

PVsyst - Simulation report

Grid-Connected System

Project: IRD

Variant: Nouvelle variante de simulation

Tables on a building

System power: 71.3 kWp

IRD - French Guiana

Author

BET ER2E (Mayotte)

**PVsyst V7.4.8**

VC2, Simulation date:
07/01/25 07:24
with V7.4.8

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Project summary**Geographical Site**

IRD
French Guiana

Situation

Latitude 4.95 °N
Longitude -52.32 °W
Altitude 14 m
Time zone UTC-3

Project settings

Albedo 0.20

Weather data

Cité Rebard
Meteonorm 8.1 (2016-2021), Sat=100 % - Synthétique

System summary**Grid-Connected System****PV Field Orientation**

Fixed planes 4 orientations
Tilts/azimuths 11.8 / 69.4 °
17.7 / -110.6 °
23.6 / -20.6 °
23.6 / 159.4 °

Tables on a building**Near Shadings**

Linear shadings : Fast (table)

User's needs

Unlimited load (grid)

System information**PV Array**

Nb. of modules 174 units
Pnom total 71.3 kWp

Inverters

Nb. of units 2 units
Pnom total 70.0 kWac
Pnom ratio 1.019

Results summary

Produced Energy 103261 kWh/year Specific production 1447 kWh/kWp/year Perf. Ratio PR 81.75 %

Table of contents

Project and results summary	2
General parameters, PV Array Characteristics, System losses	3
Near shading definition - Iso-shadings diagram	6
Main results	8
Loss diagram	9
Predef. graphs	10



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General parameters

Grid-Connected System

PV Field Orientation

Orientation

Fixed planes 4 orientations
Tilts/azimuths 11.8 / 69.4 °
17.7 / -110.6 °
23.6 / -20.6 °
23.6 / 159.4 °

Horizon

Free Horizon

Tables on a building

Sheds configuration

Nb. of sheds 174 units
Several orientations

Near Shadings

Linear shadings : Fast (table)

Models used

Transposition Perez
Diffuse Perez, Meteonorm
Circumsolar separate

User's needs

Unlimited load (grid)

PV Array Characteristics

PV module

Manufacturer Jinkosolar
Model JKM-410M-54HL4
(Original PVsyst database)
Unit Nom. Power 410 Wp
Number of PV modules 88 units
Nominal (STC) 36.1 kWp

Array #1 - GARAGE PAN 1

Orientation #4
Tilt/Azimuth 24/159 °
Number of PV modules 44 units
Nominal (STC) 18.04 kWp
Modules 2 string x 22 In series

At operating cond. (50°C)

Pmpp 16.49 kWp
U mpp 619 V
I mpp 27 A

Array #2 - GARAGE PAN 2

Orientation #3
Tilt/Azimuth 24/-21 °
Number of PV modules 44 units
Nominal (STC) 18.04 kWp
Modules 2 string x 22 In series

At operating cond. (50°C)

Pmpp 16.49 kWp
U mpp 619 V
I mpp 27 A

PV module

Manufacturer Jinkosolar
Model JKM-410M-54HL4
(Original PVsyst database)
Unit Nom. Power 410 Wp
Number of PV modules 86 units
Nominal (STC) 35.3 kWp

Inverter

Manufacturer Huawei Technologies
Model SUN2000-30KTL-M3-400V
(Original PVsyst database)
Unit Nom. Power 30.0 kWac
Number of inverters 1 unit
Total power 30.0 kWac

Number of inverters 2 * MPPT 25% 0.5 unit
Total power 15.0 kWac

Operating voltage 200-1000 V
Max. power (=>55°C) 33.0 kWac
Pnom ratio (DC:AC) 1.20

Number of inverters 2 * MPPT 25% 0.5 unit
Total power 15.0 kWac

Operating voltage 200-1000 V
Max. power (=>55°C) 33.0 kWac
Pnom ratio (DC:AC) 1.20

Inverter

Manufacturer Huawei Technologies
Model SUN2000-40KTL-M3-400V
(Original PVsyst database)
Unit Nom. Power 40.0 kWac
Number of inverters 1 unit
Total power 40.0 kWac



PV Array Characteristics

Array #3 - BAT B PAN 1

Orientation	#2		
Tilt/Azimuth	18/-111 °		
Number of PV modules	38 units	Number of inverters	2 * MPPT 25% 0.5 unit
Nominal (STC)	15.58 kWp	Total power	20.0 kWac
Modules	2 string x 19 In series		
At operating cond. (50°C)			
Pmpp	14.24 kWp	Operating voltage	200-1000 V
U mpp	535 V	Max. power (=>40°C)	44.0 kWac
I mpp	27 A	Pnom ratio (DC:AC)	0.78

Array #4 - BAT B PAN 1

Orientation	#2		
Tilt/Azimuth	18/-111 °		
Number of PV modules	18 units	Number of inverters	1 * MPPT 25% 0.3 unit
Nominal (STC)	7.38 kWp	Total power	10.0 kWac
Modules	1 strings x 18 In series		
At operating cond. (50°C)			
Pmpp	6.74 kWp	Operating voltage	200-1000 V
U mpp	506 V	Max. power (=>40°C)	44.0 kWac
I mpp	13 A	Pnom ratio (DC:AC)	0.74

Array #5 - BAT B PAN 2

Orientation	#1		
Tilt/Azimuth	12/69 °		
Number of PV modules	30 units	Number of inverters	1 * MPPT 25% 0.3 unit
Nominal (STC)	12.30 kWp	Total power	10.0 kWac
Modules	2 string x 15 In series		
At operating cond. (50°C)			
Pmpp	11.24 kWp	Operating voltage	200-1000 V
U mpp	422 V	Max. power (=>40°C)	44.0 kWac
I mpp	27 A	Pnom ratio (DC:AC)	1.23

Total PV power

Nominal (STC)	71 kWp	Total inverter power	
Total	174 modules	Total power	70 kWac
Module area	340 m²	Number of inverters	2 units
		Pnom ratio	1.02
		No power sharing	

Array losses

Thermal Loss factor

Module temperature according to irradiance	
Uc (const)	20.0 W/m²K
Uv (wind)	0.0 W/m²K/m/s

Module Quality Loss

Loss Fraction	-0.8 %
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Module mismatch losses

Array #1 - GARAGE PAN 1

Loss Fraction	2.0 % at MPP
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Array #2 - GARAGE PAN 2

Loss Fraction	2.0 % at MPP
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Array #3 - BAT B PAN 1

Loss Fraction	2.0 % at MPP
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Array #4 - BAT B PAN 1

Loss Fraction	2.0 % at MPP
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Array #5 - BAT B PAN 2

Loss Fraction	2.0 % at MPP
---------------	--------------

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Array losses**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	0.962	0.892	0.816	0.681	0.440	0.000

DC wiring losses

Global wiring resistance 10 mΩ
Loss Fraction 1.5 % at STC

Array #1 - GARAGE PAN 1

Global array res. 386 mΩ
Loss Fraction 1.5 % at STC

Array #3 - BAT B PAN 1

Global array res. 333 mΩ
Loss Fraction 1.5 % at STC

Array #5 - BAT B PAN 2

Global array res. 263 mΩ
Loss Fraction 1.5 % at STC

Array #2 - GARAGE PAN 2

Global array res. 386 mΩ
Loss Fraction 1.5 % at STC

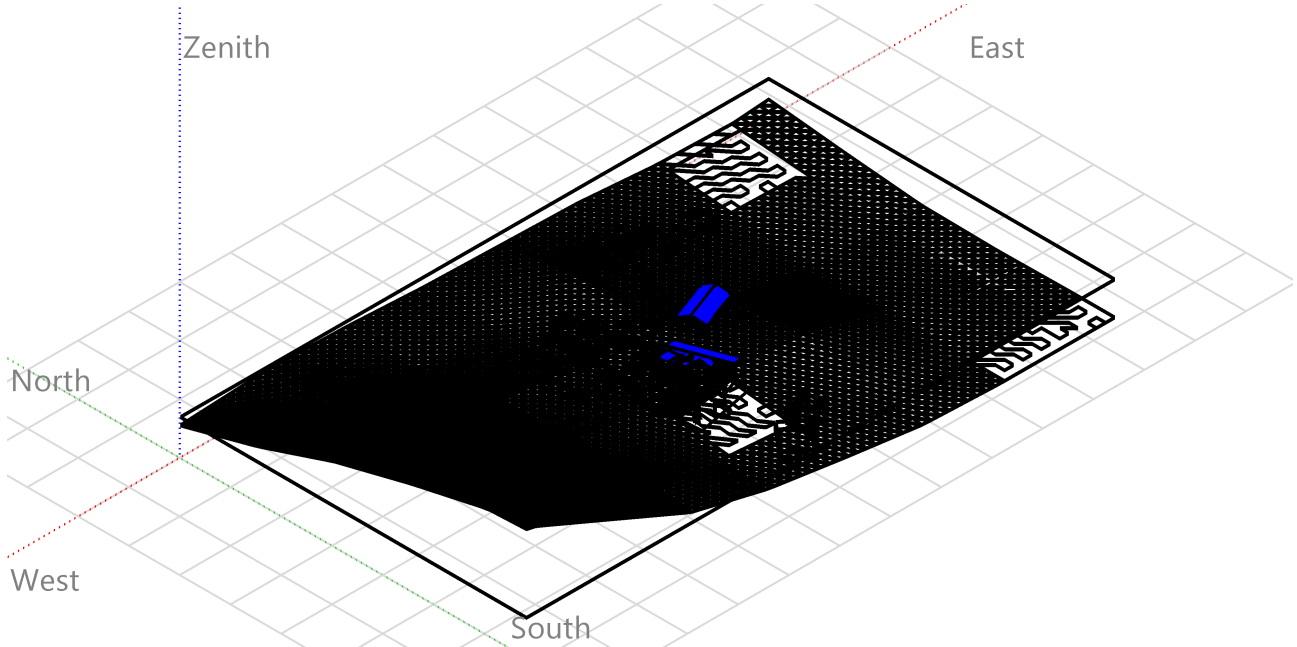
Array #4 - BAT B PAN 1

Global array res. 632 mΩ
Loss Fraction 1.5 % at STC



Near shadings parameter

Perspective of the PV-field and surrounding shading scene

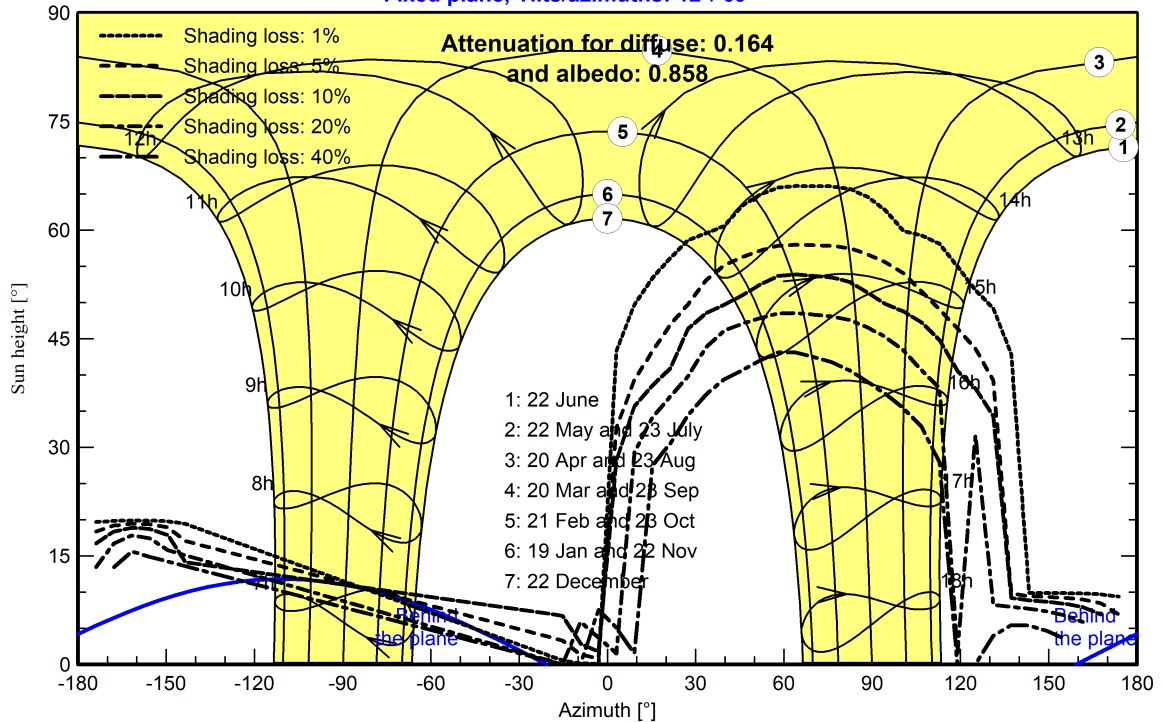




Iso-shadings diagram

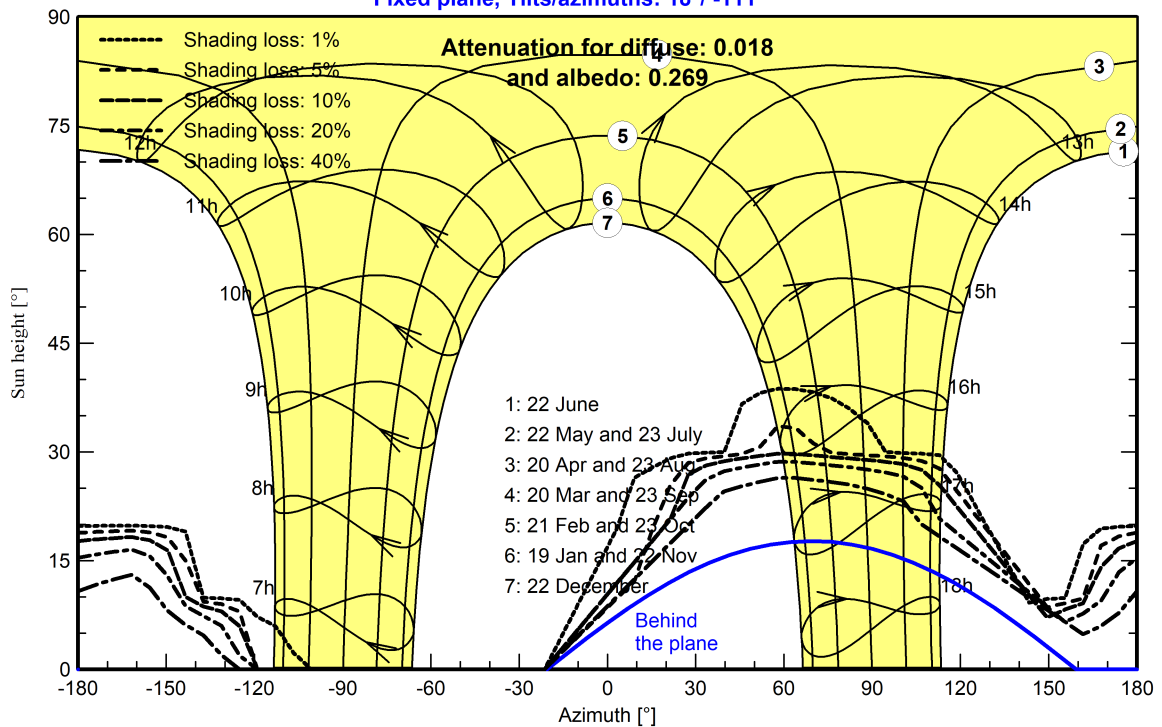
Orientation #1

Fixed plane, Tilts/azimuths: 12°/ 69°



Orientation #2

Fixed plane, Tilts/azimuths: 18°/ -111°





Main results

System Production

Produced Energy

103261 kWh/year

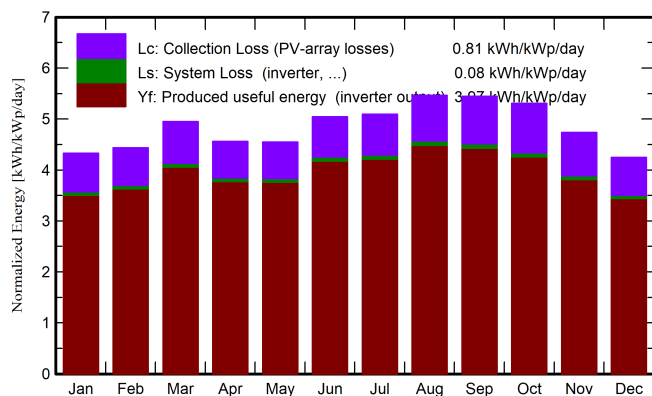
Specific production

1447 kWh/kWp/year

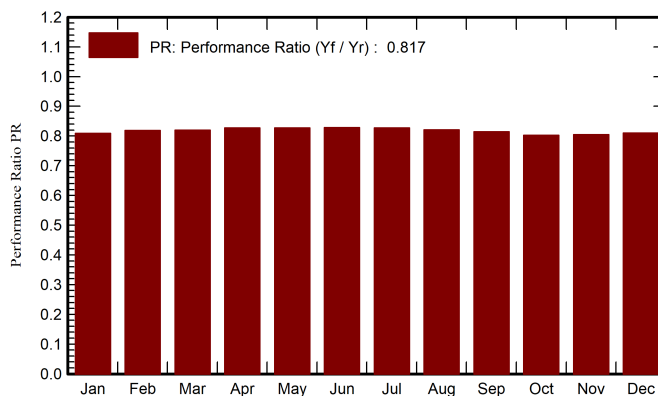
Perf. Ratio PR

81.75 %

Normalized productions (per installed kWp)



Performance Ratio PR



Balances and main results

	GlobHor	DiffHor	T_Amb	GlobInc	GlobEff	EArray	E_Grid	PR
	kWh/m ²	kWh/m ²	°C	kWh/m ²	kWh/m ²	kWh	kWh	ratio
January	140.5	69.61	25.82	134.3	124.8	7910	7755	0.809
February	129.5	75.54	25.83	124.3	116.4	7398	7254	0.818
March	159.8	86.45	26.27	153.5	145.0	9148	8973	0.819
April	142.4	92.27	25.99	136.9	129.1	8238	8083	0.828
May	145.6	86.58	26.24	141.0	133.5	8482	8319	0.827
June	156.0	73.25	25.68	151.3	144.3	9122	8947	0.829
July	162.8	79.50	26.08	158.0	150.8	9505	9326	0.827
August	175.5	83.16	26.56	169.5	161.3	10117	9927	0.821
September	169.8	78.02	26.67	163.3	154.8	9668	9485	0.814
October	172.3	75.62	27.12	164.6	154.0	9605	9420	0.802
November	149.0	73.22	26.43	142.2	132.1	8321	8160	0.805
December	137.5	77.20	26.26	131.7	122.2	7761	7611	0.810
Year	1840.7	950.43	26.25	1770.6	1668.4	105273	103261	0.817

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

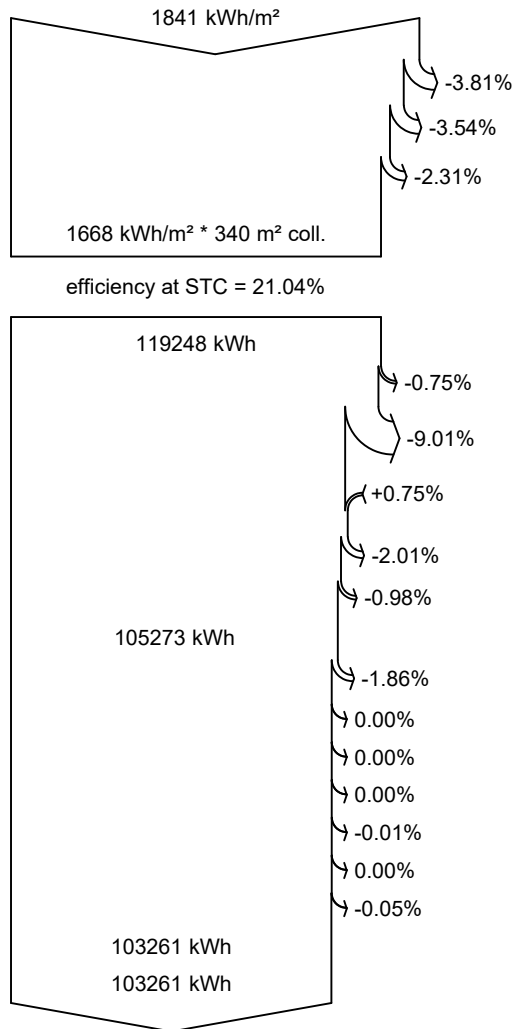
EArray Effective energy at the output of the array

E_Grid Energy injected into grid

PR Performance Ratio



Loss diagram



Global horizontal irradiation

Global incident in coll. plane

Near Shadings: irradiance loss

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

Module quality loss

Module array mismatch loss

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

Night consumption

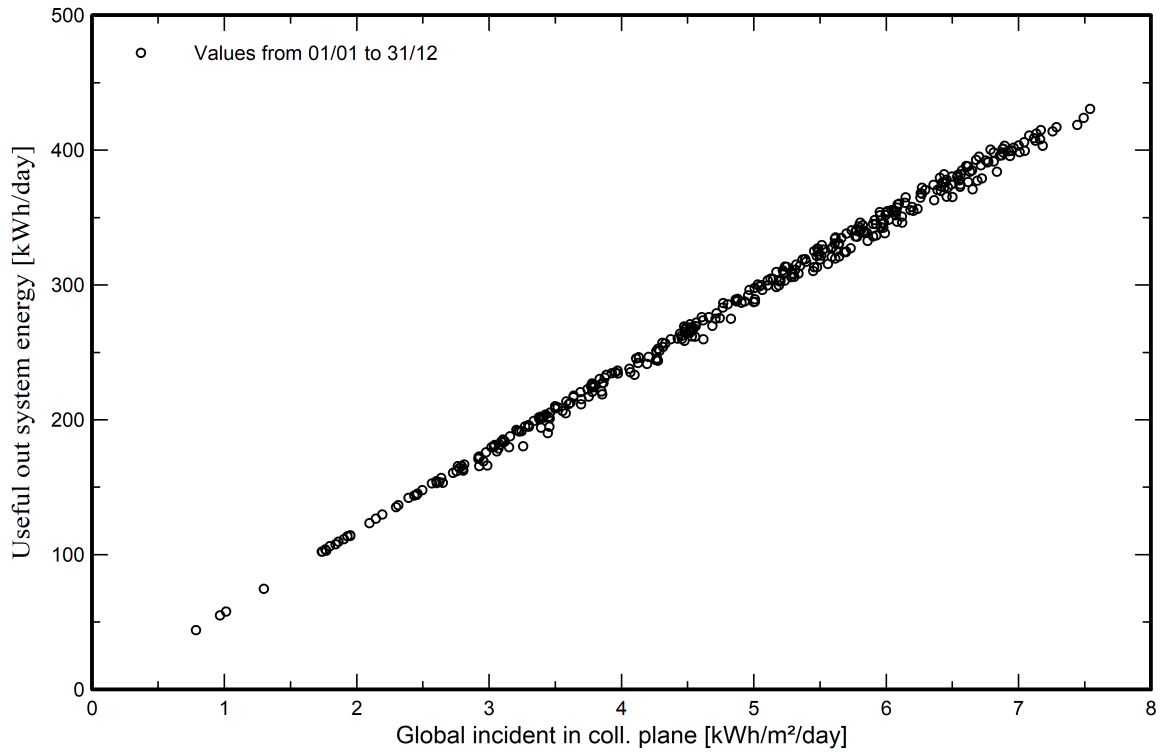
Available Energy at Inverter Output

Energy injected into grid



Predef. graphs

Diagramme d'entrée/sortie journalier



Distribution de la puissance de sortie système

