

PVsyst - Simulation report

Grid-Connected System

Project: 20MWp_Runiland

Variant: New simulation variant

Sheds system, seasonal tilt

System power: 20.02 MWp

Runi land - India

**PVsyst V7.4.8**

VC0, Simulation date:
20/08/24 19:39
with V7.4.8

Project summary**Geographical Site****Runi land**

India

Situation

Latitude 24.05 °N

Longitude 71.50 °E

Altitude 20 m

Time zone UTC+5.5

Project settings

Albedo 0.20

Weather data

Runi land

Meteonorm 8.1 (1996-2015), Sat=100% - Synthetic

System summary**Grid-Connected System****PV Field Orientation**

Seasonal tilt adjustment

azimuth 0 °

Summer Tilt 5 °

winter 22 °

Oct.-Nov.-Dec.-Jan.-Feb.-

Sheds system, seasonal tilt**Near Shadings**

No Shadings

User's needs

Unlimited load (grid)

System information**PV Array**

Nb. of modules

36400 units

Pnom total

20.02 MWp

Inverters

Nb. of units

50 units

Pnom total

17.50 MWac

Pnom ratio

1.144

Results summary

Produced Energy	33373769 kWh/year	Specific production	1667 kWh/kWp/year	Perf. Ratio PR	83.03 %
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Table of contents

Project and results summary	2
General parameters, PV Array Characteristics, System losses	3
Main results	5
Loss diagram	6
Predef. graphs	7
Single-line diagram	8



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General parameters

Grid-Connected System

PV Field Orientation

Orientation

Seasonal tilt adjustment
azimuth 0 °
Summer Tilt 5 °
winter 22 °
Oct.-Nov.-Dec.-Jan.-Feb.-

Horizon

Free Horizon

Sheds system, seasonal tilt

Sheds configuration

No 3D scene defined

Models used

Transposition Perez
Diffuse Perez, Meteonorm
Circumsolar separate

User's needs

Unlimited load (grid)

PV Array Characteristics

PV module

Manufacturer

Waaree

Model

Bi-55-550

(Custom parameters definition)

Unit Nom. Power 550 Wp
Number of PV modules 36400 units
Nominal (STC) 20.02 MWp
Modules 1400 string x 26 In series

At operating cond. (50°C)

Pmpp 18.49 MWp
U mpp 992 V
I mpp 18630 A

Total PV power

Nominal (STC) 20020 kWp
Total 36400 modules
Module area 93700 m²
Cell area 86801 m²

Inverter

Manufacturer

Sungrow

Model

SG350-HX

(Original PVsyst database)

Unit Nom. Power 350 kWac
Number of inverters 50 units
Total power 17500 kWac
Operating voltage 500-1450 V
Pnom ratio (DC:AC) 1.14
Power sharing within this inverter

Total inverter power

Total power 17500 kWac
Number of inverters 50 units
Pnom ratio 1.14

Array losses

Array Soiling Losses

Average loss Fraction 2.0 %

Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	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. 0.29 mΩ
Loss Fraction 0.5 % at STC

LID - Light Induced Degradation

Loss Fraction 2.0 %

Module Quality Loss

Loss Fraction 0.0 %

Module mismatch losses

Loss Fraction 1.0 % at MPP

Strings Mismatch loss

Loss Fraction 0.1 %

IAM loss factor

Incidence effect (IAM): User defined profile

0°	30°	50°	60°	70°	75°	80°	85°	90°
1.000	0.999	0.985	0.958	0.886	0.809	0.676	0.449	0.000



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System losses

Unavailability of the system

Time fraction 1.0 %
 3.7 days,
 3 periods

Auxiliaries loss

Proportional to Power 3.0 W/kW
0.0 kW from Power thresh.

AC wiring losses

Inv. output line up to injection point

Inverter voltage 800 Vac tri
Loss Fraction 1.50 % at STC

Inverter: SG350-HX

Wire section (50 Inv.) Copper 50 x 3 x 150 mm²
Average wires length 193 m



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Main results

System Production

Produced Energy

33373769 kWh/year

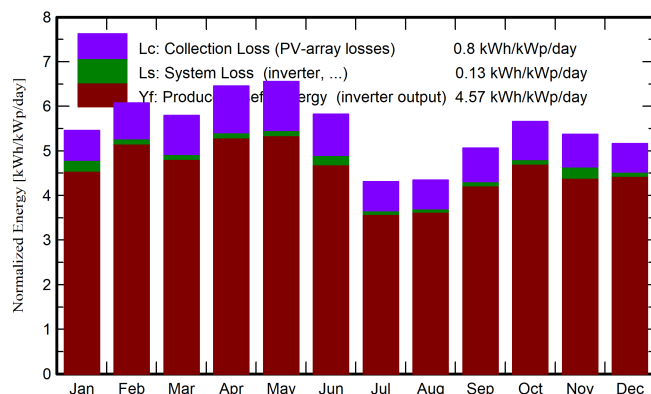
Specific production

1667 kWh/kWp/year

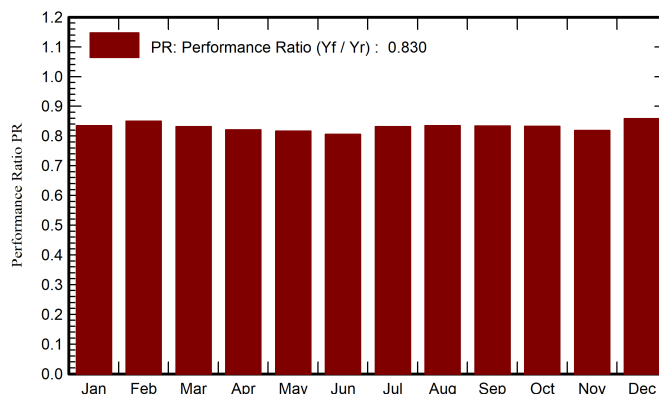
Perf. Ratio PR

83.03 %

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	129.4	44.9	19.12	169.2	162.7	2978186	2825569	0.834
February	140.2	47.8	22.33	170.0	163.9	2957356	2893171	0.850
March	173.8	75.0	27.94	179.6	172.1	3055927	2990863	0.832
April	191.2	85.7	31.44	193.7	185.9	3254284	3184828	0.821
May	203.5	97.5	33.86	203.3	195.1	3393521	3321584	0.816
June	176.0	105.1	32.37	174.8	167.4	2947312	2822028	0.806
July	134.4	100.2	29.97	133.6	127.1	2273063	2224840	0.832
August	134.5	94.3	28.58	134.8	128.4	2302333	2253936	0.835
September	148.9	79.7	28.84	152.0	145.1	2591633	2537029	0.834
October	152.4	71.5	29.18	175.5	168.5	2987560	2925856	0.833
November	127.8	50.3	24.64	161.1	155.2	2790722	2640032	0.819
December	120.9	43.0	20.46	160.2	154.4	2813859	2754032	0.859
Year	1833.0	895.0	27.42	2007.7	1925.8	34345757	33373769	0.830

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

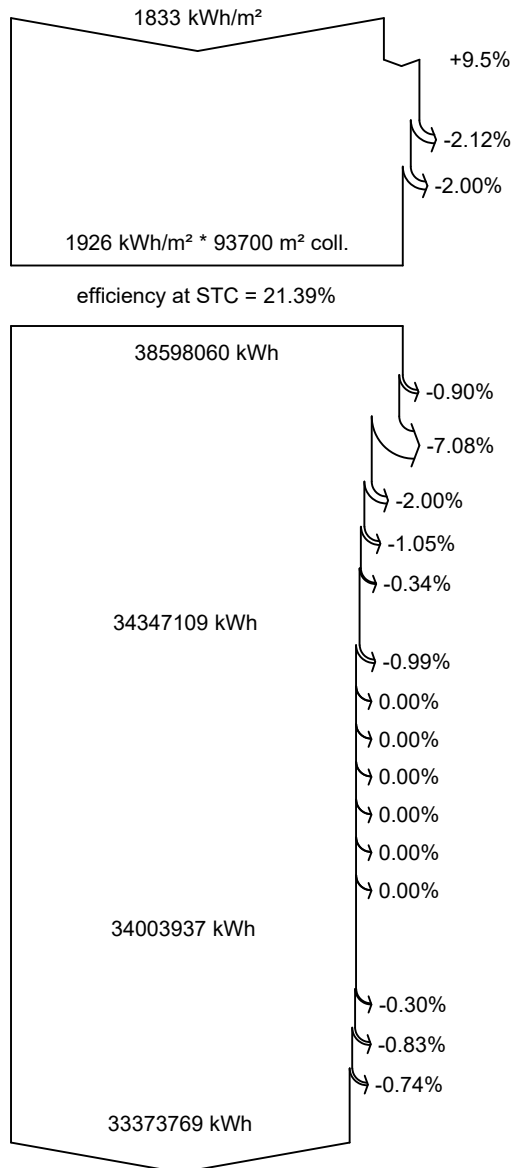
PR Performance Ratio



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Loss diagram



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

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

Auxiliaries (fans, other)

AC ohmic loss

System unavailability

Energy injected into grid

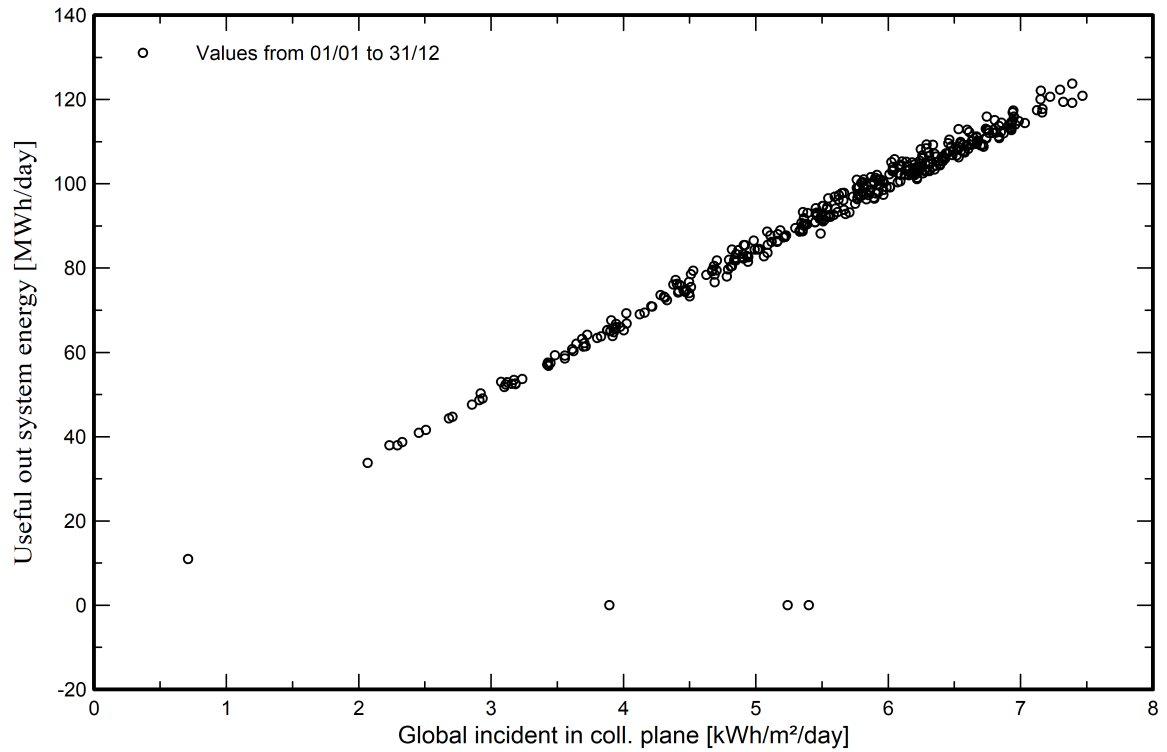


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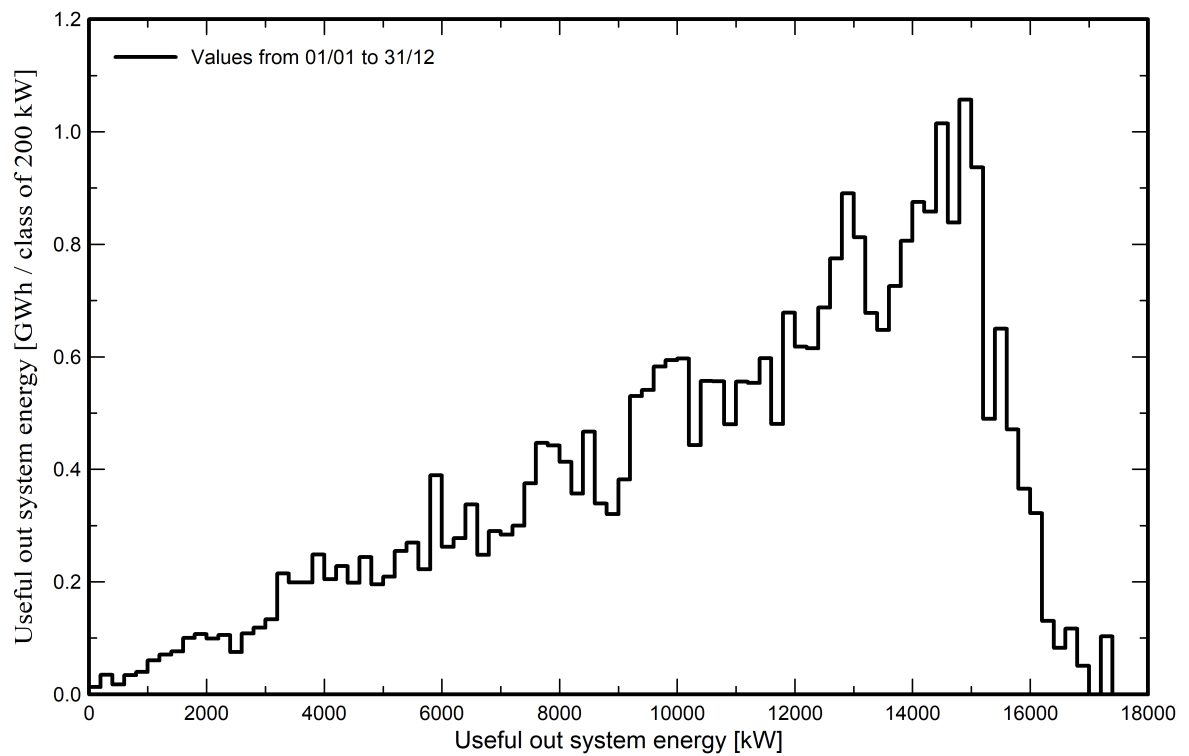
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Predef. graphs

Daily Input/Output diagram



System Output Power Distribution

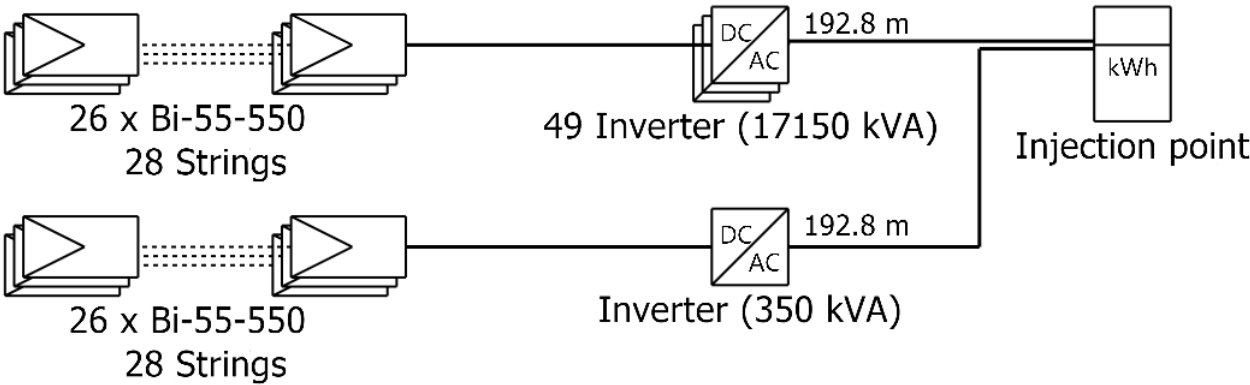




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Single-line diagram



PV module	Bi-55-550
Inverter	SG350-HX
String	26 x Bi-55-550

20MWp_Runiland

VC0 : New simulation variant

20/08/24