Raven Residential

Case Story Ironworks, Mill Road

EnergiRaven

Case Story - Ironworks, Mill Road

Uncovering Hidden Savings: The Impact of Performance Monitoring on a Communal Heat Network

Cambridge Investment Partnership (CIP), an equal partnership between Cambridge City Council and award-winning housebuilder The Hill Group embarked on a transformative journey three years ago. Collaborating with SAV, they sought a platform that would effectively monitor energy consumption in their communal heat networks. This case story focuses on their partnership and the unexpected revelations that emerged after implementing the Raven Residential energy monitoring platform in a new build project, Ironworks, Mill Road.

The Scheme's Overview

The project comprised two phases, with phase one consisting of 130 dwellings and phase two adding an additional 50 units. The focus initially was on the first 130 dwellings spread across seven blocks. The heat delivered to the scheme from two EC Power XRGI 20 CHPs and a gas boiler. Supplying a Danfoss FlatStation with a Kamstrup heat meter and feeding an underfloor heating circuit in each dwelling. The overall design of the scheme was to achieve 70˚C flow and a 40˚C return temperature.

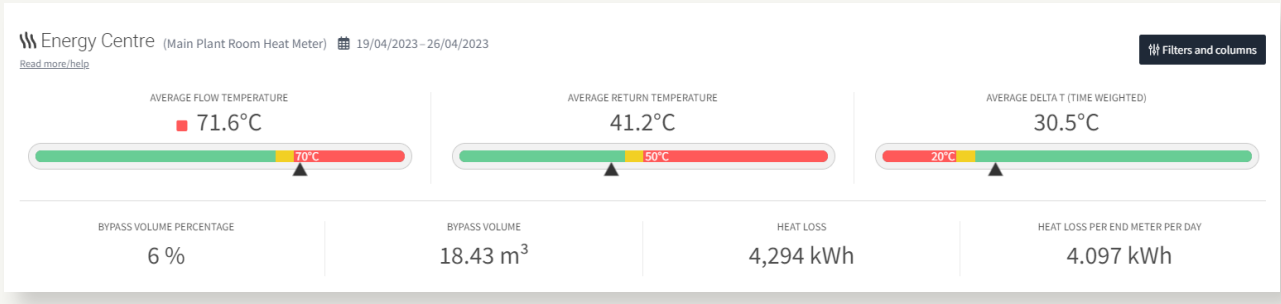


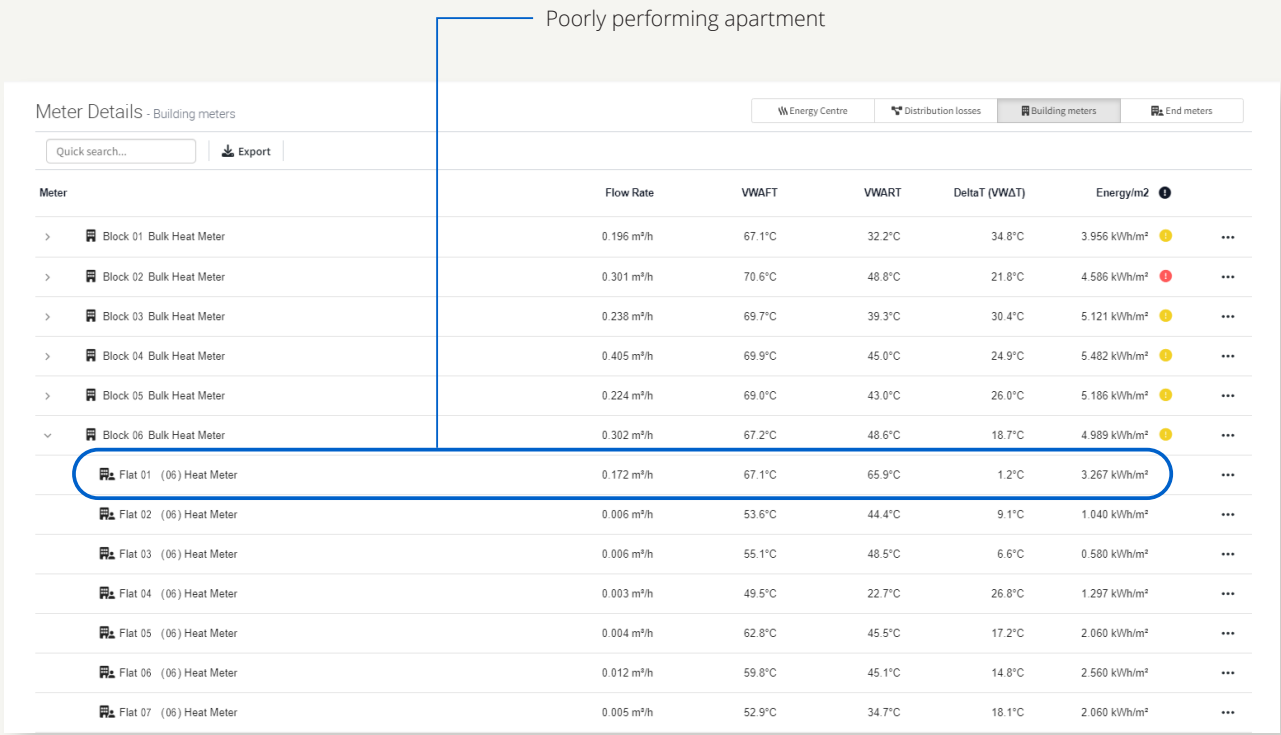
Fig. 1 Ironworks, Mill Road block 7 prior to Raven Residential energy monitoring.

Case Story - Ironworks, Mill Road

Case Story - Ironworks, Mill Road

Early Observations

Upon implementing the energy monitoring platform, the team was pleased to find that the scheme was functioning well. Commissioning had been performed to a high standard, and as residents began moving in, the heat network was performing well. The initial assessment indicated that the scheme was operating at the expected 70/40˚C design temperature. However, one notable observation was that the heat loss appeared to be slightly higher than anticipated.



Meter	Flow Rate	VWAFT	VWART	DeltaT (VWΔT)	Energy/m2
Block 01 Bulk Heat Meter	0.196 m³/h	67.1°C	32.2°C	34.8°C	3.956 kWh/m²
Block 02 Bulk Heat Meter	0.301 m³/h	70.6°C	48.8°C	21.8°C	4.586 kWh/m²
Block 03 Bulk Heat Meter	0.238 m³/h	69.7°C	39.3°C	30.4°C	5.121 kWh/m²
Block 04 Bulk Heat Meter	0.405 m³/h	69.9°C	45.0°C	24.9°C	5.482 kWh/m²
Block 05 Bulk Heat Meter	0.224 m³/h	69.0°C	43.0°C	26.0°C	5.186 kWh/m²
Block 06 Bulk Heat Meter	0.302 m³/h	67.2°C	48.6°C	18.7°C	4.989 kWh/m²
Flat 01 (06) Heat Meter	0.172 m³/h	67.1°C	65.9°C	1.2°C	3.267 kWh/m²
Flat 02 (06) Heat Meter	0.006 m³/h	53.6°C	44.4°C	9.1°C	1.040 kWh/m²
Flat 03 (06) Heat Meter	0.006 m³/h	55.1°C	48.5°C	6.6°C	0.580 kWh/m²
Flat 04 (06) Heat Meter	0.003 m³/h	49.5°C	22.7°C	26.8°C	1.297 kWh/m²
Flat 05 (06) Heat Meter	0.004 m³/h	62.8°C	45.5°C	17.2°C	2.060 kWh/m²
Flat 06 (06) Heat Meter	0.012 m³/h	59.8°C	45.1°C	14.8°C	2.560 kWh/m²
Flat 07 (06) Heat Meter	0.005 m³/h	52.9°C	34.7°C	18.1°C	2.060 kWh/m²

Fig. 2 Benchmarking of key metrics of building level down to the individual dwelling or bulk meter.

Uncovering the Issue

Delving deeper into the data provided by the monitoring platform, it was discovered that two specific units were bypassing on the heat network. This bypassing resulted in unusually high flow rates and return temperatures.

With the launch of the Raven Residential platform the team identified these anomalies approximately six months after the scheme had gone live. Unfortunately, by the time the issue was pinpointed and addressed, the apartments were already occupied.

Resolving the Bypassing Issue

The process of rectifying the bypassing problem was not without its challenges. Coordinating access to the apartments proved difficult, and initial attempts by technicians failed to identify the root cause. Eventually, SAV's Senior Site Engineer, Keith Waller, visited the site and discovered similar faults in both apartments. The actuator heads within the heat interface units were not properly seated, preventing the valves from closing fully. Consequently, the bypassing occurred. The fix was relatively straightforward, ensuring that the valves closed properly when needed.

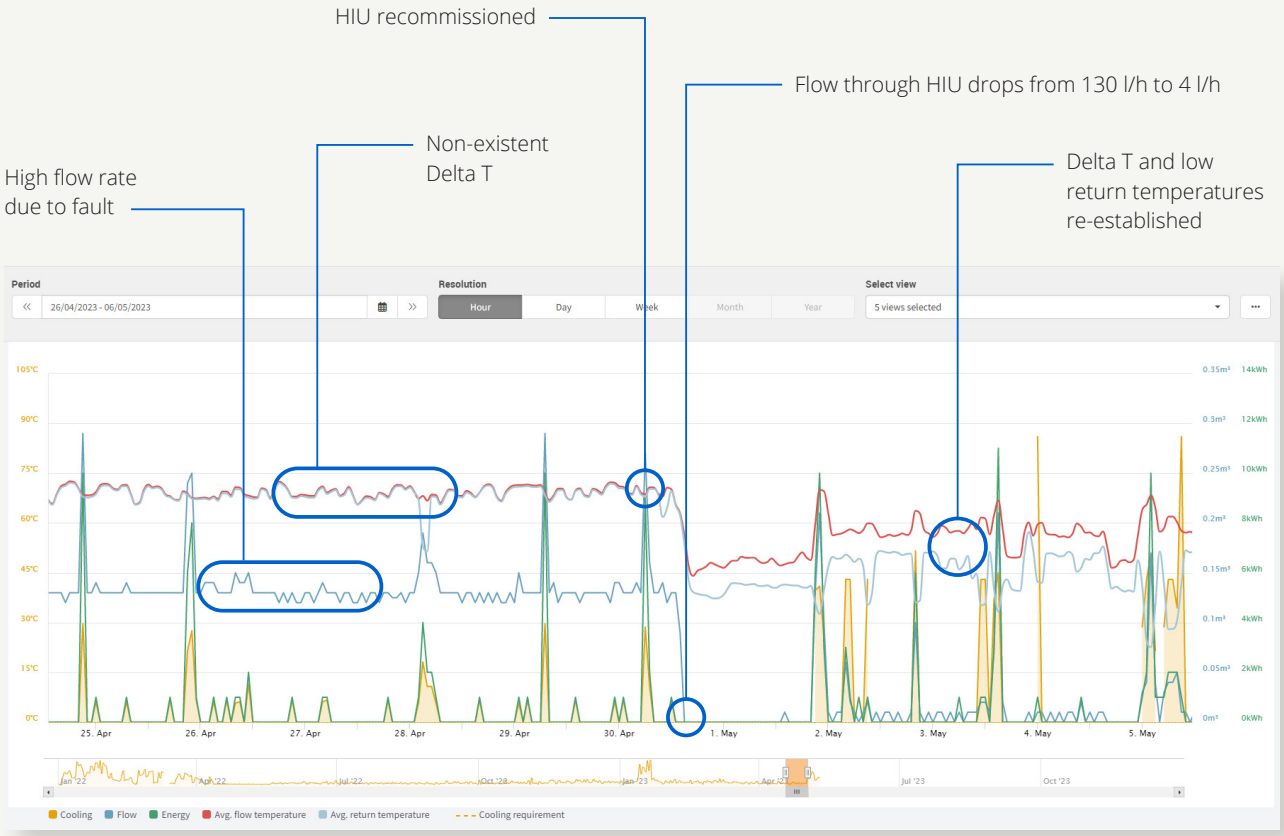


Fig. 3 Data from one of the culprit apartments

Case Story - Ironworks, Mill Road

Remarkable Impact

Rectifying the bypassing issue had a surprisingly significant impact on the heat network's performance. The return temperature dropped from around 41-42˚C to approximately 35-34˚C. Given that this change occurred in only two apartments out of 130, it highlighted the remarkable influence even a small number of faulty units could have on the overall system. Additionally, the heat loss decreased from 4.1 kWh/dwelling/day to 2.9 kWh/dwelling/day, resulting in substantial energy savings.

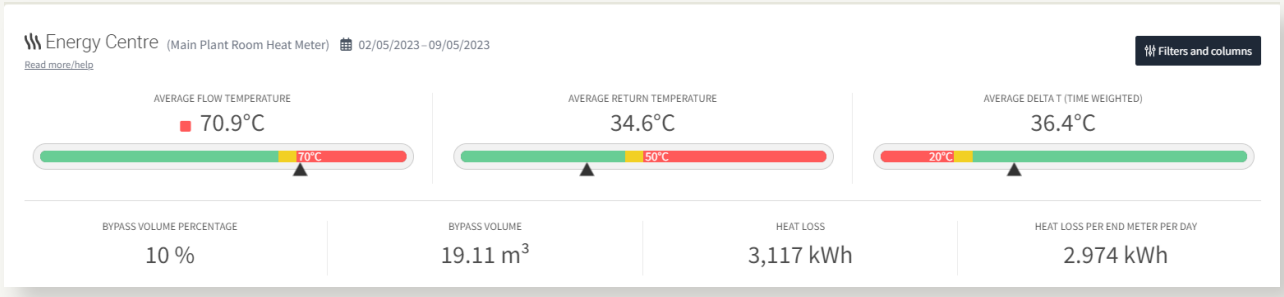


Fig. 4 Ironworks, Mill Road block 7 after re-commissioning of two apartments.

Financial and Operational Benefits

The reduction in heat loss translated into tangible financial benefits for the scheme. Based on a tariff of 15 pence per kWh, approximately £6,000 per year has been saved. When divided among the 130 dwellings, this equated to approximately £46 per resident per year. Moreover, the improved efficiency led to a decrease in pumping costs, as the two previously bypassing apartments now flowed at an average rate of 4 l/h, instead of 130 l/h.

> "It's great to finally have a platform that can quantifiably evaluate the network and highlight issues. Whilst there are many ways to find a bypass there aren't many solutions that quantify the benefits that it has brought to the network. Raven Residential can do that for you."

Matt Clegg, Building Services Manager, The Hill Group

Continuous Performance Monitoring

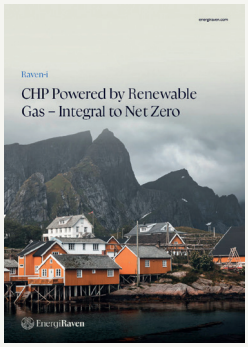
The successful identification and resolution of the bypassing issue has motivated the team to explore additional optimisation opportunities. They've now also identified certain heating circuits that are not operating as efficiently as desired. By monitoring the flow rates and return temperatures, the team aims to identify further savings and fine-tune the system.

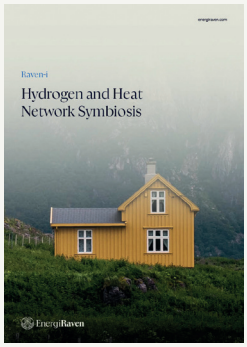
Further Optimisation Opportunities

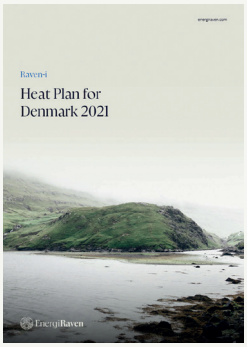
By leveraging the insights gained from performance monitoring, CIP is considering whether to implement motivational tariffs on their schemes to encourage residents to actively participate in maintaining the efficiency of the heat network. Through financial incentives linked to the Volume Weighted Average Return Temperatures (VWART), occupants are motivated to ensure that their systems operate optimally, avoiding bypassing or other inefficiencies. This collaborative approach empowers residents to take ownership of their energy consumption, leading to improved system performance, reduced heat loss, significant energy savings, and lower operational costs for the heat network.

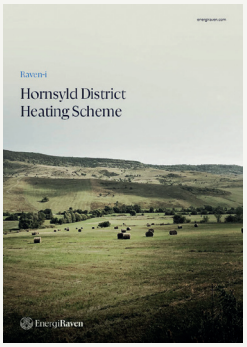
Related documents:

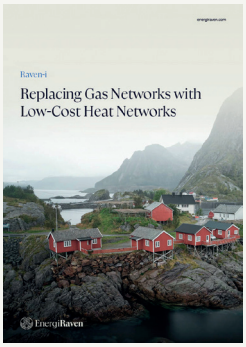
Explore our library for more Raven-i documents: **www.energiraven.com/the-library**











Head Office: EnergiRaven
Scandia House, Boundary Road,
Woking, Surrey, GU21 5BX
+ 44 (0) 1483 227500

EnergiRaven

www.energiraven.com – info@energiraven.com