

PVsyst - Simulation report

Grid-Connected System

Project: 100 Beded Maurawa Unnao

Variant: New simulation variant

Unlimited sheds

System power: 313 kWp

Bīghāpur Khurd.1 - India

Author

Jakson Limited (India)



Project: 100 Beded Maurawa Unnao

Variant: New simulation variant

PVsyst V8.0.2

VC0, Simulation date:
25/12/24 08:51
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

539 units

Pnom total

313 kWp

Inverters

Nb. of units

3 units

Pnom total

270 kWac

Pnom ratio

1.158

Results summary

Produced Energy 469627 kWh/year Specific production 1502 kWh/kWp/year Perf. Ratio PR 93.77 %

Table of contents

Project and results summary	2
General parameters, PV Array Characteristics, System losses	3
Main results	6
Loss diagram	7
Predef. graphs	8
P50 - P90 evaluation	9



PVsyst V8.0.2

VC0, Simulation date:
25/12/24 08:51
with V8.0.2

Jakson Limited (India)

General parameters

Grid-Connected System

Unlimited sheds

Orientation #1

Sheds

Tilt	10 °
Azimuth	45 °

Sheds configuration

Nb. of sheds	10 units
Unlimited sheds	
Shading limit angle	
Limit profile angle	8 °

Sizes

Sheds spacing	6.70 m
Collector width	3.00 m
Average GCR	44.8 %
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
-------	--------------------------

Bifacial model geometry

Sheds spacing	6.70 m
Sheds width	3.04 m
Limit profile angle	8.0 °
GCR	45.4 %
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

Array #1 - PV Array

PV module

Manufacturer	Panasonic Life Solutions India Pvt. Ltd
Model	AE14T580VHC16B5R

(Custom parameters definition)

Unit Nom. Power	580 Wp
Number of PV modules	140 units
Nominal (STC)	81.2 kWp
Modules	14 string x 10 In series

At operating cond. (50°C)

Pmpp	75.3 kWp
U mpp	411 V
I mpp	183 A

Inverter

Manufacturer	Growatt New Energy
Model	MAX 70KTL3 LV

(Original PVsyst database)

Unit Nom. Power	70.0 kWac
Number of inverters	1 unit
Total power	70.0 kWac
Operating voltage	200-1000 V
Pnom ratio (DC:AC)	1.16
Power sharing within this inverter	



PV Array Characteristics

Array #2 - Sub-array #2

PV module

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

Unit Nom. Power 580 Wp
Number of PV modules 399 units
Nominal (STC) 231 kWp
Modules 21 string x 19 In series

At operating cond. (50°C)

Pmpp 215 kWp
U mpp 780 V
I mpp 275 A

Total PV power

Nominal (STC) 313 kWp
Total 539 modules
Module area 1391 m²

Inverter

Manufacturer Growatt New Energy
Model MAX 100KTL3-X LV
(Original PVsyst database)

Unit Nom. Power 100 kWac
Number of inverters 2 units
Total power 200 kWac
Operating voltage 180-1000 V
Pnom ratio (DC:AC) 1.16
Power sharing within this inverter

Total inverter power

Total power 270 kWac
Number of inverters 3 units
Pnom ratio 1.16

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

Serie Diode Loss

Voltage drop 0.7 V
Loss Fraction 0.2 % at STC

LID - Light Induced Degradation

Loss Fraction 0.3 %

Module Quality Loss

Loss Fraction 0.0 %

Module mismatch losses

Array #1 - PV Array

Loss Fraction 1.0 % at MPP

Array #2 - Sub-array #2

Loss Fraction 1.0 % at MPP

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

DC wiring losses

Global wiring resistance 10 mΩ
Loss Fraction 1.5 % at STC

Array #1 - PV Array

Global array res. 36 mΩ
Loss Fraction 1.5 % at STC

Array #2 - Sub-array #2

Global array res. 46 mΩ
Loss Fraction 1.5 % at STC

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	0.26 % at STC

Inverters: MAX 70KTL3 LV, MAX 100KTL3-X LV

Wire section (3 Inv.)	Alu 3 x 3 x 95 mm ²
Average wires length	20 m



Project: 100 Beded Maurawa Unnao

Variant: New simulation variant

PVsyst V8.0.2

VC0, Simulation date:
25/12/24 08:51
with V8.0.2

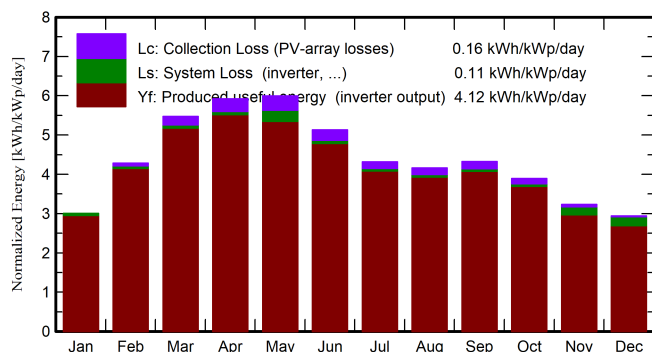
Jakson Limited (India)

Main results

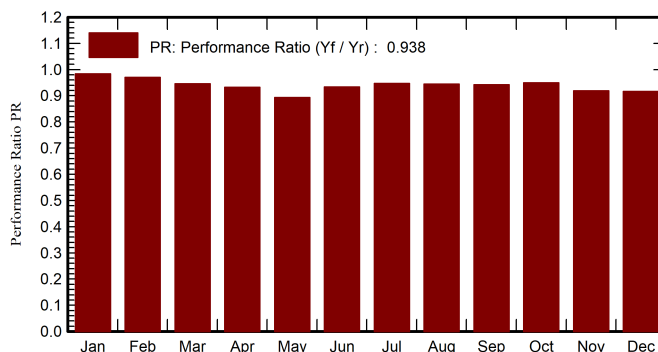
System Production

Produced Energy (P50)	469627 kWh/year	Specific production (P50)	1502 kWh/kWp/year	Perf. Ratio PR	93.77 %
Produced Energy (P90)	458770 kWh/year	Specific production (P90)	1468 kWh/kWp/year		
Produced Energy (P75)	463919 kWh/year	Specific production (P75)	1484 kWh/kWp/year		

Normalized productions (per installed kWp)



Performance Ratio PR



Balances and main results

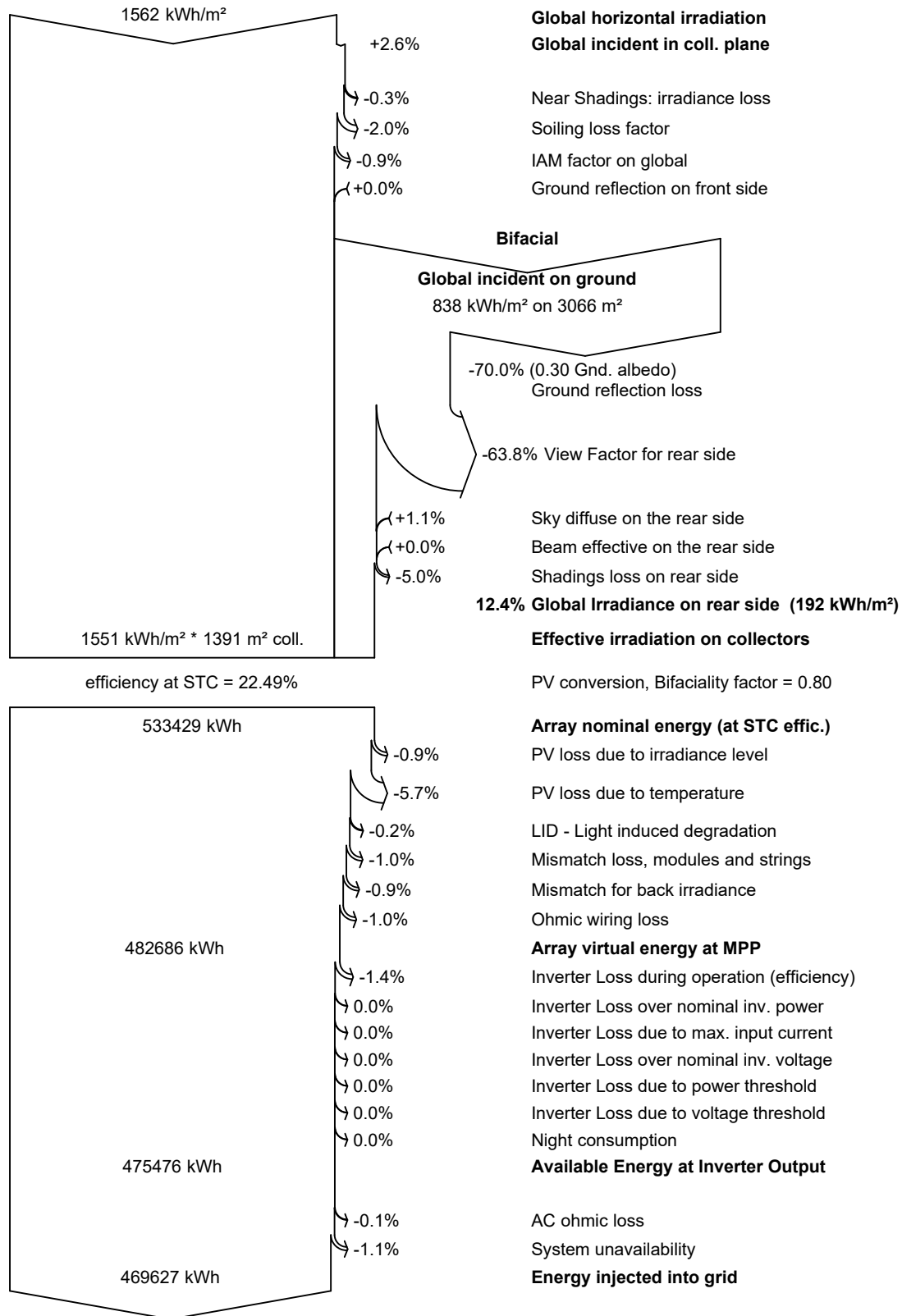
	GlobHor kWh/m ²	DiffHor kWh/m ²	T_Amb °C	GlobInc kWh/m ²	GlobEff kWh/m ²	EArray kWh	E_Grid kWh	PR ratio
January	86.0	47.03	14.08	93.2	90.1	29151	28677	0.984
February	113.1	57.93	18.52	119.9	116.0	36931	36360	0.970
March	162.1	71.37	24.31	169.7	164.7	51013	50212	0.946
April	174.9	87.94	30.03	177.6	172.3	52578	51769	0.932
May	185.8	99.41	32.82	185.7	180.2	54618	51856	0.893
June	156.6	96.19	32.32	154.0	149.1	45660	44921	0.933
July	136.7	91.35	30.09	133.8	129.3	40250	39599	0.946
August	129.4	87.15	29.55	129.0	124.8	38731	38107	0.945
September	127.4	72.30	28.59	129.9	125.8	38879	38243	0.942
October	115.0	73.62	26.47	120.8	116.9	36463	35885	0.950
November	90.8	59.86	20.68	97.1	93.8	29818	27875	0.918
December	83.9	52.18	15.73	91.1	88.0	28379	26124	0.917
Year	1561.7	896.34	25.29	1602.1	1550.9	482471	469627	0.938

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		



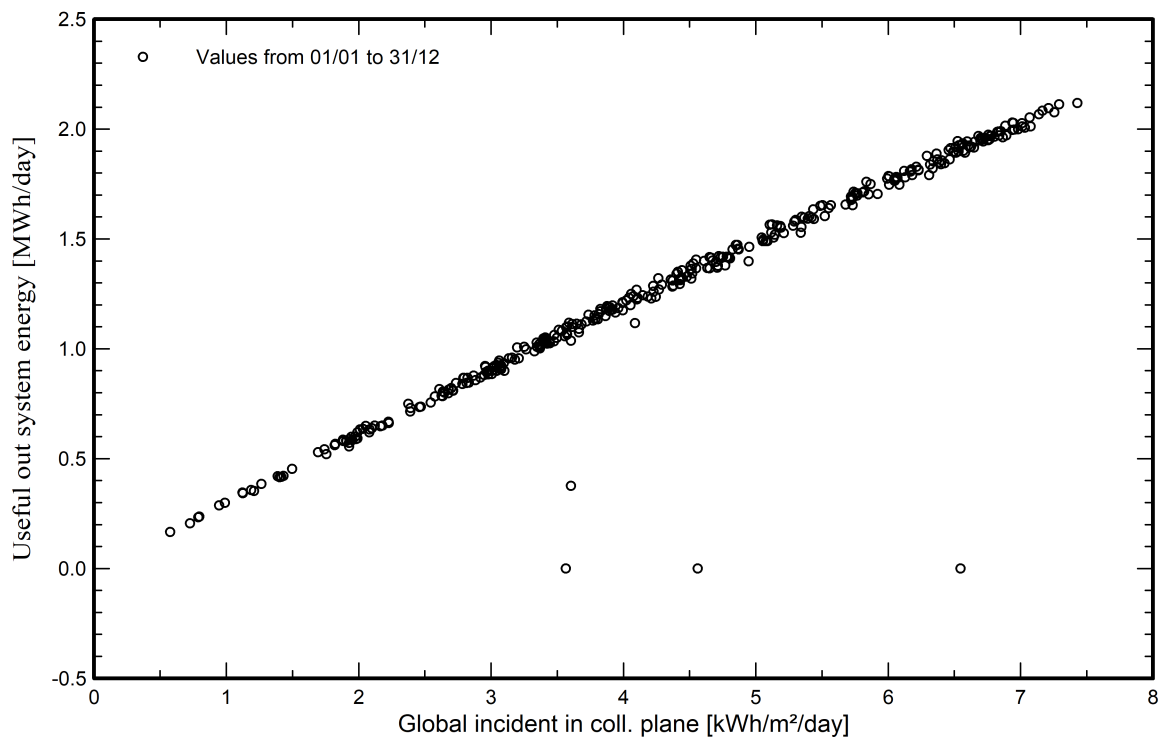
Loss diagram



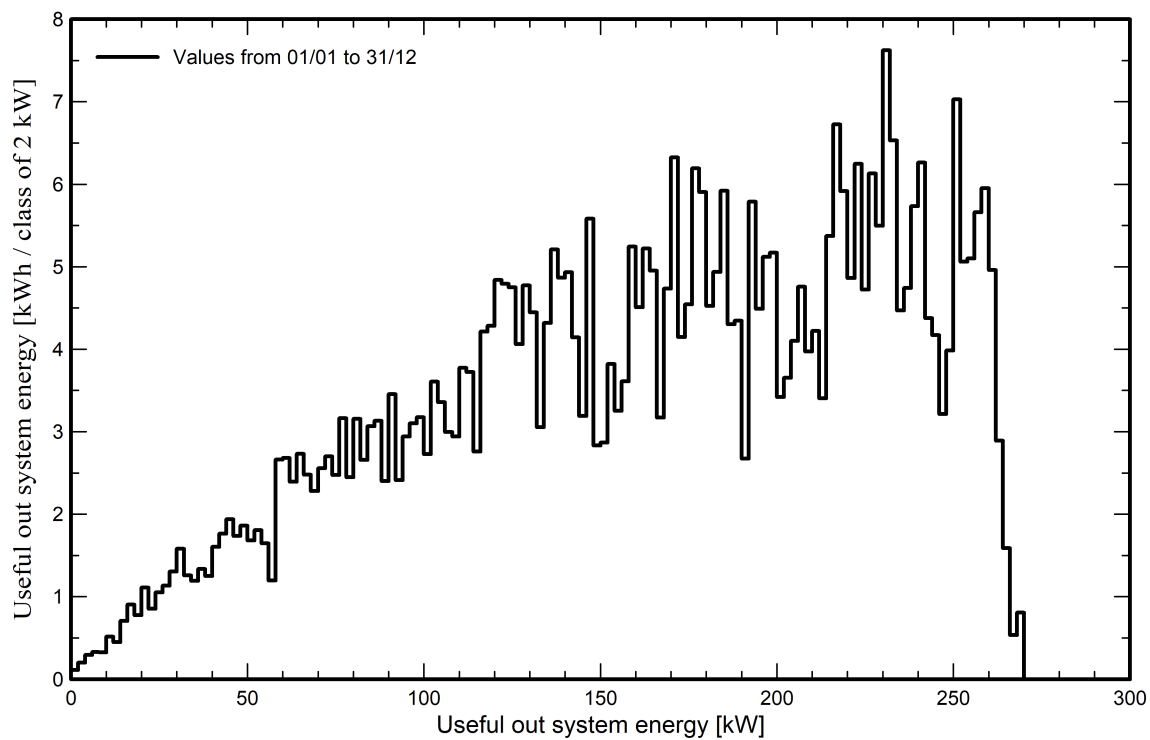


Predef. graphs

Daily Input/Output diagram



System Output Power Distribution





P50 - P90 evaluation

Weather data

Source Meteoronorm 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 8.5 MWh
P50 469.6 MWh
P90 458.8 MWh
P75 463.9 MWh

Probability distribution

