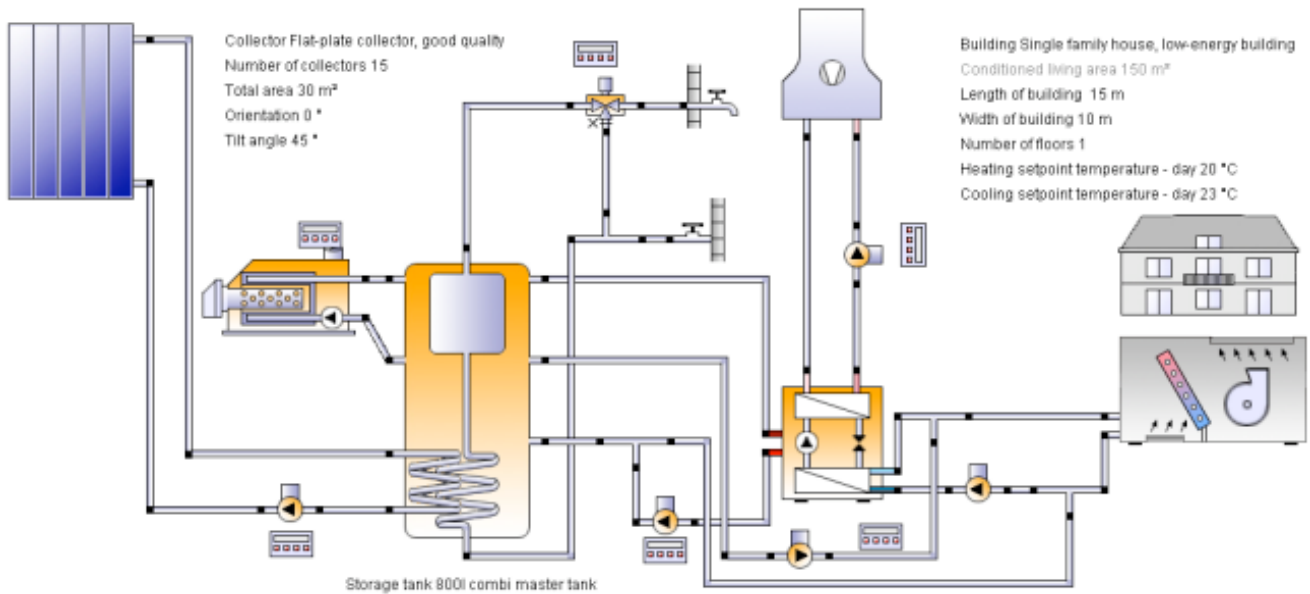


Professional report

Projekt

Space heating and cooling with absorption chiller, wet recoler and buffer tank



Vela Solaris AG

Seyed Rezaei
 Stadthausstrasse 125
 8400 Winterthur

Location

Palermo
 Longitude: 13.367°, Latitude: 38.117°
 Elevation: 8 m

Overview

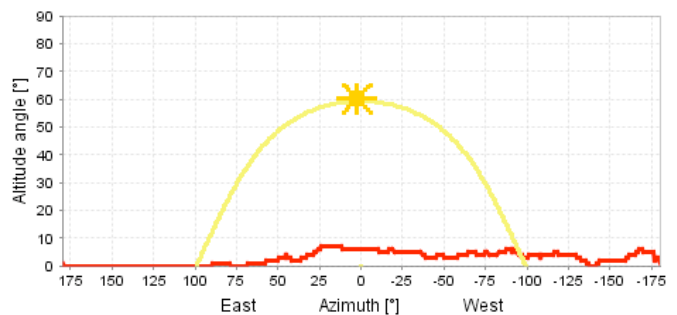
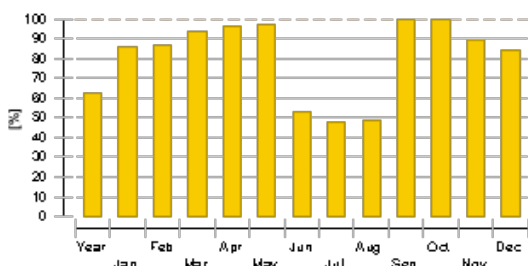
Total fuel and/or electrical energy consumption	7,456.5 kWh
Total energy consumption (Quse)	8,659.6 kWh

Overview thermal energy

Collector area	30 m ²
Solar fraction total	62.294 %
Total collector field yield	9,102 kWh
Collector field yield relating to aperture area	337 kWh/m ² /Year

Overview heat driven chiller

Seasonal performance factor-Cooling	0.65
Total cooling energy yield	5,626.1 kWh
Heat supplied in generator	8,664.4 kWh



Solar fraction: fraction of solar energy to system

polysun®

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Meteorological data

Outdoor temperature 24h	18.8 °C
Global irradiance	1,737.8 kWh/m ²
Diffuse irradiance	621.4 kWh/m ²

System overview

Absorption chiller	Single-effect, small size	
Cooling_Seasonal_Performance_Factor		0.65
Cooling energy yield	kWh	5,626.1
Heat supplied in generator	kWh	8,664.4

Boiler	Gas boiler 5 kW with internal pump	
Power	kW	5
Total efficiency	%	78.2
Energy from/to the system	kWh	5,509.7
Fuel and electrical energy consumption	kWh	7,049.2

Collector	Flat-plate collector, good quality	
Data Source		SPF
Number of collectors		15
Number of arrays		1
Total area	m ²	30
Total aperture area	m ²	27
Tilt angle	°	45
Orientation	°	0
Collector field yield	kWh	9,102.4
Irradiance onto collector area	kWh	51,922.5
Direct irradiance after IAM	kWh	32,783.1
Diffuse irradiance after IAM	kWh	16,465.5

Wet recooler 1	Residential-small size	
Rejected heat	kWh	13,485.6
Thermal efficiency	%	19.08

Building	Single family house, low-energy building	
Conditioned living area	m ²	150
Heating setpoint temperature	°C	19.7
Heating energy demand	kWh	8
Specific heating energy demand	kWh/m ²	0.1
Cooling setpoint temperature	°C	23.3
Cooling energy demand	kWh	5,914.9
Specific cooling energy demand	kWh/m ²	39.4
Solar gain through windows	kWh	15,727.4
Total energy losses	kWh	14,884.8

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Hot water demand	Constant	
Withdraw volume	l/d	202
Temperature setting	°C	50
Energy demand	kWh	2,912.7

Pump 2	Pump, medium	
Circuit pressure drop	bar	0.133
Flow rate	l/h	1,800
Fuel and electrical energy consumption	kWh	106.2

Height	m	1.8
Material		Steel
Insulation		Rigid PU foam
Thickness of insulation	mm	80
Heat loss	kWh	1,110.9
Connection losses	kWh	1,138

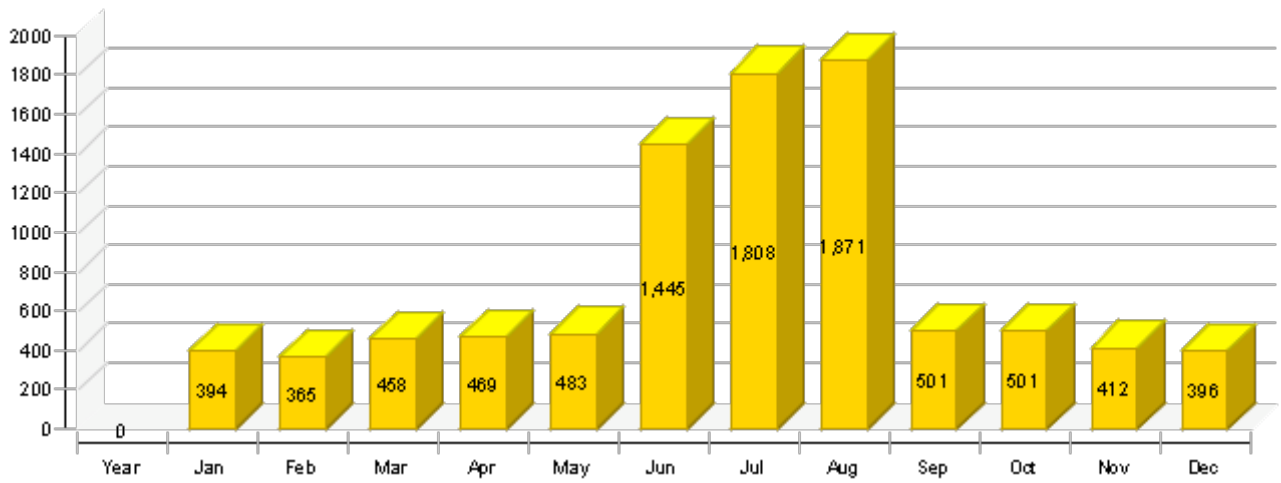
Loop

Solar loop		
Fluid mixture		Ethylene mixture
Fluid concentration	%	33.3
Fluid domains volume	l	44.8
Pressure on top of the circuit	bar	4

Professional report

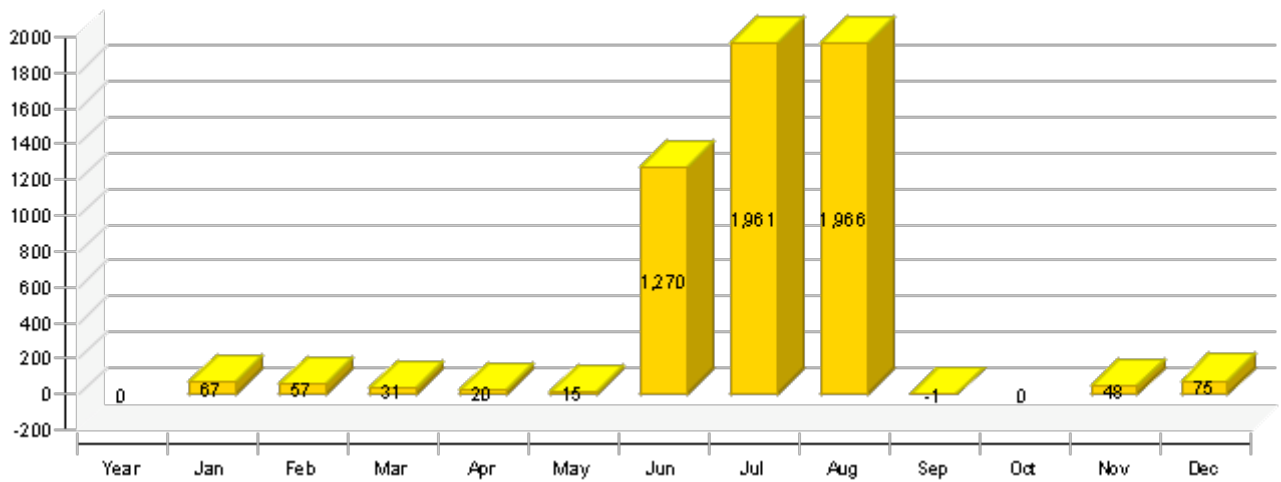
Solar energy to the system [Qsol]

kWh



Heat generator energy to the system [Qaux]

kWh

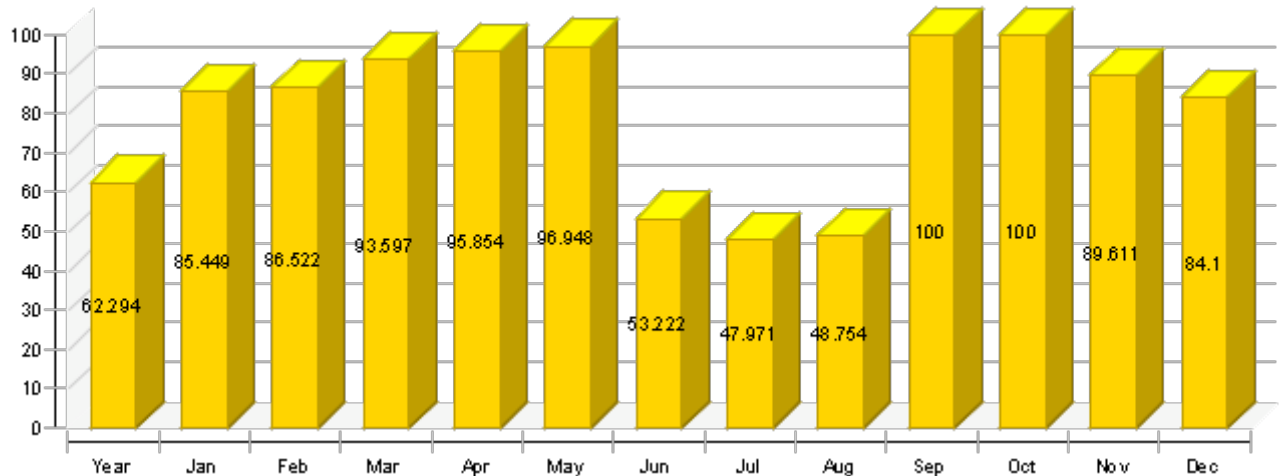


Solar fraction: fraction of solar energy to system [SFn]

%

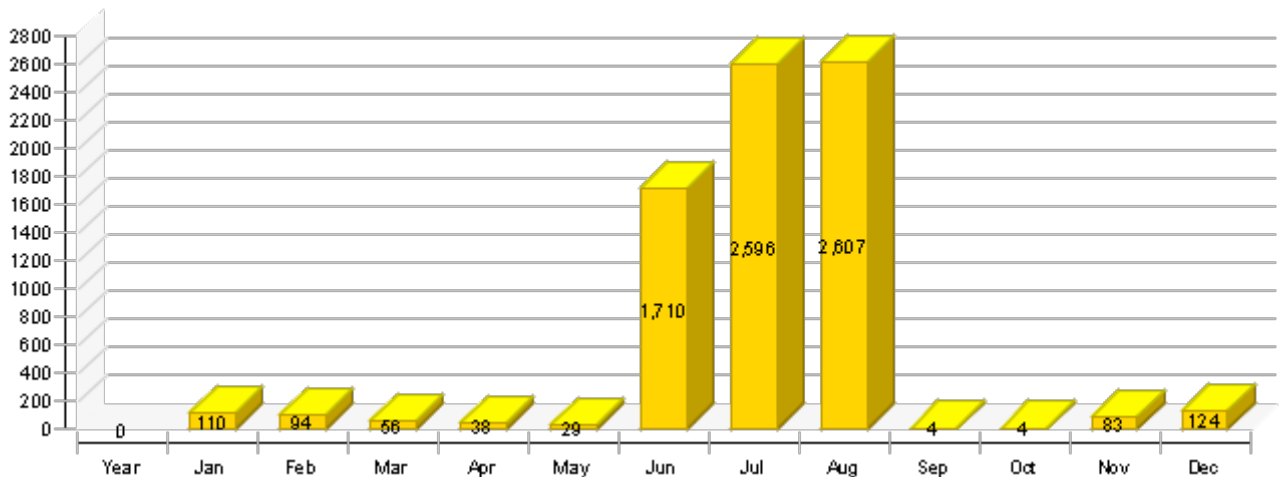


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Total fuel and/or electrical energy consumption [Etot]

kWh



	Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Solar energy to the system [Qsol]													
kWh	9102	394	365	458	469	483	1445	1808	1871	501	501	412	396
Heat generator energy to the system [Qaux]													
kWh	5510	67	57	31	20	15	1270	1961	1966	-1	0	48	75
Heat generator fuel and electrical energy consumption [Eaux]													
kWh	7049	107	91	52	33	25	1612	2459	2469	0	0	80	121
Solar fraction: fraction of solar energy to system [SFn]													
%	62.3	85.4	86.5	93.6	95.9	96.9	53.2	48	48.8	100	100	89.6	84.1
Total fuel and/or electrical energy consumption [Etot]													
kWh	7456	110	94	56	38	29	1710	2596	2607	4	4	83	124
Irradiance onto collector area [Esol]													
kWh	51923	3167	3356	4302	4634	4928	4879	5249	5310	4943	4817	3383	2953
Electrical energy consumption of pumps [Epar]													

Professional report

kWh	407	3	3	4	4	4	98	137	139	4	4	4	3
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Heat loss to indoor room (including heat generator losses) [Qint]

kWh	4762	248	224	244	235	245	705	940	951	233	243	242	251
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Heat loss to surroundings (without collector losses) [Qext]

kWh	61	3	3	4	5	5	7	8	9	4	5	4	3
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Total energy consumption [Quse]

kWh	8660	266	240	265	257	265	1665	2311	2345	257	265	257	266
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Collector

Daily maximum temperature [°C]

