

PVsyst - Simulation report

Grid-Connected System

Project: 100 Beded Bighapur Unnao

Variant: New simulation variant

Unlimited sheds

System power: 200 kWp

Bīghāpur Khurd.1 - India

Author

Jakson Limited (India)



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PVsyst V8.0.2

VC0, Simulation date:
25/12/24 09:00
with V8.0.2

Jakson Limited (India)

Project summary

Geographical Site

Bīghāpur Khurd.1

India

Situation

Latitude 26.35 °N

Longitude 80.67 °E

Altitude 112 m

Time zone UTC+5.5

Project settings

Albedo 0.20

Weather data

Bīghāpur Khurd.1

Meteonorm 8.2 (1996-2015), Sat=100% - Synthetic

System summary

Grid-Connected System

Orientation #1

Sheds

Tilt 10 °

Azimuth 45 °

Unlimited sheds

Near Shadings

Mutual shadings of sheds

User's needs

Unlimited load (grid)

System information

PV Array

Nb. of modules

345 units

Pnom total

200 kWp

Inverters

Nb. of units

2 units

Pnom total

160 kWac

Pnom ratio

1.251

Results summary

Produced Energy 297239 kWh/year Specific production 1485 kWh/kWp/year Perf. Ratio PR 92.72 %

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General parameters

Grid-Connected System

Orientation #1

Sheds

Tilt	10 °
Azimuth	45 °

Unlimited sheds

Sheds configuration

Nb. of sheds	10 units
Unlimited sheds	
Shading limit angle	
Limit profile angle	7.8 °

Sizes

Sheds spacing	6.80 m
Collector width	3.00 m
Average GCR	44.1 %
Top inactive band	0.02 m
Bottom inactive band	0.02 m

Models used

Transposition	Perez
Diffuse	Perez, Meteonorm
Circumsolar	separate

Horizon

Free Horizon

Near Shadings

Mutual shadings of sheds

Bifacial system definition

Orientation #1

Bifacial system

Model	Unlimited Sheds 2D Model
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Bifacial model geometry

Sheds spacing	6.80 m
Sheds width	3.04 m
Limit profile angle	7.8 °
GCR	44.7 %
Height above ground	1.50 m
Nb. of sheds	10 units

Bifacial model definitions

Ground albedo	0.30
Bifaciality factor	80 %
Rear shading factor	5.0 %
Rear mismatch loss	10.0 %
Shed transparent fraction	0.0 %

User's needs

Unlimited load (grid)

PV Array Characteristics

PV module

Manufacturer	Panasonic Life Solutions India Pvt. Ltd
Model	AE14T580VHC16B5R
(Custom parameters definition)	

Unit Nom. Power	580 Wp
Number of PV modules	345 units
Nominal (STC)	200 kWp
Modules	23 string x 15 In series

At operating cond. (50°C)

Pmpp	186 kWp
U mpp	616 V
I mpp	301 A

Total PV power

Nominal (STC)	200 kWp
Total	345 modules
Module area	890 m²

Inverter

Manufacturer	Growatt New Energy
Model	MAX 80KTL3 LV
(Original PVsyst database)	

Unit Nom. Power	80.0 kWac
Number of inverters	2 units
Total power	160 kWac
Operating voltage	200-1000 V
Pnom ratio (DC:AC)	1.25
Power sharing within this inverter	

Total inverter power

Total power	160 kWac
Number of inverters	2 units
Pnom ratio	1.25



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Array losses

Array Soiling Losses

Loss Fraction 2.0 %

Thermal Loss factor

Module temperature according to irradiance

Uc (const) 29.0 W/m²K

Uv (wind) 0.0 W/m²K/m/s

DC wiring losses

Global array res. 33 mΩ

Loss Fraction 1.5 % at STC

Serie Diode Loss

Voltage drop 0.7 V

Loss Fraction 0.1 % at STC

LID - Light Induced Degradation

Loss Fraction 0.3 %

Module Quality Loss

Loss Fraction 0.0 %

Module mismatch losses

Loss Fraction 1.0 % at MPP

Strings Mismatch loss

Loss Fraction 0.1 %

IAM loss factor

Incidence effect (IAM): User defined profile

0°	30°	50°	60°	70°	75°	80°	85°	90°
1.000	1.000	0.998	0.992	0.963	0.917	0.812	0.567	0.000

System losses

Unavailability of the system

Time fraction 1.0 %

3.7 days,
3 periods

AC wiring losses

Inv. output line up to injection point

Inverter voltage 400 Vac tri

Loss Fraction 1.39 % at STC

Inverter: MAX 80KTL3 LV

Wire section (2 Inv.) Alu 2 x 3 x 70 mm²

Average wires length 50 m



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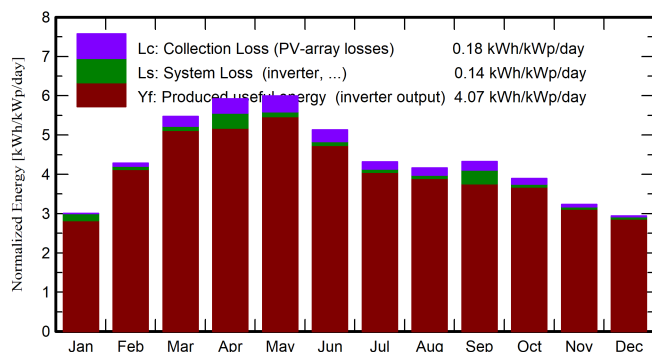
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Main results

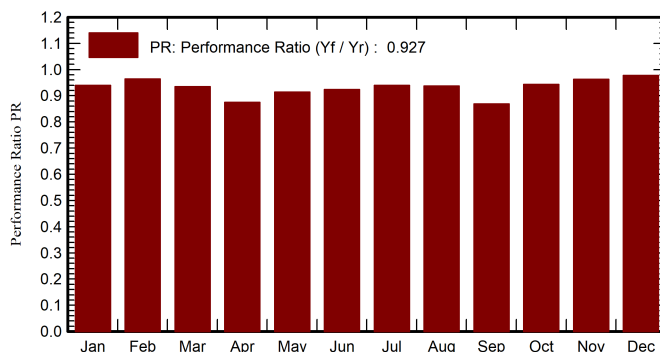
System Production

Produced Energy (P50)	297239 kWh/year	Specific production (P50)	1485 kWh/kWp/year	Perf. Ratio PR	92.72 %
Produced Energy (P90)	290367 kWh/year	Specific production (P90)	1451 kWh/kWp/year		
Produced Energy (P75)	293626 kWh/year	Specific production (P75)	1467 kWh/kWp/year		

Normalized productions (per installed kWp)



Performance Ratio PR



Balances and main results

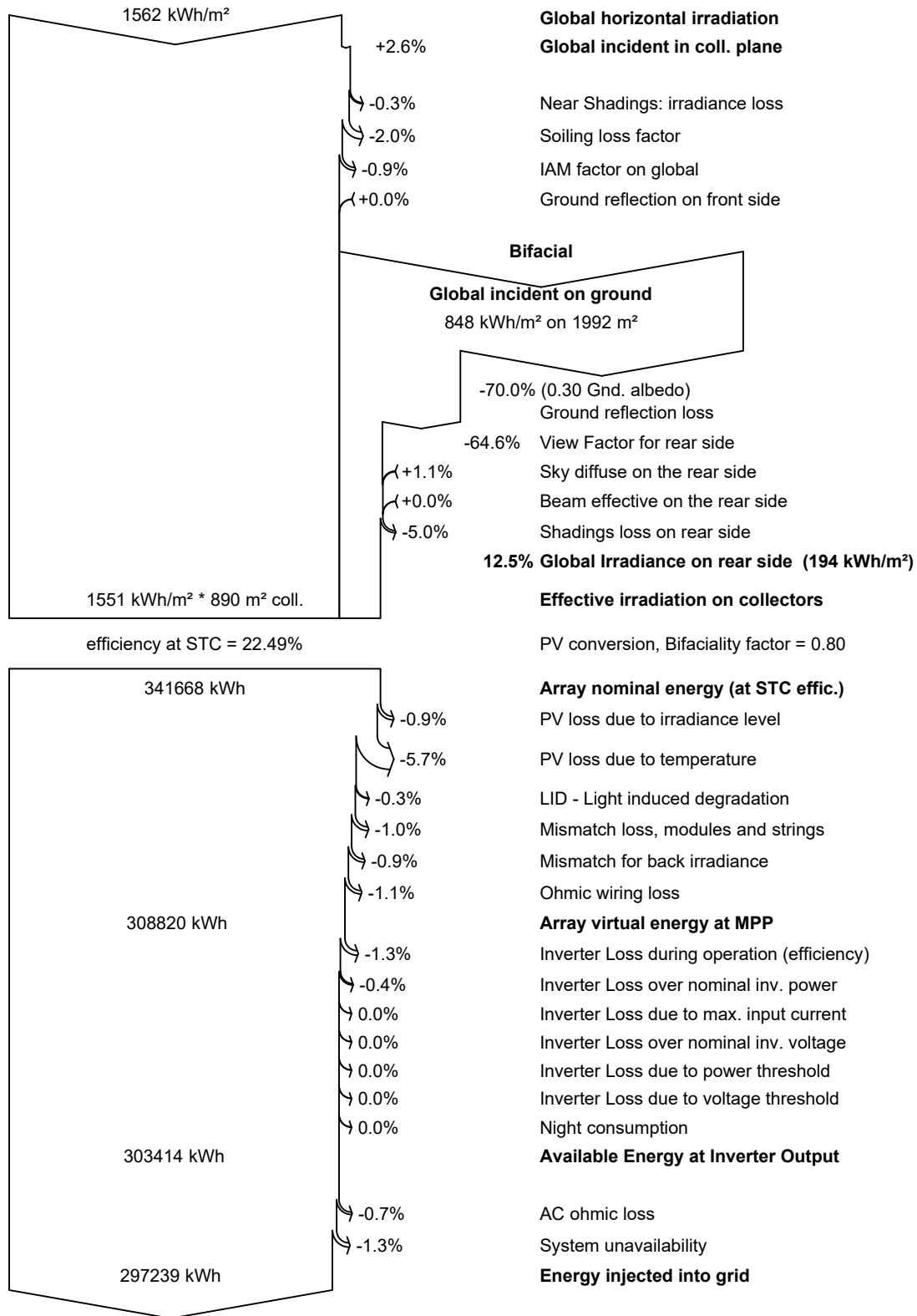
	GlobHor	DiffHor	T_Amb	GlobInc	GlobEff	EArray	E_Grid	PR
	kWh/m ²	kWh/m ²	°C	kWh/m ²	kWh/m ²	kWh	kWh	ratio
January	86.0	47.03	14.08	93.2	90.1	18651	17537	0.940
February	113.1	57.93	18.52	119.9	116.0	23617	23134	0.964
March	162.1	71.37	24.31	169.7	164.7	32456	31759	0.935
April	174.9	87.94	30.03	177.6	172.3	33421	31101	0.875
May	185.8	99.41	32.82	185.7	180.2	34724	33980	0.914
June	156.6	96.19	32.32	154.0	149.2	29068	28453	0.923
July	136.7	91.35	30.09	133.8	129.3	25674	25150	0.939
August	129.4	87.15	29.55	129.0	124.8	24701	24194	0.937
September	127.4	72.30	28.59	129.9	125.8	24707	22580	0.869
October	115.0	73.62	26.47	120.8	116.9	23286	22822	0.944
November	90.8	59.86	20.68	97.1	93.8	19081	18718	0.963
December	83.9	52.18	15.73	91.1	88.0	18161	17813	0.977
Year	1561.7	896.34	25.29	1602.1	1551.0	307546	297239	0.927

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		



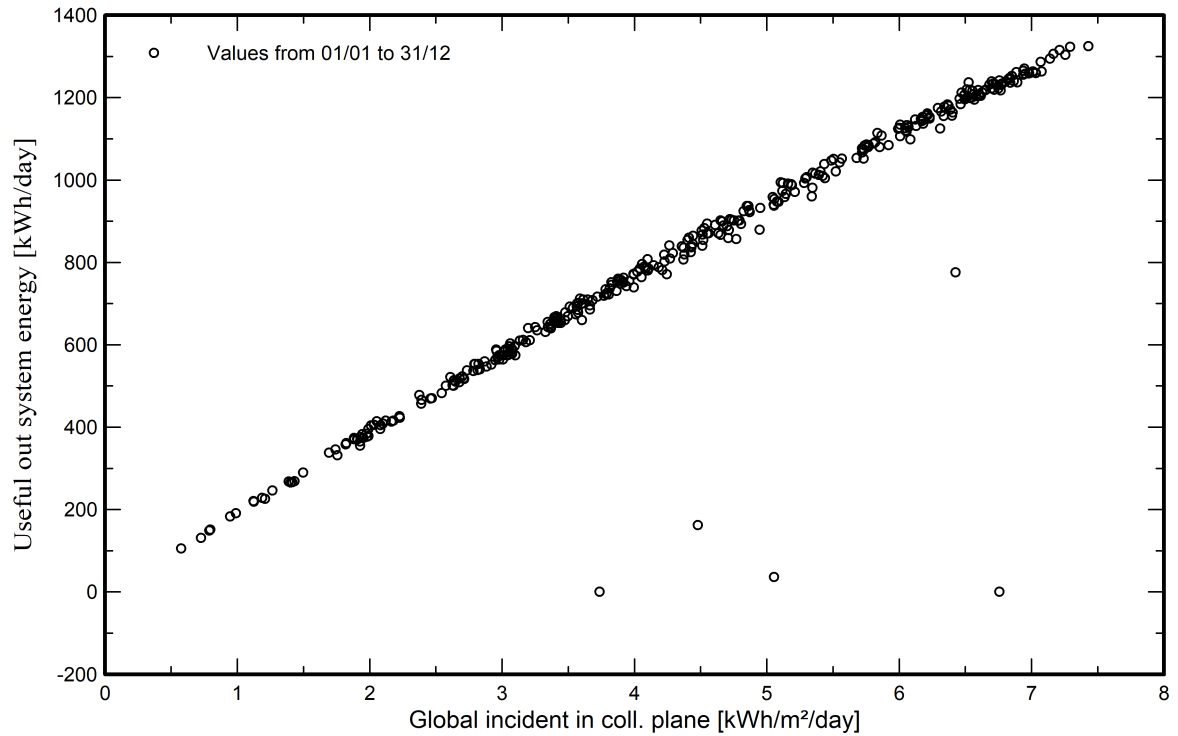
Loss diagram



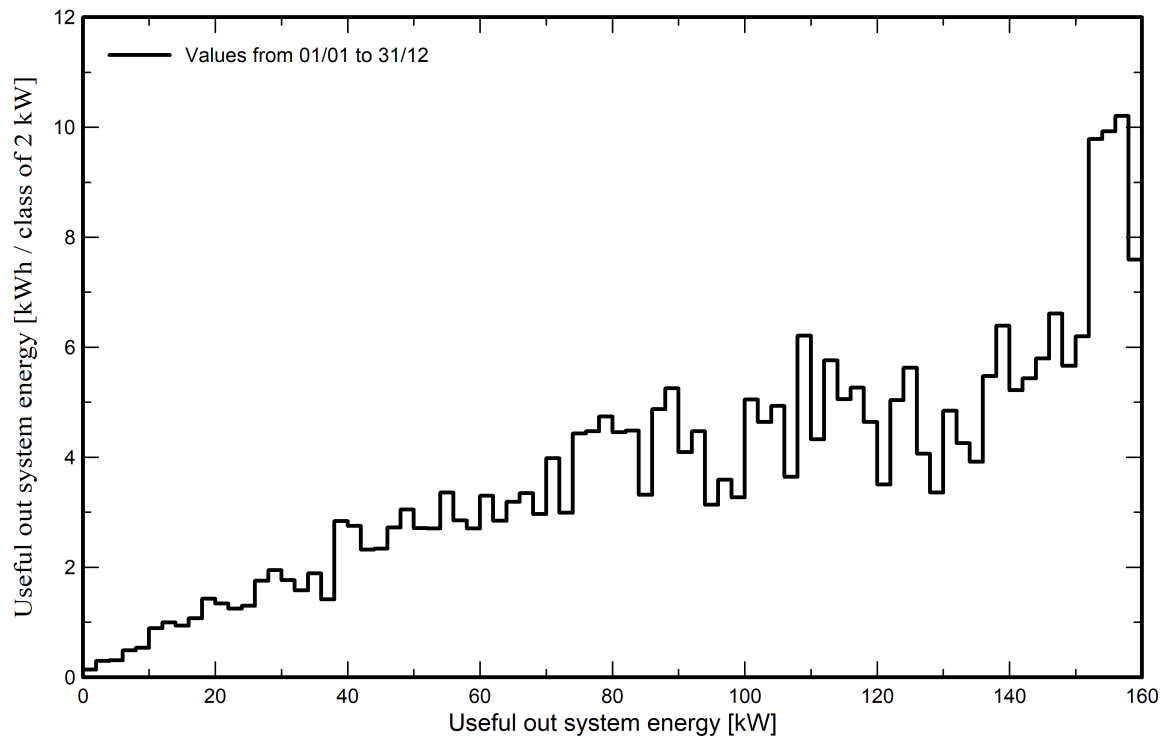


Predef. graphs

Daily Input/Output diagram



System Output Power Distribution





P50 - P90 evaluation

Weather data

Source Meteonorm 8.2 (1996-2015), Sat=100%
Kind Not defined
Year-to-year variability(Variance) 0.0 %

Specified Deviation

Global variability (weather data + system)

Variability (Quadratic sum) 1.8 %

Simulation and parameters uncertainties

PV module modelling/parameters 1.0 %
Inverter efficiency uncertainty 0.5 %
Soiling and mismatch uncertainties 1.0 %
Degradation uncertainty 1.0 %

Annual production probability

Variability 5.4 MWh
P50 297.2 MWh
P90 290.4 MWh
P75 293.6 MWh

Probability distribution

