



Department for
Business, Energy
& Industrial Strategy

HEAT NETWORKS: 2019 Q4 PIPELINE



Introduction

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

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

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

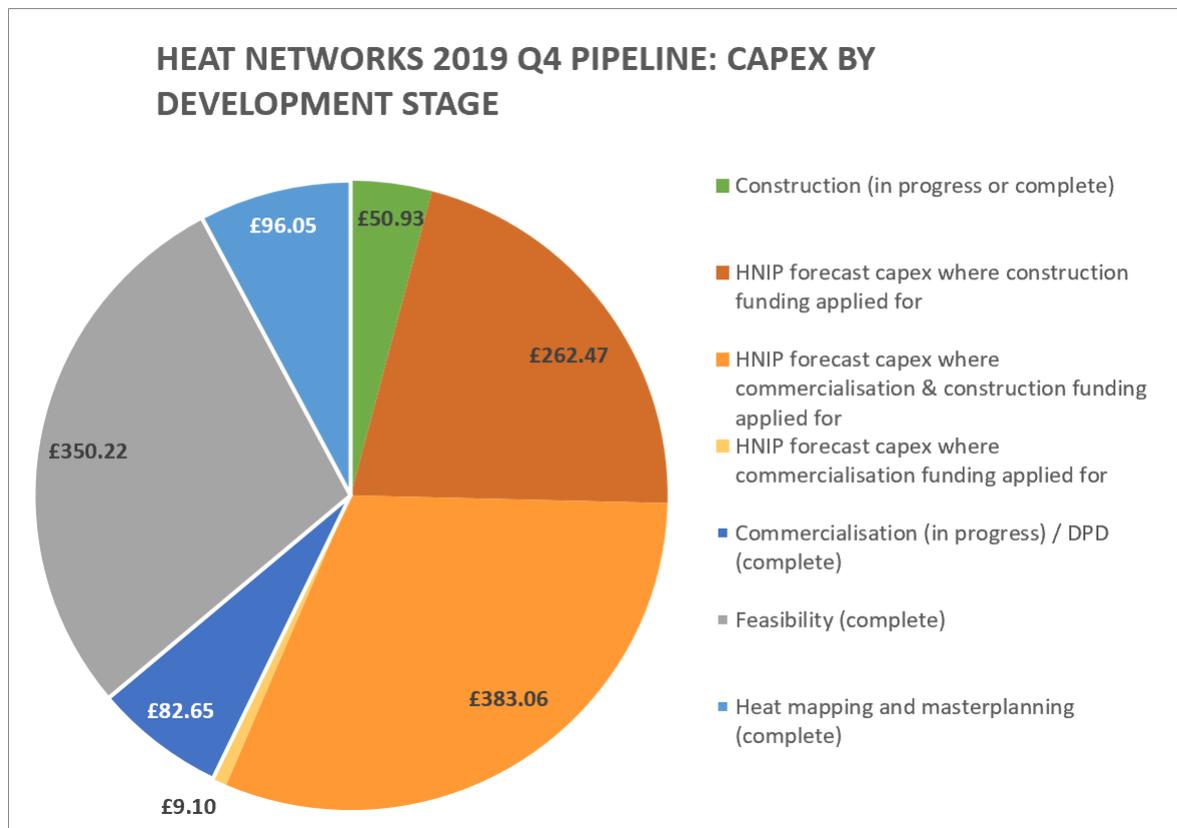
The following chart shows the 2019 Q4 Capex pipeline of HNDU and HNIP projects from early stage development through to construction.

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 George Robinson.

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

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

2019 Q4 Capex Pipeline: £1,234m of which £51m is under construction, £655m relates to HNIP projects:



Of the above pipeline the HNDU projects represent 99 opportunities for which we have relevant data in a format that we can publish. However, we are currently actively working on a number of live projects with Local Authorities across England and Wales, as well as have a pipeline of projects that have either applied for funding or have been awarded funding and are in the process of procuring consultants. Below is a summary of the open opportunities supported by HNDU:

Region	At Funding / Tender	HNDU Active Support	Total
North East	7	1	8
North West	22	13	35
Yorkshire and The Humber	13	6	19
East Midlands	3	0	3
West Midlands	11	9	20
East of England	13	3	16
London	14	7	21
South East	15	3	18
South West	17	7	24
Wales	2	5	7
Total	117	54	171



HNIP APPLICATIONS

(SEEKING COMMERCIALISATION AND/OR CONSTRUCTION FUNDING)



Bolton Town Centre Heat Network

Project Sponsor:

The Borough Council of Bolton

Network Map:



Summary forecast financial information:

Total capex (£m)	£22.40
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Project IRR*	1.40%
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* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	2022	2023	2027

Project Stage

Commercialisation + Construction

Project Contact Details:

Contact Name:	Nicola Farrell
Email:	nicola.farrell@bolton.gov.uk

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:

CHP – Gas

Project description:

Currently at DPD stage and producing outline business case

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.

The preferred option is a gas CHP, to be replaced by Air Source Heat Humps after 15 years of operation. 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)

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.

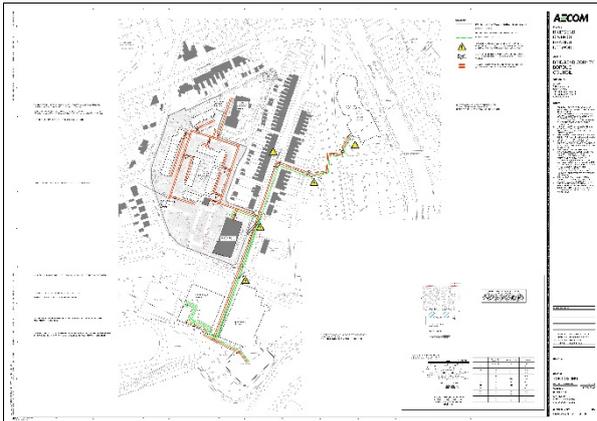


Bridgend Town Heat Network

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.

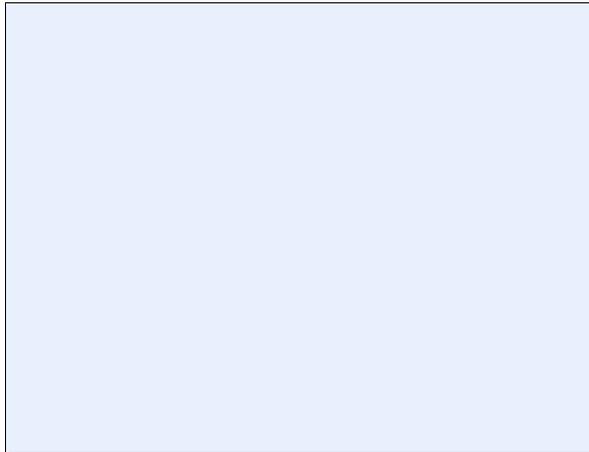


Northwest Chester Heat Network Project

Project Sponsor:

Cheshire West and Chester Borough Council

Network Map:



Summary forecast financial information:

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

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

CHP – Gas

Project description:

The Countess of Chester Health Park (CoCH) and the University of Chester Main Campus are two significant heat loads; made of multiple buildings forming a complex network located within a short distance of each other, to the Northwest of Chester city Centre.

There is a prime opportunity, now the CoCH's current CHP system is reaching end of life, to replace with a Gas CHP based energy centre with thermal store and link the two sites forming the basis for a wider potential network towards the city centre picking up two potential leisure centres. Following engagement work with the all of the key stakeholders, it is proposed to locate an Energy Centre (EC) with a larger Combined Heat & Power (CHP) engine located at CoCH supplying heat and power to buildings on the 'health campus' (including those operated by the Cheshire & Wirral Partnership) as well as to the nearby University of Chester Campus to the south-west, The network will supply heat (in the form of hot water) to the indicated buildings as well as electricity via a 'Private Wire' electricity cable.

It is also proposed that, where space heating is currently steam-fed, this will be changed over to Domestic Hot Water (DHW): steam will be retained locally for catering and sterilisation. The current proposals, including proposed de-steam, location of the EC and routing of the network have been discussed with the CoCH Estates Department as a 'sense-check' for technical deliverability. Should the network be established and operating temperatures for space heating (SH) and DHW reduced, future transition could be to Heat Pumps (either water source potentially using heat from the nearby canal or aquifers that have been identified, or ground source). Other alternatives that would not require a change to temperatures of operating systems include hydrogen fuel cell CHP.

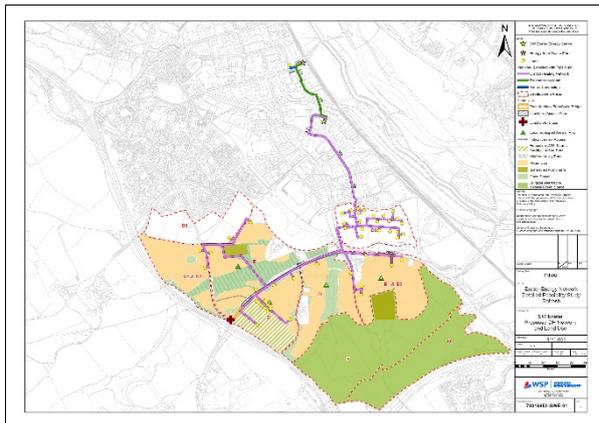


South West Exeter Heat Network

Project Sponsor:

Leep Holdings (Utilities) Limited

Network Map:



Technical Information:

Primary energy source:

CHP – Biomass

Project description:

The South West Exeter urban extension comprises 2,325 homes and commercial developments including the Matford Phase 3 commercial site. The housing development straddles the boundary between Exeter City Council and Teignbridge District Council. The majority of homes (1,850) are in Teignbridge. Construction of homes is due to commence in 2019. SW Exeter lies approximately 1.4km south of the Marsh Barton Energy Recovery Facility (ERF). The ERF is contracted by Devon County Council and owned by Viridor.

The plant generates up to 3.5MWe but also has an unused 7.4MWth heat offtake. The heat network scheme is to take up to 4MWth heat from the ERF to an energy centre with heat storage and back up boilers (400m from the ERF). From there heat will be distributed to residential and commercial customers in the SW Exeter development. The scheme includes connecting pipework and a heat transfer station at the ERF plant, a heat transmission line to the energy centre which contains pumping, heat storage and peaking/back-up gas boilers, the onward heat network to the housing and commercial developments and heat interface units in each building.

There are a unique set of planning conditions to promote the use of heat from the ERF including best endeavours to market the energy from the ERF and requirements for new buildings to connect to heat networks. However, the SW Exeter development has a planning condition which requires commitment to a heat network prior to the development starting. Housebuilders are expected to commence development over the coming months.

Devon County Council, the sponsor of the scheme, is therefore making this pre-application in advance of a market engagement event on 12th March which will engage a private sector company to move forward with the heat network and make the full application.

Summary forecast financial information:

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

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

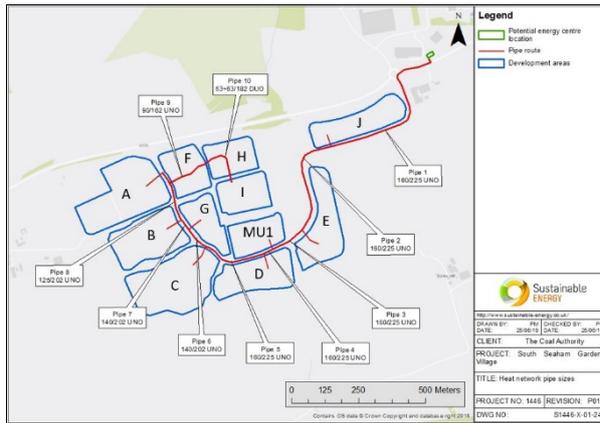


South Seaham Garden Village Heat Network

Project Sponsor:

Tolent Construction Limited

Network Map:



Summary forecast financial information:

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

FID	Construct ion Start	Heat On (initial)	Heat On (full)
2022	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)	£3.27
Corporate Loan req. (£m)	£1.64
Project Loan requested (£m)	£0.00

Technical Information:

Primary energy source:

Geothermal

Project description:

The South Seaham Garden Village Network will be a district heat network supplying low carbon heat to a new garden village development to the south of Seaham. The scheme is planned to be a 'no gas' network with heat supplied by mine water source heat pumps and electric peak and reserve boilers. The garden village development will include 1500 houses, a primary school, local centre, health and wellbeing hub and an innovation hub. 50% of the residential units are to be affordable and developed by Karbon Homes.

Mine water is currently being pumped out of the nearby Dawdon mine and treated to remove contaminants at the Dawdon Mine Water Treatment facility near to the garden village development. Network phasing will follow the housing development phasing with phase 1 connecting developments in 2021, phase 2 connecting developments in 2024 and phase 3 connecting developments in 2027.

The new energy centre will comprise 1 x 1.022MW water source heat pump in phase 1, then an additional 1 x 1.022MW water source heat pump in phase 2; the heat source for the water source heat pumps will be abstracted mine water from the Dawdon mine. The energy centre will supply heat to a new underground pre-insulated plastic heat network which will be built out over 3 x phases with a total trench length of 17.464km. Phase 1 comprises 835 houses, phase 2 - 472 houses and phase 3 - 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 such as roads, roundabouts etc, to minimise costs and installation time.

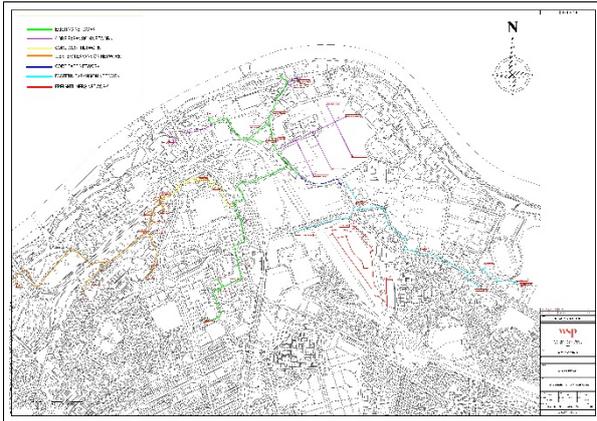


Gateshead District Energy Scheme – East Extension

Project Sponsor:

Gateshead Council

Network Map:



Technical Information:

Primary energy source:

CHP – Gas

Project description:

The project aims to construct the first major strategic expansion of the heat and power networks 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 water source heat pump to the network, to increase the proportion of heat supplied from renewable sources.

Summary forecast financial information:

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

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

Project Stage

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

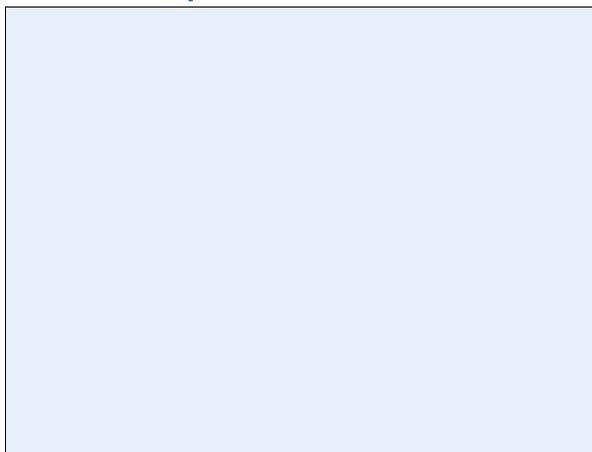


Hull Town Centre

Project Sponsor:

Hull City Council

Network Map:



Summary forecast financial information:

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

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

Project Stage

Commercialisation + Construction

Project Contact Details:

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

HNIP Application Information:

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

Technical Information:

Primary energy source:

CHP – EfW

Project description:

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



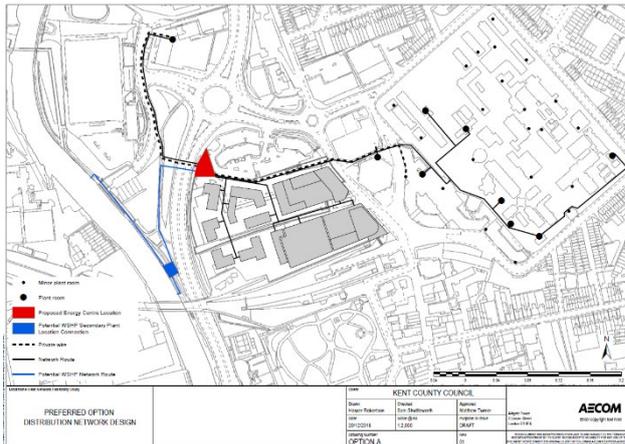
Maidstone Heat Energy Network

Project Sponsor:
Kent County Council

Technical Information:

Network Map:

Primary energy source:
CHP – Gas



Project description:

The Maidstone Heat Network at stage one consists of the following heat loads in order of size; HM Prison Maidstone, Kent County Council County Hall- Sessions House and Invicta House, Maidstone East Residential, Commercial and Retail Development & finally Kent County Council History Centre, Library & Residences. This will deliver X heat and X power from 500kWth Water Source Heat Pump from the nearby River Medway, 1,318 kWth Gas CHP and 6,900kWth Gas Boiler with 50m³ Thermal Storage capacity. The construction of 661m² Energy Centre distributing heat along 1,722m of pipework 645m of which is low temp to provide 9,373MWh/year in heat sales. The provision of 1,338m of private wire to provide 5,908MWh/year of electricity sales.

Summary forecast financial information:

Total capex (£m)	£9.10
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Project IRR*	Not provided
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* Real pre-tax pre-finance

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

Project Stage

Commercialisation

Project Contact Details:

Contact Name:	Steve Baggs
Email:	steven.baggs@kent.gov.uk

HNIP Application Information:

Grant requested (£m)	£3.85
Corporate Loan req. (£m)	£0.00
Project Loan requested (£m)	£0.00

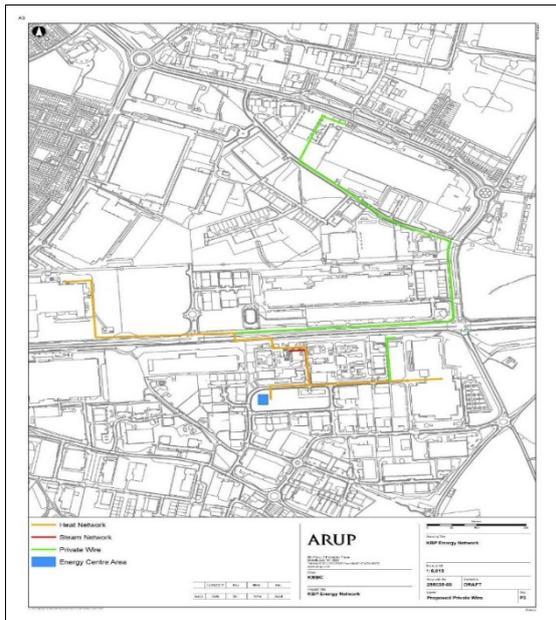


Knowsley Business Park (KBP) Energy Network Project

Project Sponsor:

Knowsley Metropolitan Borough Council

Network Map:



Summary forecast financial information:

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

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

Project Stage

Commercialisation + Construction

Project Contact Details:

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

HNIP Application Information:

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

Technical Information:

Primary energy source:

CHP – Gas

Project description:

The objective is for the Council to offer a unique selling proposition for businesses to be located on KBP by providing them with direct support to their management of energy. This is based on making a contribution to the Council's regenerating the Park so as to enhance this Liverpool City Region hub for commerce and industry over the next 25-50 years.

In so doing the Council would create a municipal Energy Services Company (ESCO). Once established its remit could be expanded to generate and supply low-carbon energy to homes and businesses in Knowsley (and the wider Liverpool City Region) for civic benefit, environmental protection and economic growth reasons.

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

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

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

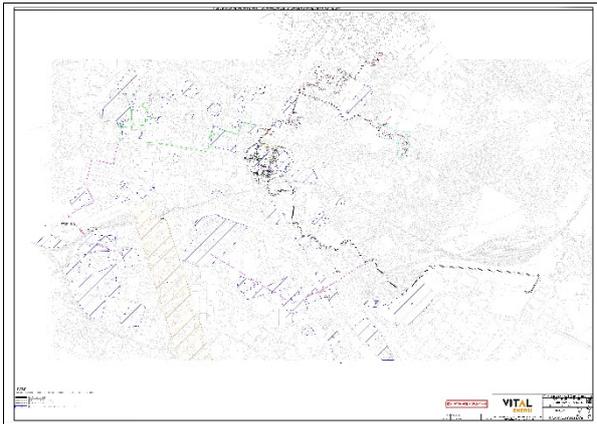


Leeds PIPES Phase 3 Extension

Project Sponsor:

Leeds City Council

Network Map:



Technical Information:

Primary energy source:

CHP – EfW

Project description:

£15mill extension following Leeds Phase 2
OBC being developed in September (6 months)
HNIP potential for Q2 2020

Summary forecast financial information:

Total capex (£m)	£4.00
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Project IRR*	Not provided
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* Real pre-tax pre-finance

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

Project Stage

Construction

Project Contact Details:

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

HNIP Application Information:

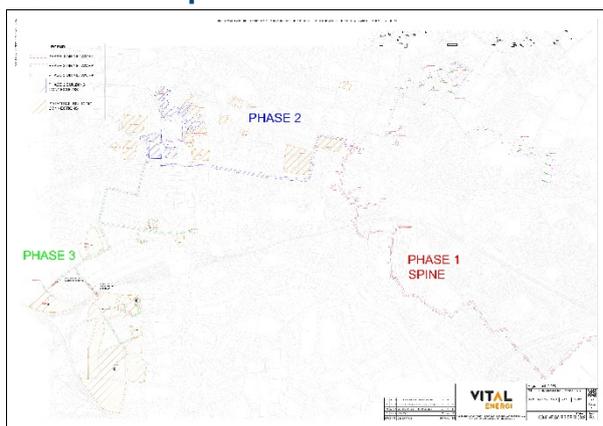
Grant requested (£m)	£2.00
Corporate Loan req. (£m)	£0.00
Project Loan requested (£m)	£0.00

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)	£4.00
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Project IRR*	1.20%
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* Real pre-tax pre-finance

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

Project Stage

Construction

Project Contact Details:

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

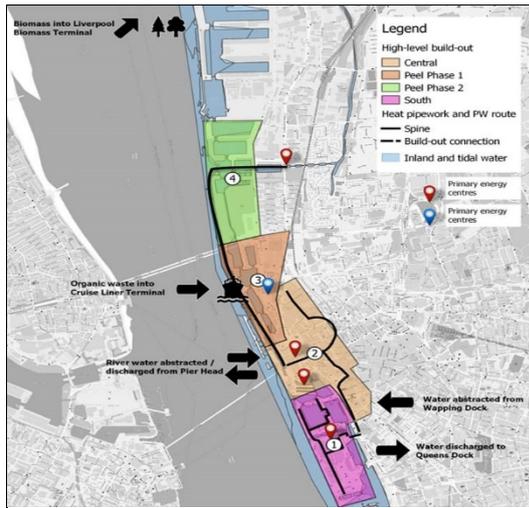
HNIP Application Information:

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

Liverpool Waters District Heat Network (1C xpansion)

Project Sponsor:
Liverpool City Council

Network Map:



Summary forecast financial information:

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

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

Project Stage

Construction

Project Contact Details:

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

HNIP Application Information:

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

Technical Information:

Primary energy source:

Water source heat pumps

Project description:

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

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

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

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

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

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

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

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

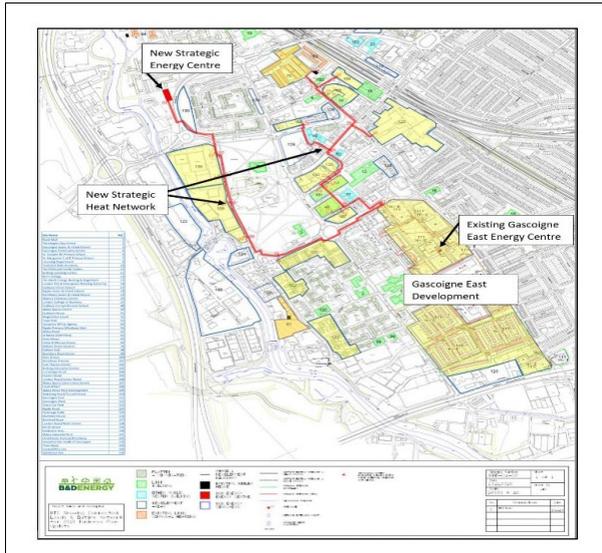


Barking Town Centre District Energy Scheme

Project Sponsor:

London Borough of Barking and Dagenham

Network Map:



Technical Information:

Primary energy source:

CHP – Gas

Project description:

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

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

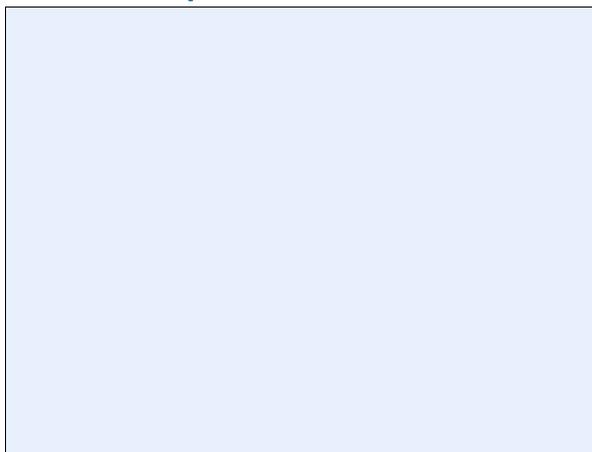


Riverside Heat Network

Project Sponsor:

Riverside Resource Recovery 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)
2020	2021	Not Provided	Not Provided

Project Stage

Construction

Project Contact Details:

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

HNIP Application Information:

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

Technical Information:

Primary energy source:

CHP – EfW

Project description:

Cory Riverside Energy own and operate the Riverside Resource Recovery Energy from Waste facility adjacent to the river Thames in Belvedere, Kent. The facility is one of the largest of its kind in the UK and processes circa 750,000 tonnes of waste annually producing 525,000 MWh of electricity.

Cory have been liaising with the London Borough of Bexley to look at the feasibility of developing a Heat Network in the region to utilise the heat produced by the Cory facility. An initial Feasibility Study has been produced by consulting engineers Ramboll on behalf of Bexley Council and at the same time Cory commissioned their own study by commercial heat network specialists Inventa Partners. Information between the studies has been shared and a deliverable network opportunity has been identified serving existing and new housing developments. The early phases would connect around 4000 homes with subsequent phases presenting the opportunity to connect over 20,000 homes. In order to deliver this exciting opportunity capital will be needed to carry out the required works on the Cory site, to enable steam to be diverted from the current generation process, heat to be stored to provide maximum flexibility and a distribution network to deliver the heat to customers.

In addition to the Riverside Resource Recovery facility, Cory are currently seeking planning on an adjacent Riverside Energy Park development which would be able to provide additional heat or back up generation to any heat network which, if granted consent, would have additional benefits to any scheme being developed alleviating the need for extensive back up gas boilers and gas CHP engines, full details of the proposals can be found at <https://riversideenergypark.com/>

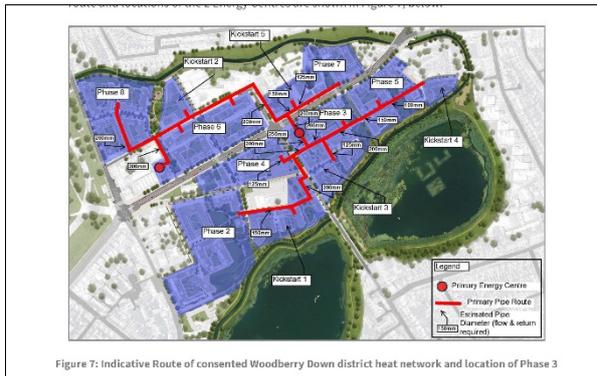


London Borough of Hackney (Woodberry Down)

Project Sponsor:

London Borough of Hackney

Network Map:



Summary forecast financial information:

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

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

Project Stage

Construction

Project Contact Details:

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

HNIP Application Information:

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

Technical Information:

Primary energy source:

CHP – Gas

Project description:

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

The current design proposals include a gas fuelled Combined Heat and Power (CHP) plant to be housed in a single energy centre, and a District Heat Network to serve 5500 dwellings within the Woodberry Down Scheme.

The Planning Consent requires the energy centre to be delivered by Phase 3 of development (2023), with heat being supplied to homes by prior to the occupation of the 200th home in Phase 4 (around 2025).

Part of the development has already been constructed and around 1000 homes have been delivered to date. Prior to connection to the Heat Network, heating is being provided by a mix of building scale boilers and CHP units. These will become redundant once the District Heat Network is up and running.



SELCHP Phase 2

Project Sponsor:

Veolia ES (UK) Limited

Network Map:



Technical Information:

Primary energy source:

CHP – EfW

Project description:

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

Summary forecast financial information:

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

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

Project Stage

Commercialisation + Construction

Project Contact Details:

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

HNIP Application Information:

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

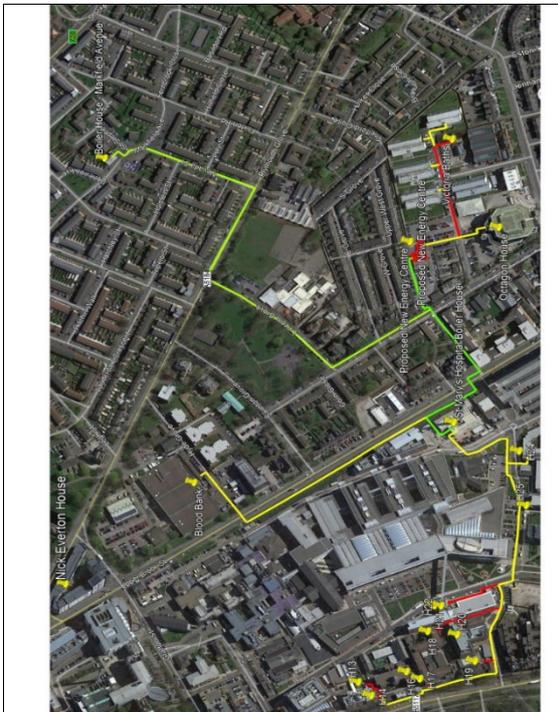


Manchester OPEN

Project Sponsor:

MEPL

Network Map:



Technical Information:

Primary energy source:

CHP – Gas

Project description:

The Octagon Project Energy Network (OPEN) will supply locally generated, reduced carbon, low cost heat, hot water, electricity and cooling to a large number of Manchester residents, institutions and businesses, delivered via a new community energy infrastructure being constructed in the South of the City.

This area contains our major hospitals, universities and a thriving commercial community, as well as being home to thousands of domestic residents and students.

This unique and diverse blend of consumers, each with different energy demand profiles, has been identified as capable of hugely benefiting from and sustaining a community energy solution.

The OPEN will use Combined Heat and Power (CHP) engines, together with other renewable and emerging technologies, to generate low cost and sustainable energy to be distributed via a local network.

The network will supply consumers with on-demand heating, hot water and private wire electricity reducing costs and the carbon footprint for all participating stakeholders.

Summary forecast financial information:

Total capex (£m)	£30.00
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Project IRR*	Not provided
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* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
2021	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)	£5.00
Corporate Loan req. (£m)	£0.00
Project Loan requested (£m)	£10.00



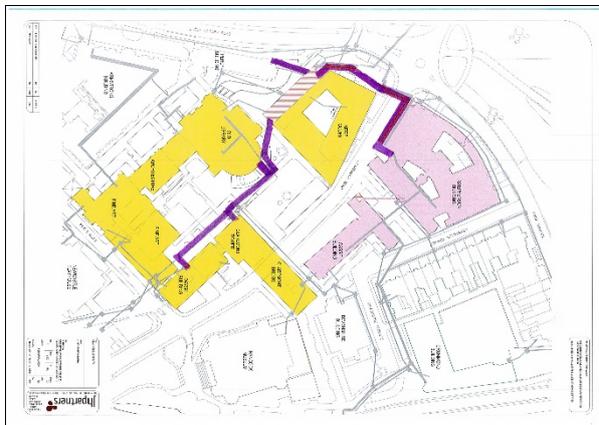
Last Update: 2020

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*	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)	£1.50
Corporate Loan req. (£m)	£0.00
Project Loan requested (£m)	£0.00

Technical Information:

Primary energy source:

CHP – Biomass

Project description:

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

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

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

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

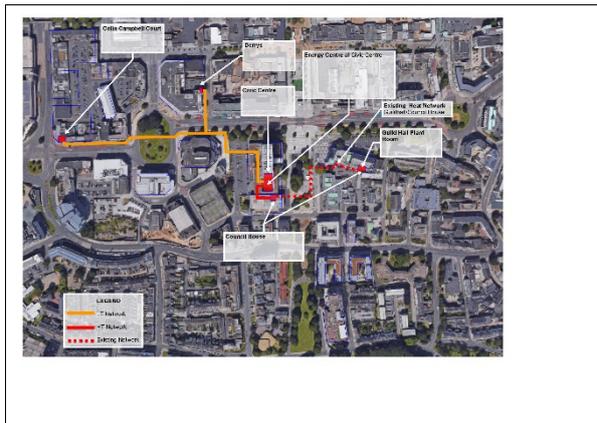


Plymouth Southern City Centre District Energy Scheme

Project Sponsor:

Plymouth City Council

Network Map:



Summary forecast financial information:

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

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

Project Stage

Construction

Project Contact Details:

Contact Name:	Jon Selman
Email:	jonathan.selman@plymouth.gov.uk

HNIP Application Information:

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

Technical Information:

Primary energy source:

Ground source heat pump

Project description:

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

Cooling will be provided to retail within the development housing the energy centre from the open loop resource. The scheme will deliver significant carbon savings through electrification of heat using the CHP as an economic generator to deliver power direct to the heat pump and to serve an existing council operated private wire.

The low temperature loop (temperatures ~70-65°C flow - 40°C return) will connect three major developments; the listed Civic Centre building redevelopment ~ 144 PRS flats and ~4,000m² retail in the city centre; Derrys, a ~400 room student residential / 110 room hotel redevelopment and a major Council/ developer Colin Campbell Court ~300 unit and ~5,500m² retail residential development. The Energy Centre will serve an existing HT network connecting the Council House and Guildhall.

Opportunities for cascading and other hydraulic arrangements to benefit efficiency will be explored. Future transition away from CHP and gas has been considered and will require a process of temperature reduction at existing buildings and implementation of high temperature heat pumps is recommended. There is opportunity to extend the network to capture other developments in the City Centre as a comprehensive redevelopment programme at Millbay and in the Centre is realised as well as existing loads such as hotels.

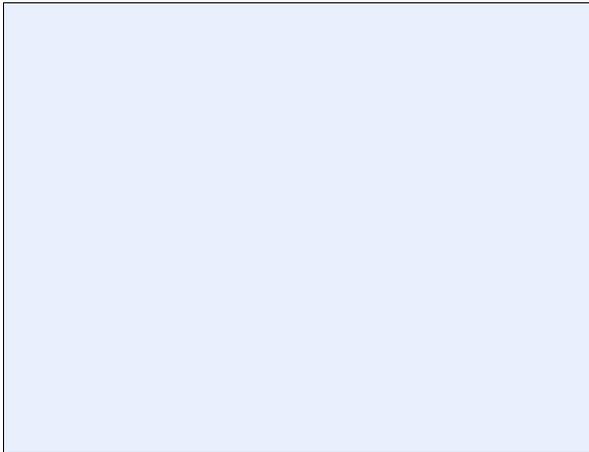


Sheffield District Heating Network Strategic Expansion

Project Sponsor:

Veolia ES (UK) Limited

Network Map:



Technical Information:

Primary energy source:

CHP – EfW

Project description:

The existing Sheffield District Heating Network (DHN) has been in place for more than 25 years and is currently the largest DHN in the UK with approximately 40km of pipe in the ground. The scope of the proposed project is to allow for further expansion of the network to areas of Sheffield that are rapidly developing and ensure that, low carbon, energy from waste sourced district heating remains the technology of choice for new developments in the City.

In order to carry out this expansion, a commercialisation phase will be required to inform detailed design and construction followed by grant assisted capital investment to allow these expansion opportunities to be commercially viable.

Summary forecast financial information:

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

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

Project Stage

Commercialisation + Construction

Project Contact Details:

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

HNIP Application Information:

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

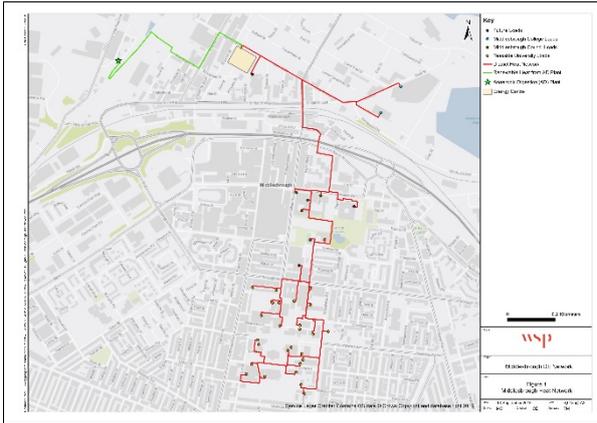


Middlesbrough District Energy Network

Project Sponsor:

Tees Valley Combined Authority

Network Map:



Summary forecast financial information:

Total capex (£m)	£45.26
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Project IRR*	Not provided
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* Real pre-tax pre-finance

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

Project Stage

Commercialisation + Construction

Project Contact Details:

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

HNIP Application Information:

Grant requested (£m)	£7.26
Corporate Loan req. (£m)	£0.00
Project Loan requested (£m)	£0.00

Technical Information:

Primary energy source:

CHP – Gas

Project description:

The Middlesbrough District Energy Network (MDEN) is a project to establish a new heat and private wire network in Middlesbrough town centre. The initial scheme is to be delivered in three phases with 3 primary off-takers / public sector project partners

Phase 1 is focused on James Cook University Hospital, phase 2 is focused on the town centre and serves the University's estate and the Council's Civic Centre and premises in close proximity and phase 3 provides an inter-connection between phases 1 and 2 enabling and facilitating further expansion.

In addition to the key partners, there is interest from a number of other organisations which could see phase 2 of the initial scheme potentially expanded to include a number of existing public buildings.

The heat and electricity is to be supplied from a gas CHP for Phase 1 and 2. Although for Phase 2 there is the potential for this to be supplied from an anaerobic digestion facility on the edge of the town centre, which would offer increased carbon savings and is the preferred source of power – subject to reaching satisfactory commercial arrangements and mitigating the risks of the network being dependent upon a third party supplier. This enables further decarbonisation to potentially be achieved in Phase 3.

With significant regeneration activity and new development planned in Middlesbrough town centre there is the potential for further growth and expansion of the network to serve other buildings and sites and the commercialisation work is take account of this.

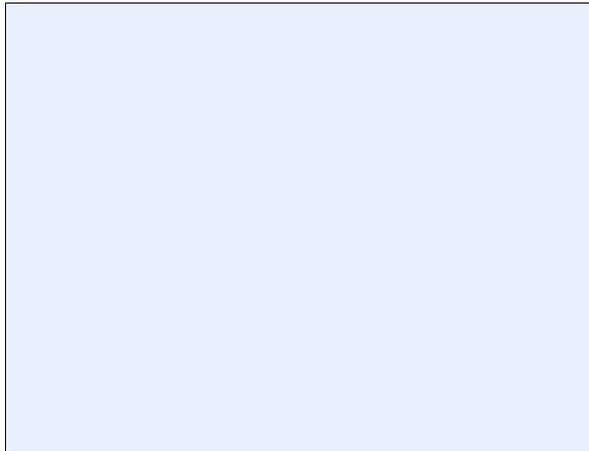


Porton Down

Project Sponsor:

Wiltshire County Council

Network Map:



Technical Information:

Primary energy source:

CHP – Gas

Project description:

The project is a CHP energy centre servicing a science park development and two neighbouring research campuses using thermal fluid-based heat distribution. The proposal is for the energy centre to be based on fuel cell technology supplying baseload, supported by conventional CHP and/or boilers during peak periods. All plant will operate using renewable fuel, with the expectation to create a supply infrastructure in Wiltshire to produce and supply suitable biomass fuels to the site as part of an integrated supply chain model. The project will be phased over a period of years to deliver each stage, in line with the build-out of the science park.

Summary forecast financial information:

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

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

The project will secure early wins through heat and power connections to neighbours which are major strategic partners, setting the model for further collaborations with other partners at other potential locations in Wiltshire. The project may commission on natural gas and then transition rapidly to the locally sourced renewables supply which will be produced using a gasification plant.

The project is expected to generate a number of permanent jobs on the site and in the area, and help to establish a supply chain and knowledge base for project construction and operation. There are then further research opportunities on bio-crop growth, processing and fuel cell optimisation on renewable fuels which can be delivered through existing links with universities, Wiltshire College and the private sector via the science park. Further value-added benefits from the project are expected to be electric vehicle infrastructure comprising rapid chargers, the potential for hydrogen fuelling infrastructure using the reforming solution on site and the production of renewable commodity products such as high purity feedstocks for the science activities on the site. Surplus electricity may be used to operate a carbon capture facility, in order to further boost the carbon credentials of the scheme

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



COMMERCIALISATION STAGE PROJECTS

(DETAILED PROJECT DEVELOPMENT WORK COMPLETE)

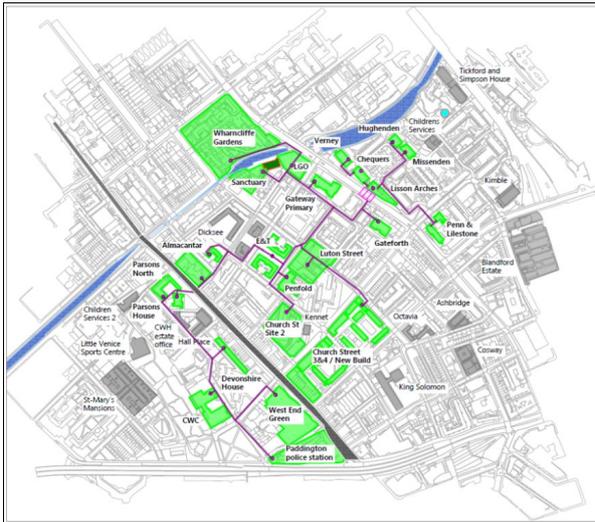


Church Street_COM

Project Sponsor:

City of Westminster

Network Map:



Technical Information:

Primary energy source:

CHP – Gas

Project description:

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

Energy centre description:

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

Heat/cooling demand phasing description:

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

Summary forecast financial information:

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

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

* Real pre-tax pre-finance

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

Project Stage

Commercialisation

Project Contact Details:

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

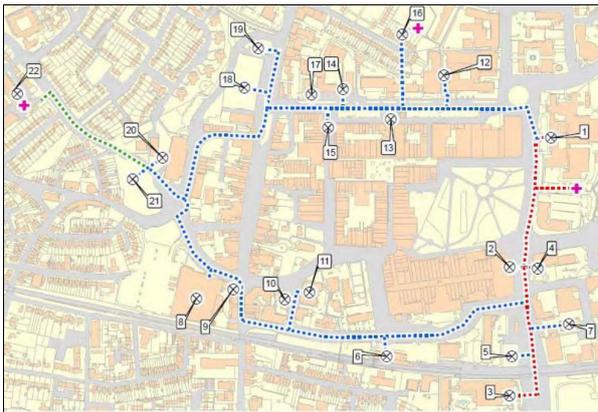


Town Centre Heat Network_DPD

Project Sponsor:

Crawley Borough Council

Network Map:



Summary forecast financial information:

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

Project IRR*	6.11%
Considering third party finance?	No

* Real pre-tax pre-finance

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

Project Stage

Detailed Project Development

Project Contact Details:

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

Technical Information:

Primary energy source:

CHP – Gas

Project description:

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

Energy centre description:

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

Heat/cooling demand phasing description:

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

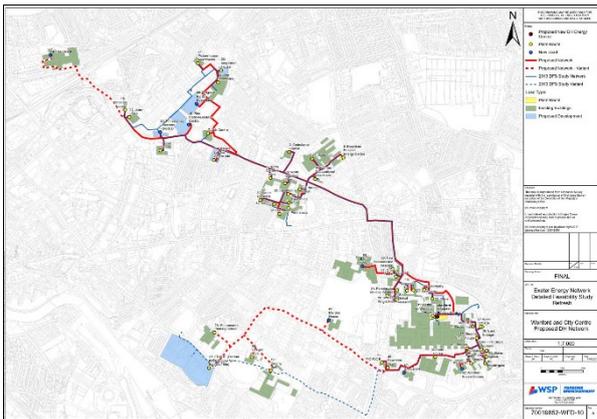


Exeter City Centre_DPD

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:	George Robinson
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.

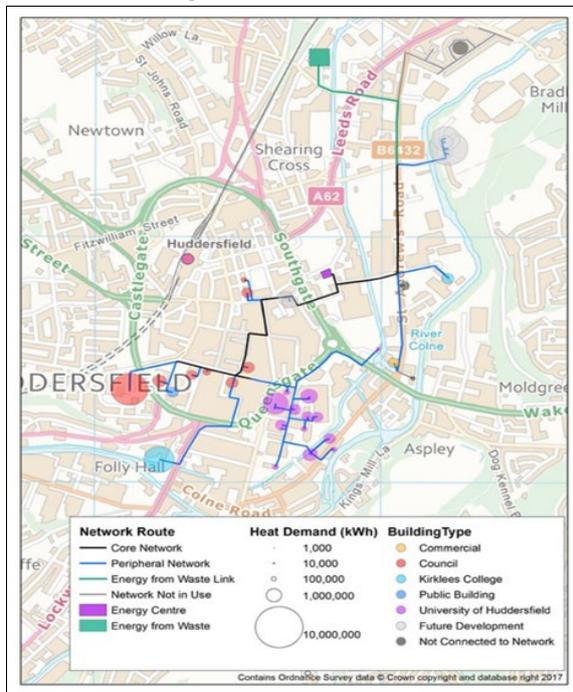


Huddersfield Heat Network

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)
2020	2021	2023	2037

Project Stage

Detailed Project Development

Project Contact Details:

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

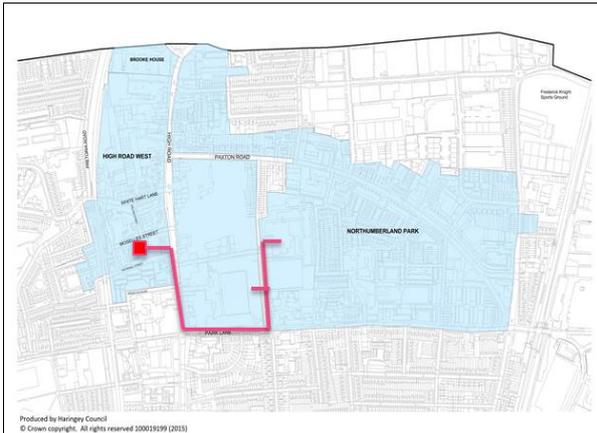


North Tottenham_DPD

Project Sponsor:

London Borough of Haringey

Network Map:



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.

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?	Yes

* 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:	George Robinson
Email:	hndu@beis.gov.uk

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)



TECHNO-ECONOMIC FEASIBILITY STAGE

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

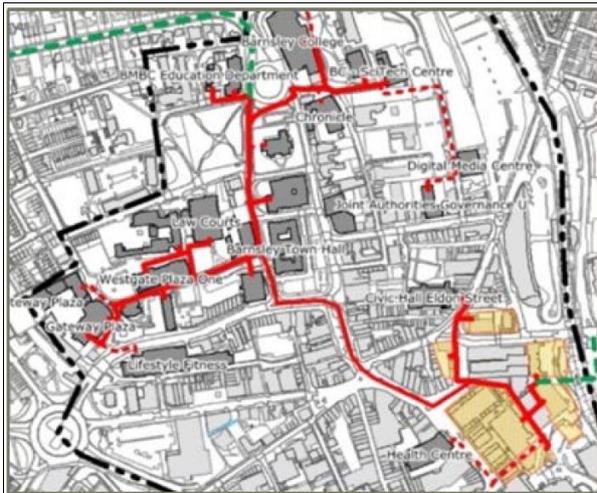


Barnsley Civic Quarter_FES

Project Sponsor:

Barnsley Metropolitan Borough Council

Network Map:



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:	George Robinson
Email:	hndu@beis.gov.uk

Technical Information:

Primary energy source:

CHP – Gas

Project description:

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

Energy centre description:

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

Heat/cooling demand phasing description:

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

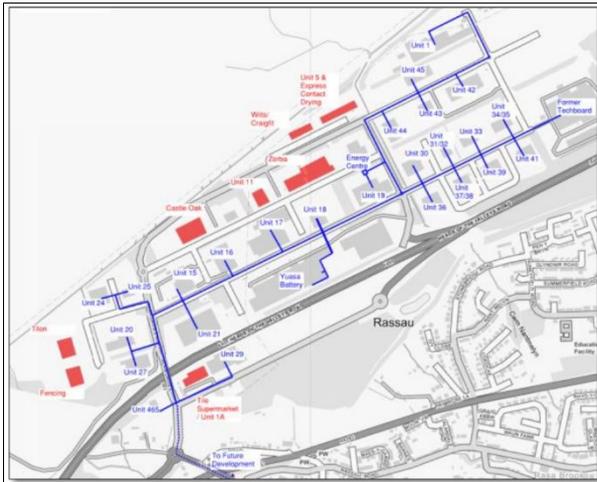


Ebbw Vale (Rassau)_FES

Project Sponsor:

Blaenau Gwent County Borough Council

Network Map:



Technical Information:

Primary energy source:

CHP – Gas

Project description:

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

Energy centre description:

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

Heat/cooling demand phasing description:

All demand will be online day one.

Summary forecast financial information:

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

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

* Real pre-tax pre-finance

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

Project Stage

Feasibility

Project Contact Details:

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

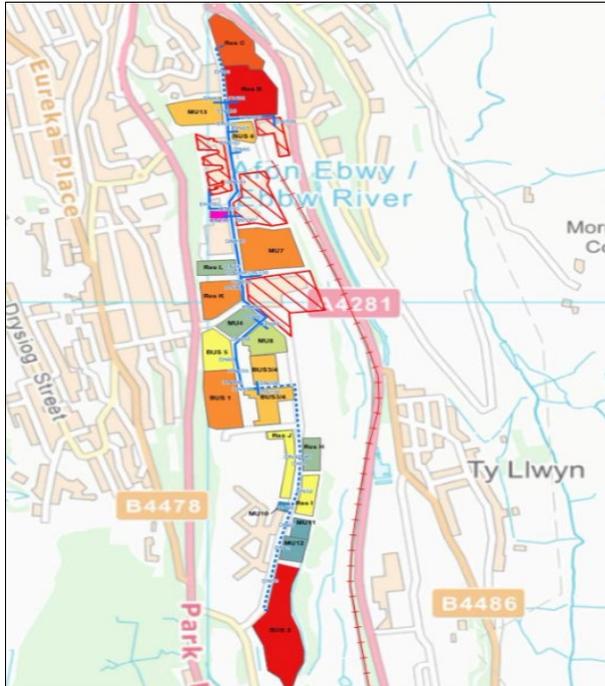


The Works_FES

Project Sponsor:

Blaenau Gwent County Borough Council

Network Map:



Technical Information:

Primary energy source:

Boiler - Biomass

Project description:

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

Energy centre description:

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

Heat/cooling demand phasing description:

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

Summary forecast financial information:

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

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

* Real pre-tax pre-finance

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

Project Stage

Feasibility

Project Contact Details:

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



Castle Lane East Network_FES

Project Sponsor:

Bournemouth Borough Council

Network Map:



Summary forecast financial information:

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

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

* Real pre-tax pre-finance

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

Project Stage

Feasibility

Project Contact Details:

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

Technical Information:

Primary energy source:

Boiler - EfW

Project description:

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

Energy centre description:

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

Heat/cooling demand phasing description:

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

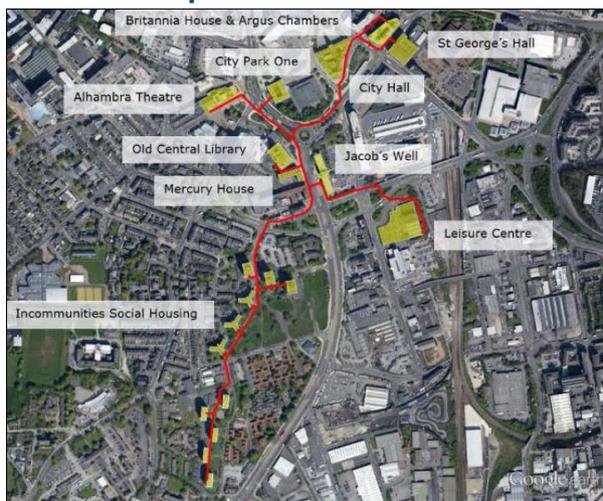


Bradford Civic Quarter_FES

Project Sponsor:

Bradford Metropolitan District Council

Network Map:



Summary forecast financial information:

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

Project IRR*	Not provided
Considering third party finance?	Yes

* Real pre-tax pre-finance

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

Project Stage

Feasibility

Project Contact Details:

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

Technical Information:

Primary energy source:

CHP – Gas

Project description:

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

Energy centre description:

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

Heat/cooling demand phasing description:

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

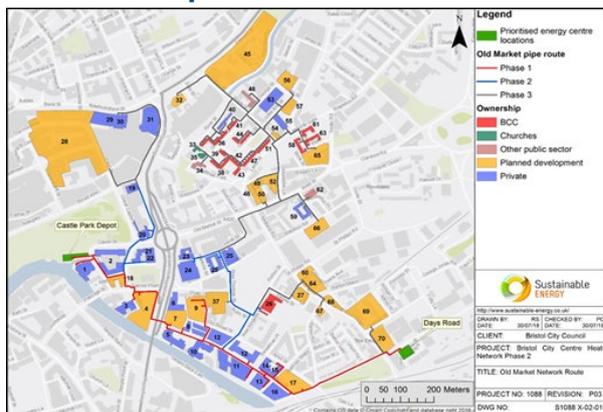


City Centre Phase 2_FES

Project Sponsor:

Bristol City Council

Network Map:



Summary forecast financial information:

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

Project IRR*	6.50%
Considering third party finance?	Yes

* Real pre-tax pre-finance

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

Project Stage

Feasibility

Project Contact Details:

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

Technical Information:

Primary energy source:

Water source heat pumps

Project description:

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

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

Energy centre description:

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

Heat/cooling demand phasing description:

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

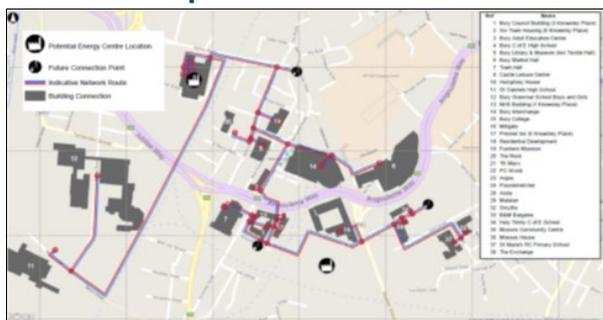


Bury Town Centre_FES

Project Sponsor:

Bury Metropolitan Borough Council

Network Map:



Summary forecast financial information:

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

Project IRR*	5.40%
Considering third party finance?	No

* Real pre-tax pre-finance

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

Project Stage

Feasibility

Project Contact Details:

LA Name:	Bury Metropolitan Borough Council
Contact Name:	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

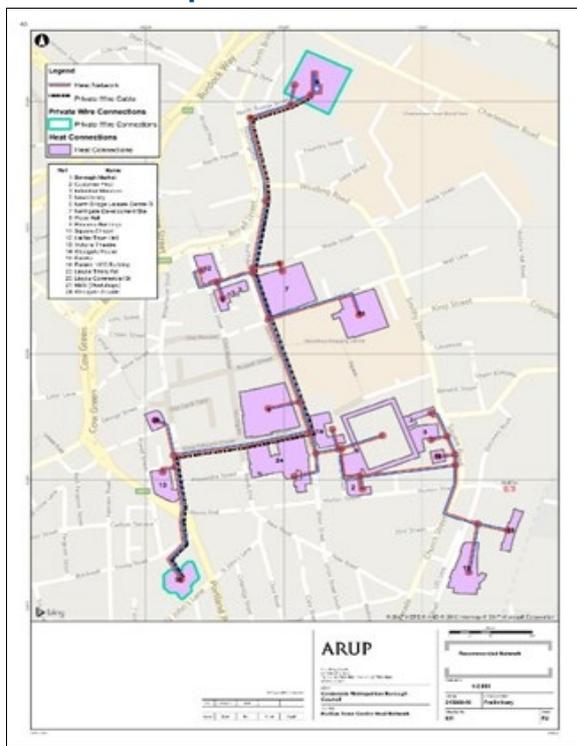
- Future connection to the Rock and Millgate retail (Exec Sum p6)

Halifax Town Centre_FES

Project Sponsor:

Calderdale Metropolitan Borough Council

Network Map:



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.

Summary forecast financial information:

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

Project IRR*	5.90%
Considering third party finance?	Yes

* Real pre-tax pre-finance

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

Project Stage

Feasibility

Project Contact Details:

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



Swaffham Prior Energy Centre_FES

Project Sponsor:

Cambridgeshire County Council

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£1.48
Private Wire (£m)	£0.00
Pipework / distribution capex (£m)	£3.47
Other capex (£m)	£1.47
Total capex (£m)	£6.42

Project IRR*	3.71%
Considering third party finance?	No

* Real pre-tax pre-finance

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

Project Stage

Feasibility

Project Contact Details:

LA Name:	Cambridgeshire County Council
Contact Name:	George Robinson
Email:	hndu@beis.gov.uk

Technical Information:

Primary energy source:

Ground source heat pump

Project description:

A new centralised closed-loop ground source heat pump energy centre to serve up to 300 homes in Swaffham Prior village. The vast majority of properties are heated by fuel oil or LPG fired boilers and some via electric or solid fuel heating. Hence, as these are comparatively carbon intensive, costly forms of heat (in comparison to the more widely used natural gas), there is a significant opportunity to deliver significant carbon and cost savings to the village.

Energy centre description:

3x Carrier Aquaforce 30XWHPZE 584kWt high-temperature heat pumps with a closed loop sink in Council-owned land, with 3x 800kW Viessman Vitocrossal natural gas boilers to act as peak and back-up, 2 x 25m³ thermal stores to provide buffering and off-peak load shifting, energy management system, mechanical systems and electrical fit-out. Energy Centre to be constructed of modular SIPS and steel frame, or as agreed with client and planning authorities

Heat/cooling demand phasing description:

As the properties are currently equipped with their own heat generation equipment, the energy centre and distribution network may be installed and soft-commissioned in parallel. The construction of the heat network will be completed in one continuous phase, programmed in accordance with the traffic management plan, planning conditions and relevant stakeholder requirements. Once soft-commissioned, a first group of properties will be connected during autumn 2020, with a view to testing the system's operation. Further properties will be connected between 2021 and 2025, reaching an estimated peak of 90% of the village's properties by 2025.



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:	Dan Griffiths
Email:	Dan.Griffiths@cheshireeast.gov.uk

Technical Information:

Primary energy source:
Ground source heat pump

Project description:

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

Energy centre description:

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

Heat/cooling demand phasing description:

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

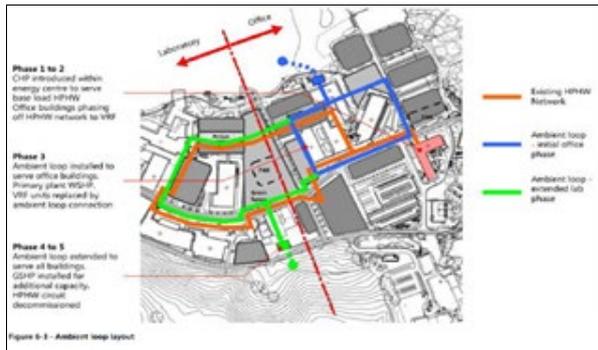


Alderley Park_FES

Project Sponsor:

Cheshire East Council

Network Map:



Summary forecast financial information:

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

Project IRR*	3.90%
Considering third party finance?	Yes

* Real pre-tax pre-finance

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

Project Stage

Feasibility

Project Contact Details:

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

Technical Information:

Primary energy source:

CHP – Gas

Project description:

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

Energy centre description:

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

Heat/cooling demand phasing description:

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

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

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

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

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

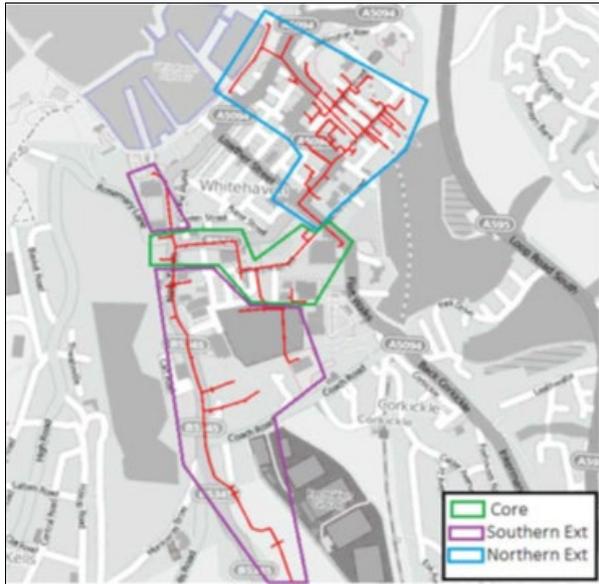


Whitehaven Minewater Heat Kells Lane_FES

Project Sponsor:

Copeland Borough Council

Network Map:



Summary forecast financial information:

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

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

* Real pre-tax pre-finance

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

Project Stage

Feasibility

Project Contact Details:

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

Technical Information:

Primary energy source:

Mine Water Heat Recovery

Project description:

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

Energy centre description:

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

Heat/cooling demand phasing description:

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

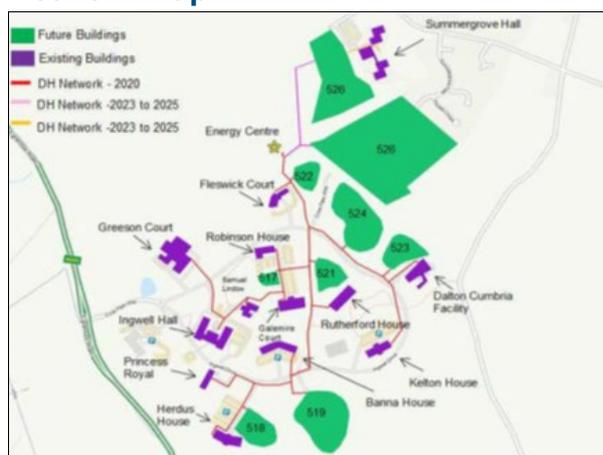


Whitehaven Westlakes Science Park_FES

Project Sponsor:

Copeland Borough Council

Network Map:



Summary forecast financial information:

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

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

* Real pre-tax pre-finance

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

Project Stage

Feasibility

Project Contact Details:

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

Technical Information:

Primary energy source:

CHP – Gas

Project description:

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

Energy centre description:

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

Heat/cooling demand phasing description:

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

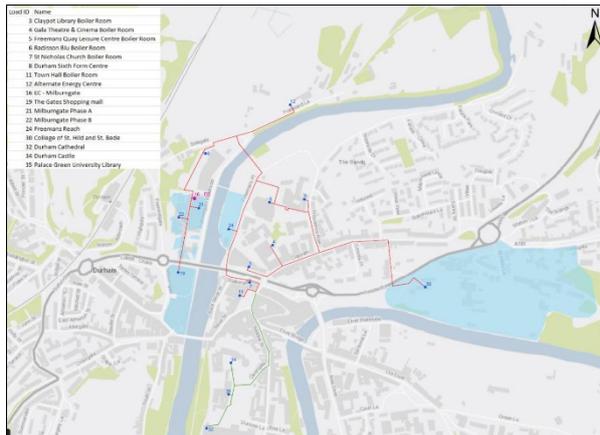


Durham Town Centre_FES

Project Sponsor:

Durham County Council

Network Map:



Summary forecast financial information:

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

Project IRR*	3.00%
Considering third party finance?	Yes

* Real pre-tax pre-finance

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

Project Stage

Feasibility

Project Contact Details:

LA Name:	Durham County Council
Contact Name:	Stephen McDonald
Email:	stephen.mcdonald@durham.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 Millburn Gate development. The best economically performing option of the preferred scenarios is for 2x1MW River Source Heat pump.

Heat/cooling demand phasing description:

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

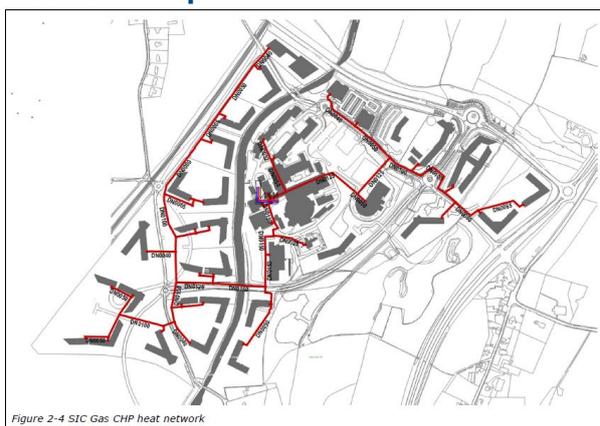


East Runcorn Daresbury Energy Network_FES

Project Sponsor:

Halton Borough Council

Network Map:



Summary forecast financial information:

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

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

* Real pre-tax pre-finance

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

Project Stage

Feasibility

Project Contact Details:

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

Technical Information:

Primary energy source:

CHP – Gas

Project description:

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

Energy centre description:

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

Heat/cooling demand phasing description:

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

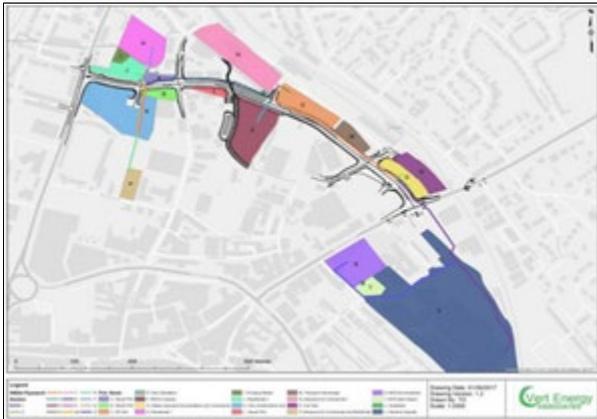


Hereford Link Road_FES

Project Sponsor:

Herefordshire Council

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£1.87
Private Wire (£m)	£0.01
Pipework / distribution capex (£m)	£3.02
Other capex (£m)	£0.00
Total capex (£m)	£4.90

Project IRR*	Not provided
Considering third party finance?	Yes

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
2018	2019	2019	2023

Project Stage

Feasibility

Project Contact Details:

LA Name:	Herefordshire Council
Contact Name:	Richard Vaughan
Email:	Richard.Vaughan@herefordshire.gov.uk

Technical Information:

Primary energy source:

CHP – Gas

Project description:

District heating scheme using Hereford Hospital as anchor heat load although it only has a steam requirement. LTHW network is district scheme to be built to support the city centre redevelopment

Energy centre description:

New energy centre of 300m2 to contain CHP Unit and Heat Recover Boiler, 3MW LTHW Gas boiler and thermal store. Existing Hospital energy centre to contain 3 x 2.8MW Byworth boilers

Heat/cooling demand phasing description:

Hospital _ 1 residential block _ 2 public buildings to be connected 2020 _ 1MWh other existing buildings. Remaining loads to come on stream over time to 2024 when all loads will be online

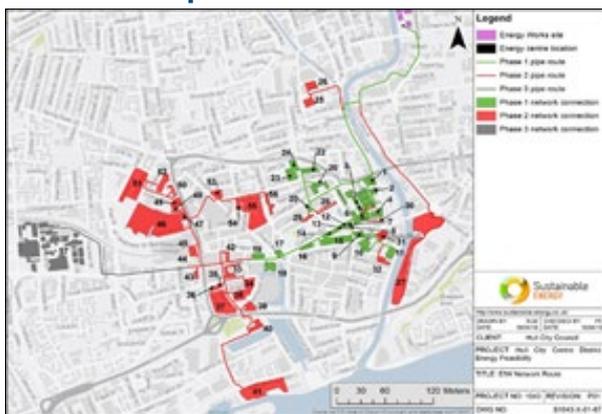


Hull City Centre_FES

Project Sponsor:

Hull City Council

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£2.76
Private Wire (£m)	£0.00
Pipework / distribution capex (£m)	£12.58
Other capex (£m)	£0.99
Total capex (£m)	£16.33

Project IRR*	8.30%
Considering third party finance?	Yes

* Real pre-tax pre-finance

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

Project Stage

Feasibility

Project Contact Details:

LA Name:	Hull City Council
Contact Name:	George Robinson
Email:	hndu@beis.gov.uk

Technical Information:

Primary energy source:

CHP – EfW

Project description:

A new district heat network supplying heat from an EfW plant (currently under construction) to the north of the City.

Energy centre description:

Two energy centres would be required; one at the EfW site housing the heat offtake equipment and some peak and reserve gas boilers. Additional peak and reserve gas boilers would be located at the Hull College site.

Heat/cooling demand phasing description:

Phase 1 supplies heat to key Council buildings and to Hull College. Phase 2 extends to a wider area connecting privately owned sites and numerous planned developments.

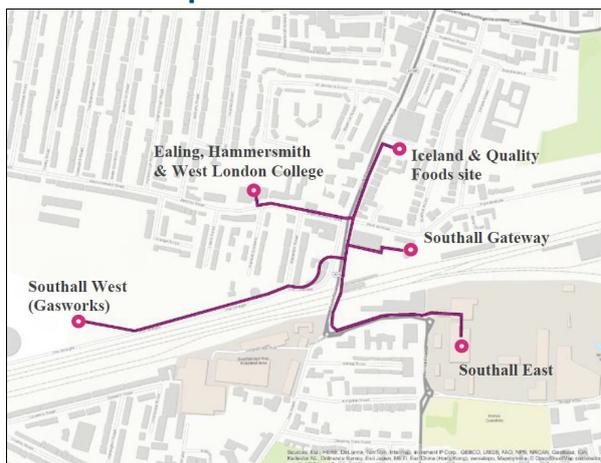


Southall DE_FES

Project Sponsor:

London Borough of Ealing

Network Map:



Summary forecast financial information:

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

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

* Real pre-tax pre-finance

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

Project Stage

Feasibility

Project Contact Details:

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

Technical Information:

Primary energy source:

CHP – Gas

Project description:

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

Energy centre description:

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

Heat/cooling demand phasing description:

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

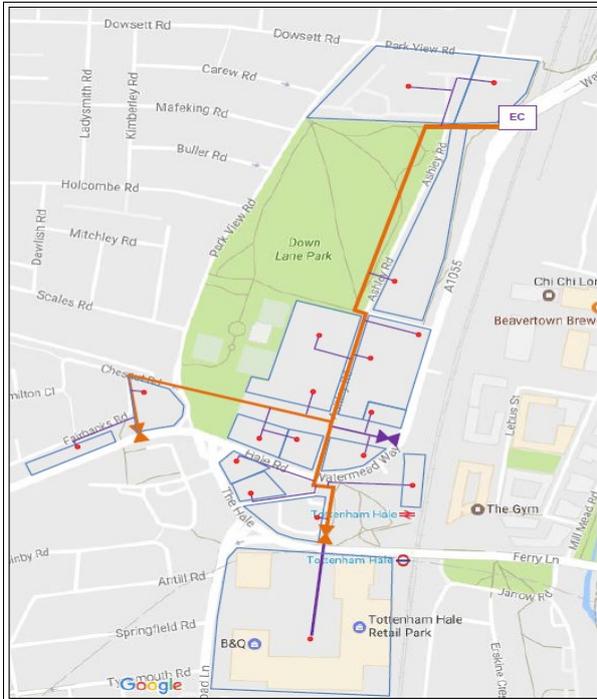


Tottenham Hale_FES

Project Sponsor:

London Borough of Haringey

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£10.24
Private Wire (£m)	£0.00
Pipework / distribution capex (£m)	£3.64
Other capex (£m)	£18.04
Total capex (£m)	£31.92

Project IRR*	7.10%
Considering third party finance?	Yes

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
2020	2022	2023	2035

Project Stage

Feasibility

Project Contact Details:

LA Name:	London Borough of Haringey
Contact Name:	George Robinson
Email:	hndu@beis.gov.uk

Technical Information:

Primary energy source:

CHP – Gas

Project description:

Feasibility work in 2017 considered 2 scenarios; "Extended Tottenham Hale" and "Central Tottenham Hale" The figures shown below are for the scenario variation "Extended Tottenham Hale with expansion capacity and 20% grant". The scheme is for 3.5MWe CHP and gas back up to supply heat to majority new build domestic and non-domestic loads, with a very small fraction of existing buildings. The work completed shows no opportunity for private wire, though it has not been categorically ruled out at time of writing. Expect updated feasibility and business case to be completed by Haringey Council in 2019/20.

Energy centre description:

2017 feasibility proposes an Energy Centre under the Watermead Way flyover and the area adjacent to this. It was proposed to develop the EC in two phases. The Energy Centre is anticipated to eventually house 3.5MWe CHP and 17MWth gas boilers at full build out. See summary forecast financial information opposite (from 2017). Scheme scope and phasing expected to be revisited in 2019.

Heat/cooling demand phasing description:

The Extended Tottenham Hale scenario analysed in 2017 has a peak heat demand of 17MW. The Central Tottenham Hale scenario has a peak heat demand of 11MW. For the extended Tottenham Hale scheme, heat demand is 12,853MWh/yr. Scope of scheme and phasing to be revisited in 2019. Earliest FID 2020 with subsequent dates provisional at this stage.



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?	Yes

* 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:	George Robinson
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 5.3MWh of gas-fired CHP. See the summary forecast financial information opposite from 2016. Note: the scheme's feasibility, phasing and delivery timescales are expected to be revisited by Haringey Council in updated feasibility work and subsequent business case in 2019/20.

Heat/cooling demand phasing description:

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

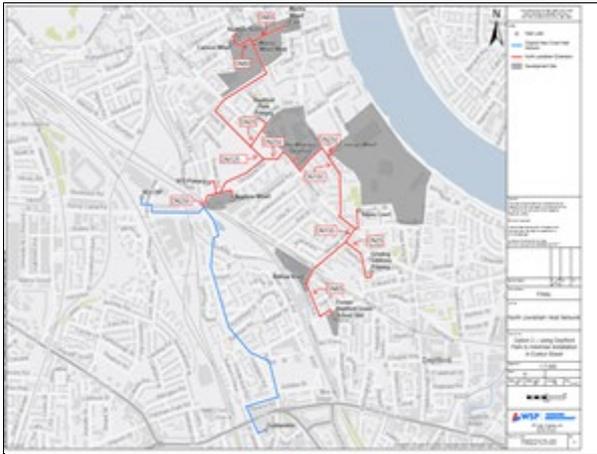


North Lewisham Heat Network_FES

Project Sponsor:

London Borough of Lewisham

Network Map:



Summary forecast financial information:

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

Project IRR*	15.30%
Considering third party finance?	Yes

* Real pre-tax pre-finance

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

Project Stage

Feasibility

Project Contact Details:

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

Technical Information:

Primary energy source:

Boiler - EfW

Project description:

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

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

Energy centre description:

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

Heat/cooling demand phasing description:

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

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

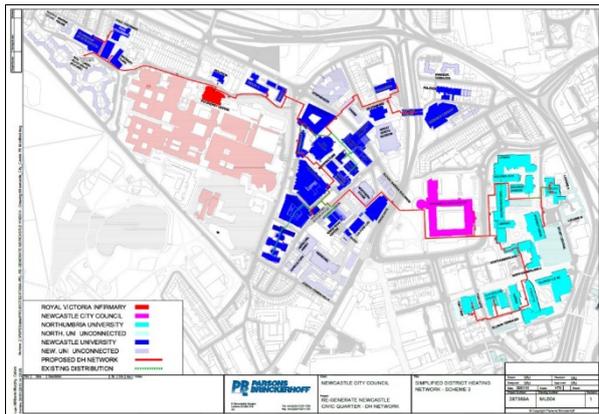


Civic Quarter District Energy Scheme_FES

Project Sponsor:

Newcastle-upon-Tyne City Council

Network Map:



Summary forecast financial information:

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

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

* Real pre-tax pre-finance

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

Project Stage

Feasibility

Project Contact Details:

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

Technical Information:

Primary energy source:

CHP – Gas

Project description:

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

Energy centre description:

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

Heat/cooling demand phasing description:

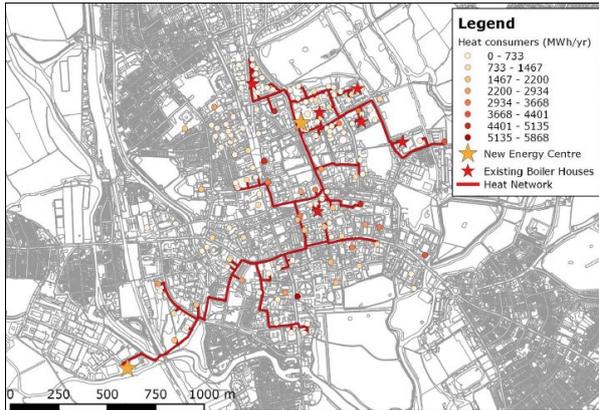
Not Provided



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?	Not Stated

* Real pre-tax pre-finance

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

Project Stage

Feasibility

Project Contact Details:

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

Technical Information:

Primary energy source:

CHP – Gas

Project description:

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

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

Energy centre description:

Not Provided

Heat/cooling demand phasing description:

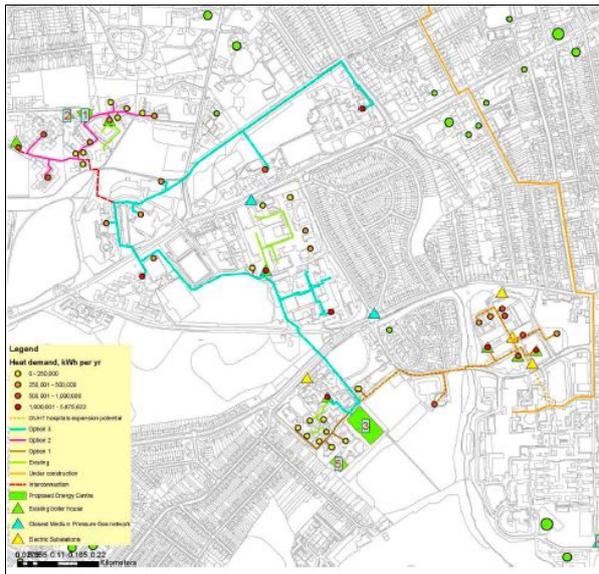
Not Provided



Oxford Headington_FES

Project Sponsor:
Oxford City Council

Network Map:



Summary forecast financial information:

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

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

* Real pre-tax pre-finance

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

Project Stage

Feasibility

Project Contact Details:

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

Technical Information:

Primary energy source:

CHP – Gas

Project description:

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

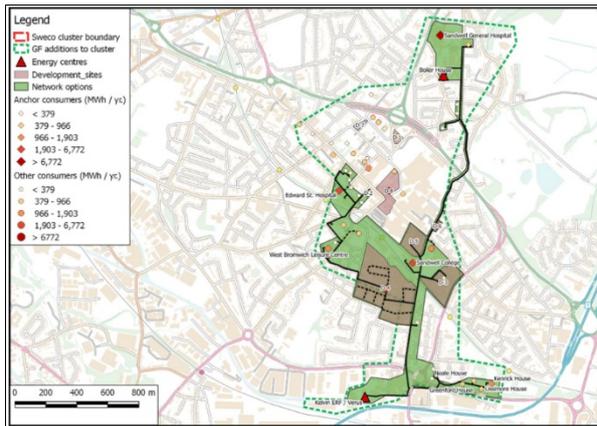


West Bromwich_FES

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?	Not Stated

* 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:	George Robinson
Email:	hndu@beis.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

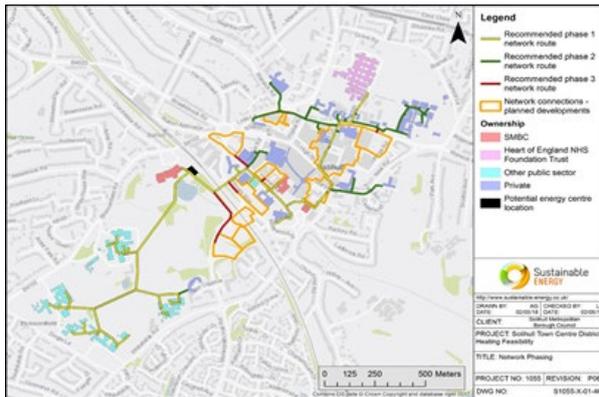


Solihull Town Centre_FES

Project Sponsor:

Solihull Metropolitan Borough Council

Network Map:



Technical Information:

Primary energy source:

CHP – Gas

Project description:

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

Energy centre description:

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

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

Heat/cooling demand phasing description:

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

Project Stage

Feasibility

Project Contact Details:

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

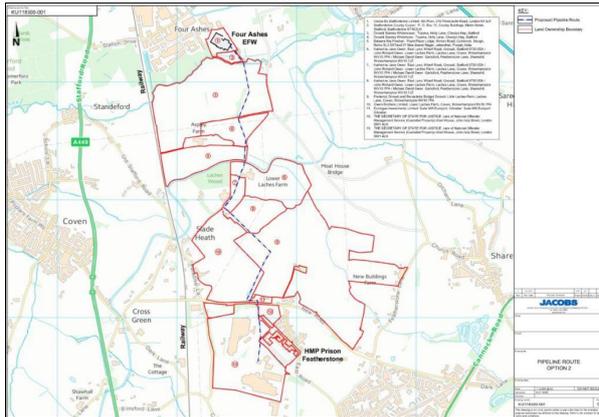


Veolia Energy from Waste_FES

Project Sponsor:

Staffordshire Moorlands District Council

Network Map:



Summary forecast financial information:

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

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

* Real pre-tax pre-finance

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

Project Stage

Feasibility

Project Contact Details:

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

Technical Information:

Primary energy source:

CHP – EfW

Project description:

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

Energy centre description:

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

Heat/cooling demand phasing description:

Not available

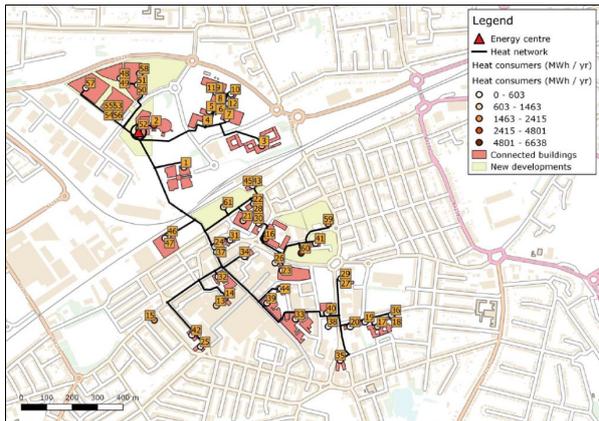


North Star and Town Centre_FES

Project Sponsor:

Swindon Borough Council

Network Map:



Summary forecast financial information:

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

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

* Real pre-tax pre-finance

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

Project Stage

Feasibility

Project Contact Details:

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

Technical Information:

Primary energy source:

CHP – Gas

Project description:

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

Energy centre description:

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

Heat/cooling demand phasing description:

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



MAPPING AND MASTER PLANNING STAGE

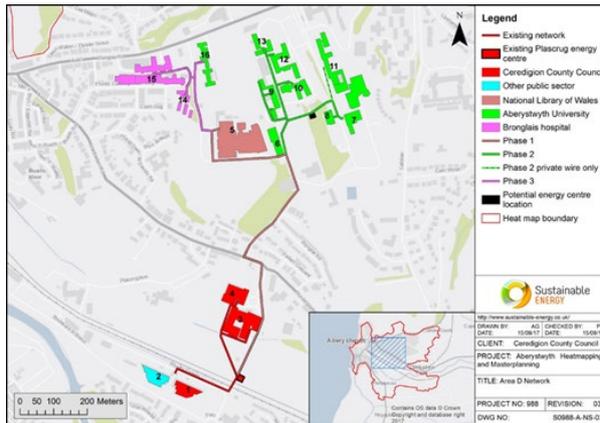


Aberystwyth_MAP

Project Sponsor:

Ceredigion County Council

Network Map:



Summary forecast financial information:

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

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

* Real pre-tax pre-finance

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

Project Stage

Heat mapping and masterplanning

Project Contact Details:

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

Technical Information:

Primary energy source:

Boiler - Biomass

Project description:

There is potential to extend the existing district heating network at 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 500kWe 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).

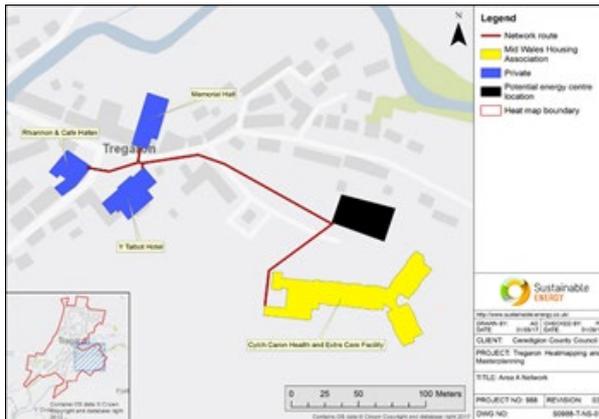


Tregaron_MAP

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:	George Robinson
Email:	hndu@beis.gov.uk

Technical Information:

Primary energy source:

Boiler - Biomass

Project description:

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

Energy centre description:

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

Heat/cooling demand phasing description:

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

Corby Town Centre_MAP

Project Sponsor:

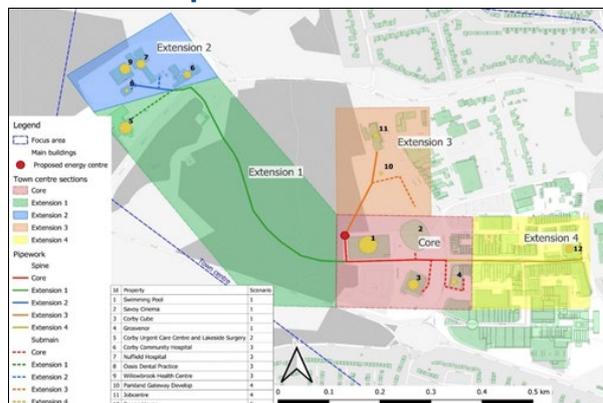
Corby Borough Council

Technical Information:

Primary energy source:

CHP – Gas

Network Map:



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.

Summary forecast financial information:

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

Project IRR*	6.00%
Considering third party finance?	No

* Real pre-tax pre-finance

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.

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

Project Stage

Heat mapping and masterplanning

Project Contact Details:

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

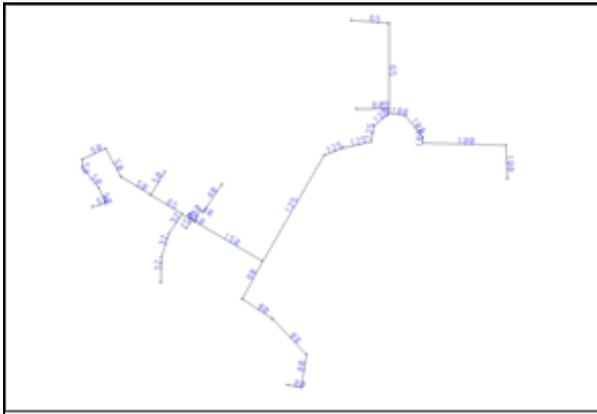


Manor Royal _ Industrial and business area_MAP

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:	George Robinson
Email:	hndu@beis.gov.uk

Technical Information:

Primary energy source:

CHP – Gas

Project description:

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

Energy centre description:

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

Heat/cooling demand phasing description:

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

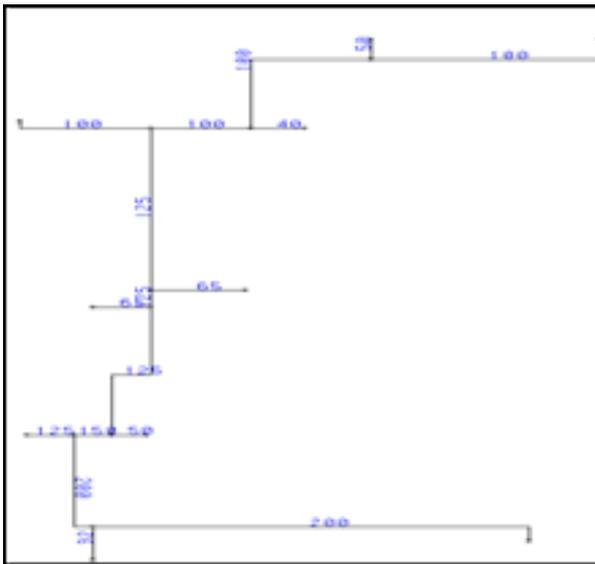


Manor Royal_Fleming Way and Manor Royal Road_MAP

Project Sponsor:

Crawley Borough Council

Network Map:



Summary forecast financial information:

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

Project IRR*	8.10%
Considering third party finance?	No

* Real pre-tax pre-finance

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

Project Stage

Heat mapping and masterplanning

Project Contact Details:

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

Technical Information:

Primary energy source:

CHP – Gas

Project description:

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

Energy centre description:

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

Heat/cooling demand phasing description:

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



Chesterfield_MAP

Project Sponsor:

Derbyshire county

Network Map:



Summary forecast financial information:

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

Project IRR*	10.28%
Considering third party finance?	Yes

* Real pre-tax pre-finance

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

Project Stage

Heat mapping and masterplanning

Project Contact Details:

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

Technical Information:

Primary energy source:

CHP – Gas

Project description:

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

Energy centre description:

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

Heat/cooling demand phasing description:

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



Clay Cross_MAP

Project Sponsor:

Derbyshire county

Network Map:



Summary forecast financial information:

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

Project IRR*	7.54%
Considering third party finance?	Yes

* Real pre-tax pre-finance

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

Project Stage

Heat mapping and masterplanning

Project Contact Details:

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

Technical Information:

Primary energy source:

CHP – EfW

Project description:

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

Energy centre description:

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

Heat/cooling demand phasing description:

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

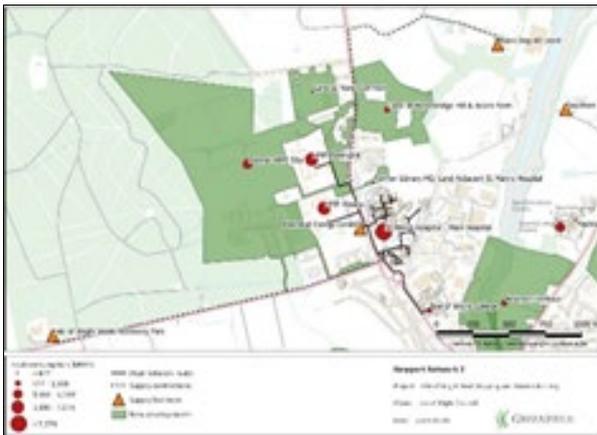


Hospital and HMP IoW_MAP

Project Sponsor:

Isle of Wight Council

Network Map:



Technical Information:

Primary energy source:

CHP – Gas

Project description:

Heat network connecting HMP IoW, IoW College and St. Mary's hospital

Energy centre description:

CHP plant is proposed to be placed at St. Mary's hospital and heat recovery from IoW Waste Recovery Park (EfW).

Heat/cooling demand phasing description:

Hospital, IoW College, HMP Parkhurst and HMP Albany are connected from the first year of construction.

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:	Jim Fawcett
Email:	jim.fawcett@iow.gov.uk

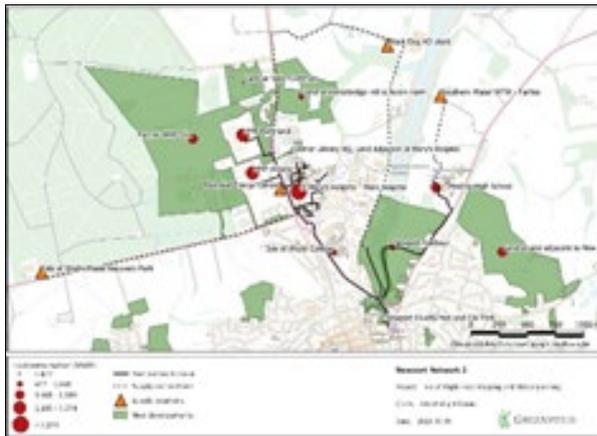


Newport Harbour _ Hospital and HMP IoW_MAP

Project Sponsor:

Isle of Wight Council

Network Map:



Technical Information:

Primary energy source:

CHP – Gas

Project description:

Network connecting consumers from network 1 and network 2. Phase 1 includes all consumers. Phase 2 connects consumers at Newport Harbour development area from the start of construction.

Energy centre description:

The primary supply is gas CHP located at the hospital area. Heat is also supplied by WSHP at Fairlee Water Treatment Works and by heat recovery from Waste Recovery Park (EfW)

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:	Jim Fawcett
Email:	jim.fawcett@iow.gov.uk



Newport Harbour _ Hospital and HMP IoW _ urban extensions _MAP

Project Sponsor:

Isle of Wight Council

Network Map:



Technical Information:

Primary energy source:

CHP – Gas

Project description:

Network, which combines network 3 and urban extensions in the north and in the east of Newport.

Energy centre description:

Energy is supplied by Gas CHP at hospital location, WSHP at Fairlee WTW and heat recovery from Isle of Wight Waste Recovery Park (EfW)

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:	Jim Fawcett
Email:	jim.fawcett@iow.gov.uk

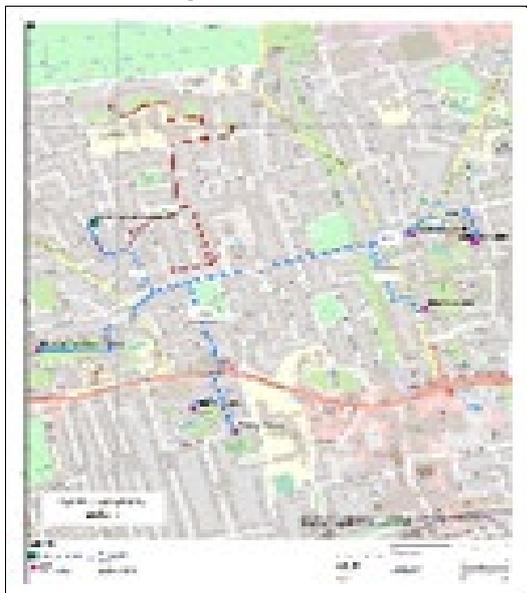


North Peckham_MAP

Project Sponsor:

London Borough of Southwark

Network Map:



Technical Information:

Primary energy source:

CHP – Gas

Project description:

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

Energy centre description:

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

Heat/cooling demand phasing description:

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

Summary forecast financial information:

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

Project IRR*	7.01%
Considering third party finance?	No

* Real pre-tax pre-finance

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

Project Stage

Heat mapping and masterplanning

Project Contact Details:

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

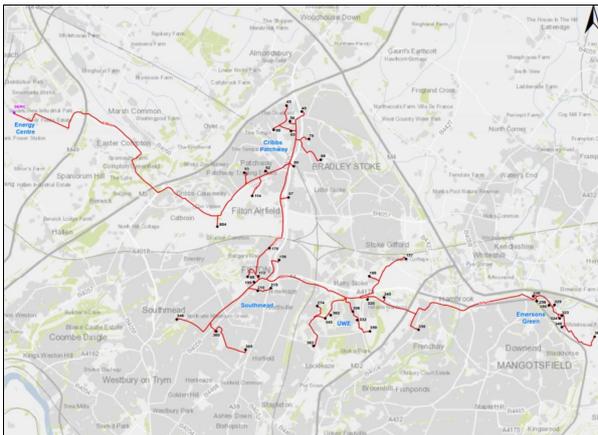


SERC EfW heat supply_MAP

Project Sponsor:

South Gloucestershire Council

Network Map:



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

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

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.

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

Project Stage

Heat mapping and masterplanning

Project Contact Details:

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



PROJECTS THAT ARE UNDER CONSTRUCTION

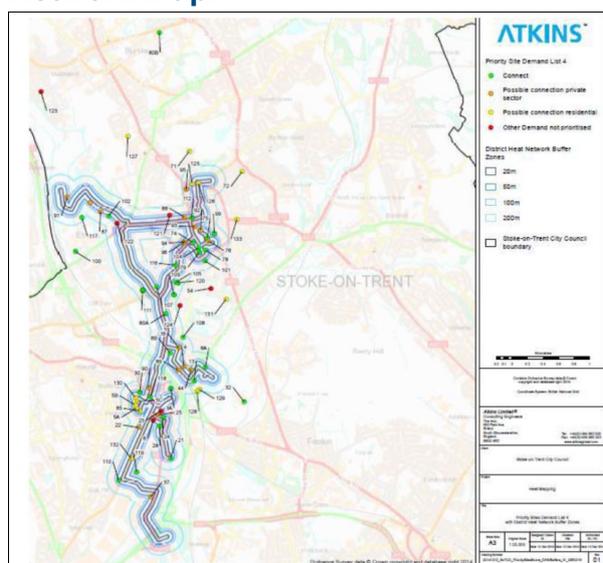


Deep Geothermal_COM_CST

Project Sponsor:

Stoke-on-Trent City Council (SoTCC)

Network Map:



Summary forecast financial information:

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

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

* Real pre-tax pre-finance

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

Project Stage

Under Construction

Project Contact Details:

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

Technical Information:

Primary energy source:

Geothermal

Project description:

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

Energy centre description:

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

Heat/cooling demand phasing description:

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



PROJECTS CURRENTLY NOT BEING PURSUED BY LOCAL AUTHORITY SPONSOR

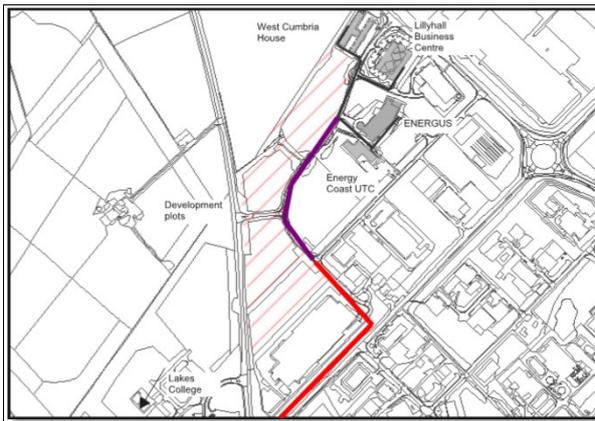


Lillyhall Hub_FES

Project Sponsor:

Allerdale Borough Council

Network Map:



Summary forecast financial information:

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

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

* Real pre-tax pre-finance

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

Project Stage

Feasibility

Project Contact Details:

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

Technical Information:

Primary energy source:

Boiler - Biomass

Project description:

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

Energy centre description:

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

Heat/cooling demand phasing description:

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

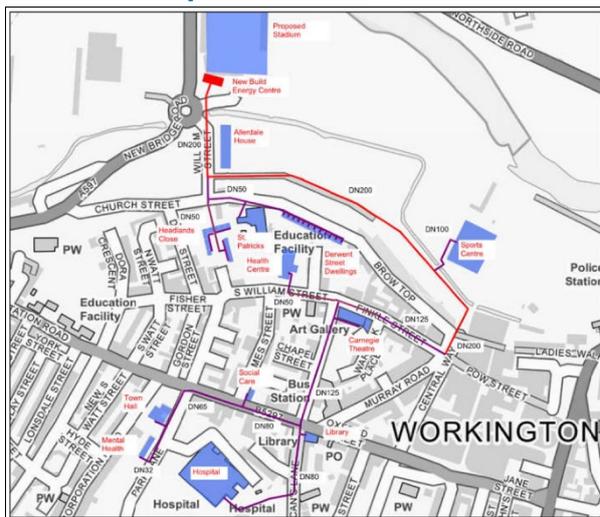


Town Centre Hub_DPD

Project Sponsor:

Allerdale Borough Council

Network Map:



Summary forecast financial information:

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

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

* Real pre-tax pre-finance

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

Project Stage

Detailed Project Development

Project Contact Details:

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

Technical Information:

Primary energy source:

CHP – Gas

Project description:

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

Energy centre description:

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

Heat/cooling demand phasing description:

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

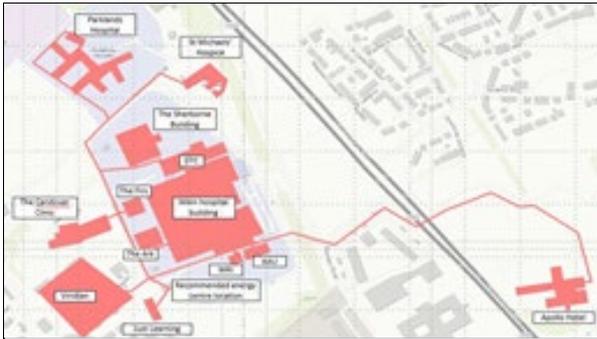


Basingstoke_FES

Project Sponsor:

Basingstoke and Deane Borough Council

Network Map:



Summary forecast financial information:

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

Project IRR*	6.80%
Considering third party finance?	Yes

* Real pre-tax pre-finance

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

Project Stage

Feasibility

Project Contact Details:

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

Technical Information:

Primary energy source:

CHP – Gas

Project description:

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

Energy centre description:

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

Heat/cooling demand phasing description:

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

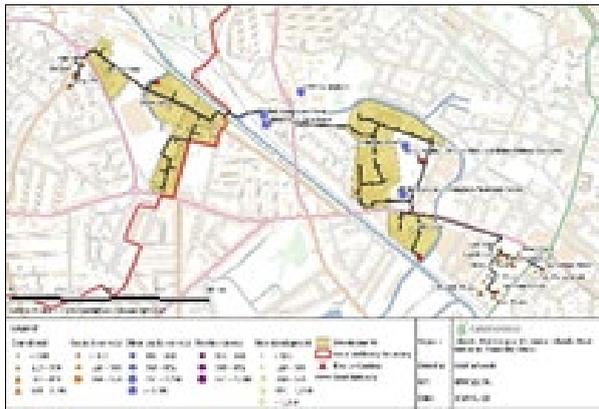


Icknield Soho Loop & Smethwick Gas CHP/WSHP_MAP

Project Sponsor:

Birmingham City Council

Network Map:



Summary forecast financial information:

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

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

* Real pre-tax pre-finance

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

Project Stage

Heat mapping and masterplanning

Project Contact Details:

LA Name:	Birmingham City Council
Contact Name:	Ellie Horwitch-Smith
Email:	ellie@energyharmonics.co.uk

Technical Information:

Primary energy source:

CHP – Gas

Project description:

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

Energy centre description:

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

Heat/cooling demand phasing description:

All consumers connected in 2021-2032.

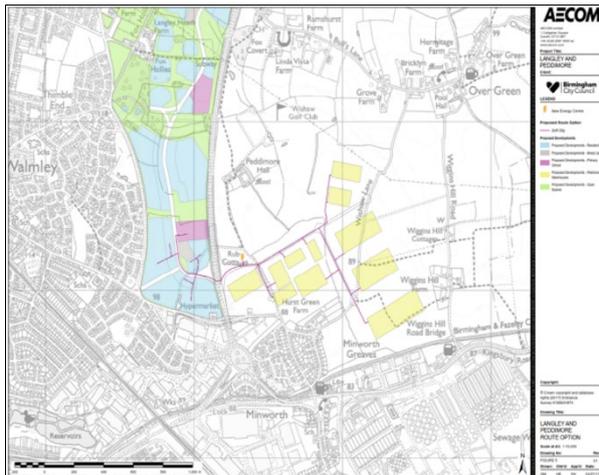


Langley & Peddimore_FES

Project Sponsor:

Birmingham City Council

Network Map:



Summary forecast financial information:

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

Project IRR*	6.60%
Considering third party finance?	No

* Real pre-tax pre-finance

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

Project Stage

Feasibility

Project Contact Details:

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

Technical Information:

Primary energy source:

CHP – Gas

Project description:

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

Energy centre description:

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

Heat/cooling demand phasing description:

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



Blackburn Town Centre_MAP

Project Sponsor:

Blackburn with Darwen Borough Council

Network Map:



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.

Summary forecast financial information:

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

Project IRR*	4.00%
Considering third party finance?	No

* Real pre-tax pre-finance

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

Project Stage

Heat mapping and masterplanning

Project Contact Details:

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



Shadsworth Industrial Estate_MAP

Project Sponsor:

Blackburn with Darwen Borough Council

Network Map:



Technical Information:

Primary energy source:

CHP – Gas

Project description:

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

Energy centre description:

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

Heat/cooling demand phasing description:

Consumers connected 2021-2026.

Summary forecast financial information:

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

Project IRR*	3.55%
Considering third party finance?	No

* Real pre-tax pre-finance

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

Project Stage

Heat mapping and masterplanning

Project Contact Details:

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



Daisyfield_MAP

Project Sponsor:

Blackburn with Darwen Borough Council

Network Map:



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:	George Robinson
Email:	hndu@beis.gov.uk

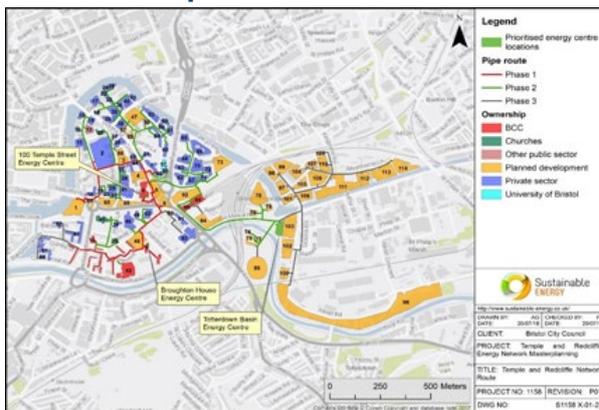


Temple and Redcliffe heat network_FES

Project Sponsor:

Bristol City Council

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£12.75
Private Wire (£m)	£0.03
Pipework / distribution capex (£m)	£23.60
Other capex (£m)	£0.00
Total capex (£m)	£36.37

Project IRR*	6.70%
Considering third party finance?	Yes

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
Not Provided	2019	2020	2028

Project Stage

Feasibility

Project Contact Details:

LA Name:	Bristol City Council
Contact Name:	Aimee Williams
Email:	aimee.williams@bristol.gov.uk

Technical Information:

Primary energy source:

Water source heat pumps

Project description:

The phase 1 network served by gas CHP and an existing biomass boiler has previously been assessed at feasibility level. The opportunity to extend the network further to the surrounding area, by utilising additional energy sources such as the Floating Harbour was identified as a way to help meet Bristol's ambition to be carbon neutral by 2050. The network looks to connect many private sector and planned developments, with phase 2 connecting all planned developments that are brought forward by 2023, and phase 3 connecting longer term developments.

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 phase 1 network is served by the existing biomass boiler located at Broughton House and the proposed gas CHP at 100 Temple Street. A 4 MW WSHP, 930 kWth gas CHP and 19 MW of peak and reserve gas boilers would be installed at Totterdown Basin in phase 2 with an additional 14 MW of gas boilers installed at Totterdown Basin in phase 3.

Heat/cooling demand phasing description:

The network is split into 3 phases. Phase 1 includes the network assessed in the 100 Temple Street Feasibility Study (2018) with the addition of the Aspire planned development. Phase 2 extends significantly to include all connections that could be brought forward by 2023, while phase 3 extends to longer term planned developments.

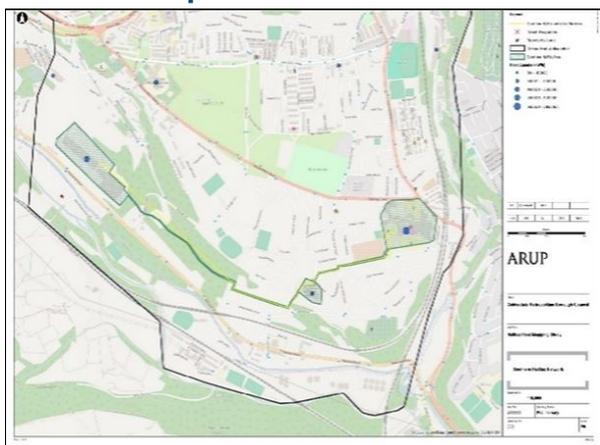


South Halifax

Project Sponsor:

Calderdale Metropolitan Borough Council

Network Map:



Summary forecast financial information:

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

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

* Real pre-tax pre-finance

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

Project Stage

Heat mapping and masterplanning

Project Contact Details:

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

Technical Information:

Primary energy source:

CHP – Gas

Project description:

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

Energy centre description:

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

Heat/cooling demand phasing description:

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

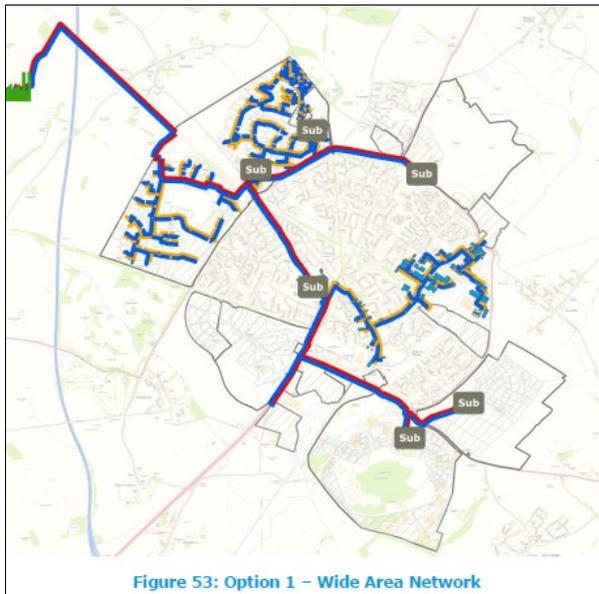


Cherwell - Bicester EcoTown_FES

Project Sponsor:

Cherwell District Council

Network Map:



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.

Summary forecast financial information:

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

Project IRR*	5.27%
Considering third party finance?	Yes

* Real pre-tax pre-finance

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

Project Stage

Feasibility

Project Contact Details:

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

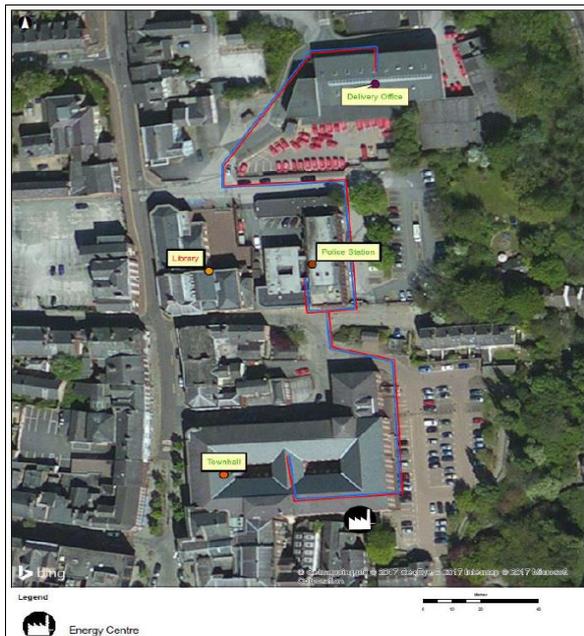


Macclesfield Town Centre Heat Network_FES

Project Sponsor:

Cheshire East Council

Network Map:



Technical Information:

Primary energy source:

CHP – Gas

Project description:

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

Energy centre description:

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

Heat/cooling demand phasing description:

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

Summary forecast financial information:

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

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

* Real pre-tax pre-finance

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

Project Stage

Feasibility

Project Contact Details:

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

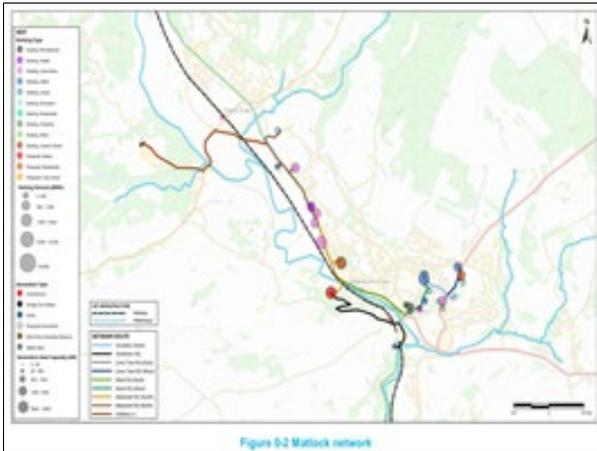


Matlock_MAP

Project Sponsor:

Derbyshire county

Network Map:



Summary forecast financial information:

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

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

* Real pre-tax pre-finance

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

Project Stage

Heat mapping and masterplanning

Project Contact Details:

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

Technical Information:

Primary energy source:

Waste heat – Industrial (without heat pump)

Project description:

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

Energy centre description:

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

Heat/cooling demand phasing description:

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

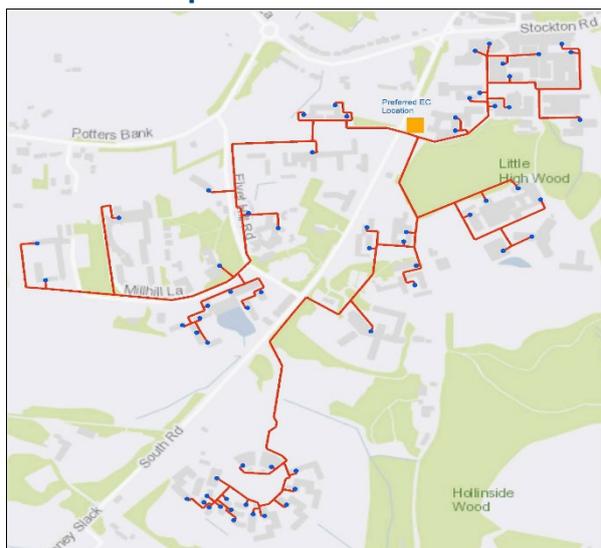


Durham University_FES

Project Sponsor:

Durham County Council

Network Map:



Summary forecast financial information:

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

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

* Real pre-tax pre-finance

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

Project Stage

Feasibility

Project Contact Details:

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

Technical Information:

Primary energy source:

CHP – Gas

Project description:

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

Energy centre description:

The preferred location for the Energy Centre is known as EC1, the green space at A177 adjacent to Ogden Centre. Option B proposes 2 x 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, 15650MWhe), PHASE 2: Western cluster in year 2021 (6630MWhth, 5360MWhe) PHASE 3: Eastern cluster in year 2022 (6850MWhth, 2910MWhe), and PHASE 4: Southern Cluster in year 2023 (3610MWhth, 1280MWhe). (Table 7-1 p67). This phasing arrangement and timetable has been used for theoretical demonstration purposes, and the real timetable will depend on the University construction timetable.



Northop Road_MAP

Project Sponsor:

Flintshire County Council

Network Map:



Summary forecast financial information:

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

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

* Real pre-tax pre-finance

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

Project Stage

Heat mapping and masterplanning

Project Contact Details:

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

Technical Information:

Primary energy source:

Boiler - Biomass

Project description:

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

Energy centre description:

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

Heat/cooling demand phasing description:

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

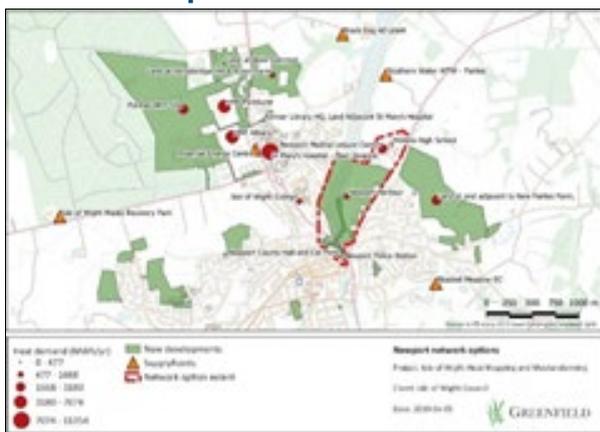


Newport Harbour_MAP

Project Sponsor:

Isle of Wight Council

Network Map:



Technical Information:

Primary energy source:

Waste heat – Industrial (with heat pump)

Project description:

Heat network supplying Newport Harbour development area, Newport Leisure Centre and Medina College.

Energy centre description:

Heat recovery of waste heat from existing Black Dog AD CHP plant.

Heat/cooling demand phasing description:

Early connection to existing consumers and connections with new developments as they are built.

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:	Jim Fawcett
Email:	jim.fawcett@iow.gov.uk

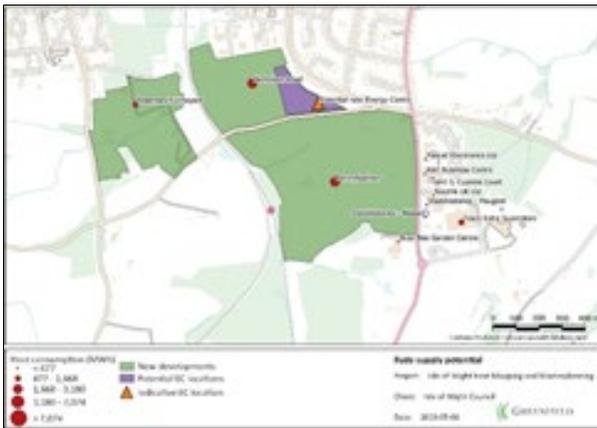


Nicholson Road_MAP

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:	Jim Fawcett
Email:	jim.fawcett@iow.gov.uk

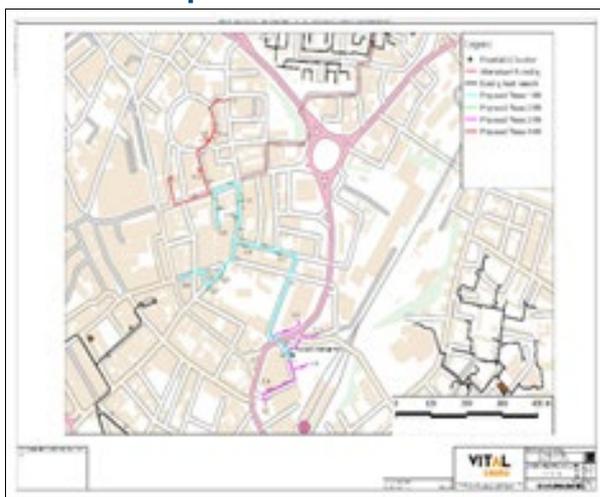


Cultural Quarter_FES

Project Sponsor:

Leicester City Council

Network Map:



Summary forecast financial information:

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

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

* Real pre-tax pre-finance

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

Project Stage

Feasibility

Project Contact Details:

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

Technical Information:

Primary energy source:

CHP – Gas

Project description:

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

Energy centre description:

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

Heat/cooling demand phasing description:

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

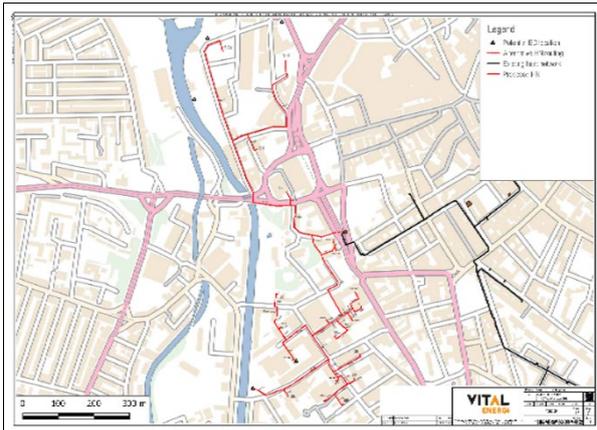


Waterside_FES

Project Sponsor:

Leicester City Council

Network Map:



Summary forecast financial information:

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

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

* Real pre-tax pre-finance

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

Project Stage

Feasibility

Project Contact Details:

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

Technical Information:

Primary energy source:

CHP – Gas

Project description:

Waterside is a regeneration area near the Centre of Leicester. The potential for a new DNH 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 DNH would be built in one phase.



County Hall site at Glenfield_FES

Project Sponsor:
Leicestershire county

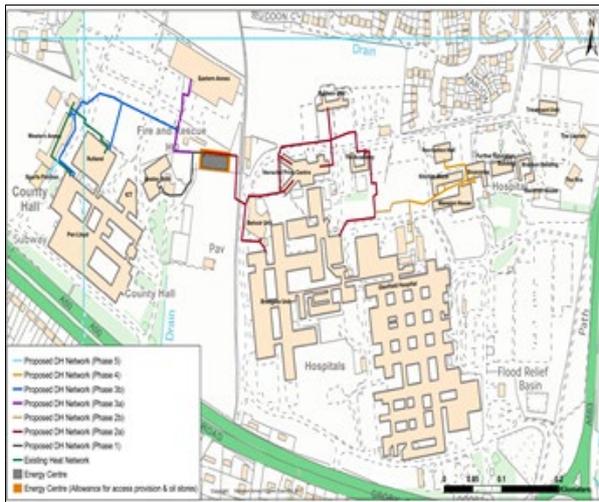
Technical Information:

Primary energy source:
CHP – Gas

Network Map:

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

Summary forecast financial information:

Heat/cooling demand phasing description:

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

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

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

* Real pre-tax pre-finance

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

Project Stage

Feasibility

Project Contact Details:

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



New Cross Heat Network_FES

Project Sponsor:

London Borough of Lewisham

Network Map:



Technical Information:

Primary energy source:

CHP – EfW

Project description:

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

Energy centre description:

Not Provided

Heat/cooling demand phasing description:

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

Summary forecast financial information:

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

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

* Real pre-tax pre-finance

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

Project Stage

Feasibility

Project Contact Details:

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

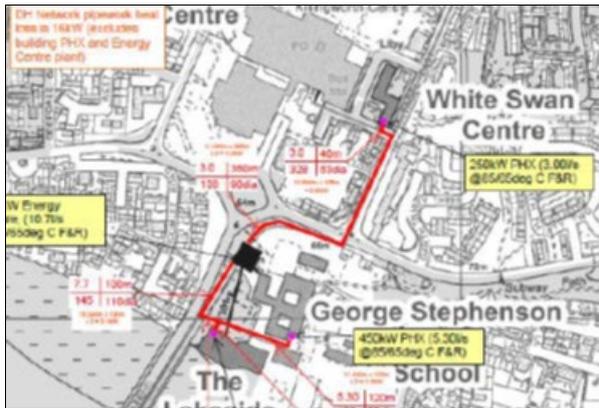


Killingworth Moor_MAP

Project Sponsor:

North Tyneside Metropolitan Borough Council

Network Map:



Summary forecast financial information:

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

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

* Real pre-tax pre-finance

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

Project Stage

Heat mapping and masterplanning

Project Contact Details:

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

Technical Information:

Primary energy source:

CHP – Gas

Project description:

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

Energy centre description:

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

Heat/cooling demand phasing description:

The project is currently proposed as a single phase.

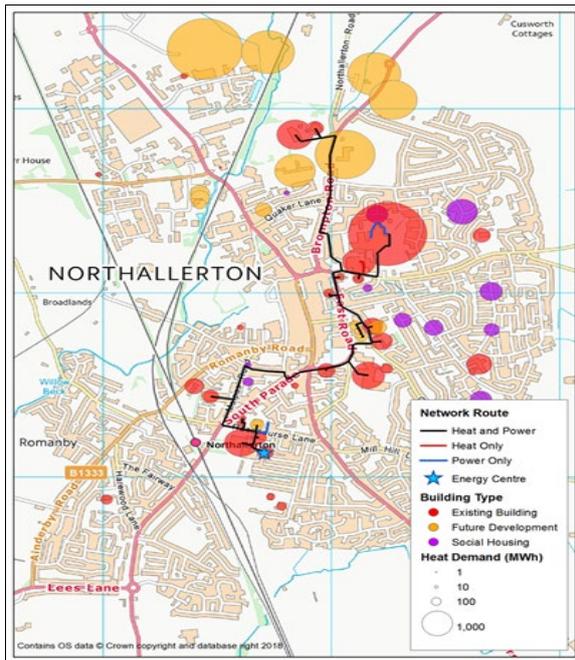


NORTHALLERTON DISTRICT HEAT NETWORK_Initial Funding

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

Initial Funding

Project Contact Details:

LA Name:	North Yorkshire County Council
Contact Name:	Mark Rushworth
Email:	Mark.Rushworth@northyorks.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.

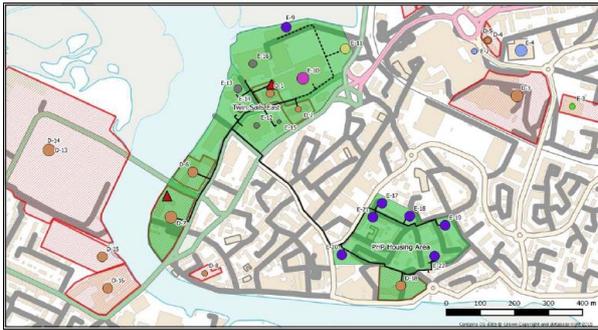


Poole - Twin Sails East_FES

Project Sponsor:

Poole Borough Council

Network Map:



Summary forecast financial information:

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

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

* Real pre-tax pre-finance

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

Project Stage

Feasibility

Project Contact Details:

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

Technical Information:

Primary energy source:

CHP – Gas

Project description:

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

Energy centre description:

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

Heat/cooling demand phasing description:

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

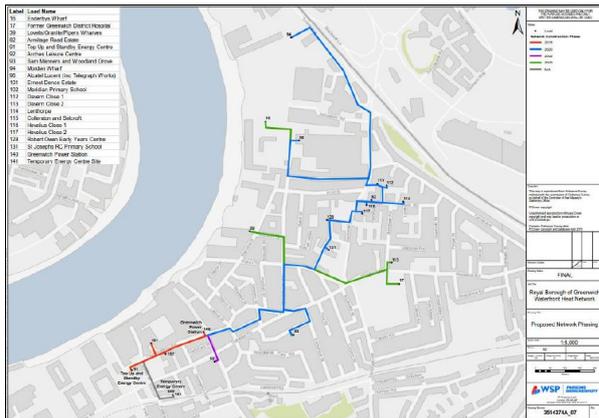


Greenwich Power Station District Heat Network_FES

Project Sponsor:

Royal Borough of Greenwich

Network Map:



Summary forecast financial information:

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

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

* Real pre-tax pre-finance

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

Project Stage

Feasibility

Project Contact Details:

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

Technical Information:

Primary energy source:

CHP – Gas

Project description:

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

Energy centre description:

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

Heat/cooling demand phasing description:

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

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

2022: Assumed earliest date for redevelopment of Arches Leisure Centre

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



Charlestown_FES

Project Sponsor:

Salford City Council

Network Map:



Summary forecast financial information:

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

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

* Real pre-tax pre-finance

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

Project Stage

Feasibility

Project Contact Details:

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

Technical Information:

Primary energy source:

CHP – Gas

Project description:

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

Energy centre description:

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

Heat/cooling demand phasing description:

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

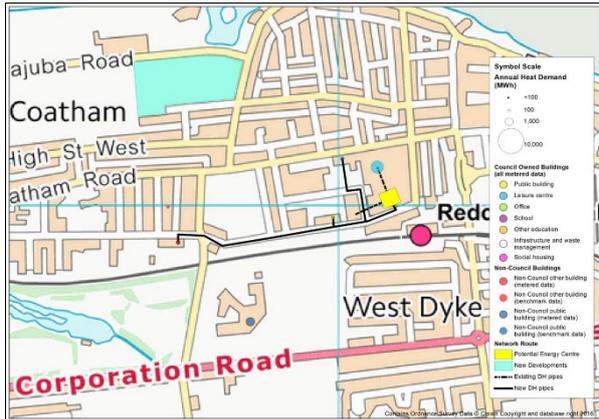


Central Redcar_FES

Project Sponsor:

Tees Valley Combined Authority

Network Map:



Summary forecast financial information:

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

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

* Real pre-tax pre-finance

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

Project Stage

Feasibility

Project Contact Details:

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

Technical Information:

Primary energy source:

CHP – Gas

Project description:

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

Energy centre description:

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

Heat/cooling demand phasing description:

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

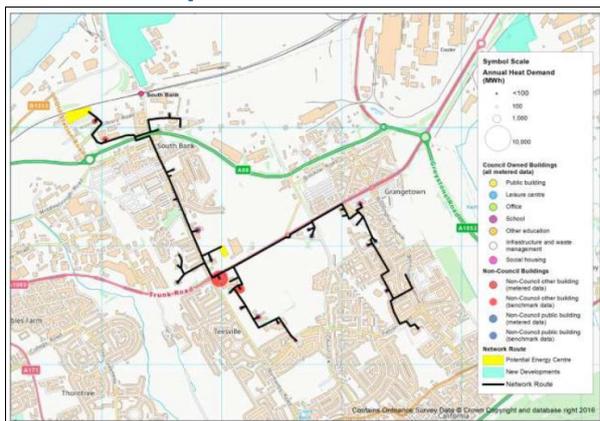


South Bank_FES

Project Sponsor:

Tees Valley Combined Authority

Network Map:



Summary forecast financial information:

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

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

* Real pre-tax pre-finance

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

Project Stage

Feasibility

Project Contact Details:

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

Technical Information:

Primary energy source:

CHP – Biogas

Project description:

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

Energy centre description:

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

Heat/cooling demand phasing description:

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

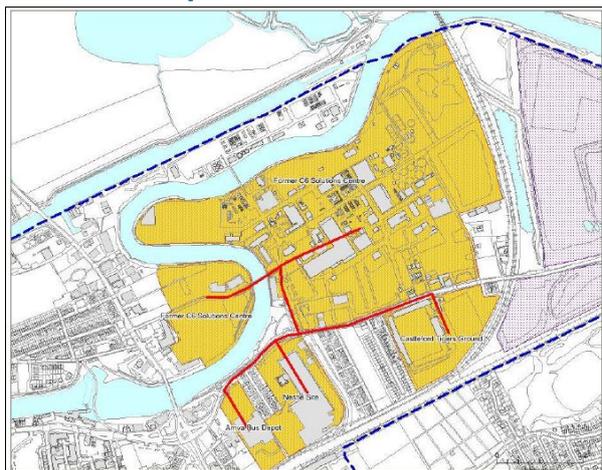


Castleford C6 Development_MAP

Project Sponsor:

Wakefield Metropolitan District Council

Network Map:



Summary forecast financial information:

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

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

* Real pre-tax pre-finance

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

Project Stage

Heat mapping and masterplanning

Project Contact Details:

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

Technical Information:

Primary energy source:

Water source heat pumps

Project description:

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

Energy centre description:

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

Heat/cooling demand phasing description:

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