



Department for
Business, Energy
& Industrial Strategy

HEAT NETWORKS DELIVERY UNIT: 2019 Q1 PIPELINE



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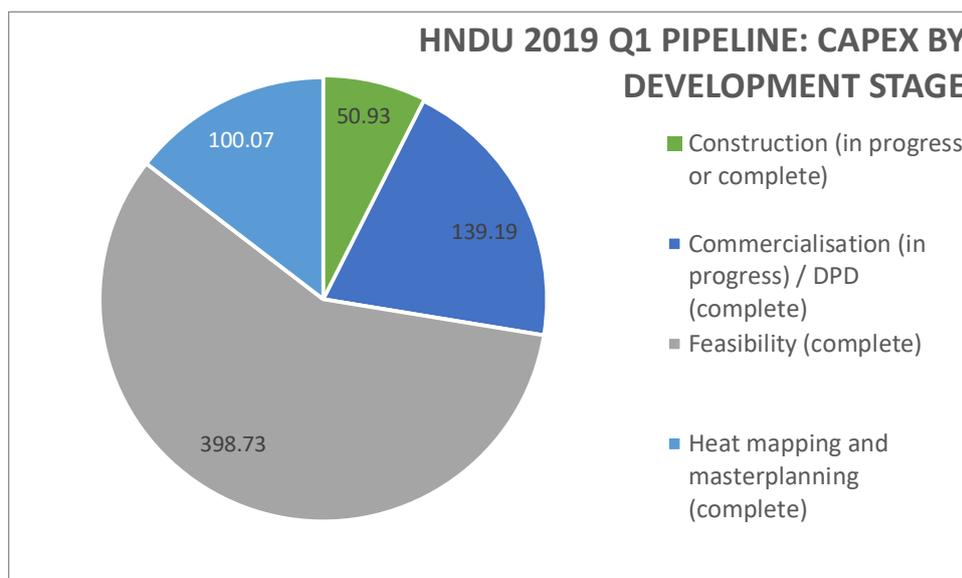
Introduction

The projects we have captured in this pipeline are live projects with assumptions being refined on a regular basis as new information is made available. While every endeavour has been made to reflect as up-to-date information as possible, the information will invariably represent a single point in time (typically a consultant's report) and we have indicated the year of the information. The one-page summaries are intended to:

- increase the visibility of what is happening in district energy across England & Wales;
- better enable potential sources of finance to assess the scale of the sector;
- facilitate conversations between investors and projects; and
- ultimately enable new finance to enter the sector.

If you are an investor and have recommendations on what other information we could provide to better enable your investment, please email these to hndu@beis.gov.uk FAO George Robinson.

2019 Q1 Capex Pipeline: £689m of which £51m is under construction





The above pipeline represents 50 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:

Region	At Funding / Tender	HNDU Active Support	Total
North East	4	1	5
North West	13	16	29
Yorkshire and The Humber	19	5	24
East Midlands	1	4	5
West Midlands	4	9	13
East of England	1	2	3
London	2	1	3
South East	9	3	12
South West	7	4	11
Wales	4	4	8
Total	64	49	113



COMMERCIALISATION STAGE PROJECTS

(DETAILED PROJECT DEVELOPMENT WORK COMPLETE)



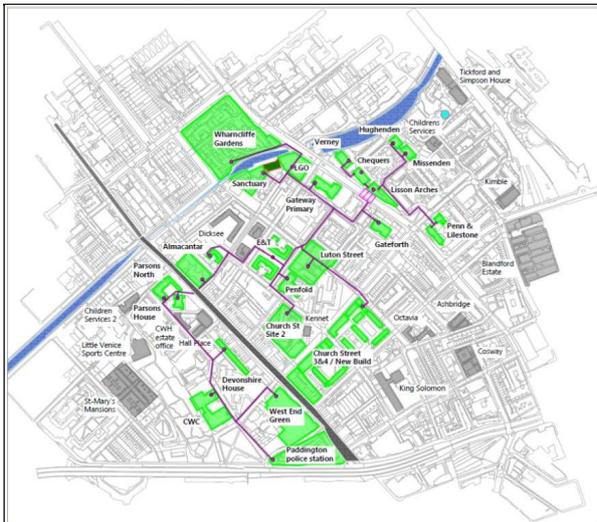


Church Street_COM

Project Sponsor:

City of Westminster

Network Map:



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:	heatnetworks@beis.gov.uk

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

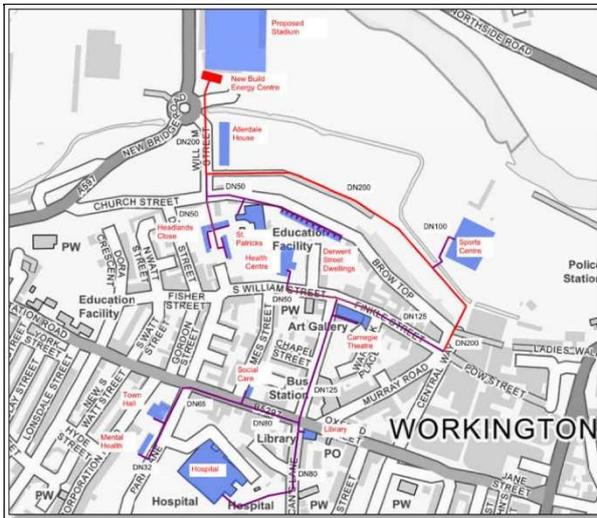


Town Centre Hub_DPDP

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:	heatnetworks@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.

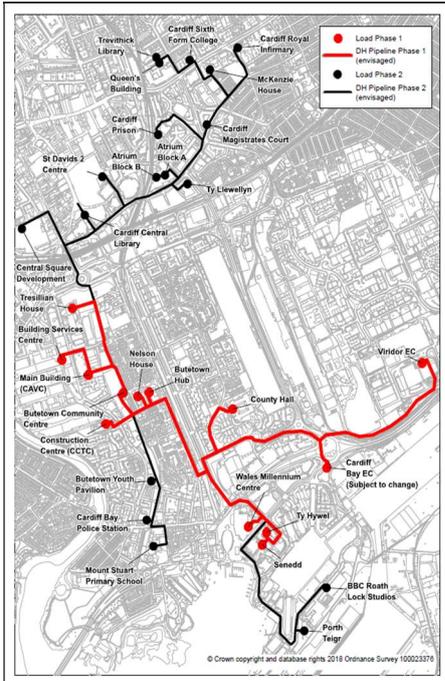


Cardiff Bay Heat Network_DPD

Project Sponsor:

Cardiff Council

Network Map:



Technical Information:

Primary energy source:

CHP – EfW

Project description:

Phase 1 will start by serving public sector buildings from 4 core stakeholders, including Cardiff Council and the National Assembly for Wales, south of the mainline Cardiff to London railway line. The full network would expand north of the mainline and east, connecting other major public sector loads. Significant further potential exists to connect additional private sector load in close proximity to the planned route. The primary heat source for the network is envisaged to be an existing Energy from Waste plant, which has the potential to supply the vast majority of the heat demand across the full network and beyond. In the long term potential exists to connect loads further to the north. The Outline Business Case (OBC) for the heat network was approved by the Council's Cabinet on the 19th April 2018.

Energy centre description:

The energy centre containing the primary heat source already exists. The Energy from Waste plant established through the Council's Project Gwyrdd Energy from Waste project processes waste to raise steam used in a 30MWe pass-out condensing steam turbine.

A separate energy centre, containing top-up/back-up gas boilers, is proposed to provide resilience for the network.

Heat/cooling demand phasing description:

The heat demand for phase 1 and the full scheme is dominated by public sector heat demand. The total demand for the full scheme is 34.5GWh/annum; however, an additional private sector heat demand of circa 22GWh exists directly adjacent to the planned network route and which could be connected at very low cost.

Summary forecast financial information:

Energy generation capex (£m)	£8.92
Private Wire (£m)	£0.00
Pipework / distribution capex (£m)	£13.21
Other capex (£m)	£4.11
Total capex (£m)	£26.24

Project IRR*	6.50%
Considering third party finance?	No

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
2020	2020	2022	2028

Project Stage

Detailed Project Development

Project Contact Details:

LA Name:	Cardiff Council
Contact Name:	Gareth Harcombe
Email:	gharcombe@cardiff.gov.uk



Town Centre Heat Network_DPD

Project Sponsor:

Crawley Borough Council

Technical Information:

Primary energy source:

CHP – Gas

Network Map:



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.

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

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.

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:	heatnetworks@beis.gov.uk



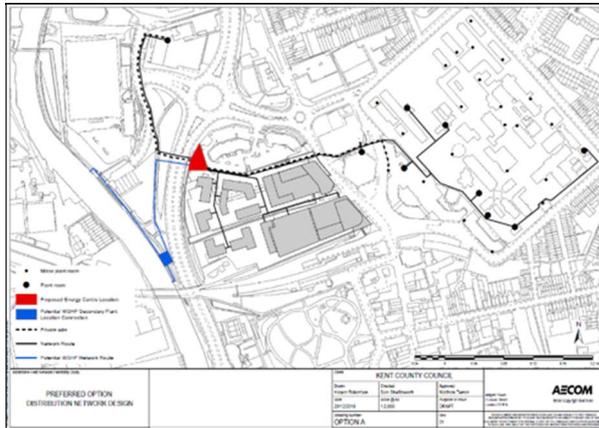
Maidstone Heat Network_DPD

Information valid as at: 2018

Project Sponsor:

Kent County Council

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£4.70
Private Wire (£m)	£0.00
Pipework / distribution capex (£m)	£1.30
Other capex (£m)	£3.10
Total capex (£m)	£9.10

Project IRR*	2.50%
Considering third party finance?	Yes

* Real pre-tax pre-finance

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

Project Stage

Detailed Project Development

Project Contact Details:

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

Technical Information:

Primary energy source:

Water source heat pumps

Project description:

Central Maidstone has been identified as having good potential for district heating. A concentrated number of buildings – owned by relatively few individual entities – have been shown to have a high demand for heat and consume significant amounts of electrical power as well. At present, large quantities of natural gas are combusted in their respective on-site boiler heating systems, leading to relatively poor environmental performance.

Building types include offices, residential accommodation, community facilities and a large prison/foreign national detention centre (HMP Maidstone). A large, mixed-use development is planned for this area, offering potential development synergies with the creation of new energy networks.

Energy centre description:

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

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

Heat/cooling demand phasing description:

Phase 1 – to power heat on Q1 2022

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

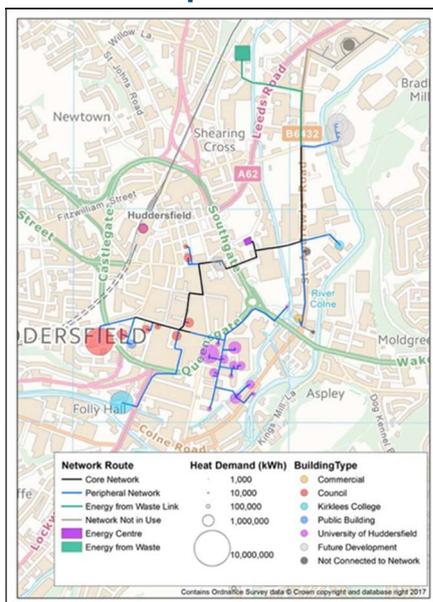
Works to be undertaken in parallel with the first phase of the Maidstone East development – the location of the energy centre. Later phases of Maidstone East development and other proposed building projects would connect when applicable.

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:

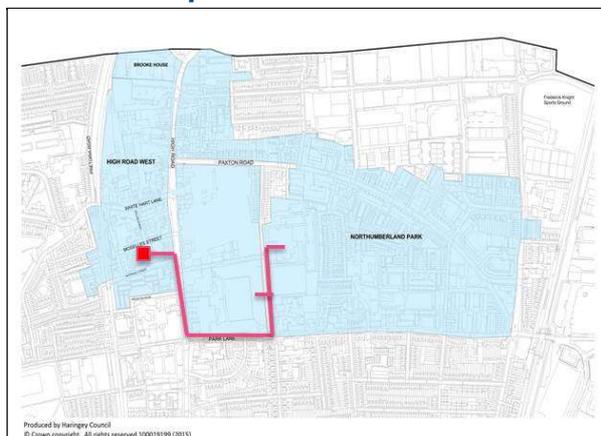
LA Name:	Kirklees Council
Contact Name:	John Atkinson
Email:	John.atkinson@kirklees.gov.uk

North Tottenham_DPD

Project Sponsor:

London Borough of Haringey

Network Map:



Summary forecast financial information:

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

Project IRR*	Not provided
Considering third party finance?	Yes

* Real pre-tax pre-finance

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

Project Stage

Detailed Project Development

Project Contact Details:

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

Technical Information:

Primary energy source:

CHP – Gas

Project description:

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

Energy centre description:

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

Heat/cooling demand phasing description:

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



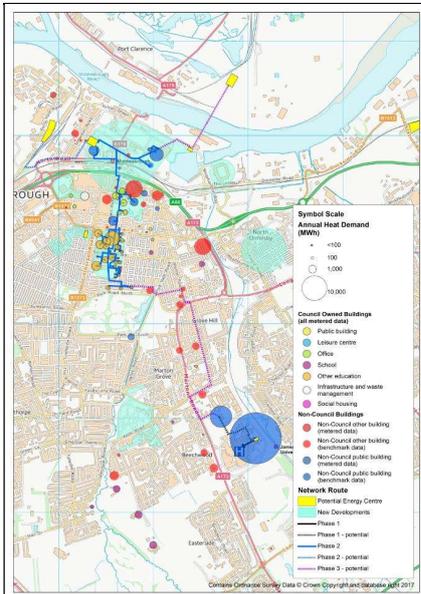
Middlesbrough_DPD

Information valid as at: 2017

Project Sponsor:

Tees Valley Combined Authority

Network Map:



Summary forecast financial information:

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

Project IRR*	Not provided
Considering third party finance?	Yes

* Real pre-tax pre-finance

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

Project Stage

Detailed Project Development

Project Contact Details:

LA Name:	Tees Valley Combined Authority
Contact Name:	Alan Weston
Email:	alan.weston@teesvalley-ca.gov.uk

Technical Information:

Primary energy source:

CHP – Gas

Project description:

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

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

Energy centre description:

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

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

Heat/cooling demand phasing description:

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



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.

The Local Authorities, included in this report, that we are aware are actively progressing projects towards DPD are:

Bolton Metropolitan Borough Council
Bradford Metropolitan District Council
Bristol City Council
Cambridgeshire County Council
Cheshire East Council
Cheshire East Council
Halton Borough Council
Hull City Council
London Borough of Haringey
Plymouth City Council
Solihull Metropolitan Borough Council

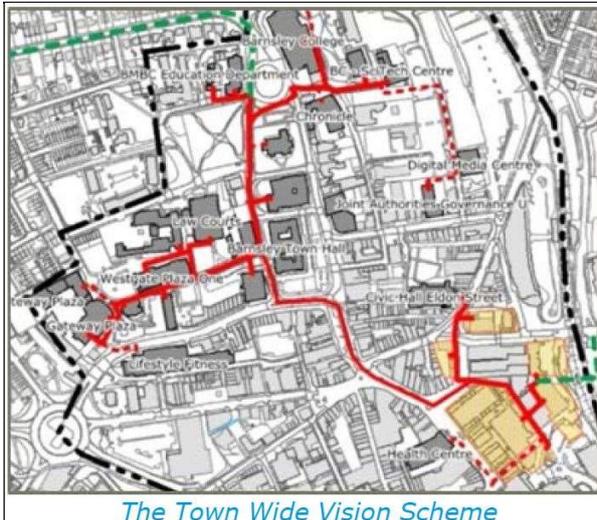


Barnsley Civic Quarter_FES

Project Sponsor:

Barnsley Metropolitan Borough Council

Network Map:



Summary forecast financial information:

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

Project IRR*	4.40%
Considering third party finance?	Not Stated

* 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:	heatnetworks@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:



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:	heatnetworks@beis.gov.uk

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.



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:	heatnetworks@beis.gov.uk

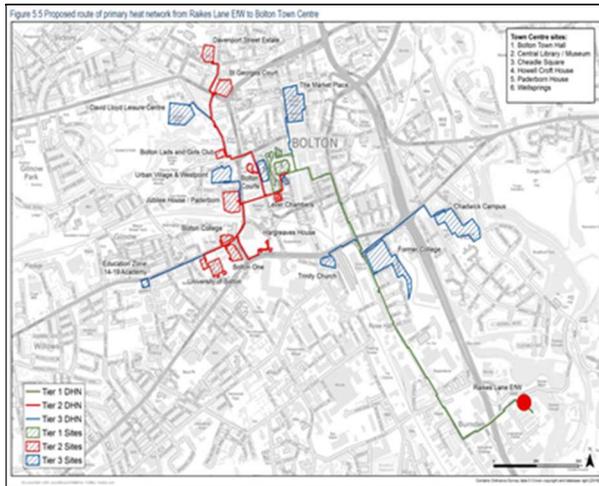


Bolton Town Centre EfW_FES

Project Sponsor:

Bolton Metropolitan Borough Council

Network Map:



Summary forecast financial information:

Energy generation capex (£m)	£0.00
Private Wire (£m)	£0.00
Pipework / distribution capex (£m)	£9.61
Other capex (£m)	£1.92
Total capex (£m)	£11.53

Project IRR*	8.10%
Considering third party finance?	Not Stated

* Real pre-tax pre-finance

FID	Construct ion Start	Heat On (initial)	Heat On (full)
2018	2019	2020	2030

Project Stage

Feasibility

Project Contact Details:

LA Name:	Bolton Metropolitan Borough Council
Contact Name:	George Robinson
Email:	heatnetworks@beis.gov.uk

Technical Information:

Primary energy source:

CHP – EfW

Project description:

Opportunity to connect the existing Raikes Lane Energy from Waste Plant owned by the Greater Manchester Waste Disposal Agency (GMWDA) and run by Viridor under concession up to 2033/34 to Bolton town centre.

Energy centre description:

The proposal analysed looks at housing back up plant on the Raikes Lane site; however, alternative options will be explored given likely space constraints.

Heat/cooling demand phasing description:

Tier 1 customers (public sector) annual heat demand estimated at 4.1GWh. These include: Town Hall, Central Library/Museum and others. Tier 2 customers (other public sector) annual heat demand estimated at 14.3GWh. These include: the university and college sites, the Bolton One multi use facility and Social Housing sites run by Bolton at Home. Tier 3 customers (private sector) primarily relate to future private developments estimated to require 8.3GWh of annual heat demand. These include redevelopment of Chadwick Campus, Cheadle Square and others.

Tier 1 forecast to connect 2020 and each subsequent tier to connect 5 years after the previous.



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:	heatnetworks@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.

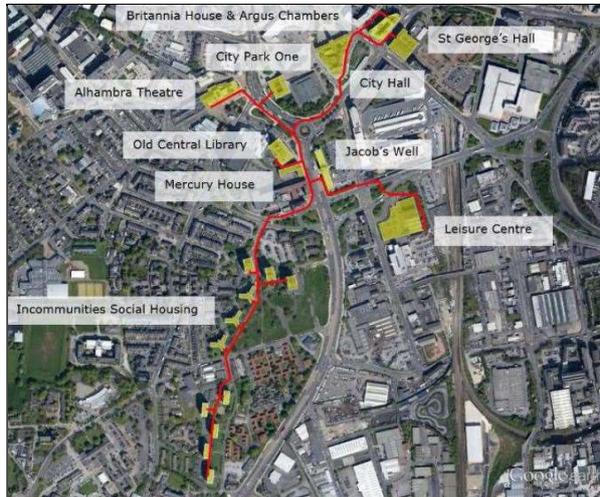


Bradford Civic Quarter_FES

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:	Neill Morrison
Email:	neill.morrison@bradford.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.



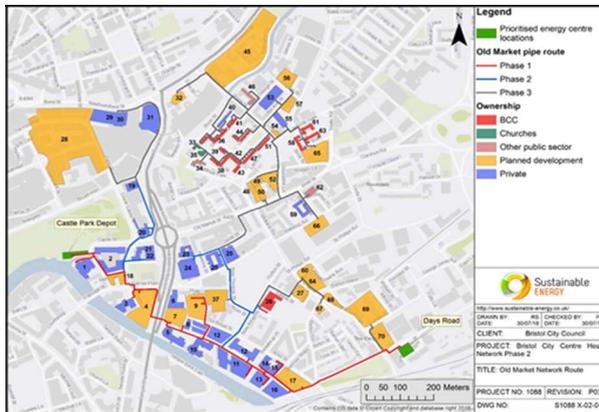
City Centre Phase 2_FES

Information valid as at: 2018

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:	heatnetworks@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.

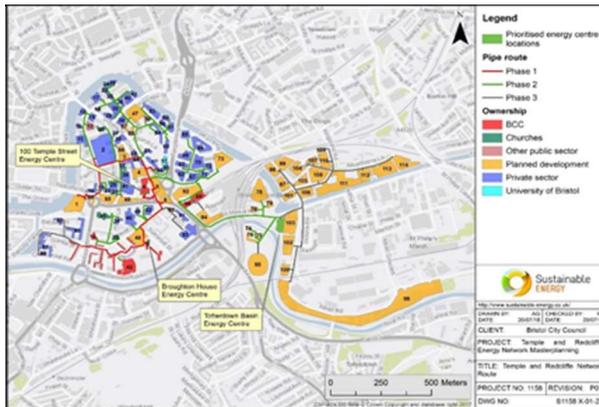


Temple and Redcliffe heat network_FES

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:	George Robinson
Email:	heatnetworks@beis.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.

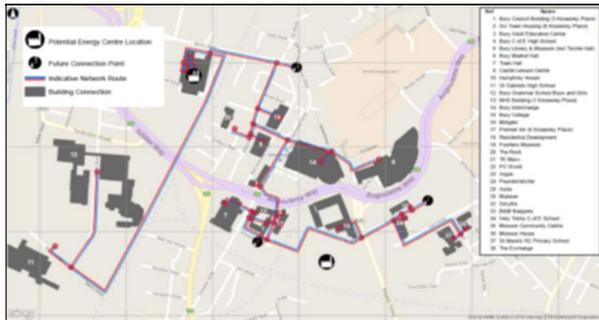


Bury Town Centre_FES

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?	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:	Bury Metropolitan Borough Council
Contact Name:	George Robinson
Email:	heatnetworks@beis.gov.uk

Technical Information:

Primary energy source:

CHP – Gas

Project description:

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

Energy centre description:

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

- Phase 1 - Two CHP units and two boilers

- Phase 2 - An additional boiler

- Phase 3 - An additional CHP unit and Boiler

The complete energy centre will contain 3x 400 kWe (504 kWth) CHP engines, and 4x 2MW gas boilers, with 60 m3 thermal storage.

Heat/cooling demand phasing description:

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

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

Phase 3: Connection to buildings east of the Metrolink.

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

- Eastern retail loads in Angouleme retail park

- Residential development on Knowsley Street

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

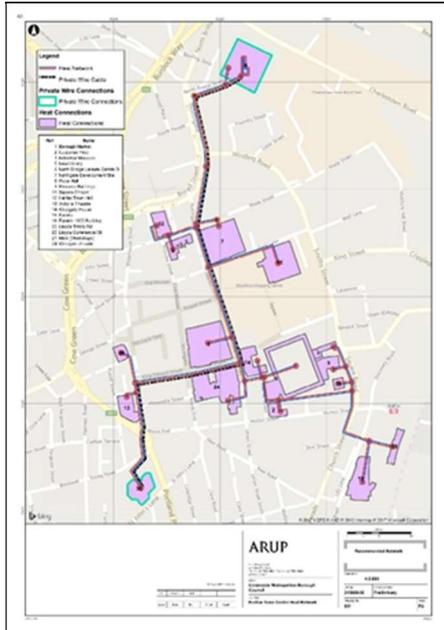


Halifax Town Centre_FES

Project Sponsor:

Calderdale Metropolitan Borough Council

Network Map:



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:	heatnetworks@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:	heatnetworks@beis.gov.uk

Technical Information:

Primary energy source:

Ground source heat pump

Project description:

A new centralised open-loop ground source heat pump energy centre to serve 296 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 an open loop sink to the Greensands Aquifer, 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 steelframe, 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 summer 2020, with a view to testing the system's operation. Further properties will be connected between 2020 and 2025, reaching an estimated peak of 90% of the village's properties by 2025.

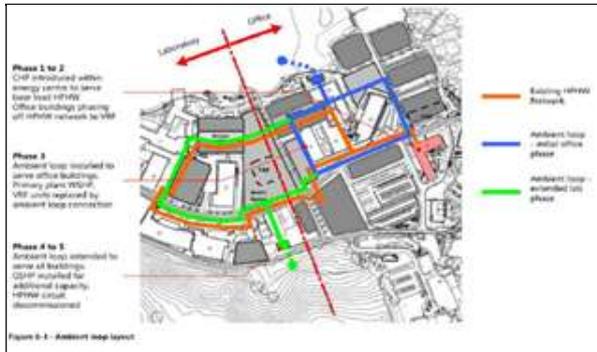


Alderley Park_FES

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:	Dan Griffiths
Email:	Dan.Griffiths@cheshireeast.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

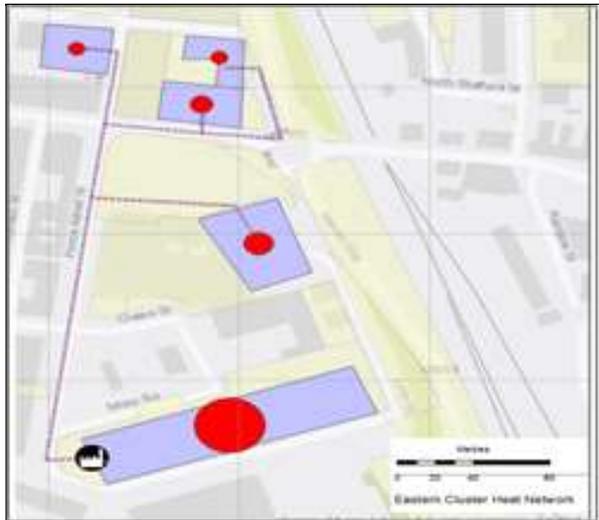


Crewe Town Centre_FES

Project Sponsor:

Cheshire East Council

Network Map:



Technical Information:

Primary energy source:

CHP – Gas

Project description:

Heat and Power from CHP, with gas back up. Heat to be provided to Lifestyle Centre, Courthouse, Lyceum Theatre and Municipal Buildings. Electricity sold to Lifestyle Centre, Lyceum Theatre and Municipal buildings via a private wire network.

Energy centre description:

Energy Centre to include 360kWe CHP, 2.7MWth gas boiler, and 170m³ thermal store. Potential EC location in an extension of the plantroom of the Lifestyle Centre. The extension footprint to house scheme energy plants is proposed over two floors.

Heat/cooling demand phasing description:

Peak heat demand is 9.3MW

Summary forecast financial information:

Energy generation capex (£m)	£0.98
Private Wire (£m)	£0.40
Pipework / distribution capex (£m)	£0.75
Other capex (£m)	£0.17
Total capex (£m)	£2.30

Project IRR*	2.00%
Considering third party finance?	Yes

* Real pre-tax pre-finance

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

Project Stage

Feasibility

Project Contact Details:

LA Name:	Cheshire East Council
Contact Name:	Dan Griffiths
Email:	Dan.Griffiths@cheshireeast.gov.uk

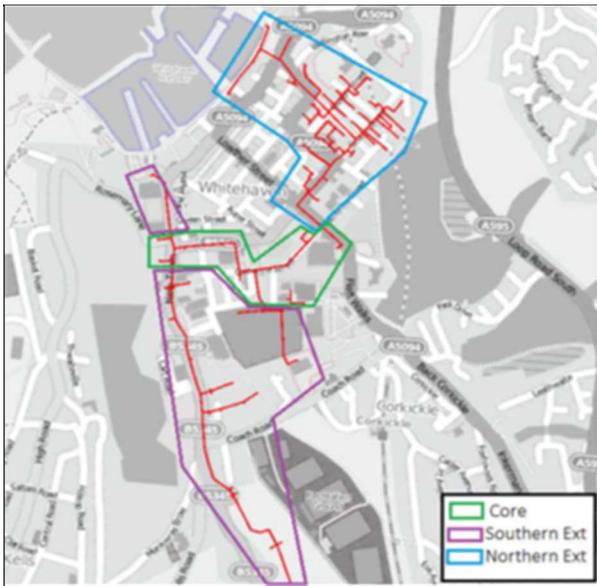


Whitehaven Minewater Heat Kells Lane_FES

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:	heatnetworks@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.

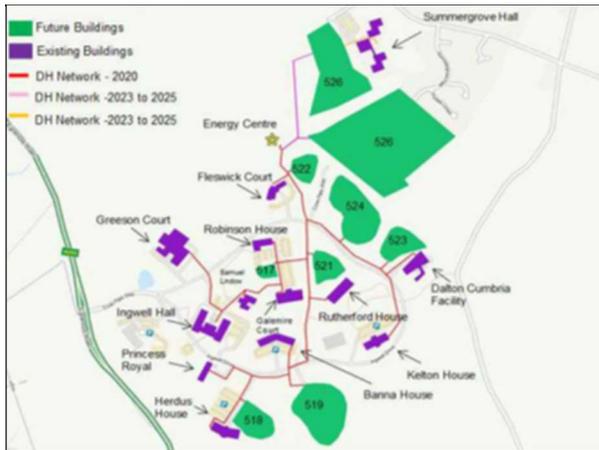


Whitehaven Westlakes Science Park_FES

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:	heatnetworks@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:

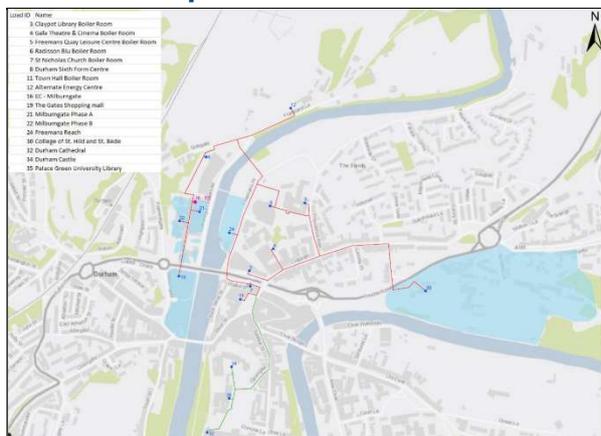
The network is proposed in 3 phases. The first connections (a selection of existing and planned buildings) are planned in 2020, the second phase includes the proposed buildings known as Plot 526, and the third phase, Summergrove Hall is planned for after 2025.

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:

CHP – Gas

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 be considered.

Energy centre description:

A number of energy centre locations have been considered. The feasibility was based upon the energy centre being located in the Milburn Gate development. The best economically performing option of the preferred scenarios is for 1x1MW River Source Heat pump initially and 2 x 800kWe CHP units to be located in the Energy Centre. After 15 years, the CHP units are to be retired, and Heat Pump capacity increased to 2x 1MW units.

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 uncertain whether or not to take forward a private wire scheme as it doesn't want to be tied into carbon inefficient Gas CHP.

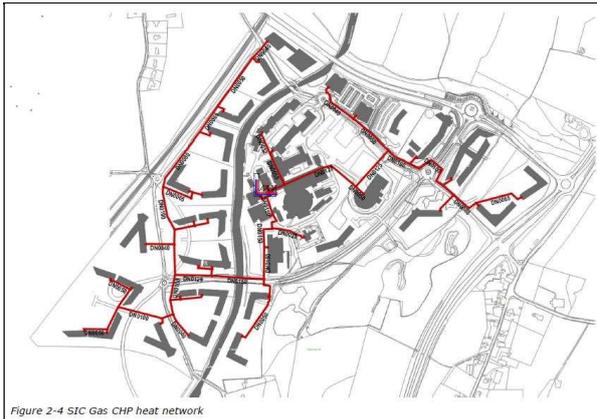


East Runcorn Daresbury Energy Network_FES

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:	heatnetworks@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:	George Robinson
Email:	heatnetworks@beis.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

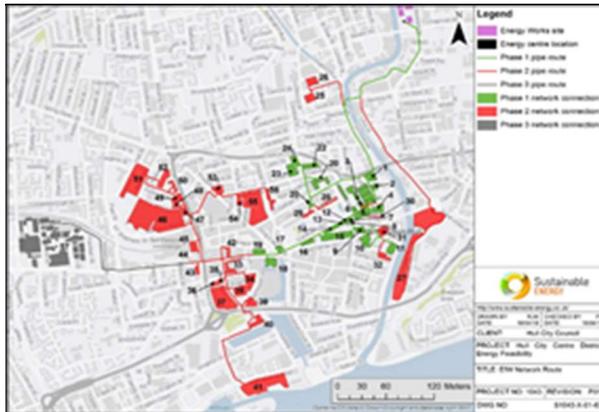


Hull City Centre_FES

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:	Martin Budd
Email:	martin.budd@hullcc.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.

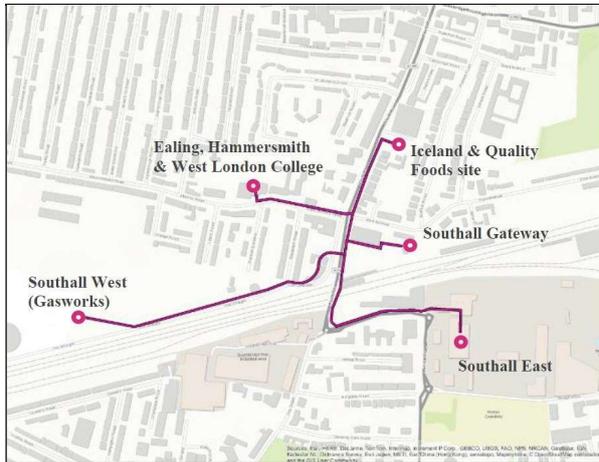


Southall DE_FES

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:	heatnetworks@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.

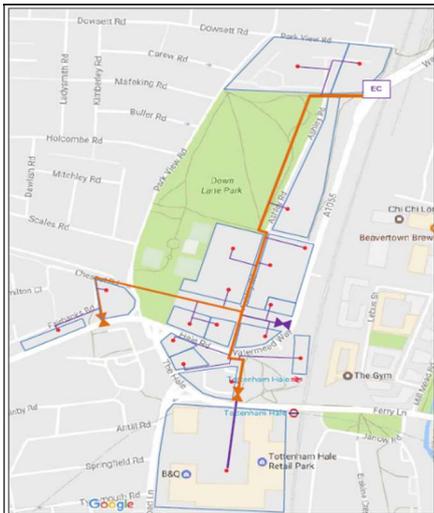


Tottenham Hale_FES

Project Sponsor:

London Borough of Haringey

Network Map:



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.

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.

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:	Tim Starley-Grainger
Email:	Tim.Starley-Grainger@haringey.gov.uk



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:	Tim Starley-Grainger
Email:	Tim.Starley-Grainger@haringey.gov.uk

Technical Information:

Primary energy source:

CHP – Gas

Project description:

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

Energy centre description:

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

Heat/cooling demand phasing description:

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

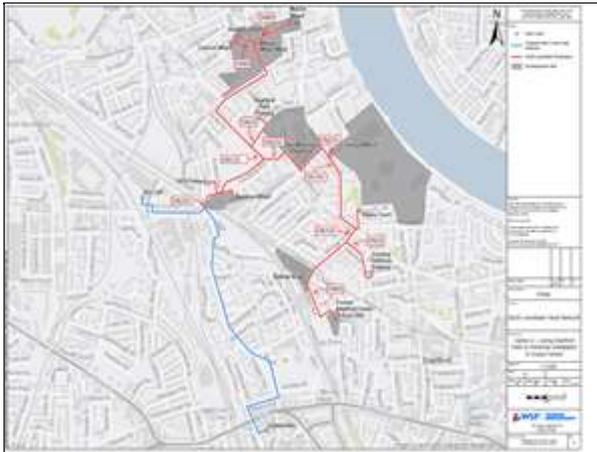


North Lewisham Heat Network_FES

Project Sponsor:

London Borough of Lewisham

Network Map:



Summary forecast financial information:

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

Project IRR*	15.30%
Considering third party finance?	Yes

* Real pre-tax pre-finance

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

Project Stage

Feasibility

Project Contact Details:

LA Name:	London Borough of Lewisham
Contact Name:	George Robinson
Email:	heatnetworks@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.

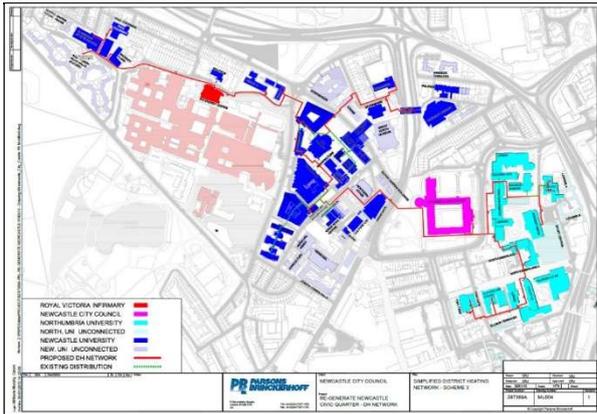


Civic Quarter District Energy Scheme_FES

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:	heatnetworks@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

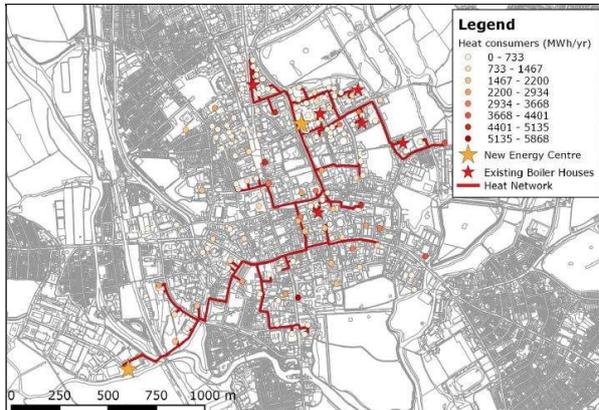


Oxford City Centre_FES

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:	heatnetworks@beis.gov.uk

Technical Information:

Primary energy source:

CHP – Gas

Project description:

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

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

Energy centre description:

Not Provided

Heat/cooling demand phasing description:

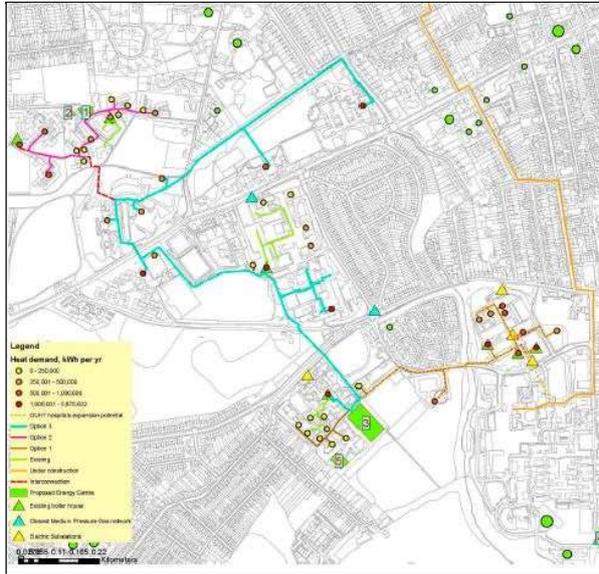
Not Provided

Oxford Headington_FES

Project Sponsor:

Oxford City Council

Network Map:



Summary forecast financial information:

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

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

* Real pre-tax pre-finance

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

Project Stage

Feasibility

Project Contact Details:

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

Technical Information:

Primary energy source:

CHP – Gas

Project description:

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

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

Energy centre description:

Not Provided

Heat/cooling demand phasing description:

Not Provided

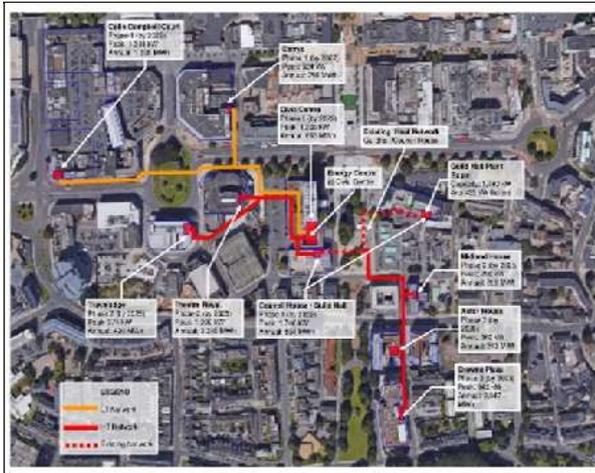


Civic Centre_FES

Project Sponsor:

Plymouth City Council

Network Map:



Summary forecast financial information:

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

Project IRR*	Not provided
Considering third party finance?	Yes

* Real pre-tax pre-finance

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

Project Stage

Feasibility

Project Contact Details:

LA Name:	Plymouth City Council
Contact Name:	Jon Selman
Email:	jonathan.selman@plymouth.gov.uk

Technical Information:

Primary energy source:

Water source heat pumps

Project description:

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

Energy centre description:

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

Heat/cooling demand phasing description:

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

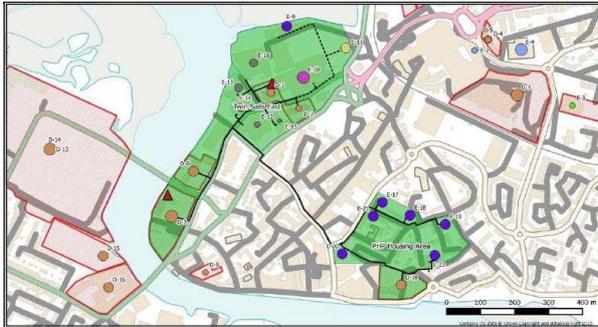


Poole - Twin Sails East_FES

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:	heatnetworks@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.

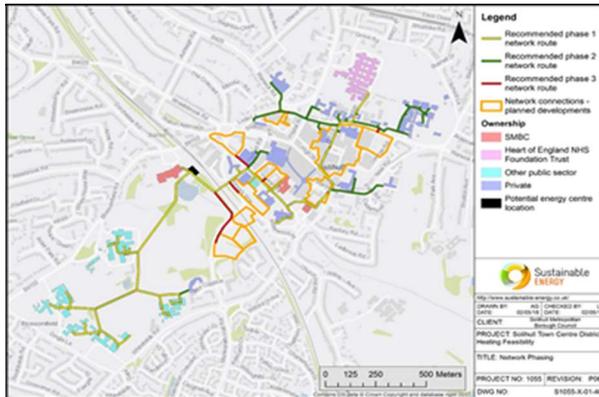


Solihull Town Centre_FES

Project Sponsor:

Solihull Metropolitan Borough Council

Network Map:



Summary forecast financial information:

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

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

* Real pre-tax pre-finance

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

Project Stage

Feasibility

Project Contact Details:

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

Technical Information:

Primary energy source:

CHP – Gas

Project description:

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

Energy centre description:

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

Heat/cooling demand phasing description:

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

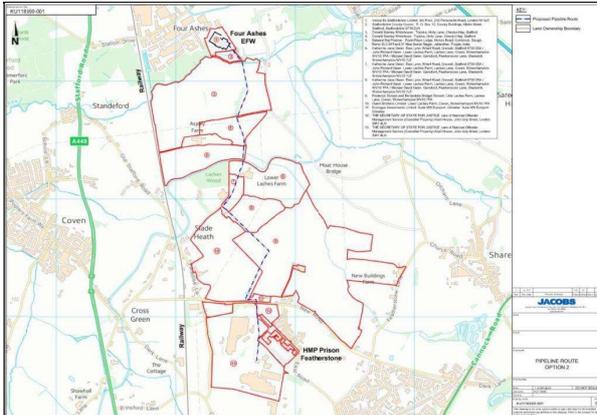


Veolia Energy from Waste_FES

Project Sponsor:

Staffordshire Moorlands District Council

Network Map:



Summary forecast financial information:

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

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

* Real pre-tax pre-finance

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

Project Stage

Feasibility

Project Contact Details:

LA Name:	Staffordshire Moorlands District Council
Contact Name:	George Robinson
Email:	heatnetworks@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

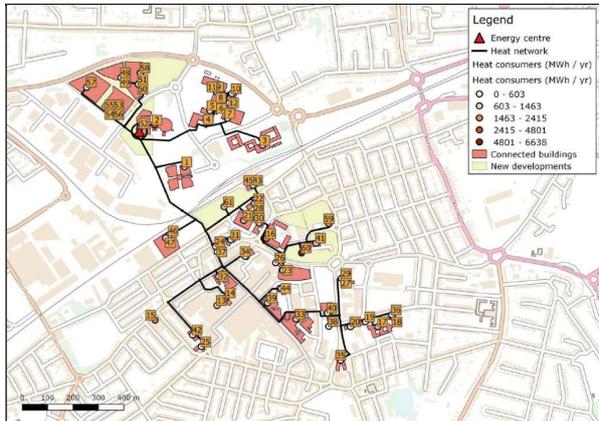


North Star and Town Centre_FES

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:	heatnetworks@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

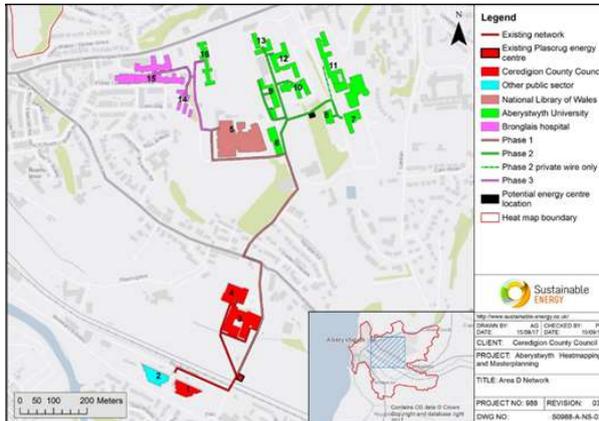


Aberystwyth_MAP

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:	heatnetworks@beis.gov.uk

Technical Information:

Primary energy source:

Boiler - Biomass

Project description:

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

Energy centre description:

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

Heat/cooling demand phasing description:

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

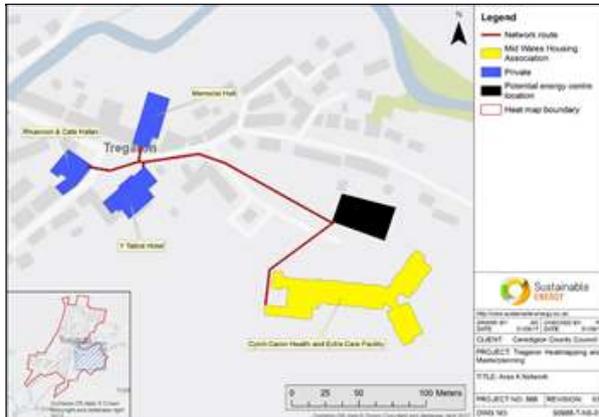


Tregaron_MAP

Project Sponsor:

Ceredigion County Council

Network Map:



Summary forecast financial information:

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

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

* Real pre-tax pre-finance

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

Project Stage

Heat mapping and masterplanning

Project Contact Details:

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

Technical Information:

Primary energy source:

Boiler - Biomass

Project description:

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

Energy centre description:

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

Heat/cooling demand phasing description:

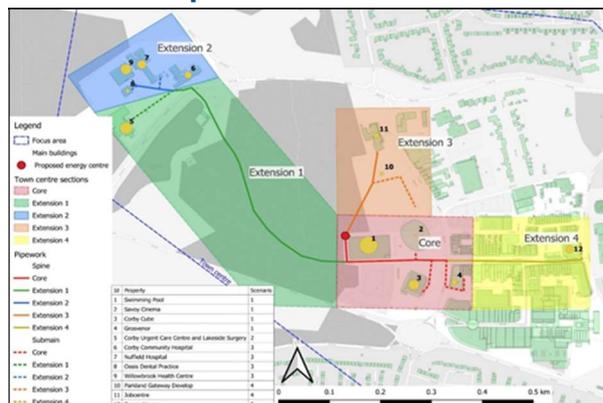
No potential viable network extensions have been identified. The network has therefore been presented as a single phase.

Corby Town Centre_MAP

Project Sponsor:

Corby Borough Council

Network Map:



Summary forecast financial information:

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

Project IRR*	6.00%
Considering third party finance?	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:	Corby Borough Council
Contact Name:	George Robinson
Email:	heatnetworks@beis.gov.uk

Technical Information:

Primary energy source:

CHP – Gas

Project description:

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

Energy centre description:

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

Heat/cooling demand phasing description:

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

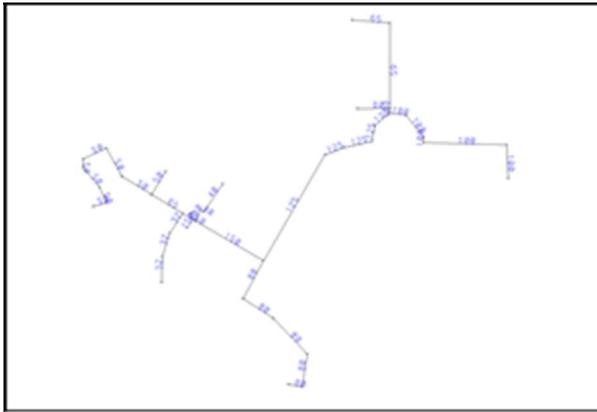


Manor Royal _ Industrial and business area_MAP

Project Sponsor:

Crawley Borough Council

Network Map:



Summary forecast financial information:

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

Project IRR*	3.90%
Considering third party finance?	No

* Real pre-tax pre-finance

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

Project Stage

Heat mapping and masterplanning

Project Contact Details:

LA Name:	Crawley Borough Council
Contact Name:	George Robinson
Email:	heatnetworks@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.

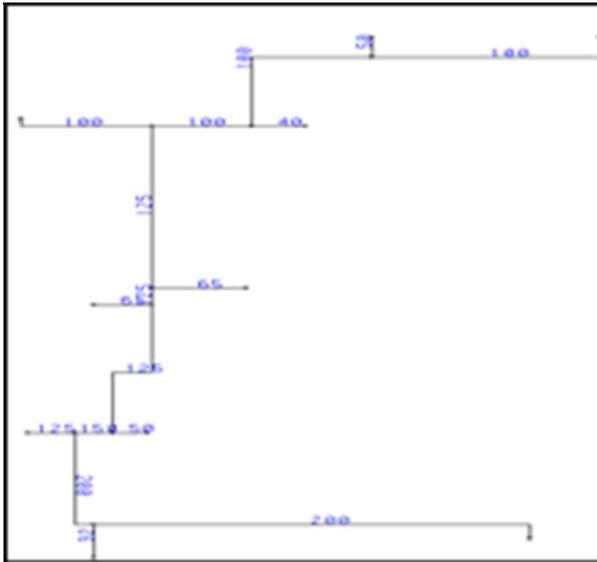


Manor Royal_Fleming Way and Manor Royal Road_MAP

Project Sponsor:

Crawley Borough Council

Network Map:



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.

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:	heatnetworks@beis.gov.uk



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:	Denise Ludlam
Email:	Denise.Ludlam@derbyshire.gov.uk

Technical Information:

Primary energy source:

CHP – Gas

Project description:

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

Energy centre description:

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

Heat/cooling demand phasing description:

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

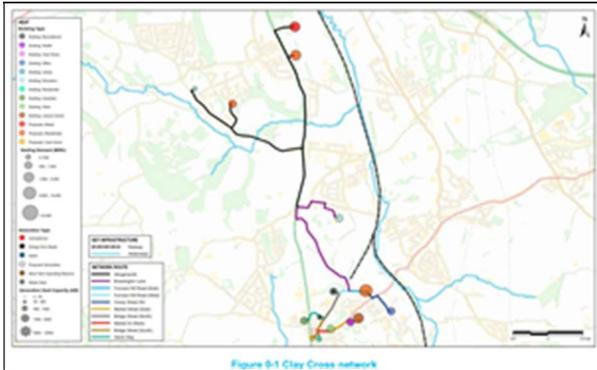


Clay Cross_MAP

Project Sponsor:

Derbyshire county

Network Map:



Summary forecast financial information:

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

Project IRR*	7.54%
Considering third party finance?	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:	Denise Ludlam
Email:	Denise.Ludlam@derbyshire.gov.uk

Technical Information:

Primary energy source:

CHP – EFW

Project description:

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

Energy centre description:

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

Heat/cooling demand phasing description:

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

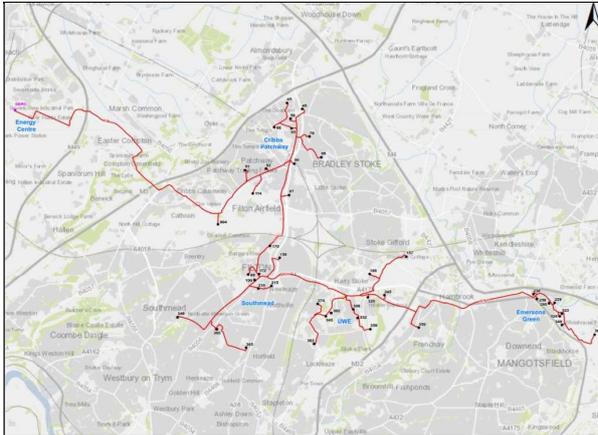


SERC EfW heat supply_MAP

Project Sponsor:

South Gloucestershire Council

Network Map:



Summary forecast financial information:

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

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

* Real pre-tax pre-finance

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

Project Stage

Heat mapping and masterplanning

Project Contact Details:

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

Technical Information:

Primary energy source:

CHP – EfW

Project description:

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

Energy centre description:

Not Provided

Heat/cooling demand phasing description:

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

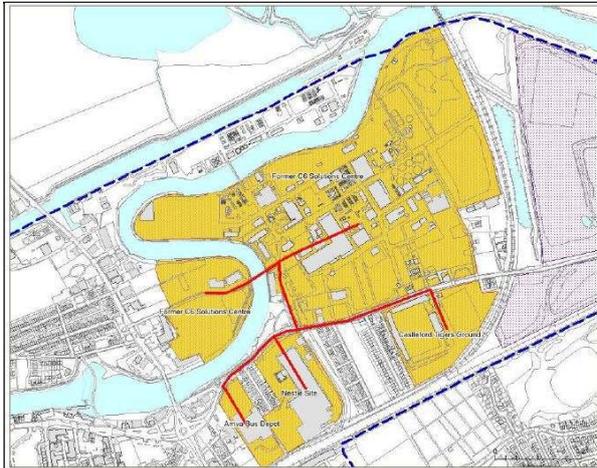


Castleford C6 Development_MAP

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:	Mark Hooton
Email:	mhooton@wakefield.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.



PROJECTS THAT ARE UNDER CONSTRUCTION

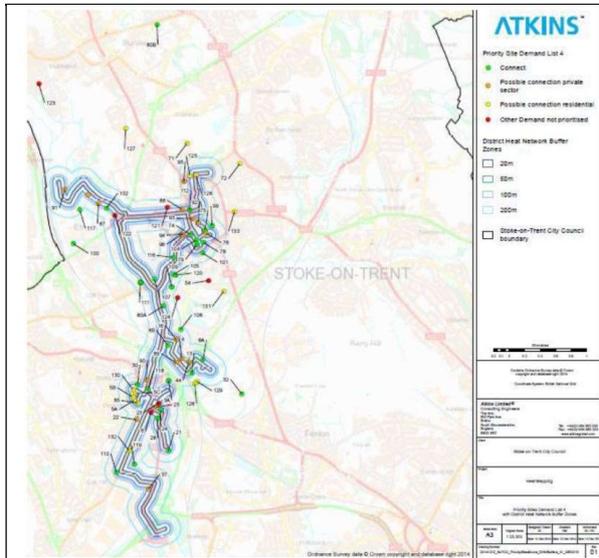


Deep Geothermal_COM_CST

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:	heatnetworks@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

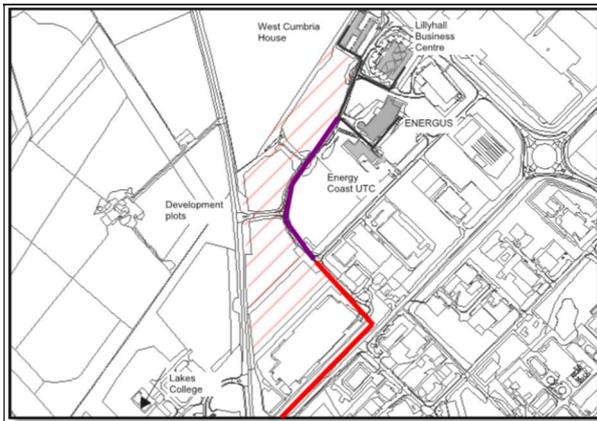


Lillyhall Hub_FES

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:	heatnetworks@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.

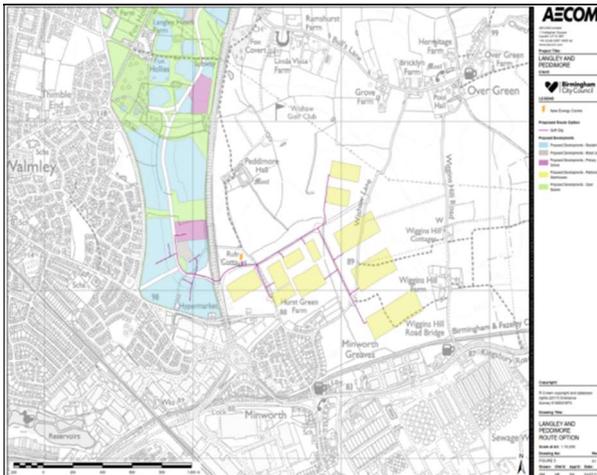


Langley & Peddimore_FES

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:	heatnetworks@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.

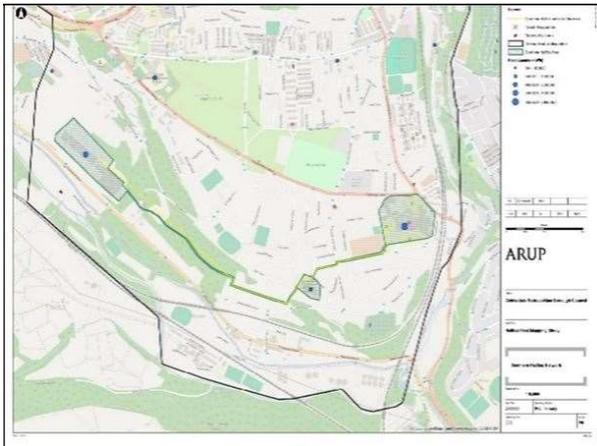


South Halifax

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:	heatnetworks@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.

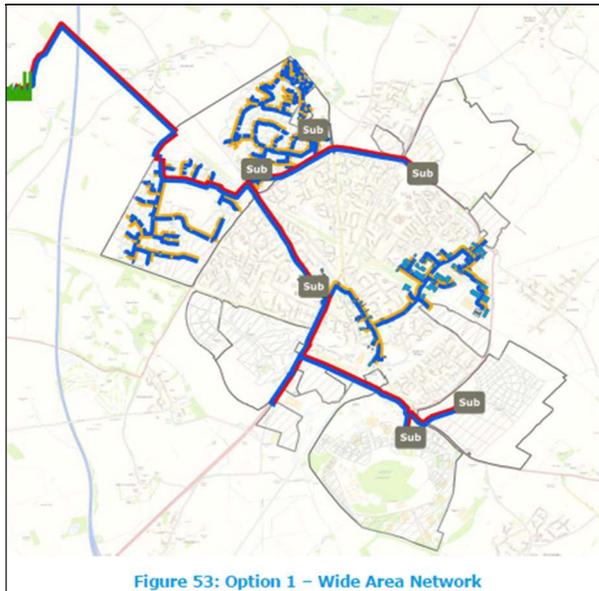


Cherwell - Bicester EcoTown_FES

Project Sponsor:

Cherwell District Council

Network Map:



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:	Sam Thomas
Email:	sam.thomas@cherwell-dc.gov.uk

Technical Information:

Primary energy source:

CHP – EfW

Project description:

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

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

Energy centre description:

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

Heat/cooling demand phasing description:

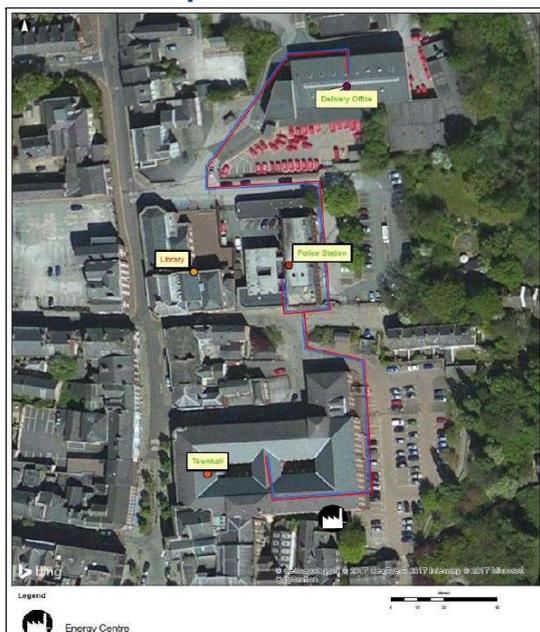
Much of the development is to be new build, and heat demand is projected to steadily grow from 2023 to full build out in 2042.

Macclesfield Town Centre Heat Network_FES

Project Sponsor:

Cheshire East Council

Network Map:



Technical Information:

Primary energy source:

CHP – Gas

Project description:

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

Energy centre description:

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

Heat/cooling demand phasing description:

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

Summary forecast financial information:

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

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

* Real pre-tax pre-finance

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

Project Stage

Feasibility

Project Contact Details:

LA Name:	Cheshire East Council
Contact Name:	Dan Griffiths
Email:	Dan.Griffiths@cheshireeast.gov.uk

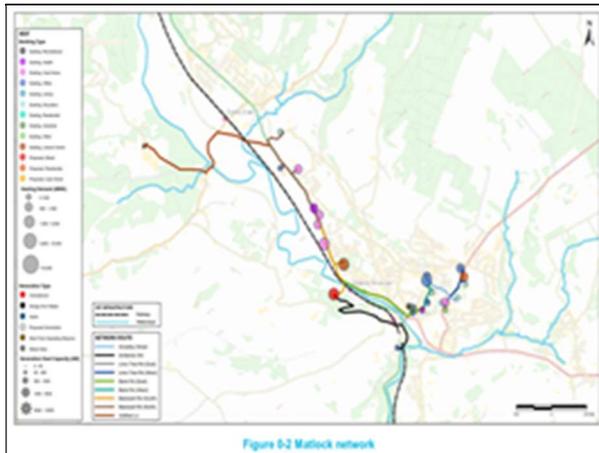


Matlock_MAP

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:	heatnetworks@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 propose the use waste heat from the Enthoven site west of Matlock and the site operator has expressed interested 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.

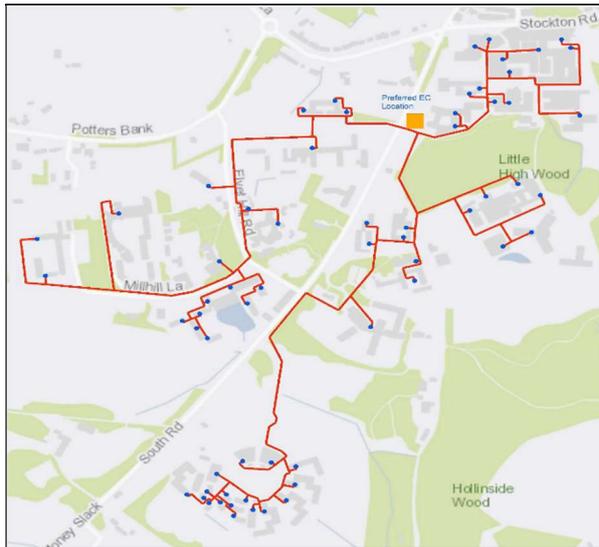


Durham University_FES

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:	heatnetworks@beis.gov.uk

Technical Information:

Primary energy source:

CHP – Gas

Project description:

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

Energy centre description:

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

Heat/cooling demand phasing description:

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

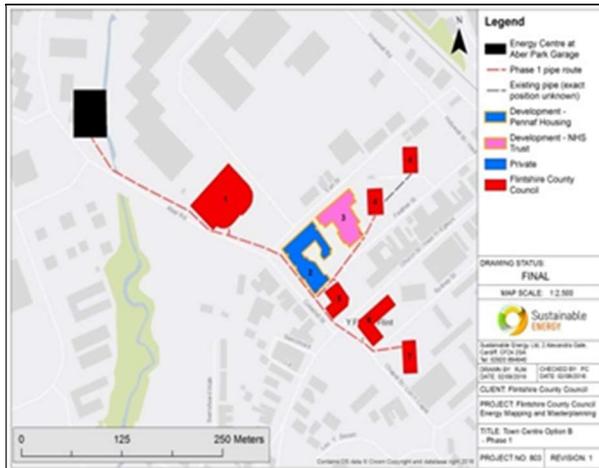


Flint Town_MAP

Project Sponsor:

Flintshire County Council

Network Map:



Technical Information:

Primary energy source:

Boiler - Biomass

Project description:

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

Energy centre description:

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

Heat/cooling demand phasing description:

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

Summary forecast financial information:

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

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

* Real pre-tax pre-finance

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

Project Stage

Heat mapping and masterplanning

Project Contact Details:

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



Northop Road_MAP

Project Sponsor:

Flintshire County Council

Network Map:



Summary forecast financial information:

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

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

* Real pre-tax pre-finance

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

Project Stage

Heat mapping and masterplanning

Project Contact Details:

LA Name:	Flintshire County Council
Contact Name:	George Robinson
Email:	heatnetworks@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.



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:	heatnetworks@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.

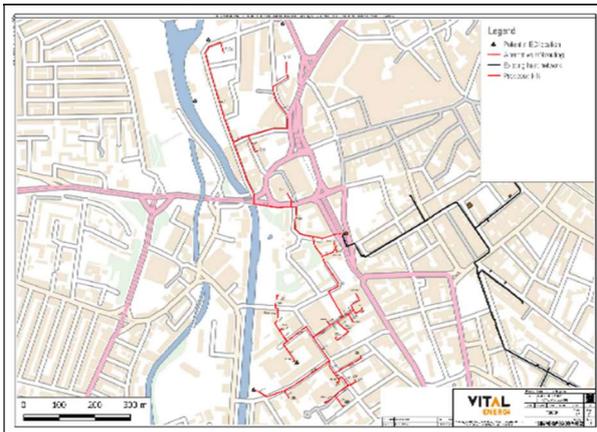


Waterside_FES

Project Sponsor:

Leicester City Council

Network Map:



Technical Information:

Primary energy source:

CHP – Gas

Project description:

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

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

Energy centre description:

Not Provided

Heat/cooling demand phasing description:

The DHN would be built in one phase

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:	heatnetworks@beis.gov.uk

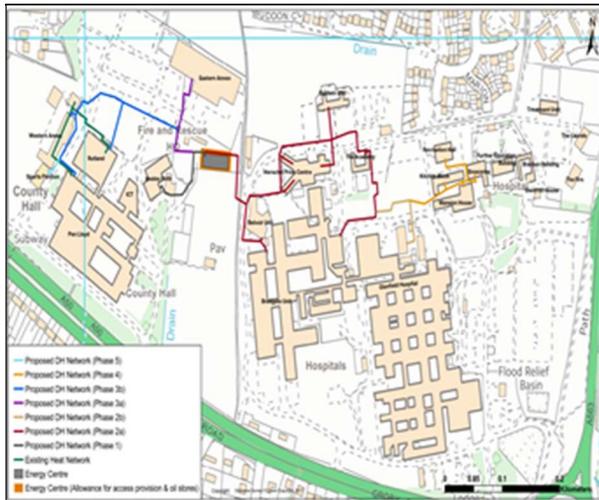


County Hall site at Glenfield_FES

Project Sponsor:

Leicestershire county

Network Map:



Summary forecast financial information:

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

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

* Real pre-tax pre-finance

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

Project Stage

Feasibility

Project Contact Details:

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

Technical Information:

Primary energy source:

CHP – Gas

Project description:

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

Energy centre description:

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

Heat/cooling demand phasing description:

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



New Cross Heat Network_FES

Project Sponsor:

London Borough of Lewisham

Network Map:



Technical Information:

Primary energy source:

CHP – EfW

Project description:

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

Energy centre description:

Not Provided

Heat/cooling demand phasing description:

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

Summary forecast financial information:

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

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

* Real pre-tax pre-finance

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

Project Stage

Feasibility

Project Contact Details:

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

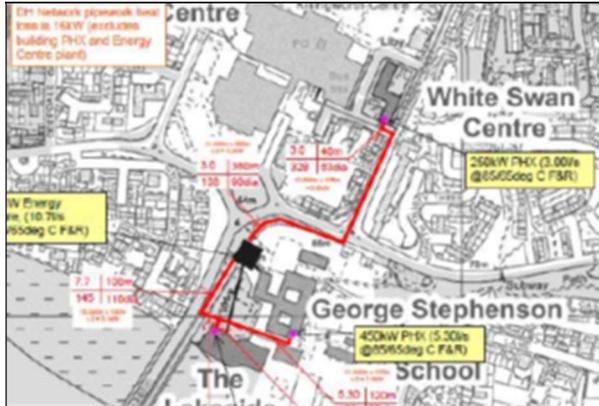


Killingworth Moor_MAP

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:	heatnetworks@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.



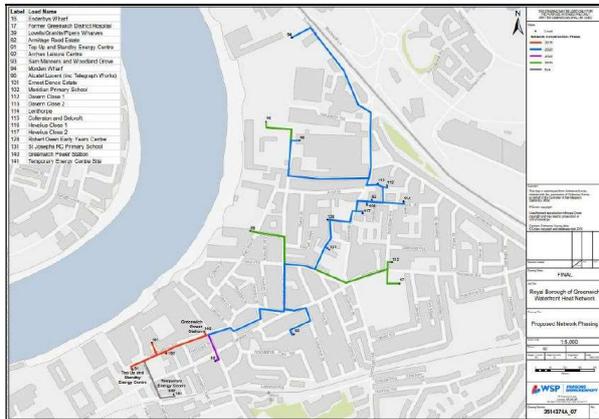
Greenwich Power Station District Heat Network_FES

Information valid as at: 2016

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:	heatnetworks@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:	heatnetworks@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.

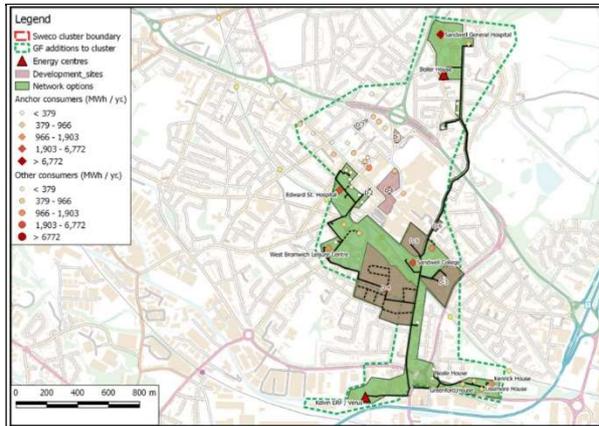


West Bromwich_FES

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:	heatnetworks@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/back-up, Gas CHP plant at the Sandwell General Hospital, peak/back-up boilers near Kenrick Way

Heat/cooling demand phasing description:

Not Provided

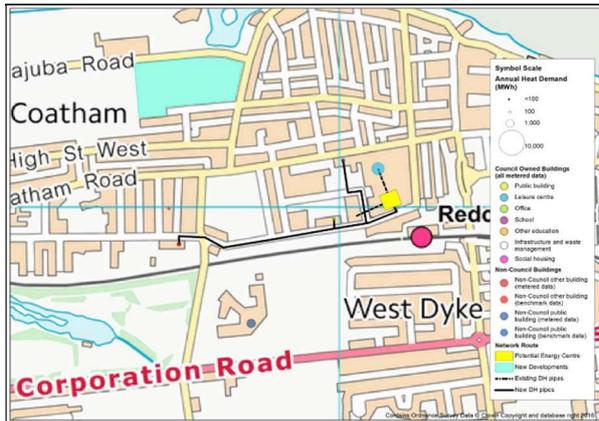


Central Redcar_FES

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:	heatnetworks@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 and existing CHP in the Community Heart Centre. Three options for a new explained 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.

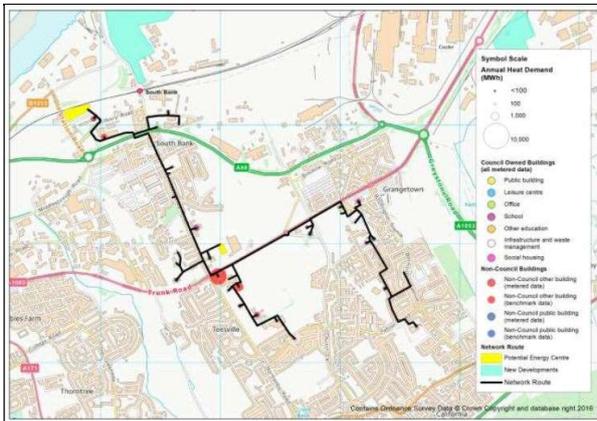


South Bank_FES

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:	heatnetworks@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.