³²
1. **Counterfactual (Do Nothing):** continuation of existing market arrangements.
 2. **Option 1 (General Authorisation):** Every heat network is authorised at the heat network level, meaning that individual heat networks must be authorised. The authorisation regime covers consumer protection measures.
 3. **Option 2 (General Licensing):** Every heat network supplier must be licensed to operate in the market. The licence covers consumer protection measures with more stringent requirements on reporting than in authorisation and allows the supplier to apply for rights and powers.
 4. **Option 3 (Hybrid):** Every heat network is authorised at the heat network level as in option 1. Heat network suppliers above a certain size threshold are required to be licensed in order to operate. The licence in this option is equivalent to the one in Option 2, which has more stringent requirements on reporting related to consumer protection measures.

³¹ Policy development of linear obstacle rights is nascent and it has therefore not been appraised within this impact assessment.

³² Discussions continue with the Scottish Government to ensure that our regulatory models are aligned.

5. **Option 4 (Authorisation Plus):** Every heat network is authorised at the heat network level as in option 1. Heat network suppliers who desire rights and powers can apply for them via a licence application. This licence is more light touch to the one in option 2. **This is the preferred option.**

41. Table 1 below sets out an overview of each of the options and how they compare. The first-row states at what 'level' the market will be regulated, either individual heat networks or at the supplier level. The coloured boxes next to 'regulation component' indicate whether the particular component of the policy objective (see section 4) is covered under the regulatory model. Red indicates that the specific component is not covered under the regulation, amber indicates that the component is covered for part of the market, and green indicates that the regulatory component covers all of the market.

Table 1 (Outline of regulatory models):

		Options				
		Counterfactual	Option 1 (Minimum Option)	Option 2	Option 3	Option 4 (Preferred)
Regulation Level		N/A	Heat Network	Supplier	Heat networks level for consumer protections and supplier level for those required to get a licence.	Heat networks level for consumer protections and supplier level for licence.
Regulation Component	a) Regulator Specified	Red	Green	Green	Green	Green
	b) Defining Consumer Protection	Red	Green	Green	Green	Green
	c) Defining Rights and powers	Red	Red	Green	Amber	Amber

42. The only component of this regulation which goes beyond the CMA's recommendations is the inclusion of rights and powers. However, we do not consider this to constitute gold-plating insofar as the rights and powers component will reduce the current burden on heat networks related to the activities it covers.

43. Each of the options are described in more detail below, whilst section 7 provides an overview of the costs and benefits of each regulatory option as compared to the counterfactual.

Counterfactual (Do Nothing):

44. The counterfactual option against which each of the options are compared is a continuation of existing market arrangements. As described previously, the heat networks market currently has limited self-regulation and industry standards.

45. A continuation, or indeed an expansion, of self-regulatory arrangements has not been deemed to be a viable option to be included within this options appraisal. In the CMA's final report on their market study into domestic heat networks, the CMA recommended that government should put in place a statutory regime whereby there is a sector regulator with the power to regulate the heat networks

sector with regards to price, quality of service and compliance with minimum technical standards.³³ This is a recommendation we agree with.

46. While there are a number of ongoing and proposed voluntary initiatives, which have the potential to improve outcomes for heat consumers, these are currently insufficient for providing consumer protections (as outlined in section 2)³⁴ and the CMA concluded that regulation is required. Should insufficient progress be made in implementing their recommendations, the CMA could still launch a market investigation and use its order making powers to remedy some of the concerns directly.

Option 1 (General Authorisation):

47. Under Option 1 every heat network has to be authorised in order to operate in the market. Heat networks are authorised at the heat network level. It is expected that approximately 13,000³⁵ heat networks will have to be authorised in this model.

48. The authorisation regime defines consumer protection measures that heat networks must adhere to. Therefore, this option responds to the CMA's recommendations on addressing consumer detriment. This option does not therefore address any other market failures in the heat networks market and is the 'do minimum' option.

Option 2 (General Licensing):

49. In Option 2 every supplier of a heat network must be licensed in order to operate in the market. The licence would apply to roughly 2,300³⁶ suppliers of heat networks.

50. As in Option 1, the licence defines consumer protection measures. However, under the licence in Option 2 the consumer protection requirements are more stringent than under authorisation to ensure a higher level of consumer protection. The decision whether to grant a supplier this licence will depend upon the supplier's ability to undertake the consumer protection measures as well as their financial holdings. Under this licence there are also more stringent requirements on reporting against consumer protection measures compared to authorisation.

51. The licence will also allow suppliers to apply for rights and powers, thereby offering them the same rights as other utilities providers. This option therefore goes beyond minimum implementation of the CMA's recommendations as it goes further to address the market failures in the heat networks market. However, this option may prove to be overly burdensome, as it requires every supplier in the market to apply for a licence regardless of their size.

Option 3 (Hybrid):

52. In Option 3 every heat network is authorised as in Option 1. Under this option, heat network suppliers above a certain size threshold of number of consumers require a licence in order to operate in the market. The licence in this option is the same as that in Option 2, which has greater requirements in relation to consumer protections, therefore it is expected that the alleviation of consumer detriment will be similar to Option 2. The threshold level above which a licence is obligatory is for suppliers that supply at least 2,000 consumers with heat.

53. This option also goes beyond the CMA's recommendations as it offers heat networks the ability to apply for rights and powers should they desire them. However, this option although less burdensome than Option 2, would be more burdensome than Option 4 due to its stronger consumer protections, and is therefore not preferred.

³³ CMA Heat Networks Market Study (2018) https://assets.publishing.service.gov.uk/media/5b55965740f0b6338218d6a4/heat_networks_final_report.pdf

³⁴ Without government intervention, the inequity with other statutory utilities will continue.

³⁵ This number is derived and scaled from the Experimental Statistics database. The scaling up process is explained in section 6. <https://www.gov.uk/government/publications/energy-trends-march-2018-special-feature-article-experimental-statistics-on-heat-networks>

³⁶ This number is derived from the Experimental Statistics database. <https://www.gov.uk/government/publications/energy-trends-march-2018-special-feature-article-experimental-statistics-on-heat-networks>.

Option 4 (Authorisation Plus):

54. In Option 4 every heat network is authorised as in Option 1. Under this option, heat network suppliers that want rights and powers can apply for a licence to get them. This licence is more light touch than the licence in Option 2, as it does not stipulate further consumer protection measures³⁷, but only relate to rights and powers. The decision whether to grant the licence or not will be based primarily on the financial holdings of the supplier. It is assumed under this option that around 200 suppliers³⁸ would be likely to apply for a licence in this model.
55. This option therefore also goes beyond the CMA's recommendations as it offers heat networks the ability to apply for rights and powers should they want them³⁹. This is the **preferred option** as it goes furthest to addressing all the market failures in the least burdensome manner.

6. Methodology

56. This IA uses a Standard Cost Model (SCM) approach to provide a framework methodology for measuring administrative costs. For each activity a 'price' and 'quantity' component need to be collected to determine the total activity cost:
- **Price:** this component is formed of a tariff (hourly cost of activity) and time (hours required to complete the activity).
 - **Quantity:** this component is formed of population (total of those impacted) and frequency (how many times a year they are impacted).
57. Thus, the total cost of an activity is given by:
- Activity cost = price x quantity = (tariff x time) x (population x frequency)
58. The quantification in this consultation stage IA of the impact of the proposed legislation, pertains almost exclusively to the administrative costs associated with the different options put forward, for both government and industry. As such, the wider social benefits of the future market framework have not been quantified in this IA for several reasons. Firstly, since much of the data that is needed to quantify these impacts is not currently available (e.g. benefits of price regulation). Furthermore, some of the impacts described in this IA are indirect and of the second order (e.g. impacts on market certainty) which would not be proportional to quantify.
59. Finally, the policy proposals in the consultation are very broad, as the consultation responses will be used to develop more detailed policy. Therefore, it is difficult to appraise quantitatively the impact of the regulation as many of the specific requirements, for example on pricing, are at an early stage of development. There is going to be a second consultation to further refine the policy and analysis, ahead of the final-stage IA being drafted. At this point the policy will be more developed and it will be possible to ask direct questions in the second-stage consultation to fill outstanding evidence gaps. As such, the consultation process will be used to develop the necessary evidence base to quantify the final stage IA in as much detail as theoretically possible. Where evidence may not be available from either of the consultations, we will consider procuring research projects to fill any evidence gaps.
60. Furthermore, this IA has limited its scope to only include the current stock of heat networks that have notified to the OPSS in 2014. It is expected that this regulation will have positive impacts on market growth. However, these have not been considered as this would go beyond the scope of what is appropriate and proportionate for this consultation stage IA. However, it is expected that this regulation will form an important part of the UK government's support of the heat networks market

³⁷ These consumer protections are covered by the authorisation process.

³⁸ This number is derived from the Experimental Statistics database. <https://www.gov.uk/government/publications/energy-trends-march-2018-special-feature-article-experimental-statistics-on-heat-networks>.

³⁹ As outlined in section 5, this option should also not constitute 'gold-plating'.

and thus allowing it to grow. The final-stage IA which will follow on from this, will include estimates of the anticipated market growth due to the regulation.

61. The consultation also considers policy on both the regulation of decarbonisation of heat networks and of 'Step-In Arrangements.' This IA does not appraise the impact of these policies due to the nascency of the associated policy development. If future regulation includes specific proposals on either of the aforementioned areas, analysis will be conducted to determine their impact.
62. Furthermore, as this is a first-stage consultation, with nascent policy development, no implementation or monitoring and evaluation plans have been included in either the consultation or this IA.

Evidence Sources

63. The data on the number and size of heat networks comes from the Heat Metering and Billing Regulations (2014) dataset. From 2014 all heat networks, both domestic, non-domestic and mixed, were required to notify the Office for Product Safety and Standards (OPSS) of their existence. over 18,000 notifications were received. Quality assurance was carried out on this database in 2017, which created a smaller dataset of approximately 14,000⁴⁰. The analysis in this IA uses the smaller dataset, to ensure the quality of the information. It has then been scaled up as it is assumed that the total number of heat networks notified to OPSS equals the total market size of heat networks in the UK. This is the most up-to-date dataset available on heat networks. The scaled up total number of heat networks in scope is therefore approximately 13,000. Heat networks in scope of this regulation are those with a domestic component, non-domestic only heat networks are excluded.
64. Where possible, comparisons of cost for the regulatory functions in the IA have been drawn from relevant activities across government. Particular areas for comparison are the work of the Office for Product Safety and Standards (OPSS) in enforcing the Heat Metering and Billing Regulations (2014) and Ofgem given the nature of the markets they regulate. The Heat Metering and Billing Regulations (2014) required each heat network to notify their existence to the OPSS to collect data. The costs of undertaking this work has been compared to the regulatory costs of Ofgem where they will also be collecting data on heat networks. Other costs in the IA such as wage levels have also been compared to those used in the IA for the Heat Metering and Billing Regulations. For comparisons with Ofgem, we have mapped their assumed costs for regulatory activities such as compliance, enforcement and monitoring, on to the heat networks market, using the number of regulated entities in the different markets to scale the numbers. This is the latest available data we could gather. The heat network market is unique however in consisting of large amounts of relatively small and diverse actors making comparison difficult with other sectors. Gas and electricity markets, in comparison, contain roughly 70 regulated entities compared to 13,000 heat networks across 2,300 suppliers. Actual cost data for regulating heat networks won't become available by the final-stage IA as there is no direct comparator, however estimates will be refined as the policy becomes more developed.
65. For many of the activities to be carried out by either the regulator or the heat network operators, there is no direct comparison to base estimates on. Where this is the case, we have relied largely on assumptions agreed with colleagues to determine appropriate inputs to the Standard Cost Model, namely regarding the length of time to undertake activities. This is particularly relevant for the heat network operators' costs. These estimates will be refined as we build the evidence base up ahead of the final stage IA.

7. Costs and Benefits

⁴⁰ BEIS Energy trends, special feature article 'Experimental statistics on heat networks' (2018): <https://www.gov.uk/government/publications/energy-trends-march-2018-special-feature-article-experimental-statistics-on-heat-networks>.

66. This section outlines the costs and benefits associated with this regulation against the counterfactual scenario (Option 0: 'Do Nothing'), which is a continuation of existing market arrangements. Due to the extensive nature of the impacts of this IA and the different options considered, Annex A provides a detailed breakdown of the different options and their impacts. The options are compared by considering the extent to which they respond to the market failures outlined in Section 3 and the overall costs and benefits of the options. This section will first outline the overall results for each of the four options, before the benefits and costs are discussed in slightly more detail.

Overall Results:

67. The overall quantified impacts of each of the options are presented in Table 2 and Figure 1 below. The table presents the discounted Social Net Present Value (SNPV) over the 10-year appraisal period, including rights and powers impacts for Options 2, 3 and 4, as well as the impact of the counterfactual⁴¹.

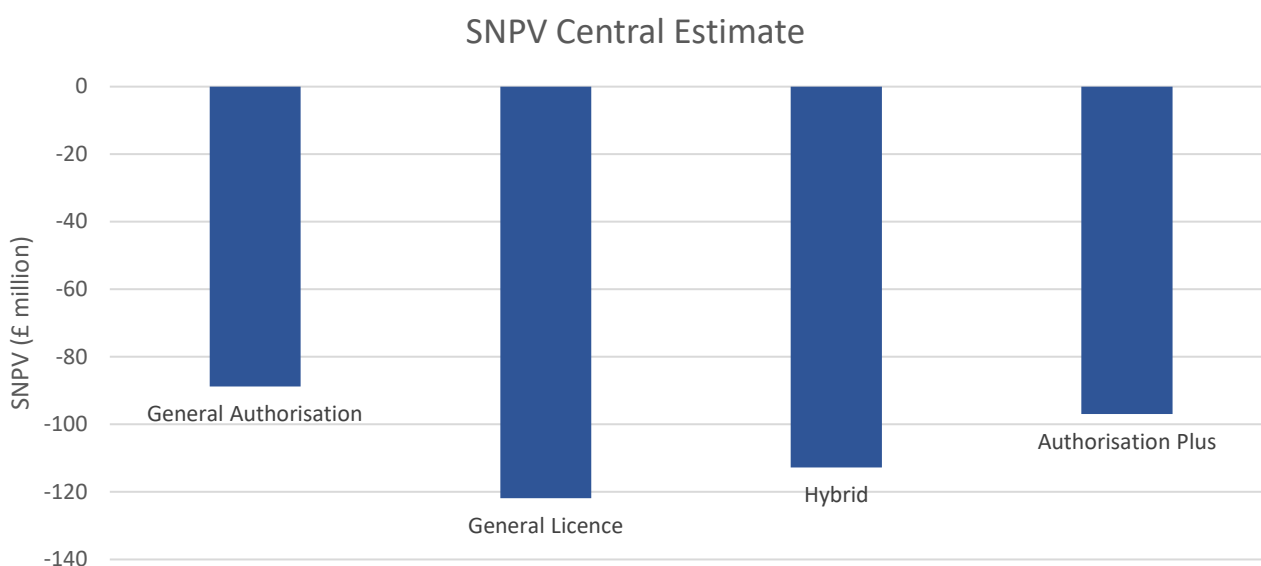
68. Whilst the quantified figures appear to indicate that the regulation will result in a large net present cost to society, there are significant unquantified benefits associated with the regulation. This will be described in more detail in this section. Furthermore, as described previously, there is also a large amount of uncertainty in the numbers, in large part due to this IA supporting a first-stage consultation. As the policy develops, and in response to this consultation, the evidence base will also develop and the numbers included in the analysis will be refined.

Table 2 (SNPV of the options considered):

	Total SNPV (£) over 10 year appraisal period
Option 1 (General Authorisation)	-88,700,000
Option 2 (General Licence)	-121,900,000
Option 3 (Hybrid)	-112,800,000
Option 4 (Authorisation Plus)	-97,000,000

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

Figure 1 (SNPV of the options considered):



Benefits:

⁴¹ Section 8 outlines the sensitivity analysis which has been conducted on these impacts to determine to which assumptions is the analysis most sensitive to changing values.

69. The four options accrue various benefits against the counterfactual. All of the options deliver social benefits from alleviating consumer detriment in the heat networks market. Only options 2, 3 and 4 also accrue the wider benefits anticipated from rights and powers (as these are the only options with access to rights and powers).
70. The benefits expected as a result of this proposed regulation are outlined in Table 3 and below. Annex A provides a more detailed outline of these benefits in relation to each of the options appraised. Broadly, the benefits of the regulation relate primarily to either consumer protection, or rights and powers, as well as indirect benefits in the market.

Table 3 (Overview of option benefits):

Benefit Type	Benefit	Option 1	Option 2	Option 3	Option 4
Pricing	Lower consumer price				
Quality of service benefits	Information transparency				
	Compensation benefit				
	Identification of vulnerable consumer				
Technical standards	Replacement cost				
	Health benefit				
Other direct benefits	Step-in arrangements				
Indirect benefits	Supply side impacts				
	Demand side impacts				
Rights and powers	Street Works				
	Easements				
	Permitted Development				
Additional benefits	Consumer detriment alleviation				
	Market certainty				

71. The quantification of the benefits of each of the four regulatory models in this IA pertains exclusively to the administrative costs associated with rights and powers. As described in Section 6, the consumer protection benefits, and wider social benefits related to rights and powers are not quantified at this stage.

Quantitative Benefits:

72. As described in the previous paragraph, the quantitative benefits considered in this analysis relate exclusively to the reduction in administrative costs of rights and powers in each of Options 2, 3 and 4. The size of this benefit is relatively small compared to the costs of the options to be described later on in this section, and compared to the expected size of the qualitative benefits of the four options.

Qualitative Benefits:

73. The qualitative benefits in this analysis cover the benefits of increased consumer protection requirements; the wider benefits of rights and powers as well as indirect benefits in the market due to there being a regulator. These benefits have not been quantified due to the theoretical difficulty in quantifying certain factors and the lack of available data.

Consumer Protection:

74. Consumer protection benefits stem directly from the measures to alleviate consumer detriment in the market. Each are described in turn below:

- **Pricing:** the regulation will introduce mandatory price transparency by heat networks, and the ability for the regulator to investigate cases where prices are deemed too high. Where these

prices are unfair, the regulator will be able to take enforcement action to reduce them. Consumers will realise a benefit in certain circumstances due to fairer pricing in the market.

- **Quality of service:** the regulation will set out a number of quality of service standards for heat network operators. These will ensure that heat networks provide heat appropriately, as well as ensuring better arrangements for complaints handling, billing processing and information transparency. These standards will lead to a range of benefits such as quicker redress; and a reduction in hassle cost from making complaints or getting information about the heat network.
- **Technical standards:** the regulator will have powers to enforce technical standards, which will mean operators better construct and maintain their networks, which should reduce costs for repair and maintenance works. For consumers, this will ensure less frequency and length of outages and an optimal level of heating.
- **Step-in arrangements:** the regulator will be able to step-in when heat networks go bankrupt, ensuring a continuation of service.

75. Whilst unquantified consumer protection benefits will be realised in each of the four options, they may be slightly higher in Options 2 and 3. The licensing regime put forward in each of these options has increased requirements for reporting on consumer protections, than under general authorisation in either Option 1 and 4.

Rights and powers:

76. The most substantial unquantified additional benefit in the IA due to rights and powers stems from the reduced investment risk due to their existence, and the impact this may have on the market. These powers will bring heat networks into line with other utilities companies, which may have a positive impact on investment in the market. As a result, more heat networks may be built and extended, and pre-existing heat networks can be better maintained to deliver an appropriate quality of service.

77. The benefits due to rights and powers will naturally only be realised in Options 2, 3 and 4. Option 1 does not define rights and powers for heat networks.

Indirect Benefits:

78. There will also be wider indirect benefits in the heat networks market due to the regulation. The presence of a regulator will provide certainty to potential investors, whilst consumer protections will remove consumer resistance to heat networks. This will ensure more heat networks are built and extended. This will have important societal benefits as heat networks deliver low carbon energy efficiently.

79. These benefits will be realised in each of the options.

Costs:

80. The four options will incur a range of costs, and these relate largely to the administrative costs associated with the proposed regulatory models. As described in the methodology section, the policy development for many proposals in the consultation is at an early stage, making the quantification of the costs for heat network operators of meeting any requirements - around pricing or technical standards for example - very difficult, notwithstanding the lack of data currently available. The quantified administrative costs are described below.

Quantitative Costs:

81. The four options accrue costs broadly to two sets of actors, the regulator and heat network operators⁴². These costs are outlined in more detail for each of the options in Annex A.
82. The regulator incurs set-up costs as well as business-as-usual running costs. These costs largely depend on the regulatory model, with more intensive regulatory models (general licensing) being more costly than less intensive regulatory models (general authorisation).
- 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 to house the information. It is assumed that these costs take place in the first year of the appraisal period.
 - Business-as-usual costs: This will involve the running of the regulatory regime. The costs to the regulator will relate primarily to: compliance, audit, monitoring the market and enforcement. It is assumed that these costs begin in the second year of the appraisal period.
83. The set-up costs were determined by looking at the costs involved in different activities across government. Regarding setting up the regulatory framework, the FTE numbers were compared to the size of the team working on the Future Retail Market within BEIS/ Ofgem. This has been determined an appropriate comparison as the team is also working on something relatively novel for Ofgem. There are also consultancy fees included within these costs, again the levels of these have been determined in comparison with similar activities in Ofgem.
84. As described in the methodology section, the BAU costs have been determined in comparison to the extent of the resource required to undertake the same functions Ofgem carries out in gas and electricity markets. The costs also include consultancy fees, as it is assumed that consultancies are used to carry out some of the functions. For example, we have extrapolated anticipated compliance case numbers and resource requirements from Ofgem's experience in the gas and electricity market, similarly we have based audit activity on that undertaken to monitor governments renewable energy schemes.
85. The business-as-usual costs to the regulator under each of the options is assumed to stay level across the appraisal period. In reality, one would assume that the costs may be higher during the first years of the regime as industry adjusts to it, and then reduce over time. In this analysis we do not have a sufficiently well-developed idea of how the regime will operate to incorporate a more dynamic element to the regulator's costs. We will endeavour to work this out by the final-stage IA, but will depend on whether policy is sufficiently developed.
86. Heat network operators also incur costs from business-as-usual activities of being regulated. Heat network operators will incur the cost of applying to be under the regulatory regime. As with costs to the regulator, the more intensive the regulatory regime, the higher the cost.
- Application costs: the costs of applying to be under the regulatory regime.
 - Compliance and familiarisation costs: the cost of complying with the regulation and familiarising with its requirements.
 - Complaints handling cost: as consumer protections will make complaining easier, it is likely more consumers will complain which will impose an additional cost on heat network operators as they have to deal with the complaints. This cost is indirect but will still be monetised.
87. Options 3 and 4, impose an additional cost on both the regulator and heat network operators, by including an additional licence to be obtained. This will have to be regulated in addition to the baseline regulatory model, and heat network suppliers will have to apply for the licence. Table 4 below sets out the total costs of each option by component.

⁴² This regulation will also impose a social cost in terms of more streets being disrupted by works. However, this will be offset by more efficient street works. This impact has not been quantified and why will be more fully outlined in Annex A.

Table 4 (Overview of total option costs over the 10-year appraisal period):

	Option 1	Option 2	Option 3	Option 4
Regulator	61,200,000	72,200,000	67,400,000	65,000,000
Heat network operator	28,700,000	51,300,000	47,000,000	33,600,000
Total	89,900,000	123,600,000	114,500,000	98,600,000

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

Preferred Option

88. Overall the preferred option is Option 4. The extent to which the options respond to the CMA's recommendations, the market failures in the market and the overall costs and benefits were considered when determining the preferred option.
89. Each of the options considered in this IA respond to the CMA's recommendation for the market to be regulated formally. Options 2, 3 and 4 go further than this to include rights and powers which address some of the market failures described in section 3. Since Option 1 doesn't go as far to address market failures, the other options are therefore seen as preferable.
90. Options 2, 3 and 4 have largely the same types of benefits accrued, albeit to slightly varying degrees. It is assumed that the licensing regime in Options 2 and 3 will have more stringent reporting requirements on consumer protection measures than under the 'Authorisation Plus' regime (Option 4). Due to the stricter reporting requirements, the consumer protection benefits of Options 2 and 3 may be slightly greater than under Option 4. The associated costs of these two options are also greater. However, the actual consumer protection provisions that will be in place in each of the options will remain the same, and resultantly each of the options implements the CMA's recommendations on consumer protection. It is not expected that the increased consumer protection benefits of Options 2 and 3 would outweigh the additional costs of these options, so Option 4 is therefore the preferred option.

8. Wider impacts

Equalities assessment:

91. Due to the nature of heat networks; being mainly an urban technology and appropriate for multi-tenancy buildings, heat networks tend to serve more vulnerable, urban and elderly consumers⁴³. As outlined in the CMA's market study, some heat networks do not deliver this quality of service with inconsistent and extreme heating (under- or over- heating). The HNCS⁴⁴ outlined a number of key findings related to the quality of service for heat network consumers, such as 39% of consumers on a heat network experienced overheating, compared to 22% not on a heat network.
92. This regulation (in particular, consumer protections and specifying technical standards), sets out to alleviate consumer detriment issues for all those served by heat networks. However, this alleviation will have a disproportionate benefit to those most in need, by ensuring a good quality of service is consistently delivered.

Small and Micro Business Assessment (SaMBA):

⁴³ Heat Networks Consumer Survey (2017)

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

⁴⁴ Ibid

93. The make-up of the heat networks market is variable. There are roughly 13,000 heat networks that are in scope of the regulation, which are supplied by roughly 2,300 suppliers⁴⁵. There is a very uneven distribution regarding the amount of heat networks that each supplier owns, and how many consumers are served by each heat network.
94. Many of the individual heat networks would fall into the classification of a small or micro business. On the other hand, it is expected that many suppliers of heat networks would be larger than the small business threshold level of 49 employees or less. The data collected through the Heat Metering and Billing Regulations (2014) does not cover the size of heat network operators, and therefore it is impossible to be exact in this estimation.
95. The preferred option put forward in this IA and accompanying consultation, has different requirements for individual heat networks, and for suppliers of heat networks. Under the preferred regulatory model, individual heat networks must be authorised. This requirement is assumed to take 1 hour per heat network. Under the preferred option, there is no requirement for suppliers to be licensed, which is a more burdensome activity for business. It is assumed that it will take 1 FTE, 3 working days to submit a licence application, compared to 1 hour for an individual heat network to be authorised. Only suppliers who desire rights and powers will apply for a licence. It has been assumed to be more likely for large suppliers to apply to be licensed. Potential fees for applying to be licensed or authorised are not yet available, as the policies have not yet been worked up in enough detail.
96. Therefore, for this IA we have not included an exemption from regulation for small and micro businesses, as we do not expect there to be an undue burden on them. However, the consultation is asking for views on whether there should be a de minimis threshold for very small heat networks to be exempted from regulation. If there are favourable responses to this question, future analysis will consider the impact of the de minimis threshold on the costs to small businesses.

9. Sensitivity analysis

97. There is considerable uncertainty associated with many of the assumptions and inputs used in this assessment. While some of this uncertainty will be mitigated through evidence collected during the consultation, we illustrate the effects on the social net present value of varying the assumptions which have the most influence on the overall outputs.
98. There is much uncertainty in these costs for two reasons. First, due to the inherent uncertainty in regulating a new market, for which it is difficult to find a highly comparable market. Secondly, the detailed scope of the regulation will be developed partly in response to the consultation, the scope of the regulation will impact the associated costs.
99. Table 6 illustrates the assumptions considered in the sensitivity analysis, and how they have been varied. Given that Option 4 represents the preferred option, the impacts of varying the assumptions are considered only for Option 4. These assumptions have been tested as they have the most impact on the SNPV of Option 4 and reflect the areas of greatest uncertainty within the analysis. These assumptions are⁴⁶:
- Wage level senior and junior: Two wage levels have been assumed for heat network operators and the regulator, senior and junior. These have been scaled by 50% for the high and low scenario respectively.
 - Overheads (regulator/ heat network operator) scale: In addition to the wage costs for the regulator and heat network operators, they will also incur overhead costs. The regulator overhead costs are scaled by 50% for the low and high scenarios, whilst for the heat network

⁴⁵ 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>

⁴⁶ For a full outline of the assumptions and how they are used, please refer to Annex A.

operator the costs are assumed to be 50% of the regulator costs and then scaled by 50% for this sensitivity analysis.

- Hours spent on task (regulator/ heat network operator) scale: This analysis uses a Standard Cost Model approach, where the hours spent on a task is a key determinant of costs. As such the hours spent for the regulator and heat networks operators on completing tasks has been scaled by 50% for the high and low scenario.
- Number of heat networks: As noted above, there is uncertainty in the number of heat networks in the UK, therefore this assumption has been scaled by 4,000 from the 18,000 used for the low and high scenario.
- Threshold options 3/4: The number of heat networks that will be licenced in each of these options is assumptions driven. For the high and low scenario, this threshold is changed by 50% respectively for each of the options. The threshold chosen is different in each of options 3 and 4.

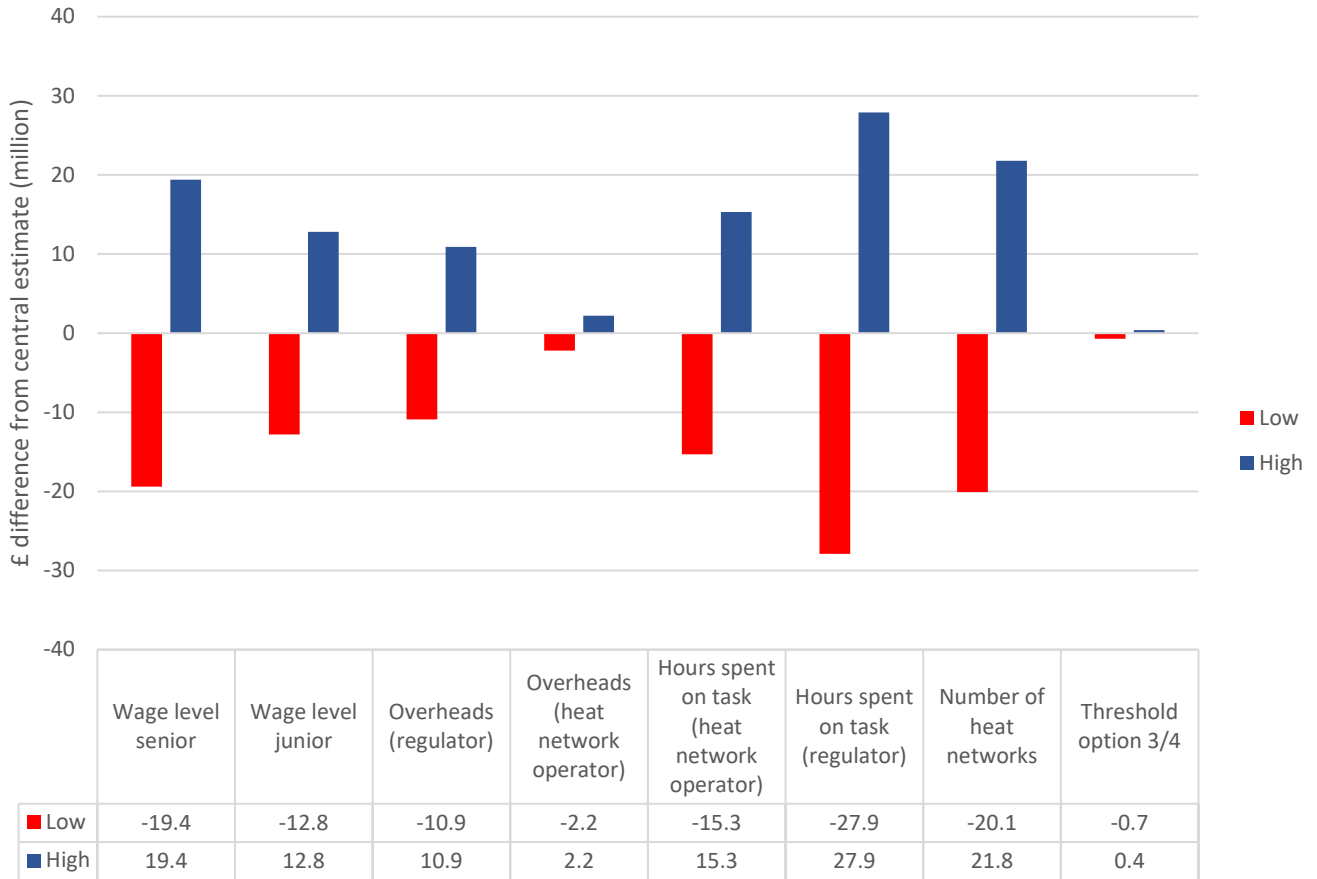
100. As is apparent from the consultation that this IA supports, there is particularly considerable uncertainty regarding the extent of the regulatory regime to be developed for heat networks. This would have a follow-on impact on the costs for the regulator in this analysis. For example, the extent of compliance, audit or enforcement activities would depend on the exact nature of the regulatory requirements and would impact the volume of regulator staff required. The sensitivity analysis relating to the number of FTE staff members in the regulator reflects this important uncertainty.

Table 5 (Assumptions to be considered in sensitivity analysis):

Sensitivity Analysis	Change
Wage level senior	+50%
Wage level junior	+50%
Overheads (regulator)	+50%
Overheads (heat network operator)	+50%
Hours spent on task (heat network operator)	+50%
Hours spent on task (regulator)	+50%
Number of heat networks	+4000
Threshold option 3/4	Half/ double of threshold supplier
	Half/ double threshold

101. The results of the sensitivity analysis can be seen in the below Figure 2:

Figure 2 (Sensitivity analysis and difference to central estimate of Social NPV):



102. As the largest component of the quantified Social NPV pertains to the costs of the regulator, the Social NPV is highly sensitive to assumptions around regulator costs. In particular, the wages of those undertaking regulator tasks and hours spent on these tasks. These variables will be tested in the consultation.

103. Analysis was undertaken as part of the sensitivity analysis to determine whether there were any ‘switching values,’ i.e. if any of the sensitivity changes run would have no longer made Option 4 the preferred option. The analysis revealed that none of the sensitivities acted as ‘switching values.’ This isn’t surprising as the analysis only focuses on the administrative costs associated with the options. The sensitivity analysis revealed which input assumptions changed the overall costs for each of the options, and by how much. However, none of the assumptions made a certain option relatively more, or less, costly.

10. EANDCB

104. This IA has considered the costs and benefits arising to business as a result of setting up a regulator, defining consumer protections and granting rights and powers. 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. BEIS 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)⁴⁷.

⁴⁷ EANDCB does not consider indirect impacts.

105. All costs to heat network operators within this IA are considered direct. The total direct costs to business of Option 4 (including benefits from rights and powers) are valued at £2.9m per year over the 10-year total appraisal period⁴⁸.
106. Benefits and costs are considered to be indirect if they arise as a 'secondary' impact of the direct changes caused by the policy. Given that all the costs considered in this IA are direct, there are no costs which are considered indirect.
107. Given that all the quantified costs accrued are direct as are the quantified benefits, this results in a total EANDCB of £2.9m⁴⁹. The EANDCB will count towards the Business Impact Target commitment of the Government.

⁴⁸ Discounted to 2017 and in 2016 prices.

⁴⁹ Ibid

Annex A

- A1. Annex A will cover the costs and benefits associated with this IA in detail, whilst section 7 provides an outline of the impacts of the proposed regulation relative to the counterfactual. This section will first cover the costs in the counterfactual, before covering the expected impacts of the four regulatory models in comparison with the counterfactual.
- A2. The costs of the regulation broadly cover the administrative costs to the regulator of operating and, for heat networks, with complying with the regulation. It is expected that the costs will be the same in type, across the regulatory regimes but will differ in size. Therefore, the types of costs are outlined in Option 1, while for the sake of brevity, only the different sizes will be considered in the remaining options.
- A3. As with the costs, it is expected that the same type of benefits will arise from consumer protections and having a regulator across the four options. Since Option 1 does not contain rights and powers, it will not get the benefits from them although they will be the same in type across Options 2, 3 and 4. Therefore, the general benefits of this regime (from the regulator and consumer protections) will be outlined in Option 1 only, but will pertain to all the options. The benefits of rights and powers will be outlined in Option 2 only, but will pertain to Options 3 and 4 also.
- A4. As outlined in section 6, where possible, assumptions have been derived from comparable markets and where not possible, they have been derived in conjunction with colleagues.

A.0. Counterfactual:

- A5. The counterfactual is the continuation of existing voluntary market arrangements, without government intervention. 51 heat networks are registered to the Heat Trust⁵⁰. As a simplifying assumption, it is assumed that although more heat networks may be on voluntary arrangements, besides the Heat Trust, 51 heat networks equal the total on voluntary arrangements. This assumption has been made due to a lack of available data on this aspect.

Cost of voluntary arrangements (regulating body):

- A6. The costs of setting up voluntary arrangements have not been included as it has been assumed they are sunk and thus irrecoverable. However, the business-as-usual costs of voluntary regulatory arrangements are outlined below.
- A7. The business-as-usual costs of the regulating body have been calculated using a Standard Cost Model approach. It has been assumed that there are two senior managers⁵¹ working to manage the voluntary regulatory arrangements in the heat networks market. It is assumed that these two employees cover a range of activities, including, but not limited to, collating yearly reports to monitoring the market and updating the regulatory regime.
- A8. The two senior managers are hired for a full year period at a wage cost of approximately £23 per hour⁵². Assuming that the cost of employing these employees is slightly higher than their wages, it has been assumed that this wage figure should be scaled to include overheads, such as building costs and IT costs⁵³. Therefore, in addition to the wage cost, approximately £8 per hour is included to cover overhead costs.

Overview of regulator costs:

⁵⁰ Heat Trust annual report (2018) https://heattrust.org/images/docs/Heat-Trust-Annual-Report-Year-2-Folder_Heat-Trust-Annual-Report-Year-2_Final-Digital-v1.pdf

⁵¹ This grade level has been assumed in line with the 2014 Heat Metering and Billing Impact Assessment and as it has been assumed that the person undertaking these tasks must be of a sufficient level. The hourly figure this gives is tested in the sensitivity analysis.

⁵² This IA uses the Office of National Statistics, Annual Survey of Hours & Earnings (ASHE) 2018, Tables 14.5. The median average figure has been used as it is less skewed by a relatively small number of high earners.
<https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/earningsandworkinghours/datasets/occupation4digitsoc2010ashtable14>

⁵³ This overhead figure has been calculated based on the estimated overhead figures of Ofgem and the approximate number of FTE this overhead figure covers.

A9. Given that the number of heat networks on voluntary arrangements is limited, this means that the overall costs of the voluntary arrangements are intrinsically limited. Table A1 below outlines the total discounted cost of voluntary arrangements over the 10-year appraisal period.

Table A1 (Overall voluntary arrangement regulator costs):

	Total (£) over 10 year appraisal period
Total	1,000,000

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

Heat network operator costs:

A10. Heat networks which are part of a voluntary regime will have to comply with the relevant rules. This is normally assured by reporting on the status of their heat network and their customers. In order to comply with the regulation, the heat network must be familiar with the regime. If the regime is updated, then the heat network will incur a cost from familiarising themselves with changes and disseminating this information. There is also an annual reporting cost incurred by the heat networks.

A11. These costs have been calculated using a Standard Cost Model approach, per heat network. This is outlined in Table A2. It is assumed that it will take one person at senior manager level, 18 hours once a year to comply with and familiarise themselves with the regulation. As with the regulator, it is assumed that the heat network operator will have costs in addition to wages. It has been assumed that these costs are 50% lower than for the regulator, based on best available evidence. Therefore, the total cost per hour of a senior manager is approximately £26.

Table A2 (Compliance and familiarisation cost):

	Standard Cost Model approach
Number of people required	1
Grade level of those required	Senior manager
Cost per grade per hour	£26
Hours spent on the task	18
Times required per year	1
Total annual cost per heat network	£475

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

A12. Heat networks must pay standard costs per customer connection which is a fee of £4.73 per customer connection⁵⁴. As with the costs to the regulator in the counterfactual, the costs to heat networks of being under voluntary arrangements are limited. Table A3 below outlines the total real discounted cost of heat network operators under voluntary arrangements, by component, across the 10-year appraisal period.

Table A3 (Overall voluntary arrangement heat network operator costs):

	Total (£) over 10 year appraisal period
Total	200,000

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

Overview of counterfactual costs:

⁵⁴ Heat Trust, Membership Fees (2018): <https://heattrust.org/membership-fees>. These have not been included in the analysis as they are a transfer from heat networks to the Heat Trust.

A13. The costs of the counterfactual are limited by the number of heat networks on voluntary arrangements. Table A4 shows the total figures for each component of the regulator and heat network operator costs over the 10-year appraisal period⁵⁵.

Table A4 (Total quantified cost of voluntary arrangements):

	Total (£) over 10 year appraisal period
Regulator	1,000,000
Heat network operator	200,000
Total	1,100,000

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

A.1 Option 1 (General Authorisation):

A14. General authorisation is the regulatory regime where all heat networks containing a domestic customer must get authorised.

A.1.1. Costs:

A15. The main costs associated with Option 1 are related to costs of the regulator and the administrative costs to heat network operators of complying with the regime. Both of these costs are calculated using a Standard Cost Model approach. The regulator will incur one-off set up costs from developing a new regulatory regime and the ongoing costs from operating the regime. Heat networks will incur costs from applying to be under the regulatory regime and from complying with its requirements.

Regulator costs:

One-off costs:

A16. The one-off costs of the regulator have been calculated using a Standard Cost Model approach. It is assumed that these one-off costs will occur within the first year of the appraisal period only. The one-off costs include:

- **Database set-up cost:** the regulator will have to set-up a database of all the heat networks who have registered to the regulatory regime.
- **Regulatory framework set-up cost:** the regulator will have to set-up the regulatory framework, including its development and implementation.

A17. It has been assumed that it will take 17.5 people within year 1 of the regulation to undertake these two tasks, based on evidence sources outlined in section 6. It is assumed, as a simplifying assumption, that these people will work at the senior manager grade at a total cost of approximately £30 per person in a year (including wages and overheads).⁵⁶

A18. It is also assumed that, in addition to employees working on these one-off costs, the regulator will employ dedicated consultancies to undertake some of the work on account of their expertise. The consultancy costs are assumed from conversations with Ofgem, in comparison with their other regulatory functions. Table A5 below outlines the total one-off costs.

Table A5 (Total one-off costs):

	Total (£) in year 1
Total	2,000,000

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

⁵⁵ Total costs have been discounted.

⁵⁶ Based on ONS, Annual Survey of Hours & Earnings (ASHE) 2018, Tables 14.5.

<https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/earningsandworkinghours/datasets/occupation4digitsoc2010ashtable14>

Business-as-usual costs:

A19. The business-as-usual costs of the regulator have been calculated using a Standard Cost Model approach. The business-as-usual costs are expected to begin in the second year of the appraisal period, after the regulatory regime has been set-up and remain static for each subsequent year in the appraisal period. The business-as-usual costs include:

- Database team: the regulator will have to manage and update the database on which heat networks are registered.
- Retail compliance: the regulator will have to monitor the market to ensure compliance with the regulation.
- Audit and monitoring: the regulator will monitor reporting and audit heat networks.
- Enforcement cost: the regulator will have to respond to cases of non-compliance and enforce the regulation.
- Regulatory framework: the regulator will have to manage the regulatory framework including updating it when necessary.

A20. It has been assumed that it will take 157 FTE to complete these tasks. The numbers have been determined by comparing the proposed regulation of the heat networks market to similar activities in other markets where relevant as outlined in section 6. It has been assumed that this number of people will be split between two grade levels: senior (as previously outlined in section A.0.) and junior. As a simplifying assumption it has been assumed that 75% of the people required will work at the lower level while the remaining percentage will work at the senior level. The senior manager wage and overhead are £30 as described above. It is assumed that the junior level will have an hourly cost of £15⁵⁷ and the same overhead additional cost of £8 as for senior managers⁵⁸.

A21. In addition to the cost of these employees, it has been assumed that the regulator will hire consultancies to help with the audit/monitoring and enforcement components of the regulator tasks, in order to provide support for more complex cases where needed. Table A6 outlines the business-as-usual costs.

Table A6 (Total business-as-usual costs):

	Total (£) over 10 year appraisal period
Total	59,200,000

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

Overview of regulator costs:

A22. The regulator will incur a number of costs both one-off and ongoing. The total discounted costs of each of these components across the 10-year appraisal period is outlined in Table A7 below.

Table A7 (Regulator costs Option 1):

	Total (£) over 10 year appraisal period
One-off costs	2,000,000
Business-as-usual costs	59,200,000
Total	61,200,000

⁵⁷ This IA uses the Office of National Statistics, Annual Survey of Hours & Earnings (ASHE) 2018, Tables 14.5. The median average figure has been used as it is less skewed by a relatively small number of high earners.

<https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/earningsandworkinghours/datasets/occupation4digitsoc2010ashtable14>

⁵⁸ It is expected that the overheads costs should not differ between the different grade levels of staff.

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

Heat network operator costs:

Unquantified Costs

A23. There are also costs to the heat network operators of complying with the new regulatory requirements which have not been included in the analysis. For example, provisions on pricing or the requirement to meet certain technical standards will have a cost impact on heat network operators that may be substantial depending on the certain circumstance of the heat network. These requirements have not yet been quantified in large part because the exact regulatory requirements are not clear, at this stage. It is not yet clear which technical standards may be required for example.

Authorisation application cost:

A24. Heat networks will have to apply to the regulator for authorised status. It is assumed that this cost will be minimal as there will be minimal informational requirements in the application process. Using a Standard Cost Model approach, it is assumed that per heat network it will take 1 senior manager 2 hours at a cost of £26 per hour to submit an application for authorisation to the regulator⁵⁹. Table A8 outlines this approach.

Table A8 (Authorisation application cost):

	Standard Cost Model approach
Number of people required	1
Grade level of those required	Senior manager
Cost per grade per hour	£26
Hours spent on the task	2
Total cost per heat network	£53

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

A25. Given that this IA considers only the current stock of heat networks and it is assumed, as a simplifying assumption, that all heat networks must register within year 1 of the regulation, the total cost of applications is incurred within the first year of the regulation. The total discounted cost of authorisation applications in year 1 is approximately £600,000.

Compliance and familiarisation cost:

A26. As in the counterfactual, heat networks will incur a yearly cost from complying with the regulation (including reporting) and familiarising themselves with any changes in the regulation and disseminating any necessary information.

A27. This cost has been calculated using a Standard Cost Model approach. The components of this are outlined in Table A9 below. It has been assumed that it will take 16 hours a year to undertake the compliance and familiarisation processes. This will need to be carried out by a senior manager, at a cost of £26 per hour.

Table A9 (Familiarisation and compliance cost):

	Standard Cost Model approach
Number of people required	1
Grade level of those required	Senior manager
Cost per grade per hour	£26
Hours spent on the task	16
Times required per year	1

⁵⁹ It has been assumed that all tasks undertaken by heat network operators will have to be at the senior manager level, given they will require a certain level of seniority. As with the counterfactual, heat network operator overheads will be 50% of regulator overheads.

Total cost per heat network	£423
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Note: these costs have been rounded and therefore may differ from elsewhere in the IA.

Complaints handling:

A28. Heat networks will receive complaints from customers for a range of reasons and will incur a cost from dealing with them. The Heat Networks Consumer Survey⁶⁰ found that 22% of customers had complained, while 8% 'had reason to complain but chose not to' and 2% 'had reason to complain but didn't know who to complain to'. It is assumed therefore, that compared to the counterfactual an additional 10% complaints will come forward due to this regulation, as the regulation serves to make complaining easier. This is a simplifying assumption due to the lack of evidence.

A29. If this 10% figure is scaled for the number of heat networks to be covered in this regulation, then approximately 1,275 new complaints will come forward. While some complaints may be easy to deal with (and therefore cheap), others will be more burdensome (and therefore expensive). £300 has been assumed as a median amount based on best understanding of voluntary arrangements complaints handling cost.

A30. The total discounted cost of additional complaints across, the appraisal period, is outlined in Table A10. This cost is indirect as they will come from the consumer reaction to the proposed policy.

Table A10 (Complaints handling cost):

	Total (£) over 10 year appraisal period
Total	2,500,000

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

Overview of heat network operator costs:

A31. The total discounted costs to heat network operators over the 10-year appraisal period of being under the regulatory regime are outlined in Table A11 below.

Table A11 (Overall heat network operator costs Option 1):

	Total (£) over 10 year appraisal period
Authorisation application cost	600,000
General compliance and familiarisation cost	25,500,000
Complaints handling	2,500,000
Total	28,700,000

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

Overview of Option 1 costs:

A32. Table A12 below, sets out the total quantified costs of Option 1 by regulator and heat network operator component. The total cost is the sum of costs over the 10-year appraisal period which has been discounted.

Table A12 (Total quantified cost of Option 1):

	Total (£) over 10 year appraisal period
Regulator	61,200,000
Heat network operator	28,700,000

⁶⁰ Heat Networks Consumer Survey (2017)

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

Total	89,900,000
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Note: these costs have been rounded and therefore may differ from elsewhere in the IA.

A.1.2. Benefits:

A33. The primary benefit of Option 1 is to consumers in reduced consumer detriment as a result of being on a heat network alleviated by stronger consumer protections. This will relate to the two forms of consumer detriment encountered: on pricing and quality of service. The regulator will also have the power to enforce compliance with technical standards which is likely to ensure the quality of heat networks built.

A34. Furthermore, having a regulator and strong consumer protections, will signal to the market that heat networks are a more stable and less risky investment. This is likely to increase the level of investment in the market, increasing the number of heat networks built (or extended) and resulting in indirect benefits, such as carbon savings and the costs of air quality damage averted, compared to alternative heat supply arrangements had heat networks not been installed.

Pricing benefit:

A35. As outlined in section 2, some heat networks consumers pay higher prices than across comparable heat networks and comparable services. This regulation will set to combat that issue in three ways:

- The regulator will have the power to monitor prices and take enforcement action if they are too high.
- This regulation will increase both the quantity and quality of information, increasing consumer awareness of the price they are paying and how it is derived, potentially leading to challenges to their suppliers.
- The regulator will have the power to enforce technical standards which should mean for future heat networks they are built without price-raising poor standards.

A36. Heat networks vary substantially in form and it is therefore very difficult to determine a 'standard' price that a heat networks customer should be paying and whether a price is too high⁶¹. When prices are high, it is difficult to determine whether this is due to poorly built heat networks or whether heat network operators are extracting rents. Due to these reasons, the impact of reduced prices has not been quantified.

Quality of service benefits:

A37. A key component of this regulation is defining and outlining consumer protections for those on heat networks, in particular outlining the quality of service that is expected of heat networks. The benefits of these quality of service standards are outlined in this section.

Information transparency:

A38. This regulation will mandate transparency in information and increase the quantity and quality of information given to heat network consumers. This is likely to have a triple impact:

- It will reduce the cost of getting information from the heat network operator, for example information on billing or consumer rights.
- If a heat network consumer wants to complain, this regulation will allow for easier complaints handling and processing.
- If a consumer is eligible for compensation, then consumer protections will reduce the hassle costs of applying for and receiving the compensation.

⁶¹ The regulator will be given the power to investigate this on a case-by-case basis.

A39. These impacts will be of benefit to consumers, since they will reduce the amount of time consumers spend trying to get information or complaining (i.e. consumers will therefore not have to take time off work to lodge complaints).

A40. This impact has not been quantified because there is limited data on the cost to consumers of making these complaints and whether, for example, consumers have to take time off work to complain.

Compensation benefit:

A41. Due to a) poor understanding of compensation eligibility b) poor understanding of the process of how to get compensation and c) a difficult compensation process, many consumers who would otherwise be eligible for compensation do not receive it. Consumer protections will ensure a clear, easy and robust compensation policy which will allow consumers who are eligible to receive the compensation they were due⁶².

A42. This impact has not been quantified because we do not have data on the average compensation level for those receiving compensation/ time taken to get it.

Identification of vulnerable consumers:

A43. Part of the regulator's duties will be to identify vulnerable consumers and ensure they are well serviced in the case of an issue arising. This may take the form of rapidly supplying an alternate heat supply if there is a heat outage or quicker provisions of compensation. The benefit of this will fall on those vulnerable consumers in need of extra care, as well as others in the building concerned.

A44. While the HNCS outlines the proportion of heat network consumers that are vulnerable (40%)⁶³, this impact has not been quantified because there is limited data on the potential benefit of these quicker provisions.

Technical standards benefit:

Replacement cost:

A45. A primary benefit of technical standards is that by ensuring proper technical specification in the construction of heat networks, those who operate the heat network will have to do less to maintain and repair the network. This will reduce the costs for operators by reducing hours spent by maintenance workers undertaking repairs, whilst reducing capital outlays for replacement parts. This benefit is therefore a cost saving for heat network operators.

A46. This impact has not been quantified. This is because there is limited data available on how costly these types of works are, including how long they take and what workforce is required.

Health benefit:

A47. Consumers on heat networks often suffer from both inconsistent and non-optimal level of heating (overheating). This is likely to have an impact on heat network consumers' health outcomes. This impact is especially pertinent because there is a correlation between those on heat networks and those who are vulnerable (as outlined in Section 3).

A48. The specifying and enforcement of compliance with technical standards will ensure that heat networks are built with a good specification during construction, which will reduce the number of repairs that need to be made and therefore the number of outages.

⁶² It may also have the added benefit of ensuring for those who receive compensation, that they receive a more appropriate (and higher) level of compensation than they otherwise would have received. However, it is expected that this impact will be small, and this benefit has therefore not been quantified as it would be disproportionate to do so.

⁶³ This is outlined in more detail in Section 3.

A49. Additionally, consumer protections on service quality will protect against a poor quality of service, ensuring that operators are quick to fix faults when they do arise and compensate consumers where necessary. These factors should ensure consistent and an optimal level of heating.

A50. The health benefits of consistent and optimal-level heating have not been quantified. While there is information from the HNCS on the proportion of heat network consumers suffering from over- heating and under- heating, this information does not specify the temperature variation in detail. More information therefore needs to be gathered to fully understand the health costs alleviation from this regulation and this goes beyond what is proportionate for this IA.

Other direct benefits:

Step-in arrangements:

A51. The regulation sets out that the regulator will be given the responsibility of being 'stepping-in'. This means that if the heat networks operator fails financially and can no longer run the heat network then the regulator will step in to ensure continued supply.

A52. The benefit of this is that this will ensure continued heat delivery from the heat network, regardless of its financial operating condition. Consumers will therefore not suffer long interruptions in supply due to the insolvency of heat network operators. This will improve consumer outcomes by reducing consumer uncertainty and improving health outcomes.

A53. This impact has not been quantified as there is limited data a) on the number of heat network operators that fail, b) how long this disrupts supply and c) the costs of this disruption.

Indirect benefits:

Supply side impacts:

A54. As outlined in Section 3, the UK's use of self-regulation may lead to lower confidence than under a single regulator. This serves to introduce an avoidable risk for investment, which may reduce both the amount and size of investments, thereby inhibiting market growth.

A55. By specifying a regulator and their powers, this risk will be reduced and will encourage investment into the market, inducing extensions and construction of new heat networks⁶⁴. As heat networks are a clean source of heating, this will have a number of indirect benefits:

- **Energy savings:** Heat networks are a more efficient way of delivering heat than other comparable providers. This means that less energy is required to produce the same amount of heat that would otherwise be needed.
- **Carbon savings:** If heat networks require less energy to produce the same heat, this will result in lower carbon emissions being produced. This will aid the UK's heat decarbonisation goals.
- **Air quality damage costs averted:** If heat networks require less energy to produce the same heat, this will result in less damage done to air quality via pollutants.

A56. The supply side impacts of this regulation have not been quantified for this IA. This is because it is beyond the scope of what is appropriate and proportionate to quantity for a consultation stage IA.

Demand side impacts:

A57. As outlined section 3, the UK's self-regulation leads to uneven consumer protections and disparities in outcomes, between consumers. This may damage the reputation of heat networks among consumers and result in reduced consumer appetite for heat networks by increasing resistance to heat network developments. This will dampen the heat networks market growth.

⁶⁴ This increased certainty in the market may provide a particular boost to international investment, which will not only increase the number of heat networks built and extended, but the cross-pollination of international expertise.

A58. Specifying a single enforcement entity for consumer protections is expected to create parity in outcomes for consumers, across networks. This will improve the reputation heat networks have amongst consumers, which may reduce consumer resistance to heat networks development (or consumer-led demand).

A59. The demand side impact of this regulation has not been quantified. This is because it is beyond the scope of what is appropriate and proportionate to quantify for a consultation stage IA. However, particularly for demand side impacts, it is expected that this may be limited, given consumers' low levels of responsiveness in the energy market. Ofgem's consumer engagement survey⁶⁵ found that in 2018, 32% of consumers compared energy tariffs while 18% switched supplier. Therefore, it would not be proportionate to quantify the demand side impacts of this regulation.

Overview of Option 1 benefits:

A60. Option 1 has a number of benefits accrued due to setting up a regulator and consumer protections. Table A13 below outlines these benefits.

Table A13 (Overview of Option 1 benefits):

Benefit Type	Benefit
Pricing	Lower consumer price
Quality of service benefits	Information transparency
	Compensation benefit
	Identification of vulnerable consumer
Technical standards	Replacement cost
	Health benefit
Other direct benefits	Step-in arrangements
Indirect benefits	Supply side impacts
	Demand side impacts

A.1.3. Option 1 Overview:

A61. Given that the costs of Option 1 are quantified while the benefits are not, it makes it inherently difficult to determine overall impact. The overall discounted quantified costs across the 10-year appraisal period for Option 1 are presented in Table A14 below. This includes the savings made against the counterfactual.

Table A14 (Quantified overview of Option 1):

	Total (£) over 10 year appraisal period
Counterfactual	1,100,000
Option 1	89,900,000
Option 1 (including the counterfactual)	88,700,000

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

A62. However, this NPV does not account for the benefits of this regulation which are likely to be substantial. This is especially true if the market grows, due to this regulation and therefore all the benefits will be incurred, over a larger number of heat networks.

⁶⁵ Ofgem Consumer Engagement Survey (2018)

https://www.ofgem.gov.uk/system/files/docs/2018/10/consumer_engagement_survey_2018_report_0.pdf

A.2. Option 2 (General Licence):

A63. General licensing is the regulatory regime where all heat networks connecting a domestic customer must obtain a licence. This regulatory regime differs slightly from Option 1, as the regulation falls at the supplier level rather than the heat network level and general licensing covers rights and powers, whilst general authorisation does not.

A64. It is expected that the same types of costs will occur between Option 1 and Option 2, but the size of them will differ, given that Option 2 is a more burdensome regulatory process. For the sake of brevity, because the benefits of Option 1 are the same as Option 2 aside from the benefits of rights and powers, only the benefits unique to Option 2 will be outlined.

A.2.1. Costs:

Regulator costs:

One-off costs:

A65. It has been assumed that these one-off costs will take 25 FTE to complete within year 1 of the regulation to undertake these two tasks, based on evidence sources outlined in section 6. It is assumed, as a simplifying assumption, that these people will work at the senior manager grade at a total cost of £30 per hour per person in a year (including wages and overheads).

A66. It is also assumed that in addition to employees working on these one-off costs, the regulator will employ dedicated consultancies to undertake some of the work, to utilise their expertise. Table A15 below outlines the total one-off costs.

Table A15 (Total one-off costs):

	Total (£) in year 1
Total	2,500,000

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

Business-as-usual costs:

A67. It has been assumed that these business-as-usual costs will take 185 people to complete these tasks, based on evidence sources outlined in section 6. The increase in staff compared to the previous option reflects the more substantial regulatory requirements, under a general licensing model. It has again been assumed as a simplifying assumption that 75% of these people will work at the junior grade whilst 25% will work at the senior manager level, at a total cost of £22 and £30 per hour respectively (including wages and overheads).

A68. In addition to the cost of these employees, it has been assumed that the regulator will hire consultancies to help with the audit/monitoring and enforcement components of the regulator tasks, in order to deal with more complex cases. Table A16 outlines the business-as-usual costs.

Table A16 (Total business-as-usual costs):

	Total (£) over 10 year appraisal period
Total	69,800,000

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

Overview of regulator costs:

A69. The total discounted costs of each of these components across the 10-year appraisal period is outlined in Table A17 below.

Table A17 (Regulator costs Option 2):

	Total (£) over 10 year appraisal period
One-off costs	2,500,000
Business-as-usual costs	69,800,000
Total	72,200,000

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

Heat network operator costs:

Cost of licence application:

A70. To continue operations heat networks will have to be licensed. This process will be more burdensome than under Option 1, as licence applications will require more information to be submitted than for authorisation applications.

A71. Using a Standard Cost Model approach, it is assumed that per heat network it will take one senior manager 24 hours, at a cost of £26 per hour, to submit a licence application. Table A18 outlines this Standard Cost Model approach.

Table A18 (Licence application cost):

	Standard Cost Model approach
Number of people required	1
Grade level of those required	Senior manager
Cost per grade per hour	£26
Hours spent on the task	24
Total cost per heat network	£634

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

A72. Option 1 will regulate at the supplier level. Given that this IA considers only the current stock of heat networks, and all heat networks must register within year 1, this total cost is incurred within the first year of the regulation as with Option 1.

Compliance and familiarisation cost:

A73. As in Option 1, heat networks will incur a yearly cost from familiarising themselves with and complying with the regulation and disseminating any necessary information. The components of the Standard Cost Model approach are outlined in Table A19 below. It has been assumed that it will take overall 28 hours a year to undertake these processes and that it will be carried out by a senior manager, at a cost of £26 per hour.

Table A19 (Familiarisation and compliance cost):

	Standard Cost Model approach
Number of people required	1
Grade level of those required	Senior manager
Cost per grade per hour	£26
Hours spent on the task	28
Times required per year	1
Total cost per heat network	£740

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

Complaints handling:

A74. It is assumed that as with Option 1, additional complaints will come forward as a result of the regulation. It is also assumed that the total number of additional complaints will be the same in Option 1 & 2. This cost is outlined in section A.2.

Overview of heat network operator costs:

A75. The total real discounted costs to heat network operators over the 10-year appraisal period of being under the regulatory regime are outlined in Table A20 below.

Table A20 (Overall heat network operator costs Option 2):

	Total (£) over 10 year appraisal period
Cost of licence application	1,300,000
General compliance and familiarisation cost	47,400,000
Complaints handling	2,500,000
Total	51,300,000

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

Overview of Option 2 costs:

A76. Table A21 below, sets out the total discounted quantified costs of Option 2, by regulator and heat network operator component. The total cost is the sum of discounted costs over the 10-year appraisal period.

Table A21 (Total quantified costs of Option 2):

	Total (£) over 10 year appraisal period
Regulator	72,200,000
Heat network operator	51,300,000
Total	123,600,000

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

A77. Another cost that is present within Option 2, is the cost of street work disruption caused by rights and powers. It is expected that the granting of rights and powers will lead to more works being undertaken and therefore more street disruption. However, this will be offset by street works being more efficient and less delayed than in the counterfactual. This has not been quantified as there is a lack of information about amount of street work delays, the length of delays in street works and the costs that are involved in this disruption⁶⁶.

A.2.2. Benefits:

A78. It is expected that the primary benefits of Option 2 will be the same as in Option 1. However, as the more stringent licensing regime has more reporting requirements on consumer protections, it is expected that the associated unquantified consumer benefit will be slightly greater in this option. However, Option 2 also has a slightly larger scope than Option 1 insofar as it includes the ability for heat networks to get rights and powers. The benefits of rights and powers will be outlined below.

A79. These rights and powers are described in a slightly different way to the other impacts of this regulation, insofar as in the following section, the counterfactual will be outlined alongside the regulations impact for each of the individual rights and powers.

Rights and powers:

⁶⁶ The Evaluation of Street Works Permit Schemes found that the average societal cost of a day of roadworks to be £221, for those impacting carriageways this figure is £261. However, this is only an average figure non-specific to heat networks. Evaluation of Street Works Permits scheme (page 41) https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/700502/permit-schemes-evaluation-report.pdf

A80. It is assumed that not all of the heat network suppliers who can get a rights and powers licence will want one, as obtaining the licence will incur an additional cost beyond what is necessarily required. Only some heat networks will require the rights and powers, and therefore apply for it. As a simplifying assumption, it has been assumed that for all those that want a rights and powers licence, they apply for it within the first year of it being available. It has been assumed that heat network suppliers would be likely to get the licence in year 2, in order to be able to use it whenever required. This assumption will be tested in the consultation.

A81. Analysis has been conducted on the Heat Metering and Billing dataset to understand where the likely threshold for those wanting a licence will be. It has been assumed that heat network suppliers with over 10 heat networks are the most likely to get rights and powers, so they are better able to manage and extend their multiple networks. This means that approximately 110 heat suppliers are above the threshold, supplying around 5,100 heat networks.

A82. Heat networks that are owned and managed by Local Authorities will not need to apply for the rights and powers licence, as they already have statutory undertaker powers. Therefore, around 80% of those over the 10 heat networks threshold are not owned by Local Authorities and would want to get rights and powers⁶⁷.

A83. It is likely that there will be a difference in demand between district and communal heat networks for rights and powers. Since communal heat networks operate within a building, unless they are looking to expand to a new building, they are unlikely to want rights and powers. A strong simplifying assumption has therefore been made that only district heat networks will want rights and powers.

A84. Of these district heat networks who want rights and powers, it is likely this will be for two reasons: a) extending their network and b) undertaking maintenance works⁶⁸. As a simplifying assumption, it has been assumed that 25% of those who want powers, do so for extension purposes. It has been assumed that the remaining 75% of heat networks who want powers, do so for maintenance purposes.

A85. Across the appraisal period, the proportion using their rights and powers in practice is likely to differ between those maintaining and extending. For those maintaining, it is expected that this will continue at a constant baseline amount across the appraisal period. However, it is expected that there is latent demand in the market for those extending, as there will be existing heat networks who would want to extend but have not due to the burdensome process for getting the relevant rights to do so. Therefore, it is assumed that within the first year 50% of those who want to extend will use their rights and powers, whilst post-year 1 of the regulation coming into force, the amount extending will return to the baseline amount.

A86. This distinction is important to make between those extending and maintaining, as it has been assumed that those with the rights and power licence will apply for different powers. It has been assumed that whilst those that extend will use all of the rights and powers, those that maintain will use only street works. This is because those maintaining will not be going into new areas (easements). This use of powers is outlined in Table A22.

Table A22 (Rights and powers by use).⁶⁹

	Maintain	Extend
Street works		
Permitted development		
Easements		

⁶⁷ Figure found from data behind the Experimental Statistics on heat networks (2018): <https://www.gov.uk/government/publications/energy-trends-march-2018-special-feature-article-experimental-statistics-on-heat-networks>

⁶⁸ As a simplifying assumption, repair works have not been considered given the poor data around how many repair works take place and with what frequency.

⁶⁹ Green indicates use of the individual extra right and power, whilst red indicates its exclusion.

A87. The section below outlines each of the rights and powers in turn. It should be noted that whilst heat network suppliers will apply for the licence, it will be individual heat networks that use them (even if they apply through the supplier). Therefore, the costs will be incurred at the heat network level.

Street works:

A88. Heat networks will have the power to apply for street work permits rather than licences, which are both less costly and require less time to produce applications.

Counterfactual:

A89. In the counterfactual, Local Authorities have to process street work licence applications. The cost of these applications is £535, and it is assumed that this covers the administrative cost of processing the application. Therefore, the total undiscounted cost to Local Authorities of processing street works applications in year one is approximately £44,000.

A90. Heat network operators will incur a cost from creating licence applications. Using a Standard Cost Model approach, it has been assumed that an application will take 1 senior manager 16 hours at a cost of approximately £26 per hour, as outlined in Table A23.

Table A23 (Counterfactual heat network street work licence cost):

	Standard Cost Model Approach
Number of people required	1
Grade level of those required	Senior manager
Cost per grade per hour	£26
Hours spent on the task	16
Total cost per heat network	£423

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

Regulation:

A91. Under the regulation, instead of applying for a street works licence, heat networks will apply for a street works permit which is a less intensive application. The total cost of a permit application is between £75 and £240, and it is assumed that this covers the cost of processing the application. As a simplifying assumption, it has been assumed that the cost of processing a street works permit application is an average of the bounds at £157.5.

A92. Heat networks themselves will also save from applying for the burdensome permits process. Using a Standard Cost Model approach, as outlined in Table A24, it is assumed that it takes 1 senior manager 8 hours to complete an application, at a cost of £26 per hour.

Table A24 (Heat network street work permit cost):

	Standard Cost Model approach
Number of people required	1
Grade level of those required	Senior manager
Cost per grade per hour	£26
Hours spent on the task	8
Total cost per heat network	£211

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

Overall:

A93. Table A25 below outlines the costs of the overall discounted costs of street works over the 10-year appraisal period. The net benefit due to rights and powers is actually a cost saving for business.

Table A25 (Overview of street work costs):

	Costs by type	Total (£) over 10 year appraisal period
Counterfactual	Local Authority Cost	300,000
	Heat network Cost	200,000
Regulation	Local Authority Cost	100,000
	Heat network Cost	100,000
Net		300,000

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

Easements:

A94. As outlined in table 29, it is assumed that those applying for easements will be those aiming to extend their heat networks. It is expected that relative to the counterfactual, the regulation will lower the price heat networks pay to access land, as they will no longer have to pay inflated prices for access to land due to landowners demands. This impact has not been quantified as there is no information on how many times heat networks are forced to pay an inflated price and if they are, by how much.

A95. Easements will also save heat networks money from a quicker, easier application process and reduced delays. There is limited information on how long delays last for when heat networks apply for easements, and this has therefore not been quantified.

Counterfactual:

A96. Heat networks are currently unable to apply for easement rights, this means that there is no burden on the Land Registry currently for processing easement applications.

A97. Heat networks must currently undertake voluntary negotiations with landowners to try to access their land. It is assumed that (using a Standard Cost Model approach), it will take two negotiators at senior manager level two weeks (80 hours) at a cost of £26 per hour. Two weeks is a simplifying assumption of the length of negotiations. There could be circumstances where negotiations last far longer than two weeks, and circumstances where they take less time. Two weeks has therefore been assumed as an average. The total cost of each voluntary negotiation is therefore £4,227.

Regulation:

A98. In the regulation, heat networks will be able to apply to the Land Registry for easement rights. The total price for an easement rights application is between £236.50-£350. A simplifying assumption is that this price will cover the cost of processing this application, and therefore an average of the total price for easements rights bounds of £293.25 will be used.

A99. For heat networks applying for easement rights, a Standard Cost Model approach is used to quantify the administrative burden. It is assumed that it takes 1 senior manager, 24 hours to make an easement application. This is outlined in Table A26.

Table A26 (Heat network operator easement costs):

	Standard Cost Model Approach
Number of people required	1
Grade level of those required	Senior manager
Cost per grade per hour	£26
Hours spent on the task	24
Total cost per heat network	£634

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

Overview:

A100. Table A27 below outlines the costs of the overall discounted costs of easements over the 10-year appraisal period.

Table A27 (Overview of easement costs):

	Costs by type	Total (£) over 10 year appraisal period
Counterfactual	Local Authority cost	0
	Heat network cost	400,000
Regulation	Local Authority cost	N/A ⁷⁰
	Heat network cost	100,000
Net		200,000

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

Permitted development:

A101. Permitted developments are treated slightly differently than street works and easements.

Permitted development gives heat networks some limited rights to undertake works without planning permission. However, it is likely that in some instances heat networks will need to get planning permission. Therefore, permitted development does not represent a perfect substitute for planning permission.

A102. It is assumed therefore, of those that are extending, only 25% will use permitted development. As a simplifying assumption it is assumed that no heat network that is maintaining their network will want permitted development. As with street works and easements, it is assumed that in the regulation in the first year due to latent demand more heat networks will come forward to use the powers than in the counterfactual, before returning to the baseline quantity.

A103. Since in the counterfactual is planning permissions, only those that no longer apply for planning permission and apply for permitted development need to be considered.

Counterfactual:

A104. In the counterfactual it is assumed that Local Authorities will suffer a burden from processing planning permissions⁷¹. Planning permission fees are determined by the number of hectares of the site. It has been assumed that £3,000 constitutes a reasonable assumption for the average planning permission fee for heat networks. It is assumed that this fee covers all the costs of processing the application.

A105. In the counterfactual, those that could have applied for permitted development will have to apply for planning permission. Using a Standard Cost Model approach it is assumed that it takes 1 senior manager 16 hours to apply for planning permission at a cost of £26 per hour. This approach is outlined in the Table A28.

Table A28 (Heat network operator planning permission costs):

	Standard Cost Model approach
Number of people required	1
Grade level of those required	Senior manager
Cost per grade per hour	£26
Hours spent on the task	16
Total cost per heat network	£423

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

⁷⁰ This cost has not been included as it is below the £100,000 rounding threshold.

⁷¹ The Town and Country Planning (Fees for Applications, Deemed Applications, Requests and Site Visits) (England) Regulations (2012) <http://www.legislation.gov.uk/uksi/2012/2920/schedule/1/made>

Heat network operator:

A106. Under the regulation, heat networks automatically get permitted development rights after they apply for the rights and powers licence. Therefore, there is no cost incurred to local authorities or heat network operators.

Overall:

A107. Under the regulation, there are significant potential savings for those that no longer need to apply for planning permission. This benefit is outlined in Table A29 below.

Table A29 (Overview of permitted development costs):

	Costs by type	Total (£) over 10 year appraisal period
Counterfactual	Local Authority cost	100,000
	Heat network cost	N/A ⁷²
Regulation	Local Authority cost	0
	Heat network cost	0
Net		100,000

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

Overall – Rights and powers Benefits

A108. Largely, the quantified benefits of rights and powers in this IA are cost savings versus the counterfactual scenario. There are wider benefits due to the rights and powers described in this section that haven't been quantified due to the lack of data available on the market. For example, it is anticipated that the rights and powers proposed will have a beneficial impact on the market more broadly, whilst it will also result in benefits due to the greater ease with which heat networks will be either maintained or extended. It is difficult to understand the scale of these benefits due to the lack of information available on the market, and the extent to which they may be used, however they are expected to be significant.

Additional benefits:

Consumer detriment alleviation:

A109. It is expected that rights and powers will improve the quality of service heat networks deliver. For example, operators will be able to better maintain their network, thus reducing the length and severity of outages. This will result in:

- Consumers spending less time seeking information, compensation and dealing with outages.
- More consistent and optimal-level heating will result in health benefits for consumers.

A110. These impacts have not been quantified. There is limited data on the amount of time consumers spend seeking information and compensation from heat network operators, and whether heat network consumers take time off work, for example, to try to deal with problems. This impact will be tested throughout the consultation process. As previously outlined, health benefits have not been quantified for this IA as they go beyond what is proportionate to quantify for a consultation stage IA.

Market certainty:

A111. Granting powers to heat networks equivalent to other utilities will have the benefit of increasing market certainty by reducing the risk inherent in heat networks' construction and operation. This will result in lower costs for heat network operators, with less time spent with idle labour and capital.

⁷² This cost has not been included as it is below the £100,000 rounding threshold.

Increased certainty is likely to result in more frequent and bigger investments being undertaken, which will increase the number of heat networks built and extended.

A112. It is also expected that this will extend the benefits of supply side impacts beyond Option 1. As previously outlined, this impact has not been quantified for this IA, as it is beyond the scope of what is appropriate and proportionate to quantify for a consultation stage IA.

Overview of Option 2 benefits:

A113. Option 2 has unique benefits from allowing heat network suppliers to get rights and powers. Table A30 below outlines these benefits.

Table A30 (Overview of Option 2 benefits):

Benefit Type	Benefit	Quantified (£m) impact over 10-year appraisal period
Rights and powers	Street works	300,000
	Easements	200,000
	Permitted development	100,000
Additional benefits	Consumer detriment alleviation	N/A
	Market certainty	N/A

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

A.2.3. Overview of Option 2:

A114. As with Option 1, it is difficult to estimate the impact of Option 2 since the costs are quantified whilst the majority of benefits are not. The quantified costs across the 10-year appraisal period including the impacts of rights and powers are outlined in Table A31 below.

Table A31 (Quantified overview of Option 2):

	Total (£) over 10 year appraisal period
Counterfactual	1,100,000
Rights and powers	600,000
Option 2	123,600,000
Option 2 (including the counterfactual and rights and powers)	121,900,000

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

A115. However, this NPV does not account for all of the benefits of this regulation, which are likely to be substantial. As described above, many of the benefits relate to the increased consumer protection measures as a result of regulation. This is especially true if the market grows due to this regulation, therefore all the benefits will be incurred over a larger number of heat networks and for rights and powers. One could assume that, if there is market growth, new heat networks would be likely to use rights and powers as they will want to expand further in future, thus increasing the expected benefits of the regulation. This will be especially true as new heat networks will likely want to make use of all the individual rights and powers.

A.3. Option 3 (Hybrid):

A116. Under the hybrid regulatory regime, every heat network is authorised. However, for heat networks suppliers who supply 2,000 or more customers, they are required to get a licence in order to operate. Suppliers who would like to obtain the licence but are not required to, will still be able to obtain a licence. This requisite licence is the same as in Option 2, and therefore as burdensome.

A117. Based on analysis of the Heat Metering and Billing dataset, a lower proportion of heat network suppliers will be required to get the licence and then will obtain one in Option 4. However, it is assumed that the total number that would want rights and powers stays constant irrespective of the regulatory regime. Therefore, although a lower proportion of heat network suppliers will be required to obtain a licence, the same number will obtain a licence in Option 3 as in Option 4⁷³.

A118. Since Option 3 extends Option 1 by including a requisite licence for those above a certain threshold, whilst all other heat networks are generally authorised, the costs outlined in this section will only include the cost of the licence specific to Option 3 for the sake of brevity.

A.3.1 Costs:

Regulator costs:

One-off costs:

A119. It has been assumed that the one-off costs incurred to the regulator will take 25 people to complete within year one of the regulation to undertake these two tasks, using evidence sources outlined in section 6. It is assumed as a simplifying assumption, that these people will work at the senior manager grade at a total cost of £30 per person in a year (including wages and overheads).

A120. It is also assumed that in addition to employees working on these one-off costs, the regulator will employ dedicated consultancies to undertake some of the work, in order to use their expertise. Table A32 below outlines the total one-off costs.

Table A32 (Total one-off costs):

	Total (£) in year 1
Authorisation regime	2,000,000
Rights and powers	400,000
Total	2,400,000

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

Business-as-usual costs:

A121. It has been assumed that these business-as-usual costs will take 175 people to complete these tasks, based on evidence sources outlined in section 6. It has been assumed that 75% of these people will work at the junior grade whilst 25% will work at the senior manager level, at a total cost of £26 and £30 per hour respectively (including wages and overheads).

A122. In addition to the cost of these employees, it has been assumed that the regulator will hire consultancies to help with the audit/monitoring and enforcement components of the regulator tasks, to provide support for more complex cases. Table A33 outlines the business-as-usual costs.

Table A33 (Total business-as-usual costs):

	Total (£) over 10 year appraisal period
Authorisation regime	59,200,000
Rights and powers	5,800,000
Total	65,000,000

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

Overview of regulator costs:

⁷³ As a simplifying assumption is assumed that those required to get the licence are not mutually exclusive from those who want the licence. Therefore, those required to get a licence are contained within the number that would get a licence. This will be tested in the consultation.

A123. The regulator will incur a number of costs both one-off and ongoing. The total discounted costs of each of these components across the 10-year appraisal period is outlined in Table A34 below.

Table A34 (Regulator costs Option 3):

	Total (£) over 10 year appraisal period
One-off costs	2,400,000
Business-as-usual costs	65,000,000
Total	67,400,000

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

Heat network operator cost:

Cost of licence application

A124. In Option 3, two sets of heat network suppliers will apply for the licence: those required to as a result of being over the customer threshold, and those who want the rights and powers. This will mean these heat suppliers incur a burden beyond Option 1. It is expected that this licence application will be similar to the licence in Option 2 and therefore as burdensome to produce.

A125. Using a Standard Cost Model approach, it is assumed that per heat network supplier, it will take one senior manager 24 hours, at a cost of £26 per hour, to submit a licence application. Table A35 outlines this Standard Cost Model approach.

Table A35 (Licence application cost):

	Standard Cost Model approach
Number of people required	1
Grade level of those required	Senior manager
Cost per grade per hour	£26
Hours spent on the task	24
Total cost per heat network	£634

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

A126. As this IA considers only the current stock of heat networks and all suppliers who want a licence or are required to get one to apply for one within year one, this cost is a one-off cost in year one.

Compliance and familiarisation cost:

A127. Compliance and familiarisation costs are faced at the heat networks level rather than the supplier level. This is because although the supplier will hold the licence, the heat networks themselves will use them in practice and therefore will have to comply with and familiarise themselves with regulation as required. They will therefore need first-hand knowledge of the licence requirements.

A128. The components of the Standard Cost Model approach are outlined in Table A36 below. It has been assumed that it will take overall 28 hours a year to undertake the compliance and familiarisation processes for the requisite licence. This process will be carried out by a senior manager, at a cost of £26 per hour. This is in line with the assumptions used in Option 2, as it is assumed that both licences will be equally burdensome to familiarise with.

Table A36 (Compliance and familiarisation cost):

	Standard Cost Model approach
Number of people required	1
Grade level of those required	Senior manager
Cost per grade per hour	£26
Hours spent on the task	28
Times required per year	1
Total cost per heat network	£740

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

Overview of heat network operator costs:

A129. Heat networks will incur costs from applying for the requisite licence and compliance, thus, incurring both one-off and ongoing costs. The total discounted costs of each of these components across the 10-year appraisal period is outlined in Table A37 below.

Table A37 (Heat network operator costs):

	Total (£) over 10 year appraisal period
Cost of licence application	100,000
Familiarisation cost (with the regulation)	4,100,000
General compliance cost (reporting)	14,200,000
Total	18,400,000

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

A130. Table A38 below shows the total heat network operator costs of Option 3, including both the total costs from authorisation (as in Option 1) and the costs of the rights and powers licence.

Table A38 (Heat network operator costs Option 3):

	Total (£) over 10 year appraisal period
Authorisation regime	28,700,000
Rights and powers	18,400,000
Total	47,100,000

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

Overview of Option 3 costs:

A131. Table A39 below, sets out the total quantified costs of Option 4, by regulator and heat network operator component. The total cost is the sum of costs over the 10-year appraisal period which has been discounted⁷⁴.

Table A39 (Quantified costs of Option 3):

	Total (£) over 10 year appraisal period
Regulator	67,400,000
Heat network operator	47,100,000
Total	114,500,000

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

⁷⁴ As in Option 2, due to rights and powers there will be an additional cost from additional street works being undertaken and thus causing street disruption. This impact has not been assessed as outlined in paragraph 141.

A.3.2. Overview of Option 3 benefits:

A132. For the sake of brevity, each of the benefits applicable to this option have previously been described and will not be repeated. Regarding the consumer protection benefits associated with this option, they are identical to those in Option 2, slightly higher than in Options 1 and 4. This is due to the increased consumer protection reporting requirements in this option.

A.3.3. Overview of Option 3:

A133. As with the other options, it is difficult to estimate the overall impact of Option 3 since the costs are quantified whilst the benefits are not. The quantified discounted costs across the 10-year appraisal period, including the impacts of rights and powers, are outlined in Table A40.

Table A40 (Quantified overview of Option 3):

	Total (£) over 10 year appraisal period
Counterfactual	1,100,000
Rights and powers	600,000
Option 3	114,500,000
Option 3 (including the counterfactual and rights and powers)	112,800,000

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

A134. However, this NPV does not account for the majority of the benefits of this regulation which are likely to be substantial. As with Option 1 and 2, this is especially likely to be the case as the market grows.

A.4. Option 4 (Authorisation Plus):

A135. Authorisation Plus (Option 4) is an extension of authorisation (Option 1), insofar as all heat networks are authorised at the heat network level, but those suppliers that want to attain rights and powers can attain them by applying for a licence. This licence is more light touch than Option 2 as it only covers rights and powers, and not consumer protections, and therefore is not as burdensome.

A136. The regime does not specify who must get a licence, so using the analysis conducted on the OPSS dataset, it is assumed that the same number of suppliers who would get rights and powers in Option 2, will use them in Option 4. This is based on the simplifying assumption that only a proportion of heat network suppliers will want rights and powers irrespective of the regulatory regime. Therefore, the same proportion will use the extra rights power across the different options.

A137. Since Option 4 is an extension of Option 1, the same costs for authorisation occur in Option 4 as in Option 1, and therefore for the sake of brevity, they will not be outlined again. Only those costs which are unique to Option 4 (costs of the rights and powers licence) will be outlined. In this regard, the consumer protection benefits from authorisation in Option 4 equal the benefits of Option 1, whilst the benefits of rights and powers in Option 4 equal the benefits of Option 2. These will not be outlined again.

A.4.1. Costs:

Regulator costs:

One-off costs:

A138. It has been assumed that the one-off costs incurred by the regulator will take 25 people to complete within year one of the regulation to undertake these two tasks, based on evidence sources

outlined in section 6. It is assumed that these people will work at the senior manager grade at a total cost of £30 per person in a year (including wages and overheads).

A139. It is also assumed that in addition to employees working on these one-off costs, the regulator will employ dedicated consultancies to undertake some of the work, in order to use their expertise. Table A41 below outlines the one-off costs.

Table A41 (Total one-off costs):

	Total (£) in year 1
Authorisation regime	2,000,000
Rights and powers	400,000
Total	2,400,000

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

Business-as-usual costs:

A140. It has been assumed that these business-as-usual costs will take 169 number of people to complete these tasks, based on the evidence sources outlined in section 6. It has been assumed that 75% of these people will work at the junior grade whilst 25% will work at the senior manager level, at a total cost of £26 and £30 per hour respectively (including wages and overheads).

A141. In addition to the cost of these employees, it has been assumed that the regulator will hire consultancies to help with the audit/monitoring and enforcement components of the regulator tasks, in order to provide support for more complex cases. Table A42 outlines the business-as-usual costs.

Table A42 (Total business-as-usual costs):

	Total (£) over 10 year appraisal period
Authorisation regime	59,200,000
Rights and powers	3,400,000
Total	62,600,000

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

Overview of regulator costs:

A142. The regulator will incur a number of costs both one-off and ongoing. The total discounted costs of each of these components across the 10-year appraisal period is outlined in Table A43 below.

Table A43 (Regulator costs Option 4):

	Total (£) over 10 year appraisal period
One-off costs	2,400,000
Business-as-usual costs	62,600,000
Total	65,000,000

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

Heat network operator costs:

Cost of licence application

A143. Those heat network suppliers that will want an rights and power licence, will have to apply for this licence beyond what is required in an authorisation application. This will mean an extra burden is incurred for heat suppliers. However, it is expected that for this licence, applications will have lower scope and thus will be less burdensome than under Option 2.

A144. Using a Standard Cost Model approach, it is assumed that per heat network supplier it will take one senior manager 8 hours, at a cost of £26 per hour, to submit a licence application. Table A44 outlines this Standard Cost Model approach.

Table A44 (Application cost):

	Standard Cost Model approach
Number of people required	1
Grade level of those required	Senior manager
Cost per grade per hour	£26
Hours spent on the task	8
Total cost per heat network	£211

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

A145. The total cost for rights and powers licences is approximately £22,000 in year one. As this IA considers only the current stock of heat networks and all suppliers who want a licence to apply for one within year one of the regulation, this cost is a one-off cost incurred in year one.

Compliance and familiarisation cost:

A146. Familiarisation and compliance costs are faced at the heat networks level rather than the supplier level. This is because although the supplier will hold the licence, the heat networks themselves will use it in practice. Heat networks will therefore need first-hand knowledge of the rights and powers to be granted and what these powers allow.

A147. The components of the Standard Cost Model approach are outlined in Table A45 below. It has been assumed that it will take 8 hours a year to undertake the compliance and familiarisation processes for the rights and powers licence alone. This process will be carried out by a senior manager, at a cost of £26 per hour.

Table A45 (Compliance and familiarisation cost):

	Standard Cost Model approach
Number of people required	1
Grade level of those required	Senior manager
Cost per grade per hour	£26
Hours spent on the task	8
Times required per year	1
Total cost per heat network	£211

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

Overview of heat network operator costs:

A148. Heat networks will incur costs from applying for rights and power licences as well as complying with them over time. The total discounted costs of each of these components across the 10-year appraisal period is outlined in Table A46 below.

Table A46 (Heat network operator costs Option 4):

	Total (£) over 10 year appraisal period
Licence application cost ⁷⁵	N/A ⁷⁶
General compliance and familiarisation cost	4,900,000
Total	4,900,000

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

⁷⁵ This cost has not been included as it is below the £100,000 rounding threshold.

⁷⁶ This cost has not been included as it is below the £100,000 rounding threshold.

A149. Table A47 below shows the total heat network operator costs of Option 4, including both the total costs from authorisation (as in Option 1) and the costs of the rights and powers licence.

Table A47 (Overview of heat network operator costs Option 4):

	Total (£) over 10 year appraisal period
Authorisation regime	28,700,000
Rights and powers	5,000,000
Total	33,600,000

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

Overview of Option 4 costs:

A150. Table A48 below, sets out the total quantified costs of Option 4, by regulator and heat network operator component. The total cost is the sum of costs over the 10-year appraisal period which has been discounted.

Table A48 (Quantified costs of Option 4):

	Total (£) over 10 year appraisal period
Regulator	65,000,000
Heat network operator	33,600,000
Total	98,700,000

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

A151. As in Option 2, due to the implementation of rights and powers, there will be an additional cost from additional street works being undertaken and thus causing street disruption. This impact has not been assessed as outlined previously.

A.4.2. Overview of Option 4 benefits:

A152. For the sake of brevity, since all the benefits from Option 1 and Option 2 accrue to Option 4, these benefits are not outlined here in extensive detail. Regarding the consumer protection benefits associated with this option, they are identical to those in Option 1. Therefore, they are slightly lower than those described in Option 2.

A.4.3. Overview of Option 4:

A153. As with Options 1 and 2, it is difficult to estimate the overall impact of Option 4 since the costs are quantified whilst the majority of the benefits are not. The discounted quantified costs across the 10-year appraisal period including the impacts of rights and powers are given in Table A49.

Table A49 (Quantified overview of Option 4):

	Total (£) over 10 year appraisal period
Counterfactual	1,100,000
Rights and powers	600,000
Option 4	98,700,000
Option 4 (including the counterfactual and rights and powers)	97,000,000

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

A154. However, this NPV does not account for the majority of the benefits of this regulation which are likely to be substantial. As with Option 1 and 2, this is especially likely to be the case as the market grows. However, as the benefits of Option 4 includes both the benefits of Option 1 and 2, and the costs are lower than Option 2 and 3, Option 4 therefore constitutes the preferred option.