

Key results in the scenarios

	LowEff	MediumEff	HighEff
Heat generation in 2050 [TWh]	562.7	395.8	324.7
Installed generation capacities in 2050 [GW]	293.6	207.8	172.6
Heat network length 2050 [thousand km]	305.6	263.7	265.6
Connected buildings 2050 [thousand]	13,766	11,800	12,031
Total cumulated cost (2020–2050) [bn EUR]	973.7	852.9	806.1
Total cost difference compared to LowEff [%]	-	-12.4%	-17.2%

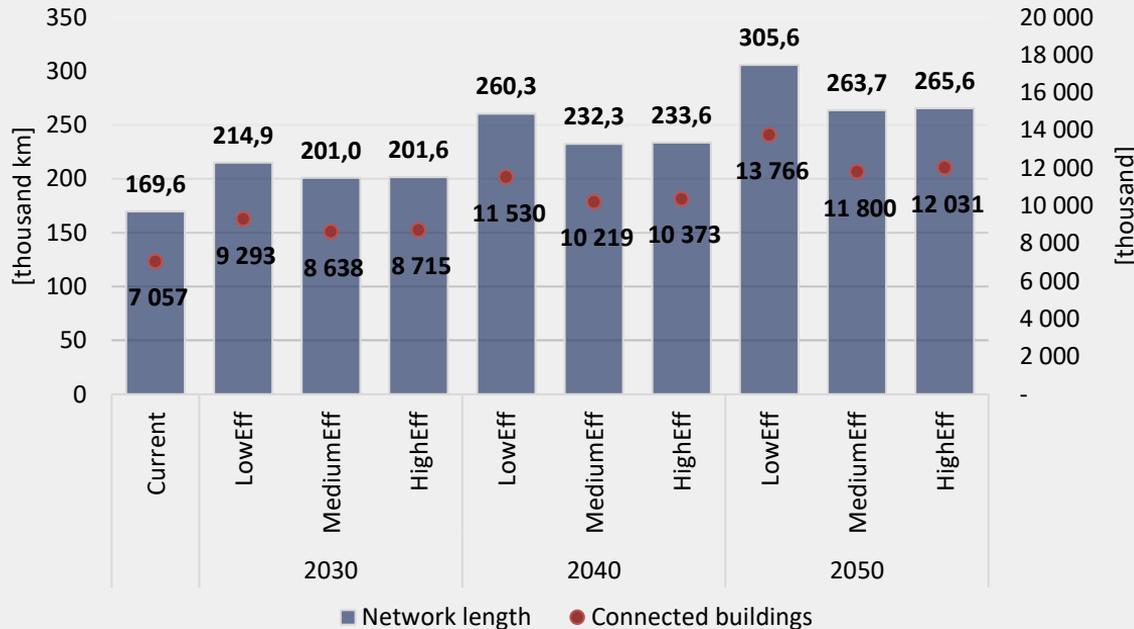


**District heating
supply**

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District heating network length and number of connected buildings



Results

- 80% more length and double the buildings connected (LowEff)
- DH share of FED increases from 11% to 20% (LowEff), 17% (MediumEff), and 16% (HighEff)
- Decreasing linear heat densities (MWh/m/a) in all scenarios

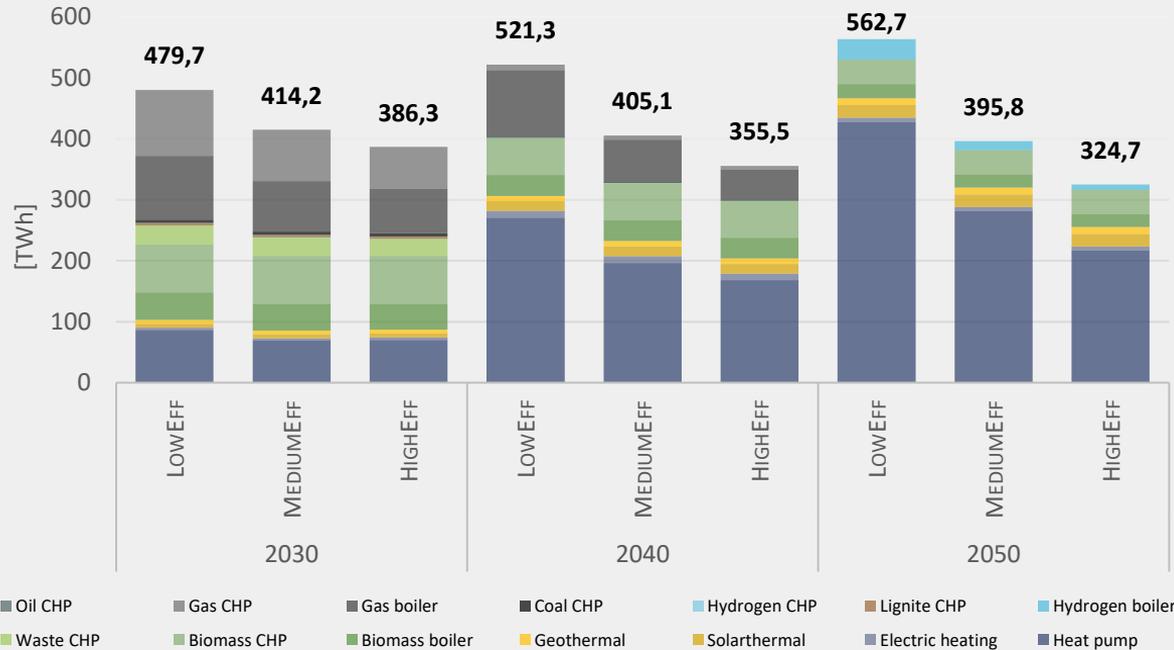
Key message

More buildings need to be connected to the networks to compensate for the reduces heat densities. The decreased linear heat densities will increase the heat supply costs

Network length in EU-27 [thousand km] and number of connected buildings



District heating generation



Results

- Heat generation in 2050 -30% (MEDIUMEFF) and -42% (HIGHEFF)
- Heat generation dominated by heat pumps (67-76% in 2050)
- Load peaks covered by hydrogen boilers (34-80 TWh in 2050)

Key message

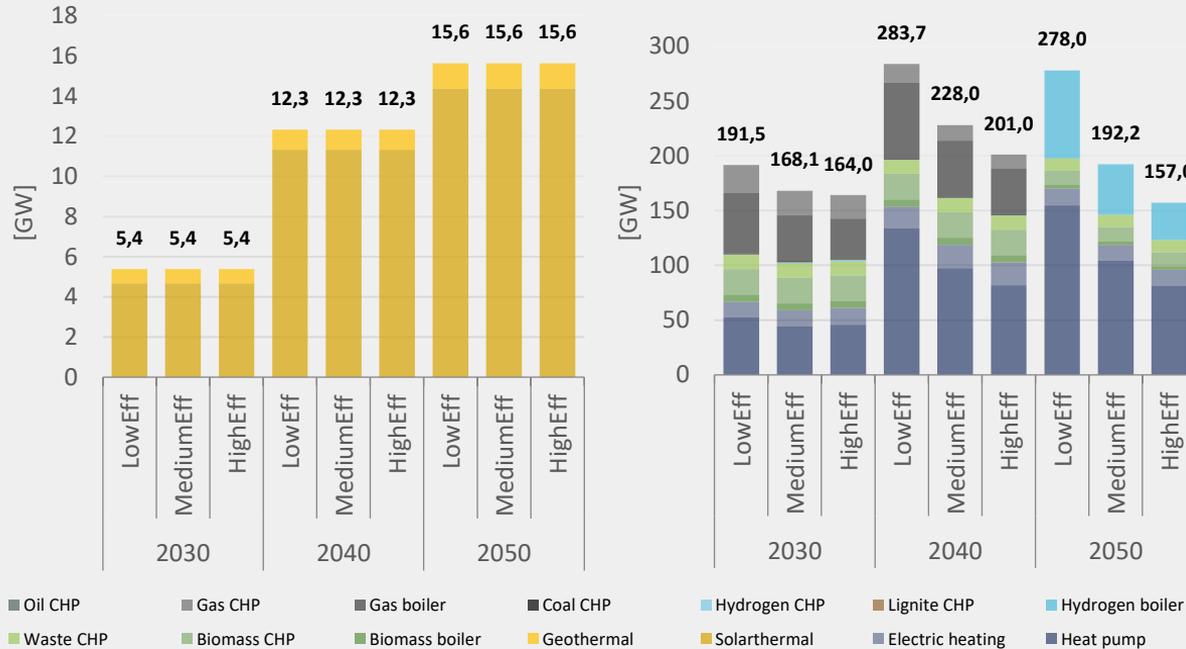
Energy efficiency in buildings reduces the need for district heating generation. Heat pumps are a key technology across all scenarios.

District heating generation by technology in EU-27 [TWh]

Note: Generation figures excluding heat storage



District heating generation capacities



Results

- Max. potential for solar thermal and geothermal exhausted
- 2050 systems rely on heat pumps, but require backup hydrogen, biomass and waste
- Capacity -86 GW (MEDIUMEff) and -121 GW (HIGHEff)

Key message

Reduced energy demand for district heating lowers the need for underutilized generation capacities.

Installed district heating generation capacity by technology in EU-27 [GW]

Note: Capacity figures excluding heat storage



Cost balance within the district heating supply sector



Analysis of cumulative differential costs compared to LowEff for EU-27 (2020–2050)
[bn EUR]

Results

- Significant reductions in CAPEX and OPEX relative to LowEff
- Overall: reduced cost in MEDIUMEFF (-120 bn EUR) and HIGH EFF (-168 bn EUR) by 2050

Key message

Energy efficiency in buildings reduces the cost of district heating supply in terms of both generation and networks