

PVsyst - Simulation report

Grid-Connected System

Project: District Women Hospital

Variant: New simulation variant

Unlimited sheds

System power: 69.6 kWp

Bijnor - India

Author

Jakson Limited (India)

**PVsyst V8.0.2**

VC0, Simulation date:
17/12/24 09:24
with V8.0.2

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Project summary**Geographical Site**

Bijnor

India

Situation

Latitude 29.38 °N

Longitude 78.14 °E

Altitude 251 m

Time zone UTC+5.5

Project settings

Albedo 0.20

Weather data

Bijnor

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

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

Tilt 10 °

Azimuth 22 °

Unlimited sheds**Near Shadings**

Mutual shadings of sheds

User's needs

Unlimited load (grid)

System information**PV Array**

Nb. of modules

120 units

Pnom total

69.6 kWp

Inverters

Nb. of units

1 unit

Pnom total

60.0 kWac

Pnom ratio

1.160

Results summary

Produced Energy 102595 kWh/year Specific production 1474 kWh/kWp/year Perf. Ratio PR 92.60 %

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General parameters

Grid-Connected System

Orientation #1

Sheds

Tilt	10 °
Azimuth	22 °

Models used

Transposition	Perez
Diffuse	Perez, Meteonorm
Circumsolar	separate

Bifacial system definition

Orientation #1

Bifacial system

Model	Unlimited Sheds 2D Model
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Bifacial model geometry

Sheds spacing	6.60 m
Sheds width	3.04 m
Limit profile angle	8.2 °
GCR	46.1 %
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 %

Unlimited sheds

Sheds configuration

Nb. of sheds	10 units
Unlimited sheds	
Shading limit angle	
Limit profile angle	8.2 °

Sizes

Sheds spacing	6.60 m
Collector width	3.00 m
Average GCR	45.5 %
Top inactive band	0.02 m
Bottom inactive band	0.02 m

Near Shadings

Mutual shadings of sheds

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	120 units
Nominal (STC)	69.6 kWp
Modules	10 string x 12 In series
At operating cond. (50°C)	
Pmpp	64.5 kWp
U mpp	493 V
I mpp	131 A

Total PV power

Nominal (STC)	70 kWp
Total	120 modules
Module area	310 m²

Inverter

Manufacturer	Growatt New Energy
Model	MAX 60KTL3 LV
(Original PVsyst database)	
Unit Nom. Power	60.0 kWac
Number of inverters	1 unit
Total power	60.0 kWac
Operating voltage	200-1000 V
Pnom ratio (DC:AC)	1.16
Power sharing within this inverter	

Total inverter power

Total power	60 kWac
Number of inverters	1 unit
Pnom ratio	1.16

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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. 61 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

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 1.35 % at STC

Inverter: MAX 60KTL3 LV

Wire section (1 Inv.) Alu 1 x 3 x 50 mm²

Wires length 50 m



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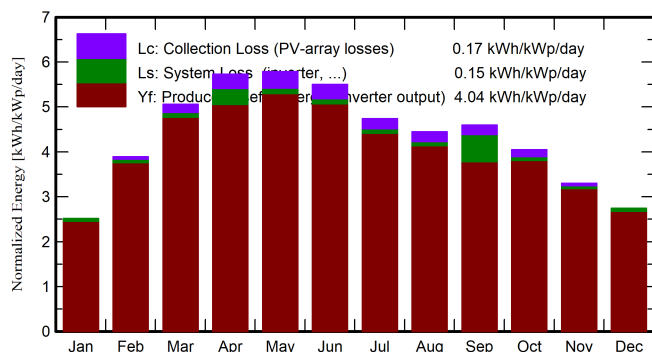
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Main results

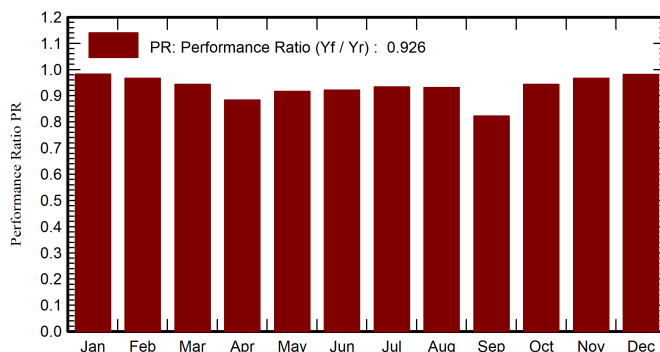
System Production

Produced Energy (P50)	102595 kWh/year	Specific production (P50)	1474 kWh/kWp/year	Perf. Ratio PR	92.60 %
Produced Energy (P90)	100223 kWh/year	Specific production (P90)	1440 kWh/kWp/year		
Produced Energy (P75)	101348 kWh/year	Specific production (P75)	1456 kWh/kWp/year		

Normalized productions (per installed kWp)



Performance Ratio PR



Balances and main results

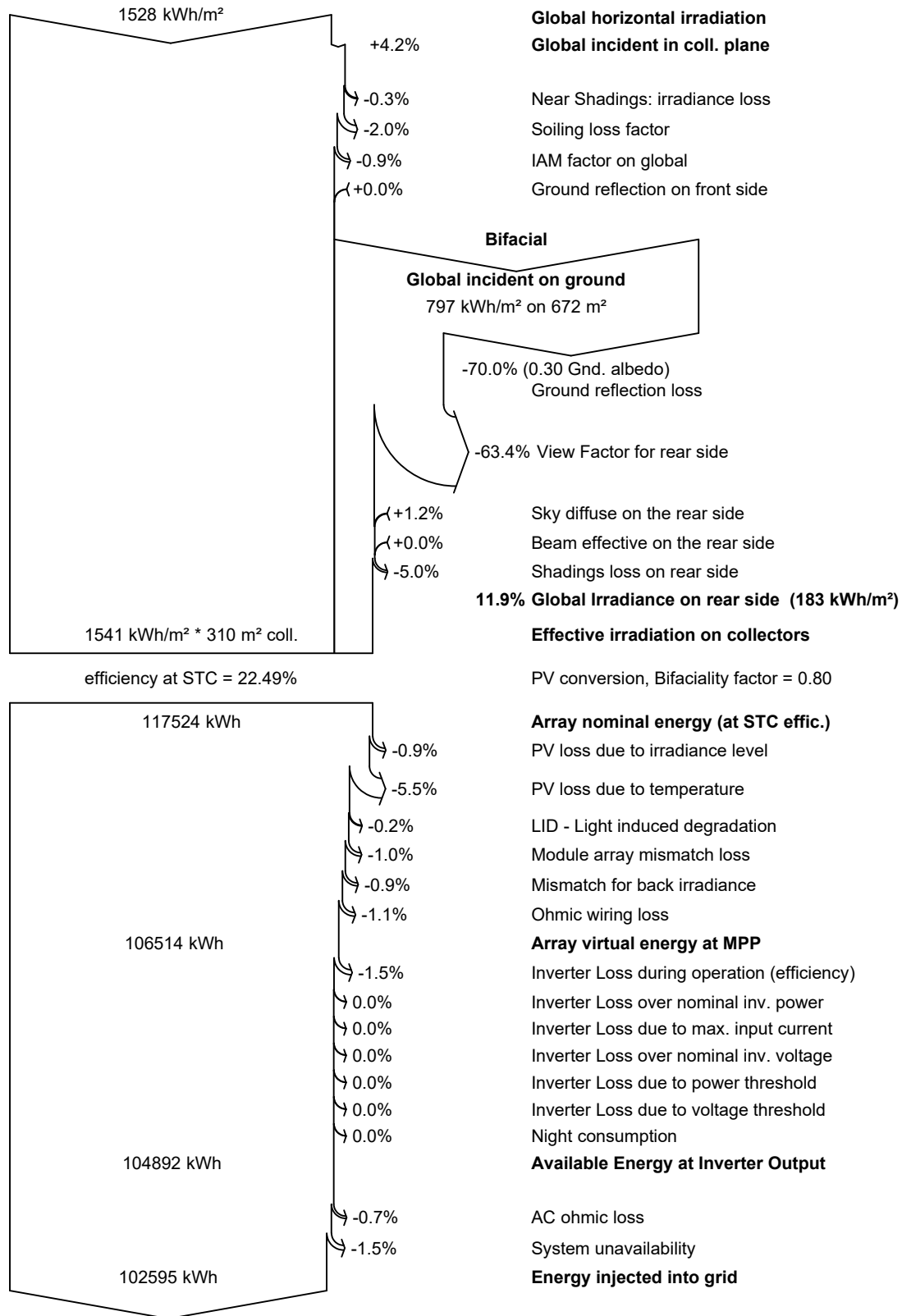
	GlobHor	DiffHor	T_Amb	GlobInc	GlobEff	EArray	E_Grid	PR
	kWh/m ²	kWh/m ²	°C	kWh/m ²	kWh/m ²	kWh	kWh	ratio
January	69.9	40.5	13.26	77.6	75.1	5430	5309	0.982
February	99.1	52.2	17.30	108.9	105.4	7492	7329	0.967
March	148.0	75.1	23.25	156.9	152.0	10536	10306	0.944
April	166.8	83.0	29.07	171.9	166.7	11308	10568	0.883
May	179.1	100.5	32.91	179.5	173.9	11705	11443	0.916
June	166.7	101.4	32.62	165.1	159.9	10830	10591	0.922
July	147.9	103.9	31.02	146.9	141.9	9747	9540	0.933
August	136.1	87.5	30.02	137.8	133.3	9135	8931	0.931
September	132.4	76.0	28.77	138.0	133.6	9167	7901	0.823
October	116.9	68.2	26.05	125.4	121.5	8413	8231	0.943
November	89.2	54.4	19.96	98.9	95.6	6793	6654	0.966
December	75.5	46.6	14.87	84.8	81.9	5916	5791	0.981
Year	1527.6	889.3	24.96	1591.8	1540.9	106472	102595	0.926

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		



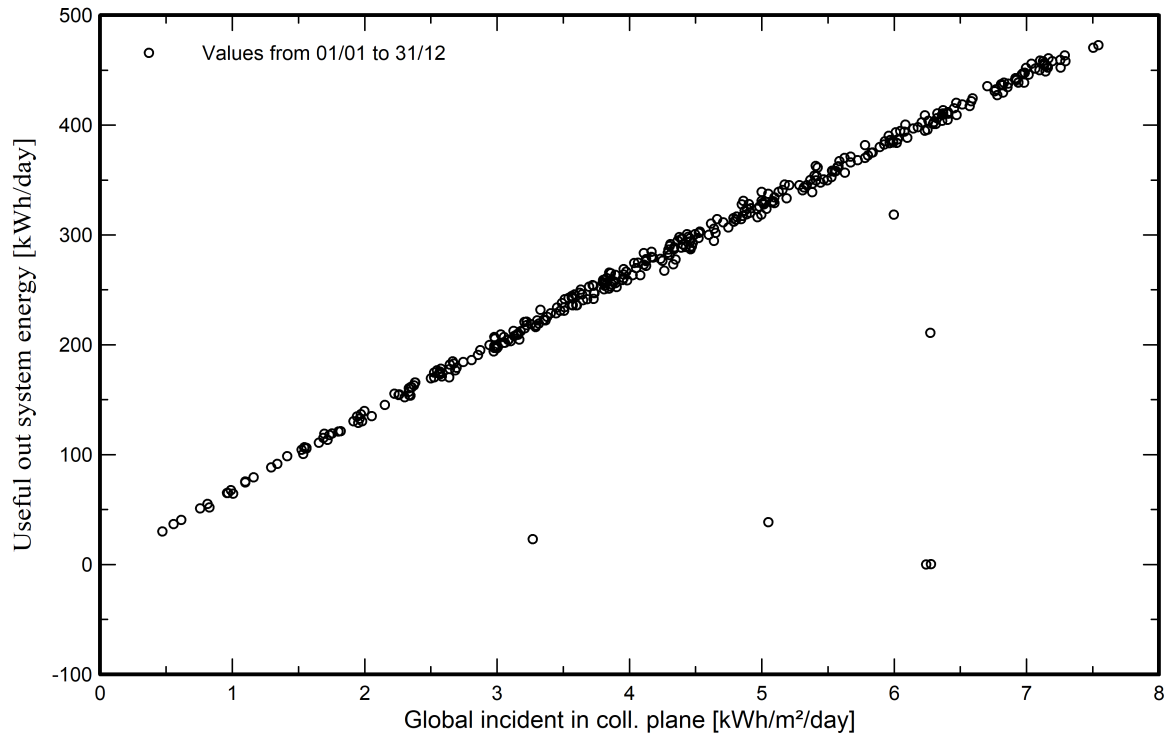
Loss diagram



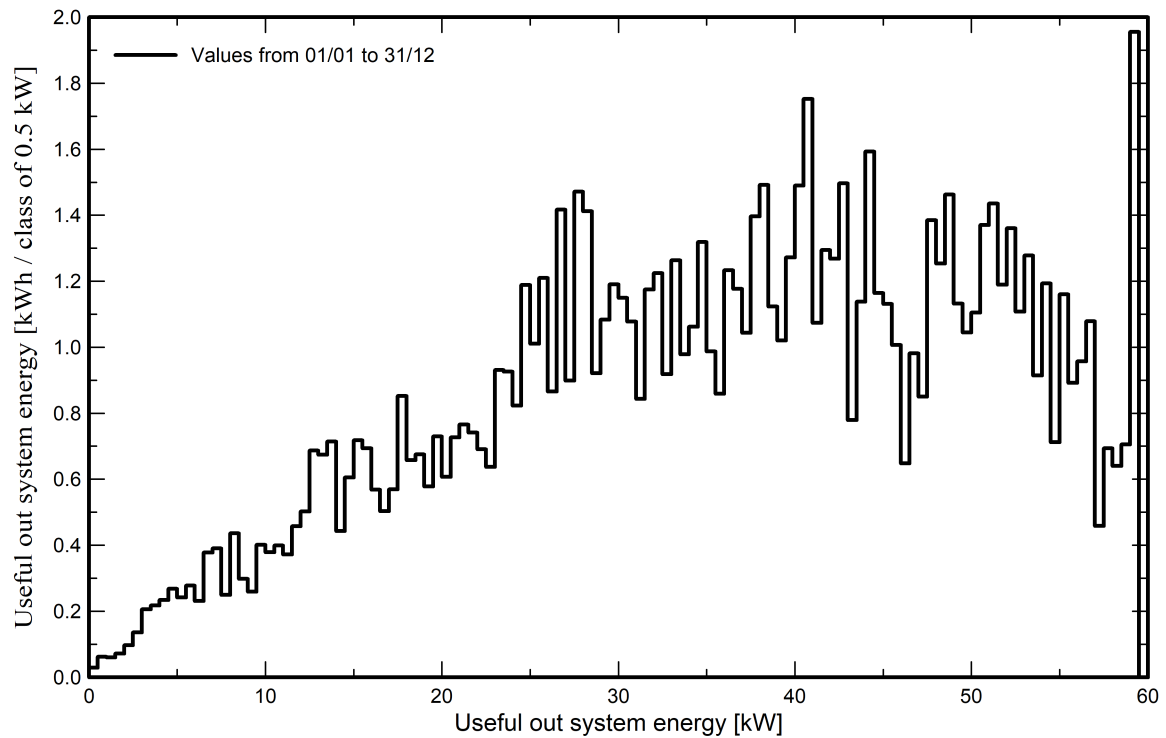


Predef. graphs

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 1.85 MWh
P50 102.59 MWh
P90 100.22 MWh
P75 101.35 MWh

Probability distribution

