Energetik low-carbon heat networks

Enfield Council
Thursday 10 December 2020

Summary

With a summary by Enfield Council's Deputy Leader, Cllr Ian Barnes, this case study is brought to you by the Energetik team.

"Energetik is Enfield Council's local energy company. Energetik builds and operates high quality heat networks to supply low carbon heat and hot water to regeneration areas across Enfield. We have three currently operating:

- Arnos Grove heat network (set up in 2017) supplies the New Ladderswood estate and electricity generated by our energy centre is sold to the on-site Premier Inn hotel.
- Ponders End heat network (2018) supplies both the new Alma estate and Electric Quarter developments.
- Oakwood heat network (2019) supplies the New Avenue estate.

"Construction of the main energy centre and our largest heat network at Meridian Water will start in early 2021 and will be complete by the end of 2022. This heat network will supply heating and hot water to 15,000 homes and businesses delivered by the £6 billion Meridian Water regeneration scheme. In 2026 the heat network will connect to the new Energy Recovery Facility on the Edmonton EcoPark to make use of very-low carbon waste heat. Read on for further information on Energetik's low-carbon heat networks."

Our problem

Carbon emissions from heating represent over a third of the UK's carbon emissions. Decarbonising heat is therefore essential in order to effectively tackle the climate emergency.

Individual gas boilers will soon be unfeasible for use in new build developments, and they do not help to achieve carbon reduction as we aim for net zero. With traditional individual gas boiler heating systems being phased out over the coming years, a better low-carbon solution is needed that is long term and flexible. Heat networks offer this flexibility by installing infrastructure built to last in excess of 80 years and can provide heat generated from multiple different sources. It offers the ability to change the heat source for all connected customers to the most carbon efficient solution of the day, without having to retrofit technology in every individual home.

Overview

100% owned by the Enfield council, Energetik is a new kind of publicly owned energy company that designs, builds and operates low carbon heat networks.

In homes connected to a heat network, heat interface units (heat exchangers) are installed in properties and hot water is supplied by centralised energy centres which can generate hot water more efficiently. Hot water is transported to homes through a network of highly insulated underground pipes. Once used, the cooler water that returns to the energy centre where it is reheated and recirculated.

Benefits for those connected include a reliable supply of near zero carbon heat and hot water at a fair price. By using heat generated that would otherwise be lost/wasted to the atmosphere, our heat supply will be 92.3% more carbon efficient than a traditional gas boiler system, and ca. 60% more carbon efficient than individual heat pumps.

Additional benefits for our all-in-one tariff include 24/7/365 emergency support, with 4 hour response times (8 hours in summer), industry leading customer service, control over energy use via smart pay-as-you-go technology and absolutely no maintenance or repair costs beyond the heat tariff.

Timeline / project progress

Our three live heat networks were established in 2017, 2018 and 2019. Construction of the Meridian Water heat network is set to begin in early 2021, with completion expected by the end of 2022. In 2026, the Meridian Water energy centre will be connected to the North London Waste Authority (NLWA) Energy Recovery Facility to make use of the waste heat.

The energy centre will have significant thermal storage, holding over 3 million litres of hot water, providing extra resilience and security of supply, with an additional six 10MW boilers installed across three phases to provide backup should the waste heat supply not be available for any reason.

Stakeholders

- London Borough of Enfield
- The North London Waste Authority
- Connected residents and businesses of Enfield
- Multiple funding partners
- The GLA and Mayor of London
- Multiple housing developers
- Customer service and DBO partners

Whole systems approach

Whilst the company’s business plan is based over 40 years, in reality, once built it is expected to serve connected customers for decades beyond the business plan. The network at Meridian Water will be Energetik’s largest - supplying over 10,000 homes. In 2017, Enfield Council invested £58 million into the company’s 40-year business plan, showing its long-term commitment to the development.

The company manages and closely monitors the design, build and operation of its heat networks by its delivery partners, to ensure that the system installed meets the stringent technical standards it requires. This starts with design and procurement, and is followed with significant engagement throughout the construction, commissioning and then operational phases of the heat network’s development. The process ensures that the entire system is carefully considered and operated to make it as efficient and reliable as possible.

Each home is fitted with a smart meter so everyone is in control of their energy usage. Energetik’s prices are set annually and are benchmarked against CPI indices. This means the tariff can both increase and decrease, depending on indexation over the previous 12 months. This year the heat charge reduced by 9%, whilst the availability charge marginally increased.

Unlike some heat networks, the single heat tariff is not based on running costs divided by the number of customers. Instead, Energetik adjusts its tariff each year and retains responsibility for ensuring the system is operated effectively to maintain network efficiency, rather than passing the cost of inefficiency on to its

customers.

Impact

There are currently four developments connected to an Energetik heat network in the borough. Two have fully active energy centres, and the other two are heated by temporary energy centres until the main energy centres are complete.

The energy centres at Energetik's satellite schemes will use gas-fired CHP once fully operational, generating carbon savings versus individual gas boilers. The short to mid-term goal of the company is to connect all satellite schemes to the Meridian Water network to make best use of the very-low carbon heat source provided by the Energy Recovery Facility (ERF).

Based on current conservative business plan assumptions about connection numbers, 250,000 tonnes of carbon are forecast to be saved. To offset the same amount, over half a million trees would need to be planted today and be left for 50 years. This carbon saving calculation is based on each network being self-reliant on gas. If connected to the ERF as the company intends, then this figure will increase significantly.

By connecting the networks together, a primary trunk network will be installed across the borough, enabling future connections to new developments as they arise, as well as existing buildings such as Enfield's Civic buildings, hospitals, leisure centres and schools where it is feasible to connect. Connections made will contribute to Enfield's emissions reduction plan by offsetting the difference between buildings heated by gas and the carbon savings offered by connection to our network.

Importantly, the networks have been designed to expand, with additional capacity built-in, as well as the ability to interconnect additional heat sources in future. Extra capacity will allow future decarbonisation as more buildings are able to connect.

Energetik's expansion will also offset NOx emissions by avoiding the need for individual gas boiler installations.

For residents, Energetik's key driver is to ensure that they are provided with reliable and very low carbon heat and hot water for a fair price. Customers should be comfortable in the knowledge that if they do have a problem, they clearly understand how to get it resolved at no extra cost to them, and that the service provided is equal to, if not better than the traditional gas heating alternative.

All our networks are registered with the Heat Trust, an organisation which operates a voluntary scheme requiring guaranteed minimum customer service standards and protection, including independent redress to the energy ombudsman. While it does not involve itself with heat pricing, the Heat Trust has a heat cost comparator that allows customers to enter their billing data and compare it with live gas energy prices, factoring in estimation of maintenance and replacement costs, to check how their heat pricing compares with a more traditional gas heating system.

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Heat networks are certainly replicable and transferrable. They can be tailored to locally available resources and needs, depending on the best heat sources available in the area. They work best at scale in dense urban environments such as cities and large towns. Being fuel agnostic, heat networks adapt over time to accommodate emerging technologies as they become available. This avoids having to replace heating infrastructure in every home – you simply add / replace heat sources to the network.

There are approximately 500,000 customers already connected to heat networks across the UK, representing approximately 2% of the UK's existing housing stock. Over the coming years, the government forecasts this will need to increase to around 18% if national decarbonisation goals are to be achieved.

Municipally owned heat networks offer benefits which may not be available if delivered by the private sector. These can include the ability to access cheaper funding, invest over a much longer period and accept lower financial returns than is generally desired in the private sector. Further, any profits generated by the municipally owned company benefits the controlling local authority as the profit remains in the borough to be reinvested for the benefit of its residents.

Various funding streams have been secured to finance the project by the company and council working together. Funding is a mixture of low-cost corporate loans to the council, as well as an element of grant funding invested as equity.

Funding has been provided by:

- The London Energy Efficiency Fund (LEEF)
- The Mayor of London's Energy Efficiency Fund (MEEF, formerly LEEF)
- European Investment Bank
- Heat Network Investment Project (HNIP)
- Public Works Loan Board

Stakeholder management is crucial to ensuring good customer outcomes, as is stringent installation quality management. Having a team with significant operational knowledge and experience to design and manage high quality heat networks that are built to last is invaluable to ensure success.

Contact details

Kallista.Bird@energetik.london