

PVsyst - Simulation report

Grid-Connected System

Project: GOVERNMENT MEDICAL COLLEGE,KOTA-500KW

Variant: New simulation variant

No 3D scene defined, no shadings

System power: 677 kWp

Kota - India

Author

Oriana power private limited (India)



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PVsyst V7.3.2

VC0, Simulation date:
16/03/23 16:32
with v7.3.2

Oriana power private limited (India)

Project summary

Geographical Site

Kota
India

Situation

Latitude 25.12 °N
Longitude 75.83 °E
Altitude 304 m
Time zone UTC+5.5

Project settings

Albedo 0.20

Meteo data

Kota
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 / 14 °

Near Shadings

No Shadings

User's needs

Unlimited load (grid)

System information

PV Array

Nb. of modules 2020 units
Pnom total 677 kWp

Inverters

Nb. of units 5 units
Pnom total 500 kWac
Pnom ratio 1.353

Results summary

Produced Energy 1109477 kWh/year Specific production 1640 kWh/kWp/year Perf. Ratio PR 85.02 %

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General parameters

Grid-Connected System

No 3D scene defined, no shadings

PV Field Orientation

Orientation

Fixed plane

Tilt/Azimuth 20 / 14 °

Sheds configuration

No 3D scene defined

Models used

Transposition Perez
Diffuse Perez, Meteonorm
Circumsolar separate

Horizon

Free Horizon

Near Shadings

No Shadings

User's needs

Unlimited load (grid)

PV Array Characteristics

PV module

Manufacturer

GOLDI SOLAR PVT LTD

Model

GOLDI072F335PY24

(Custom parameters definition)

Unit Nom. Power

335 Wp

Number of PV modules

2020 units

Nominal (STC)

677 kWp

Modules

101 Strings x 20 In series

At operating cond. (50°C)

Pmpp

617 kWp

U mpp

706 V

I mpp

873 A

Total PV power

Nominal (STC)

677 kWp

Total

2020 modules

Module area

4010 m²

Cell area

3665 m²

Inverter

Manufacturer

Sungrow

Model

SG110-CX

(Original PVsyst database)

Unit Nom. Power

100 kWac

Number of inverters

5 units

Total power

500 kWac

Operating voltage

200-1000 V

Max. power (=>45°C)

110 kWac

Pnom ratio (DC:AC)

1.35

Power sharing within this inverter

Total inverter power

Total power

500 kWac

Max. power

550 kWac

Number of inverters

5 units

Pnom ratio

1.35

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.

13 mΩ

Loss Fraction

1.5 % at STC

LID - Light Induced Degradation

Loss Fraction 0.5 %

Module Quality Loss

Loss Fraction -1.2 %

Module mismatch losses

Loss Fraction 0.1 % at MPP

Strings Mismatch loss

Loss Fraction 0.1 %

IAM loss factor

Incidence effect (IAM): User defined profile

0°	10°	20°	40°	50°	60°	70°	80°	90°
1.000	0.999	0.998	0.983	0.967	0.945	0.912	0.764	0.000



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Main results

System Production

Produced Energy 1109477 kWh/year

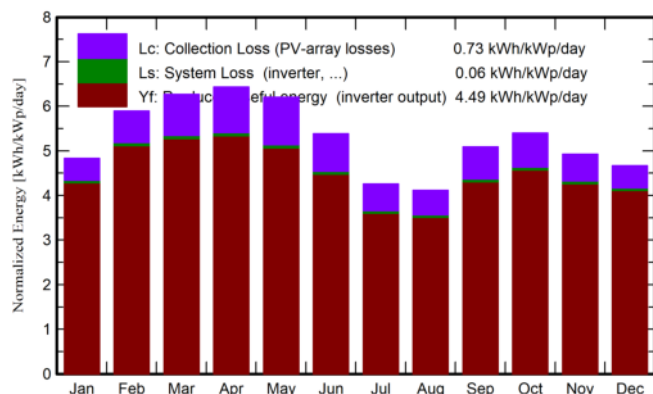
Specific production

1640 kWh/kWp/year

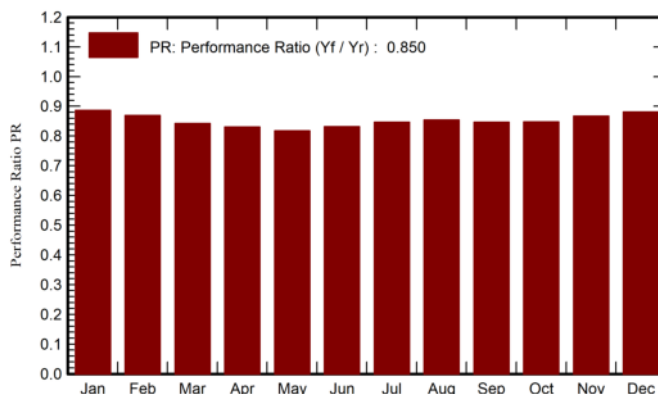
Performance Ratio PR

85.02 %

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	118.5	47.19	16.87	149.8	143.2	91200	89900	0.887
February	137.2	48.58	20.78	165.0	158.1	98390	97054	0.869
March	176.5	68.19	27.15	194.2	185.9	112306	110792	0.843
April	187.9	77.94	31.76	193.0	184.9	109984	108428	0.830
May	200.0	94.84	36.68	192.2	183.7	107839	106355	0.818
June	171.9	99.60	34.18	161.6	154.0	92283	90995	0.832
July	139.6	92.46	30.41	132.1	125.4	76783	75669	0.846
August	129.3	86.79	28.70	127.6	121.6	74866	73745	0.854
September	144.9	73.40	29.26	152.7	145.9	88804	87539	0.847
October	146.7	68.56	28.68	167.5	160.4	97382	96035	0.847
November	120.1	54.46	23.32	147.8	141.2	87878	86679	0.867
December	112.2	44.45	18.60	144.8	138.2	87517	86286	0.881
Year	1784.8	856.45	27.22	1928.5	1842.5	1125233	1109477	0.850

Legends

GlobHor Global horizontal irradiation

DiffHor Horizontal diffuse irradiation

T_Amb Ambient Temperature

GlobInc Global incident in coll. plane

GlobEff Effective Global, corr. for IAM and shadings

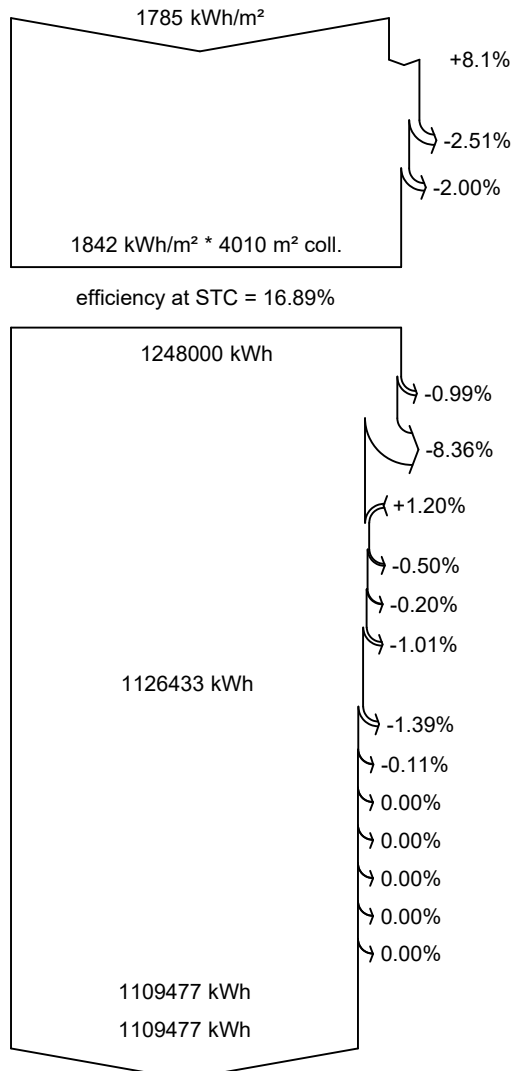
EArray Effective energy at the output of the array

E_Grid Energy injected into grid

PR Performance Ratio



Loss diagram



Global horizontal irradiation

Global incident in coll. plane

IAM factor on global

Soiling loss factor

Effective irradiation on collectors

PV conversion

Array nominal energy (at STC effic.)

PV loss due to irradiance level

PV loss due to temperature

Module quality loss

LID - Light induced degradation

Mismatch loss, modules and strings

Ohmic wiring loss

Array virtual energy at MPP

Inverter Loss during operation (efficiency)

Inverter Loss over nominal inv. power

Inverter Loss due to max. input current

Inverter Loss over nominal inv. voltage

Inverter Loss due to power threshold

Inverter Loss due to voltage threshold

Night consumption

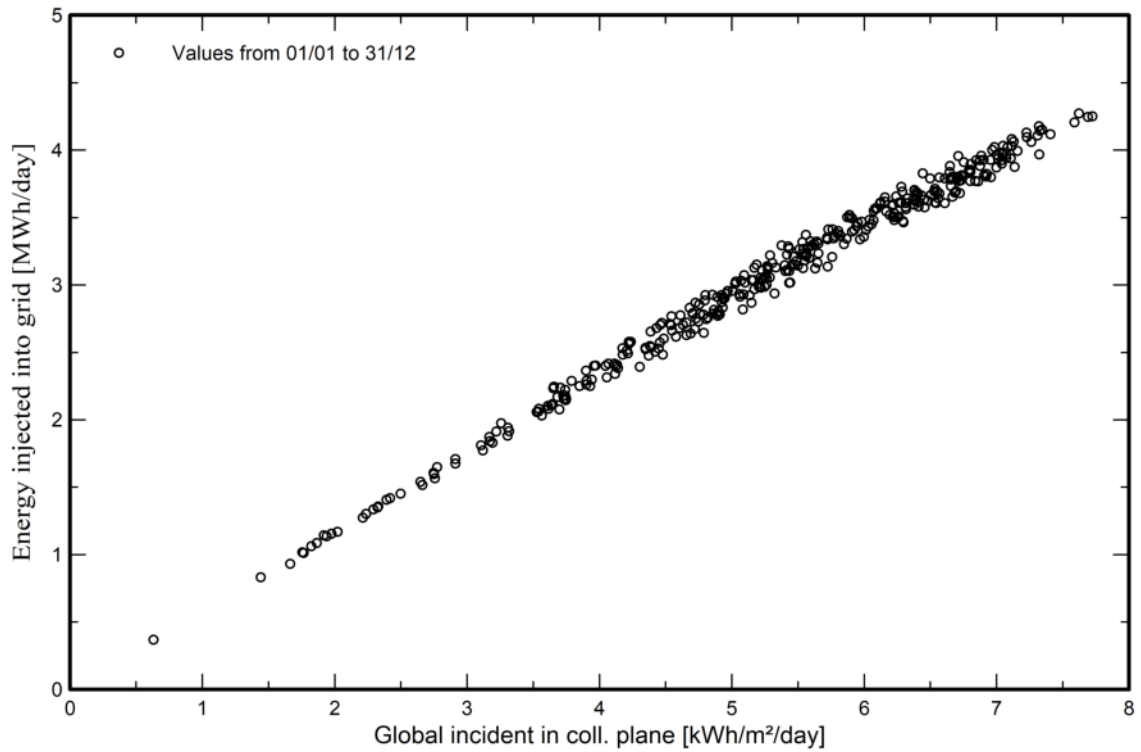
Available Energy at Inverter Output

Energy injected into grid

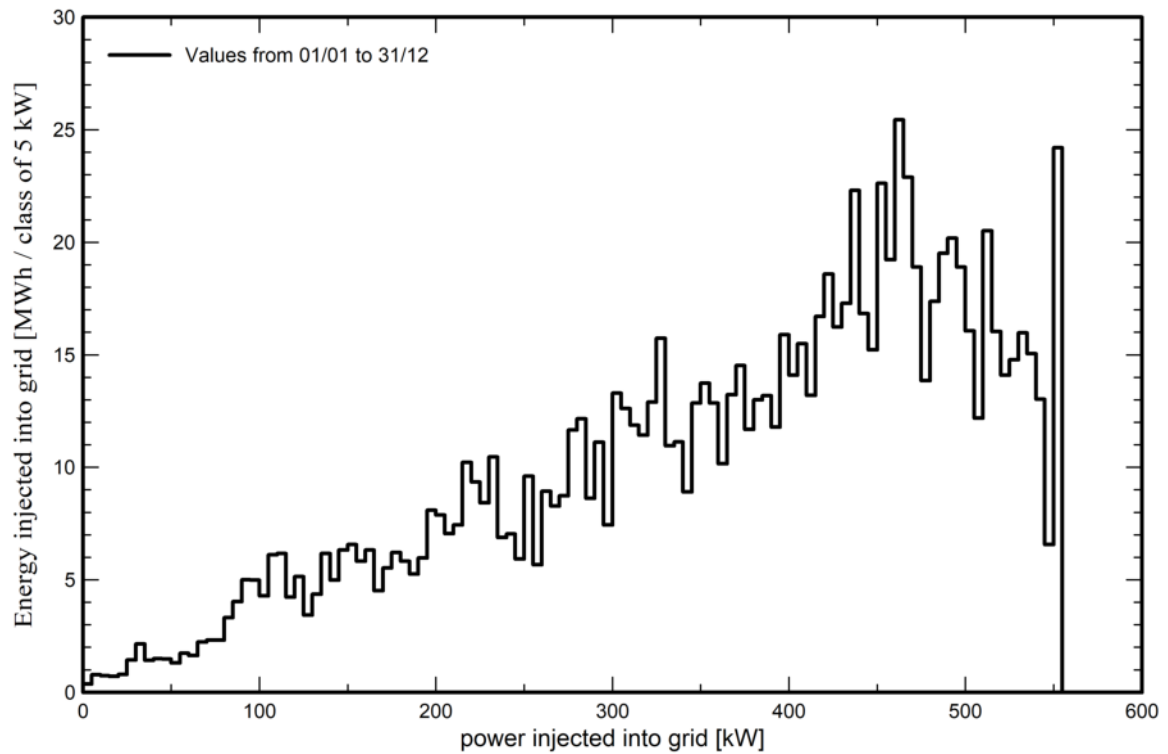


Predef. graphs

Daily Input/Output diagram



System Output Power Distribution





P50 - P90 evaluation

Meteo data

Source Meteonorm 8.1 (1996-2015), Sat=100%
Kind Not defined
Year-to-year variability(Variance) -1.0 %

Specified Deviation

Global variability (meteo + system)

Variability (Quadratic sum) 2.1 %

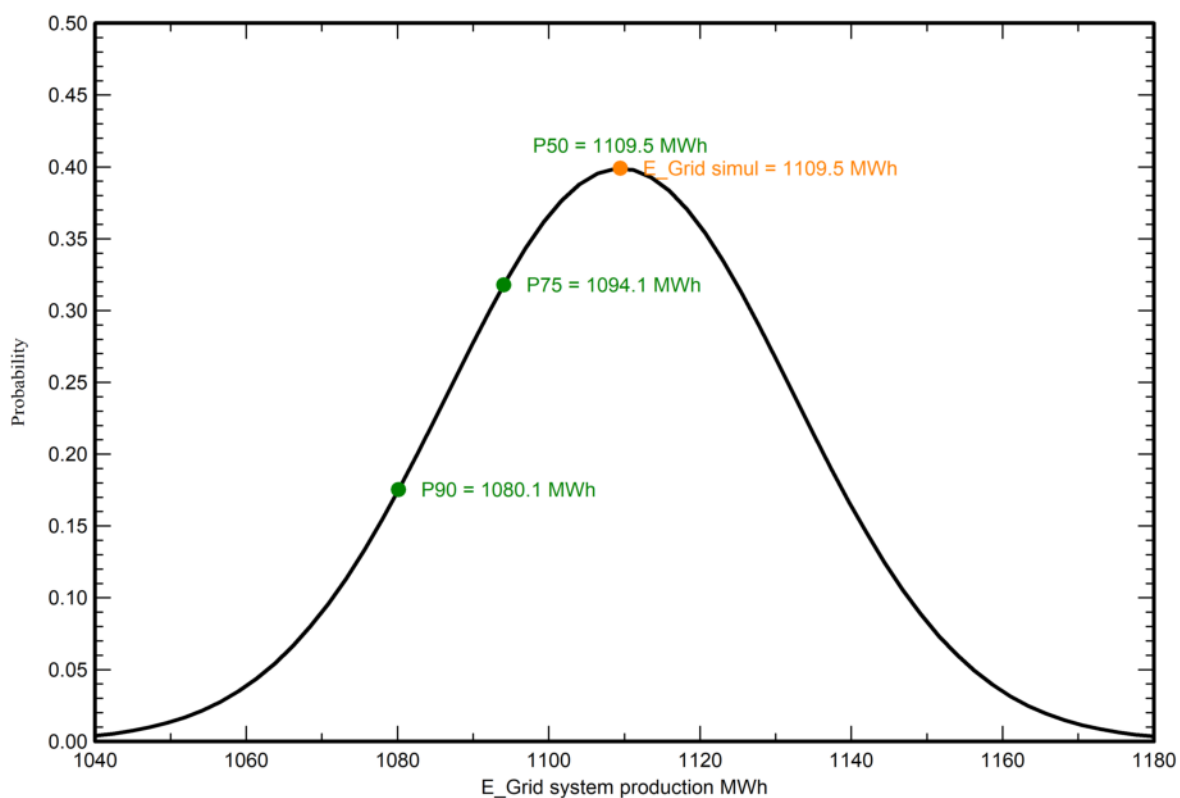
Simulation and parameters uncertainties

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 22.9 MWh
P50 1109.5 MWh
P90 1080.1 MWh
P75 1094.1 MWh

Probability distribution

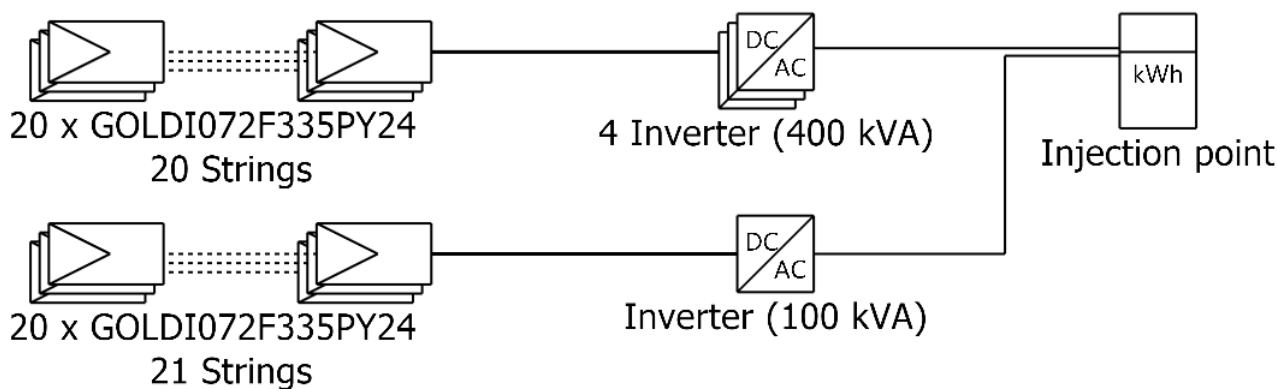




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Single-line diagram



PV module	GOLDI072F335PY24
Inverter	SG110-CX
String	20 x GOLDI072F335PY24

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