Version 7.2.15

PVsyst - Simulation report

Grid-Connected System

Project: Kopellis_ Fixed

Variant: 100KW Fixed

Sheds on ground

System power: 100 kWp

Thessaloniki/Livadákion - Greece

Author

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Project summary

Geographical Site
Thessaloniki/Livadákion
Greece

Situation

Latitude	40.52 °N
Longitude	22.97 °E
Altitude	4 m
Time zone	UTC+2

Project settings
Albedo 0.20

Meteo data
Thessaloniki/Livadákion
Meteonorm 8.0 (1994-2006), Sat=14% - Synthetic

System summary

Grid-Connected System
Sheds on ground

PV Field Orientation
horizontal plane

Near Shadings
Linear shadings

User's needs
Unlimited load (grid)

System information

PV Array		Inverters	
Nb. of modules	189 units	Nb. of units	1 unit
Pnom total	100 kWp	Pnom total	111 kWac
		Pnom ratio	0.902

Results summary

Produced Energy	139.1 MWh/year	Specific production	1388 kWh/kWp/year	Perf. Ratio PR	89.10 %

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General parameters

Grid-Connected System

Sheds on ground

PV Field Orientation

Orientation	
horizontal plane	

Sheds configuration

Nb. of sheds	241 units

Sizes

Sheds spacing	1.16 m
Collector width	1.13 m
Ground Cov. Ratio (GCR)	97.9 %

Shading limit angle

Limit profile angle	0.0 °

Models used

Transposition	Perez
Diffuse	Perez, Meteonorm
Circumsolar	separate

Horizon

Average Height	7.4 °

Near Shadings

Linear shadings

User's needs

Unlimited load (grid)

PV Array Characteristics

PV module

Manufacturer	Generic
Model	JKM530M-72HL4-BDVP
(Custom parameters definition)	
Unit Nom. Power	530 Wp
Number of PV modules	189 units
Nominal (STC)	100 kWp
Modules	7 Strings x 27 In series
At operating cond. (50°C)	
Pmpp	91.5 kWp
U mpp	995 V
I mpp	92 A

Inverter

Manufacturer	Generic
Model	SG111-HV
(Original PVsyst database)	
Unit Nom. Power	111 kWac
Number of inverters	1 unit
Total power	111 kWac
Operating voltage	780-1450 V
Pnom ratio (DC:AC)	0.90

Total PV power

Nominal (STC)	100 kWp
Total	189 modules
Module area	487 m²
Cell area	449 m²

Total inverter power

Total power	111 kWac
Number of inverters	1 unit
Pnom ratio	0.90

Array losses

Array Soiling Losses

Loss Fraction	1.5 %

Thermal Loss factor

Module temperature according to irradiance	
Uc (const)	29.0 W/m²K
Uv (wind)	0.0 W/m²K/m/s

DC wiring losses

Global array res.	119 mΩ
Loss Fraction	1.0 % at STC

Module Quality Loss

Loss Fraction	0.0 %

Module mismatch losses

Loss Fraction	0.6 % at MPP

IAM loss factor

Incidence effect (IAM): User defined profile

0°	30°	50°	60°	70°	75°	80°	85°	90°
1.000	1.000	1.000	1.000	0.989	0.967	0.924	0.729	0.000

System losses

Auxiliaries loss

Proportionnal to Power	4.0 W/kW

0.0 kW from Power thresh.

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AC wiring losses

Inv. output line up to MV transfo

Inverter voltage	540 Vac tri
Loss Fraction	0.19 % at STC

Inverter: SG111-HV

Wire section (1 Inv.)	Copper 1 x 3 x 240 mm²
Wires length	70 m

AC losses in transformers

MV transfo

Grid voltage	20 kV

Operating losses at STC

Nominal power at STC	99 kVA
Iron loss (24/24 Connexion)	0.10 kW
Loss Fraction	0.10 % at STC
Coils equivalent resistance	3 x 29.43 mΩ
Loss Fraction	1.00 % at STC

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Horizon definition

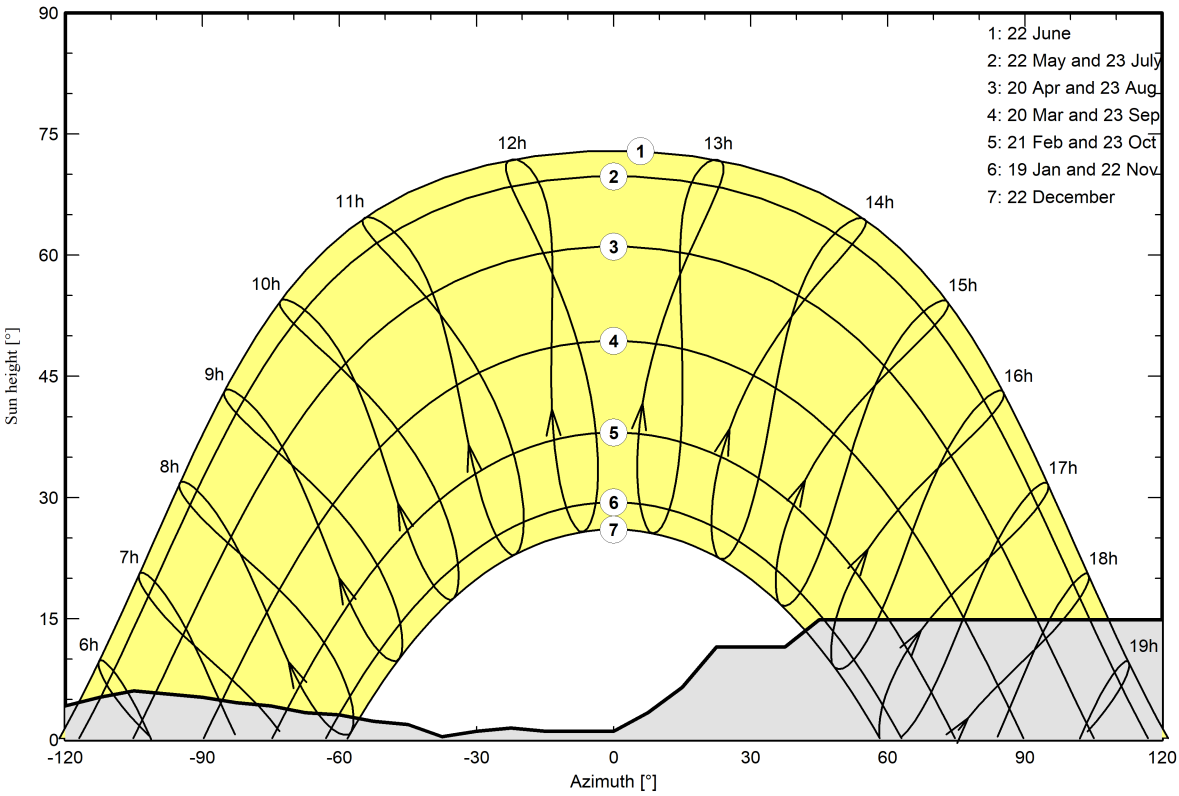
Horizon from PVGIS website API, Lat=39°37"58', Long=22°13"41', Alt=153m

Average Height	7.4 °	Albedo Factor	0.00
Diffuse Factor	0.97	Albedo Fraction	100 %

Horizon profile

Azimuth [°]	-180	-173	-165	-158	-143	-135	-128	-120	-113	-105	-98	-90
Height [°]	1.9	3.4	4.6	5.7	7.3	6.5	4.6	4.2	5.3	6.1	5.7	5.3
Azimuth [°]	-83	-75	-68	-60	-53	-45	-38	-30	-23	-15	0	8
Height [°]	4.6	4.2	3.4	3.1	2.3	1.9	0.4	1.1	1.5	1.1	1.1	3.4
Azimuth [°]	15	23	38	45	135	143	150	158	165	173	180	
Height [°]	6.5	11.5	11.5	14.9	14.9	8.0	8.0	5.3	1.9	1.5	1.9	

Sun Paths (Height / Azimuth diagram)



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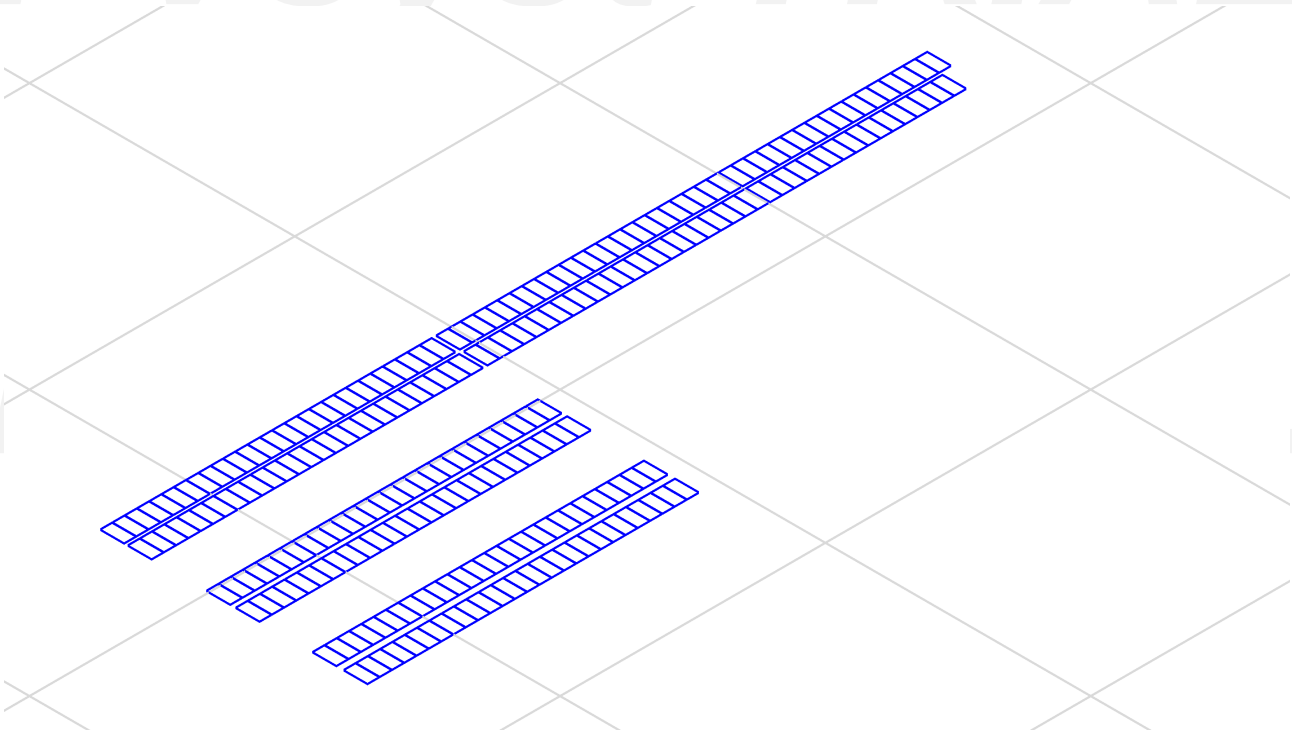
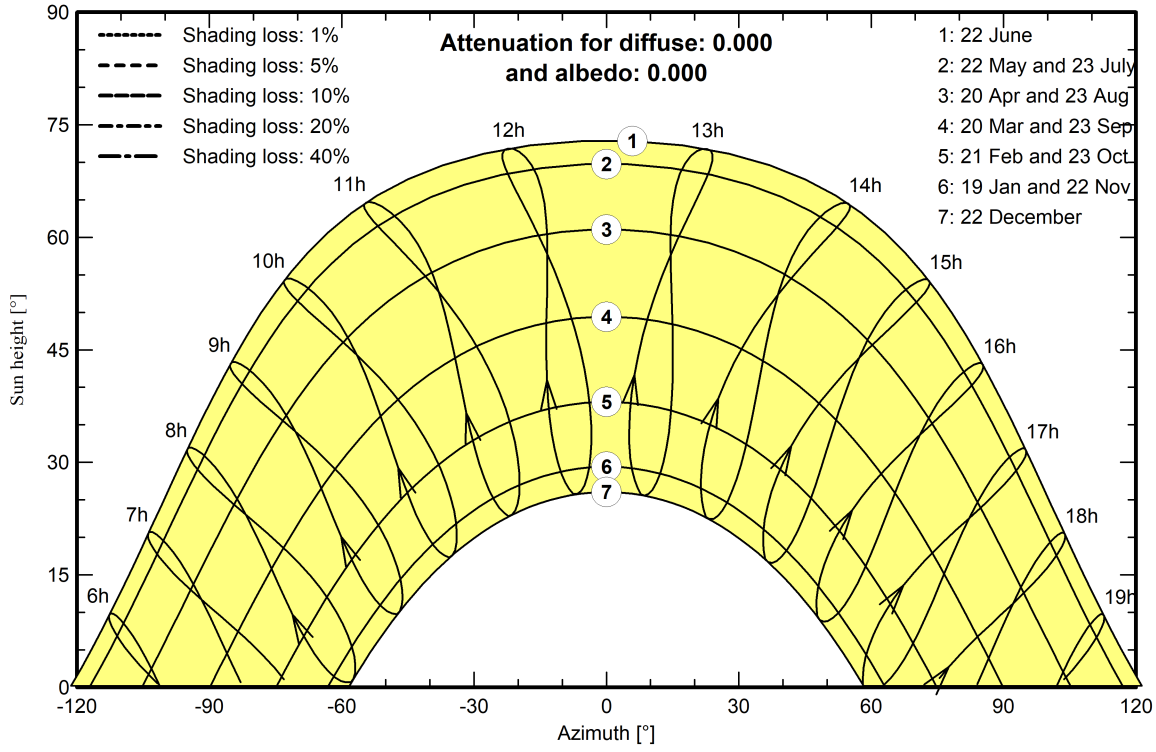
Near shadings parameter

Perspective of the PV-field and surrounding shading scene



Iso-shadings diagram

Orientation #1



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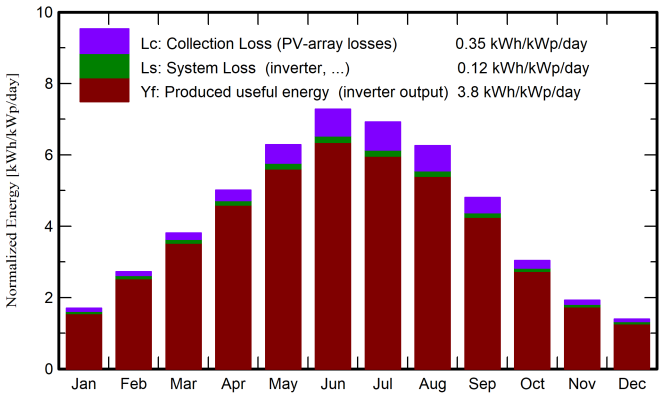
Main results

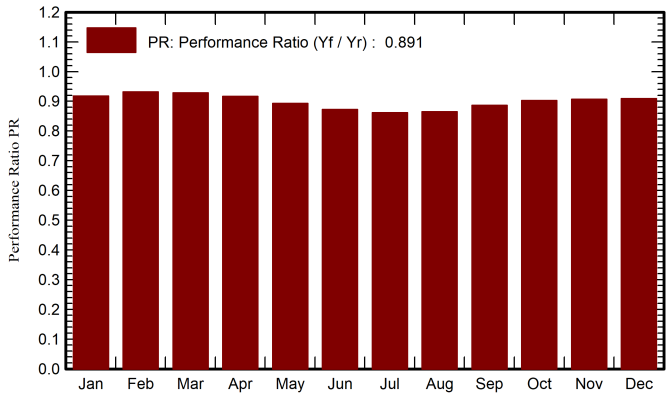
System Production

Produced Energy	139.1 MWh/year	Specific production	1388 kWh/kWp/year
		Performance Ratio PR	89.10 %

Normalized productions (per installed kWp)



Performance Ratio PR



Balances and main results

	GlobHor kWh/m²	DiffHor kWh/m²	T_Amb °C	GlobInc kWh/m²	GlobEff kWh/m²	EArray MWh	E_Grid MWh	PR ratio
January	52.6	29.21	4.95	52.6	49.1	5.03	4.83	0.917
February	76.4	39.36	6.71	76.3	72.6	7.36	7.12	0.931
March	118.0	57.36	9.91	117.9	113.4	11.30	10.97	0.929
April	150.3	77.02	13.73	150.3	145.3	14.21	13.81	0.917
May	195.0	84.41	19.52	194.9	188.7	17.93	17.43	0.893
June	218.4	75.24	24.54	218.4	212.2	19.64	19.10	0.873
July	214.7	82.15	27.83	214.7	208.1	19.06	18.53	0.862
August	194.0	76.29	27.71	193.9	187.6	17.26	16.79	0.865
September	144.2	53.93	21.67	144.1	138.9	13.18	12.80	0.886
October	94.1	43.87	16.53	94.1	89.6	8.78	8.50	0.902
November	57.9	29.79	11.46	57.8	54.6	5.46	5.25	0.907
December	43.4	24.96	6.66	43.3	40.6	4.14	3.95	0.909
Year	1559.1	673.58	15.99	1558.3	1500.7	143.33	139.08	0.891

Legends

GlobHor	Global horizontal irradiation	EArray	Effective energy at the output of the array
DiffHor	Horizontal diffuse irradiation	E_Grid	Energy injected into grid
T_Amb	Ambient Temperature	PR	Performance Ratio
GlobInc	Global incident in coll. plane		
GlobEff	Effective Global, corr. for IAM and shadings		

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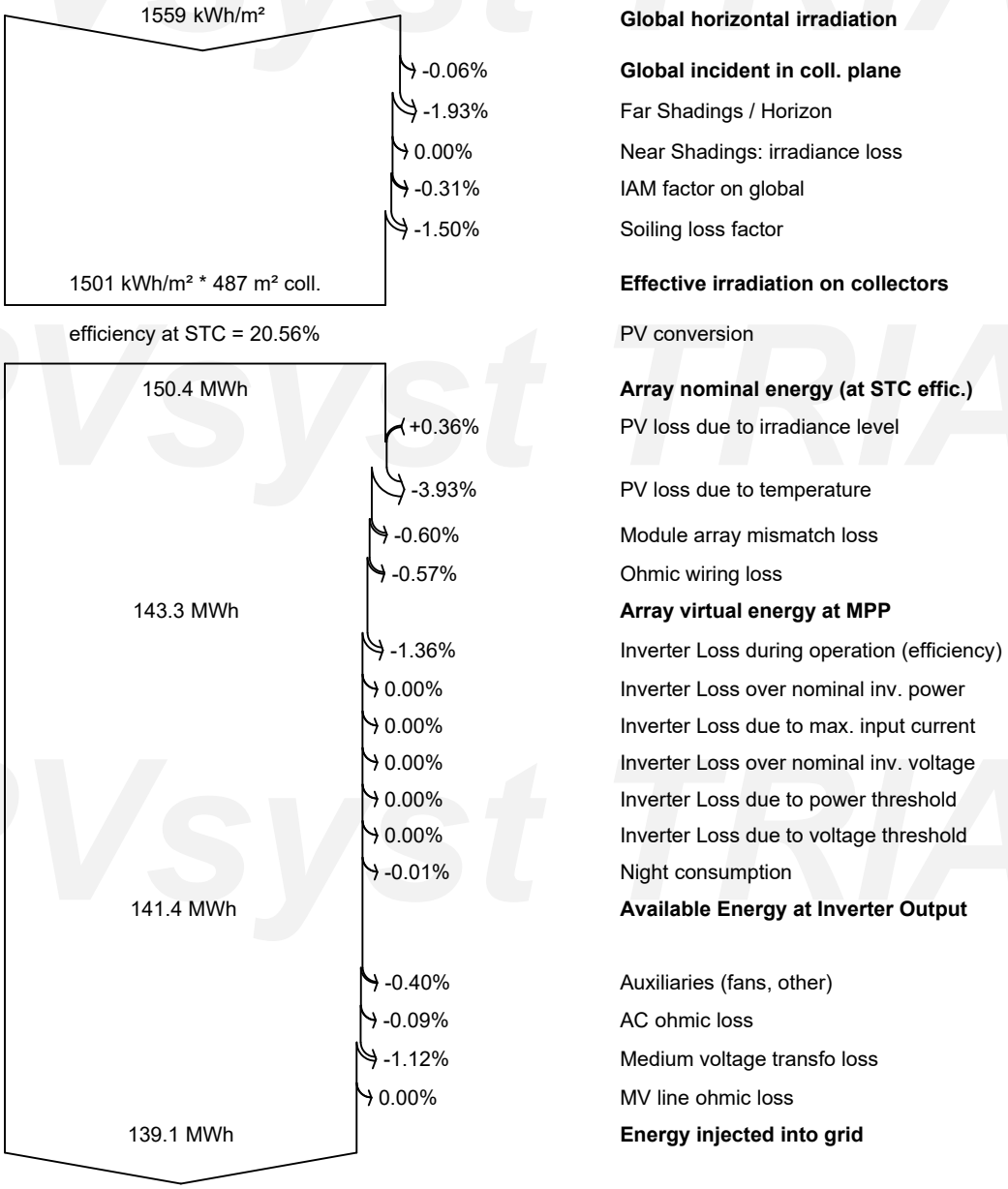
Loss diagram



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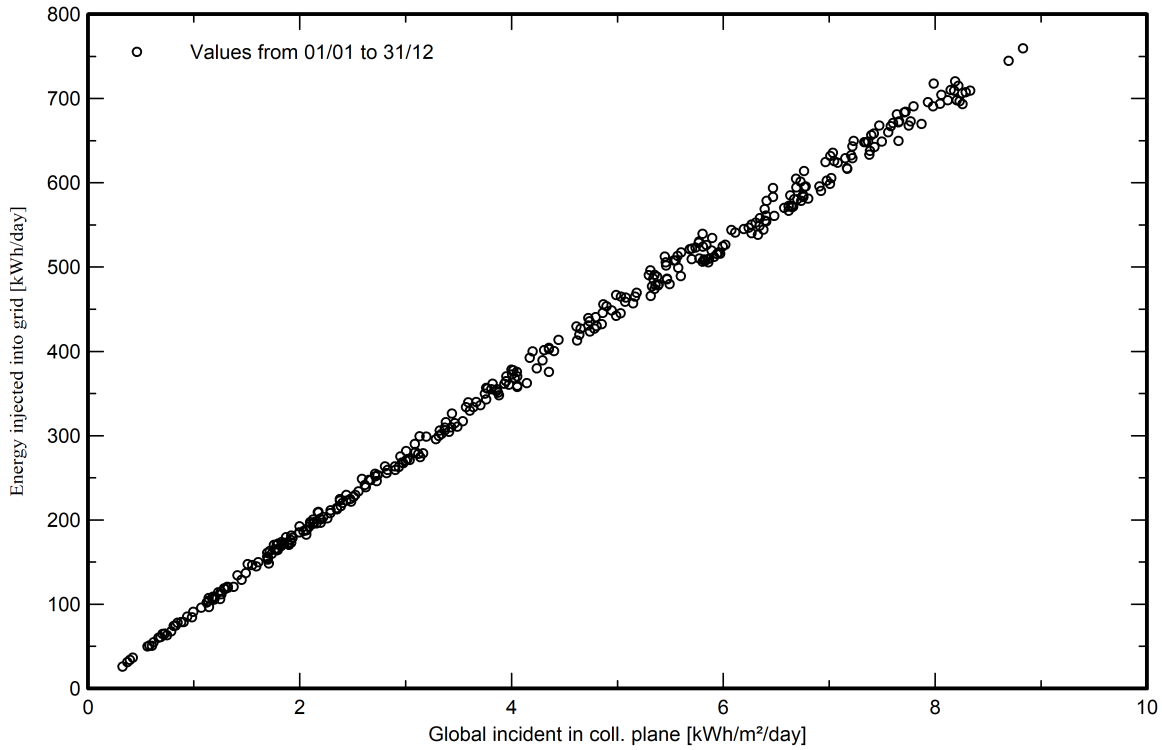
Special graphs

Daily Input/Output diagram



System Output Power Distribution