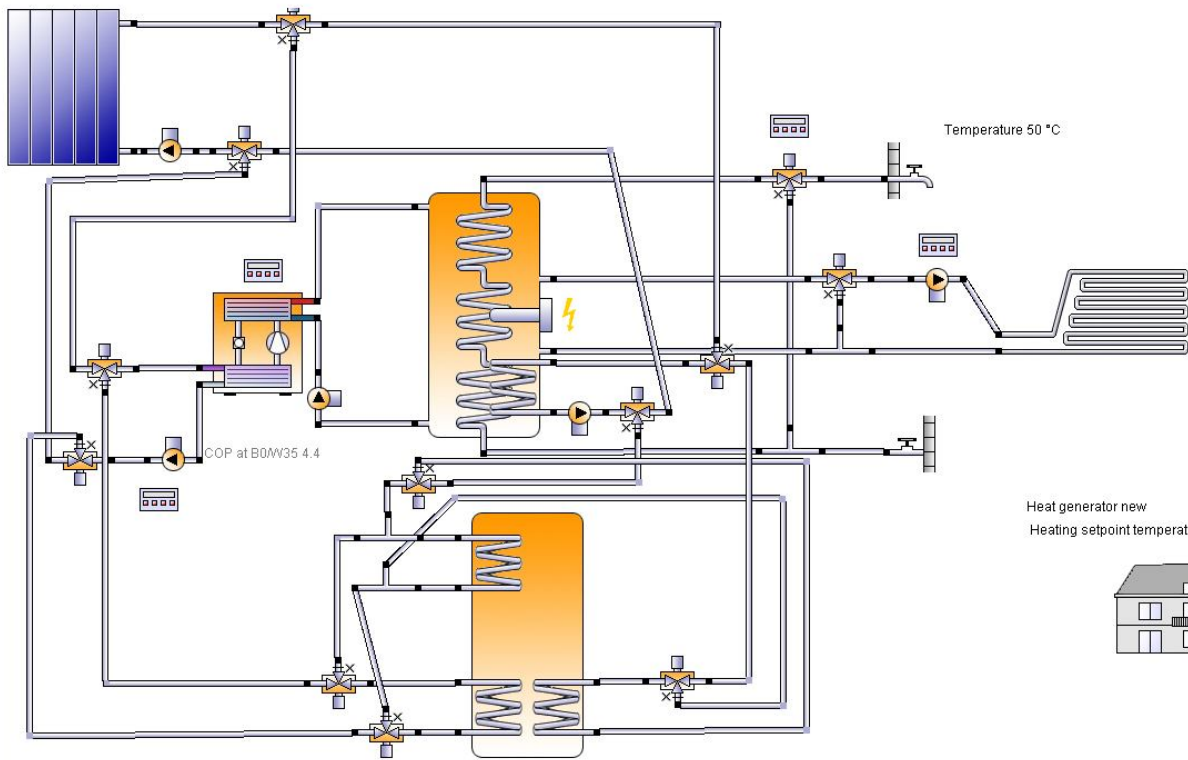


Project

PolarSol koti 41\193\-

vela solaris

Project Project - System diagram PolarSol koti



Location of the system

Map section

Espoo

Longitude: 24.659°

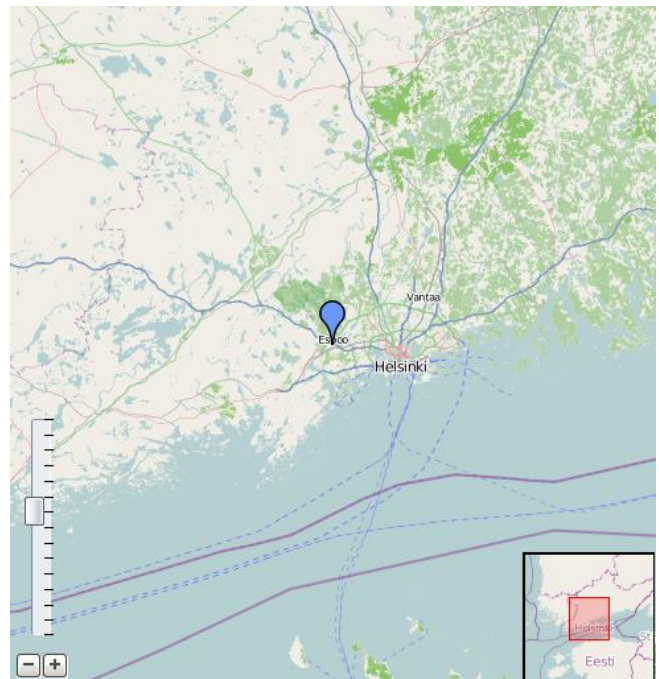
Latitude: 60.213°

Elevation: 10 m

This report has been created by:

Anton Serbin

Dealer: www.profil.fi
Annerman Oy



Comments on the project

Projekt in Espoo

Photograph of property



System overview (annual values)

Total fuel and/or electrical energy consumption of the system [Etot]	5,624.9 kWh
Total energy consumption [Quse]	18,985 kWh
System performance (Quse / Etot)	3.38
Comfort demand	Energy demand covered

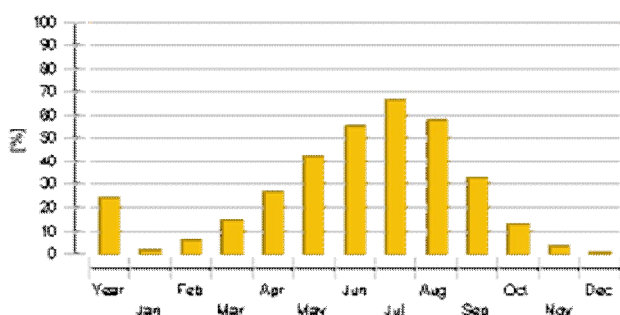
Overview solar thermal energy (annual values)

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	6,570.5 kWh
Collector field yield relating to gross area	739.2 kWh/m ² /Year
Collector field yield relating to aperture area	821.3 kWh/m ² /Year
Max. energy savings	1,752.5 kWh
Max. reduction in CO2 emissions	940 kg

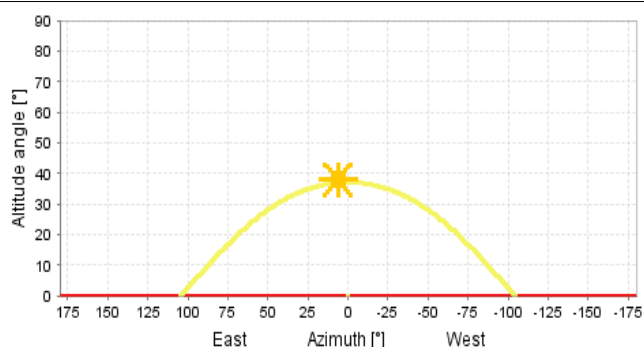
Overview heat pump (annual values)

Seasonal performance factor (without pump energy)	3.7
Total electrical energy consumption when heating [Eaux]	5,562.9 kWh
Total energy savings	15,294.2 kWh
Total reduction in CO ₂ emissions	8,203.8 kg

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



Horizon line



Meteorological data-Overview

Average outdoor temperature	5.8 °C
Global irradiation, annual sum	966.3 kWh/m ²
Diffuse irradiation, annual sum	440.3 kWh/m ²

Component overview (annual values)

B/W or W/W heat pump	Thermalia® 5P	
Seasonal performance factor (without pump energy)		3.75
Energy from/to the system [Qaux]	kWh	20,857.1
CO ₂ emissions	kg	2,983.9
Fuel and electrical energy consumption [Eaux]	kWh	5,562.9
Energy savings solar thermal	kWh	1,752.5
CO ₂ savings solar thermal	kg	940
Energy savings heat pump	kWh	15,294.2
CO ₂ savings heat pump	kg	8,203.8

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	6,570.5
Irradiation onto collector area [Esol]	kWh	9,434.7
Collector efficiency [Qsol / Esol]	%	69.6
Direct irradiation after IAM	kWh	5,243.1
Diffuse irradiation after IAM	kWh	3,581.4

Building	-	
Heated/air-conditioned living area	m ²	150
Heating setpoint temperature	°C	21
Heating energy demand excluding DHW [Qdem]	kWh	15,500
Annual specific heating energy demand	kWh/m ²	103.3
Useful heat gain	kWh	31,000
Total energy losses	kWh	46,499.9

Convactor	Floor heating 1000W	
Number of heating/cooling modules	-	13
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	15,384.8

Hot water demand	Constant	
Volume withdrawal/daily consumption	l/d	202
Temperature setting	°C	50
Energy demand [Qdem]	kWh	3,790.7

Pump 2	Pump Eco, small	
Circuit pressure drop	bar	0.004
Flow rate	l/h	660
Fuel and electrical energy consumption [Epar]	kWh	19.5

Pump 4	Pump Eco, small	
Circuit pressure drop	bar	0.005
Flow rate	l/h	619.1
Fuel and electrical energy consumption [Epar]	kWh	14

Pump 5	Pump Eco, small	
Circuit pressure drop	bar	0.088
Flow rate	l/h	2,640
Fuel and electrical energy consumption [Epar]	kWh	19.5

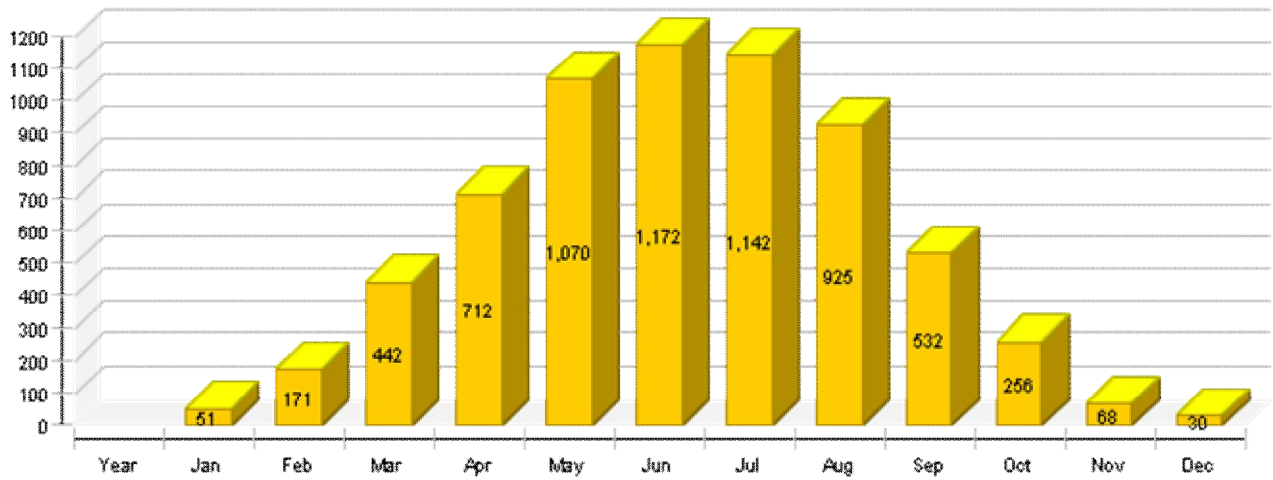
Pump 6	Pump Eco, small	
Circuit pressure drop	bar	97.18
Flow rate	l/h	3,600
Fuel and electrical energy consumption [Epar]	kWh	9.1

Storage tank 11	Combined solar tank HTS 1450	
Volume	l	1,450
Height	m	2.19
Material		Steel
Insulation		Rigid PU foam
Thickness of insulation	mm	80
Heat loss	kWh	784.5
Connection losses	kWh	529.4

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	-2,269.6
Connection losses	kWh	-50

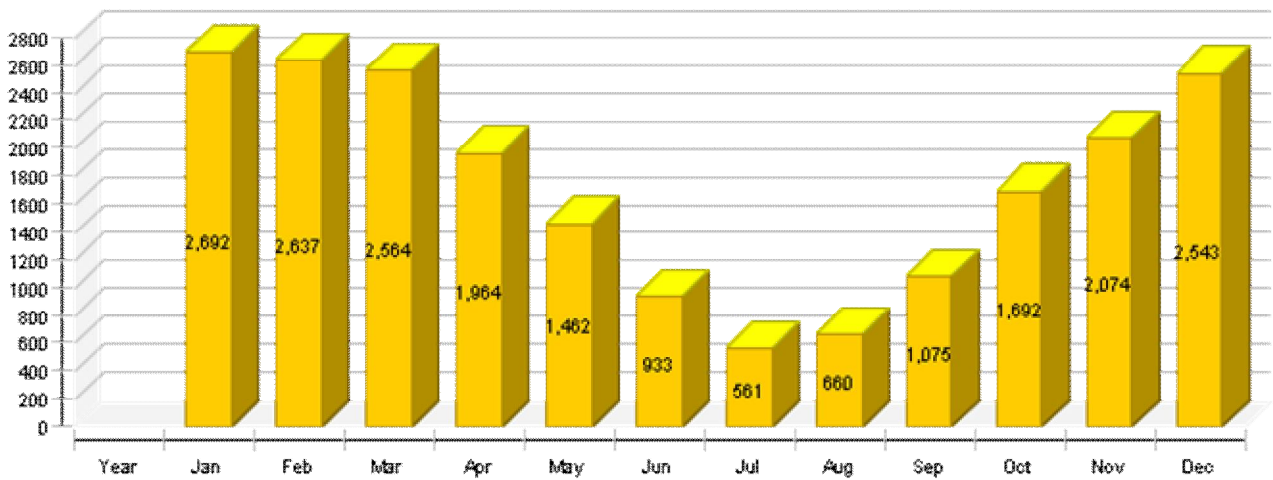
Solar thermal energy to the system [Qsol]

kWh



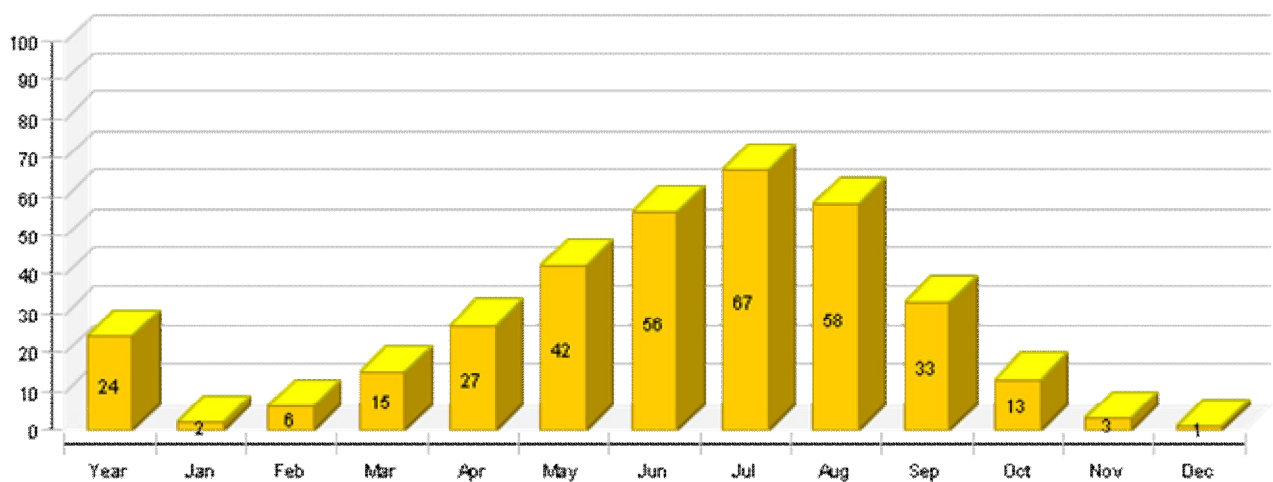
Heat generator energy to the system (solar thermal energy not included) [Qaux]

kWh



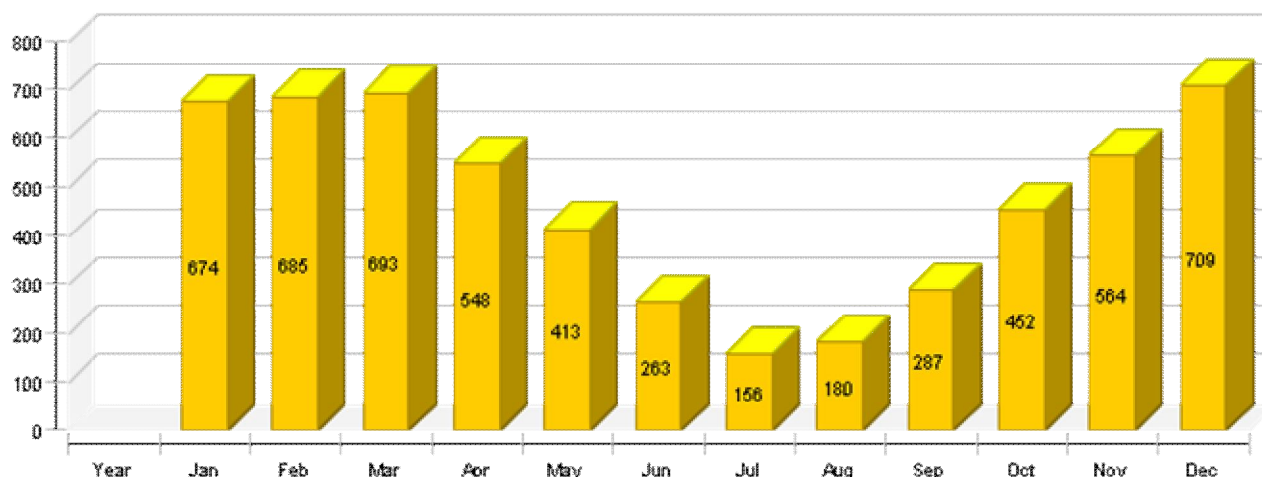
Solar fraction: fraction of solar energy to system [SF_n]

%



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	6571	51	171	442	712	1070	1172	1142	925	532	256	68	30
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Heat generator energy to the system (solar thermal energy not included) [Qaux]

kWh	20857	2692	2637	2564	1964	1462	933	561	660	1075	1692	2074	2543
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Heat generator fuel and electrical energy consumption [Eaux]

kWh	5563	668	678	686	542	408	259	154	177	284	447	559	702
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Solar fraction: fraction of solar energy to system [SFn]

%	24	1.9	6.1	14.7	26.6	42.3	55.7	67	58.4	33.1	13.2	3.2	1.2
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Total fuel and/or electrical energy consumption of the system [Etot]

kWh	5625	674	685	693	548	413	263	156	180	287	452	564	709
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Irradiation onto collector area [Esol]

kWh	9435	149	379	771	1071	1467	1522	1446	1202	764	426	154	82
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Electrical energy consumption of pumps [Epar]

kWh	62	7	7	7	6	5	4	3	3	4	5	6	7
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Heat loss to indoor room (including heat generator losses) [Qint]

kWh	-442	102	16	-51	-85	-102	-88	-54	-14	6	-7	-49	-116
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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	18985	2521	2503	2379	1804	1299	783	413	510	927	1535	1906	2406
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Collector 2

Daily maximum temperature [°C]

