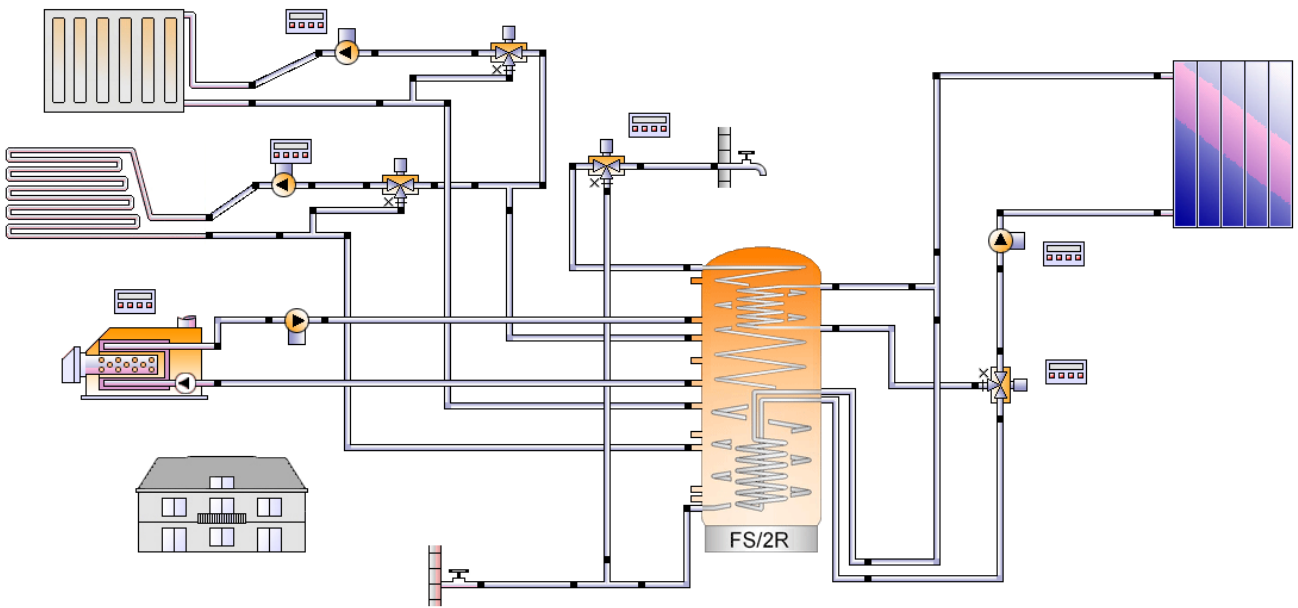


# Professional Report

Project

Hot water + heating (FS/2R)



## Location of the system

## Map section

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

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

## This report has been created by:

Vela Solaris AG

## System overview (annual values)

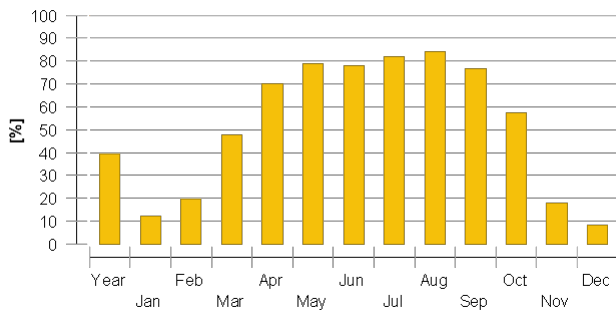
Total fuel and/or electrical energy consumption of the system [Etot]	5,180.5 kWh
Total energy consumption [Quse]	6,370 kWh
System performance (Quse / Etot)	1.23
Comfort demand	Energy demand covered

# Professional Report

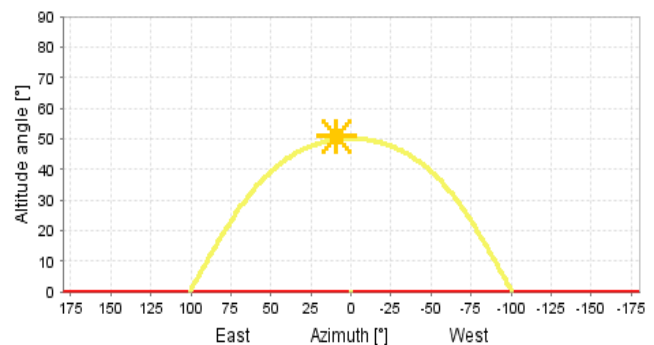
## Overview solar thermal energy (annual values)

Collector area	10.2 m <sup>2</sup>
Solar fraction total	39.3%
Solar fraction hot water [SF <sub>n</sub> Hw]	52.6 %
Solar fraction building [SF <sub>n</sub> Bd]	10.1 %
Total annual field yield	3,371.5 kWh
Collector field yield relating to gross area	330.5 kWh/m <sup>2</sup> /Year
Collector field yield relating to aperture area	355.5 kWh/m <sup>2</sup> /Year
Max. fuel savings	395 m <sup>3</sup> (gas): [Natural gas L]
Max. energy savings	3,371.5 kWh
Max. reduction in CO <sub>2</sub> emissions	780.8 kg

Solar fraction: fraction of solar energy to system [SF<sub>n</sub>]



Horizon line



## Meteorological data-Overview

Average outdoor temperature	10.1 °C
Global irradiation, annual sum	1,103.5 kWh/m <sup>2</sup>
Diffuse irradiation, annual sum	578 kWh/m <sup>2</sup>

## Component overview (annual values)

Boiler	ecoTEC plus VC 126	
Power	kW	12
Total efficiency	%	101.2
Energy from/to the system [Q <sub>aux</sub> ]	kWh	5,209.9
Fuel and electrical energy consumption [E <sub>aux</sub> ]	kWh	5,147.3
Energy savings solar thermal	kWh	3,371.5
CO <sub>2</sub> savings solar thermal	kg	780.8
Fuel savings solar thermal	m <sup>3</sup> (gas)	395

# Professional Report

Collector	FM-S	
Data Source		ISFH
Number of collectors		4
Number of arrays		3
Total gross area	m <sup>2</sup>	10.2
Total aperture area	m <sup>2</sup>	9.484
Total absorber area	m <sup>2</sup>	9.44
Tilt angle (hor.=0°, vert.=90°)	°	40
Orientation (E=+90°, S=0°, W=-90°)	°	0
Collector field yield [Qsol]	kWh	3,371.5
Irradiation onto collector area [Esol]	kWh	11,834.1
Collector efficiency [Qsol / Esol]	%	28.5
Direct irradiation after IAM	kWh	5,581.2
Building	Single family house, passive building	
Heated/air-conditioned living area	m <sup>2</sup>	180
Heating setpoint temperature	°C	18.7
Heating energy demand excluding DHW [Qdem]	kWh	3,410.7
Specific heating energy demand excluding DHW [Qdem]	kWh/m <sup>2</sup>	18.9
Solar gain through windows	kWh	11,086.1
Total energy losses	kWh	21,849.9
Heating element 1	Floor heating	
Number of heating/cooling modules	-	7
Power per heating element under standard conditions	W	1,000
Nominal inlet temperature	°C	35
Nominal return temperature	°C	25
Net energy from/to heating/cooling modules	kWh	3,400
Heating element 2	Radiator	
Number of heating/cooling modules	-	7
Power per heating element under standard conditions	W	1,000
Nominal inlet temperature	°C	60
Nominal return temperature	°C	40
Net energy from/to heating/cooling modules	kWh	0.003
Hot water demand	Constant	
Volume withdrawal/daily consumption	l/d	202.1
Temperature setting	°C	45
Energy demand [Qdem]	kWh	2,994.4

# Professional Report

<b>Pump 1</b>	<b>Eco, small</b>	
Circuit pressure drop	bar	0.019
Flow rate	l/h	237.1
Fuel and electrical energy consumption [Epar]	kWh	7.7

<b>Pump 2</b>	<b>Eco, medium</b>	
Circuit pressure drop	bar	0.156
Flow rate	l/h	3,600
Fuel and electrical energy consumption [Epar]	kWh	8.6

<b>Pump 3</b>	<b>Eco, medium</b>	
Circuit pressure drop	bar	0.002
Flow rate	l/h	379.8
Fuel and electrical energy consumption [Epar]	kWh	16.9

<b>Storage tank 3</b>	<b>FS 1000-S/2R</b>	
Volume	l	950
Height	m	1.71
Material		Steel
Insulation		Fleece insulation
Thickness of insulation	mm	100
Heat loss	kWh	699.7
Connection losses	kWh	677.5

## Loop

<b>Solar loop</b>		
Fluid mixture		Propylene mixture
Fluid concentration	%	33.3
Fluid domains volume	l	50.8
Pressure on top of the circuit	bar	4

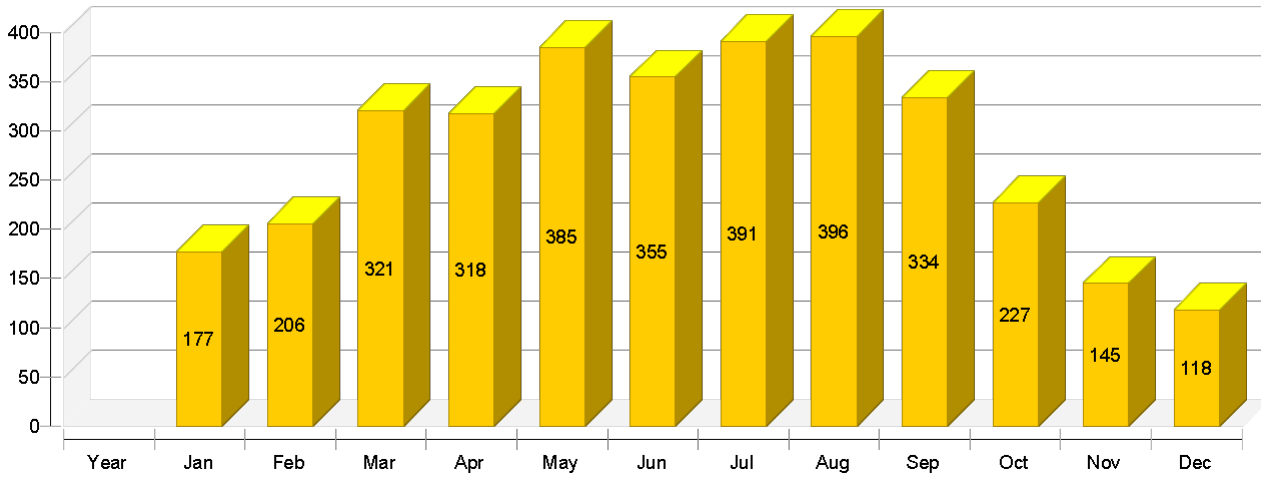
Demo Version

# Professional Report

Demo Version

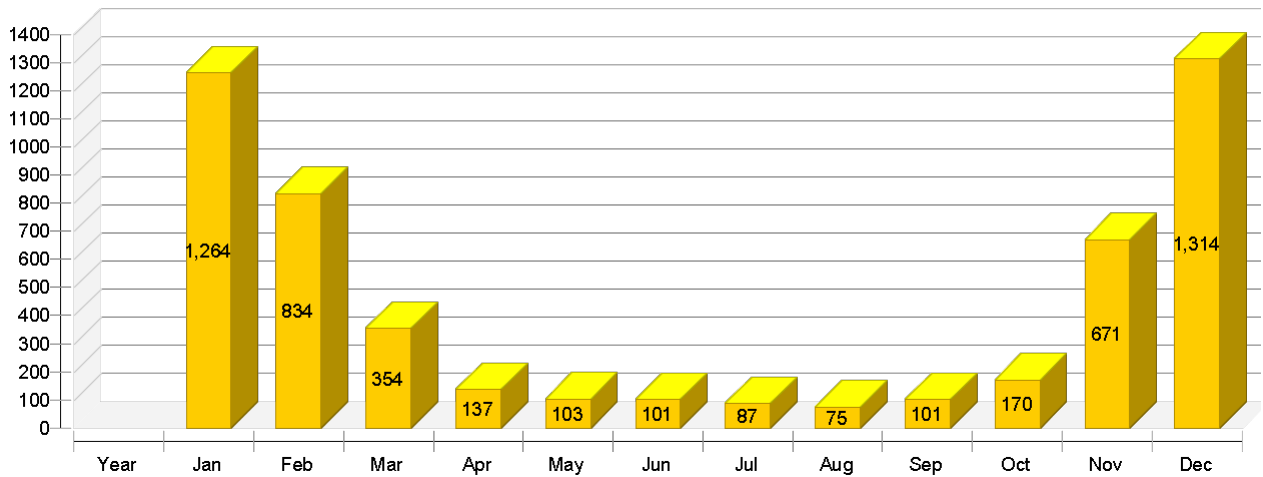
Solar thermal energy to the system [Qsol]

kWh



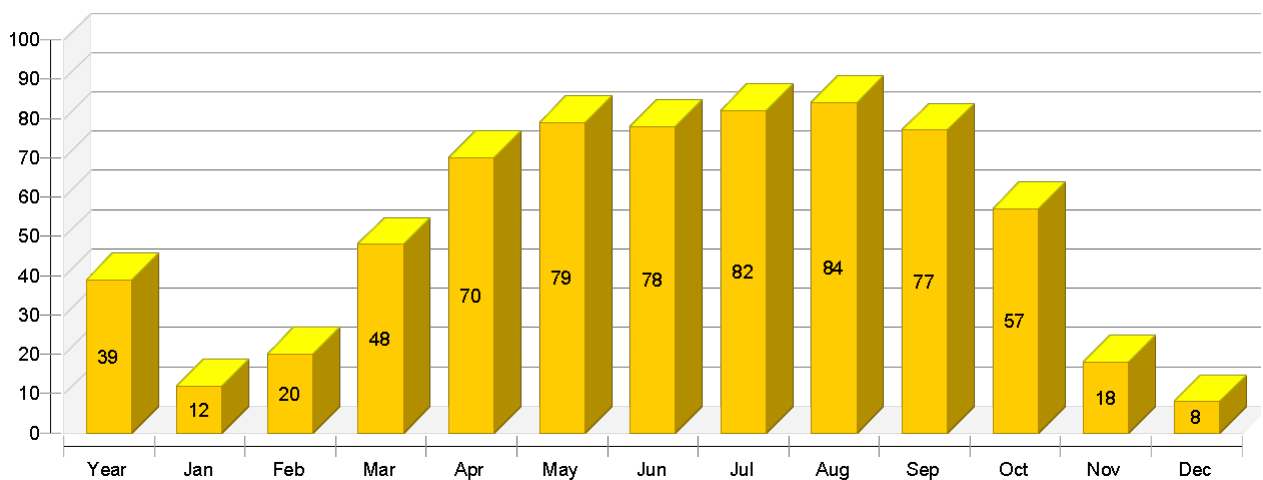
Heat generator energy to the system (solar thermal energy not included) [Qaux]

kWh



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

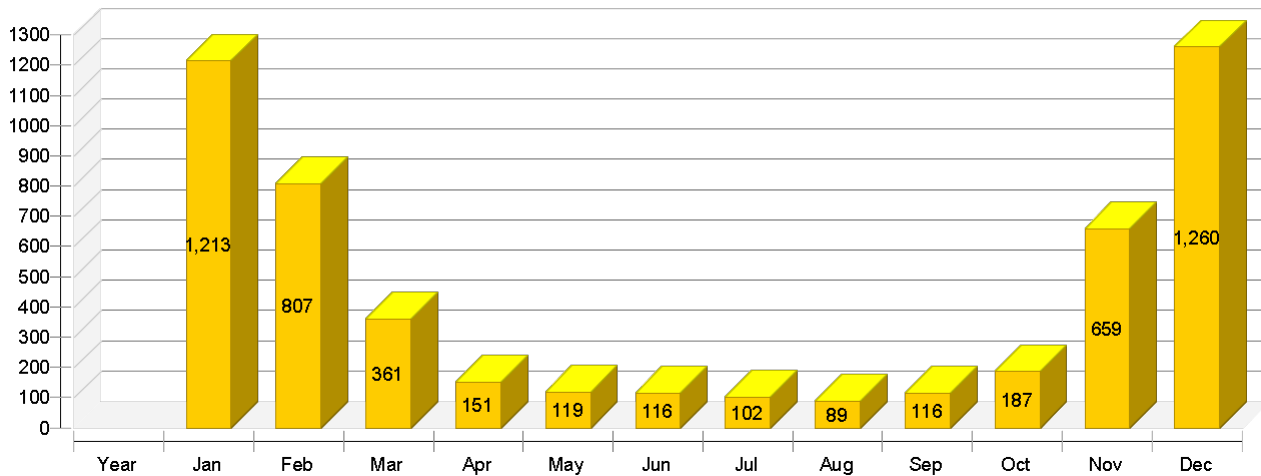
%



# Professional Report

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	3372	177	206	321	318	385	355	391	396	334	227	145	118
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## Heat generator energy to the system (solar thermal energy not included) [Qaux]

kWh	5210	1264	834	354	137	103	101	87	75	101	170	671	1314
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## Heat generator fuel and electrical energy consumption [Eaux]

kWh	5147	1206	802	358	150	118	115	101	88	116	186	655	1252
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## Solar fraction: fraction of solar energy to system [SFn]

%	39.3	12.3	19.8	47.5	69.9	78.8	77.9	81.9	84.1	76.8	57.2	17.7	8.3
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## Total fuel and/or electrical energy consumption of the system [Etot]

kWh	5180	1213	807	361	151	119	116	102	89	116	187	659	1260
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## Irradiation onto collector area [Esol]

kWh	11834	522	671	1050	1218	1367	1341	1468	1411	1132	798	476	381
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## Electrical energy consumption of pumps [Epar]

kWh	33	8	5	2	1	1	1	1	1	1	1	4	8
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## Total energy consumption [Quse]

kWh	6370	1319	892	483	262	258	237	233	227	220	234	692	1314
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## Heat loss to indoor room (including heat generator losses) [Qint]

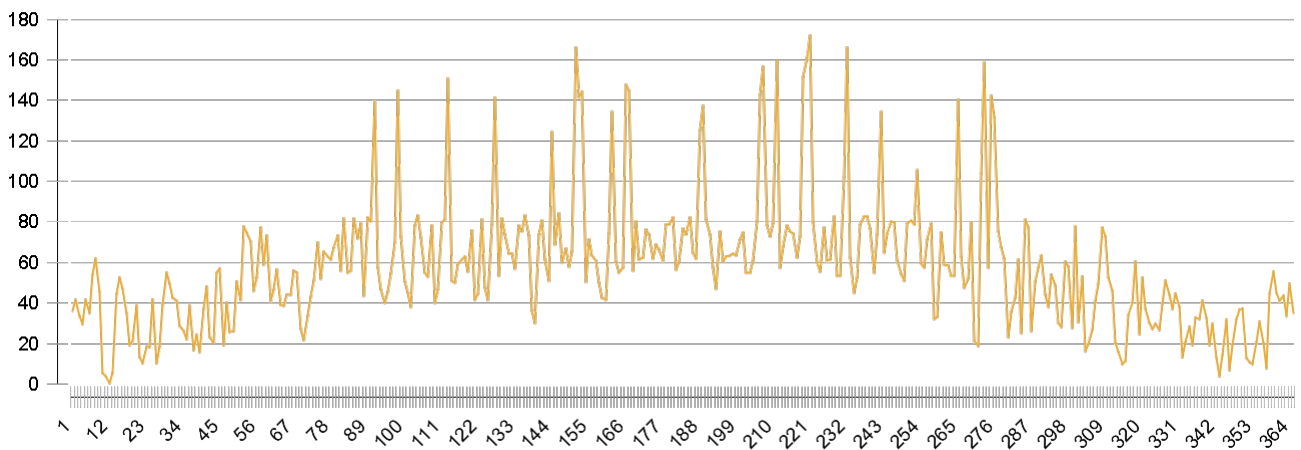
kWh	2123	71	101	185	208	235	233	253	248	221	193	116	58
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## Heat loss to surroundings (without collector losses) [Qext]

kWh	72	3	4	7	8	8	8	9	8	7	5	3	2
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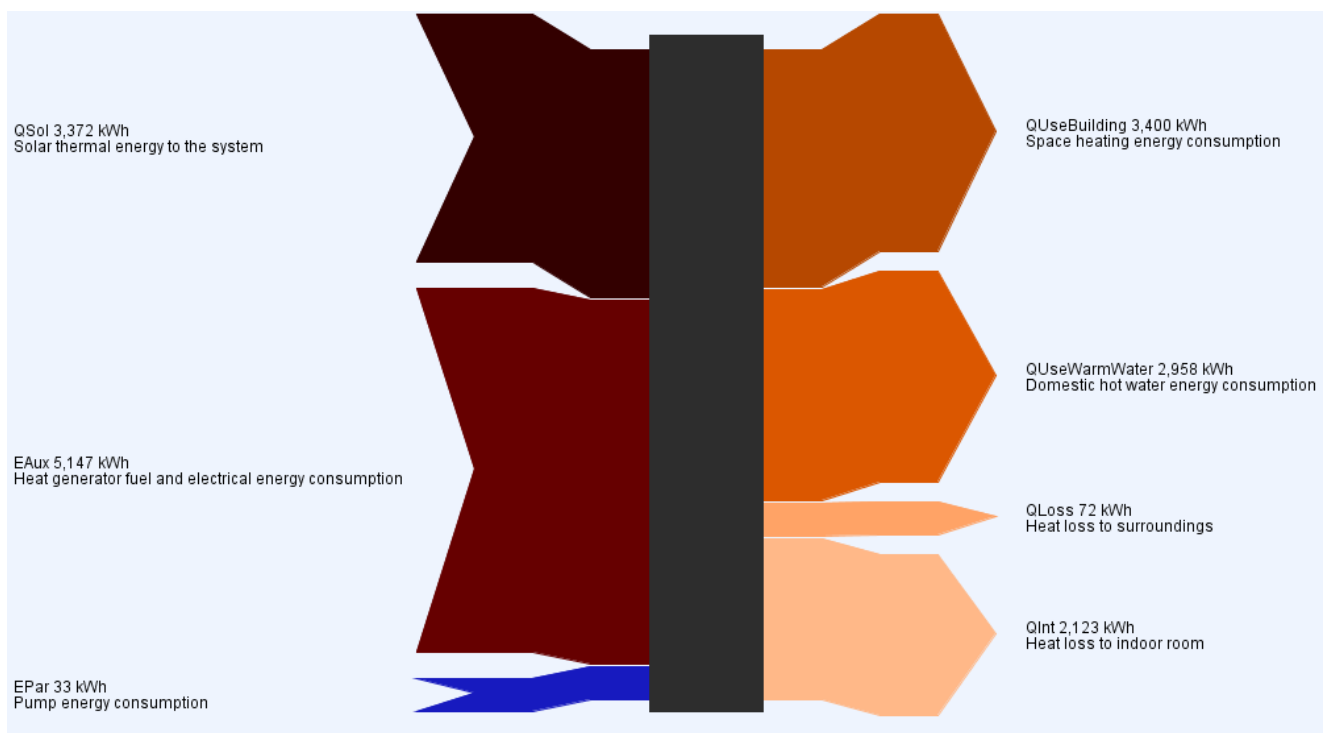
## Collector

Daily maximum temperature [ °C]



# Professional Report

## Energy flow diagram (annual balance)



Demo Version