VITAL ENERGi

CASE STUDY

Hebburn Heat Network

ENERGY CENTRE, AIR SOURCE HEAT PUMPS AND DISTRICT HEATING

EXECUTIVE SUMMARY

South Tyneside Council declared a climate emergency in July 2019, pledging to reduce emissions and take all necessary steps towards becoming carbon neutral. To meet these ambitious goals, the council has implemented a new scheme featuring a low-carbon energy centre and district heating network. This innovative system supplies heat to two buildings, marking a significant step towards sustainable energy solutions in the area.

VITAL SOLUTION

South Tyneside Council is actively working towards achieving carbon neutrality, with the Hebburn Heat Network playing a crucial role in decarbonising their heating systems. The project was strategically designed to be delivered in phases, with the initial phase connecting Hebburn Central and Durham Court. The design also facilitates the future connection of Victoria Court Children's Home by including valves in the district heating which enables the new development to transition on to the network without downtime being required.

By moving from traditional gas boilers to a renewable solution, the project delivers approximately 320 tonnes of CO_2 reduction per year and is another fantastic addition to the council's net zero infrastructure.

The Hebburn heat network project is made up of two main elements. Firstly, the custom-built Paul Younger Energy centre was created to facilitate the roof mounted air source heat pump, and thermal storage amongst other system plant and equipment.

The second is the 240m heat network serving the nearby Hebburn Central Leisure Centre and Durham Court tower block. Both the heat network and energy centre have been future-proofed, to enable expansion throughout the town, enabling more homes and businesses to connect as the network grows. The district heating network design also incorporates Hebburn Central's existing CHP and gas boiler infrastructure as resilience of supply and top-up as the network expands.

Building The Paul Younger Energy Centre

The energy centre's design was conceived by the council's professional team and delivered by Vital Energi. The project aimed to achieve a high standard of architectural excellence, blending

PROJECT SUMMARY:

CLIENTS
South Tyneside Council

PROJECT
Air Source Heat Pump Energy Centre & District Heating Network

THE BENEFITS:

- 320 tonnes of carbon reduction per year due to latest air source heat pumps.
- Replaces a fossil-fuelled boiler system.
- 240m heat network designed for future expansion.
- 450kW two stage water source heat pump.
- Connects leisure and tower blocks.

'These groundbreaking energy centres show real innovation and vision in renewable energy solutions. We will continue to work in partnership with others to assess and deliver future schemes wherever possible to help us deliver even more carbon savings. They are just one of the ways we are using modern technology to meet our energy demands in a more sustainable way and creating a cleaner, greener Borough for our residents.'

COUNCILLOR ERNEST GIBSON
SOUTH TYNESIDE COUNCIL

form with function. Vital Energi took on the full scope of the project, from groundworks and civil engineering to construction and interior finishes, delivering a full turnkey solution.

Named in honour of the late Professor Paul Younger, a distinguished academic from Hebburn, the energy centre was designed to serve a dual purpose as both a functional facility and an educational resource. To this end, the design incorporates an innovative viewing gallery and system display screen, allowing visitors to observe the inner workings of the energy centre firsthand. This feature not only pays tribute to Professor Younger's legacy but also serves to educate and inspire future generations about sustainable energy solutions.

By combining cutting-edge technology with thoughtful design elements, the building is of a higher architectural standard than an average energy facility, creating a structure which combines form and function and adds to the architectural profile of the area.

Inside the Energy Centre

At the heart of the energy centre is a 450kW two-stage heat pump which takes ambient heat from the air and converts it into low-temperature-hot-water. This charges the 20m³ litre thermal store which discharges the heat into the network.

The project retains the existing CHP engine and gas boilers at the leisure centre, providing additional capacity during times of peak demand and back up heating during planned maintenance of the energy centre.

The project required careful design as the original CHP and boiler system delivered heat at 80/60°C which is a traditional temperature and the apartments on Durham Court and the Leisure Centre had internal heating systems to handle this. We were able to lower the network temperature to 75/55 °C which made the system more efficient, whilst still being compatible with the existing radiators, valves, and hot water systems.

Whilst the heat pumps require electricity to generate heat, Hebburn draws power directly from on-site solar panels. This integration ensures a highly efficient and environmentally friendly heating solution, significantly reducing reliance on grid electricity and minimising carbon emissions.

Delivering The Heat Network

Phase 1 of the energy centre saw Vital Energi install 240m of district heating pipework to connect the first two customers.

The residential component of the project connected the 18-storey Durham Court which is the biggest of South Tyneside's tower blocks. Additionally, we connected Hebburn Central, one of the most important buildings to the local community which includes a gym, hosts exercise and fitness classes, two pools and a state-of-the-art library.

The installation involved installing a buried, pre-insulated network of district heating pipework, with Vital Energi taking responsibility for all civil engineering, such as digging trenches and reinstatement work.

As there are plans to potentially expand the heat network, we designed it with a series of valves which will make adding further connections a more straightforward process and will negate a future shutdown of the network.

Integrating the existing buildings onto the new system

It was essential that electricity from the CHP and solar could be exported to the new energy centre, so we undertook a series of upgrades which included modifying Hebburn Central's LV infrastructure to facilitate downstream electricity supply to the energy centre.

We also modified the existing control system to allow heat from the boilers and CHP to be exported onto the new heat network.

On Durham Court we converted radiator circuits to twin pipe and reduced the operating temperatures ensuring that the existing in-home controls and radiators would operate more efficiently.

A Long-Term Addition to the Low-Carbon Infrastructure

This project is a practical example of a council demonstrating leadership and investing in a low-carbon solution which I not only makes an immediate impact, but as it evolves and grows throughout the community to connect more homes and organisations, will become a genuine regional asset in their net zero journey.