HEAT NETWORK EFFICIENCY SCHEME

Case Study: One Friargate, Coventry City Council

Optimisation Study

Summary	
Network name	One Friargate
Network owner / operator	Coventry City Council
Location	Coventry CV1 2GN
Number of residential / commercial customers	5
Heat source	District heating – Energy from Waste (EfW)
Total funding awarded	£9,997
Optimisation Study delivered by	Hydronic System Optimisation Ltd (Hysopt)
Top three recommendations for improvement	• All the three-way valves at the absorption chillers and DHW calorifiers should be adapted to two-way valves. • Implement new BEMS control over the low-loss headers to ensure that there is minimal overflow. To control the primary and secondary flow temperature with a Temperature difference of 1 °C (ensuring the minimum flow of the boiler is still met).

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Overview of heat network

One Friargate is part of the Coventry District Energy Network, a district heating system powered by an EfW solution. The network provides communal heating, hot water, and cooling to several tenants within One Friargate.

Details of why the project was needed

With the building originally designed for single tenancy, its current multi-tenant use has exposed the limitations of the existing control and metering systems. This multi-tenanted building operation approach has revealed inefficiencies in heat distribution and control that have resulted in high energy costs and suboptimal operation.

Additionally, the low-temperature difference (dT) between the flow and return temperatures in the building's heating system indicates potential inefficiencies, necessitating a comprehensive optimisation study. Therefore, the hydraulic digital twin model is a good option available to analyse heating efficiency in such multi-storey building to optimise the system's performance and reduce overall operational costs.

Recommendations proposed by the Optimisation Study

The optimisation study conducted by Hydronic System Optimisation Ltd (Hysopt) using their Hydraulic Digital Twin model resulted in the following key recommendations:

1. **Adaptation of Valves:** Replace all three-way valves at the absorption chillers and DHW calorifiers with two-way valves. This will convert the system from a constant flow to a variable flow installation, enhancing efficiency and reducing energy waste.
2. **BEMS Control Implementation:** Introduce new Building Energy Management System (BEMS) control over the low loss headers to minimise overflow and precisely control the primary and secondary flow temperatures. This will ensure the system meets the minimum boiler flow requirements while enhancing efficiency.

Projected benefits realised from actioning proposed measures

The recommended measures aim to transition the system from a constant flow to a variable flow installation, significantly reducing pump energy consumption and lowering the return temperature to the district heating network. This will help to reduce carbon emissions and ensure cost-effective heat delivery to end users.

Efficiencies gained from consultancy advice

The Hysopt study has provided a robust framework for understanding and addressing the inefficiencies within the One Friargate system. By using a digital twin model, CCC can pre-emptively assess the impact of any changes, ensuring that only beneficial modifications are implemented without unintended consequences.

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Benefits to network customers

For the customers within One Friargate, the optimisation measures will result in lower energy costs and improved system reliability. Additionally, the reduced heat demand on the network will create opportunities for future connections, potentially benefiting other buildings and the wider community by facilitating a transition to low-carbon heating solutions.

Next steps

The findings from the optimisation study will be shared with the Facilities Management team within the Council. Any identified improvements and recommended measures will be communicated to the building's tenants, along with the expected financial benefits. CCC is expected to submit a Capital funding application in the upcoming HNES rounds to secure grant funding.

Quote from heat network owner

"This study was vital for us to review our heating systems, improve their efficiency and ultimately cut down on heating costs.

"Using this model on the Friargate One, which is one of our larger buildings helped us identify areas for improvement and with further grant funding we can look to make those changes."

- **Councillor Jim O'Boyle, Cabinet Member for Jobs, Regeneration and Climate Change**