

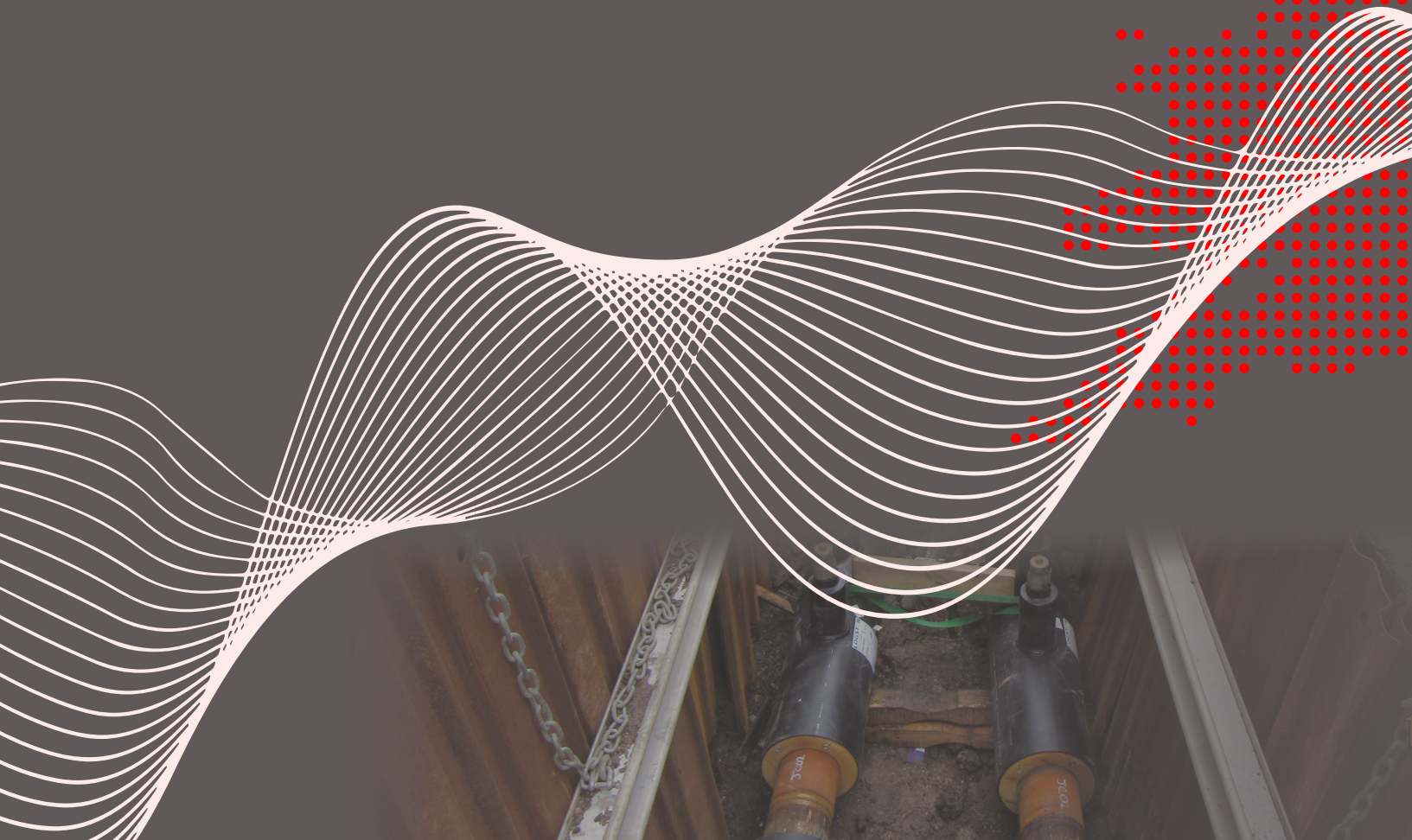


Triple Point
HEAT NETWORKS
INVESTMENT MANAGEMENT



Department for
Energy Security
& Net Zero

HNIP Case Studies





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Department for
Energy Security
& Net Zero

HNIP CASE STUDIES



Leeds PIPES

Construction Grant: £5,500,000
Heating Technology: Industrial heat extraction
Annual carbon savings: 1,905 tCO₂e
Est Completion Date: Ongoing

PEEL – Liverpool Waters

Commercialisation & Construction Loan: £7,566,000
Heating Technology: Water Source Heat Pump
Annual carbon savings: 3124 tCO₂e
Est Completion Date: 2024

Manchester Civic Quarter

Construction Grant: £2,870,000
Heating Technology: Combined heat and power energy centre
Annual carbon savings: 473 tCO₂e
Est Completion Date: 2022

Bristol Redcliffe

Commercialisation & Construction Grant: £3,628,000
Heating Technology: Gas CHP plant
Annual carbon savings: 500 tCO₂e per annum
Est Completion Date: 2024

Bristol Old Market

Commercialisation & Construction Grant: £6,594,000
Heating Technology: Water Source Heat Pumps
Annual carbon savings: 3,073 tCO₂e
Est Completion Date: 2025

Enfield – Meridian Water

Construction Grant & Loan : £14,760,000 + £23,860,000 for construction (2 rounds)
Heating Technology: Waste heat recovery
Annual carbon savings: 1,952 tCO₂e (first round),
6,133 tCO₂e (second round)
Est Completion Date: 2026

Crawley

Construction Grant: £1,400,000
Heating Technology: Gas CHP
Annual carbon savings: 158 tCO₂e
Est Completion Date: 2025

Somers Town Energy

Construction Grant: £1,050,000
Heating Technology: CHP generator and thermal storage
Annual carbon savings: 300 tCO₂e
Est Completion Date: 2021

Gateshead

Construction Grant: £5,909,000
Heating Technology: Mine Water Heat Pump
Annual carbon savings: 1,252 tCO₂e
Est Completion Date: 2026

Swaffham Prior

Commercialisation & Construction Grant: £3,268,000
Heating Technology: Air Source and Ground Source Heat Pumps
Annual carbon savings: 1,052 tCO₂e
Est Completion Date: 2024/25

Wood Street South

Construction Grant: £1,000,000
Heating Technology: CHP network
Annual carbon savings: 170 tCO₂e
Est Completion Date: 2025

INTRODUCTION



The Heat Networks Investment Project (HNIP) was a government funded programme aimed at increasing the amount of heat networks being built across England and Wales to deliver carbon savings whilst helping to create the conditions necessary for a sustainable heat network market to develop.

Heat networks, sometimes referred to as district heating, use centralised sources of heat that is delivered to a number of different buildings. The centralised heating source can easily be upgraded to new low carbon sources without disrupting individual homes. The technology is particularly popular for cities and high-density areas whilst providing an opportunity to exploit larger scale, renewable and recovered heat sources that can't be accessed at an individual building level.

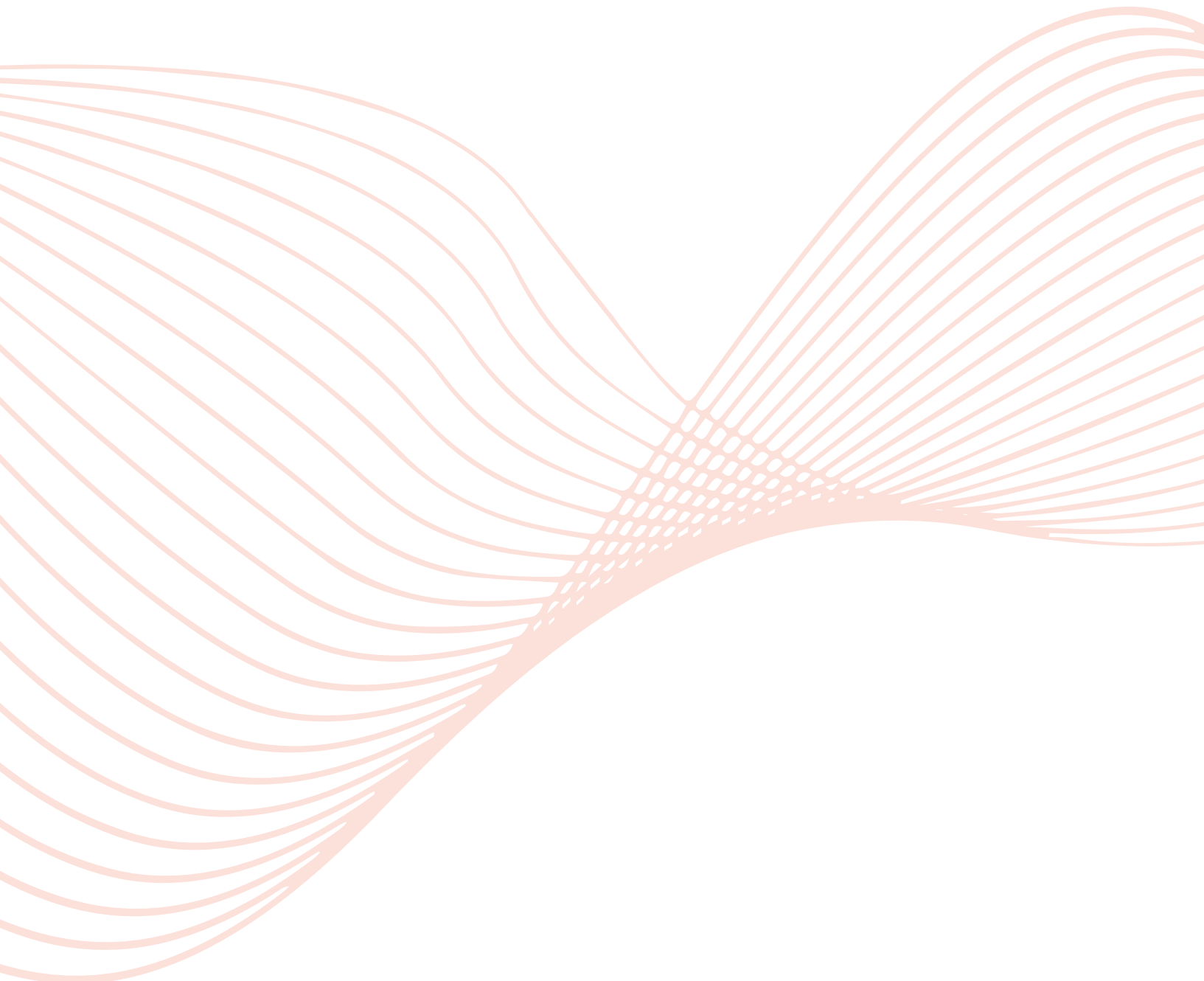
HNIP provided over £250 million of capital funding in the form of both commercialisation and construction loans and grants, helping projects build and expand their heat networks.

The scheme saw both public and private sector heat network projects get off the ground across England and Wales, currently saving over 80,000 tonnes of CO2 per year, with many using government funding to future-proof their networks for extension to other homes and businesses.

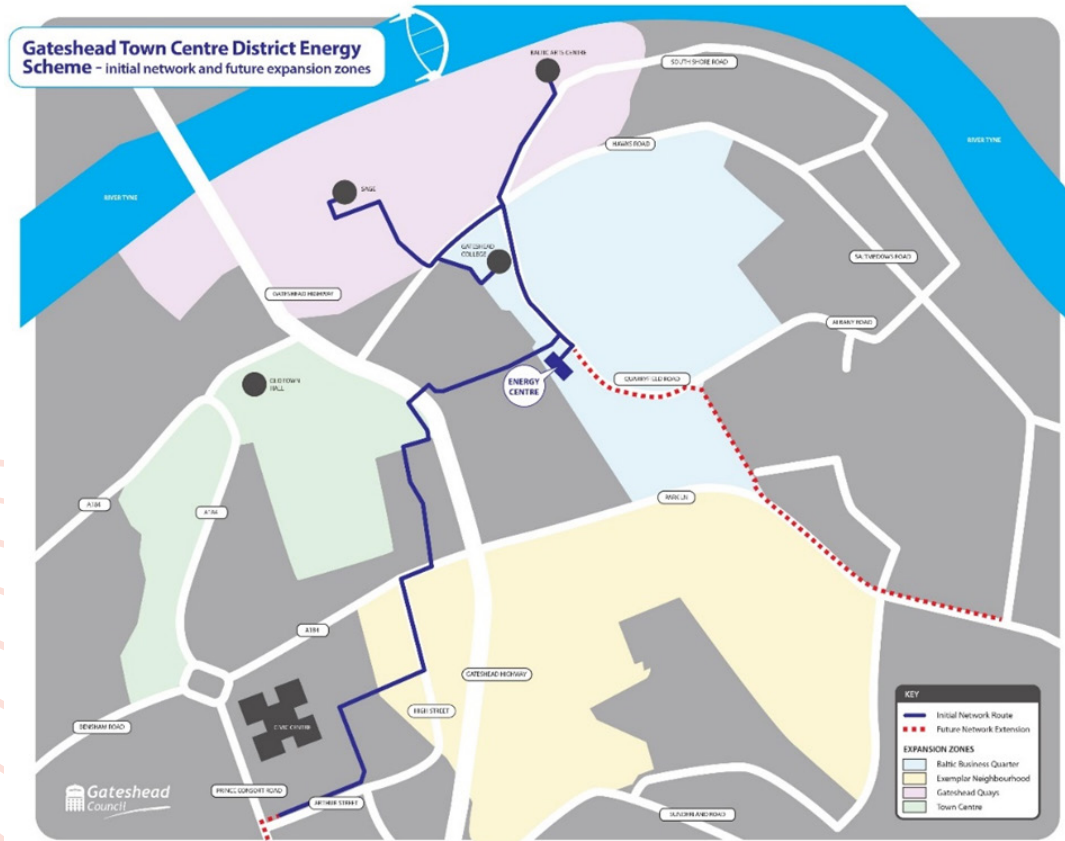
This booklet showcases just a portion of the work made possible by the success of the Heat Networks Investment Project and the potential these networks have to reduce emissions and improve how we heat our buildings.

The information presented in this document was correct as of March 2023 and may be subject to change given that many of the projects are under development.





GATESHEAD DISTRICT ENERGY SCHEME

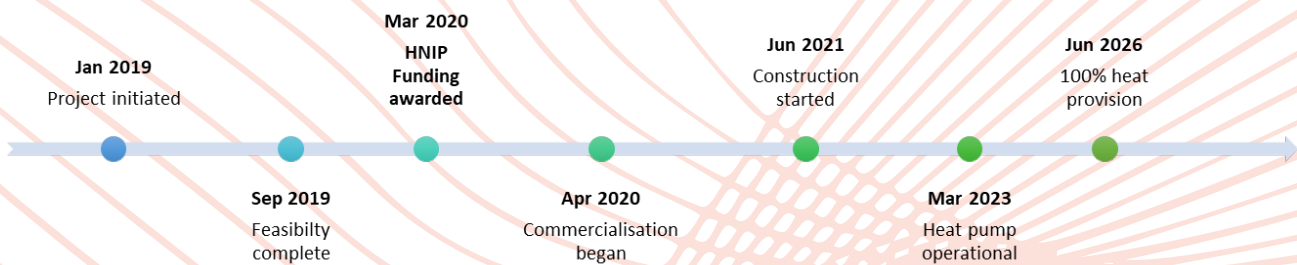


Funding beneficiary	Gateshead Council
Location	Gateshead
Total project capex	£15,100,000
Funding awarded	£5,909,000 commercialisation and construction grant
Planned/estimated heat export at completion	c. 10 GWh per annum
Heat source & technology	Mine Water Heat Pump, backed up by gas CHP Plant
Thermal storage capacity planned	250m ³ stores, and 750m ³ in network
Key anchor loads	Gateshead Quays Arena and Conference Centre
Length of primary network	5.5km
Anticipated number of buildings and/or connections	Gateshead Quays Arena Conference Centre 270 private homes
Annual carbon savings (average over first 15 years)	1,252 tCO ₂ e



The Gateshead District Energy Scheme is an expansion upon the development of the Gateshead Energy Centre. Opened by the council in 2017, the energy centre provides heat and power to a 5km energy network. £5.9 million of HNIP funding supported the commercialisation and construction of the network expansion which saw the installation of a 6MW mine water source heat pump. The technology will provide geothermal heat into the network, displacing both gas CHP and gas boiler generated heat. Upon completion, the network will supply lower carbon, lower cost heat to Gateshead Quays Arena and Conference Centre and 270 new private homes. The council is actively looking to roll out zero carbon heating to a much wider audience across the borough.

Project Milestones



The Story So Far*

The project has passed many significant milestones since it was awarded HNIP funding in 2020. After starting construction in June 2021, the heat pump was delivered, and the mine water borehole completed by February 2022. In June 2022, the commissioning of the mine water heat pump commenced. By March 2023, the heat pump passed load and efficiency tests, achieving 6.23MW peak output, and a COP of 2.99. Permits from both the Environment Agency and Coal Authority were then received, allowing operation to commence. For the network extension, connection agreements for 270 homes were signed in March 2022, and the heat network extended to the site entrance by August 2022. Final designs for the heat substation and site heat network are ongoing, with an expectation that heat will be delivered to the first homes from Autumn 2023.

The project also relied on securing a Renewable Heat Incentive (RHI) subsidy, which was achieved only after the Government extended the non-domestic RHI to March 2023. This has been submitted and will go through appraisal. Thanks to the HNIP project, Gateshead Council, in contract with Balfour Beatty and GEA, has been able to secure a further £8.1m of Public Sector Decarbonisation Scheme (PSDS) grants. These enabled the connection of four more Council buildings to the network by Feb 2023 and helped to install almost 4MW of solar PV – largely through brownfield solar parks – which were switched on in Dec 2022. These panels further increase available renewable electricity on the network.

Project Insights

The installation of a mine water heat pump posed interesting challenges for this large-scale project. For example, the project encountered some delays in locating suitable borehole locations. To streamline the process and ensure efficiency, it is recommended that future projects consider starting with a range of borehole locations, allowing for areas that may not be suitable.

Innovative hydrogeological tools were developed by the Gateshead Energy Company in collaboration with the Coal Authority which played a crucial role in securing large mine water flow rates, significantly increasing the availability of heat from the mine water heat pumps. This innovation highlights the project's commitment to exploring novel solutions and maximising the potential of sustainable heat sources.

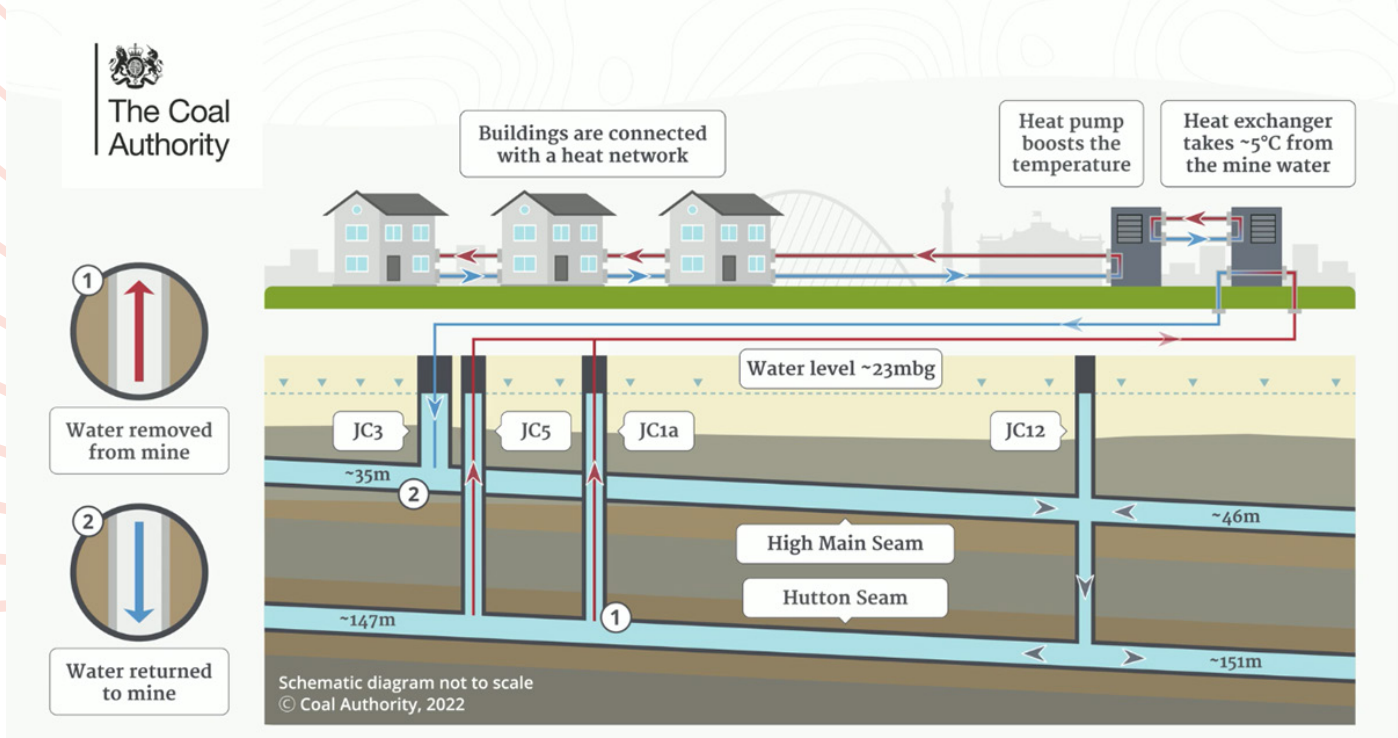


The HNIP investment placed the Gateshead Heat Network in a position to unlock funds from other government schemes, which were required to match the ambition and scope of the project which may have not been met otherwise.

Mid-way through the project, the team had to adapt to the need to remove less viable connections. This resulted in the connection of the Gateshead Quays development and new residential properties, which required new commercial terms for the developer to secure the connection to meet Building Regulations. Appropriate contingency planning would have limited the impact of these changing circumstances.

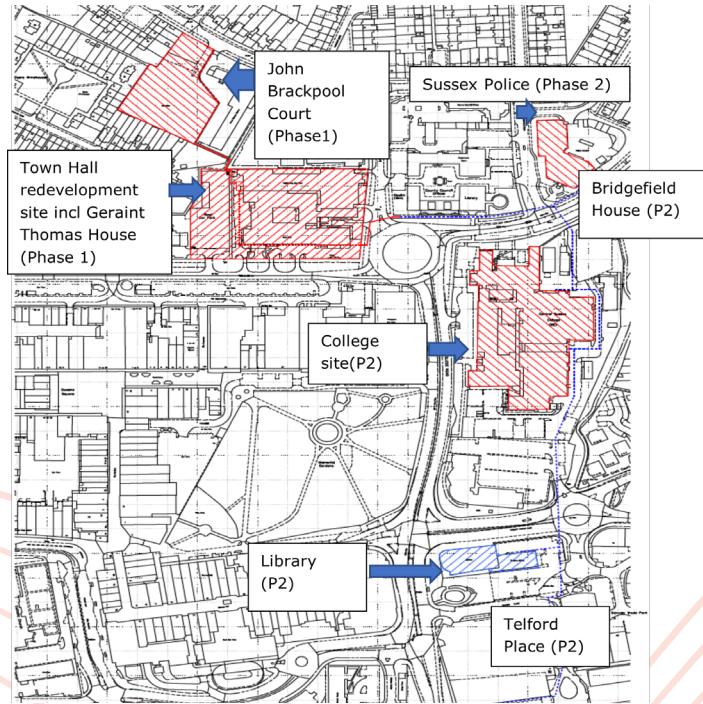
Councillor John McElroy, Gateshead Council Cabinet member with responsibility for energy said:

"This is a real statement of intent for our ambitions to tackle climate change in Gateshead and reach our zero carbon goal by 2030. We already have a significant track record of investment in heat networks, so this is proven technology - now our challenge is to expand on that success and roll out zero carbon heating - using heat from mine water - to a much wider audience across the borough."



*Up to date as of March 2023

CRAWLEY TOWN CENTRE HEAT NETWORK

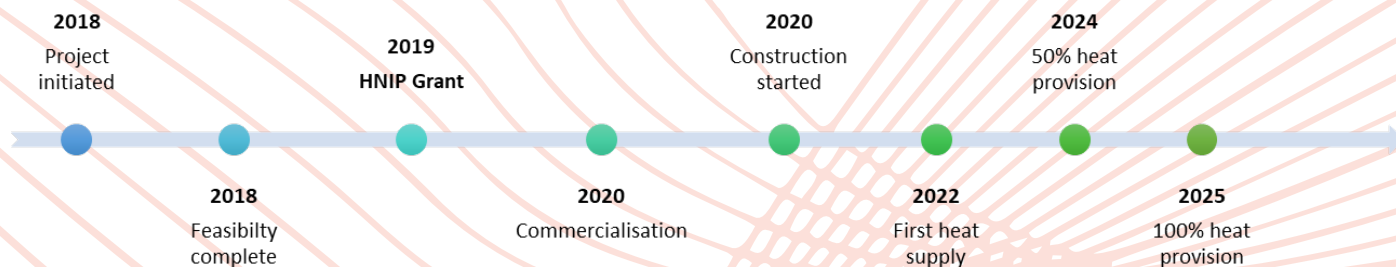


Funding beneficiary	Crawley Borough Council
Location	Crawley
Total project capex	£5,160,000
Funding awarded	£1,400,000 construction grant
Planned/estimated heat export at completion	Phase 1 - 1.4 GWh per annum Phase 2 - 11.6 GWh per annum
Heat source & technology	Gas Combined Heat and Power (CHP) plant
Thermal storage capacity	15m ³
Key anchor loads	Phase 1 (operational since May 2022): Residential buildings, new Town Hall and commercial offices. Phase 2 (in planning): new residential and commercial developments and existing residential block library, college, and the police station
Length of primary network	Phase 1 – 275m , Phase 2 – 1.1 km
Anticipated number of buildings and/or connections	310 residential units and 11,650 m ² commercial space
Annual carbon savings (average over first 15 years)	158 t/CO ₂ e



Crawley Borough Council and Development Manager Westrock constructed a new energy centre part funded by HNIP in the centre of Crawley, with the aim of installing a district heat network that supplies affordable heat and hot water for connected residents and businesses. The scheme has been designed to enable further connections of over 700 residential, commercial, and public buildings, with the network planning to introduce newer, greener technology as part of the Phase 2 expansion. Design & Build contract awarded to Kier. The network is operated by Pinnacle Power.

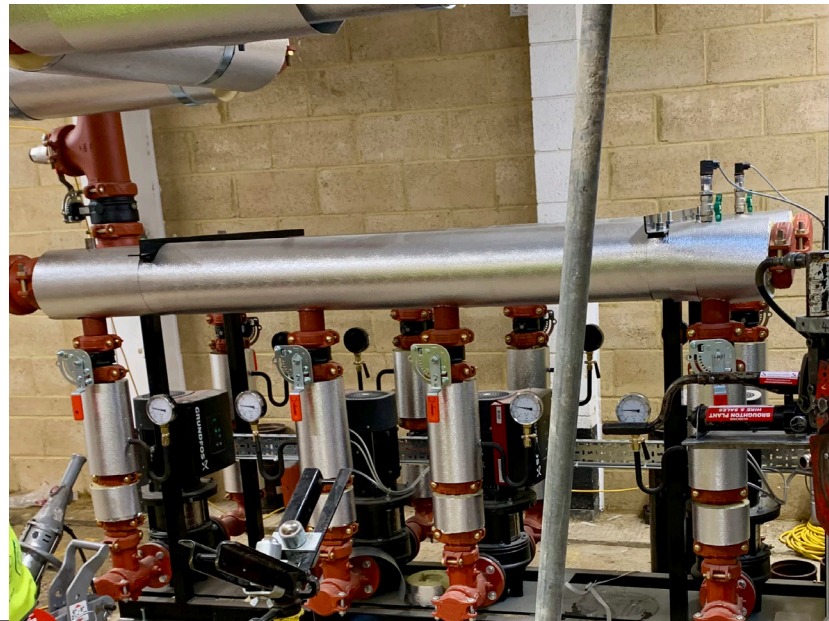
Project Milestones



The Story So Far*

Crawley Borough Council aims to achieve net zero by 2040 at the latest, and decarbonising heat is a key element to realising this target. With this in mind, the council set out to decarbonise some of the Crawley Town Centre building stock which was heated by gas. The heat network is part of the publicly supported Town Centre major redevelopment plans which reposition the town centre with commercial, business, and residential premises.

A three-phased approach to delivering heat through the heat network has been taken. The first phase was given the green light in December 2018 and is currently providing heat to consumers.



With Phase 1 of the project completed in May 2022, HNIP funding has helped provide over 600,000,000 kWh of heat to residents and businesses.

The network has so far connected the new Town Hall and commercial offices, two residential blocks (128 units) and another block with 182 residential units due to be completed in 2024. Further connections are planned in the Phase 2 expansion of the network to supply existing and new developments across the town centre including 700 homes, along with Crawley Homes flats which are District Heat Network ready, and the library, college and police station. New plans in Phase 2 will aim to incorporate newer and greener technology through a switch to a low carbon heat source as part of Crawley Borough Council's plans to bring greener energy to the town centre, moving away from natural gas.

Project Insights

Crawley Borough Council took proactive steps to minimise issues and challenges from the start. They engaged separate consultants for technical and economic modelling to support feasibility and business case evaluation. Through rigorous testing and scenario analysis, they aimed to optimise the heat network's deployment. While effective, it was noted that appointing a single consultant for both aspects could increase efficiencies.

The commercialisation and construction phase provided an opportunity to strengthen relationships with customers and stakeholders, enhancing commercial arrangements. The project faced complexities with regulations and experienced time delays during the installation of a new substation, causing a delay in network activation. However, through perseverance, these challenges were overcome, successfully connecting the network to customers. This experience served as a valuable learning opportunity for future similar situations.

Cllr Gurinder Jhans, Cabinet member for Environmental Services and Sustainability, said:

"This is an exciting development in such an important project. The council is committed to providing cheaper, greener energy and this project will contribute towards us becoming carbon neutral to help meet our climate emergency targets."

*Up to date as of March 2023

SWAFFHAM PRIOR HEAT NETWORK



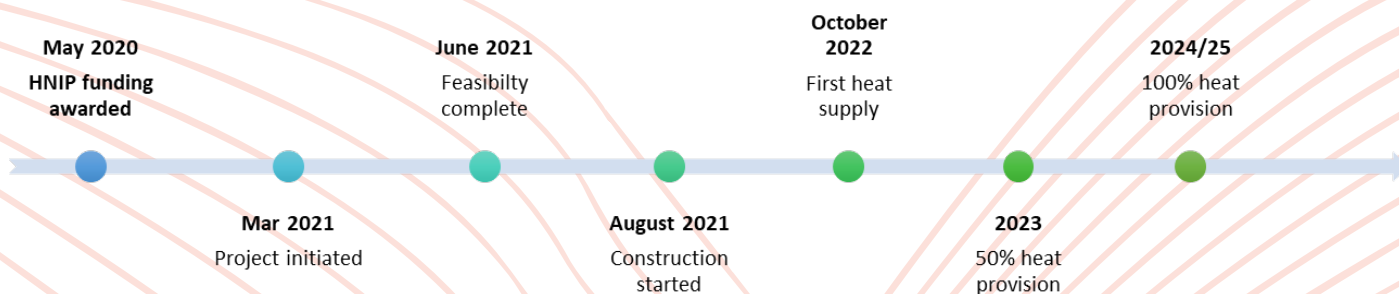
Funding beneficiary	Cambridgeshire County Council
Location	Swaffham Prior, Cambridgeshire
Total project capex	£12,330,000
Funding awarded	£3,268,000 commercialisation and construction grant
Planned/estimated heat export at completion	4.4 GWh per annum
Heat source & technology	500kW Air Heat Pump, two 750kW Ground Source Heat Pumps and an upcoming connection to the 12MW North Angle Solar Park
Thermal storage capacity planned	200m ³ thermal stores and four electric boilers
Key anchor loads	297 residential houses and the Village Hall
Length of primary network	5.3 km
Anticipated number of buildings and/or connections	297 residential houses and the Village Hall
Annual carbon savings (average over first 15 years)	1,052 tCO ₂ e

The Swaffham Prior Heat Network scheme is a success story in terms of both a sustainability and community project. This network first began in 2018 when the Swaffham Prior Community Land Trust (SPCLD) approached Cambridgeshire County Council. Their aim was to collaborate on a scheme that would help the community as a whole transition from heating oil to low carbon heating. After exploring various options to support the switch to low carbon heating, the decision was taken to opt for a community heat network. The scheme initially received grant funding support through the Heat Networks Delivery Unit (HNDU) and further funding for commercialisation and construction through the Heat Networks Investment Project (HNIP). Bouygues Energies and Services Ltd are the design and build contractors and to meet the rare challenge of delivering a heat network to an entire village they procured Pinnacle Power to deliver the heat network.

The Swaffham Prior Heat Network is a low carbon community heat network with ground source and air source heat pumps powered by solar panels, providing a unique hybrid solution. The community-wide scheme will provide a blueprint model for other rural communities currently reliant on oil heating.

Construction started in August 2021 and the energy centre and heat network were largely completed by the end of 2022. Heat on for the first five homes was in October 2022 and a programme to connect the remaining homes to the heat network is now underway. The aim is for 120 homes to be connected during 2023 if possible.

Project Milestones



The Story So Far*

The Swaffham Prior Heat Network’s central aim was to remove the reliance on oil heating units in the local area, and shift everyone to a more sustainable and cost-effective alternative without a negative difference in heating capabilities. The project has been community led through a series of presentations and meetings held with members of the SPCLD and those who would be supported by the scheme. Each of these opportunities allowed households to agree to be connected to the network during the phased rollout. Whilst the Centre was being created, residential buildings were surveyed, and residents were directly communicated with by Bouygues and Cambridgeshire County Council, the owner and main funder of the project.

As of January 2023, the Energy Centre is 99% complete, with the final steps to full conclusion underway. In its current state, the Energy Centre is functional and has been connected to five homes. The primary heat network is 100% complete, with more houses being added via secondary pipework installations throughout this year. The work to connect the North Angle Solar Farm to the Energy Centre has also commenced.





Project Insights

Resident feedback and regular engagement played a pivotal role in the project's success, creating a positive and community-driven approach. By collaborating with stakeholders and understanding their concerns, the team has fostered a sense of community involvement and ownership, resulting in a high level of customer satisfaction.

Area suitability for the heat network was also a recurring theme throughout the project, with each case offering a slightly different challenge. Working with the local area and residents has been an important element to consider in all aspects of delivery.

Efficient management of challenges, such as asbestos which was particularly time consuming to overcome, highlights the team's proactive approach and commitment to delivering a safe and successful project and will contribute to continued success in future endeavours.

Sheryl French, Assistant Director, Climate Change and Energy Services said:

"This is a fantastic project and a first of its kind that we know of in the country. Retrofitting a whole village is a challenge but the Swaffham Prior Community Land Trust has been a great partner driving the project forward. Securing the funding is a huge step in creating accessible renewable heat for oil dependent homes in Cambridgeshire. Cambridgeshire County Council is committed to tackling climate change and I'm looking forward to seeing the continued success of this project."



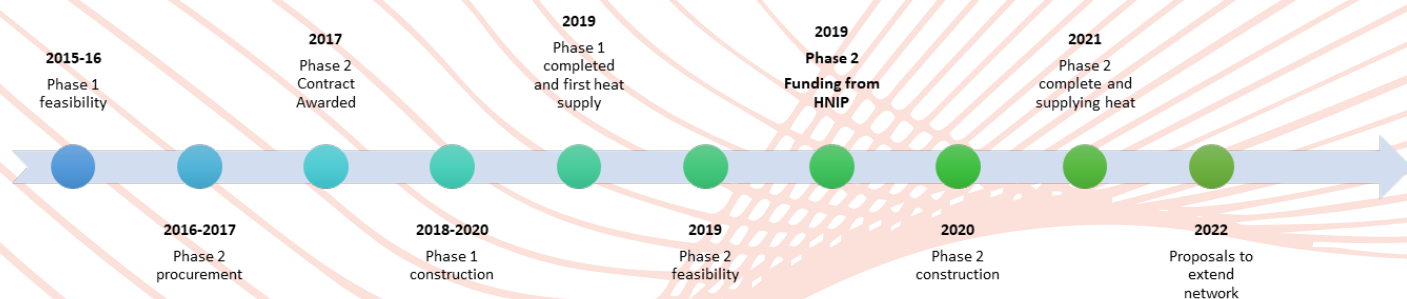
*Up to date as of March 2023

The first two phases of the Leeds PIPES district heat network have been completed with 16km of pipework connecting the energy from a waste Recycling and Energy Recovery Facility (RERF) to commercial properties, council homes and non-domestic buildings. Phase 3 commenced construction in October 2022, and is due to be completed early 2024.

The Leeds PIPES project is a multi-phase scheme, developed by Leeds City Council and constructed and operated by Vital Energi. Phases 1 and 2 are now complete, with a total investment of £45 million, c£2.5 million of which is from HNIP funding, which predominantly contributed to the Phase 2 extension. Phase 1 started construction in 2018 with the installation of c11km of pipework to connect the energy from the waste Recycling and Energy Recovery Facility (RERF) to commercial and council homes. Phase 2 received HNIP funding to add another c5km of pipework to connect several council offices and public buildings, alongside other properties. Phase 3, again partially funded by HNIP, will connect further council homes, public buildings, and private housing schemes with an additional c2km pipeline. The network has been deliberately oversized to allow for future growth, through infill development and new network extensions, to make use of up to 160GWh of low carbon heat available from the RERF.



Project Milestones



The Story So Far*

The Leeds PIPES network went live in 2019, utilising low carbon heat from the city’s Recycling and Energy Recovery Facility (RERF) to supply council flats and commercial businesses around the Quarry Hill area of Leeds. The network is owned by the Council and enjoys strong political support, as it is a key part of the Council’s net zero carbon strategy. As part of Phase 1, an energy centre was built which provides full network resilience for planned and unplanned RERF maintenance and to cover future peaks. All key elements of the network were deliberately designed to be oversized, to support the Council’s ambitious growth plans.

Leeds City Council were awarded c£2.5m HNIP funding to enable a Phase 2 extension of the Leeds PIPES network. This extension allowed the network to connect into the heart of the city centre, including five of the Council’s own civic buildings. Phase 2 is owned by Leeds PipeCo LTD, a Special Purpose Vehicle (SPV) created and owned in turn by the Council. The Phase 2 extension took place in conjunction with the Connecting Leeds scheme, a significant and wide-reaching highways and public space improvement project, providing exemplary interdisciplinary working, which significantly reduced disruption in the city centre. Phase 2 was completed in 2021. Construction of Phase 2 took place throughout much of the 2020 covid pandemic, so the principal contractor, Vital Energi, was able to work ahead of programme and make the most of the quiet city centre.

In Spring 2023, the network supplied heat to c1,800 council flats, St James' Hospital Beckett Wing, Quarry House, Leeds Playhouse, Leeds Trinity Academy, St George House, Leeds Beckett University and five major civic buildings. Phase 3 began construction in autumn 2022 and is due to complete mid-2023. Rather than a singular extension of the network as was seen in Phase 2, Phase 3 consists of a number of branches which are designed to aid the network's strategic growth. New connections include an additional c300 council flats and a significant number of buildings at St James' Hospital by way of a new bulk heat exchanger connecting to the hospital's existing pipes. There are also further public buildings and a range of new private housing schemes. The extension will also aid the network in reaching the city's South Bank area, a key focus of regeneration and concentration of heat demand. Additional connections will continue to be sought after throughout the network, in addition to a further extension towards the city's South Bank. It is intended that in the coming years, the network is built out all the way to the South Bank. A key part of this expansion will rely on the proposed district heat zoning policy, due to come into effect in 2025.

Since its inception, the project has helped to employ 430 people including 36 apprentices. The continuing growth of the network, including the strategic Phase 3, will deliver long-term carbon savings of over 20,000 tonnes per annum, vital to reaching the local net-zero target.



Project Insights

Lessons learned from LeedsPIPES underscored the significance of effective stakeholder engagement throughout the project's lifecycle, leading to positive relationships and community support.

By navigating sensitivities and prioritising early pipe installation, the team maximised customer opportunities during the regeneration project, fostering sustainable growth of the network.

The project's success in overcoming delays, often outside of their control, through contingency plans and flexibility reflects the team's proactive approach and commitment to delivering positive outcomes. This ranged from co-ordinating utilities works sequentially to approaching network design strategically to ensure pipe routes are futureproofed.

Their approach helped to communicate the right messages to the right audiences, but more importantly it can help secure customers and partners. A key outcome of this is that new customers have come forward after seeing the network during construction, so positive early engagement has delivered benefits later.

Clear responsibilities and effective risk management have ensured a smooth and successful project, while regular stakeholder engagement has created a sense of ownership and positive community impact.



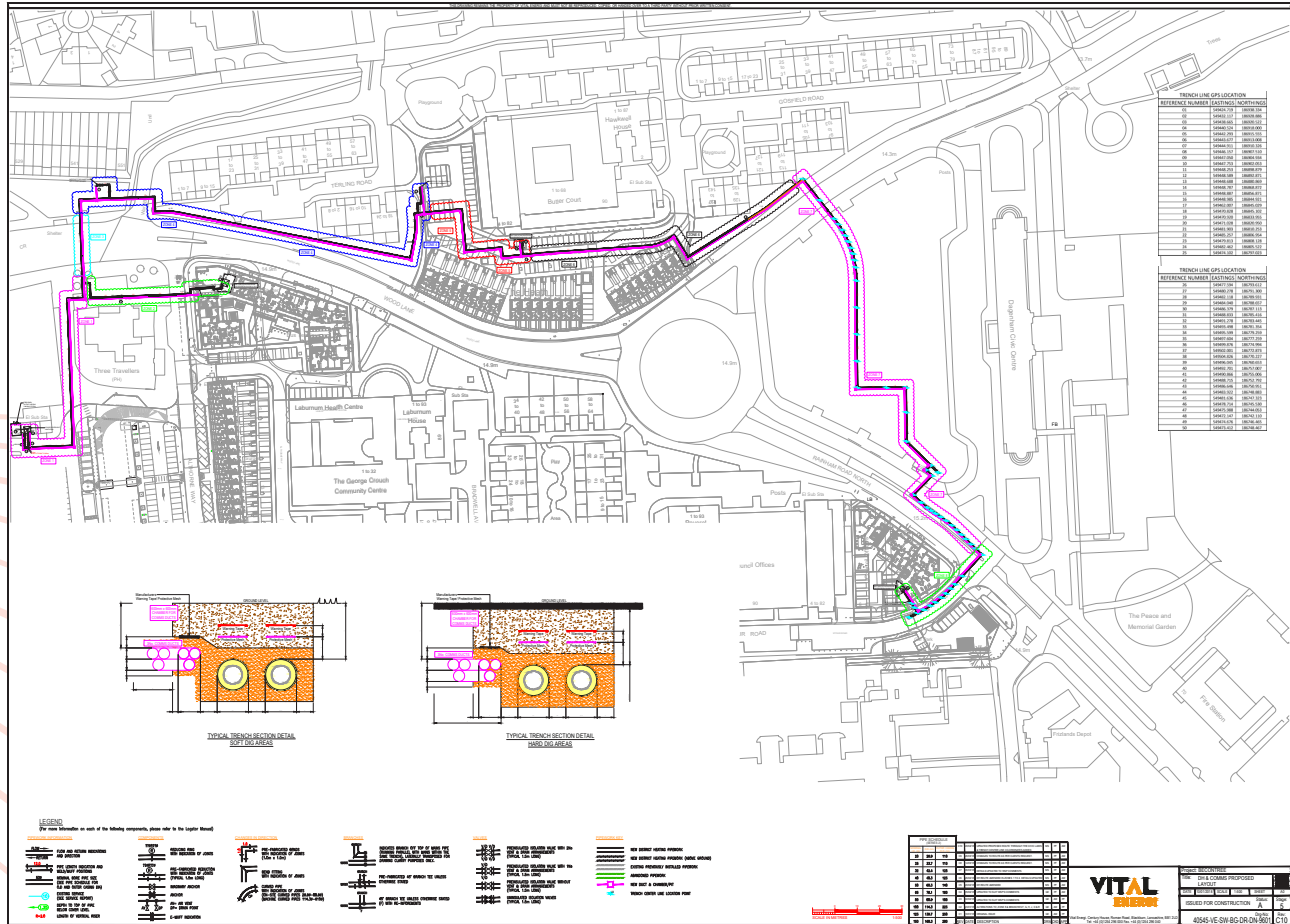
Councillor James Lewis, Leader of Leeds City Council:

"It's fantastic to have secured funding to extend the district heating. This expansion means that we will be able to connect more of the city's buildings to the Leeds PIPES network and further reduce the use of individual, fossil fuel powered boilers - helping building owners save money on energy, improve local air quality and reduce the city's carbon footprint."

*Up to date as of March 2023



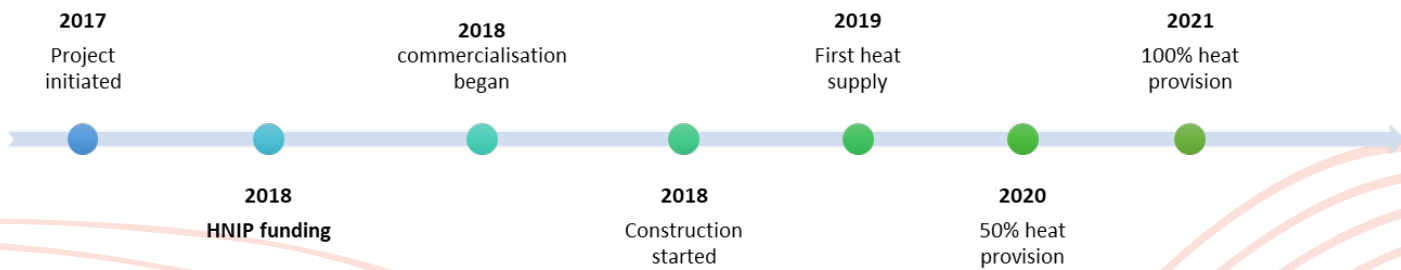
BECONTREE DISTRICT ENERGY SCHEME



Funding beneficiary	Barking and Dagenham Council on funded to B&D Energy Limited
Location	Barking & Dagenham
Total project capex	£5,350,000
Funding awarded	£1,075,000 construction grant
Planned/estimated heat export at completion	4.2 GWh per annum
Heat source & technology	Combined heat and power energy centre
Key anchor loads	Becontree Leisure Centre and Civic Centre
Length of primary network	0.8km
Anticipated number of buildings and/or connections	231 connections
Annual carbon savings (average over first 15 years)	197 t/CO ₂ e

Barking and Dagenham Council received over £1 million of HNIP funding for the Becontree heat network. This has been used to develop the energy centre, which uses combined heat and power (CHP) to heat business and residential developments. The network currently heats the Becontree Leisure Centre as well as 230 homes, reducing carbon emissions for hundreds of residents across the borough, and has so far provided over 267 million kWh of heat. The network is designed to facilitate future connections, to maximise benefits to area residents and businesses in the long run.

Project Milestones



The Story So Far*

In 2018, B&D Energy entered into a contract with Barking & Dagenham Reside and Countryside Properties to deliver low carbon supplies of heat energy to a new development within the Becontree area of Dagenham. The development was for 170 new homes.

The inclusion of district energy reduced the carbon emissions associated with these properties resulting in a lower carbon footprint across the site compared to the counterfactual. This scheme also supplied heat and electricity to the existing Leisure Centre’s new 50m pool and the Civic Centre.

The network comprises of 0.8 kilometres of underground pipework and involved the installation of 3 boilers and a Combined Heat and Power Unit. The installation work was complete in 2021 with heat being supplied to customers, utilising the CHP units to reduce the carbon intensity.

Project Insights

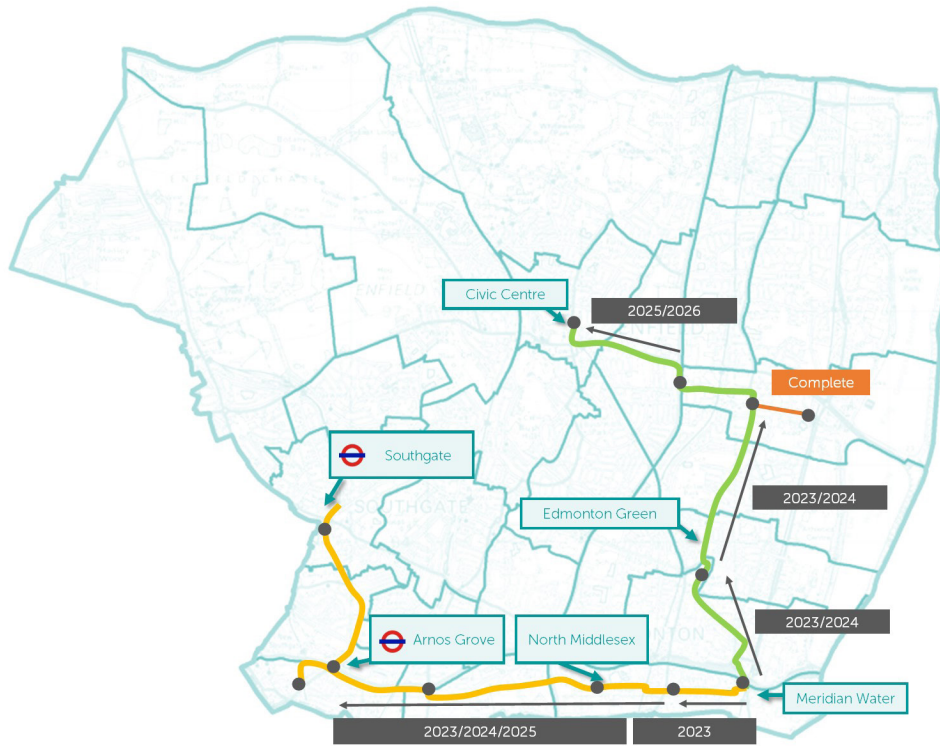
The operational phase of the network provided valuable insights, leading to improved stakeholder communication and streamlined processes. By implementing an SMS notification system on substations, the team achieved quicker alerts and efficient issue resolution, fostering an elevated level of customer satisfaction.

The project’s success in navigating complex regulations and overcoming time delays during substation installation required resilience and adaptability. These experiences have strengthened the project’s foundation and provided valuable opportunities for mitigating similar challenges in the future.



*Up to date as of March 2023

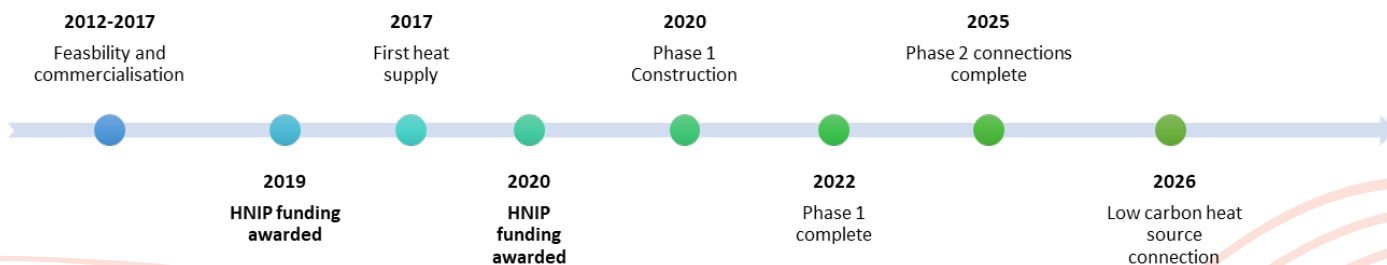
ENERGETIK MERIDIAN WATER



Funding beneficiary	Enfield Council on funded to Energetik
Location	Enfield, North London
Total project capex	£34,440,000 + £48,650,000 (from two rounds)
Funding awarded	£14,760,000 + £23,860,000 construction grant and loan
Annual delivered heat average over first 15 years	22.1 GWh + 37.3 GWh
Heat source & technology	Heat from EfW, 41MW of Temporary Boilers such as CHP, and Waste Recovery
Key anchor loads	6 non-residential connections including commercial outlets, a hotel, school and community centre, and the Meridian Water development including a new train station, workplaces, and open spaces.
Length of primary network	8.2km + 18.4km
Anticipated number of buildings and/or connections	Currently ~1000 residential & 6 commercial connections. 15,000+ projected residential connections over the next 5-10 years.
Annual carbon savings (average over first 15 years)	1,952 CO ₂ e over first round + 6,133 CO ₂ e over second round

Energetik, Enfield Council, and Vital Energi are delivering the Meridian Water heat network in Enfield. The project has benefitted from support across two HNIP funding rounds, representing £14.7 million and £23.8 million in funding respectively, to support the north of £80 million heat network project. There is ambition to decarbonise the network by changing to a low carbon heat source, to provide heat to nearly 20,000 residents, which will play a key role in Enfield's largest regeneration scheme.

Project Milestones



The Story So Far*

The project was commissioned in 2012, where a thorough feasibility assessment took place. After five years of foundational planning work, the project was granted approval by the Council and began commercialisation. The first HNIP grant award of £14.76 million acted as a springboard for development, with the central 60MW energy recovery facility at Edmonton Eco-Park kicking off the Meridian Water Heat Network. The vision for the development is to support the Council's social and environmental objectives and deliver key infrastructure for Enfield's largest regeneration scheme.

The second round of HNIP funding for £24 million was granted in 2021, to support the expansion of Energetik's network north and west of Meridian Water, installing a total of 18km of new pipe which will enable an extra 100GWh of new heat demand, saving an extra 22,000 tonnes of carbon dioxide equivalent per annum. These two major extensions will increase the networks reach, enable new connections, and link existing satellite schemes to the Meridian Water heat network and energy centre, maximising carbon savings. The northwards extension will link the network with the existing Ponders End heat network providing energy to two large housing developments of 1,200 homes, and then extend through to Enfield Town, adding two care homes and a civic centre building to the heat network. The westwards extension will further connect through to the Arnos Grove and Oakwood heat networks, providing opportunities to connect with more buildings along the way.

Connected homes will benefit from a carbon saving for heat and hot water of over 90%, compared to a traditional gas boiler system. With Meridian Water's first residential connections due for completion before the energy centre is operational, Energetik will provide heat through the network using temporary boilers but will later utilise the low carbon source.

The energy centre is approaching completion. Energetik's Meridian Water energy centre is progressing well and is expected to be complete in the summer of 2023. The installation works of the northern extension to link Meridian Water to existing heat networks in Ponders End have begun and are progressing well.



The scheme has been successful in securing customer sign ups with a success rate of 85% of retrofit customers agreeing to connect to the network. Following two successful retrofit projects connecting 25+ existing homes to our heat network, Energetik are now set to begin the third phase of retrofits in the same area (Ponders End, Enfield).

Project Insights

Energetik faced the challenge of engaging numerous homes connected to Enfield's heat network while ensuring implementation teams understood the network's purpose. Regular engagement benefits various aspects of network operations. Frequent workshops and meetings have been held with partners, maintaining a clear understanding of processes and information. This proactive approach addresses issues promptly and prevents knowledge loss when experiencing staff turnover.

Consistent messaging was key to the success of Energetik. Hosting regular events for new and existing customers helped improve understanding of system operation and the advantages over gas boilers. This approach enhanced customer satisfaction and promoted long-term network success.

Jayne Clare, Managing Director at Energetik says:

"Energetik will utilise a local heat source and supply tens of thousands of homes with low carbon heat and hot water, generating huge carbon savings and contributing towards Enfield's climate action plan objectives. We are demonstrating how to do district heating the right way, placing quality and our customers and the centre of everything we do and how we do it. We want to set an example for the rest of the industry as it grows."



*Up to date as of March 2023

MANCHESTER CIVIC QUARTER



Figure 1. Location of Manchester Civic Quarter Heat & Power Network and Energy Centre – note Midland Hotel will no longer connect to the network. (adapted from Vital Energi drawing)

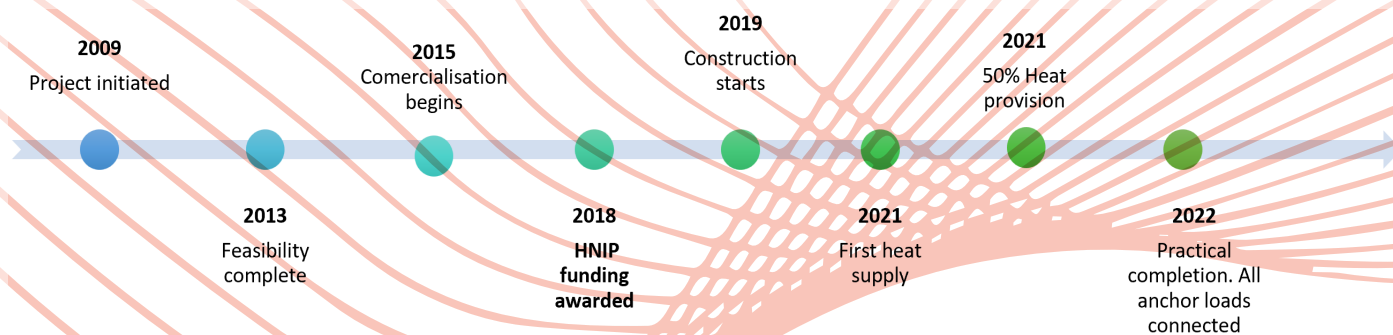
Funding beneficiary	Manchester City Council
Location (Town/City)	Manchester
Total project capex	£20,000,000
Funding awarded	£2,870,000 construction grant
Planned heat export at completion	18.7 GWh per annum
Planned cooling provision at completion	N/A
Heat source & technology	CHP and backup boilers 3.3MW CHP generator and two 12MW gas boilers
Thermal storage capacity	3 x 40m ³
Key anchor loads	Manchester Town Hall
Length of primary network	2km
Anticipated number of buildings and/or connections	Town Hall, Town Hall Extension, Central Library, Manchester Central Convention Centre, Manchester Art Gallery, The Bridgewater Hall and Heron House
Annual carbon savings (average over first 15 years)	473 tCO ₂ e

The Manchester Civic Quarter Heat Network (CQHN) was initiated by Manchester Council - delivered by Vital Energi - to help the Council deliver on its local decarbonisation, and now net zero strategy. The HNIP grant enabled the first construction of the network.



The energy centre is located beneath the railway arches of Manchester Central Station and is earmarked by the 40m 'Tower of Light', acting as an awe-inspiring architectural cowl for the five CHP generator flues. The project has been designed with the potential for future expansion, not only in scale but in its heat and power generating means. As new technology becomes available, like hydrogen blending, biomethane, and more renewable generating technologies, upgrades to production and storage methods can be made.

Project Milestones



The Story So Far*

The provision of HNIP funding to CQHN enabled Manchester to reap the benefits of district heating networks in its bid to decarbonise. The potential for further future decarbonisation of CQHN and the wider energy and heating network will be enabled through the procurement of Green Gas and hydrogen blending (in 2025), an increased mix of renewable grid energy, and other decarbonising solutions measures implemented in the UK. This means that Manchester can compound its carbon reducing measures and move towards its net zero goal with confidence.

The funding also provided substantial social value to the local and wider area. As a result of the project, 22 new members of staff, including four apprentices and one Manchester graduate, were hired by the delivery partner Vital Energi. Furthermore, £15,000 has been donated to The Christie NHS Foundation, a leading Mancunian cancer treatment clinic – this was raised through various fundraising efforts carried out over the project's duration.

Continuing to develop plans and engage with further off-takers to the network will help it reach full capacity.

Project Insights

Architectural complexities arising from heritage challenges at the energy centre required innovative solutions. Overcoming the challenges of laying pipes in the congested underground of central Manchester required expertise and problem-solving capabilities.

Adaptability within the supply chain played a crucial role, considering Manchester's bustling economic hub. The project successfully adjusted to changes in buildings, such as event spaces, national events, and judicial spaces.

The heat network maintained a proactive and collaborative approach throughout implementation, fostering strong relationships with clients and funders.

Efficient planning and project structuring laid a solid foundation for the heat network's success. Early structuring with a preferred bidder and the use of pre-services construction agreements allowed for ample time during contract negotiations, facilitating planning applications, early orders, and design development.

Collaborative work with the operator and off-takers proved effective in achieving the decarbonisation goals of the energy centre.

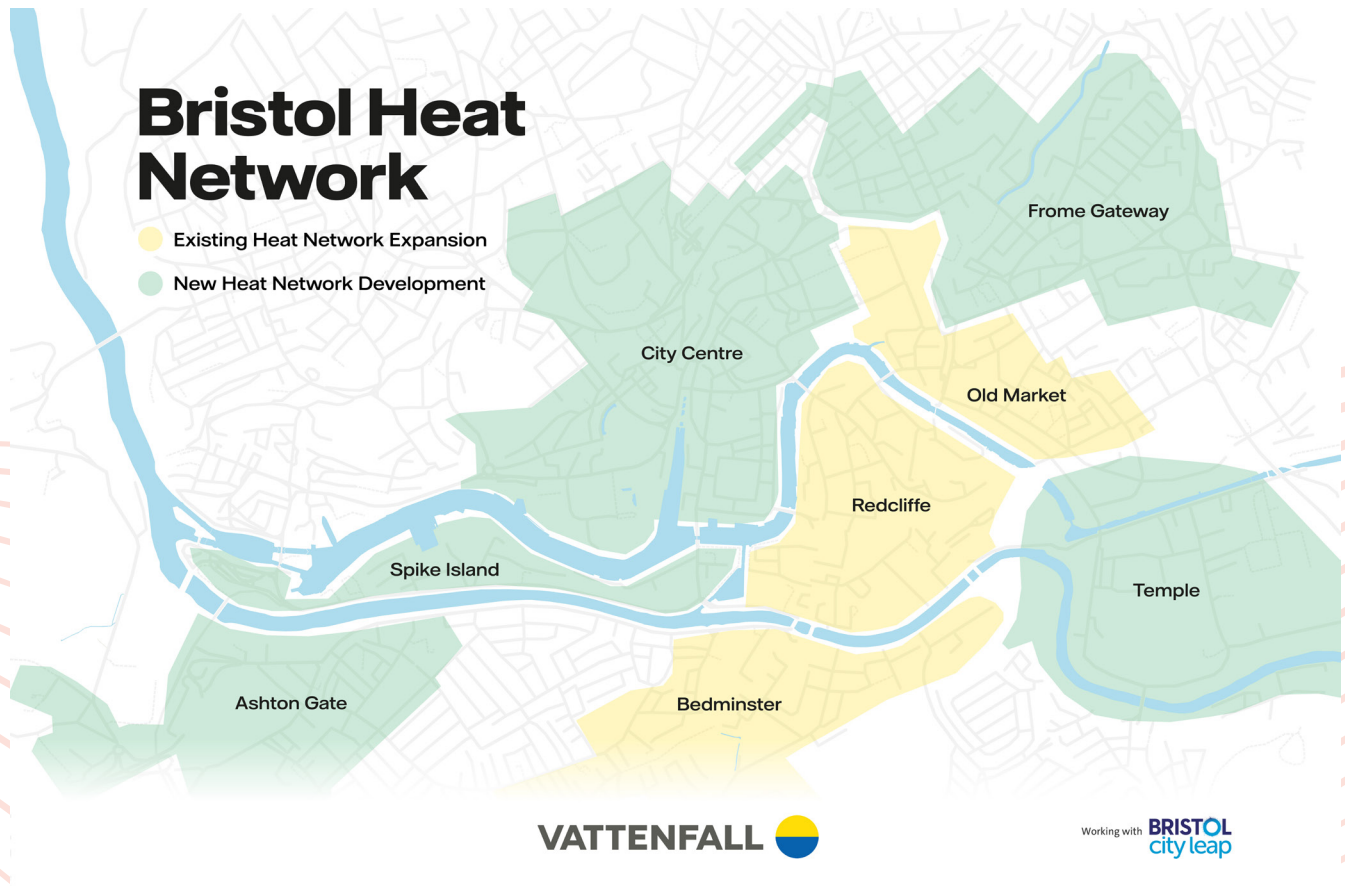
Councillor Tracey Rawlins, Executive Member for the Environment, and Transport Manchester City Council said:

"The Civic Quarter Heat Network will provide a highly efficient source of heat and power for some of Manchester's most iconic buildings, making significant carbon reductions and contributing towards the city's shared goal of becoming carbon-neutral by 2038."



*Up to date as of March 2023

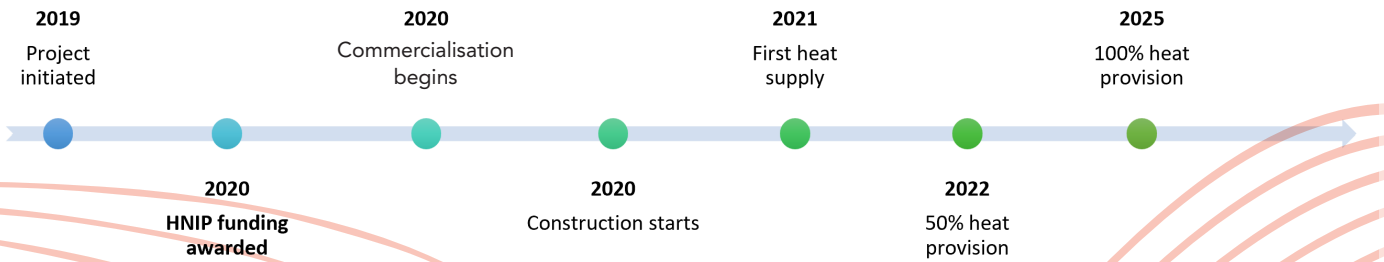
BRISTOL OLD MARKET



Funding beneficiary	Bristol City Council
Location	Bristol
Total project capex	£18,200,000
Funding awarded	£6,594,000 commercialisation and construction grant
Planned heat export at completion	19.1 GWh
Heat source & technology	3MW Water Source Heat Pumps with Peak & Reserve Gas boilers
Key anchor loads	Castle Park View and Linear Park
Length of primary network	5.5km
Anticipated number of buildings and/or connections	25 buildings including 4 residential blocks, 10 office blocks, 2 hotels and 2 schools
Annual carbon savings (average over first 15 years)	3073 tCO ₂ e

The Old Market Heat Network (OMHN) was initiated by Bristol City Council with delivery of the water source heat pump being carried out by Vital Energi and Star Renewables in partnership with Goram Homes to help the Council deliver on its city-wide carbon neutral aspirations. The energy centre, located at the current Castle Park Council Depot site, has a Water Source Heat Pump (WSHP) which provides low carbon heat whilst meeting high demand across the city centre. The project also includes back up and reserve Gas boilers. This is part of a multi-heat network approach to decarbonising Bristol City. HNIP granted funding for Phase 1 of the scheme, which helped to fund the new district heat network across the East of Bristol City Centre.

Project Milestones



The Story So Far*

Bristol City has so-far installed heat networks that supply over 2,000 homes and businesses with low carbon heat in a bid to decarbonise the city. This followed the declaration of a climate emergency and pledge for carbon neutrality by the Council in 2018, and ambition to transform the city into a low-carbon jurisdiction. The Bristol Old Market Heat Network is playing a key role to realising this target.

The Old Market heat network currently supplies 8 buildings, including 4 large residential blocks, 3 office blocks, a school and health clinic with an annual demand of 20.09MWh, through 2.6km of DH pipe with the help of HNIP funding. The newest extension of the project connected Old Market East and Old Market West, both to the WSHP in Castle Park. This will begin to connect 751 new apartments to a low carbon source of heat. Over the next 25 years, the Old Market Network Phase 1 project will save around 76,911 tonnes of carbon.

The network has progressed well and will continue to extend to new developments and homes across the council. There are more connections planned throughout 2023, including residential buildings, schools and universities.



Experience

Vattenfall Heat UK are working with Bristol City Leap to expand the existing network, develop new networks and ultimately interconnect them to create a single Bristol Heat Network. The company acquired the networks as part of the City Leap transaction and continue to build out new networks as well as put in place a comprehensive plan to decarbonise the heat network by 2030.

Vattenfall Heat UK bring investment and proven experience in large scale, resilient heat networks across Europe. Within five years, over 120 GWh of low carbon heat will be delivered to customers in Bristol through over £200 million of investment into high-quality, long-term infrastructure across the city.

The City Leap Energy Partnership is a twenty-year joint venture that is 50% owned by Bristol City Council and 50% owned by Ameresco, with their essential subcontractor, Vattenfall Heat UK – a coming together of global partners from the UK, the USA and Sweden.



Project Insights

The implementation of new technology in the heat network's expansion provided valuable lessons, particularly when dealing with the installation of pipes in congested highways. Through innovative approaches during the installation and design stages, the team successfully improved efficiency and effectiveness. Utilising vacuum excavators proved to be transformative, significantly expediting pipework installation and optimising operations.

Building upon this success, the project has established a well-tested customer journey for future expansions, setting a positive precedent for future endeavours.

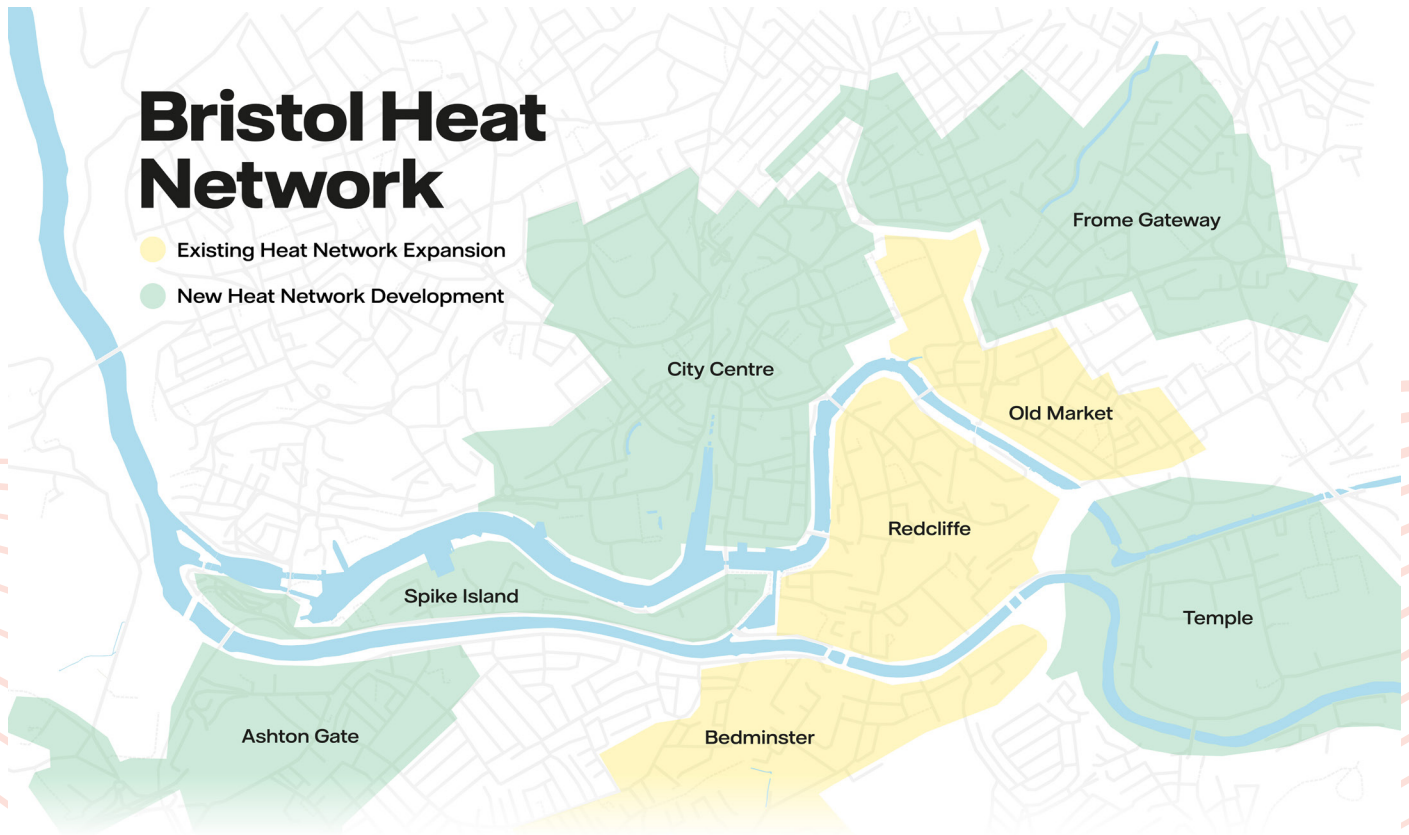
Councillor Kye Dudd, Cabinet Member for Energy Transport Said:

"Our Bristol heat network has such a vital role to play in our city's journey to carbon neutrality. The council has invested over £12 million in this infrastructure over the last five years and will continue to expand the network to serve new communities with low-carbon heat. This new funding from BEIS is so welcome to support the growth of the network and will enable us to innovate with new technology that will provide zero carbon heat to a number of new developments in the city. It's also very exciting to see old fossil fuel infrastructure like the Bedminster coal mine being considered for use to provide zero carbon heat for the future - another example of Bristol's ability to find pioneering ways to tackle the climate emergency."

"It's exciting to be replacing old technology with greener solutions and great to be supporting public sector partners with their own efforts to decarbonise. Developing the heat networks has so many benefits for the city including the reduction in fuel poverty, cutting carbon emissions and creating thousands of jobs to support the local economy."

*Up to date as of March 2023

BRISTOL REDCLIFFE



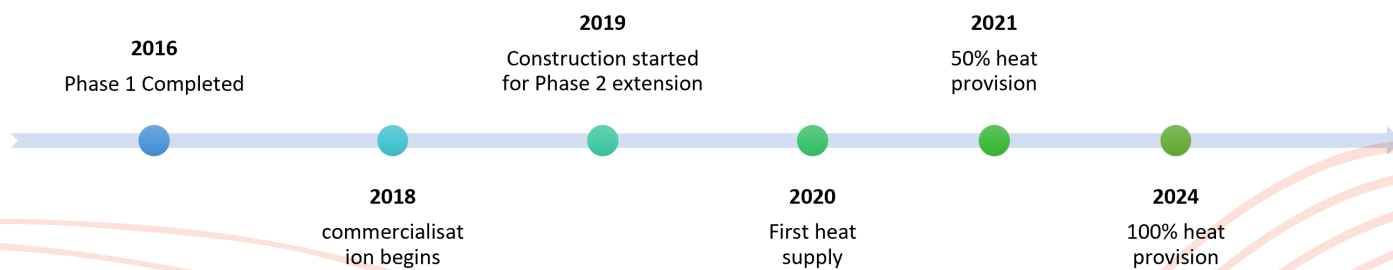
VATTENFALL

Working with **BRISTOL city leap**

Funding beneficiary	Bristol City Council
Location	Bristol
Total project capex	£8,090,000
Funding awarded	£3,628,000 commercialisation and construction grant
Planned heat export at completion	8.4 GWh per annum
Heat source	1MW Biomass + Gas fuelled combined heat and power
Key technology	0.6MW Gas CHP and 1MW biomass boiler with peak & reserve gas boilers
Connections	700 social housing flats plus offices, student accommodation and private residential connections
Key anchor loads	Redcliffe social housing blocks, Halo office, Millwrights place flats and Coopers court.
Length of primary network	1.8km
Annual carbon savings (average over first 15 years)	500 tCO ₂ e

The Bristol Redcliffe Heat Network (BRHN) was initiated by Bristol City Council to help the Council deliver on its city-wide carbon neutral aspirations. The first phase was completed in 2016 and supplied 700 social housing properties with low carbon heating from biomass boilers through a 1MWth biomass energy centre. In a bid to extend and grow the heat network to meet Bristol City Councils decarbonisation plans, BRHN was amongst the first seven heat network projects to secure £3.6m of HNIP funding for Phase 2 and 3 of the Redcliffe extension. With the new extension, the Redcliffe heat network is expected to produce over 5,000 tonnes of carbon savings in its first 15 years of operation.

Project Milestones



The Story So Far*

At present, Bristol City has installed heat networks that supply almost 2,000 properties with low carbon heat in a bid to decarbonise and cut emissions across the city. This followed the declaration of a climate emergency and a pledge for carbon neutrality by the Council in 2018, and a subsequent slew of measures to combat its emissions and transform the city into a low carbon jurisdiction.

The HNIP grant has given Bristol City Council a means to not only invest in up-and-coming heating technologies for city-wide decarbonisation, but to further their position in reaching net zero and creating an emissions-free city.

The growth of the BRHN has provided hundreds of further properties within the city centre with low carbon heating and given traction to its implementation in Bristol and further afield. The funding supports the development of localised infrastructure, like the BRHN, but also provides wider proof of its purpose, practicality, and potential for implementable decarbonisation of domestic and non-domestic properties.

The extension of the Redcliffe heat network with the help of HNIP funding has enabled the heat network to supply new and upcoming commercial and residential developments in the area, and the connection of Bristol City Council’s Temple Street office to further accelerate the city’s decarbonising venture.

The HNIP grant has extended capacity within the energy centres, which include a new gas CHP and back up boilers. Future proofing works will enable connections to additional areas, including new developments around Bristol Temple Meads and expansion into other city areas. These extensions will be powered by lower carbon technology, such as water source heat pumps and geothermal power.

Recently announced new connections include Millwright Place, Coopers Court, Aspire and Redcliffe Street.



Experience

Vattenfall Heat UK are working with Bristol City Leap to expand the existing network, develop new networks and ultimately interconnect them to create a single Bristol Heat Network. The company acquired the networks as part of the City Leap transaction and continue to build out new networks as well as put in place a comprehensive plan to decarbonise the heat network by 2030.

Vattenfall Heat UK bring investment and proven experience in large scale, resilient heat networks across Europe. Within five years, over 120 GWh of low carbon heat will be delivered to customers in Bristol through over £200 million of investment into high-quality, long-term infrastructure across the city.

The City Leap Energy Partnership is a twenty-year joint venture that is 50% owned by Bristol City Council and 50% owned by Ameresco, with their essential subcontractor, Vattenfall Heat UK – a coming together of global partners from the UK, the USA and Sweden.

Project Insights

Bristol's heat network expansion provided valuable insights, emphasising the importance of realistic construction timelines and effective collaboration with developers to overcome challenges. This experience has paved the way for enhanced best practices and flexibility in resource allocation, ensuring a smoother implementation process. For example, as part of the process, Bristol City Council worked with delivery partners to ensure construction and connection dates are realistic and account for possible caveats along the way.

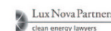
Lessons learned from initial connections have been instrumental in streamlining processes and efficiently resolving breakdowns. By treating challenges as valuable opportunities to enhance ways of working, the project team has demonstrated a proactive approach to risk mitigation and continuous improvement.

Councillor Kye Dudd, Cabinet Member for Energy Transport Said:

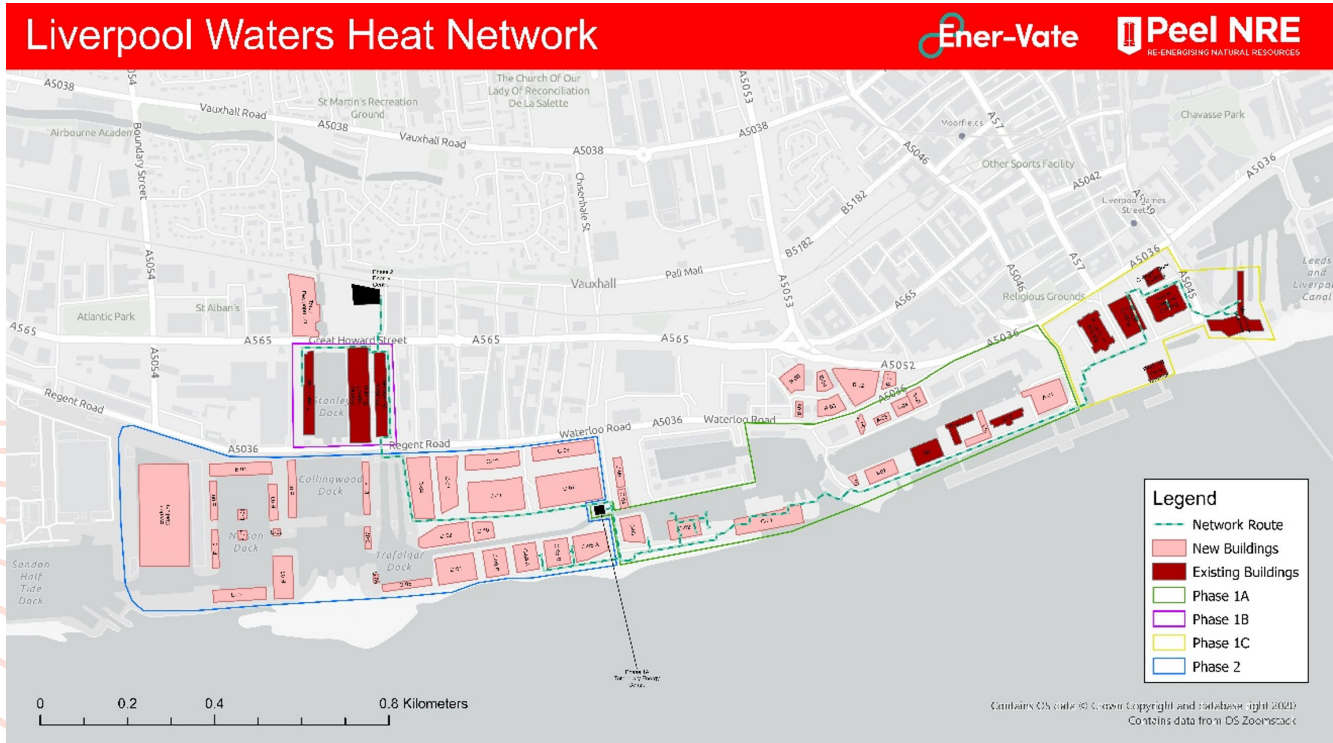
"Our Bristol heat network has such a vital role to play in our city's journey to carbon neutrality. The council has invested over £12 million in this infrastructure over the last five years and will continue to expand the network to serve new communities with low carbon heat. This new funding from BEIS is so welcome to support the growth of the network and will enable us to innovate with new technology that will provide zero carbon heat to a number of new developments in the city. It's also very exciting to see old fossil fuel infrastructure like the Bedminster coal mine being considered for use to provide zero carbon heat for the future – another example of Bristol's ability to find pioneering ways to tackle the climate emergency.

"It's exciting to be replacing old technology with greener solutions and great to be supporting public sector partners with their own efforts to decarbonise. Developing the heat networks has so many benefits for the city including the reduction in fuel poverty, cutting carbon emissions and creating thousands of jobs to support the local economy."

*Up to date as of March 2023



PEEL - LIVERPOOL WATERS

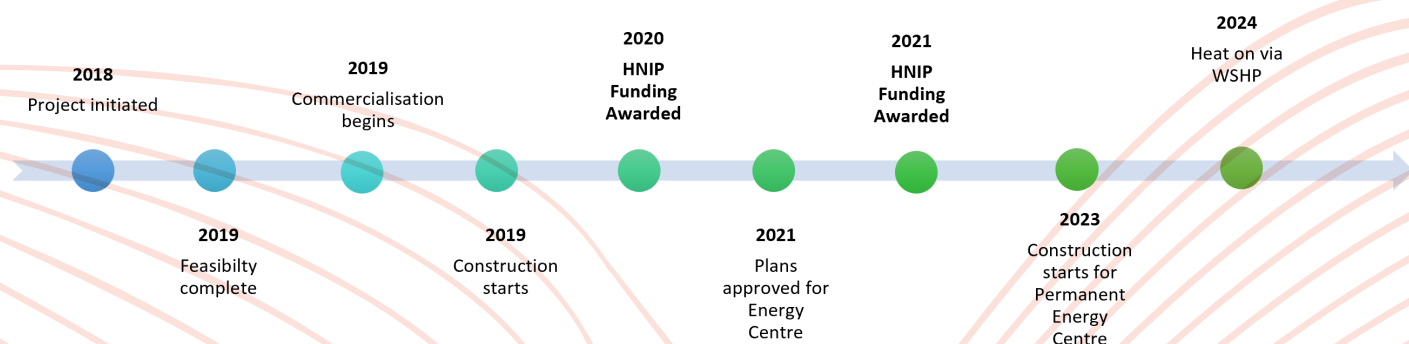


Funding beneficiary	Peel L&P Energy Limited on funded to Mersey Heat Limited
Location	Liverpool City
Total project capex	£34,070,000
Funding awarded	£7,566,000 commercialisation grant and construction loan
Planned/estimated heat export at completion	29 GWh per annum
Heat source & technology	3 MW Water Source Heat Pump (planning for 6MW), and 40 MW of backup boilers
Thermal storage capacity planned	260m ³ of thermal stores
Key anchor loads	Peel L&P's mixed use development Liverpool Waters and surrounding developments and existing buildings
Length of primary network	2.2 km
Anticipated number of buildings and/or connections	Up to 9000 residential homes and 50 non-residential buildings
Annual carbon savings (average over first 15 years)	3124 tCO ₂ e

Mersey Heat is Peel NRE’s proposal to develop, install and operate a district heat network and energy service company. This will serve residential and commercial buildings within Liverpool Waters, a Peel L&P mixed-use development on the Liverpool waterfront, and the surrounding area. HNIP funding has allowed Liverpool Waters to install a 3MW water source heat pump (WSHP). This opens the door to provide low carbon heat to the Liverpool Waters development and expand their existing network south to connect important buildings, including the Grade II listed Cunard Building, George’s Dock Building and Museum of Liverpool.

Plans for the energy centre were approved in Feb 2021, and planning and development on Mersey Heat’s Permanent Energy Centre is reaching completion. The key components of the energy centre will be two water source heat pumps (WSHPs), gas boiler backup and thermal stores. The first phase of the project focuses on connecting existing buildings around Princes Dock. A second award of £6.27m was then granted to fund the second phase. This stage involves connecting an additional 1km of pipe from Princes Dock to Stanley Dock, connecting with the new energy centre and the installation of one of the WSHPs.

Project Milestones



The Story So Far*

The combination of planning approval in February 2021 and two rounds of HNIP funding have allowed the project to reach an ambitious scale and put emphasis on high quality delivery for those it will benefit. Liverpool Waters is a large undertaking, which has required careful planning. This involved splitting the project into different phases of project development to link various parts of the heat network through the two rounds of HNIP funding. Doing so has allowed smoother expansion of the existing network by assigning timelines, costs, materials, and contracts to specific areas and provides the ability to review the scope and scale of current and future additions to the network.

Peel NRE appointed Ener-Vate as commercial consultants for the scheme. This involved considerable stakeholder engagement, preparation of commercial models and investment papers, funding applications and all planning and permitting requirements. Ener-Vate has also had a project management role from conception to delivery and operation through its asset management service.

Vital Energi were appointed as delivery partners to construct the energy centre and install the district heating network. Using the customer data, Vital Energi created load models, sourced materials, and ensured construction was delivered smoothly. Their flexible design approach has allowed for room to adjust plans. The original scheme was designed to generate heat from gas combined heat and power, however, this has now been redesigned to utilise a WSHP. This is a much lower carbon solution which will provide most of the heat required for the first phase of the network.



Project Insights

The Liverpool Waters project has been a valuable learning experience for Peel NRE, offering important insights. One significant takeaway was the effectiveness of breaking down a project of this magnitude into manageable microprojects. By dividing the project into logical phases and leveraging Vital Energi's extensive data, the management of both the core and growth of the heat network has been feasible. This approach has allowed for a cohesive and integrated finished product that surpasses the individual components.

Additionally, the project has served as a means to establish strong relationships with stakeholders interested in being connected to the network or overseeing connected areas. This has been facilitated by streamlined planning, communications, and initial implementation phases, to ensure that each zone's specific requirements are effectively addressed.

Jo Longdon, Commercial Director for Ener-Vate, part of Peel NRE, said:

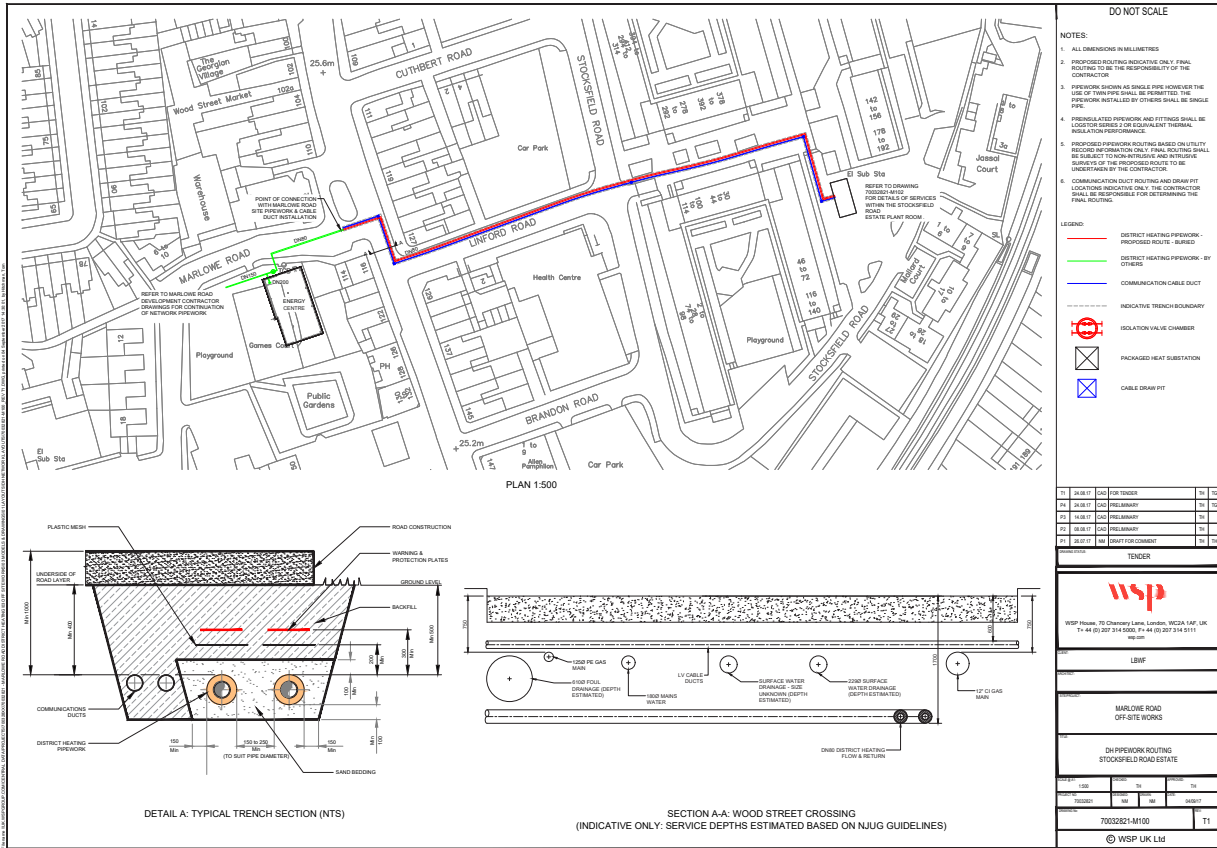
"Mersey Heat supports national and local targets to achieve net zero and we're pleased to receive further funding to help roll-out the network on a larger scale."

"The technology in the energy centre will help to save more than 4,000 tonnes of carbon per year to help supply low carbon heat and hot water to residents and businesses in Liverpool."



*Up to date as of March 2023

WOOD STREET SOUTH HEAT NETWORK



Funding beneficiary	London Borough of Waltham Forest
Location (Town/City)	Walthamstow, London
Total project capex	£1,950,000
Funding awarded	£1,000,000 construction grant
Planned/estimated heat export at completion	3.8 GWh per annum
Heat source & technology	Combined heat and power plant
Thermal storage capacity planned	24m ³ (2x 12m ³ Vessels)
Key anchor loads	Stocksfield Estate, Holy Family College, Alliston House
Length of primary network	0.5km
Anticipated number of buildings and/or connections	742 connections to date
Annual carbon savings (average over first 15 years)	170 t/CO ₂ e

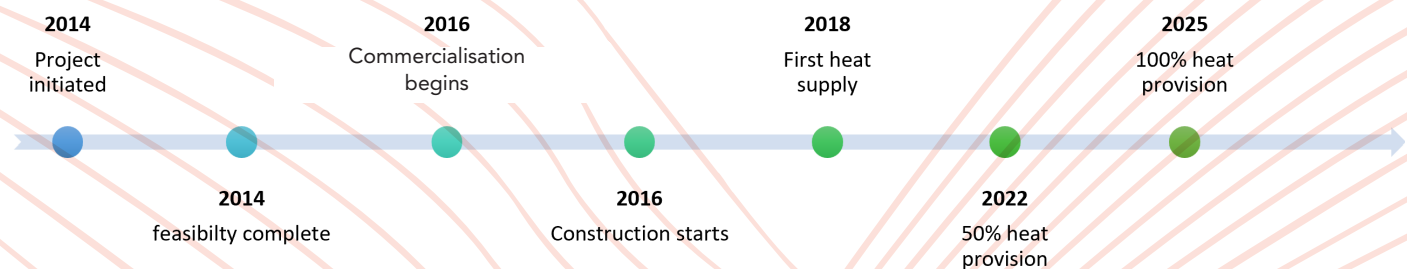
The Wood Street South heat network will use a combined heat and power energy centre to provide decentralised heat to 589 new homes as well as existing off-site residential blocks (Northwood Tower and Walnut Court) and other off-site connections in the local area.

The new energy centre will use natural gas to produce electricity which will eventually be sold to the National Grid, whilst heat generated through the process is used to produce hot water which is piped to residents' homes on the regenerated estate as well as off-site locations across Waltham Forest Borough once the final connections are made.

HNIP funding is helping to extend the project to provide district heating to the other off-site locations at Stocksfield Estate, Holy Family College and Alliston House care home.

The network was built by the London Borough of Waltham Forest in partnership with Countryside Properties. There is the capacity to add further connections to the heat network if new schemes are developed in the local area.

Project Milestones



The Story So Far*

The project is in its final phase of construction, with the Marlowe Road Energy Centre now supplying heat to 331 homes as well as the existing adjacent blocks at Northwood Tower and Walnut Court.

The energy centre has supplied a total of 101,394,244 million kwh of heat since its construction.

The network is currently connected to a gas boiler with a combined heat and power element currently under construction.

Project Insights

Lessons from the Wood Street project emphasised the importance of assessing off-site connections in advance. Prior consideration of off-site connections like Northwood Tower and Walnut Court, including necessary remediation work, would have improved the return temperature before making the connection. Connecting older existing buildings to new developments significantly affects return temperatures, as observed in this project.

To address remediation costs for off-site buildings, exploring options to share expenses with the contractor and incorporate them into the build contract is recommended. However, in the case of the Marlowe Road Regeneration, retrospective works made this approach unfeasible.

*Up to date as of March 2023



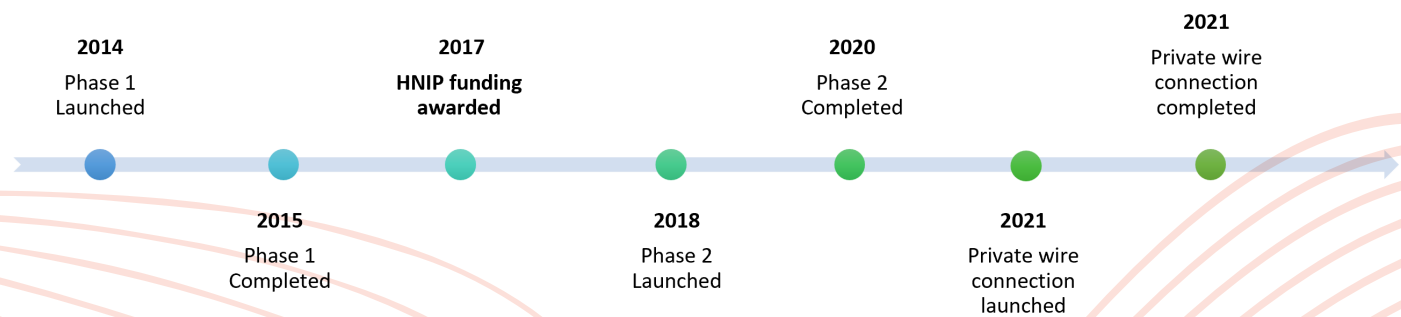
SOMERS TOWN ENERGY



Funding beneficiary	Camden Council
Location (Town/City)	Somers Town, Camden, London
Total project capex	£6,600,000
Funding awarded	£1,050,000 construction grant
Planned/estimated heat export at completion	8.2 GWh per annum
Heat source & technology	One 900kW _e gas CHP generator and three 1.3MWh boilers
Thermal storage capacity	69m ³
Key anchor loads	Francis Crick Institute, Edith Neville School and a new community centre
Length of primary network	0.65 km
Anticipated number of buildings and/or connections	634 residential connections, one school, one community centre and the Francis Crick Institute. There is scope to extend this, with plans to add 30 additional homes.
Annual carbon savings (average over first 15 years)	300 tCO ₂ e

The Somers Town Energy project was delivered in two stages. The initial stage, delivered by Vital Energi and completed in 2015, laid the groundwork for a major heat network. Phase 1 of the project included connecting four housing estates – Monica Shaw Court, Clyde Court, Oakshott Court and Goldington. A retrofit energy centre was installed in the basement of an under-used car park. A second stage was then funded in part by HNIP which upgraded this energy centre with the installation of a Combined Heat and Power (CHP) engine and thermal stores, allowing room to expand on this core capacity. This extended the heat network to a fifth tower block, a local primary school and a community centre.

Project Milestones



The Story So Far*

Phase 1 of the project involved the removal of outdated boilers on individual estates and the installation of a Decentralised Energy Network (DEN) with the scope to expand and upgrade when required. To do this, pipes were sized to allow for further expansion on the heat network, and space for growth was created in the 'core' of thermal capacity. The HNIP support allowed the Somers Town Decentralised Energy Network to then upgrade this DEN to the more efficient CHP generators and to generate electricity for private sale to help subsidise operational costs of the network. This upgrade helped to reduce cost for sites connected to the network and has lowered carbon emissions in line with Camden Council's vision for a net-zero borough by 2030. The sizing of the heating plant installed also provided wider scope for expanding the heat network for further residential and community buildings.

Since the installation of the CHP and thermal stores and the expansion of the DEN in 2020, various other interventions have taken place to improve the efficiency of the network. Elysator water treatment units have been installed in two of the connected sites to improve water quality and subsequently the efficiency of heat delivered. One of the connected sites has undergone significant refurbishment of the secondary side distribution pipework whilst heat interface units have been installed in each of the dwellings. This has reduced energy consumption of the site by 30%. The Council are seeking opportunities to complete similar secondary side refurbishments on other council-owned housing sites connected to the estate.



Project Insights

The Somers Town heat network presented unique challenges for the council. Considering the area's location between Euston and St Pancras, it was crucial to minimise disruptions during construction while navigating London's congested utilities. Engaging with residents through consultations played a vital role in successfully initiating such a significant project in a densely populated area. Keeping residents informed about project updates, benefits, and potential disruptions effectively addressed any concerns.

Given its central location, the project required careful planning and consideration of heritage factors. This included designing the external flue for the CHP and boilers to seamlessly integrate with the existing building fabric. The use of matching cladding ensured visual harmony with the original structure.

A key objective of the heat network was to provide efficient and affordable energy to consumers while allowing for future expansion. This ambitious transformation was successfully achieved, further reinforcing the project's positive impact on the community.



Councillor Adam Harrison, Cabinet Member for Improving Camden's Environment Said:

"Somers Town Energy is a project designed to reduce borough-wide CO₂ emissions whilst also improving the energy efficiency of heat supply to residents in Somers Town.

"The climate emergency is the most serious threat that our planet and its people face. Camden is committed to leading radical action, doing what we can to address this threat. Carbon dioxide emissions in Camden have fallen by over 40% over the last 10 years, but we know we need go further and more urgently. In 2019 we declared a climate emergency and committed to doing everything we could to make Camden a zero carbon borough by 2030.

"In June of 2020 the council approved a Climate Action Plan that proposes a five-year programme of projects and activities around the themes of People, Places, Buildings and Organisations that deliver on 17 Citizens' Assembly recommendations and bring to like the vision of a zero carbon Camden. This will be the first of two plans to 2030.

"We will only achieve this by working together with strategic and local partners and Somers Town Energy is a great example of this in practice."

*Up to date as of March 2023

