Høje Taastrup (Sønderby), Denmark

In Høje Taastrup, Denmark, the old district heating system has been replaced in an area with about 75 detached houses in an area called Sønderby. The existing system was only about 15 years old, but had distribution losses at levels of 38-44 %. The new system was connected via a shunt connection to the main network, which has a supply temperature of about 80 °C and a return temperature of about 50 °C

Table 1. Key data for the Høje Taastrup case study. Measured data from 2012.

Parameter	Value
Year of construction	2012
New development/renovation	Renovation
Type of houses	Detached houses, built 1997-1998
Number of houses	75
Total heated area	11,230 m²
Supply temperature (design/measured)	55-52 / 55.0 °C
Return temperature (design/measured)	27-30 / 40.3 °C
DHW temperature	45-50 °C
Trench length	2,743 m
Supplied heat	1,228 MWh
Delivered heat	1,052 MWh
Distribution losses	14.3 %

Supply-side technologies/System solution

- Shunt connection to the main district heating system through a “3-pipe connection shunt arrangement”. This solution allows the return water from the main network to be used as primary water in the low-temperature network, but the main supply water can be mixed in to raise the temperature if necessary. The “main network return water” ranged from 30 to 67 °C (47 °C on average) in 2012-2013, whereas the “main network supply water” ranged from 65 to 107 °C (80 °C on average). Thanks to this solution, the new system was supplied with return water up to 81% of the time.

Distribution technologies

- Twin pipes. Steel twin pipes for main pipes (insulation class/series 2) and flexible twin Alupex for all house connection pipes (insulation class/series 3).
- Maximum pressure level 10 bar, maximum velocity 2 m/s in order to keep down pipe dimensions. Minimum pressure difference at substations 0.3 bar.

Demand-side technologies

- The substations in each house were replaced with new ones, Danfoss Redan Akvalux II VX.
- Underfloor heating systems, indirect connection.

- Instantaneous preparation of domestic hot water. Small volume approach, where the maximum allowed DHW volume in DHW supply pipes is 3 litres. A few houses have DHW circulation.

Lessons learned

Some lessons learned reported from this project:

- The underfloor space heating systems in the relatively newly built houses were suitable for the low-temperature concept. No modifications were needed except new substations.
- The average return temperature was 40 °C, which was higher than expected. The reason was faulty settings or defective components (valves etc.) in a few consumer substations, which resulted in high bypass flow. Troubleshooting these and other building installations is expected to lower the return temperature.