Version 7.4.0

PVsyst - Simulation report

Grid-Connected System

Project: Jurnal

Variant: New simulation variant

No 3D scene defined, no shadings

System power: 60.0 kWp

GSG UNILA - Indonesia

Author

PVsyst V7.4.0
VC0, Simulation date:
07/10/24 11:44
with v7.4.0

Project summary

Geographical Site
GSG UNILA
Indonesia

Situation

Latitude	-5.36 °S
Longitude	105.24 °E
Altitude	123 m
Time zone	UTC+7

Project settings

Albedo	0.20

Meteo data
GSG UNILA
Meteonorm 8.1 (1996-2015), Sat=100% - Synthetic

System summary

Grid-Connected System

No 3D scene defined, no shadings

PV Field Orientation
Fixed plane
Tilt/Azimuth 20 / -35 °

Near Shadings
No Shadings

User's needs
Daily profile
Constant over the year
Average 292 kWh/Day

System information

PV Array

Nb. of modules	120 units
Pnom total	60.0 kWp

Inverters

Nb. of units	1 unit
Pnom total	50.0 kWac
Pnom ratio	1.200

Results summary

Produced Energy	88548 kWh/year	Specific production	1476 kWh/kWp/year	Perf. Ratio PR	84.34 %
Used Energy	106748 kWh/year			Solar Fraction SF	65.96 %

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General parameters

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

PV Field Orientation

Orientation	Sheds configuration	Models used
Fixed plane	No 3D scene defined	Transposition Perez
Tilt/Azimuth 20 / -35 °		Diffuse Perez, Meteonorm
		Circumsolar separate

Horizon	Near Shadings	User's needs
Free Horizon	No Shadings	Daily profile
		Constant over the year
		Average 292 kWh/Day

Hourly load	0 h	1 h	2 h	3 h	4 h	5 h	6 h	7 h	8 h	9 h	10 h	11 h	
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	41.78	41.78	41.78	kW
	12 h	13 h	14 h	15 h	16 h	17 h	18 h	19 h	20 h	21 h	22 h	23 h	
	41.78	41.78	41.78	41.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	kW

PV Array Characteristics

PV module

Manufacturer	Trina Solar
Model	TSM-DE18M-(II)-500
(Custom parameters definition)	
Unit Nom. Power	500 Wp
Number of PV modules	120 units
Nominal (STC)	60.0 kWp
Modules	8 Strings x 15 In series
At operating cond. (50°C)	
Pmpp	54.6 kWp
U mpp	584 V
I mpp	93 A

Inverter

Manufacturer	Sungrow
Model	SG50CX-P2
(Original PVsyst database)	
Unit Nom. Power	50.0 kWac
Number of inverters	4 * MPPT 25% 1 unit
Total power	50.0 kWac
Operating voltage	160-1000 V
Max. power (=>40°C)	55.0 kWac
Pnom ratio (DC:AC)	1.20
No power sharing between MPPTs	

Total PV power

Nominal (STC)	60 kWp
Total	120 modules
Module area	287 m²

Total inverter power

Total power	50 kWac
Number of inverters	1 unit
Pnom ratio	1.20

Array losses

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. 103 mΩ
Loss Fraction 1.5 % at STC

Module Quality Loss
Loss Fraction -1.3 %

Module mismatch losses
Loss Fraction 2.0 % at MPP

Strings Mismatch loss
Loss Fraction 0.2 %

IAM loss factor
Incidence effect (IAM): Fresnel, AR coating, n(glass)=1.526, n(AR)=1.290

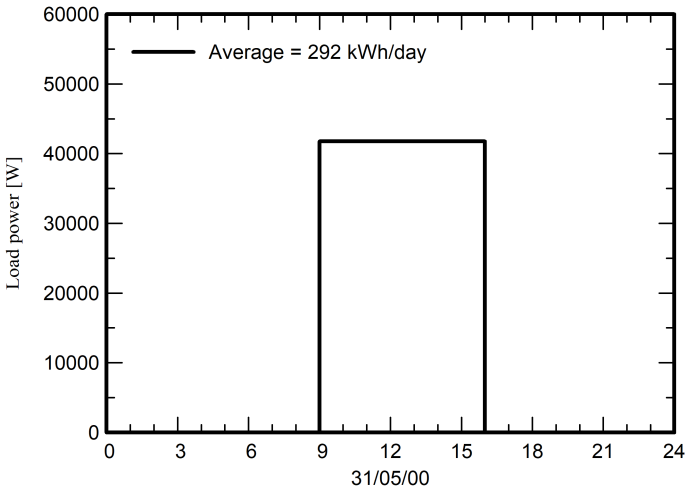
0°	30°	50°	60°	70°	75°	80°	85°	90°
1.000	0.999	0.987	0.962	0.892	0.816	0.681	0.440	0.000

Detailed User's needs

Daily profile, Constant over the year, average = 292 kWh/day

Hourly load	0 h	1 h	2 h	3 h	4 h	5 h	6 h	7 h	8 h	9 h	10 h	11 h	
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	41.78	41.78	41.78	kW
	12 h	13 h	14 h	15 h	16 h	17 h	18 h	19 h	20 h	21 h	22 h	23 h	
	41.78	41.78	41.78	41.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	kW

Daily profile

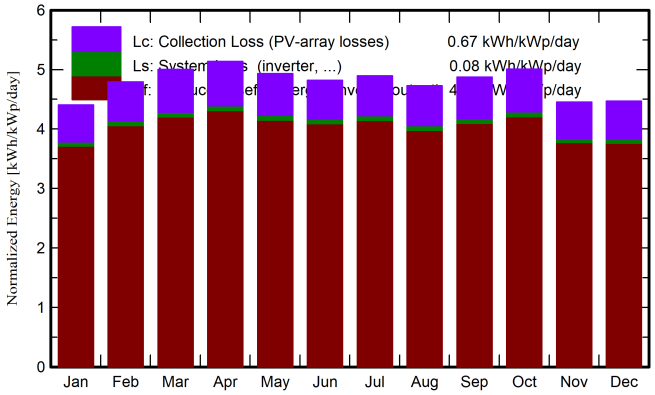


Main results

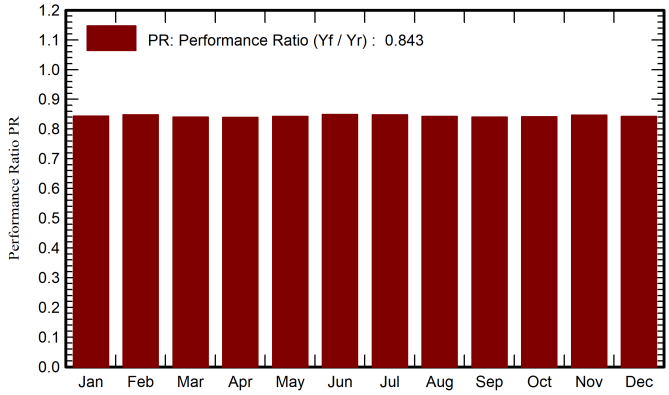
System Production

Produced Energy	88548 kWh/year	Specific production	1476 kWh/kWp/year
Used Energy	106748 kWh/year	Perf. Ratio PR	84.34 %
		Solar Fraction SF	65.96 %

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 kWh	E_User kWh	E_Solar kWh	E_Grid kWh	EFrGrid kWh
January	153.1	78.03	26.56	136.6	132.6	7048	9066	5507	1407	3560
February	146.5	80.53	26.52	134.2	130.8	6956	8189	5524	1301	2665
March	161.3	83.30	26.99	155.1	151.6	7976	9066	6221	1602	2846
April	150.6	76.60	26.92	154.1	151.0	7914	8774	6031	1730	2743
May	144.2	73.31	27.39	152.9	149.8	7878	9066	6166	1560	2901
June	133.1	69.57	26.64	144.7	141.9	7513	8774	5950	1422	2824
July	141.9	74.08	26.64	151.7	148.6	7860	9066	6282	1430	2784
August	141.9	76.28	26.95	146.6	143.8	7554	9066	6041	1366	3025
September	145.4	77.05	26.81	146.3	143.3	7520	8774	5742	1632	3032
October	164.4	94.03	27.40	155.3	151.5	7987	9066	6185	1650	2881
November	147.7	83.39	26.75	133.7	129.9	6921	8774	5312	1482	3462
December	155.4	77.74	26.89	138.6	134.3	7142	9066	5449	1559	3617
Year	1785.7	943.92	26.88	1749.8	1709.1	90270	106748	70408	18140	36340

Legends

GlobHor	Global horizontal irradiation	EArray	Effective energy at the output of the array
DiffHor	Horizontal diffuse irradiation	E_User	Energy supplied to the user
T_Amb	Ambient Temperature	E_Solar	Energy from the sun
GlobInc	Global incident in coll. plane	E_Grid	Energy injected into grid
GlobEff	Effective Global, corr. for IAM and shadings	EFrGrid	Energy from the grid

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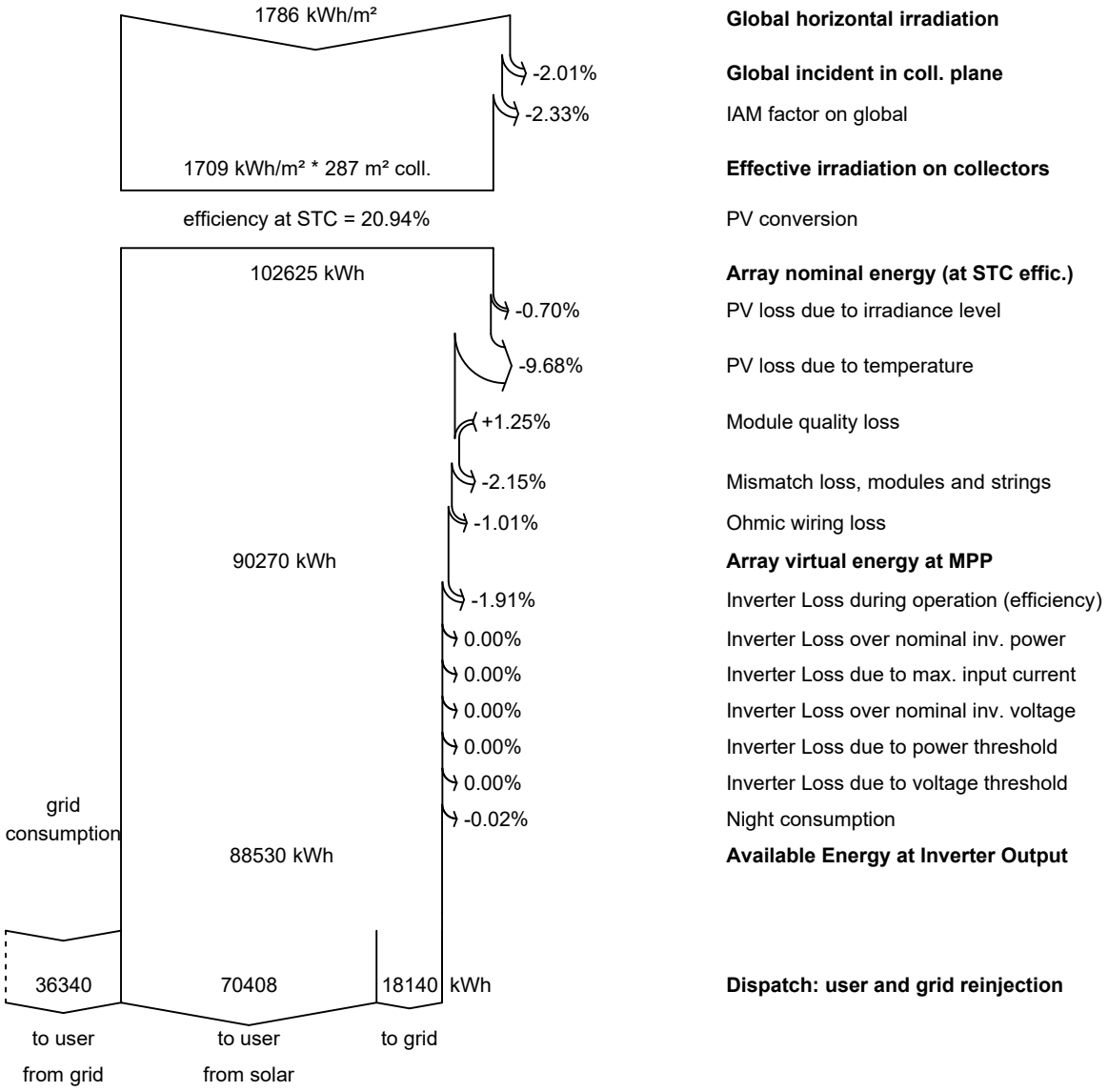
Loss diagram



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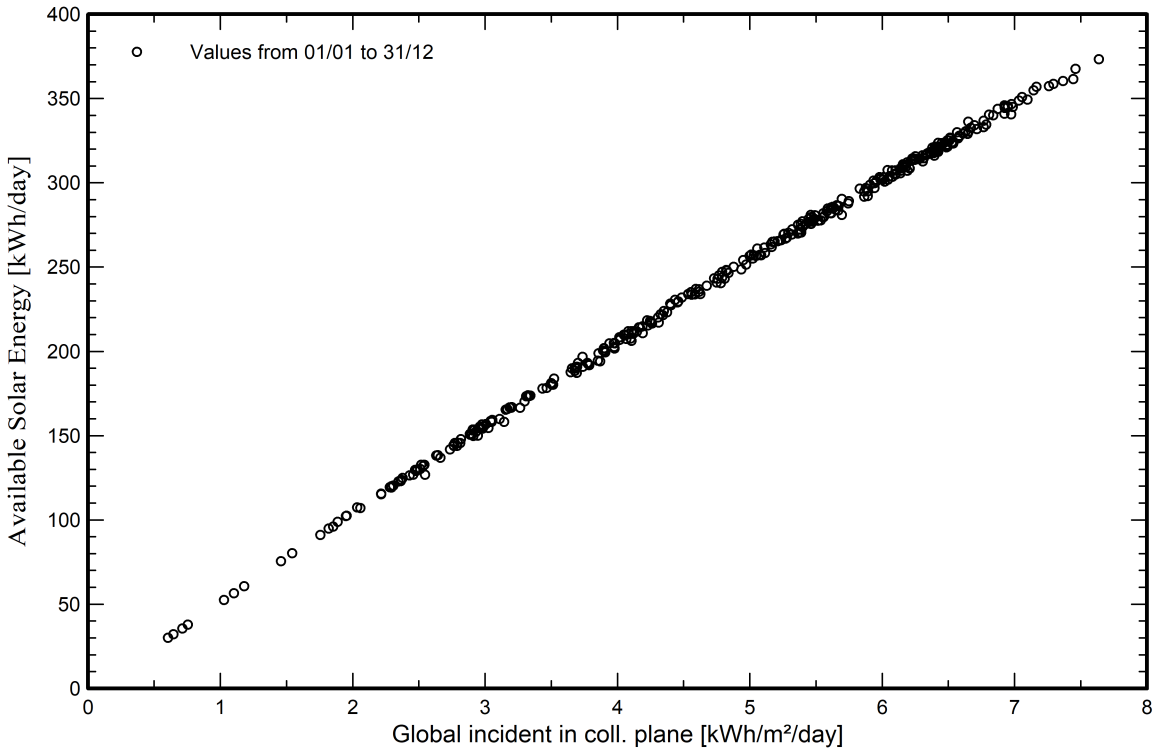
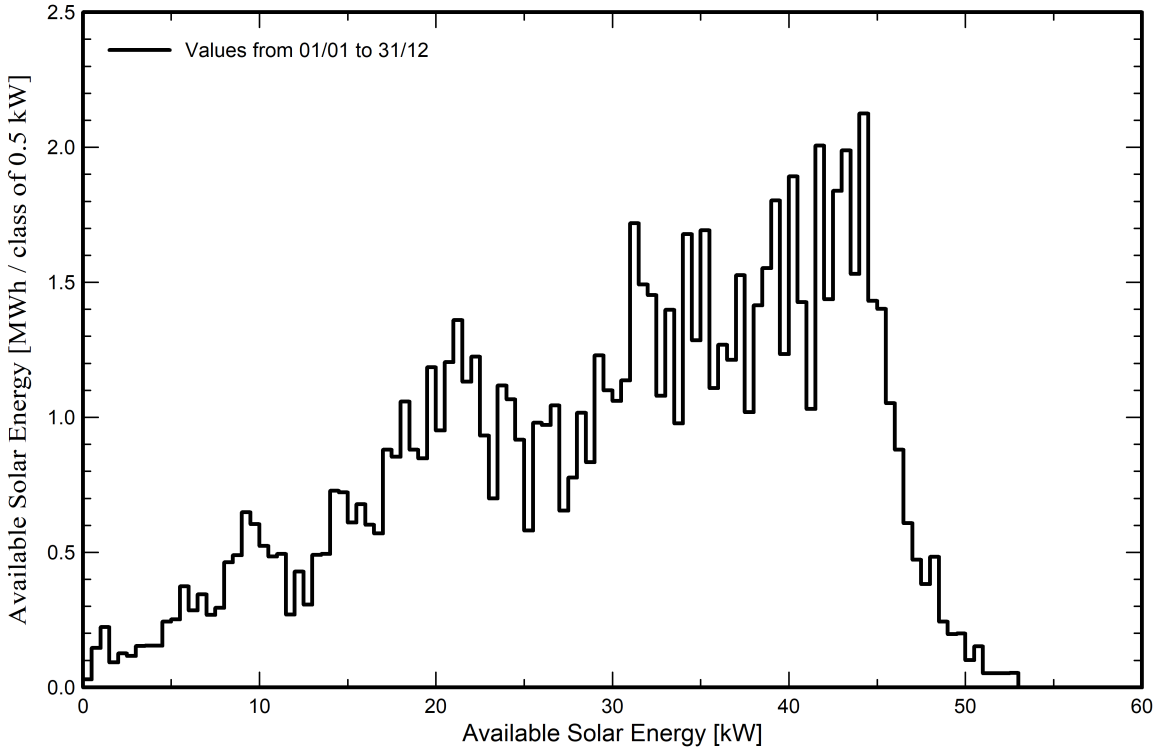
Predef. graphs

Daily Input/Output diagram



System Output Power Distribution



Single-line diagram

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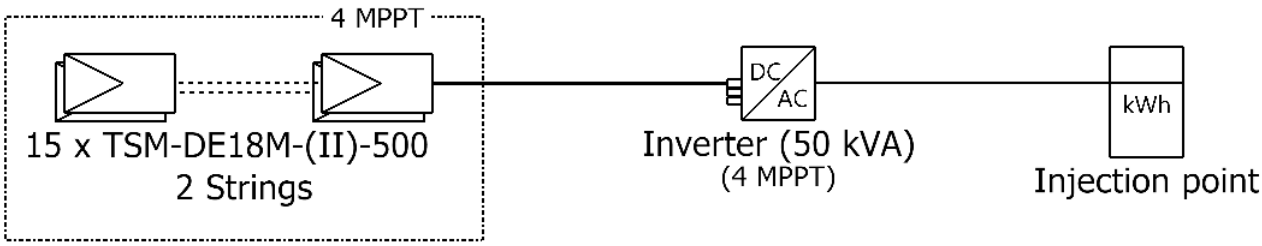

PV module	TSM-DE18M-(II)-500
Inverter	SG50CX-P2
String	15 x TSM-DE18M-(II)-500

	Jurnal	
	VC0 : New simulation variant	07/10/24