



Department for
Business, Energy
& Industrial Strategy

HEAT NETWORKS: 2020 Q3 PIPELINE



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INTRODUCTION

This publication by the Department for Business, Energy and Industrial Strategy (BEIS) brings together heat networks investment opportunities in England and Wales. The opportunities present a wide range of projects supported through the development stages by the Heat Networks Delivery Unit (HNDU) and projects seeking capital support from the Heat Networks Investment Project (HNIP).

The publication includes a list of one-page summaries for each of the heat network projects supported by BEIS, which set out details of HNDU and HNIP projects, where projects have provided enough detail in time for publication.

For HNIP, this represents projects which have submitted at least a pre-application to the Delivery Partner, Triple Point Heat Networks Investment Management (<https://tp-heatnetworks.org>), since the scheme opened in February 2019. As a number of the projects are at different stages of development some of the costs aren't currently available or will be subject to project consent¹ and change as they progress through the project lifecycle.

The following chart shows the 2020 Q3 Capex pipeline of HNDU and HNIP projects from early stage development through to construction.

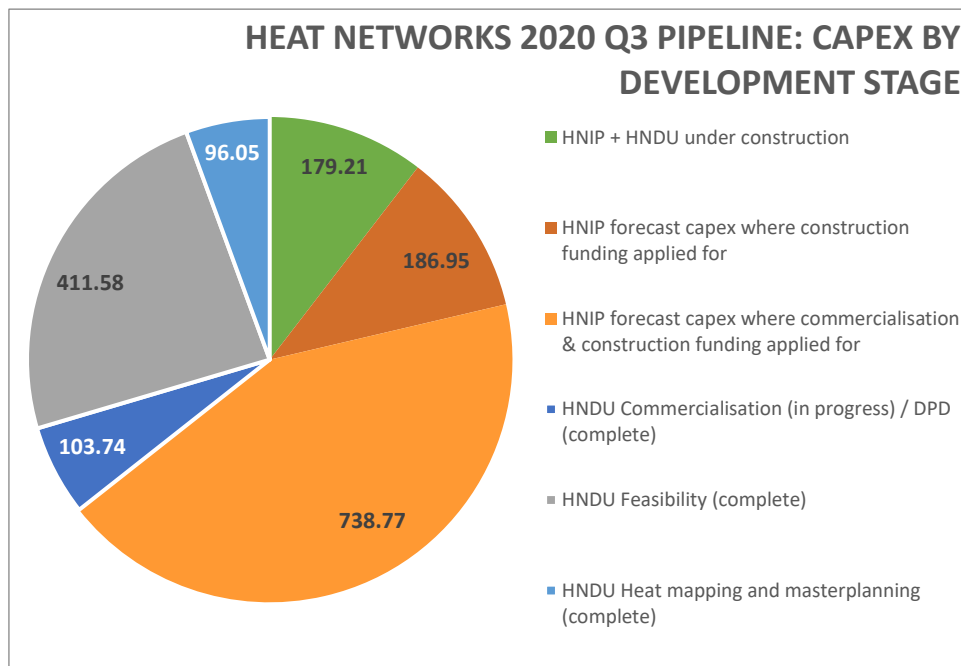
For questions relating to the HNIP pipeline or scheme enquiries, please direct these to enquiries@tp-heatnetworks.org. For questions relating to the HNDU pipeline opportunities please direct these to HNDU@beis.gov.uk FAO: George Robinson

¹ Projects seeking HNIP funding can choose between three consent levels for the purpose of this application, full consent, limited consent and aggregated data only:

- "full consent" level will include all project information listed in the "Heat Networks Project Pipeline Summary" one-pager,
- "limited consent" keeps commercially sensitive data, such as financial information, confidential, and
- "aggregated data only" will only include projects in the Pipeline chart and applies to all projects as part of the application process.



2020 Q3 Active Capex Pipeline: £1,716m of which £179m is under construction and £926m relates to HNIP projects for which applications have been made:





HNIP APPLICATIONS

(SEEKING COMMERCIALISATION AND/OR CONSTRUCTION FUNDING)

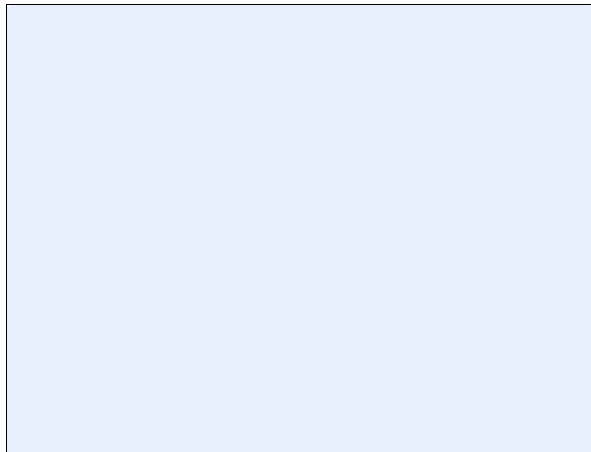


Shoreham Heat Network

Project Sponsor:

Adur District Council

Network Map:



Summary forecast financial information:

Total capex (£m)	£8.00
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Project IRR*	Not provided
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* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
2020	2021	2023	Not Provided

Project Stage

Construction

Project Contact Details:

Contact Name:	HNIP
Email:	BDM@tp-heatnetworks.org

HNIP Application Information:

Grant requested (£m)	£0.00
Corporate Loan req. (£m)	£5.00
Project Loan requested (£m)	£0.00

Technical Information:

Primary energy source:

Water source heat pumps

Project description:

Adur District Council is commissioning consultants to carry out detailed project development of the Shoreham heat network. This follows a high level Feasibility Study funded by HNDU by Carbon Trust (CT) and Sustainable Energy (SEL) dated 2019.

Existing and future energy demands in the Shoreham Harbour area arise mainly from the private sector and planned developments across the Western Harbour Arm, with several large developments making up much of the demand.

All appropriate energy generation technologies were assessed in relation to specific network options. The recommended scheme utilises a combination of marine source heat pump (MSHP) and gas CHP technologies. A network served by MSHP and gas CHP technologies meets the stated project priorities providing affordable low carbon energy and the combination of technologies provides a more robust, lower risk solution than heat pump only options.

The outline business case will be complete by autumn 2020. Construction is expected to commence in 2021, with the first connection in 2023.

Scope of Works for the heat network to include:

- Installation Management
- Pipework delivery, installation and commissioning
- Energy centre delivery, construction & commissioning
- Customer connection

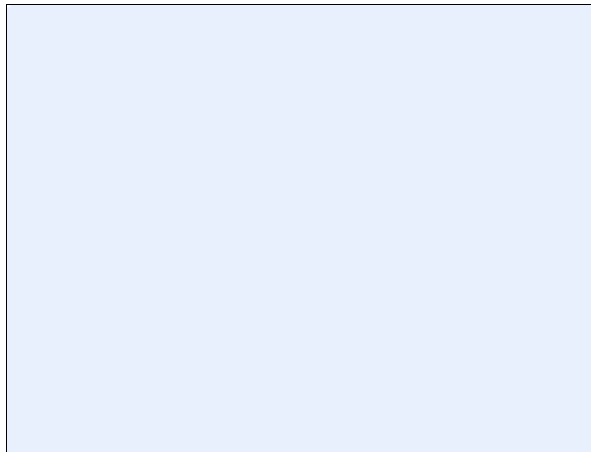


Bridgend Town Heat Network

Project Sponsor:

Bridgend County Borough Council

Network Map:



Summary forecast financial information:

Total capex (£m)	£4.20
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Project IRR*	2.60%
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* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
2020	2020	2020	Not Provided

Project Stage

Commercialisation&Construction

Project Contact Details:

Contact Name:	HNIP
Email:	BDM@tp-heatnetworks.org

HNIP Application Information:

Grant requested (£m)	£1.24
Corporate Loan req. (£m)	£0.00
Project Loan requested (£m)	£0.00

Technical Information:

Primary energy source:

CHP – Gas

Project description:

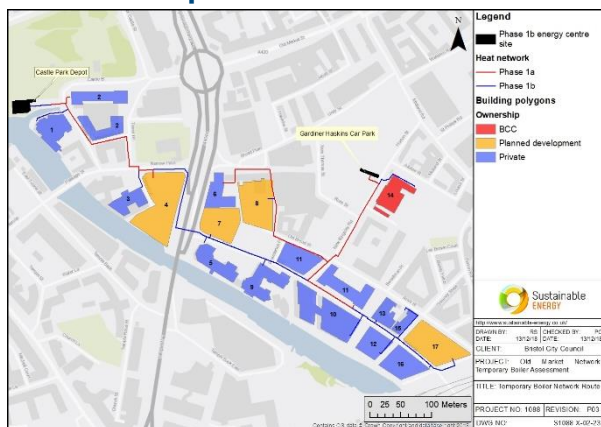
The project involves the use of an existing plant room located in a Bridgend Council (BCBC) owned Leisure Centre (LC) to host a new Energy Centre (EC). The LC and adjacent Bowls Centre (BC) are currently leased to an operator (GLL who own the leisure operator HALO). It is agreed that the existing contract between BCBC and GLL will be modified so that ownership and control of the EC can pass to the 100% BCBC owned SPV: the SPV will then procure a DBOM contractor to deliver the proposed scheme. The existing EC currently has a gas-fired CHP with back-up boilers - these will be replaced with a larger CHP unit and new back-up/peak boilers. A thermal storage tank will be installed to the rear of the LC. The existing incoming gas to the LC is sufficient to support the proposed scheme but there will need to be an upgrade to the capacity of the transformer: the connection offer has been requested from the DNO concerned to whom a G99 application will then be submitted. The new EC will supply the existing LC (including swimming pool) and the BC with heat and power. In addition, the EC will supply heat and power to the nearby BCBC Civic Office and a Registry Office, the latter being located next to the Sunnyside development site which is ear-marked for mixed-use development. The lead developer for Sunnyside is Linc Cymru, a Registered Social Landlord (RSL) who is building 59 residential units (of different types) as well as a Medical Centre that will be owned and occupied by Cwm Taf Health Board. The Sunnyside development will be completed by December 2020. The EC will supply heat and power to the Medical Centre as well as heat to the residential units.

Old Market Network

Project Sponsor:

Bristol City Council

Network Map:



Summary forecast financial information:

Total capex (£m)	£18.15
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Project IRR*	1.30%
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* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
2020	2020	2020	Not Provided

Project Stage

Commercialisation&Construction

Project Contact Details:

Contact Name:	HNIP
Email:	BDM@tp-heatnetworks.org

HNIP Application Information:

Grant requested (£m)	£6.59
Corporate Loan req. (£m)	£0.00
Project Loan requested (£m)	£0.00

Technical Information:

Primary energy source:

Water source heat pumps

Project description:

A new network in Bristol, as the City Council seeks to install a city centre-wide provision of low carbon heat through heat network pipes. Designed to supply low carbon heat from the Energy Centre at the current Castle Park Council Depot site, at full build out the energy centre will comprise of a Water Source Heat Pump, Gas CHP and Gas peak and reserve boilers. The Phase 1 Old Market Network will supply 17 buildings including 4 residential blocks, 10 office blocks, 2 hotels and 1 school with an annual demand of 14.4MWh, through 1.6km of DH pipe. Over the next 25 years, the Old Market Network Phase 1 project will save around 76,911 tonnes of carbon. In the longer term, there may be more opportunities for new low or zero carbon sources of heat to connect to the network.

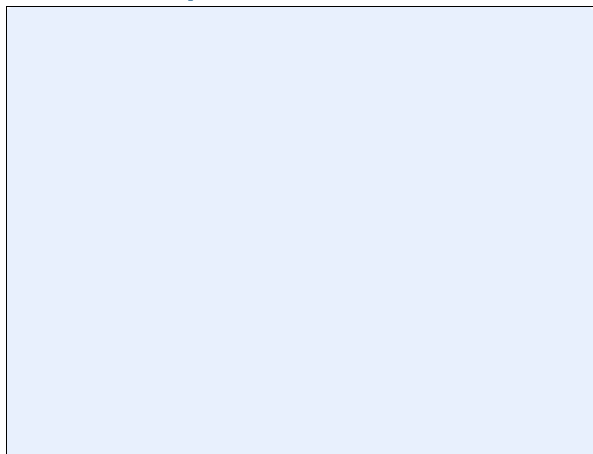


Temple

Project Sponsor:

Bristol City Council

Network Map:



Technical Information:

Primary energy source:

Water source heat pumps

Project description:

The Temple Heat Network is new heat network being developed to generate low carbon from water sources heat accessible from the regeneration of Temple Island and waste heat from Bristol Universities Temple Quarter Enterprise Campus. The Temple Heat network will support significant regeneration around Temple Quarter Enterprise Zone.

Summary forecast financial information:

Total capex (£m)	Not Provided
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Project IRR*	Not provided
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* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
2022	Not Provided	Not Provided	Not Provided

Project Stage

Commercialisation&Construction

Project Contact Details:

Contact Name:	HNIP
Email:	BDM@tp-heatnetworks.org

HNIP Application Information:

Grant requested (£m)	Not provided
Corporate Loan req. (£m)	Not provided
Project Loan requested (£m)	Not provided

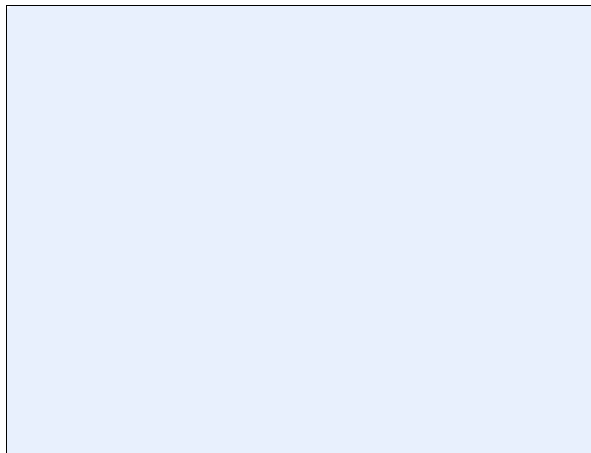


Bedminster

Project Sponsor:

Bristol City Council

Network Map:



Summary forecast financial information:

Total capex (£m)	Not Provided
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Project IRR*	Not provided
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* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
2022	2021	2021	Not Provided

Project Stage

Commercialisation&Construction

Project Contact Details:

Contact Name:	HNIP
Email:	BDM@tp-heatnetworks.org

HNIP Application Information:

Grant requested (£m)	Not provided
Corporate Loan req. (£m)	Not provided
Project Loan requested (£m)	Not provided

Technical Information:

Primary energy source:

Water source heat pumps

Project description:

"The Bedminster Network is new heat network being developed to generate low carbon from mine and sewer sources accessible within Dame Emily Park. The Bedminster Heat Network will support significant regeneration in the local area within the Bedminster (I) Green and Bedminster II regeneration schemes. Bristol City Council (BCC) is one of the land owners within the Bedminster Green framework area consisting of open space, car parking, offices and industrial units. The Bedminster Green Framework is designed to support the development of a number of high rise high density residential development delivering over 500 student beds and more than 330 flats. Building heights will range from around 4 to 17 storeys. The density of development proposed makes the framework area well suited to be served by a low carbon heat network and there has been private sector interest in bringing this forward based on the quantum of development proposed for the area.

The pipework installation will be coordinated with major transport infrastructure and road upgrades. This is future proofing works and will enable the heat network to connect to existing and proposed new developments around Bedminster.

Bedminster phase I will consist of:

1. A new energy centre designed to access low carbon heat from mine sewage sources in Dame Emily Park

2. Targeting connections to key anchor loads such as the Bedminster Green Development Framework sites and the Bristol South Swimming Pool. These developments represent eight out of the top ten heat loads identified in the Bedminster Heat Mapping and Masterplanning Report.

"

Redcliffe Heat Network

Project Sponsor:

Bristol City Council

Network Map:



Technical Information:

Primary energy source:

CHP – Gas

Project description:

The extension of the Bristol Redcliffe heat network will involve the expansion of the existing network and the installation of a second low carbon energy centre to supply heat to a number of new commercial developments in the area. The current scheme, which utilises biomass boilers, was completed in 2016 and supplies 700 social housing properties.

The extension will use the additional capacity within the current energy centre as well as the new energy centre, located within the council's offices, which will include new gas CHP and back up boilers. The scheme will also include future proofing works to enable the network to be connected to additional existing loads and proposed new developments around Bristol Temple Meads. In addition to this section of the network the council will also be expanding to new areas of the city which will be served by new renewable sources such as water source heat pumps and geo-thermal technology.

Summary forecast financial information:

Total capex (£m)		£8.06	
Project IRR*		4.80%	
* Real pre-tax pre-finance			
FID	Construct ion Start	Heat On (initial)	Heat On (full)
2020	2020	2020	Not Provided

Project Stage

Commercialisation&Construction

Project Contact Details:

Contact Name:	HNIP
Email:	BDM@tp-heatnetworks.org

HNIP Application Information:

Grant requested (£m)	£3.63
Corporate Loan req. (£m)	£0.00
Project Loan requested (£m)	£0.00

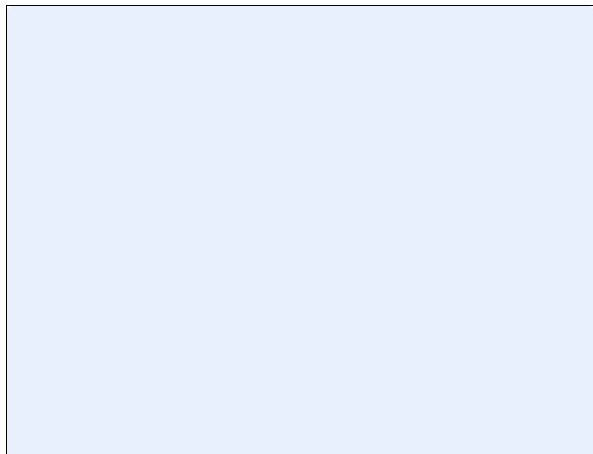


Swaffham Prior Community Heat Network

Project Sponsor:

Cambridgeshire County Council

Network Map:



Summary forecast financial information:

Total capex (£m)	£7.32
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Project IRR*	3.48%
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* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
2020	2021	2021	2022

Project Stage

Commercialisation&Construction

Project Contact Details:

Contact Name:	HNIP
Email:	BDM@tp-heatnetworks.org

HNIP Application Information:

Grant requested (£m)	£2.15
Corporate Loan req. (£m)	£0.00
Project Loan requested (£m)	£0.00

Technical Information:

Primary energy source:

Ground source heat pump

Project description:

Swaffham Prior Community Land Trust and Cambridgeshire County Council are developing a fossil-fuel-free heat network for a rural community in East Cambs. This project will save 46,000tCO₂e over 40 years, upgrade broadband capacity for homes, whilst also improving biodiversity in the area, offering educational facilities to local schools, businesses, public sector; and tackling fuel poverty in the village. This is a crucial strategic opportunity to demonstrate the capacity for retrofit heat networks in the UK. The project is configured to remove dependence on fossil-fuels for heating and hot water - another UK first. The board regularly receive enquiries from other communities, in Cambridgeshire and beyond, looking to implement similar projects – this is a flagship, pioneering project with huge potential for replication nationally. The scheme comprises boreholes on agricultural land to the south of the village and air-source heat collectors above ground; an energy centre where the heat pumps are located; and the network itself, distributing heat to the properties connected to the scheme.

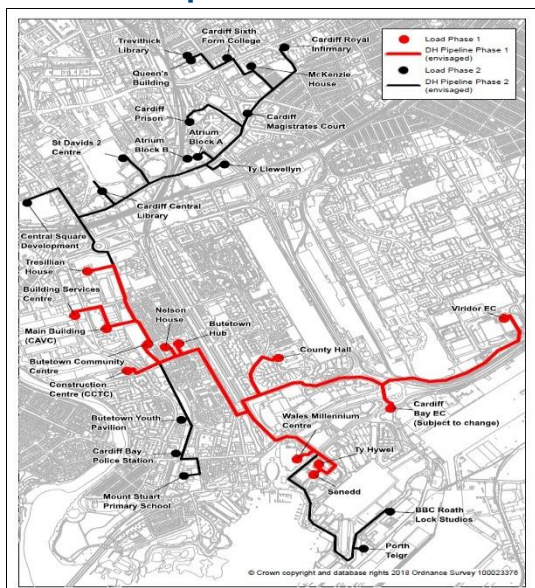
The project is currently in commercialisation, with planning approval submitted, and strong support politically for the scheme. We intend to commence construction in spring/summer 2021.

Cardiff Heat Network - Phase 1

Project Sponsor:

County Council of the City and County of Cardiff

Network Map:



Summary forecast financial information:

Total capex (£m)	£15.60
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Project IRR*	0.02%
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* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
2022	2024	2024	Not Provided

Project Stage

Construction

Project Contact Details:

Contact Name:	HNIP
Email:	BDM@tp-heatnetworks.org

HNIP Application Information:

Grant requested (£m)	£6.63
Corporate Loan req. (£m)	£0.00
Project Loan requested (£m)	£0.00

Technical Information:

Primary energy source:

CHP – EfW

Project description:

The proposed Cardiff Heat Network is envisaged to begin at the Trident Park Energy from Waste (EfW) plant in Cardiff Bay and run through large parts of the Bay area before crossing the main Cardiff to London railway line. It will then skirt the southern edge of the city centre and finally end in the western parts of Newport Road. Phase 1 will reach to the area immediately south of the railway line and Phase 2 will complete the network to points north and east of this as well as providing further reach into the southern Bay area.

The proposed primary heat source for the network is envisaged to be the EfW plant. Low pressure steam from the EfW plant will be used to heat water which will then circulate in the distribution network at a temperature of around 90C. A heat exchange process will ensure physical separation of the fluid at the EfW plant from those in the distribution network. A separate “energy centre” containing top-up/back-up gas boilers will also be required to ensure resilience for the network. This facility will step in to guarantee heat supplies in the event that the EfW cannot deliver sufficient heat as a result of routine maintenance requirements or other operational issues.

The feasibility study work focussed on public sector customers. This is because these organisations are more able to commit to the long term heat supply contracts required to instigate the network. They are also bound by the same carbon reduction targets and so have other non-financial motivations to participate. This committed and stable customer base is a particular feature that potential funders are looking for to give confidence that any scheme is financially stable and sustainable in the longer term.

The envisaged route of the network shown in the feasibility study identifies the potential public sector customers along this route. There is also a considerable private sector customer pool in the vicinity of the proposed network. The public sector connections for the full network (Phases 1 and 2) have a combined annual heat demand of 34 GWh. Adjacent to the full network are private sector buildings with a combined annual demand of around 22 GWh. From a technical perspective the existing EfW plant could supply over 85% of the total combined public and private heat demand of buildings in close proximity to the distribution pipes. The network will therefore be sized to allow the potential connection of these private sector loads from the outset.

The delivery model envisages that the network will be developed in two key phases as described above. Phase 1 will be the focus of the initial grant. This is the most expensive phase as it contains all of the costs of initial connections to the EfW plant, the development of the backup energy centre and the costs of “future proofed” heat distribution pipes to accommodate future growth.

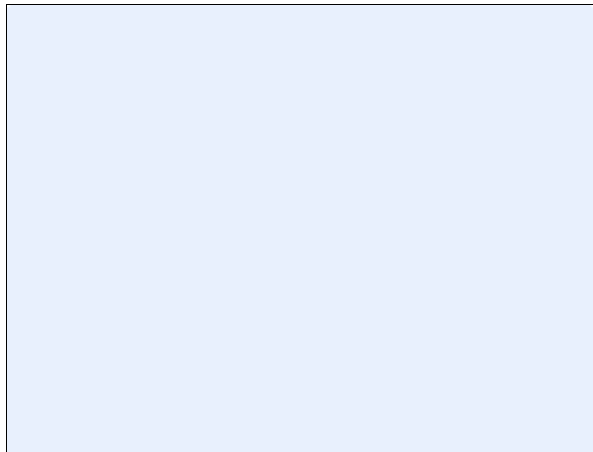


Citigen

Project Sponsor:

EON

Network Map:



Summary forecast financial information:

Total capex (£m)	Not Provided
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Project IRR*	Not provided
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* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
2020	2021	2021	Not Provided

Project Stage

Commercialisation&Construction

Project Contact Details:

Contact Name:	HNIP
Email:	BDM@tp-heatnetworks.org

HNIP Application Information:

Grant requested (£m)	Not provided
Corporate Loan req. (£m)	Not provided
Project Loan requested (£m)	Not provided

Technical Information:

Primary energy source:

Ground source heat pump

Project description:

The proposed project is to develop and deploy a low carbon, low temperature decentralised heating and cooling (DHC) network extension from the existing Citigen energy plant to 3 commercial customers.

1. Museum of London (namely MoL, new location in West Smithfield, south of Citigen) -

<https://www.museumoflondon.org.uk/about-us/our-organisation/west-smithfield>

2. Farringdon West Crossrail over site development (namely Bloom Clerkenwell, north of Citigen) -

<https://hbreavis.com/en/project/bloomclerkenwell/>

3. Charterhouse Place (west of Citigen) -

<https://ashbycapital.com/portfolio/charter-house-place-london/>

The proposal is about a cost effective low carbon DHC generation installation having integration of new 4MW water source heat pump(s) capacity and a 800m3 cold store into the existing Citigen generation capacity (currently having 9MWe CHPs + 9MWh boilers + 300m3 thermal store and 6MWc Chiller).

The project proposes to extract energy from 2 existing wells at the Citigen site, and explore the possibility to have additional energy extraction from the River Fleet. With HNIP funding to support the initial investment, this project will increase DHC supply of Citigen, future proof of DHC network system in terms of having smart and flexible energy solutions, having low carbon DHC connections readily viable, economical for existng and future customers, and provide motivation for new customers/developments to connect to Citigen. Hence supporting the growth of low carbon DHC in London.

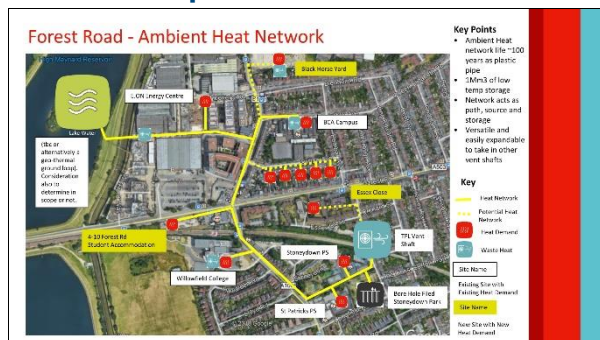
This project will not only reduce the overall Citigen carbon emissions (as a result of reduce gas consumption), it will also free up the already constrained Citigen supply capacity for other DHC connections in the area. We see the project will bring better sustainability and economic values for our customers connected to Citigen network.

Blackhorse Lane

Project Sponsor:

EON

Network Map:



Technical Information:

Primary energy source:

Ground source heat pump

Project description:

The design, build and operate/ESCO project involves waste heat recovery from TFL's London Underground (Tube), an ambient temperature heat network connecting the ventilation shaft at Forest Road and EON Blackhorse Lane (BHL) Energy Centre, and with ambition to extract additional free heat from other heat sources such as from a new local geo-thermal ground loop and extraction from the River Lea.

The project will recover waste heat from the chilled water circuit of the existing TFL cooling system at the Forest Road's ventilation shaft and distributes it via an ambient loop to localised heat pumps at the BHL energy centre. Localised heat pumps are required at the premise of customers premise connected to the new distributed heat network.

The waste heat recovered from the Tube will support BHL in delivering low carbon heating and hot water to local residents. It is expected that the existing CHP(s) at BHL will power the new HPs for overall energy cost benefit.

Free heat recovery from other sources are under investigation. This additional heat will enhance the energy efficiency of the proposed ambient network, creating furthermore low carbon heat capacity in the network and viable heat supply economics for future DH connections in the area.

Summary forecast financial information:

Total capex (£m)	Not Provided
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Project IRR*	Not provided
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* *Real pre-tax pre-finance*

FID	Construct ion Start	Heat On (initial)	Heat On (full)
2020	2020	2021	Not Provided

Project Stage

Commercialisation&Construction

Project Contact Details:

Contact Name:	HNIP
Email:	BDM@tp-heatnetworks.org

HNIP Application Information:

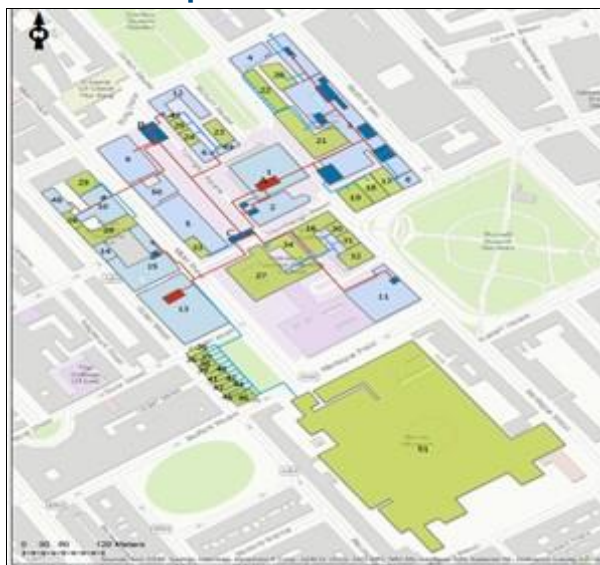
Grant requested (£m)	Not provided
Corporate Loan req. (£m)	Not provided
Project Loan requested (£m)	Not provided

Bloomsbury Heat and Power Consortium II Upgrade

Project Sponsor:

Bloomsbury Heat and Power Consortium II

Network Map:



Summary forecast financial information:

Total capex (£m)	£22.74
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Project IRR*	Not provided
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* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
2021	2021	2022	Not Provided

Project Stage

Commercialisation&Construction

Project Contact Details:

Contact Name:	HNIP
Email:	BDM@tp-heatnetworks.org

HNIP Application Information:

Grant requested (£m)	£5.50
Corporate Loan req. (£m)	£1.82
Project Loan requested (£m)	£0.00

Technical Information:

Primary energy source:

Water source heat pumps

Project description:

The project will both refurbish and expand the existing Bloomsbury Heat and Power (BHP) decentralised energy scheme serving colleges under the University of London. The scheme is over 50 years old and supplied by a mix of gas and oil-fired boilers and gas CHP. The heat generation plant is end of life and will be replaced with large-scale heat pumps utilising waste heat sources including heat from local sewers and chillers as well as ambient air, sourced via a new ambient heat network designed to build in future flexibility and enable the connection of more low temperature heat sources in the future. This is modelled as achieving a 79% reduction in carbon emissions vs. BAU. The scheme will also increase the number of connected sites significantly, aiming to supply all the consortia's buildings in the area served by the heat network. Two large 3rd party sites: London School of Hygiene and Tropical Medicine and the British Museum have also been modelled with a view to connection, but are not included in the numbers presented here at this time. The scheme will also look to connect to the adjacent UCL district heating network and also consider the extension of the ambient heat network to the UCL campus. The two heat networks were originally intended to join together 20 years ago when the CHP plant was installed on both sites under PFI contracts. However, as the UCL site originally utilised steam heating, the complications of conversion and joining were too great at the time and the networks remained separated.

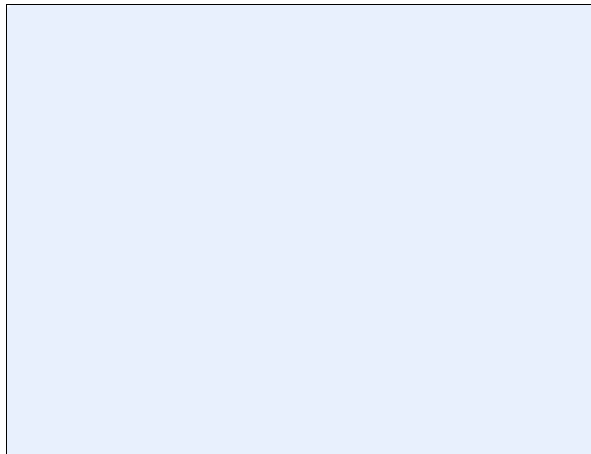


South Seaham Garden Village Heat Network

Project Sponsor:

Durham County Council

Network Map:



Summary forecast financial information:

Total capex (£m)	£9.48
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Project IRR*	0.10%
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* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
2020	2020	2021	Not Provided

Project Stage

Commercialisation&Construction

Project Contact Details:

Contact Name:	HNIP
Email:	BDM@tp-heatnetworks.org

HNIP Application Information:

Grant requested (£m)	£3.80
Corporate Loan req. (£m)	£0.00
Project Loan requested (£m)	£0.00

Technical Information:

Primary energy source:

Water source heat pumps

Project description:

The South Seaham Garden Village district heat network will be a supplying low-carbon geothermal heat from abandoned coal mines to a new development to the south of Seaham. This will be a commercially viable sustainable energy demonstrator project that can be duplicated across the UK coalfields which contains ¼ of UK population and as such is of strategic importance. It will be a 'no gas' network with heat supplied by mine water source heat pumps and electric peak and reserve boilers supplying 1500 houses, a primary school, local centre, health and wellbeing hub and an innovation hub. 50% of homes will be affordable developed by Karbon Homes.

Mine water is continuously pumped from the mine and treated to remove contaminants at the Dawdon Mine Water Treatment facility adjacent to the development. The mine water is heated by geothermal processes to circa 20°C providing low-cost low-carbon heat via heat pumps operating at COP4 with no seasonal variation. At circa 6MW the mine energy source exceeds peak demand.

Network phasing follows the development. The new energy centre will comprise; phase 1 - 1 x 1.022MW water source heat pump, phase 2 - an additional 1 x 1.022MW water source heat pump.

The energy centre will supply heat sourced from mine water to a new underground pre-insulated plastic heat network built out over 3 x phases with a total trench length of 17.464km.

Phase 1 built by 2023 comprises 835 houses, phase 2 built by 2026 - 472 houses and phase 3 built by 2030 - 160 houses plus several commercial connections. This is a planned new build housing development and so construction has not yet commenced, it is planned that the heat network will be installed in tandem with the housing infrastructure including roads, roundabouts etc, to minimise costs and installation time.

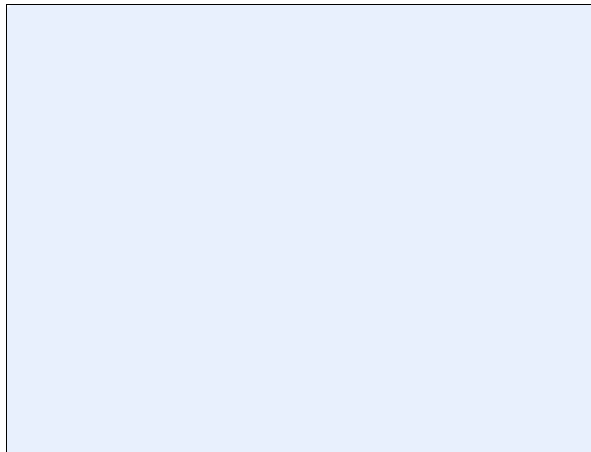


Cranbrook/Monkerton Expansion

Project Sponsor:

East Devon District Council

Network Map:



Summary forecast financial information:

Total capex (£m)	£10.00
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Project IRR*	Not provided
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* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	Not Provided	2021	Not Provided

Project Stage

Commercialisation&Construction

Project Contact Details:

Contact Name:	HNIP
Email:	BDM@tp-heatnetworks.org

HNIP Application Information:

Grant requested (£m)	£5.49
Corporate Loan req. (£m)	£0.00
Project Loan requested (£m)	£0.00

Technical Information:

Primary energy source:

CHP – EfW

Project description:

Cranbrook is a freestanding new town served by an existing EON owned and operated district heating network which delivers low carbon heat from gas combined heat and power. Some 2,000 of the 3,500 homes initially envisaged have been built. 2,000 occupied homes is the trigger point within the s.106 agreement for the energy centre for commissioning a solid biomass combined heat and power system which is capable of delivering 2.4MWth and 2.0MWe. Currently there is no technical solution for meeting the required thermal and electrical outputs but the obligation on EON to deliver this amount of renewable energy remains to fulfil the original zero carbon vision for the development.

Cranbrook will expand to circa 8,000 homes over the period 2021-2031. A near zero carbon heat network is required for the expansion areas together with decarbonisation of the existing heat network.

The planning process for the expansion areas is at a critical point. This requires a heat network market offering to be developed for the expansion area housebuilders over the next 6 months.

A second EON owned and operated network serves the Monkerton/Tithebarn area to the west of Cranbrook. In total this will supply circa 4,000 further homes plus a Science Park. There is an associated challenge to also decarbonise this network and move it away from gas CHP.

A techno-economic feasibility study looking at alternative energy sources has recently been completed. Two base load local industrial waste heat sources totalling 35MWth are becoming available. This waste heat comprises 23MWth from energy from waste, 7MWth from a DC/AC converter station and 5MWth from a data centre. These heat sources are 3.4km and 1.9km from the Cranbrook energy centre respectively (although pipe runs will be longer).

The scope of work will be to provide a heat transmission main connection from the EfW plant to both the existing Cranbrook and Monkerton networks. This will also facilitate servicing the continued expansion of Cranbrook. This will serve to transition the extended network from gas CHP.

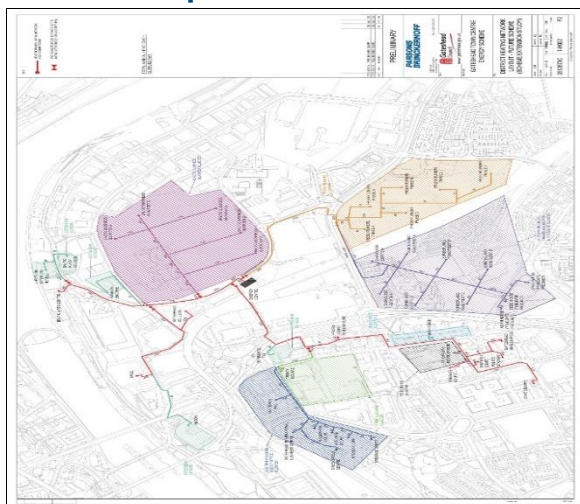
Gateshead District Energy Scheme

- East Extension

Project Sponsor:

Gateshead Council

Network Map:



Technical Information:

Primary energy source:

Geothermal

Project description:

The project aims to construct the a 5km expansion of the heat network within Gateshead District Energy Scheme. This will enable the scheme to supply lower cost, lower carbon energy to an extra 11 GWh of heat load. In addition, it will provide future connection points for the Exemplar Neighbourhood (Gateshead's largest housing development site of 1200 dwellings). The scheme also proposes to add a 6MW minewater source heat pump to the network, to increase the proportion of heat supplied from renewable sources

Summary forecast financial information:

Total capex (£m)	£15.60
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Project IRR*	0.09%
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* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
2020	2021	2022	Not Provided

Project Stage

Construction

Project Contact Details:

Contact Name:	HNIP
Email:	BDM@tp-heatnetworks.org

HNIP Application Information:

Grant requested (£m)	£5.91
Corporate Loan req. (£m)	£0.00
Project Loan requested (£m)	£0.00

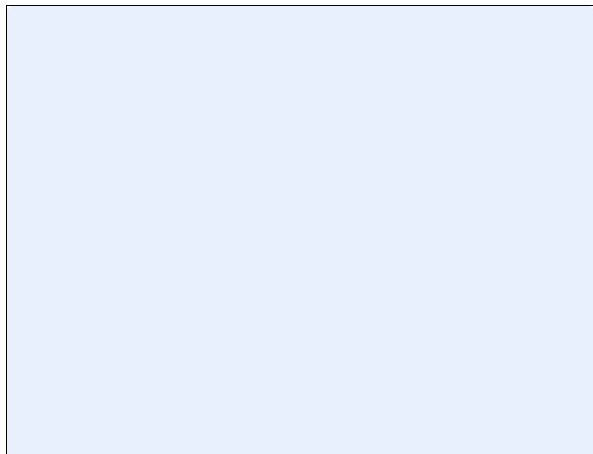


Birtley and Kibblesworth Minewater District Energy Scheme

Project Sponsor:

Gateshead Metropolitan Borough Council

Network Map:



Summary forecast financial information:

Total capex (£m)	Not Provided
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Project IRR*	Not provided
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* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
2023	2022	2023	Not Provided

Project Stage

Commercialisation&Construction

Project Contact Details:

Contact Name:	HNIP
Email:	BDM@tp-heatnetworks.org

HNIP Application Information:

Grant requested (£m)	Not provided
Corporate Loan req. (£m)	Not provided
Project Loan requested (£m)	Not provided

Technical Information:

Primary energy source:

Geothermal

Project description:

The primary heat source for the heat network is a water source heat pump (WSHP), located in a newly constructed energy centre, utilising water pumped from mine workings at a nearby Coal Authority mine water pumping station. The scheme will be served by a second energy centre containing a gas CHP, providing electricity to the WSHP and private wire network, and top up heat to the district heating network. Including a private wire network improves commercial viability through electricity supply and self-supply to the WSHP. Both energy centres will contain peak and reserve gas boilers and thermal storage, although the scheme has been designed to minimise gas use. The network will include 1.3MW solar PV, which will reduce the electricity required from the CHP, further reducing the carbon intensity of the network. The network will be built in phases. This pre-application is for funding for phases 1 and 2, planned for 2023-25. Key customer loads in these phases are:

- Phase 1: A manufacturing site, sheltered accommodation, Birtley Leisure Centre & Pool, Lord Lawson Academy and 300 unit new build housing site
- Phase 2: Supermarket, a manufacturing site, 225 unit new build housing site

There will be a third phase, connecting up to 1500 social housing units, which we will submit a HNIP application for at a later date. We may bring some of the social housing connections forward to phase 2, however this is not required to make phases 1 and 2 viable. The scope of works will include the construction of two energy centres and installation of all related plant and equipment, construction of a heat and private wire network, and connection to customer sites

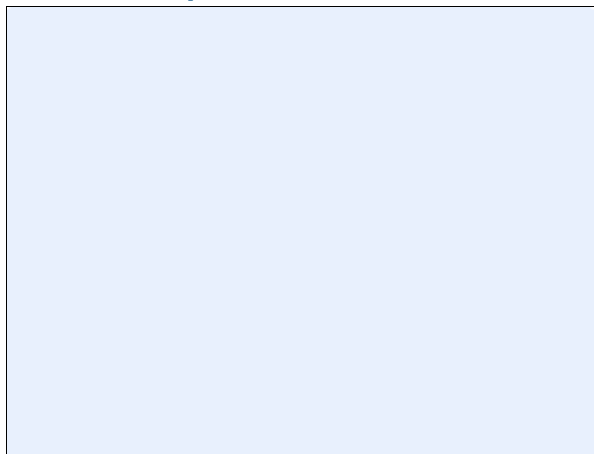


Hull Town Centre

Project Sponsor:

Hull City Council

Network Map:



Summary forecast financial information:

Total capex (£m)	£18.00
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Project IRR*	Not provided
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* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
2020	2020	2021	Not Provided

Project Stage

Commercialisation&Construction

Project Contact Details:

Contact Name:	HNIP
Email:	BDM@tp-heatnetworks.org

HNIP Application Information:

Grant requested (£m)	£2.00
Corporate Loan req. (£m)	£0.00
Project Loan requested (£m)	£0.00

Technical Information:

Primary energy source:

CHP – EfW

Project description:

Hull District Energy will take heat and potentially power from an energy centre to supply heat and power to the city centre of Hull to service public and private sector properties. The network will provide heat/power services to office, educational, residential and industrial premises, both existing and underdevelopment to support the regeneration and decarbonisation of the city of Hull. Funding is required to take heat and power from the energy centre through a sub-service network, including crossing of the River Hull, to final distribution points within each of the buildings connected including building level and resident/occupier HIU/HE and heat meters. The Network will be potentially owned by Hull City Council through a subsidiary who will contract with an O&M and metering/billing specialist sub-contractors for the day to day operation of the network.

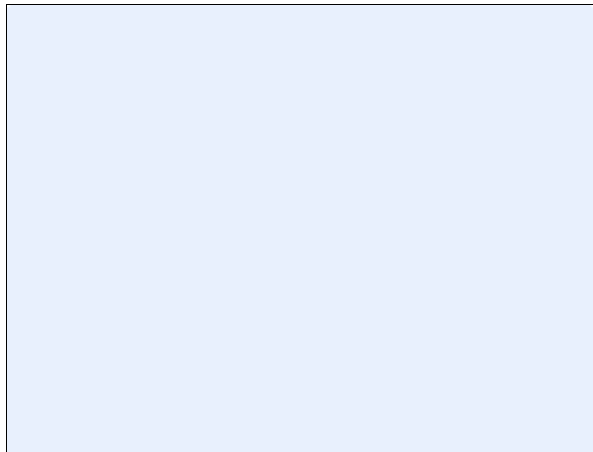


Amey Heat IOW

Project Sponsor:

Amey Ventures Management Services Limited

Network Map:



Technical Information:

Primary energy source:

CHP – EfW

Project description:

Design, build, own and operate a heat connection between the IOW Amey Energy from Waste plant to nearby HMP Albany and Parkhurst existing local heating distribution system providing near zero carbon heat on long term supply agreement. The technical design may incorporate a heat substation plate-exchanger on customer premises along with necessary access rights to maintain. Heat pricing to comply with Heat Trust obligations and full transparency. Support services to operate on 24/7 basis.

Summary forecast financial information:

Total capex (£m)	£8.00
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Project IRR*	Not provided
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* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
2020	2020	2021	Not Provided

Project Stage

Commercialisation&Construction

Project Contact Details:

Contact Name:	HNIP
Email:	BDM@tp-heatnetworks.org

HNIP Application Information:

Grant requested (£m)	£0.50
Corporate Loan req. (£m)	£0.00
Project Loan requested (£m)	£3.50

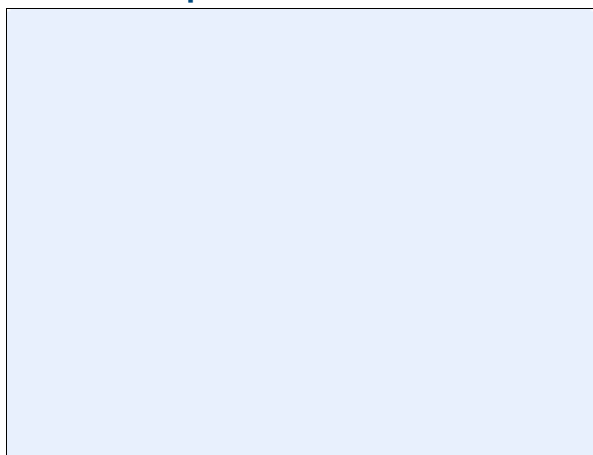
Knowsley Business Park (KBP)

Energy Network Project

Project Sponsor:

Knowsley Metropolitan Borough Council

Network Map:



Summary forecast financial information:

Total capex (£m)	Not Provided
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Project IRR*	Not provided
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* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	Not Provided	Not Provided	Not Provided

Project Stage

Commercialisation&Construction

Project Contact Details:

Contact Name:	HNIP
Email:	BDM@tp-heatnetworks.org

HNIP Application Information:

Grant requested (£m)	Not provided
Corporate Loan req. (£m)	Not provided
Project Loan requested (£m)	Not provided

Technical Information:

Primary energy source:

CHP – Gas

Project description:

The objective is for the Council to offer a unique selling proposition for businesses to be located on KBP by providing them with direct support to their management of energy. This is based on making a contribution to the Council's regenerating the Park so as to enhance this Liverpool City Region hub for commerce and industry over the next 25-50 years. In so doing the Council would create a municipal Energy Services Company (ESCo). Once established its remit could be expanded to generate and supply low-carbon energy to homes and businesses in Knowsley (and the wider Liverpool City Region) for civic benefit, environmental protection and economic growth reasons.

To understand the opportunities and risks this poses a detailed Business Case is being prepared. This is focused on the Project, which is designed to catalyse these ambitions through the establishment of a Knowsley ESCo which would generate and supply of heat and power to four large businesses (the Anchors) located in close proximity to each other on KBP. This energy would be supplied at a tariff that is 10% cheaper than their current expenditure on energy; part of the Energy Supply Offer that has been made to them.

The ESCo would construct two Energy Centres on KBP that would use natural gas to generate heat and power which would be transported to the Anchors. The infrastructure would be owned by the ESCo and designed and installed using well-established techniques and technology that the ESCo would commission.

Through the ESCo the Council would lead the design, build, operation, maintenance and financing of this energy generation and supply infrastructure. It would make this investment founded on the Anchors' commitment as customers to the ESCo (through Energy Supply Agreements).

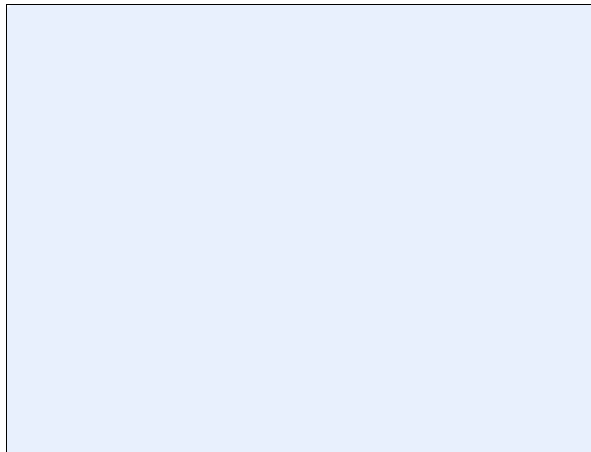


Leeds PIPES Phase 3 Extension

Project Sponsor:

Leeds City Council

Network Map:



Summary forecast financial information:

Total capex (£m)	£6.10
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Project IRR*	2.30%
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* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
2021	2020	2021	Not Provided

Project Stage

Construction

Project Contact Details:

Contact Name:	HNIP
Email:	BDM@tp-heatnetworks.org

HNIP Application Information:

Grant requested (£m)	£2.44
Corporate Loan req. (£m)	£0.00
Project Loan requested (£m)	£0.00

Technical Information:

Primary energy source:

CHP – EfW

Project description:

"Leeds PIPES is a recently completed network that has commenced heat supply. It comprises a network of ~8km of pipework taking low carbon heat from an EfW plant (the RERF) to commercial properties and council flats. A successful round 1 HNIP application has led to construction commencing on a c2.5 km network extension into the city centre of Leeds.

This HNIP application is for a phase 3 East extension. This will construct a c2.4 km network to the new city centre south park, a major regeneration priority for the council and a site in single ownership on the south bank of the river. The pipework will be oversized to enable further expansion to other areas within the southbank, one of the largest brownfield site in Europe, to facilitate connection to new developments. The council has already invested in district heating pipework within a bridge constructed over the River Aire in 2018/19 in order to de-risk this extension. There is an urgent need to commence construction by Oct/Nov 2020 in order to install DH pipework within service trenches planned for developments surrounding the new park. If this window is missed, it may be impossible to connect to these developments. At best, costs would increase considerably and at worst the opportunity would be lost. Therefore it is imperative that this extension commences in late 2020. Vital Energi won the D&B and O&M contracts for the current network via an OJEU compliant tendering process with a requirement so support the council to strategically extend the network. The extension is therefore extremely deliverable, with contracts in place and a contractor familiar with working in Leeds. Vital also have teams mobilised for phase 2 and so are perfectly situated to continue construction of phase 3E. Leeds PIPES is strongly aligned to the council's strategic aims and enjoys strong political support."

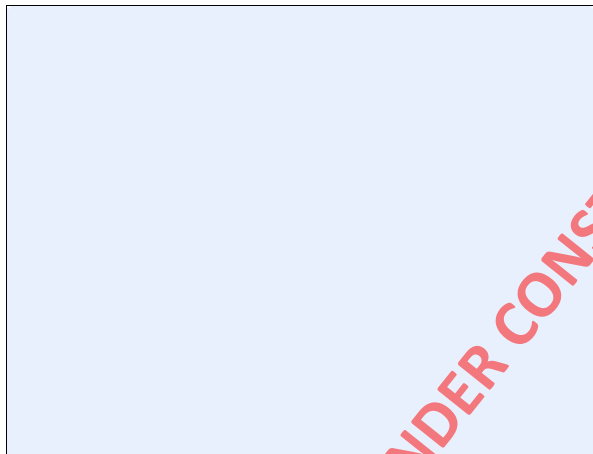


Leeds PIPES - City Centre (Phase 2)

Project Sponsor:

Leeds City Council

Network Map:



Technical Information:

Primary energy source:

CHP – EfW

Project description:

The Leeds PIPES scheme is a recently-completed district heat network that has already begun delivering heat to Leeds. It currently comprises a network of around 16km of pipework, delivering low carbon heat and hot water, generated from waste steam created by the Recycling and Energy Recovery Facility (RERF), to commercial properties and council-tenanted properties. HNIP funds will be used to extend the network into the city centre, connecting five council buildings and allowing other existing buildings and developments to connect in the future. The pipework therefore will be sized to enable a future extension to the South Bank, an area of major development and regeneration. The extension of the network comes at a key time, as Connecting Leeds will deliver extensive highways remodelling in the city centre.

Summary forecast financial information:

Total capex (£m)	£5.30
Project IRR*	1.20%

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
2019	2019	2021	Not Provided

Project Stage

Construction

Project Contact Details:

Contact Name:	HNIP
Email:	BDM@tp-heatnetworks.org

HNIP Application Information:

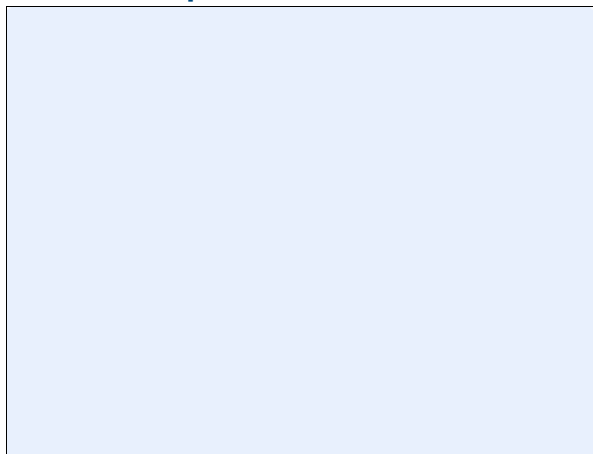
Grant requested (£m)	£2.44
Corporate Loan req. (£m)	£0.00
Project Loan requested (£m)	£0.00

Low Carbon Waterfront Heat Network Project

Project Sponsor:

Liverpool City Council

Network Map:



Summary forecast financial information:

Total capex (£m)	Not Provided
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Project IRR*	Not provided
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* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
2021	2021	2021	Not Provided

Project Stage

Construction

Project Contact Details:

Contact Name:	HNIP
Email:	BDM@tp-heatnetworks.org

HNIP Application Information:

Grant requested (£m)	Not provided
Corporate Loan req. (£m)	Not provided
Project Loan requested (£m)	Not provided

Technical Information:

Primary energy source:

Water source heat pumps

Project description:

The Liverpool Waterfront Heat Network feasibility study aims to support the delivery of low carbon, cost effective heat and cooling to local businesses and residents.

The project has been examining renewable heat and energy generation in the form of SWSHP, GWSHP and CHP. The potential for working with existing local energy generating facilities has also been considered.

It is anticipated that such an initiative would provide a best practice approach to utilising local low carbon technologies and existing assets in cities, with water bodies as part of the decarbonisation agenda.

The latest modelling has shown that there is a commercially viable heat network to be developed. A range of build-out approaches have been evaluated. These routes each require further evaluation at DPD to confirm and optimise the preferred solution:

- Accelerated build-out: A DHN build-out catalysed/led, at least initially, by Mersey Heat (MH) by expansion of it's under construction scheme. This involves installing 6MWth SWSP in the Cunard Building in the early 20s and supplying heat North to the Mersey Heat DHN (Princes Dock) for 3-4 years until the MH energy Centre is fully operational/connected. A sequential build-out around the Three Graces could allow for the possible connection of tens of additional buildings across the Waterfront at a future time.

- Traditional build-out: A DHN build-out led by LCC from around the Three Graces, in an identical approach to the accelerated option (but without a connection to the MH DHN). This provides a slower approach to develop a network.

- Standalone Southern Cluster: A DHN limited to the buildings around the Arena and Albert Dock, building out from 2022/3.

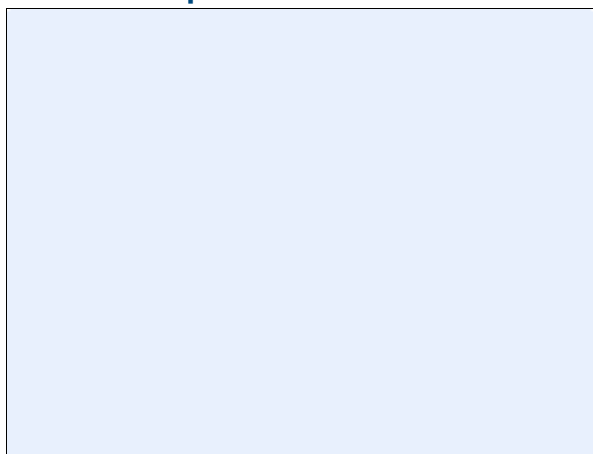
Commercially, the leading option is a smaller derivative of the accelerated build-out. RHI is critical to the business case for heat pumps and this route is currently seen as the only approach which would allow the installation of heat pumps prior to the assumed withdrawal of RHI in 2021.

Liverpool Water District Heat Network - Phase 1b Road Crossings

Project Sponsor:

Peel Energy Limited

Network Map:



Technical Information:

Primary energy source:

Boiler - Gas

Project description:

Peel Energy, through its supply company (ESCo) Mersey Heat is delivering a district heat network to serve Peel L&P's Liverpool Waters development and surrounding areas including 2,000,000m² of development floorspace, 9,000 residential units, 315,000m² of business space and 53,000m² of hotel and conference facilities. The awarded funding will support the supply of heat to multiple residential and commercial buildings with a temporary energy centre. A planned transition to a low carbon heat source will occur in the future to reduce carbon emissions.

Summary forecast financial information:

Total capex (£m)	Not Provided
Project IRR*	Not provided

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
2020	2019	2020	Not Provided

Project Stage

Construction

Project Contact Details:

Contact Name:	HNIP
Email:	BDM@tp-heatnetworks.org

HNIP Application Information:

Grant requested (£m)	Not provided
Corporate Loan req. (£m)	Not provided
Project Loan requested (£m)	Not provided

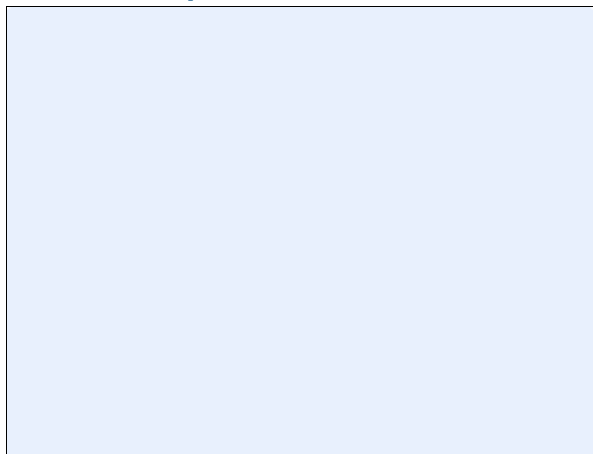


Retained Estate DH Project

Project Sponsor:

Alder Hey ESCo Limited via Enervate

Network Map:



Summary forecast financial information:

Total capex (£m)	Not Provided
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Project IRR*	Not provided
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* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
2020	2021	2021	Not Provided

Project Stage

Commercialisation&Construction

Project Contact Details:

Contact Name:	HNIP
Email:	BDM@tp-heatnetworks.org

HNIP Application Information:

Grant requested (£m)	Not provided
Corporate Loan req. (£m)	Not provided
Project Loan requested (£m)	Not provided

Technical Information:

Primary energy source:

Ground source heat pump

Project description:

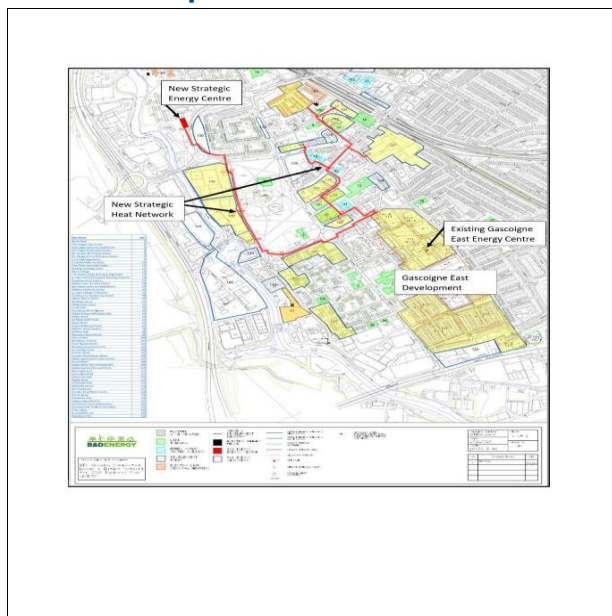
A district heating network is being developed to provide heating and cooling to a number of new developments on the retained Alder Hey Hospital land. These buildings include new offices, healthcare units and new Neonatal units etc. The energy will be generated utilising GHSP technology with the possible mix of ASHP depending on the capacity required. The entity developing this network is Alder Hey ESCo Ltd, which has been newly formed specifically for the delivery of the project. The NHS trust will be the anchor load customer and plan to connect 8 number of their buildings to the network once completed. Alder Hey ESCo is made up of Ener-Vate consultants and a team of multi disciplined consultants who have many years experience of developing heat networks.

Barking Town Centre District Energy Scheme

Project Sponsor:

London Borough of Barking and Dagenham

Network Map:



Technical Information:

Primary energy source:

CHP – Gas

Project description:

Barking and Dagenham Council has been awarded £5m by the Government's Heat Network Investment Project (HNIP) to co-fund the creation of a landmark low carbon UK district heating scheme in Barking Town Centre. The project has been classified as strategically significant by the GLA and builds on the borough's ambitions to become the green capital of London. It involves modification of the existing energy centre on the Gascoigne East Estate, Weavers Quarter, and the construction of a new large-scale energy centre. Together these will supply over 30 GWh per year of low carbon heat into a new Barking Town Centre wide heat network, serving a mixture of new developments comprising over 8,000 homes, together with existing buildings. Initially, supplies of heat will come from gas-fired combined heat and power units, but over time these will be replaced with existing sources of waste heat in the borough to deliver zero carbon heat supplies.

Summary forecast financial information:

Total capex (£m)	£27.60
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Project IRR*	3.91%
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* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
2020	2020	2020	Not Provided

Project Stage

Construction

Project Contact Details:

Contact Name:	HNIP
Email:	BDM@tp-heatnetworks.org

HNIP Application Information:

Grant requested (£m)	£5.00
Corporate Loan req. (£m)	£0.00
Project Loan requested (£m)	£0.00

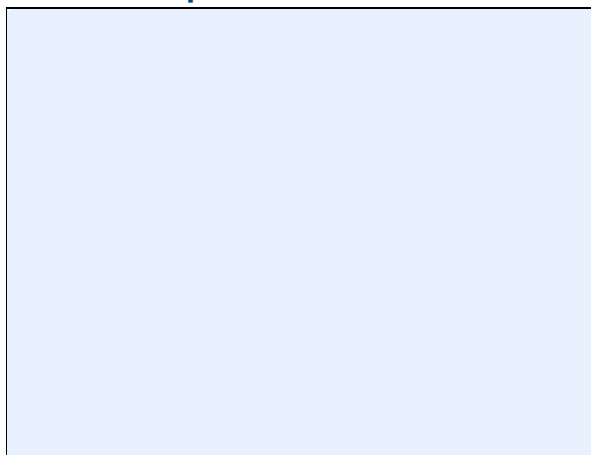


Riverside Heat Network

Project Sponsor:

Riverside Resource Recovery Limited / Vattenfall Heat UK Limited or an entity over which those party(ies) have control

Network Map:



Summary forecast financial information:

Total capex (£m)	£91.62
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Project IRR*	Not provided
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* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
2020	2022	2024	Not Provided

Project Stage

Commercialisation&Construction

Project Contact Details:

Contact Name:	HNIP
Email:	BDM@tp-heatnetworks.org

HNIP Application Information:

Grant requested (£m)	£1.60
Corporate Loan req. (£m)	£0.00
Project Loan requested (£m)	£10.51

Technical Information:

Primary energy source:

CHP – EfW

Project description:

Cory and Vattenfall have partnered with the aim of developing one of the largest heat networks in the UK. Through this we aim to deliver affordable, reliable and low carbon heat to communities in South East London.

The Riverside Heat Network, originating in Bexley, will connect Cory's Riverside Resource Recovery Facility (RRRF) with properties in the London Borough of Bexley and the Royal Borough of Greenwich. The RRRF has the capability to provide up to 28.6MW heat and will form the anchor source for the heat network. In addition, Cory's recent grant of a Development Consent Order for the Riverside Energy Park (REP) will be CHP enabled with the potential to provide a further 30MW heat, scheduled for operation by 2024/25.

The Riverside Heat Network is envisaged in three-phases, reflecting the location of the RRRF and REP and the potential heat loads, mainly Peabody and the various regeneration schemes in the area. With the proposed scope we anticipate that the network could deliver approximately 430GWh of low carbon heat in its first 15 years of operation, supplying over 25,000 local homes and businesses with sustainable heat with spare capacity, making the heat network one of the largest in the UK. The project aims to connect several new build developments, assisting them to achieve compliance with planning regulations, and to also connect to existing properties along the route. This will enable to replace and upgrade older, less economical and efficient fossil fuel heating systems.

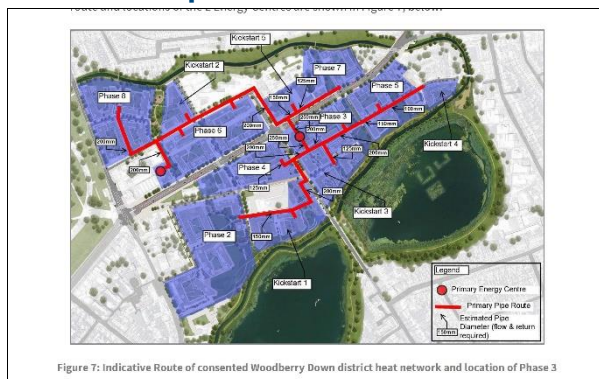
The Riverside Heat Network represents the first stage and building block that would unlock a wider East London Heat Network with the potential to supply heating and cooling to residential, commercial, retail and industry with a scale equivalent of 75,000 homes.

London Borough of Hackney (Woodberry Down)

Project Sponsor:

London Borough of Hackney

Network Map:



Summary forecast financial information:

Total capex (£m)	£0.00
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Project IRR*	Not provided
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* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
2020	2025	2025	Not Provided

Project Stage

Construction

Project Contact Details:

Contact Name:	HNIP
Email:	BDM@tp-heatnetworks.org

HNIP Application Information:

Grant requested (£m)	£5.00
Corporate Loan req. (£m)	£0.00
Project Loan requested (£m)	£0.00

Technical Information:

Primary energy source:

CHP – Gas

Project description:

Woodberry Down is a major regeneration scheme within the London Borough of Hackney. It is being delivered by Berkeley Homes through a Principle Development Agreement. To meet the requirements of the Planning Consent for Woodberry Down, Berkeley Homes are required to deliver a

District Heat Network.

The current design proposals include a gas fuelled Combined Heat and Power (CHP) plant to be housed in a

single energy centre, and a District Heat Network to serve

5500 dwellings within the Woodberry Down Scheme.

The Planning Consent requires the energy centre to be

delivered by Phase 3 of development (2023), with heat being

supplied to homes by prior to the occupation of the 200th

home in Phase 4 (around 2025).

Part of the development has already been constructed and

around 1000 homes have been delivered to date.

Prior to

connection to the Heat Network, heating is being provided

by a mix of building scale boilers and CHP units.

These will

become redundant once the District Heat Network is up and

running.

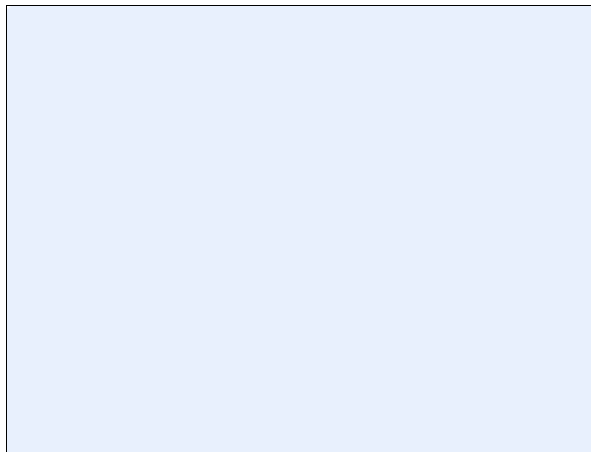


Tottenham Hale and Broadwater Farm District Heating Network

Project Sponsor:

London Borough of Haringey

Network Map:



Summary forecast financial information:

Total capex (£m)	£29.48
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Project IRR*	Not provided
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* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
2021	Not Provided	2024	Not Provided

Project Stage

Commercialisation&Construction

Project Contact Details:

Contact Name:	HNIP
Email:	BDM@tp-heatnetworks.org

HNIP Application Information:

Grant requested (£m)	£8.70
Corporate Loan req. (£m)	£0.00
Project Loan requested (£m)	£0.00

Technical Information:

Primary energy source:

CHP – EfW

Project description:

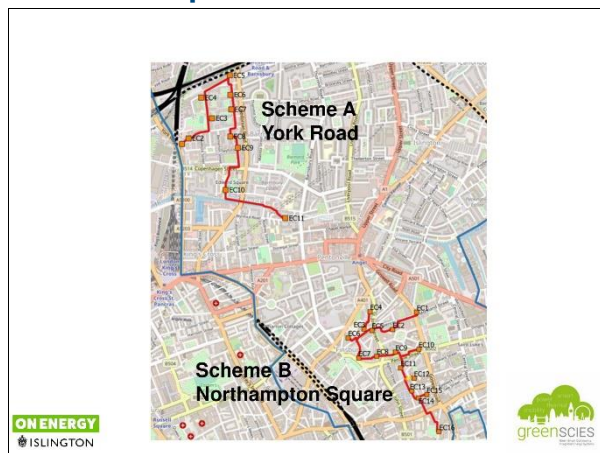
The Tottenham Hale and Broadwater Farm District Heating Network will supply 25 connections in Tottenham Hale and the Broadwater Farm Estate in Tottenham. The scheme consists in total of 7,495 dwellings and 125,548m2 of commercial floor space. The Broadwater Farm Estate district heating scheme currently serves 937 existing homes across 11 blocks and two schools. One of the high rise blocks is to be demolished which will reduce the load to 835 homes and two schools but redevelopment of the estate will see the Council add another 350 new homes to the system over the next 5 years. The network will connect to and purchase heat from Energetik who are connecting to the new North London Heat and Power Energy Recovery Facility. The interconnector will run southwards of the facility towards the Tottenham Hale Energy Centre and will branch off en route westwards to supply the Broadwater Farm Estate. The Energy Centre in Tottenham Hale will be located in close proximity to the connected loads and will be equipped with thermal stores and top-up/back-up gas boilers. The Broadwater Farm (BWF) Estate will be supplied only with ERF heat, top-up and back-up will be provided by existing local gas boilers located within an existing local Energy Centre. The thermal substation in the BWF Estate will be accommodated within the existing energy centre.

GreenSCIES York Road 5th Generation Heat Network

Project Sponsor:

GreenSCIES

Network Map:



Summary forecast financial information:

Total capex (£m)	Not Provided
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Project IRR*	Not provided
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* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	2022	2024	Not Provided

Project Stage

Commercialisation + Construction

Project Contact Details:

Contact Name:	HNIP
Email:	BDM@tp-heatnetworks.org

HNIP Application Information:

Grant requested (£m)	£3.68
Corporate Loan req. (£m)	£0.00
Project Loan requested (£m)	£0.00

Technical Information:

Primary energy source:

Ground source heat pump

Project description:

This will be a 5th generation heat network with an ultra-low temperature 'ambient loop' supplying a number of decentralised heat pumps distributed across a range of buildings. A TFL London Underground Ventilation shaft will provide a heat source and a cooling demand. Aquifer boreholes will also provide heating/cooling to the network to ensure a balance across the season using Aquifer Thermal Energy Storage. Local heat pumps within 10 energy centres will supply heating to a range buildings. The majority of the buildings to be supplied are residential accommodation and schools within LBI control with a number of existing gas fired boiler plant rooms acting as large 'anchor loads' for the scheme. Our proposed scheme will meet the EED. All the heat will come from heat pumps using ATES boreholes and a tube ventilation shaft as the source.

KEY BENEFITS

- This 5th generation heat network will allow 'prosuming' of heating and cooling across the ambient loop network. This will allow heat from buildings to be used as cooling for the ventilation shaft.
- London Underground overheating is a problem and this scheme will help mitigate this on the Piccadilly line.
- This scheme will be a 'smart grid' allowing the heat pumps to be used in a flexible way in relation to electricity tariffs, providing a 'demand side response' approach to cost and carbon saving
- The smart grid will also include PV and EV connected to each of the Heat Pump plant rooms. The EV's will help meet the increasing needs of local residents for charging EV's
- The scheme will bring affordable warmth to a large number of LBI housing tenants/owners
- Our modelling shows around 1,793 Tonnes/yr of carbon savings compared to a BAU gas boiler scenario

GreenSCIES Northampton Square

5th generation heat network

Project Sponsor:

GreenSCIES

Network Map:



Summary forecast financial information:

Total capex (£m)	Not Provided
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Project IRR*	Not provided
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* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	2022	2024	Not Provided

Project Stage

Commercialisation + Construction

Project Contact Details:

Contact Name:	HNIP
Email:	BDM@tp-heatnetworks.org

HNIP Application Information:

Grant requested (£m)	£5.00
Corporate Loan req. (£m)	£0.00
Project Loan requested (£m)	£0.00

Technical Information:

Primary energy source:

Ground source heat pump

Project description:

This will be a 5th generation heat network with an ultra-low temperature 'ambient loop' supplying a number of decentralised heat pumps distributed across a range of buildings. Two large data centres will provide very significant cooling demand, balanced by two universities and a range of LBI buildings with mainly heating demands. Aquifer boreholes will also provide heating/cooling to the network to ensure a balance across the season using Aquifer Thermal Energy Storage. Local heat pumps within 14 energy centres will supply heating to a range buildings. A large part of the buildings to be supplied are residential accommodation and schools within LBI control with a number of existing gas fired boiler plant rooms acting as large 'anchor loads' for the scheme. Two University Campuses also provide large public sector heating demands.

Our proposed scheme will meet the EED. All the heat will come from heat pumps using ATES boreholes and a tube ventilation shaft as the source.

KEY BENEFITS

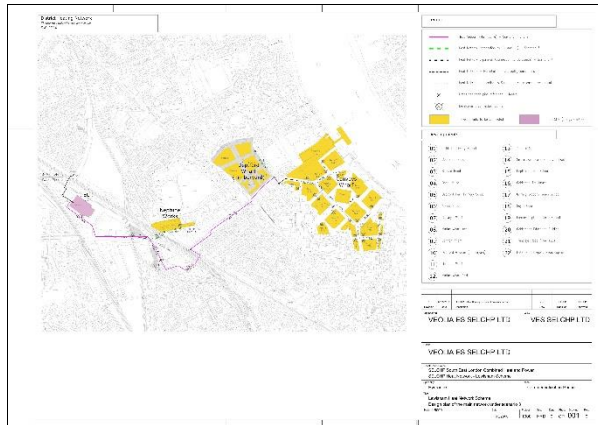
- This 5th generation heat network will allow 'prosuming' of heating and cooling across the ambient loop network. This will allow heat from buildings to be used as cooling for the data centres.
- This scheme will be a 'smart grid' allowing the heat pumps to be used in a flexible way in relation to electricity tariffs, providing a 'demand side response' approach to cost and carbon saving
- The Smart Grid will also include PV and EV connected to each of the Heat Pump plant rooms. The EV's will help meet the increasing needs of local residents for charging EV's
- The scheme will bring affordable warmth to a large number of LBI housing tenants/owners
- The modelling shows around 4,762 Tonnes/yr of carbon savings compared to a BAU gas boiler scenario

SELCHP Phase 2

Project Sponsor:

Veolia ES (UK) Limited

Network Map:



Technical Information:

Primary energy source:

CHP – EfW

Project description:

This private sector applicant to Round 1 will create a new pipework branch from an existing waste heat source to serve a new-build development comprised of 3,500 homes with additional heat loads which could be served in the future.

Summary forecast financial information:

Total capex (£m)	Not Provided
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Project IRR*	Not provided
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* *Real pre-tax pre-finance*

FID	Construct ion Start	Heat On (initial)	Heat On (full)
2020	2021	2022	Not Provided

Project Stage

Commercialisation&Construction

Project Contact Details:

Contact Name:	HNIP
Email:	BDM@tp-heatnetworks.org

HNIP Application Information:

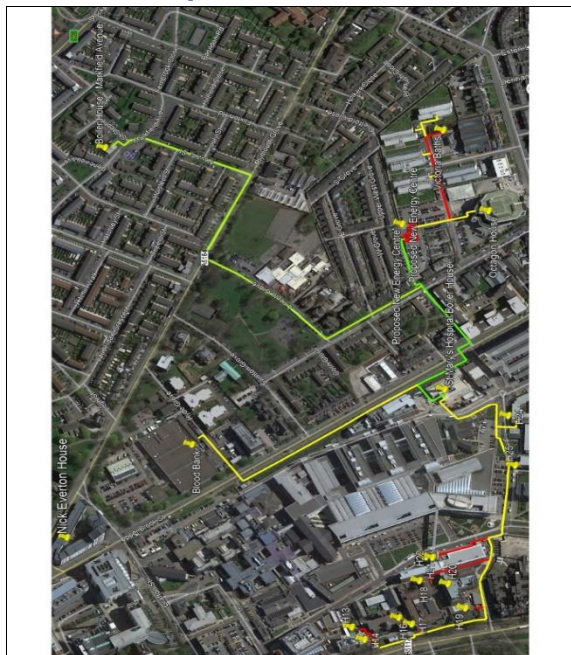
Grant requested (£m)	Not provided
Corporate Loan req. (£m)	Not provided
Project Loan requested (£m)	Not provided

Manchester OPEN

Project Sponsor:

MEPL

Network Map:



Summary forecast financial information:

Total capex (£m)	£28.37
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Project IRR*	5.20%
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* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
2022	2020	2021	Not Provided

Project Stage

Commercialisation&Construction

Project Contact Details:

Contact Name:	HNIP
Email:	BDM@tp-heatnetworks.org

HNIP Application Information:

Grant requested (£m)	£1.74
Corporate Loan req. (£m)	£0.00
Project Loan requested (£m)	£12.91

Technical Information:

Primary energy source:

CHP – Gas

Project description:

"The OPEN will distribute locally generated, low-carbon electricity, heat and cooling, to a diverse Stakeholder group, each with different energy consumption profile, located within a major city. The Project Area includes Manchester University NHS Foundation Trust, University buildings, a mix of social and private housing (served by an existing DHN), numerous Student Accommodation blocks and commercial organisations, such as Heineken brewery.

The project is led by Manchester Energy Partnership Limited ("MEPL") a JV between Octagon Estates Ltd., (developer of the Octagon Project) and Electricity North West (Contracts and Maintenance Division) Ltd, (part of the local DNO) and supported by Manchester City Council and Greater Manchester Combined Authority. MEPL will initially construct 9.9Mw of CHP generation at the Octagon site, combined with renewables throughout the network, to supply stakeholders with sustainable, price stable and resilient energy sources. Each off-taker is at various stages of engagement, ranging from 'interest expressed' to having signed an MOU (an engagement methodology leading to a Supply Agreement).

The total Phase 1 demand is; heat 75 GWh and electricity 84 GWh, producing an annual revenue of circa £9.0m. The estimated phase 2 expansion is heat 96 GWh and electricity 126 GWh. The min Anchor Load is the largest NHS trust in the UK, supporting a 21-year supply contract, representing 65% of the above revenue.

The OPEN incorporates advanced monitoring systems, to assist stakeholders in efficient resource use, with value for money assured by a guaranteed Annual Percentage Price Differential, maintained below a Benchmark throughout the Supply Agreement.

The future network development strategy incorporates both retrofit opportunities, to reduce off-taker consumption, together with the introduction of emerging sustainable technologies into the generation centre.

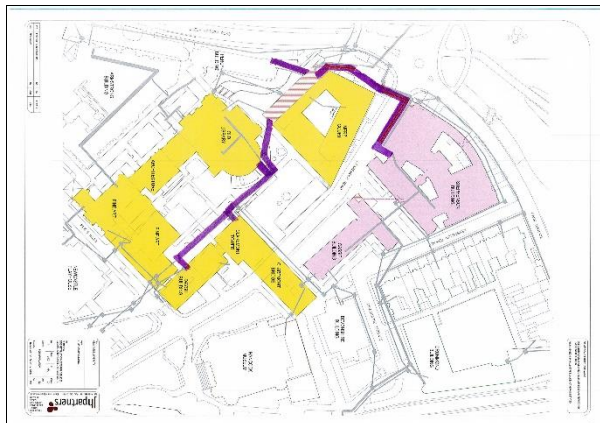
Connection to the OPEN will assist stakeholders to reduce carbon emissions in line with Manchester City Council's targets to become carbon neutral by 2035. "

Newcastle University Merz Court Energy Centre

Project Sponsor:

Newcastle University

Network Map:



Summary forecast financial information:

Total capex (£m)	£6.00
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Project IRR*	2.97%
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* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
2020	2021	2021	Not Provided

Project Stage

Construction

Project Contact Details:

Contact Name:	HNIP
Email:	BDM@tp-heatnetworks.org

HNIP Application Information:

Grant requested (£m)	£0.00
Corporate Loan req. (£m)	£2.90
Project Loan requested (£m)	£0.00

Technical Information:

Primary energy source:

CHP – Biogas

Project description:

Extension and upgrade of existing District Heat (DH) network on Newcastle University's city centre campus in Newcastle upon Tyne. Key work packages include:

New pipework from an existing DH Energy Centre (Merz Court) to serve a University development project (The Stephenson Building project - part demolition & new build, part retain and refurbish) over a nearby road. The road crossing will either utilise an existing asbestos contaminated duct (following asbestos removal), or an entirely new crossing. The secondary network i.e. after the PHE within the development is not within the scope of this DH project.

Energy centre plant replacement and integration with existing heat network: removal of redundant gas boilers, installation of a liquid biofuel CHP (1060kWe, 1275kWth), installation of new natural gas (backup) boilers, flues, controls etc. for the above.

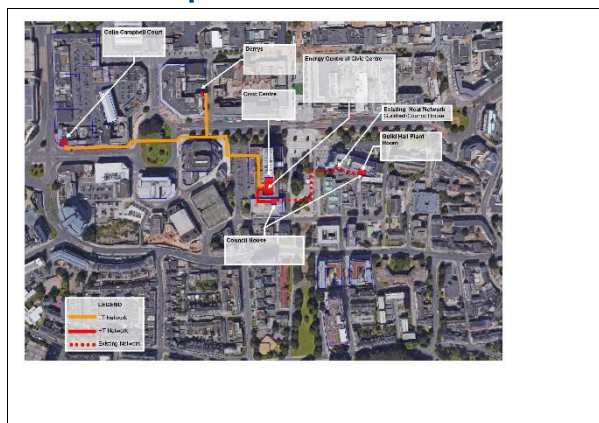
HV/LV network integration. The university owns and operates its own 11KV network. The project includes costs for both LV and HV integration of the CHP.

Plymouth Southern City Centre District Energy Scheme

Project Sponsor:

Plymouth City Council

Network Map:



Summary forecast financial information:

Total capex (£m)	£6.10
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Project IRR*	Not provided
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* *Real pre-tax pre-finance*

FID	Construct ion Start	Heat On (initial)	Heat On (full)
2021	2021	2021	Not Provided

Project Stage

Construction

Project Contact Details:

Contact Name:	HNIP
Email:	BDM@tp-heatnetworks.org

HNIP Application Information:

Grant requested (£m)	£0.75
Corporate Loan req. (£m)	£0.00
Project Loan requested (£m)	£1.80

Technical Information:

Primary energy source:

Airsource heat pump

Project description:

The Plymouth City Centre Heat Network project proposes to deliver low carbon heat to existing and new build connections in the heart of the city centre over three phases. Phase 1 focusses on council buildings and planning applications, phase 2 and 3 3rd party connections. The system will serve a low temperature 4G heat network and an existing high temperature heat network from a hybrid energy centre utilising; 1) Open loop ground source (supplied from a primary aquifer) water source heat pump, and cooling 2) Gas fired CHP and 3) High efficiency gas boilers.

Cooling will be provided to retail within the development housing the energy centre from the open loop resource. The scheme will deliver significant carbon savings through electrification of heat using the CHP as an economic generator to deliver power direct to the heat pump and to serve an existing council operated private wire. The low temperature loop (temperatures ~70-65°C flow - 40°C return) will connect three major developments; the listed Civic Centre building redevelopment ~ 144 PRS flats and ~4,000m2 retail in the city centre; Derrys, a ~400 room student residential / 110 room hotel redevelopment and a major Council/ developer Colin Campbell Court ~300 unit and ~5,500m2 retail residential development. The Energy Centre will serve an existing HT network connecting the Council House and Guildhall. Opportunities for cascading and other hydraulic arrangements to benefit efficiency will be explored.

Future transition away from CHP and gas has been considered and will require a process of temperature reduction at existing buildings and implementation of high temperature heat pumps is recommended.

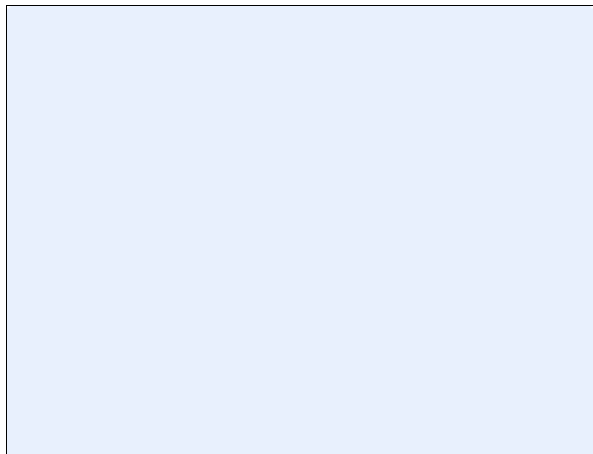
There is opportunity to extend the network to capture other developments in the City Centre as a comprehensive redevelopment programme at Millbay and in the Centre is realised as well as existing loads such as hotels.

Sheffield District Heating Network Strategic Expansion

Project Sponsor:

Veolia ES (UK) Limited

Network Map:



Technical Information:

Primary energy source:

CHP – EfW

Project description:

The existing Sheffield District Heating Network (DHN) has been in place for more than 25 years and is currently the largest DHN in the UK with approximately 40km of pipe in the ground. The scope of the proposed project is to allow for further expansion of the network to areas of Sheffield that are rapidly developing and ensure that, low carbon, energy from waste sourced district heating remains the technology of choice for new developments in the City. In order to carry out this expansion, a commercialisation phase will be required to inform detailed design and construction followed by grant assisted capital investment to allow these expansion opportunities to be commercially viable.

Summary forecast financial information:

Total capex (£m)	Not Provided
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Project IRR*	Not provided
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* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
2019	2019	2021	Not Provided

Project Stage

Commercialisation&Construction

Project Contact Details:

Contact Name:	HNIP
Email:	BDM@tp-heatnetworks.org

HNIP Application Information:

Grant requested (£m)	Not provided
Corporate Loan req. (£m)	Not provided
Project Loan requested (£m)	Not provided

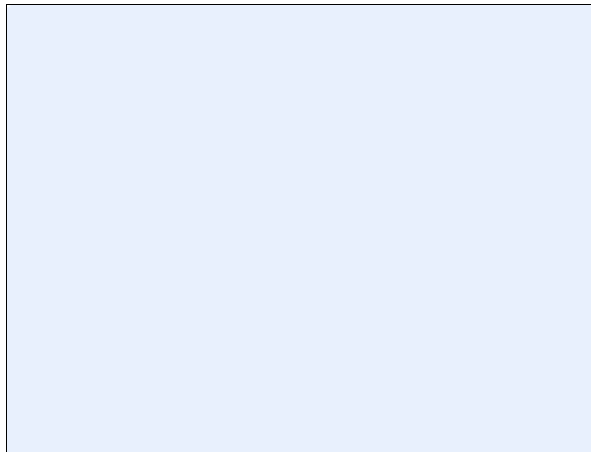


This is Gravity

Project Sponsor:

This is Gravity Limited

Network Map:



Summary forecast financial information:

Total capex (£m)	Not Provided
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Project IRR*	Not provided
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* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	2020	2021	Not Provided

Project Stage

Commercialisation&Construction

Project Contact Details:

Contact Name:	HNIP
Email:	BDM@tp-heatnetworks.org

HNIP Application Information:

Grant requested (£m)	Not provided
Corporate Loan req. (£m)	Not provided
Project Loan requested (£m)	Not provided

Technical Information:

Primary energy source:

Water source heat pumps

Project description:

Our vision at Gravity is to provide a home for tomorrows workforce. To achieve this the UK must shift to a cleaner economy that embraces innovation by creating spaces that allow forward-thinking companies and local communities to thrive. That is why we created Gravity – a clean, smart campus where new businesses can grow. Ideally located in Somerset, with direct access to the M5 and accessible by rail, air and sea, the site will offer over 635 acres, with opportunities for up to 8 million sq ft of scalable, flexible and shared working space. No other UK site is ready to be developed at such scale and speed. It provides occupiers with the ability to build, expand and develop faster and more efficiently. Gravity will be a beacon for evolving a clean growth economy in the South West

Gravity is the perfect platform to deploy E.ON's Ectogrid™ heating and cooling network. E.ON will design, build & operate a future proofed network utilising geothermal and water to water heat pumps to provide the buildings which are constructed on the development simultaneously with low carbon heating and cooling through a low temperature network of pipes, heat pumps and central boreholes for seasonal storage. E.ON will steer the network through the use of their optimisation software which in real time calculates the heat/coolth storage in each building to optimize the system as a whole resulting in energy + carbon savings across the campus. Tenants at the development will be able to recycle waste heat and cooling into the network to further increase the efficiency and carbon savings of the whole network. E.ON operates similar projects in Sweden and we will create the UK's largest 5th Generation heating and cooling network showcasing innovative technology solutions as we drive towards net zero.

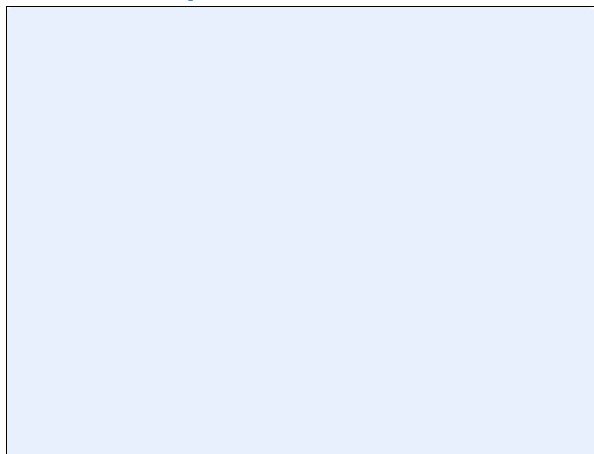


Porton Down

Project Sponsor:

Wiltshire County Council

Network Map:



Technical Information:

Primary energy source:

CHP – Gas

Project description:

The project aims to connect several new build developments, assisting them to achieve compliance with planning regulations, and to also connect to existing properties along the route. This will enable to replace and upgrade older, less economical and efficient fossil fuel heating systems.

Summary forecast financial information:

Total capex (£m)	Not Provided
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Project IRR*	Not provided
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* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	2021	2021	Not Provided

Project Stage

Commercialisation&Construction

Project Contact Details:

Contact Name:	HNIP
Email:	BDM@tp-heatnetworks.org

HNIP Application Information:

Grant requested (£m)	Not provided
Corporate Loan req. (£m)	Not provided
Project Loan requested (£m)	Not provided

Worthing Civic Quarter Heat Network

Project Sponsor:

Worthing City Council

Network Map:



Technical Information:

Primary energy source:

Water source heat pumps

Project description:

Sewer Source Heat pump led scheme delivering heat to 7no. Public estate buildings within the Civic Quarter in Worthing Town Centre. Energy centre situated in new development site (Worthing Integrated Care Centre). Significant potential to expand towards other new developments (Union Place, Cannon Place) and existing public sites (Theatres, Worthing Hospital, Leisure Centre) and private sites in Worthing Town Centre. The project is key in enabling Worthing & Adur Councils to meet their carbon neutral ambitions (2030 target).

Summary forecast financial information:

Total capex (£m)	£16.00
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Project IRR*	Not provided
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* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
2020	2021	2022	2022

Project Stage

Commercialisation&Construction

Project Contact Details:

Contact Name:	HNIP
Email:	BDM@tp-heatnetworks.org

HNIP Application Information:

Grant requested (£m)	£5.60
Corporate Loan req. (£m)	£0.00
Project Loan requested (£m)	£0.00

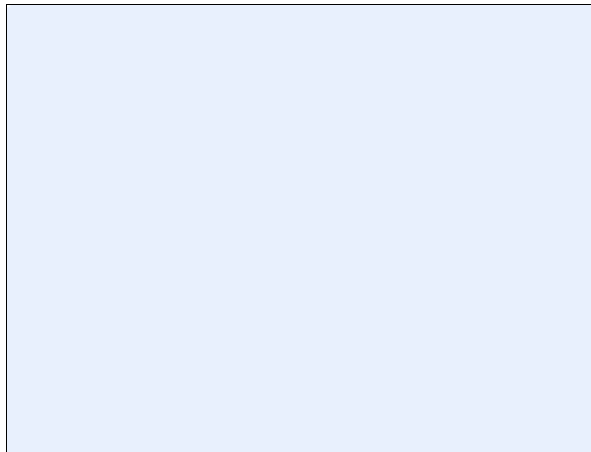


South West Exeter

Project Sponsor:

Leep Holdings (Utilities) Limited

Network Map:



Summary forecast financial information:

Total capex (£m)	Not Provided
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Project IRR*	3.43%
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* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
2020	2021	2023	Not Provided

Project Stage

Commercialisation&Construction

Project Contact Details:

Contact Name:	HNIP
Email:	BDM@tp-heatnetworks.org

HNIP Application Information:

Grant requested (£m)	£4.30
Corporate Loan req. (£m)	£0.00
Project Loan requested (£m)	£5.36

Technical Information:

Primary energy source:

CHP – EfW

Project description:

The South West Exeter urban extension comprises 2,325 homes and commercial developments including the Matford Phase 3 commercial site. The housing development straddles the boundary between Exeter City Council and Teignbridge District Council. The majority of homes (1,850) are in Teignbridge. Construction of homes is due to commence in 2019. SW Exeter lies approximately 1.4km south of the Marsh Barton Energy Recovery Facility (ERF). The ERF is contracted by Devon County Council and owned by Viridor. The plant generates up to 3.5MWe but also has an unused 7.4MWth heat offtake. The heat network scheme is to take up to 4MWth heat from the ERF to an energy centre with heat storage and back up boilers (400m from the ERF). From there heat will be distributed to residential and commercial customers in the SW Exeter development. The scheme includes connecting pipework and a heat transfer station at the ERF plant, a heat transmission line to the energy centre which contains pumping, heat storage and peaking/back-up gas boilers, the onward heat network to the housing and commercial developments and heat interface units in each building. There are a unique set of planning conditions to promote the use of heat from the ERF including best endeavours to market the energy from the ERF and requirements for new buildings to connect to heat networks. However, the SW Exeter development has a planning condition which requires commitment to a heat network prior to the development starting. Housebuilders are expected to commence development over the coming months. Devon County Council, the sponsor of the scheme, is therefore making this pre-application in advance of a market engagement event on 12th March which will engage a private sector company to move forward with the heat network and make the full application.



HNDU COMMERCIALISATION STAGE PROJECTS

(DETAILED PROJECT DEVELOPMENT WORK COMPLETE)

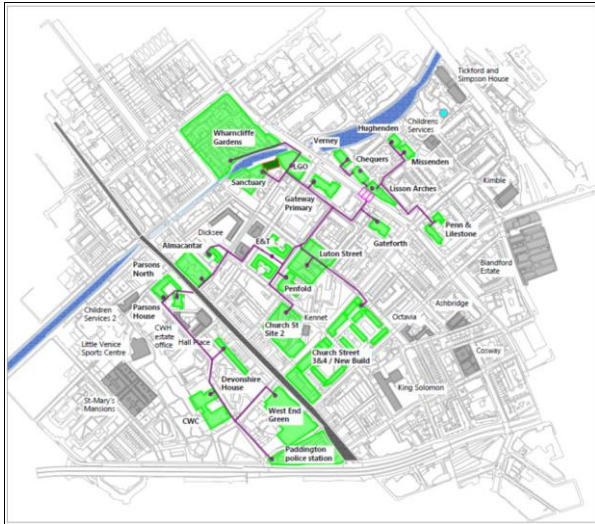


Church Street_COM

Project Sponsor:

City of Westminster

Network Map:



Technical Information:

Primary energy source:

CHP – Gas

Project description:

This project is focussed around Church Street and the surrounding area, including, Luton Street, Lisson Green Estate, Wharncliffe Gardens, City of Westminster College and West End Gate. At the heart of this is the Church Street Programme, a WCC led masterplan to deliver new development to the area, including residential, commercial, a green spine and future-proofed infrastructure to prepare the area for the coming decades and deliver benefits to the local residents.

Energy centre description:

The first phase would utilise existing plant across the sites. In 2021/22 a new energy centre would be built.

Heat/cooling demand phasing description:

Core connections comprise existing WCC buildings and the initial tranche of Church Street new build projects (broadly in line with WCC's Housing Zone). Thus, connections are made to the large existing blocks at Wharncliffe, Church St 3&4, Eastlake and Tadema and the Lisson Green Estate; and to Luton St, Lisson Arches, Penn and Lilestone Offices along with Sanctuary and Lisson Grove offices redevelopment

Summary forecast financial information:

Energy generation capex (£m)	£8.47
Private Wire (£m)	£0.00
Pipework / distribution capex (£m)	£6.27
Other capex (£m)	£1.17
Total capex (£m)	£15.91

Project IRR*	8.00%
Considering third party finance?	Not Stated

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
2018	2018	2019	2026

Project Stage

Commercialisation

Project Contact Details:

LA Name:	City of Westminster
Contact Name:	George Robinson
Email:	HNDU@beis.gov.uk

Barnsley Town Centre Civic Quarter

Project Sponsor:

Barnsley Metropolitan Borough Council

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£4.94
Private Wire (£m)	£0.00
Pipework / distribution capex (£m)	£2.85
Other capex (£m)	£3.15
Total capex (£m)	£10.95

Project IRR*	1.40%
Considering third party finance?	Yes

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
2021	2021	2022	2022

Project Stage

Detailed Project Development

Project Contact Details:

LA Name:	Barnsley Metropolitan Borough Council
Contact Name:	George Robinson
Email:	HNDU@beis.gov.uk

Technical Information:

Primary energy source:

Ground source heat pump

Project description:

The project is to implement a district heating scheme in Barnsley Civic Quarter, generating low carbon heat and electricity using an ambient loop network coupled with building level WSHP, to be located in an existing energy centre location. Heat off takers include public sector buildings such as Barnsley Council (Town Hall, Westgate Plaza, Gateway Plaza), Barnsley College, South Yorkshire Police and Berneslai Homes

Energy centre description:

During site visit it was realised that Westgate Plaza, Digital Media Centre and The Core have sufficient plant room space to house plant items relating to the distribution system as well as their own separate circuit equipment. The exact location of the central pump system will depend on the location of the abstraction boreholes. At this stage, it was assumed that Westgate Plaza will house the central plant items as it is included in all three scenarios. Pump house and the filtration system would require an area of 10m x 8m.

Heat/cooling demand phasing description:

Scheme is designed as the second phase to be built in 2025

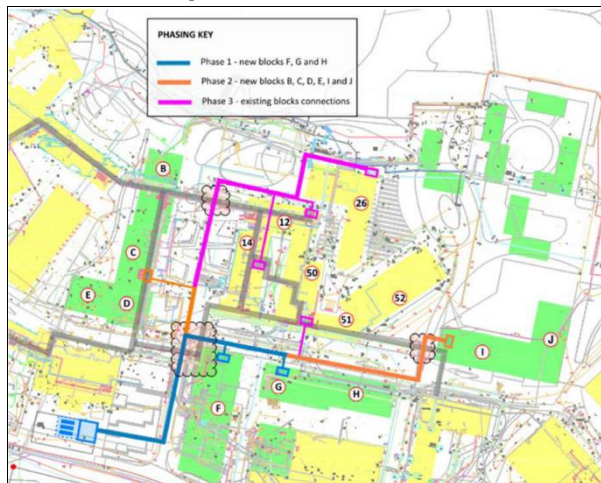


Alderley Park_DPD

Project Sponsor:

Cheshire East Council

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£0.68
Private Wire (£m)	£0.00
Pipework / distribution capex (£m)	£0.44
Other capex (£m)	£0.00
Total capex (£m)	£1.12

Project IRR*	2.90%
Considering third party finance?	Not Stated

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	Not Provided	2023	2025

Project Stage

Detailed Project Development

Project Contact Details:

LA Name:	Cheshire East Council
Contact Name:	George Robinson
Email:	HNDU@beis.gov.uk

Technical Information:

Primary energy source:

Ground source heat pump

Project description:

Network at Alderley Park - Ambient loop solution utilising WSHPs in buildings and aquifer water used via PHEX, ASHPs and CHP wasted heat in energy centre.

Energy centre description:

New energy centre proposed to be built to the south of the site to accommodate all equipment. Phase 1 assumes same energy centre location and specifications to account for future expansion

Heat/cooling demand phasing description:

Phase 1 – Serving buildings F, G and H, 4 boreholes initially. Two abstraction and 2 return
Phase 2 – Connection of B, C, D, E, I and J with additional capacity from open loop boreholes (another 4)
Phase 3 – Ambient loop extended to laboratory (existing) building. Continual energy saving through improved network and building efficiencies



Town Centre Heat Network_DPD

Project Sponsor:

Crawley Borough Council

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£2.76
Private Wire (£m)	£0.00
Pipework / distribution capex (£m)	£3.17
Other capex (£m)	£1.55
Total capex (£m)	£7.48

Project IRR*	6.11%
Considering third party finance?	No

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
2018	2018	2019	2020

Project Stage

Detailed Project Development

Project Contact Details:

LA Name:	Crawley Borough Council
Contact Name:	George Robinson
Email:	HNDU@beis.gov.uk

Technical Information:

Primary energy source:

CHP – Gas

Project description:

A three phase approach to delivering heat and power to Crawley Town centre has been assessed by Atkins. A number of different technical solutions have been assessed as potentially viable. The core heat load has been assessed to be 15GWh (including system losses) from a number of customers each with an average estimated heat density of 2MWh per meter of pipe installed.

Energy centre description:

Two different heat sources have been identified: Option 1 - 1160kWe CHP with Private Wire (PW); Option 2 - 999kW Biomass boiler with a 1160kWe CHP & PW. Both options are suggesting a positive IRR. The option presented represents the CHP _ biomass with Private wire option.

Heat/cooling demand phasing description:

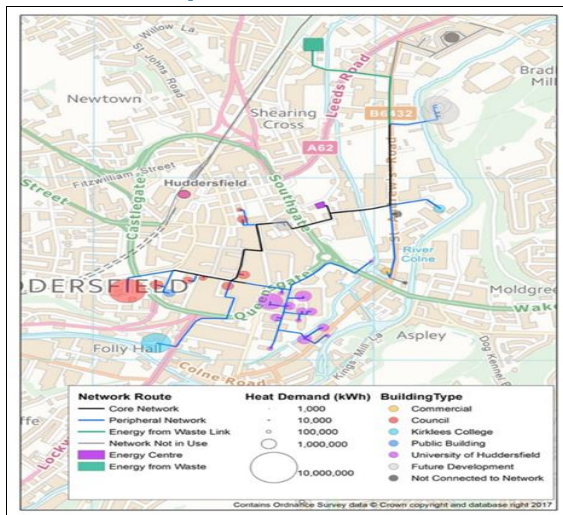
Key customers identified for the first phase are: 500 new residential units, the town hall, a police station, a library, a hotel, and a college.

Huddersfield Heat Network

Project Sponsor:

Kirklees Council

Network Map:



Technical Information:

Primary energy source:

CHP – EfW

Project description:

The Huddersfield Heat Network aims to connect the EfW on Diamond Street to potential heat and power customers in the town centre, along the key industrial corridor of St Andrews Road and the University quarter.

Energy centre description:

Site at junction of Old Leeds Road and Watergate next to Council Data Centre. Site is in Council ownership.

Heat/cooling demand phasing description:

Loads to be connected in 4 phases. Connection of heat customers is based on boiler ages for existing sites and expected development dates for future developments. Most electrical customers connect in phase 1.

Summary forecast financial information:

Energy generation capex (£m)	£4.26
Private Wire (£m)	£2.59
Pipework / distribution capex (£m)	£6.31
Other capex (£m)	£3.29
Total capex (£m)	£16.45

Project IRR*	11.80%
Considering third party finance?	Yes

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
2022	2024	2025	2039

Project Stage

Detailed Project Development

Project Contact Details:

LA Name:	Kirklees Council
Contact Name:	George Robinson
Email:	HNDU@beis.gov.uk

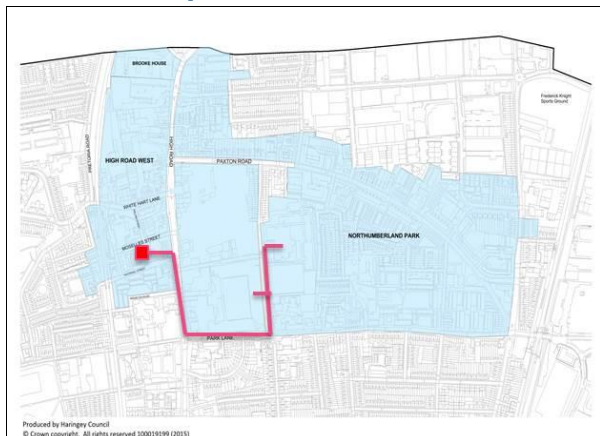


North Tottenham_DPD

Project Sponsor:

London Borough of Haringey

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£4.65
Private Wire (£m)	£0.00
Pipework / distribution capex (£m)	£3.89
Other capex (£m)	£2.13
Total capex (£m)	£10.66

Project IRR*	Not provided
Considering third party finance?	No

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
2020	2022	2024	2035

Project Stage

Detailed Project Development

Project Contact Details:

LA Name:	London Borough of Haringey
Contact Name:	Tim Starley-Grainger
Email:	Tim.Starley-Grainger@haringey.gov.uk

Technical Information:

Primary energy source:

CHP – Gas

Project description:

The summary financial forecast is based on 2016 analysis which assumed 3 large and adjacent development sites anticipated to commence before 2020 with 10 year build out. Spurs new 61,000 seat stadium opening in 2018, hotel and leisure facilities. Potential for up to 2700 new homes at High Road West and up to 5000 new homes in Northumberland Park, relocation of two schools into new facilities, new library and community facilities, and mix of employment space. Regeneration of the largest site has been suspended but scheme still viable and there is still strong political support for the project which is being actively progressed.

Energy centre description:

Heat and private wire. 2016 analysis of full build out: peak heat c.30MW. Initially gas CHP, with gas boilers and thermal store. Potential to deliver future transition to lower carbon heat source at scale, and further carbon savings via connection to future ERF in Edmonton. Energy Centre Shell to be delivered by the High Road West Development Partner in early 2020s.

Heat/cooling demand phasing description:

Final build-out estimates 40MW boiler plant and 8MWe CHP with 40GWh annual heat sales. Assumes build out of 400 units pa at HRW over 8yrs and 350 units pa at NP over 15 years. Spurs stadium assumed to be added in initial phase. Additional 80,000m2 non-residential development added at approx. 5,500m2 pa over 15yrs. Potential to add c1,000 existing homes at Broadwater Farm Estate (not currently included)



Smethwick_DPD

Project Sponsor:

Sandwell Metropolitan Borough Council

Network Map:



Technical Information:

Primary energy source:

UNKNOWN

Project description:

Heat network connecting new developments in Smethwick plus (Sandwell) council tower blocks.

Energy centre description:

Energy Centre proposed near canal. Includes WHSPs and gas boilers.

Heat/cooling demand phasing description:

All consumers connected in 2022-2030.

Summary forecast financial information:

Energy generation capex (£m)	£4.81
Private Wire (£m)	£0.00
Pipework / distribution capex (£m)	£4.22
Other capex (£m)	£2.15
Total capex (£m)	£11.17

Project IRR*	1.59%
Considering third party finance?	No

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	Not Provided	Not Provided	2022

Project Stage

Detailed Project Development

Project Contact Details:

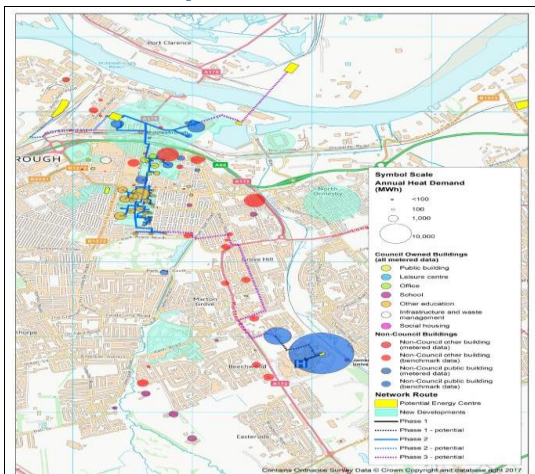
LA Name:	Sandwell Metropolitan Borough Council
Contact Name:	Mark Taylor
Email:	mark_taylor@sandwell.gov.uk

Middlesbrough_DPD

Project Sponsor:

Tees Valley Combined Authority

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£0.00
Private Wire (£m)	£0.00
Pipework / distribution capex (£m)	£0.00
Other capex (£m)	£0.00
Total capex (£m)	£30.00

Project IRR*	Not provided
Considering third party finance?	Yes

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	Not Provided	Not Provided	Not Provided

Project Stage

Detailed Project Development

Project Contact Details:

LA Name:	Tees Valley Combined Authority
Contact Name:	George Robinson
Email:	HNDU@beis.gov.uk

Technical Information:

Primary energy source:

CHP – Gas

Project description:

New gas CHPs in each of the town centre and hospital, connected via a heat network. Private wire network around the town centre. Potential to connect both the heat and private wire networks to local AD biogas CHP, biomass and waste industrial heat sources.

Key core off-taker partners identified and actively supporting the development of the project are: James Cook University Hospital, Teesside University and Middlesbrough Council. A number of other potential off-takers have been identified in the Outline Business Case - October 2017 (OBC) for inclusion in the scheme and discussions are on-going. This creates a potential for c52,000MWh pa thermal demand and c53,000MWh pa electrical demand.

Energy centre description:

In the OBC the town centre energy centre location is proposed on Richmond Street, on the western edge of the Middlehaven Regeneration area. The site is approximately 6,000m² and is bound on its north, south and west sides by roads, with further open space to the west of the site. This site is located north of the A66 and is considered suitable for gas CHP, standby boilers. The site is also well suited for the potential connection to one of two existing AD CHP plants, a biomass plant (under construction) or a WSHP. The hospital energy centre will be at the existing boiler house (within the hospital complex) or immediately adjacent (depending on access issues).

Work has started on developing the Full Business Case and is currently at the pre-procurement stage. A review of the proposed energy centre location is on-going as the proposed site may now not be available.

Heat/cooling demand phasing description:

In the OBC a 3 phase build out was proposed: Hospital CHP scheme, town centre DE scheme, then the heat connection between the two. The current pre-procurement work is reviewing this proposed phasing approach to ensure that it still meets the needs and timescales of key partners for replacement of existing infrastructure and / or proposed new developments which have the potential to be connected to the network.



HNDU TECHNO-ECONOMIC FEASIBILITY STAGE

It should be noted that whilst these projects have completed a techno-economic feasibility study some, but not all, will have progressed to DPD or are aiming to soon progress to DPD.

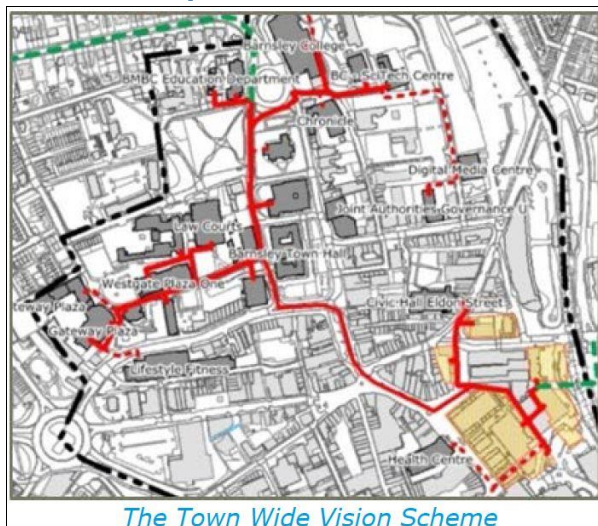


Barnsley Civic Quarter_FES

Project Sponsor:

Barnsley Metropolitan Borough Council

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£2.37
Private Wire (£m)	£0.29
Pipework / distribution capex (£m)	£2.75
Other capex (£m)	£6.00
Total capex (£m)	£11.41

Project IRR*	4.40%
Considering third party finance?	Yes

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	2018	2019	2022

Project Stage

Feasibility

Project Contact Details:

LA Name:	Barnsley Metropolitan Borough Council
Contact Name:	George Robinson
Email:	HNDU@beis.gov.uk

Technical Information:

Primary energy source:

CHP – Gas

Project description:

The feasibility study concluded that the Town Centre Wide - Scenario 1 scheme is to be taken forwards to stage 2. This scheme includes all loads identified in the EMP, with inclusion of St Marys Church, the Digital Media Centre, Joint Authorities Governance Unit, Civic Hall, and Centre for Voluntary action. To also include the Alhambra Shopping Centre. Heat and power to be supplied to the Better Barnsley development phase 1, with only power being supplied to phases 2 and 3. Should this scheme not pass stage 2, there is the option to fall back on the Civic Quarter scheme.

Energy centre description:

The site for the proposed EC is within the Better Barnsley development. The EC will contain Natural Gas CHP units. The proposed plant includes 7MW gas boilers, and 1,200kW gas CHP engines, 2x115m2 thermal stores.

Heat/cooling demand phasing description:

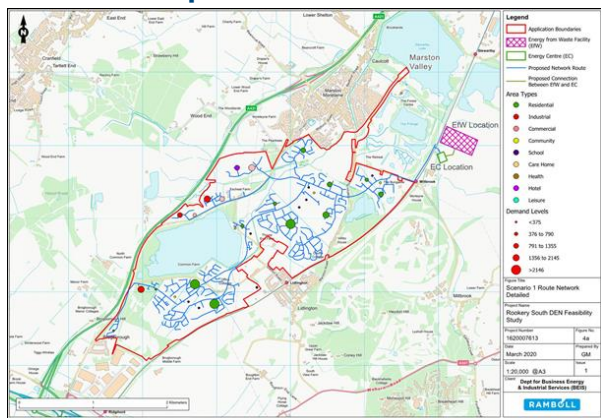
Heat demand is 7,254 MWh/yr. Peak heat demand 4.7MW. Phase 1 in operation from 2019 is proposed to connect all stakeholders except St Marys Church, power from CHP to supply Better Barnsley Phase 1, and the Alhambra shopping centre. Phase 2 and 3, 2020 and 2021 would see power connected to the final phases of the Better Barnsley development. Phase 4 would see St Marys Church being connected in 2022.

Rookery South - Scenario 1_FES

Project Sponsor:

Bedford Council

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£6.57
Private Wire (£m)	£0.00
Pipework / distribution capex (£m)	£14.77
Other capex (£m)	£9.66
Total capex (£m)	£31.00

Project IRR*	5.77%
Considering third party finance?	Not Stated

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	2021	2022	2022

Project Stage

Feasibility

Project Contact Details:

LA Name:	Bedford Council
Contact Name:	George Robinson
Email:	HNDU@beis.gov.uk

Technical Information:

Primary energy source:

Boiler - EfW

Project description:

To establish the potential for a district heating network (DHN) supplying heat from Rookery South Energy Recovery Facility (ERF) to new developments in Marston Valley and potentially also other loads in the wider area.

The main aims of the study were to carry out techno-economic modelling to establish the viability of a new heat network, to define any gap funding requirements and develop initial Stage 2 design information for the heat offtake, heat network and building interfaces.

Energy centre description:

The Energy centre is assumed to be located south of the ERF (Approx 50-100 m). To minimise the footprint requirement of the Energy Centre building, the EfW district heating condensers, which extract heat from the EfW steam for the district heating, have been assumed to be located within the ERF. The footprint of the Energy Centre is 28m x 19m (LxW), 530m². The Energy Centre houses 1No. 0.8MW and 3No. 8.5MW gas boilers, DH pumps, pressurisation units, expansion vessels and ancillary equipment. 2No. 150m³ thermal stores are located outside the Energy Centre main building.

Heat/cooling demand phasing description:

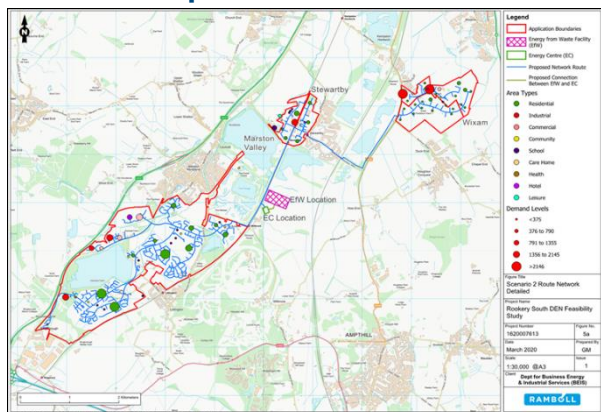
Under Scenario 1, phasing of the network was assumed to follow the phased growth of the development over 17 years. Similarly, under Scenario 2 the network is phased in parallel with the evolution of each development. There is also some scope for phasing the development of the heat offtake infrastructure at the ERF and the Energy Centre itself, although this would need careful consideration to avoid additional cost. At this stage it was assumed the necessary infrastructure is installed in year 1.

Rookery South - Scenario 2_FES

Project Sponsor:

Bedford Council

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£8.09
Private Wire (£m)	£0.00
Pipework / distribution capex (£m)	£24.25
Other capex (£m)	£14.24
Total capex (£m)	£46.58

Project IRR*	5.30%
Considering third party finance?	Not Stated

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	2021	2022	2022

Project Stage

Feasibility

Project Contact Details:

LA Name:	Bedford Council
Contact Name:	George Robinson
Email:	HNDU@beis.gov.uk

Technical Information:

Primary energy source:

Boiler - EfW

Project description:

To establish the potential for a district heating network (DHN) supplying heat from Rookery South Energy Recovery Facility (ERF) to new developments in Marston Valley and potentially also other loads in the wider area.

The main aims of the study were to carry out techno-economic modelling to establish the viability of a new heat network, to define any gap funding requirements and develop initial Stage 2 design information for the heat offtake, heat network and building interfaces.

Energy centre description:

The Energy centre is assumed to be located south of the ERF (Approx 50-100 m). To minimise the footprint requirement of the Energy Centre building, the EfW district heating condensers, which extract heat from the EfW steam for the district heating, have been assumed to be located within the ERF. The footprint of the Energy Centre is 28m x 19m (LxW), 530m². The Energy Centre houses 1No. 0.8MW and 3No. 8.5MW gas boilers, DH pumps, pressurisation units, expansion vessels and ancilliary equipment. 2No. 150m³ thermal stores are located outside the Energy Centre main building.

Heat/cooling demand phasing description:

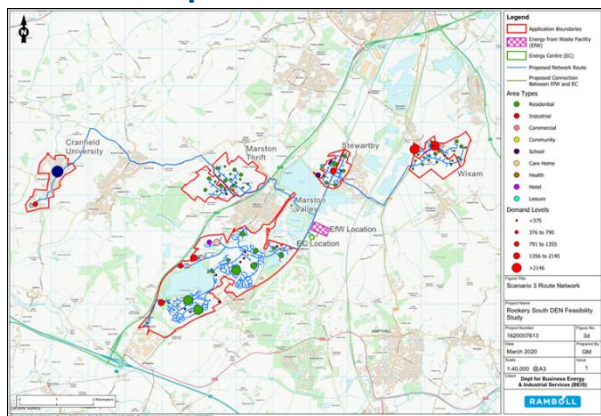
Under Scenario 1, phasing of the network was assumed to follow the phased growth of the development over 17 years. Similarly, under Scenario 2 the network is phased in parallel with the evolution of each development. There is also some scope for phasing the development of the heat offtake infrastructure at the ERF and the Energy Centre itself, although this would need careful consideration to avoid additional cost. At this stage it was assumed the necessary infrastructure is installed in year 1.

Rookery South - Scenario 3_FES

Project Sponsor:

Bedford Council

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£10.00
Private Wire (£m)	£0.00
Pipework / distribution capex (£m)	£36.34
Other capex (£m)	£20.08
Total capex (£m)	£66.42

Project IRR*	5.32%
Considering third party finance?	Not Stated

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	2021	2022	2022

Project Stage

Feasibility

Project Contact Details:

LA Name:	Bedford Council
Contact Name:	George Robinson
Email:	HNDU@beis.gov.uk

Technical Information:

Primary energy source:

Boiler - EfW

Project description:

To establish the potential for a district heating network (DHN) supplying heat from Rookery South Energy Recovery Facility (ERF) to new developments in Marston Valley and potentially also other loads in the wider area.

The main aims of the study were to carry out techno-economic modelling to establish the viability of a new heat network, to define any gap funding requirements and develop initial Stage 2 design information for the heat offtake, heat network and building interfaces.

Energy centre description:

The Energy centre is assumed to be located south of the ERF (Approx 50-100 m). To minimise the footprint requirement of the Energy Centre building, the EfW district heating condensers, which extract heat from the EfW steam for the district heating, have been assumed to be located within the ERF. The footprint of the Energy Centre is 28m x 19m (LxW), 530m². The Energy Centre houses 1No. 0.8MW and 3No. 8.5MW gas boilers, DH pumps, pressurisation units, expansion vessels and ancillary equipment. 2No. 150m³ thermal stores are located outside the Energy Centre main building.

Heat/cooling demand phasing description:

Under Scenario 1, phasing of the network was assumed to follow the phased growth of the development over 17 years. Similarly, under Scenario 3 the network is phased in parallel with the evolution of each development. There is also some scope for phasing the development of the heat offtake infrastructure at the ERF and the Energy Centre itself, although this would need careful consideration to avoid additional cost. At this stage it was assumed the necessary infrastructure is installed in year 1. Also it is assumed that Cranfield University connects in year 1 as well.

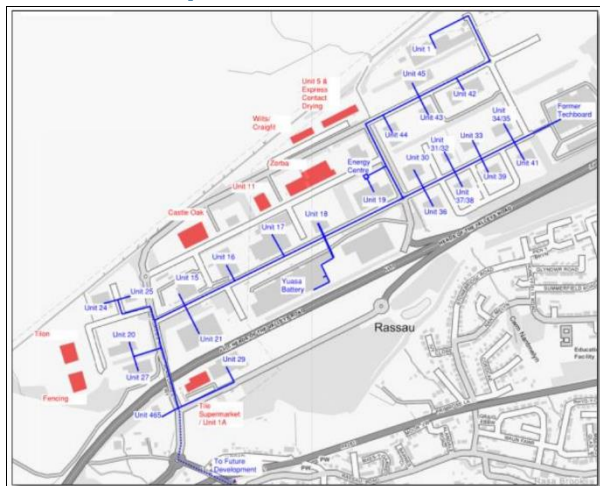


Ebbw Vale (Rassau)_FES

Project Sponsor:

Blaenau Gwent County Borough Council

Network Map:



Technical Information:

Primary energy source:

CHP – Gas

Project description:

Rassau Estate is an industrial park in Blaenau Gwent County. There is opportunity for a district heat network for businesses on the estate to be served by a CHP. Thirty-seven distinct loads were identified at Rassau Estate, and are exclusively private sector light industrial / manufacturing, distribution and commercial.

Energy centre description:

New energy centre would be located at Rassau Estate. Technology: CHP and back up boilers.

Heat/cooling demand phasing description:

All demand will be online day one.

Summary forecast financial information:

Energy generation capex (£m)	£2.41
Private Wire (£m)	£0.00
Pipework / distribution capex (£m)	£2.83
Other capex (£m)	£1.83
Total capex (£m)	£7.07

Project IRR*	0.95%
Considering third party finance?	Not Stated

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	Not Provided	Not Provided	2019

Project Stage

Feasibility

Project Contact Details:

LA Name:	Blaenau Gwent County Borough Council
Contact Name:	George Robinson
Email:	HNDU@beis.gov.uk

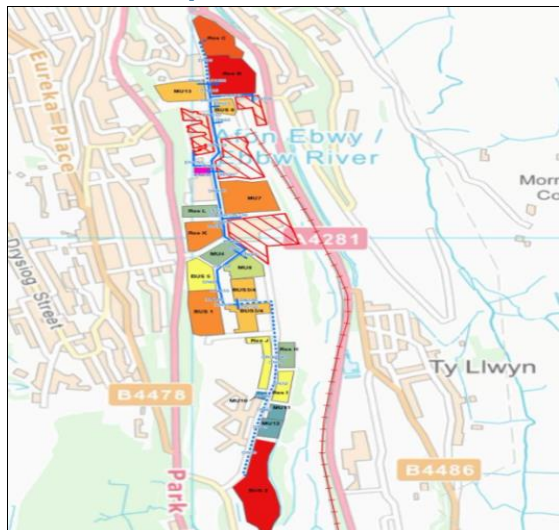


The Works_FES

Project Sponsor:

Blaenau Gwent County Borough Council

Network Map:



Technical Information:

Primary energy source:

Boiler - Biomass

Project description:

Opportunity to connect on local loads to the existing Works district heat network in the Ebbw Vale area.

Energy centre description:

Existing energy centre with CHP, biomass boilers and gas boilers. Located in Ebbw Vale.

Heat/cooling demand phasing description:

Loads are phased online over six years. Mixture of residential and commercial loads to be added over this time period. There are 19 loads added over seven years, three per year for the first five years, then two per year for the last two. Seven residential plots, five commercial plots and seven mixed use.

Summary forecast financial information:

Energy generation capex (£m)	£0.00
Private Wire (£m)	£0.00
Pipework / distribution capex (£m)	£0.92
Other capex (£m)	£0.00
Total capex (£m)	£0.92

Project IRR*	-4.28%
Considering third party finance?	Not Stated

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	Not Provided	Not Provided	2019

Project Stage

Feasibility

Project Contact Details:

LA Name:	Blaenau Gwent County Borough Council
Contact Name:	George Robinson
Email:	HNDU@beis.gov.uk



Castle Lane East Network_FES

Project Sponsor:

Bournemouth Borough Council

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£0.00
Private Wire (£m)	£0.00
Pipework / distribution capex (£m)	£0.00
Other capex (£m)	£9.10
Total capex (£m)	£9.10

Project IRR*	11.10%
Considering third party finance?	Not Stated

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	Not Provided	2020	2023

Project Stage

Feasibility

Project Contact Details:

LA Name:	Bournemouth Borough Council
Contact Name:	George Robinson
Email:	HNDU@beis.gov.uk

Technical Information:

Primary energy source:

Boiler - EfW

Project description:

There is potential for a viable DH network in Bournemouth, with the Hospital being the key anchor load, and location for the EC. Viability depends on the expansion of the hospital and development of adjacent land.

Energy centre description:

It is proposed to locate the EC at the Hospital and use the Incinerator as the main heat supply source. 2x CHP units each with capacity of 1580kW will be located alongside the incinerator to supply heat and power in the best performing scenario. Existing boilers are to be omitted from the scheme.

Heat/cooling demand phasing description:

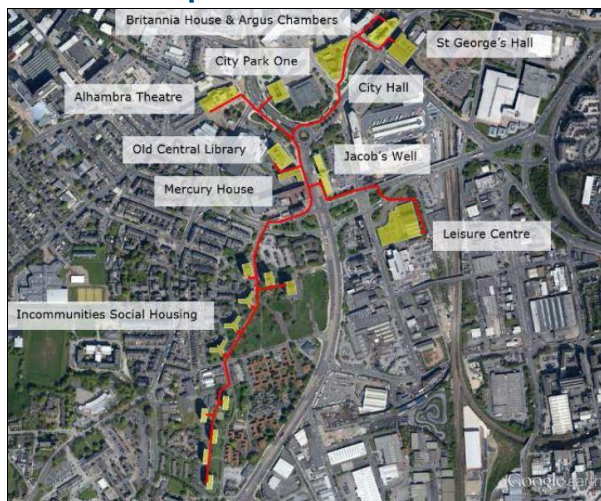
The phasing of the scheme will be coordinated to try and do most of the work in the summer when there is the lowest demand for the heat. The development is assumed to be connected in 3 equal loads in 2020, 2021 and 2023.

Bradford Civic Quarter_FES

Project Sponsor:

Bradford Metropolitan District Council

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£3.02
Private Wire (£m)	£0.31
Pipework / distribution capex (£m)	£3.53
Other capex (£m)	£1.24
Total capex (£m)	£8.09

Project IRR*	Not provided
Considering third party finance?	Yes

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	Not Provided	Not Provided	Not Provided

Project Stage

Feasibility

Project Contact Details:

LA Name:	Bradford Metropolitan District Council
Contact Name:	George Robinson
Email:	HNDU@beis.gov.uk

Technical Information:

Primary energy source:

CHP – Gas

Project description:

A priority network has been identified that offers a preferred business case; this comprises the installation of a 3MWe gas CHP in an Energy Centre within the Leisure Centre and 1MW of biomass heating capacity within the Old Central Library. The network would supply Britannia and Argus Chambers, City Park One, Alhambra Theatre, Old Central Library, Mercury House, St George's Hall, City Hall, Public Service Hub, Leisure Centre and eleven In-communities social housing blocks.

Energy centre description:

A 2MWe CHP and 1MW biomass boiler would be the primary heat sources. The CHP is intended to operate at full capacity between the hours of 6am and 7pm due to the large heat demand of the buildings. The biomass boiler is intended to operate throughout the day to satisfy the remaining demand, although peak demand from around 6am to 1pm exceeds capacity of both the CHP and biomass boiler and would be met by the existing fossil fuel boilers.

Heat/cooling demand phasing description:

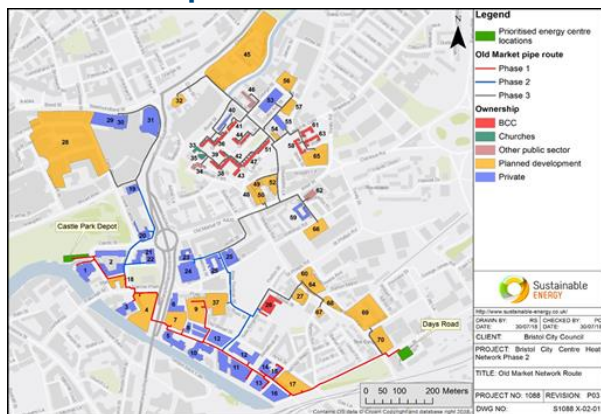
The priority network represents the first phase of development of a district energy network for the City of Bradford. In the future, additional heat demands may be added via extension to the network, as new developments are constructed near to the priority network or lower cost and carbon heat sources become available. In order to future proof the scheme and network outline design, consideration of proposed existing and planned heat loads was undertaken and future proofing design measures developed, such as increasing pipe sizes and specification to accommodate future increased heat flow.

City Centre Phase 2_FES

Project Sponsor:

Bristol City Council

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£2.39
Private Wire (£m)	£0.00
Pipework / distribution capex (£m)	£10.86
Other capex (£m)	£1.12
Total capex (£m)	£14.37

Project IRR*	6.50%
Considering third party finance?	Yes

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	2020	2021	2028

Project Stage

Feasibility

Project Contact Details:

LA Name:	Bristol City Council
Contact Name:	George Robinson
Email:	HNDU@beis.gov.uk

Technical Information:

Primary energy source:

Water source heat pumps

Project description:

Bristol City Council's ambition for the city to be carbon neutral by 2050 led to the council's desire to implement heat networks throughout the city. This network is served by a WSHP and gas CHP engine (which supplies electricity to the HP) located at Castle Park Depot, abstracting water from the Floating Harbour. The phase 1 network comprises of many large planned development sites and commercial buildings. The proximity of the network to the Floating Harbour and significant planned development heat loads results in a prime opportunity for a district heat network.

Note on Bristol's Heat Network Investment Strategy:

Bristol City Council is seeking external investment of up to £1 billion to support a city-scale low carbon, smart energy infrastructure programme which includes investment in the Bristol Heat Network. For more information please visit www.energyservicebristol.co.uk/prospectus/

Energy centre description:

The Castle Park Depot energy centre includes a combination of gas CHP, WSHP and peak and reserve gas boilers, integrated with thermal storage tanks. The gas boilers will be used to provide heat at times of peak demand and when network temperatures are required to be higher than the heat pump set point, or as a reserve heat source during times of gas CHP or WSHP maintenance or failure. Controls will prioritise heat from the gas CHP unit and WSHP using thermal stores with priority over the gas peak and reserve boilers to maximise the use of low carbon technologies.

Heat/cooling demand phasing description:

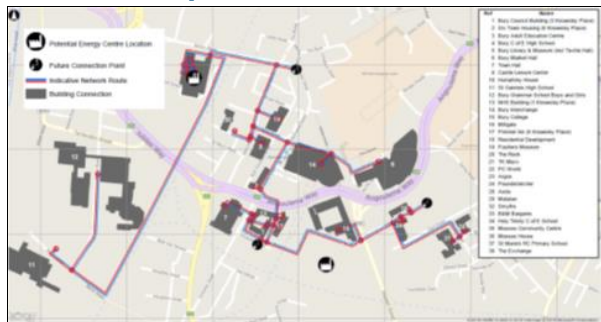
The phase 1 network option connects routes of high linear heat density to privately owned sites and planned developments. Phase 2 connects Hannah More Primary School (owned by BCC) and additional private sector and planned development sites. The phase 3 network extends to a significant number of connections including lower linear heat density routes, longer term planned developments and surrounding existing sites.

Bury Town Centre_FES

Project Sponsor:

Bury Metropolitan Borough Council

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£2.15
Private Wire (£m)	£1.07
Pipework / distribution capex (£m)	£4.10
Other capex (£m)	£0.00
Total capex (£m)	£7.32

Project IRR*	5.40%
Considering third party finance?	No

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	2018	Not Provided	Not Provided

Project Stage

Feasibility

Project Contact Details:

LA Name:	Bury Metropolitan Borough Council
Contact Name:	George Robinson
Email:	HNDU@beis.gov.uk

Technical Information:

Primary energy source:

CHP – Gas

Project description:

The preferred option for the town centre extends from St Gabriels High School in the West to Moses Community Centre in the East and covers the areas to the north and south of the A58. Once completed heat will be provided to 17 buildings. The network will be built in 3 phases, and future proofed to allow for further expansion. The network will be supplied with heat and power from CHP gas backup and thermal storage.

Energy centre description:

The preferred energy centre location is in the Castle Leisure Centre. The energy centre has been developed as a phased build up over the duration of the network development to reduce initial CAPEX and redundant heat generation.

- Phase 1 - Two CHP units and two boilers
 - Phase 2 - An additional boiler
 - Phase 3 - An additional CHP unit and Boiler
- The complete energy centre will contain 3x 400 kWe (504 kWth) CHP engines, and 4x 2MW gas boilers, with 60 m3 thermal storage.

Heat/cooling demand phasing description:

Phase 1: Connection to buildings to the east of the Energy Centre up to the Metrolink underpass

Phase 2: Connection to Bury Grammar Boys school, Bury Grammar Girls school and St Gabriels High School with the pipe route along East Lancs Railway.

Phase 3: Connection to buildings east of the Metrolink.

The network has been future proofed to take account of potential new development by including planned blank connections, for future connections to:

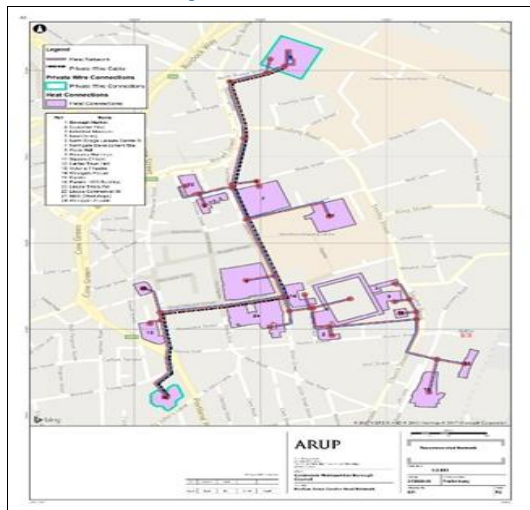
- Eastern retail loads in Angouleme retail park
- Residential development on Knowsley Street
- Future connection to the Rock and Millgate retail (Exec Sum p6)

Halifax Town Centre_FES

Project Sponsor:

Calderdale Metropolitan Borough Council

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£3.65
Private Wire (£m)	£0.41
Pipework / distribution capex (£m)	£5.26
Other capex (£m)	£0.23
Total capex (£m)	£9.55

Project IRR*	5.90%
Considering third party finance?	Yes

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
2019	2020	2021	Not Provided

Project Stage

Feasibility

Project Contact Details:

LA Name:	Calderdale Metropolitan Borough Council
Contact Name:	George Robinson
Email:	HNDU@beis.gov.uk

Technical Information:

Primary energy source:

CHP – Gas

Project description:

The network is designed around CMBC buildings incorporating all viable CMBC owned buildings in the Town Centre, including the Town Hall, Piece Hall, Northgate Development Site and North Bridge Leisure Centre Development amongst others. The scheme also connects to key private consumers in the area including Lloyds Trinity Rd and Eureka. A private wire connection is intended to be incorporated between the Energy Centre and Lloyds, a key anchor load central to the scheme viability. The scheme is designed to allow for future heat network expansion to Dean Clough but requires further engagement with the developer for this to be realised.

Energy centre description:

The Energy Centre proposed is part of a Leisure Centre development north of the Town Centre (provision has been given in modelling and report for a standalone Energy Centre if this is not possible). The Energy Centre would contain two 1.5MWe gas-fired CHP engines along with ancillary and back-up plant including four 3.3MW gas boilers and a 150m³ thermal store. As a standalone Energy Centre, the building would have an estimated 290m³ footprint. The operational strategy is heat-led.

Heat/cooling demand phasing description:

Through consultation with CMBC and HNDU, the scheme has been specified as a single phase. This has been selected as the network is not large enough to require multiple phases and all key internal and external stakeholders have engaged with the scheme. It is acknowledged that the major transport works planned throughout the Town Centre may impose build out constraints; however, the programme for this is unknown and therefore cannot be addressed at this stage.

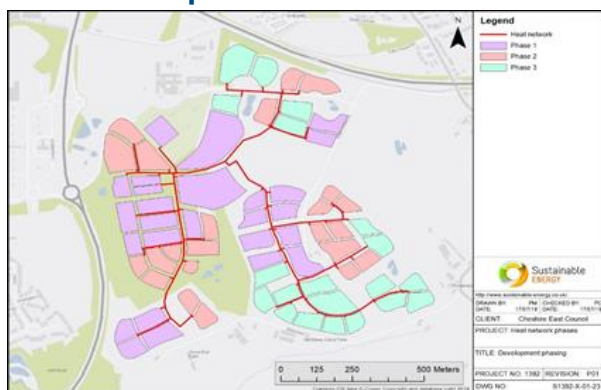


North Cheshire Garden Village_FES

Project Sponsor:

Cheshire East Council

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£3.18
Private Wire (£m)	£0.00
Pipework / distribution capex (£m)	£4.83
Other capex (£m)	£0.52
Total capex (£m)	£8.53

Project IRR*	0.02%
Considering third party finance?	Yes

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	1905	1905	1905

Project Stage

Feasibility

Project Contact Details:

LA Name:	Cheshire East Council
Contact Name:	George Robinson
Email:	HNDU@beis.gov.uk

Technical Information:

Primary energy source:

Ground source heat pump

Project description:

The Garden Village at Handforth network serves the proposed garden village developments and is served by a ground source heat pump (GSHP) located at the centre of the development site. The network connects the garden village developments only that are to be designed for DH connection and allows for lower network temperatures. BGS borehole records suggest the site is a suitable location for GSHPs.

Energy centre description:

The energy centre is located in Parcel 9 of the development, at the centre of the site, near the village centre. The energy centre is to include 580 kW GSHP and a 389 kWth gas CHP installed in phase 1 and additional 580 kW GSHPs installed in phase 2 and 3 to serve the later development phases.

Heat/cooling demand phasing description:

The network phasing follows the development phasing. Phase 1 connects the majority of the village centre, including the primary school and the extra care facility. The high density housing located towards the centre of the site is also connected in phase 1. Phase 2 connects the remaining village centre buildings and further residential parcels. Phase 3 connects the remaining and primarily lower density housing.

Alderley Park_FES

Project Sponsor:

Cheshire East Council

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£5.83
Private Wire (£m)	£0.00
Pipework / distribution capex (£m)	£1.35
Other capex (£m)	£0.00
Total capex (£m)	£7.18

Project IRR*	3.90%
Considering third party finance?	Yes

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	Not Provided	2019	2035

Project Stage

Feasibility

Project Contact Details:

LA Name:	Cheshire East Council
Contact Name:	George Robinson
Email:	HNDU@beis.gov.uk

Technical Information:

Primary energy source:

CHP – Gas

Project description:

Network at Alderley Park - installation of gas CHP at 2019, phasing the network towards an ambient loop solution utilising WSHP and open-loop GSHP.

Energy centre description:

Initial phases utilise the existing energy centre. Future phases expect to build a new energy centre adjacent to Radnor Mere.

Heat/cooling demand phasing description:

Phase 1 – Existing strategy, total heat load served by gas fired boilers supplying hot water at 176°C.

Phase 2 – A number of short term energy efficiency measures have been introduced., CHP supplies a portion of heat to the LTHW network and supply temperature drops to 90°C. A number of office buildings have converted to VRF systems and are thus disconnected from the existing network.

Phase 3 – Ambient loop system introduced powered by WSHP adjacent to Radnor Mere and initially serving the office buildings which are all served by VRF systems. Existing heat network continues to serves laboratory buildings.

Phase 4 – Ambient loop extended to laboratory buildings with additional capacity from open loop GSHP. Existing heat network decommissioned and CHP taken offline.

Phase 5 – Continual energy saving through improved network and building efficiencies

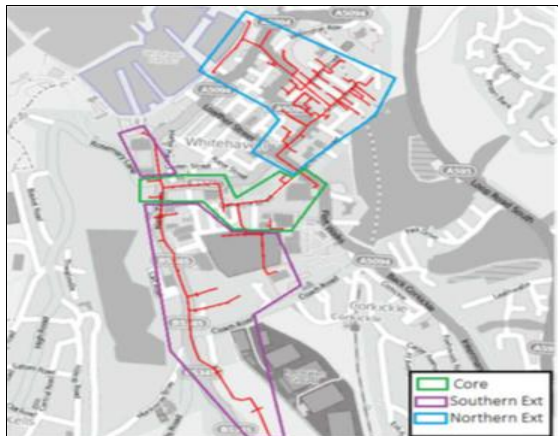


Whitehaven Minewater Heat Kells Lane_FES

Project Sponsor:

Copeland Borough Council

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£3.80
Private Wire (£m)	£0.00
Pipework / distribution capex (£m)	£2.18
Other capex (£m)	£2.17
Total capex (£m)	£8.15

Project IRR*	4.00%
Considering third party finance?	Not Stated

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	2021	2021	Not Provided

Project Stage

Feasibility

Project Contact Details:

LA Name:	Copeland Borough Council
Contact Name:	George Robinson
Email:	HNDU@beis.gov.uk

Technical Information:

Primary energy source:

Mine Water Heat Recovery

Project description:

Feasibility shows that minewater-fed network for Whitehaven town centre is technically feasible though financial performance is very poor, and without RHI payments the scheme is highly unlikely to make an operating surplus. Analysis shows that a low temperature scheme, serving only new developments with low temperature heating systems would make a profit, and without grant funding approaches an investible IRR. Such a scheme is dependent on buildings that do not yet exist so scheme development will need to wait until their construction is more certain.

Energy centre description:

Suitable locations for an energy centre to house a 4MW minewater heat pump and ancillary equipment were identified. The preferred site – Castle Meadows car park – is council-owned and is in close proximity to a suitable minewater abstraction borehole and the key heat loads.

Heat/cooling demand phasing description:

For the low temperature network, connections begin in 2021; Civic Quarter replacement, Plot 1 of The Ginns, Plot 1 of the Meadows, 13 Quay St developments. 2022: Plots 2 and 5 the Ginns, Plot 2 at 6 The Meadows. 2023 Plot 3 at the Ginns, and Plot 3 at 6 the Meadows, Preston St Gateway developments. 2024: Plot 4 at 6 the Meadows. 2025: Plot 4 The Ginns. 2026: Plot 5 at 6 The Meadows.

Whitehaven Westlakes Science Park_FES

Project Sponsor:

Copeland Borough Council

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£3.67
Private Wire (£m)	£1.43
Pipework / distribution capex (£m)	£2.60
Other capex (£m)	£2.72
Total capex (£m)	£10.43

Project IRR*	3.88%
Considering third party finance?	Not Stated

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	Not Provided	2020	2025

Project Stage

Feasibility

Project Contact Details:

LA Name:	Copeland Borough Council
Contact Name:	George Robinson
Email:	HNDU@beis.gov.uk

Technical Information:

Primary energy source:

CHP – Gas

Project description:

The preferred option is for a network to supply the Westlakes Science Park, though the IRRs are unlikely to be investible even with HNIP funding. It has been advised that further funding be sought in addition to HNIP. (p.116). Investigations considering viability of connecting the Eastern Whitehaven cluster did not improve the economics. The Westlakes Science Park is a majority private sector proposal, that would serve non-domestic loads.

Energy centre description:

A new energy centre site to the north side of Westlakes Science Park has been identified as the preferred option. The network would be supplied by 2x 1180kWth gas CHP engines. (p.62)

Heat/cooling demand phasing description:

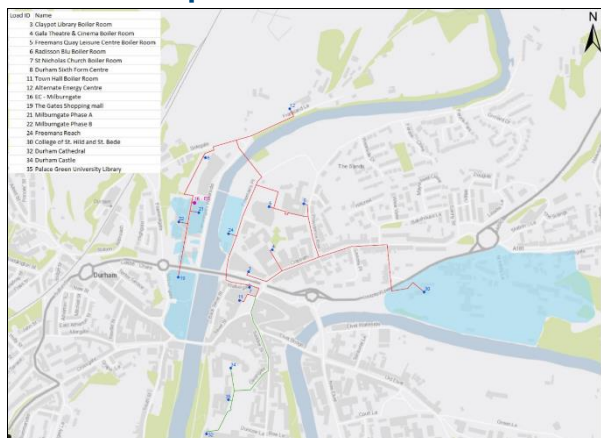
The network is proposed in 3 phases. The first connections (a selection of existing and planned buildings) are planned in 2020, the second phase includes the proposed buildings known as Plot 526, and the third phase, Summergrove Hall is planned for after 2025.

Durham Town Centre_FES

Project Sponsor:

Durham County Council

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£4.93
Private Wire (£m)	£0.63
Pipework / distribution capex (£m)	£3.75
Other capex (£m)	£1.84
Total capex (£m)	£11.15

Project IRR*	3.00%
Considering third party finance?	Yes

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	Not Provided	2019	2022

Project Stage

Feasibility

Project Contact Details:

LA Name:	Durham County Council
Contact Name:	George Robinson
Email:	HNDU@beis.gov.uk

Technical Information:

Primary energy source:

Water source heat pumps

Project description:

The core scheme is based upon new and existing public and private sector development on the east and west side of the River Wear. River Source or Sewerage Source Heat pumps are to be the primary heat generators. CHP will not be considered.

Energy centre description:

A number of energy centre locations have been considered. The feasibility was based upon the energy centre being located in the Milburn Gate development. The best economically performing option of the preferred scenarios is for 2x1MW River Source Heat pump.

Heat/cooling demand phasing description:

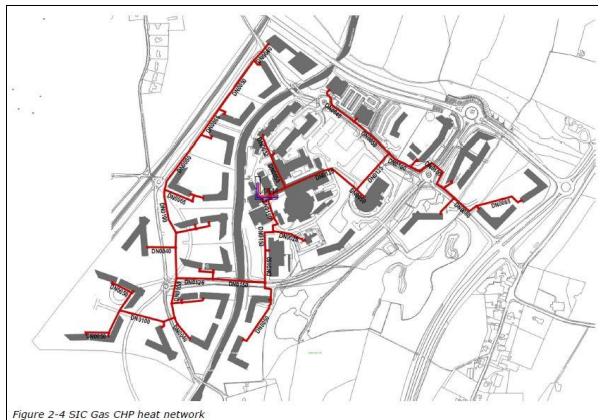
The heat demand for the Town Centre North and Northern Quarter is 4055MWh in 2019, rising to 8,267MWh in 2020, 11,647MWh in 2021 and finally 14,769MWh in 2022. The Council is unlikely to develop a private wire network.

East Runcorn Daresbury Energy Network_FES

Project Sponsor:

Halton Borough Council

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£3.45
Private Wire (£m)	£0.00
Pipework / distribution capex (£m)	£4.77
Other capex (£m)	£1.90
Total capex (£m)	£10.12

Project IRR*	Not provided
Considering third party finance?	Not Stated

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	Not Provided	2018	2034

Project Stage

Feasibility

Project Contact Details:

LA Name:	Halton Borough Council
Contact Name:	George Robinson
Email:	HNDU@beis.gov.uk

Technical Information:

Primary energy source:

CHP – Gas

Project description:

Over the next twenty years the construction of a new community in East Runcorn - with up to 2800 new homes alongside new schools and retail buildings, and the expansion of the existing Science and Innovation Campus and Business Park - represents a significant opportunity to develop a shared energy network.

Energy centre description:

Gas CHP is assumed to provide baseload heat, hot water and power, with 3.3 MW (thermal) CHP and 5.8 MW of gas boilers required once all consumers are connected. Absorption chillers are considered for use to supply cooling to the Science and Innovation Campus data centre.

Heat/cooling demand phasing description:

First stage connection forecast (as at 2016) to connect in 2018 with 4.5MW of thermal capacity installed (estimated 1.16GWh p.a. heat demand). This increases to installed capacity of 8MWth in 2026 (estimated 9.92GWh p.a. heat demand) rising to full capacity of 9MWth in 2031 (estimated 12.56GWh p.a. heat demand).

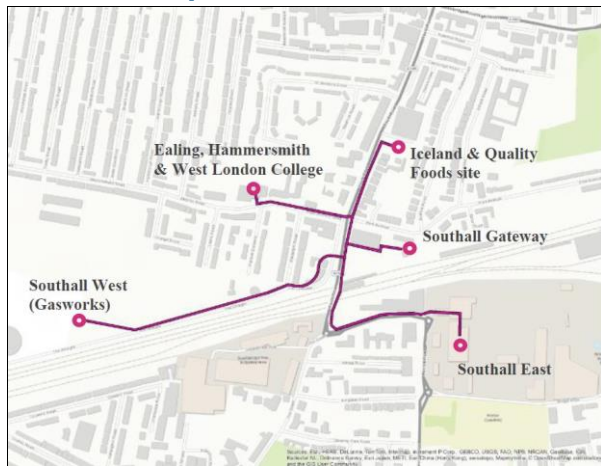


Southall DE_FES

Project Sponsor:

London Borough of Ealing

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£5.48
Private Wire (£m)	£0.00
Pipework / distribution capex (£m)	£3.67
Other capex (£m)	£0.00
Total capex (£m)	£9.15

Project IRR*	12.40%
Considering third party finance?	Not Stated

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	Not Provided	2019	2043

Project Stage

Feasibility

Project Contact Details:

LA Name:	London Borough of Ealing
Contact Name:	George Robinson
Email:	HNDU@beis.gov.uk

Technical Information:

Primary energy source:

CHP – Gas

Project description:

Southall is a vibrant and bustling place, poised to play a renewed role as one of London's most significant growth areas. With the arrival of Crossrail, significant investment from the Mayor's Regeneration Fund and clusters of major development sites, including the Gas Works, Southall is capable of exploiting the opportunities presented by this enhanced connectivity and committed investment.

Energy centre description:

Heat is provided for the scheme via combined heat and power (CHP) technology, with a large energy centre (EC) housing boilers and gas engines to be constructed on the site of the redeveloped Southall Gasworks. A heat network will take heat from the EC to serve new loads on the Gasworks site, as well as developments to the east, and to the south of the railway.

Heat/cooling demand phasing description:

Cumulative heat loads (excluding primary and secondary losses) reach a plateau at 24,000 MWh/year as the full build-out of all connected development sites is expected to happen in 2043.



Wood Green_FES

Project Sponsor:

London Borough of Haringey

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£22.10
Private Wire (£m)	£0.00
Pipework / distribution capex (£m)	£6.80
Other capex (£m)	£2.00
Total capex (£m)	£30.90

Project IRR*	2.60%
Considering third party finance?	No

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	Not Provided	2023	2038

Project Stage

Feasibility

Project Contact Details:

LA Name:	London Borough of Haringey
Contact Name:	Tim Starley-Grainger
Email:	Tim.Starley-Grainger@haringey.gov.uk

Technical Information:

Primary energy source:

CHP – Gas

Project description:

Feasibility study in 2016 analysed a new network to serve a large programme of regeneration around Wood Green. The initial source of low carbon heat was anticipated to be gas-fired combined heat and power, with an aspiration to connect to the energy from waste plant in Edmonton in the longer term. It envisaged that electricity can be sold via private wire to Haringey Council. Heat would supply mainly new developments proposed in the area, alongside some existing loads. Expect updated feasibility and business case to be completed by Haringey Council in 2019/20.

Energy centre description:

The proposed energy centre was expected to be integrated into the Clarendon Square development. The energy centre was assumed to be made available in early 2020s to allow construction of scheme to commence. The feasibility work suggested the fully built out scheme is estimated to require around 28MW of gas boiler plant and 5.3MWth of gas-fired CHP. See the summary forecast financial information opposite from 2016. Note: the scheme's feasibility, phasing and delivery timescales are expected to be revisited by Haringey Council in updated feasibility work and subsequent business case in 2019/20.

Heat/cooling demand phasing description:

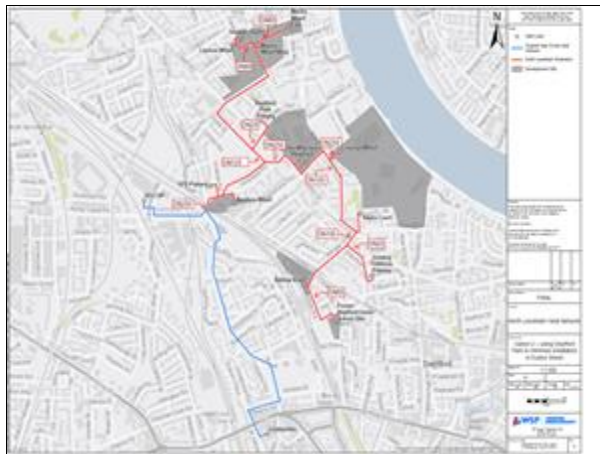
Feasibility work in 2016 estimated the total annual heat demand on full build out of the masterplan at 28.2 GWh Phase 1 was assumed to be Clarendon Road, areas adjacent to the railway and the Cultural Quarter. Phase 2 assumed to include the Mall, Morrisons and High Road South. Phase 3 assumed to include the Civic Centre, Bus Depot and Mecca Bingo sites. Future timelines are uncertain - FID unlikely to be prior to 2021 with build out dates to follow.

North Lewisham Heat Network_FES

Project Sponsor:

London Borough of Lewisham

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£0.00
Private Wire (£m)	£0.00
Pipework / distribution capex (£m)	£7.68
Other capex (£m)	£0.00
Total capex (£m)	£7.68

Project IRR*	15.30%
Considering third party finance?	Yes

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	Not Provided	Not Provided	2025

Project Stage

Feasibility

Project Contact Details:

LA Name:	London Borough of Lewisham
Contact Name:	George Robinson
Email:	HNDU@beis.gov.uk

Technical Information:

Primary energy source:

Boiler - EfW

Project description:

The opportunity is to connect the SELCHP energy from waste facility to a number of new developments in the north Lewisham area. The North Lewisham continues from the point of interface with the New Cross study, which is the junction of Surrey Canal Road and Grinstead Road. The pipework running between SELCHP and this interface point (i.e. down Surrey Canal Road) was assessed in the previous feasibility study and the sizing included an allowance for the loads included in this North Lewisham extension study.

Note that the use of two different heat network names across the two studies gives the impression that there would be two separate heat networks – the New Cross and the North Lewisham heat networks. These two names are used to define two separate studies, focusing on two areas of what would be the same heat network if all loads connected.

Energy centre description:

n/a - all heat to be supplied by SELCHP.

Heat/cooling demand phasing description:

The scope of this feasibility assessment is therefore to build upon the analysis undertaken in the New Cross Heat Network feasibility assessment to include the following development sites: The Wharves, Deptford; Cannon Wharf; Marine Wharf East; Marine Wharf West; Yeoman Street; Neptune Wharf; Convoys Wharf; Arklow Road. Annual heat demand is estimated at 47GWh.

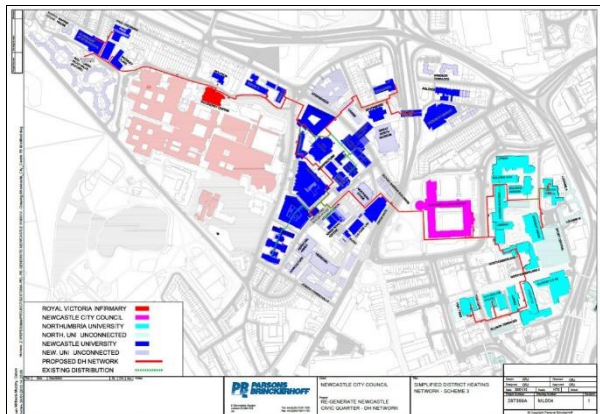
LBL planning officers and local housing associations will also be consulted to determine whether there are additional sites that should be considered for connection.

Civic Quarter District Energy Scheme_FES

Project Sponsor:

Newcastle-upon-Tyne City Council

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£6.09
Private Wire (£m)	£0.00
Pipework / distribution capex (£m)	£0.00
Other capex (£m)	£0.00
Total capex (£m)	£6.09

Project IRR*	10.70%
Considering third party finance?	Not Stated

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	Not Provided	2018	Not Provided

Project Stage

Feasibility

Project Contact Details:

LA Name:	Newcastle-upon-Tyne City Council
Contact Name:	George Robinson
Email:	HNDU@beis.gov.uk

Technical Information:

Primary energy source:

CHP – Gas

Project description:

The project is dependent on securing surplus heat from the energy centre at the Royal Victoria Infirmary (RVI). In order to secure sufficient heat to meet the project objectives of supplying heat to the three key stakeholders while meeting the RVI's requirement would require an upgrade of the existing energy centre at the RVI which is currently operated by Veolia (formally Dalkia). The preferred scheme supplies over 20GWh of low carbon heat from the RVI energy centre to key stakeholder buildings via a 1.8km buried heating network at a capital cost of £5million, resulting in a total CO2 reduction of 6,300 tonnes per year.

Energy centre description:

Two 1.9MW CHP engines are currently installed in the Royal Victoria Infirmary energy centre, manufactured by Jenbacher (model: JMS 612). The energy centre is operated under a 25-year PFI contract which ends in 2027. The CHPs are understood to have been installed in around 2002. They are due for a major refurbishment around 2017. The preferred replacement engines have been assessed to be 2 x JMS 624 CHP engines with 8.276MWth/8.802MWe capacity.

Heat/cooling demand phasing description:

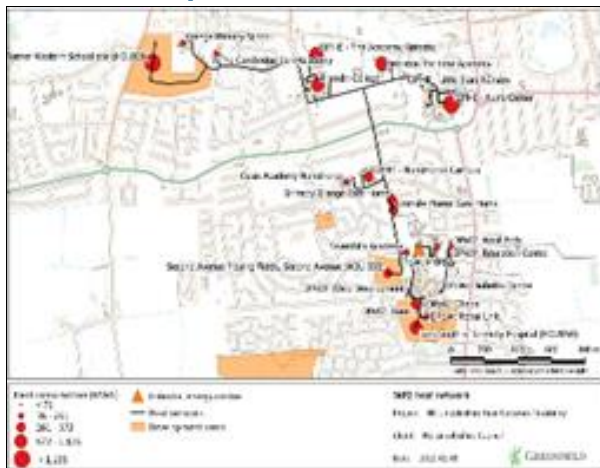
Not Provided

GIFHE(peak)_FES

Project Sponsor:

North East Lincolnshire Council

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£5.64
Private Wire (£m)	£1.21
Pipework / distribution capex (£m)	£9.33
Other capex (£m)	£3.25
Total capex (£m)	£19.43

Project IRR*	2.50%
Considering third party finance?	Yes

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	Not Provided	2022	Not Provided

Project Stage

Feasibility

Project Contact Details:

LA Name:	North East Lincolnshire Council
Contact Name:	Tony Neul
Email:	tony.neul@nelincs.gov.uk

Technical Information:

Primary energy source:

CHP – Gas

Project description:

Heat network serving educational facilities, hospital outbuildings, care facilities and residential developments around the Grimsby Institute (Further and Higher Education Campus) and Diana Princess of Wales Hospital in Grimsby.

Energy centre description:

Energy centre is proposed to be located on the estate of Diana, Princess of Wales Hospital adjacent to an existing Energy Centre (separate building). The energy centre is proposed to employ gas CHP (to meeting a significant power load), Groundwater sourced Heat Pumps, heat recovery from the hospital and (peaking) gas boilers. The proportion of the heat supplied from Heat Pumps is an important consideration since this could significantly improve the carbon performance of the scheme as compared a scheme dominated by gas CHP.

Heat/cooling demand phasing description:

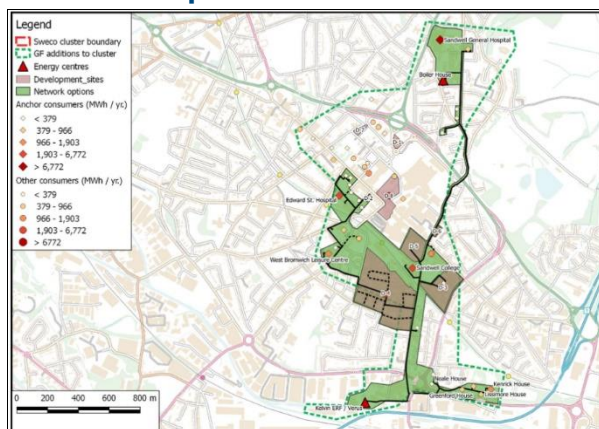
Connection of existing consumers is phased based on known boiler ages for key consumers. Developments are connected as they are built out. The network is proposed to originate from the Diana, Princess of Wales Hospital site, which is also among the first connections. A potential major re-build of the hospital within the next 10 years will enable significant expansion.

West Bromwich_FES

Project Sponsor:

Sandwell Metropolitan Borough Council

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£4.81
Private Wire (£m)	£0.00
Pipework / distribution capex (£m)	£14.58
Other capex (£m)	£0.83
Total capex (£m)	£20.22

Project IRR*	6.09%
Considering third party finance?	No

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
2019	2020	2021	2026

Project Stage

Feasibility

Project Contact Details:

LA Name:	Sandwell Metropolitan Borough Council
Contact Name:	Mark Taylor
Email:	mark_taylor@sandwell.gov.uk

Technical Information:

Primary energy source:

Waste heat – Other (without heat pump)

Project description:

Heat supply from planned Energy from Waste plant supplying heat to Opp1&2 networks plus connection to Sandwell General Hospital and West Bromwich town centre with a new CHP plant at Sandwell General Hospital

Energy centre description:

Heat offtake from planned Energy from Waste plant with gas boilers for peak/backup, Gas CHP plant at the Sandwell General Hospital, peak/backup boilers near Kenrick Way

Heat/cooling demand phasing description:

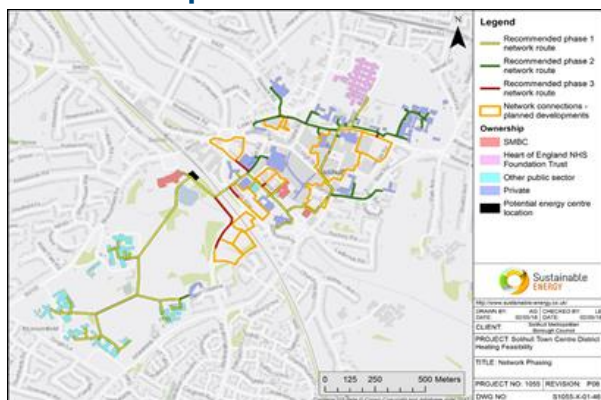
Not Provided

Solihull Town Centre_FES

Project Sponsor:

Solihull Metropolitan Borough Council

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£4.60
Private Wire (£m)	£0.39
Pipework / distribution capex (£m)	£14.88
Other capex (£m)	£0.00
Total capex (£m)	£19.48

Project IRR*	3.72%
Considering third party finance?	Not Stated

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	Not Provided	2021	2027

Project Stage

Feasibility

Project Contact Details:

LA Name:	Solihull Metropolitan Borough Council
Contact Name:	George Robinson
Email:	HNDU@beis.gov.uk

Technical Information:

Primary energy source:

CHP – Gas

Project description:

Solihull Town Centre has been identified as an area of high enough heat density to support a heat network.

Energy centre description:

The energy centre would contain a 823kWe CHP, a 3MW heat pump and 6.6MWth of auxiliary boilers for phase 1. In phase 2, a 1560kWe CHP and 3MWth of auxiliary would be added. In phase 3, approximately 5-6MW of auxiliary would be added to the network, although most likely not at the energy centre but in one of the developments connecting to the network in phase 3.

Heat/cooling demand phasing description:

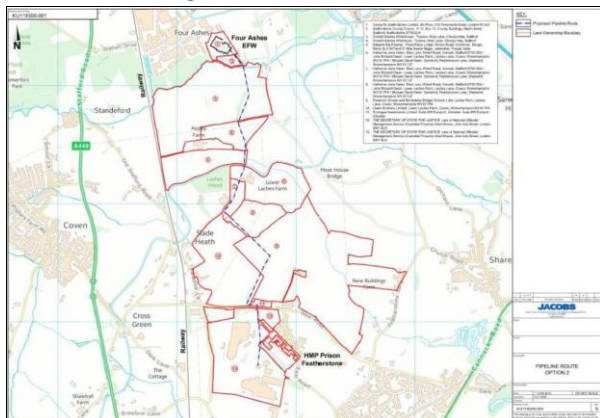
The proposed network would connect up mainly council buildings in phase 1, as well as the hospital and a few private sector buildings. A small private wire network would also be part of phase 1, serving the hospital, council buildings and a private sector building (Touchwood shopping centre). Phase 2 adds several private sector connections, and phase 3 connects proposed developments.

Veolia Energy from Waste_FES

Project Sponsor:

Staffordshire Moorlands District Council

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£0.00
Private Wire (£m)	£0.00
Pipework / distribution capex (£m)	£0.00
Other capex (£m)	£0.00
Total capex (£m)	£4.77

Project IRR*	Not provided
Considering third party finance?	Not Stated

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	Not Provided	Not Provided	Not Provided

Project Stage

Feasibility

Project Contact Details:

LA Name:	Staffordshire Moorlands District Council
Contact Name:	George Robinson
Email:	HNDU@beis.gov.uk

Technical Information:

Primary energy source:

CHP – EfW

Project description:

Staffordshire County Council (SCC) is contracting with Veolia Environmental Services (Veolia) in the delivery of a 300,000tpa energy recovery facility (ERF) at Four Ashes Industrial Estate, Staffordshire. The facility has recently been completed and was deemed fully operational in 2014. The plant has been designed to be combined heat and power (CHP) enabled and it is estimated that the turbine has the capacity to provide up to 18.5MWth hourly which has the potential to be exported through a district heating scheme, to viable local end users. There are three prisons on the site at Featherstone and have a capacity of approximately 2,800 inmates. From discussions with the MoJ, it is understood that there are plans for expansion of the Oakwood facility which could increase the capacity by a further 500-1000 inmates over the coming years. Due to the nature of the operation of the three prisons, there is a demand for heating over a 24 hour period throughout the year, although this naturally fluctuates with the season, occupancy etc. Relative to other district heating schemes providing domestic hot water demands this project offers a potential to supply constant and relatively predictable base load heating requirement over a long term.

Energy centre description:

The DH scheme considered includes modification of the existing ERF to accommodate a new heat recovery system, DH heat exchanger, district heating pipework and associated pumps, end users heat delivery substations and the modifications to the prisons' existing boiler plant to accommodate the heat delivery substations.

Heat/cooling demand phasing description:

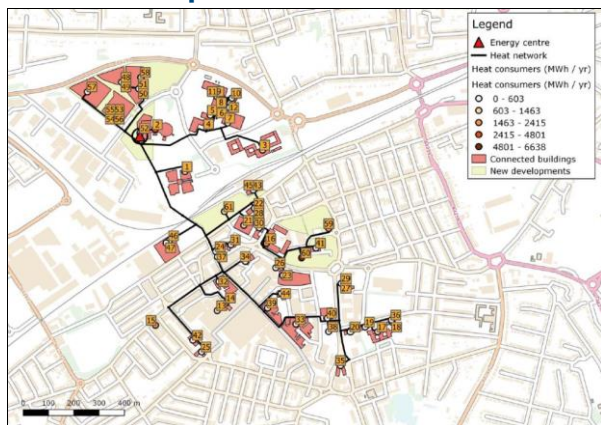
Not available

North Star and Town Centre_FES

Project Sponsor:

Swindon Borough Council

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£8.46
Private Wire (£m)	£0.00
Pipework / distribution capex (£m)	£7.14
Other capex (£m)	£4.68
Total capex (£m)	£20.28

Project IRR*	8.00%
Considering third party finance?	Not Stated

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	2019	Not Provided	2027

Project Stage

Feasibility

Project Contact Details:

LA Name:	Swindon Borough Council
Contact Name:	George Robinson
Email:	HNDU@beis.gov.uk

Technical Information:

Primary energy source:

CHP – Gas

Project description:

North Star is located to the north of Swindon town centre, the two areas divided by the London to Bristol rail line. The North Star area is a focus for major redevelopment involving the redevelopment of the Oasis Leisure Centre, the construction of an indoor ski facility, arena and associated leisure and retail development.

Energy centre description:

3 x 5.8MWth gas CHPs plus 22.3MWth of gas boilers proposed to supply the full network. Absorption chillers considered for supplying cooling to the ski facility. The figures presented reflect the heat only scheme. The inclusion of cooling is still estimated to provide a positive return (6.2_ PIRR over 40 years) but is slightly lower than the heat only scheme.

Heat/cooling demand phasing description:

Within the Town Centre area 35 buildings were identified with sufficient heat consumption and proximity to a probable heat network route (from the North Star site) to enable connection to a heat network. Assumed connections include the station and Kimmerfields developments. These developments present an ideal opportunity where their phasing can coincide with the establishment of a network, particularly Kimmerfields which present a major load from a mix of commercial and residential properties.

Trafford Park Heat Network_FES

Project Sponsor:

Trafford Metropolitan Borough Council

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£3.29
Private Wire (£m)	£0.38
Pipework / distribution capex (£m)	£1.28
Other capex (£m)	£1.24
Total capex (£m)	£6.19

Project IRR*	3.20%
Considering third party finance?	No

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
2021	2022	2024	2024

Project Stage

Feasibility

Project Contact Details:

LA Name:	Trafford Metropolitan Borough Council
Contact Name:	George Robinson
Email:	HNDU@beis.gov.uk

Technical Information:

Primary energy source:

CHP – Gas

Project description:

A network incorporating two existing buildings and four future developments (all part of the UA92 development). It was found that a CHP only network resulted in a 40 year IRR of 5.4% but negative carbon savings over 40 years. A hybrid solution is therefore recommended incorporating both a gas CHP and a Sewage Source Heat Pump (SSHP) as a source of low carbon heat.

It was found that a 860kWth gas CHP, a 250kW SSHP and top-up boilers result in an IRR of 3.2% and carbon savings of 1,800 tonnes over 40 years. The IRR can be improved if capital funding is provided from a source such as HNIP.

Energy centre description:

The proposed energy centre location is an area of land on the proposed UA92 development. The primary reasons for the sites selection are its proximity to the largest heat loads on the network, and the potential integration with the proposed future development. The Stretford Sports Village provides an alternative location which is under council ownership, not shown on the network due to uncertainty regarding the long term future of the current site and proposals for a replacement leisure centre at an alternative nearby location. Technically, the Sports Village and/or future leisure centre site is likely to offer a good addition to the network and it is suggested that the council takes a strategic view on this opportunity.

Heat/cooling demand phasing description:

The Trafford South network described above is recommended as the first step in the development of a larger network. This could include expansion to:

- Additional existing loads in the surrounding area, where engagement has not been successful to date. For example, Trafford College and Stretford High School.
- Additional future developments in the surrounding area as outlined in the emerging Civic Quarter Area Action Plan. Analysis shows that connection to additional office or residential developments could increase the IRR and lead to greater CO2 savings.
- Buildings within the Trafford North cluster should additional loads present themselves, or engagement with Manchester United become successful.



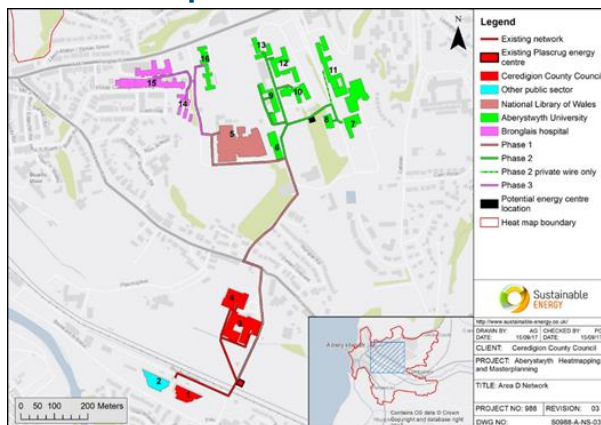
HNDU MAPPING AND MASTERPLANNING STAGE

Aberystwyth_MAP

Project Sponsor:

Ceredigion County Council

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£1.77
Private Wire (£m)	£0.29
Pipework / distribution capex (£m)	£1.89
Other capex (£m)	£0.00
Total capex (£m)	£3.94

Project IRR*	11.80%
Considering third party finance?	Not Stated

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	Not Provided	Not Provided	Not Provided

Project Stage

Heat mapping and masterplanning

Project Contact Details:

LA Name:	Ceredigion County Council
Contact Name:	George Robinson
Email:	HNDU@beis.gov.uk

Technical Information:

Primary energy source:

Boiler - Biomass

Project description:

There is potential to extend the existing district heating network at Plasrugg (currently connecting Ceredigion County Council (CCC) offices, Welsh Government offices, Ysgol Penweddig and Plasrugg Leisure Centre) extending to include the National Library of Wales, Aberystwyth University and Bronglais Hospital. The network would be served by the existing biomass boiler, gas CHP and an additional biomass boiler. The project would have a material impact on heat decarbonisation in Aberystwyth. Benefits for CCC include reducing carbon emissions, potential revenue generation, reducing operational / energy costs, utilising local energy sources, improving energy security, and reducing fuel poverty.

Energy centre description:

The network would be served from 2 energy centres; the existing Plasrugg energy centre and a new energy centre at Aberystwyth University. Plasrugg would house the 500kW gas CHP engine and backup boilers required for phase 1. For additional network phases, backup boilers would need to be housed at Aberystwyth University. Gas CHP units for additional network phases would be located in containerised units adjacent to the existing Plasrugg energy centre. For the full phase 3c network, an additional area of approximately 300m² would be required adjacent to the Plasrugg energy centre and approximately 220m² at Aberystwyth University.

Heat/cooling demand phasing description:

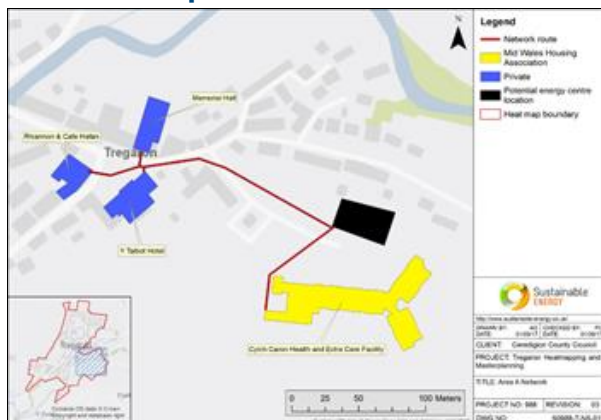
Phase 1 will extend the existing network to the National Library of Wales and connect existing heat network connections to private wire. Phase 2 will connect key buildings at Aberystwyth University. Phase 3 will then connect Bronglais Hospital and Pantycelyn (an additional Aberystwyth University building).

Tregaron_MAP

Project Sponsor:

Ceredigion County Council

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£0.23
Private Wire (£m)	£0.00
Pipework / distribution capex (£m)	£0.16
Other capex (£m)	£0.00
Total capex (£m)	£0.40

Project IRR*	6.60%
Considering third party finance?	Not Stated

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	Not Provided	Not Provided	Not Provided

Project Stage

Heat mapping and masterplanning

Project Contact Details:

LA Name:	Ceredigion County Council
Contact Name:	George Robinson
Email:	HNDU@beis.gov.uk

Technical Information:

Primary energy source:

Boiler - Biomass

Project description:

A district heat network in this area would supply heat to Cylch Caron planned development, Y Talbot Hotel, Rhiannon and Café Hafan, and the Memorial Hall by means of a biomass boiler. The network will provide benefits to Ceredigion County Council (CCC) including generating revenue, local carbon reduction, and utilising local energy sources, through woodchip purchase. The network could also potentially improve energy security and resilience against rising energy prices.

Energy centre description:

An energy centre and woodfuel delivery area to accommodate a 250 kW biomass boiler would require a land area of approximately 1,000 m². It has been assumed that this would be located adjacent to the Council-owned car park to the north of the Cylch Caron development.

Heat/cooling demand phasing description:

No potential viable network extensions have been identified. The network has therefore been presented as a single phase.

Corby Town Centre_MAP

Project Sponsor:

Corby Borough Council

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£0.81
Private Wire (£m)	£0.12
Pipework / distribution capex (£m)	£0.45
Other capex (£m)	£0.33
Total capex (£m)	£1.71

Project IRR*	6.00%
Considering third party finance?	No

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	Not Provided	Not Provided	Not Provided

Project Stage

Heat mapping and masterplanning

Project Contact Details:

LA Name:	Corby Borough Council
Contact Name:	George Robinson
Email:	HNDU@beis.gov.uk

Technical Information:

Primary energy source:

CHP – Gas

Project description:

The cluster comprises a mixture of public and private sector connections; dominated by the energy demands of Corby Community Hospital and the Swimming Pool. A range of scenarios were assessed with the most commercial incorporating buildings up to and including extension 2: Swimming Pool, Cube, Grosvenor House, Corby Hospital complex as heat and electrical customers, and the Cinema as a private wire customer. With a HNIP contribution equivalent to 25% of the total CAPEX, the IRR is 4.5%. Whilst the extension of the network to include extension 3 (Job Centre and a new residential development), and extension 4 (Deene House), this would be to the detriment of the financial returns and are not deemed commercially viable to connect.

Energy centre description:

A new energy centre close to/adjacent to Corby Swimming Pool is proposed - There is a small area of undeveloped land to the rear of the pool that is believed to be large enough. It is close to a gas main that is currently used by the pool and is in a concealed location that would have a limited impact on local aesthetics. The area can be accessed from the main road by a service road. A gas-fired CHP is proposed. The existing heating assets in the swimming pool and hospital are not very old and are proposed to be retained for back-up.

Heat/cooling demand phasing description:

- Core – consists of the core of the heat network, i.e. Swimming pool, Savoy Cinema, Corby Cube and Grosvenor buildings.
 - Extension 1 - Core buildings plus the Corby Urgent Care centre and the Lakeside GP surgery.
 - Extension 2 – Core, extension 1 plus the remaining 4 buildings on the hospital site. This includes Corby Community Hospital, Nuffield Hospital, Oasis Dental Practice and Willowbrook Health Centre.
- No cooling loads have been considered. To be investigated further during a feasibility study.

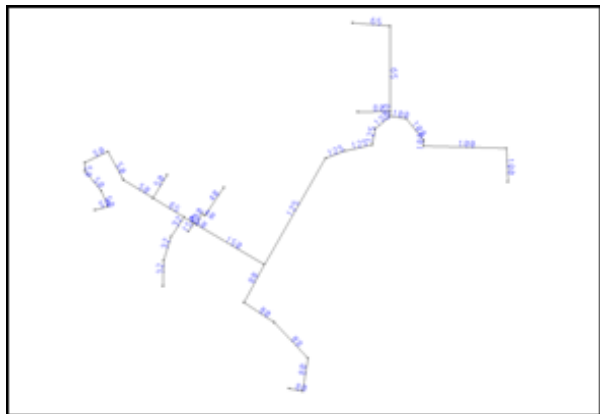


Manor Royal _ Industrial and business area_MAP

Project Sponsor:

Crawley Borough Council

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£3.00
Private Wire (£m)	£0.09
Pipework / distribution capex (£m)	£2.29
Other capex (£m)	£0.97
Total capex (£m)	£6.35

Project IRR*	3.90%
Considering third party finance?	No

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	2020	2021	2021

Project Stage

Heat mapping and masterplanning

Project Contact Details:

LA Name:	Crawley Borough Council
Contact Name:	George Robinson
Email:	HNDU@beis.gov.uk

Technical Information:

Primary energy source:

CHP – Gas

Project description:

Industrial and office building area with a total heat demand of 6.6 GWh/year and an electricity demand of 10.3GWh/year. The opportunity is located on the west site of the business park. The project consists of connecting with a district heating network main anchor loads in the area selected in order to supply heat and electricity.

Energy centre description:

The location of the Energy centre is likely to be on CBC trucks car park, located within the Cluster. A CHP engine supplying heat to the cluster and electricity to a selection of stakeholders is modelled.

Heat/cooling demand phasing description:

No phasing schedule as this stage has been included in the model.

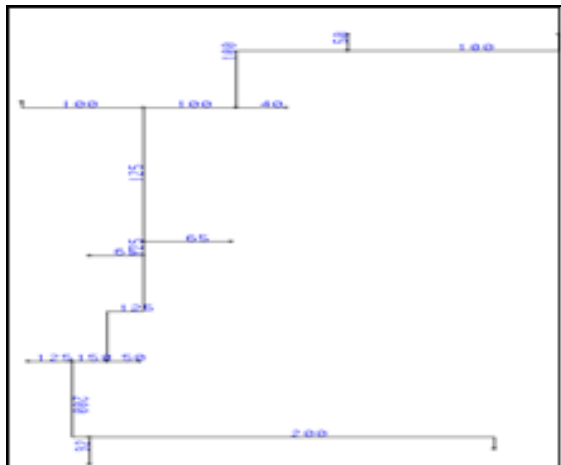


Manor Royal_Fleming Way and Manor Royal Road_MAP

Project Sponsor:

Crawley Borough Council

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£3.58
Private Wire (£m)	£0.08
Pipework / distribution capex (£m)	£2.44
Other capex (£m)	£1.03
Total capex (£m)	£7.14

Project IRR*	8.10%
Considering third party finance?	No

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	2020	2021	2021

Project Stage

Heat mapping and masterplanning

Project Contact Details:

LA Name:	Crawley Borough Council
Contact Name:	George Robinson
Email:	HNDU@beis.gov.uk

Technical Information:

Primary energy source:

CHP – Gas

Project description:

Mainly offices located between Fleming Way and Manor Royal road. Total heat demand of 9.7 GWh/year and an electricity demand of 31.1 GWh/year. The opportunity is located on the centre of the business park. The project consists of connecting with a district heating network main anchor loads in the area selected in order to supply heat and electricity.

Energy centre description:

It was indicated that available land on the south side of Harwoods Jaguar Land Rover showroom (south side of Manor Royal and Faraday Road junction) could be used for an energy centre. This land is a non-allocated business hub at the time of the writing.

Heat/cooling demand phasing description:

No phasing schedule as this stage has been included in the model.



Chesterfield_MAP

Project Sponsor:

Derbyshire county

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£14.09
Private Wire (£m)	£0.22
Pipework / distribution capex (£m)	£15.70
Other capex (£m)	£1.85
Total capex (£m)	£31.86

Project IRR*	10.28%
Considering third party finance?	No

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	Not Provided	Not Provided	2020

Project Stage

Heat mapping and masterplanning

Project Contact Details:

LA Name:	Derbyshire county
Contact Name:	Denise Ludlam
Email:	Denise.Ludlam@derbyshire.gov.uk

Technical Information:

Primary energy source:

CHP – Gas

Project description:

New network opportunity in central Chesterfield sourcing heat from a single energy centre containing gas CHP and gas boiler plant.

Energy centre description:

Energy centre is proposed to be on the Royal Chesterfield Hospital Site and is estimated to require the following capacities of plant to serve the scenario 6 network: Initial phase - 6.6MWe of gas CHP, 13MW gas boiler, Final phase - additional 10MW gas boiler

Heat/cooling demand phasing description:

Scenario 6 total heat demand is expected to be 60,006MWh p.a. with a peak demand of 19.6MW, the first phase (containing existing buildings only) has a peak demand of 11.3MW.

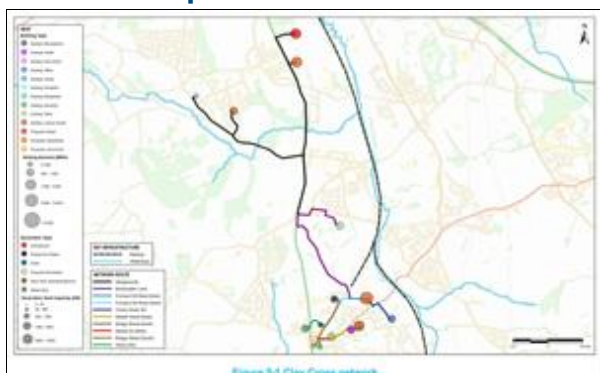


Clay Cross_MAP

Project Sponsor:

Derbyshire county

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£2.68
Private Wire (£m)	£0.00
Pipework / distribution capex (£m)	£5.55
Other capex (£m)	£0.41
Total capex (£m)	£8.65

Project IRR*	7.54%
Considering third party finance?	No

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	Not Provided	Not Provided	2020

Project Stage

Heat mapping and masterplanning

Project Contact Details:

LA Name:	Derbyshire county
Contact Name:	Denise Ludlam
Email:	Denise.Ludlam@derbyshire.gov.uk

Technical Information:

Primary energy source:

CHP – EfW

Project description:

New network opportunity sourcing heat from the proposed Clay Cross Energy from Waste facility and serving 11 sites in Clay Cross.

Energy centre description:

The proposed Clay Cross Energy from Waste facility - planning permission on the facility has been granted and is to be installed and operated by Larkfleet group. Lark energy confirmed that the district heating network energy centre could be located on the same site as the EfW facility.

Heat/cooling demand phasing description:

Boiler installation will be split into two phases (2020 and 2025). 12MW installed operational capacity is proposed in 2025 allowing full load to be met without any heat recovery element. Demand is estimated to be 3MW and 6MW for 2020 and 2025 respectively.



North Peckham_MAP

Project Sponsor:

London Borough of Southwark

Network Map:



Technical Information:

Primary energy source:

CHP – Gas

Project description:

The North Peckham Estate is one of Southwark's largest existing heating networks. This opportunity explored the options for extending the network and installing a CHP engine in the existing energy centre on Blake's Road

Energy centre description:

There is an existing EC on Blake's Road that could potentially accommodate a c. 2.5MW CHP engine, if the removal of 1no. 5MW boilers currently located in the plant room can be removed.

Heat/cooling demand phasing description:

Heat demand is existing; connection could be implemented immediately. Best performing scenario was to extend the network south to Sceaux Gardens but not further.

Summary forecast financial information:

Energy generation capex (£m)	£1.68
Private Wire (£m)	£0.00
Pipework / distribution capex (£m)	£0.00
Other capex (£m)	£0.41
Total capex (£m)	£2.09

Project IRR*	7.01%
Considering third party finance?	No

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
2018	2019	2020	2020

Project Stage

Heat mapping and masterplanning

Project Contact Details:

LA Name:	London Borough of Southwark
Contact Name:	George Robinson
Email:	HNDU@beis.gov.uk

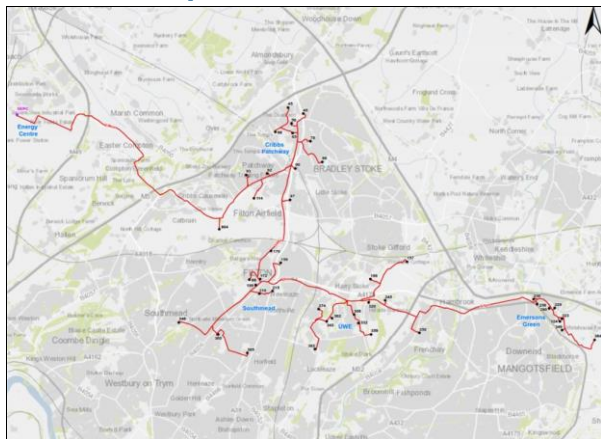


SERC EfW heat supply_MAP

Project Sponsor:

South Gloucestershire Council

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£3.05
Private Wire (£m)	£0.00
Pipework / distribution capex (£m)	£27.83
Other capex (£m)	£3.03
Total capex (£m)	£33.91

Project IRR*	Not provided
Considering third party finance?	Not Stated

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	Not Provided	Not Provided	Not Provided

Project Stage

Heat mapping and masterplanning

Project Contact Details:

LA Name:	South Gloucestershire Council
Contact Name:	George Robinson
Email:	HNDU@beis.gov.uk

Technical Information:

Primary energy source:

CHP – EfW

Project description:

A heat network is proposed to connect the significant heat loads in Cibbs Patchway, Southmead and UWE to the Sita Severnside energy recovery centre. With baseload heat estimated at 137.8GWh per year and potential additional annual heat loads of 33.2GWh the project offers an estimated heat density of just under 9MWh per meter of pipe installed and an undiscounted payback of 9 years.

Energy centre description:

Not Provided

Heat/cooling demand phasing description:

Cibbs Patchway is estimated to provide 49GWh p.a. of existing heat demand with a potential further annual 9.3GWh. Southmead is estimated to provide 33.3GW p.a. of existing heat demand with a potential further annual 22.9GWh from GKN Aerospace and Airbus. UWE is estimated to provide an annual 55.4GWh of heat loads. As such total heat loads assessed in the area have been estimated at 170GWh per year.



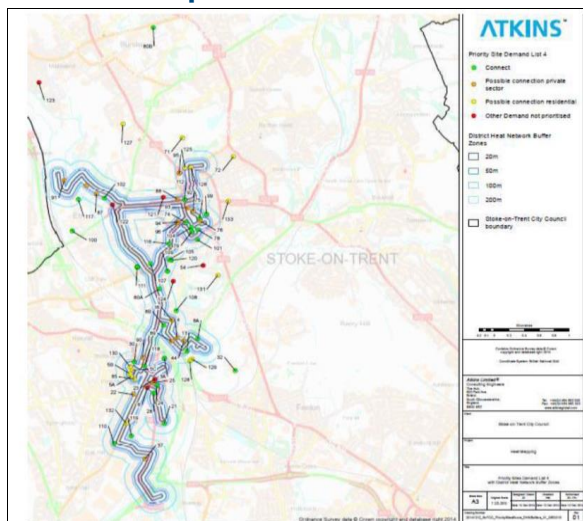
NON-HNIP PROJECTS THAT ARE UNDER CONSTRUCTION

Deep Geothermal_COM_CST

Project Sponsor:

Stoke-on-Trent City Council (SoTCC)

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£32.45
Private Wire (£m)	£0.00
Pipework / distribution capex (£m)	£17.41
Other capex (£m)	£1.07
Total capex (£m)	£50.93

Project IRR*	6.83%
Considering third party finance?	Not Stated

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	Not Provided	2018	2020

Project Stage

Under Construction

Project Contact Details:

LA Name:	Stoke-on-Trent City Council (SoTCC)
Contact Name:	George Robinson
Email:	HNDU@beis.gov.uk

Technical Information:

Primary energy source:

Geothermal

Project description:

SoTCC is considering a structure whereby heat is supplied to a mix of commercial and public sector. Average annual heat supplied to customers is estimated to be 45GWh. The head demand for the first phase is proposed to be met through back-up gas boilers of 10.5MW. A deep geothermal well is the proposed primary technology due to connect in 2019. Anchor load customers are Staffordshire University campus and SoTCC owned buildings and various other public sector buildings representing 60% of the total demand.

Energy centre description:

The deep geothermal energy centre will be owned and operated by a private sector owner operator. The project will own on site gas for system resilience and initial heat supply up to the point that the deep geothermal system is connected. The deep geothermal solution will comprise two wells, a doublet, drilled into the carboniferous limestone reservoir located at a depth of up to 4,000m. The production well will target the area where the reservoir is deepest and where a targeted production temperature of over 100°C is likely to be achieved. The hot geothermal fluid will be pumped to the surface using an electrical submersible pump where it will be passed through a heat exchanger and then send into the DHN.

Heat/cooling demand phasing description:

Heat connections are aimed to be in 2018/19 to the University, SoTCC buildings, schools, private housing association, local swimming pool and other commercial customers. Full loads are estimated to be connected by 2020.



PROJECTS CURRENTLY NOT BEING PURSUED BY LOCAL AUTHORITY SPONSOR

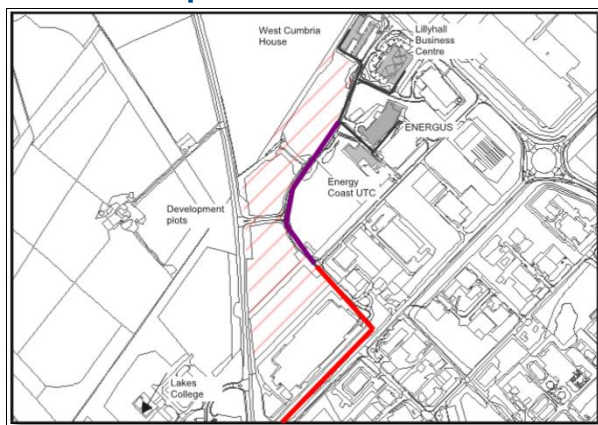


Lillyhall Hub_FES

Project Sponsor:

Allerdale Borough Council

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£0.00
Private Wire (£m)	£0.00
Pipework / distribution capex (£m)	£0.00
Other capex (£m)	£2.44
Total capex (£m)	£2.44

Project IRR*	0.80%
Considering third party finance?	Not Stated

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	2018	Not Provided	Not Provided

Project Stage

Feasibility

Project Contact Details:

LA Name:	Allerdale Borough Council
Contact Name:	George Robinson
Email:	HNDU@beis.gov.uk

Technical Information:

Primary energy source:

Boiler - Biomass

Project description:

Lillyhall Hub. a proposed standalone network located at an out of town business park with a series of offices and light industry. The only economically feasible option, but still only feasible with grant funding. Scheme is in two phases, and is dependent on phase 2 connections being built, as at present they are not in existence.

Energy centre description:

Biomass. Containerised woodchip biomass energy centre. 0.5MW. 85% Efficiency. 100m3 thermal store. 3MW gas back up boiler providing 26% of the load.

Heat/cooling demand phasing description:

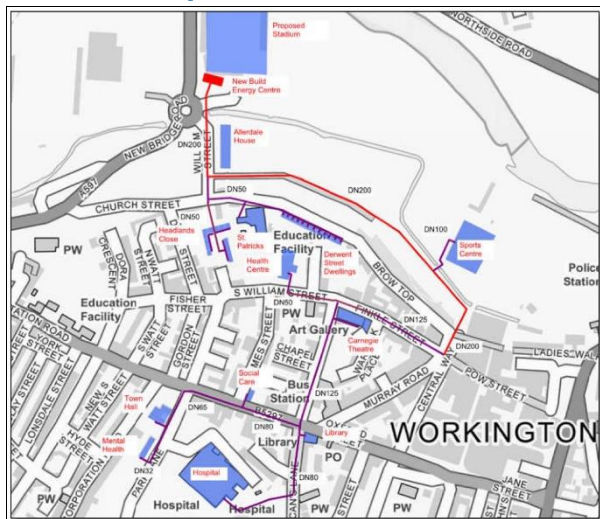
The most feasible project would be the Lillyhall Hub. There are several plots nearby earmarked for future development, which would provide phase 2 of the network. The network is only feasible if phase 2 heat demands are constructed. Total heat demand is 2,111MWh/yr.

Town Centre Hub_DPD

Project Sponsor:

Allerdale Borough Council

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£1.08
Private Wire (£m)	£0.11
Pipework / distribution capex (£m)	£2.39
Other capex (£m)	£1.16
Total capex (£m)	£4.75

Project IRR*	5.42%
Considering third party finance?	Not Stated

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
2019	2020	2021	Not Provided

Project Stage

Detailed Project Development

Project Contact Details:

LA Name:	Allerdale Borough Council
Contact Name:	George Robinson
Email:	HNDU@beis.gov.uk

Technical Information:

Primary energy source:

CHP – Gas

Project description:

Heat would be provided to a potential new Stadium planned for construction in 2020/21, Workington Hospital, Workington Leisure Centre and a variety of smaller public sector buildings. No commercial or private residential loads are envisaged as part of the initial build-out, reducing project risk, but connections to some social housing owned by Derwent & Solway Housing Association is included. To aid project economics, electricity is exported by private wire to the Stadium, to local Council offices and to the Leisure Centre.

Energy centre description:

A central energy centre could be located on the site of the new Stadium, allowing benefits for both projects via a coordinated approach. Options appraisal arrived at a 600kWe engine being the optimum size for the Day One load. The engine is of sufficient size to provide more than 75% of the annual heat load from the engine but will also achieve economic running hours. Residual heat will be provided by backup gas boilers. There is insufficient local electrical demand to make use of all electricity produced from the engine, and a proportion will be exported to the national grid.

Heat/cooling demand phasing description:

The project would be constructed over fifteen months from January 2020 and it is expected to cost £4.773m, with the largest percentage of this being related to below ground pipework.



Basingstoke_FES

Project Sponsor:

Basingstoke and Deane Borough Council

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£2.10
Private Wire (£m)	£0.00
Pipework / distribution capex (£m)	£3.07
Other capex (£m)	£3.06
Total capex (£m)	£8.36

Project IRR*	6.80%
Considering third party finance?	Yes

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
2020	2021	2021	2025

Project Stage

Feasibility

Project Contact Details:

LA Name:	Basingstoke and Deane Borough Council
Contact Name:	George Robinson
Email:	HNDU@beis.gov.uk

Technical Information:

Primary energy source:

CHP – Gas

Project description:

There is an opportunity for Basingstoke and Deane Borough Council to develop a district heating network around North Hampshire Hospital in Basingstoke.

Energy centre description:

The proposed route would require a new energy centre to be built in the existing hospital carpark, behind their water tanks. This energy centre would contain gas CHP and boilers and would require planning permission.

Heat/cooling demand phasing description:

The hospital cluster and hotel would connect first (scenario 6), with the Parklands cluster coming online when the stakeholders were engaged potentially 2025 (scenario 5)

Icknield Soho Loop & Smethwick Gas CHP/WSHP_MAP

Project Sponsor:

Birmingham City Council

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£10.06
Private Wire (£m)	£0.48
Pipework / distribution capex (£m)	£13.29
Other capex (£m)	£5.06
Total capex (£m)	£28.89

Project IRR*	3.53%
Considering third party finance?	Not Stated

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	Not Provided	Not Provided	2021

Project Stage

Heat mapping and masterplanning

Project Contact Details:

LA Name:	Birmingham City Council
Contact Name:	George Robinson
Email:	HNDU@beis.gov.uk

Technical Information:

Primary energy source:

CHP – Gas

Project description:

Heat network connecting City Hospital buildings, HMP Birmingham, BCC residential buildings, care homes and new residential developments in the area, plus residential developments and (SMBC) tower blocks in Smethwick.

Energy centre description:

Energy Centre proposed at Birmingham City Hospital site. Houses Gas CHP units and gas boilers. Second energy centre in Smethwick near canal, houses WSHPs and gas boilers.

Heat/cooling demand phasing description:

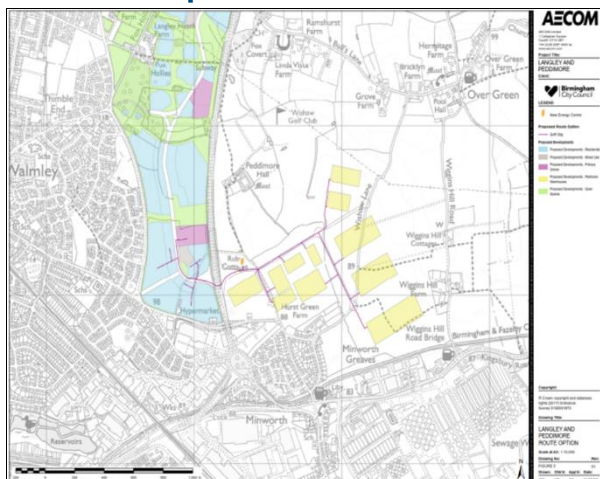
All consumers connected in 2021-2032.

Langley & Peddimore_FES

Project Sponsor:

Birmingham City Council

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£11.69
Private Wire (£m)	£0.22
Pipework / distribution capex (£m)	£5.07
Other capex (£m)	£0.00
Total capex (£m)	£16.98

Project IRR*	6.60%
Considering third party finance?	No

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	Not Provided	Not Provided	Not Provided

Project Stage

Feasibility

Project Contact Details:

LA Name:	Birmingham City Council
Contact Name:	George Robinson
Email:	HNDU@beis.gov.uk

Technical Information:

Primary energy source:

CHP – Gas

Project description:

The district heat network consists of the new residential development parcel Langley South and the Peddimore Industrial Park development. Heat is supplied to Langley South and Peddimore by the CHP units at Peddimore along with a private wire electrical supply on the Peddimore site.

Energy centre description:

The Energy Centre will be located on the Peddimore site, near the site's main entrance. The Energy Centre will contain 2 gas-fired CHP units (both 2 MWe capacity), backup gas-fired boilers, and thermal stores.

Heat/cooling demand phasing description:

Because the network is comprised entirely of new developments, the demand phasing will be in sync with the completion of the buildings / residential areas. The construction of the new developments is expected to begin in 2020, completing in 2030.



Blackburn Town Centre_MAP

Project Sponsor:

Blackburn with Darwen Borough Council

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£3.14
Private Wire (£m)	£0.36
Pipework / distribution capex (£m)	£6.26
Other capex (£m)	£2.60
Total capex (£m)	£12.36

Project IRR*	4.00%
Considering third party finance?	No

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	Not Provided	Not Provided	2021

Project Stage

Heat mapping and masterplanning

Project Contact Details:

LA Name:	Blackburn with Darwen Borough Council
Contact Name:	George Robinson
Email:	HNDU@beis.gov.uk

Technical Information:

Primary energy source:

CHP – Gas

Project description:

Heat network connecting Daisyfield cluster and Blackburn Town Centre cluster.

Energy centre description:

Daisyfield: Energy Centre proposed at Daisyfield Pool, which would house GSHPs and gas boilers. Boreholes located on green space around tower blocks. Town Centre: Energy Centre proposed on council-owned empty plot near Blackburn College, which would house Gas CHP and gas boilers.

Heat/cooling demand phasing description:

Consumers connected 2021-2028.



Shadsworth Industrial Estate_MAP

Project Sponsor:

Blackburn with Darwen Borough Council

Network Map:



Technical Information:

Primary energy source:

CHP – Gas

Project description:

Heat network connecting Royal Blackburn Hospital and surrounding sites and developments.

Energy centre description:

Energy Centre proposed at RBH, which would house Gas CHP and gas boilers. Additional energy centre at RPC Containers (outfitting existing power generators with heat recovery).

Heat/cooling demand phasing description:

Consumers connected 2021-2026.

Summary forecast financial information:

Energy generation capex (£m)	£8.89
Private Wire (£m)	£0.25
Pipework / distribution capex (£m)	£4.04
Other capex (£m)	£2.88
Total capex (£m)	£16.05

Project IRR*	3.55%
Considering third party finance?	No

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	Not Provided	Not Provided	2021

Project Stage

Heat mapping and masterplanning

Project Contact Details:

LA Name:	Blackburn with Darwen Borough Council
Contact Name:	George Robinson
Email:	HNDU@beis.gov.uk



Daisyfield_MAP

Project Sponsor:

Blackburn with Darwen Borough Council

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£0.72
Private Wire (£m)	£0.00
Pipework / distribution capex (£m)	£1.02
Other capex (£m)	£0.67
Total capex (£m)	£2.41

Project IRR*	1.80%
Considering third party finance?	No

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	Not Provided	Not Provided	2021

Project Stage

Heat mapping and masterplanning

Project Contact Details:

LA Name:	Blackburn with Darwen Borough Council
Contact Name:	George Robinson
Email:	HNDU@beis.gov.uk

Technical Information:

Primary energy source:

Ground source heat pump

Project description:

Heat network connecting Daisyfield Pool and nearby residential tower blocks.

Energy centre description:

Energy Centre proposed at Daisyfield Pool, which would house GSHPs and gas boilers. Boreholes located on green space around tower blocks.

Heat/cooling demand phasing description:

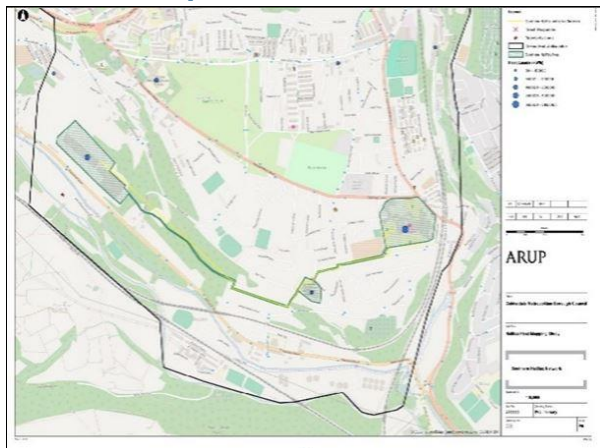
All consumers connected in 2021.

South Halifax

Project Sponsor:

Calderdale Metropolitan Borough Council

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£1.65
Private Wire (£m)	£0.07
Pipework / distribution capex (£m)	£2.85
Other capex (£m)	£0.27
Total capex (£m)	£4.85

Project IRR*	16.90%
Considering third party finance?	Not Stated

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	Not Provided	Not Provided	Not Provided

Project Stage

Heat mapping and masterplanning

Project Contact Details:

LA Name:	Calderdale Metropolitan Borough Council
Contact Name:	George Robinson
Email:	HNDU@beis.gov.uk

Technical Information:

Primary energy source:

CHP – Gas

Project description:

The network is designed around two major heat users to the south of Halifax Town Centre. The network route is predominately soft dig. CMBC have little to no influence on the commercial connections both of which are expected to have high resilience requirements.

Energy centre description:

The Energy Centre would contain one 1.75MWe gas-fired CHP engine along with ancillary and back-up plant including three 3.6MW gas boilers and a 100m³ thermal store. As a standalone Energy Centre, the building would have an estimated 255m³ footprint. The operational strategy is heat-led.

Heat/cooling demand phasing description:

Due to the small number of anchor loads this is a single phase development. There is minimal scope to connect to additional buildings through network expansion as the surrounding areas are either undeveloped or low density detached and semi-detached private housing.

Cherwell - Bicester EcoTown_FES

Project Sponsor:

Cherwell District Council

Network Map:

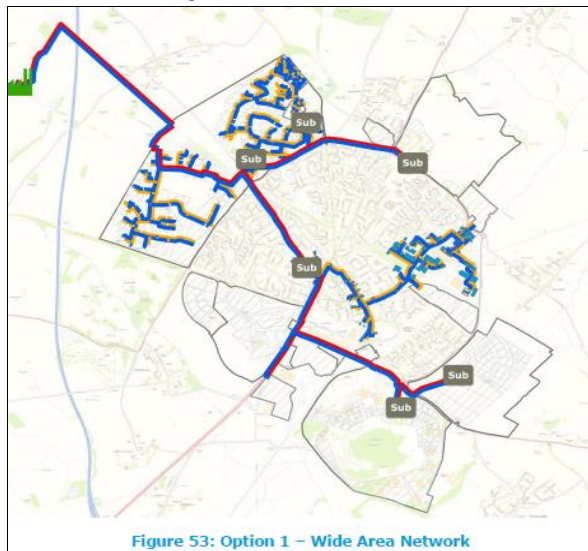


Figure 53: Option 1 - Wide Area Network

Summary forecast financial information:

Energy generation capex (£m)	£0.00
Private Wire (£m)	£0.00
Pipework / distribution capex (£m)	£9.74
Other capex (£m)	£0.00
Total capex (£m)	£9.74

Project IRR*	5.27%
Considering third party finance?	Yes

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	Not Provided	2023	Not Provided

Project Stage

Feasibility

Project Contact Details:

LA Name:	Cherwell District Council
Contact Name:	George Robinson
Email:	HNDU@beis.gov.uk

Technical Information:

Primary energy source:

CHP – EfW

Project description:

Following an initial feasibility study looking at heat demand in Bicester and possible networks, a more detailed analysis of utilising waste heat from the Ardley EfW to be provided to the new 6,000 home Eco Town (with a zero carbon planning requirement) is being conducted.

This opportunity is not being actively pursued by Cherwell District Council. Any third party investor who would need to lead the scheme, and support will be given where necessary under the Council's jurisdiction only.

Energy centre description:

It is proposed that heat will be supplied from the 12.5MW capacity Ardley ERF facility

Heat/cooling demand phasing description:

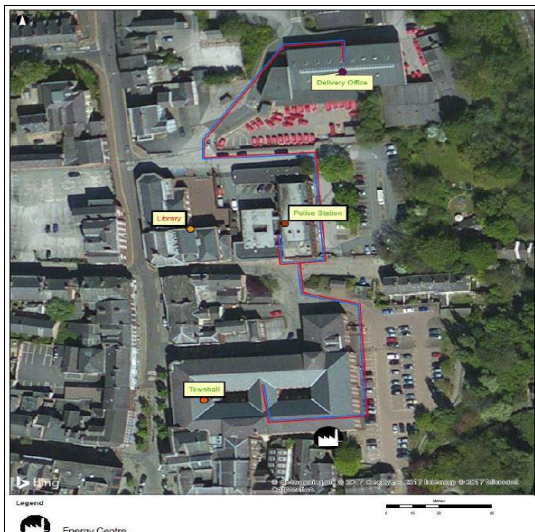
Much of the development is to be new build, and heat demand is projected to steadily grow from 2023 to full build out in 2042.

Macclesfield Town Centre Heat Network_FES

Project Sponsor:

Cheshire East Council

Network Map:



Technical Information:

Primary energy source:

CHP – Gas

Project description:

A heat network would connect and provide heat via buried pipes to the Town Hall, Police Station and Royal Mail Delivery Office. A private wire electricity network would connect and provide electricity to the Town Hall, Library and Police Station.

Energy centre description:

The 250kWe CHP engine, along with a 35m³ (approx. 3.0m dia x 5.9m high) thermal store and other ancillary equipment would be located to the rear of the Town Hall in the location of the current bike shed. The New Town Hall plant room, on the second floor of the New Town Hall, would house the supplementary gas boilers (2No. 719kW) which would replace the existing 22-year old gas boilers.

Heat/cooling demand phasing description:

An additional 2 demand clusters have been identified with a potential additional 2.5GWh of thermal demand and 2GWh of electrical demand. These clusters have not been included in the economic appraisal at this stage but the proposed system design has been future proofed to enable expansion and future connection.

Summary forecast financial information:

Energy generation capex (£m)	£0.48
Private Wire (£m)	£0.05
Pipework / distribution capex (£m)	£0.46
Other capex (£m)	£0.02
Total capex (£m)	£1.02

Project IRR*	4.80%
Considering third party finance?	Not Stated

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
2018	2019	2020	2020

Project Stage

Feasibility

Project Contact Details:

LA Name:	Cheshire East Council
Contact Name:	George Robinson
Email:	HNDU@beis.gov.uk

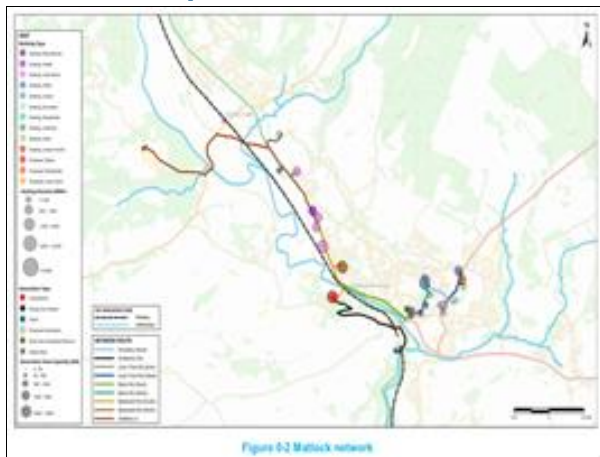


Matlock_MAP

Project Sponsor:

Derbyshire county

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£4.01
Private Wire (£m)	£0.00
Pipework / distribution capex (£m)	£14.73
Other capex (£m)	£1.34
Total capex (£m)	£20.08

Project IRR*	1.70%
Considering third party finance?	Not Stated

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	Not Provided	Not Provided	2020

Project Stage

Heat mapping and masterplanning

Project Contact Details:

LA Name:	Derbyshire county
Contact Name:	George Robinson
Email:	HNDU@beis.gov.uk

Technical Information:

Primary energy source:

Waste heat – Industrial (without heat pump)

Project description:

New heating network opportunity utilising waste heat from an existing battery recycling facility and serving multiple sites in western and central Matlock.

Energy centre description:

The network proposes the use of waste heat from the Enthoven site west of Matlock and the site operator has expressed interest in housing an energy centre on their site. It is expected that 4Mw of heat will be available from the facility and a further 10MW of boiler capacity would be required.

Heat/cooling demand phasing description:

Total annual network demand is 20,657MWh. The majority of buildings listed as potential site connections are existing. Initial load is estimated to be 7.7MW with a further 3.3MW of load expected to arise between 2023 and 2028, which will be met through additional gas boiler capacity.



Durham University_FES

Project Sponsor:

Durham County Council

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£8.32
Private Wire (£m)	£2.37
Pipework / distribution capex (£m)	£10.18
Other capex (£m)	£1.23
Total capex (£m)	£22.11

Project IRR*	7.40%
Considering third party finance?	Not Stated

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	2019	2020	2023

Project Stage

Feasibility

Project Contact Details:

LA Name:	Durham County Council
Contact Name:	George Robinson
Email:	HNDU@beis.gov.uk

Technical Information:

Primary energy source:

CHP – Gas

Project description:

The report concluded that a CHP only system would be preferable, though the exact configuration has not been decided on yet. The figures in this appendix refer to CHP, Option B, with 23% of Capex supplied by grant funding. Private wire cables to use same trenches as the network pipes.

Energy centre description:

The preferred location for the Energy Centre is known as EC1, the green space at A177 adjacent to Ogden Centre. Option B proposes 2 x 3333kW CHP units and 1x 300m³ thermal store.

Heat/cooling demand phasing description:

The scheme is divided up into clusters-the Northern, Western, Eastern and Southern clusters. These clusters will be connected in phases as follows. PHASE 1: Northern Cluster in year 2020, (13,900MWhth, 15650MWhe), PHASE 2: Western cluster in year 2021 (6630MWhth, 5360MWhe) PHASE 3: Eastern cluster in year 2022 (6850MWhth, 2910MWhe), and PHASE 4: Southern Cluster in year 2023 (3610MWhth, 1280MWhe). (Table 7-1 p67). This phasing arrangement and timetable has been used for theoretical demonstration purposes, and the real timetable will depend on the University construction timetable.

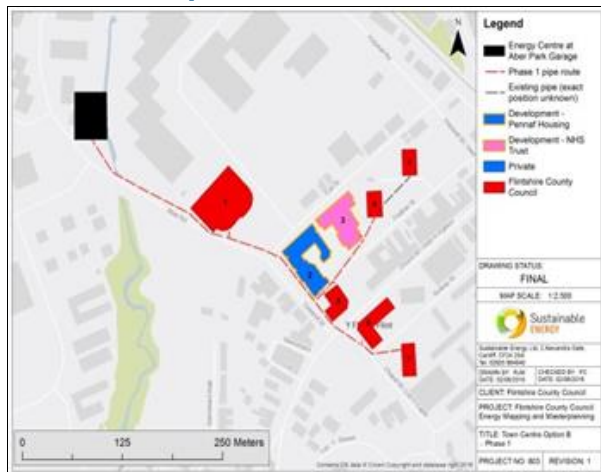


Flint Town_MAP

Project Sponsor:

Flintshire County Council

Network Map:



Technical Information:

Primary energy source:

Boiler - Biomass

Project description:

The figures detailed here are for the Town Centre option B, phase 1 and final stage 3. Option B is for biomass heat only with gas auxiliary back up.

Energy centre description:

The Energy Centre for the Town Centre Option B Phase 1 is proposed to be at Aber Park Grange. It will contain 1x 800kW biomass boiler, and na 1,500kW gas boiler.

Heat/cooling demand phasing description:

. Heat demand for Option B phase 1 only biomass heat is 5,918MWh/yr (Table 13, p56).

Summary forecast financial information:

Energy generation capex (£m)	£0.00
Private Wire (£m)	£0.00
Pipework / distribution capex (£m)	£0.00
Other capex (£m)	£0.00
Total capex (£m)	£2.07

Project IRR*	8.50%
Considering third party finance?	Not Stated

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	Not Provided	Not Provided	Not Provided

Project Stage

Heat mapping and masterplanning

Project Contact Details:

LA Name:	Flintshire County Council
Contact Name:	George Robinson
Email:	HNDU@beis.gov.uk



Northop Road_MAP

Project Sponsor:

Flintshire County Council

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£0.00
Private Wire (£m)	£0.00
Pipework / distribution capex (£m)	£0.00
Other capex (£m)	£0.00
Total capex (£m)	£0.95

Project IRR*	7.60%
Considering third party finance?	Not Stated

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	Not Provided	Not Provided	Not Provided

Project Stage

Heat mapping and masterplanning

Project Contact Details:

LA Name:	Flintshire County Council
Contact Name:	George Robinson
Email:	HNDU@beis.gov.uk

Technical Information:

Primary energy source:

Boiler - Biomass

Project description:

This scenario is Northrup Rd option B Single phase only. Heat to be supplied to 2 care homes, a 2x schools run by Flintshire County Council. This network is reliant on successful engagement with Barchester Healthcare who run both the care homes.

Energy centre description:

This scenario is a single phase network only, with biomass heat generation meeting the majority of heat demand, supported by natural gas auxiliary

Heat/cooling demand phasing description:

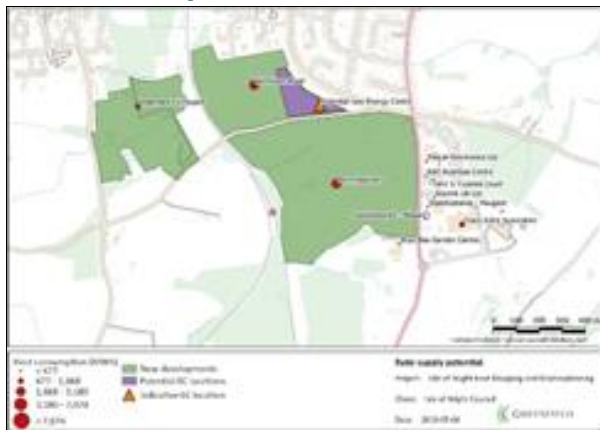
This scenario is a single phase scenario with a heat demand of 2,586MWh.

Nicholson Road_MAP

Project Sponsor:

Isle of Wight Council

Network Map:



Technical Information:

Primary energy source:

Boiler - Biomass

Project description:

Network connecting new Rosemary's Vineyard, Nicholson Road and Pennyfeathers development areas, as well as existing properties near Tesco Superstore.

Energy centre description:

New biomass boiler, presumably located within the Nicholson Road development.

Heat/cooling demand phasing description:

Not Provided

Summary forecast financial information:

Energy generation capex (£m)	£0.00
Private Wire (£m)	£0.00
Pipework / distribution capex (£m)	£0.00
Other capex (£m)	£0.00
Total capex (£m)	£0.00

Project IRR*	Not provided
Considering third party finance?	Not Stated

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	Not Provided	Not Provided	2022

Project Stage

Heat mapping and masterplanning

Project Contact Details:

LA Name:	Isle of Wight Council
Contact Name:	George Robinson
Email:	HNDU@beis.gov.uk

Cultural Quarter_FES

Project Sponsor:

Leicester City Council

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£0.00
Private Wire (£m)	£0.00
Pipework / distribution capex (£m)	£3.89
Other capex (£m)	£0.00
Total capex (£m)	£3.89

Project IRR*	-4.80%
Considering third party finance?	Not Stated

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	2019	2020	2023

Project Stage

Feasibility

Project Contact Details:

LA Name:	Leicester City Council
Contact Name:	George Robinson
Email:	HNDU@beis.gov.uk

Technical Information:

Primary energy source:

CHP – Gas

Project description:

The Leicester station area has been identified as an opportunity to explore regeneration and redevelopment because Network Rail has plans for electrification of the Midlands Mainline, the East Midlands Train's franchise is expected to end in 2017 and there has been a recent sale of Campbell Street sorting office. St George's Cultural Quarter comprises 16.2 hectares of mixed land use. The Cultural Quarter has received considerable public sector investment in recent years. The principal areas of cultural, and associated, investment have been: Curve Theatre, Leicester Creative Business Depot (Creative Industries Workspace); Phoenix Square (Media Centre, Cinema, Creative Industries Workspace) and connectivity improvements to the city centre.

Energy centre description:

The Railway Area and Cultural Quarter is a dense urban area with limited opportunity for a standalone energy centre to feed into a new district heating scheme. The only option identified for this area is to connect to a possible future energy centre at the railway station redevelopment scheme, which is still at high level concept stage.

Heat/cooling demand phasing description:

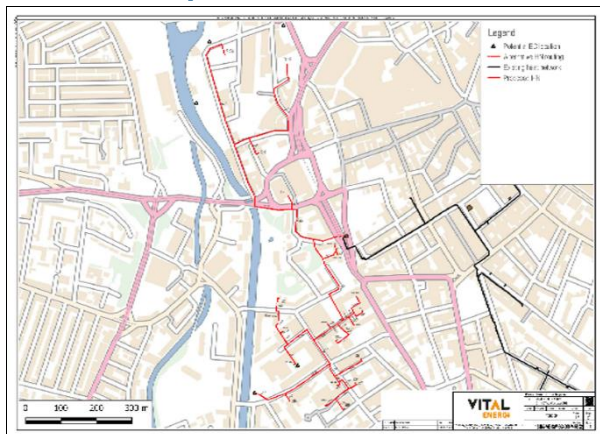
To build out the district heating network from the proposed energy centre most efficiently and cost effectively the network has been split into four phases shown in Figure 5 with a four-year construction programme.

Waterside_FES

Project Sponsor:

Leicester City Council

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£6.12
Private Wire (£m)	£0.00
Pipework / distribution capex (£m)	£5.17
Other capex (£m)	£0.00
Total capex (£m)	£11.29

Project IRR*	6.40%
Considering third party finance?	Not Stated

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	Not Provided	Not Provided	2020

Project Stage

Feasibility

Project Contact Details:

LA Name:	Leicester City Council
Contact Name:	George Robinson
Email:	HNDU@beis.gov.uk

Technical Information:

Primary energy source:

CHP – Gas

Project description:

Waterside is a regeneration area near the Centre of Leicester. The potential for a new DHN network linking up this area with De Montfort University has been investigated. The study concluded that the Waterside/ DMU network utilising gas CHP presents a positive and robust case for investment, whilst acknowledging there are key sensitivities such as power sales. Whilst gas CHP is estimated to deliver good carbon savings (19% over 25 years), it will be necessary for stakeholders to consider whether this meets their objectives in the short-term and plan to switch towards a lower carbon energy source in future

Energy centre description:

Not Provided

Heat/cooling demand phasing description:

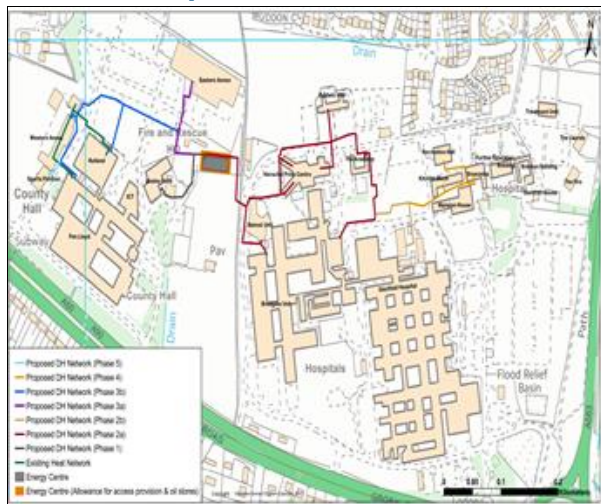
The DHN would be built in one phase

County Hall site at Glenfield_FES

Project Sponsor:

Leicestershire county

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£5.17
Private Wire (£m)	£0.21
Pipework / distribution capex (£m)	£3.40
Other capex (£m)	£0.10
Total capex (£m)	£8.94

Project IRR*	4.83%
Considering third party finance?	Not Stated

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	Not Provided	2021	2030

Project Stage

Feasibility

Project Contact Details:

LA Name:	Leicestershire county
Contact Name:	George Robinson
Email:	HNDU@beis.gov.uk

Technical Information:

Primary energy source:

CHP – Gas

Project description:

Creation of a new energy centre within LCC land serving select LCC buildings, LPT building and Glenfield Hospital. Heat to be served in addition to HV power to two existing private wire ring mains. Existing Biomass boiler and Gas CHP to be retained (due to age). Ownership of existing biomass and gas CHP to remain with LCC and hospital respectively and not transferred to new Heat Co.

Energy centre description:

New build concrete and steel build energy centre. Gas boilers to be installed in two phase. Packaged CHP plant to housed externally to allow transition to new technology in the future

Heat/cooling demand phasing description:

All loads are existing and served by existing plant. Phase 1/2 will connect Hospital as a priority anchor load. All buildings modelled to be connected by 2030 but likely to be by 2025 or earlier. No cooling network proposed

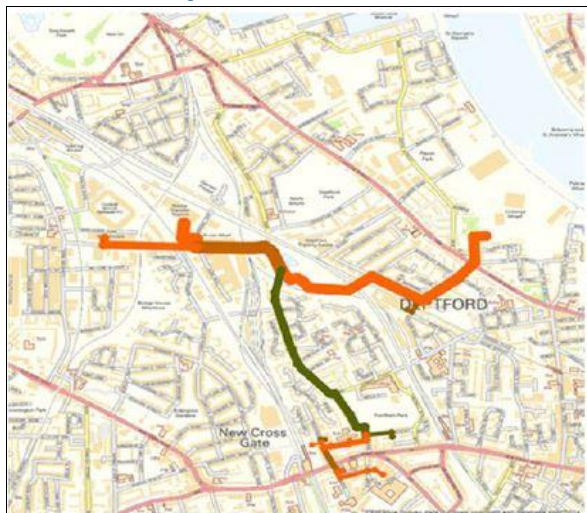


New Cross Heat Network_FES

Project Sponsor:

London Borough of Lewisham

Network Map:



Technical Information:

Primary energy source:

CHP – EfW

Project description:

A route feasibility assessment was undertaken for a heat network linking the SELCHP energy from waste facility on Landmann Way and the Goldsmiths, University of London campus in New Cross.

Energy centre description:

Not Provided

Heat/cooling demand phasing description:

The scheme assessed is proposed as a kick start to a wider, area heat network, the economic performance of which has not yet been assessed. Goldsmiths are an existing, significant heat load with a strong interest in connection that can act as an 'anchor load' from which to build the wider network.

Summary forecast financial information:

Energy generation capex (£m)	£0.00
Private Wire (£m)	£0.00
Pipework / distribution capex (£m)	£4.68
Other capex (£m)	£0.00
Total capex (£m)	£4.68

Project IRR*	Not provided
Considering third party finance?	Not Stated

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	Not Provided	Not Provided	Not Provided

Project Stage

Feasibility

Project Contact Details:

LA Name:	London Borough of Lewisham
Contact Name:	George Robinson
Email:	HNDU@beis.gov.uk



Killingworth Moor_MAP

Project Sponsor:

North Tyneside Metropolitan Borough Council

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£0.77
Private Wire (£m)	£0.00
Pipework / distribution capex (£m)	£0.66
Other capex (£m)	£0.00
Total capex (£m)	£1.43

Project IRR*	13.30%
Considering third party finance?	Not Stated

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	Not Provided	Not Provided	Not Provided

Project Stage

Heat mapping and masterplanning

Project Contact Details:

LA Name:	North Tyneside Metropolitan Borough Council
Contact Name:	George Robinson
Email:	HNDU@beis.gov.uk

Technical Information:

Primary energy source:

CHP – Gas

Project description:

The proposal is to supply anchor loads with heat and power, via private wire (PW) from gas CHP. All electricity generation can be accommodated by the PW. After the initial phase of the network is constructed, it is hoped that a reduction in operational temperatures can be achieved. Energy efficiency improvement opportunities have been investigated, and implementation would improve the economics slightly. It is hoped some of these improvements could be implemented prior to construction. Design is to take account of future efficiency improvements.

Energy centre description:

The preferred site is immediately north-west of the George Stephenson secondary school. The footprint of the EC is proposed to be 150m², to house 3x1000kW gas backup boilers, 2x165kWe gas CHP units, and 100m³ thermal storage.

Heat/cooling demand phasing description:

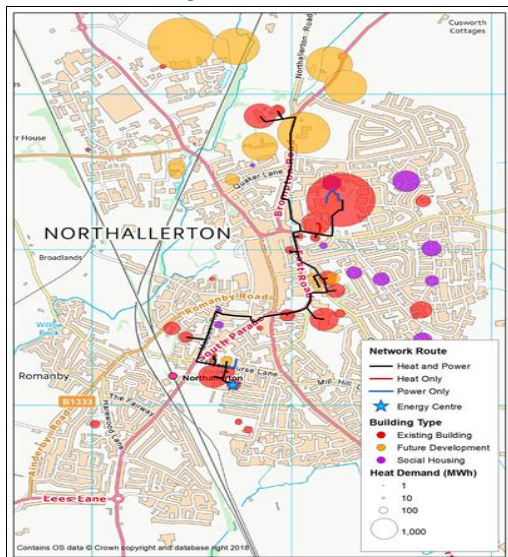
The project is currently proposed as a single phase.

Northallerton town centre_MAP

Project Sponsor:

North Yorkshire County Council

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£8.01
Private Wire (£m)	£2.09
Pipework / distribution capex (£m)	£5.13
Other capex (£m)	£4.57
Total capex (£m)	£19.81

Project IRR*	2.66%
Considering third party finance?	No

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
2020	2021	2023	Not Provided

Project Stage

Heat mapping and masterplanning

Project Contact Details:

LA Name:	North Yorkshire County Council
Contact Name:	George Robinson
Email:	HNDU@beis.gov.uk

Technical Information:

Primary energy source:

CHP – Gas

Project description:

The network opportunity includes several council buildings and the Friarage Hospital, in the centre of Northallerton. It is proposed that heat and electricity is supplied using a combination of a CHP, a GSHP and back-up/peaking gas boilers.

Over 40 years, the network results in carbon savings and an IRR of 2.7% without funding. The network is eligible for capital funding from the Heat Networks Investment Project (HNIP) which could help achieve the Council's hurdle IRR. A hurdle rate of 10% over 40 years can be achieved with approximately £10.6 million grant funding, of which £9.9 million (50% of the capital cost) can be obtained through HNIP.

Energy centre description:

The NYCC County Hall campus has been chosen at this stage of the study to model and scenario test the energy centre location. This site includes the potential to use surplus land or, alternatively, the existing boiler room in the Brierley Building where space may be available and could be reconfigured as an energy centre. This could mitigate the visual impact on the Grade II Listed building.

Heat/cooling demand phasing description:

The network is recommended as a first step in the development of a larger network. At this stage, the study has focussed on a low-risk scheme that incorporates a large proportion of council owned buildings, as well as public and private sector buildings where positive engagement has been made.

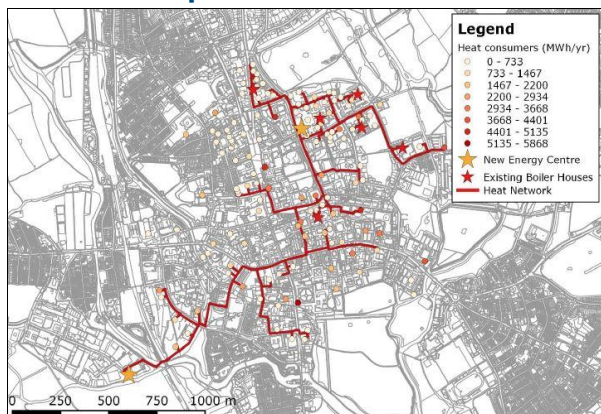
In the long-term it is hoped that additional energy customers will connect to the DEN along the proposed route and the network is extended to supply local and national retailers along the High Street. Currently, most large national retailers have national energy supply contracts and are reluctant to consider alternatives for individual sites. However in time this may change as DENs become more prevalent, the energy market evolves and the pressures to decarbonise increase.

Oxford City Centre_FES

Project Sponsor:

Oxford City Council

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£25.79
Private Wire (£m)	£0.00
Pipework / distribution capex (£m)	£13.16
Other capex (£m)	£0.00
Total capex (£m)	£38.95

Project IRR*	14.00%
Considering third party finance?	No

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	2018	2019	Not Provided

Project Stage

Feasibility

Project Contact Details:

LA Name:	Oxford City Council
Contact Name:	George Robinson
Email:	HNDU@beis.gov.uk

Technical Information:

Primary energy source:

CHP – Gas

Project description:

Carbon reduction has been the driver for Oxford's investigations into heat networks suitability. It is no longer considered appropriate for Oxford to pursue large scale gas CHP and biomass options for heat networks in the city centre (the approach that the feasibility studies favoured), as Oxford is now leading the way in setting up a zero emission zone for parts of the city that have air quality issues. The conventional large scale gas CHP option for heat networks involves burning more gas locally and more local emissions - significant carbon reduction would only kick in as a progressive move was made to biomass burning - again there will be more local emissions, and large truck deliveries of biomass fuel to the energy centres. (Also biomass fuel that is truly sustainable - ie. from managed woodland in the region - is expected to become more difficult to source.)

Rather than pressing on with detailed project development using the gas/biomass combustion approach. We have just appointed consultants to undertake feasibility on clean solutions for a heat network for the Science Area of the city centre, assessing current levels of carbon and NO2 emissions as a starting point, and investigating innovative approaches that will not have a negative impact on Oxford's air quality.

Energy centre description:

Not Provided

Heat/cooling demand phasing description:

Not Provided

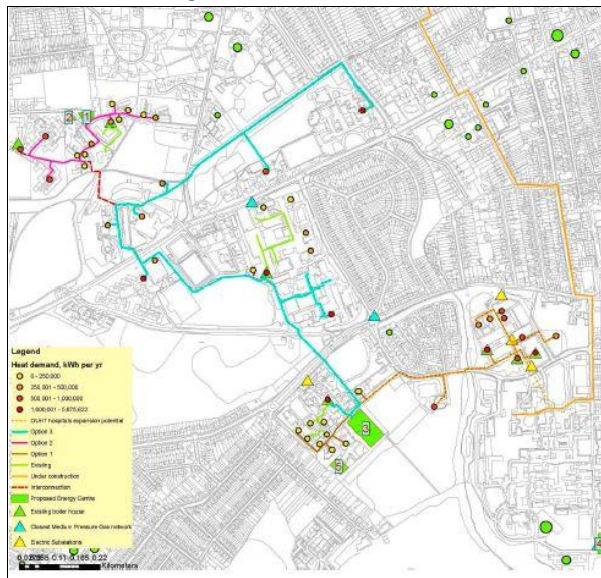


Oxford Headington_FES

Project Sponsor:

Oxford City Council

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£7.11
Private Wire (£m)	£0.00
Pipework / distribution capex (£m)	£2.63
Other capex (£m)	£0.00
Total capex (£m)	£9.74

Project IRR*	5.00%
Considering third party finance?	Not Stated

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	Not Provided	Not Provided	Not Provided

Project Stage

Feasibility

Project Contact Details:

LA Name:	Oxford City Council
Contact Name:	George Robinson
Email:	HNDU@beis.gov.uk

Technical Information:

Primary energy source:

CHP – Gas

Project description:

Carbon reduction has been the driver for Oxford's investigations into heat networks suitability. It is no longer considered appropriate for Oxford to pursue large scale gas CHP and biomass options for heat networks in Headington area of the city (the approach that the feasibility studies favoured), as Oxford is now leading the way in setting up a zero emission zone for parts of the city that have air quality issues. The conventional large scale gas CHP option for heat networks involves burning more gas locally and more local emissions - significant carbon reduction would only kick in as a progressive move was made to biomass burning - again there will be more local emissions, and large truck deliveries of biomass fuel to the energy centres. (Also biomass fuel that is truly sustainable - ie. from managed woodland in the region - is expected to become more difficult to source.)

For the above reasons, the Headington potential for heat networks is not being explored further at this time. However work about to start on feasibility of clean air solutions for heat networks for a specific area of the city centre – the Science Area (as it has the greatest HN potential) - may prove to be applicable to the Headington area of the city as well.

Energy centre description:

Not Provided

Heat/cooling demand phasing description:

Not Provided

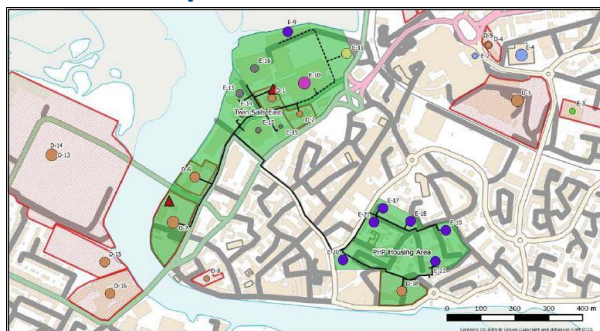


Poole - Twin Sails East_FES

Project Sponsor:

Poole Borough Council

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£4.92
Private Wire (£m)	£0.00
Pipework / distribution capex (£m)	£6.84
Other capex (£m)	£11.75
Total capex (£m)	£23.51

Project IRR*	4.20%
Considering third party finance?	Not Stated

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	Not Provided	2019	2026

Project Stage

Feasibility

Project Contact Details:

LA Name:	Poole Borough Council
Contact Name:	George Robinson
Email:	HNDU@beis.gov.uk

Technical Information:

Primary energy source:

CHP – Gas

Project description:

This work has been completed to outline feasibility stage. Electricity is intended to be sold to the RNLI buildings via Private Wire. Figures in this appendix are for this preferred scenario. Other options are still under consideration.

Energy centre description:

The most economically viable supply solution is gas CHP though other scenarios utilising water sourced heat pump solutions utilising water abstracted and discharge to and from the Back Water channel, are still under consideration. The figures in this appendix are for the Gas CHP solution. One solution proposes 1.4MW Gas CHP and 7.7MW back up plant.

Heat/cooling demand phasing description:

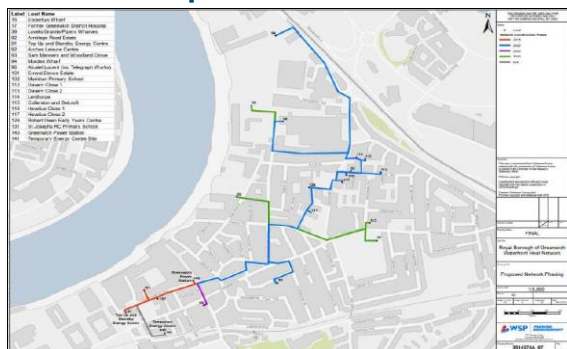
Potential connections include the RNLI campus, Poole Housing Partnership multi-storey housing (to the east of the High Street), together with new development and existing consumers in close proximity to the RNLI campus. Initial connections to connect in 2019, with additional phases coming online in 2022, 2025, and 2027.

Greenwich Power Station District Heat Network_FES

Project Sponsor:

Royal Borough of Greenwich

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£0.98
Private Wire (£m)	£0.00
Pipework / distribution capex (£m)	£5.48
Other capex (£m)	£0.20
Total capex (£m)	£6.66

Project IRR*	11.40%
Considering third party finance?	Not Stated

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	Not Provided	Not Provided	Not Provided

Project Stage

Feasibility

Project Contact Details:

LA Name:	Royal Borough of Greenwich
Contact Name:	George Robinson
Email:	HNDU@beis.gov.uk

Technical Information:

Primary energy source:

CHP – Gas

Project description:

The case for a decentralised energy network in the Greenwich Waterfront area was given momentum by TfL's proposal to install two CHP engines in Greenwich Power Station. TfL proposes to operate these units to supply electricity at an advantageous rate to the London Underground system. TfL does not have an immediate use for the heat produced as part of the power generation process, and is therefore interested in making this 'waste' heat available to a district heating network, for both economic and environmental reasons. The preferred option at this stage is that the network takes ownership of existing customer boiler plant rather than build a separate energy centre. This approach removes significant capex (c.£5.7m) but still provides system resilience for peak demand not met through the GPS CHP engines.

Energy centre description:

Given that resilience plant cannot be accommodated within Greenwich Power Station back up plant would be located in a separate permanent energy centre. For the permanent energy centre, a final boiler capacity of 3 no. 10MWth boilers is proposed, with space allowed for further potential expansion or use of a smaller 'summer' boiler to cope with potential lower levels of turndown required. However, the early phase operation of the network and the metered, actual peak demands of the initial phases should be used to guide this requirement as the project expands.

Heat/cooling demand phasing description:

2018: Kick-start network formed with existing loads in the immediate vicinity of GPS, opportunity to gain initial experience of network operation and establish working principles with TfL.

2020: Network extended to feed first phases of Morden Wharf. Connection of loads between GPS and Morden Wharf

2022: Assumed earliest date for redevelopment of Arches Leisure Centre

2030: Opportunity to displace CHP replacement at Enderby's Wharf, Greenwich Hospital site, and Greenwich Wharf.

Charlestown_FES

Project Sponsor:

Salford City Council

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£1.95
Private Wire (£m)	£0.00
Pipework / distribution capex (£m)	£4.10
Other capex (£m)	£0.00
Total capex (£m)	£6.04

Project IRR*	6.70%
Considering third party finance?	Not Stated

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	Not Provided	Not Provided	Not Provided

Project Stage

Feasibility

Project Contact Details:

LA Name:	Salford City Council
Contact Name:	George Robinson
Email:	HNDU@beis.gov.uk

Technical Information:

Primary energy source:

CHP – Gas

Project description:

The preferred option is known as 'scenario 3, cluster 3&4'. The proposal is for gas CHP to supply heat to 9x connections in two phases. It is proposed to sell electricity to 3x connections in phase 1 and an additional 2x connections in phase 2.

Energy centre description:

The proposed Energy Centre is to be located at the former Cromwell School site. The preferred scenario (scenario 3 clusters 3&4) has 1x770kW CHP, 1x1,465kW and 1x 2,344kW gas backup boilers, and includes 60m3 thermal storage.

Heat/cooling demand phasing description:

Phase 1 loads include Albion Academy, Seaford Rd Industrial units, 1Q Student Quarter, Waterside Student Village and Tramways Student Accommodation. Phase 2 includes Salford Innovation Park, Salbec House, ENW Frederick Road Depot, and Salford City College. There are no dates or timelines in the feasibility study.

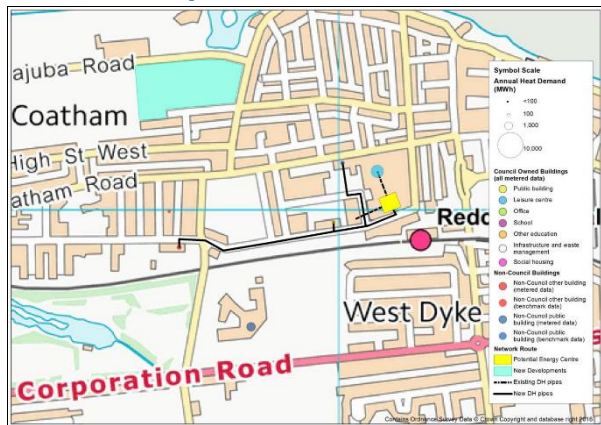


Central Redcar_FES

Project Sponsor:

Tees Valley Combined Authority

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£0.00
Private Wire (£m)	£0.00
Pipework / distribution capex (£m)	£0.00
Other capex (£m)	£1.08
Total capex (£m)	£1.08

Project IRR*	Not provided
Considering third party finance?	Not Stated

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	Not Provided	Not Provided	Not Provided

Project Stage

Feasibility

Project Contact Details:

LA Name:	Tees Valley Combined Authority
Contact Name:	George Robinson
Email:	HNDU@beis.gov.uk

Technical Information:

Primary energy source:

CHP – Gas

Project description:

There is already an existing CHP unit in the Community Heart building which serves as the primary heat source for the Community Heart Building and the adjacent Redcar and Cleveland House. The proposed project will see the existing small network extended to serve some additional buildings in the area. To achieve a return, the existing CHP will have to be replaced with a larger gas fired CHP unit.

Energy centre description:

There is already an existing CHP in the Community Heart Centre. Three options for a new expanded Energy Centre location are all in the new Community Heart Building; in the plant room, basement car park or the courtyard. Gas CHP is the proposed technology with capacity 400kWe.

Heat/cooling demand phasing description:

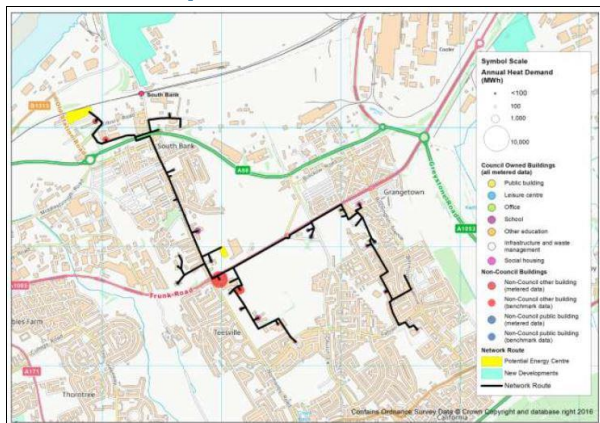
There is no information on phasing, other than that this network if constructed could be connected to the proposed South Tees network in the future. No timescales for this have been proposed as yet.

South Bank_FES

Project Sponsor:

Tees Valley Combined Authority

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£0.11
Private Wire (£m)	£0.47
Pipework / distribution capex (£m)	£0.00
Other capex (£m)	£10.27
Total capex (£m)	£10.85

Project IRR*	7.20%
Considering third party finance?	Not Stated

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	Not Provided	Not Provided	Not Provided

Project Stage

Feasibility

Project Contact Details:

LA Name:	Tees Valley Combined Authority
Contact Name:	George Robinson
Email:	HNDU@beis.gov.uk

Technical Information:

Primary energy source:

CHP – Biogas

Project description:

Waste heat from local Anaerobic Digestion CHP Plant on Imperial Avenue. Network to provide heat and potentially power via private wire for connections in the South Bank area with potential for network to join up with other local networks in the future.

Energy centre description:

The first choice for energy supply is an AD CHP on Imperial Avenue. Output from AD CHP estimated to be 4,886kWe and 3,842kWth. The report recommends that testing should continue for a second EC in case the AD scheme fails. A second EC would allow for a gas CHP standalone supply as a fall back option.

Heat/cooling demand phasing description:

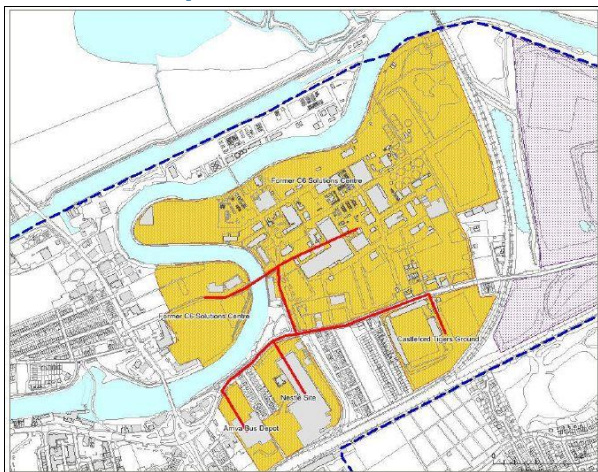
Heat demand includes a group of light industrial buildings to the north, several school buildings, a large care home and leisure centre. Total heat demand is estimated at 10,967MWh/yr. Total electricity is estimated at 1,806MWh/yr. (figures are sum of loads in Table 81, p.137) There is no detail on phasing for the South Bank network, though there is an overview of how the South Bank network could connect to the proposed Redcar South and Middlesbrough networks in time. No dates have been proposed for this.

Castleford C6 Development_MAP

Project Sponsor:

Wakefield Metropolitan District Council

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£1.28
Private Wire (£m)	£0.00
Pipework / distribution capex (£m)	£4.53
Other capex (£m)	£0.30
Total capex (£m)	£6.11

Project IRR*	10.00%
Considering third party finance?	Not Stated

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	Not Provided	2018	2020

Project Stage

Heat mapping and masterplanning

Project Contact Details:

LA Name:	Wakefield Metropolitan District Council
Contact Name:	George Robinson
Email:	HNDU@beis.gov.uk

Technical Information:

Primary energy source:

Water source heat pumps

Project description:

The Castleford C6 Solutions opportunity area is located to the east of Castleford and links four new residential developments: the former C6 Solutions site, Castleford Tigers, Nestle and Arriva Bus Depot sites.

Energy centre description:

It was concluded that several spaces in Castleford have potential to offer suitable energy centre locations for different schemes. In technological terms, the main technologies being considered are gas CHP, industrial water source heat pumps (WSHP) extracting heat from the River and, potentially, the Calder Vale Waste Water Treatment Works (WWTW). The gas CHP options focused around the Town Centre have been assessed as economically viable, but would be heavily dependent on electricity sale revenue. The WSHP option exploring supply to the C6 development was found to achieve IRRs well in excess of the Sponsors hurdle rate and it is recommended that the scheme be considered for further investigation (the figures presented reflect this option).

Heat/cooling demand phasing description:

The network infrastructure was modelled to come forward in three stages over three years from 2017 to 2019. The heat demands heat on year is 2018 except for phases 2 and 3 of the C6 Solutions site with come on in 2019 and 2020 respectively.