



Overview and Scrutiny Business Panel

District heating report for Overview and Scrutiny Business Panel.

Date: 20 July 2021

Key decision: No.

Ward(s) affected: None

Contributors: Emma Bushell - Sustainability Manager

Outline and recommendations

The Committee is invited to note the contents of this report and direct questions to officers at the meeting on the 20th July 2021.

1. Recommendations

- 1.1. The Committee is invited to note the contents of this report and direct questions to officers at the meeting on 20th July 2021.

2. Background

- 2.1. In February 2019 Lewisham Council agreed a motion to declare a 'Climate Emergency' and asked Mayor and Cabinet to agree a new action to make Lewisham zero carbon by 2030.
- 2.2. At just over 32% the burning of gas to heat homes is by far the biggest single contributor to carbon emissions in the borough. Objective 2.6 of Lewisham's Climate Emergency Strategic Action Plan agreed by Mayor and Cabinet on 11th March 2020 is to decarbonise heat. Facilitating the creation of heat networks is essential to this objective.
- 2.3. Lewisham's draft Local Plan SD 4 Energy Infrastructure requires new development where possible to prioritise connection to heat networks. Major development proposals are expected to provide detailed feasibility assessments for connecting to and if possible extending, existing or planned future heat networks on or in proximity

to their site.

- 2.4. The draft London Plan Policy SI3 requires new development to install communal heating systems if the scheme is in a Heat Network Priority Area and are required to fully evaluate the potential to connect to existing district heat networks.
- 2.5. The BEIS 2017 Clean Growth Strategy recognised heat as the most difficult decarbonisation challenge facing the country and has identified a significant role for heat networks in meeting this challenge.
- 2.6. The two main options for decarbonising heat identified by the Clean Growth Strategy are:
 - Heat networks
 - Heat pumps

Where neither of these options is suitable then hydrogen produced by low carbon energy sources is the proposed solution.

- 2.7. The Government's Energy white paper published in 2020 identified the need to build up the heat pump market to deliver 600,000 heat pump installations per year by 2028. This will require a rebalancing of electricity and gas prices to ensure equivalence between the cost of heat delivered by a gas boiler and by a heat pump. Only by doing this will the necessary, more favourable market conditions be created. The Government is expected to set out more details of its approach to decarbonising heating in a Heat and Buildings Strategy

3. What is a district heat network?

- 3.1. District heat networks (often shortened to heat networks), supply heat from a central source, commonly called an energy centre, to consumers, via a network of underground pipes carrying hot water. Another term sometimes used is a District Energy Network (DEN). District heat networks can cover a large area or be fairly local supplying a small cluster of buildings. This avoids the need for individual boilers or electric heaters in every building or dwelling.
- 3.2. The term district heat network or DEN only applies when there are a number of buildings served by an energy centre. When an energy centre is located in a single building (usually a residential block) and only serves the dwellings within this building the term used is communal heating system. This report primarily covers district heat networks. However building level communal heating systems can connect in to district heat networks and may be considered part of the wider network, particularly where the whole system is operated and maintained by a single organisation.
- 3.3. In much of Europe, heat networks are already very widespread and well accepted by consumers. 60% of the Danish population is connected to a heating network (1.5m households), for example, with 98% of Copenhagen's heat supplied by these systems ([BEIS 2018 Heat networks: Ensuring sustained investment and protecting consumers](#))

4. What are the benefits?

- 4.1. A heat network is one of the most cost-effective ways of reducing carbon emissions from heating. Many of the cheapest sources of low-carbon heat can only be used if there is a network to distribute the heat ([BEIS: What is a heat network?](#)).
- 4.2. Heat networks can utilise waste heat that would otherwise go unused; such as heat generated by power stations, from industrial processes such as water treatment and low temperature heat sources such as the heat ejected from cooling units such as

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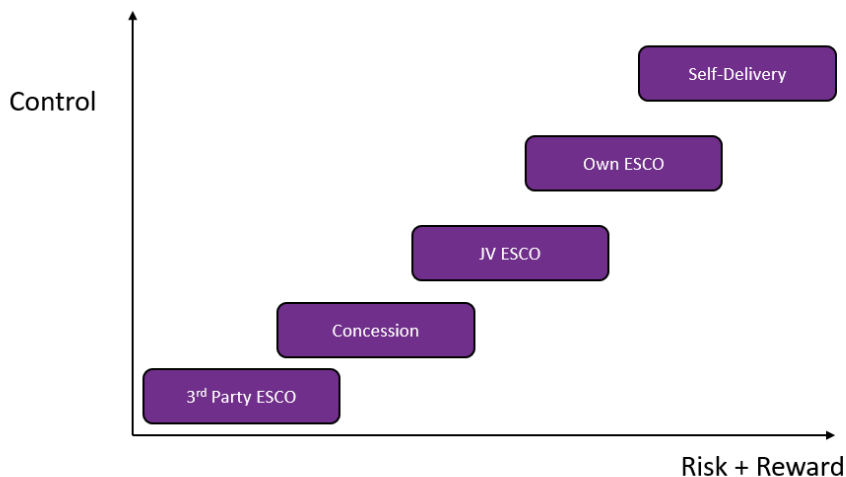
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those use in data centres.

- 4.3. Heat networks can have a beneficial impact on the stability and cost-effectiveness of the whole energy system. For example a large heat network system, especially when combined with a large thermal store (hot water tank), could be a cheap and easy way of storing energy until it is needed. This could include taking any surplus supplies of electricity and converting them to useable heat, to the benefit of the overall energy system ([BEIS: What is a heat network?](#)).
- 4.4. Heat networks make it easier to transition more dwellings to a low carbon source of fuel all at once by changing the heat source in the energy centre rather than needing to do this in every individual dwelling.
- 4.5. Heat networks can be designed with the objective of alleviating fuel poverty.
- 4.6. Heat networks can reduce local air pollution as they displace individual gas fired boilers.

5. What are the risks and challenges?

- 5.1. District heat networks are big infrastructure projects that do not come without the common construction risks such as cost overspend or time overrun. Broadly speaking there are five delivery routes available to develop heat networks as shown in the image below:



This image is from an appended slide set (that includes case studies from each of the five delivery models.

- 5.2. The key risks to the delivery and operation of a heat network are as follows:

- CapEx overspend
- Construction programme delays
- OpEx increases through changes to the regulatory environment and increases in fuel prices
- Breakdown of heat supply equipment
- Customer risks such as fuel debt
- Reputational risk from potential supply outages

- 5.3. The risk of full private sector delivery is the Council's wider objectives of mitigating

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fuel poverty and decarbonising heat to reduce carbon emissions are not met, however there is zero financial risk to the Council. At the other end of the scale the risks of full public sector delivery include cost overrun entirely borne by the Council.

- 5.4. A number of local authorities have taken intermediate option and entered into a joint venture with a specialist delivery partner. These JVs can take the form of an Asset Co and/or a Supply Co where the risks and benefits are shared.
- 5.5. A number of London boroughs have built networks either by setting up wholly owned companies or through joint vehicles with private sector delivery partners. The cost of constructing heat networks is substantial and requires a high degree of technical competence. These authorities have specialist teams in place to deliver these complex infrastructure projects.
- 5.6. There are also potential risks to the customers of either a district or communal heating systems, as identified by Lewisham's Housing Select Committee review of communal heating systems in conducted in 2014/15. The review highlighted a number of issues with communal heating systems; overheating both in corridors and some homes, cost of the energy to residents and reliability. The Committee recognised these issues are not unique to Lewisham.
- 5.7. An update to the Committee in 2017 noted a number of national developments that would address the issues highlighted in the original review. These include the published Heat Networks Code of Practice to address standards in design, construction and operation, a review of the figures used in SAP (Standard Assessment Procedure methodology for predicting the energy performance of buildings) for heat loss from networks and the launch of the Heat Trust, an independent consumer standards body.
- 5.8. Since 2017 there have been further developments. In July 2018 the Competition and Markets Authority (CMA) published their Heat Networks Market Study. This study found that a statutory regime governing the regulation of heat networks is required and recommended Ofgem as the sector regulator. In December 2018 the Department for Business, Energy and Industrial Strategy (BEIS) published their Heat Networks: Ensuring Sustained Investment and Protecting Consumers report. This report committed the Government to working closely with the CMA, Ofgem and devolved administrations to develop an effective heat networks market framework that works for investors and consumers now and in the future.

6. Examples from other Local Authorities

- 6.1. Islington Council built their own heat network called [Bunhill Heat and Power Network](#) . The first phase was completed in 2012, using a CHP engine to provide heat to a leisure centre, LBI housing blocks and a number of large private residential led developments. Phase two was completed in 2020 and is the first scheme in the world to take waste heat from an underground train network and use it to provide lower cost, greener heat.
- 6.2. In 2018 Newcastle City Council entered into a Joint Venture with Engie ([link here](#)) to develop and operate district energy schemes over 40 years. The partnership is now delivering the first scheme serving a new large scale city centre development by Newcastle City Council, Newcastle University and Legal and General.
- 6.3. In 2016 Barking and Dagenham Council formed a wholly owned Energy Services Company (ESCo), [B&D Energy Ltd](#) with the aim of becoming the green capital of the capital and ambitions to become London's Energy Capital. The network provides heat to over 1,500 homes on a Council led regeneration scheme. The network is shortly to be extended to serve another regeneration scheme and a leisure centre.
- 6.4. Other London boroughs currently involved in delivering heat networks include:

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Camden, Southwark, Hackney, Enfield, Sutton and Haringey.

7. What are the opportunities for Lewisham?

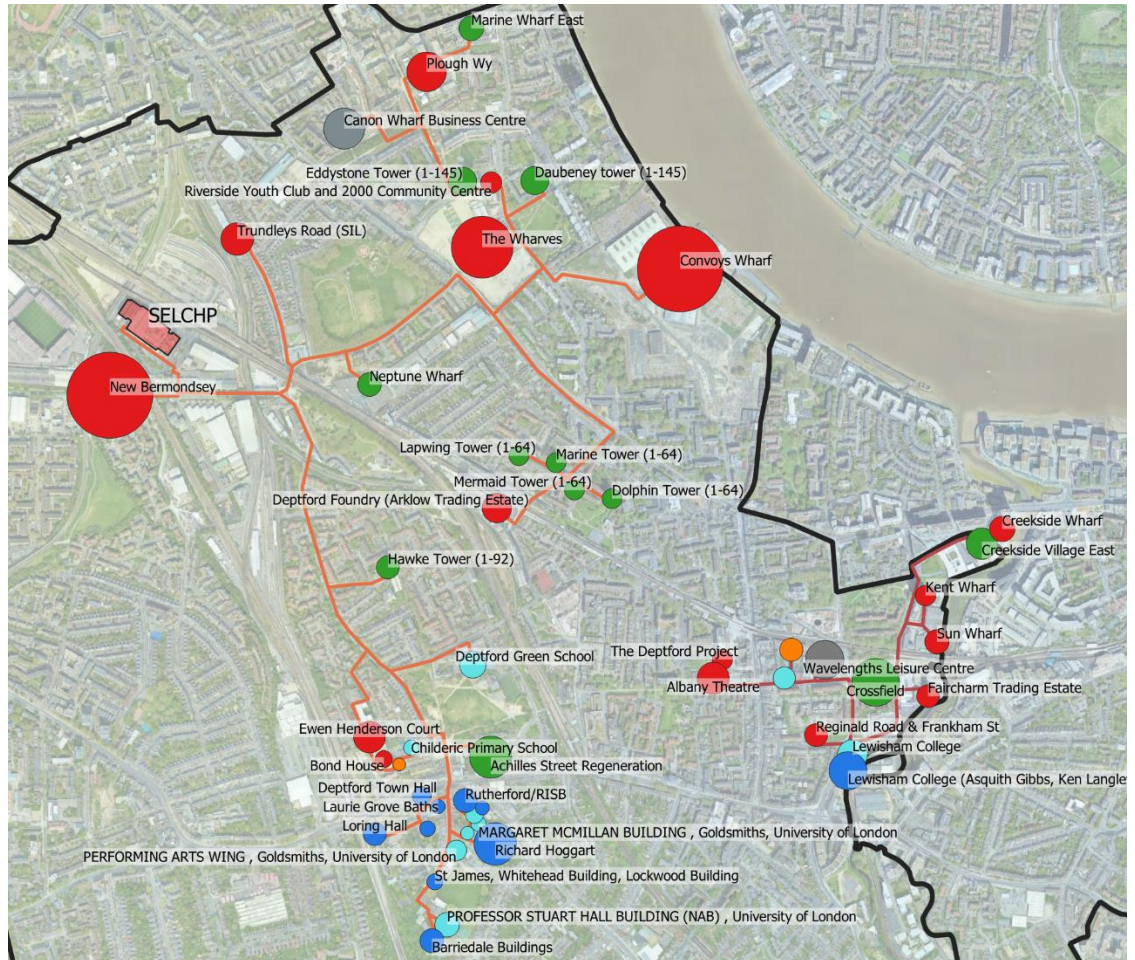
- 7.1. South East London Combined Heat and Power (SELCHP), owned and operated by Veolia, has been in operation for over 25 years and processes 420,000 tonnes of waste annually from 4 London boroughs including Lewisham. The waste is incinerated, producing 220,000 MWh of electricity with a capacity to generate 45MW of heat at peak. Currently only 10MW peak is needed to supply heat to 2,500 homes across the borough boundary in Southwark.
- 7.2. In 2015/16 the Council undertook two separate studies; one investigating the feasibility of extending a network from SELCHP towards Deptford and another to New Cross. Following the completion of these studies the Council began discussions with Veolia that resulted in a Memorandum of Understanding being signed in 2018 to work in partnership to develop opportunities for heat networks in the borough ([Lewisham Council - Decision - Memorandum of Understanding with Veolia to develop a Lewisham heat network](#)).
- 7.3. In 2020 Veolia were awarded £5.5M of funding through the Central Government Heat Network Investment Programme (HNIP) to install a district heat pipe from SELCHP to the new Convoys Wharf development. As a condition of the grant Veolia are committed to oversizing the pipe to allow for a wider network to be constructed.
- 7.4. In 2019 the Council updated our [Energy Masterplan](#). The key aim was to explore the potential of district heat networks in Lewisham, identify the key opportunity areas for district heating and develop a longer-term vision to support Lewisham's growth and low carbon transition using decentralised energy. It provides an evidence base for the development of district heating network schemes in Lewisham, informing both policy and delivery. The Energy Masterplan identified three clusters that warranted more detailed feasibility work. Officers successfully applied for BEIS funding to undertake this work and it is a current project.
- 7.5. The current BEIS funded project is a detailed feasibility study to evaluate three heat network clusters and explore their potential to create a strategic corridor via Lewisham Hospital. The three clusters are:
 - A network in Deptford and New Cross using the planned Veolia pipe from SELCHP to Convoys Wharf.
 - A low carbon heat network serving a cluster of existing and planned development in Lewisham Town.
 - A detailed energy masterplan covering Catford.

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- 7.6. The image below sets out the opportunities for creating a heat network in Deptford and New Cross by extending from the Veolia pipe to Convoys Wharf. There are a number of developments in Deptford that have been built in the last 10 years served by their own site wide communal heat networks. These communal networks are typically powered by a gas fired Combined Heat and Power (CHP) engine. These networks will need to be decarbonised. The potential in this cluster is through connection to SELCHP offering a more financial viable decarbonisation option to these developments. In addition where technically and financially viable the Council could seek to connect buildings from our own stock, including tower blocks that are currently heated through costly inefficient storage heaters or individual gas boilers.



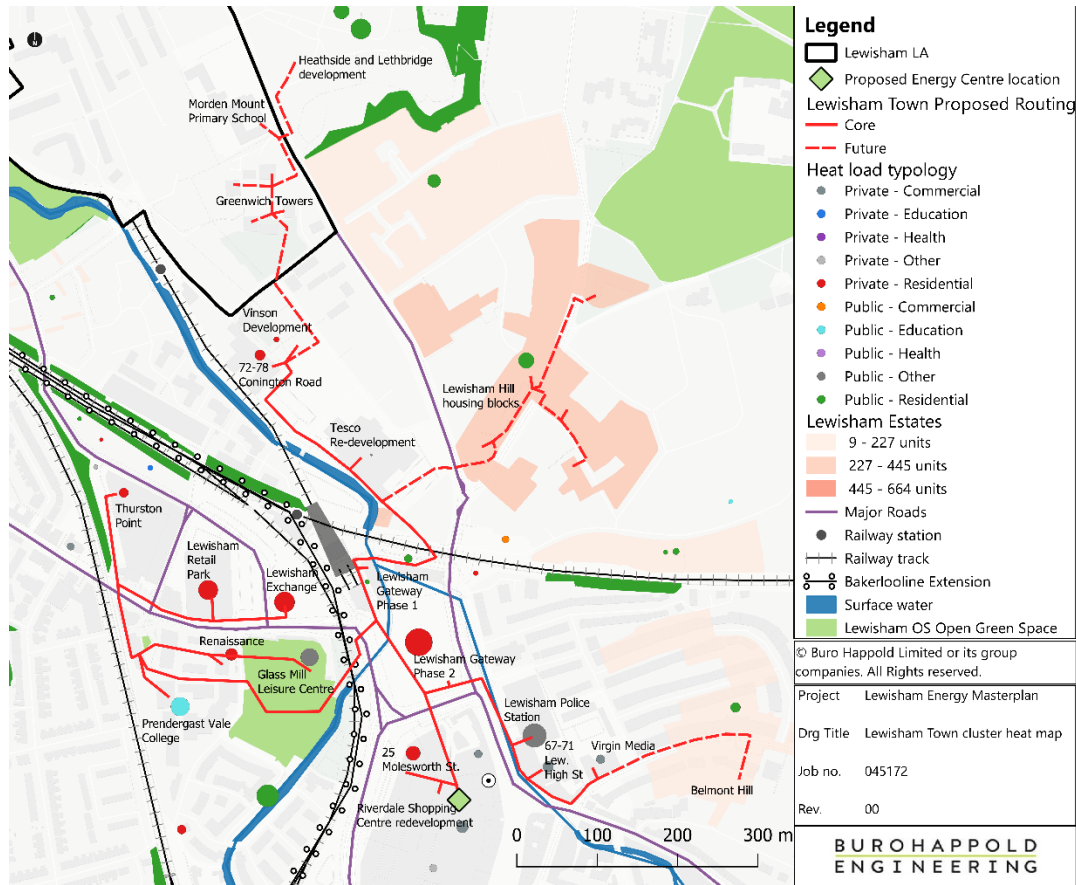
North Lewisham Cluster (Deptford and New Cross)

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- 7.7. The image below sets out the opportunities for extending a heat network in Lewisham Town Centre cluster. There is an existing district network in this location operated by E.ON. It currently serves Glass Mill leisure centre, Pendergrast Vale school and four residential led private developments. The heat is currently generated using a gas fired CHP engine which as some point will need to be decarbonised. There are several other recent developments, including Gateway 1 and 2 that have CHP led communal networks. There is an opportunity to site a low carbon energy centre on the forthcoming Riverdale Shopping Centre redevelopment. Long term this energy centre could take waste heat from the Citigen data centre over the road and potentially the river.



Lewisham Town Centre Cluster

- 7.8. Catford town centre presents a different opportunity in the guise of the Catford Masterplan. With lots of new development planned over the next decade a heat network could be constructed concurrently. There is a sizeable potential to use the green open spaces to install a ground source heat pump within a new energy centre. This energy centre could also supply chilled water to the theatre, civic suite and offices. With the waste heat from these locations being returned to the energy centre to pre heat hot water supplies.
- 7.9. BEIS have funded several feasibility studies in Lewisham and clearly believe there is opportunity to create heat networks in the borough. There is funding available for further business case development through the GLA's [Local Energy Accelerator](#) programme. There is also funding available from Central Government through the [Green Heat Network Fund Transition Scheme](#) to support the commercialisation of low carbon heat networks.
- 7.10. A Lewisham heat network would provide the opportunity to decarbonise heat on a large scale, making a significant contribution to the borough's aspiration to be carbon neutral by 2030.

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8. Financial implications

- 8.1. There are no financial implications arising directly from this report. However the cost of constructing and operating a heat network is substantial.
- 8.2. The recent Energy Masterplan and current detailed techno economic feasibility studies have been funded externally by the GLA's DEEP (Decentralised Energy Enabling Project) and the BEIS HNDU (Heat Network Delivery Unit).
- 8.3. The Council has no budget or resource allocated for this work.

9. Legal implications

- 9.1. Heat networks are covered by the Heat Network (Metering and Billing) Regulations ('the Regulations'), which came into force initially in 2014. The purpose of the Regulations is to drive energy efficiency and reduce carbon emissions from heating. The energy efficiency is achieved through the installation of metering devices and billing based on consumption, which will decrease the use of energy and reduce consumer bills, and result in associated carbon emission savings. Metering also supports fair and transparent billing for customers on heat networks.
- 9.2. Under the Regulations, the operators of heat networks must submit notifications for the heat networks they operate. They must, where required, install metering devices on those networks.
- 9.3. The Regulations place a number of obligations on heat suppliers. A heat supplier is defined as any person or organisation that supplies and charges for the supply of heating, cooling or hot water to customers through a heat network.
- 9.4. A heat supplier is the party with day-to-day responsibility for operating a network to generate heating, cooling or hot water and distribute this supply to customers. Where multiple parties are involved in running a network, the heat supplier is the beneficiary of the customers' payments. Typically, this is the party using customers' payments to pay fuel bills to keep the network running.
- 9.5. Heat suppliers with a new heat network must submit an initial notification to the Office for Product Safety and Standards (OPSS) on or before the day it becomes operational, meaning the day it first supplies heating, cooling or hot water to customers.
- 9.6. After the initial notification, heat suppliers must submit a renotification within every four-year period thereafter, in respect of all networks that they operate.

10. Equalities implications

- 10.1. There are no specific equalities implications arising directly from this report but it should be noted that the risks and impacts of a changing climate will not fall equally, and without action the consequences will exacerbate poverty and health inequalities globally and locally.

11. Climate change and environmental implications

- 11.1. Lewisham's Climate Emergency Strategic Action Plan sets out an ambitious plan for the borough to be carbon neutral by 2030. Objective 2.6 of the Action Plan is to decarbonise heat in the borough and heat networks are a crucial development to meet this objective.

12. Health and wellbeing implications

- 12.1. Decarbonising heat in the borough requires the removal of gas fired boilers and

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replacing them with either low carbon heat from a network or electric systems. The removal of gas fired boilers will improve air quality as domestic gas boilers are responsible for a significant amount of Lewisham's emissions, specifically nitrogen oxides (NOx).

- 12.2. Poor air quality has several detrimental impacts on health, including effects on lung function, exacerbation of asthma, increases in respiratory and cardiovascular hospital admissions and mortality.
- 12.3. See Section 6.10.6. - "Health and wellbeing implications" in the guidance for more information

13. Background papers

- 13.1. <https://lewisham.gov.uk/myservices/environment/making-the-borough-carbon-neutral-by-2030-climate-emergency-declaration>
- 13.2. <https://lewisham.gov.uk/-/media/files/imported/accessible-lewisham-energy-masterplan.ashx?la=en>

14. Report author(s) and contact

- 14.1. Emma Bushell | 07826 891919 | emma.bushell@lewisham.gov.uk

15. Appendices

- 15.1. DHN Case Studies powerpoint

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