

PVsyst - Simulation report

Grid-Connected System

Project: MAHATMA GANDHI HOSPITAL,JODHPUR- 500KW

Variant: New simulation variant

No 3D scene defined, no shadings

System power: 677 kWp

Ratanada - India

Author

Oriana power private limited (India)



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PVsyst V7.3.2

VC0, Simulation date:
16/03/23 16:43
with v7.3.2

Oriana power private limited (India)

Project summary

Geographical Site

Ratanada

India

Situation

Latitude 26.28 °N

Longitude 73.02 °E

Altitude 247 m

Time zone UTC+5.5

Project settings

Albedo 0.20

Meteo data

Jodhpur

Meteonorm 8.1 (1996-2015) - Synthetic

System summary

Grid-Connected System

No 3D scene defined, no shadings

PV Field Orientation

Fixed plane

Tilt/Azimuth 20 / 42 °

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 1130602 kWh/year Specific production 1671 kWh/kWp/year Perf. Ratio PR 82.86 %

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General parameters

Grid-Connected System

No 3D scene defined, no shadings

PV Field Orientation

Orientation

Fixed plane

Tilt/Azimuth 20 / 42 °

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

SG110CX

(Custom parameters definition)

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 0.5 %

Module mismatch losses

Loss Fraction 0.1 % at MPP

Strings Mismatch loss

Loss Fraction 0.5 %

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

1130602 kWh/year

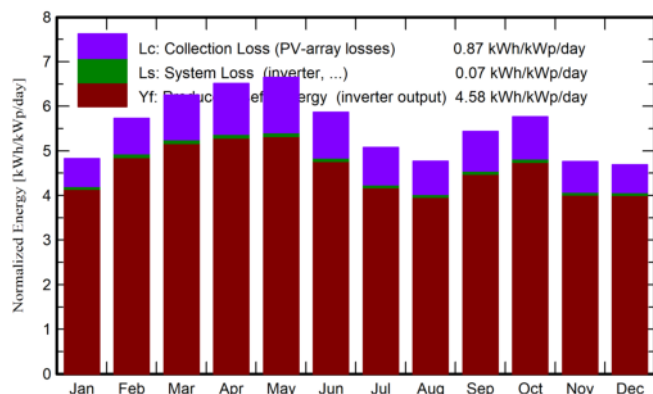
Specific production

1671 kWh/kWp/year

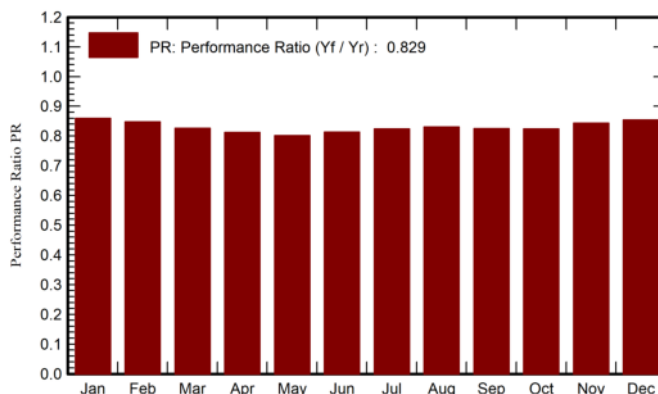
Performance Ratio PR

82.86 %

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	122.2	38.4	16.56	149.5	141.9	88339	86943	0.859
February	138.0	43.3	20.22	160.4	153.1	93559	92052	0.848
March	179.7	64.5	26.81	193.8	185.7	110237	108424	0.827
April	193.6	78.6	31.33	195.3	187.2	109210	107426	0.813
May	211.9	87.5	35.12	206.1	197.1	113659	111856	0.802
June	185.7	101.7	34.03	176.1	168.0	98380	96855	0.813
July	165.0	98.2	31.64	157.3	150.0	89104	87688	0.824
August	150.3	92.4	29.82	147.9	141.2	84566	83203	0.831
September	158.8	75.0	29.84	163.0	155.8	92465	90992	0.825
October	159.0	57.4	28.62	178.7	170.9	101190	99595	0.824
November	120.6	47.3	22.70	142.9	136.1	82896	81528	0.843
December	116.3	35.8	18.12	145.4	138.0	85453	84039	0.854
Year	1901.1	820.2	27.10	2016.5	1924.9	1149059	1130602	0.829

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

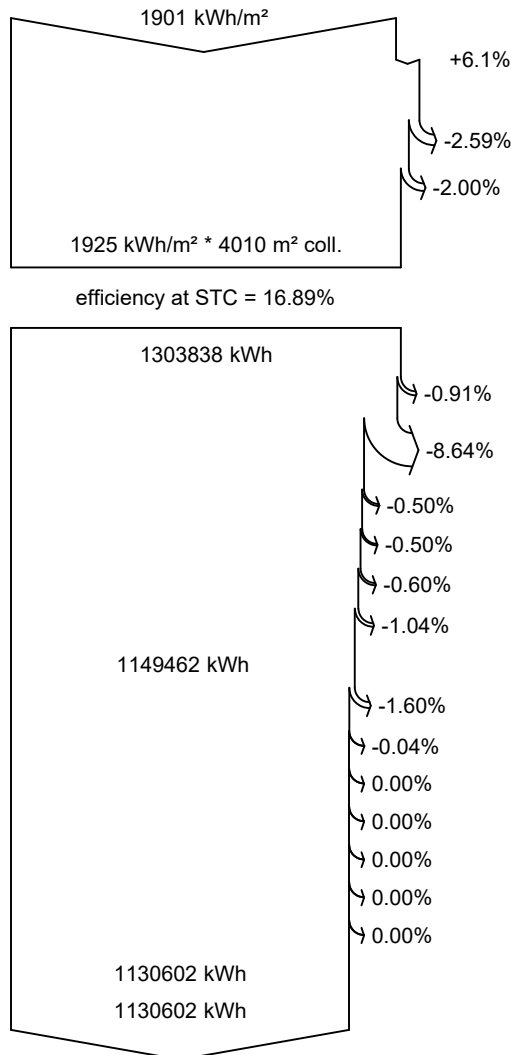
EArray Effective energy at the output of the array

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

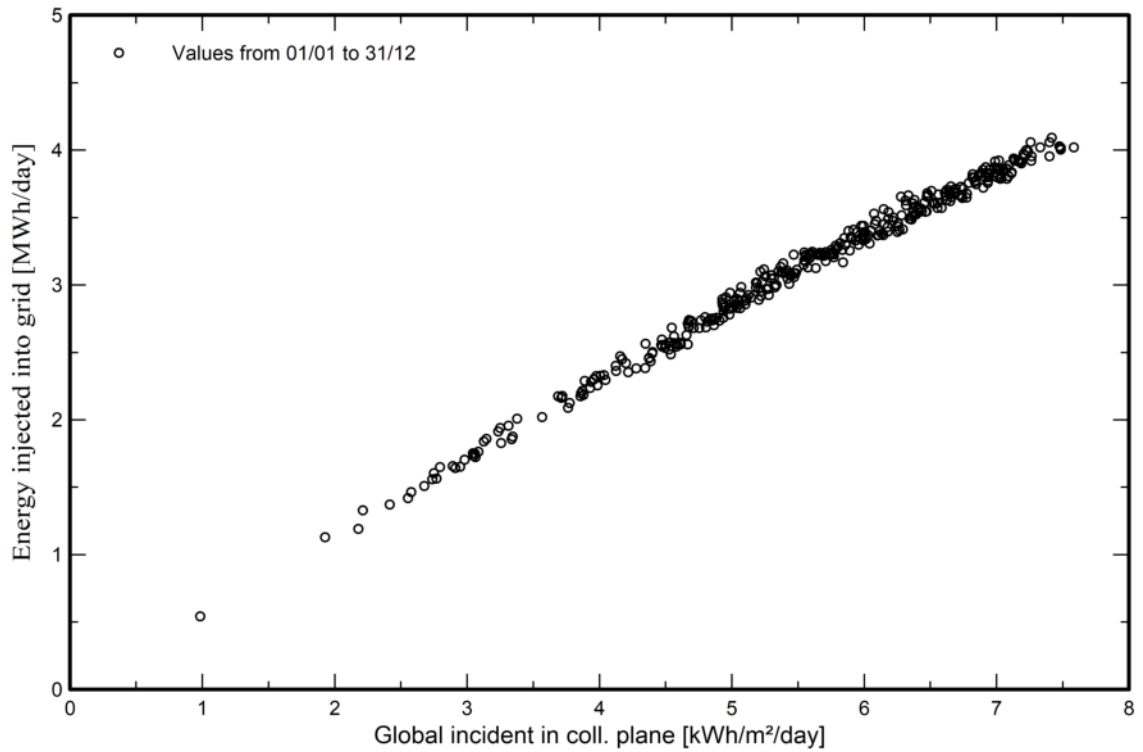
Available Energy at Inverter Output

Energy injected into grid

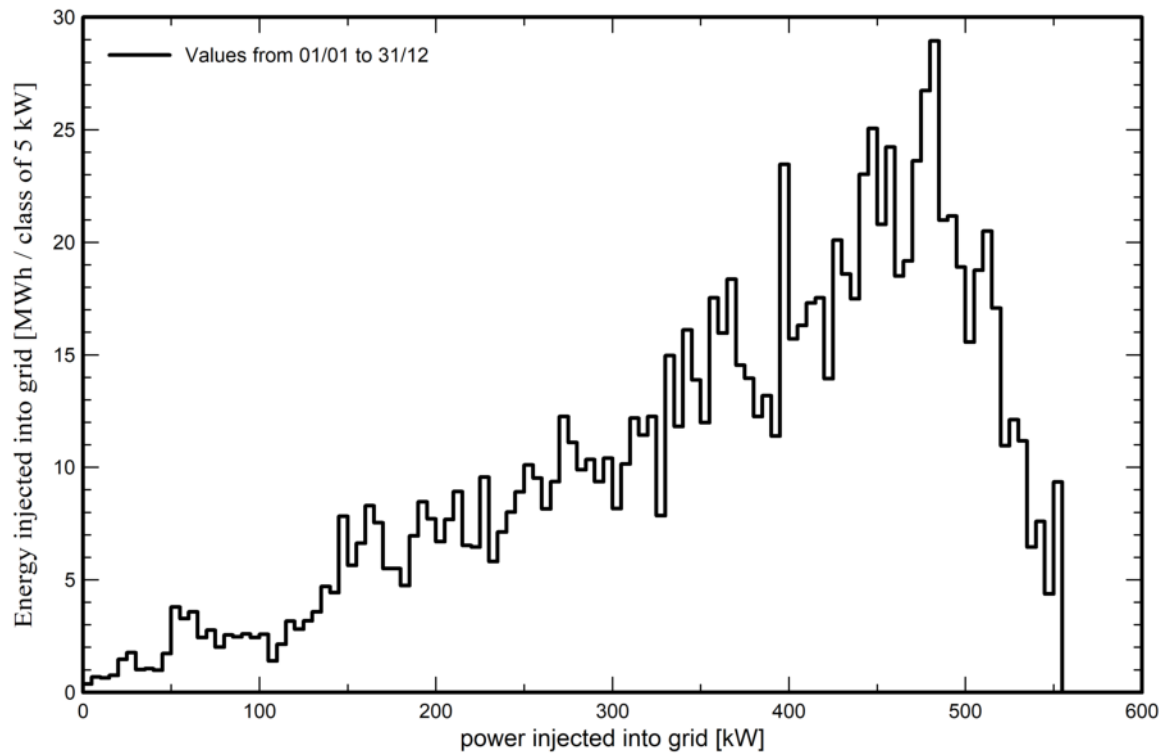


Predef. graphs

Daily Input/Output diagram



System Output Power Distribution





P50 - P90 evaluation

Meteo data

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

Specified Deviation

Global variability (meteo + system)

Variability (Quadratic sum) 2.1 %

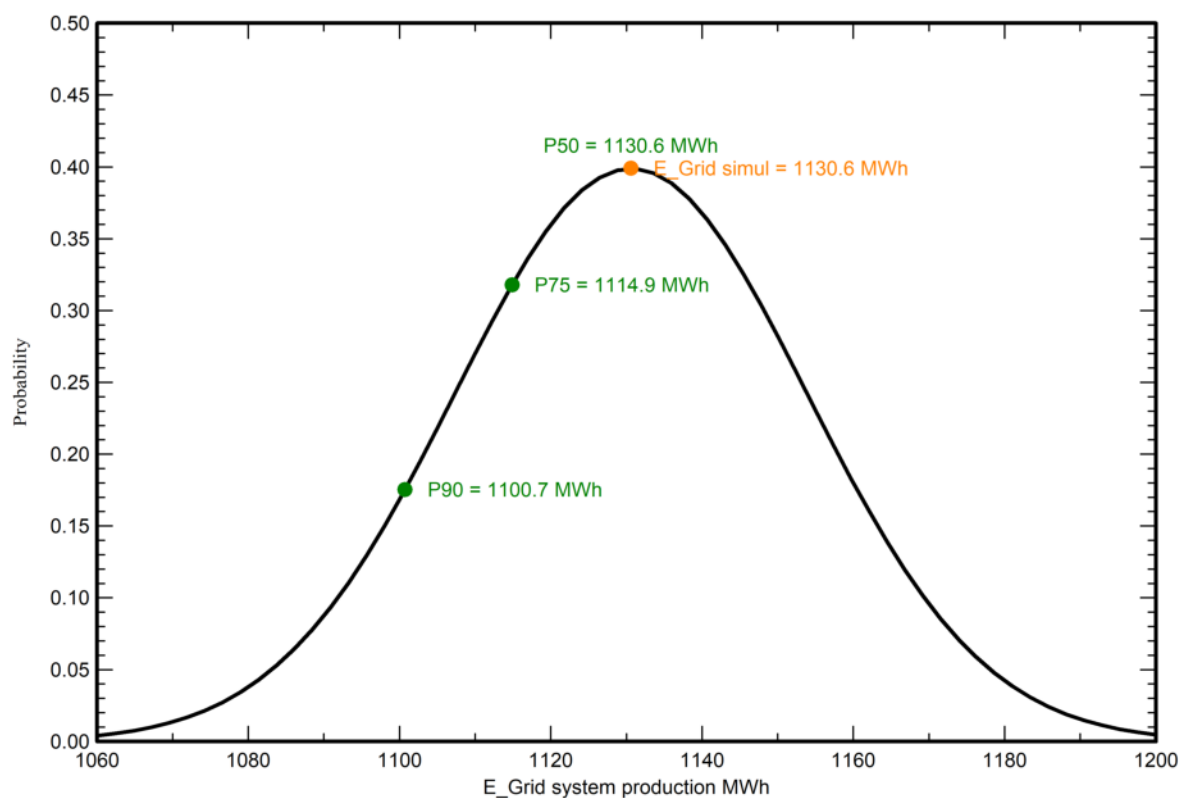
Simulation and parameters uncertainties

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 23.3 MWh
P50 1130.6 MWh
P90 1100.7 MWh
P75 1114.9 MWh

Probability distribution

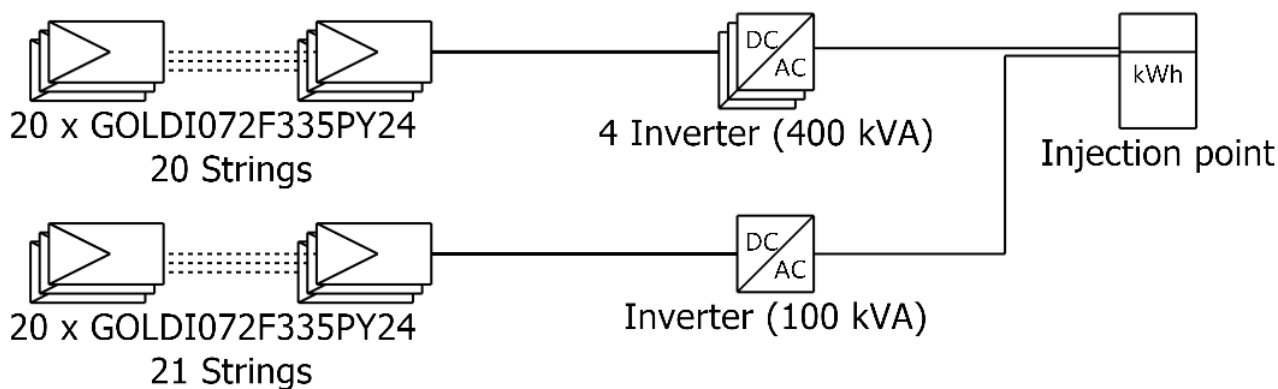




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Single-line diagram



PV module	GOLDI072F335PY24
Inverter	SG110CX
String	20 x GOLDI072F335PY24

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ODHPUR- 500KW

Oriana power priva
te limited (India)

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