

Solihull Town Centre Low Carbon Energy Network

Sustainability Schools Conference

Agenda

- Sustainable Energy – Technical
- Buro Happold – Commercial
- Womble Bond Dickinson - Legal

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What are heat networks?

- Heat networks have 3 main components:
 - Heat generation
 - Heat distribution
 - Heat consumption

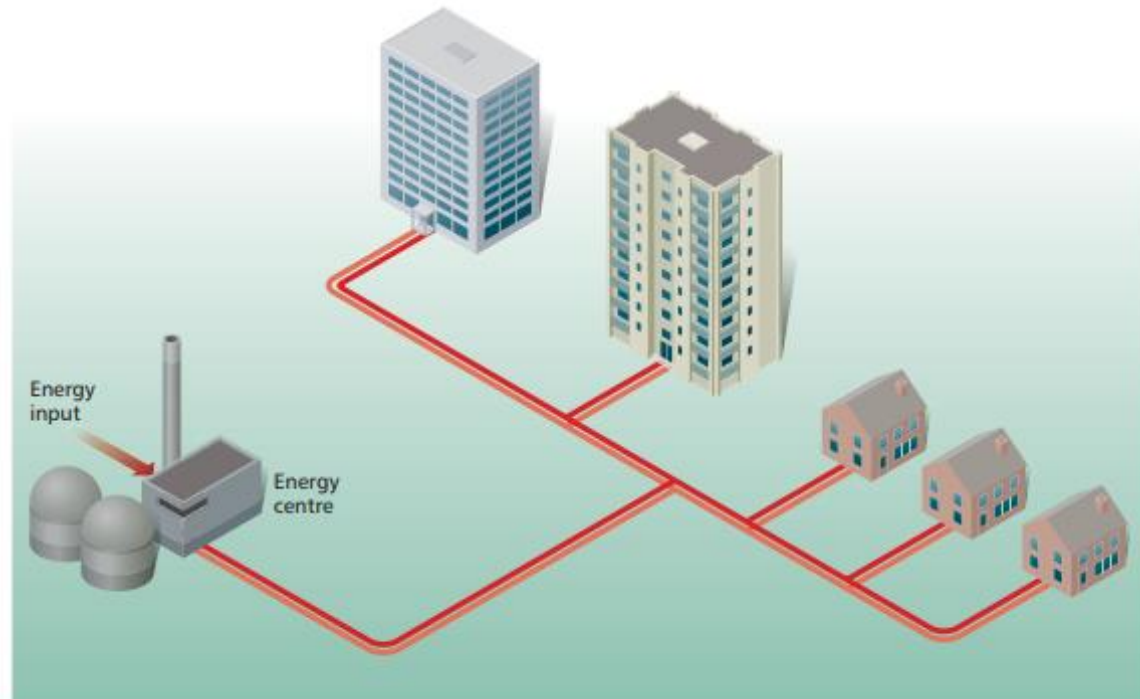


Image from: CIBSE Heat networks: Code of Practice for the UK

Why use heat networks?

- Net zero carbon commitments (2030 / 2050)
- Improved security of supply
- Energy mix
- Potential to use 'waste' heat
- Economies of scale
- Smart operation

Low-carbon heating to replace gas in new UK homes after 2025

Environmental groups say chancellor's climate change pledges do not go far enough



▲ Philip Hammond says new homes built after 2025 will not be allowed to use gas heating. Photograph: George Clerk/Getty Images

Gas boilers will be replaced by low-carbon heating systems in all new homes built after 2025 in an attempt to tackle the escalating climate crisis, Philip Hammond has said.

How is heat generated?

Low carbon technologies used as much as possible, such as:

- Heat pumps – air source, water source, ground source
- Biomass boilers
- Combined heat and power
- Energy from Waste
- Solar thermal

How is heat distributed?

- Heat is distributed to each customer via an underground pipe network
- Heat is transferred using low temperature hot water (LTHW) typically being heated to circa 80°C and returning from the customers as low as circa 35°C



How is heat consumed?

Heat is transferred from the distribution network to the customers heating system. Typically heat is transferred via thermal substations or heat interface units (HIUs)

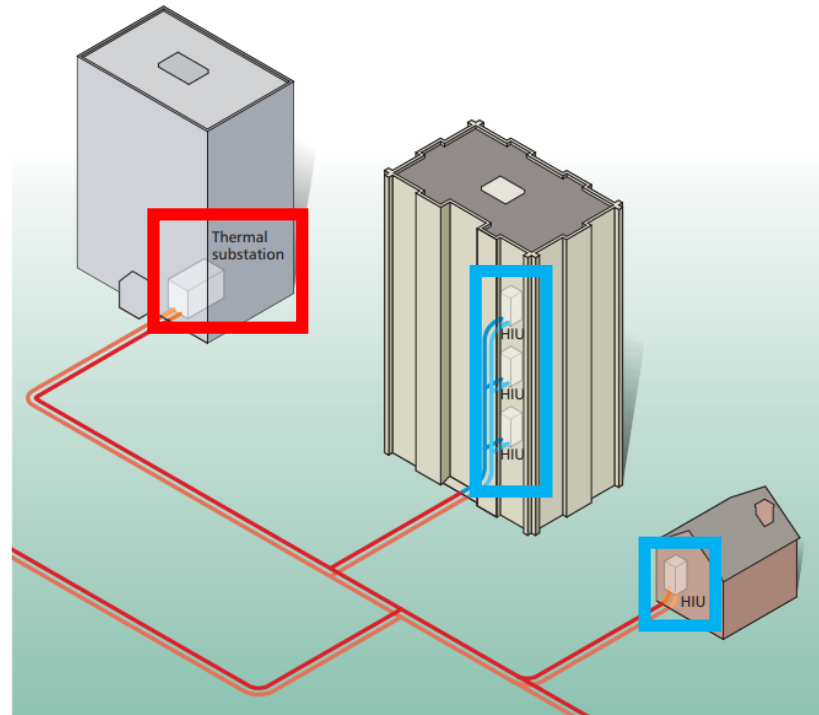


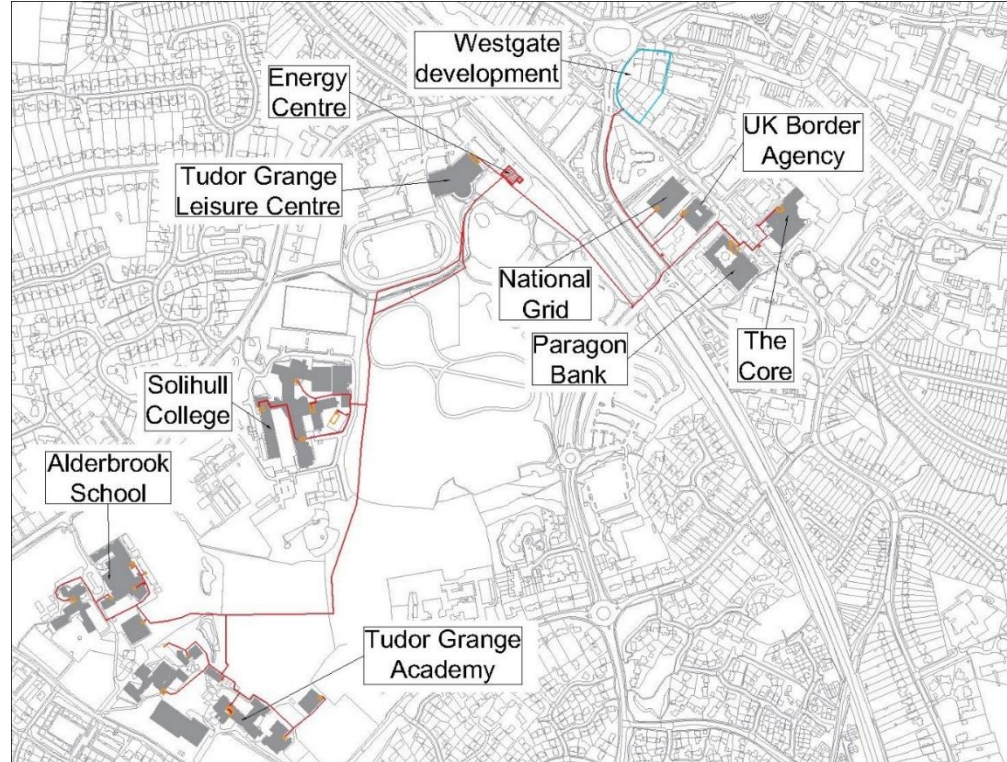
Image from: CIBSE Heat networks: Code of Practice for the UK

Solihull Town Centre Low Carbon Energy Network Scheme Summary



Network overview

- Phase 1 is the connection of 5 existing sites to a heat and power network:
 - Solihull Central Library
 - Tudor Grange Leisure Centre
 - Solihull College
 - Paragon Bank
 - Tudor Grange Academy
- Network comprises:
 - Circa 2.3 km of underground pipe
 - Circa 1.5 km of underground electricity cable



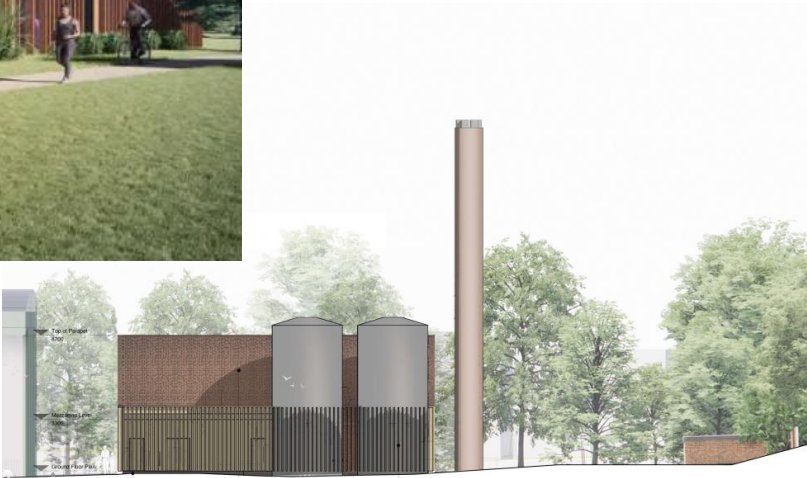
Energy centre location

Energy centre to be located next to Tudor Grange Leisure Centre



Energy centre building

Architects plans for the energy centre

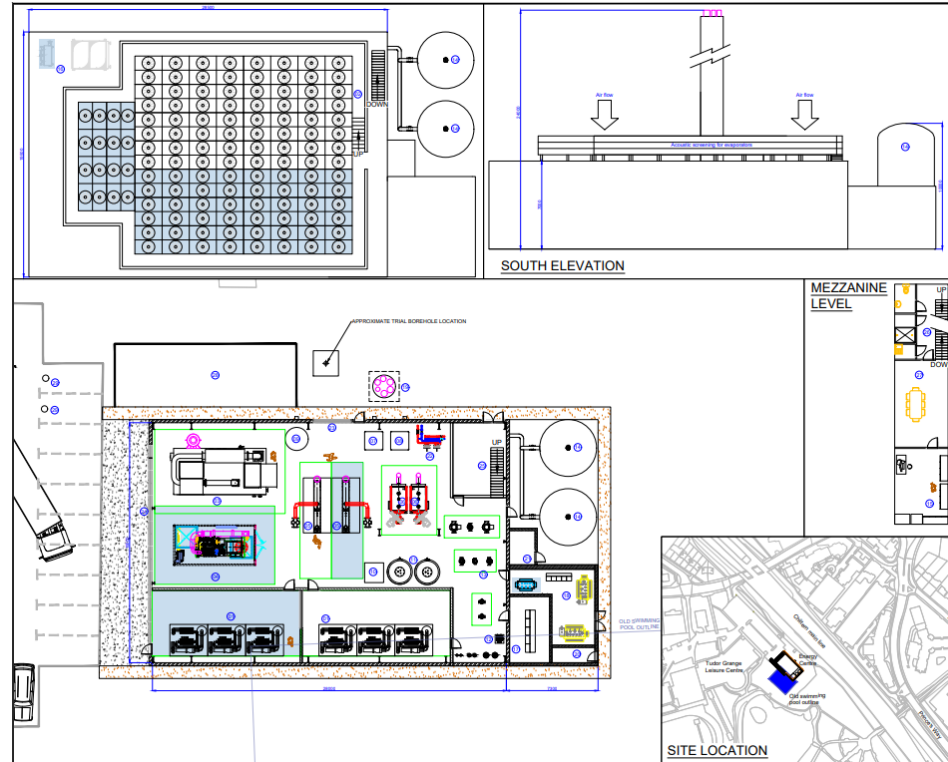


Energy centre layout

The Phase 1 heat network will be supplied with heat and power from an energy centre next to the Leisure Centre.

The energy centre plant comprises:

- 1.7 MW air source heat pump with evaporators located on the roof
- 1.6 MWe natural gas combined heat and power plant (CHP)
- Circa 4 MW of natural gas or electric boilers for back-up heat
- 200,000 litres of thermal storage tanks



CO₂e savings



The Phase 1 energy centre will generate:

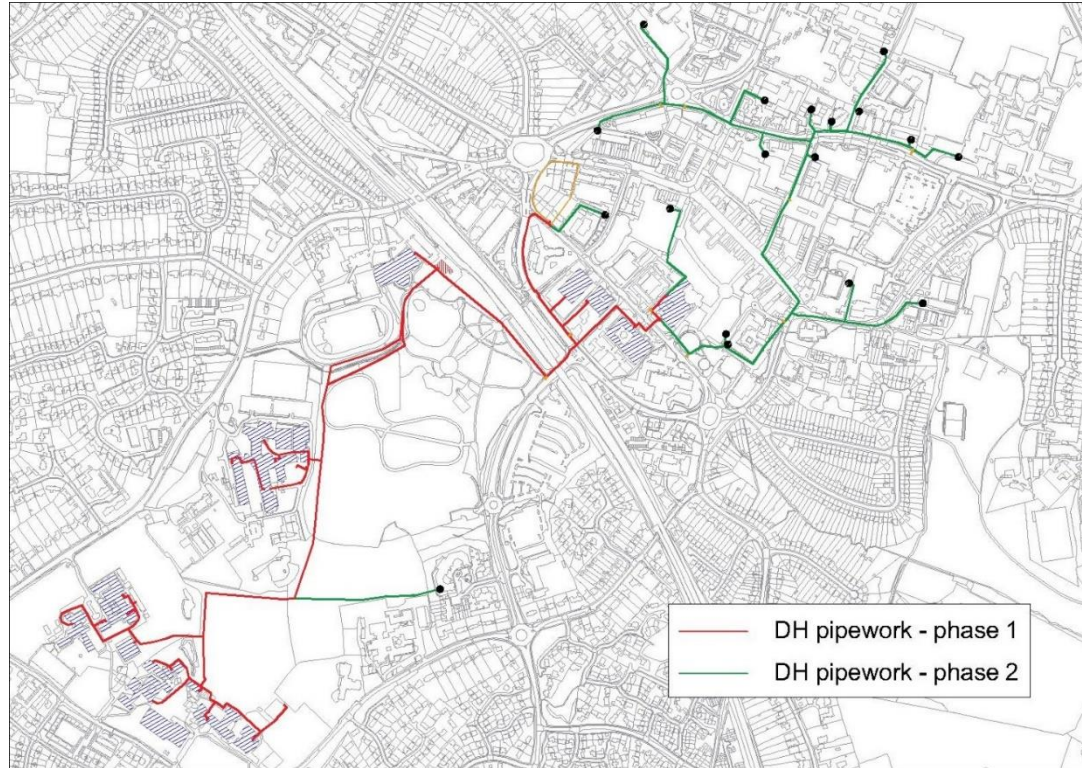
- Circa 2,145,000 kWh of heat per year from the air source heat pump
- Circa 6,944,000 kWh of heat per year from the CHP plant
- Circa 1,214,000 kWh of heat per year from the back up boilers
- Circa 6,777,300 kWh of electricity per year from the CHP plant

The carbon savings associated with the phase 1 network are as follows, measured against a business as usual case of individual gas boilers and grid electricity in all connecting buildings:

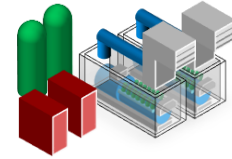
- 20,185 tCO₂e over 25 years
- 25,987 tCO₂e over 40 years

Future development

Potential future development of the heat network in Phase 2 to include connection of circa 25 additional sites and will be developed in line with the Town Centre Masterplan



Alternative Infrastructure



Old vs New

- In 2019 the Committee on Climate Change announced that non carbon friendly heating systems amount to 1/3 of UK greenhouse gases
- 2025 Future Home Standard will require all new builds to adopt alternative low carbon technologies
 - Heat networks
 - Heat pumps
 - Hydrogen boilers
 - Electric radiators
- Heat in buildings accounts for 23% of UK emissions
- Heat Networks are the only solution to larger scale renewable and where recovered heat sources can be utilised
- Currently 2% of overall UK head demand is met by heat networks with an aim for 18% by 2050
- Technology is proven in European countries e.g. Denmark
- Delivery of heat networks is government supported



Government Initiative



Heat Networks Delivery Unit (HNDU)

(Feasibility, Detailed Project Development)

- In 2013 the UK government set up HDNU to support local authorities with the early stages of heat network development
 - Heat mapping
 - Energy master planning
 - Techno-economic feasibility
 - Detailed project development
- Local authorities apply for HNDU support through bidding rounds
- Since birth has provided £25.6m of grant funding
- HNDU funding up to 67% of eligible costs
- Successful applications will be supported by team of specialists within HNDU

Heat Networks Investment Projects (HNIP)

(Commercialisation, Construction)

- Major government initiative which will invest £320m of capital funding in heat network projects
- For commercially viable heat network schemes that promise to deliver low carbon, economical and reliable heat
- Open to private, public & third sector project sponsors, developers and investors
- Final year 2021 - 2022

Green Heat Network Fund (GHNF)

- Formed as an extension and replacement of HNIP
- Starts April 2022

Heat Network Zoning Consultation (HNZ)



What is HNZ?

- Part of the wider governments plan for decarbonisation
- A designated area in which heat networks are the lowest cost and lowest carbon solution
- Mandatory connections for certain buildings within a given timeframe

Why HNZ?

- Provides clarity to local stakeholders and investors on where heat networks will be the most viable solution
- Allows for long term investment, better planning and coordination
- Mitigates uncertainty surrounding potential future heat loads

Who will the HNZ effect?

- Public sector
- Private sector



Commercialisation

Finance

- Financial Model
 - Developed from the Techno-Economic Model
 - Input
 - Capex/ opex, revenue, timings, risk assessment
 - Outputs
 - IRR/ NPV, preferred option

Final Business Case

- Internal governance/ approval
- External Funding/ grant

Connection to the Network



- Procurement
- Heads of Terms
- Connection and Supply Agreements



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Thank you!

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