



HEAT NETWORKS: 2021 Q4 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), 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 2021 Q4 Capex pipeline of HNDU and HNIP projects from early stage development through to construction.

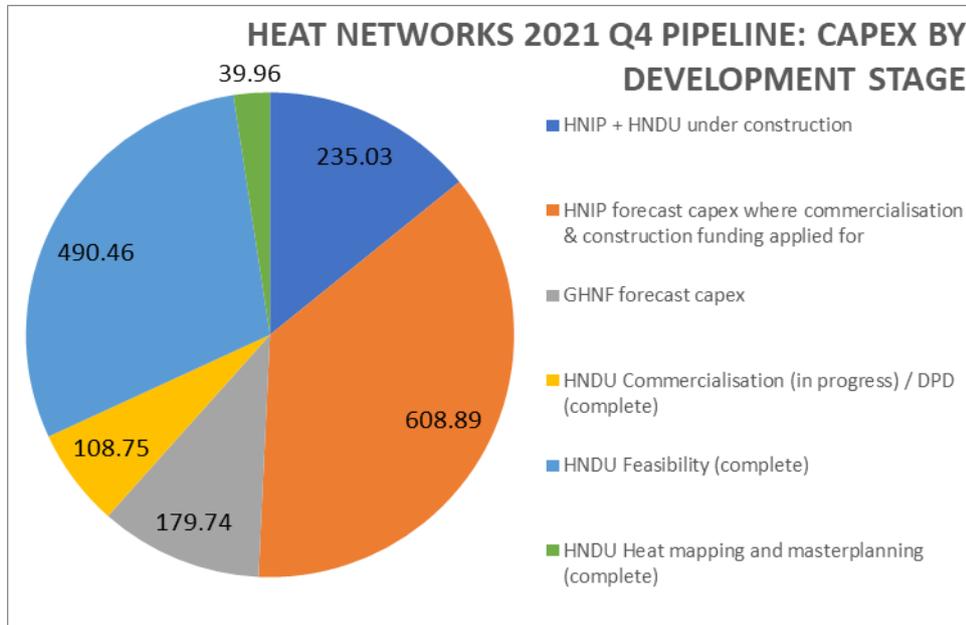
For questions relating to the HNIP pipeline or scheme enquiries, please direct these to enquiries@tp-heatnetworks.org. For questions relating to the HNDU pipeline opportunities please direct these to HNDU@beis.gov.uk FAO: FAO HNDU

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.



2021 Q4 Active Capex Pipeline: £1,663m of which £235m is under construction, £967m relates to HNIP + GHNF projects for which applications have been made:



The key movement on the quarter is the inclusion of several opportunities within the Royal Borough of Greenwich.



HNIP APPLICATIONS

(SEEKING COMMERCIALISATION AND/OR CONSTRUCTION FUNDING)

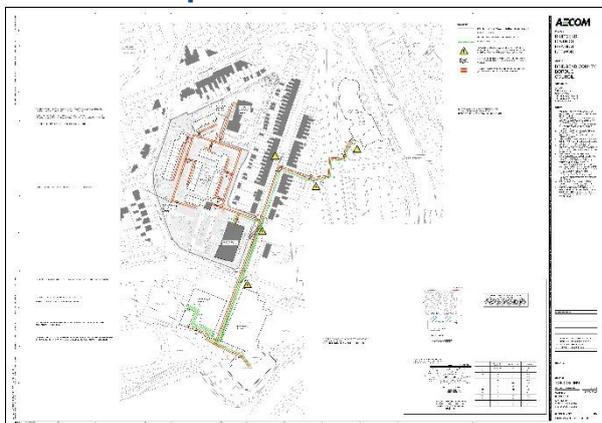


Bridgend Town Heat Network

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.

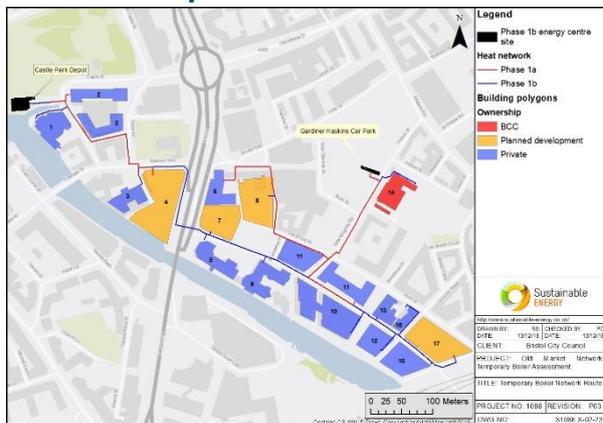


Old Market Network

Project Sponsor:

Bristol City Council

Network Map:



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.

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

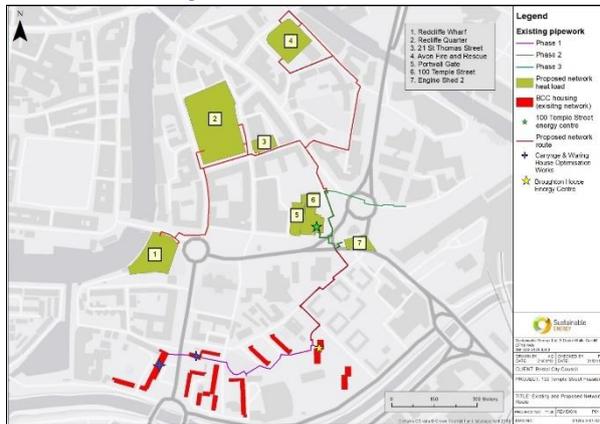


Redcliffe Heat Network

Project Sponsor:

Bristol City Council

Network Map:



Summary forecast financial information:

Total capex (£m)	£8.06
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Project IRR*	4.80%
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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)	£3.63
Corporate Loan req. (£m)	£0.00
Project Loan requested (£m)	£0.00

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.

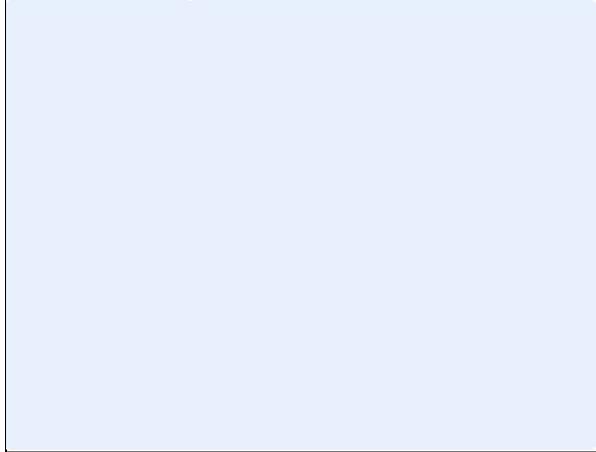


Swaffham Prior Community Heat Network

Project Sponsor:

Cambridgeshire County Council

Network Map:



Summary forecast financial information:

Total capex (£m)	£12.17
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Project IRR*	0.12%
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* Real pre-tax pre-finance

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

Project Stage

Construction

Project Contact Details:

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

HNIP Application Information:

Grant requested (£m)	£3.2
Corporate Loan req. (£m)	£0.00
Project Loan requested (£m)	£0.00

Technical Information:

Primary energy source:

Hybrid Ground Source and Air Source heat pumps supplied directly with solar PV generated electricity and the grid as back up electricity supply

Project description:

Cambridgeshire County Council is working with the Swaffham Prior Community Land Trust to retrofit a whole village of 300 homes with low carbon heating and hotwater. Swaffham Prior is an historic village, with homes of all sizes and ages, based in rural East Cambridgeshire. The village is not connected to the gas mains and reliant on oil for heating and hot water. This project is a first of its kind in the UK, retrofitting a heat network, to demonstrate how to decarbonise heat at scale and shift swiftly off oil. This project will save 41,000tCO₂e over 40 years and will hopefully share the heat main trench with fibre broadband for homes, whilst also tackling future fuel poverty. This is a crucial strategic opportunity to demonstrate the capacity for retrofit heat networks in the UK at a scale not tested before. The project is configured to remove dependence on fossil-fuels for heating and hot water and is a flagship, pioneering project with potential for replication nationally for off-gas rural communities. 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. HNIP is supporting the project with a capital grant of £2.9million towards the cost of the heat network. This infrastructure once in place can facilitate distribution of heat through the village for 60 years and adapt to new technologies as they develop for generating low carbon heat. A grant of £355,000 was also provided for the commercialisation of the project. Planning permission was secured November 2020, construction contracts signed April 2021 with works starting on site from July 2021. First homes will be connected by March 2022.

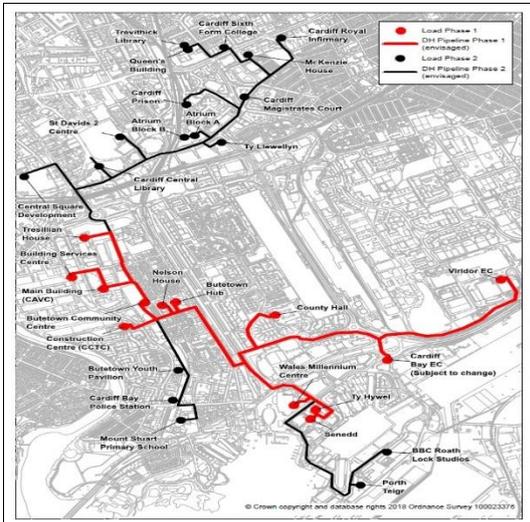


Cardiff

Project Sponsor:

County Council of the City and County of Cardiff

Network Map:



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.

Summary forecast financial information:

Total capex (£m)	£15.63
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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

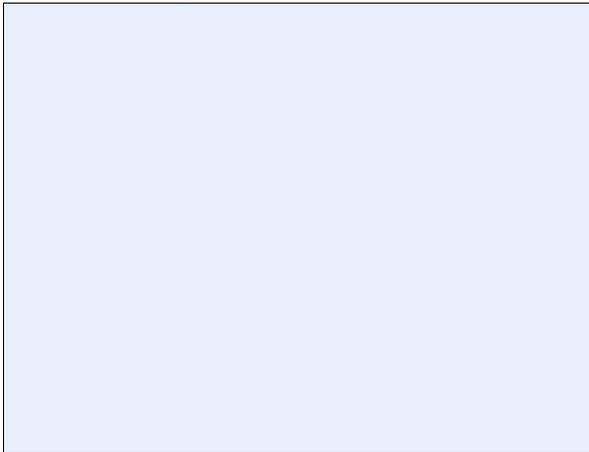


South Seaham Garden Village Heat Network

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.

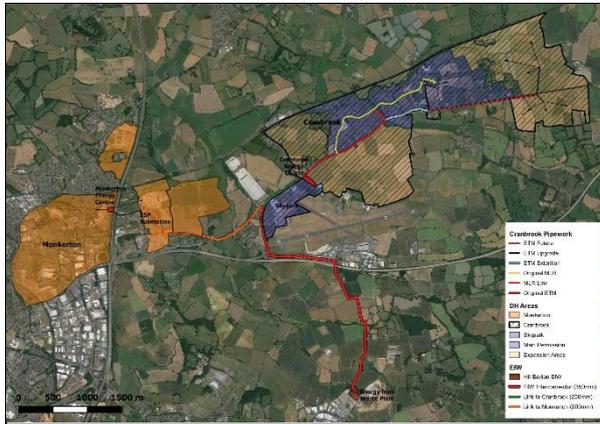


Cranbrook Expansion

Project Sponsor:

East Devon District Council

Network Map:



Summary forecast financial information:

Total capex (£m)	£20.79
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Project IRR*	0.85%
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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)	£3.70
Corporate Loan req. (£m)	£7.08
Project Loan requested (£m)	£0.00

Technical Information:

Primary energy source:

CHP – EfW

Project description:

This project will connect two existing heat networks with a forthcoming Energy from Waste Plant. The two networks are Cranbrook/Skypark (3,500 homes and 1.4m sq ft commercial space) and Monkerton (4,600 homes + 800k sq ft commercial space). Both concessions are controlled by E.ON. The project will enable the bulk supply of heat to both networks including all necessary resilience and back up. The project will also support the planned expansion of the Cranbrook new town to circa 8,000 houses through enabling the delivery of a Future Homes Standard compliant energy solution. A special purpose vehicle will be created to own the asset and to contract with the heat supplier (Stuart Partners), E.ON and whichever Energy Services Company is selected to serve the Cranbrook expansion areas.

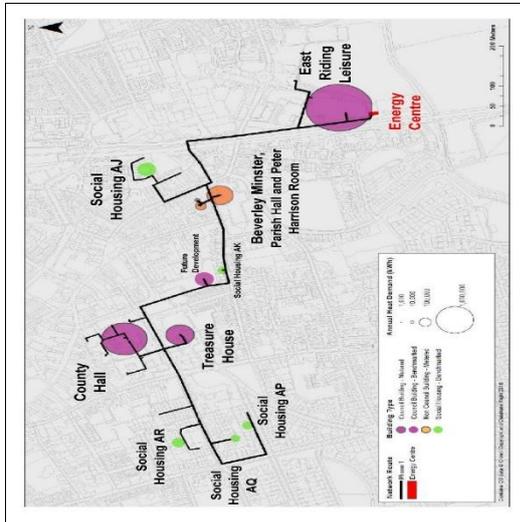


Beverley Heat Network

Project Sponsor:

East Riding of Yorkshire 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	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:

CHP – Gas

Project description:

The project comprises of the construction of a district energy scheme, with the generation for heat and electricity coming from a low carbon technology in the form of a combined heat and power (CHP) unit. The only visible element of the project will be the construction of an energy centre that houses the generation and hydraulic equipment which includes the CHP, gas boilers, pumps, thermal stores etc. The design and installation of the energy centre will allow for the flexibility of future low or zero carbon technologies to be installed as they become technically or commercially viable. There will be buried heat and electricity distribution infrastructure in the form of pipes for the supply of heat and buried cables for electricity. This network of pipes and cables around Beverley will run from the energy centre to the various end users depending on their requirement for heat or electricity. Along the route of the electrical distribution cable on-street electric vehicle (EV) charging points will be installed. The EV chargers are not part of the capital costs of the ESIF project. District energy is the generation and supply of heat and/or electricity over a distribution network to multiple buildings, with the generation close to the point of supply. District energy networks include a system of insulated pipes which distribute hot water from a centralised heat generation plant to a number of different buildings to provide space heating and hot water. Instead of individual boilers, each building has a heat interface unit (HIU) which supplies heat from the network to the local building distribution system. Generated electricity is distributed through buried cables that typically follow the same route as the buried insulated pipes. Energy networks provide long-term infrastructure that facilitates the supply of low carbon energy. To enable heat networks to be delivered in urban areas and provide the effective delivery of low to zero carbon heat the heat production should be from low carbon sources such as a CHP and other zero carbon or renewable technologies in the future. The project will involve the creation of two special purpose vehicles (SPV's) which will be responsible for the delivery of the project. The delivery model and delivery arrangements for the project in respect of the two SPV's are described below. Energy networks provide long-term infrastructure that facilitates the supply of low carbon energy. To enable heat networks to be delivered in urban areas and provide the effective delivery of low to zero carbon heat the heat production should be from low carbon sources such as a CHP and other zero carbon or renewable technologies in the future. The project will involve the creation of two special purpose vehicles (SPV's) which will be responsible for the delivery of the project. feasibility studies completed gas boilers and Gas CHP CAPEX approx £7.63m Expected IRR 5.54% 4800 tCO2e reduction over 15 years



Gateshead District Energy Scheme - East Extension

Project Sponsor:

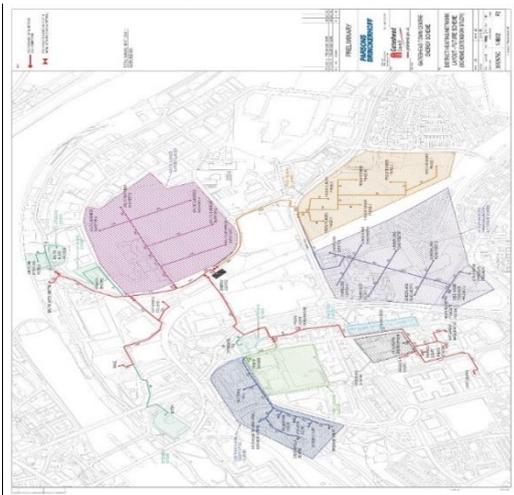
Gateshead Council

Technical Information:

Primary energy source:

Mine Water Heat Recovery

Network Map:



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

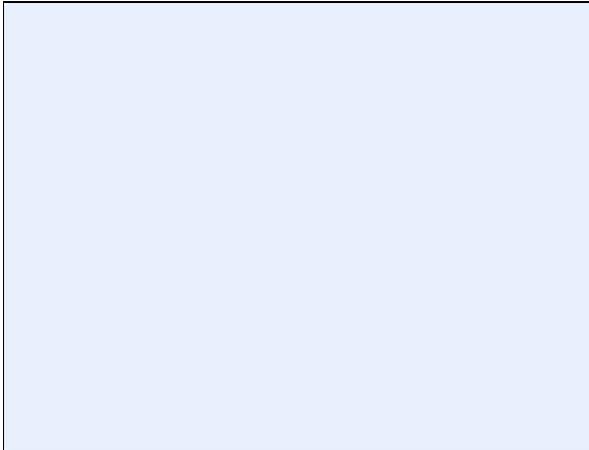
Chopwell Village DHN



Project Sponsor:

Gateshead Metropolitan Borough Council

Network Map:



Summary forecast financial information:

Total capex (£m)	£27.89
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Project IRR*	0.00%
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* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
2022	2022	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)	£0.00
Corporate Loan req. (£m)	£0.00
Project Loan requested (£m)	£0.00

Technical Information:

Primary energy source:

Ground source heat pump

Project description:

This project is a new district energy scheme in the rural village of Chopwell. Heat will be generated by 3.25MW combined air source and ground source heat pumps in a newly constructed energy centre. Heat will be delivered to 2000 domestic dwellings and 4 public buildings (including a library and a medical practice). Electricity will also be supplied via a private wire network to 181 new build domestic dwellings across two sites. The project will feature 1.5MW wind turbine and 1MW solar PV (outside scope of HNIP grant support) that will provide electricity to the heat pump and the private wire network, with any remainder exported to the grid. The project will be delivered in one phase. Domestic connections are across all tenures and we are starting a period of consultation to determine potential uptake prior to submitting a full HNIP application. Domestic customers will be offered heat at the same rate they are currently charged for gas (including the avoided costs of gas boiler maintenance and replacements in the standing charge). Existing domestic customers will be offered the connection free of charge. Developers will be charged a price equivalent to installing gas to connect to the heat and electricity network.

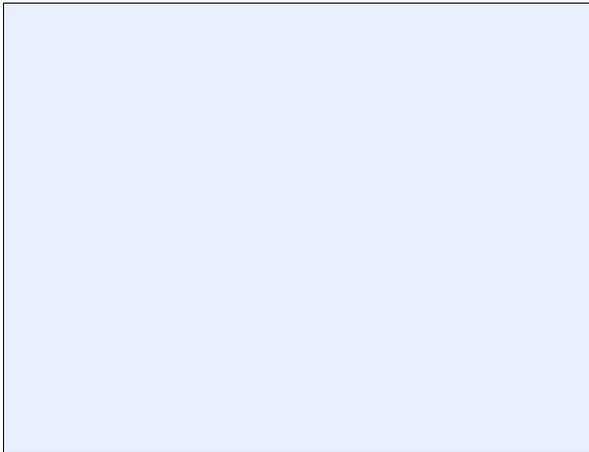


Gateshead Low Rise council estates

Project Sponsor:

Gateshead Council

Network Map:



Technical Information:

Primary energy source:

Mine Water Heat Recovery

Project description:

The project will extend Gateshead District Energy Scheme into low rise social housing estates for the first time, proving viability of heat network retrofit as a means to achieving zero carbon heat for Council homes, which supports our Zero Carbon Heat Strategy to connect 15,000 Council Homes to heat networks by 2030. The heat network currently terminates adjacent to Old Fold / Nest House estates, comprising 550 Council homes, of which 470 are Council owned, with 80 (15%) privately owned. We will also connect 2 primary schools, and 1 care home. We will install ca. 3.7km of DH mains, and 3.3km of house spurs, to 100% of homes, including all privates. We have derisked resident uptake by targeting a social housing area, and can then test offers to drive uptake in private homes. All heat to be provided by Gateshead Minewater Heat Pump, which has spare capacity to supply all heat required. Over 15 years, carbon savings improve, as power decarbonises, to provide 19,234 tonnes and 96 GWh over 15 years.

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	2022	2023	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

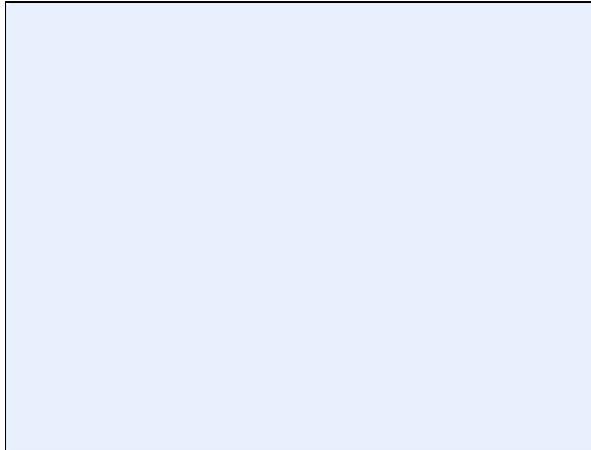
Leeds PIPES Phase 3 Extension



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	2021	2022	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:

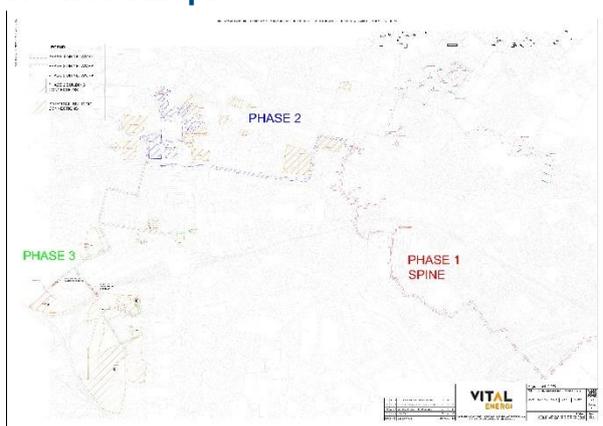
"Leeds PIPES is a recently completed network that has commenced heat supply. It comprises a network of ~8km of pipework taking low carbon heat from an EfW plant (the RERF) to commercial properties and council flats. A successful round 1 HNIP application has led to construction commencing on a c2.5 km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

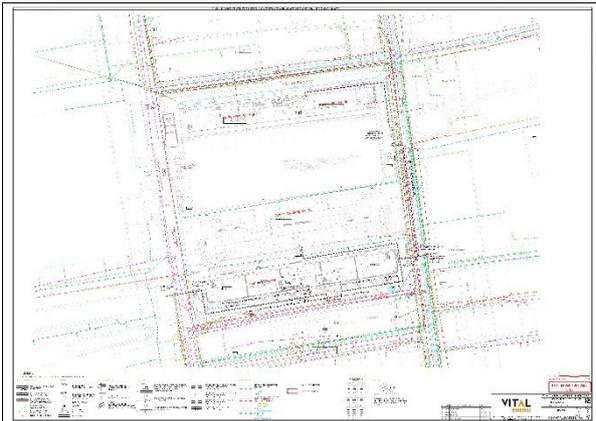


Liverpool Waters District Heat Network - Phase 1B Road Crossings

Project Sponsor:

Peel NRE Developments Ltd

Network Map:



Technical Information:

Primary energy source:

Boiler - Gas

Project description:

Peel NRE Developments Ltd (previously 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. The development is to include 9,000 residential units, 2,000,000m² of development floorspace, 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 and connect two early phases of the district heat network. This is made possible by the early investment and construction of 2 major road crossings and a link pipe. A planned transition to a low carbon heat source will occur in the near future to reduce carbon emissions across the network.

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	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

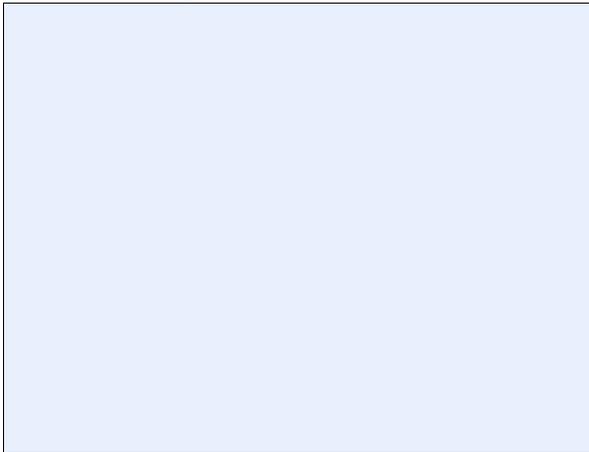


Central Cluster extension and heat pump

Project Sponsor:

Peel NRE Developments Ltd

Network Map:



Technical Information:

Primary energy source:

Water source heat pumps

Project description:

Peel NRE, through Mersey Heat are delivering a district heat network to the Liverpool Waters development and the surrounding areas. Mersey Heat is underway with the delivery of the heat network to supply identified loads within the Princes Parade area and also around the Stanley Dock development. We have a mixture of connections including new build and retrofit. The scheme has been designed on a Gas CHP generation however we are seeking support from HNIP to bring forward a heat pump solution as our main source of heat. This decarbonisation of the Mersey Heat network is especially important for the 1C extension. We have been in discussion with a number of the key stakeholders in this area and they have advised consideration to connect to the heat network would be preferable if we can provide low carbon heat from the outset.

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	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

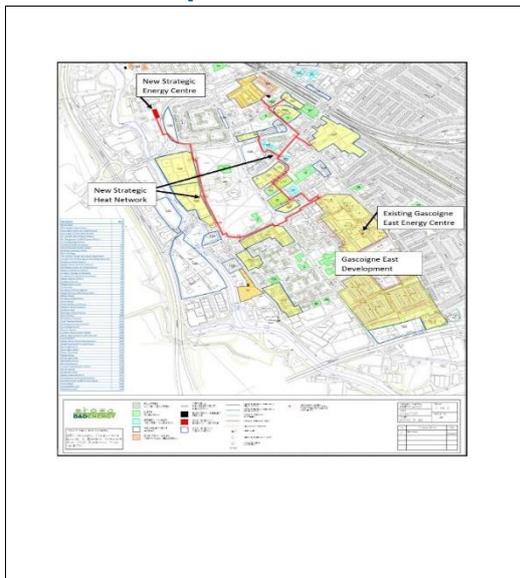


Barking Town Centre District Energy Scheme

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)	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	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

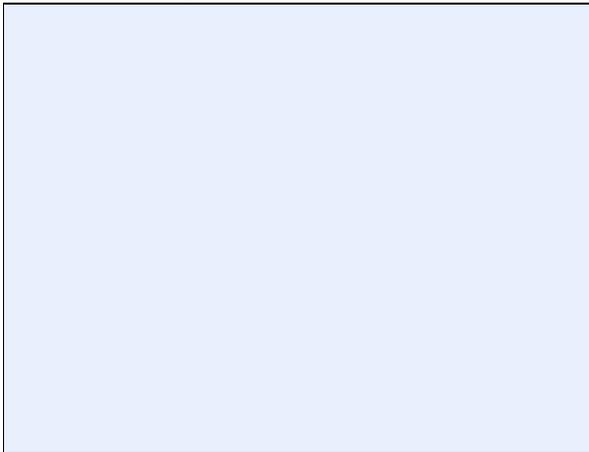


Riverside Heat Network

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

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. More information is provided in the Outline Business Case, and the Commercialisation Plan attached to this submission.

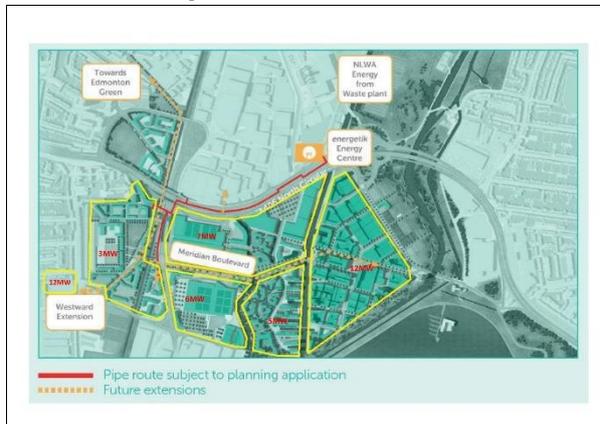


Meridian Water Heat Network

Project Sponsor:

London Borough of Enfield

Network Map:



Summary forecast financial information:

Total capex (£m)	£34.40
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Project IRR*	4.99%
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* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
2020	2020	2022	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)	£9.76
Project Loan requested (£m)	£0.00

Technical Information:

Primary energy source:

CHP – EfW

Project description:

Meridian Water Heat Network will supply low carbon heat to 10,000 homes, with potential to rise to 30,000 in the lifetime of the network. The project is planned to be operational in 2022 and extended as new developments are built, with connection to the North London Waste Authority's new Energy Recycling Facility (ERF) when built in 2026.

Temporary energy centre boilers will be installed in the meantime, enabling the heat network and future connection to the ERF to supply up to 60MW heat. The network's construction will enable 8.9km of heat network piping to be installed, serving three large housing developments and connecting to other networks in neighbouring London boroughs. Once the ERF is connected in 2026, the equivalent annual carbon savings will exceed 2200 tonnes and will rise rapidly over the next 10 years to over 5700 tonnes per annum in 2036.

UNDER CONSTRUCTION

North and west strategic extensions to Meridian Water Heat Network

Project Sponsor:

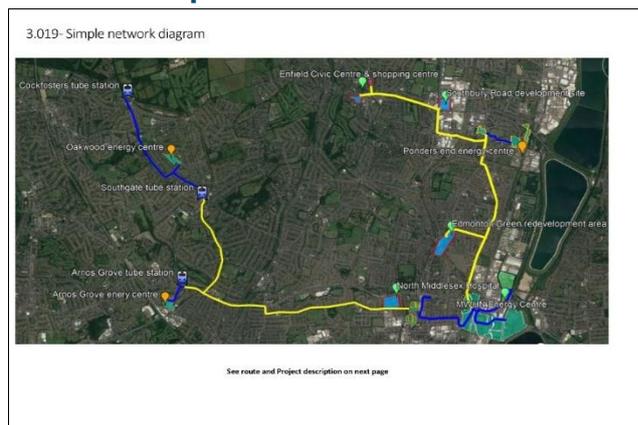
London Borough of Enfield (C/O Energetik)

Technical Information:

Primary energy source:

CHP – EfW

Network Map:



Project description:

North and western strategic extensions from the Meridian Water Heat Network to connect significant new heat loads as well as to connect existing satellite schemes, creating significant carbon savings. Extension northwards from Meridian Water to connect and serve two large new housing developments totalling ca. 3300 dwellings, as well as to connect to the existing Ponders End Heat Network, then westwards to connect to Enfield town, including civic centre building. Extension westwards to connect two care homes along the route towards the Arnos Grove Heat Network, and then north to connect to the Oakwood Heat Network, which will significantly decarbonise existing networks and will create opportunities to connect further buildings/developments along each route, creating a strategic scale heat network in North London.

Summary forecast financial information:

Total capex (£m)	£48.65
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Project IRR*	0.27%
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* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	2023	2024	Not Provided

Project Stage

Construction

Project Contact Details:

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

HNIP Application Information:

Grant requested (£m)	£12.00
Corporate Loan req. (£m)	£11.86
Project Loan requested (£m)	£0.00

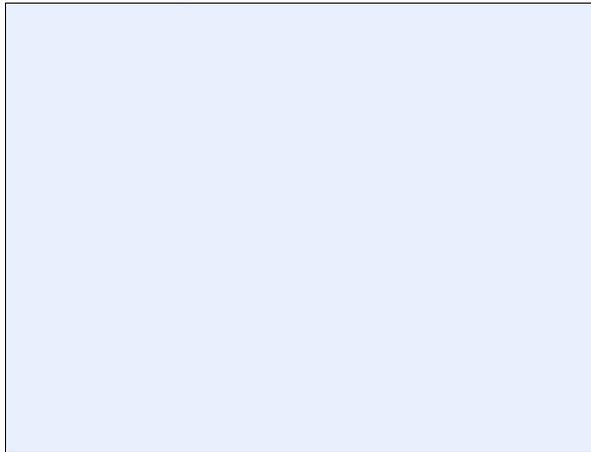


Tottenham Hale and Broadwater Farm District Heating Network

Project Sponsor:

London Borough of Haringey

Network Map:



Summary forecast financial information:

Total capex (£m)	£32.47
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Project IRR*	3.34%
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* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
2022	2023	2024	Not Provided

Project Stage

Commercialisation&Construction

Project Contact Details:

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

HNIP Application Information:

Grant requested (£m)	£4.60
Corporate Loan req. (£m)	£12.65
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.

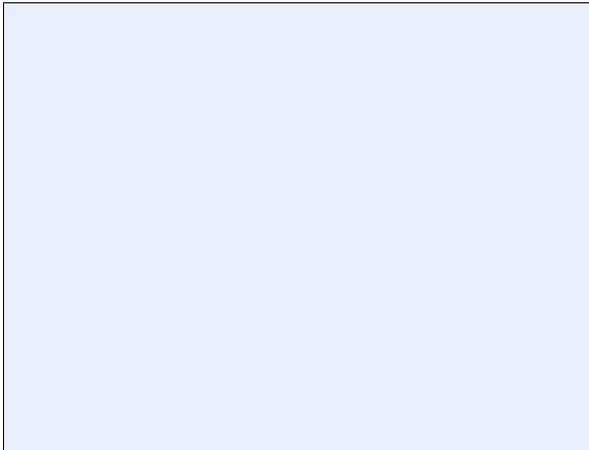


Wood Green District Heating Network

Project Sponsor:

London Borough of Haringey

Network Map:



Technical Information:

Primary energy source:

CHP – EfW

Project description:

The Wood Green District Heating Network will supply 28 site Wood Green. The scheme consists in total of 5,054 dwellings and 144,533m² of commercial floor space. The network will connect to and purchase heat from the proposed Tottenham Hale District heating network (Phase 1) which is connecting to the Energetik network who are connecting to the new North London Heat and Power Energy Recovery Facility. The interconnector to Wood Green will connect to phase 1 near Broadwater Farm and will run westwards to the wood Green area and the Energy Centre located in the Clarendon Square development . The Energy Centre Wood Green will be located in the Clarendon Square development where the developer is providing a EC shell to LBH as part of the S106 agreement. It will be equipped with thermal stores and top-up/back-up gas boilers.

Summary forecast financial information:

Total capex (£m)	£33.89
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Project IRR*	2.61%
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* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
2022	2023	2025	Not Provided

Project Stage

Commercialisation&Construction

Project Contact Details:

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

HNIP Application Information:

Grant requested (£m)	£8.03
Corporate Loan req. (£m)	£2.56
Project Loan requested (£m)	£0.00

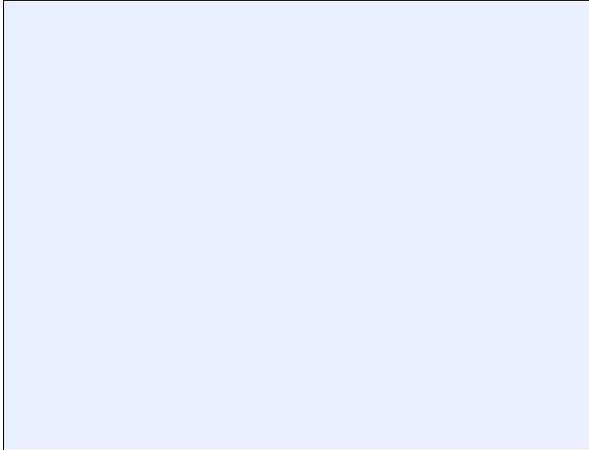


Bunhill extension

Project Sponsor:

London Borough of Islington

Network Map:



Summary forecast financial information:

Total capex (£m)	£1.61
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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	2022	2023	Not Provided

Project Stage

Commercialisation&Construction

Project Contact Details:

Contact Name:	Rodrigo Matabuena
Email:	rmatabuena@islington.gov.uk

HNIP Application Information:

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

Technical Information:

Primary energy source:

Airsource heat pump

Project description:

The Bunhill Heat Network was launched in 2012. A second energy centre was built starting in 2017, with sufficient capacity to add future expected connections in the area, including the two that this project will connect to the network. The project is to add two new connections to the Bunhill Heat Network - one private mixed use development consisting of around 1,000 homes, retail space and a hotel (known as 'City Forum'), and one new council-owned block of flats (Telfer House) consisting of 38 homes. City Forum was identified as a future connection as part of a Bunhill north extension in our heat masterplan in 2014. We have been in negotiations with the developer about the connection since 2015 and expect to conclude a heat supply agreement in the near future. The CapEx for this project covers the construction works as well as employment of a consultant engineer and quantity surveyor to deliver the connection of Telfer House and City Forum to the Bunhill Heat Network. This will include the design of the connections, pricing of the works, procurement of a contractor to install the connections, and providing advice and oversight during the build phase. The HNIP grant will cover part of the construction costs of the projects.

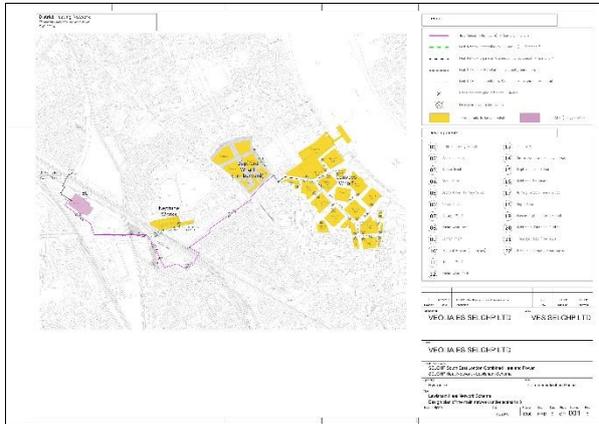


SELCHP Phase 2

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

UNDER CONSTRUCTION

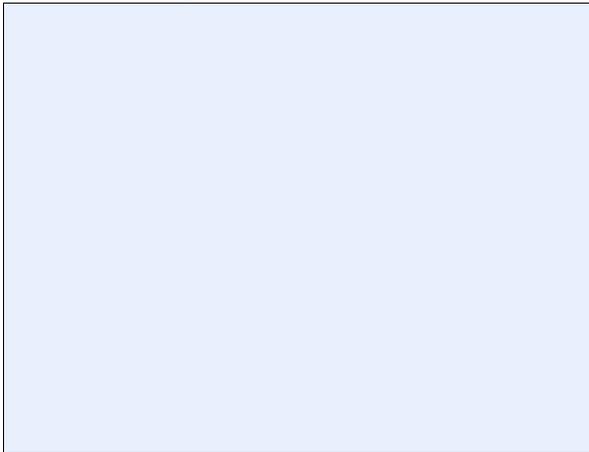


SELCHP Southwark : LBS2.0 DHN Expansion Scheme

Project Sponsor:

Veolia ES Southwark 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)
2022	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:

CHP – EfW

Project description:

This project will bring an EfW sourced, low-carbon, heat network to a new area of Southwark. The scheme proposes to supply heating and hot water to several existing estates and schools that depend on gas boilers. Many of these Energy Centres are reaching the end of their operating life. While the existing estates drive the initial viability of the scheme, it also supports the future growth to a new regeneration area aimed to accommodate 20,000 new homes over the next 15 years - Old Kent Road (OKR). This mixed use of existing and new buildings defines the strategic value of the project and structures a long-term sustainable DHN. The project requires three main work packages - First modifications to an EfW energy centre (SELCHP) to enable further extraction of heat, second construction of a DHN with approx. 6km of trench while crossing areas of high risk (i.e. rail, IP/HV utilities) and third, modifications to existing boiler houses allowing the transfer of heat while defining the resilience strategy of the overall system. Some of these Boiler Houses will be adopted as part of the fail-safe and fall-back plans. The proposed network will provide immediate and long-term carbon reductions to these developments compared to the proposed counterfactuals while providing good value to residents and businesses. The current structure of the project results in an unfinanceable IRR and carries significant construction risks and high operational costs. HNIP commercialization will enable financial support to conduct all required due diligence and construction grants would unlock the investment of a major infrastructure scheme while delivering the base for a heat exclusion zone around the Old Kent Road Opportunity Area.

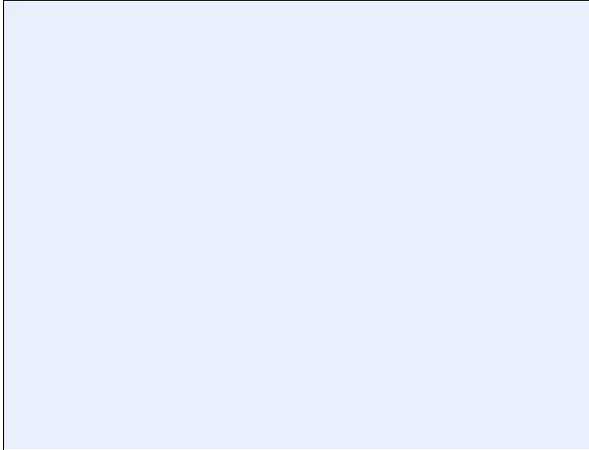


Manchester OPEN

Project Sponsor:

MEPL

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	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:

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 (serviced 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. "

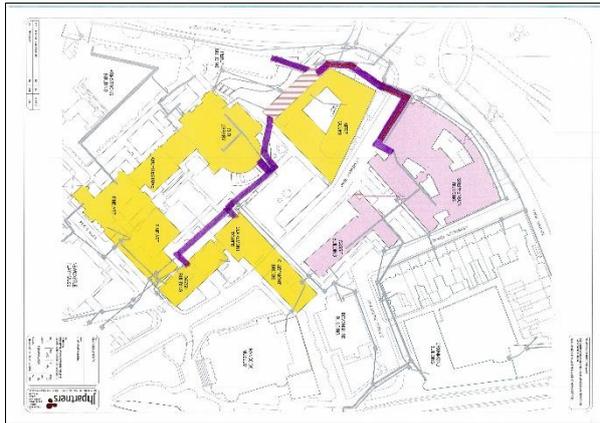


Newcastle University Merz Court Energy Centre

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.

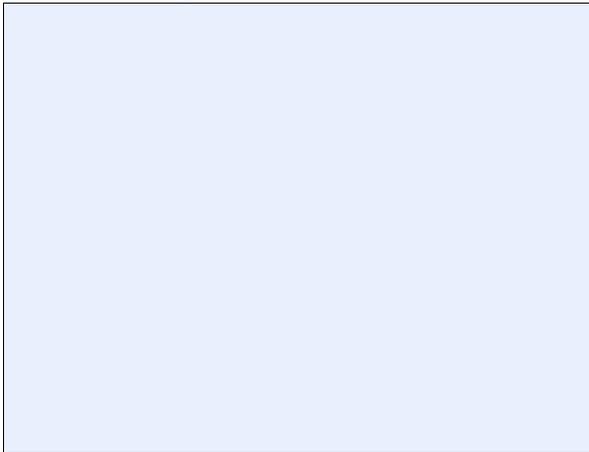


Portsmouth Naval Base Low Carbon Heat Network

Project Sponsor:

Ministry of Defence

Network Map:



Technical Information:

Primary energy source:

Waste heat – Other (without heat pump)

Project description:

Installation of heat network to distribute heat from MOD CHP asset to end-users. The MOD are the owners of existing CHP and peaking boilers providing steam into an existing distribution network. However, the CHP is wasting approximately 50% of the generated heat as this is produced by the engine jacket and unsuitable to raise steam. Therefore this is currently being vented via a dry air cooler to atmosphere. This project will install a Low Temperature Hot Water network to replace the existing steam network, to ensure full utilisation of the available heat from the CHP. The network will also be extended to cover network adjacent buildings currently operating on their own gas boilers; a new section of the base and areas to be redeveloped including plans to relocate sports facilities from an off-site location, onto the Naval Base, including a swimming pool.

Summary forecast financial information:

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

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
2022	2023	2024	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



Nottingdale Heat Network

Project Sponsor:

Royal Borough of Kensington and Chelsea

Network Map:



Summary forecast financial information:

Total capex (£m)	£5.93
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Project IRR*	1.76%
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* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
2021	2022	2023	Not Provided

Project Stage

Construction

Project Contact Details:

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

HNIP Application Information:

Grant requested (£m)	£1.12
Corporate Loan req. (£m)	£0.00
Project Loan requested (£m)	£0.00

Technical Information:

Primary energy source:

Airsource heat pump

Project description:

The Notting Dale Heat Network project will provide a new zero-carbon heat network for a core scheme of 826 existing homes on Lancaster West Estate (vast majority social); Kensington Aldridge Academy; Kensington Leisure Centre, Baseline Studios (start-up business units); North Kensington Community Centre and Lancaster West Community Centre. All are located on the Lancaster West Estate in North Kensington. Currently the existing supply of heat to 652 homes (80% of the Estate) uses two time-expired heat networks that are 50 years' old. 142 homes on the Estate use individual gas combi boilers, with a further 32 new homes using gas CHP. The leisure centre and Academy use gas boilers and CHP. Baseline Studios is all electric. North Kensington Resource Centre and Lancaster West Estate Community Centre both have small gas boilers. The lack of individual control and unreliability are the highest source of resident complaints for homes connected to the two existing heat networks. By using Air Source Heat Pump technology, the Heat Network will be 100% zero-carbon from 2030. It will form a key strategic asset in the Council's plans for the Estate to become Net-Zero Carbon by 2030 and importantly, to act as a launchpad to expand the heat network to help achieve its objective for the Borough to become net-zero carbon by 2040. The project is supported by HNDU.



Kingston District Heating network

Project Sponsor:

Kingston Council

Network Map:



Summary forecast financial information:

Total capex (£m)	£9.50
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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	2023	2025	Not Provided

Project Stage

Commercialisation&Construction

Project Contact Details:

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

HNIP Application Information:

Grant requested (£m)	£3.47
Corporate Loan req. (£m)	£0.00
Project Loan requested (£m)	£0.00

Technical Information:

Primary energy source:

Water source heat pumps

Project description:

In 2019, Kingston Council passed a motion on combatting the Climate Emergency, and reduction in local carbon emissions is a political priority of the ruling administration. The Kingston district heating network presents an innovative, strategic opportunity for Kingston and Thames Water, as well as future schemes across the UK. If the network achieves full potential, is likely to be the largest carbon saving measure initiated in this current council term and will future proof the area by providing low-carbon heat for generations to come. The network will play a major role in decarbonising central Kingston by supplying low carbon heat at a viable price from Thames Water operations. The heat source is located at the outflow of the Hogsmill sewage treatment works, which ejects 50 Giga Watt Hours of waste heat into the river. This is equivalent to heating 13,000 homes or most of the buildings in central Kingston. Phase 1 of the project will incorporate the Cambridge Road Estate redevelopment, in which over 2,000 homes will be connected to the network, and Kingston Hospital. There is considerable scope for future network expansion, including to the University's Clayhill halls of residence. It is anticipated that the scheme will grow over time to form a large-scale network serving significant parts of Kingston. This scheme has the potential is to be a pathfinder project for other heat network schemes across the UK. Among the key drivers of the project is to provide a blueprint for a scheme that can be replicated across the country in communities trying to take advantage of waste heat and provide customers with affordable low carbon heat.

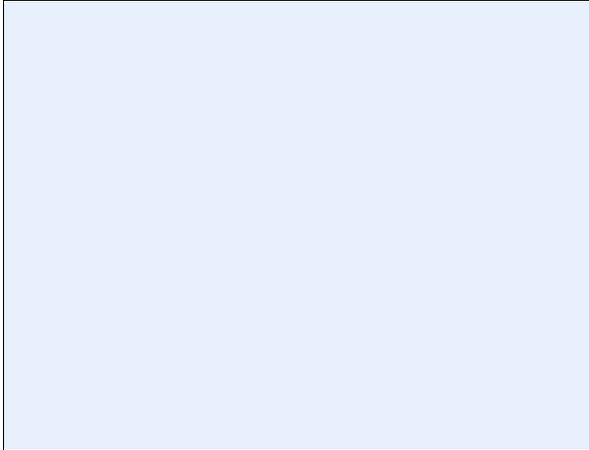


Solihull Town Centre

Project Sponsor:

Solihull Metropolitan County Council

Network Map:



Summary forecast financial information:

Total capex (£m)	£14.93
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Project IRR*	1.80%
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* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
2020	2021	2024	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:

CHP – Biogas

Project description:

The network will supply public and commercial buildings using a combination of a 1.7MWth air source heat pump, 1,560 kWe gas-fired Combined Heat and Power engine (prioritised for network heat supply) and auxiliary gas boilers. Electricity generated by the CHP will supply the Energy Centre and heat pump operations, 4 public and private sector customers via private wire supply and or grid export depending on electricity demand and grid electricity prices. The network will supply heat to four education sites to the south, Tudor Grange Leisure Centre and then cross under the railway line to supply further public sector and commercial buildings including Solihull Library, National Grid Headquarters, Paragon Bank and the UK Border Agency to the east. Stakeholders for all proposed phase 1 connected sites are supportive and site surveys have been carried out. Letters of Intent to work towards signed Heads of Terms have been received from 2 customers so far: Solihull College (a heat and private wire customer) and Tudor Grange Academy. Letters are expected from other customers prior to submission of the full application. There are further significant existing connection opportunities in Phase 2 as identified in the Outline Business Case, including John Lewis and Touchwood Shopping Centre. The phase 1 network connects 9 existing buildings including 4 school campus sites with multiple plant room connections, and one commercial development on council-owned land (The Gateway or Westgate); designed to accommodate heat network connection. The network accommodates expansion to new developments within the town centre masterplan. No domestic connections are envisaged in phase 1, although new developments in the town centre are likely to include residential apartments. The network is being sponsored by Solihull Council with full engagement across all department and Cabinet support for the OBC and submission of funding applications. The project steering group is chaired by the Assistant Director for Managed Growth. Please note that in further clarification to 2.010, if in the full application it is assumed that the ASHP (and associated M&E) will receive RHI or an equivalent replacement subsidy, these capex items will be removed from the HNIP as non-eligible costs.

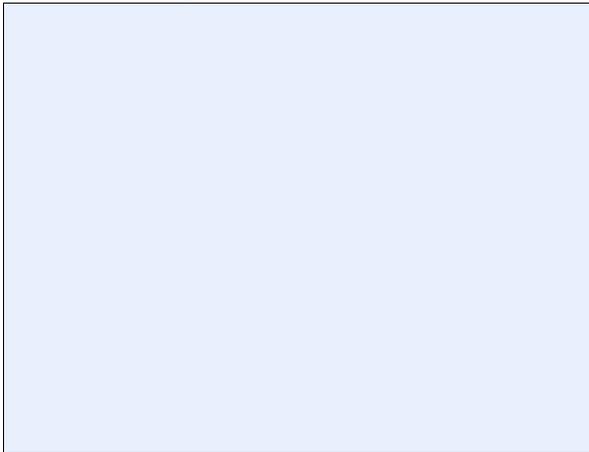


The Galleries Re-development Project

Project Sponsor:

Wigan Metropolitan Borough Council

Network Map:



Technical Information:

Primary energy source:

Ground source heat pump

Project description:

This £190m project comprises the demolition and redevelopment the Galleries Shopping Centre, Market Hall buildings (8.2 Ha) in the Heart of Wigan Town Centre. The redevelopment comprises a new basement and energy centre, podium, 464 new homes over 7 residential towers, 140 bed hotel, new cinema, new market hall, a retirement living unit and associated public realm and new square.

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	2023	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



Mersey Heat at Wirral Waters

Project Sponsor:

Peel NRE Developments Ltd

Network Map:



Technical Information:

Primary energy source:

Water source heat pumps

Project description:

The development at Wirral Waters site will see the creation of a mixed use, high density, highly sustainable project that will elevate and regenerate the area to benefit new occupiers and the existing community. The development which has 13,000 homes consented and 20million square feet of mixed-use floor space approved will be delivered over a 15–20-year programme. As sustainability is key to the development, Peel NRE is exploring all low carbon solutions for meeting the demands for heating, hot water, and power for the site. As such, they are undertaking heat network feasibility studies to include a low carbon technology for generation. Given the development is waterside, we are looking to utilise the thermal energy from the adjacent dock water as the main source of heat providing local, low carbon heat.

Summary forecast financial information:

Total capex (£m)	£21.06
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Project IRR*	0.00%
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* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
2022	2022	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)	£0.00
Corporate Loan req. (£m)	£0.00
Project Loan requested (£m)	£0.00



Woking Heat Network

Project Sponsor:

Thameswey Energy Limited

Network Map:



Summary forecast financial information:

Total capex (£m)	£19.21
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Project IRR*	3.10%
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* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
2021	2022	2024	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)	£9.42
Project Loan requested (£m)	£0.00

Technical Information:

Primary energy source:

CHP – Gas

Project description:

Thameswey Energy Limited (TEL) has, since 2000, operated gas CHP-led trigeneration plant, district heating, cooling and power distribution networks supplying public sector, commercial and residential customers in Woking town centre and is recognised as a pioneer in district energy in the UK. Woking is experiencing a period of major growth with commercial, retail and residential developments underway and planned. Consequentially, new generation equipment and distribution infrastructure is required to meet the growth in energy demand. The major expansion coincides with a ten year plan to achieve net carbon neutral by 2030. In response TEL has already made significant progress towards increasing capacity with the development of a 10MW energy centre (due for completion in June 2021) and installation of 890 metres of new primary energy heat network, comprising an investment of £22m. The project comprises two principal initiative to progress this investment to the next stage and will achieve twin objectives of meeting growth in demand in Woking and enabling progress towards carbon neutrality. Firstly it will connect its heat and cooling networks serving the east of the town centre to the new networks that will serve the west and the south of the town ("interconnection"). Secondly it will provide new infrastructure to distribute heat to major developments elsewhere in the town, including south of the main railway lines ("Expansion"). Interconnection will provide additional capacity to supply up to 800 new residential units planned in the east of Woking town centre. Significantly, it will also enable network temperature to be reduced by transition from an 82 degree C network generated by CHP to 63 degree C supplies from heat pumps. Investment in new infrastructure through Expansion will enable up to 3,450 new homes to be supplied as part of a major strategic infrastructure scheme in the west and south of Woking.



Worthing Civic Centre

Project Sponsor:

Worthing Borough Council

Network Map:



Technical Information:

Primary energy source:

Water source heat pumps

Project description:

The Worthing Borough Heat network will distribute heat generated via a sewer source heat pump to 27 buildings across Worthing. These 27 connections range from new build development and existing buildings including Worthing Hospital. The 27 connections are owned by just 5 parties and it is intended that all connections will sign a letter of intent to connect.

Summary forecast financial information:

Total capex (£m)	£11.38
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Project IRR*	2.01%
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* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
2020	2021	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)	£4.11
Corporate Loan req. (£m)	£1.27
Project Loan requested (£m)	£0.00



HNDU COMMERCIALISATION/DPD STAGE PROJECTS

(DETAILED PROJECT DEVELOPMENT WORK COMPLETE)

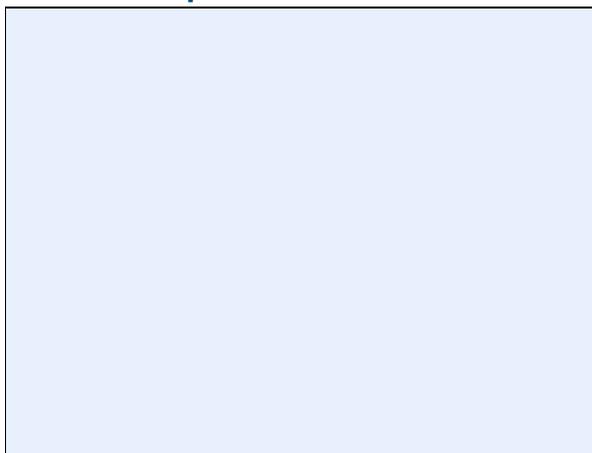


Bolton Town Centre Heat network

Project Sponsor:

Bolton Metropolitan Borough Council

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£13.80
Private Wire (£m)	£0.00
Pipework / distribution capex (£m)	£8.60
Other capex (£m)	£0.00
Total capex (£m)	£22.40

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	2023	2027

Project Stage

Detailed Project Development

Project Contact Details:

LA Name:	Bolton Metropolitan Borough Council
Contact Name:	HNDU
Email:	HNDU@beis.gov.uk

Technical Information:

Primary energy source:

CHP – Gas

Project description:

Ramboll was commissioned by Bolton Council to undertake a techno-economic study on the feasibility of developing a new heat network serving Bolton Town Centre. Kew Consult was commissioned to undertake commercial and financial work and Womble Bond Dickinson were commissioned to undertake legal work.

Energy centre description:

The energy centre is proposed to be located at Black Horse Street Car Park, in Bolton town centre. Ramboll modelled this to include:

- 2 No. Gas Engine CHP's – 2.0MWe (Total installed capacity 4.0MWe, operating between 2023-2037)
- Thermal Storage – 250m3 (Phase 1 – 2023)
- ASHP 1 – 2.0 MWth (2038 onwards)
- ASHP 2 – 2.0 MWth (2038 onwards)

Heat/cooling demand phasing description:

There are 3 phases to the project including both existing and future developments. The estimated years of connection for each phase are 2023, 2025 and 2027.

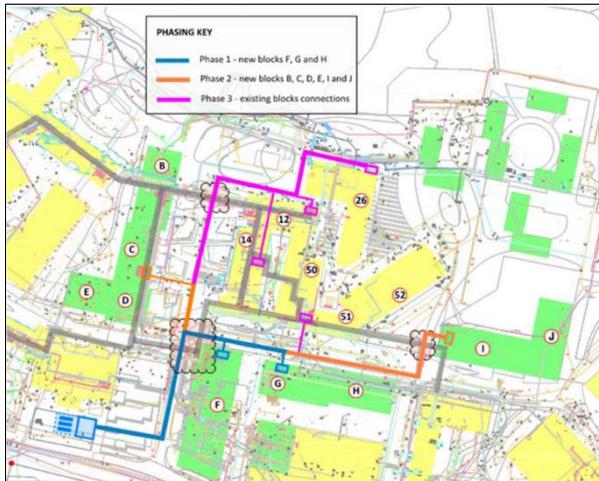


Alderley Park_DPD

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:	HNDU
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

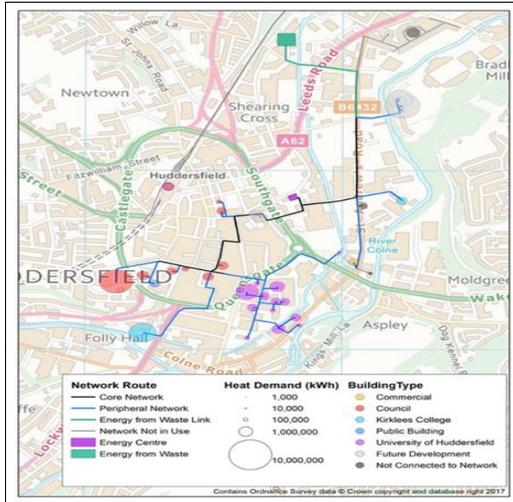


Huddersfield Heat Network

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:	HNDU
Email:	HNDU@beis.gov.uk

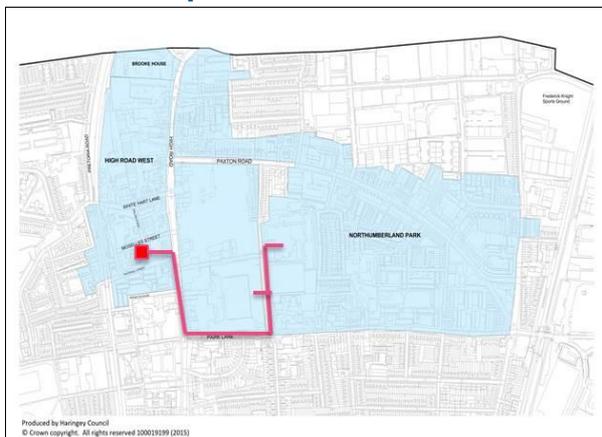


North Tottenham_DPD

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:	HNDU
Email:	HNDU@beis.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)

2019/20 HNDU_ Notting Dale

Heat Network DPD

Project Sponsor:

Royal Borough of Kensington and Chelsea

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£2.28
Private Wire (£m)	£0.00
Pipework / distribution capex (£m)	£9.44
Other capex (£m)	£2.26
Total capex (£m)	£13.98

Project IRR*	Not provided
Considering third party finance?	No

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	2022	2024	2029

Project Stage

Detailed Project Development

Project Contact Details:

LA Name:	Royal Borough of Kensington and Chelsea
Contact Name:	Jeff Laidler
Email:	jefflaidler@sustainabilityco.world

Technical Information:

Primary energy source:

Airsource heat pump

Project description:

The Lancaster West Estate (LWE) is located within the Notting Dale Ward, in the Royal Borough of Kensington and Chelsea (RBKC) and is currently undergoing a comprehensive refurbishment to deliver on a government promise to "Deliver a model social housing estate for the 21st century where residents can live in affordable comfort". The deep energy retrofit will improve the energy performance of the Council's housing stock, whilst the Notting Dale Heat Network project will provide a new zero-carbon heat network for up to 826 existing homes on the Lancaster West Estate (75% social rent); Kensington Aldridge Academy; Kensington Leisure Centre and Baseline Studios (start-up business units). The two existing heat networks, which supply 80% of homes on Lancaster West Estate, are over 40 years' old and time expired. The lack of individual control in people's homes is a significant source of resident complaints, alongside frequent outages.

Energy centre description:

The new heat network's energy centre will use a large Air Source Heat Pump and electric boiler, to make the Notting Dale Heat Network 100% zero-carbon from 2030. Having been co-designed with residents, the renewable heat network is a key strategic asset in the council's plans for the Estate to become carbon-neutral by 2030. It will also create a launchpad for significant heat network expansion, with the opportunity for wider roll-out able to help the council deliver a net-zero carbon Borough by 2040. The project is supported by HNDU, HNIP and the GLA's Local Energy Accelerator.

Heat/cooling demand phasing description:

The buildings will be connected to the Notting Dale heat network across four phases, as shown below:

- Phase 1 would come online in April 2024
- Phase 2 would come online in April 2025
- Phase 3 would come online in April 2026
- Phase 4 would come online in April 2029

The phasing schedule was developed in line with the requirements of the refurbishment programme, technical viability, commercial aspects, and RBKC's strategic objective to be carbon neutral by 2030.

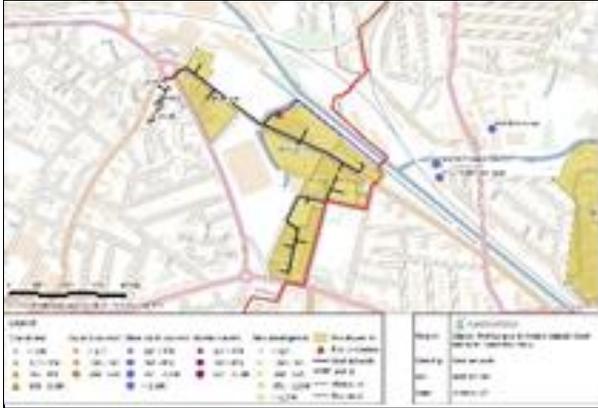


Smethwick_DPD

Project Sponsor:

Sandwell Metropolitan Borough Council

Network Map:



Technical Information:

Primary energy source:

Water source heat pumps

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?	Yes

* 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:

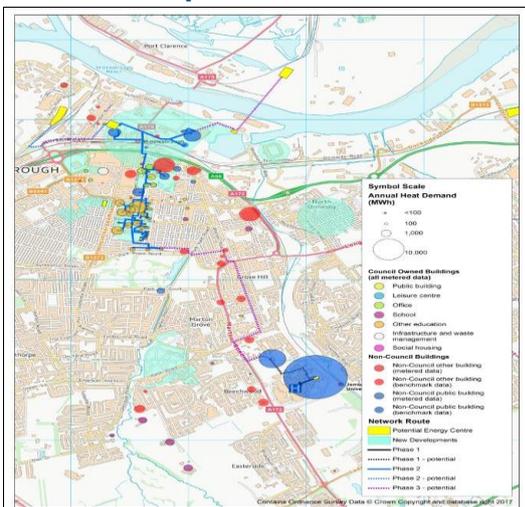
Tees Valley Combined Authority

Technical Information:

Primary energy source:

CHP – Gas

Network Map:



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.

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

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.

Project Stage

Detailed Project Development

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.

Project Contact Details:

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



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

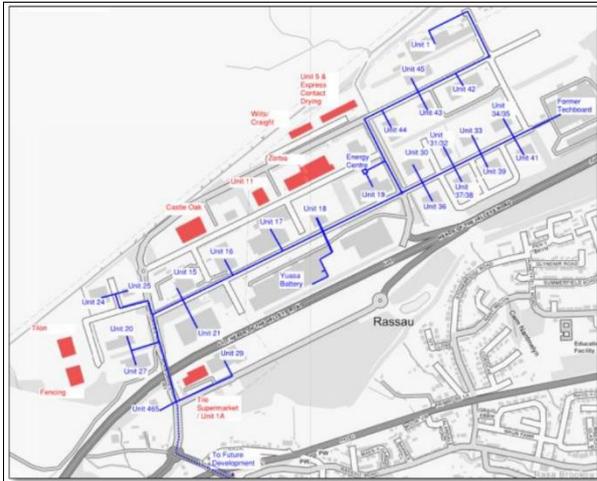


Ebbw Vale (Rassau)_FES

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:	HNDU
Email:	HNDU@beis.gov.uk

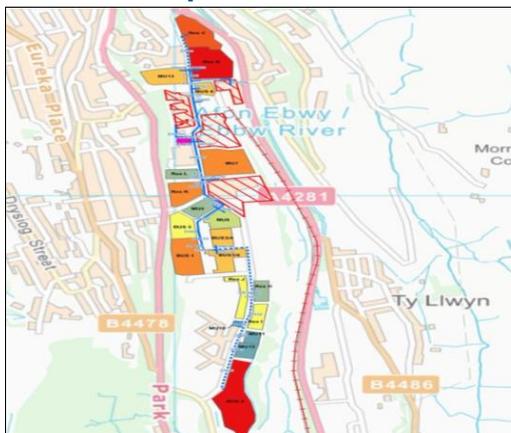


The Works_FES

Project Sponsor:

Blaenau Gwent County Borough Council

Network Map:



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:	HNDU
Email:	HNDU@beis.gov.uk

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.

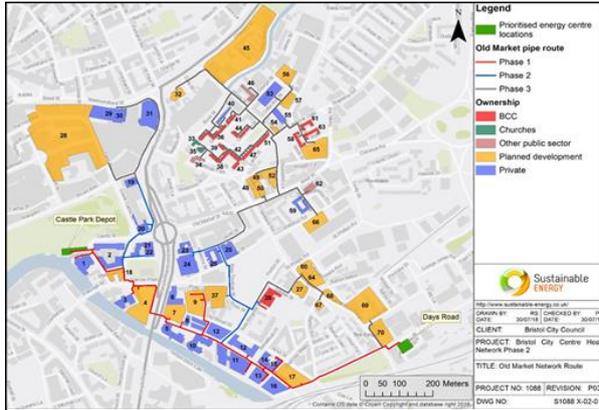


City Centre Phase 2_FES

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?	No

* 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:	HNDU
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.

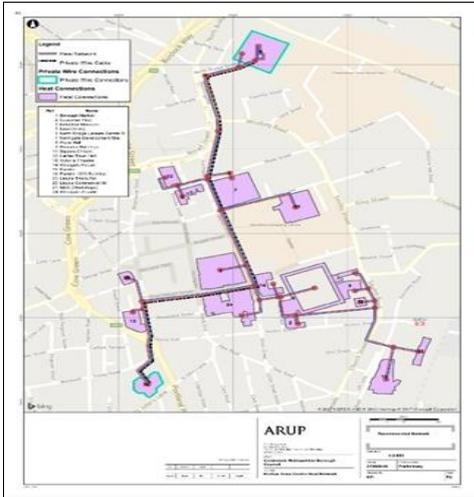


Halifax Town Centre_FES

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:	HNDU
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:

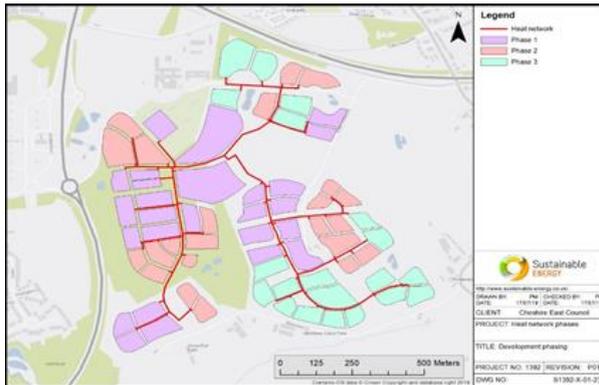
Through consultation with CMBC and HNDU, the scheme has been specified as a single phase. This has been selected as the network is not large enough to require multiple phases and all key internal and external stakeholders have engaged with the scheme. It is acknowledged that the major transport works 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:	HNDU
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.

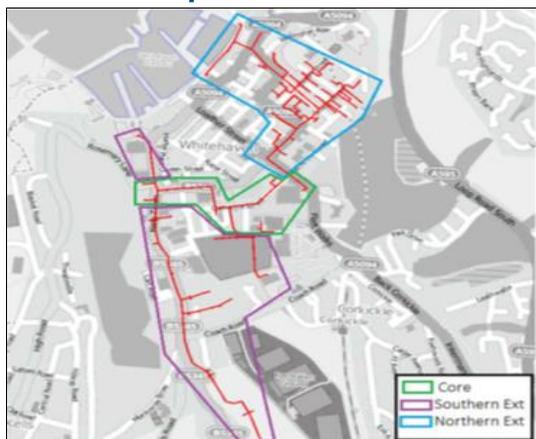


Whitehaven Minewater Heat Kells Lane_FES

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:	HNDU
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.

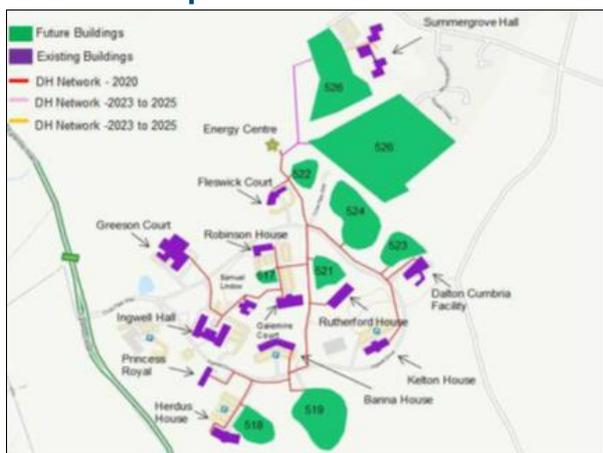


Whitehaven Westlakes Science Park_FES

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:	HNDU
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:

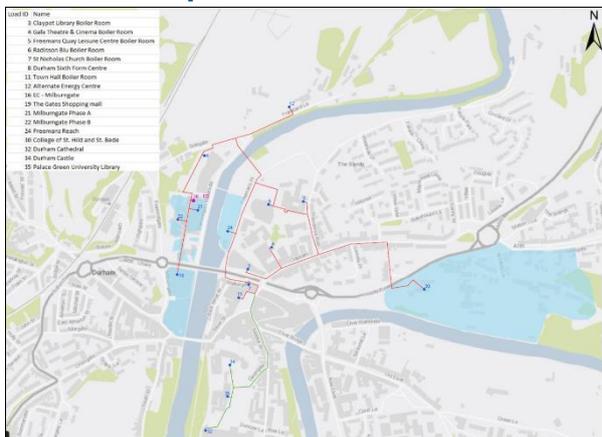
The network is proposed in 3 phases. The first connections (a selection of existing and planned buildings) are planned in 2020, the second phase includes the proposed buildings known as Plot 526, and the third phase, Summergrove Hall is planned for after 2025.

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:	HNDU
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.



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:	HNDU
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 3333kWe 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, 15650MWh), PHASE 2: Western cluster in year 2021 (6630MWhth, 5360MWh) PHASE 3: Eastern cluster in year 2022 (6850MWhth, 2910MWh), and PHASE 4: Southern Cluster in year 2023 (3610MWhth, 1280MWh). (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.

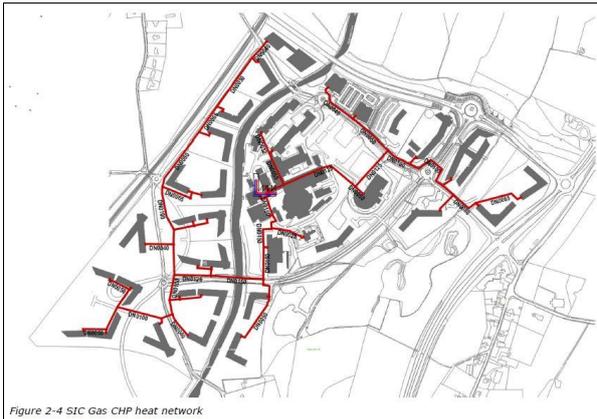


East Runcorn Daresbury Energy Network_FES

Project Sponsor:

Halton Borough Council

Network Map:



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).

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:	HNDU
Email:	HNDU@beis.gov.uk

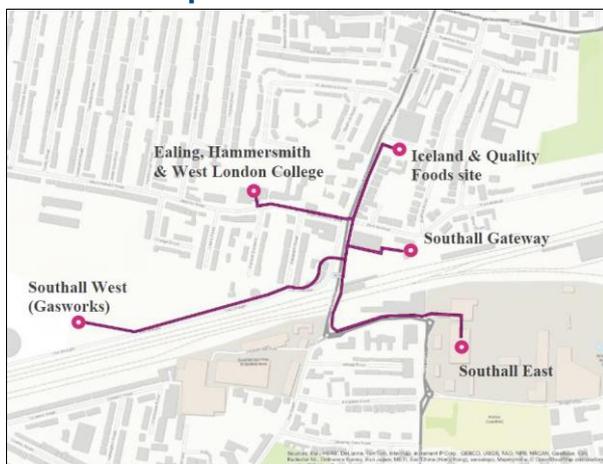


Southall DE_FES

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:	HNDU
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.

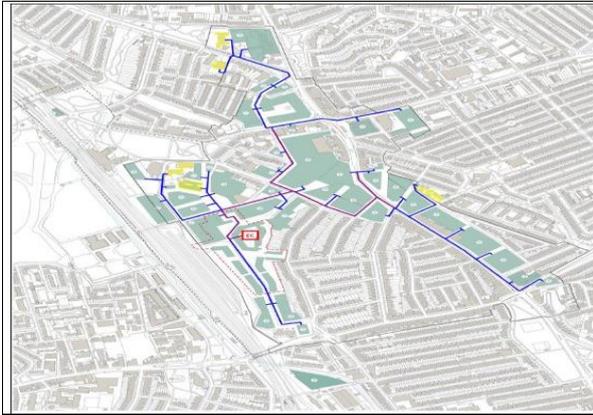


Wood Green_FES

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:	HNDU
Email:	HNDU@beis.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.

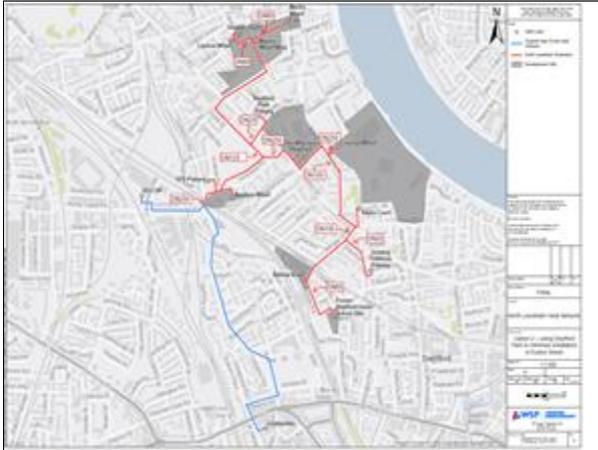


North Lewisham Heat Network_FES

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:	HNDU
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.

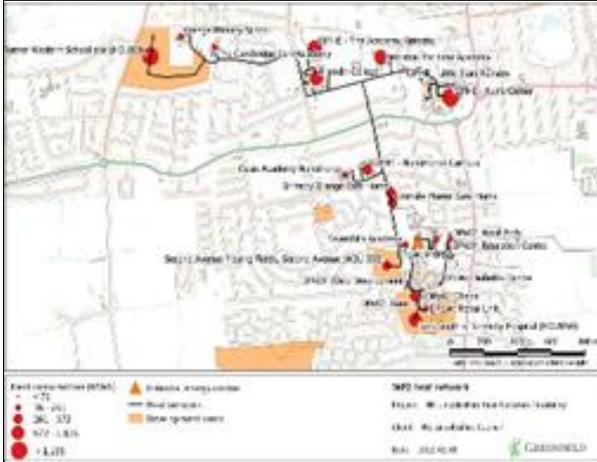


GIFHE(peak)_FES

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:	HNDU
Email:	HNDU@beis.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.

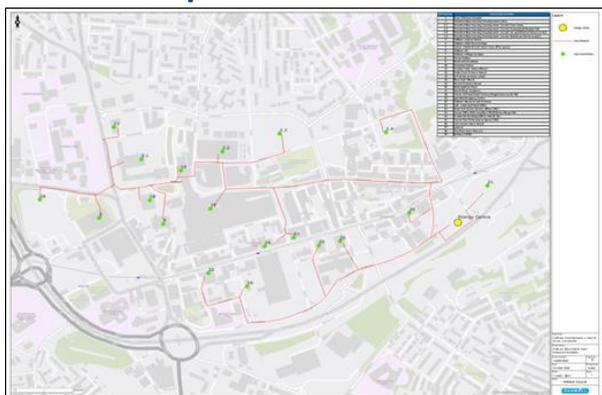


Oldham_MWSHP Town Centre_Scenario 1A_FES

Project Sponsor:

Oldham Metropolitan Borough Council

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£6.68
Private Wire (£m)	£0.00
Pipework / distribution capex (£m)	£4.92
Other capex (£m)	£4.26
Total capex (£m)	£15.86

Project IRR*	Not provided
Considering third party finance?	Yes

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
2022	2023	2024	2028

Project Stage

Feasibility

Project Contact Details:

LA Name:	Oldham Metropolitan Borough Council
Contact Name:	Andrew Hunt
Email:	andrew.hunt@oldham.gov.uk

Technical Information:

Primary energy source:

Mine Water Heat Recovery

Project description:

Ramboll was appointed by Oldham Metropolitan Borough Council (OMBC, the Council) in June 2020 to undertake a techno-economic feasibility study for a new District Heating Network (DHN). The aim is to supply with low carbon heat the Oldham Town Centre redevelopment area, including ground source heat using mine water from disused coal mines beneath the town centre as the main energy source. Throughout the study, Ramboll has closely engaged with Oldham Council to inform its work, especially regarding new developments in the Civic Quarter and regeneration areas of the Town Centre.

Energy centre description:

The Energy Centre is assumed to be located at the Rhodes Bank site. This site was identified as the preferred location for a borehole by the Coal Authority. If the trial borehole is not successful, an alternative location would be the Woodstock Street site. The footprint of the Energy Centre is 25m x 16m (LxW), 400m². The Energy Centre houses 4 MW MWSHP, 3No. 3.5 MW gas boilers (1 of these to be installed for Phase 4), 1No. 480kW summer gas boiler, DH pumps, pressurisation units, expansion vessels and ancillary equipment. 2No. 100m³ thermal stores are located outside the Energy Centre main building.

Heat/cooling demand phasing description:

The core connections were assessed for when they could practically connect to a district heating network. The DHN is proposed to be built in 5 phases, from 2023 to 2027 with heat supply date being 2024. Existing commercial buildings proposed to be connected to the district heating were given a connection date of 2024 (Phase 1). For new developments, the Client provided indicative connection year. Potential new housing developments have been assumed to connect in 4 phases between 2025 and 2028.

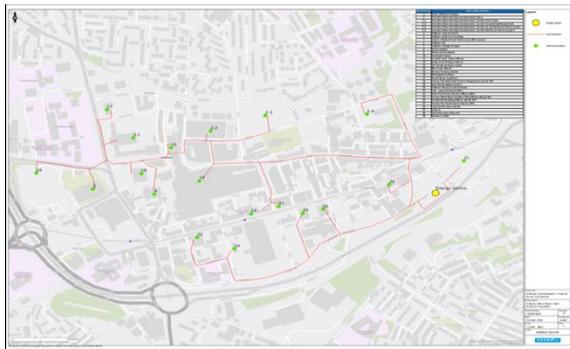


Oldham_Ambient Loop_MWSHP_ASHP_Scena rio 5A_FES

Project Sponsor:

Oldham Metropolitan Borough Council

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£10.71
Private Wire (£m)	£0.00
Pipework / distribution capex (£m)	£5.11
Other capex (£m)	£6.18
Total capex (£m)	£22.00

Project IRR*	Not provided
Considering third party finance?	Yes

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
2022	2023	2024	2027

Project Stage

Feasibility

Project Contact Details:

LA Name:	Oldham Metropolitan Borough Council
Contact Name:	Andrew Hunt
Email:	andrew.hunt@oldham.gov.uk

Technical Information:

Primary energy source:

Mine Water Heat Recovery

Project description:

Ramboll was appointed by Oldham Metropolitan Borough Council (OMBC, the Council) in June 2020 to undertake a techno-economic feasibility study for a new District Heating Network (DHN). The aim is to supply with low carbon heat the Oldham Town Centre redevelopment area, including ground source heat using mine water from disused coal mines beneath the town centre as the main energy source. There is an opportunity to use an ambient loop to supply heat and cooling in Oldham Town Centre. Throughout the study, Ramboll has closely engaged with Oldham Council to inform its work, especially regarding new developments in the Civic Quarter and regeneration areas of the Town Centre.

Energy centre description:

The Energy Centre is assumed to be located at the Rhodes Bank site. This site was identified as the preferred location for a borehole by the Coal Authority. If the trial borehole is not successful, an alternative location would be the Woodstock Street site. The footprint of the Energy Centre is 36m x 18m (LxW), 648m². The Energy Centre houses 3.5MW MWSHP, 2MW ASHP, 3No. 3.5 MW gas boilers (1 of these to be installed for Phase 4), 1No. 480kW summer gas boiler, DH pumps, pressurisation units, expansion vessels and ancillary equipment. 2 No, 125m³ thermal stores and 1No. 100m³ cold store are located outside the Energy Centre main building.

Heat/cooling demand phasing description:

The core connections were assessed for when they could practically connect to a district heating network. The ambient loop is proposed to be built in 5 phases, from 2023 to 2027 with heat supply date being 2024. Existing commercial buildings proposed to be connected to the DHC were given a connection date of 2024 (Phase 1). For new developments, the Client provided indicative connection year. Potential new housing developments have been assumed to connect in 4 phases between 2025 and 2028.

Plymouth Southern City Centre District Energy Scheme

Project Sponsor:

Plymouth City Council

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£1.10
Private Wire (£m)	£0.00
Pipework / distribution capex (£m)	£1.66
Other capex (£m)	£0.79
Total capex (£m)	£3.55

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	2020	2021	2028

Project Stage

Feasibility

Project Contact Details:

LA Name:	Plymouth City Council
Contact Name:	HNDU
Email:	HNDU@beis.gov.uk

Technical Information:

Primary energy source:

Airsource heat pump

Project description:

A district heating network centred around the redevelopment of the Civic Centre in Plymouth. The scheme connects new development at Colin Campbell Court to the Civic Centre, Council House, Guildhall, with the opportunity to also connect the Derrys building. The energy centre for the scheme is to be located in the Civic Centre basement. The scheme uses ground source heat pumps and gas CHP as the low carbon heat sources. There is a private wire to the Council House. Additionally investigated is the expansion of the scheme through phases two and three, although these do not improve performance.

Energy centre description:

The energy centre may contain 350 kW of ground source heat pumps, or utilise air source heat pumps, pending open loop viability. These pumps feed a 70 oC flow network, feeding the new/redeveloped buildings. This scheme utilises a high temperature top up (80 oC) which is generated by CHP and gas boilers. This 80 oC circuit also feeds the Council House and Guildhall. There is a private wire connection from the CHP unit into an existing private wire network serving PCC buildings.

Heat/cooling demand phasing description:

Phase 1 of the scheme contains 3.5 GWh/a heat load, the addition of Phase 2 raises this to 4.5 GWh/a, with Phase 3 bringing it to 7.3 GWh. It is recommended that the build out of the scheme commences with Phase 1 initially due to economic viability and also the proving of a starter scheme before being extended further.



RBGreenwichDecentralised Energy_FES

Project Sponsor:

Royal Borough of Greenwich

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£7.65
Private Wire (£m)	£0.00
Pipework / distribution capex (£m)	£4.70
Other capex (£m)	£1.08
Total capex (£m)	£13.44

Project IRR*	4.53%
Considering third party finance?	Yes

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	2023	2024	2030

Project Stage

Feasibility

Project Contact Details:

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

Technical Information:

Primary energy source:

Water source heat pumps

Project description:

The Charlton area has been identified as a regeneration area and there is an opportunity to serve the large amount of new developments with a heat network

Energy centre description:

An energy centre located within the RBG Commercial development is currently the preferred option. This will house a 3.5MW water source heat pump abstracting from the Thames. There is an alternative EC location on the riverside which is currently owned by Cory and has been indicated as potentially available for rent. This should be explored further as the project progresses.

Heat/cooling demand phasing description:

- Phase 1: connects short term key planned developments including Stone Foundries, 9 Herringham Road and existing sites such as Sainsbury's Thameside and Royal Greenwich Trust School.
- Phase 2: connects medium term planned developments including VIP Trading Estate, RBG Commercial, RBG Residential and Proposed 3FE School site.
- Phase 3: no additional heat demands are connected, but a connection to the proposed transmission main is made.



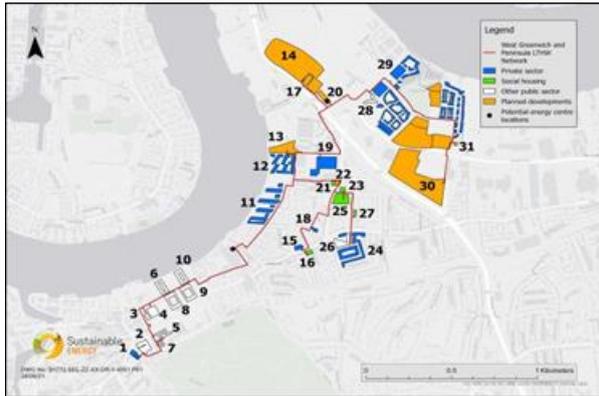
RBGreenwichWestGrPen_FE

S

Project Sponsor:

Royal Borough of Greenwich

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£9.38
Private Wire (£m)	£0.00
Pipework / distribution capex (£m)	£74.57
Other capex (£m)	£3.25
Total capex (£m)	£87.20

Project IRR*	2.14%
Considering third party finance?	Yes

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	2023	2024	2034

Project Stage

Feasibility

Project Contact Details:

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

Technical Information:

Primary energy source:

Water source heat pumps

Project description:

A network serving several existing communally heated developments, Greenwich University and Maritime museum. The main heat source will be a water source heat pump, and the network will connect to the proposed transmission main from Cory EfW when available.

Energy centre description:

Two proposed energy centres: Greenwich Power Station houses a 5MW heat pump in phase 1 and an additional 5MW heat pump in phase 3. The Pinnacle Power/KnightDragon energy centre houses the required peak and reserve boilers and is also the connection point for the proposed transmission main in 2040.

Heat/cooling demand phasing description:

- Phase 1: connects short term key planned developments including Greenwich Millennium Village phases 3, 4 and 5 and Site Between A102 and Millennium Way, as well as key existing sites including Greenwich Wharf, Enderby Wharf phase 1 and Greenwich Millennium Village phase 1 and 2.
- Phase 2: connects the medium term planned developments Enderby Wharf phase 2 and 87 Blackwall Lane
- Phase 3: connects long term planned developments including Site Between A102 and Busby's Way, Knight Dragon and Millennium Retail Park

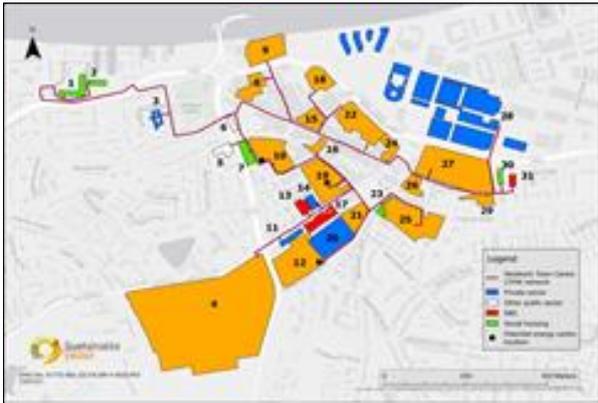


RBGreenwichWoolwichTC_F ES

Project Sponsor:

Royal Borough of Greenwich

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£9.94
Private Wire (£m)	£0.00
Pipework / distribution capex (£m)	£29.06
Other capex (£m)	£0.00
Total capex (£m)	£39.01

Project IRR*	0.48%
Considering third party finance?	Yes

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	2023	2024	2034

Project Stage

Feasibility

Project Contact Details:

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

Technical Information:

Primary energy source:

Water source heat pumps

Project description:

The Woolwich Town Centre has been identified as an area of high heat density with a mix of existing buildings and planned developments.

Energy centre description:

The energy centre at the Monk Street car park site will house a 5MW water source heat pump abstracting from the river Thames. The energy centre size is limited by the available footprint and so the scheme will be restricted in size until a connection to the proposed transmission main is made.

Heat/cooling demand phasing description:

- Phase 1: focuses on connecting short term planned developments, in the case of Woolwich Town Centre this is defined as any planned development assumed to be connecting before 2030. These include Mortgramit Square, Island Site and Woolwich Leisure. This phase also connects existing buildings such as Plantagenet House, Woolwich New Road 47 and Woolwich Dockyard •
- Phase 2: connects more existing buildings, including both private and public sector owned connections, such as Gill Court, Former Woolwich Theatre and Ogilby Housing Society Site •
- Phase 3: connects long term planned developments such as Burrage Road/Spray Street, Royal Artillery Barracks and Former New Look



RBGreenwichThamesmeadN _FES

Project Sponsor:

Royal Borough of Greenwich

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£3.47
Private Wire (£m)	£0.00
Pipework / distribution capex (£m)	£51.41
Other capex (£m)	£2.64
Total capex (£m)	£57.51

Project IRR*	14.74%
Considering third party finance?	Yes

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	2023	2024	2032

Project Stage

Feasibility

Project Contact Details:

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

Technical Information:

Primary energy source:

CHP – EfW

Project description:

The Thamesmead North area is the location of the Thamesmead Waterfront development of 15,000 homes. This has been identified as an area for a potential heat network which could connect existing buildings, allowing them to decarbonise in the most cost effective manner.

Energy centre description:

The preferred energy centre location is in the shopping centre car park, however further discussions with developers of Thamesmead Waterfront are required to determine if housing the energy centre within the development is a viable option.

Heat/cooling demand phasing description:

- Phase 1: connects the first third of the Thamesmead Waterfront development alongside existing sites such as Woolwich Polytechnic School for Boys, Hawksmoor School and Thamesmead Medical Associates.
- Phase 2 & 3: each connect another third of the Thamesmead Waterfront



RBGreenwichAbbeywoodE_ FES

Project Sponsor:

Royal Borough of Greenwich

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£1.76
Private Wire (£m)	£0.00
Pipework / distribution capex (£m)	£3.62
Other capex (£m)	£0.31
Total capex (£m)	£5.70

Project IRR*	3.21%
Considering third party finance?	Yes

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	2023	2024	2029

Project Stage

Feasibility

Project Contact Details:

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

Technical Information:

Primary energy source:

CHP – EfW

Project description:

A cluster of heat demands around the Cross Quarter development has been identified as a potential heat network being served by the proposed transmission main.

Energy centre description:

The preferred energy centre location is within the Cross Quarter development. Further engagement with the developers are required to secure this EC location.

Heat/cooling demand phasing description:

- Phase 1: connects existing buildings including Boxgrove Primary School, Thistlebrook Industrial Estate and Sainsbury's as well as the Cross Quarter planned development
- Phase 2: connects key planned developments, these include the Land at Felixstore Road and Cross Quarter developments

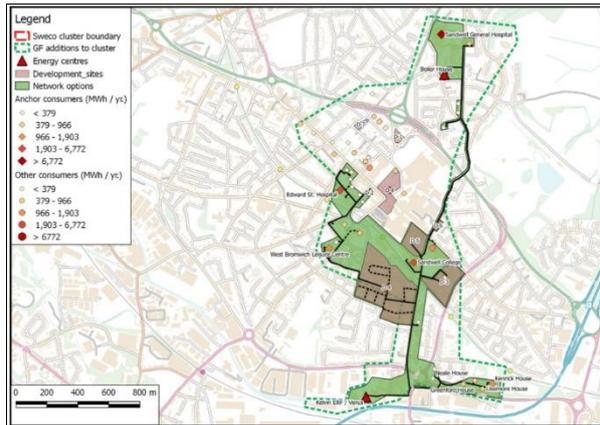


West Bromwich_FES

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?	Yes

* 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

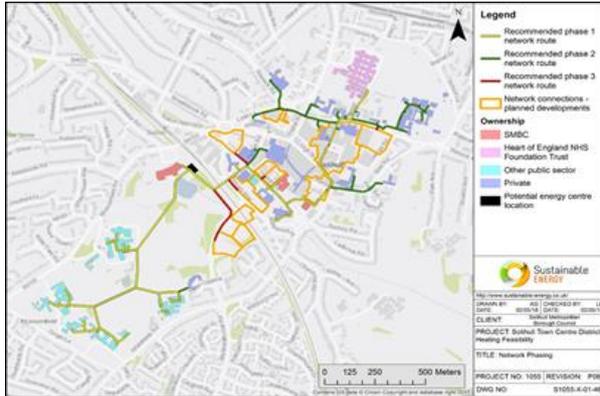


Solihull Town Centre_FES

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:	HNDU
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 1.7MW air source heat pump a 1.6MWe CHP, and 7.5MWth of auxiliary boilers for phase 1. In phase 2, a 776kWe CHP, a 1.7MW heat pump and 1.5MWth of auxiliary would be added. In phase 3, approximately 5-6MW of auxiliary and 1.7MW heat pump 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 council buildings, schools and a few private sector buildings in phase 1. A small private wire network would also be part of phase 1, serving Solihull College, council buildings and a private sector building. Phase 2 adds several private sector connections, and phase 3 connects proposed developments.

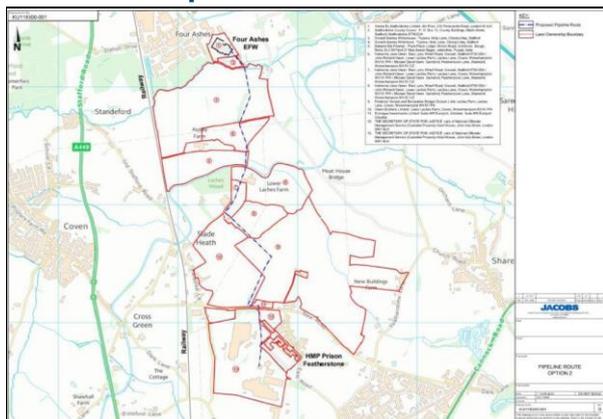


Veolia Energy from Waste_FES

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:	HNDU
Email:	HNDU@beis.gov.uk

Technical Information:

Primary energy source:

CHP – Ew

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

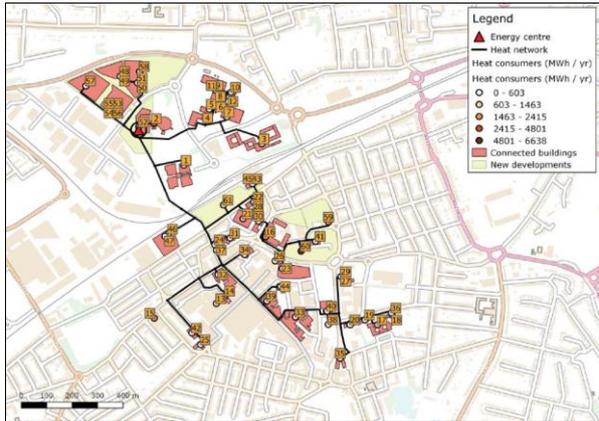


North Star and Town Centre_FES

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:	HNDU
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.

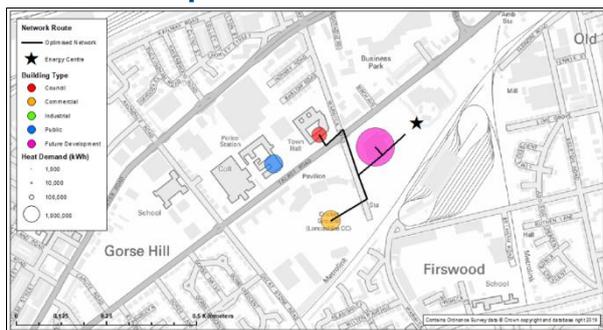


Trafford Park Heat Network_FES

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:	HNDU
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:

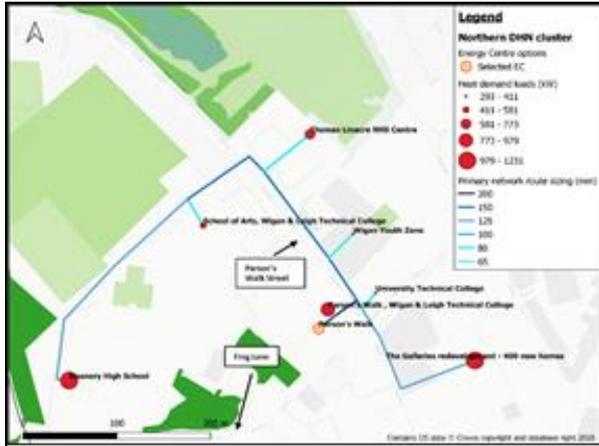
The Trafford South network described above is recommended as the first step in the development of a larger network. This could include expansion to: - Additional existing loads in the surrounding area, where engagement has not been successful to date. For example, Trafford College and Stretford High 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.

Wigan Town Centre_FES

Project Sponsor:

Wigan Metropolitan Borough Council

Network Map:



Technical Information:

Primary energy source:

Ground source heat pump

Project description:

New district heating network in Wigan Town Centre

Energy centre description:

EC located in Wigan & Leigh Technical college.

Heat/cooling demand phasing description:

Existing CHP will be used until end of life. This will be replaced by a heat pump.

Summary forecast financial information:

Energy generation capex (£m)	£3.35
Private Wire (£m)	£0.00
Pipework / distribution capex (£m)	£2.34
Other capex (£m)	£0.00
Total capex (£m)	£5.69

Project IRR*	520.00%
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:	Wigan Metropolitan Borough Council
Contact Name:	HNDU
Email:	HNDU@beis.gov.uk



HNDU MAPPING AND MASTERPLANNING STAGE

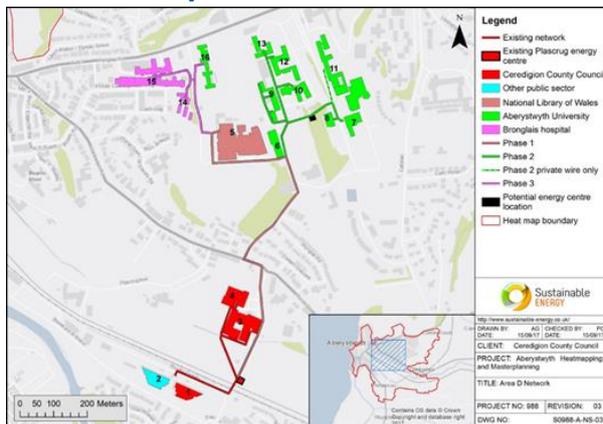


Aberystwyth_MAP

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:	HNDU
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 Plascrug (currently connecting Ceredigion County Council (CCC) offices, Welsh Government offices, Ysgol Penweddig and Plascrug 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 Plascrug energy centre and a new energy centre at Aberystwyth University. Plascrug would house the 500kW_e 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 Plascrug energy centre. For the full phase 3c network, an additional area of approximately 300m² would be required adjacent to the Plascrug 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).

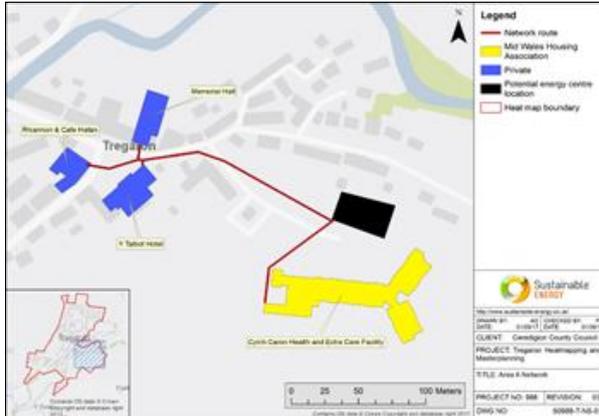


Tregaron_MAP

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:	HNDU
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:

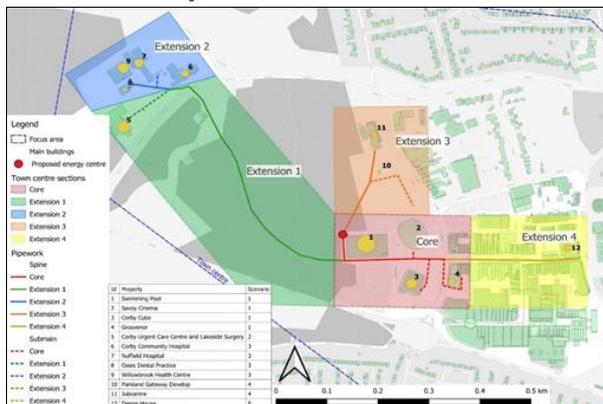
No potential viable network extensions have been identified. The network has therefore been presented as a single phase.

Corby Town Centre_MAP

Project Sponsor:

North Northamptonshire 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?	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

Heat mapping and masterplanning

Project Contact Details:

LA Name:	North Northamptonshire Council
Contact Name:	HNDU
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.

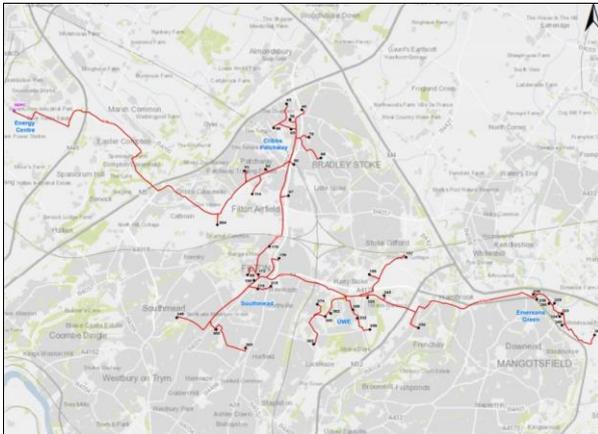


SERC EfW heat supply_MAP

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:	HNDU
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



Town Centre Heat Network_COM_CST

Project Sponsor:

Crawley Borough Council

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£5.27
Private Wire (£m)	£0.00
Pipework / distribution capex (£m)	£0.00
Other capex (£m)	£0.00
Total capex (£m)	£5.27

Project IRR*	3.00%
Considering third party finance?	No

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
2019	2020	2022	2024

Project Stage

Under Construction

Project Contact Details:

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

Technical Information:

Primary energy source:

CHP – Gas

Project description:

The first phase of the Crawley Town Centre heat network is under construction with heat on in May 2022. It will serve the new Town Hall and commercial offices (11,700 m²) as well as three adjacent new residential developments with a total of 310 units. Total heat demand of 1.3 GWh. Feasibility study for phase 2 expansion (heat demand 10.5 GWh) to start in Spring 2022. This will look at switch to low/zero carbon heat sources to further contribute towards Crawley Borough Council's net zero by 2040 commitments.

Energy centre description:

The main heat source is a 133kW_e gas fired CHP with private wire. The energy centre has been constructed as phase 2 ready as far as possible, so that the phase 1 investment can be maximised.

Heat/cooling demand phasing description:

Key customers committed to this first phase are: 310 new residential units and the new town hall and commercial offices. Phase 2 connections include a police station, a library, a college and new residential and commercial developments that are all located within the town centre zone covered by the Local Plan Heat Network Planning Policy ENV 7.

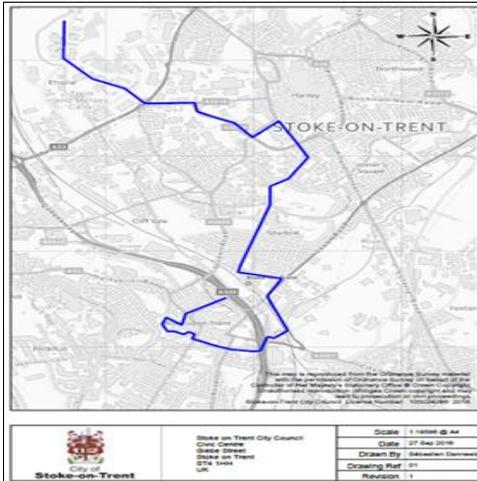


Deep Geothermal_COM_CST

Project Sponsor:

Stoke-on-Trent City Council (SoTCC)

Network Map:



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 and planning consent was secured in early 2021. Anchor load customers are Staffordshire University campus and SoTCC owned buildings and various other public sector buildings representing 60% of the total demand.

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)
2018	2019	2021	2025

Project Stage

Under Construction

Project Contact Details:

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

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 2021/22 to the University, SoTCC buildings, schools, private housing association, local swimming pool and other commercial customers. Full loads are estimated to be connected by 2025.



PROJECTS NOT CURRENTLY BEING PURSUED BY LOCAL AUTHORITY SPONSOR



Alternative heat sources_DPD

Project Sponsor:

Adur District Council

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£5.98
Private Wire (£m)	£0.00
Pipework / distribution capex (£m)	£3.41
Other capex (£m)	£2.45
Total capex (£m)	£11.84

Project IRR*	7.70%
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

Detailed Project Development

Project Contact Details:

LA Name:	Adur District Council
Contact Name:	Chris Jones
Email:	chris.jones@adur-worthing.gov.uk

Technical Information:

Primary energy source:

Airsource heat pump

Project description:

Development of a new 4th generation heat network in the Shoreham Harbour area serving current and future new developments in the area

Energy centre description:

Two air source heat pump based energy centres (gas boiler back-up) serving two initial heat clusters that will ultimately interconnect as developments along the harbour front are completed.

Heat/cooling demand phasing description:

The Shoreham DHN scheme will initially consist of two heat network clusters serving 5.7 GWh/year, interconnecting in year 8 and expanding to supply a total heat demand of 11.7 GWh/year at full build out in year 13

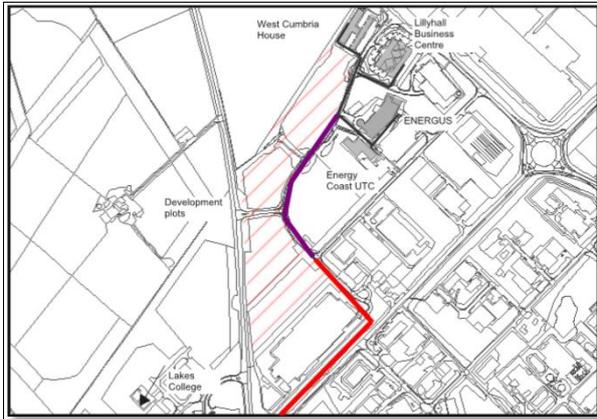


Lillyhall Hub_FES

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:	HNDU
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.

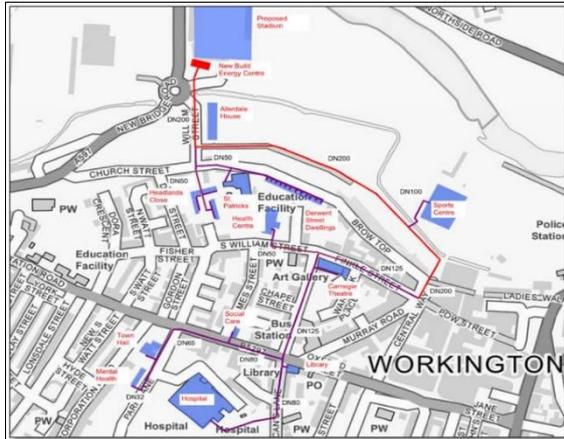


Town Centre Hub_DPD

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:	HNDU
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.



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:	HNDU
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

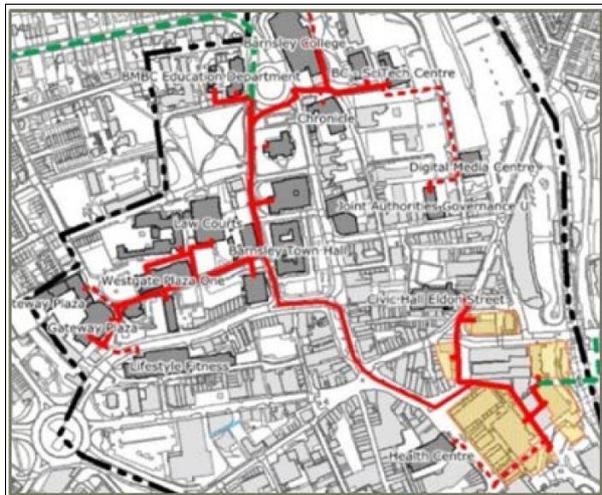


Barnsley Civic Quarter_FES

Project Sponsor:

Barnsley Metropolitan Borough Council

Network Map:



The Town Wide Vision Scheme

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:	HNDU
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.

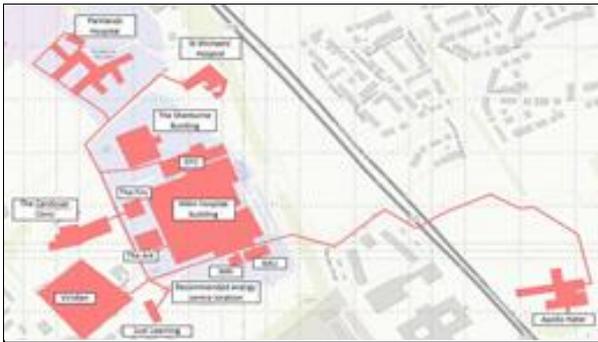


Basingstoke_FES

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:	HNDU
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)



Castle Lane East Network_FES

Project Sponsor:

BCP 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:	BCP Council
Contact Name:	HNDU
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.

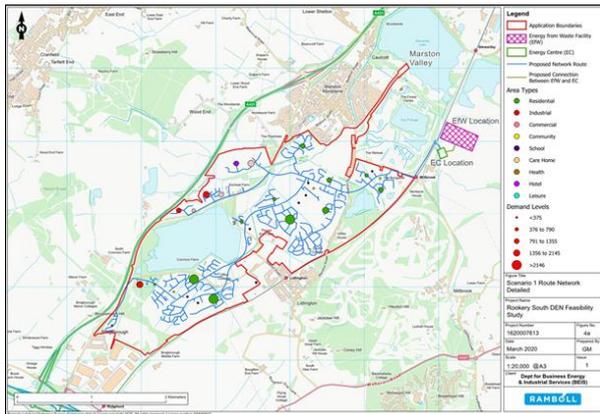


Rookery South - Scenario 1_FES

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:	HNDU
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.

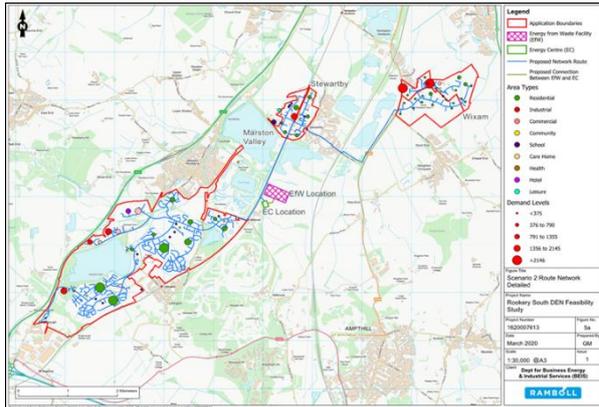


Rookery South - Scenario 2_FES

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:	HNDU
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:

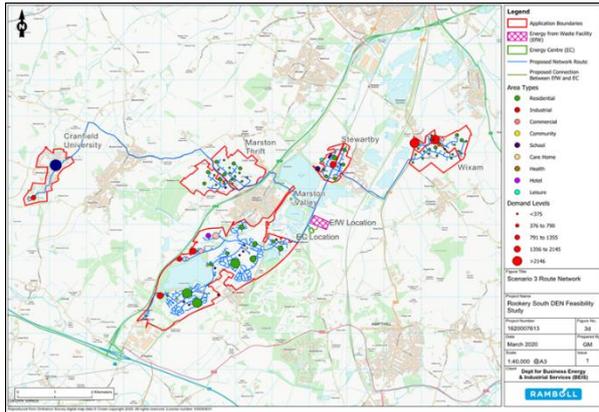
Under Scenario 1, phasing of the network was assumed to follow the phased growth of the development over 17 years. Similarly, under Scenario 2 the network is phased in parallel with the evolution of each development. There is also some scope for phasing the development of the heat offtake infrastructure 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 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:	HNDU
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 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.

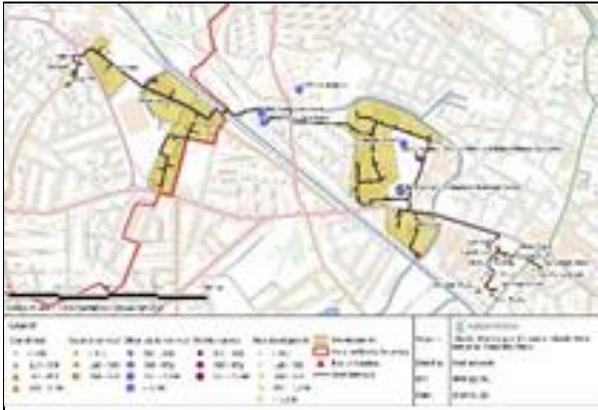


Icknield Soho Loop & Smethwick Gas CHP/WSHP_MAP

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:	HNDU
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.

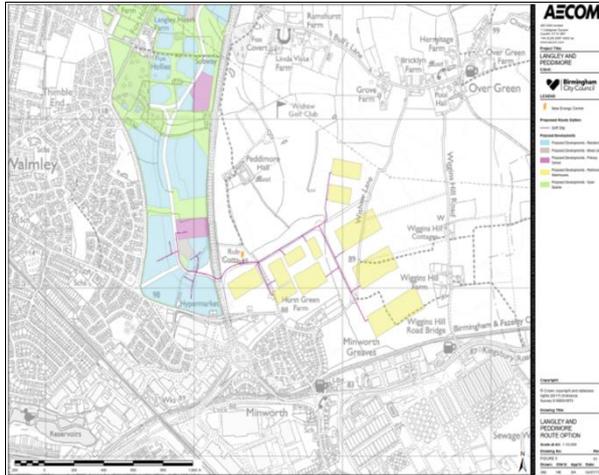


Langley & Peddimore_FES

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:	HNDU
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:	HNDU
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:	HNDU
Email:	HNDU@beis.gov.uk



Daisyfield_MAP

Project Sponsor:

Blackburn with Darwen Borough Council

Network Map:



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.

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:	HNDU
Email:	HNDU@beis.gov.uk

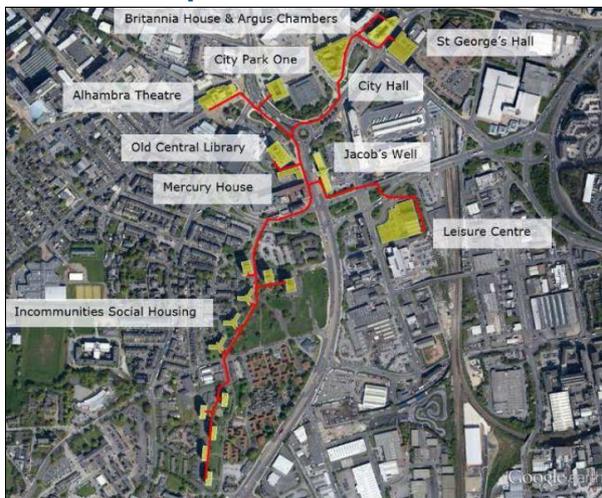


Bradford Civic Quarter_FES

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:	HNDU
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.

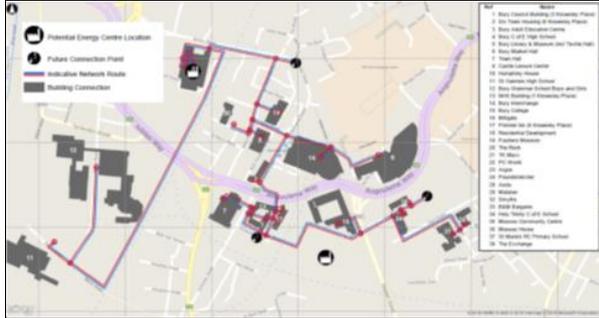


Bury Town Centre_FES

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:	Chris Horth
Email:	c.horth@bury.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)

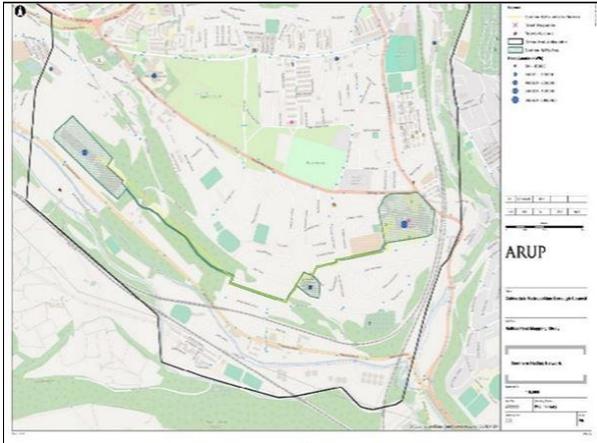


South Halifax

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:	HNDU
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 255m² 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.

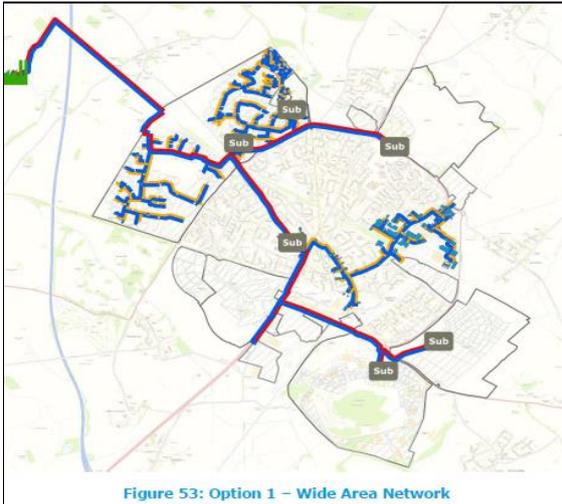


Cherwell - Bicester EcoTown_FES

Project Sponsor:

Cherwell District Council

Network Map:



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:	HNDU
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.

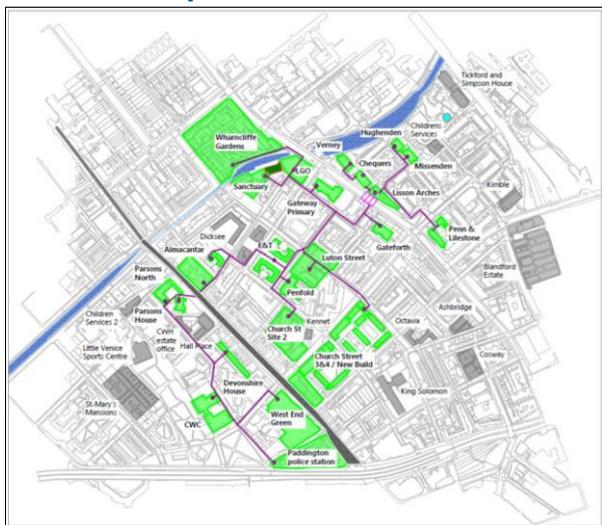


Church Street_COM

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, Wharnclyffe 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.

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

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 Wharnclyffe, 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

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:	HNDU
Email:	HNDU@beis.gov.uk

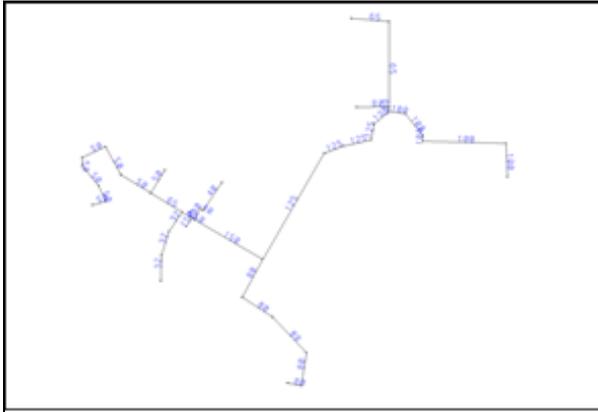


Manor Royal _ Industrial and business area_MAP

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:	HNDU
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.

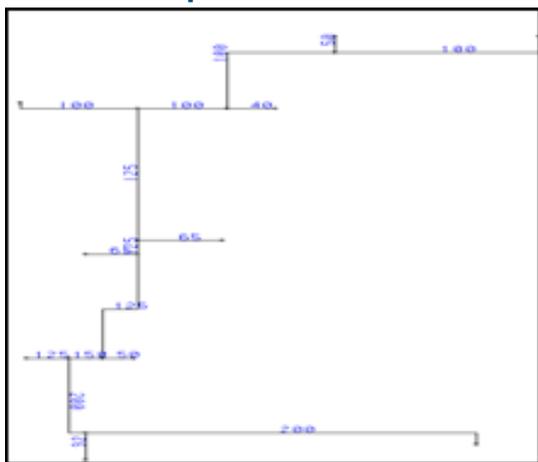


Manor Royal_Fleming Way and Manor Royal Road_MAP

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:	HNDU
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:	HNDU
Email:	HNDU@beis.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.

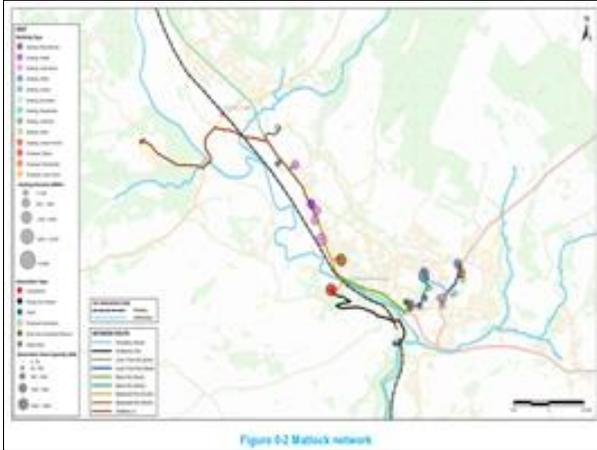


Matlock_MAP

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:	HNDU
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.



Clay Cross_MAP

Project Sponsor:

Derbyshire county

Network Map:



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.

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?	Yes

* Real pre-tax pre-finance

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.

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:	HNDU
Email:	HNDU@beis.gov.uk

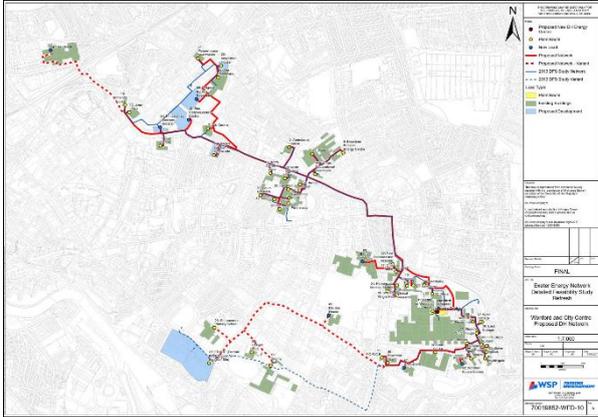


Exeter City Centre_DPD

Project Sponsor:

Devon County Council

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£10.40
Private Wire (£m)	£0.00
Pipework / distribution capex (£m)	£8.20
Other capex (£m)	£0.00
Total capex (£m)	£18.60

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

Detailed Project Development

Project Contact Details:

LA Name:	Devon County Council
Contact Name:	HNDU
Email:	HNDU@beis.gov.uk

Technical Information:

Primary energy source:

CHP – Gas

Project description:

The Exeter Energy Network project enlarges the energy centre at the RD&E hospital's Wonford site and delivers a 6.5km heat network to take heat from 3MWe of gas CHP at the hospital into the city centre to public sector and potential commercial offtakers. The public sector partners in the scheme have jointly established a company (Dextco Ltd) which is procuring a joint venture partner to undertake the project.

Energy centre description:

The enlargement of the energy centre at the RD&E hospital's Wonford site increases the capacity of the current 1 MWe gas CHP to 3 MWe, replaces boilers and other equipment, and installs 100 m3 of thermal storage. The new CHP provides 16 GWh of electricity to the RD&E.

Heat/cooling demand phasing description:

Heat supplied to the RD&E at Wonford comprises 4 GWhth of steam, 12 GWhth of medium temperature hot water and the supply of heat to outlying buildings on the site through the core heat network. The core heat network is 6.5 km long and provides a total of 21 GWhth through low temperature hot water to public sector buildings and other commercial heat users along a corridor into the city centre. Following a successful procurement in 2019 works would start in 2020 with completion by 2025/26.

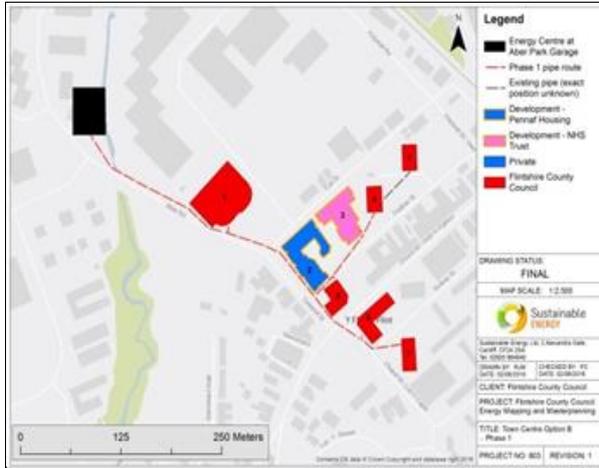


Flint Town_MAP

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:	HNDU
Email:	HNDU@beis.gov.uk



Northop Road_MAP

Project Sponsor:

Flintshire County Council

Network Map:



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.

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:	HNDU
Email:	HNDU@beis.gov.uk

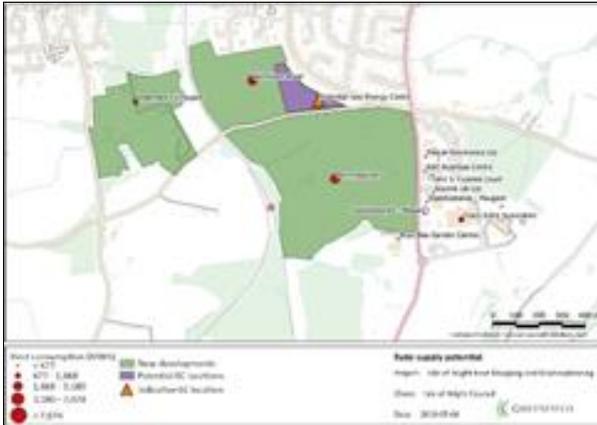


Nicholson Road_MAP

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:

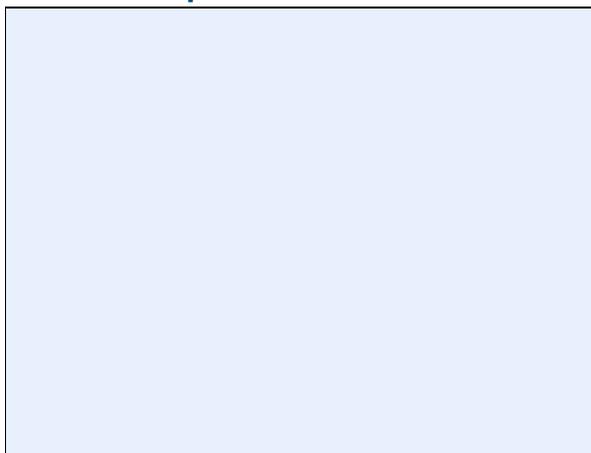
LA Name:	Isle of Wight Council
Contact Name:	HNDU
Email:	HNDU@beis.gov.uk



Maidstone Heat Energy Networks

Project Sponsor:
Kent County Council

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£3.90
Private Wire (£m)	£0.00
Pipework / distribution capex (£m)	£2.30
Other capex (£m)	£3.40
Total capex (£m)	£9.60

Project IRR*	3.20%
Considering third party finance?	Yes

* Real pre-tax pre-finance

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

Project Stage

Detailed Project Development

Project Contact Details:

LA Name:	Kent County Council
Contact Name:	Steve Baggs
Email:	steven.baggs@kent.gov.uk

Technical Information:

Primary energy source:
Water source heat pumps

Project description:

Central Maidstone has been identified as having good potential for district heating. A concentrated number of buildings – owned by relatively few individual entities – have been shown to have a high demand for heat and consume significant amounts of electrical power as well. At present, large quantities of natural gas are combusted in their respective on-site boiler heating systems, leading to relatively poor environmental performance. Building types include offices, residential accommodation, community facilities and a large prison/foreign national detention centre (HMP Maidstone). A large, mixed-use development is planned for this area, offering potential development synergies with the creation of new energy networks.

Energy centre description:

Due to relatively small size of the network, a single-phase development programme is proposed, until further details regarding the new development are available. Concept designs suggest plant as follows:

- Ø River-Medway-sourced, water source heat pumps (WSHPs) c. 500 kWth capacity
- Ø 2No. 600 kWe gas-fired CHP engines
- Ø 7 MWth gas boilers
- Ø 2No. 25 m³ thermal storage vessels
- Ø Electrical and mechanical ancillary equipment
- Ø Meters, management and control system
- Ø Flues appropriately sized for combustion plant
- Ø Private Wire electrical network serving all facilities except HMP Maidstone
- Ø Photo-voltaic panels for Energy Centre parasitic electrical load

Heat/cooling demand phasing description:

Phase 1 – to power heat on Q1 2022

- Ø All plant in the energy centre and within river bank (water management system)
- Ø All distribution infrastructure

Works to be undertaken in parallel with the first phase of the Maidstone East development – the location of the energy centre. Later phases of Maidstone East development and other proposed building projects would connect when applicable.

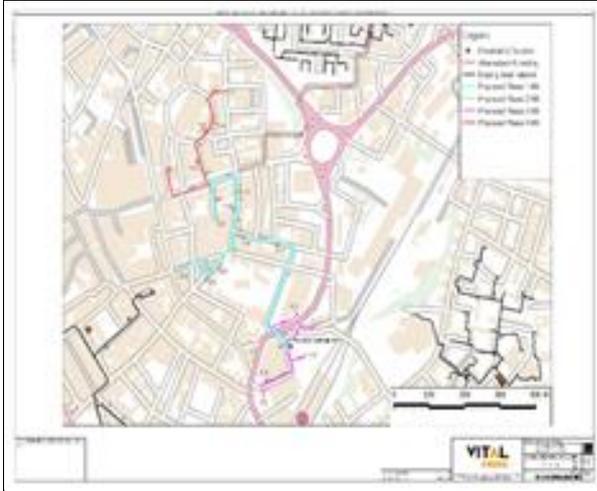


Cultural Quarter_FES

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:	HNDU
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.

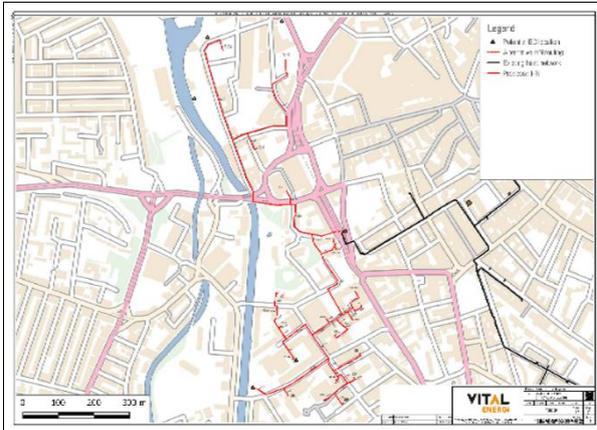


Waterside_FES

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:	HNDU
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 sensitives 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:

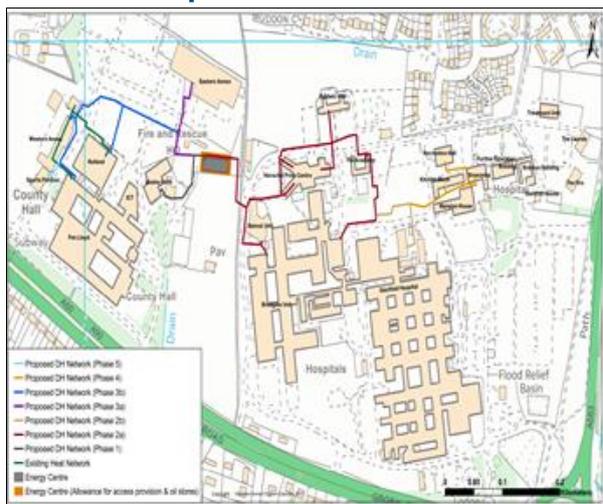
The DHN would be built in one phase



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:	HNDU
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

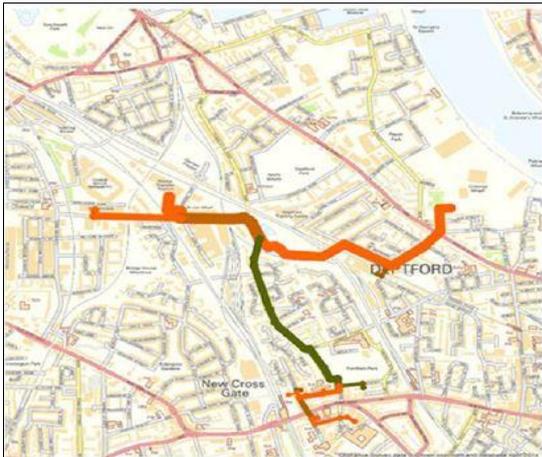


New Cross Heat Network_FES

Project Sponsor:

London Borough of Lewisham

Network Map:



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:	HNDU
Email:	HNDU@beis.gov.uk

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.



North Peckham_MAP

Project Sponsor:

London Borough of Southwark

Network Map:



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:	HNDU
Email:	HNDU@beis.gov.uk

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 1 no. 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.

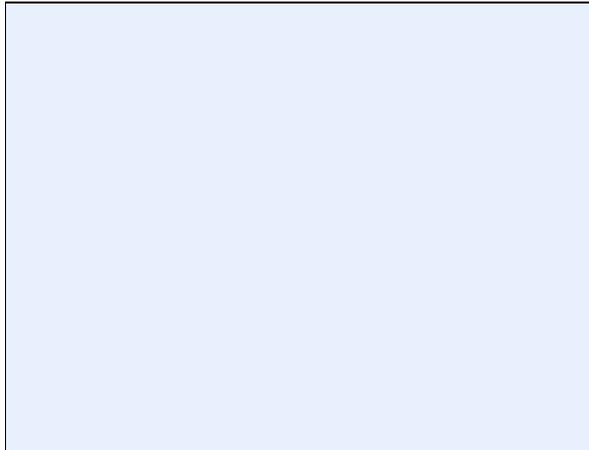


Manchester Science Park_FES

Project Sponsor:

Manchester City Council

Network Map:



Technical Information:

Primary energy source:

Airsource heat pump

Project description:

Network at Manchester Science Park - The preferred solution involves heat being transferred to and from the ground via water extracted from boreholes and using plate heat exchangers (PHEXs) in an energy centre location. ASHPs also located in the energy centre are used for providing the remaining portion of the heating or cooling. Heat and coolth provision is distributed and balanced across the site via a low temperature ambient loop network

Energy centre description:

New energy centre proposed to be built to the south of the site to accommodate all equipment.

Heat/cooling demand phasing description:

Feasibility Study examining the viability of the project when all buildings are connected to an ambient loop.

Summary forecast financial information:

Energy generation capex (£m)	£1.75
Private Wire (£m)	£0.00
Pipework / distribution capex (£m)	£3.40
Other capex (£m)	£9.75
Total capex (£m)	£14.90

Project IRR*	3.60%
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

Feasibility

Project Contact Details:

LA Name:	Manchester City Council
Contact Name:	HNDU
Email:	HNDU@beis.gov.uk

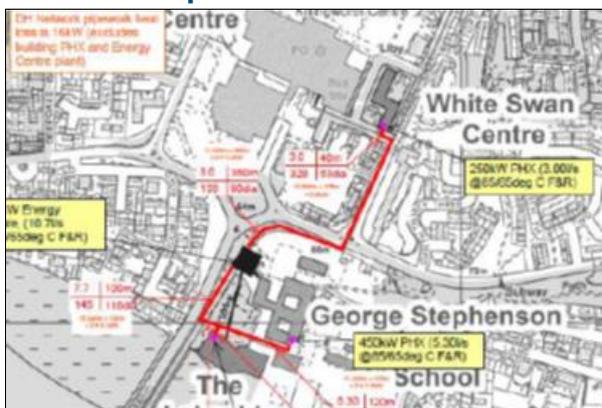


Killingworth Moor_MAP

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:	HNDU
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:

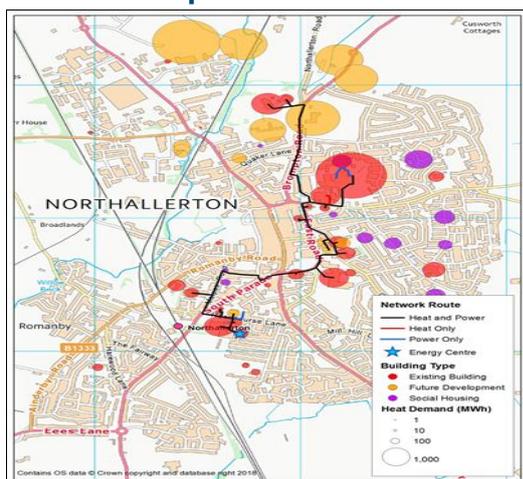
The project is currently proposed as a single phase.

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:	HNDU
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.

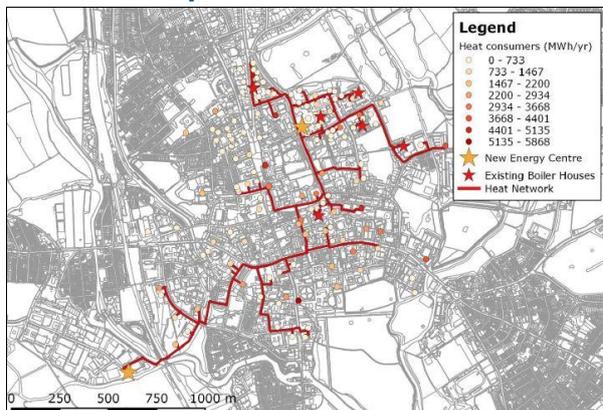


Oxford City Centre_FES

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:	HNDU
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

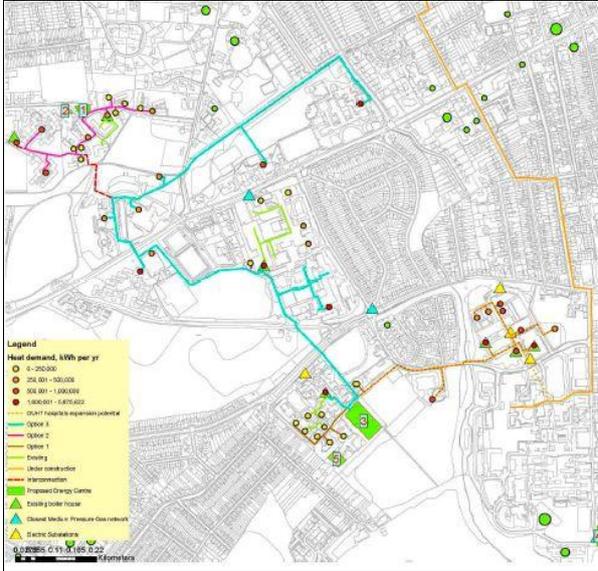


Oxford Headington_FES

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:	HNDU
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

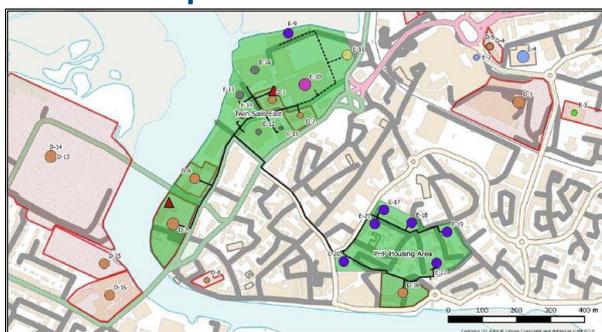


Poole - Twin Sails East_FES

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:	HNDU
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.

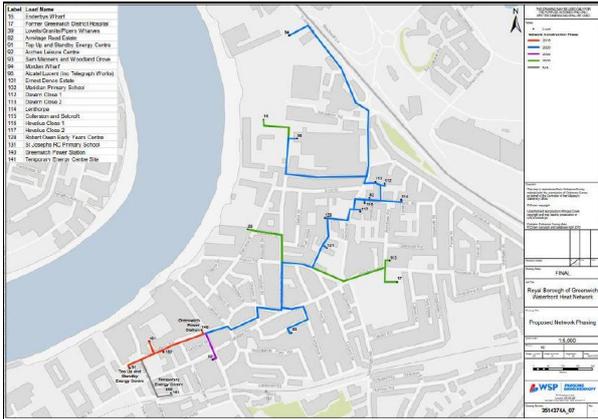


Greenwich Power Station District Heat Network_FES

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:	HNDU
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:	HNDU
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.

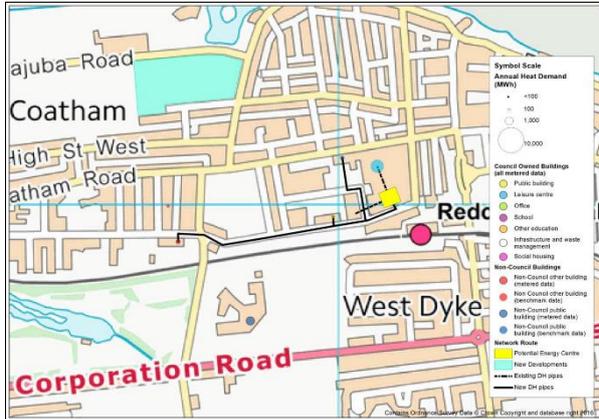


Central Redcar_FES

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:	HNDU
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.

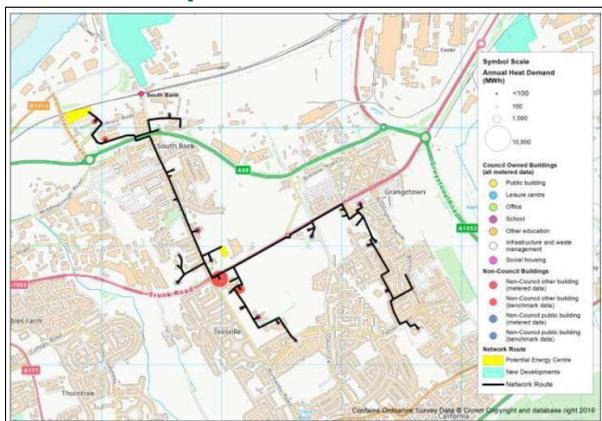


South Bank_FES

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:	HNDU
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.

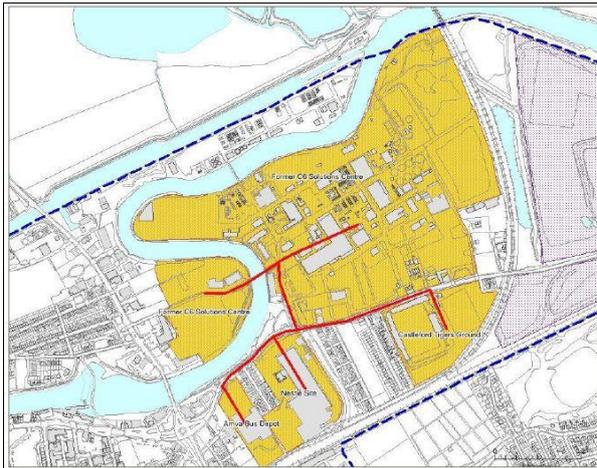


Castleford C6 Development_MAP

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:	HNDU
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.