GHEtool calculation report

My first report

17/11/24

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Introduction

This can be an introduction to my first report.

Description

My first scenario!

Input

Number of boreholes: 6

Average minimal borehole spacing: 6,0 m

Borehole depth: 100,0 m

SCOP heating: 5,00

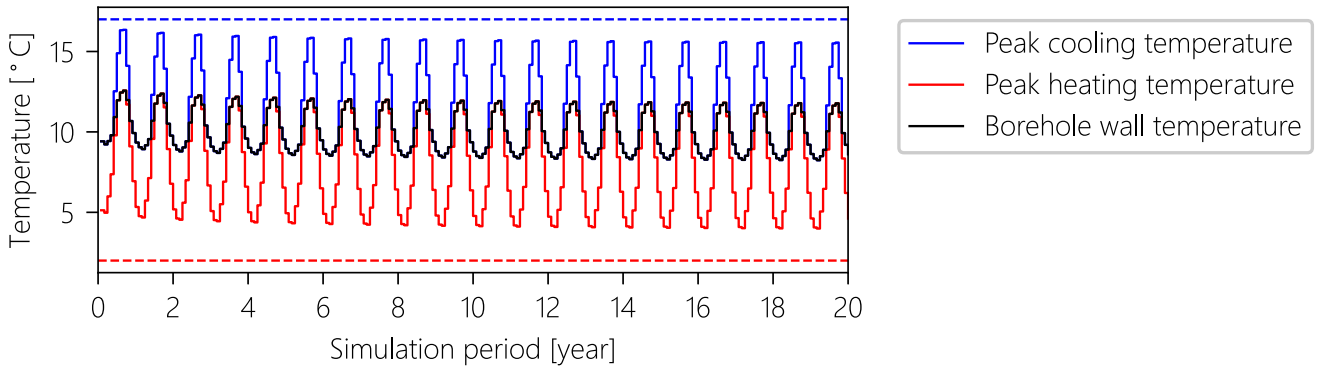
SEER cooling: 20,00

Heating (primary)		Cooling (primary)	
Load	17 600 kWh/y	Load	8 022 kWh/y
Peak	12,0 kW	Peak	10,5 kW

Results

Equivalent borehole thermal resistance: 0,15 m·K/W

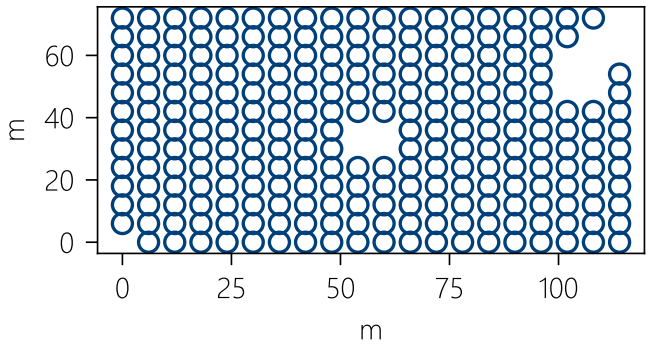
Maximal average fluid temperature: 16,35 °C, Minimal average fluid temperature: 3,99 °C



Description

My first scenario with hourly data! The cooling peak exceeds the maximum allowed limit of 17°C for passive cooling.

Input



Number of boreholes: 245

Average minimal borehole spacing: 6,0 m

Borehole depth: 120,0 m

Buried depth: 1,0 m

Borehole diameter: 14,0 cm

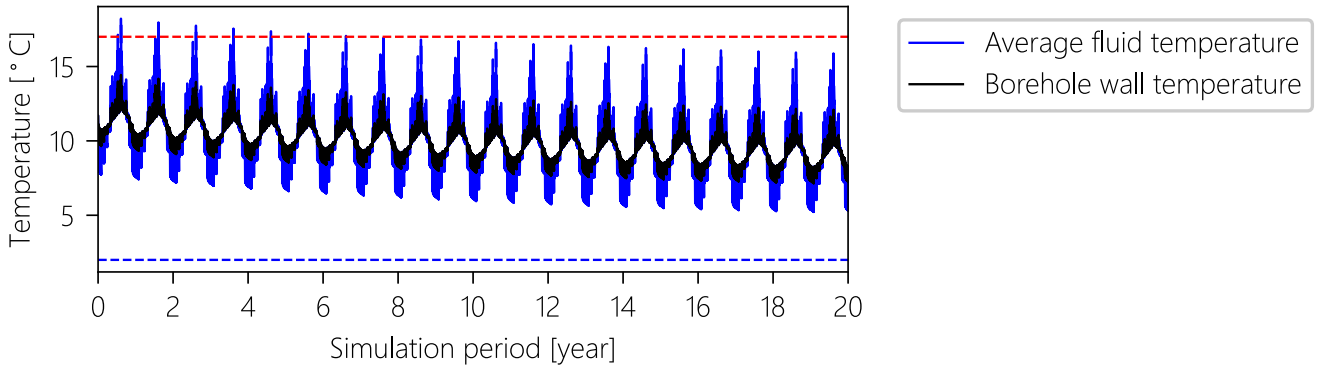
SCOP heating: 5,00; SEER cooling: 20,00

Heating (primary)		Cooling (primary)	
Load	514 414 kWh/y	Load	281 131 kWh/y
Peak	428,8 kW	Peak	710,2 kW

Results

Equivalent borehole thermal resistance: 0,16 m·K/W

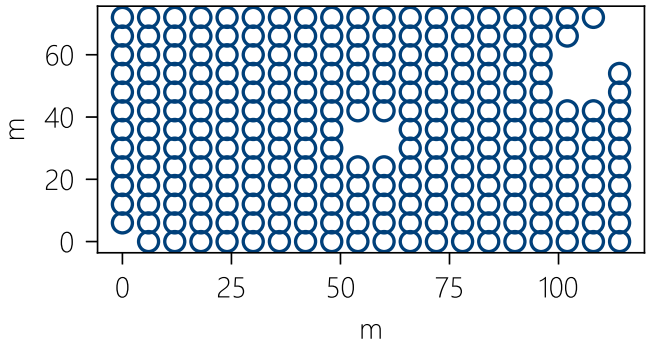
Maximal average fluid temperature: 18,22 °C, Minimal average fluid temperature: 5,22 °C



Description

One solution for systems with a critical cooling demand is to combine active and passive cooling. In doing so, the maximum temperature limit can be increased and we see that after 8 years, all the cooling can be done in a passive way!

Input



Number of boreholes: 245

Average minimal borehole spacing: 6,0 m

Borehole depth: 120,0 m

Buried depth: 1,0 m

Borehole diameter: 14,0 cm

SCOP heating: 5,00; SEER active | passive cooling: 5,00 | 20,00

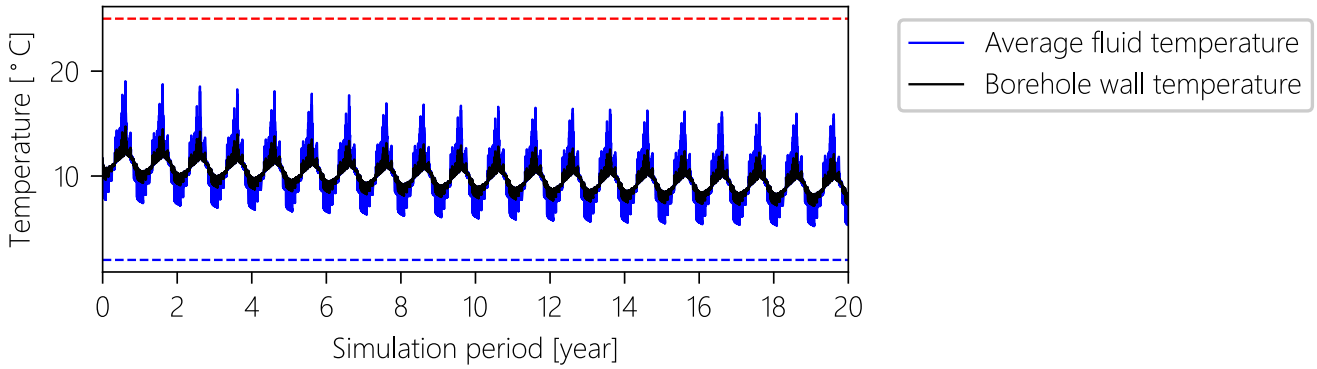
Heating (primary)		Cooling (primary)	
Load	514 414 kWh/y	Load	281 362 kWh/y
Peak	428,8 kW	Peak	811,7 kW

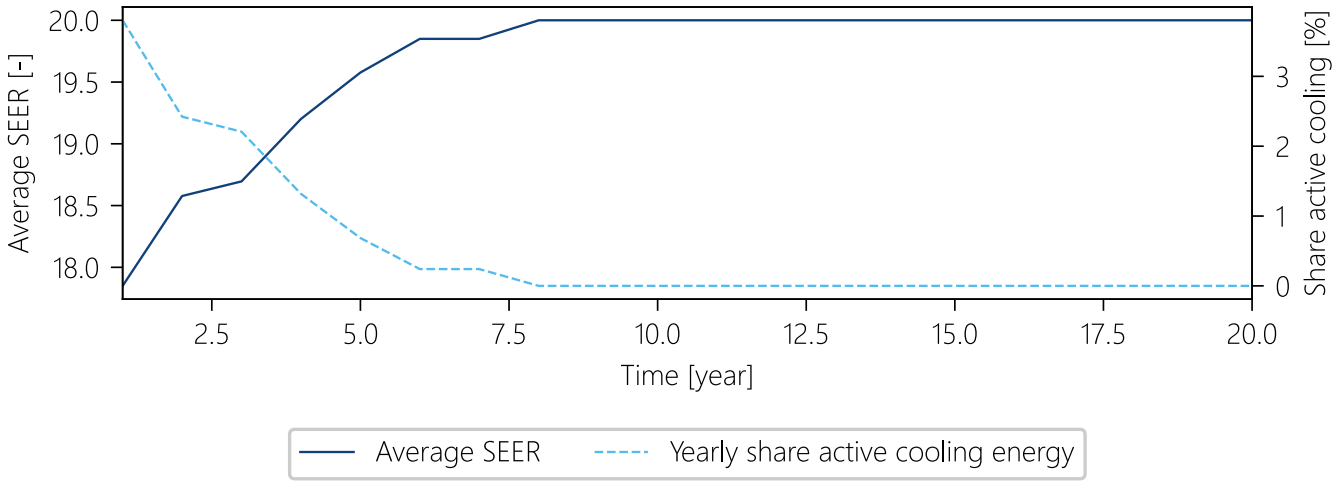
Results

Equivalent borehole thermal resistance: 0,16 m·K/W

Yearly average SEER, due to combined active and passive cooling: 19,66 (share passive cooling: 99,42%)

Maximal average fluid temperature: 19,04 °C, Minimal average fluid temperature: 5,22 °C

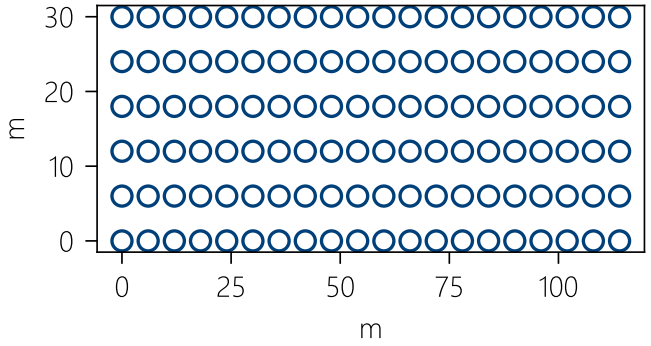



Average SEER [-]
20.0
19.5
19.0
18.5
18.0
Share active cooling [%]
3
2
1
0
2.5
5.0
7.5
10.0
12.5
15.0
17.5
20.0
Time [year]
Average SEER
Yearly share active cooling energy

Description

When your borefield size is limited by budget or available space, not all of the building demand can be met with the geothermal system. In that case, system hybridisation can give you an answer and GHEtool will tell you what percentage you can get from your borefield and what power you should install for the other heating/cooling technology.

Input



Number of boreholes: 120

Average minimal borehole spacing: 6,0 m

Borehole depth: 120,0 m

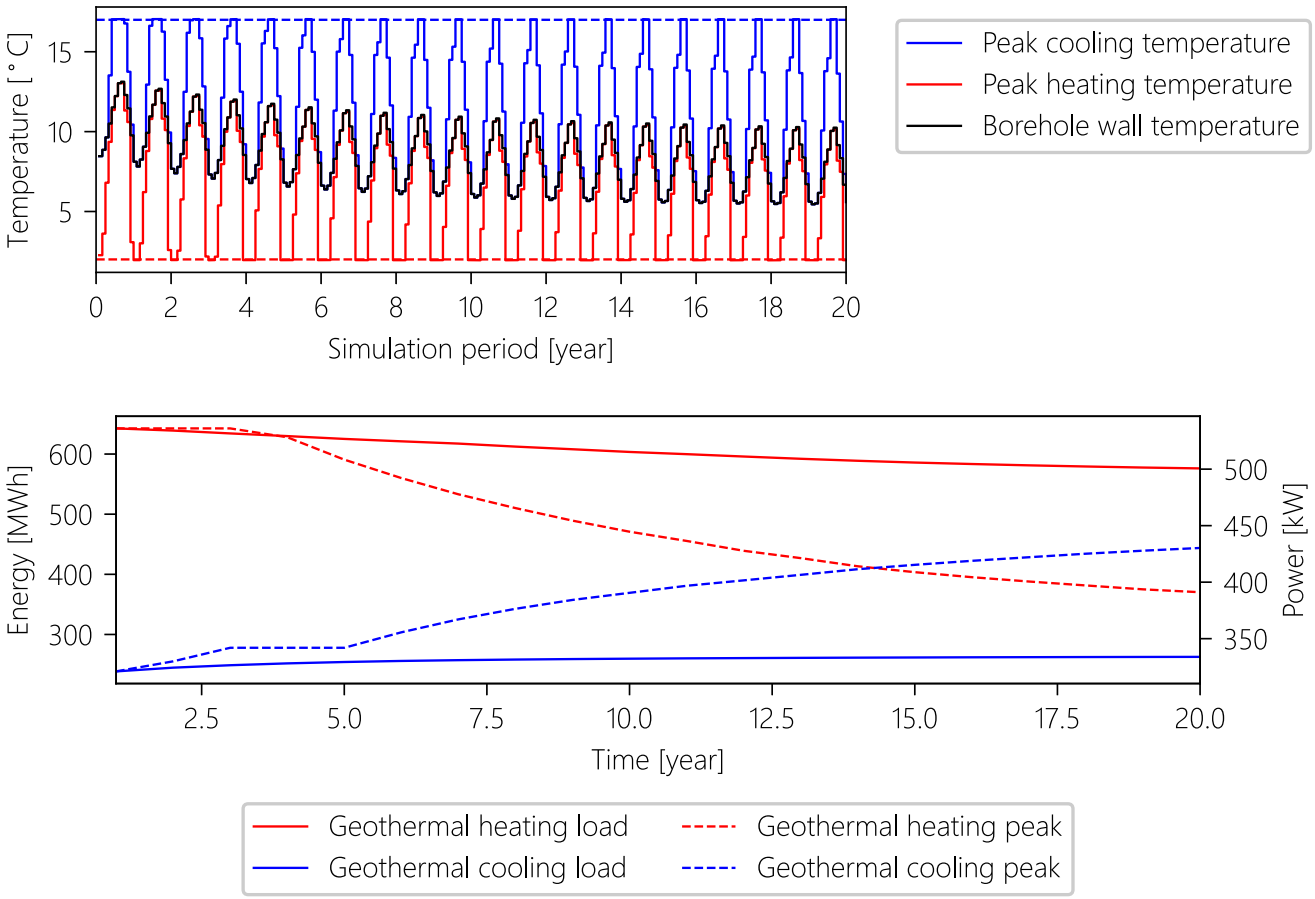
Buried depth: 1,0 m

Borehole diameter: 14,0 cm

SCOP heating: 5,00; SEER cooling: 20,00

Results

Heating			Cooling		
Geothermal load	604 657	kWh/y	Geothermal load	257 300	kWh/y
External load	38 360	kWh/y	External load	10 445	kWh/y
Geothermal percentage	94,0	%	Geothermal percentage	96,1	%
Geothermal peak	536,0	kW	Geothermal peak	430,3	kW
External peak	214,6	kW	External peak	426,1	kW
Geothermal percentage	71,4	%	Geothermal percentage	50,2	%


Temperature [°C]
15
10
5
0
2
4
6
8
10
12
14
16
18
20
Simulation period [year]
Peak cooling temperature
Peak heating temperature
Borehole wall temperature
Energy [MWh]
600
500
400
300
Power [kW]
500
450
400
350
2.5
5.0
7.5
10.0
12.5
15.0
17.5
20.0
Time [year]
Geothermal heating load
Geothermal cooling load
Geothermal heating peak
Geothermal cooling peak

Conclusion

Some final thoughts about this report. We think it is amazing!

This report has been generated with
GHEtool Cloud v2.3.0.1
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