

PVsyst - Simulation report

Grid-Connected System

Project: Saha Farm

Variant: 05

No 3D scene defined, no shadings

System power: 500 kWp

Ban Nong Bua Thong - Thailand

Author

**PVsyst V7.4.6**

VC4, Simulation date:
05/01/24 20:59
with V7.4.6

Project summary**Geographical Site****Ban Nong Bua Thong**

Thailand

Situation

Latitude 15.53 °N

Longitude 101.13 °E

Altitude 58 m

Time zone UTC+7

Project settings

Albedo 0.20

Weather data

Ban Nong Bua Thong

Meteonorm 8.1 (1996-2015), Sat=100% - Synthetic

System summary**Grid-Connected System****No 3D scene defined, no shadings****PV Field Orientation**

Fixed planes 2 orientations

Tilts/azimuths 20 / 15 °

20 / -165 °

Near Shadings

No Shadings

User's needs

Unlimited load (grid)

System information**PV Array**

Nb. of modules

720 units

Pnom total

500 kWp

Inverters

Nb. of units

9 units

Pnom total

450 kWac

Pnom ratio

1.112

Results summary

Produced Energy	624610 kWh/year	Specific production	1248 kWh/kWp/year	Perf. Ratio PR	75.00 %
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General parameters

Grid-Connected System

No 3D scene defined, no shadings

PV Field Orientation

Orientation

Fixed planes 2 orientations
Tilts/azimuths 20 / 15 °
20 / -165 °

Sheds configuration

No 3D scene defined

Models used

Transposition Perez
Diffuse Perez, Meteonorm
Circumsolar separate

Horizon

Free Horizon

Near Shadings

No Shadings

User's needs

Unlimited load (grid)

PV Array Characteristics

PV module

Manufacturer Generic
Model CS7N-695TB-AG 1500V
(Original PVsyst database)

Unit Nom. Power 695 Wp
Number of PV modules 720 units
Nominal (STC) 500 kWp
Modules 45 string x 16 In series

At operating cond. (50°C)

Pmpp 464 kWp
U mpp 585 V
I mpp 793 A

Total PV power

Nominal (STC) 500 kWp
Total 720 modules
Module area 2237 m²

Inverter

Manufacturer Generic
Model SUN2000-50KTL-M3-400V
(Original PVsyst database)

Unit Nom. Power 50.0 kWac
Number of inverters 9 units
Total power 450 kWac
Operating voltage 200-1000 V
Max. power (=>35°C) 55.0 kWac
Pnom ratio (DC:AC) 1.11
Power sharing within this inverter

Total inverter power

Total power 450 kWac
Max. power 495 kWac
Number of inverters 9 units
Pnom ratio 1.11

Array losses

Array Soiling Losses

Loss Fraction 6.9 %

Thermal Loss factor

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

DC wiring losses

Global array res. 12 mΩ
Loss Fraction 1.5 % at STC

LID - Light Induced Degradation

Loss Fraction 3.0 %

Module Quality Loss

Loss Fraction 2.0 %

Module mismatch losses

Loss Fraction 2.0 % at MPP

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



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Main results

System Production

Produced Energy 624610 kWh/year

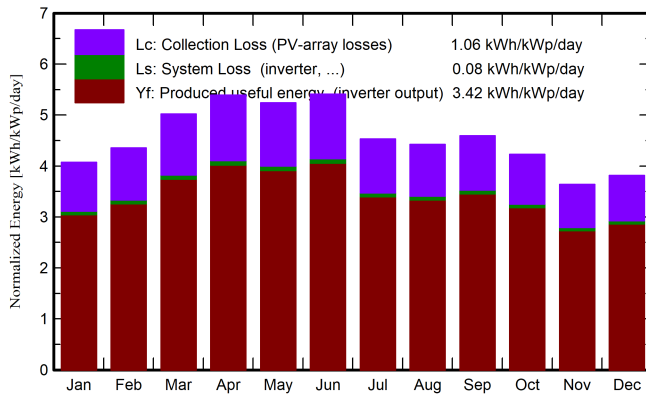
Specific production

1248 kWh/kWp/year

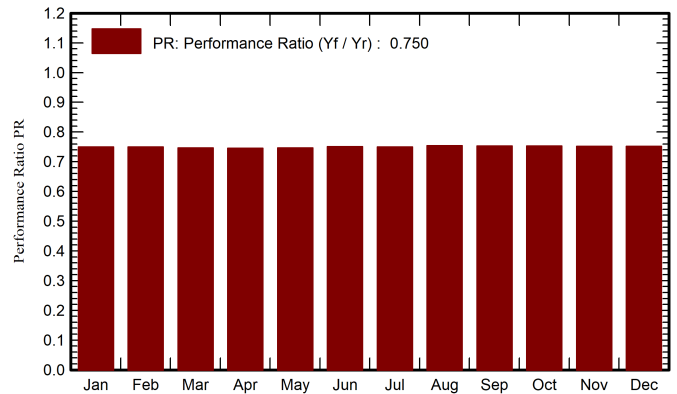
Perf. Ratio PR

75.00 %

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 kWh	E_Grid kWh	PR ratio
January	130.2	60.14	25.50	126.2	113.5	48355	47331	0.749
February	126.1	71.13	27.66	121.9	110.3	46727	45730	0.750
March	161.3	91.31	29.68	155.6	141.2	59410	58132	0.746
April	167.8	90.79	30.16	161.7	147.2	61703	60348	0.746
May	168.9	85.21	29.72	162.4	147.7	62073	60715	0.747
June	168.7	82.29	28.90	162.3	147.6	62308	60951	0.750
July	146.2	76.11	28.80	140.5	127.6	53900	52712	0.750
August	142.6	85.23	28.37	137.2	124.6	52896	51753	0.754
September	143.0	74.73	27.66	137.7	124.9	53041	51897	0.753
October	135.9	80.26	28.09	131.2	118.8	50533	49456	0.753
November	112.9	64.34	26.54	109.1	98.3	41966	41068	0.752
December	122.1	61.77	25.50	118.3	106.2	45468	44517	0.752
Year	1726.0	923.31	28.05	1664.2	1507.8	638381	624610	0.750

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

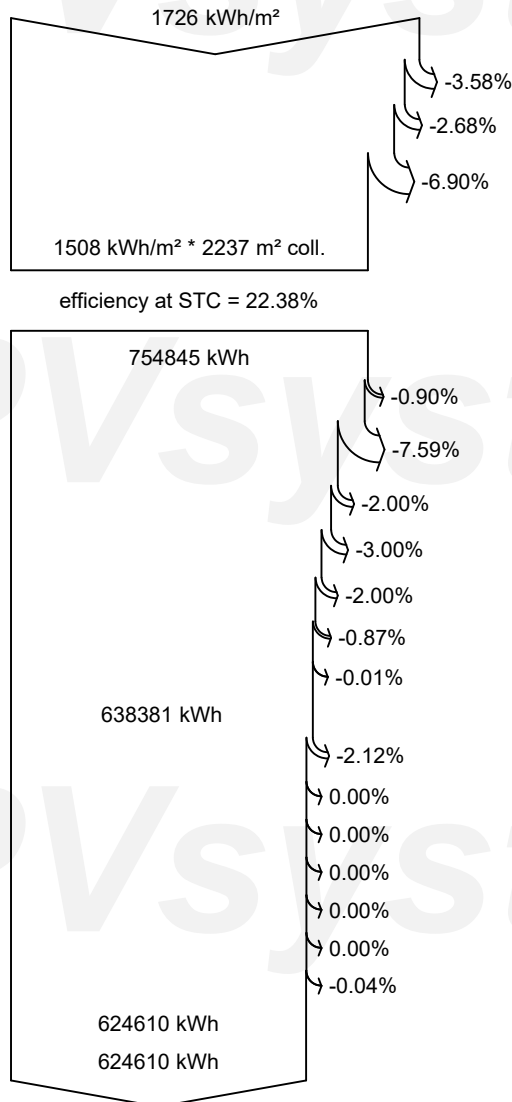
PR Performance Ratio



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Loss diagram



Global horizontal irradiation

Global incident in coll. plane

IAM factor on global

Soiling loss factor

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

LID - Light induced degradation

Module array mismatch loss

Ohmic wiring loss

Mixed orientation mismatch 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

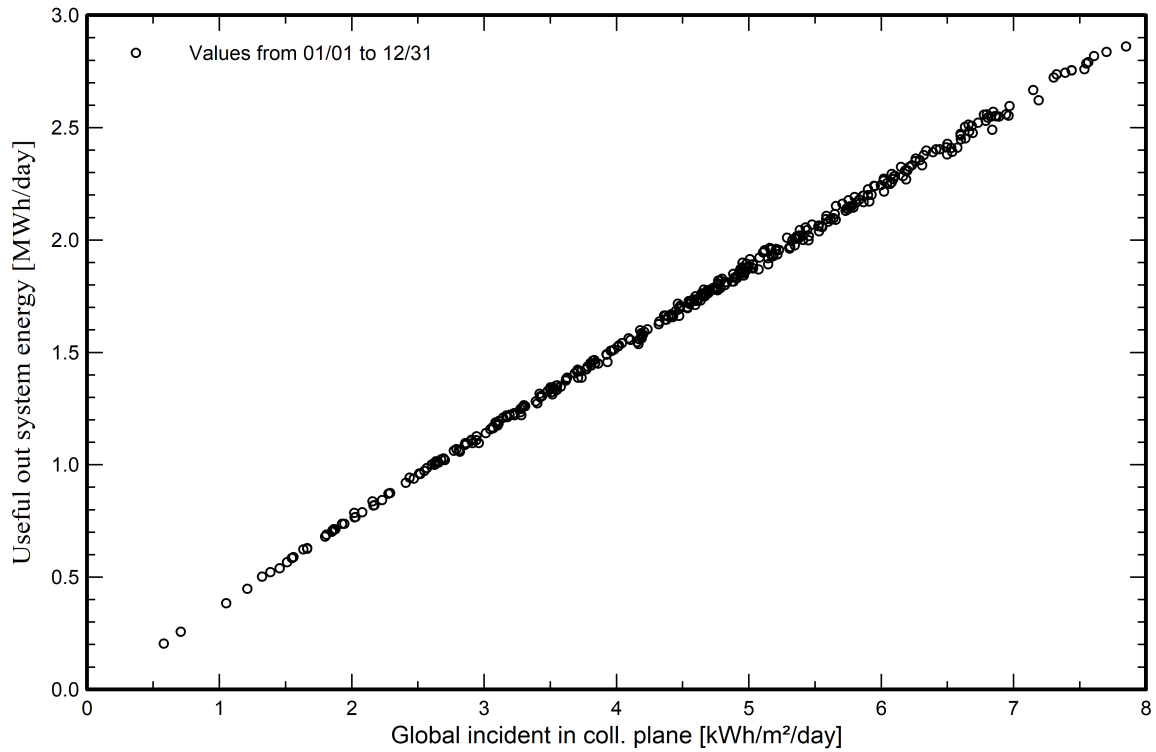


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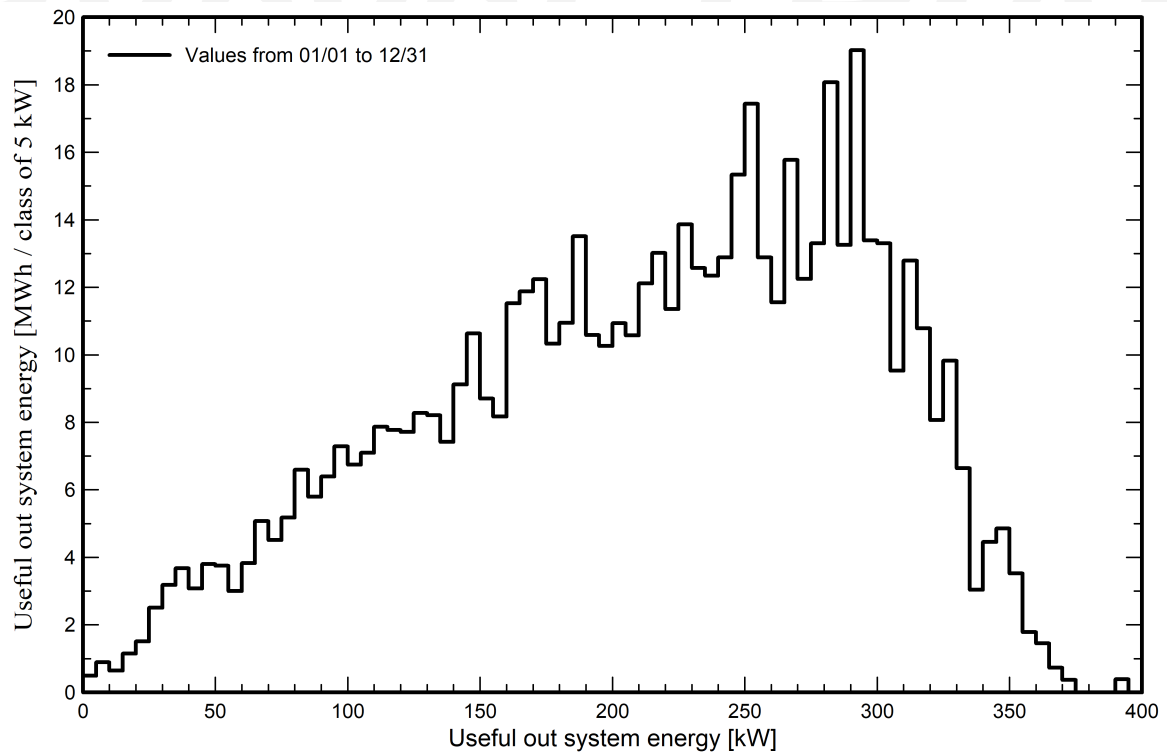
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Predef. graphs

Daily Input/Output diagram



System Output Power Distribution





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e-line diagram not available