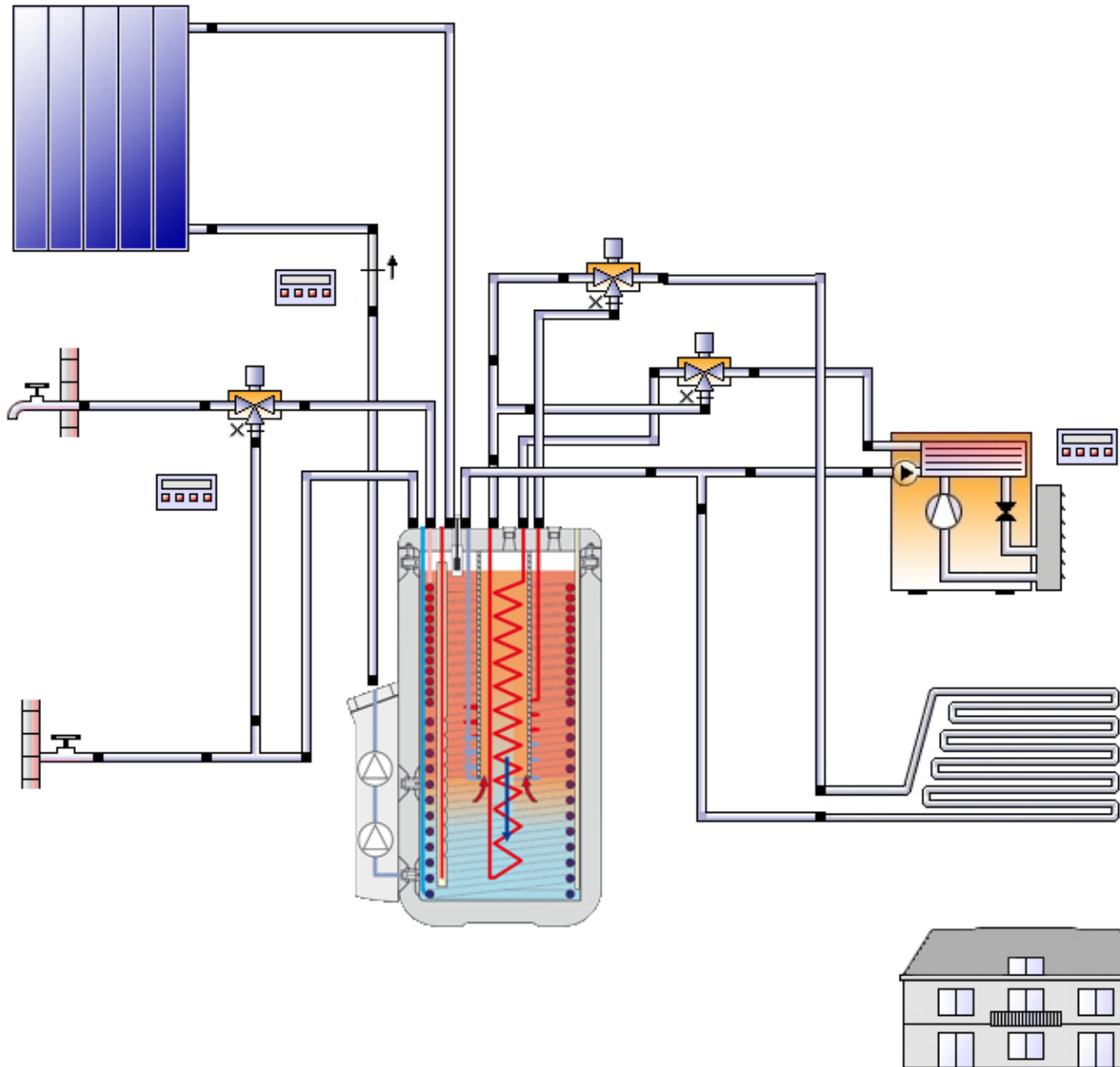


Professional Report

Project

HPSU compact with space heating



Location of the system

Rapperswil SG
Longitude: 8.82°
Latitude: 47.23°
Elevation: 417 m

Map section

"Current report item is not supported in this report format."

This report has been created by:

Vela Solaris AG

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System overview (annual values)

Total fuel and/or electrical energy consumption of the system [Etot]	1,863.1 kWh
Total energy consumption [Quse]	7,329.7 kWh
System performance (Quse / Etot)	3.93
Comfort demand	Energy demand covered

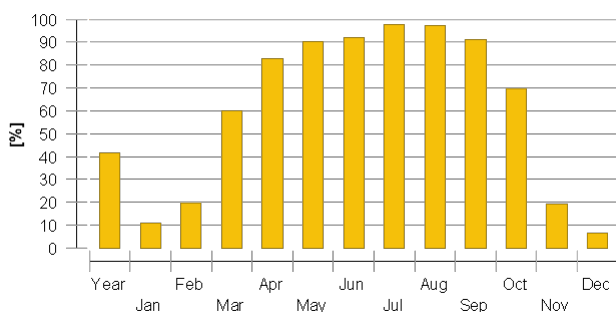
Overview solar thermal energy (annual values)

Collector area	13 m ²
Solar fraction total	41.6%
Solar fraction hot water [SFnHw]	66.4 %
Solar fraction building [SFnBd]	9.9 %
Total annual field yield	3,693.7 kWh
Collector field yield relating to gross area	284 kWh/m ² /Year
Collector field yield relating to aperture area	312.5 kWh/m ² /Year
Max. energy savings	3,693.7 kWh
Max. reduction in CO2 emissions	1,981.3 kg

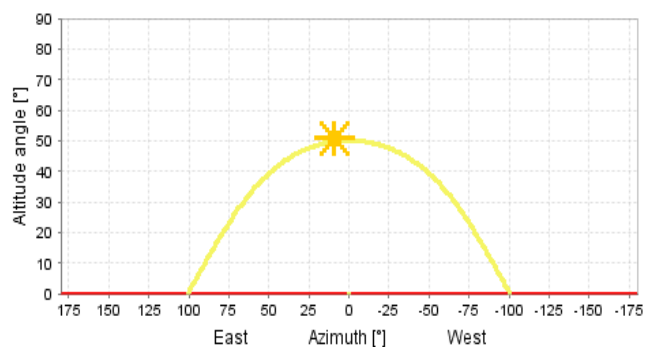
Overview heat pump (annual values)

Seasonal performance factor for air-to-water heat pump	2.8
Total electrical energy consumption when heating [Eaux]	1,831.4 kWh
Total energy savings	3,344.7 kWh
Total reduction in CO2 emissions	1,794.1 kg

Solar fraction: fraction of solar energy to system [SFn]



Horizon line



Meteorological data-Overview

Average outdoor temperature	10.1 °C
Global irradiation, annual sum	1,103.5 kWh/m ²

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Meteorological data-Overview

Diffuse irradiation, annual sum	578 kWh/m ²
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Component overview (annual values)

Collector	V26P	
Data Source		SPF
Number of collectors		5
Number of arrays		1
Total gross area	m ²	13.01
Total aperture area	m ²	11.82
Total absorber area	m ²	11.77
Tilt angle (hor.=0°, vert.=90°)	°	45
Orientation (E=+90°, S=0°, W=-90°)	°	0
Collector field yield [Qsol]	kWh	3,693.7
Irradiation onto collector area [Esol]	kWh	14,611.5
Collector efficiency [Qsol / Esol]	%	25.3
Direct irradiation after IAM	kWh	7,322
Heat pump	HP12 M	
Heating power at A2/W35	kW	8
Electrical power at A2/W35	kW	2
COP at A2/W35		4
DeltaT at A7/W35	K	5
Performance factor		2.83
Energy from/to the system [Qaux]	kWh	5,176.1
Fuel and electrical energy consumption [Eaux]	kWh	1,831.4
Energy savings solar thermal	kWh	3,693.7
CO2 savings solar thermal	kg	1,981.3
Energy savings heat pump	kWh	3,344.7
CO2 savings heat pump	kg	1,794.1
Building	Single family house, passive building	
Heated/air-conditioned living area	m ²	210
Heating setpoint temperature	°C	19.5
Heating energy demand excluding DHW [Qdem]	kWh	3,758.7
Specific heating energy demand excluding DHW [Qdem]	kWh/m ²	17.9
Solar gain through windows	kWh	15,042.3
Total energy losses	kWh	28,761.2

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Heating element	Floor heating	
Number of heating/cooling modules	-	9
Power per heating element under standard conditions	W	1,000
Nominal inlet temperature	°C	30
Nominal return temperature	°C	25
Net energy from/to heating/cooling modules	kWh	3,732.8

Hot water demand	Constant	
Volume withdrawal/daily consumption	l/d	202.1
Temperature setting	°C	50
Energy demand [Qdem]	kWh	3,421.2

Pump 1	Flow rate producer	
Circuit pressure drop	bar	0.028
Flow rate	l/h	177.3
Fuel and electrical energy consumption [Epar]	kWh	31.7

Storage tank	HPSU 500	
Volume	l	544
Height	m	1.3
Material		Polypropylene
Insulation		Rigid PU foam
Thickness of insulation	mm	80
Heat loss	kWh	481
Connection losses	kWh	626.7

Loop

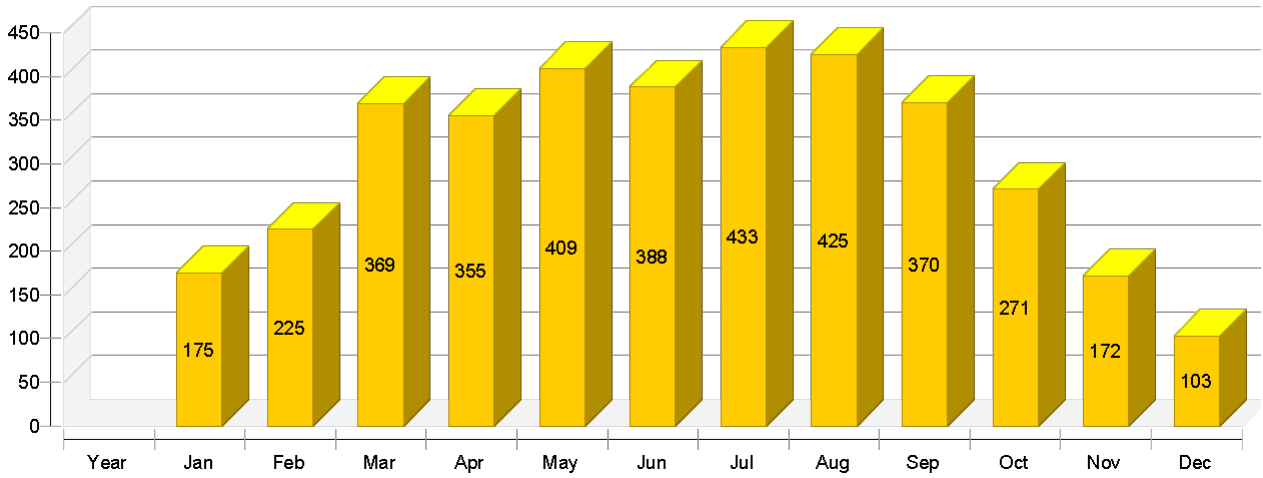
Solar loop		
Fluid mixture		Propylene mixture
Fluid concentration	%	33.3
Fluid domains volume	l	555.6
Pressure on top of the circuit	bar	4

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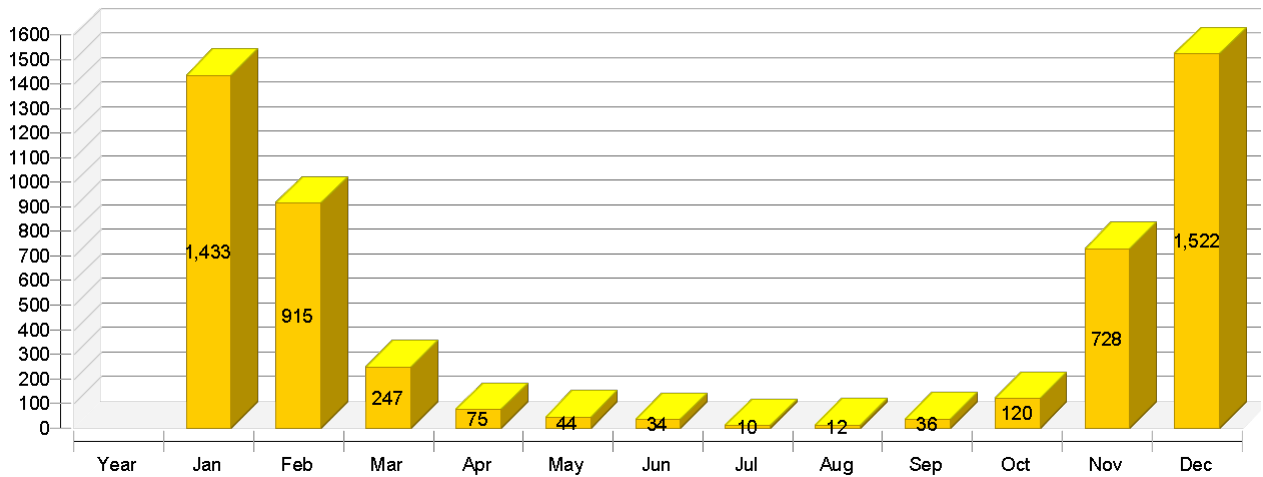
Solar thermal energy to the system [Qsol]

kWh



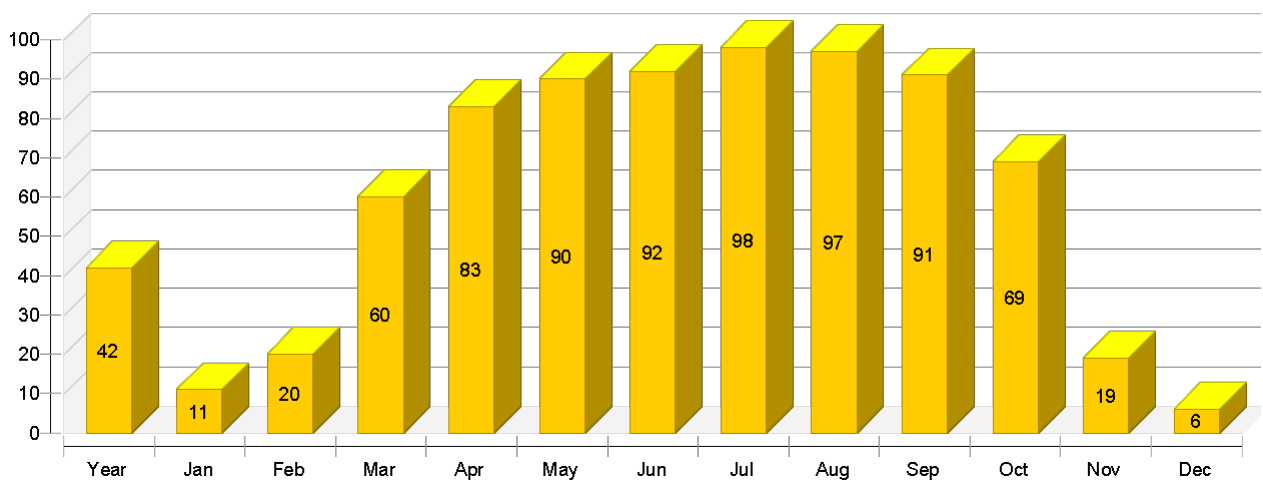
Heat generator energy to the system (solar thermal energy not included) [Qaux]

kWh



Solar fraction: fraction of solar energy to system [SF_n]

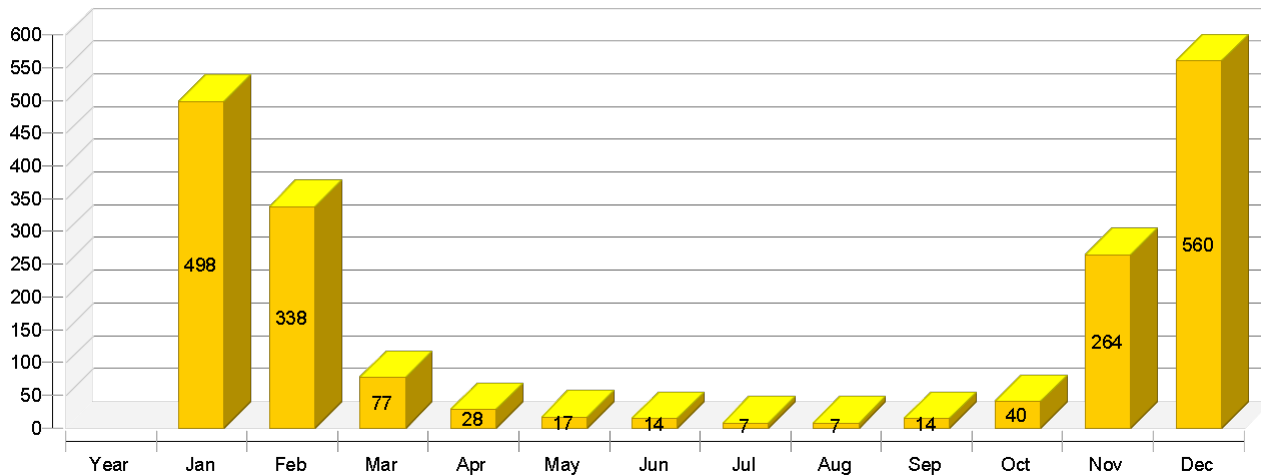
%



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Total fuel and/or electrical energy consumption of the system [Etot]

kWh



Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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Solar thermal energy to the system [Qsol]

kWh	3694	175	225	369	355	409	388	433	425	370	271	172	103
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Heat generator energy to the system (solar thermal energy not included) [Qaux]

kWh	5176	1433	915	247	75	44	34	10	12	36	120	728	1522
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Heat generator fuel and electrical energy consumption [Eaux]

kWh	1831	496	336	74	25	13	10	3	4	11	38	262	559
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Solar fraction: fraction of solar energy to system [SFn]

%	41.6	10.9	19.7	59.9	82.5	90.3	91.9	97.8	97.3	91.2	69.4	19.1	6.3
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Total fuel and/or electrical energy consumption of the system [Etot]

kWh	1863	498	338	77	28	17	14	7	7	14	40	264	560
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Irradiation onto collector area [Esol]

kWh	14611	673	852	1312	1495	1656	1613	1771	1724	1408	1008	608	491
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Electrical energy consumption of pumps [Epar]

kWh	32	2	2	3	3	4	4	4	4	3	2	1	1
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Total energy consumption [Quse]

kWh	7330	1482	1024	492	311	311	288	288	281	271	285	790	1506
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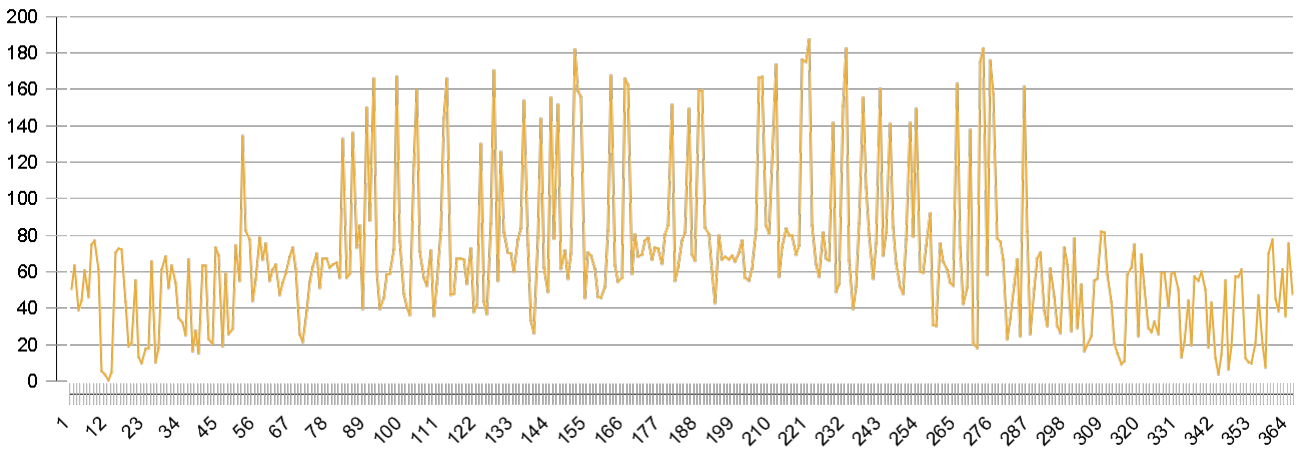
Heat loss to indoor room (including heat generator losses) [Qint]

kWh	1597	128	115	122	128	147	145	160	157	136	118	112	129
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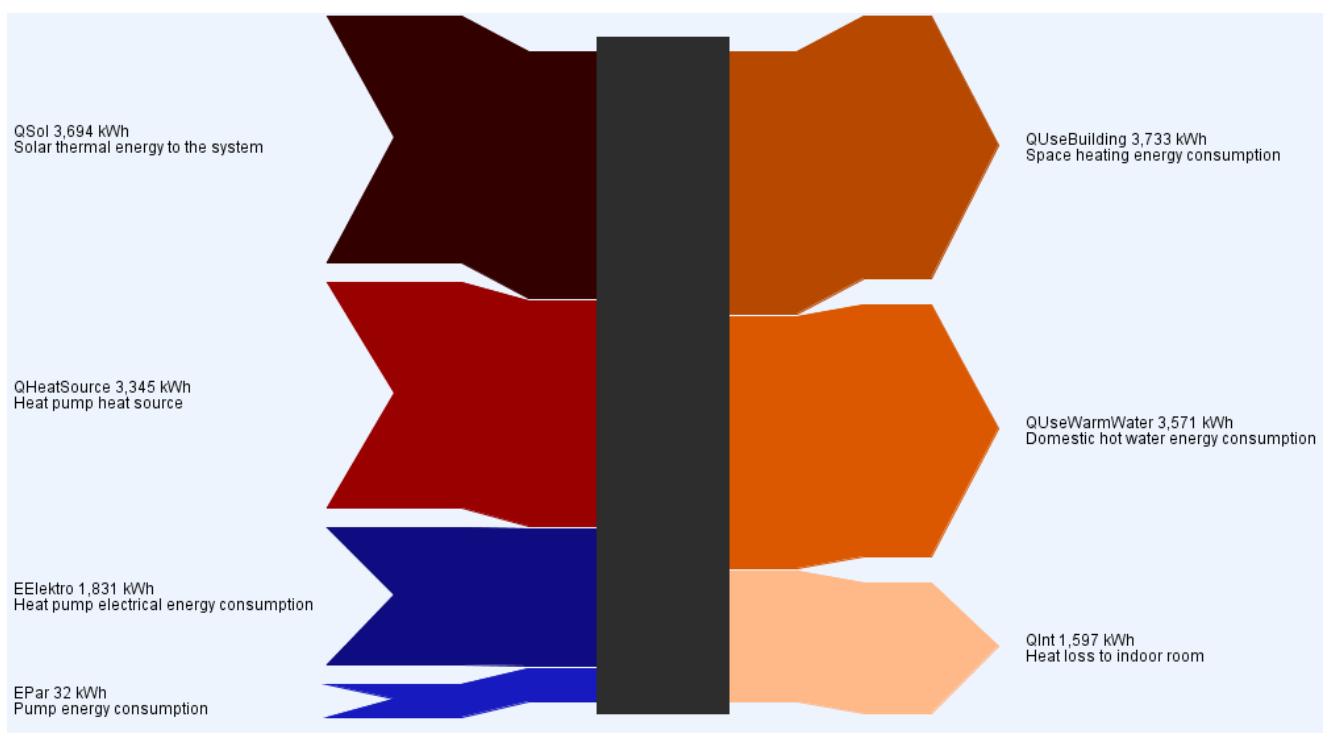
Collector

Daily maximum temperature [°C]



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Energy flow diagram (annual balance)



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