

PVsyst - Simulation report

Grid-Connected System

Project: Proyecto

Variant: VARIANTE 1 HOTEL BARI TAURO 50KW Y SOLIS 30KW

Tables on a building

System power: 86.1 kWp

HBari - Colombia



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PVsyst V8.0.21

VCO, Simulation date:
16/04/26 09:59
with V8.0.21

Project summary

Geographical Site

HBarí
Colombia

Situation

Latitude 7.12 °(N)
Longitude -73.11 °(W)
Altitude 1000 m
Time zone UTC-5

Project settings

Albedo 0.20

Weather data

HBarí
Meteonorm 8.2 (2016-2021), Sat=100% - Sintético

System summary

Grid-Connected System

Orientation #1

Fixed plane

Tilt/Azimuth 8 / -8.6 °

System information

PV Array

Nb. of modules 118 units
Pnom total 86.1 kWp

Tables on a building

Near Shadings

Detailed electrical calculation
acc. to module layout : Slow (simul.)

User's needs

Unlimited load (grid)

Inverters

Nb. of units 2 units
Total apparent power 50 kVA
Total active power 30 kWac
Pnom ratio 1.08

Results summary

Produced Energy	133.97 MWh/year	Specific production	1555 kWh/kWp/year	Perf. Ratio PR	80.60 %
Apparent energy	141.18 MVAh/year				

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General parameters

Grid-Connected System

Orientation #1

Fixed plane

Tilt/Azimuth 8 / -8.6 °

Near Shadings

Detailed electrical calculation
acc. to module layout : Slow (simul.)

Grid injection point

Power factor

Cos(phi) (lagging) 0.950

Tables on a building

Models used

Transposition Perez
Diffuse Perez, Meteonorm
Circumsolar separate

Horizon

Average Height 5.0 °

User's needs

Unlimited load (grid)

PV Array Characteristics

Array #1 - TAURO50KW

PV module

Manufacturer Generic
Model ZXM8-GPLDD132-730
(Custom parameters definition)
ZXM8-GPLDD132-730.PAN
Unit Nom. Power 730 Wp
Number of PV modules 75 units
Nominal (STC) 54.8 kWp
Modules 5 string x 15 In series

At operating cond. (50°C)

Pmpp 50.6 kWp
U mpp 572 V
I mpp 89 A

PV module

Manufacturer Generic
Model ZXM8-GPLDD132-730
(Custom parameters definition)
ZXM8-GPLDD132-730.PAN
Unit Nom. Power 730 Wp

Array #2 - 30KW

Number of PV modules 33 units
Nominal (STC) 24.09 kWp
Modules 3 string x 11 In series

At operating cond. (50°C)

Pmpp 22.28 kWp
U mpp 419 V
I mpp 53 A

Array #3 - Subconjunto #3

Number of PV modules 10 units
Nominal (STC) 7.30 kWp
Modules 1 strings x 10 In series

At operating cond. (50°C)

Pmpp 6.75 kWp
U mpp 381 V
I mpp 18 A

Inverter

Manufacturer Generic
Model Tauro Eco 50-3-D 208-220
(Custom parameters definition)
Unit Nom. Power 50.0 kVA
Number of inverters 1 unit
Total power 50.0 kVA
Operating voltage 500-850 V
Pnom ratio (DC:AC) 1.10
Leading limit Cos(phi) min 0.100
Lagging limit Cos(phi) min 0.100

Inverter

Manufacturer Generic
Model S5-GC30K-LV
(Original PVsyst database)
Unit Nom. Power 30.0 kWac

Number of inverters 3 * MPPT 25% 0.8 unit
Total power 22.5 kWac

Operating voltage 180-1000 V
Pnom ratio (DC:AC) 1.07
Leading limit Cos(phi) min 0.800
Lagging limit Cos(phi) min 0.800
No power sharing between MPPTs

Number of inverters 1 * MPPT 25% 0.3 unit
Total power 7.5 kWac

Operating voltage 180-1000 V
Pnom ratio (DC:AC) 0.97
Leading limit Cos(phi) min 0.800
Lagging limit Cos(phi) min 0.800



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PV Array Characteristics

Total PV power

Nominal (STC)	86 kWp
Total	118 modules
Module area	367 m ²
Cell area	343 m ²

Total inverter power

Inverter PNom limit mixed, 63% apparent power	
Total apparent power	50 kVA
Total active power	30 kWac
Number of inverters	2 units
Pnom ratio	1.08
No power sharing	

Array losses

Array Soiling Losses

Loss Fraction	3.0 %
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Thermal Loss factor

Module temperature according to irradiance	
Uc (const)	29.0 W/m ² K
Uv (wind)	0.0 W/m ² K/m/s

Serie Diode Loss

Voltage drop	0.7 V
Loss Fraction	0.1 % at STC

LID - Light Induced Degradation

Loss Fraction	1.27 %
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Module Quality Loss

Loss Fraction	-1.25 %
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Module mismatch losses

Array #1 - TAURO50KW

Loss Fraction	2.00 % at MPP
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Array #2 - 30KW

Loss Fraction	2.00 % at MPP
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Array #3 - Subconjunto #3

Loss Fraction	2.00 % at MPP
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IAM loss factor

Incidence effect (IAM): Fresnel, AR coating, n(glass)=1.526, n(AR)=1.290

0°	30°	50°	60°	70°	75°	80°	85°	90°
1.000	0.999	0.987	0.963	0.892	0.814	0.679	0.438	0.000

DC wiring losses

Global wiring resistance	6.0 mΩ
Loss Fraction	0.18 % at STC

Array #1 - TAURO50KW

Global array res.	13 mΩ
Loss Fraction	0.18 % at STC

Array #2 - 30KW

Global array res.	16 mΩ
Loss Fraction	0.18 % at STC

Array #3 - Subconjunto #3

Global array res.	42 mΩ
Loss Fraction	0.18 % at STC

System losses

Unavailability of the system

Time fraction	0.5 %
	2.0 days,
	2 periods



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AC wiring losses

Inv. output line up to injection point

Inverter voltage	220 Vac tri
Loss Fraction	0.98 % at STC

Inverters: Tauro Eco 50-3-D 208-220, S5-GC30K-LV

Wire section (2 Inv.)	Copper 2 x 3 x 95 mm ²
Average wires length	54 m



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Horizon definition

Horizon from Meteonorm web service, Lat=7°6'58", Long=-73°6'30"

Average Height	5.0 °	Albedo Factor	0.87
Diffuse Factor	0.98	Albedo Fraction	100 %

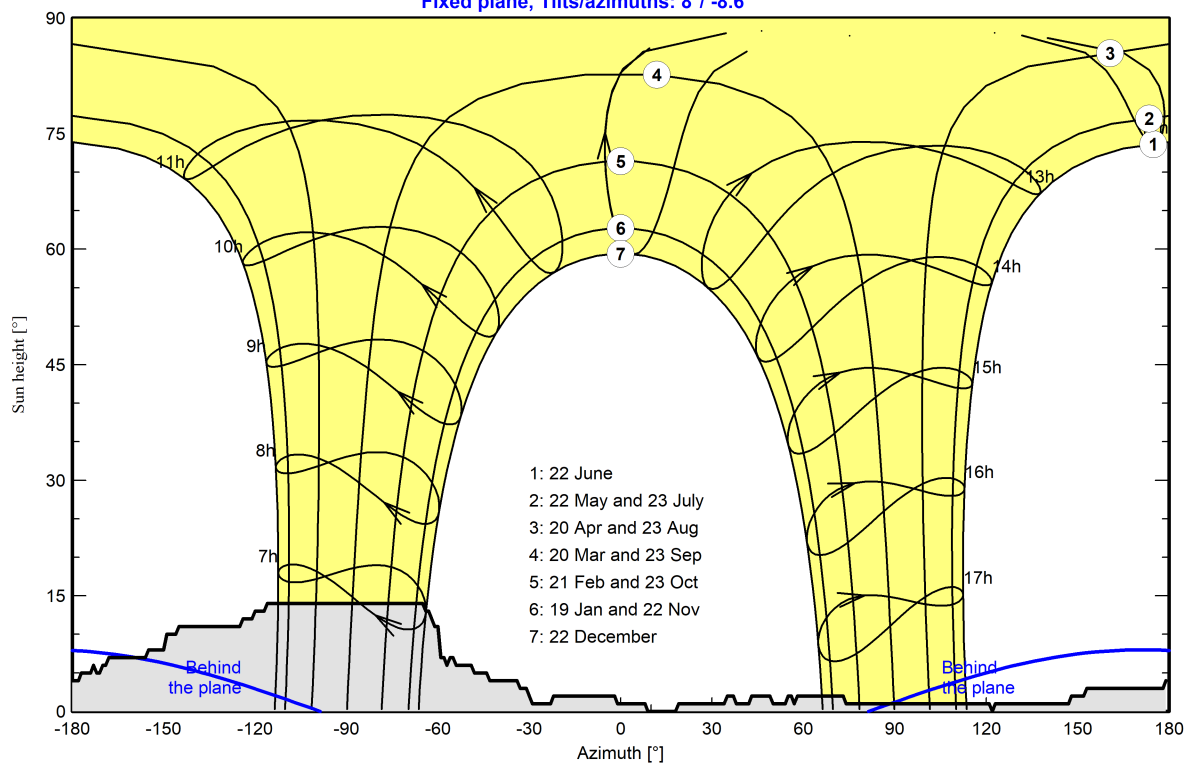
Horizon profile

Azimuth [°]	-180	-178	-177	-173	-171	-170	-168	-156	-155	-146	-145	-125	-124	-120
Height [°]	4.0	4.0	5.0	6.0	5.0	6.0	7.0	7.0	8.0	10.0	11.0	11.0	12.0	13.0
Azimuth [°]	-117	-116	-65	-63	-61	-60	-59	-57	-56	-55	-54	-48	-44	-43
Height [°]	13.0	14.0	14.0	13.0	11.0	11.0	7.0	6.0	7.0	7.0	6.0	5.0	5.0	4.0
Azimuth [°]	-34	-31	-29	-23	-22	-1	8	9	18	34	35	37	38	43
Height [°]	4.0	3.0	1.0	1.0	2.0	1.0	1.0	0.0	0.0	1.0	2.0	2.0	1.0	2.0
Azimuth [°]	49	50	54	56	57	58	73	121	122	147	152	153	178	179
Height [°]	2.0	1.0	1.0	2.0	1.0	2.0	2.0	1.0	0.0	1.0	2.0	3.0	3.0	4.0

Sun Paths (Height / Azimuth diagram)

Orientation #1

Fixed plane, Tilts/azimuths: 8°/-8.6°



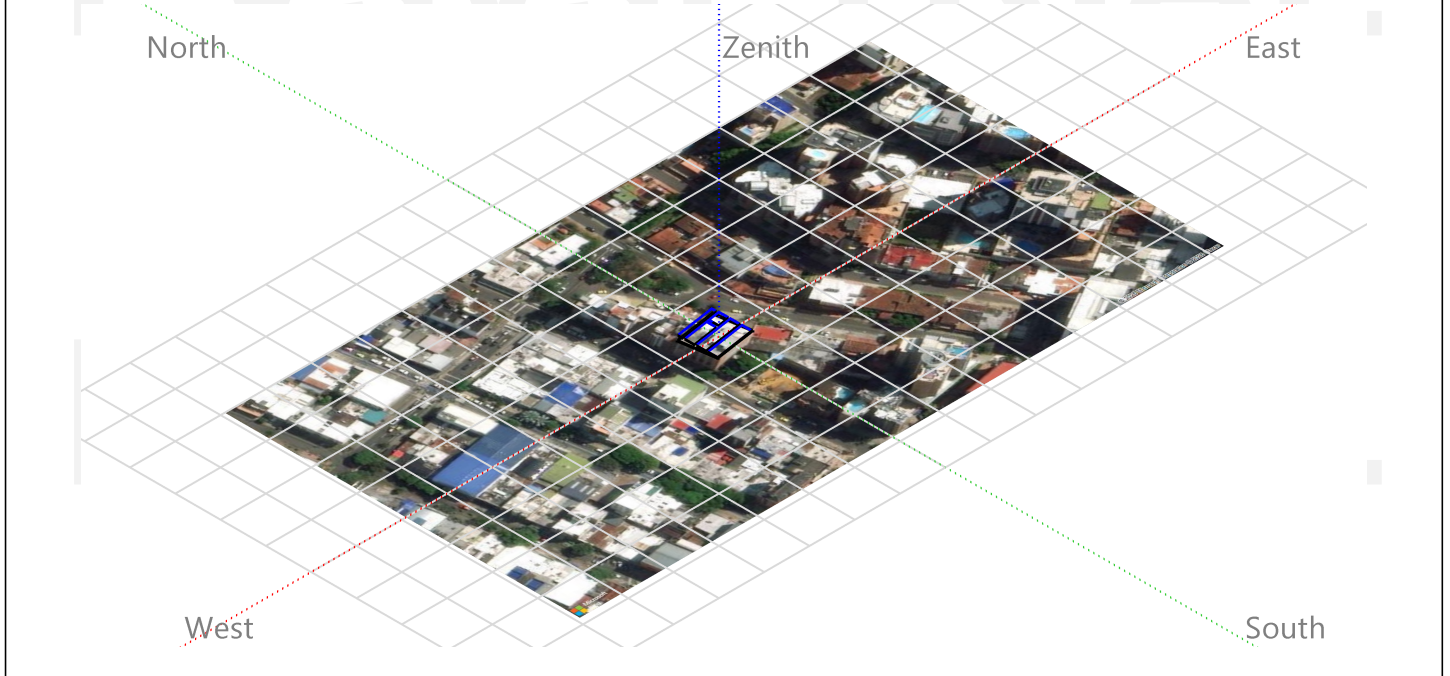


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Near shadings parameter

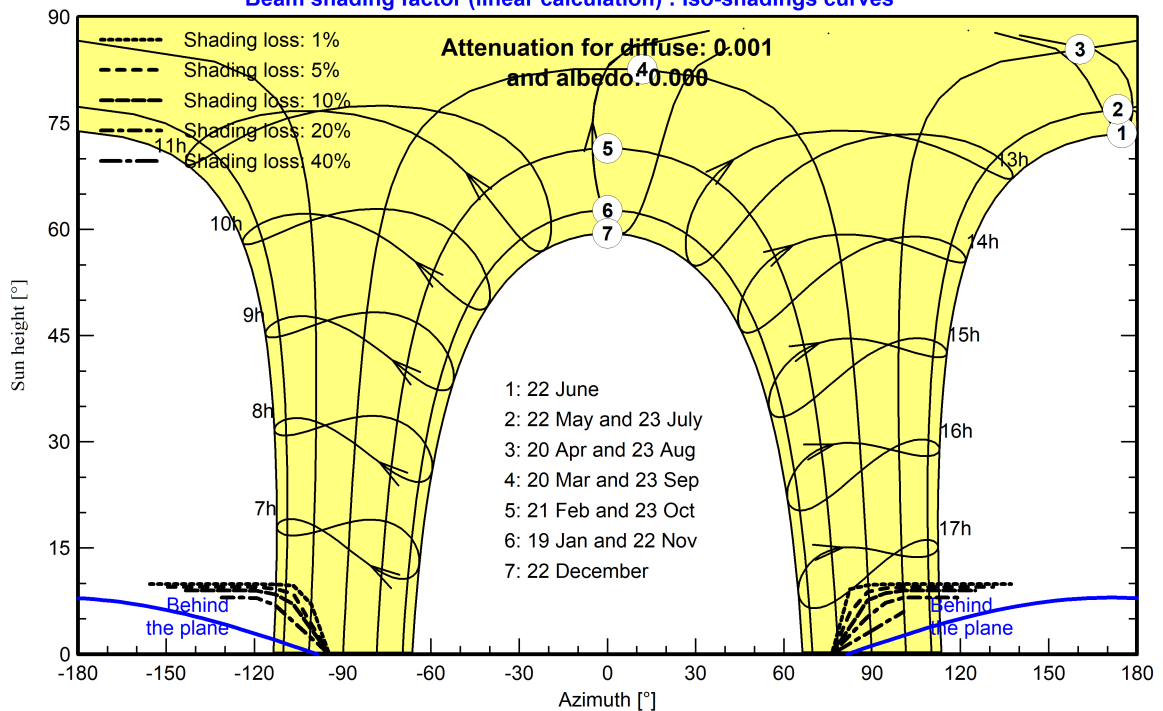
Perspective of the PV-field and surrounding shading scene



Iso-shadings diagram

Orientation #1 - Fixed plane, Tilts/azimuths: 8°/-8.6°

Beam shading factor (linear calculation) : Iso-shadings curves





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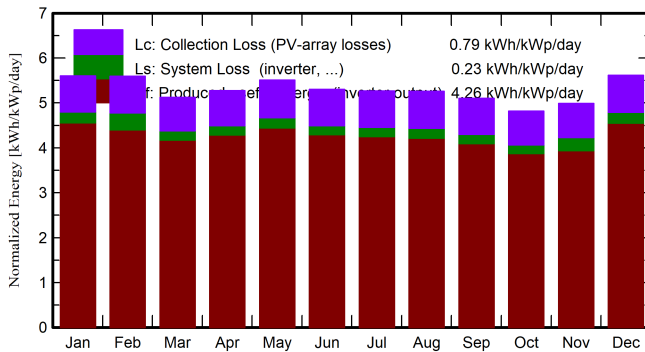
Main results

System Production

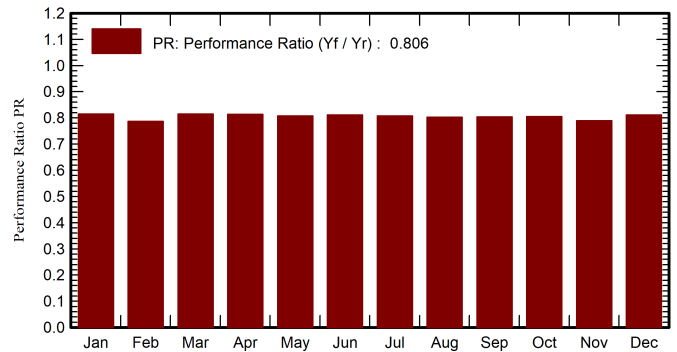
Produced Energy 133.97 MWh/year
Apparent energy 141.18 MVAh/year

Specific production 1555 kWh/kWp/year
Perf. Ratio PR 80.60 %

Normalized productions (per installed kWp)



Performance Ratio PR



Balances and main results

	GlobHor kWh/m ²	DiffHor kWh/m ²	T_Amb °C	GlobInc kWh/m ²	GlobEff kWh/m ²	EArray MWh	E_Grid MWh	PR ratio
January	163.1	68.03	25.84	173.6	163.5	12.82	12.19	0.815
February	150.5	61.63	26.14	156.7	147.7	11.54	10.62	0.787
March	156.8	82.07	26.60	158.8	149.6	11.71	11.15	0.815
April	160.3	81.62	26.51	158.2	148.2	11.63	11.09	0.814
May	177.6	62.56	27.47	170.8	160.1	12.48	11.88	0.807
June	167.5	68.35	27.10	159.0	148.4	11.63	11.10	0.811
July	171.6	64.78	27.68	163.4	152.6	11.92	11.37	0.808
August	167.7	62.00	28.23	163.0	152.7	11.85	11.27	0.803
September	153.2	70.28	27.99	153.0	143.3	11.13	10.60	0.804
October	145.3	69.48	27.69	149.3	139.7	10.86	10.35	0.805
November	142.3	74.06	26.10	149.7	139.3	10.94	10.18	0.790
December	161.6	58.52	26.08	174.1	163.4	12.81	12.17	0.811
Year	1917.5	823.40	26.96	1929.6	1808.4	141.33	133.97	0.806

Legends

GlobHor Global horizontal irradiation
DiffHor Horizontal diffuse irradiation
T_Amb Ambient Temperature
GlobInc Global incident in coll. plane
GlobEff Effective Global, corr. for IAM and shadings

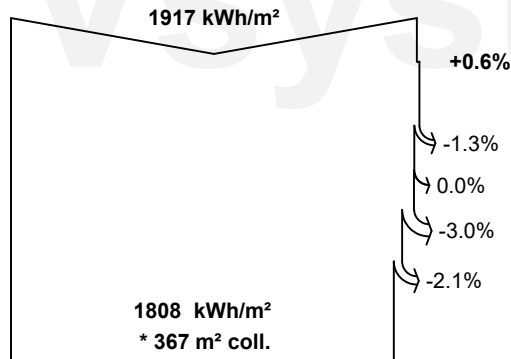
EArray Effective energy at the output of the array
E_Grid Energy injected into grid
PR Performance Ratio



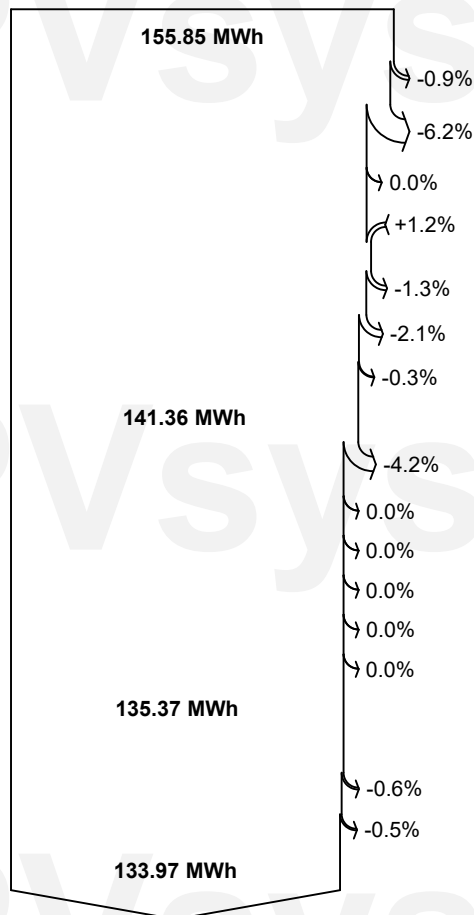
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Loss diagram



efficiency at STC = 23.51%



44.54 MVARh

141.18 MVAh

Global horizontal irradiation

Global incident in coll. plane

Far Shadings / Horizon

Near Shadings: irradiance loss

Soiling loss factor

IAM factor on global

Effective irradiation on collectors

PV conversion

Array nominal energy (at STC effic.)

PV loss due to irradiance level

PV loss due to temperature

Shadings: Electrical Loss detailed module calc.

Module quality loss

LID - Light induced degradation

Mismatch loss, modules and strings

Ohmic wiring loss

Array virtual energy at MPP

Inverter Loss during operation (efficiency)

Inverter Loss over nominal inv. power

Inverter Loss due to max. input current

Inverter Loss over nominal inv. voltage

Inverter Loss due to power threshold

Inverter Loss due to voltage threshold

Available Energy at Inverter Output

AC ohmic loss

System unavailability

Active Energy injected into grid

Reactive energy to the grid, Yearly effective $\cos(\Phi) = 0.950$

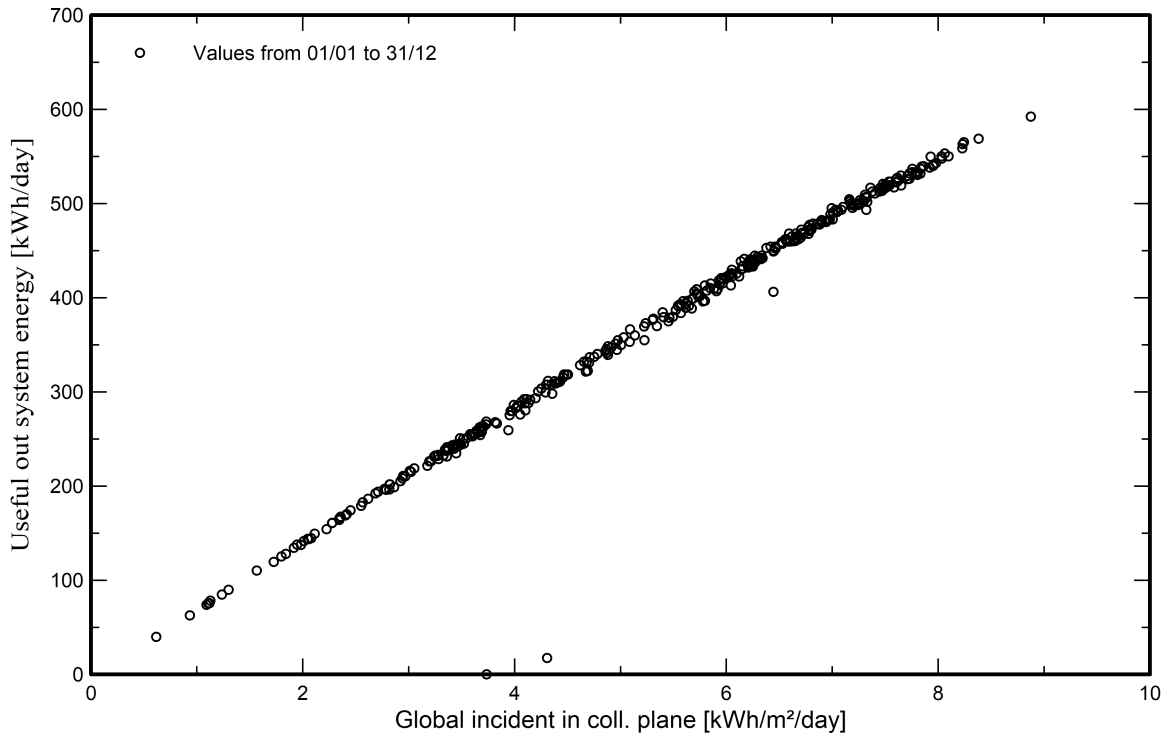
Apparent energy to the grid



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Predef. graphs
Daily Input/Output diagram



System Output Power Distribution

