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ELEXON's response to Policy Paper on Heat networks: Ensuring Sustained Investment and Protecting Consumers

We welcome the opportunity to comment on the questions posed in the above publication relating to the Government's considerations on developing a market framework for Heat Networks.

As you are aware, ELEXON is the Code Manager and Delivery Body for the Balancing and Settlement Code (BSC). We are responsible for managing and delivering the end-to-end services set out in the BSC and accompanying systems that support the BSC. This includes responsibility for the delivery of balancing and imbalance settlement and the provision of assurance services to the BSC Panel and BSC Parties. We manage not just the assessment/analysis, but also the development, implementation and operation of changes to central systems and processes.

In addition, through our subsidiary, EMR Settlements Ltd, we are the Electricity Market Reform (EMR) settlement services provider, acting as settlement agent to the Low Carbon Contracts Company (LCCC), for Contracts for Difference (CfD) and Capacity Market (CM). EMR services are provided to the LCCC through a contract and, like the BSC, on a non-for-profit basis.

ELEXON's operations are heavily driven by the numerous changes occurring in the energy industry and we are constantly working to address these appropriately. Our ongoing commitment and evolution in delivering balancing and settlement services for the GB electricity industry has placed us at the top of Ofgem's cross-Code Administrators' performance survey in both 2017 and 2018. We continue to direct our efforts into customer engagement with all customers through the provision of an efficient and effective end-to-end service (concept, design, implementation and operation).

Relating to the issue of Heat Networks, or elsewhere 'district heating', we believe that the government should continue to engage with stakeholders to develop a market framework that applies for the benefit of potential investors, developers and end consumers/communities. We also see this as an opportunity for the government to attain its 2050 decarbonisation targets through a whole systems approach that would allow effective harmonisation between various energy sources such as electricity and gas.

ELEXON appreciates there is an overall similarity between heat networks and electricity and gas in terms of system operability and shape of demand. At this point we would like to bring forward the case of the Copenhagen heat network – one of the largest and most successfully integrated groupings of heat networks in the world – as we were able to detect some direct equivalents with the electricity and gas networks:

- Heat is both transmitted and distributed according to the different pores of pipe. The three transmission companies (VEKS, CTR and Vestforbraending) are responsible for the purchase of heat from production units and for the transport of this heat through the transmission network to the different municipalities. Likewise, the various distribution

companies within the different municipalities across the region will distribute the heat to the end consumers.

- Multiple heat sources, including peak load plants which are equivalent to multiple electricity generators.
- The map below (Figure 1) shows the Copenhagen District Heating Network and the connectivity between the different actors

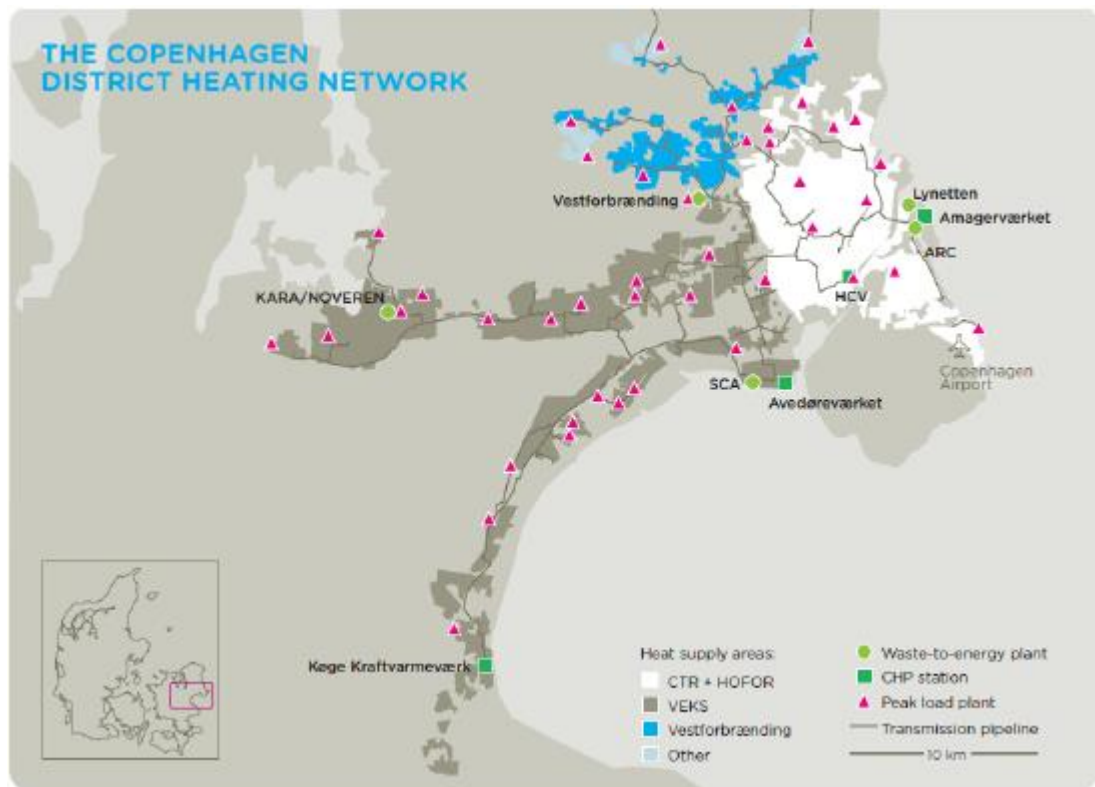


Figure 1 District heating system in Greater Copenhagen (Source: *Efficient district heating and cooling systems in the EU - publication¹*)

As such, the Copenhagen model indicates the possibility of adopting a similar framework for larger heat networks in the UK. Although currently at early stages in the formation of a market framework, we would like to discuss the opportunity of a body that could help administer the settlement of heat quantities between the different actors should the government decide to pursue such a framework. ELEXON's breadth of expertise in balancing and settlement services in the electricity industry could assist further in the development of a similar approach and extend this to heat networks.

¹ Galindo Fernández, M., Roger-Lacan, C., Gährs, U., Aumaitre, V. , *Efficient district heating and cooling systems in the EU - Case studies analysis, replicable key success factors and potential policy implications*, EUR 28418 EN , doi: 10.2760/371045

The views expressed in this response are those of ELEXON Ltd and do not seek to represent those of the BSC Panel or of Parties to the BSC.

I hope you find these thoughts helpful and if you would like to discuss any aspects, please do not hesitate to contact Thomas Demetriades, Strategy Analyst on 020 7380 4135, or by email at thomas.demetriades@elexon.co.uk.

Yours sincerely,

Angela Love
Director of Strategy and Communications

ELEXON'S RESPONSES TO THE QUESTIONS UNDER EACH TOPIC

1. Decarbonisation

Q1. Do you agree that a heat networks market framework should support the use of low carbon heat sources? Please explain.

- 1.1 In a collective effort to attend the UK's decarbonisation targets, we agree that heat networks should support the use of low carbon heat sources. Arguably, they should not only support but further enable or even mandate the various low carbon heat sources in an aim to drive a cleaner, cost-effective long-term plan.
- 1.2 As stated in the Clean Growth Strategy, decarbonising heat is the most difficult policy and technology challenge to meet the carbon targets. We understand that reduction in energy demand could present a possible route for decarbonisation; however, with our society (whether households or businesses) becoming increasingly reliant in energy usage, urges the government to find alternative ways to achieve its targets. We therefore recognise and also welcome the Industry Heat Network Task Force Report² '*Shared Warmth*' which highlights the heat networks prospects in their overall ability to facilitate heat decarbonisation by utilising waste heat, renewable and low carbon heat sources.

Q2. Which cost-effective approaches could be used to deliver low carbon heat networks projects?

- 1.3 We strongly support the initiative towards utilising technologies that would increase the share of renewable and low carbon sources of heat. We would also like to welcome the Heat Network Investment Project's (HNIP) initiative to encourage new customers to join in the currently established network and new projects that will drive low-carbon heat networks.
- 1.4 A significant reduction in carbon emissions could not only be justified by a mere reduction in energy demand. Expanding to what has been previously mentioned (please see response to question 1), the future heat networks market framework must make the best possible use of all existing energy sources and avoid waste. In other words, the best possible utilisation should also be about harnessing energy that would otherwise be wasted elsewhere in the course of other industrial processes. Heat could beneficially emerge from the same source of energy and this is evident in the CHP (combined heat and power) technology. Looking at the Assumed heat network technology mix under HNIP within the technical annex, we can see that the government aspires to a 33% of total heat demand sourced from CHP technology. Apart from offering a long term solution to decarbonising heat, this technology may also support further harmonisation between different sources of energy i.e. a whole systems approach in integrating energy.

² '*Shared Warmth*', Industry Heat Network Task Force Report (2018)
<https://www.theade.co.uk/resources/publications/shared-warmth-a-heat-network-market-that-benefits-customers-investors-and-t>

- 1.5 This cost-effective low carbon heat supply is evident in the case of Greater Copenhagen where district heating is mainly sourced from various CHP technologies and is connected to one million residents in 25 municipalities. Some of the CHP technologies currently utilised by Metropolitan Copenhagen Heating Transmission Company (CTR) and its partnerships are:
- Two multi fuel CHP Plants;
 - One biomass CHP plant; and
 - Four waste to energy CHP plants³.
- 1.6 We would also like to point out other examples of foreign district heating systems that are currently being developed and could be used as guidance to build the most appropriate heat networks framework in the UK. Apart from the Danish district heating system, Sweden has also proven to be a pioneer in the evolution of the district heating and cooling systems with more than 60% of all Swedish homes and commercial buildings being heated from district heating⁴. The joint Swedish government and industry-led initiative 'Heat Networks – Sustainability by Sweden'⁵ has been operating since 2016 and supports both UK stakeholders and the government in utilising the best possible heating strategies for the future. In addition, the city of Amsterdam sees a continuous expansion in its heat network with 5000 new connections every year making it the fastest growing heat network in Europe⁶.
- 1.7 We also recognise an overall advantage in the development of heat networks in strategic locations i.e. existing heat sources like industrial parks or energy from waste plants where the excess heat can be used to heat buildings. Once again the concept of harnessing energy as waste to produce and distribute heat is reinforced from collocating heat networks with other industrial practices. Strategic locations could also be areas of high heat demand density such as urban centres, campuses and business parks.

2. Ensuring Sustained Investment into the Sector

Q3. To what extent do you agree with our characterisation of demand risk?

- 2.1 We agree with your characterisation of demand risk as being the risk of incorrect forecast of heat usage and we recognise its significance in being one of the largest risks faced by new or potential heat network investments. In addition, we also welcome the three contributing factors underpinning demand risk with particular attention to consumption and connection risks.

³ Galindo Fernández, M., Roger-Lacan, C., Gähns, U., Aumaitre, V. , *Efficient district heating and cooling systems in the EU - Case studies analysis, replicable key success factors and potential policy implications*, EUR 28418 EN , doi: 10.2760/371045

⁴ SweHeat & Cooling (<https://sweheat.com/about-us/>)

⁵ Heat Networks – Sustainability by Sweden (<http://heatnetworks.se/about-us/>)

⁶ Amsterdam Case Study by Vattenfall (<https://heat.vattenfall.co.uk/case-studies/amsterdam>)

Q4. How could government and industry address demand risk, especially connection risk and consumption risk?

- 2.2 We understand that the Task Force's approach to successfully managing demand risk is driven by the need to ensure potential investors and developers of heat networks that their investments will be both operationally and financially viable. It is imperative that an adequate amount of confidence is built upon potential investment bodies that will eventually allow them to proceed with their proposed projects.
- 2.3 In order to address demand risk, we would like to discuss the possibility of exemplifying the electricity market model in establishing a more or less similar market framework for heat networks. An open and competitive business model would allow heat quantities to be generated, transmitted and distributed on a market price basis and under contractual agreements between respective parties. This will therefore secure an agreed amount of heat to be generated and hence consumed and, as such, provide a level of confidence on estimating heat usage; however, this will also depend on the project length and investor contracts. Like power, heat could be settled according to the metered quantities that were agreed to be generated and consumed and a respective charge/payment would be attributed to any quantities in surplus or shortage. Should the heat networks grow at the same scale as electricity and gas markets, we believe there is fit with balancing and settlement services and we are keen to discuss this further with you in the future to ensure market readiness.
- 2.4 Furthermore, we would also like to bring your attention to the concept of Profiling as a method to better forecast heat demand and hence address both demand and consumption risks at most. Profiling is currently used in the electricity and gas markets and in particular for Settlement purposes under the BSC in electricity; it is a method of providing a representation of electricity usage of a segment of supply market customers. Likewise, a load profile will give the pattern or 'shape' of usage across a day (Settlement Day), and the pattern across the Settlement Year, for the average customer of each of the eight profile classes. We recommend that this method could be replicated to creating different profile classes for heat users according to their current usage and location (for example areas with high heat demand density). In case you require additional information on Profiling or should you wish to discuss this further we are keen to sharing our wide experience and knowledge on this matter with you.

Q5. Are there particular areas where government can collect and distribute data that will effectively mitigate the consumption risk?

N/A

Q6. Which of the approaches set out to address connection risk (demand assurance, heat zoning, concession schemes) would you consider to be most effective and why?

- 2.5 We believe that the "Demand Assurance" approach is the most effective out of the outlined options as it appeals to a number of different stakeholders and results to a greater benefit. With heat-zoning and concession schemes focusing more on locational heat networks, Demand Assurance applies to the development of a wider heat network that would eventually enable more consumers to connect. Arguably, the "Demand Assurance" approach could be applied to locational heat networks models and encourage existing network developers/owners to expand their operations within those areas.

- 2.6 In order to be awarded “Demand Assurance”, the potential investors or developers will be required to prepare a Strategic Plan in which they will outline their overall scope for developing a heat networks project. Within the Strategic Plan the developers are also required to include a proposed future scale of the project, plans to progress decarbonisation of heat, plans to manage customers and their demand/usage as well as any future plans for network expansion and further connectivity. We therefore welcome this approach as it is enabling investors and developers to commit in implementing and sustaining their projects in return for a financial support/assurance over the life of the project.
- 2.7 We also recognise that in order to achieve further financial support through the “Demand Assurance” approach, developers would have to meet conditions “including minimum customer service requirements, and heat networks design and build standards. These conditions would be based on mitigating the other risks associated with a heat network, including the risks faced by customers”⁷. We therefore support the Task Force’s conclusion that when “Demand Assurance” is linked to customer service obligations it would effectively address demand and connection risks.
- 2.8 We would like to highlight that this concept can also be seen in the gas and electricity markets through the RIIO⁸ framework as to what is known as Revenue Assurance. Like Demand Assurance, this framework assures network operators of recovering reasonable costs and returns, subject to providing value for customers.

Q7. What other approaches to addressing connection risk should we consider? Please provide details.

N/A

Q8. Do you agree that we should consider granting greater access, maintenance and development rights to heat networks?

N/A

Q9. What are the most important types of access, maintenance and development rights needed?

N/A

3. Ensuring consumer protections

Q10. Do you agree that the scope of the heat networks market framework should extend to non-domestic consumers?

⁷ ‘Shared Warmth’, Industry Heat Network Task Force Report (2018)
<https://www.theade.co.uk/resources/publications/shared-warmth-a-heat-network-market-that-benefits-customers-investors-and-t>

⁸ RIIO: Revenue=Incentives+Innovation+Outputs

- 3.1 We agree that the scope of the heat networks market framework should extend to non-domestic consumers. Heat demand and usage is at a much larger scale when it comes to non-domestic consumers such as businesses, hospitals, universities and other public sector buildings therefore it is sensible that the heat market framework is also applied to this type of consumers.
- 3.2 In addition, extending the heat networks market framework to non-domestic consumers will also facilitate greater decarbonisation of heat as it would be applied to these larger scale demand areas that are of strategic importance in developing low-carbon heat networks (please see response to question 2 and paragraph 1.7).

Q11. Can you provide evidence of issues specific to non-domestic heat networks consumers?

N/A

Q12. Do you agree that a minimum level of performance and quality standards should be mandated for existing networks as well as new networks? What would you expect this to include?

- 3.3 We strongly support the establishment of minimum level of performance and quality standards and that these standards should be mandated for existing networks as well as new networks.
- 3.4 Currently, one of the main barriers to implementing large scale heat networks is the monopoly status of the many existing heat networks. Due to the high upfront fixed costs of heat networks, it may not be of economic interest for new investors or developers to establish a heat network in the same area. This will therefore leave customers with limited sources of heat alternatives and as the paper suggests, these customers may be locked into long-term contracts with limited protection.
- 3.5 We therefore recognise the Competition and Markets Authority (CMA) recommendation to attribute heat networks consumers similar level of protection to gas and electricity consumers. Should the heat networks market grow to reach the large scale of other utility networks, we believe that any terms of service, quality standards and performance levels should be mandated and enforced accordingly.
- 3.6 As you are aware, both the electricity and gas industries are administered by a number of codes which define a set of rules and guidelines for the different processes that underpin each industry. In the longer term, given the scale and complexity of heat networks, codifying the various processes around heat generation and supply will ensure an adequate level of consistency in systems and services. This would also allow for an implementation of best practice in the operation of heat networks. As experts in Code Management and Delivery, we are keen to explore this opportunity and collaborate with you in the future given the requirements and regulatory framework of the prospective UK heat networks market.

Q13. How could information on heat networks and related services be better provided to relevant consumers, both during property transactions and through billing?

N/A