

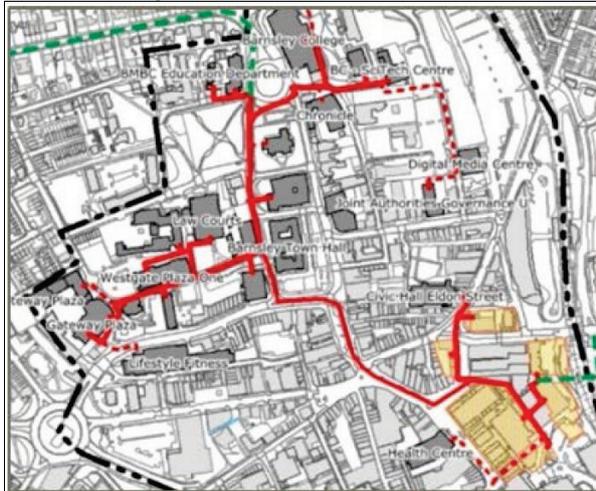


Barnsley Town Centre Wide_FES

Project Sponsor:

Barnsley Metropolitan Borough Council

Network Map:



The Town Wide Vision Scheme

Summary forecast financial information:

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

| | |
|----------------------------------|-------|
| Project IRR* | 4.40% |
| Considering third party finance? | Yes |

* Real pre-tax pre-finance

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

Project Stage

Feasibility

Project Contact Details:

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

Technical Information:

Primary energy source:

CHP – Gas

Project description:

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

Energy centre description:

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

Heat/cooling demand phasing description:

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

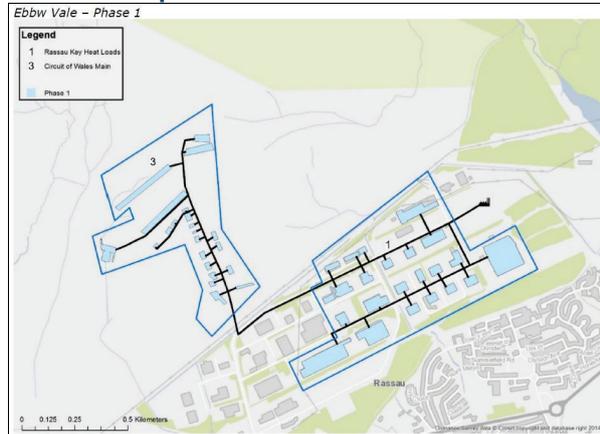


Ebbw Vale (Rassau)_MAP

Project Sponsor:

Blaenau Gwent County Borough Council

Network Map:



Summary forecast financial information:

| | |
|------------------------------------|---------------|
| Energy generation capex (£m) | £4.98 |
| Private Wire (£m) | £0.00 |
| Pipework / distribution capex (£m) | £5.93 |
| Other capex (£m) | £1.10 |
| Total capex (£m) | £12.08 |

| | |
|----------------------------------|--------------|
| 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 | 2020 | 2030 |

Project Stage

Heat mapping and masterplanning

Project Contact Details:

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

Technical Information:

Primary energy source:

CHP – Gas

Project description:

The Ebbw Vale offers a high heat density with the Rassau Industrial Estate and proposed Circuit of Wales race track adjacent to the site. Figures presented reflect the Phase 1 scheme.

Energy centre description:

A modular approach is proposed to allow for the build out of the three phases minimising up front payment for key plant and equipment for future phases. At phase 1 a 6MWth / 5.4MWe gas CHP is proposed as the primary heat source. Wales and West Utilities have confirmed that a 180mm gas main runs next to the proposed energy centre site and that there is likely to be available capacity (this would only be guaranteed as part of a formal application). For Phase 2 the gas CHP capacity is forecast to be increased to 10MWth/8.99MWe. For Phase 3 the gas CHP capacity is forecast to be increased to 12MWth/10.8MWe. Auxiliary boilers would also be required for system resilience.

Heat/cooling demand phasing description:

The proposed project is split into three phases. Phase 1 seeks to connect the Circuit of Wales (phase 1) and three private sector industrial buildings. Electrical demand from the phase 1 industrial customers is estimated to be high (c40GWh p.a.). Of this demand, phase 1 electrical output from the gas CHP engine is forecast to be 23.4GWh. Phase 1 completion is forecast for 2020. Phase 2 is expected to be possible to develop within the next 4-8 years to compliment the next phases of the Circuit of Wales build out. Current estimates are completion for 2025. The third phase of development would coincide with development of the Rhyd-y-blew and/or Bryn Serth sites. At present, it is unclear as to exactly when this would take place. Current estimates are completion for 2030.



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: | David Lawrence |
| Email: | david.lawrence@bournemo uth.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:

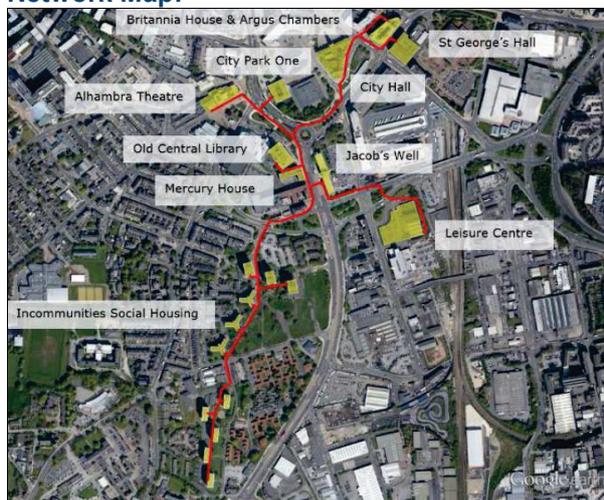
The phasing of the scheme will be coordinated to try and do most of the work in the summer when there is the lowest demand for the heat. The development is assumed to be connected in 3 equal loads in 2020, 2021 and 2023.

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

Technical Information:

Primary energy source:

CHP – Gas

Project description:

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



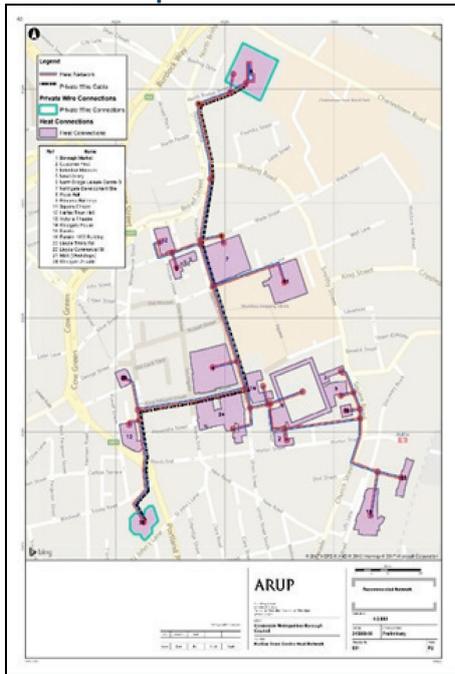
Halifax Town Centre (with Charlestown & Dean Clough)_FES

Project Sponsor:
Calderdale Metropolitan Borough Council

Technical Information:

Primary energy source:
CHP – Gas

Network Map:



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 290m² 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: | Sam Saxby |
| Email: | Sam.Saxby@calderdale.gov.uk |

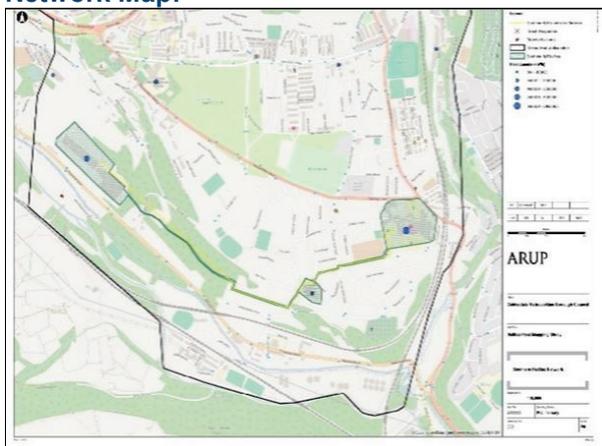


South Halifax

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* | 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: | Calderdale Metropolitan Borough Council |
| Contact Name: | Sam Saxby |
| Email: | Sam.Saxby@calderdale.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

Technical Information:

Network Map:

Primary energy source:
CHP – EfW

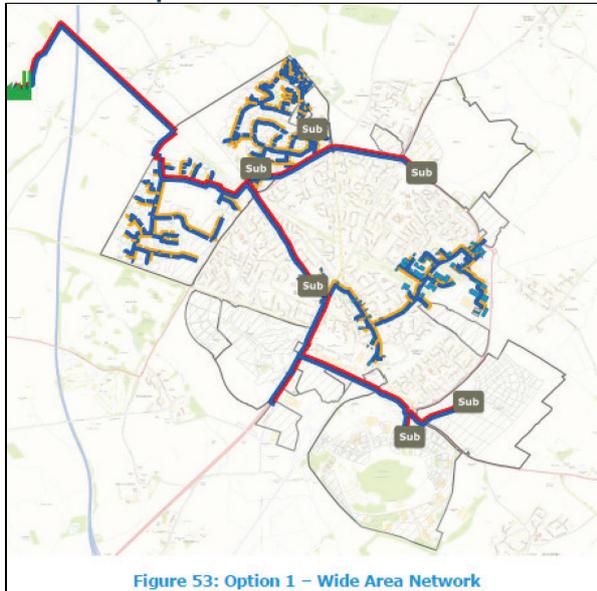


Figure 53: Option 1 – Wide Area Network

Project description:

An initial feasibility study has recommended that two scenarios to be taken forwards to the next stage. Of these potential options, this Appendix summarises the project with the greatest IRR known as "The Wider Bicester Opportunity". This scenario assumes heat will be supplied from the Ardley ERF plant to existing and planned buildings in Bicester. Plans are in place to make Bicester a zero carbon Eco-town.

Energy centre description:

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

Heat/cooling demand phasing description:

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

Summary forecast financial information:

| | |
|------------------------------------|---------------|
| Energy generation capex (£m) | £0.00 |
| Private Wire (£m) | £0.00 |
| Pipework / distribution capex (£m) | £0.00 |
| Other capex (£m) | £64.00 |
| Total capex (£m) | £64.00 |

| | |
|----------------------------------|------------|
| 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 | 2023 |

Project Stage
Feasibility

Project Contact Details:

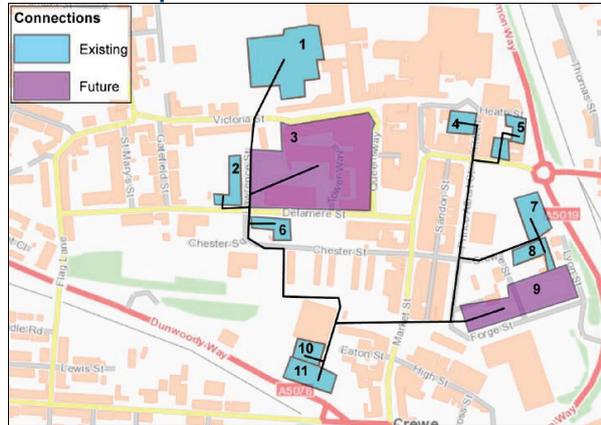
| | |
|---------------|---------------------------|
| LA Name: | Cherwell District Council |
| Contact Name: | George Robinson |
| Email: | HNDU@beis.gov.uk |



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 Wellington House, Royal arcade, Lyceum Theatre, Municipal Buildings and Delamere House. Electricity sold to Royal Arcade, Delamere House and Wellington House via a private wire network. Route Option B. (Table 6, p75)

Energy centre description:

Energy Centre to include 2MWe CHP, 8.7MWth gas boiler, and 170m3 thermal store. Potential EC locations have been short listed and are as follows; Royal Arcade Redevelopment, Gatefield St Carpark and Victoria Centre Caprark (Appendix 3 p 141)

Heat/cooling demand phasing description:

Peak heat demand is 9.3MW (Table 7, p79). There is no information on the phasing sequence in which loads could be connected at time of writing.

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) | £5.50 |

| | |
|----------------------------------|-------|
| Project IRR* | 6.40% |
| 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: | Renia Kotynia |
| Email: | Renia.Kotynia@cheshireea st.gov.uk |

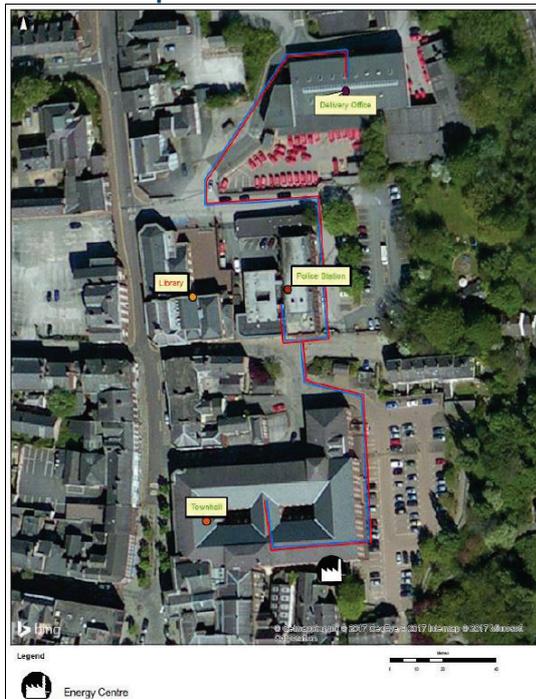
Macclesfield Town Centre Heat Network_FES

Project Sponsor:
Cheshire East Council

Technical Information:

Primary energy source:
CHP – Gas

Network Map:



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? | Yes |

* 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:

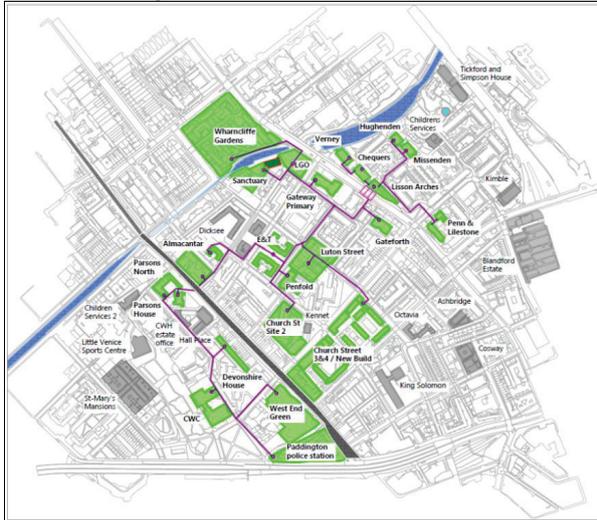
| | |
|---------------|-----------------------------------|
| LA Name: | Cheshire East Council |
| Contact Name: | Renia Kotynia |
| Email: | Renia.Kotynia@cheshireeast.gov.uk |



Church Street_COM

Project Sponsor:
City of Westminster

Network Map:



Technical Information:

Primary energy source:
CHP – Gas

Project description:

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

Energy centre description:

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

Heat/cooling demand phasing description:

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

Summary forecast financial information:

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

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

* Real pre-tax pre-finance

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

Project Stage

Commercialisation

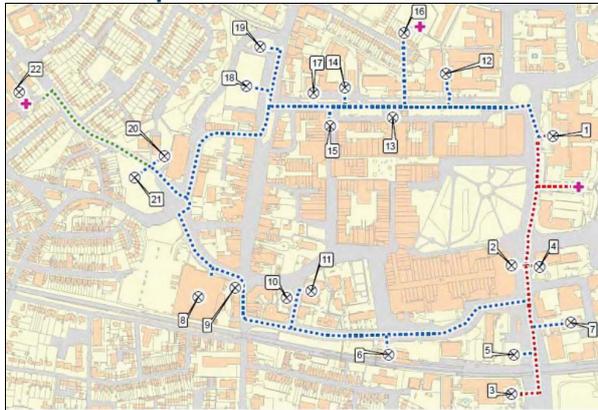
Project Contact Details:

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

Town Centre Heat Network_DPD

Project Sponsor:
Crawley Borough Council

Network Map:



Summary forecast financial information:

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

| | |
|----------------------------------|------------|
| Project IRR* | 6.11% |
| Considering third party finance? | Not Stated |

* Real pre-tax pre-finance

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

Project Stage

Detailed Project Development

Project Contact Details:

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

Technical Information:

Primary energy source:
CHP – Gas

Project description:

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

Energy centre description:

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

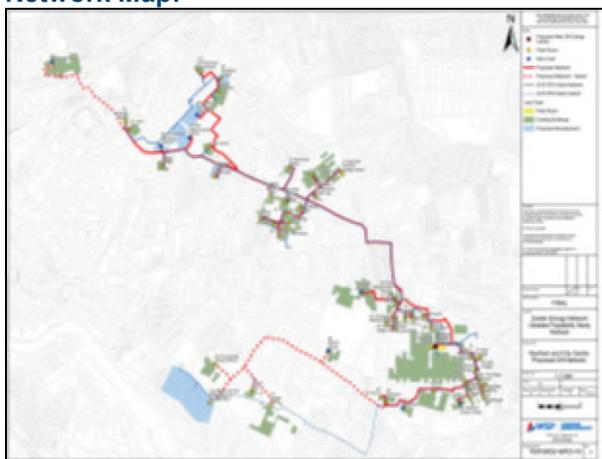
Heat/cooling demand phasing description:

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

Exeter City Centre_DPD

Project Sponsor:
Exeter City Council

Network Map:



Summary forecast financial information:

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

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

* Real pre-tax pre-finance

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

Project Stage

Detailed Project Development

Project Contact Details:

| | |
|---------------|-----------------------------|
| LA Name: | Exeter City Council |
| Contact Name: | Melanie Sealey |
| Email: | melanie.sealey@devon.gov.uk |

Technical Information:

Primary energy source:

CHP – Gas

Project description:

The Exeter Energy Network project enlarges the energy centre at the RD&E hospitals Wonford site and delivers a 6.5km heat network to take heat from 3MWe of gas CHP at the hospital into the city centre to public sector and potential commercial offtakers. The public sector partners in the scheme have jointly established a company (Dextco Ltd) which is procuring a joint venture partner to undertake the project (<https://procontract.due-north.com/Advert?advertId=dac17b37-2e3a-e711-80e1-005056b64545>).

Energy centre description:

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

Heat/cooling demand phasing description:

Heat supplied to the RD&E at Wonford comprises 4 GWhth of steam, 12 GWhth of medium temperature hot water and the supply of heat to outlying buildings on the site through the core heat network. The core heat network is 6.5 km long and provides a total of 21 GWhth through low temperature hot water to public sector buildings and other commercial heat users along a corridor into the city centre. Following a successful procurement in 2018 works would start in 2019 with completion by 2025.



East Runcorn Daresbury Energy Network_FES

Project Sponsor:

Halton Borough Council

Network Map:

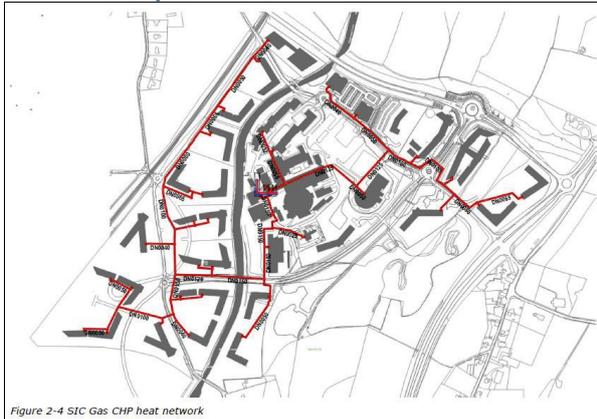


Figure 2-4 SIC Gas CHP heat network

Summary forecast financial information:

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

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

* Real pre-tax pre-finance

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

Project Stage

Feasibility

Project Contact Details:

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

Technical Information:

Primary energy source:

CHP – Gas

Project description:

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

Energy centre description:

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

Heat/cooling demand phasing description:

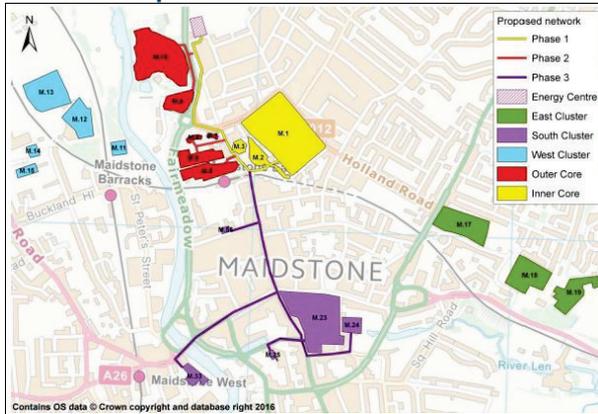
First stage connection forecast (as at 2016) to connect in 2018 with 4.5MW of thermal capacity installed (estimated 1.16GWh p.a. heat demand). This increases to installed capacity of 8MWth in 2026 (estimated 9.92GWh p.a. heat demand) rising to full capacity of 9MWth in 2031 (estimated 12.56GWh p.a. heat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



Maidstone Heat Network_FES

Project Sponsor:
Kent county

Network Map:



Technical Information:

Primary energy source:
CHP – Gas

Project description:

Central Maidstone has been identified as having good potential for district heating. A concentrated number of buildings are shown to have a high demand for heat, and consume significant quantities of natural gas in their respective onsite boiler heating systems. Building types range from offices and residential accommodation, to community facilities (such as libraries, museums and shopping centres) and a large detention centre (HMP Maidstone). Phase 1 will include the 3 large county council sites and HMP Maidstone.

Energy centre description:

A modular approach is proposed to allow for the build out of the three phases minimising upfront payment for key plant and equipment for future phases. Preliminary designs suggest total requirement as;

- 3 no 1MWe gas-CHP engines or fuel cell equivalent
- Total of 18MW gas boilers
- 3 no 25m3 thermal storage vessels
- Selective catalytic reduction units (to reduce NOx emissions)
- CHP, boiler electrical and mechanical ancillary equipment
- Meters, management and control system
- Flues (20m)
- PV panels for centre load

Summary forecast financial information:

| | |
|------------------------------------|---------------|
| Energy generation capex (£m) | £17.28 |
| Private Wire (£m) | £0.00 |
| Pipework / distribution capex (£m) | £3.76 |
| Other capex (£m) | £2.88 |
| Total capex (£m) | £23.92 |

| | |
|----------------------------------|--------------|
| 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 | 2021 | 2025 |

Project Stage
Feasibility

Project Contact Details:

| | |
|---------------|--------------------------|
| LA Name: | Kent county |
| Contact Name: | Chris Gadsby |
| Email: | chris.gadsby@kent.gov.uk |

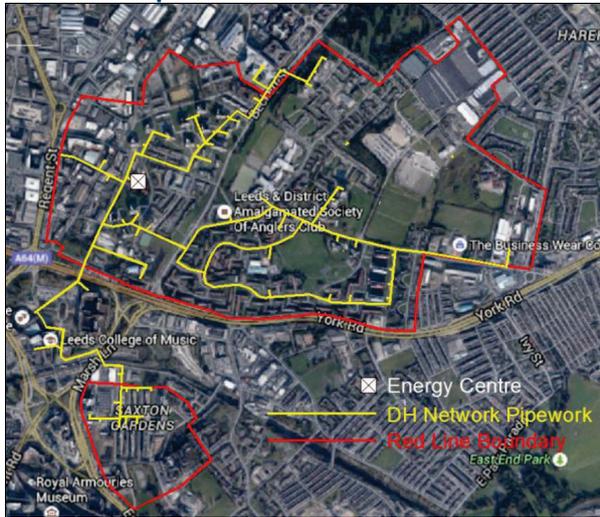
Heat/cooling demand phasing description:

- Phase 1 Q1 2021 Inner Core
 - 8 MW – boiler
 - 1 MW – CHP
 - 25 m3 thermal store
 - Network length 693m
- Phase 2 Q1 2024 Inner Core + Outer Core
 - 12 MW – boiler
 - 2 MW – CHP
 - 50 m3 thermal store
 - Network length 1,434
- Phase 3 Q1 2025 Inner + Outer Core + Southern
 - 18 MW – boiler
 - 3 MW – CHP
 - 75 m3 thermal store
 - Network length 3,630

Leeds Phase 2 DHN_FES

Project Sponsor:
Leeds City Council

Network Map:



Summary forecast financial information:

| | |
|------------------------------------|---------------|
| Energy generation capex (£m) | £0.00 |
| Private Wire (£m) | £0.00 |
| Pipework / distribution capex (£m) | £10.00 |
| Other capex (£m) | £2.00 |
| Total capex (£m) | £12.00 |

| | |
|----------------------------------|--------------|
| 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
Feasibility

Project Contact Details:

| | |
|---------------|--------------------|
| LA Name: | Leeds City Council |
| Contact Name: | George Robinson |
| Email: | HNDU@beis.gov.uk |

Technical Information:

Primary energy source:
CHP – EfW

Project description:

Leeds City Council is developing a flagship District Heating Network (DHN) that will use heat generated by processing waste at the council's newly constructed Recycling and Energy Recovery Facility (RERF). This multi-million pound investment will create a flexible 6km spine network and a connected local DHN to serve 1,983 flats, as illustrated. Vital Energi will start construction this year and complete the network in late 2019.

The council is now interested in developing a second phase of the spine network, to extend heat provision to the city centre and/or the rapidly developing Southbank area.

Energy centre description:

The phase 2 extension will not require a new energy centre as the phase 1 spine network has been designed with growth in mind. The network will be provided with up to 20MWth of heat from the RERF with an additional c30MWth of peaking/back-up plant, plus significant thermal stores. This is sufficient for expansion, but the council is open to offers from existing/new heat sources that would offer lower cost and lower carbon heat, particularly to offset gas as the network grows.

Heat/cooling demand phasing description:

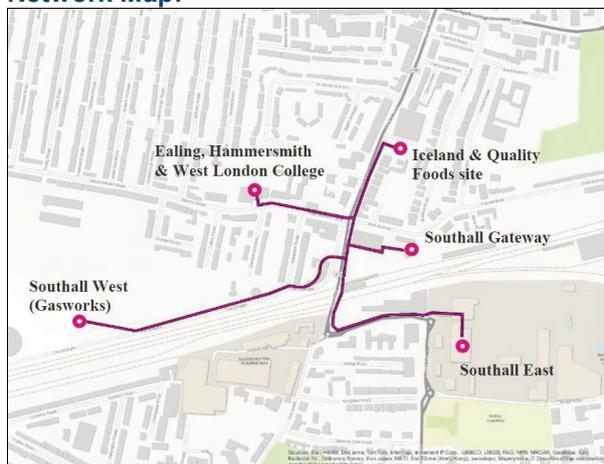
The network will initially connect to existing council/public sector buildings to provide an anchor load from day 1. The city centre and the Southbank have numerous active development sites and we anticipate that these will connect to the network between 2020 and 2025. The Southbank will also boast the HS2 station for Leeds so another tranche of development will happen as that is built and becomes established.



Southall DE_FES

Project Sponsor:
London Borough of Ealing

Network Map:



Summary forecast financial information:

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

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

* Real pre-tax pre-finance

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

Project Stage
Feasibility

Project Contact Details:

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

Technical Information:

Primary energy source:
CHP – Gas

Project description:

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

Energy centre description:

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

Heat/cooling demand phasing description:

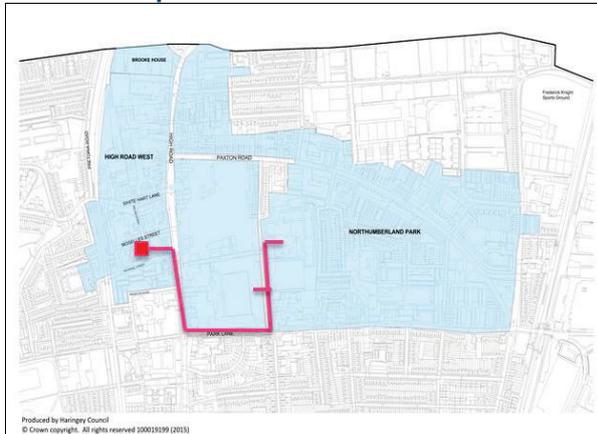
Cumulative heat loads (excluding primary and secondary losses) reach a plateau at 24,000 MWh/year as the full build-out of all connected development sites is expected to happen in 2043.

North Tottenham_DPD

Project Sponsor:

London Borough of Haringey

Network Map:



Summary forecast financial information:

| | |
|------------------------------------|---------------------|
| Energy generation capex (£m) | Not provided |
| Private Wire (£m) | Not provided |
| Pipework / distribution capex (£m) | Not provided |
| Other capex (£m) | Not provided |
| Total capex (£m) | Not Provided |

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

* Real pre-tax pre-finance

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

Project Stage

Detailed Project Development

Project Contact Details:

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

Technical Information:

Primary energy source:

CHP – Gas

Project description:

3 large and adjacent development sites forecast to commence in next c.3 years (10 year build out). Spurs new 61,000 seat stadium opening in 2018, hotel and leisure facilities. Potential for 5000-8000 new homes, relocation of two schools into new facilities, new library and community facilities, and mix of employment space. Strong political support for the project.

Energy centre description:

Heat and private wire. At 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. Energy Centre Shell to be delivered by the High Road West Development Partner.

Heat/cooling demand phasing description:

Tottenham Hotspur Football Club & partners. Haringey Development Vehicle (Council procured the partner for the JV). High Road West Development Partner (Council procured private sector partner). Existing sites. Others sites including Mayor of London / GLA (Housing Zone Funding, London Plan, DEEP), BEIS, existing and future residents and businesses.

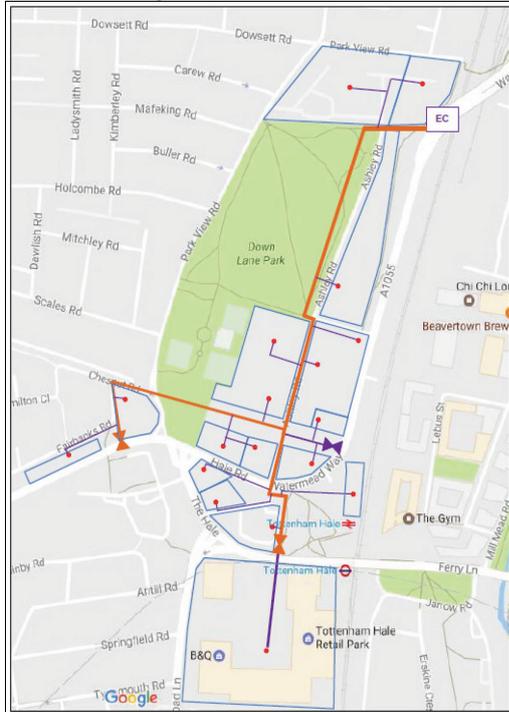


Tottenham Hale_FES

Project Sponsor:

London Borough of Haringey

Network Map:



Technical Information:

Primary energy source:

CHP – Gas

Project description:

2 scenarios are considered; "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 economic benefit from private wire, though it has not been categorically ruled out at time of writing.

Energy centre description:

An Energy Centre is proposed under the Watermead Way flyover and the area adjacent to this, subject to approval of detailed design proposals. It is proposed to develop the EC in two phases, phase 2 being developed after redevelopment of retail park. The Energy Centres will house 3.5MWe CHP and 17MWth gas boilers.

Heat/cooling demand phasing description:

Extended Tottenham Hale has a peak heat demand of 17MW. Central Tottenham Hale has a peak heat demand of 11MW. For the extended Tottenham Hale scheme, heat demand is 12,853MWh/yr, and electricity demand is 14,442MWh/yr. Figure 6, p23 shows heat on in 2018, with 60% of total demand supplied by 2025. In 2030, phase 2 loads come online with the redevelopment of the retail park, gradually building up to 100% heat demand being supplied by 2035.

Summary forecast financial information:

| | |
|------------------------------------|---------------------|
| Energy generation capex (£m) | Not provided |
| Private Wire (£m) | Not provided |
| Pipework / distribution capex (£m) | Not provided |
| Other capex (£m) | Not provided |
| Total capex (£m) | Not Provided |

| | |
|----------------------------------|--------------|
| 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 | 2018 | 2018 | 2030 |

Project Stage

Feasibility

Project Contact Details:

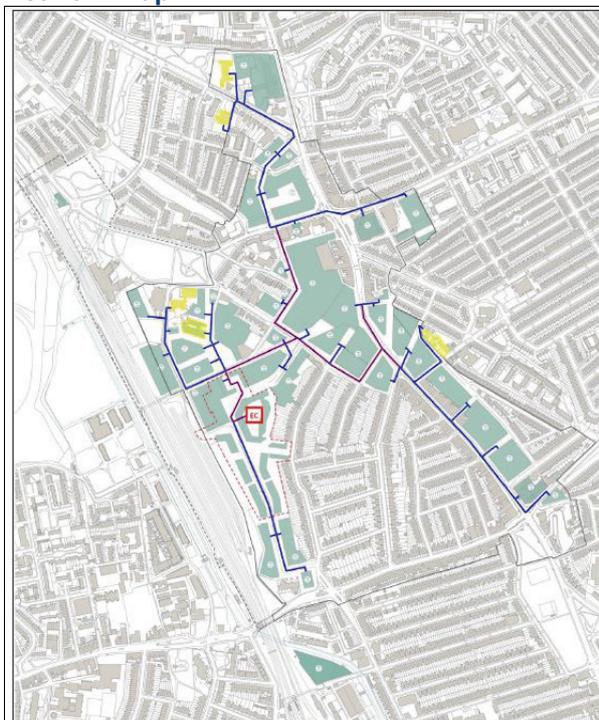
| | |
|---------------|----------------------------|
| LA Name: | London Borough of Haringey |
| Contact Name: | George Robinson |
| Email: | HNDU@beis.gov.uk |



Wood Green_FES

Project Sponsor:
London Borough of Haringey

Network Map:



Technical Information:

Primary energy source:
CHP – Gas

Project description:

A new network is proposed. The initial source of low carbon heat is 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 is hoped that electricity can be sold via private wire to Haringay Council or the rail works to the west of the scheme. Heat will supply mainly new developments proposed in the area, alongside some existing loads.

Energy centre description:

The proposed energy centre of footprint 2700m2 will be integrated into the proposed Clarendon Square development. The energy centre is anticipated to need to be integrated with other building uses and will need to be fully built out at the start of the project. The fully built out scheme is estimated to require around 28MW of gas boiler plant and 5.3MWth of gas-fired CHP

Heat/cooling demand phasing description:

The estimated total annual heat demand on full build out of the masterplan is 28.2 GWh Phase 1 has been taken as Clarendon Road, areas adjacent to the railway and the Cultural Quarter. Phase 2 has been taken as the Mall, Morrisons and High Road South. Phase 3 has been taken as the Civic Centre, Bus Depot and Mecca Bingo sites.

Summary forecast financial information:

| | |
|------------------------------------|---------------------|
| Energy generation capex (£m) | Not provided |
| Private Wire (£m) | Not provided |
| Pipework / distribution capex (£m) | Not provided |
| Other capex (£m) | Not provided |
| Total capex (£m) | Not Provided |

| | |
|----------------------------------|--------------|
| 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 | 2019 | 2034 |

Project Stage
Feasibility

Project Contact Details:

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



New Cross Heat Network_FES

Project Sponsor:

London Borough of Lewisham

Network Map:



Technical Information:

Primary energy source:

CHP – EfW

Project description:

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

Energy centre description:

Not Provided

Heat/cooling demand phasing description:

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

Summary forecast financial information:

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

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

* Real pre-tax pre-finance

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

Project Stage

Feasibility

Project Contact Details:

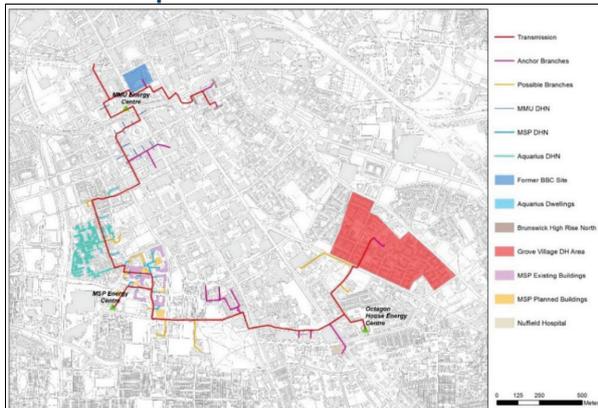
| | |
|---------------|----------------------------|
| LA Name: | London Borough of Lewisham |
| Contact Name: | George Robinson |
| Email: | HNDU@beis.gov.uk |



Manchester Oxford Road Corridor_FES

Project Sponsor:
Manchester City Council

Network Map:



Summary forecast financial information:

| | |
|------------------------------------|---------------|
| Energy generation capex (£m) | £0.00 |
| Private Wire (£m) | £0.00 |
| Pipework / distribution capex (£m) | £14.44 |
| Other capex (£m) | £0.00 |
| Total capex (£m) | £14.44 |

| | |
|----------------------------------|------------|
| 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: | Manchester City Council |
| Contact Name: | George Robinson |
| Email: | HNDU@beis.gov.uk |

Technical Information:

Primary energy source:
UNKNOWN

Project description:

A Corridor-wide Transmission Network is proposed whereby heat Producers provide heat to this network in addition to supplying their own heat needs. Corridor Manchester (also known as Oxford Road Corridor) is a 243-hectare area home to an exceptional group of knowledge-intensive organisations and businesses, operating in the areas of health, higher education, creative industries, advanced materials, low carbon, digital and financial services.

Energy centre description:

Not Provided

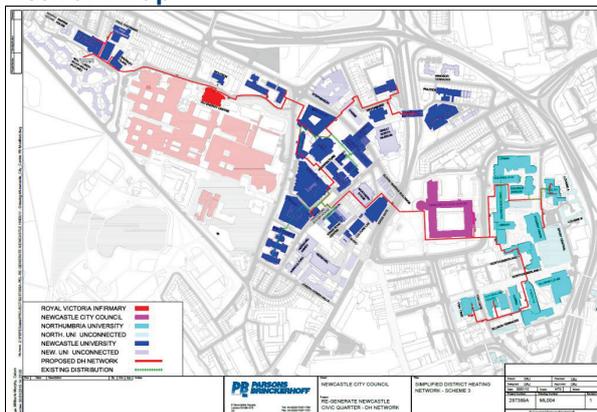
Heat/cooling demand phasing description:

Anchor load customers are estimated to represent 41.5GWh of heat from the university, university hospitals, aquatics centre, council buildings and others. An additional 3.45GWh of potential heat loads have been identified from schools within the corridor.

Civic Quarter District Energy Scheme_FES

Project Sponsor:
Newcastle-upon-Tyne City Council

Network Map:



Summary forecast financial information:

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

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

* Real pre-tax pre-finance

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

Project Stage
Feasibility

Project Contact Details:

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

Technical Information:

Primary energy source:
CHP – Gas

Project description:

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

Energy centre description:

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

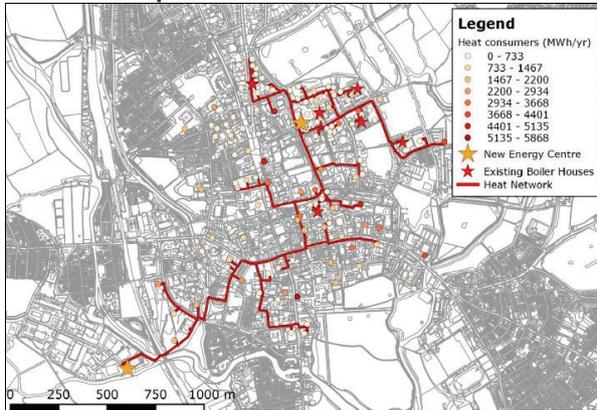
Heat/cooling demand phasing description:

Not Provided

Oxford City Centre_FES

Project Sponsor:
Oxford City Council

Network Map:



Summary forecast financial information:

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

| | |
|----------------------------------|------------|
| Project IRR* | 14.00% |
| Considering third party finance? | Not Stated |

* Real pre-tax pre-finance

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

Project Stage
Feasibility

Project Contact Details:

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

Technical Information:

Primary energy source:
CHP – Gas

Project description:

The investigation has been largely focused on the University of Oxford estate, with the city-wide network also incorporating major new development loads (primarily the Westgate and Oxpens developments) along with a number of other key consumers such as local council and other public properties. Other key load opportunities have been excluded at this stage, for example, the university colleges and numerous independently owned / operated properties due to physical and technical constraints.

Energy centre description:

A number of potential locations have been identified but at this stage a firm decision has yet to be determined.

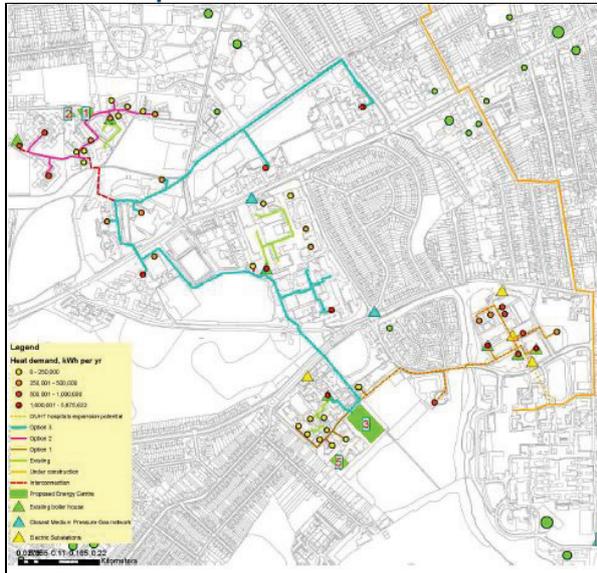
Heat/cooling demand phasing description:

Option 3, the largest of the network scenarios, incorporates the areas of Option 1 and 2, as well as most of the heat demand between those areas. The heat network would extend from Osney Mead and Oxpens to the Science Area and Keble Triangle, picking up the areas of dense heat demand in the City Centre, including among others the Library Area, University College Area, Ashmolean Museum Area, Balliol College, and Manor Road Area.

Oxford Headington_FES

Project Sponsor:
Oxford City Council

Network Map:



Summary forecast financial information:

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

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

* Real pre-tax pre-finance

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

Project Stage
Feasibility

Project Contact Details:

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

Technical Information:

Primary energy source:
CHP – Gas

Project description:

The Headington West proposed scheme is the largest potential option at 2.8km and will have the greatest number of involved stakeholders. It would join large loads in the west of Headington around the Oxford Brookes University and Headington School with an energy centre at Warneford Hospital (the same energy centre proposed in Option 1). The advantage of the option is that allows most expansion potential. Towards the west, potentially built in parallel as urgent plant replacement is required, option 2 could be integrated. In the east, the OUHT hospital which is currently under construction could be interfaced while picking up ORC as one of the major loads in Headington. Additionally, as the largest option it could give opportunity to connect additional heat loads not considered in this study. A full development of Headington could lead to an expansion towards the city centre or UoO Science Area. This could improve air quality in the city centre through relocation of emissions.

Energy centre description:

A number of sites are being considered

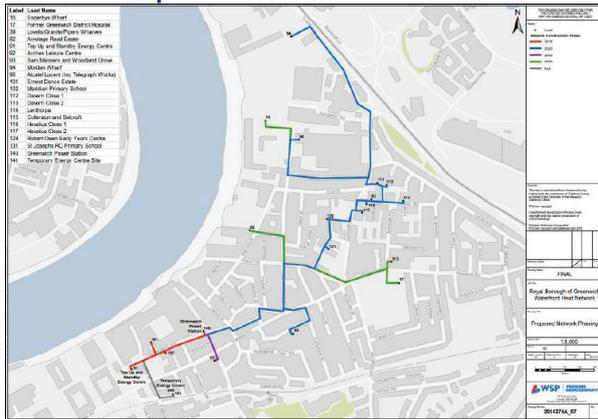
Heat/cooling demand phasing description:

Not Provided

Greenwich Power Station District Heat Network_FES

Project Sponsor:
Royal Borough of Greenwich

Network Map:



Summary forecast financial information:

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

| | |
|----------------------------------|--------|
| Project IRR* | 11.40% |
| Considering third party finance? | 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: | Royal Borough of Greenwich |
| Contact Name: | George Robinson |
| Email: | HNDU@beis.gov.uk |

Technical Information:

Primary energy source:
CHP – Gas

Project description:

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

Energy centre description:

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

Heat/cooling demand phasing description:

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

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

2022: Assumed earliest date for redevelopment of Arches Leisure Centre

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



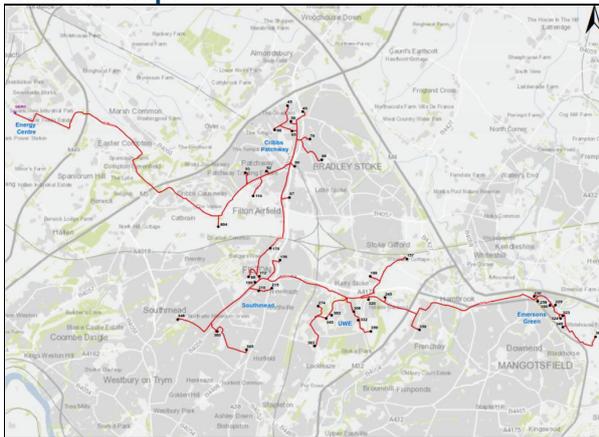
SERC EfW heat supply_MAP

Project Sponsor:
South Gloucestershire Council

Technical Information:

Network Map:

Primary energy source:
CHP – EfW



Project description:

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

Energy centre description:

Not Provided

Summary forecast financial information:

Heat/cooling demand phasing description:

| | |
|------------------------------------|---------------|
| 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 |

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.

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

* Real pre-tax pre-finance

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

Project Stage

Heat mapping and masterplanning

Project Contact Details:

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

Public Service Village_FES

Project Sponsor:
 St Edmundsbury Borough Council

Network Map:



Summary forecast financial information:

| | |
|------------------------------------|--------------|
| Energy generation capex (£m) | £0.00 |
| Private Wire (£m) | £0.00 |
| Pipework / distribution capex (£m) | £0.36 |
| Other capex (£m) | £0.30 |
| Total capex (£m) | £0.66 |

| | |
|----------------------------------|------------|
| 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 | 2016 | 2018 | 2019 |

Project Stage
 Feasibility

Project Contact Details:

| | |
|---------------|--------------------------------|
| LA Name: | St Edmundsbury Borough Council |
| Contact Name: | Peter Gudde |
| Email: | Peter.gudde@westsuffolk.gov.uk |

Technical Information:

Primary energy source:
 CHP – Gas

Project description:

The preferred option was found to be a DH network supplied by gas combined heat and power (CHP), connected to all new buildings within the Public Service Village in addition to the existing West Suffolk House. The supply of waste heat from British Sugar was also considered as a potential opportunity in the case of a wider network.

Energy centre description:

The CHP size (0.834MWth) was established to deliver a total contribution of at least 60% of the annual heat load, whilst achieving a minimum number of running hours of approximately 4,500 peak load hours per annum. The gas boiler capacity (1.9MWth) is such that there is sufficient back-up capacity included if the CHP and/or boilers should fail or be offline for maintenance. This capacity typically equates to approximately 1.2 times the peak heat load.

Heat/cooling demand phasing description:

It was assumed that the development connects to the network in two phases to represent the phased construction of the site. At the time of writing (June 2016), PSV2 was expected to come forward in four phases. It was assumed from the scale of development that it was reasonable to divide this into two construction phases, with the first being available for connection to a heat network in 2018.

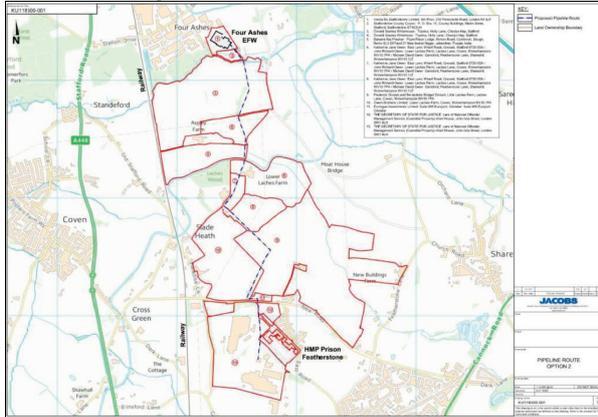


Veolia Energy from Waste_FES

Project Sponsor:

Staffordshire Moorlands District Council

Network Map:



Summary forecast financial information:

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

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

* Real pre-tax pre-finance

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

Project Stage

Feasibility

Project Contact Details:

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

Technical Information:

Primary energy source:

CHP – EfW

Project description:

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

Energy centre description:

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

Heat/cooling demand phasing description:

Not available

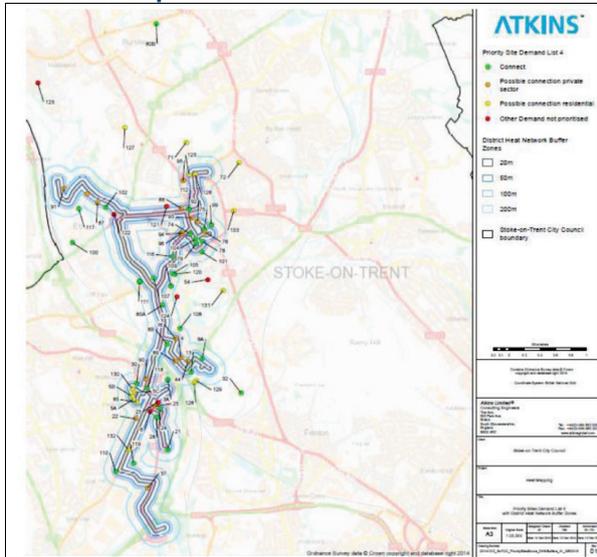


Deep Geothermal_DPD

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* | 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 | 2018 | 2020 |

Project Stage

Under Construction

Project Contact Details:

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

Technical Information:

Primary energy source:

Geothermal

Project description:

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

Energy centre description:

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

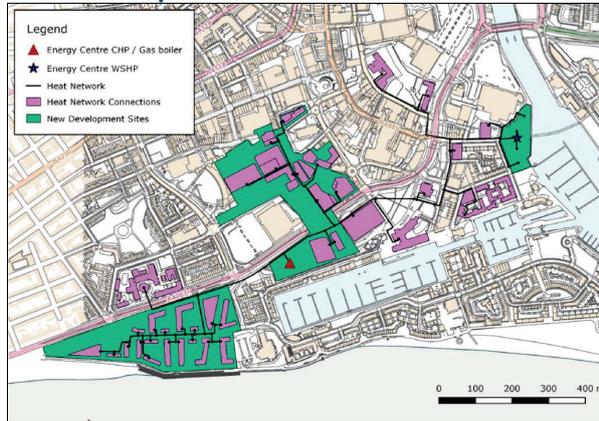
Heat/cooling demand phasing description:

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

Swansea Central_FES

Project Sponsor:
Swansea City and Borough Council

Network Map:



Summary forecast financial information:

| | |
|------------------------------------|---------------|
| Energy generation capex (£m) | £7.76 |
| Private Wire (£m) | £0.00 |
| Pipework / distribution capex (£m) | £3.73 |
| Other capex (£m) | £0.00 |
| Total capex (£m) | £11.49 |

| | |
|----------------------------------|------------|
| 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 | Not Provided | Not Provided | Not Provided |

Project Stage

Feasibility

Project Contact Details:

| | |
|---------------|----------------------------------|
| LA Name: | Swansea City and Borough Council |
| Contact Name: | George Robinson |
| Email: | HNDU@beis.gov.uk |

Technical Information:

Primary energy source:

CHP – Gas

Project description:

A number of opportunities have been identified. The preferred option both for feasibility and economic returns looks at a network that connects existing city centre buildings (Leisure centre, the waterfront museum and HMP swansea), Swansea central development, the City Waterfront Development and Sail Bridge development.

Energy centre description:

Energy is assumed to be supplied from an energy centre located within the new Swansea Central development area (indicative location on the parking area proposed near the Arena site). The preferred option opts for a 1.5MWth/1.3MWe gas CHP engine and 9.2MWth of back up boilers.

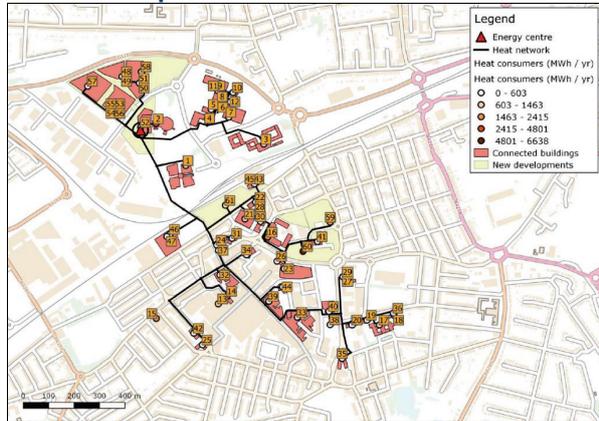
Heat/cooling demand phasing description:

Not available

North Star and Town Centre_FES

Project Sponsor:
Swindon Borough Council

Network Map:



Summary forecast financial information:

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

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

* Real pre-tax pre-finance

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

Project Stage

Feasibility

Project Contact Details:

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

Technical Information:

Primary energy source:

CHP – Gas

Project description:

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

Energy centre description:

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

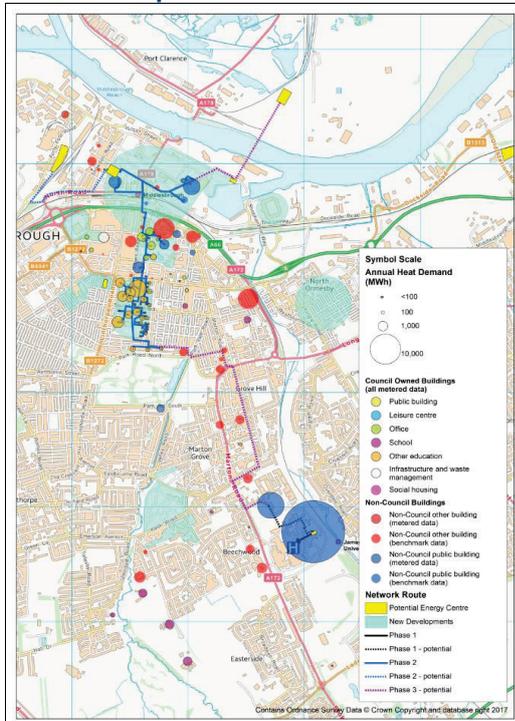
Heat/cooling demand phasing description:

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

Middlesbrough_DPD

Project Sponsor:
Tees Valley Combined Authority

Network Map:



Technical Information:

Primary energy source:
CHP – Gas

Project description:

New gas CHP_s 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.

Energy centre description:

The town centre energy centre location is 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).

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

Heat/cooling demand phasing description:

3 phase build out: Hospital CHP scheme, town centre DE scheme, then the heat connection between the two.

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

Project Stage

Detailed Project Development

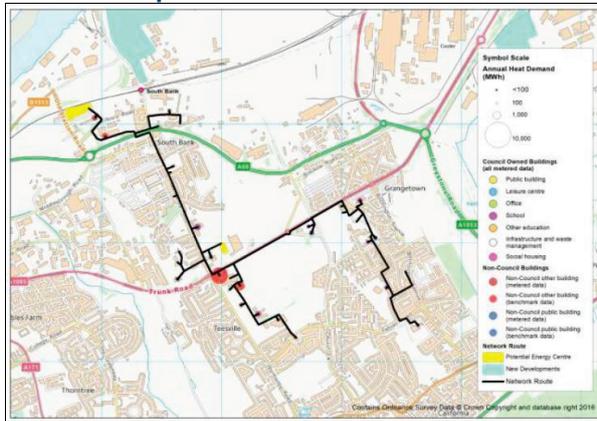
Project Contact Details:

| | |
|---------------|-------------------------------------|
| LA Name: | Tees Valley Combined Authority |
| Contact Name: | Sarah Tennison |
| Email: | Sarah.Tennison@teesvalley-ca.gov.uk |

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

Technical Information:

Primary energy source:

CHP – Biogas

Project description:

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

Energy centre description:

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

Heat/cooling demand phasing description:

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