

PVsyst - Simulation report

Grid-Connected System

Project: Pratapgarh Dist Hospital

Variant: New simulation variant

Unlimited sheds

System power: 280 kWp

Bela - India

Author

Jakson Limited (India)

**PVsyst V8.0.2**

VC0, Simulation date:
17/12/24 11:22
with V8.0.2

Project: Pratapgarh Dist Hospital

Variant: New simulation variant

Jakson Limited (India)

Project summary**Geographical Site****Bela**

India

Situation

Latitude 25.92 °N

Longitude 82.00 °E

Altitude 97 m

Time zone UTC+5.5

Project settings

Albedo 0.20

Weather data

Bela

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

System summary**Grid-Connected System****Orientation #1****Sheds**

Tilt 10 °

Azimuth 7 °

Unlimited sheds**Near Shadings**

Mutual shadings of sheds

User's needs

Unlimited load (grid)

System information**PV Array**

Nb. of modules

482 units

Pnom total

280 kWp

Inverters

Nb. of units

3 units

Pnom total

230 kWac

Pnom ratio

1.215

Results summary

Produced Energy 413606 kWh/year Specific production 1479 kWh/kWp/year Perf. Ratio PR 92.79 %

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Jakson Limited (India)

General parameters

Grid-Connected System

Unlimited sheds

Orientation #1

Sheds

Tilt	10 °
Azimuth	7 °

Sheds configuration

Nb. of sheds	10 units
Unlimited sheds	
Shading limit angle	
Limit profile angle	9 °

Sizes

Sheds spacing	6.30 m
Collector width	3.00 m
Average GCR	47.6 %
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	6.30 m
Sheds width	3.04 m
Limit profile angle	9.0 °
GCR	48.3 %
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	10 string x 14 In series

At operating cond. (50°C)

Pmpp	75.3 kWp
U mpp	575 V
I mpp	131 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 342 units
Nominal (STC) 198 kWp
Modules 18 string x 19 In series

At operating cond. (50°C)

Pmpp 184 kWp
U mpp 780 V
I mpp 236 A

Total PV power

Nominal (STC) 280 kWp
Total 482 modules
Module area 1244 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) 1.24
Power sharing within this inverter

Total inverter power

Total power 230 kWac
Number of inverters 3 units
Pnom ratio 1.22

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 0.1 % 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

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. 72 mΩ
Loss Fraction 1.5 % at STC

Array #2 - Sub-array #2

Global array res. 54 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 0.41 % at STC

Inverter: MAX 70KTL3 LV

Wire section (1 Inv.) Alu 1 x 3 x 50 mm²
Wires length 45 m

Inverter: MAX 80KTL3 LV

Wire section (2 Inv.) Alu 2 x 3 x 70 mm²
Average wires length 0 m

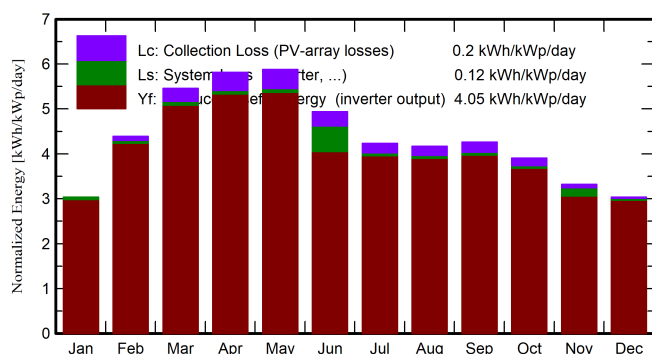


Main results

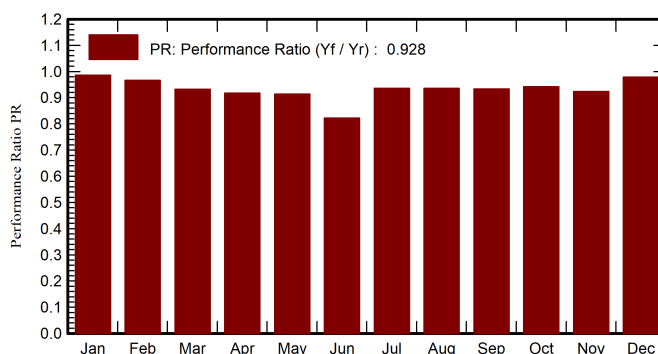
System Production

Produced Energy (P50)	413606 kWh/year	Specific production (P50)	1479 kWh/kWp/year	Perf. Ratio PR	92.79 %
Produced Energy (P90)	404044 kWh/year	Specific production (P90)	1445 kWh/kWp/year		
Produced Energy (P75)	408579 kWh/year	Specific production (P75)	1462 kWh/kWp/year		

Normalized productions (per installed kWp)



Performance Ratio PR



Balances and main results

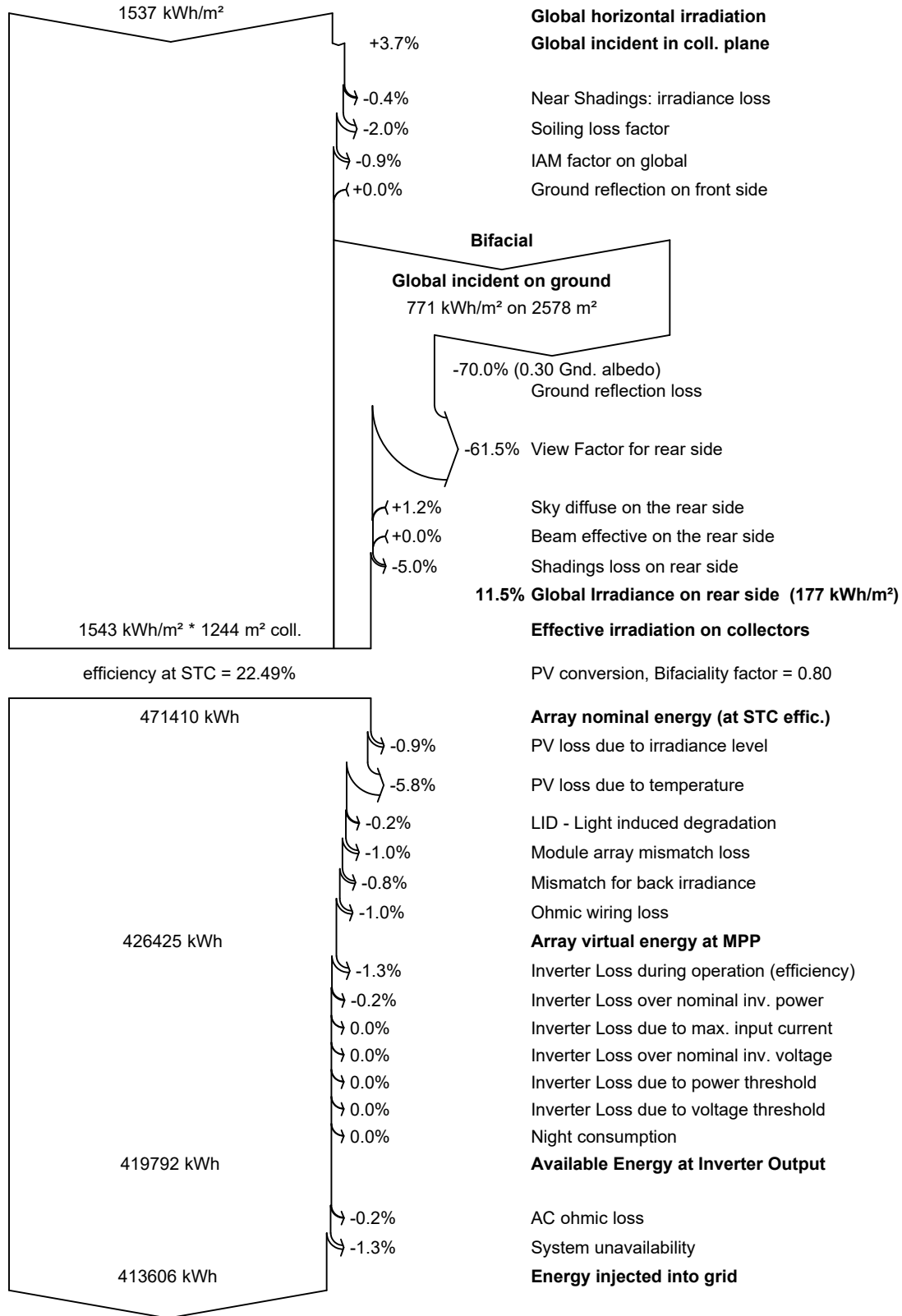
	GlobHor	DiffHor	T_Amb	GlobInc	GlobEff	EArray	E_Grid	PR
	kWh/m ²	kWh/m ²	°C	kWh/m ²	kWh/m ²	kWh	kWh	ratio
January	85.3	54.5	15.15	94.0	90.8	26296	25889	0.985
February	112.7	62.6	19.71	122.9	119.1	33723	33213	0.967
March	159.9	75.8	25.99	169.3	164.3	44833	44132	0.932
April	170.8	88.4	31.13	174.4	169.0	45450	44755	0.918
May	183.4	100.3	34.35	182.3	176.7	47334	46598	0.914
June	150.5	97.3	33.01	148.1	143.3	38822	34034	0.822
July	132.9	87.6	30.56	131.3	126.9	34926	34352	0.936
August	129.4	85.2	29.92	129.4	125.0	34397	33845	0.936
September	124.3	75.7	29.00	127.8	123.5	33917	33381	0.934
October	113.4	66.5	27.27	121.1	117.3	32431	31921	0.943
November	90.8	57.4	21.84	99.7	96.3	27244	25726	0.923
December	83.8	50.9	17.13	94.2	91.0	26162	25761	0.979
Year	1537.1	902.3	26.28	1594.4	1543.1	425533	413606	0.928

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		



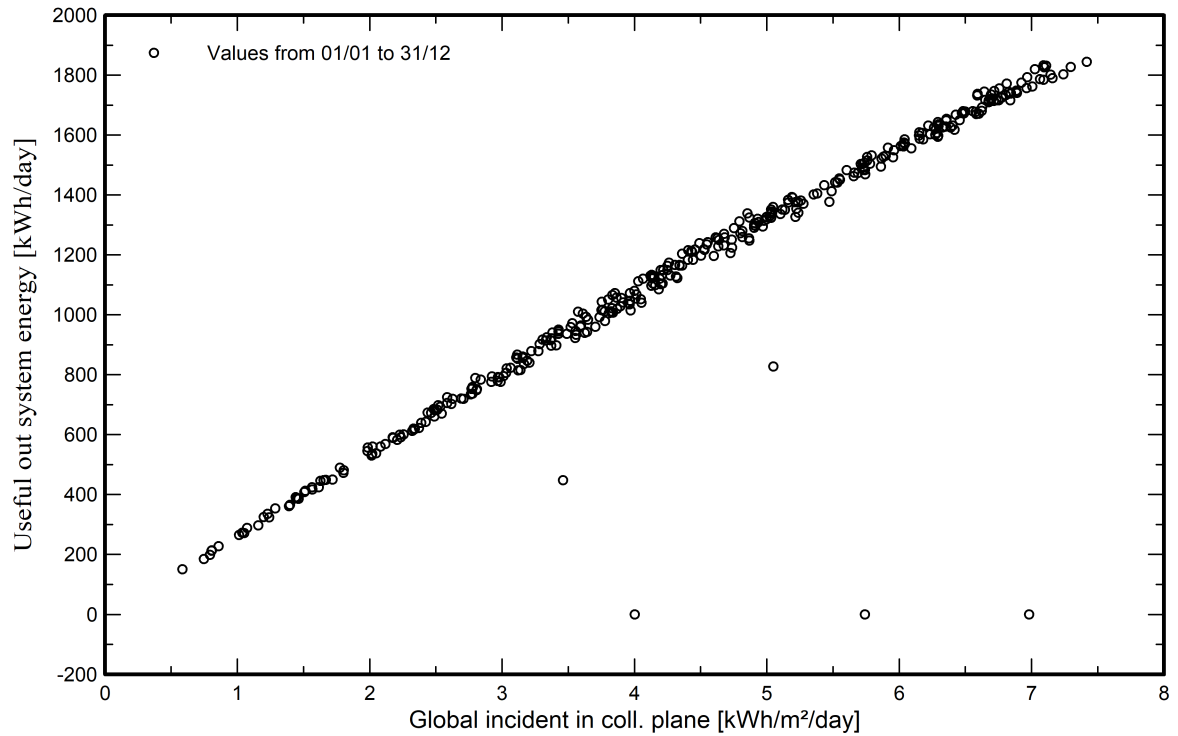
Loss diagram



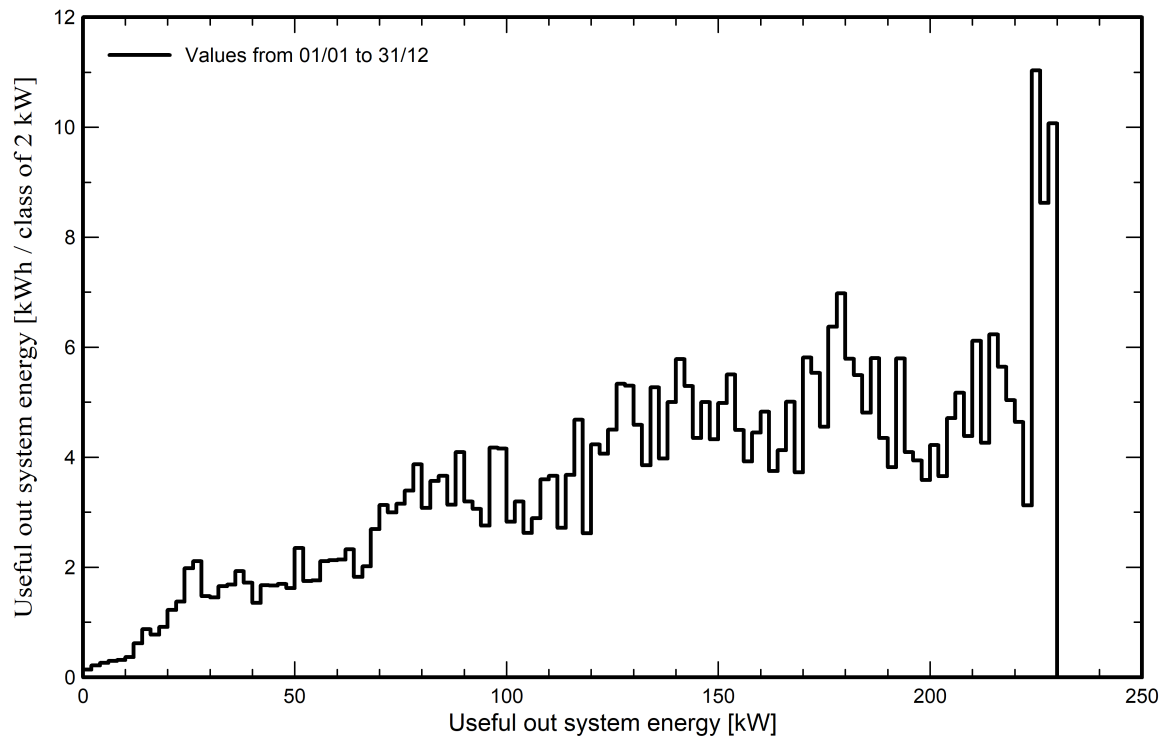


Predef. graphs

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 7.5 MWh
P50 413.6 MWh
P90 404.0 MWh
P75 408.6 MWh

Probability distribution

