

ELEEXON

**UK Heat Networks: The prospects of
decarbonisation through developing a
heat marketplace**

BIEE 2021 Conference

14 September 2021

Introduction and agenda

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Elexon – background and outline of what we do

2

An overview of the heat sector in Great Britain

3

District Heating – sector overview

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Heat Networks – challenges and opportunities

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What could the future look like for heat networks in the UK?

6

Conclusion and final remarks

Elexon: who we are and what we do



Code Administration

- Industry rules management and change
- Trusted critical friend
- Dedicated customer support (OSMs)
- Training and webinars



System Operation

- 24/7 Party Management
- 24/7 Settlement
- Technology Design/change implementation
- Data Analytics & Insights



Performance Assurance

- Monitor Settlement performance and compliance
- Hold Parties to account for their performance
- Assist Suppliers in creating plans to address performance issues



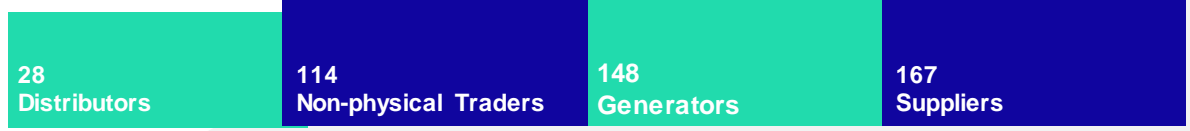
Policy Support

- Impartial, expert advice/guidance
- Market scanning
- Providing support to BEIS/Ofgem to deliver policy outcomes

End-to-End Code Manager/Market Operator providing key energy market infrastructure

For BSC operations we exchange funds to the value of £2.5bn every year and £6bn in respect of EMR

We serve around **530** Market Participants

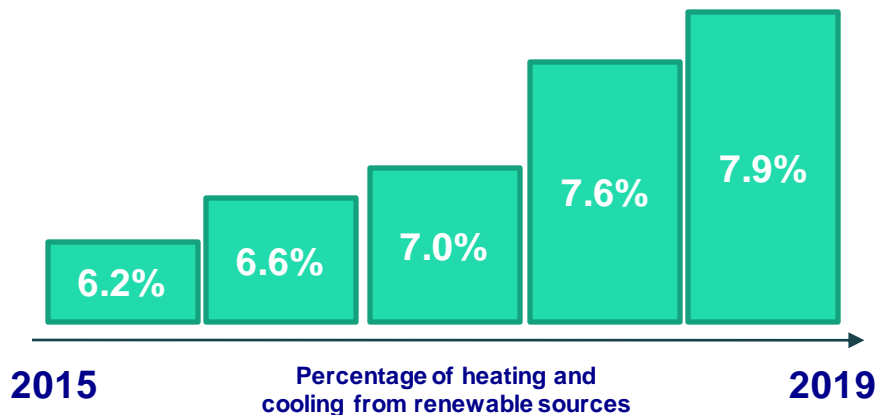
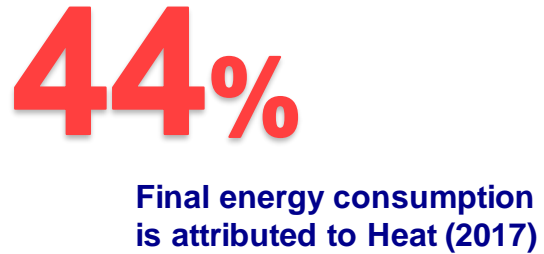
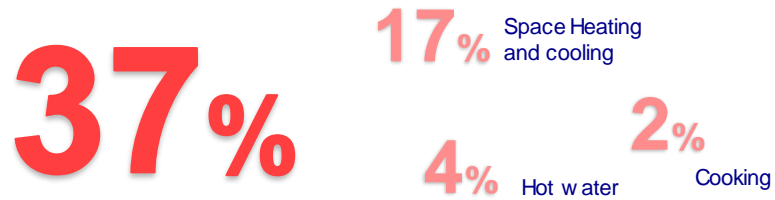


Note: Number of market participants as of June 2021.

 We also calculate, collect & distribute payments to CFD generators and Capacity Market providers 

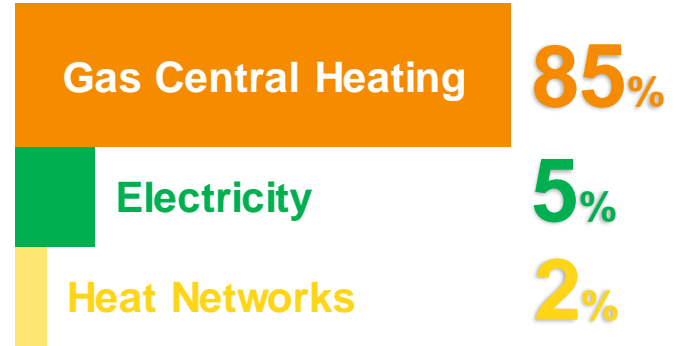
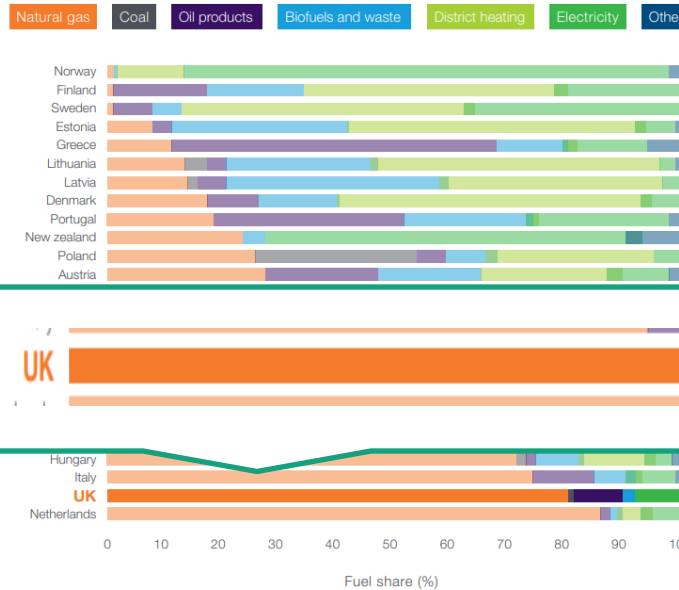
GB Heat sector – An overview

GB Heat sector - statistics



Domestic heat – fuel consumption

In the UK, **gas** has become the predominant source of heating, with the vast majority of customers connected to the GB gas grid



Heating appliances in homes (2016)

Reaching **Net Zero** goals?
What are some alternative methods to heating?

Heating – what are some alternatives?

The UK Government has suggested that from **2025** onwards, new builds will be banned from installing gas boilers

Electric Heat Pumps

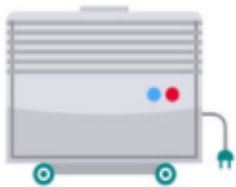
HPA: manufacturers have placed orders to deliver units almost double the amount from 2019

PM's 10-point plan (2020) set an ambition of 600,000 heat pumps installations per year by 2028

Although heat pumps incur high upfront costs they are cheaper to operate compared to combustion-based heat systems

Heat pumps reduce carbon footprint over time

Eligible for the Renewable Heat Incentive (RHI) scheme



Flexibility

Combined Heat and Power

Combined generation (cogeneration) can help reduce emissions by up to 30% compared to other conventional heating methods

CHP plants can reach efficiency ratings in excess of 80%

More than 2,000 businesses and sites in the UK use CHP technology

Natural gas is the main fuel used by the majority of CHP plants.

Biomass fuel CHP plants could be eligible for the RHI scheme



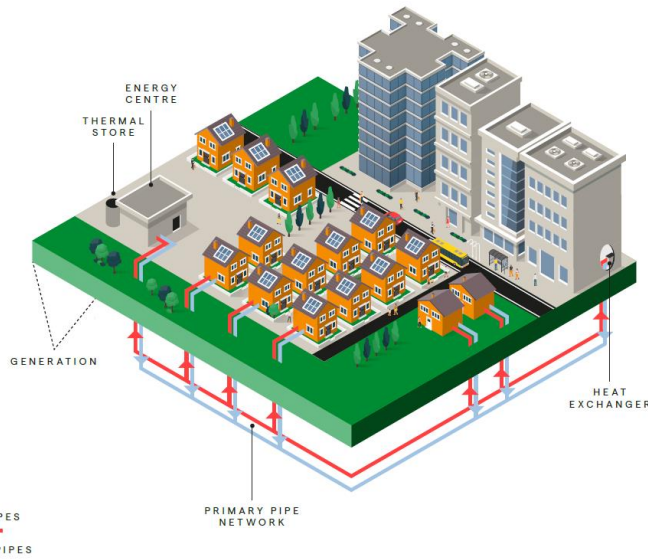
District Heating – sector overview

What are **Heat Networks**?

Heat Networks distribute heat from a central source to a number of connected domestic and non-domestic customers on the network

There are over **14,000** Heat Networks in the UK serving up to **480,000** consumers. This accounts to **2%** of all heat demand from UK homes, businesses and industry.

HEAT NETWORK DIAGRAM



91% of Heat Networks are powered by **gas**

Heat Networks are **technology agnostic**

18% of heat in buildings supplied by Heat Networks if we are to achieve **2050 Net Zero goals**

Can **Heat Networks** help achieve these goals?

Challenges faced by Heat Networks sector in the UK

Demand

- Heat Networks remain relatively unknown amongst consumers in the UK
- Uncertainty around how many connections a new Heat Network development will attract
- Can new connections to Heat Networks be mandated?

Regulation

- No robust policy framework around consumer protection (Heat Networks as Monopolies)
- CIBSE/ADE Code of Practice (CP1)
- Heat Network (Metering and Billing) Regulations 2014

Funding/Financing

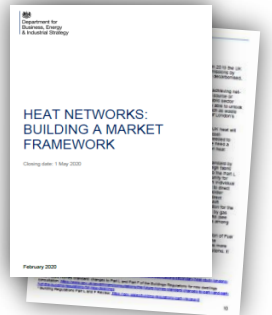
- Limited understanding of potential costs and return on investment
- Financial burden and risk for developers and investors due to complexity of market arrangements and lack of standardised documentation or shared data

How is the **Government** helping Heat Networks?

Heat Network Investment Project - **£320m** to support development across England and Wales

HNIP

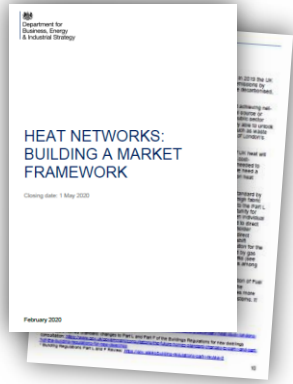
BEIS Consultation on building a **Market Framework** for Heat Networks (2020)



Heat Networks (Scotland) Act 2021 – regulate supply of thermal energy, construction and operation of Heat Networks



Opportunities for Heat Networks



The UK Government has been consulting with industry on building a new **Market Framework** for Heat Networks

- ➔ Ofgem as the Heat Networks regulator, giving **customers** access to similar protections as other energy customers
- ➔ Ensure **developers and investors** have the tools to establish new Heat Networks and expand existing ones
- ➔ All Heat Networks become **low carbon** by 2050

1 Regulation

Protecting the interests of current and future consumers and set guidance relating to:

- Provision of information to improve transparency
- Pricing
- Quality of Service

Proposed Regulatory model: **General Authorisation** with optional licence for rights and powers

2 Local Approach

ZONING

Defining local areas based on a suitable heating strategy



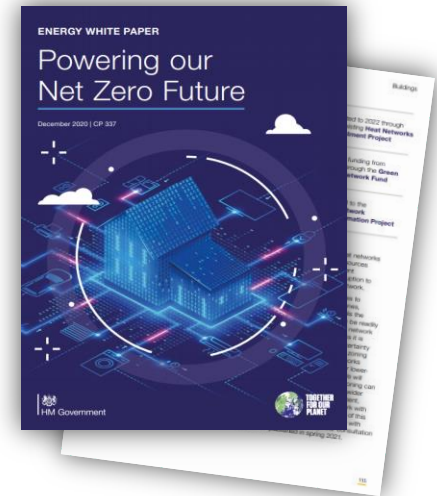
3 Decarbonisation

Consumers should be aware of the low-carbon heat sources they use

Future Homes Standard

Regulation of Decarbonisation

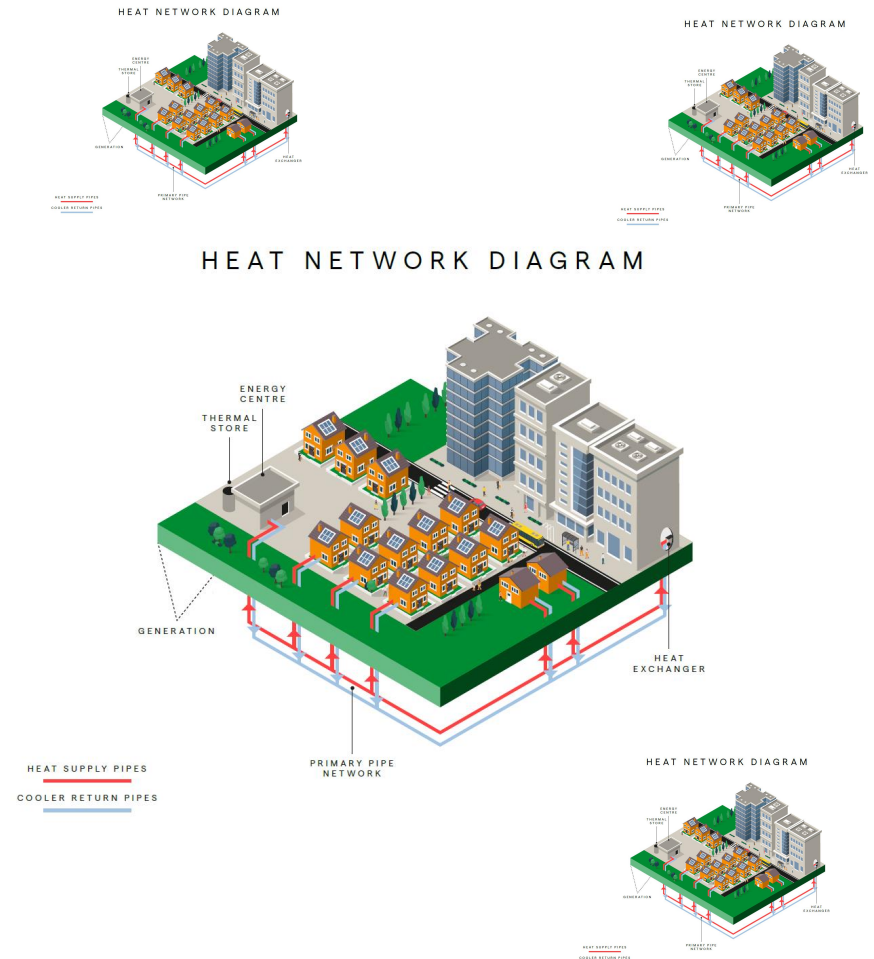
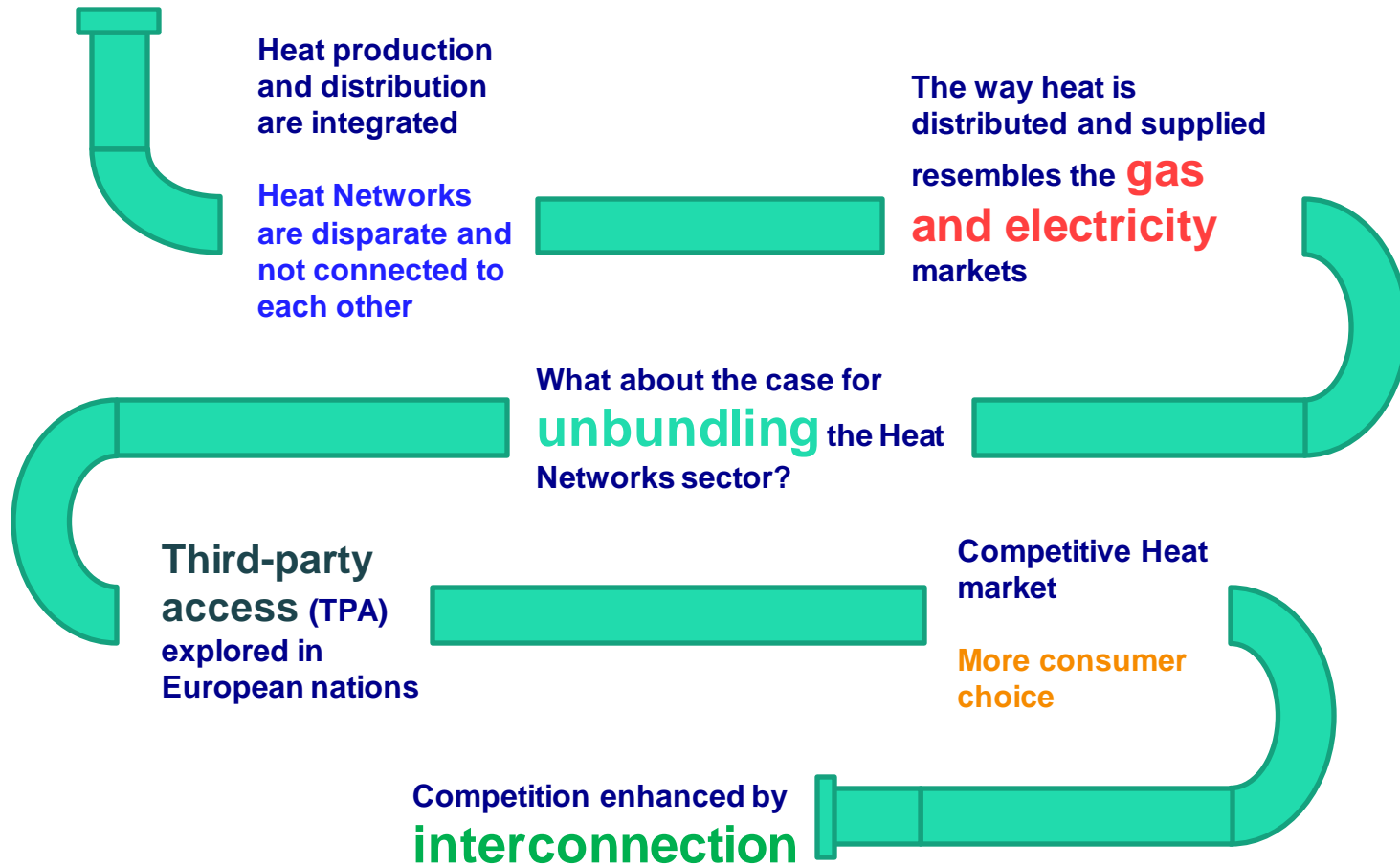
Waste-heat sources – encourage commercial and industrial sources of waste heat to connect to local Heat Networks



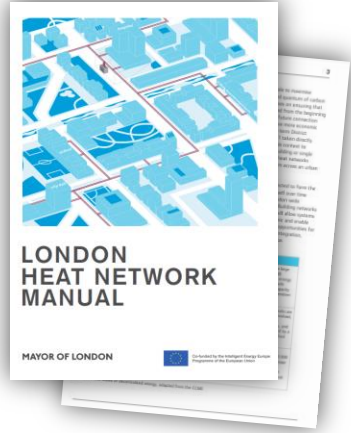
Energy White Paper, 2020

Future Heat Networks landscape (1)

There is a lot of **potential** for Heat Networks to contribute towards spreading **low-carbon heat** across the UK



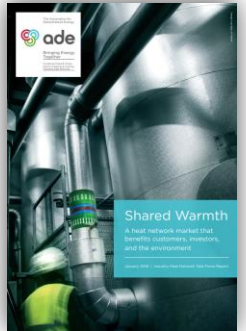
Future Heat Networks landscape (2)



Interconnection of Heat Networks across areas in the UK could bring a number of benefits to the sector

- ➔ Back in 2014, the Mayor of London office started to explore the potentials of interconnected Heat Networks
- ➔ Connected directly and share Heat Network supply water, or be hydraulically separated with a heat exchanger

ADE's Shared Warmth report (2018) noted that the regulatory framework should be designed to allow interconnection of Heat Networks



Benefits of interconnected networks

- CONSUMERS** ➔ Interconnection could allow a **heat marketplace** to be established enabling competition and lower costs
- ➔ Greater security of supply due to **multiple heat sources** supplying the same network
- DEVELOPERS** ➔ Extract more value from existing energy centre assets and other stranded assets
- ➔ Greater use of more efficient plan can be made, reducing emissions and lowering carbon emissions
- DECARBONISATION** ➔ Creates incentives to connect network heat supply to energy waste plants

BEIS Consultation on building a **Market Framework** for Heat Networks (2020)

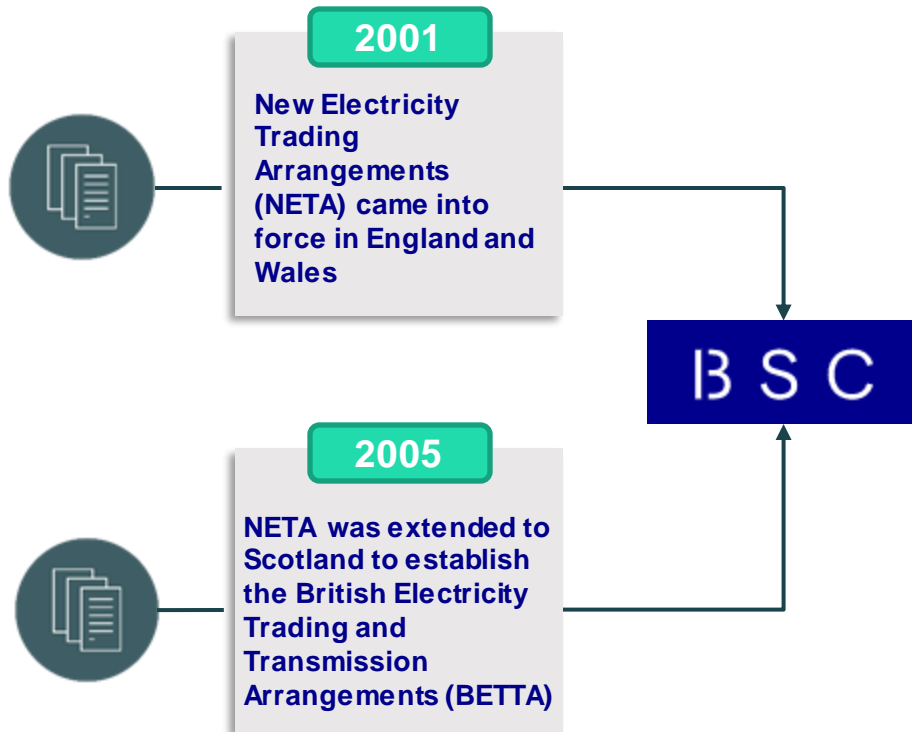
However, we do expect any requirements relating to technical standards and/or decarbonisation should apply to all networks, including those consisting exclusively of non-domestic customers. **Technical standards will aim to drive new networks' performance and facilitate networks' expansion and interconnection;** this would benefit all networks, regardless of the types of consumers served. Similarly, we believe that any potential future decarbonisation requirement should apply to all heat networks and their customers.

- The network being able to distribute thermal energy in the form of steam or liquids (including heating or cooling) from a central source, or a number of significant generation sites, to multiple buildings or consumers where an operator is responsible for delivery of the thermal energy to the consumers.

Lessons learned from the electricity industry

It is expected that the Heat Networks market will **grow significantly** over the coming years and **competition** could be introduced.

Background



Should the Heat Networks sector open to competition, a number of ‘**tried and tested**’ **electricity market design principles** could be applied to the future heat market.

Central Settlement of heat

➔ The creation of a competitive heat market where heat could be produced, transported and sold on a market price basis similar to how electricity and gas markets work

FUTURE MARKET ARRANGEMENTS

Assurance of Settlement/Data

➔ Inspection and assurance of meter readings from Heat Networks to ensure data entering heat Settlement is accurate

FUTURE MARKET ARRANGEMENTS

Assurance of Metering Systems

➔ Ensure Heat Network operators are using metering equipment that has been certified under technical standards and sector guidelines

FUTURE MARKET ARRANGEMENTS

QUICK WIN

Code development and management

➔ Development of a new code specific to the technical standards around the development and operation of Heat Networks

FUTURE MARKET ARRANGEMENTS

➔ Mandating and administering the current CIBSE/ADE CP1

QUICK WIN

Conclusion and final comments

Decarbonisation

37%

Greenhouse emissions are produced from Heat (2016)

7.9%

Percentage of heating and cooling from renewable resources

A mix of **new technologies and approaches** be needed to achieve the 2050 net zero target

Future of Heat Networks

Only **2%** of heat demand is covered by heat networks

What about the case for **unbundling** the Heat Networks sector?

Competition enhanced by **interconnection**

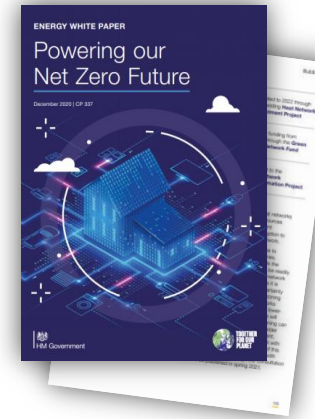
Existing and new heat networks should be encouraged to develop and expand to benefit from a **competitive heat marketplace**

Multi-vector policy Framework

Technical and operational similarities between **heat and gas and electricity**

Some **tried and tested design principles in the electricity sector** could be applied to heat networks

Any policy should be future-proofed, incentivise efforts towards **decarbonisation targets** and be able to facilitate a **whole-systems perspective.**



<https://www.youtube.com/watch?v=unuRwEBG24I&t=2s>

ELEXON

THANK YOU

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