

PVsyst - Simulation report

Grid-Connected System

Project: Muzafarnagar_Project

Variant: New simulation variant

No 3D scene defined, no shadings

System power: 9.60 kWp

Muzaffarnagar - India



PVsyst V7.4.8

VC0, Simulation date:
28/08/24 22:20
with V7.4.8

Project summary

Geographical Site

Muzaffarnagar

India

Situation

Latitude 29.47 °N

Longitude 77.71 °E

Altitude 251 m

Time zone UTC+5.5

Project settings

Albedo 0.20

Weather data

Muzaffarnagar

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 29 / 0 °

Near Shadings

No Shadings

User's needs

Unlimited load (grid)

System information

PV Array

Nb. of modules

32 units

Pnom total

9.60 kWp

Inverters

Nb. of units

1 unit

Pnom total

9.00 kWac

Pnom ratio

1.067

Results summary

Produced Energy	13068.06 kWh/year	Specific production	1361 kWh/kWp/year	Perf. Ratio PR	83.18 %
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General parameters

Grid-Connected System

No 3D scene defined, no shadings

PV Field Orientation

Orientation

Fixed plane

Tilt/Azimuth 29 / 0 °

Sheds configuration

No 3D scene defined

Models used

Transposition Hay
Diffuse Perez, Meteonorm
Circumsolar separate

Horizon

Free Horizon

Near Shadings

No Shadings

User's needs

Unlimited load (grid)

PV Array Characteristics

PV module

Manufacturer

Model

(Original PVsyst database)

Unit Nom. Power

Number of PV modules

Nominal (STC)

Modules

At operating cond. (50°C)

Pmpp

U mpp

I mpp

Total PV power

Nominal (STC)

Total

Module area

Cell area

Generic

Mono 300 Wp 60 cells

300 Wp

32 units

9.60 kWp

2 string x 16 In series

8.64 kWp

455 V

19 A

10 kWp

32 modules

52.1 m²45.5 m²

Inverter

Manufacturer

Model

(Original PVsyst database)

Unit Nom. Power

Number of inverters

Total power

Operating voltage

Max. power (=>25°C)

Pnom ratio (DC:AC)

No power sharing between MPPTs

Generic

9 kWac inverter

9.00 kWac

2 * MPPT 50% 1 unit

9.0 kWac

150-750 V

10.00 kWac

1.07

Total inverter power

Total power

Number of inverters

Pnom ratio

9 kWac

1 unit

1.07

Array losses

Thermal Loss factor

Module temperature according to irradiance

Uc (const) 20.0 W/m²KUv (wind) 0.0 W/m²K/m/s

DC wiring losses

Global array res.

Loss Fraction

403 mΩ

1.5 % at STC

Module Quality Loss

Loss Fraction

-0.8 %

Module mismatch losses

Loss Fraction 2.0 % at MPP

IAM loss factor

Incidence effect (IAM): Fresnel, AR coating, n(glass)=1.526, n(AR)=1.290

0°	30°	50°	60°	70°	75°	80°	85°	90°
1.000	0.999	0.987	0.962	0.892	0.816	0.681	0.440	0.000



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Main results

System Production

Produced Energy 13068.06 kWh/year

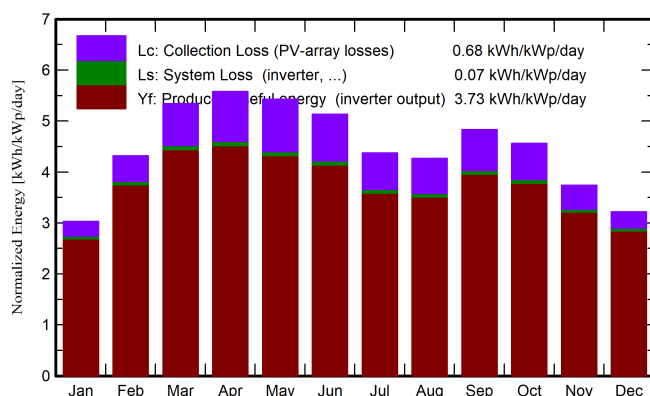
Specific production

1361 kWh/kWp/year

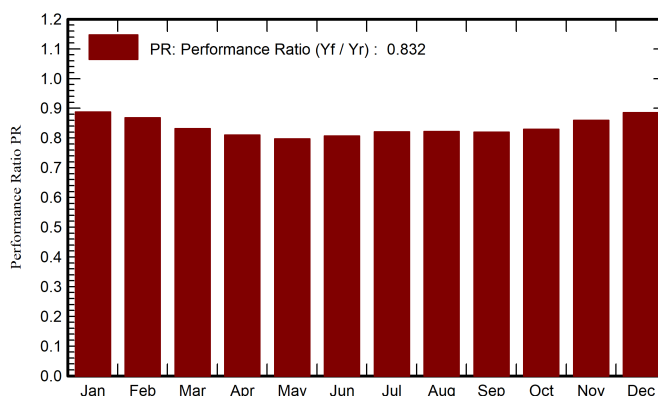
Perf. Ratio PR

83.18 %

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	76.0	45.4	13.16	94.0	92.2	817	800	0.887
February	100.3	53.8	17.22	121.0	118.8	1028	1009	0.869
March	149.3	68.3	23.13	165.5	162.3	1346	1322	0.832
April	167.0	85.1	28.97	167.4	163.7	1327	1302	0.810
May	179.6	98.5	32.89	168.2	164.2	1311	1287	0.797
June	168.3	103.8	32.52	154.1	150.1	1216	1193	0.807
July	146.8	98.7	31.02	135.6	131.8	1090	1068	0.821
August	137.9	89.9	30.12	132.4	128.9	1066	1045	0.822
September	138.5	75.3	28.67	144.9	141.7	1162	1140	0.820
October	124.0	68.4	25.94	141.4	138.8	1148	1126	0.830
November	89.9	51.3	19.86	112.2	110.2	944	926	0.860
December	78.9	49.2	14.81	99.8	98.0	865	848	0.885
Year	1556.4	887.8	24.89	1636.5	1600.6	13320	13068	0.832

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

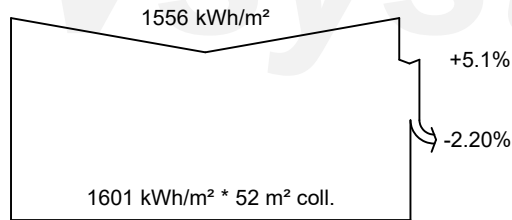
PR Performance Ratio



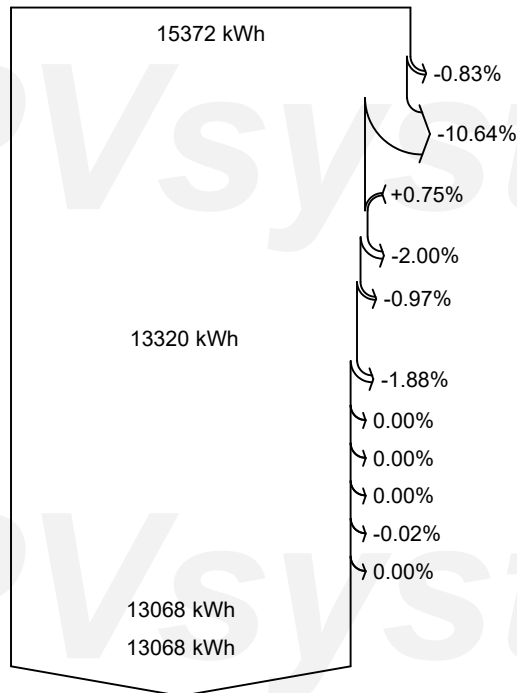
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Loss diagram



efficiency at STC = 18.45%



Global horizontal irradiation

Global incident in coll. plane

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

Module quality loss

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

Available Energy at Inverter Output

Energy injected into grid

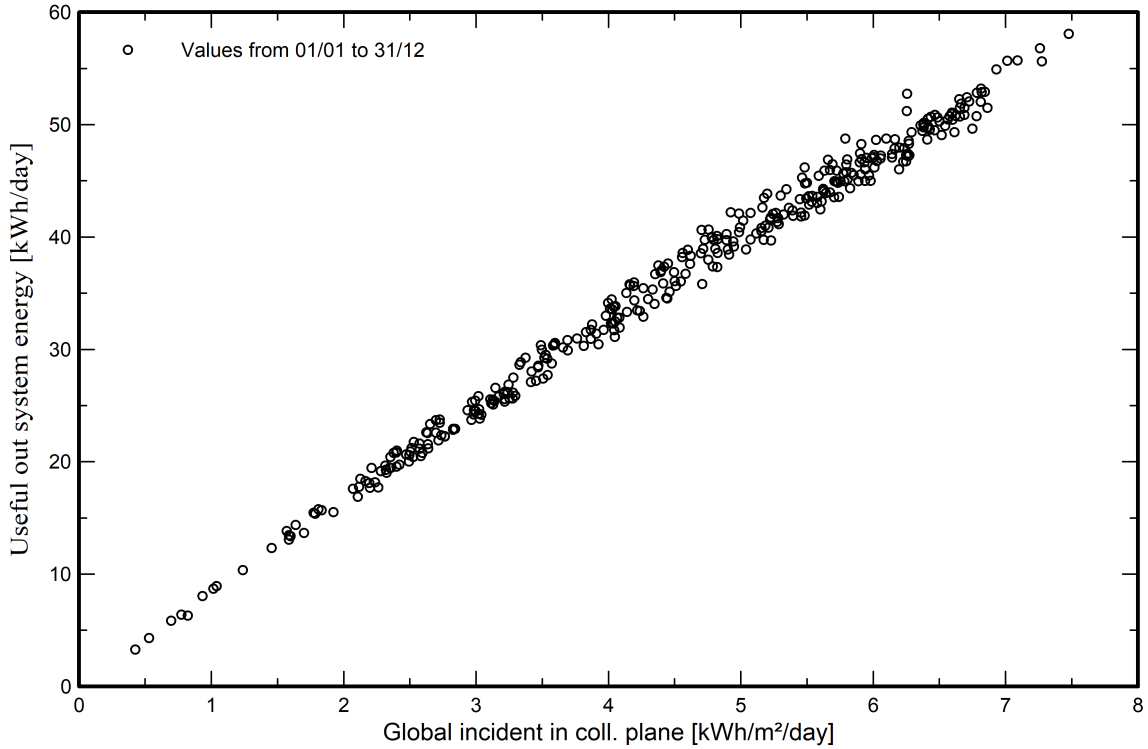


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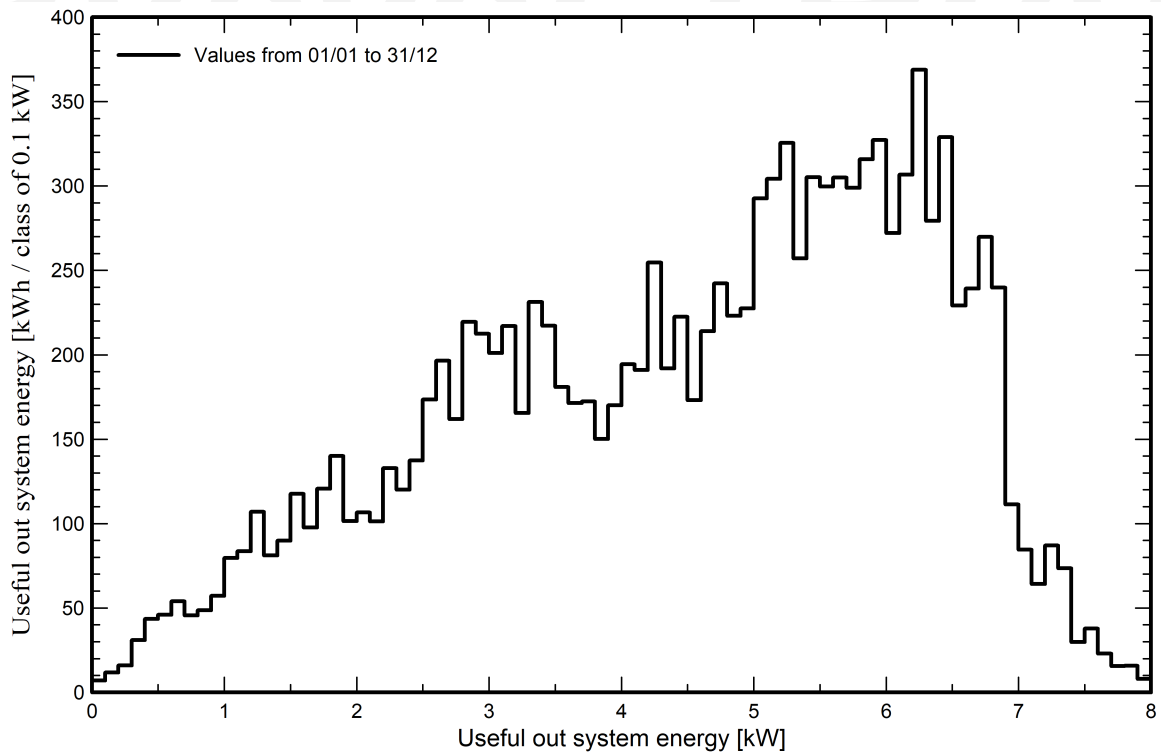
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Predef. graphs

Daily Input/Output diagram



System Output Power Distribution

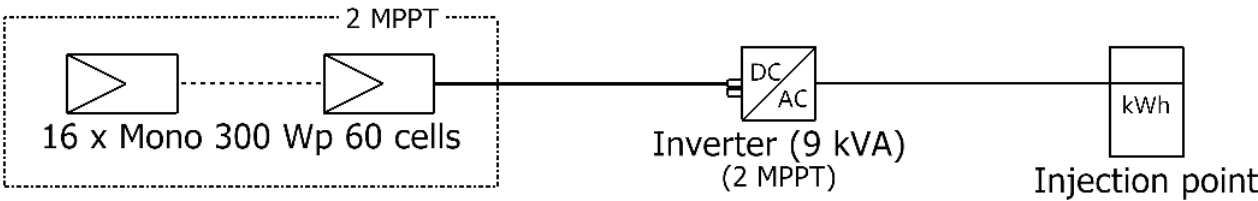




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Single-line diagram



PV module	Mono 300 Wp 60 cells
Inverter	9 kWac inverter
String	16 x Mono 300 Wp 60 cells

Muzafarnagar_Project

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