P_19

A Local Plan for

Lancaster District

2020 – 2031

Plan period 2011 - 2031

District Heating & Cooling Opportunities Study [June 2021]

Shaping
a better future

LANCASTER CITY COUNCIL
Promoting City, Coast & Countryside

CONTENTS

EXECUTIVE SUMMARY

i. This study has been prepared to support the Council's Local Plan Review process. The City Council adopted the Lancaster District Local Plan in July 2020 on the basis that an immediate review would take place, seeking to strengthen the Council's position in relation to Climate Change.

ii. In the context of the Local Plan Review it is the purpose of this study is to explore opportunities for district heating and cooling networks to be established in the district. Understanding whether opportunities exist, where they could be located and how they could be pursued provides a strong starting point in terms of Local Plan policies which seeks to promote district heating and cooling networks as a low-carbon energy source.

iii. The study seeks to summarise key pieces of evidence which have already been undertaken on this matter, in particular the 2019 '*Heat Mapping and Masterplanning in Lancaster'* which was undertaken by Element Energy.[1]The 2019 work provides some of the critical understanding for this Study. This Opportunity Study seeks to build on the 2019 work and align it with the Local Plan Review, updating opportunities which have arisen over the past 2 years.

iv. Moving forward, it is anticipated that the Study will support the direction given on district heating and cooling networks in the Local Plan Review. The Study can also act as a basis for further investigation of the opportunities presented, this will be through feasibility work and wider discussions with key stakeholders. These opportunities could be explored by the City Council or other external parties who have ambitions to deliver new heating and cooling networks in the district.

v. The report places a focus on heating however there is an increasing role that heat networks play in delivering cooling services as well as the growing need to provide cooling services in response to changes in climate. The following should be read therefore in relation both heating and cooling networks.

1. INTRODUCTION

Content and Objectives

1.1 This document aims to identify potential district heating and cooling networks within Lancaster District, mainly focusing on the urban areas of Lancaster, Morecambe and Heysham. This will involve the consideration of short, medium and long term opportunities and the development of a longer term vision to help support the Council's ambitions in relation to addressing Climate Change. The strategy has been prepared with support from the Council's Planning Policy Team, Climate Change Hub and Lancaster University. It has used evidence collected from the 2019 'Heat Mapping and Masterplanning in Lancaster' study as a basis for understanding the opportunities for heating networks.

[1] *Heat mapping and masterplanning in Lancaster.* June 2019. Led by ElementEnergy on behalf of BEIS Heat Network Delivery Unit.

1.2 At present 37% of the UK's greenhouse gas emissions is accounted for by heating, whether that being through industrial processes, cooking, provision of hot water or through the heating of space. District heating can be an important way to decarbonise heating and reduce greenhouse gas emissions. There is growing recognition that district heating and cooling networks can make a contribution towards meeting our future thermal energy demands in areas where heat density is sufficiently high to develop networks that can provide heat at affordable costs. Where such networks are allied to a low carbon heat source, it also offers the opportunities to support the decarbonisation agenda.

1.3 Local authorities have a key leadership role in developing district heating and cooling networks through the actions they take on their own buildings and activities to minimise heat demand. A core element of Lancaster City Council's Climate Emergency Declaration[2] of January 2019 was to investigate its own actions and how it could seek to achieve its own carbon neutrality by 2030. This involves consideration of innovative approaches towards energy and heat generation within its own estates.

1.4 The aim of this strategy is to not simply focus on the Council's own actions but look at the leadership role that the Council can play in terms of achieving wider benefits in the delivery of heating and cooling networks within the district, specifically:

1. Through the Local Plan Review[3] (LPR), encouraging developers to focus on renewable and low carbon alternatives to fossil fuel heating through the planning process and to move away from single building thermal energy supply.
2. The creation of heat maps to plan how and where decarbonisation initiatives can be achieved in the district.
3. To establish frameworks and programmes which seek to incentivise businesses, industry and homeowners to minimise heat demand through the connection to, or creation of, heating and cooling networks.

What are District Heating and Cooling Networks?

1.5 District heating systems use a network of pipes to deliver heat from a place where heat is generated to multiple customers where heat is used. This is highlighted in Figure 1 below. The heat is typically in the form of hot water and is transported through a network of pre-insulated underground pipes. The heat may be generated in an energy centre using a range of technologies (for instance surplus heat recovered from an energy from waste facility or other industrial plant, water source heat pump, gas combined heat and power (CHP), solar thermal, biomass etc) and could change over time as lower carbon renewable heat sources emerge.

1.6 Buildings are connected to the heat network through a substation where the heat is metered. Buildings may have an associated energy centre which at times provides heat to the building, but at other times feeds into the building, but at other times feeds heat into the wider district heating network. As the district heating network expands, higher levels of efficiency and resilience are achieved through the incorporation of multiple heat sources supplying multiple and varying demands.

[2] Climate Emergency - Lancaster City Council
[3] Local Plan review - Lancaster City Council

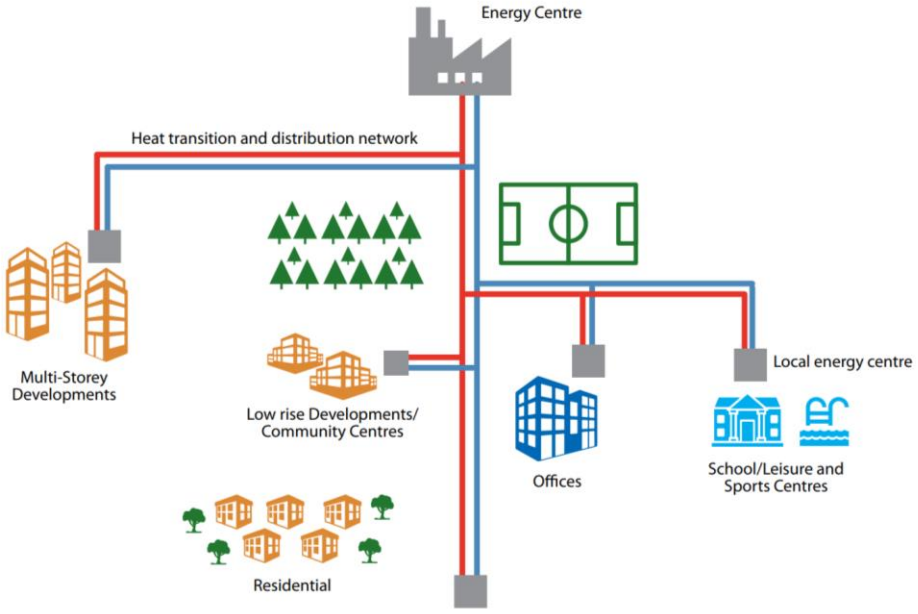

Figure 1: Diagram of a District Heating and Cooling Network (Source: Dundee CC 2018[4])

1.7 The hot water which is produced from the energy centre is transported round the network, over time this water cools and returns to the centre. This cooler or cold water can provide cooling opportunities, particularly in warm weather, to assist in the cooling processes within energy efficient buildings.

1.8 Whilst the scope of district heating projects can vary considerably, the vast majority of heat networks in the UK are relatively small-scale; in which these elements are under a high degree of common ownership or control. In many cases generation, transmission and management is carried out by a single organisation supplying properties on a single site, typically a local authority or housing association.

1.9 As small-scale 'island' networks gradually expand and integrate to form larger scale networks and recovery of low-grade heat from industry becomes more widespread, the various elements will become increasingly less siloed into single ownership. Where this can be achieved, the delivery of heating and cooling networks need to evolve to mange the differing ownership of generation, transmission and distribution assets.

1.10 Modern district heating networks allow heat to be efficiently transferred for up to 30km from a single heat source. The pipe network infrastructure may also be combined with the provision of other utilities such as electricity and data. With multiple heat sources, district heating networks, such as those in continental European countries can be hundreds of kilometres long. In some northern European countries, more than 50% of the building stock is connected to a district heating system; in Copenhagen this figure is in excess of 95%.

[4] https://www.dundeecity.gov.uk/sites/default/files/publications/districtheating.pdf

Case Study: Lancaster University

Figure 2: Lancaster University's district heating is powered by a biomass boiler (left picture of wood chips used) and a gas powered combined heat and power engine (right). Pictures from: https://www.lancaster.ac.uk/sustainability/low-carbon-technologies/biomass-boiler/ and https://www.lancaster.ac.uk/sustainability/low-carbon-technologies/combined-heat-and-power/

Lancaster University's uses both a biomass boiler and a Combined Heat and Power Engine (CHP) to provide district heating across its campus. This combined system is key to the University's commitment to reaching net zero emissions by 2035. It also provides significant cost savings for the University. The CHP alone reduces energy costs by about £750,000 per year with plans to increase capacity which will lead to yearly savings of approximately £1.3m.

Biomass Boiler

The University runs a 999kW Schmid UTSR-1200 biomass boiler. The system currently produces approximately 1,750,000 kWh of heat per year, enough to heat more than 145 homes. Avenues are being explored for increasing its output. The biomass boiler delivers about 6% of the University's heat demand on the district heating network. Wood chips are sourced from commercial forests within 30 miles of the site which are managed on a long-term sustainable basis.

Combined Heat and Power

The CHP is a CGC-2000CS-072-NG-50-500. It is rated at 5452 kW input, 2000 kW electrical output and 2248 kW thermal output. It produces around 7,000,000 kWh of electricity per year and about the same in terms of thermal energy. The amount of heat produced could more than 580 homes. The CHP delivers approx. 34% of the heat demand on our district heating network. The system is currently being optimised and should soon produce 13,500,000 kWh of heat per year or enough to heat for more than 1200 homes.

For more information:

Biomass Boiler: https://www.lancaster.ac.uk/sustainability/low-carbon-technologies/biomass-boiler/
Combined Heat and Power: https://www.lancaster.ac.uk/sustainability/low-carbon-technologies/combined-heat-and-power/

1.11 The network can fulfil two functions. Firstly, it can provide heating with hot water being taken out of the energy centre and distributed to those homes and businesses within the network. However, the network can also fulfil a cooling role as cold water returns to the energy centre providing the opportunity to cool buildings. This can be particularly beneficial where there is a high number of energy efficient buildings within the network which would benefit from low-carbon cooling opportunities in summer months.

Benefits of District Heating and Cooling Network

1.12 District heating and cooling systems usually offer benefits from economies of scale. Even a small-scale district heating system is usually operating at a greater scale than the alternative system it replaces. District heating and cooling may also result in heat production efficiencies, reduced operating costs to customers and higher levels of reliability and quality of heat as outlined below.

Efficiency

1.13 CHP technologies are more efficient in their use of energy than the combination of centralised power stations (to produce electricity) and gas boilers (to produce heat) they typically replace. A CHP system may operate at 80-90% overall efficiency, providing both heat and electricity with a lower carbon footprint. Modern, large-scale energy centres have heat efficiencies of up to 300 to 400% when compared directly to the equivalent quantity of electricity generated by thermal power plants with no heat recovery and heat generation from boilers.

Emissions

1.14 District heating networks offer the potential to reduce emissions from existing boiler installations. The district includes three Air Quality Management Areas in Lancaster City Centre, Carnforth Town Centre and Galgate which are designated as such due to the exceedances of the statutory European and National air quality objectives for nitrogen dioxide ($N0_2$) and fine particulate matter (PM_{10}).

Fuel Poverty

1.15 District heating systems have the potential to help address fuel poverty by providing secure heat a price lower than alternatives. Whilst the development of a district heating system may be capital intensive, district heating systems have the potential to offer stable financial returns to investors, which may then allow access to finance at low rates. This, together with the ability to use efficient heat generation and to feed in low-cost heat (for example waste heat from industrial processes), can result in the ability to supply heat at a relatively low cost, with the security of long-term contracts and the security of a local energy supply giving some protection from the volatility of energy markets. These savings can be significant. For residents in buildings connected to district heating through the The City CHP Network in Aberdeen have seen their fuel bills reduced by 50%. To date in the UK, access to suitable finance has remained a barrier to developing some district heating projects.

Integration

1.16 The 'economy of integration' derives from the ability to balance different heat loads which have peak requirements at different times. It is typical for maximum heating and cooling loads to fluctuate significantly, with maximum demand occurring for short periods of time. When loads with different peak demand times are served by the same network, the total heat capacity required can be significantly less than the sum of each individual heat capacity requirement. The more diverse the heat loads on a system (mixing commercial, residential and public buildings) the greater the benefit.

Renewables

1.17 District heating networks offer opportunities to use renewable and/or low carbon sources of heat (for example heat pumps, heat from water and sewerage, geothermal, solar thermal, biomass, hydrogen fuel cells, waste heat from industrial processes, energy from waste) and heat storage technologies that may otherwise not be viable, especially as networks grow. They do so as the network is 'technology agnostic' meaning that any source and combination of sources of heat can be fed into the network without the operation of the network being dependent on any one heat source.

Connectivity

1.18 The ability to connect to an existing district heating system can be very attractive to developers. Firstly, they can avoid the high capital costs of installing standalone building heat generation equipment (for instance gas boilers). Secondly, they can make productive use of space that would otherwise be required for the boiler house or energy centre. Thirdly, because large-scale district heating systems support the use of low and zero carbon energy sources, the carbon footprint of the building can be significantly reduced, enabling them to meet any obligations in connection with building standards and/or planning. Lastly, they may be able to offer the building occupiers the opportunity to take heat supply contracts at a lower cost than the alternative cost of a building scale supply, especially when maintenance and refurbishment costs are taken into account.

Case Study: Lancaster Cohousing

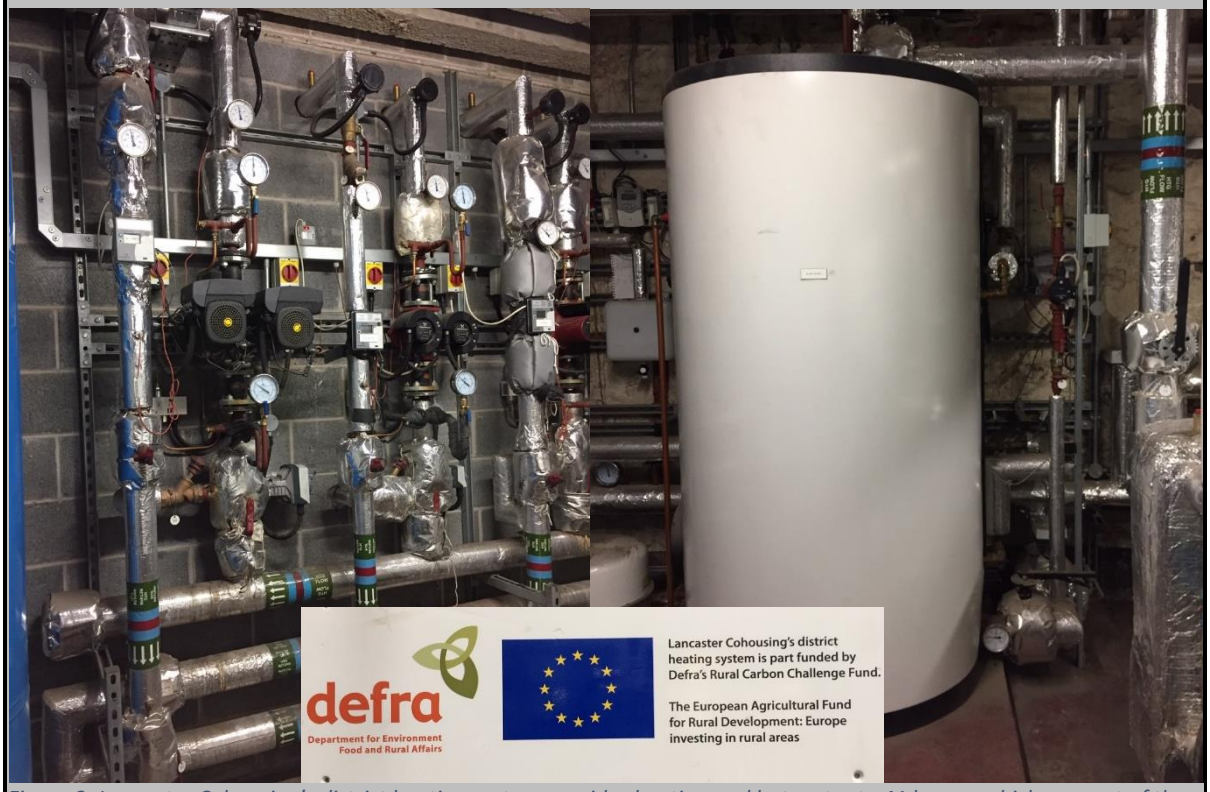

Figure 3: Lancaster Cohousing's district heating system provides heating and hot water to 41 homes which are part of the Cohousing development as well as the Halton Mill a low carbon co-working space.

Lancaster Cohousing owns and operates a district heating system which provides both heating and hot water to the 41 Passivhaus homes, a common house, children's playroom, guest rooms, and laundry in the cohousing development as well as the Lancaster Cohousing owned Halton Mill a shared working, art studio and venue space.

The installation is comprised of a biomass boiler and solar thermal system which is backed up by three natural gas boilers to continue to provide continuity of service should the primary system be down or undergoing maintenance. The district heating is a key part of Lancaster Cohousing delivering on their commitment to be a low carbon development.

Solar Thermal

The 40kW solar thermal system operates on a glycol mixture and has a drain-back system to prevent over heating or discharge of solar thermal transfer fluid. The solar thermal system is designed to input thermal energy into the water entering the biomass boiler.

Biomass Boiler

A Herz Firematic 151kW wood chip boiler is used to heat a 5,000L buffer vessel which in turn supplies the district heating network via three pumped circuits. Woodchip is sourced from a local Ofgem accredited supplier who also regularly services and maintains the boiler to ensure it is operating efficiently. The biomass boiler provides on average 177,000 kWh of thermal energy to the district heating network and the system is registered under the government Renewable Heat Incentive (RHI) scheme.

For more information see: https://lancastercohousing.org.uk/

Description of the Study Area

1.19 The study area, as identified in Figure 2, is aligned with the work which has already been undertaken as part of the *'Heating Mapping and Masterplanning in Lancaster'* study, undertaken in 2019 by Element Energy.

1.20 The red-line boundary identified in Figure 2 contains Lancaster, Morecambe, Heysham, South Lancaster (including Bailrigg, Aldcliffe and Stodday), the area also extends northwards to include Slyne-with-Hest. The 2019 study area was reviewed to assess the potential for extension of the boundary to include any relevant heat sources or key heat users.

1.21 The study area identifies the main population centres in the district, including Lancaster, Morecambe and Heysham, with a small number of smaller villages within close proximity of these centres. The study area also picks up the broad location of growth as identified in Lancaster District Local Plan[5] (2020) in South Lancaster.

1.22 The study area also includes the main employment areas in the district, this includes White Lund Employment Area and the established employment areas on the Heysham Peninsula. Also included is the Port of Heysham and Heysham Nuclear Power Station. In relation to key economic drivers, the study area also includes the campuses of both Lancaster University (South Lancaster) and the University of Cumbria (Central Lancaster).

[5] About the Local Plan & Planning Policy - Lancaster City Council

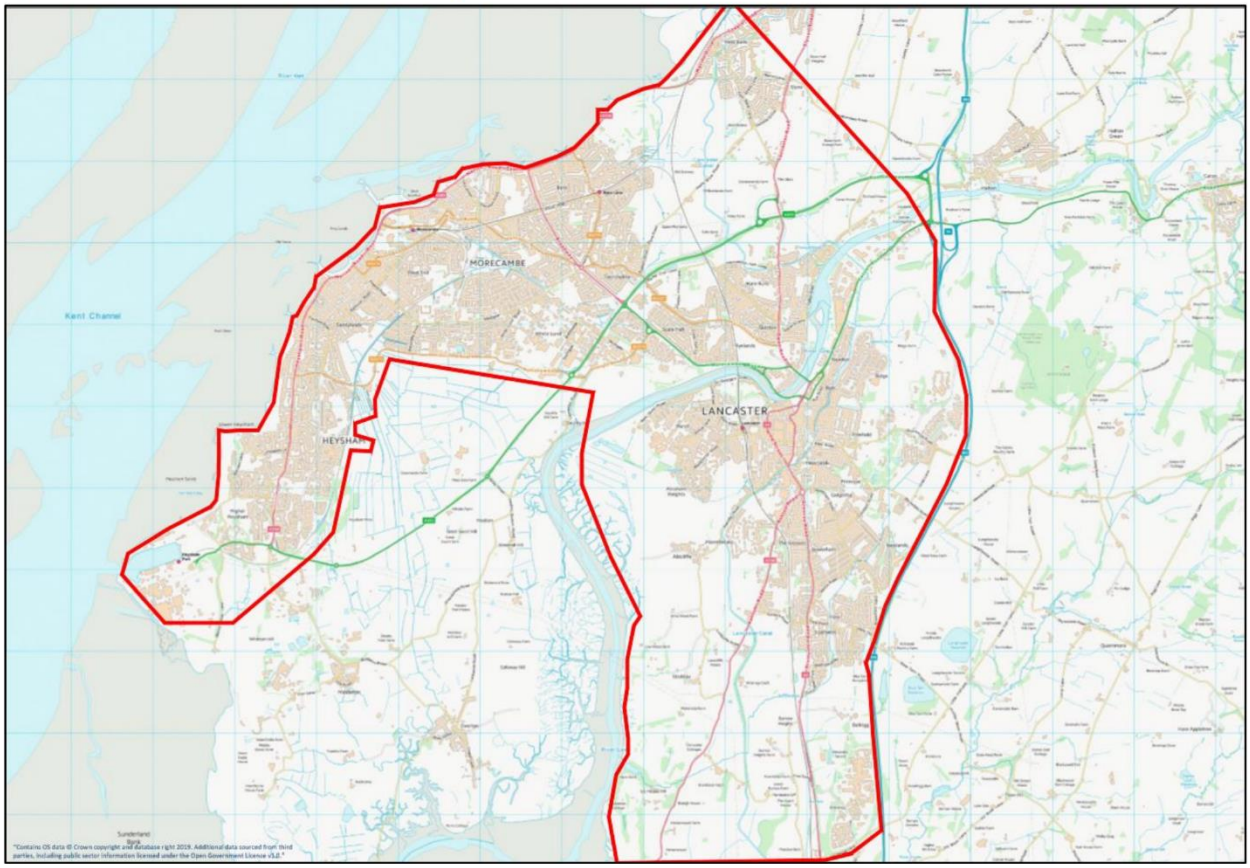

Figure 4: A Map showing the extent of the Study Area (Source: Element Energy Study 2019)

2. Policy Context

2.1 There are a series of key policies which address carbon reductions and net zero, energy and district heating, and to some extent district cooling, in the UK. The following sections provide the legislation, policy and guidance at the national, regional, and local level that provide key background for this study.

National Policy

2.2 The following are the key policies that have been introduced by the national government. They refer to the ways in which carbon emissions can be mitigated in the energy and build environment sector and particularly in thermal energy production and distribution.

2.2.1 **The Climate Change Act (2008 amended 2019)**[6]—The Climate Change act set the framework for the UK to reduce greenhouse gas emissions by 80% over a 1990 baseline and to ensure that steps are taken to adapt to the impacts of climate change. This was amended in 2019 to set a target for 100% greenhouse gas emissions reductions by 2050. Making the UK the first major economy to do this.

2.2.2 **The Energy Act (2013)—** Provides for the setting of decarbonisation target ranges and reforming the electricity market to encourage low carbon electricity generation and ensuring security of supply.

[6] https://www.legislation.gov.uk/ukdsi/2019/9780111187654/pdfs/ukdsi_9780111187654_en.pdf

2.2.3 **The metering and billing of district heating, district cooling, and communal heating and hot water systems (2014**)[7] –Sets out the Government's position on how the metering and billing elements of the Energy Efficiency Directive apply to district and communal heating and cooling. The Directive set out some minimum requirements for metering and billing.

2.2.4 **The National Planning Policy Framework (2012)** sets out the Government's planning policies for England and how these are expected to be applied. The NPPF must be taken into account in the preparation of local and neighbourhood plans, and is a material consideration in planning decisions. Local planning authorities are required to design policies which increase the use and supply of low carbon energy, have a positive strategy to promote energy from renewable and low carbon sources, support community-led initiatives for low carbon energy, and identify suitable areas for low carbon energy sources.

2.2.5 **Heat Networks (Metering and Billing) regulations (2014 amended 2015 and 2020)**—These regulations govern how heat networks are metered and billed. The purpose of the regulations is to drive energy efficiency in heating, reduce customer bills, and support carbon emissions reductions in the eating sector. Their implementation led to the first database of UK heat networks.

2.2.6 **Heat Networks: Building a Market Framework[8] (2020)**—This consultation ran from 6 February 2020 to 1 June 2020 and sought views on policy options for regulating the heating and cooling network sector. It includes a range of proposals which cover a range of areas including: proposals for consumer protection, measures for delivering cost effective low carbon thermal energy, giving heat networks equivalent rights and powers I comparted with other utilities, creating a regulatory framework for investors, and ensuring that carbon savings are maximised in existing and new heating and cooling networks. The consultation results are forthcoming.

2.2.7 **Ten Point Plan for a Green Industrial Revolution (2020**)[9]—This lays out the expectations for how the UK will mitigate and adapt to climate change and include a focus on delivering greener buildings with low carbon heat as well as highlighting the forthcoming "Heat and Buildings Strategy" expected in 2021.

2.2.8 **Energy White Paper: Powering Our Net Zero Future (2020)[10]—**This white paper lays out the Government's ambitions for a net zero carbon energy future in the UK. Part of this highlights the importance of heat networks and the government's commitment to creating a Heat Network Transformation Program and funding for a Green Heat Network Fund to decarbonise heat networks and encourage their expansion. It also commits to supporting Local Authorities in designating heat network zones and how connections can be mandated.

[7] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/379049/EED_Government_response_-_261114_version.pdf

[8] https://www.gov.uk/government/consultations/heat-networks-building-a-market-framework

[9] https://www.gov.uk/government/publications/the-ten-point-plan-for-a-green-industrial-revolution

[10] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/945899/201216_BEIS_EWP_Command_Paper_Accessible.pdf

Local Policy

2.3 Lancaster City Council is committed to adapting to the effects of climate change and mitigating the District's impact on the climate through efforts to reach net zero CO2e emissions in existing and new developments. This encompasses a range of policies and strategies, some of which are highlighted here:

2.3.1 **Lancaster City Council Energy Strategy (2015)**[11] – The strategy lays out the Council's corporate energy strategy and how the council aspires to deliver its own energy and how it can improve energy use. While it refers to the Council's own operations, it sets out a commitment to investment and future planning in renewable and low carbon energy.

2.3.2 **Lancaster Climate Emergency Declaration (2019)**[12]—The climate emergency declaration commits the Council to reducing its own carbon emissions to net zero by 2030 and to support the wider district in also reaching net zero within the same time frame. This lays the groundwork for broad support for renewable and low carbon thermal energy delivery.

2.3.3 **Lancaster District Local Plan (2020)**[13]—The Local Plan sets out the planning framework for the District. Within it provides support for transitioning to a low carbon future and support for renewable and low carbon energy though Policy DM53. It provides support for development to connect to existing heat networks and to explore the development of new heat networks in larger developments.

Consumer protection and codes of practice

2.4 As of the time of this writing, heat networks are not regulated like other utilities. As such under best practice heat network providers adhere to both Heat Trust and CIBSE codes of practice to ensure consumer protection and best assurance of quality heat network delivery.

2.4.1 As referenced in paragraph 2.2.6, in 2020, the Government established a consultation on building a market framework for heat networks, which set out measures to increase investment in the sector, proposals for giving heat networks equivalent rights and powers (such as undertaker or statutory access rights) compared with other utilities, proposals to drive decarbonisation of heat networks and use of waste-heat sources and so forth. At the time of writing, the outcome of this consultation is unknown.

2.4.2 As the regulatory framework and legislation around heat networks is actively developing, compliance with the Heat Trust standards should be expected for systems connecting to both domestic and commercial customers.[14] While, adherence to these standards is currently voluntary, it represents best practice and is a framework for ensuring consumer protection.

2.4.3 The Chartered Institute of Building Services Engineers produce a Code of Practice for Heat Networks which outlines the best practice process in terms of district heating

[11] https://committeeadmin.lancaster.gov.uk/documents/s49395/AppendixA1EnergyStrategyv26%2017022015%20Cabinet.pdf

[12] https://committeeadmin.lancaster.gov.uk/documents/g7072/Public%20minutes%2030th-Jan-2019%2018.00%20Council.pdf?T=11

[13] Local Plan Part Two: Development Management DPD - Lancaster City Council

[14] https://www.heattrust.org/

feasibility, design, operation and maintenance for the UK.[15] Its focus is on delivering value for the end-users of the heat networks. It is best practice for heat networks providers to adhere to this code.

3. Energy Demand, Heat Sources and Constraints

3.1 Making use of the 2019 Element Energy Study, the data and mapping collected identified a series of clusters where potential heat networks could be investigated. Key characteristics of these clusters included:

- High volume of heat delivered.
- High heating and/or cooling demand density.
- Deliverability: including high levels of engagement, presence of planned new development and strong local planning policies for heat networks.
- Proximity to low carbon heat source(s).
- Potential for innovative district heat network systems.
- Mix of user types to provide steady level of heat demand.

Energy and Heat Use

3.2 As identified in the 2019 Study, one of the most important features of a suitable area for a heating / cooling network is high heating and / or cooling demand. There needs to be sufficiently high demand for energy within a specific area for energy sales to cover the costs of installing the network in the first place. Another key feature of a suitable area for heat networks in the presence of large energy users which could act as 'anchor' customers for the network, this would provide a sufficient certainty over demand to reduce investment risk.

3.3 Figure 5 and Figure 6taken from the 2019 Element Energy Study, identify the significant heat users within the district. The varying size and colour of the icons used in Figure 5 and Figure 6 represent the annual heat demand of each significant user.

3.4 The maps provided relate to heating use only. Whilst the Element Energy Study considered the demand for a cooling network and concluded that no demand had been identified, it will be the purpose of this and further studies to re-consider this potential demand in light of the expectations of Local Plan Review that the delivery of more thermo-efficient buildings – both residential and commercial. This will be explored in more detail later in this Study.

[15] https://www.cibse.org/knowledge/knowledge-items/detail?id=a0q3Y00000IMrmGQAT

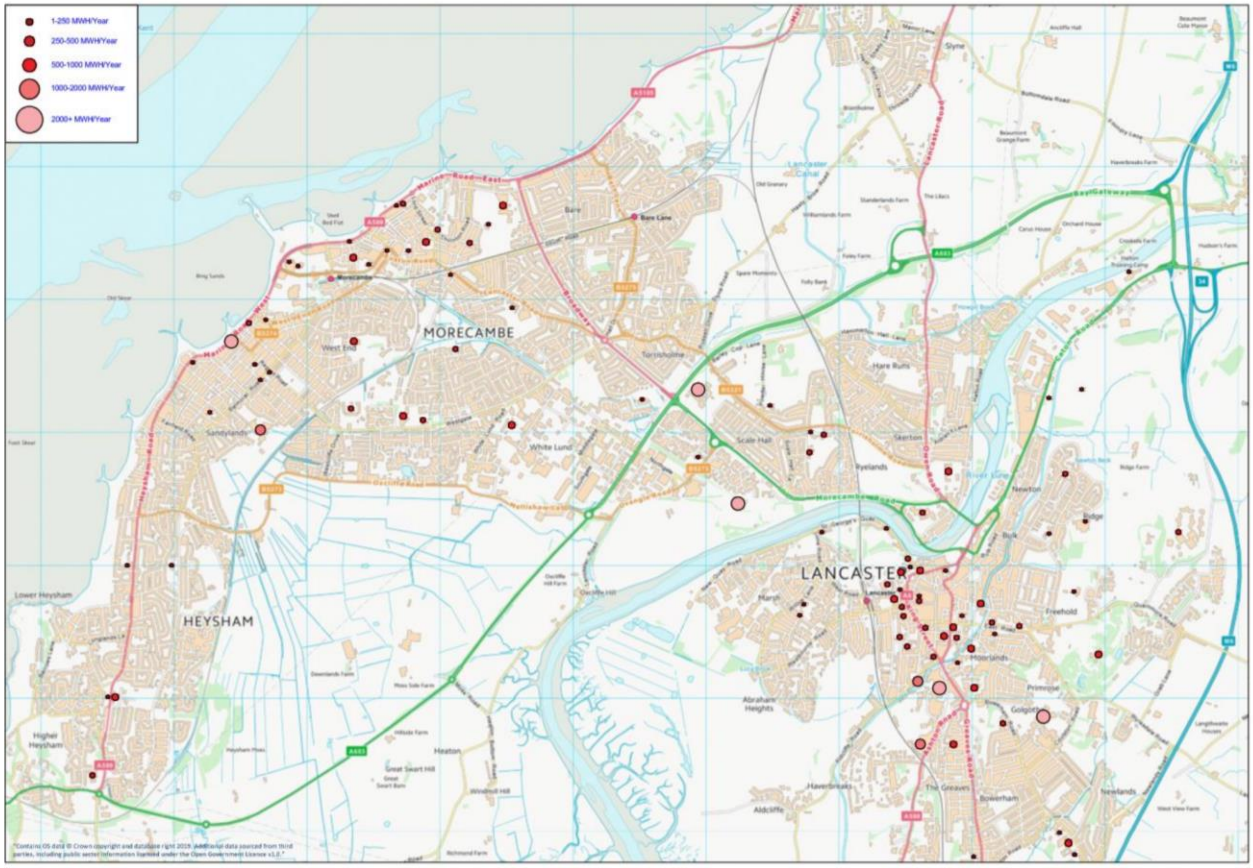

Figure 5: Significant Heat Users within the Study Area (Map 1 of 2) (Source: Element Energy Study 2019)

3.5 Figure 5 highlights that demand areas of heating demand are focused in Lancaster City Centre where concentration of demand is at its highest. The main users relate to Lancaster Royal Infirmary and the University of Cumbria Campus. North of the River Lune the main heat users are Salt Ayre Sports Centre and Lancaster & Morecambe College.

3.6 There is also demand identified in both Morecambe and Heysham, however heat users in these areas are more widespread, meaning that any network provided would have to be extensive in length (and consequently facing greater installation costs). Significant users in the Morecambe area include the Bay Leadership Academy and properties off Regent Road in the West End.

3.7 It should be noted that the mapping does not include the heat use associated with Heysham Nuclear Power Station. Whilst a high user and creator of heat this has not been considered as part of this study due to the sensitivities around nuclear power and the anticipated 'end of life' for both Reactors on the site.

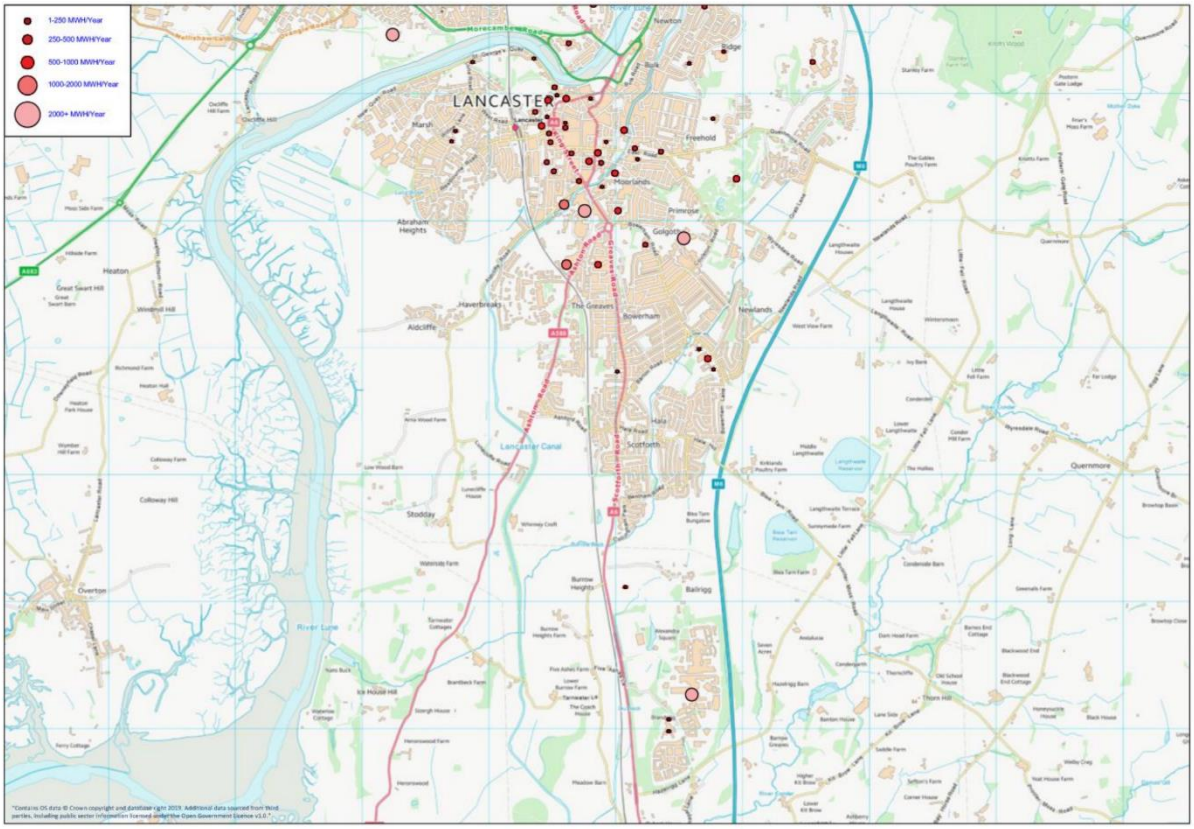

Figure 6: Significant Heat Users within the Study Area (Map 2 of 2) (Source: Element Energy Study 2019)

3.8 Figure 6 again highlights the heat clusters in Lancaster City Centre, however the mapping extends south towards Lancaster University and the proposed Broad Location of Growth as identified in the adopted Local Plan. Figure 6 confirms that the Lancaster University Campus is a significant heat user.

Deliverability - Planned New Development

3.9 The practicalities of delivering new heating and cooling networks mean that retro-fitting networks into existing places can be much more challenging than planning from afresh. Again, a key characteristic of a potential cluster is where new development will be located, these have been highlighted in Table 1.

3.10 The Lancaster Local Plan[16] was adopted in July 2020 and sets out a series of development sites which seeks to meet future development needs across the district up to 2031. The Plan seeks to focus new development towards the Lancaster area and into a series of Strategic Development Sites in North and East Lancaster, which could deliver in the region of 1,600 new homes and associated infrastructure.

[16] About the Local Plan & Planning Policy - Lancaster City Council

Table 1: Planned Developments contained with the Lancaster District Local Plan

ID	Development	Description	Current Position
1	Bailrigg Garden Village	Designated in the Adopted Local Plan (2020) for sustainable growth and the creation of a new Garden Village under Policy SG1. The area is expected to see the development in the region of 3,500 new homes through the plan period along with associated infrastructure such as schools, employment opportunities, local centre and healthcare.	Designated and will be explored through a forthcoming Area Action Plan DPD.
2	Lune Industrial Estate	Allocated in the Adopted Local Plan (2020) as a Development Opportunity Site under Policy DOS2. The policy position for this site sets a flexible approach towards mix-used regeneration of the site which could include residential and employment opportunities if planned on a comprehensive basis.	Application is currently being prepared for an employment-led regeneration of the large portion of the site.
3	Lancaster Leisure Park & Auction Mart	Allocated in the Adopted Local Plan (2020) for residential development under Policy H5. This policy allows for the development of up to 242 new homes across the Plan period.	Allocated. No progress made on implementation of the site as of 2021.
4	Land at Grab Lane, Lancaster	Allocated in the Adopted Local Plan (2020) for residential development under Policy H4. This policy allows for the development of up to 200 new homes across the Plan period.	Allocated. No progress made on implementation of the site as of 2021.
5	East Lancaster Strategic Site	Allocated in the Adopted Local Plan (2020) as a strategic development site under Policy SG7. The area is expected to see the development in the region of 930 new homes through the plan period along with associated infrastructure such as a school and local centre.	Allocated. No progress made on implementation of the site as of 2021.
6	North Lancaster Strategic Site	Allocated in the Adopted Local Plan (2020) as a strategic development site under Policy SG9. The area is expected to see development of in the region of 700 new homes through the plan period along with associated infrastructure such as schools, local centre and extra care provision.	Allocated. Planning application for the first phase of development expected in 2021.
7	Land at Ashton Road, Lancaster	Allocated in the Adopted Local Plan (2020) for residential development under Policy H6. This policy allows for the development of up to 137 new homes across the plan period.	Allocated. Planning permission has been secured for the site.

3.11 The largest designation is focused in South Lancaster and contains proposals for a new Garden Village. The Local Plan designates a 'Broad Location for Growth' across the South Lancaster (under Policy SG1) in which development opportunities will be explored through the preparation of an Area Action Plan DPD[17]. This DPD will set a detailed planning framework for future growth in this location. Policy SG1 identifies an expectation for the delivery of up to 3,500 new homes and associated infrastructure across the South Lancaster area.

3.12 Table 1 identifies the planned development which are being progressed through the plan-making process and have been identified in the adopted Local Plan. However, there are other developments

[17] Lancaster South Area Action Plan DPD - Lancaster City Council

which are being pursued outside of the Local Plan process which may have implications on the opportunity for heating and cooling networks. These are set out in Table 2.

Table 2: Potential Projects being advanced outside of the Local Plan process

ID	Development	Description	Current Position
1	Eden North Project[18], Morecambe	Proposal is being made by conservation group Eden for the establishment of the Eden North project in Central Morecambe. This will involve the development of a series of bio-spheres which link to the environmental value associated with marine life in Morecambe Bay.	Masterplanning work underway however further funding required to secure implementation.
2	Veolia Energy Plant[19], South Heysham	Proposal for the creation of an energy recovery facility at Imperial Road in South Heysham which will focus on the incineration of solid waste, commercial and industrial waste and refuse derived fuel.	Application being considered by Lancashire County Council.
3	Mainway Estate[20]	Lancaster City Council proposal to regenerate the Mainway Estate in Skerton.	Lancaster City Council's cabinet has agreed to progress proposals for the site.
4	Canal Quarter[21]	Lancaster City Council's proposal to develop a contemporary development with diverse residential, commercial, cultural and recreational opportunities.	Public consultation has concluded and more details are to follow.

3.13 The schemes identified in Table 2 above are projects which are being advanced outside of the Local Plan process but, if realised and implemented, may have become significant users and generator of heat. The opportunities explored in this study consider the implications and opportunities of these projects being realised over the course of the Local Plan Review period.

Deliverability – Heat Source Mapping

3.14 A further key element for identifying opportunities for heating networks are finding heat sources to power such a network. Whilst stand-alone energy centres can be delivered to power a heating a cooling network, there are significant benefits to finding existing heat sources where heat is a continual and secure output. For instance this could be heat which is generated from manufacturing purposes, energy generation or treatment processes.

3.15 Table 3 provides a summary to such potential heat sources within the study area. The descriptions provided and the conclusions are taken from the 2019 Element Energy Study.

[18] Eden Project North
[19] Veolia Heysham
[20] Mainway proposals move to the next stage - Lancaster City Council
[21] The Canal Quarter - Lancaster City Council

Table 3: Table to show the operational, planned or potential heating sources within the Study Area (Element Energy 2019).

ID	Development	Operational or Planned	Current Position
1	Waste Water Treatment Works – United Utilities	Operational	Waste water treatment plant including a 500kW CHP Plant installed in 2011. It is not known whether any heat from this source is not considered by the 2019 Study.
2	Heysham Nuclear Power Station	Operational	Nuclear Power Plant which a capacity of 1,155Mw and an expected end of life generated in 2024. Due to imminent end of life this as not considered by the 2019 Study.
3	Veolia Energy Plant, South Heysham	Planned	Proposal for the creation of a energy recovery facility at Imperial Road in South Heysham which will focus on the incineration of solid waste, commercial and industrial waste and refuse derived fuel. The status of this potential heat source should be monitored.
4	Walney Offshore Wind Farm Extension Substation[22], South Heysham	Operational	The sub-station in South Heysham which brings onshore the power from the Walney Wind Farm. The transfer of voltage into the National Grid creates a source of heat.
5	Lancaster University Data Centre – Cooling Systems	Operational	There are three data centre cooling systems in different locations across the university campus. Estimated heat rejection for these systems is in the region of 1Mw.
6	River Lune	Potential	River Lune was identified to have potential for water source heat pump deployment by the Department of Energy & Climate Change in their National Heat Map: Water Source heat map layer report in March 2015 with an estimated heat capacity of 37Mw. The use of this source is likely to be viable only where an energy centre can be located close to the river. Whilst this is not a potential option pursued in the 2019 Study, this is an opportunity which should be picked up within the Action Plan to this Study.
7	Groundwater Heating Opportunities	Potential	In case where an energy centre cannot be located near the river, or the river cannot be used as a source for a Water Source Heat Pump, the 2019 Study seeks to identify a potential location for a bore-hole based pump. The 2019 Study recommends a feasibility Study and/or detailed project development study should be implemented looking at site assessment, environmental assessment and a hydrological survey to better determine feasibility. This is picked up within the Action Plan to this Study.

[22] Walney Extension offshore wind farm

4. Cluster Assessment

Cluster Assessment Approach

4.1 This Opportunity Study makes use of the approach of the 2019 Element Energy Study which takes the characteristics required to develop district heating and cooling networks and looks for clusters where networks could be investigated. The clusters identified via the 2019 work were identified to combine areas of high heat demand, to separate areas according to major constraints (for instance physical barriers like rivers or railway lines) and to capture areas planned for development via the Local Plan.

4.2 This sifting process lead to eight separate clusters being defined which covered the majority of the study area which are highlighted in Figure 7.

4.3 The purpose of this section is to summarised and update the findings of the 2019 Study in relation to these eight potential clusters. The outcomes of this assess will lead the preparation of an Action Plan which sits at the end of this Study and should form the basis of the City Council's understanding of opportunity for district heating network – particularly where they could be located, how they could be powered and how they could be delivered. This study should only be seen as the starting point for such investigations, it will be important for any of the actions to be realised in this Study that further feasibility work will be necessary.

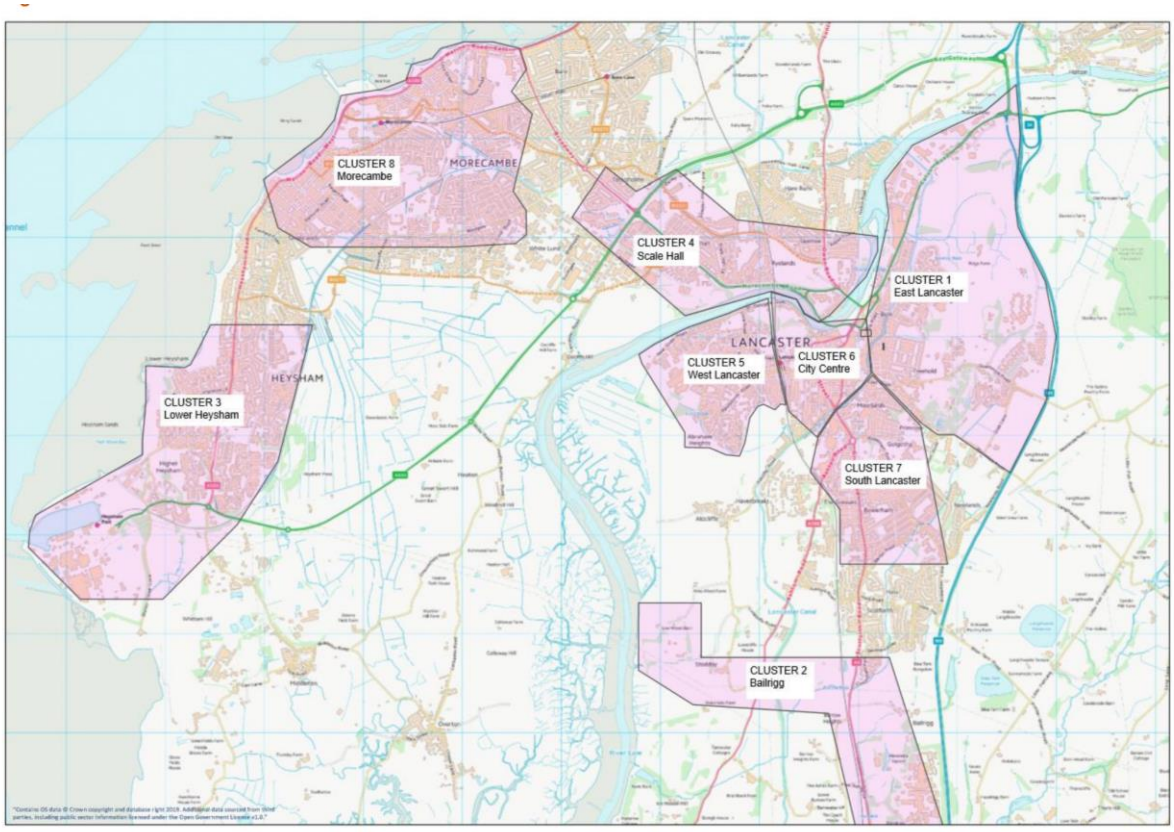

Figure 7: Indicative Clusters for Potential Heating and Cooling Networks (Source: Element Energy 2019)

Cluster 1: East Lancaster

4.4 The East Lancaster cluster contains both public and private sector buildings. The Holiday Inn on Lancaster Road is identified as the largest heat user, which amounts to one third of heat demand in this locality. Further information on heat use can be found in the 2019 Element Energy Strategic development is planned for within this cluster, with the allocation of the East Lancaster Strategic Site under Policy SG7 of the adopted Local Plan (Strategic Policies & Land Allocations DPD[23]). Development is anticipated to commence within the next 5 years on the site and will deliver in the region of 930 new homes by the end of the plan period.

4.5 Many heat users border the River Lune along the Caton Road employment area, the employment uses, coupled with the growth proposed via the Local Plan suggests that demand for a heating and cooling network could be high in this location in the future.

4.6 The River Lune could provide a source for a new energy centre through the creation of a water source heat pump. This could be coupled with any indirect heat which is generated through manufacturing processes on the Caton Road Employment area.

4.7 Opportunities for its installation should be explored through further feasibility work. The opportunity for connection into the East Lancaster Strategic Site could be considered through the Local Plan Review[24] process, subject to viability testing, and could be included in an updated Policy SG7.

Cluster 2: Bailrigg (South Lancaster Broad Location for Growth)

4.8 The high energy demands of Lancaster University provides a potential anchor user for a district heating and cooling system. The university campus includes a sports centre (with a swimming pool), on-site student accommodation and services, hotel and faculty buildings. Through engagement on the 2019 Element Energy study, the University highlighted ongoing work in experimenting with approaches to integrate a range of on-site low-carbon technologies, both for research purposes and to be able to meet their carbon reduction targets. The university also expressed an interest in how their energy system could be integrated with the wider local energy system.

4.9 The heating and cooling demands of the university are also matched by the opportunity for heat generation. The university campus have a number of data centres within the campus whose cooling systems could be used as an energy centre for a district heating system to offer a low carbon heat source.

4.10 Another potential heat source in the South Lancaster area is the 500kW CHP plant at Lancaster Waste Water Treatment works in Stodday. The facility is operated by United Utilities and the CHP unit was installed in 2011. Otherwise, a water-source heat pump could deployed, though this is likely to need to be a borehole-based approach given the South Lancaster cluster is some distance from the River Lune and it is not clear whether other surface bodies of water would have the heat capacity required to supply a large network. This would have to be explored through further feasibility work.

[23] Local Plan Part One: Strategic Policies & Land Allocations DPD - Lancaster City Council
[24] Local Plan review - Lancaster City Council

4.11 The South Lancaster cluster includes the 'broad location of growth' which is identified under Policy SG1 of the Local Plan (Strategic Policies & Land Allocations DPD), this includes the establishment of a new Garden Village[25]. The Council, through the preparation of an Area Action Plan DPD[26], will seek to prepare a planning framework for its delivery. Development in this area is expected to include in the region of 3,500 new homes and associated infrastructure, including a new school, healthcare facilities, a local centre and employment opportunities.

4.12 Growth on the scale proposals will lead to high levels of heating and cooling demand, this demand is accelerated by the fact that the majority of development will be focused in a Garden Village which will seek to establish higher levels of design and construction standards, including high levels of energy efficiency. This will drive demand for a district heating and cooling network to serve as a low-carbon option for future energy supply.

4.13 Moving forward, opportunities should be explored in relation to the feasibility of using the existing heat sources at Lancaster University and the Stodday Waste Water Treatment facility as an energy centre for a heating and cooling network. It should be noted that the presence of the Lancaster Canal and West Coast Mainline may present significant physical barriers to the establishment of any wider networks.

4.14 In the context of planning, in the preparation of the Area Action Plan DPD which will set the future framework for development in South Lancaster, careful consideration should be given to the establishment of a district heating and cooling system for the whole of the Garden Village. This could utilise an existing source of heat (as described above) or establish a new energy centre within the Garden Village itself. Work on how this can be established, the associated costs and methods of delivery should be investigated to inform the Area Action Plan process.

Cluster 3: Lower Heysham / South Heysham / Heysham Gateway

4.15 This cluster includes the residential areas of Heysham and, moving south, towards the industrial area areas which surround (and include) the Port of Heysham and Heysham Nuclear Power Station. The 2019 Element Energy Study identifies a number of potential heat users in the area however given the plans for regeneration and economic growth proposed in this area through the Local Plan this demand has the potential to escalate over the coming years.

4.16 There are a number of potential heat sources in the locality of this cluster which including accessing heat derived from the Walney Wind Farm Extension[27] substation (operated by DONG energy) and the proposed Energy from Waste Plant[28] which is being progressed by Veolia UK. The proposed plant, which is currently going through the application process with Lancashire County Council, could provide sufficient capacity to supply energy for 60,000 homes. This cluster has the potential to supply available waste heat to areas which are have significant heat demand.

4.17 The opportunity to achieve such a network will require further investigation, particularly exploring how the heat source, for instance the Veolia plant, can be connected to a wider network to heat residential properties. It should be noted that the Local Plan does not propose any significant

[25] Bailrigg Garden Village
[26] Lancaster South Area Action Plan DPD - Lancaster City Council
[27] Walney Extension offshore wind farm
[28] Veolia Heysham

residential growth in the South Heysham area (other than proposed regeneration at Middleton Towers) and therefore any network will need to be retrofitted into existing residential areas. Given such a network cannot be financed through new development then alternative methods of delivery would have to be explored.

Cluster 4: Scale Hall, North Lancaster & Mainway

4.18 The cluster is populated by a range of buildings which either provide opportunities for heating source or heat demand. This includes Sport Ayre Sports Centre (which includes a swimming pool), Morecambe and Lancaster College and Our Lady's Catholic College. These generate an annual heat demand of 8.4 GWh. The cluster is physically separated from Lancaster City Centre by the River Lune which would make any connections to a wider network in the south very difficult to achieve.

4.19 A suitable low carbon heat source for this cluster could be the creation of a water source heat pump using the River Lune, which runs adjacent to this cluster. The feasibility of siting such infrastructure would have to be explored through further investigation and assessment.

4.20 The Council are currently seeking to regenerate a significant element of its own Council housing stock within this cluster – at Mainway[29]. This estate is in significant need of renewal and therefore the Council is proposing a complete re-modelling of this area to deliver more modern and efficient housing for the residents of that area. The re-modelling of the estate provides the opportunity to incorporate a range of design principles and construction techniques which include investigating the opportunities to deliver district heating and cooling networks.

4.21 As the Mainway project progresses the Council can seriously consider its ability to deliver a heating and cooling network for the new residential development it proposes. This could be established as part of a wider network in this cluster or could be small-scale to the re-modelling project itself.

Cluster 5: West Lancaster (Luneside)

4.22 This cluster is focused on development on Lancaster's quayside with recent developments of Luneside East and West now either completed or nearing completion. The existing heat demand is calculated by the 2019 Element Energy Study to be in the region of 440MWh per annum.

4.23 Further development and regeneration is planned for this locality through the re-modelling of the Lune Industrial Estate, it is anticipated that an employment-led regeneration of this area will be submitted for this site in due course. This may provide the potential for both new heat sources but also increase heat demand in this area.

4.24 The River Lune could be utilised as a heat source for this cluster although it was considered in 2019 that the demand for heat was marginal. Should the potential regeneration at the Lune Industrial Estate be realised then it would be beneficial to reconsider heat demands in the local area to ascertain whether a network could be achievable.

Cluster 6: Lancaster City Centre

4.25 Lancaster City Centre has a range of buildings, in both public and private sector ownership which have significant heating demands. This includes a range of student accommodation blocks and public

[29] Mainway proposals move to the next stage - Lancaster City Council

administration buildings such as a Lancaster Town Hall, the Police Station and Lancaster Grammar Schools. There is an approximate heat demand in the city centre cluster of 10GWh.

4.26 The proximity to the River Lune may provide an opportunity for a suitable low carbon heat source through the provision of a water source heat pump. However, the feasibility and practicalities of installing a new network should be fully explored, particularly in a city centre setting.

4.27 The Council are seeking to lead on the delivery of regeneration of the Canal Quarter[30], which is located directly to the east of the city centre. This will involve the development of a range of residential and city-centre based uses which will further drive up demand in this locality. The regeneration of this area will be relatively comprehensive and therefore may provide the opportunity for a new small-scale network to be delivered in this area. The opportunity benefits from the fact that the majority of the Canal Quarter site is City Council owned.

4.28 The Council have prepared an SPD for the Canal Quarter area which sets out its ambitions for regeneration. Further work could be undertaken by the Council to investigate the feasibility of creating a new energy centre (either via the River Lune or on-site) and network in this locality which could act as a starting point to widen a network out into other areas of the city centre.

Cluster 7: South Lancaster

4.29 The South Lancaster cluster sits in the urban area between Lancaster City Centre and the planned area of growth around Bailrigg. The cluster contains a high number of sites which have high heat demand, including the Royal Lancaster Infirmary, the University of Cumbria and Ripley St Thomas School. There is a good diversity of types of user within this cluster which means that heating demands are relatively balanced and generates approximately 31GWh per year.

4.30 Given its location, the cluster has the potential to link with new networks in either Lancaster City Centre or Bailrigg Garden Village[31], connecting a network to the users described above and the residential properties in Scotforth, Hala and Bowerham. It should be noted that the South Lancaster cluster is separated from the City Centre by Lancaster Canal therefore investigation will be required to see whether a network can use an existing crossing.

4.31 The South Lancaster cluster is distant from the River Lune and this may therefore not provide a suitable heat source. Investigations could take place in relation to the use of the Lancaster Canal as a location to install a water source heat pump, however due to scale and flow rates it is not considered to be a suitable location for such a heat source. Through the Element Energy Study it is suggested that the most appropriate option for this cluster could be the creation of a borehole-based heat pump however this would have to be considered through a detailed feasibility study. The 2019 Study suggests that this cluster is not deemed as favourable as those bordering the river in terms of the presence of a suitable low-carbon heat source.

4.32 It may therefore be favourable to consider establishing heating and cooling networks in either Lancaster City Centre and/or Bailrigg which can then be extended over time to address heat demands within this area.

[30] The Canal Quarter - Lancaster City Council
[31] Bailrigg Garden Village

Cluster 8: Morecambe

4.33 Morecambe sits outside of many of the clusters previously described in this section, whilst it has some relationship with the cluster identified in South Heysham, there is some geographical distance from those described in the Lancaster area. Therefore, any network for Morecambe is likely to sit in some degree of isolation.

4.34 Central Morecambe is considered by the Council as one of the key priorities for regeneration by the City Council. This priority has been established through the adopted Local Plan. Latterly, the Council have been working with the Eden Project to establish a significant new attraction to the town – Eden Project North[32] – which will have significant economic and cultural benefits not just for Morecambe itself but for the wider region.

4.35 Of interest to this Study is the nature of the Eden Project North proposal which will seek to develop a series of bio-spheres which will provide linkages to the natural environment of the adjacent Morecambe Bay. Given the nature of the development it is anticipated that this will generate a significant heat demand which could be satisfied by the establishment of an energy centre which could be rolled out into a wider heating and cooling network for (parts of) the town.

4.36 Given the early stages of the project the methods of heating the bio-spheres has yet to be established but it is clear that this could present a low-carbon option to achieve this and should be discussed further with the Eden Project as part of the design and planning process.

4.37 Beyond the proposal for Eden North, the majority of buildings in the Morecambe area have relatively low heating demands. However, the combined demands are actually identified in the 2019 Element Energy Study to be relatively high, due to the large number of buildings which demand above average amounts of heat. The 2019 Study puts combined heat demand for the cluster at 14 GWh per year. One reason for the relatively high combined heat demand is the high number of hotels and self-catering accommodation within the cluster.

4.38 As highlighted in Figure 5 of this study, the heat demand for Morecambe is generally evenly spread across the town and consists mainly of a range of private sector businesses and organisations. Given this it is likely to be very difficult to establish and deliver a network in this area without incurring significant up-front costs in terms of establishing a lengthy network.

5. Action Plan and Next Steps

Local Plan Review[33]

5.1 The City Council adopted a new Local Plan in July 2020, this included two core documents – the Strategic Policies & Land Allocations DPD and a reviewed Development Management DPD. The City Council adopted the Plan on the basis that it would seek to undertake an immediate review of the Plan in the context of Climate Change, particularly seeking to explore how the Plan could contribute to the actions of the Council's own Climate Emergency Declaration which has been declared in January 2019.

[32] Eden Project North

[33] Local Plan review - Lancaster City Council

5.2 The ambition of the Council is that it seeks to strengthen policies in the Local Plan in the context of Climate Change, particularly ensuring that new development is resilient and adaptable to and mitigates the effects and impacts of Climate Change. Work on the Climate Emergency Local Plan Review commenced following the adoption of the Local Plan. Scoping work on the content of the Review took place in the autumn of 2020 and the Council anticipates consulting on a set of draft Policies in the summer of 2021. Ultimately, the City Council anticipate the adoption of a Reviewed Local Plan by late 2022.

5.3 The Local Plan Review will consider a wide range of issues which relate to Climate Change, including opportunities to deliver low-carbon heat sources. It will be important that any content and reference to potential district heating and cooling networks within planning policy is justified and effective. Specifically that if the Council have ambitions to establish district heating and cooling networks there are clearly realistic opportunities to achieve this. This study provides a critical piece of evidence which demonstrates that there are clearly a number of opportunities to support heating and cooling networks across the district which can be achieved through new development or, alternatively though Council-led projects. This study demonstrates that, subject to other planning considerations, the inclusion of district heating and cooling networks within the Local Plan process is both justified and effective.

Lancaster South Area Action Plan DPD[34]

5.4 The adoption of the Local Plan established a number of key principles for future growth and development within the district. This included establishing the principle of future development in the South Lancaster area, primarily through the creation of a new garden village (Bailrigg Garden Village). The Local Plan designated a 'Broad Location of Growth' in the South Lancaster area and established a series of key growth principles, however it deferred a detailed planning framework to the preparation of a locationally specific Area Action Plan DPD. This is a document which will be produced by the City Council which will direct how future development will be achieved in this area.

5.5 Following on from the adoption of the Local Plan in July 2020 work has begun on masterplanning for the Garden Village, which is being led by Council-appointed masterplanners JTP. Masterplanning began in early 2021 and is anticipated to be complete by the summer of 2021 at which point work on the Area Action Plan DPD will formally commence.

5.6 As highlighted in this Study, there is a significant opportunity which exists within the new Garden Village for a new district heating and cooling network. The delivery of such a network would not only align with the wider ambitions of the City Council (via the Local Plan Review) but also fit with the ethos of garden village development.

5.7 Using this study as a basis, it is expected that the Area Action Plan DPD will take forward and investigate the opportunities for a district heating and cooling network within the garden village and explore opportunities to link such a system wider across the South Lancaster area, working with Lancaster University to explore such opportunities.

[34] Lancaster South Area Action Plan DPD - Lancaster City Council

Setting Priorities

5.8 Appendix A of this Study sets out an Action Plan which identifies all known opportunities for district heating and cooling networks across the study area. The Action Plan sets out priorities for future investigation which are based on a strategic view over their suitability for future implementation. These decisions are based on the potential feasibility of their delivery and the scope which the City Council will be able to lead on their delivery.

5.9 Consequently, those which are of the highest priority are opportunities which require short-term intervention (action soon) which could deliver tangible results in the relative short-term. This includes work on the Lancaster South AAP and consideration of network creation as part of the Council-led regeneration projects at Mainway and Canal Quarter. Medium priorities lie with the projects at South Heysham and Central Morecambe which rely on external funding decisions before any networks can be realised in these areas. The low priorities relate to projects where feasibility is expected to be marginal or whether connections may be best realised as a longer-term ambition (i.e. through a long-term widening of the network).

Collaborative Engagement

5.10 The delivery of district heating and cooling systems requires a collaborative approach from a range of differing stakeholders. Whilst the City Council can play a role in both feasibility, delivery and implementation it will also be for others to participate and engage in the process to ensure that opportunities and success of future schemes can be maximised.

5.11 Key challenges which require engagement include establishing the feasibility of a particular project and scheme, particularly understand how a network can be established, how much it would cost to create and manage and who assumes responsibility for its management and maintenance. Engagement will also be a critical factor in the construction processes, particularly in areas where installation will involve differing landowners and interested (for instance Lancaster City Centre). Finally, engagement will be essential for the implementation of the network and its effective ongoing use. For instance it will be critical for engagement with the power companies to ensure that such networks have sufficient power to function.

5.12 Consideration of how use dialogue can be achieved through the feasibility, installation and operation phases of a new network should be established early in the process. Through the feasibility work undertaken for any specific project the key stakeholders need to be identified and engaged with to secure support and cooperation.

Further Assessment

5.13 In many cases this study provides direction that further assessment work will be necessary to fully understand the opportunities for district heating and cooling. This will be particularly the case through the preparation of a number of feasibility studies for the various opportunities identified. This study provides a basis for engaging in this feasibility work in due course subject to funding and resource commitments.

5.14 The clusters identified show that opportunities for district heating and cooling networks clearly existing. However, the identification of the clusters does not suggest that any network should be separate from each other.

5.15 The longer-term ambition should be to consider how such clusters can be joined to form a comprehensive network, starting with the main urban areas of Lancaster, Morecambe and Heysham but the considering how that can be expanded with the wider district, for instance to include Carnforth. More comprehensive studies over how that should be achieved could be considered, subject to funding and resources, to understand how a wider network could be achieved. This could be considered against best practice in places such as Plymouth[35]

[35] 170703 NN Plymouth City Wide Energy Strategy Draft Report 02

Opportunity Study: Action Plan for Exploring Heating & Cooling Networks

	TITLE	DESCRIPTION	ACTION	PRIORITY	RESPONSIBLE ORGANISATION(S)	POTENITAL SOURCE(S) OF FUNDING
A	**Exploring the use of a Water Source Heat Pump in the River Lune in East Lancaster**	To investigate the opportunity for the installation of a Water Source Heat Pump at the River Lune in East Lancaster in order to create a new heating / cooling network to serve the East Lancaster Strategic Site and existing employment uses along Caton Road.	• Feasibility Study required.	**MEDIUM**	• Lancaster City Council • Development Industry • Business Owners • Environment Agency	
B	**The installation of a district heating system for South Lancaster (Bailrigg Garden Village)**	Recognising the significant extra demands for heating and cooling as part of the proposed growth in South Lancaster (including Bailrigg Garden Village) the opportunity exists to meet these demands using a district heating and cooling network. This should consider the following matters: 1. Establish the heat source, either using an existing source such as the University or UU facility or the creation of a new energy centre. 2. Understand how the new network can be delivered as part of the development process, the timescales and associated costs (which can then be factored into the viability process). 3. Clarify methods of management and maintenance of such a network, who will be responsible for this and how will it be financed.	• Feasibility Study required to investigate use of existing heat sources. • Assessment required into how a heating / cooling network can be established using a new Energy Centre within the new settlement.	**HIGH**	• Lancaster City Council • Lancashire County Council • Lancaster University • Development Industry	
C	**Heating and Cooling Networks from South Heysham**	Recognising the potential heat source opportunities in South Heysham further investigation should be undertaken to explore how this could be delivered. This investigation should consider: 1. Investigation of how the heat source connects to a wider network to supply wider heat demand. 2. Consideration of where any heat network should be directed to, either the urban areas of Morecambe / Heysham or Lancaster. 3. Provide an understanding of how a network can be retrofitted into existing residential areas and the costs which are associated with that. 4. Establish how the creation of such a network can be funded (in the absence of new development). 5. Clarify methods of management and maintenance of such a network, who will be responsible for this and how it will be financed. Any study work should be based on the outcomes of the Veolia UK proposal and its implementation. Should the potential for this plant not be realised then this action should not come forward.	• Work dependent on the outcomes of the application for the Veolia UK Energy Plant. • Feasibility work required into establishing network connections.	**MEDIUM**	• Lancaster City Council • Lancashire County Council • Veolia UK • Business Owners	
D	**Exploring the use of a Water Source Heat Pump in the River Lune in North Lancaster**	To investigate the opportunity for the installation of a Water Source Heat Pump at the River Lune in North Lancaster, between Scale Hall and the Mainway Estate in order to create a new heating / cooling network to residential development and other public buildings where it can offer diversity in energy supply.	• Feasibility Study Required.	**LOW**	• Lancaster City Council • Environment Agency	

E	**The creation of a small-scale heating and cooling network as part of the re-modelling for Mainway.**	As part of the Council-led re-modelling of the Mainway estate, the installation of a small-scale heating and cooling network should be investigated. This should be given due consideration in the early stages of planning for the re-modelling work and consider the following aspects: 1. Potential heat sources, whether this be an individual energy centre, a water source heat pump on the adjacent River Lune or connection into a wider heating network. 2. How a network can be designed into new development and the associated costs of achieving this. 3. Clarify methods of management and maintenance of such a network, who will be responsible for this and how it will be financed.	• Opportunities for district heating and cooling to be considered in the initial design and planning stages. • Detailed feasibility work to be undertaken to design and cost how installation could be achieved.	**HIGH**	• Lancaster City Council • Environment Agency	
F	**Demand Assessment for a Heating and Cooling Network in West Lancaster.**	Following the regeneration of the Lune Industrial Estate, consideration should be given to re-investigating the potential demand for a heating and cooling network in this area. Demand will not only be subject to the regeneration of the estate but also the future users (and their demands) within the regenerated estate.	• Heat Demand Assessment to be undertaken at the appropriate point.	**LOW**	• Lancaster City Council • Environment Agency	
G	**Exploring the use of a Water Source Heat Pump in the River Lune in Lancaster City Centre**	To investigate the opportunity for the installation of a Water Source Heat Pump at the River Lune in the vicinity of Lancaster City Centre in order to create a new heating / cooling network to residential development and other public buildings where it can offer diversity in energy supply.	• Feasibility Study Required.	**MEDIUM**	• Lancaster City Council • Environment Agency	
H	**The creation of a small-scale heating and cooling network in Central Lancaster as part of the Canal Quarter regeneration**	As part of the Council-led regeneration of the Canal Quarter in Lancaster City Centre, the installation of a small-scale heating and cooling network should be investigated. Given the holistic nature required for such a network it should be considered in the early stages of the project and consider the following aspects: 1. Potential heat sources, whether this be an individual energy centre, a water source heat pump on the adjacent River Lune or connection into a wider heating network. 2. How a network can be designed into new development and the associated costs of achieving this. 3. Clarify methods of management and maintenance of such a network, who will be responsible for this and how it will be financed.	• Opportunities for district heating and cooling to be considered in the initial design and planning stages. • Detailed feasibility work to be undertaken to design and cost how installation could be achieved.	**HIGH**	• Lancaster City Council • Lancashire County Council • Environment Agency • Development Industry	
I	**Exploring the use of a Borehole-based heat pump in the South Lancaster Area (Cluster 7).**	To investigate the opportunity for the installation of a borehole-based water source heat pump in the South Lancaster area to provide a heating cooling network to users in the Scotforth, Hala and Bowerham areas of the City. This could also look at links to key users such as the Royal Lancaster Infirmary, the University of Cumbria and Ripley St Thomas High School.	• Feasibility Study Required.	**LOW**	• Lancaster City Council	

J	**Explore Options around the Eden North Proposal in terms of establishing an Energy Centre in Central Morecambe**	Recognising the potential of the Eden North project in terms of the heat demands it could create and the opportunities it could provide to deliver a low-carbon heat source. This should involve discussions with Eden UK at an early stage to explore the following: 1. To investigate the feasibility of incorporating a Energy Centre within the Eden North project. 2. To investigate potential low-carbon heat sources in which to power such an energy centre. 3. To understand whether any energy centre situated in the Eden North project could provide the focus for wider network creation within Central Morecambe. 4. Should a wider network be feasible, investigation of how such a network could be delivered, managed and maintained giving due consideration to viability.	• Work dependent on the outcomes of discussions with the Eden Project. • Feasibility work required into establishing network connections.	**MEDIUM**	• Lancaster City Council • Eden Project	

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