Improving thermal performance of an existing UK district heat network: a case for temperature optimization

This paper presents results of a research study into improving energy performance of small-scale district heat network through water supply and return temperature optimization technique. The case study involves establishing the baseline heat demand of the estate’s buildings, benchmarking the existing heat network operating parameters, and defining the optimum supply and return temperature. A stepwise temperature optimization technique of plate radiators heat emitters was applied to control the buildings indoor thermal comfort using night set back temperature strategy of 21/18 °C. It was established that the heat network return temperature could be lowered from the current measured average of 55 °C to 35.6 °C, resulting in overall reduction of heat distribution losses and fuel consumption of 10% and 9% respectively. Hence, the study demonstrates the potential of operating existing heat networks at optimum performance and achieving lower return temperature. It was also pointed out that optimal operation of future low temperature district heat networks will require close engagement between the operator and the end user through incentives of mutual benefit.

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