Heat storage
CHP coal
CHP oil

Heat storage
CHP waste
CHP coal
CHP oil

Coal
Waste

Centralised district cooling plant

Data center

Seasonal heat storage

Large scale solar

Biomass conversion

2-way DH

PV, Wave
Wind surplus
Electricity

Geothermal

Centralised biomass

2-way DH

Biomass conversion

Centralised heat pump

Also low energy buildings

Development
(District Heating generation) / Period of best available technology

1G: STEAM
Steam system, steam pipes in concrete ducts

DH flow
< 200 °C

DH return
< 80 °C

Energy efficiency

2G: IN SITU
Pressurised hot-water system
Heavy equipment
Large "build on site" stations

> 100 °C

< 100 °C

< 80 °C

3G: PREFabricated
Pre-insulated pipes
Industrialised compact substations (also with insulation)
Metering and monitoring

< 100 °C

< 70 °C

< 45 °C

4G: 4th GENERATION
Low energy demands
Smart energy (optimum interaction of energy sources, distribution and consumption)
2-way DH

50-60 °C (70 °C)
(ULTDH < 50 °C)
~ 25 °C

Future energy source

Cold storage

4DH

DH return
< 80 °C

< 70 °C

< 45 °C ~ 25 °C

(ULTDH < 50 °C)

DH flow
< 200 °C

< 100 °C

< 70 °C

< 45 °C

DH return
< 80 °C

< 70 °C

< 45 °C

Data center

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Development
(District Heating generation) / Period of best available technology

1G / 1880-1930

2G / 1930-1980

3G / 1980-2020

4G / 2020-2050

Steam storage

Coal

Waste

Local District Heating

District Heating

District Heating

District Heating incineration

District Heating