PVsyst - Simulation report

Grid-Connected System

Project: Kinh Vinh Phuc

Variant: New simulation variant

No 3D scene defined, no shadings

System power: 930 kWp

Bồ Điền - Vietnam

Author

CÔNG TY TNHH XUÂN SƠN HẢI DƯƠNG (Viet Nam)

Project: Kinh Vinh Phuc

Variant: New simulation variant

CÔNG TY TNHH XUÂN SƠN HẢI DƯƠNG (Viet Nam)

Project summary

Geographical Site	Situation		Project settings	
Bồ Điền	Latitude	21.21 °(N)	Albedo	0.20
Vietnam	Longitude	105.52 °(E)		
	Altitude	12 m		
	Time zone	UTC+7		

Weather data
Bồ Điền
Meteonorm 8.2 (1991-2000), Sat=100% - Synthetic

System summary

Grid-Connected System — **No 3D scene defined, no shadings**

Orientation #1		Orientation #2		Near Shadings
Fixed plane		Fixed plane		no Shadings
Tilt/Azimuth	12 / 94 °	Tilt/Azimuth	12 / -86 °	

System information

PV Array		Inverters	
Nb. of modules	1500 units	Nb. of units	6 units
Pnom total	930 kWp	Total power	850 kWac
		Pnom ratio	1.09

User's needs
Unlimited load (grid)

Results summary

Produced Energy	904.86 MWh/year	Specific production	973 kWh/kWp/year	Perf. Ratio PR	84.67 %

Table of contents

General parameters

Grid-Connected System — No 3D scene defined, no shadings

Orientation #1		Orientation #2		Models used	
Fixed plane		Fixed plane		Transposition	Perez
Tilt/Azimuth	12 / 94 °	Tilt/Azimuth	12 / -86 °	Diffuse	Perez, Meteonorm
				Circumsolar	separate

Horizon	Near Shadings	User's needs
Free Horizon	no Shadings	Unlimited load (grid)

PV Array Characteristics

Array #1 - PV Array

Mixed orient.
#1/#2: 31/31 strings
Tilt/Azimuth 12/94 °
12/-86 °

PV module

Manufacturer	JA Solar
Model	JAM66-D45-620-LB
(Original PVsyst database)	
Unit Nom. Power	620 Wp
Number of PV modules	1240 units
Nominal (STC)	769 kWp
Modules	62 string x 20 In series
At operating cond. (50°C)	
Pmpp	713 kWp
U mpp	745 V
I mpp	957 A

Inverter

Manufacturer	Huawei Technologies
Model	SUN2000-150K-MG0-400V
(Original PVsyst database)	
Unit Nom. Power	150 kWac
Number of inverters	35 * MPPT 14% 5 units
Total power	750 kWac
Operating voltage	200-1000 V
Max. power (=>30°C)	165 kWac
Pnom ratio (DC:AC)	1.03
No power sharing between MPPTs	

Array #2 - Sub-array #2

Mixed orient.
#1/#2: 7/6 strings
Tilt/Azimuth 12/94 °
12/-86 °

PV module

Manufacturer	JA Solar
Model	JAM66-D45-620-LB
(Original PVsyst database)	
Unit Nom. Power	620 Wp
Number of PV modules	260 units
Nominal (STC)	161 kWp
Modules	13 string x 20 In series
At operating cond. (50°C)	
Pmpp	150 kWp
U mpp	745 V
I mpp	201 A

Inverter

Manufacturer	Huawei Technologies
Model	SUN2000-100KTL-M1-400Vac
(Original PVsyst database)	
Unit Nom. Power	100 kWac
Number of inverters	1 unit
Total power	100 kWac
Operating voltage	200-1000 V
Max. power (=>33°C)	110 kWac
Pnom ratio (DC:AC)	1.61
Power sharing within this inverter	

Total PV power

Nominal (STC)	930 kWp
Total	1500 modules
Module area	4052 m²

Total inverter power

Total power	850 kWac
Number of inverters	6 units
Pnom ratio	1.09

Array losses

Array Soiling Losses
Loss Fraction 1.0 %

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 -0.75 %

Module mismatch losses
Array #1 - PV Array
Loss Fraction 2.00 % at MPP
Array #2 - Sub-array #2
Loss Fraction 2.00 % at MPP

IAM loss factor
Incidence effect (IAM): Fresnel smooth glass, n = 1.526

0°	30°	50°	60°	70°	75°	80°	85°	90°
1.000	0.998	0.981	0.948	0.862	0.776	0.636	0.402	0.000

DC wiring losses

Global wiring resistance 10 mΩ
Loss Fraction 1.5 % at STC

Array #1 - PV Array
Global array res. 13 mΩ
Loss Fraction 1.5 % at STC

Array #2 - Sub-array #2
Global array res. 61 mΩ
Loss Fraction 1.5 % at STC

System losses

Unavailability of the system
Time fraction 0.5 %
2.0 days,
3 periods

Project: Kinh Vinh Phuc

Variant: New simulation variant

CÔNG TY TNHH XUÂN SƠN HẢI DƯƠNG (Viet Nam)

Main results

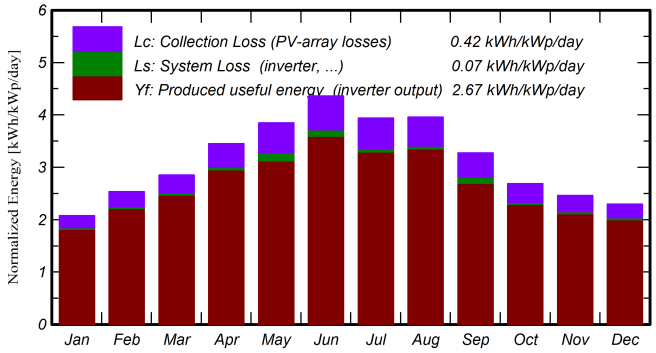
System Production

Produced Energy 904.86 MWh/year

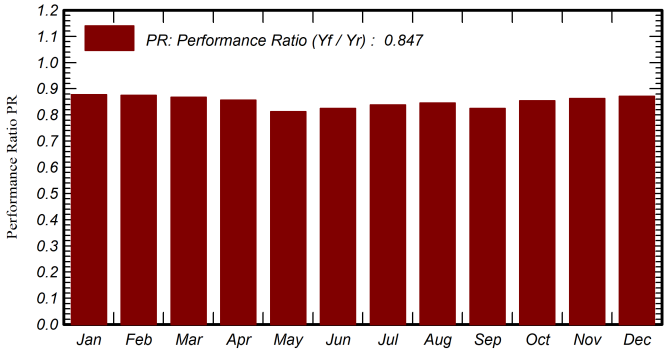
Specific production 973 kWh/kWp/year

Perf. Ratio PR 84.67 %

Normalized productions (per installed kWp)



Performance Ratio PR



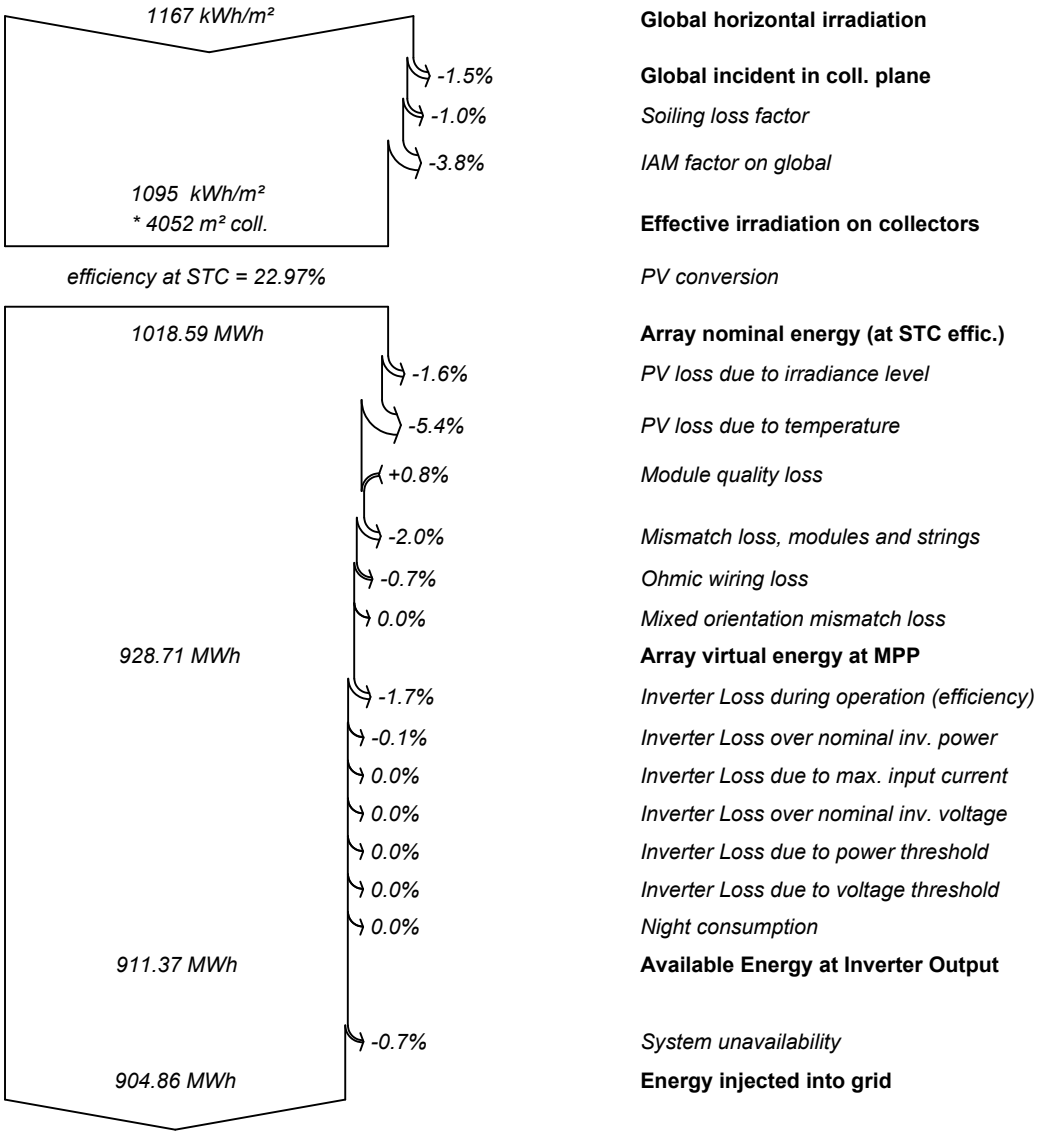
Balances and main results

	GlobHor kWh/m²	DiffHor kWh/m²	T_Amb °C	GlobInc kWh/m²	GlobEff kWh/m²	EArray MWh	E_Grid MWh	PR ratio
January	65.4	49.76	15.43	64.3	60.7	53.45	52.49	0.877
February	72.2	55.30	17.44	71.0	67.2	58.78	57.74	0.874
March	89.9	69.93	20.87	88.5	84.3	72.65	71.35	0.867
April	105.0	80.55	24.74	103.5	98.8	83.91	82.45	0.856
May	121.1	79.74	28.42	119.3	114.2	94.80	90.10	0.812
June	132.8	83.85	29.79	130.9	125.3	103.73	100.38	0.825
July	124.0	82.63	29.71	122.1	116.9	96.88	95.18	0.838
August	124.6	87.03	28.69	122.8	117.5	98.34	96.63	0.846
September	99.7	71.28	27.03	98.3	93.8	78.77	75.39	0.825
October	84.7	66.17	25.11	83.4	79.2	67.34	66.17	0.853
November	75.0	57.07	21.20	73.8	69.8	60.27	59.21	0.863
December	72.3	51.29	17.17	71.3	67.2	58.80	57.77	0.872
Year	1166.7	834.60	23.83	1149.2	1094.7	927.71	904.86	0.847

Legends

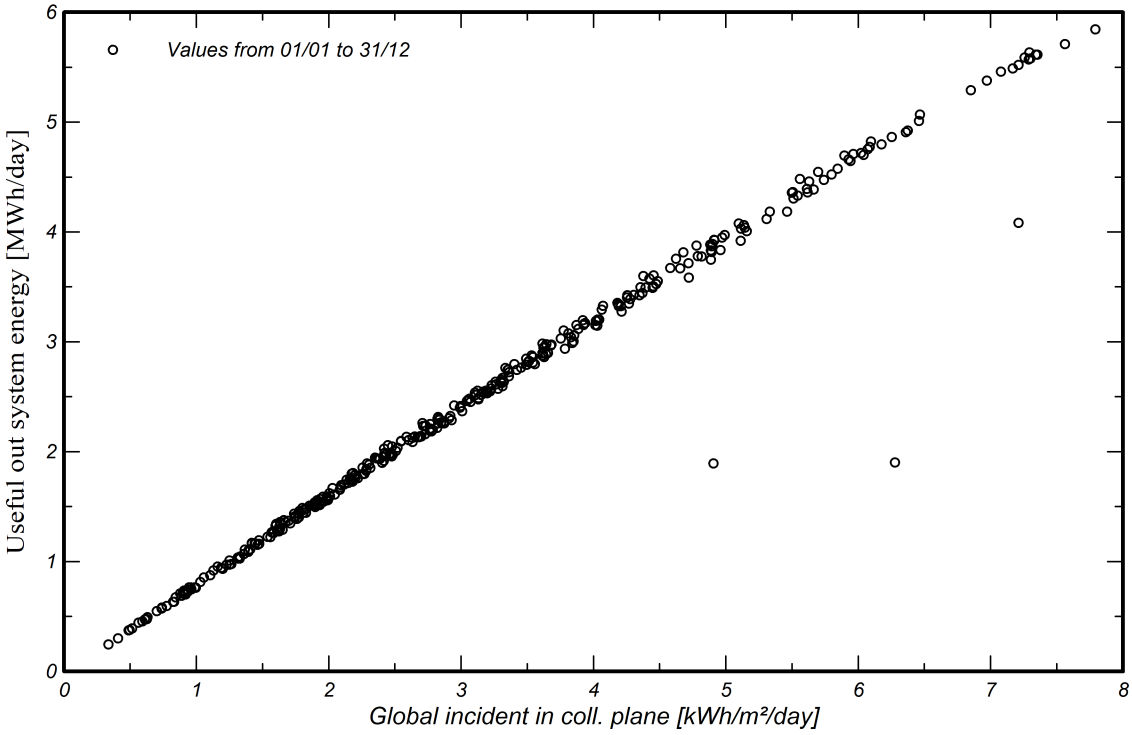
GlobHor	Global horizontal irradiation
DiffHor	Horizontal diffuse irradiation
T_Amb	Ambient Temperature
GlobInc	Global incident in coll. plane
GlobEff	Effective Global, corr. for IAM and shadings
EArray	Effective energy at the output of the array
E_Grid	Energy injected into grid
PR	Performance Ratio

Loss diagram



Predef. graphs

Daily Input/Output diagram



System Output Power Distribution