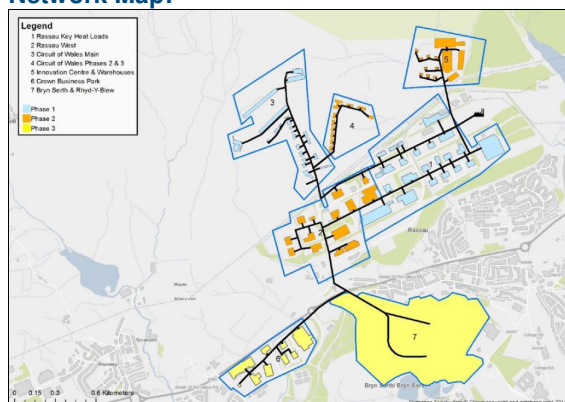


# Ebbw Vale (Rassau)\_MAP

**Project Sponsor:**  
 Blaenau Gwent County Borough Council

## Network Map:



## Summary forecast financial information:

Energy generation capex (£m)	£4.98
Pipework / distribution capex (£m)	£5.93
Other capex (£m)	£1.10
<b>Total capex (£m)</b>	<b>£12.08</b>

Project IRR*	9.00%
Considering third party finance?	Not Stated

\* Real pre-tax pre-finance

Construction Start	First Connection	Full Connection
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:	heatnetworks@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. Auxillary boilers would also be required for system resilience.

### Heat/cooling demand phasing description:

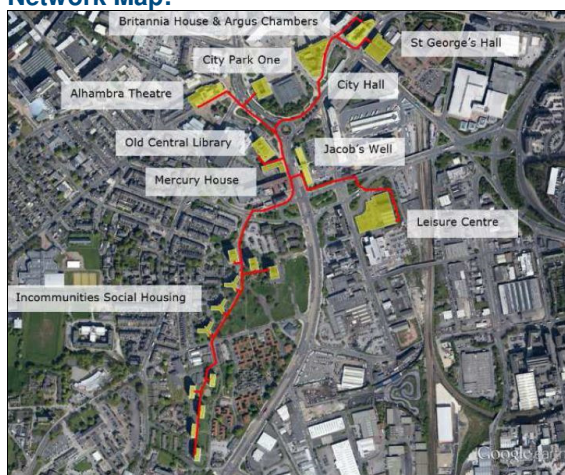
The proposed project is split into three phases. Phase 1 seeks to connect the Circuit of Wales (phase 1) and three private sector industrial buildings. Electrical demand from the phase 1 industrial customers is estimated to be high (c40GWh p.a.). Of this demand, phase 1 electrical output from the gas 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.

# Leisure centre and Old Central Library\_FES

## Project Sponsor:

Bradford Metropolitan District Council

## Network Map:



## Summary forecast financial information:

Energy generation capex (£m)	£3.02
Pipework / distribution capex (£m)	£3.84
Other capex (£m)	£1.24
<b>Total capex (£m)</b>	<b>£8.09</b>

Project IRR*	10.44%
Considering third party finance?	Not Stated

\* Real pre-tax pre-finance

Construction Start	First Connection	Full Connection
Not Provided	Not Provided	Not Provided

## Project Stage

Feasibility

## Project Contact Details:

LA Name:	Bradford Metropolitan District Council
Contact Name:	George Robinson
Email:	heatnetworks@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:

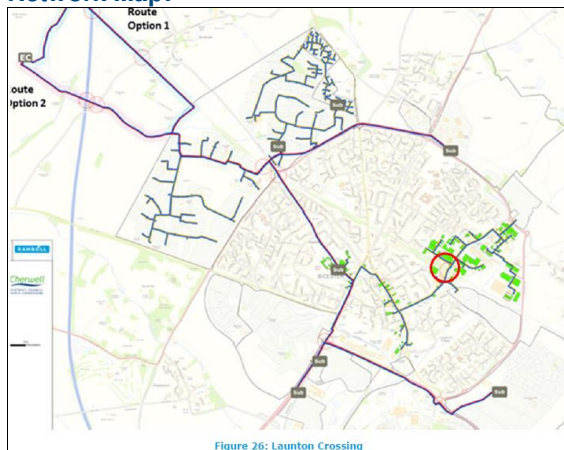
The priority network represents the first phase of development of a district energy network for the City of Bradford. In the future, additional heat demands may be added via extension to the network, as new developments are constructed near to the priority network or lower cost and carbon heat sources 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.

# Bicester\_FES

## Project Sponsor:

Cherwell District Council

## Network Map:



## Summary forecast financial information:

Energy generation capex (£m)	£4.78
Pipework / distribution capex (£m)	£31.11
Other capex (£m)	£7.23
<b>Total capex (£m)</b>	<b>£43.12</b>

Project IRR*	8.60%
Considering third party finance?	Not Stated

\* Real pre-tax pre-finance

Construction Start	First Connection	Full Connection
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Not Provided	2023	Not Provided
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## Project Stage

Feasibility

## Project Contact Details:

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

## Technical Information:

### Primary energy source:

Boiler - EfW

### Project description:

Opportunity for developing a decentralised energy heat network supplying a 6,000 home Eco-town development at North West Bicester with low cost, low carbon heat from the Ardley Energy Recovery Facility (ERF).

### Energy centre description:

12.5 MW supply capacity from Ardley ERF, 39 MW peaking and back-up boilers, 5.3 km transmission network length and 48 km distribution network length.

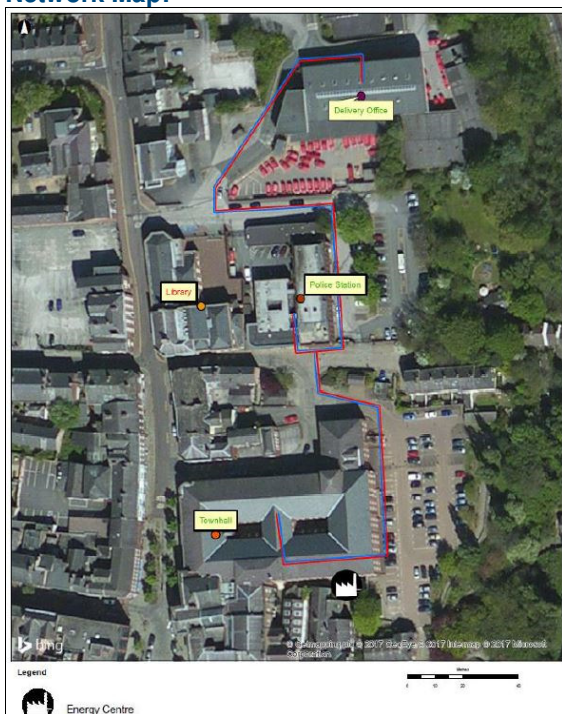
### Heat/cooling demand phasing description:

The first 1,200 homes in the development cannot form the basis for a business case for the network. This is because the value of heat sales from the Project Company to the ESCo contracted to supply them would be much less than for homes not tied into a supply contract. Commencement of construction for the remaining 4,800 is planned for 2022. As such 2023 is recommended as the year for connection for the project to maximise the use of available heat from the ERF.

# 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 35m<sup>3</sup> (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
Pipework / distribution capex (£m)	£0.51
Other capex (£m)	£0.02
<b>Total capex (£m)</b>	<b>£1.02</b>

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

\* Real pre-tax pre-finance

Construction Start	First Connection	Full Connection
2019	2020	2020

## Project Stage

Feasibility

## Project Contact Details:

LA Name:	Cheshire East Council
Contact Name:	Dan Griffiths
Email:	dan.griffiths@skillsandgrowth.co.uk





# Church Street\_COM

**Project Sponsor:**  
City of Westminster

## Network Map:



## Summary forecast financial information:

Energy generation capex (£m)	£8.47
Pipework / distribution capex (£m)	£6.27
Other capex (£m)	£1.17
<b>Total capex (£m)</b>	<b>£15.91</b>

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

\* Real pre-tax pre-finance

Construction Start	First Connection	Full Connection
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 Heat Network\_DPD

**Project Sponsor:**  
Crawley Borough Council

## Network Map:



## Summary forecast financial information:

Energy generation capex (£m)	£2.76
Pipework / distribution capex (£m)	£3.17
Other capex (£m)	£1.55
<b>Total capex (£m)</b>	<b>£7.48</b>

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

\* Real pre-tax pre-finance

Construction Start	First Connection	Full Connection
2018	2019	2020

## Project Stage

Detailed Project Development

## Project Contact Details:

LA Name:	Crawley Borough Council
Contact Name:	Brett Hagen
Email:	brett.hagen@crawley.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:

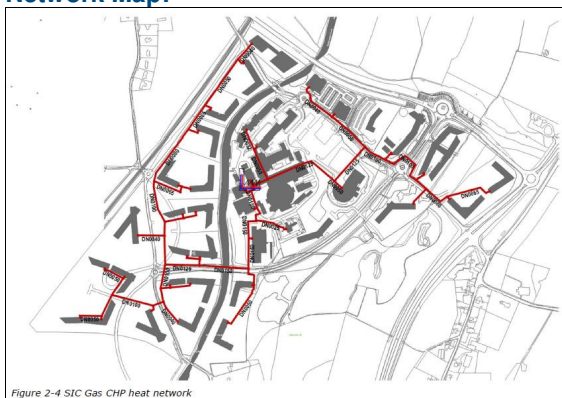
Key customers identified for the first phase are: 500 new residential units, the town hall, a police station, a library, a hotel, and a college.

# East Runcorn Daresbury Energy Network\_FES

## Project Sponsor:

Halton Borough Council

## Network Map:



## Summary forecast financial information:

Energy generation capex (£m)	£3.45
Pipework / distribution capex (£m)	£4.77
Other capex (£m)	£1.90
<b>Total capex (£m)</b>	<b>£10.12</b>

Project IRR*	6.20%
Considering third party finance?	Not Stated

\* Real pre-tax pre-finance

Construction Start	First Connection	Full Connection
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.

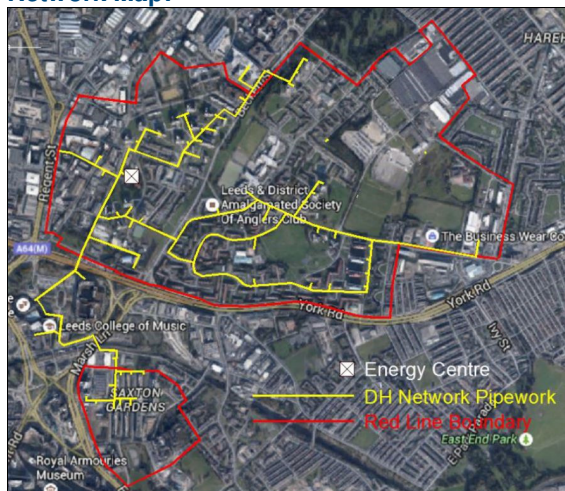
### Heat/cooling demand phasing description:

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).

## Leeds Phase 2 DHN\_FES

**Project Sponsor:**  
Leeds City Council

### Network Map:



### Summary forecast financial information:

Energy generation capex (£m)	Not provided
Pipework / distribution capex (£m)	£10.00
Other capex (£m)	£2.00
<b>Total capex (£m)</b>	<b>£12.00</b>

Project IRR*	Not provided
Considering third party finance?	Yes

\* Real pre-tax pre-finance

Construction Start	First Connection	Full Connection
2018	2019	Not Provided

**Project Stage**  
Feasibility

### Project Contact Details:

LA Name:	Leeds City Council
Contact Name:	George Munson
Email:	george.munson@leeds.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:

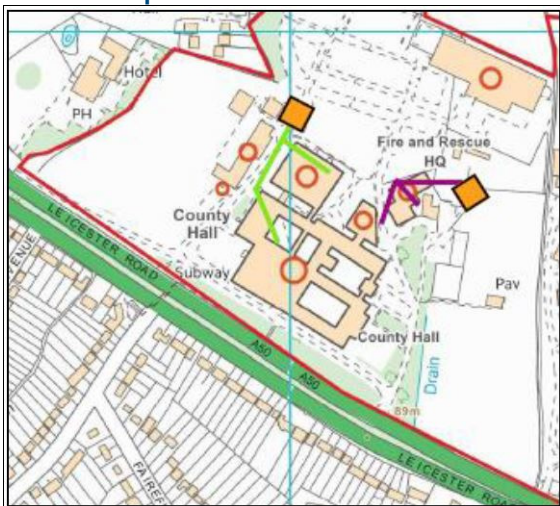
The network will initially connect to existing council/public sector buildings to provide an anchor load from day 1. The city centre and the Southbank have numerous active development sites and we anticipate that these will connect to the network between 2020 and 2025. The Southbank will also boast the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



## County Hall site at Glenfield\_FES

**Project Sponsor:**  
Leicestershire county

### Network Map:



### Summary forecast financial information:

Energy generation capex (£m)	£0.27
Pipework / distribution capex (£m)	£0.11
Other capex (£m)	£0.10
<b>Total capex (£m)</b>	<b>£0.48</b>

Project IRR*	8.90%
Considering third party finance?	Not Stated

\* Real pre-tax pre-finance

Construction Start	First Connection	Full Connection
Not Provided	Not Provided	Not Provided

**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 – Biomass

### Project description:

A number of options were explored. A biomass-fired CHP adjacent to the Anstey Frith building to provide space heating and hot water to the Anstey Frith and ICT buildings, whilst also generating electricity which can be used on-site by the LCC to offset some imported grid-electricity has been assessed to be one of the preferred options. Key benefits: Low carbon heat supply to Anstey Frith and ICT (biomass-fired CHP); Increased on-site electricity generation; Short network connecting two buildings only, no heat network supply to a third party; Quick mobilisation, no heat network supply to a third party; 24 hour heat load in Anstey Frith, and the ICT is likely to require increased amounts of DHW; Biomass supply chain already in place; Biomass has lower carbon emissions than natural gas; Additional RHI income from the use of biomass.

### Energy centre description:

An initial assessment of CHP provision indicates that a 45kWe unit with a thermal output of 75kWth would be suitable for this option. This unit has been sized to meet 70% of the total thermal load of Anstey Frith and the converted ICT (thermal base load), and to operate for 5,000 hours per annum. The unit will produce circa 370 MWh heat and 225 MWh electricity annually. This electricity is proposed to be used locally within the LCC site and not exported to the grid as the electricity has the greatest value whilst being used on-site, and export is prohibited by the grid (fault levels) above the 200 kW limit agreed with the DNO. The electrical power may be used at LCC East; Anstey Frith, ICT or Eastern Annex.

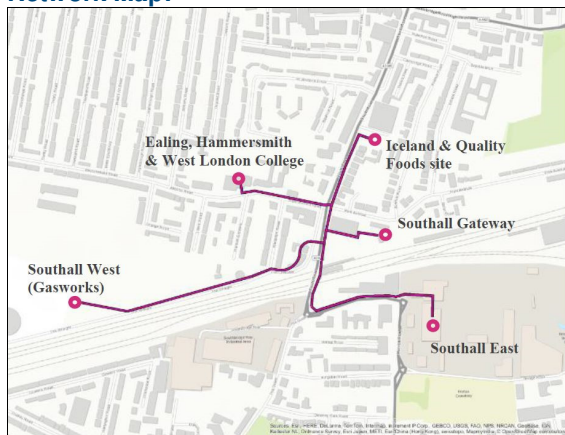
**Heat/cooling demand phasing description:**  
Not available

# Southall DE\_FES

## Project Sponsor:

London Borough of Ealing

## Network Map:



## Summary forecast financial information:

Energy generation capex (£m)	£5.48
Pipework / distribution capex (£m)	£3.67
Other capex (£m)	Not provided
<b>Total capex (£m)</b>	<b>£9.15</b>

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

\* Real pre-tax pre-finance

Construction Start	First Connection	Full Connection
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:

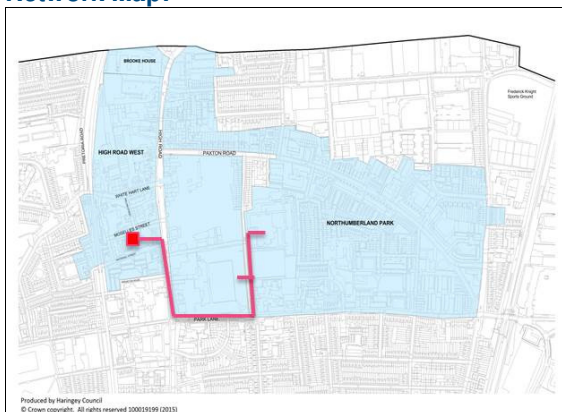
Cumulative heat loads (excluding primary and secondary losses) reach a plateau at 24,000 MWh/year as the full build-out of all connected development sites is expected to happen in 2043.

# North Tottenham\_DPD

## Project Sponsor:

London Borough of Haringey

## Network Map:



## Summary forecast financial information:

Energy generation capex (£m)	Not provided
Pipework / distribution capex (£m)	Not provided
Other capex (£m)	Not provided
<b>Total capex (£m)</b>	<b>Not Provided</b>

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

\* Real pre-tax pre-finance

Construction Start	First Connection	Full Connection
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:	heatnetworks@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:

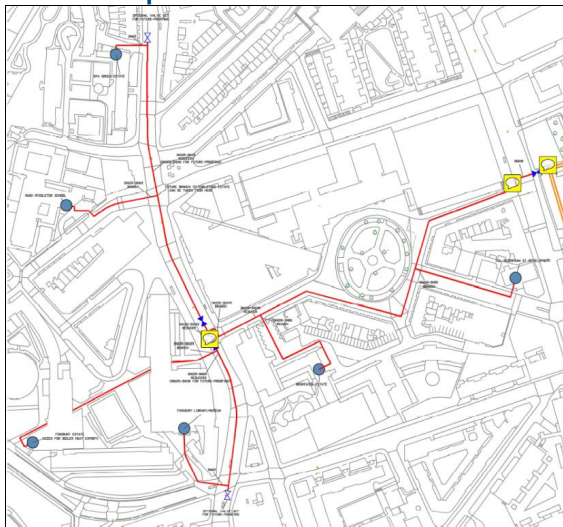
Tottenham Hotspur Football Club & partners. Haringey Development Vehicle (Council procured the partner for the JV). High Road West Development Partner (Council procured private sector partner). Existing sites. Others sites including Mayor of London / GLA (Housing Zone Funding, London Plan, DEEP), BEIS,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

## Bunhill Phase 3 FES

**Project Sponsor:**

London Borough of Islington

### Network Map:



### Summary forecast financial information:

Energy generation capex (£m)	£1.86
Pipework / distribution capex (£m)	£2.29
Other capex (£m)	£0.75
<b>Total capex (£m)</b>	<b>£4.90</b>

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

\* *Real pre-tax pre-finance*

Construction Start	First Connection	Full Connection
2017	2018	2018

### Project Stage

## Feasibility

### Project Contact Details:

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

### Technical Information:

**Primary energy source:**

CHP – Gas

### Project description:

The existing Bunhill network is proposed to be extended to connect to a number of residential estates, a school and a library with an estimated combined heat load of 9.1GWh per year.

### Energy centre description:

The primary heat supply for the expanded phase 3 Bunhill network will be from the existing phase 2 energy centre and a new energy centre at the new Finsbury Leisure Centre, which will form part of the St Luke's area redevelopment. The new energy centre will replace the existing phase 1 energy centre, which is being decommissioned as part of the redevelopment. The proposed strategy is to reuse the existing Bunhill phase 1 CHP, which has a heat supply capacity of 2.27MWth, in the new energy centre.

**Heat/cooling demand phasing description:**

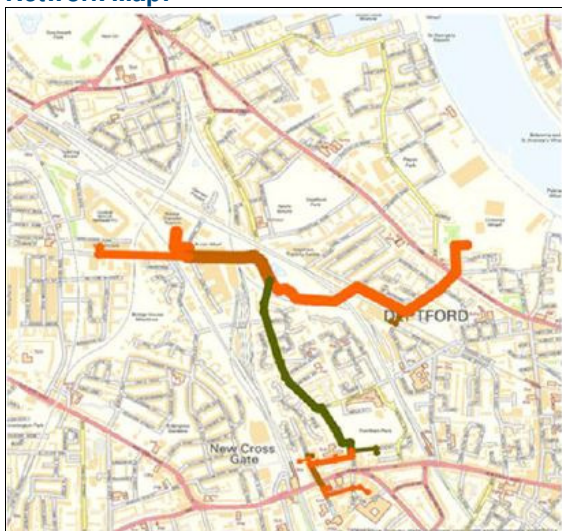
Not Provided



# 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)	Not provided
Pipework / distribution capex (£m)	£4.68
Other capex (£m)	Not provided
<b>Total capex (£m)</b>	<b>£4.68</b>

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

\* Real pre-tax pre-finance

Construction Start	First Connection	Full Connection
Not Provided	Not Provided	Not Provided

**Project Stage**  
 Feasibility

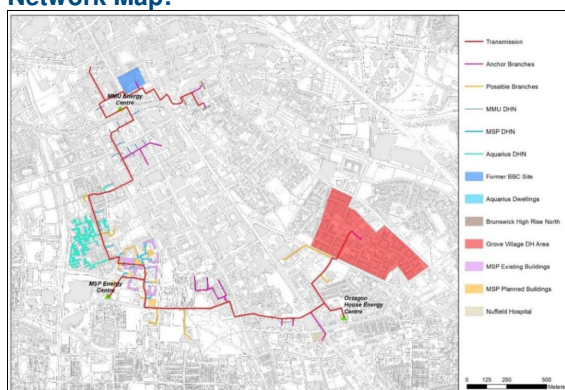
## Project Contact Details:

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

# Manchester Oxford Road Corridor\_FES

**Project Sponsor:**  
Manchester City Council

## Network Map:



## Summary forecast financial information:

Energy generation capex (£m)	Not provided
Pipework / distribution capex (£m)	£14.44
Other capex (£m)	Not provided
<b>Total capex (£m)</b>	<b>£14.44</b>

Project IRR*	5.40%
Considering third party finance?	Not Stated

\* Real pre-tax pre-finance

**Construction Start**      **First Connection**      **Full Connection**

Not Provided	Not Provided	Not Provided
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## Project Stage

Feasibility

## Project Contact Details:

LA Name:	Manchester City Council
Contact Name:	Alex Trebowicz
Email:	Alex.Trebowicz@greatermanchester-ca.gov.uk

## Technical Information:

### Primary energy source:

Not Provided

### 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:

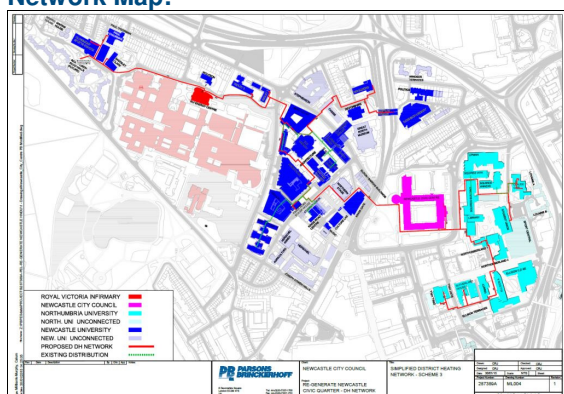
Anchor load customers are estimated to represent 41.5GWh of heat from the university, university hospitals, aquatics centre, council buildings and others. An additional 3.45GWh of potential heat loads have been identified from schools within the corridor.

# 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
Pipework / distribution capex (£m)	Not provided
Other capex (£m)	Not provided
<b>Total capex (£m)</b>	<b>£6.09</b>

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

\* Real pre-tax pre-finance

Construction Start	First Connection	Full Connection
2017	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.

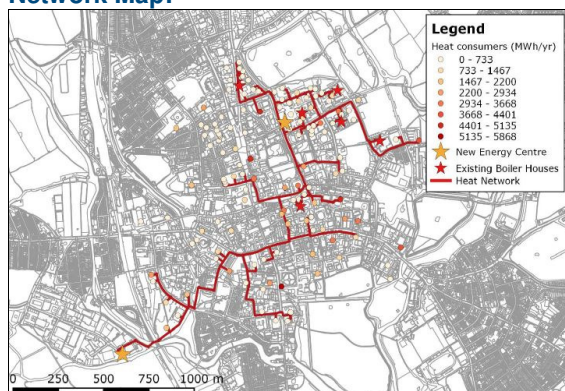
### Heat/cooling demand phasing description:

Not Provided

# Oxford City Centre\_FES

**Project Sponsor:**  
Oxford City Council

## Network Map:



## Summary forecast financial information:

Energy generation capex (£m)	£25.79
Pipework / distribution capex (£m)	£13.16
Other capex (£m)	Not provided
<b>Total capex (£m)</b>	<b>£38.95</b>

Project IRR*	14.40%
Considering third party finance?	Not Stated

\* Real pre-tax pre-finance

Construction Start	First Connection	Full Connection
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:

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:

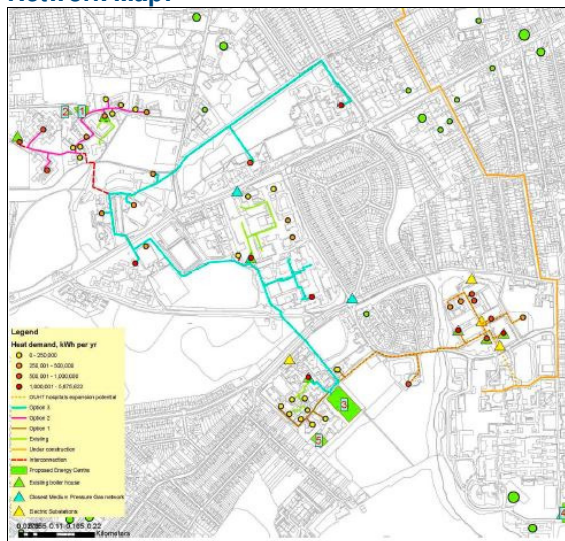
Option 3, the largest of the network scenarios, incorporates the areas of Option 1 and 2, as well as most of the heat demand between those areas. The heat network would extend from Osney Mead and Oxpens to the Science Area and Keble Triangle, picking up the areas of dense heat demand in the City Centre, 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
Pipework / distribution capex (£m)	£2.63
Other capex (£m)	Not provided
<b>Total capex (£m)</b>	<b>£9.74</b>

Project IRR*	5.20%
Considering third party finance?	Not Stated

\* Real pre-tax pre-finance

Construction Start	First Connection	Full Connection
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:

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:

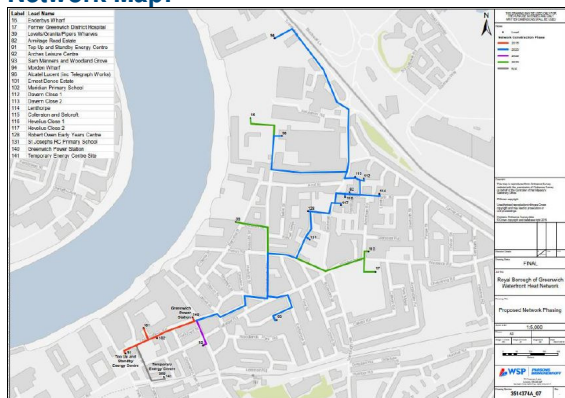
Not Provided

# 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
Pipework / distribution capex (£m)	£5.48
Other capex (£m)	£0.20
<b>Total capex (£m)</b>	<b>£6.66</b>

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

\* Real pre-tax pre-finance

Construction Start	First Connection	Full Connection
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.

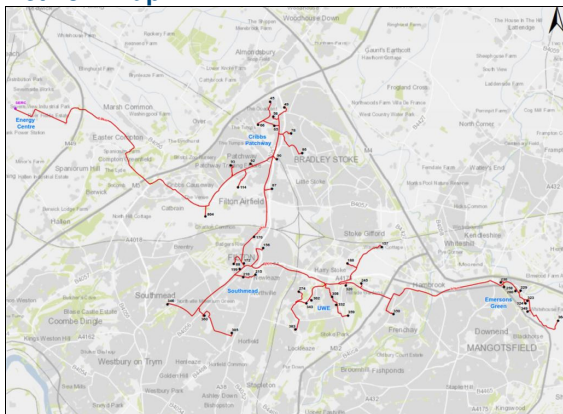


# SERC EfW heat supply\_MAP

## Project Sponsor:

South Gloucestershire Council

## Network Map:



## Technical Information:

### Primary energy source:

CHP – EfW

### Project description:

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

### Energy centre description:

### 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.

## Summary forecast financial information:

Energy generation capex (£m)	£3.05
Pipework / distribution capex (£m)	£27.83
Other capex (£m)	£3.03
<b>Total capex (£m)</b>	<b>£33.91</b>

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

\* Real pre-tax pre-finance

### Construction Start

Not Provided

### First Connection

Not Provided

### Full Connection

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

# Public Service Village\_FES

## Project Sponsor:

St Edmundsbury Borough Council

## Network Map:



## Summary forecast financial information:

Energy generation capex (£m)	Not provided
Pipework / distribution capex (£m)	£0.36
Other capex (£m)	£0.30
<b>Total capex (£m)</b>	<b>£1.72</b>

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

\* Real pre-tax pre-finance

Construction Start	First Connection	Full Connection
2016	2018	2019

## Project Stage

Feasibility

## Project Contact Details:

LA Name:	St Edmundsbury Borough Council
Contact Name:	George Robinson
Email:	heatnetworks@beis.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.

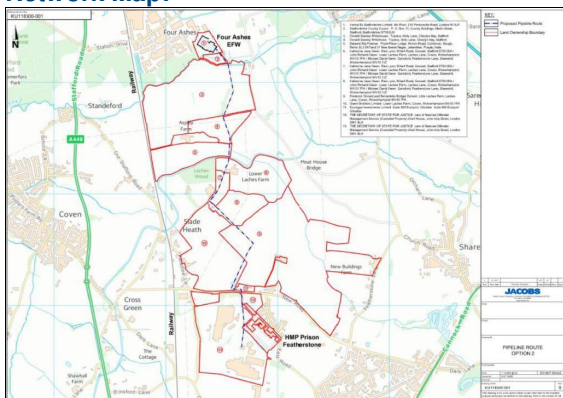


# Veolia Energy from Waste\_FES

## Project Sponsor:

Staffordshire Moorlands District Council

## Network Map:



## Summary forecast financial information:

Energy generation capex (£m)	Not provided
Pipework / distribution capex (£m)	Not provided
Other capex (£m)	Not provided
<b>Total capex (£m)</b>	<b>£4.77</b>

Project IRR*	7.00%
Considering third party finance?	Not Stated

\* Real pre-tax pre-finance

Construction Start	First Connection	Full Connection
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.

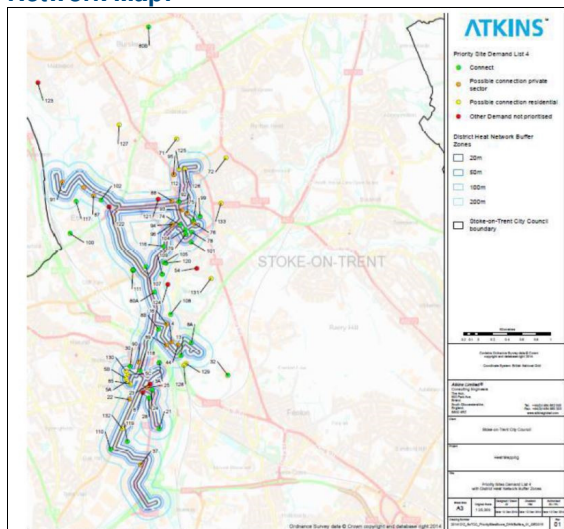
### Heat/cooling demand phasing description:

Not available

# Deep Geothermal\_DPD

**Project Sponsor:**  
 Stoke-on-Trent City Council (SoTCC)

## Network Map:



## Summary forecast financial information:

Energy generation capex (£m)	£32.45
Pipework / distribution capex (£m)	£17.41
Other capex (£m)	£1.07
<b>Total capex (£m)</b>	<b>£50.93</b>

Project IRR*	6.83%
Considering third party finance?	Yes

\* Real pre-tax pre-finance

Construction Start	First Connection	Full Connection
Not Provided	2018	2020

## Project Stage

Detailed Project Development

## Project Contact Details:

LA Name:	Stoke-on-Trent City Council (SoTCC)
Contact Name:	Sébastien Danneels
Email:	Sebastien.Danneels@stoke.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.

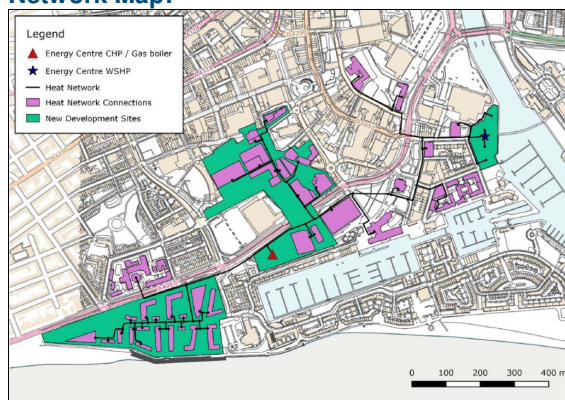
## Heat/cooling demand phasing description:

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
Pipework / distribution capex (£m)	£3.73
Other capex (£m)	Not provided
<b>Total capex (£m)</b>	<b>£11.49</b>

Project IRR*	8.20%
Considering third party finance?	Not Stated

\* Real pre-tax pre-finance

Construction Start	First Connection	Full Connection
Not Provided	Not Provided	Not Provided

## Project Stage

Feasibility

## Project Contact Details:

LA Name:	Swansea City and Borough Council
Contact Name:	George Robinson
Email:	heatnetworks@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.

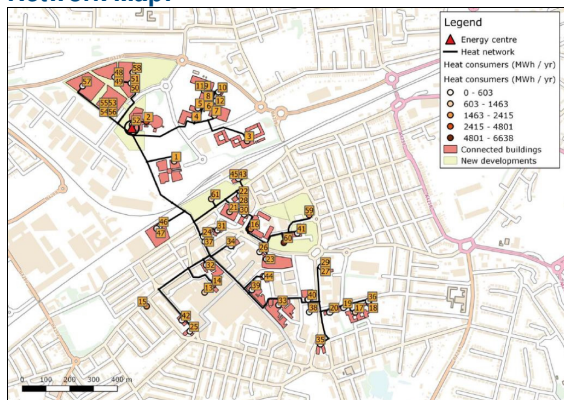
### Heat/cooling demand phasing description:

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
Pipework / distribution capex (£m)	£7.14
Other capex (£m)	£4.68
<b>Total capex (£m)</b>	<b>£20.28</b>

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

\* Real pre-tax pre-finance

Construction Start	First Connection	Full Connection
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:

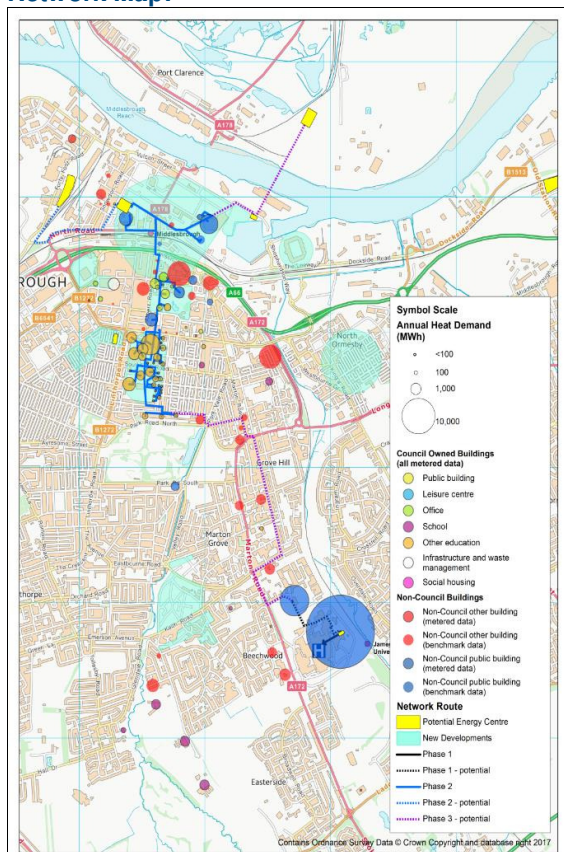
Within the Town Centre area 35 buildings were identified with sufficient heat consumption and proximity to a probable heat network route (from the North Star site) to enable connection to a heat network. Assumed connections include the station and Kimmerfields developments. These developments present 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.



# 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 6,000m<sup>2</sup> 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).

## Heat/cooling demand phasing description:

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

## Summary forecast financial information:

Energy generation capex (£m)	Not provided
Pipework / distribution capex (£m)	Not provided
Other capex (£m)	Not provided
<b>Total capex (£m)</b>	<b>£30.00</b>

Project IRR*	Not provided
Considering third party finance?	Yes

\* Real pre-tax pre-finance

Construction Start	First Connection	Full Connection
2020	2020	2024

## Project Stage

Detailed Project Development

## Project Contact Details:

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

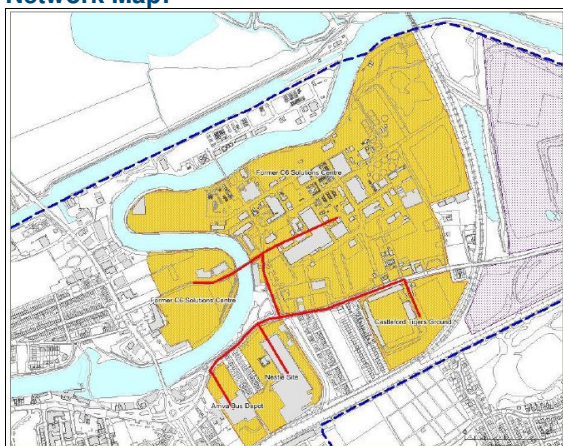
Information valid as at: **2016**

## Castleford C6 Development\_MAP

### Project Sponsor:

Wakefield Metropolitan District Council

### Network Map:



### Summary forecast financial information:

Energy generation capex (£m)	£1.28
Pipework / distribution capex (£m)	£4.53
Other capex (£m)	£0.30
<b>Total capex (£m)</b>	<b>£6.10</b>

Project IRR*	9.70%
Considering third party finance?	Not Stated

\* Real pre-tax pre-finance

Construction Start	First Connection	Full Connection
Not Provided	2018	2020

### Project Stage

Heat mapping and masterplanning

### Project Contact Details:

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

### Technical Information:

#### Primary energy source:

Water source heat pumps

#### Project description:

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

#### Energy centre description:

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

#### Heat/cooling demand phasing description:

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