PVsyst - Simulation report

Grid-Connected System

Project: LMS VINA

Variant: New simulation variant
No 3D scene defined, no shadings
System power: 3167 kWp
LMS VINA - Vietnam

Author

PVsyst V7.4.8
VC0, Simulation date:
03/28/25 20:52
with V7.4.8

Project summary

Geographical Site
LMS VINA
Vietnam

Situation	
Latitude	20.92 °N
Longitude	106.26 °E
Altitude	8 m
Time zone	UTC+7

Project settings
Albedo	0.20

Weather data
LMS VINA
Meteonorm 8.1 (1991-2000), Sat=100% - Synthetic

System summary

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

PV Field Orientation
Fixed planes	4 orientations
Tilts/azimuths	6 / -90 °
	6 / 90 °
	6 / 0 °
	6 / 180 °

Near Shadings
No Shadings

User's needs
Unlimited load (grid)

System information
PV Array		Inverters	
Nb. of modules	4460 units	Nb. of units	20 units
Pnom total	3167 kWp	Pnom total	3000 kWac
		Pnom ratio	1.056

Results summary

Produced Energy	3084.17 MWh/year	Specific production	974 kWh/kWp/year	Perf. Ratio PR	84.11 %

Table of contents

PVsyst V7.4.8
VC0, Simulation date:
03/28/25 20:52
with V7.4.8

General parameters

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

PV Field Orientation

Orientation		Sheds configuration	Models used	
Fixed planes	4 orientations	No 3D scene defined	Transposition	Perez
Tilts/azimuths	6 / -90 °		Diffuse	Perez, Meteonorm
	6 / 90 °		Circumsolar	separate
	6 / 0 °			
	6 / 180 °			

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

PV Array Characteristics

PV module

		Inverter	
Manufacturer	JA Solar	Manufacturer	Huawei Technologies
Model	JAM66D46-710/LB	Model	SUN2000-150K-MG0-400V
(Custom parameters definition)		(Original PVsyst database)	
Unit Nom. Power	710 Wp	Unit Nom. Power	150 kWac
Number of PV modules	4460 units	Number of inverters	20 units
Nominal (STC)	3167 kWp	Total power	3000 kWac

Array #1 - PV Array

Orientation	#1		
Tilt/Azimuth	6/-90 °		
Number of PV modules	456 units	Number of inverters	2 units
Nominal (STC)	324 kWp	Total power	300 kWac
Modules	24 string x 19 In series		
At operating cond. (50°C)		Operating voltage	200-1000 V
Pmpp	301 kWp	Max. power (=>30°C)	165 kWac
U mpp	709 V	Pnom ratio (DC:AC)	1.08
I mpp	425 A	Power sharing within this inverter	

Array #2 - Sub-array #2

Orientation	#2		
Tilt/Azimuth	6/90 °		
Number of PV modules	684 units	Number of inverters	3 units
Nominal (STC)	486 kWp	Total power	450 kWac
Modules	36 string x 19 In series		
At operating cond. (50°C)		Operating voltage	200-1000 V
Pmpp	452 kWp	Max. power (=>30°C)	165 kWac
U mpp	709 V	Pnom ratio (DC:AC)	1.08
I mpp	638 A	Power sharing within this inverter	

Array #3 - Sub-array #3
Mixed orient.
#1/2: 1/7 strings

Tilt/Azimuth	6/-90 °		
	6/90 °		
Number of PV modules	152 units	Number of inverters	5 * MPPT 13% 0.7 unit
Nominal (STC)	108 kWp	Total power	98.3 kWac
Modules	8 string x 19 In series		
At operating cond. (50°C)		Operating voltage	200-1000 V
Pmpp	100 kWp	Max. power (=>30°C)	165 kWac
U mpp	709 V	Pnom ratio (DC:AC)	1.10
I mpp	142 A		

PVsyst V7.4.8
VC0, Simulation date:
03/28/25 20:52
with V7.4.8

PV Array Characteristics

Array #4 - Sub-array #4
Mixed orient.
#1/2: 2/2 strings

Tilt/Azimuth	6/-90 °		
	6/90 °		
Number of PV modules	80 units	Number of inverters	2 * MPPT 17% 0.3 unit
Nominal (STC)	56.8 kWp	Total power	51.7 kWac
Modules	4 string x 20 In series		
At operating cond. (50°C)		Operating voltage	200-1000 V
Pmpp	52.9 kWp	Max. power (=>30°C)	165 kWac
U mpp	746 V	Pnom ratio (DC:AC)	1.10
I mpp	71 A		

Array #5 - Sub-array #5
Mixed orient.
#1/2: 11/11 strings

Tilt/Azimuth	6/-90 °		
	6/90 °		
Number of PV modules	440 units	Number of inverters	2 units
Nominal (STC)	312 kWp	Total power	300 kWac
Modules	22 string x 20 In series		
At operating cond. (50°C)		Operating voltage	200-1000 V
Pmpp	291 kWp	Max. power (=>30°C)	165 kWac
U mpp	746 V	Pnom ratio (DC:AC)	1.04
I mpp	390 A	Power sharing within this inverter	

Array #6 - Sub-array #6

Orientation	#3		
Tilt/Azimuth	6/0 °		
Number of PV modules	1320 units	Number of inverters	6 units
Nominal (STC)	937 kWp	Total power	900 kWac
Modules	66 string x 20 In series		
At operating cond. (50°C)		Operating voltage	200-1000 V
Pmpp	872 kWp	Max. power (=>30°C)	165 kWac
U mpp	746 V	Pnom ratio (DC:AC)	1.04
I mpp	1169 A	Power sharing within this inverter	

Array #7 - Sub-array #7

Orientation	#4		
Tilt/Azimuth	6/180 °		
Number of PV modules	1100 units	Number of inverters	5 units
Nominal (STC)	781 kWp	Total power	750 kWac
Modules	55 string x 20 In series		
At operating cond. (50°C)		Operating voltage	200-1000 V
Pmpp	727 kWp	Max. power (=>30°C)	165 kWac
U mpp	746 V	Pnom ratio (DC:AC)	1.04
I mpp	974 A	Power sharing within this inverter	

Array #8 - Sub-array #8

Orientation	#4		
Tilt/Azimuth	6/180 °		
Number of PV modules	228 units	Number of inverters	1 unit
Nominal (STC)	162 kWp	Total power	150 kWac
Modules	12 string x 19 In series		

Project: LMS VINA

Variant: New simulation variant

PV Array Characteristics

At operating cond. (50°C)		Operating voltage	200-1000 V
Pmpp	151 kWp	Max. power (=>30°C)	165 kWac
U mpp	709 V	Pnom ratio (DC:AC)	1.08
I mpp	213 A	Power sharing within this inverter	

Total PV power		Total inverter power	
Nominal (STC)	3167 kWp	Total power	3000 kWac
Total	4460 modules	Number of inverters	20 units
Module area	13854 m²	Pnom ratio	1.06
Cell area	12981 m²	Power sharing defined	

Array losses

Array Soiling Losses

Loss Fraction	3.7 %

Thermal Loss factor

Module temperature according to irradiance

Uc (const)	20.0 W/m²K
Uv (wind)	0.0 W/m²K/m/s

Serie Diode Loss

Voltage drop	0.7 V
Loss Fraction	0.1 % at STC

LID - Light Induced Degradation

Loss Fraction	2.0 %

Module Quality Loss

Loss Fraction	-0.8 %

Module mismatch losses

Loss Fraction	2.0 % at MPP

Strings Mismatch loss

Loss Fraction	0.1 %

IAM loss factor

Incidence effect (IAM): User defined profile

0°	50°	60°	65°	70°	75°	80°	85°	90°
1.000	1.000	1.000	1.000	0.995	0.964	0.913	0.750	0.000

DC wiring losses

Global wiring resistance	3.9 mΩ
Loss Fraction	2.0 % at STC

Array #1 - PV Array

Global array res.	36 mΩ
Loss Fraction	2.0 % at STC

Array #2 - Sub-array #2

Global array res.	24 mΩ
Loss Fraction	2.0 % at STC

Array #3 - Sub-array #3

Global array res.	108 mΩ
Loss Fraction	2.0 % at STC

Array #4 - Sub-array #4

Global array res.	228 mΩ
Loss Fraction	2.0 % at STC

Array #5 - Sub-array #5

Global array res.	41 mΩ
Loss Fraction	2.0 % at STC

Array #6 - Sub-array #6

Global array res.	14 mΩ
Loss Fraction	2.0 % at STC

Array #7 - Sub-array #7

Global array res.	17 mΩ
Loss Fraction	2.0 % at STC

Array #8 - Sub-array #8

Global array res.	72 mΩ
Loss Fraction	2.0 % at STC

AC wiring losses

Inv. output line up to injection point

Inverter voltage	400 Vac tri
Loss Fraction	3.00 % at STC

Inverter: SUN2000-150K-MG0-400V

Wire section (20 Inv.)	Copper 20 x 3 x 95 mm²
Average wires length	157 m

PVsyst V7.4.8

VC0, Simulation date:
03/28/25 20:52
with V7.4.8

Main results

System Production

Produced Energy	3084.17 MWh/year	Specific production	974 kWh/kWp/year
		Perf. Ratio PR	84.11 %

Normalized productions (per installed kWp)

- Lc: Collection Loss (PV-array losses)   0.43 kWh/kWp/day
- Ls: System Loss (inverter, ...)   0.08 kWh/kWp/day
- Yf: Produced useful energy (inverter output)   2.67 kWh/kWp/day

Performance Ratio PR

PR: Performance Ratio (Yf / Yr) : 0.841
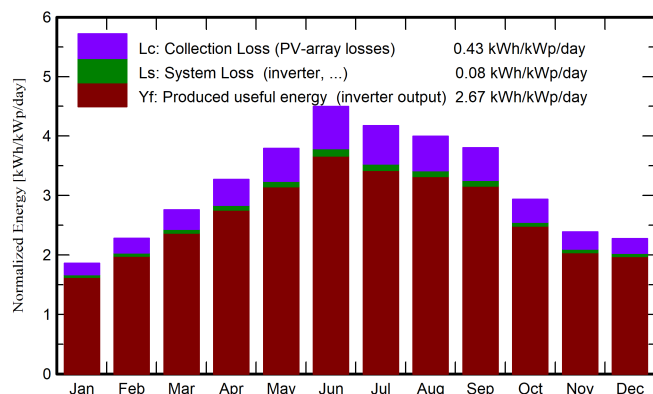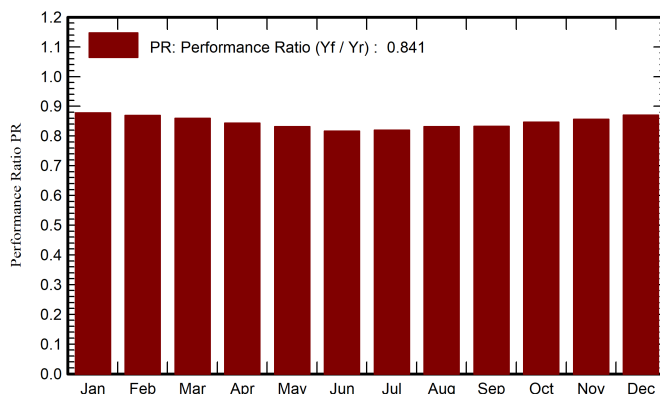
Balances and main results

	GlobHor	DiffHor	T_Amb	GlobInc	GlobEff	EArray	E_Grid	PR
	kWh/m²	kWh/m²	°C	kWh/m²	kWh/m²	MWh	MWh	ratio
January	58.0	46.17	15.98	57.6	55.1	164.3	160.1	0.877
February	64.3	48.28	17.76	63.9	61.2	180.8	175.9	0.870
March	86.0	69.35	20.72	85.5	81.9	239.2	232.6	0.859
April	98.6	70.73	24.45	98.1	94.0	269.9	262.0	0.843
May	118.2	85.79	28.22	117.5	112.6	318.5	309.3	0.831
June	135.3	76.08	29.77	134.9	129.4	360.1	348.7	0.817
July	130.0	75.97	29.69	129.4	124.1	346.8	336.2	0.820
August	124.3	88.43	28.70	123.8	118.6	335.7	326.2	0.832
September	114.5	74.45	27.09	114.1	109.3	309.8	300.6	0.832
October	91.5	71.33	25.22	91.0	87.2	250.9	244.1	0.847
November	72.0	49.71	21.54	71.7	68.6	199.8	194.3	0.856
December	70.7	50.23	17.72	70.4	67.4	199.3	194.1	0.870
Year	1163.4	806.51	23.93	1157.9	1109.4	3174.9	3084.2	0.841

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		

PVsyst V7.4.8
VC0, Simulation date:
03/28/25 20:52
with V7.4.8

Loss diagram
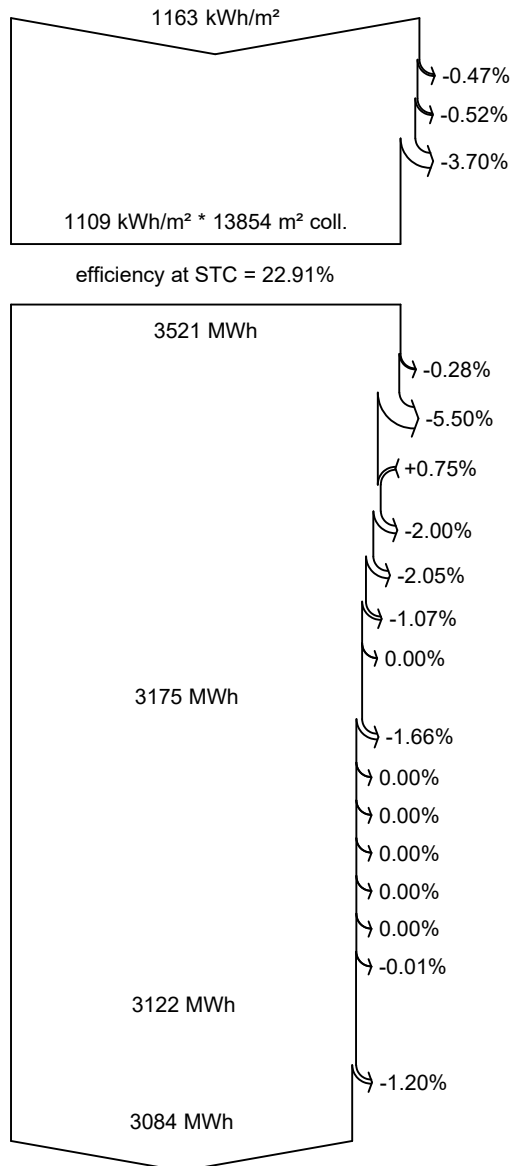
1163 kWh/m²	**Global horizontal irradiation**
-0.47%	**Global incident in coll. plane**
-0.52%	IAM factor on global
-3.70%	Soiling loss factor
1109 kWh/m² * 13854 m² coll.	**Effective irradiation on collectors**
efficiency at STC = 22.91%	PV conversion
3521 MWh	**Array nominal energy (at STC effic.)**
-0.28%	PV loss due to irradiance level
-5.50%	PV loss due to temperature
+0.75%	Module quality loss
-2.00%	LID - Light induced degradation
-2.05%	Mismatch loss, modules and strings
-1.07%	Ohmic wiring loss
0.00%	Mixed orientation mismatch loss
3175 MWh	**Array virtual energy at MPP**
-1.66%	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
0.00%	Inverter Loss due to power threshold
0.00%	Inverter Loss due to voltage threshold
-0.01%	Night consumption
3122 MWh	**Available Energy at Inverter Output**
-1.20%	AC ohmic loss
3084 MWh	**Energy injected into grid**

PVsyst V7.4.8
VC0, Simulation date:
03/28/25 20:52
with V7.4.8

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]
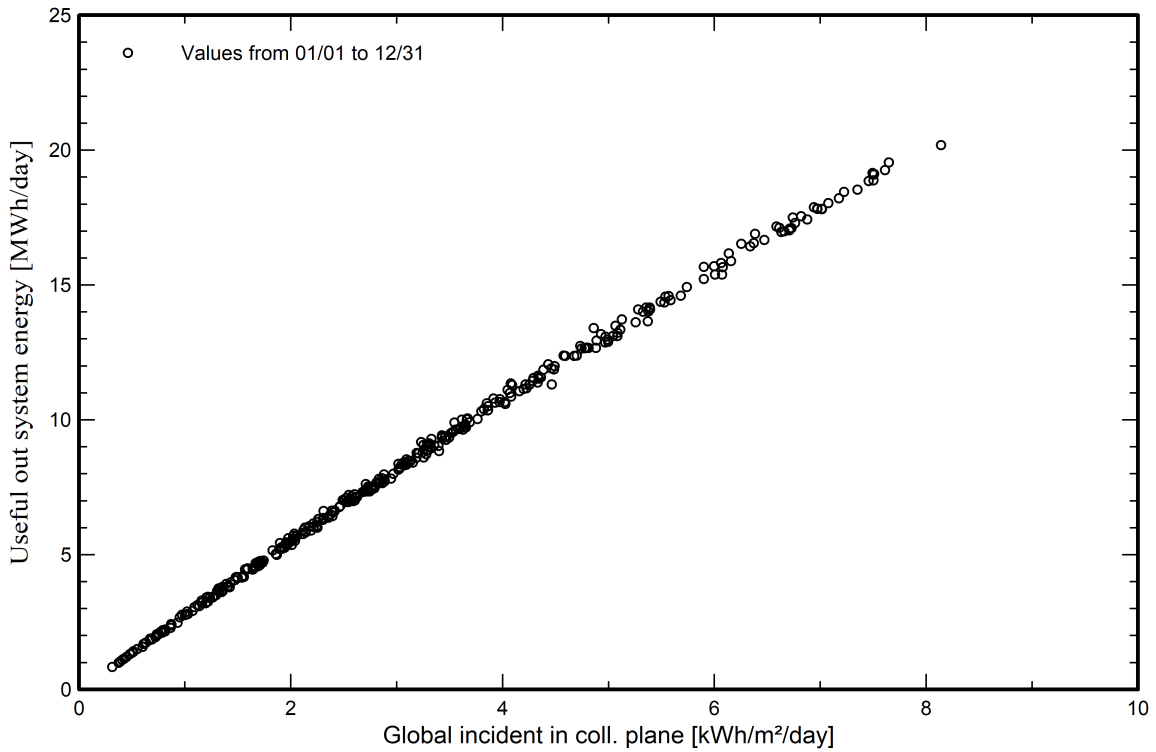
System Output Power Distribution

Values from 01/01 to 12/31

Y-axis: Useful out system energy [kWh / class of 20 kW]
X-axis: Useful out system energy [kW]

PVsyst V7.4.8

VC0, Simulation date:
03/28/25 20:52
with V7.4.8