

Brooke Street – South Derbyshire



Figure 1: Brooke Street [1]

Context

Brooke Street is an off-gas grid area on the edge of a rural village in South Derbyshire. A small heat pump in district heating installation was implemented in 2012 to serve 18 existing local authority flats (built in 1982).

The previous heating strategy had been all-electric, through storage heaters. Residents had made numerous complaints about the high running cost of these systems and the low level of control they had over their operation. The council was interested in exploring renewable energy solutions and obtained an RHPP grant to cover part of the cost of the heat pump in district heating installation. At the same time as the installation of the scheme, fabric retrofits were deployed to help improve thermal efficiency of the dwellings.

3 ground source heat pumps were implemented to serve 18 existing local authority flats.

Besides, there is good technical potential for energy and CO₂ savings from heat pumps in heat networks in off-gas grid areas such as this one, where the previous heating system is direct electric resistance heating or storage heaters.

How does the scheme work?

Three blocks of six flats are served from three ground source heat pumps coupled to a common ground loop served by 28 boreholes, each 100 metres deep. The system provides space heating and hot water to each flat. The flats were all retrofitted with low temperature radiators so that the space heating supply

temperature can be kept as low as 55°C. The system temperature is raised to 60°C for a period every night to heat the DHW cylinder to mitigate Legionella risks. Two plant rooms have been installed, one serving six flats and the other serving twelve flats. Each heat pump also has a 100 litre thermal store.

Challenges overcome

A couple of years on, the residents are very satisfied with the new system. There were however a number of problems at the start. The project caused more upheaval in and around the flats than the council had first envisaged, one reason being that other maintenance work needed to be brought forward, and another being that the short time period in which the grant needed to be spent meant that the scheme of works could not be planned for minimum disruption. Residents initially did not understand how to best operate their new heating and DHW systems, leading to higher operating costs than anticipated. It has also taken time for the council to consider how best to charge for the cost of operating the system, in terms of how the fixed and variable costs are passed through to the residents.

Key facts

Building type: residential building (18 flats)

Heat source: 3 ground source heat pumps

Supply temperatures: up to 60°C

Source temperature: 6-10°C

Max heat output: 120 kW

Heat pump type: Dimplex 40kW with R134a Refrigerant

Design COP: 3.2

Time frame: In operation since 2012

References

- [1] "Heat Pumps in District Heating: Case studies", Element Energy and Carbon alternatives for DECC, 2016
- [2] "Heat Pumps in District Heating: Final report", Element Energy and Carbon alternatives for DECC, 2016
- [3] "Investigating Opportunities for Low Impact: Energy retrofitting in Cities", Fraser Muir Reid, 2017
- [4] "Brooke Street, South Derbyshire, UK – Case Study", GI Energy



Figure 2: Installation of Brooke street heat pumps system [4]