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# Leeds PIPES District Heating Network

**Like most local authorities, Leeds City Council has declared a climate emergency in 2019 and committed to working towards becoming a carbon-neutral city. Key to this ambition will be the decarbonisation of heat, which in 2019 represented just under a quarter (23%) of UK carbon emissions. The council views its heat and energy related policies and projects as an opportunity to address its environmental challenges as well as supporting the one-in-six households in Leeds that were classed as living in fuel poverty in 2019. The Leeds PIPES district heating network is a great example of one of these projects.**

## Project background

The £49 million 'Leeds PIPES' network was imagined and developed with the aim of providing affordable, reliable, and low carbon heat and hot water to benefit both the council and commercial customers.

'Affordable' means that the network is designed to provide heat to connected commercial customers at competitive and attractive rates, whilst at the same time providing heat to connected social housing tenants at cheaper rates than alternative technologies, helping to alleviate fuel poverty. Being linked to an energy from waste facility means prices are less volatile than the global fossil fuel-based energy market.

'Reliable' means that the network provides a consistent service that customers can rely on, with multiple



layers of resilience designed in to ensure continuity of supply.

'Low carbon' means that heat from the network is significantly less carbon intensive than electricity from the grid or other traditional methods of heating building, namely gas or oil.

The scheme currently uses energy recovered from the city's non-recyclable household waste at the Leeds Recycling and Energy Recovery Facility (RERF). There are around 360,000 homes in the city and most of these have their waste collected by Leeds City Council and taken to the RERF. With the average household in Leeds producing enough waste each year to recover around 1.3 megawatt-hours of heat, the RERF has significant heat generation capacity. This potential use of the facility for heat supply was considered at the earliest stages of developing the site and informed the council's approach

to procuring a long-term operator.

Theoretically, once any network of insulated underground pipes is in place then it could be retrofitted so that any heat source—or combination of heat sources—could be used to power the network. Despite not technically being powered using a 'renewable' resource, the Leeds PIPES project helps cut the city's carbon footprint in multiple significant ways.

First, recovering energy from waste releases fewer (and less potent) greenhouse gas emissions than waste sent to landfill. Second, the energy that is recovered from waste can be converted into either electricity or (more efficiently) heat as a by-product which reduces the burning of fossil fuels. Typically, the RERF produces 5-7+ units of heat for each unit of electricity sacrificed, which is significantly better than any heat pump on the market. Third, heating

a building by connecting it to a district heating network typically replaces or makes redundant less sustainable heating methods such as gas combustion systems. The Leeds PIPES network supports the council's long-term ambition of the district becoming the first net zero major city in the country.

### Stakeholder buy-in

When the council first began consulting prospective customers about connecting to the network, a clear message came back that customers would only seriously negotiate once construction had started, and ideally with the network already operational. However, without a firm idea of potential customers, the risks of beginning construction were high. In response to this concern the council took a calculated risk, underpinned by 'anchor' connections to its own social housing and public sector partners, to commence construction on the assumption that new customers would connect once district heating infrastructure was available.

This assumption is now being realised but is a real barrier to many large strategic networks ever commencing. It was made possible in Leeds in part due to successful engagement with regional, national, and European bodies to secure a combination of grants and use of our own low-interest borrowing capability. Leeds PIPES continues to expand and is regularly connecting to new buildings with the expectation of becoming one of the UK's largest heat networks in the near future.

Around 1,800 residential properties, 8 public buildings, and 2 commercial buildings are currently connected to the network. Several more customers (including the Ministry of Justice and

a second major connection to the Leeds Teaching Hospitals Trust) have recently announced plans to connect and discussions are progressing well with many potential customers.

Stakeholder engagement was also important for minimising disruption. The project team worked with highways officers to coordinate pipe-laying and planned roadworks to minimise the duration of road closures and their associated impacts. Similarly, as domestic connections involved work in people's homes, close liaison with council housing team helped reduce the number of



visits and therefore disruption for both tenants and installers.

### Project execution

Leeds PIPES began construction in 2018 and was constructed in three phases, some of which were constructed in parallel. Phase 1 was completed during 2019, phase 2 in 2020, and construction on phase 3 has now commenced.

Phases 1 and 2 of the network were designed to facilitate connections for public sector organisations and council buildings. Once phase 3 is installed and operational, we expect new customers to primarily be new developments, with a mix of residential, student accommodation and non-domestic customers. Every

new connection helps to raise the profile of the network in the city, attracting potential customers and reaffirming the viability of district heating connections.

Resilience was considered at an early stage. A new energy centre was created to take low energy steam from the RERF and convert it into low-temperature hot water for the district heating network. A second energy centre at Saxton Gardens was created to meet peak demand and add resilience to the overall system using gas boilers, ensuring continuity of supply in all

circumstances. Our approach to resilience has meant that there has never been a loss of heat to customers at any point. Whenever the RERF has had outages, the back-up boilers at Saxton Gardens have automatically fired to ensure uninterrupted service is provided to customers.

The project has received funding from a number of regional, national and European sources:

- £5.8m from the European Regional Development Fund to help connect 1,080 council homes to the network.
- £5.5m from the Heat Network Investment Project, managed by the Department for Business, Energy and Industrial Strategy (two separate grants for phase 2 and 3).
- £4m from West Yorkshire Combined Authority and Leeds City Region Enterprise Partnership (LEP) through the Leeds City Region Growth Deal.
- £0.1m from the LEP Energy Accelerator programme, funded by the Leeds City Region Growth Deal and the European Investment Bank's European Local Energy Assistance (ELENA) programme.