Innovate UK

POLICY INSIGHTS

Realising Heat Networks

Case studies of local authority roles in delivering district heating

MARCH 2026

Delivered for Innovate UK's Net Zero Living programme by Regen and The Carbon Trust

CARBON TRUST

REGEN

About Net Zero Living

Innovate UK's £60 million Net Zero Living Programme is helping local authorities and businesses work together to deliver new solutions that improve local services and open markets for economic growth.

Places across the UK are seizing the opportunities that come with decarbonisation to create warmer homes, cheaper local energy, new skills, and more secure work for their communities. But often, while the technology is available, places face barriers in areas such as resources, investment, planning and buy-in.

The 52 local authorities taking part in the Programme have generated a wealth of experience on overcoming systemic barriers to net zero solutions.

About Regen

Regen provides independent, evidence-led insight and advice in support of our mission to transform the UK's energy system for a net zero future. We focus on analysing the systemic challenges of decarbonising power, heat and transport. We know that a transformation of this scale will require engaging the whole of society in a just transition.

About the Carbon Trust

The Carbon Trust, a consultancy committed to accelerating the transition to a decarbonised future, has pioneered positive climate action for over 20 years. It partners with governments, public bodies, leading businesses and financial institutions to drive progress towards net zero. Its global team of more than 400 environmental sustainability experts, including engineers and specialists in finance and policy, collaborates with diverse organisations, industries and business sectors worldwide. Recognising the critical importance of transition planning and collaboration across public and private sectors in achieving net zero, the Carbon Trust places this focus at the core of its work. To date, its experts have supported over 3,000 organisations and cities across five continents in their journey towards net zero.

Authors

Lucy Pemble, Senior Manager, Cities & Regions, Heat Networks, the Carbon Trust, lucy.pemble@carbontrust.com
Alex Robertson, Local Net Zero Project Manager, Regen arobertson@regen.co.uk

Acknowledgements

We would like to express our sincere appreciation to all those who contributed to the successful completion of these case studies. This work benefited greatly from the support of:

- Bradford City Council
- Bristol City Council
- Leeds City Council

Additional resources

Net Zero Living publications on heat and retrofit

- Better Warmer Homes
- Mind the Gap: Ensuring heat policy reaches space-constrained homes
- Harnessing local skills for heritage and conservation contexts
- Delivering retrofit in rural environments
- The UK's retrofit workforce for heat and fabric efficiency

Government guidance

- Department for Energy Security and Net Zero: Heat Networks
- Department for Energy Security and Net Zero: Heat Networks Delivery Unit

Industry leadership

- ADE: Heat Networks
- Heat Networks Industry Council

Table of Contents

Executive Summary

Decarbonising heat is essential for meeting national and local net zero targets, with around one third of UK carbon emissions deriving from domestic, commercial and industrial heating. The transition to net zero heat will involve the replacement of millions of fossil-fuel-powered heating systems in buildings across the UK.

Heat networks provide space heating and hot water to buildings using a network of pipes supplied by one or more centralised energy centres. Heat networks can be a powerful solution for heat decarbonisation for large numbers of domestic, commercial and industrial buildings at a district level, particularly in urban contexts where building density is high. They can thereby allow the transition of large areas without installing large number of individual heat pumps.

Most current heat networks in the UK have gas fired energy centres, which are not low carbon. New generations of heat networks must be principally heated through large heat pumps, perhaps with waste heat resources, in order to ensure they deliver low carbon energy.

National policy context

The UK Government's flagship strategy for the heat transition is the Warm Homes Plan, published in February 2026. The Warm Homes Plan is seeking to balance the transition to low carbon heat with reducing cost burden on households and improving the resilience and security of the UK energy system.

Heat networks form a key part of the plan to transition to low carbon heat for households and businesses in the UK. The Warm Homes Plan sets out targets to double heat demand met by heat networks to 7% by 2035 and for 20% of all heat to be supported by district heating technologies by 2050.

> Heat networks will play a crucial role in lowering bills and delivering energy security to homes and businesses in densely populated urban areas, or in places near to accessible heat sources which can be tapped into – for example data centres and industrial sites which generate excess heat. – Executive Summary, *Warm Homes Plan*

To support these ambitions, the UK Government has been developing the policy framework to incentivise and govern heat network development.

This includes the development of regulation to protect consumers, identification of 'Heat Network Zones' in England and technical standards for heat network performance.

As of January 2026, Ofgem has assumed its role as the regulator for heat networks across the UK and is developing the governance structures to oversee heat network development and operation, including registration processes, consumer protections akin to existing energy supply and enforcement of new standards.

The Government has also introduced Heat Network Zoning in England, which is designed to identify areas where heat networks represent the lowest cost technology to decarbonise heat. This introduces regulation and requirements on how heat networks should be developed in these areas, as well as requirements to connect for certain buildings, which will de-risk and accelerate project delivery.

Simultaneously, technical standards are being developed and consulted on by the Department of Energy Security and Net Zero. The Heat Network Technical Assurance Scheme's consultation period closes on 15 April 2026, and is seeking to create technical standards for new and existing heat networks in the UK. These will act to improve efficiency and thereby reduce both emissions and consumer cost.

Finally, public finance is being mobilised to support the growth of public-private heat network delivery with the Green Heat Network Fund providing £195mn of public finance to support projects up to 2030.

Heat network policy is evolving, and for local authorities and their partners, these national policy frameworks and funding will influence the development of projects already in the pipeline and future projects.

Local project delivery

Many local authorities across the UK are looking to low-carbon heat networks as a pathway for heat decarbonisation. This includes local authorities supported by the Innovate UK-funded Net Zero Living Programme, from Bristol to Belfast. To support Net Zero Living Programme participants and wider local authorities, Regen and the Carbon Trust have collaborated to develop three case studies of local authority heat network projects from across the UK.

This policy insight showcases projects from Bradford, Bristol and Leeds in detail. We outline the local authority role, private sector collaboration, key non-technical barriers and valuable lessons learned. These case studies illustrate the range of approaches using different technologies, that local authorities can take to support heat network development. They can be used to support other local authorities in understanding

the range of options as they look to scope, develop and deploy low carbon heat networks in their area.

Thematic learnings for local authorities

While each project has its own characteristics and development journey, the three case studies have highlighted shared learnings for local authorities to consider for future heat network development.

1. **Stakeholder engagement is critical; it must start early and continue throughout the project.** Effective engagement with key stakeholders, including citizens, building owners and councillors are essential for addressing key technical and non-technical barriers for project delivery.

2. **Capacity building is vital to success.** All three local authority case studies highlight the specialist knowledge required to successfully design and deliver heat networks, which requires capacity building within local authorities, but also the importance of harnessing private sector expertise through effective public-private partnerships.

3. **Customer and building preparedness are key enablers.** Both technical and non-technical preparation to accept heat network technologies locally is key, this includes engagement with individuals and businesses early to grow acceptance and confidence, while also identifying the technical upgrades which may be required within buildings.

4. **Funding streams are key for enabling development.** Public funding through schemes such as the Green Heat Networks Fund and the Heat Network Efficiency Scheme were vital to supporting development, while public-private partnership creates an acceptable investment and risk-profile for projects.

5. **Future-decarbonisation and long-term planning should be a key consideration.** As heat networks are deployed in a quickly evolving local context where the energy transition is taking place across multiple sectors, ensuring that networks are designed with future full decarbonisation, expansion and integration with other industries (Example: waste heat integration) is an important factor which should inform development.

Anyone who wishes to engage with Regen or the Carbon Trust further on the transition to net zero heat can reach out to the report authors using the contact details provided above.

1. Bradford Energy Network

Project Name	Bradford Energy Network
Local Authority	Bradford City Council
Private sector entity	1Energy
Status of project	In construction
Delivery model	Private-sector owned: council as customer only
Technology	Air-source heat pumps (ASHP), top-up/back-up gas
Size	8MW peak heat demand £75m
Types of buildings served	Existing, listed buildings. Public owned. Previously gas-heated including some previously steam heated.

Overview of project

Bradford Energy Network is a low-carbon heat network being developed by 1Energy in the city centre. The network aims to reduce carbon emissions from connected buildings by up to 75% during Phase 1. This phase will run until 2030, followed by further expansion and emission reductions.

Large public sector customers in Phase 1 are the university, Bradford College, City Hall and the law courts. The University of Bradford is the biggest customer, the heat network heats the whole campus, and the energy centre is located close by. Buildings connected to the Bradford Energy Network will have their gas boilers removed, improving local air quality by avoiding localised combustion of fossil fuels.

The date for heat supply to the first customers is scheduled for September 2026. The network is heated by air-source heat pumps and targets large scale buildings, including listed buildings such as the Alhambra Theatre, which can be more complex to otherwise retrofit. The network does not currently serve any domestic customers but may expand to serve these in the future. 1Energy have an ambition to make the network Net Zero by 2030.

The following case study has been informed by an interview with Bradford City Council (November 2025), in addition to information in the public domain.

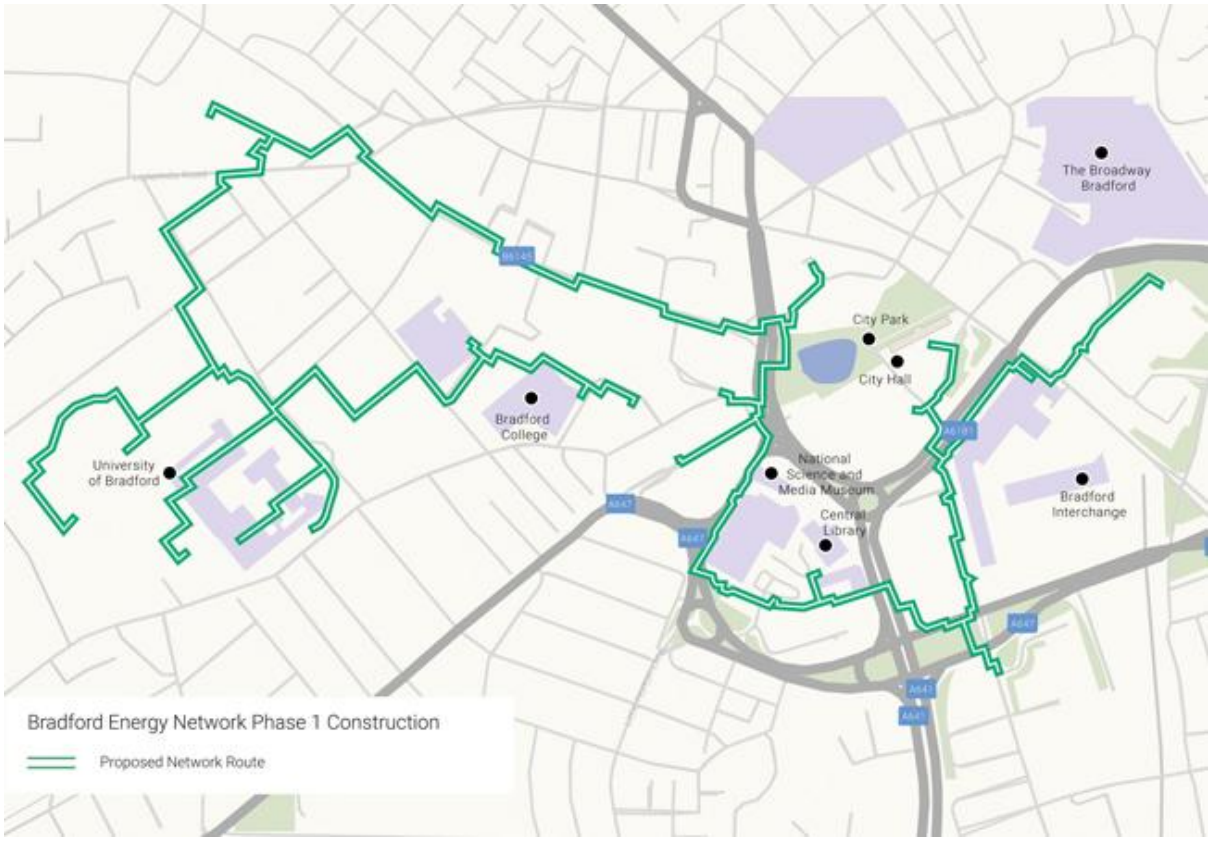

Figure 1 Bradford Energy Network Phase 1 Connection (Source: CIBSE Journal)

Delivery model, future plans and finance

Delivery model

Bradford energy network is 100% private sector owned. 1Energy have secured funding from Asper Investment Management to deploy low-carbon heat networks in the UK. 1Energy and Asper Investment Management established an Energy Services Company (ESCo) joint venture called Bradford Energy Limited to build and operate the network.

Further growth and decarbonisation plans

Because the heat network is owned by 1Energy, the council has no control in the expansion direction of the network. However, their aspirations are broadly aligned. 1Energy plans to connect two other Council buildings as part of future phases of construction: the Grade II listed Alhambra Theatre and St George's Hall.

There are early stage plans to approach a nearby data centre about potential to supply waste heat. The data centre is currently scheduled for construction.

The top-up/back-up gas boilers are planned to be replaced by alternative low-carbon heat sources within four years, as part of a commitment to make the network net zero carbon.

Finance

£75 million has been invested into the delivery of the network. The majority of funding comes from 1Energy, though £20 million of funding was secured from GHNF. Both public and private sector bodies can apply for GHNF; in this project 1Energy led the application and the council supported them by providing information and letters of support.

Funding for public sector connections like City Hall was secured through successful PSDS applications, including secondary side upgrade works. PSDS applications for these buildings were supported by 1Energy consultants directly, which the council found useful. Later costs for the connection of other public buildings will be funded from the council's capital reserves.

Early-stage heat network development initiated by the council was funded by West Yorkshire Combined Authority and the European Regional Development Fund.

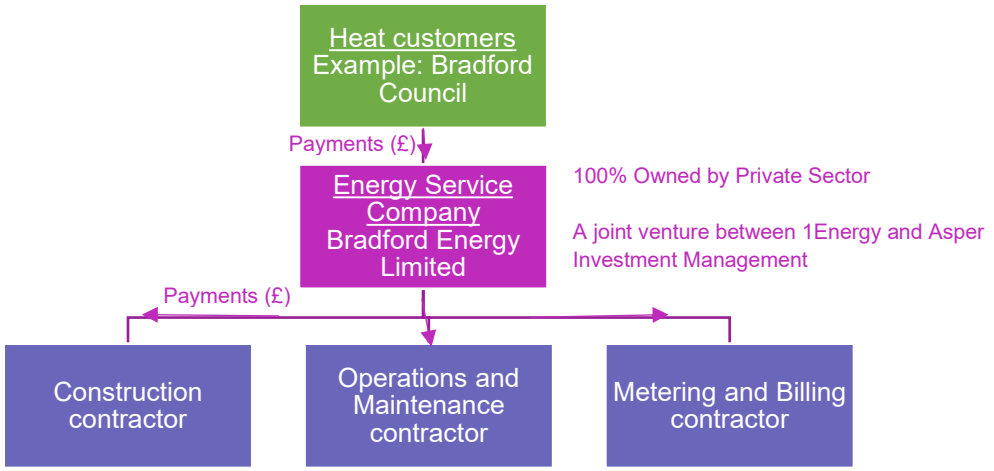

Figure 2 Commercial structure Bradford Energy Network. For illustrative purposes only.

Local authority and partner roles

Local authority role

Bradford City Council's role is primarily as a customer on the network; it has no role in the governance of Bradford Energy Network. The Council has also been an active supporter of the network, promoting locally and beyond.

Bradford City Council conducted its own early-stage research into implementing a heat network, starting in 2014. The Council undertook various feasibility studies and even purchased land for an energy centre. At the time, a gas CHP led network was the most viable option. However, these schemes became non-viable over time due to the changing carbon landscape, in particular, the decarbonisation of the electricity network.

The Council was approached by 1Energy regarding a private sector-led heat network in its area. Given the advent of the Green Heat Network Fund (GHNF), the private partner offered to lead a GHNF application to support the development of the heat network. It also proposed a fully electric network heated by ASHPs, which would be much lower carbon than the initially proposed gas CHP scheme, and would be compatible with the council's Net Zero targets. The Council supported 1Energy with the GHNF application and supported the business case by providing a firm customer base.

The Council worked alongside 1Energy to inform its business planning, provided feedback on 1Energy's heat network subcontractor and influenced subsequent procurement decisions regarding construction contractors. Bradford City Council granted planning permission to 1Energy for an energy centre, which was built on private land.

Figure 3 Bradford Energy Network Energy Centre Vision (Source: 1Energy)

Building upgrades

As a customer, Bradford City Council needed to upgrade its secondary side network, that is, the heat network delivery pipes inside its buildings. This was a necessity in terms of scheduled maintenance, but also to mitigate the risk of penalties for high return temperatures in its intended heat network supply contract, which also improves network efficiency.

To procure the secondary upgrade works, the council collaborated with University of Bradford and commissioned 1Energy to design and install the secondary side upgrade works across the respective parties' buildings. It found having combined experiences and skill sets optimised procurement.

The availability of the Public Sector Decarbonisation Scheme (PSDS) at the time facilitated both the connection fee to the heat network and upgrade of the secondary side pipework for both Bradford Council and University of Bradford. There are no live rounds of PSDS currently available as of 1 December 2025.

Private Partner role

1Energy designed, built, financed, owns, operates and maintains the network. It has access to resources which the council feels are able to facilitate a much more ambitious heat network project than the council itself was initially conceptualising.

Stakeholder engagement

As owner and operator, 1Energy has undertaken led community engagement and promotional activities in the local region, initiating workshops with local councillors, businesses and MPs. It has used its online presence, including social media, to engage with other stakeholders. 1Energy has kept the council informed and invited to engagement events, with no obligation to attend.

The Council itself has collaborated with other local authorities. For example, it has a strong relationship with Leeds City Council which has delivered Leeds PIPES. Although Leeds PIPES has a different delivery model and heat source, both councils have benefitted from knowledge sharing. Bradford has benefitted from advice on PSDS applications, whilst Leeds City Council benefitted from Bradford's experience of building management systems, as two examples.

Liaison with necessary council departments, for example highways, was led by 1Energy. Early-stage engagement helped and 1Energy smoothly coordinated the necessary consultations and approvals.

Lessons learned by Bradford Energy Network

- Developing the Bradford Energy Network highlighted the **importance of building internal capability early**. At the outset, the Council identified gaps in its working knowledge of heat networks and in understanding available funding routes, such as the PSDS. Knowledge sharing with other local authorities, particularly Leeds City Council, proved valuable in closing these gaps and in improving confidence when engaging with private-sector partners.

- **Building condition and maintenance requirements emerged as a key consideration**. Many of the Council's buildings required upgrades to their internal heat distribution systems before they could be connected to the network. In several cases, poor-quality pipework, single-pipe systems, or legacy steam heating necessitated upgrades regardless of the heat network connection. Securing PSDS funding created an opportunity to address these issues alongside connection works, reducing disruption and improving long-term system performance.

- **Early and sustained engagement** across council departments was essential but challenging. Heat networks were a new area for many stakeholders, and securing buy-in from councillors, trade unions and building users required time and targeted engagement. Aligning this process with external funding deadlines proved difficult, reinforcing the importance of starting internal engagement as early as possible.

- **Joint working with other anchor customers** can bring clear benefits, but it also introduces complexity. Collaborating with the University of Bradford on secondary-side upgrades strengthened procurement and delivery, but differing legal risk appetites and levels of familiarity with heat network contracts added time to negotiations. Clear expectations and early alignment on legal and commercial issues are critical when pursuing joint approaches.

- From a commercial perspective, the Council recognised the **importance of understanding heat network pricing and performance obligations** before committing to connection. Heat networks are not always cheaper than gas on a unit price basis, and value should be assessed on a whole-life cost basis that includes operation, maintenance and long-term asset replacement. Reviewing draft heat supply contracts early, particularly provisions linked to return temperatures and performance penalties, helped the Council understand its responsibilities as a customer.

- Overall, connection to the heat network has improved reliability and simplified fault resolution for the Council. Responsibility for primary-side operation and maintenance sits with the network operator, reducing operational risk compared with council-owned plant. This reinforced the value of a well-structured private-sector-led model, supported by an informed and engaged local authority customer.

2. Bristol Heat Network

Local Authority	Bristol City Council
Private sector entity	Vattenfall Heat UK (Bristol Heat Networks Limited) via Ameresco
Status of project	In operation by Vattenfall Heat UK since 2023
Technology	Biomass, gas-CHP (combined heat and power) and boilers and water source heat pump (WSHP)
Size	5MW peak 17GWh of heat delivered per year Currently 13,376 homes equivalent are supplied heating and hot water from the Bristol heat network. Vattenfall has a vision that by 2050 over half of all Bristolians that live, work and learn in the city will be kept warm by the Bristol heat network.
Types of buildings served	New and existing residential, commercial and public sector buildings (including social housing).

Overview of project

The Bristol Heat Network is a low carbon heat network serving both residential and non-residential buildings, delivering heat equivalent to that of 13,376 homes. Heat is supplied from biomass boilers, gas-CHP, gas boilers and a water source heat pump at
Castle Park Energy Centre, which is England's largest harbour-based WSHP.

Castle Park Energy Centre provides low carbon heating and hot water to 2,500 homes equivalent on the Old Market heat network area, with connected buildings including a Victorian Primary School, NHS building, world class office facilities and premium new build apartments.

There are nine heat network areas planned for Bristol and the network is currently serving customers in Redcliffe, Old Market, Bedminster and Temple. A new network

area is under construction in the city centre, called the Frome network area. . More detail can be seen in the map below.

The following case study is informed by Vattenfall and Bristol City Council, August 2025, and by information in the public domain.

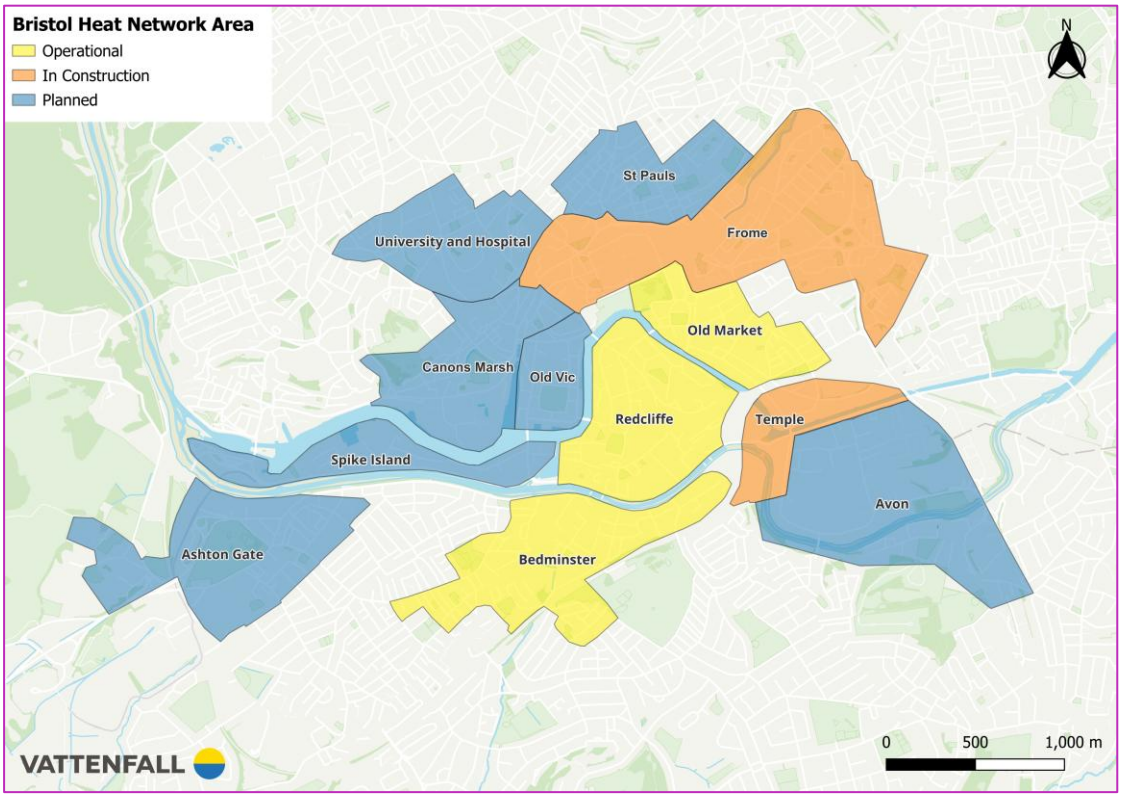

Figure 4 Bristol Heat Network existing areas, those in construction and planed areas for expansion

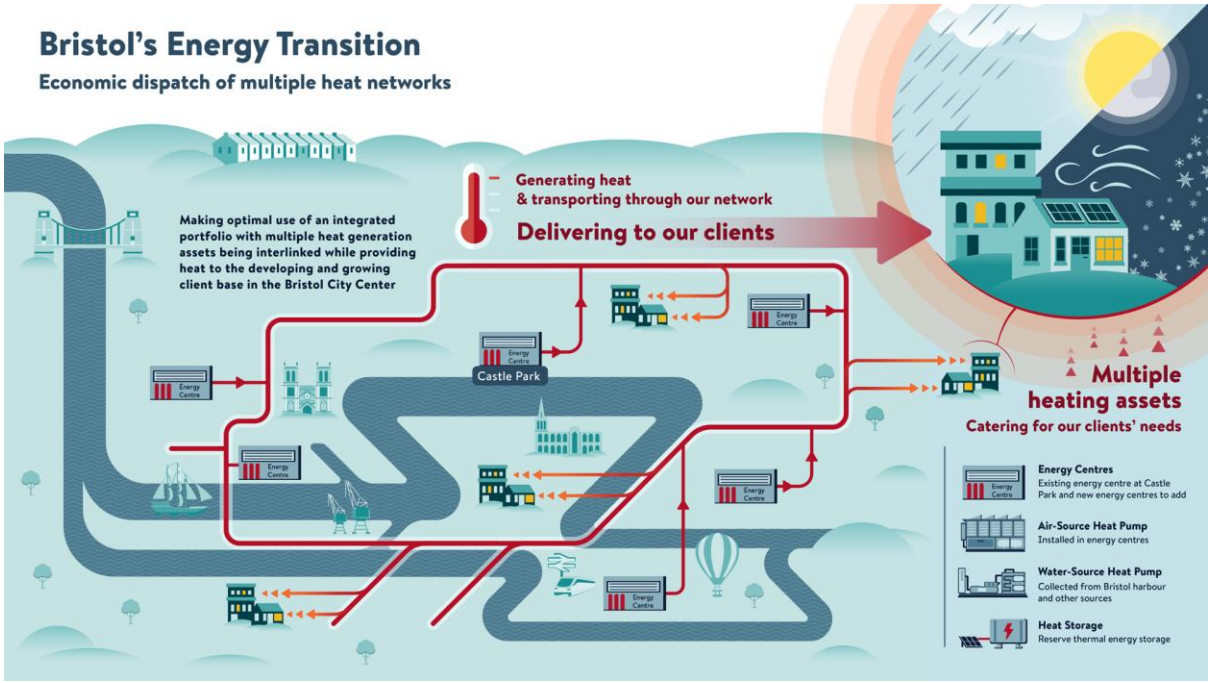

Figure 5 Bristol's energy transition, Vattenfall 2025 (developed by Buro Happold)

Delivery model, future plans and finance

Delivery model

In 2023, as part of the establishment of the Bristol City Leap partnership, Vattenfall Heat acquired Bristol Heat Networks Limited, a company previously wholly owned by Bristol City Council. This means that the local authority now has no direct ownership in the delivery model.

Bristol City Leap is a twenty-year joint venture that is 50% owned by Bristol City Council and 50% owned by Ameresco Ltd (an energy services company), established to deliver decarbonisation projects across the city.

Under this arrangement, Vattenfall Heat acts as an essential subcontractor to Ameresco, through a "subconcession agreement", taking responsibility for the development and operation of the Bristol heat network. The sub-concession agreement sets Key Performance Indicators (KPIs) for Vattenfall Heat (and Ameresco) to meet through project delivery, including with respect to decarbonisation and other key factors to support the council in achieving its wider aspirations for the city.

The delivery model for Bristol Heat Network is shown in the figure below.

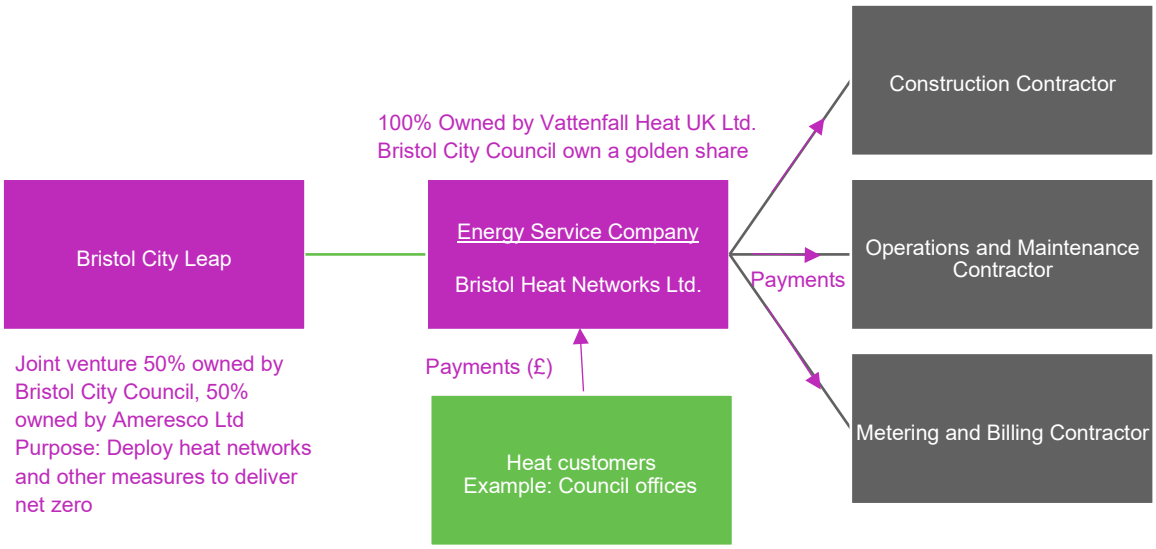

Figure 6 Commercial structure Bristol Heat Network. For illustrative purposes only

Decarbonisation strategy

As part of Bristol City Leap, Vattenfall has made contractual commitments to Bristol City Council not to install any new permanent fossil fuel energy centres following its purchase of Bristol Heat Networks Limited in January 2023. It also plans to reduce all existing gas assets.

Finance

Finance and funding sources vary for different sections of this complex project. Some of the publicly shared sources are detailed below.

The early phases of the Redcliffe, Temple, Bedminster and Old Market areas including the Castle Park water source heat pump energy centre were supported by government funding through the Heat Network Investment Project (HNIP). This funding awarded to Bristol City Council when they owned the Bristol Heat Network was a vital launch pad for the growth of the heat network.

Finance for the upgrade of the Redcliffe area of the heat network was provided by Vattenfall Heat UK and the UK Government's Heat Network Efficiency Scheme (HNES), with a 50:50 share. Vattenfall was most recently awarded grant funding from the government's Green Heat Network Fund (GHNF) for commercialisation and construction of a new area of the Bristol heat network, the Frome network area. This covers a large area of the city centre from Easton to Canon's Marsh. Initially supporting connection to the heat network largely for new developments in the area,

the funding unlocks significant future expansion opportunities to existing buildings and other areas of the city.

Local authority and partner roles

At the point of sale of Bristol Heat Networks Ltd, the council retained a small, time limited “special share” to exercise limited and specific controls, for example, with respect to fair and transparent pricing and acting as the supplier of last resort. The council pursued this model to ensure that the heat network continued to be operated in a manner that it was comfortable with, following its sale.

The special share was time limited to remain in place until Heat Network regulation comes into effect in January 2026. Provided the regulations are robust enough when introduced to deal with the items the special share is intended to guarantee, the plan is to remove the oversight requirements currently held by the council through the special share.

When developing new heat networks infrastructure, Vattenfall Heat works closely with the council, as a landowner, as a heat consumer, and with respect to the council’s role as a local planning authority. The council will continue to monitor compliance with the KPIs set out in the concession agreement, beyond the expiration of its “special share”.

As the developer, operator and bulk supplier of this heat network, Vattenfall Heat will comply with Ofgem regulation (as of 27 January 2026) and is responsible for ensuring compliance with the new Heat Network Technical Assurance Scheme.

Customer protection

Vattenfall reviews and sets the heat tariffs annually and has made a commitment to Bristol City Council through Bristol City Leap to ensure prices are fair and transparent. This also forms a key part of delivery good outcomes for consumers as part of Ofgem regulation.

In Bristol, Vattenfall Heat UK only supplies heat to domestic buildings in bulk, i.e. to building boundary level, serving buildings with multiple residential units. Thereafter, the building owner provides services onward to end-users.

Community engagement in the local region

Bristol City Leap established a Heat Network Advisory Panel and a Community Forum to support decision making. It also committed to work with the Centre for Sustainable Energy and other partners to reduce fuel poverty through the development and delivery of the No Cold Homes Strategy.

Bristol City Leap offers funding for local community groups via the Community Energy Fund, which is co-funded by Vattenfall Heat UK and Ameresco. It worked with community energy groups to explore options for installing heat generation plant near the heat network, as well as other energy efficiency measures or climate initiatives.

In summer 2025, Vattenfall delivered a community co-design project in collaboration with a local artist, RTiiKA, to conduct workshops in the Barton Hill area of East Bristol. These sessions, delivered with support from Bristol City Council's Art and Culture Team, aimed to inform people about the Bristol heat network and spark creative discussion around how we heat our buildings without fossil fuels.

The output is a spray-painted hoarding on one of the heat network's compound sites, which shows drawings taken directly from the workshops from participants aged 8-80 years old.

Figure 7 Bristol Heat Network Artwork created by local residents and local artist RTiiiKA

Lessons learned by Bristol Heat Network

The following advice has been informed by Vattenfall and is aimed at local authorities who want to promote heat networks in their area and attract developers.

- Introduce **supportive planning policy** that implement a heat development hierarchy, see Bristol City Council's Local Plan Policy BCS14, for an example. This policy requires new developments to demonstrate their heat and cooling systems have prioritised connection to existing heat networks over other modes. This strengthens the business case for local heat networks.

- **Publicly procure a long term "energy partner"** rather than a heat network developer, with other relevant public bodies included as contracting authorities. This allows the successful partner to supply services across your area to all relevant public bodies by direct award. This can increase market interest for a particular network and expedite the delivery and expansion of heat networks. Note that incoming zoning regulation in England may supersede this recommendation.

- **Use Local Development Orders** to support the timely installation of heat network infrastructure in appropriate areas; see Bristol Council's Local Development Order for an example.[8] This instates rights for heat network pipework installation, maintenance etc. on otherwise private developments in order to encourage and facilitate implementation of the network.

- **Promote heat networks that provide the opportunity for expansion in the future.** For example, the existing network in the Redcliffe area of Bristol was included in the conception of the wider Bristol Heat Networks project. This included opportunities not just to upgrade, but to expand into neighbouring areas and interconnect schemes into one large network.

- **Consider if the council has access to heat generation sources** (Energy from waste, waterways) and actively look to make these available to heat network developments.

- **Engage the local property agency and engineering consultancy sectors** to build understanding and buy-in for heat networks, so that they may positively influence decisions of their clients, who are the developers and building owners.

- **Provide council-owned land on favourable terms** for infrastructure development.

3. Leeds PIPES

Local Authority	Leeds City Council
Private sector entity	Vital Energi
Status of project	Phase 1 and 2 in operation since 2019, Phase 3 South Bank extension is under construction
Delivery model	Public-sector owned (Phases 1 and 2), Private sector and Public Sector Joint Venture (Phase 3)
Technology	Leeds Recycling and Energy Recovery Facility (RERF) - Energy from Waste plant operated by Veolia, back-up gas
Size	33MW peak 160GWh of heat delivered per year 30km of pipes £49m invested to date
Types of buildings served	Commercial and domestic. Public and private sector owned. Previously gas heated. Inclusive of Grade II listed Civic Hall

Overview of project

Leeds PIPES (Providing Innovative Pro-Environment Solutions) provides low carbon heat and hot water to over 3,000 council homes and numerous businesses across Leeds using waste heat from a Veolia-operated recycling and energy recovery facility outside the city.

The £49 million project is one of the UK's largest heat networks and is pivotal to Leeds City Region's plans to become net zero by 2038, with the potential to reduce carbon emissions by 11,000 tonnes annually.

Phases 1 and 2 of the project are wholly owned by Leeds City Council and operated in partnership with its delivery partner, Vital Energi. Phase 3 of the project will see the network expand to the south bank area and connect to many new-build developments. This phase will be delivered by a joint venture between public and private sector.

The following case study has been informed by an interview with Leeds City Council (November 2025), in addition to information in the public domain.

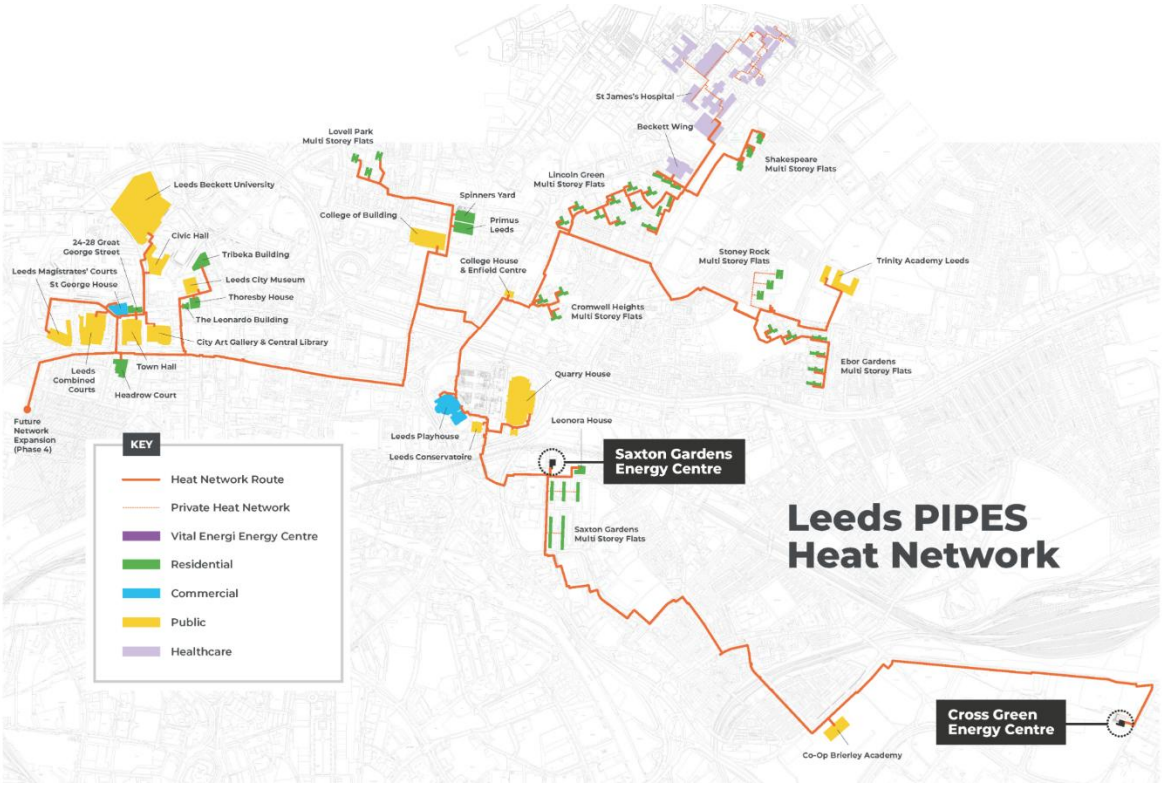

Figure 8 Leeds PIPES Heat Network pipe route, as built, excluding Phase 3's Southbank Extension

Delivery model, future plans and finance

Delivery model

Leeds PIPES Phase 1 and 2 is an example of a 100% public-sector owned scheme. The council established an energy service company (ESCo) to build and maintain the network, though all income from heat sales goes straight to Leeds City Council itself and invoices are issued via its finance department.

This delivery model was chosen primarily to benefit social housing tenants, with the aim of combatting fuel poverty and achieving carbon savings. When making the decision on the delivery model, the council reviewed the risks involved and were comfortable to make a commitment to the 100% ownership model at the time of financial decision. In addition, the council was able to source and provide the capital requirements.

There was great reputational benefit from choosing a council-led delivery model. Existing trust in Leeds City Council was leveraged in interactions with potential customers. It was helpful to market the scheme as not-for-profit, which the council feel increased the number of customer signups.

For Phase 3, the council initially led a Green Heat Network Fund (GHNF) application and explored delivery under a 100% council-owned model. As plans developed, the council concluded that greater ambition and scale could be achieved through private-

sector delivery. This shift was influenced by the upcoming implementation of Heat Network Zoning, intended to accelerate heat network deployment and attract private-sector investment.

Leeds has been prioritised under the Government's Advanced Zoning Programme, which is working with 19 areas to support the rapid delivery of heat networks once Heat Network Zoning is implemented. This designation reinforced the council's decision to evolve its Phase 3 approach, aligning delivery plans with the emerging zoning framework and market-led delivery expectations.

A private-sector-led model was also better suited to the practical requirements of Phase 3. Private developers had access to the scale of capital required and were able to mobilise more quickly to meet connection timescales in an area dominated by active redevelopment. As a result, the council intends to pursue Phase 3 through a joint venture with private-sector partner Vital Energi.

The delivery models for Phases 1, 2 and 3 are shown in the figures below.

Phases 1 and 2 Delivery Model

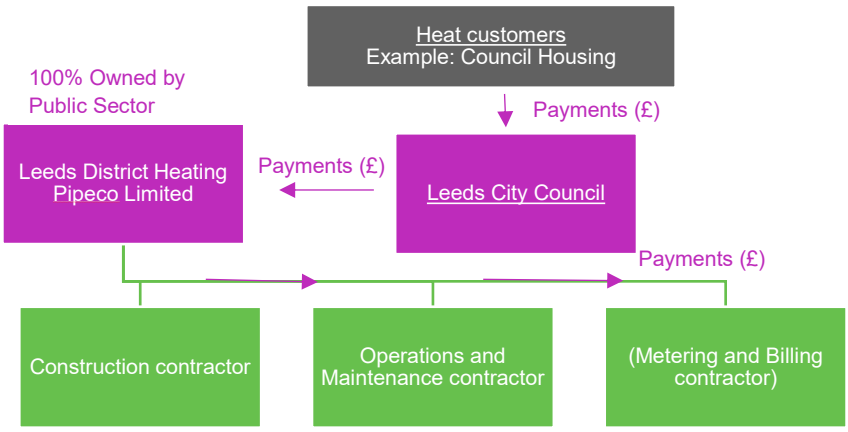

Figure 9 Commercial structure Leeds PIPES Phases 1 and 2. For illustrative purposes only

Phase 3 South Bank Extension Delivery Model

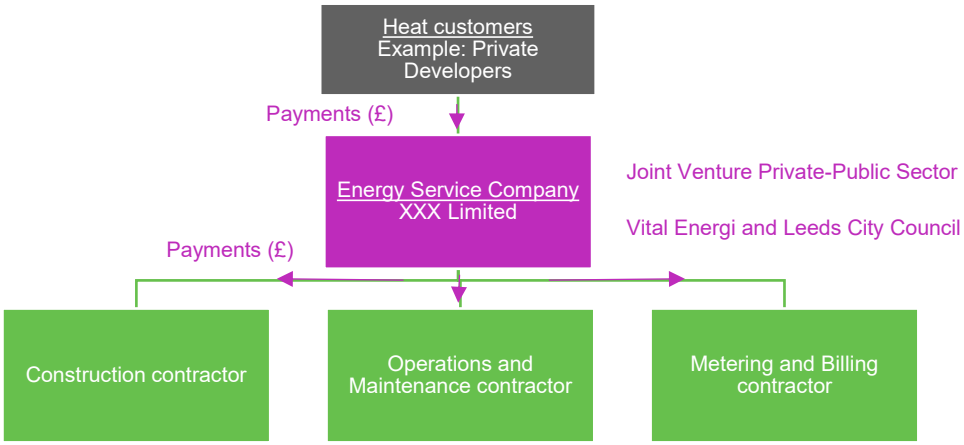

Figure 10 Commercial structure Leeds PIPES south bank extension. For illustrative purposes only

Finance

Leeds PIPES was financed from a number of sources. The council acquired grant funding through the UK Government's Heat Network Investment Project (HNIP). The West Yorkshire Combined Authority (WYCA) provided early-stage funding through its energy accelerator and later stage capital funding. The European Regional Development Fund also financed early-stage development and the Heat Network Development Unit (HNDU) funded feasibility stages. Leeds City Council used loans to provide the remaining capital for the project.

To cover the cost of its buildings connecting to the heat network, the council was successful in applying to the Public Sector Decarbonisation Scheme (PSDS).[1] Other public sector customers were also successful in using this funding to cover the connection charge.

The council feels that PSDS funding was critical for the Quarry House and Leeds Beckett University in joining the network, as it proved the concept to them with low financial risk. There are no live rounds of PSDS funding currently, which may be a limitation to heat network development.

Further growth plans

Phase 3 of the network is expanding into the south bank over the next 18 months. The extension will be a standalone heat network delivered with Vital Energi, interconnected with Leeds PIPES Phase 1 and 2 to facilitate a nearer 'heat on' date.

[1] https://www.gov.uk/government/collections/public-sector-decarbonisation-scheme

Subsequently, the private sector is building another energy centre for the south bank.

The council secured funding for a bridge between Phases 1 and 2, and the south bank extension, adding resilience for both schemes. The change in delivery model from, 100% council-owned to a joint venture between private and public ownership, coincides with Leeds' participation in the Advanced Zoning Programme, in anticipation of Heat Network Zoning.

Local authority and partner roles

Local authority role

The network's governance has been in place for over seven years now and is well established. The council is invested in and committed to the continued growth of the network. It has three members of staff working on the heat network, two of which work full time on it. There is one senior member overseeing duties. The staff report quarterly to the board. The council prepares reports for the executive board on the network's performance and future ambition at least annually, or more as required.

The council holds monthly meetings with its contractor, Vital Energi. It also has regular meetings to discuss customers connections and any upcoming construction programmes for network extension. Though Vital Energi manages the metering and billing for most customers, the council takes responsibility for this for some customers, for example, student accommodation and several commercial customers. These are supplied in bulk, that is up to the building boundary only, rather than for individual units.

The council issues heat invoices through its existing, internal finance team. Prospective customer engagement takes minimal resource from the council since the network is now well established. Future customer enquiries come directly via staff, the Leeds PIPES website or the council's planning department.

The council has full control over future connections, though there has to be a business case to support these. In most cases, this requires spatial proximity to other connections or the energy centre.

The council has to go through the necessary consultations and approvals from different departments for the network's development: land and property, highways, planning department, etc. Internal collaboration between different departments within one organisation has been simpler to establish than new relationships with the private sector would have been.

Private sector partner role

Vital Energi's role is to design, build, operate and maintain the network.
It manages the metering and billing for Leeds City Council housing tenants and calculate the price of new connections.

Vital works with a subcontractor, Enervate, to manage prospective customer engagement, providing comparators to counterfactuals. Vital also provides specialist heat network legal support.

Customers can contact Vital Energi if they have issues with the network. The company operates a 24 hour team and has live monitoring to detect issues.

Lessons learned from Leeds PIPES

Key challenges

One of the biggest challenges is performing construction work under highways. Not only in terms of the governance procedures required but also what is physically discovered underneath highways. The consequent delays and costs of discovering unforeseen services or voids are significant. The only measures to mitigate this risk are digging trial holes and reviewing utility drawings.

Coordination of traffic management plans to manage diversions when expanding the network is also a challenge. These require approvals with highly senior management and engagement with WYCA and emergency services. The council finds it hard to remove the likelihood of complaints regarding road closures.
The advent of heat network zoning may exacerbate such issues, rather than minimise them, because the rate of deployment will be greater.

Ensuring sufficiently low return temperatures of water from customers has been a challenge. While the water automatically returns to the wider network after transferring its heat, if the water temperature is not sufficiently low it will cause the wider network to run less efficiently and at higher cost. Contractual mechanisms are in place to recoup some costs from higher than desired return temperatures. Customers on Leeds PIPES that have been suffering with higher return temperatures have therefore been motivated to improve the pipework systems they own to lower their return temperatures. This will improve efficiency across the network.

Community engagement

Having been established for several years, Leeds PIPES is now well known and the council is using the communications strategy it developed at project initiation. It has

a website and has used a public information board in Millenium Square to advertise the scheme

Approximately twice a year the council aims to issue a press release regarding the network. It is in the process of hanging plaques in connected buildings' lobbies to raise awareness among the public that the building is connected to Leeds PIPES.

Ongoing community engagement efforts are focused around disruption from development works. These currently consist of informing residents of upcoming works through letter drops and door knocking. The council also engages with Leeds Business Improvement District to inform stakeholders. The council liaises with WYCA as the transport authority and with local bus networks to notify them of planned road closures and diversions.

Leeds City Council regularly engages with other local authorities for knowledge sharing such as with Bradford City Council. Government representatives from DEFRA, DESNZ and HNDU have visited the network to inform national policy.

Advice for local authorities

- Cost of heat is critical to getting customer sign-up and momentum in the business and sustained customer satisfaction.
- Tie in your planning department early to get them on board with the investment and make sure there is a planning policy to fall back on. This can act as a strong incentive for connections.
- Bring people along with you. Keep stakeholders engaged in as many project stages as you can for the best chances of success.