Extraction of geothermal energy from a mine shaft located in the hard coal mining district of Aachen, Germany

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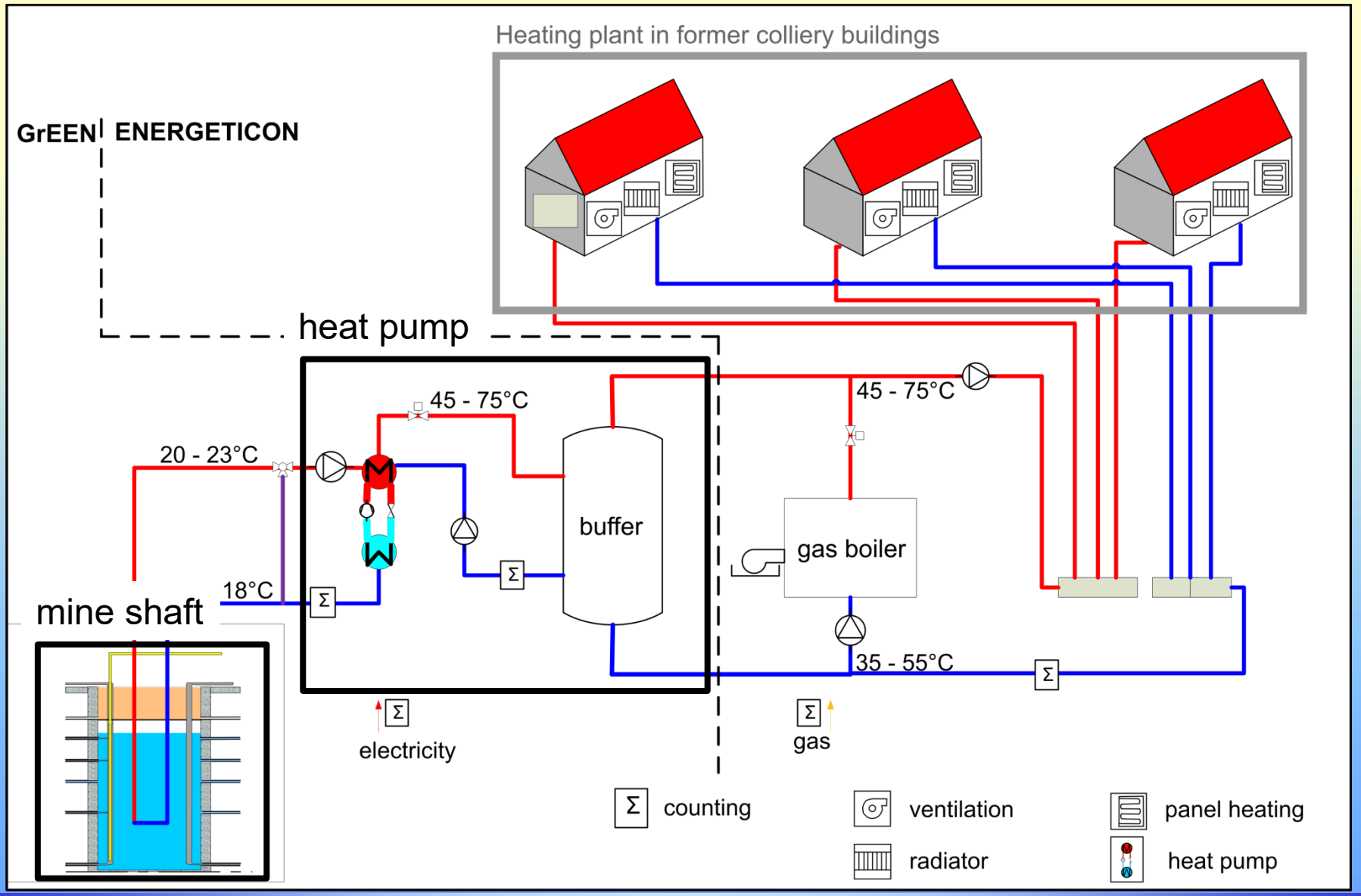
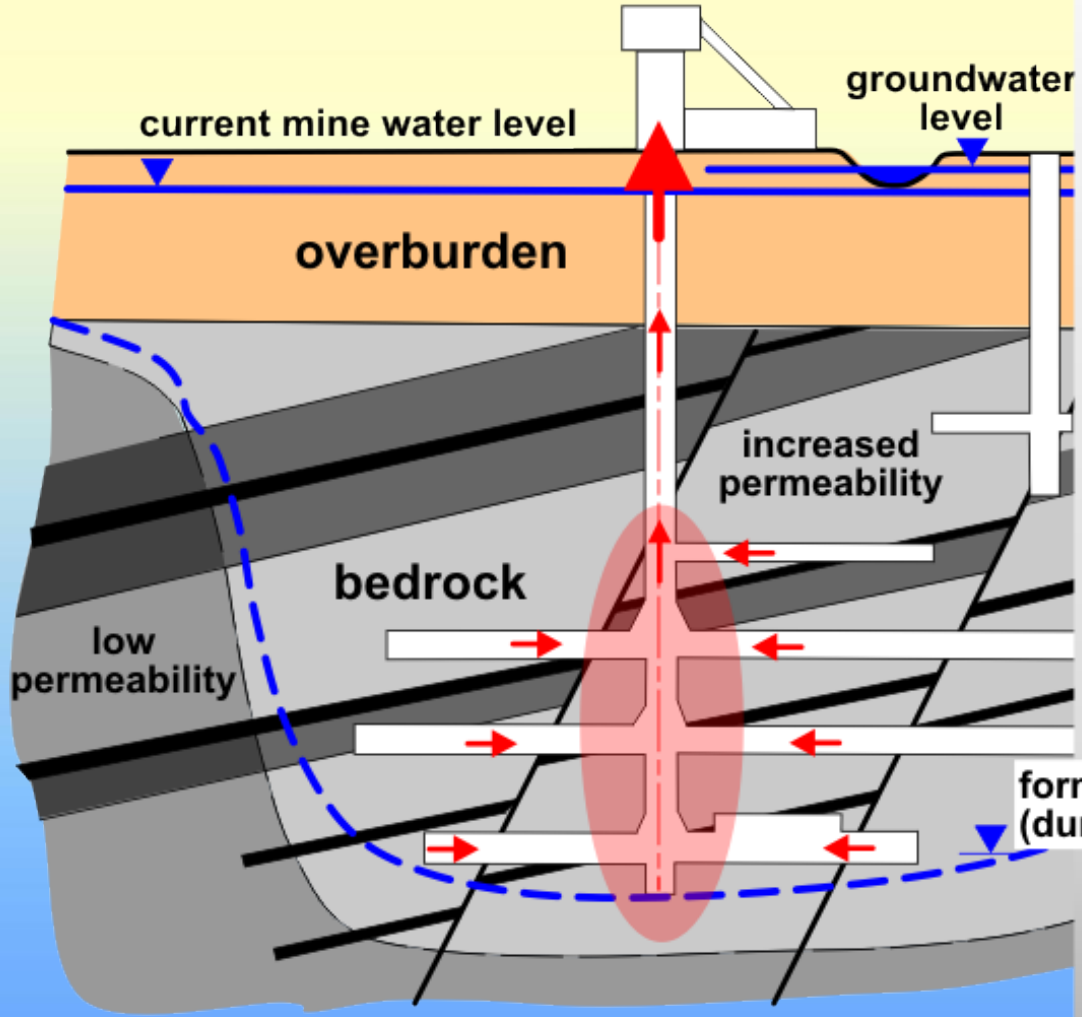

Heating plant in former colliery buildings
GrEEN ENERGETICON
heat pump
45 - 75°C
20 - 23°C
buffer
45 - 75°C
gas boiler
18°C
mine shaft
35 - 55°C
electricity
gas
counting
ventilation
panel heating
radiator
heat pump

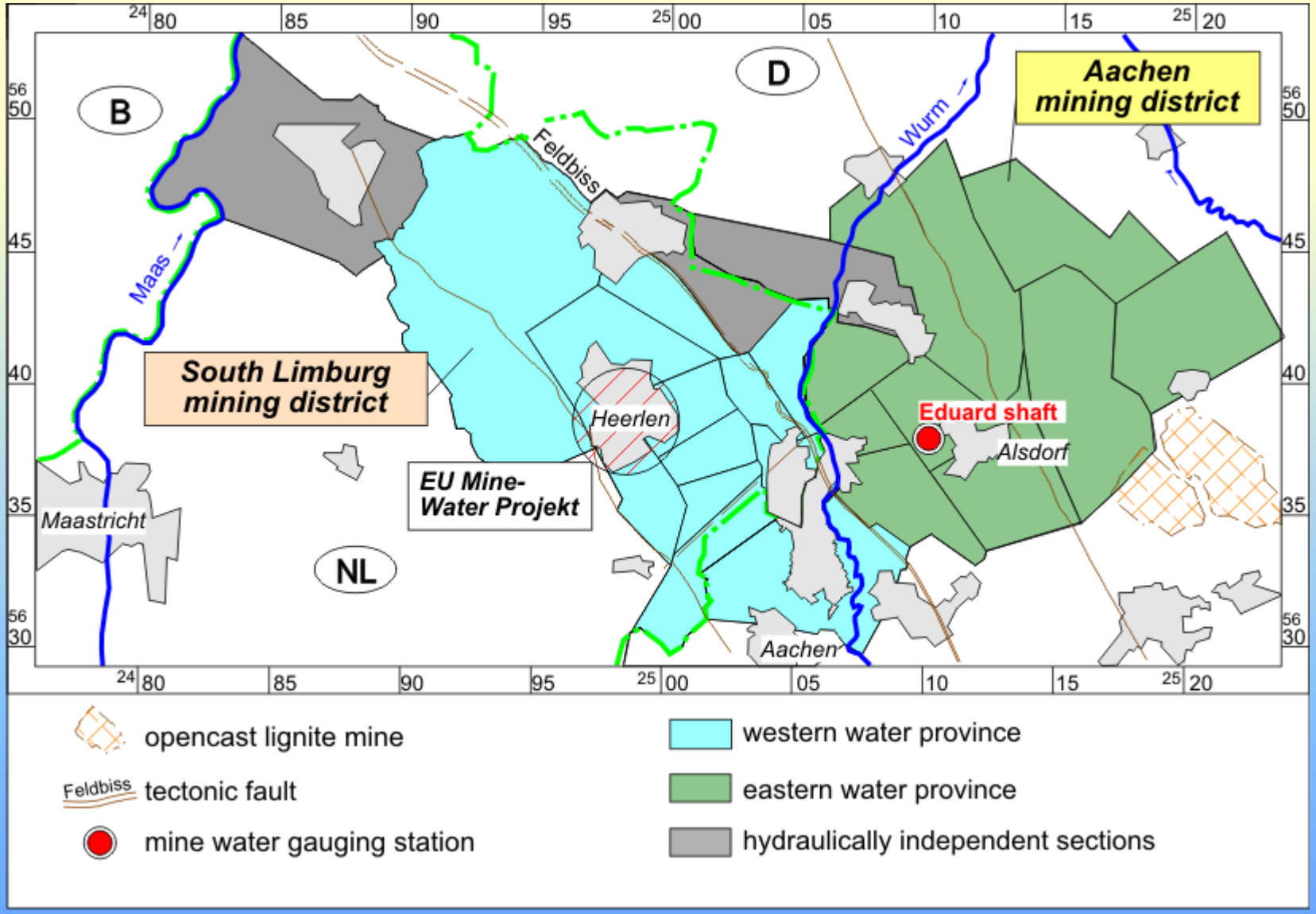
Heat extraction from an abandoned hard coal mine

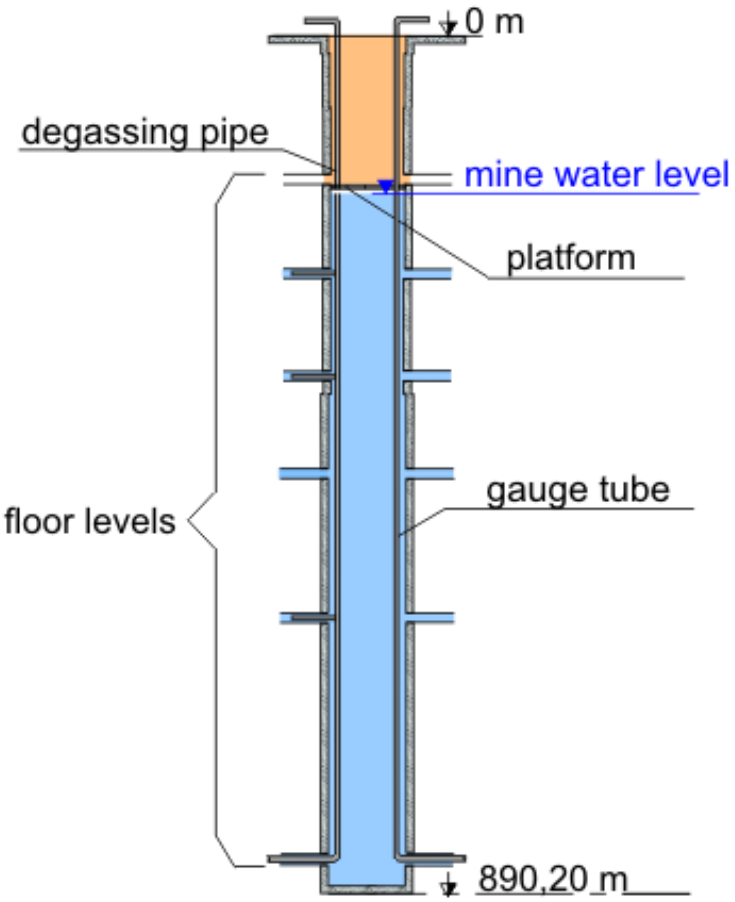


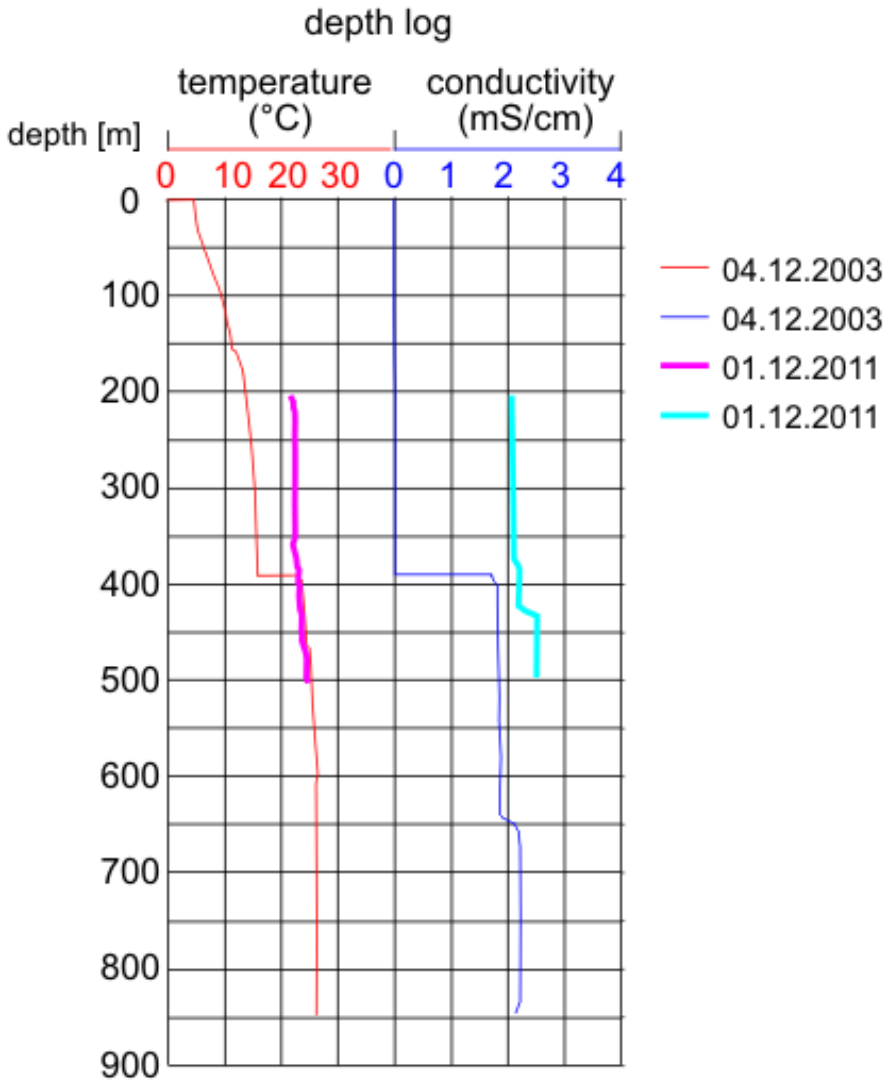
geothermal tube

- pumping and infiltration together in a single shaft
- uses the heat in the shaft and its vicinity
- moderate capacity but low investment costs

General map of the Aachen and South Limburg mining districts





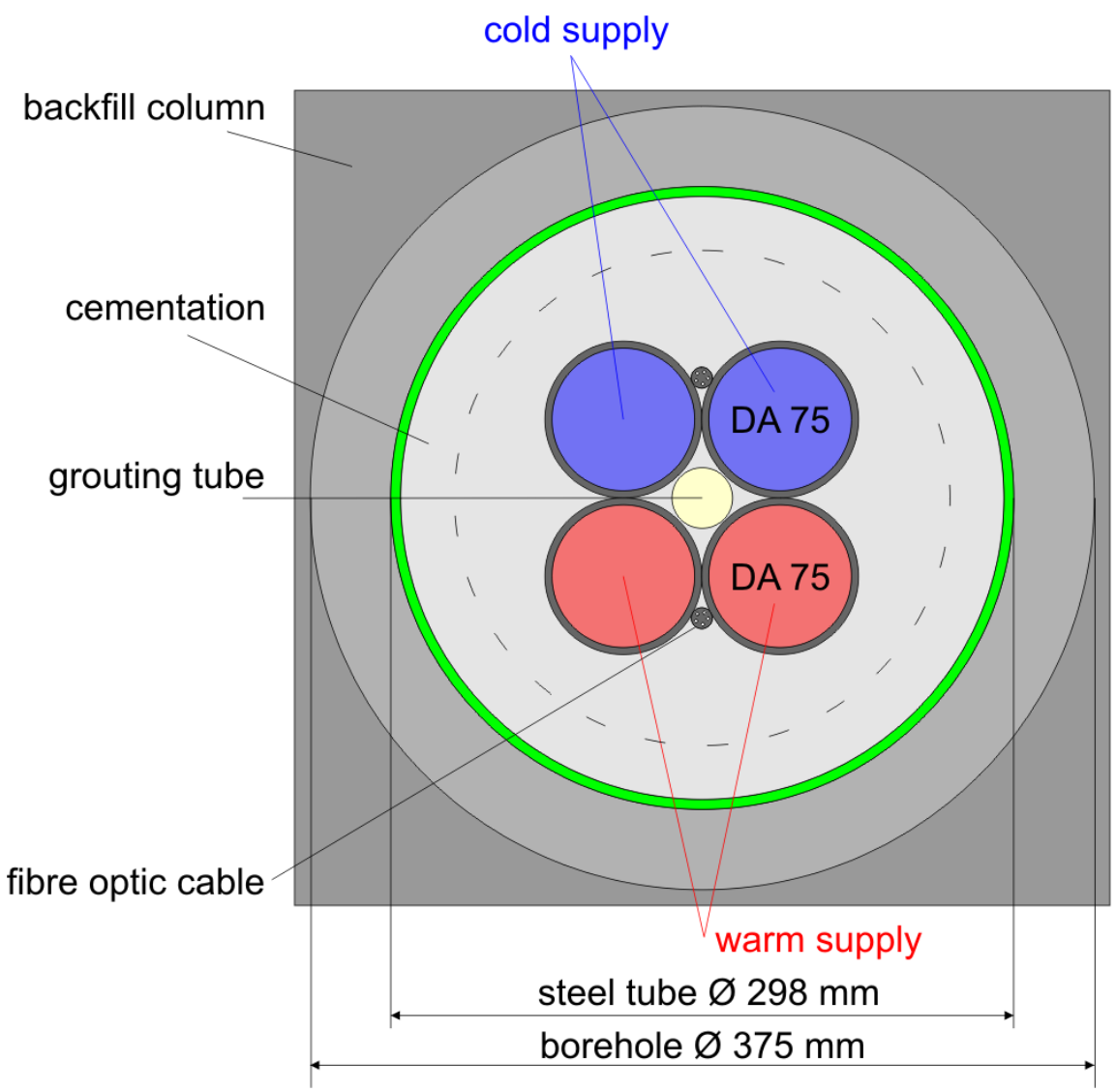


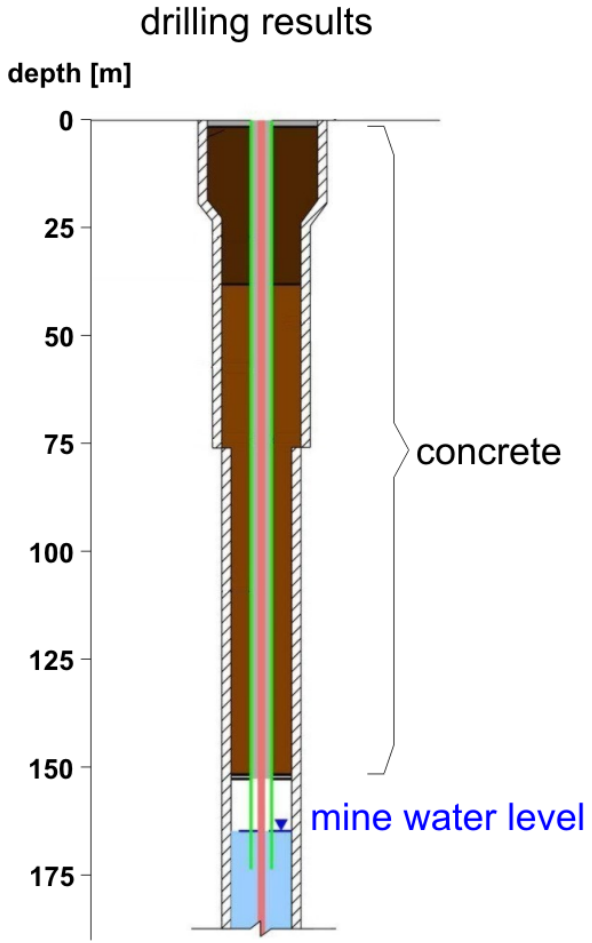
source: EBV GmbH

Characteristics of the geothermal tube

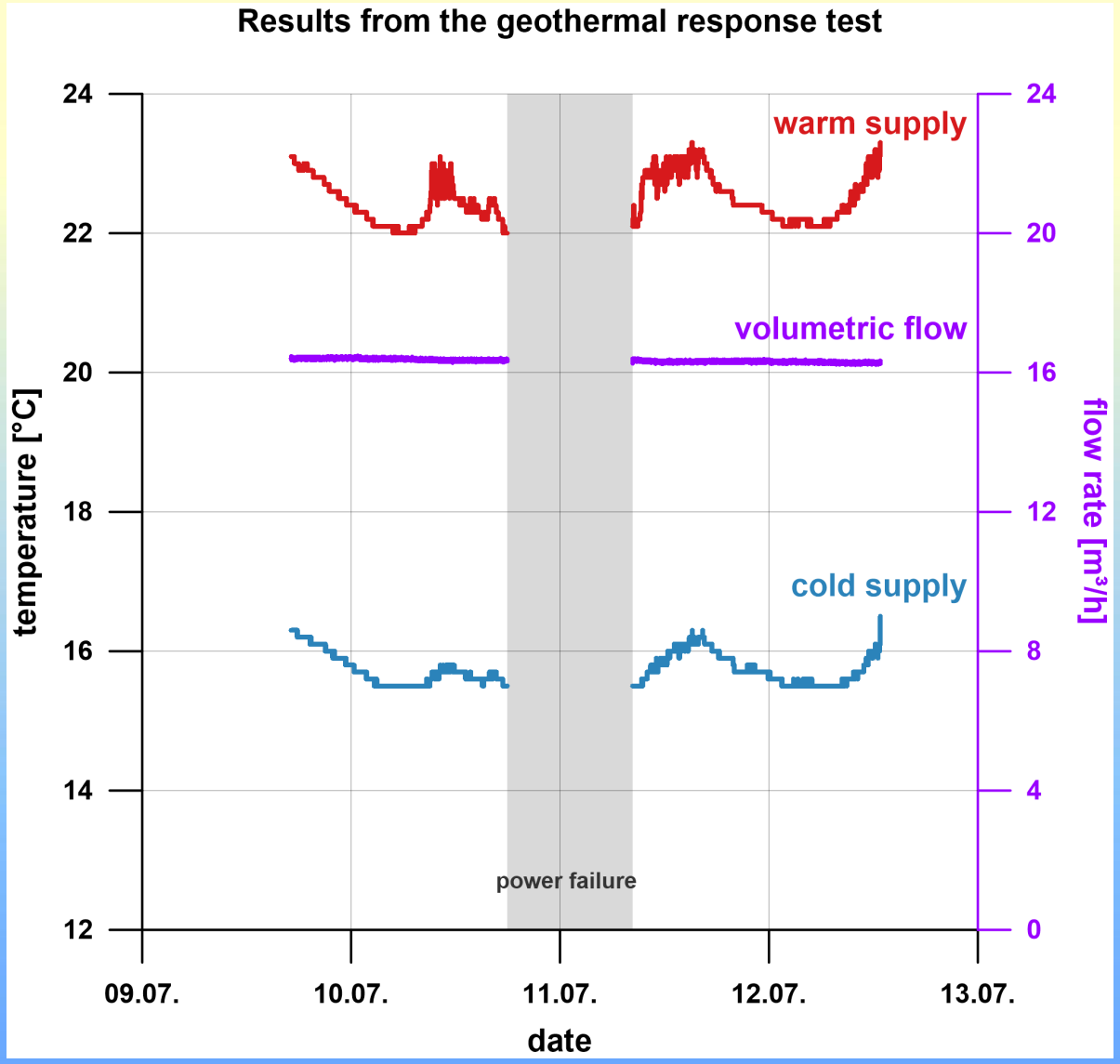
- **Probe type:** DA 75 double u-tube
- **Length:** 860 m
- **Weight:** 5.200 kg (empty)
  15.000 kg (filled)
- **Mounting:** Grouting in the backfill column down to a depth of 150 m
- **Temp. monitoring:** Fibre optic cable (infinite loop, 1.720 m)

Equipment of the borehole





Thermal response test (07.2018)

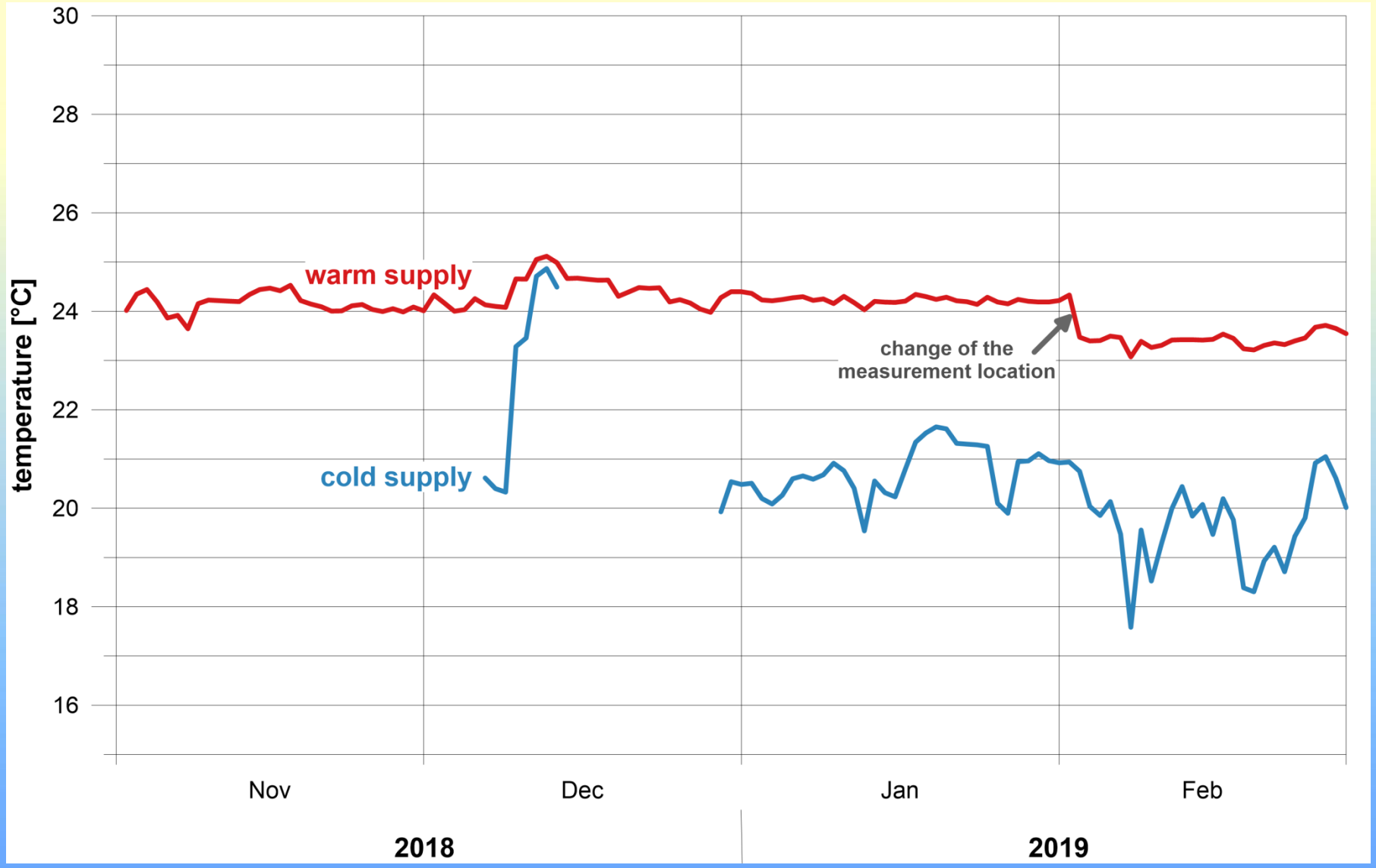


Connection to the heating system

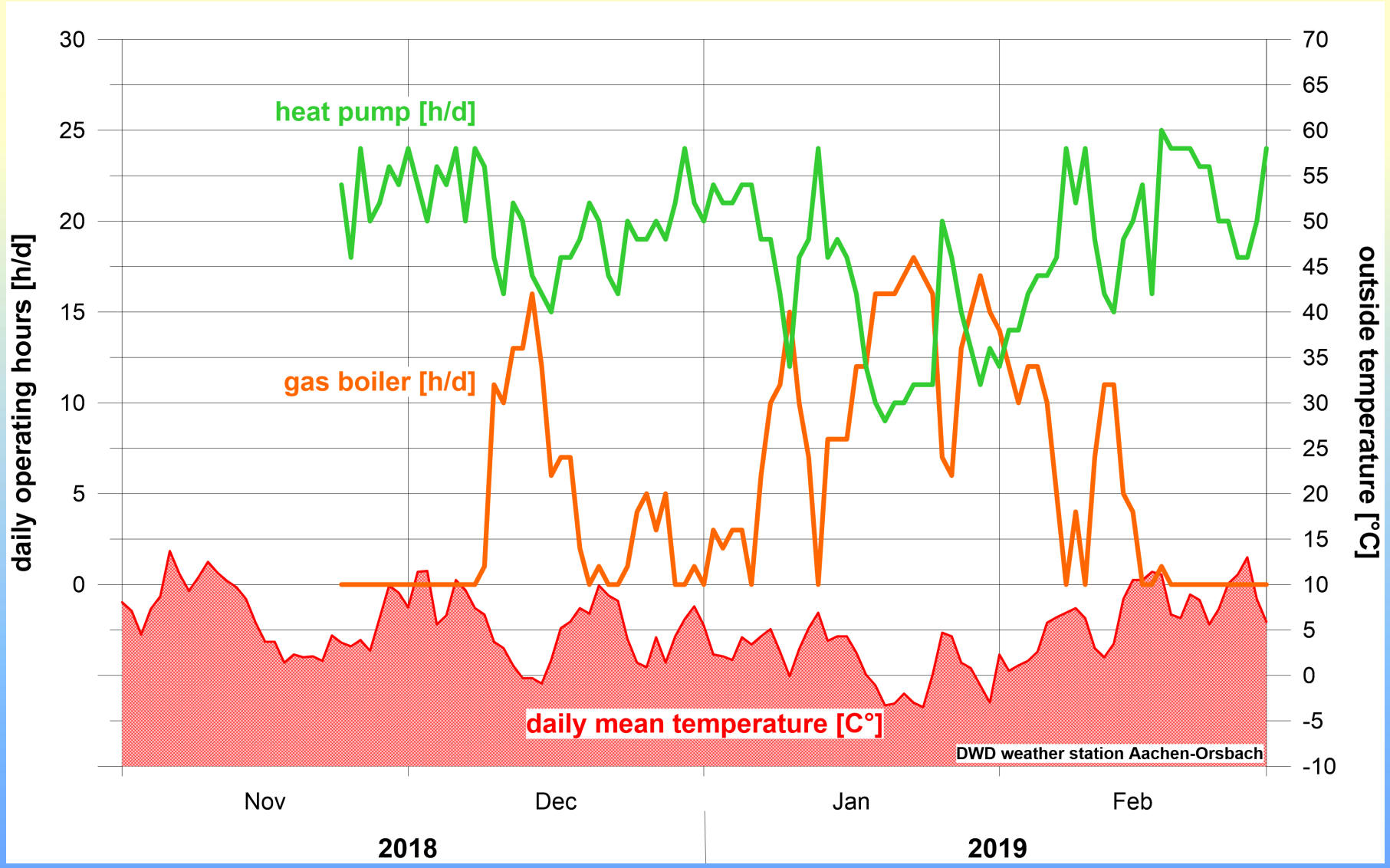
Heat pump

Buffer 4 m³

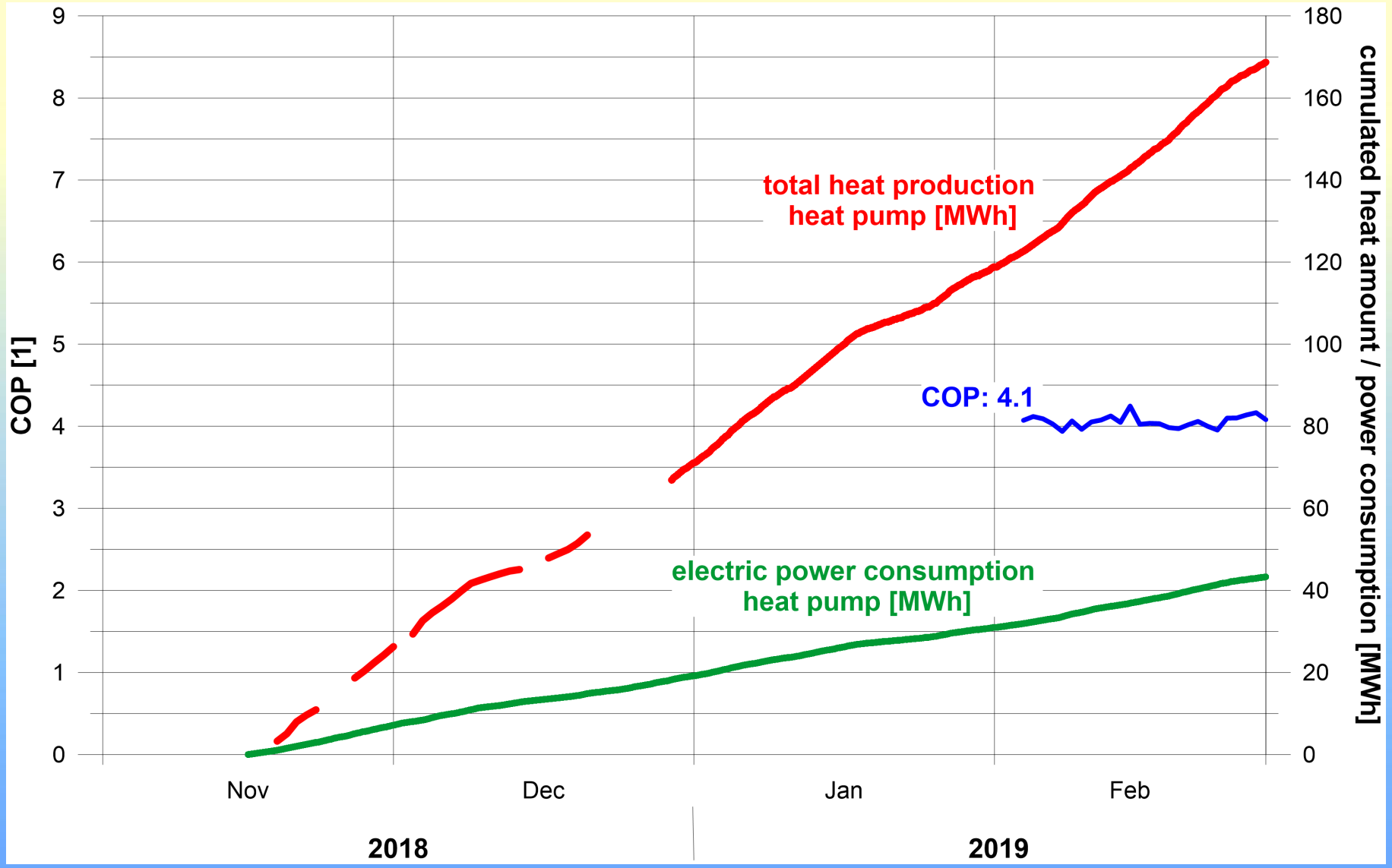
Temperatures in the water supply of the geothermal tube



Operating hours of heat pump vs. outside temperature

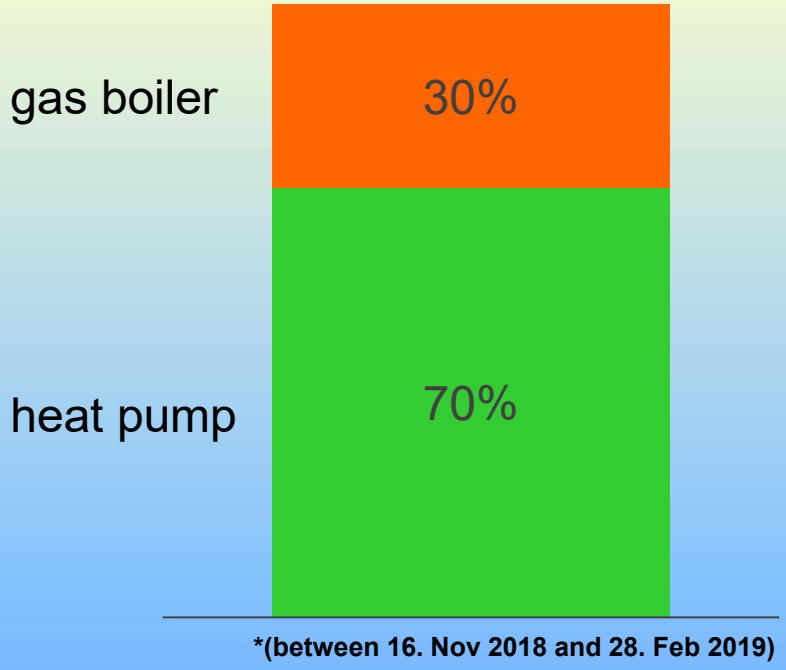


Performance of the heat pump



CO_2 savings and profitableness at the ENERGETICON

The total heat demand of 240 MWh* was covered by:



*(between 16. Nov 2018 and 28. Feb 2019)

CO_2 savings through the use of the heat pump:

ca. **30 %**

Profitableness depends on:

- **gas tariff**
- **electricity tariff****

**(electric power consumption of the heat pump: 43 MWh)