PVsyst

PHOTOVOLTAIC SOFTWARE

PVsyst - Simulation report

Grid-Connected System

Project: Saha Farm

Variant: 01
No 3D scene defined, no shadings
System power: 801 kWp
Ban Noen Sawang - Thailand

Author

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with V7.4.6

Project summary

Geographical Site
Ban Noen Sawang
Thailand

Situation
Latitude	16.15 °N
Longitude	101.12 °E
Altitude	90 m
Time zone	UTC+7

Project settings
Albedo	0.20

Weather data
Ban Noen Sawang
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 / 40 °
	20 / -140 °

Near Shadings
No Shadings

User's needs
Unlimited load (grid)

System information

PV Array
Nb. of modules	1152 units
Pnom total	801 kWp

Inverters
Nb. of units	14 units
Pnom total	700 kWac
Pnom ratio	1.144

Results summary

Produced Energy	976892 kWh/year	Specific production	1220 kWh/kWp/year	Perf. Ratio PR	75.01 %

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General parameters

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

PV Field Orientation

Orientation		Sheds configuration	Models used	
Fixed planes	2 orientations	No 3D scene defined	Transposition	Perez
Tilts/azimuths	20 / 40 °		Diffuse	Perez, Meteonorm
	20 / -140 °		Circumsolar	separate

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

PV Array Characteristics

PV module		**Inverter**	
Manufacturer	Generic	Manufacturer	Generic
Model	CS7N-695TB-AG 1500V	Model	SUN2000-50KTL-M3-400V
(Original PVsyst database)		(Original PVsyst database)	
Unit Nom. Power	695 Wp	Unit Nom. Power	50.0 kWac
Number of PV modules	1152 units	Number of inverters	14 units
Nominal (STC)	801 kWp	Total power	700 kWac
Modules	72 string x 16 In series	Operating voltage	200-1000 V
At operating cond. (50°C)		Max. power (=>35°C)	55.0 kWac
Pmpp	743 kWp	Pnom ratio (DC:AC)	1.14
U mpp	585 V	Power sharing within this inverter	
I mpp	1269 A		

Total PV power		**Total inverter power**	
Nominal (STC)	801 kWp	Total power	700 kWac
Total	1152 modules	Max. power	770 kWac
Module area	3579 m²	Number of inverters	14 units
		Pnom ratio	1.14

Array losses

Array Soiling Losses		**Thermal Loss factor**		**DC wiring losses**	
Loss Fraction	7.1 %	Module temperature according to irradiance		Global array res.	7.5 mΩ
		Uc (const)	20.0 W/m²K	Loss Fraction	1.5 % at STC
		Uv (wind)	0.0 W/m²K/m/s		

LID - Light Induced Degradation		**Module Quality Loss**		**Module mismatch losses**	
Loss Fraction	3.0 %	Loss Fraction	2.0 %	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	976892 kWh/year	Specific production	1220 kWh/kWp/year
		Perf. Ratio PR	75.01 %

Normalized productions (per installed kWp)

Lc: Collection Loss (PV-array losses) 1.04 kWh/kWp/day
Ls: System Loss (inverter, ...) 0.07 kWh/kWp/day
Yf: Produced useful energy (inverter output) 3.34 kWh/kWp/day

Performance Ratio PR

PR: Performance Ratio (Yf / Yr) : 0.750
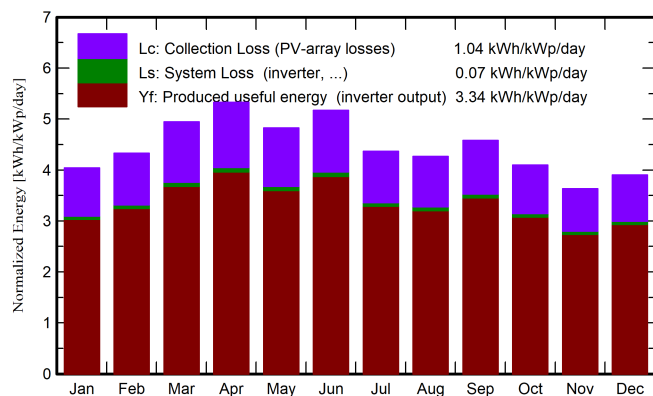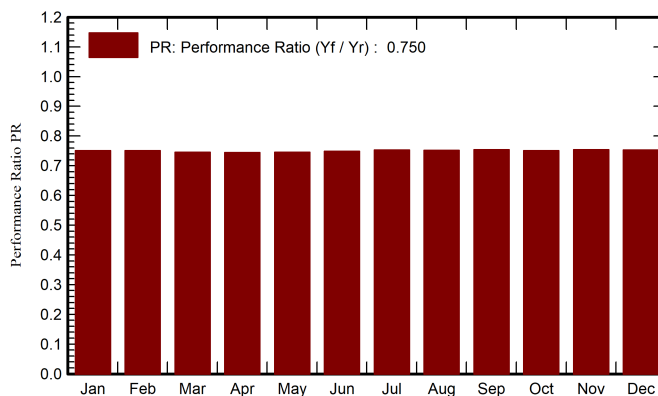
Balances and main results

	GlobHor	DiffHor	T_Amb	GlobInc	GlobEff	EArray	E_Grid	PR
	kWh/m²	kWh/m²	°C	kWh/m²	kWh/m²	kWh	kWh	ratio
January	129.6	57.53	24.75	125.3	112.6	76972	75339	0.751
February	125.4	70.59	26.97	121.2	109.5	74428	72850	0.751
March	158.9	88.64	29.15	153.3	139.0	93462	91420	0.745
April	165.7	92.19	29.92	159.8	145.1	97433	95291	0.745
May	155.3	84.75	29.33	149.6	135.6	91385	89380	0.746
June	160.8	78.68	28.43	155.2	140.8	95177	93084	0.749
July	140.4	88.22	28.19	135.5	122.5	83459	81683	0.753
August	137.5	78.98	27.68	132.2	119.8	81426	79645	0.752
September	142.7	82.60	27.18	137.4	124.4	84779	82960	0.754
October	131.9	74.78	27.63	127.1	114.9	78132	76439	0.751
November	113.1	69.12	26.24	109.0	98.1	67273	65874	0.755
December	125.2	63.02	24.96	120.9	108.4	74474	72927	0.753
Year	1686.6	929.10	27.54	1626.6	1470.8	998401	976892	0.750

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
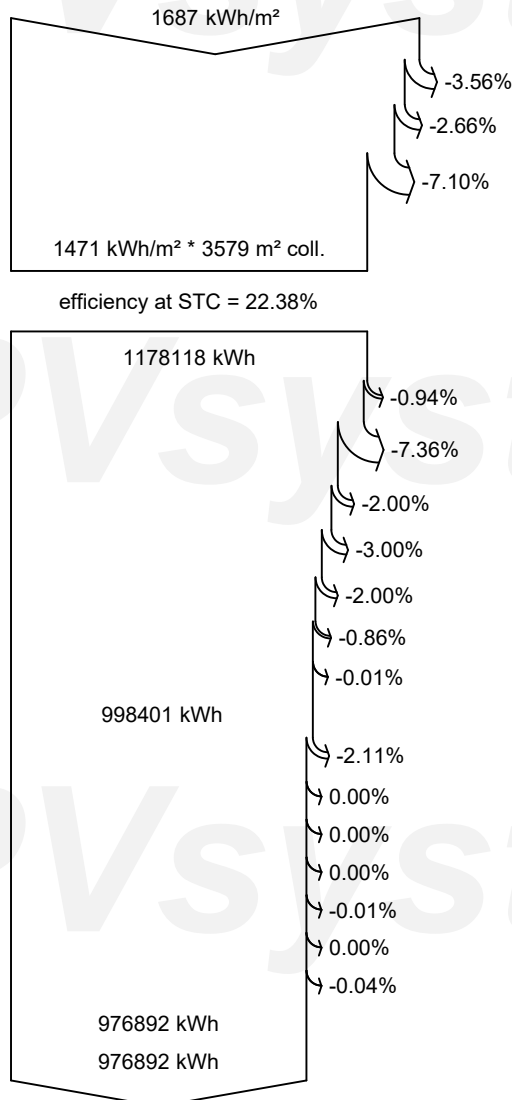
1687 kWh/m²	**Global horizontal irradiation**
-3.56%	**Global incident in coll. plane**
-2.66%	IAM factor on global
-7.10%	Soiling loss factor
1471 kWh/m² * 3579 m² coll.	**Effective irradiation on collectors**
efficiency at STC = 22.38%	PV conversion
1178118 kWh	**Array nominal energy (at STC effic.)**
-0.94%	PV loss due to irradiance level
-7.36%	PV loss due to temperature
-2.00%	Module quality loss
-3.00%	LID - Light induced degradation
-2.00%	Module array mismatch loss
-0.86%	Ohmic wiring loss
-0.01%	Mixed orientation mismatch loss
998401 kWh	**Array virtual energy at MPP**
-2.11%	Inverter Loss during operation (efficiency)
0.00%	Inverter Loss over nominal inv. power
0.00%	Inverter Loss due to max. input current
0.00%	Inverter Loss over nominal inv. voltage
-0.01%	Inverter Loss due to power threshold
0.00%	Inverter Loss due to voltage threshold
-0.04%	Night consumption
976892 kWh	**Available Energy at Inverter Output**
976892 kWh	**Energy injected into grid**

Predef. graphs

Daily Input/Output diagram

Values from 01/01 to 12/31

Y-axis: Useful out system energy [MWh/day]
X-axis: Global incident in coll. plane [kWh/m²/day]
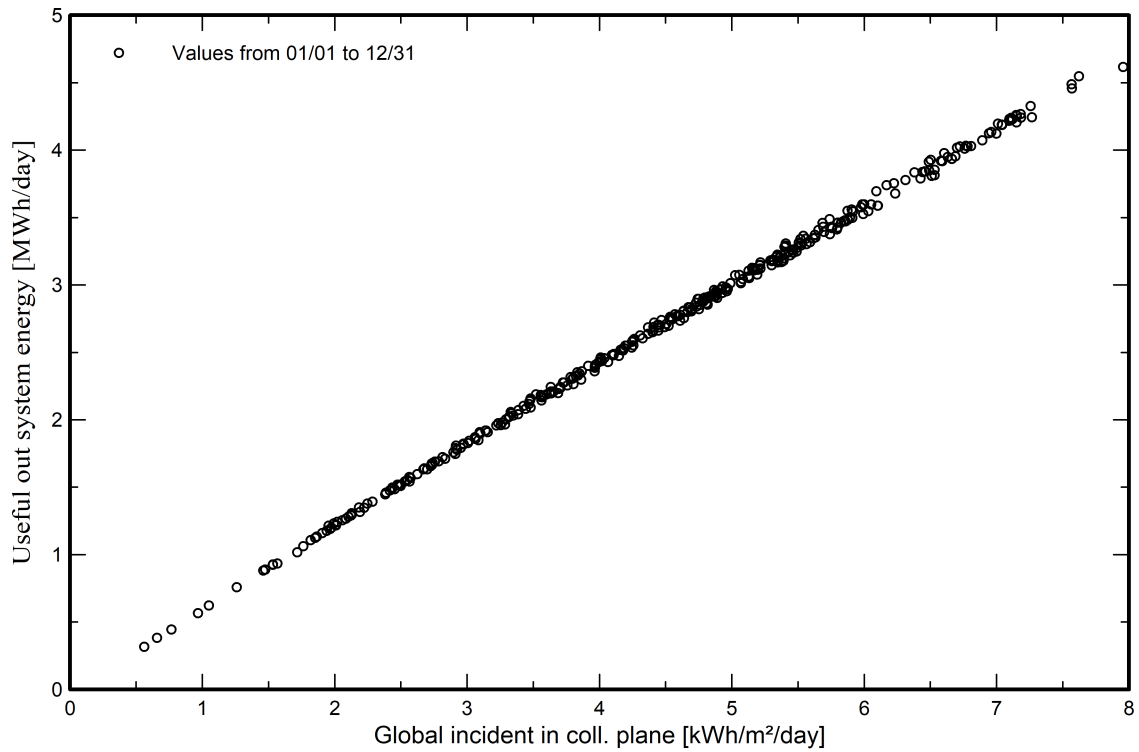
System Output Power Distribution

Values from 01/01 to 12/31

Y-axis: Useful out system energy [MWh / class of 5 kW]
X-axis: Useful out system energy [kW]

e-line diagram not avai