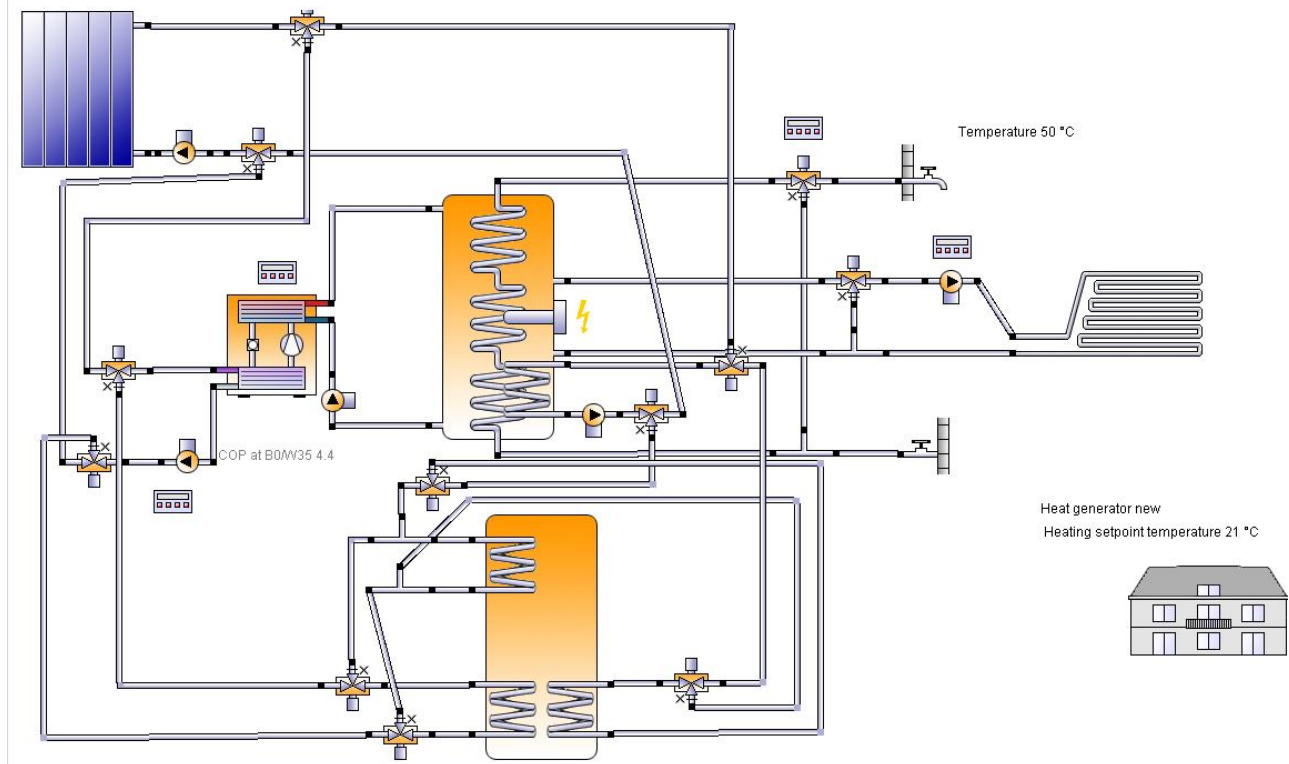


Project

PolarSol koti 41\193\-

vela solaris

Project Project - System diagram PolarSol koti



Location of the system

Otava
Longitude: 27.12°
Latitude: 61.662°
Elevation: 116 m

Map section



This report has been created by:

Anton Serbin

Dealer: www.profil.fi
Annerman Oy

Comments on the project

Projekt in Otava

Photograph of property



System overview (annual values)

Total fuel and/or electrical energy consumption of the system [Etot]	2,899.4 kWh
Total energy consumption [Quse]	10,018.7 kWh
System performance (Quse / Etot)	3.46
Comfort demand	Energy demand covered

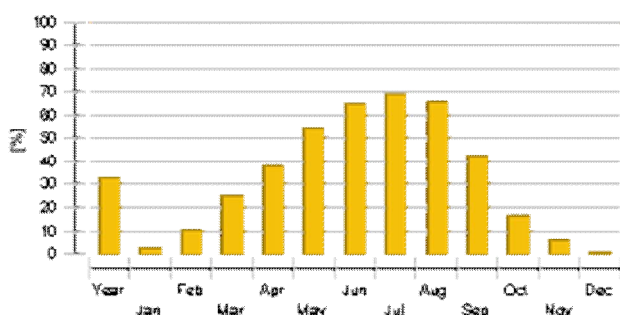
Overview solar thermal energy (annual values)

Collector area	8.9 m ²
Solar fraction total	99.9%
Solar fraction hot water [SFnHw]	99.9 %
Solar fraction building [SFnBd]	99.9 %
Total annual field yield	5,490.8 kWh
Collector field yield relating to gross area	617.7 kWh/m ² /Year
Collector field yield relating to aperture area	686.3 kWh/m ² /Year
Max. energy savings	1,390.4 kWh
Max. reduction in CO2 emissions	745.8 kg

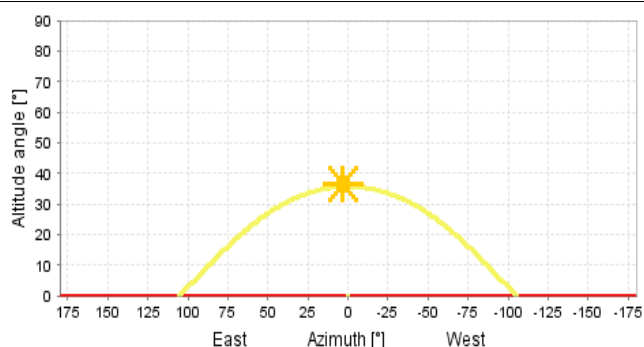
Overview heat pump (annual values)

Seasonal performance factor (without pump energy)	3.9
Total electrical energy consumption when heating [Eaux]	2,854.5 kWh
Total energy savings	8,418.2 kWh
Total reduction in CO ₂ emissions	4,515.5 kg

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



Horizon line



Meteorological data-Overview

Average outdoor temperature	3.8 °C
Global irradiation, annual sum	875.5 kWh/m ²
Diffuse irradiation, annual sum	452.2 kWh/m ²

Component overview (annual values)

B/W or W/W heat pump	Thermalia® 5P	
Seasonal performance factor (without pump energy)		3.95
Energy from/to the system [Qaux]	kWh	11,272.8
CO ₂ emissions	kg	1,531.2
Fuel and electrical energy consumption [Eaux]	kWh	2,854.5
Energy savings solar thermal	kWh	1,390.4
CO ₂ savings solar thermal	kg	745.8
Energy savings heat pump	kWh	8,418.2
CO ₂ savings heat pump	kg	4,515.5

Collector 2	Flat-plate collector, premium quality	
Data Source		SPF
Number of collectors		4.44
Number of arrays		1
Total gross area	m ²	8.89
Total aperture area	m ²	8
Total absorber area	m ²	8
Tilt angle (hor.=0°, vert.=90°)	°	30
Orientation (E=+90°, S=0°, W=-90°)	°	0
Collector field yield [Qsol]	kWh	5,490.8
Irradiation onto collector area [Esol]	kWh	8,649.9
Collector efficiency [Qsol / Esol]	%	63.5
Direct irradiation after IAM	kWh	4,418.3
Diffuse irradiation after IAM	kWh	3,644.6

Building	-	
Heated/air-conditioned living area	m ²	150
Heating setpoint temperature	°C	21
Heating energy demand excluding DHW [Qdem]	kWh	6,375
Annual specific heating energy demand	kWh/m ²	42.5
Useful heat gain	kWh	12,750
Total energy losses	kWh	19,125

Convactor	Floor heating 1000W	
Number of heating/cooling modules	-	6
Power per heating module under standard conditions	W	1,000
Nominal inlet temperature	°C	45
Nominal return temperature	°C	35
Net energy from/to heating/cooling modules	kWh	6,337.5

Hot water demand	Constant	
Volume withdrawal/daily consumption	l/d	202
Temperature setting	°C	50
Energy demand [Qdem]	kWh	3,929.4

Pump 2	Pump Eco, small	
Circuit pressure drop	bar	0.004
Flow rate	l/h	660
Fuel and electrical energy consumption [Epar]	kWh	10.2

Pump 4	Pump Eco, small	
Circuit pressure drop	bar	0.001
Flow rate	l/h	284.2
Fuel and electrical energy consumption [Epar]	kWh	16.1

Pump 5	Pump Eco, small	
Circuit pressure drop	bar	0.087
Flow rate	l/h	2,640
Fuel and electrical energy consumption [Epar]	kWh	10.8

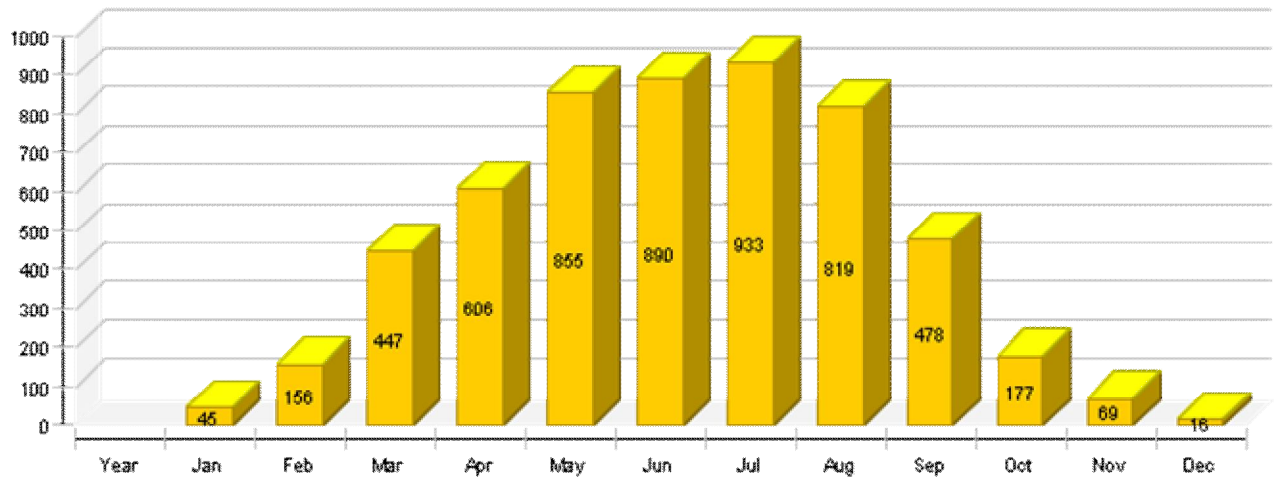
Pump 6	Pump Eco, small	
Circuit pressure drop	bar	94.82
Flow rate	l/h	3,600
Fuel and electrical energy consumption [Epar]	kWh	7.7

Storage tank 11	100gal US universal tank	
Volume	l	378.5
Height	m	1.8
Material		Enameled steel
Insulation		Flexible polyurethane foam
Thickness of insulation	mm	101.6
Heat loss	kWh	302
Connection losses	kWh	456.2

Storage tank 13		
Volume	l	6,000
Height	m	2.7
Material		Stainless steel
Insulation		Rigid PU foam
Thickness of insulation	mm	200
Heat loss	kWh	-782
Connection losses	kWh	-23.1

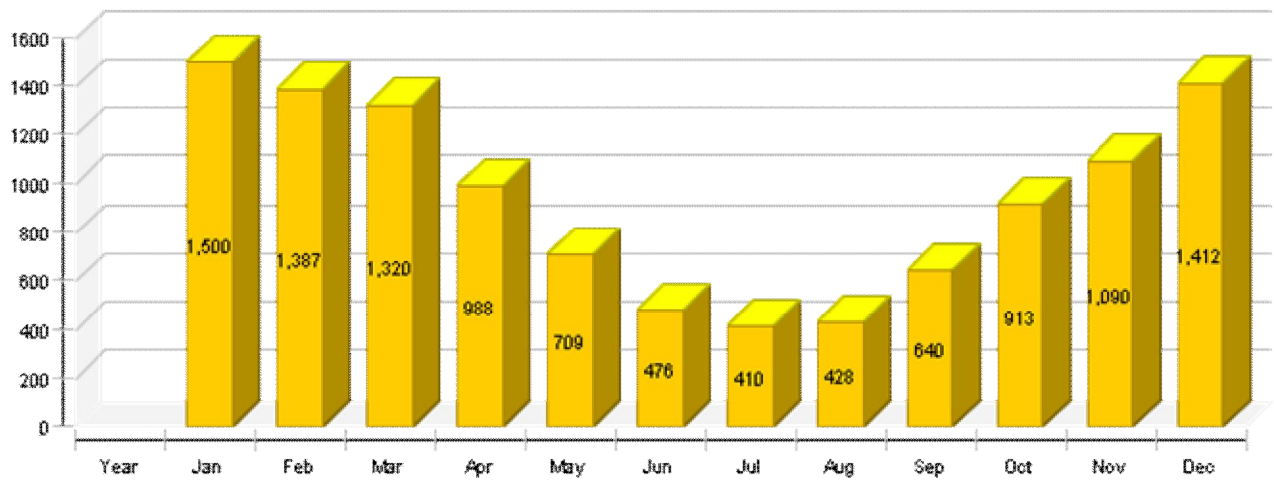
Solar thermal energy to the system [Qsol]

kWh



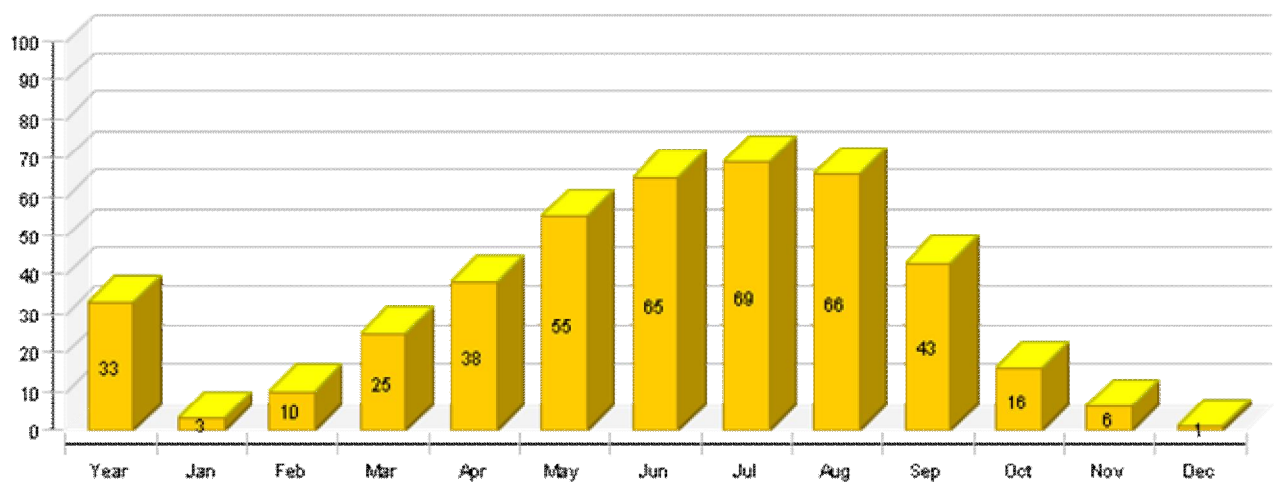
Heat generator energy to the system (solar thermal energy not included) [Qaux]

kWh



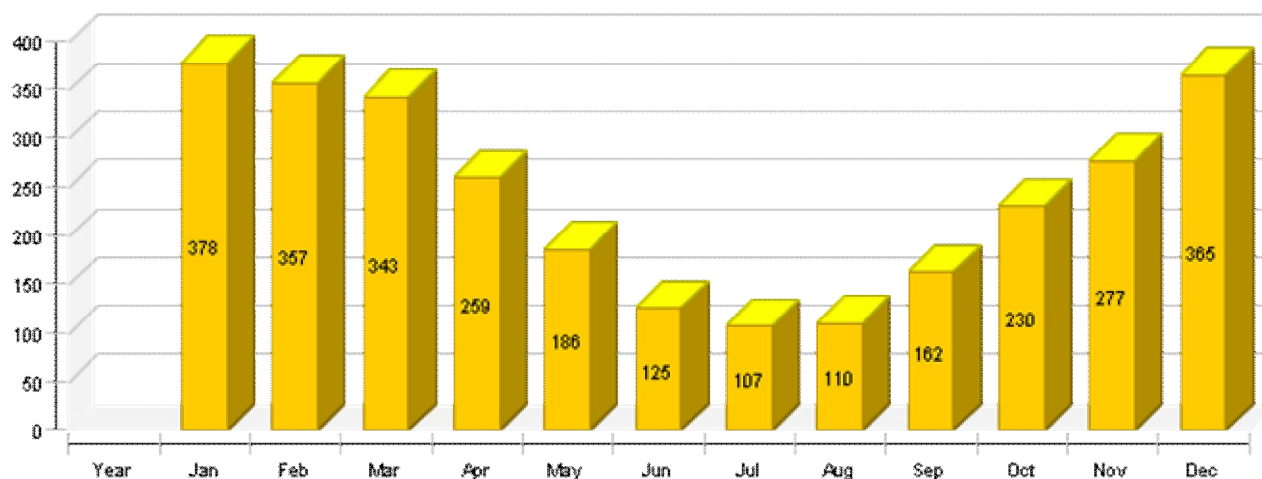
Solar fraction: fraction of solar energy to system [SFn]

%



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	5491	45	156	447	606	855	890	933	819	478	177	69	16
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Heat generator energy to the system (solar thermal energy not included) [Qaux]

kWh	11273	1500	1387	1320	988	709	476	410	428	640	913	1090	1412
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Heat generator fuel and electrical energy consumption [Eaux]

kWh	2855	373	352	338	255	183	122	105	108	159	227	273	360
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Solar fraction: fraction of solar energy to system [SFn]

%	32.8	2.9	10.1	25.3	38	54.7	65.2	69.5	65.7	42.7	16.2	6	1.1
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Total fuel and/or electrical energy consumption of the system [Etot]

kWh	2899	378	357	343	259	186	125	107	110	162	230	277	365
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Irradiation onto collector area [Esol]

kWh	8650	148	384	818	989	1276	1254	1273	1155	757	371	166	59
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Electrical energy consumption of pumps [Epar]

kWh	45	5	5	5	4	3	2	2	2	3	3	4	5
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Heat loss to indoor room (including heat generator losses) [Qint]

kWh	471	76	30	-2	-15	-12	15	49	79	91	84	55	19
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Heat loss to surroundings (without collector losses) [Qext]

kWh	0	0	0	0	0	0	0	0	0	0	0	0	0
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Total energy consumption [Quse]

kWh	10019	1383	1286	1213	885	606	378	308	326	537	808	983	1306
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Collector 2

Daily maximum temperature [°C]

