MegaWatt Solutions
Värmepumpberäkning

Energy calculations

Brf Trasten

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Summary

Energy/power consumption

Energy for heating	1401000	kWh
Energy for hot water	900000	kWh
Building's power req for heating at DOT	481,0	kW

After heatpump installation

6 * HPM72-R290		
Suggested number of holes and depth	36 * 276	m
Energy from heat pump totally	2291828	kWh/year
Auxiliary energy	9172	kWh/year
Energy to purchase	677327	kWh/year
Energy savings	1623673	kWh/year

Installation

City	Mellerud	
Avg. outdoor temp	7,0	°C
Dim. Outdoor Temp (DOT)	-15,6	°C
Room temp curr	21,0	°C
Heating stops at	18,0	°C
Forward temp at DOT	60	°C
Return temp at DOT	45	°C
Specific energy consumption	69	kWh/m²

Performance data

Total energy production	2301000	kWh/year
Total Energy Consumption	668155	kWh/year
Auxiliary energy for heating	9172	kWh/year
Auxiliary energy for hot water	0,00	kWh/year
Power coverage at DOT	78,3	%
Energy coverage heat pump	99,6	%
Yearly performance factor (heat pump)	3,43	
Max heating power of HP at DOT	310,0	kW

Indata

Project Data

Project name	**Brf Trasten**	Notes
Building	**Brf Trasten**	
Company		

Energy/power consumption

Net Energy Consumption	**2301000 kWh**	
Water heating	**900000 kWh**	
Room temp curr	**21,0 °C**	
Selfheating	**3,0 K**	
Heated Area A(temp)	**9780 m²**	

Calculation method	**Known energy consumption**
Energy (efficiency)	*Net (gross)*
District heating (η=100%)	**2301000 (2301000) kWh**

Installation

Heatpump	**6 * HPM72-R290**	City	**Mellerud**
Two-step DHW production	**2 units**	Dim. Outdoor Temp (DOT)	**-15,6 °C**
Source	**Bore hole**	Avg. outdoor temp	**7,0 °C**
Type of rock	**Normal**	Degreehours	**97866**
Conductivity	**3,30 W/m·K**	Hot water boiler temp	**60 °C**
Geometry	**Line / L-shape**		
Max depth	**280 m**		
Depth to rock	**10 m**		
Horiz. distance between holes	**15 m**		
Spreading angle of holes	**0,0 °**		
Auxiliary power	**172,0 kW**		

Operation Parameters

Forward temp at DOT	**60,0 °C**	Avg temp of incoming brine	**0,5 °C**
Return temp at DOT	**45,0 °C**	Avg temp diff brine in/out	**3,0 °C**

Calculation Results

Building's energy req for heating and hot water	**2301000 kWh**	Theoretic active bore hole depth	**7869 m**
Building's power req for heating at DOT	**481,0 kW**	Geometrically adapted active bore hole depth	**9565 m**
Max heating power of HP at DOT	**310,0 kW**	Suggested number of holes and depth	**36 * 276 m**
Avg. power HW (kW)	**102,7 kW**	Max cooling power HP	**308,4 kW**
Max heating power of HP (hot water) at DOT	**193,9 kW**	Max brine flow	**24,5 l/s**
Power coverage at DOT	**78,3 %**	Total cooling energy HP	**1623673 kWh/year**
Energy coverage heat pump	**99,6 %**		
Max electric power for heat pump and auxiliary heat	**320,4 kW**		
HP maximum power (at -6,0 °C outdoor)	**343,6 kW**		
Time of utilization[1]	**6671 h**		
HP operation (heating)	**4359 h**		
HP operation (hot water)	**4641 h**		
Yearly performance factor (heat pump)	**3,43**		
Energy factor[2]	**3,40**		

Energy from heat pump for heating	**1391828 kWh/year**	Electricity to heat pump for heating	**328839 kWh/year**
Auxiliary energy for heating	**9172 kWh/year**	Auxiliary energy for heating	**9172 kWh/year**
Energy from heat pump for hot water	**900000 kWh/year**	Electricity to heat pump for hot water	**339317 kWh/year**
Auxiliary energy for hot water	**0 kWh/year**	Auxiliary energy for hot water	**0 kWh/year**
Total energy production	**2301000 kWh/year**	Total Energy Consumption	**677327 kWh/year**
		Of which Electricity	**668155 kWh/year**
		District heating (η=100%) as auxiliary	**9172 kWh/year**
		Specific energy consumption	**69 kWh/m²**

Energy savings

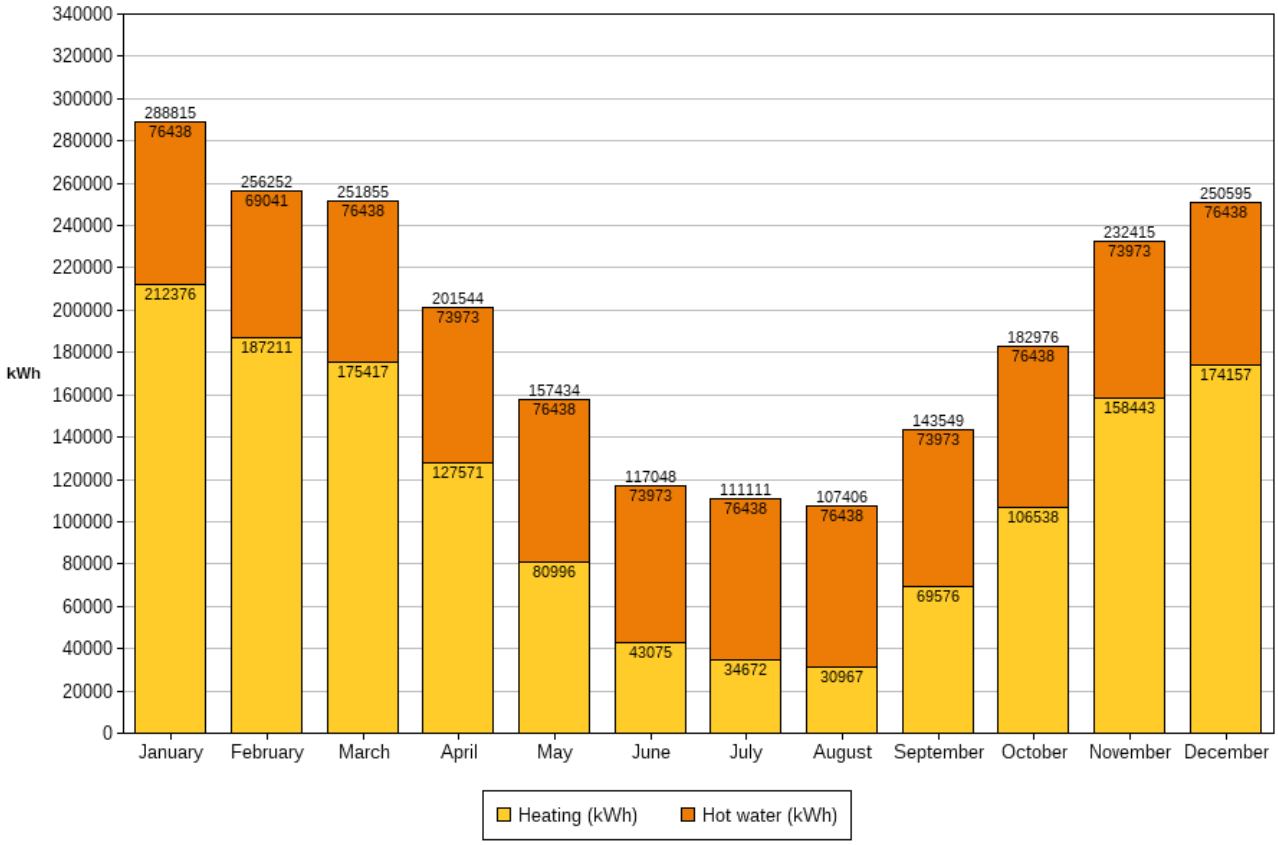
1623673 kWh/year

Gross savings on purchased energy **1623673 kWh/year**

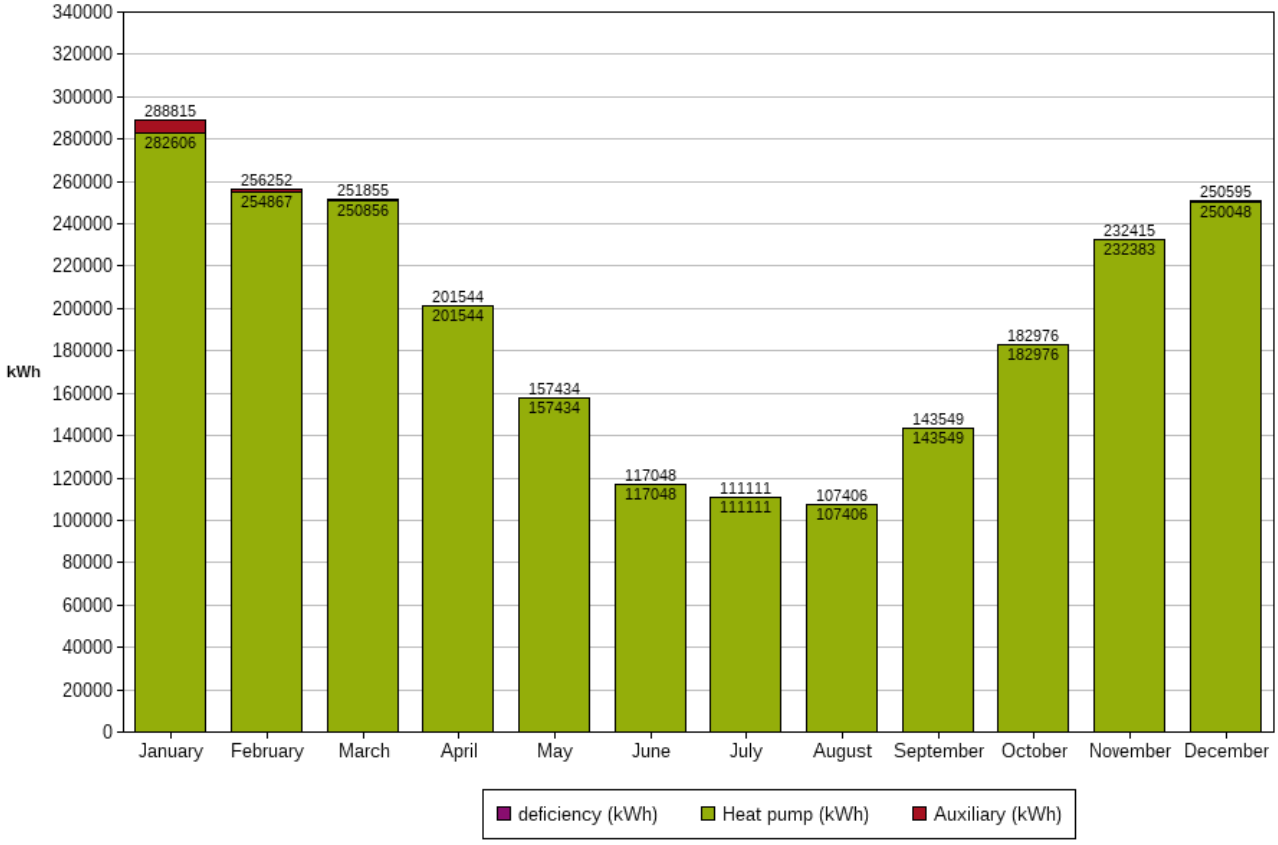
[1] Time of utilization is the ratio of total energy produced for heating by the HP and the maximum power of the HP
[2] Energy factor is the ratio between useful and total purchased energy, auxiliary included.

The calculations are based on a simplified model and that the given indata is correct. Presented results should not be considered as a promise.
Meteorological data from Klimatfiler 1981-2010 för Energiberäkning Sveby-SMHI.

Energy consumption/mon



Energy production/mon



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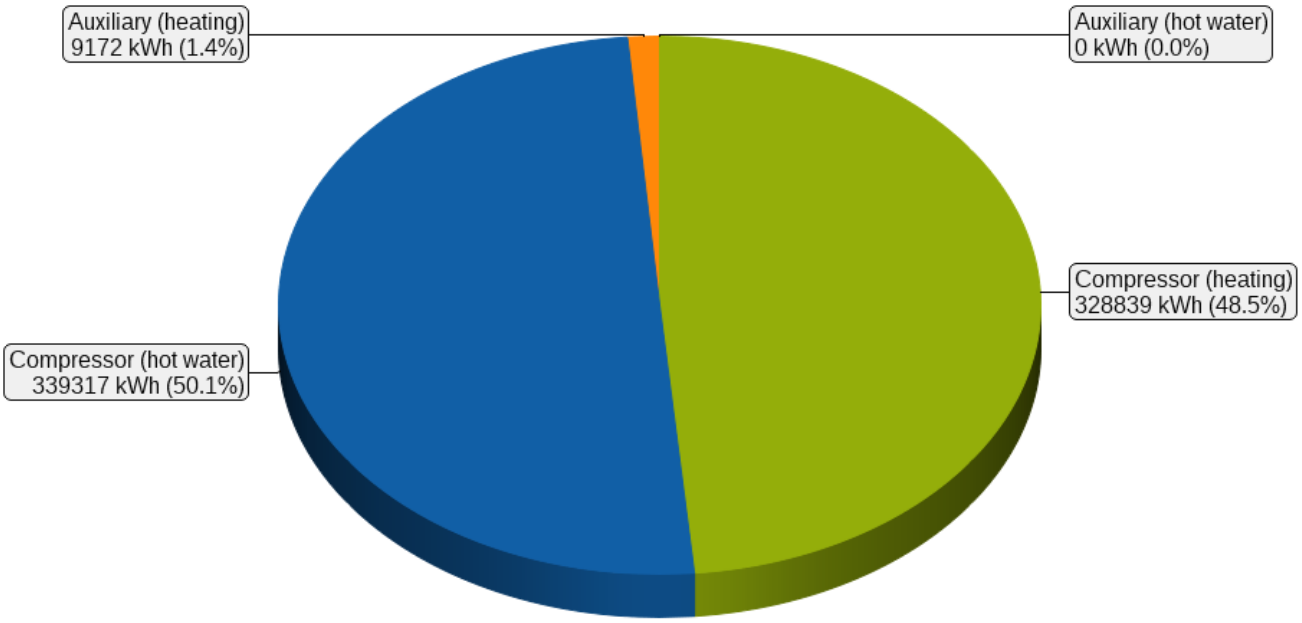
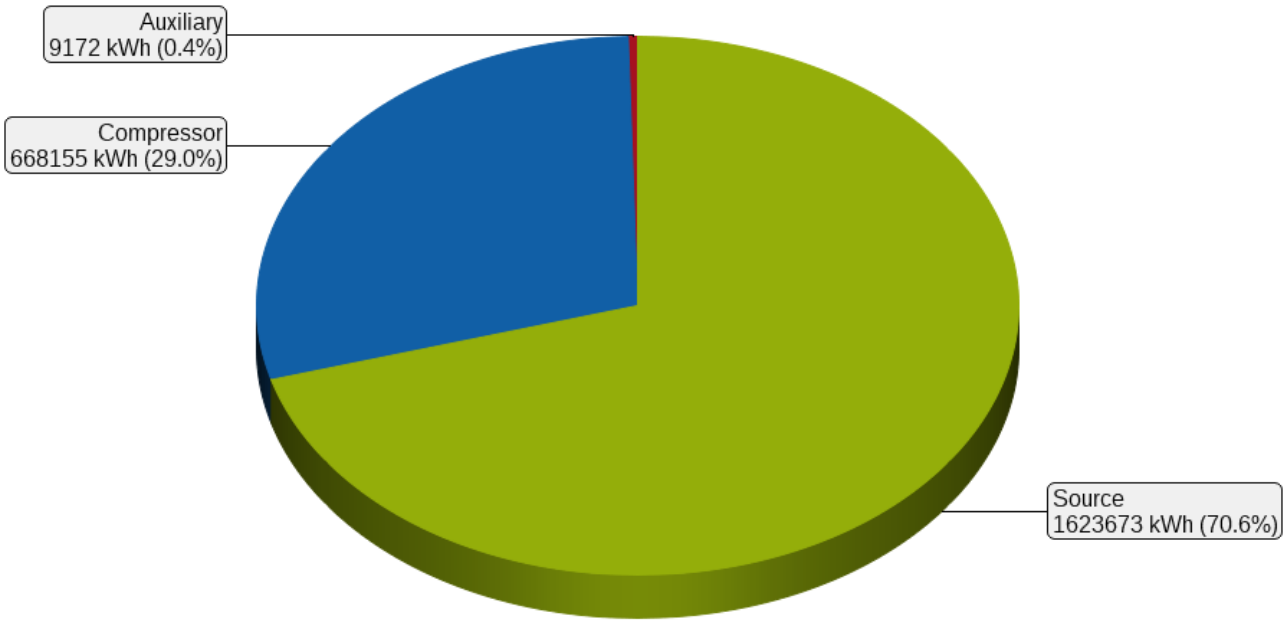
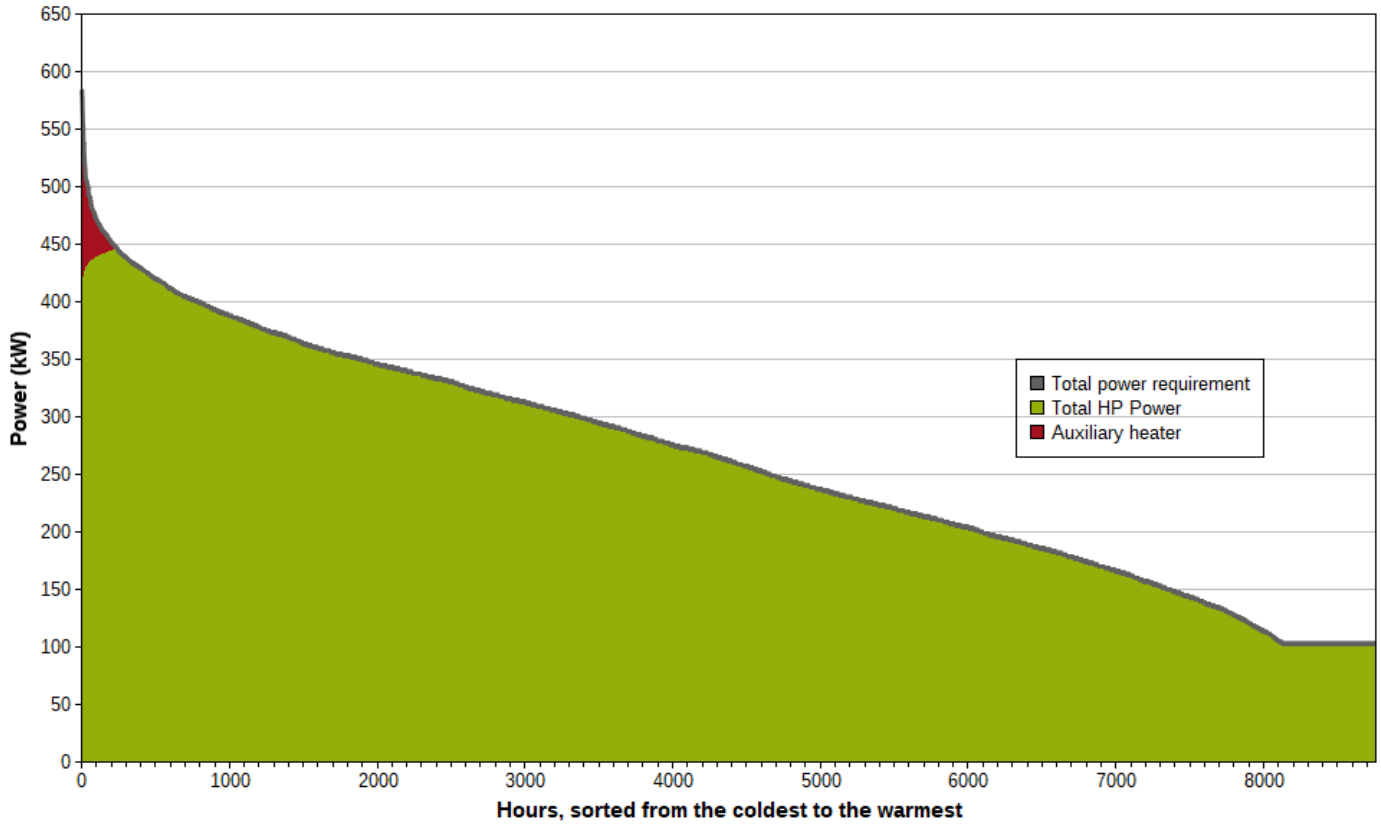
Electricity consumption



Energy production



Consecutive Graphs



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