Experience from a practical test of low-temperature district heating for space heating in five Danish single-family houses from the 1930s - DTU Orbit (28/09/2019)

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The efficiency of district heating systems is greatly affected by network supply and return temperatures. However, the opportunities to lower the temperatures and thereby increase network efficiency are restricted by customer installations. Very little is known about the customer installations, because heating system operation is only rarely monitored in detail. In this study, we therefore investigated the operation of the heating systems in five houses. The study had two aims: first to investigate how much of the heating season the houses could be heated with supply temperatures as low as 55 °C, and second to investigate whether occupant behaviour and heating system malfunctions caused unnecessarily high return temperatures. The results showed that all the houses were compatible with low-temperature supply, and in two of the houses return temperatures were even as low as the preferred 25–30 °C. Two main causes were found for unnecessarily high return temperatures in the remaining houses: a few radiators were found to be too small, and thermostatic radiator valves did not always ensure proper water mass flow. In conclusion, if these errors were corrected, the study indicates that it would be possible to heat the investigated houses with district heating temperatures of 55/30 °C.