

PVsyst - Simulation report

Grid-Connected System

Project: Medical College Gonda

Variant: New simulation variant

Unlimited sheds

System power: 301 kWp

Imlia - India

Author

Jakson Limited (India)

**PVsyst V8.0.2**

VC0, Simulation date:
16/12/24 15:08
with V8.0.2

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Jakson Limited (India)

Project summary**Geographical Site**

Imlia
India

Situation

Latitude 27.12 °N
Longitude 81.94 °E
Altitude 103 m
Time zone UTC+5.5

Project settings

Albedo 0.20

Weather data

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

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

Tilt 10 °
Azimuth 2 °

Unlimited sheds**Near Shadings**

Mutual shadings of sheds

User's needs

Unlimited load (grid)

System information**PV Array**

Nb. of modules 519 units
Pnom total 301 kWp

Inverters

Nb. of units 3 units
Pnom total 260 kWac
Pnom ratio 1.158

Results summary

Produced Energy 401684 kWh/year Specific production 1334 kWh/kWp/year Perf. Ratio PR 84.61 %

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General parameters

Grid-Connected System

Orientation #1

Sheds

Tilt	10 °
Azimuth	2 °

Unlimited sheds

Sheds configuration

Nb. of sheds	10 units
Unlimited sheds	
Shading limit angle	
Limit profile angle	11.7 °

Sizes

Sheds spacing	5.50 m
Collector width	3.00 m
Average GCR	54.5 %
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

User's needs

Unlimited load (grid)

PV Array Characteristics

Array #1 - PV Array

PV module

ManufacturePanasonic Life Solutions India Pvt. Ltd

ModelAE14T580VHC16B5R

(Custom parameters definition)

Unit Nom. Power	580 Wp
Number of PV modules	315 units
Nominal (STC)	183 kWp
Modules	21 string x 15 In series

At operating cond. (50°C)

Pmpp	169 kWp
U mpp	616 V
I mpp	275 A

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)	1.14
Power sharing within this inverter	

Array #2 - Sub-array #2

PV module

ManufacturePanasonic Life Solutions India Pvt. Ltd

ModelAE14T580VHC16B5R

(Custom parameters definition)

Unit Nom. Power	580 Wp
Number of PV modules	204 units
Nominal (STC)	118 kWp
Modules	12 string x 17 In series

At operating cond. (50°C)

Pmpp	110 kWp
U mpp	698 V
I mpp	157 A

Inverter

Manufacturer

Growatt New Energy

Model

MAX 100KTL3-X LV

(Original PVsyst database)

Unit Nom. Power	100 kWac
Number of inverters	1 unit
Total power	100 kWac
Operating voltage	180-1000 V
Pnom ratio (DC:AC)	1.18
Power sharing within this inverter	

Total PV power

Nominal (STC)	301 kWp
Total	519 modules
Module area	1340 m²

Total inverter power

Total power	260 kWac
Number of inverters	3 units
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/m²KUv (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 2.0 % 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.

72 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 0.69 % at STC

Inverter: MAX 80KTL3 LV

Wire section (2 Inv.) Alu 2 x 3 x 70 mm²

Average wires length 45 m

Inverter: MAX 100KTL3-X LV

Wire section (1 Inv.)

Alu 1 x 3 x 95 mm²

Wires length

0 m

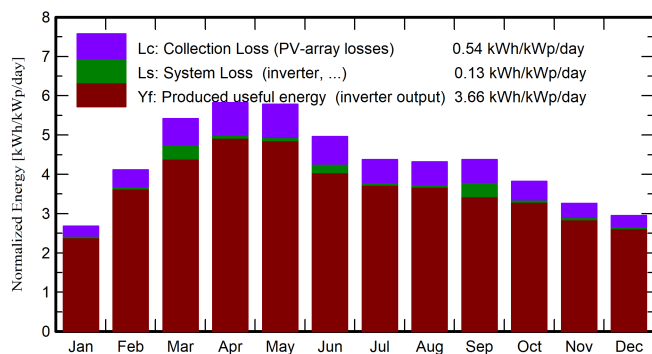


Main results

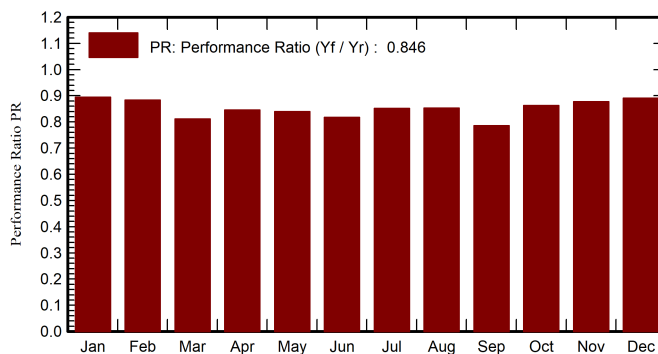
System Production

Produced Energy (P50)	401684 kWh/year	Specific production (P50)	1334 kWh/kWp/year	Perf. Ratio PR	84.61 %
Produced Energy (P90)	392398 kWh/year	Specific production (P90)	1304 kWh/kWp/year		
Produced Energy (P75)	396802 kWh/year	Specific production (P75)	1318 kWh/kWp/year		

Normalized productions (per installed kWp)



Performance Ratio PR



Balances and main results

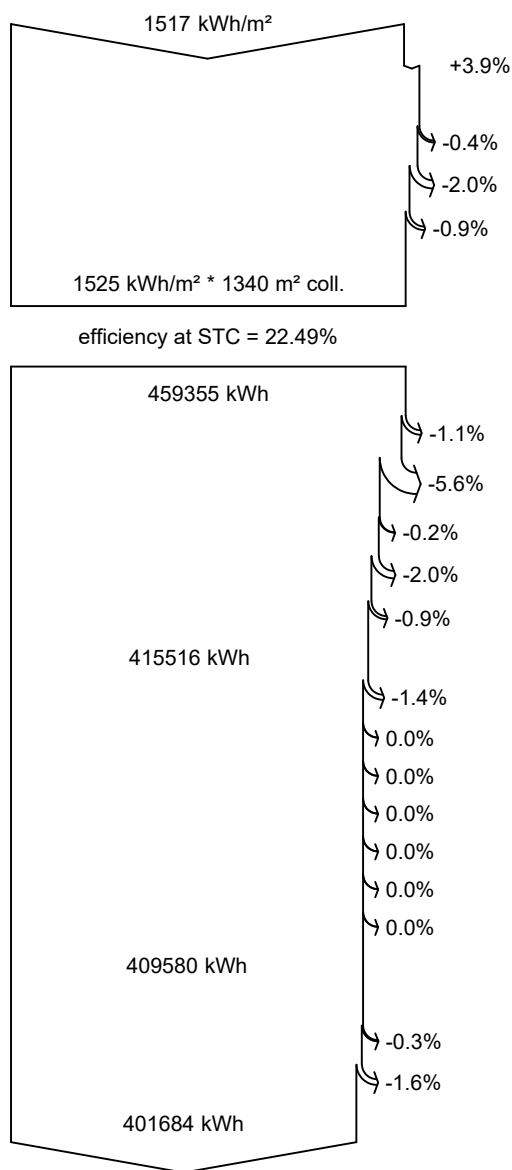
	GlobHor	DiffHor	T_Amb	GlobInc	GlobEff	EArray	E_Grid	PR
	kWh/m ²	kWh/m ²	°C	kWh/m ²	kWh/m ²	kWh	kWh	ratio
January	75.7	52.4	14.30	83.0	80.0	22760	22353	0.895
February	105.4	59.2	18.73	115.3	111.6	31180	30645	0.883
March	157.4	74.7	24.44	167.9	162.7	44368	41036	0.812
April	170.5	86.8	29.73	174.7	169.2	45271	44497	0.846
May	180.0	101.1	32.24	179.3	173.7	46162	45347	0.840
June	150.7	100.2	31.72	148.7	143.7	38530	36595	0.817
July	137.2	91.3	29.87	135.7	131.0	35448	34804	0.852
August	133.0	88.2	29.44	133.7	129.1	34959	34344	0.853
September	126.7	75.8	28.46	131.1	126.6	34350	31019	0.786
October	111.4	73.5	26.24	118.4	114.4	31298	30755	0.863
November	88.7	56.0	20.71	97.7	94.3	26237	25780	0.877
December	80.8	47.9	15.93	91.5	88.3	24945	24509	0.890
Year	1517.4	907.1	25.18	1577.0	1524.7	415510	401684	0.846

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



Global horizontal irradiation

Global incident in coll. plane

Near Shadings: irradiance loss

Soiling loss factor

IAM factor on global

Effective irradiation on collectors

PV conversion

Array nominal energy (at STC effic.)

PV loss due to irradiance level

PV loss due to temperature

LID - Light induced degradation

Module array mismatch loss

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

AC ohmic loss

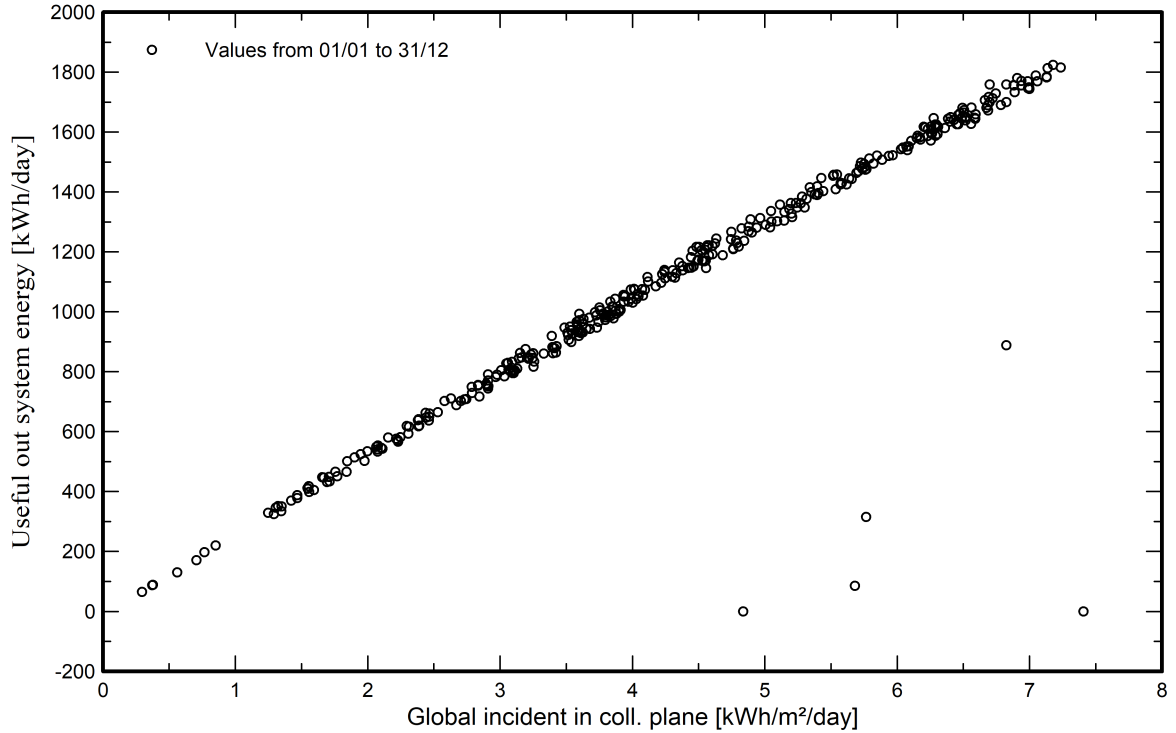
System unavailability

Energy injected into grid

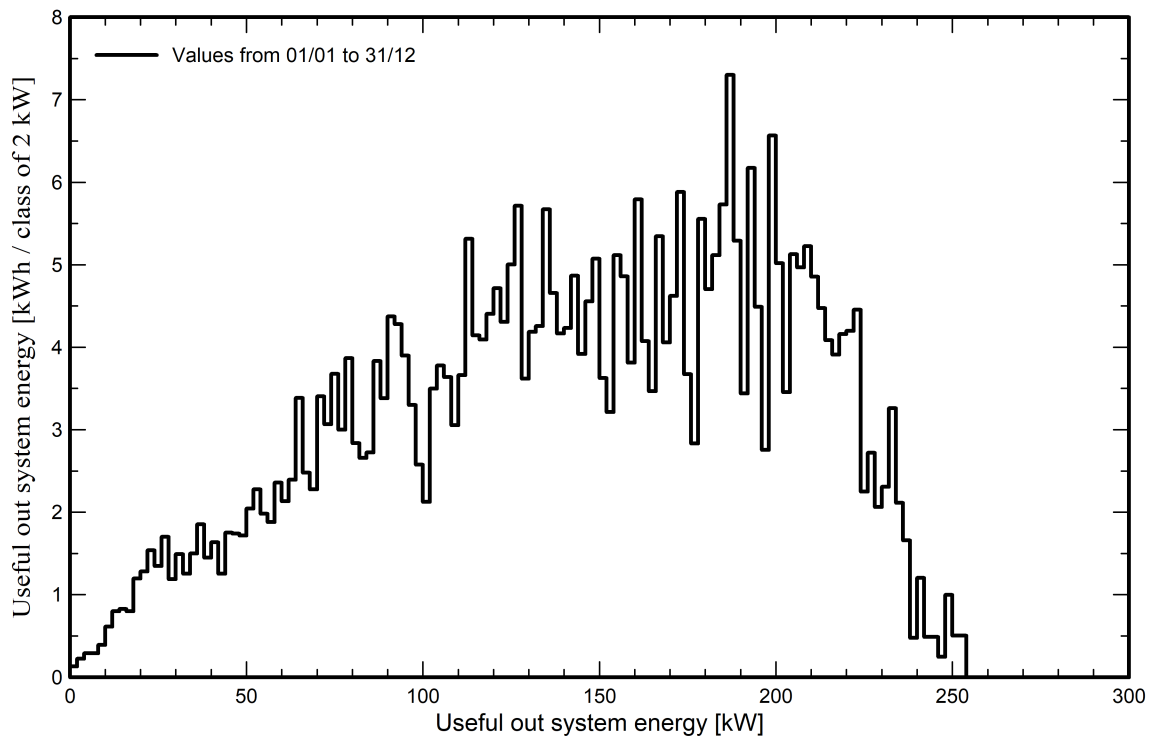


Predef. graphs

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 7.2 MWh
P50 401.7 MWh
P90 392.4 MWh
P75 396.8 MWh

Probability distribution

