Västerås, Sweden

A new area of 130 dwellings is situated in Västerås, Sweden. All houses will have district heating, and their energy demand is low because of energy efficient building techniques. In some of the buildings, some household appliances will be supplied with heat from the district heating, such as white goods and towel warmers.

Table 1. Key data for the Västerås case study.

Parameter	Value
Year of construction	2011-
New development/renovation	Renovation
Type of houses	Single family houses and apartment blocks
Number of houses	148
Supply temperature (design)	60 °C
Return temperature (design)	30 °C
Delivered heat	908 MWh
Distribution losses	approx. 20 %

Supply-side technologies/System solution

- The low-temperature district heating network is secondarily connected via a heat exchanger to the main district heating system in Västerås.

Distribution technologies

- The DH is distributed in plastic PEX pipes insulated with EPS foam. These pipes were laid at the same time as the piping for water, sanitation, electricity and broadband, which reduced the total time for laying the pipes by a third.

Demand-side technologies

- Direct connection of space heating systems. Forced-air heating in passive houses, and radiators and underfloor heating in the rest.
- Instantaneous DHW preparation. In the apartment blocks, flat substations have been installed; thus, no hot water circulation is necessary.
- In some of the buildings, some household appliances are supplied with heat from the district heating system, such as dishwashers, washing machines and towel warmers, adding 1,000-2,000 kWh/year per dwelling. This increases the heat demand of the district heating network, which makes it more cost-effective. It also decreases primary energy use.

Lessons learned

- The investments costs per metre of pipes are estimated to be about 10 % lower than for conventional systems.
- According to Mälarenergi, three conditions need to be met for district heating supply to low-energy houses:
- Lower distribution losses
- Lower investments
- Increasing the use of heat by replacing electricity with heat.