

PVsyst - Simulation report

Grid-Connected System

Project: Fixed vs Tracked

Variant: Fixed at 20 degrees - 450 cm - 2x30 Portrait

No 3D scene defined, no shadings

System power: 293 kWp

Christchurch Intl - New Zealand

Client

Solar South West
Nick Keeler

PdV



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PVsyst V7.2.0

VC0, Simulation date:
09/09/21 15:31
with v7.2.0

Project summary

Geographical Site

Christchurch Intl
New Zealand

Situation

Latitude -43.90 °S
Longitude 171.80 °E
Altitude 34 m
Time zone UTC+12

Project settings

Albedo 0.20

Meteo data

Christchurch Intl
MeteoNorm 8.0 station - Synthetic

System summary

Grid-Connected System

No 3D scene defined, no shadings

PV Field Orientation

Fixed plane
Tilt/Azimuth 20 / 0 °

Near Shadings

No Shadings

User's needs

Unlimited load (grid)

System information

PV Array

Nb. of modules 450 units
Pnom total 293 kWp

Inverters

Nb. of units 1 Unit
Pnom total 200 kWac
Pnom ratio 1.463

Results summary

Produced Energy 399.9 MWh/year Specific production 1367 kWh/kWp/year Perf. Ratio PR 88.87 %

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General parameters

Grid-Connected System

No 3D scene defined, no shadings

PV Field Orientation

Orientation

Fixed plane

Tilt/Azimuth 20 / 0 °

Sheds configuration

Near Shadings

No Shadings

Models used

Transposition Perez
Diffuse Perez, Meteonorm
Circumsolar separate

Horizon

Free Horizon

User's needs

Unlimited load (grid)

PV Array Characteristics

PV module

Manufacturer

Risen Energy Co., Ltd

Model

RSM132-8-650BMDG

(Original PVsyst database)

Unit Nom. Power

650 Wp

Number of PV modules

450 units

Nominal (STC)

293 kWp

Modules

15 Strings x 30 In series

At operating cond. (50°C)

Pmpp

268 kWp

U mpp

1032 V

I mpp

259 A

Total PV power

Nominal (STC)

293 kWp

Total

450 modules

Module area

1398 m²

Cell area

1310 m²

Inverter

Manufacturer

Huawei Technologies

Model

SUN2000-215KTL-H3

(Original PVsyst database)

Unit Nom. Power

200 kWac

Number of inverters

1 Unit

Total power

200 kWac

Operating voltage

500-1500 V

Max. power (=>33°C)

215 kWac

Pnom ratio (DC:AC)

1.46

Total inverter power

Total power

200 kWac

Nb. of inverters

1 Unit

Pnom ratio

1.46

Array losses

Thermal Loss factor

Module temperature according to irradiance

Uc (const)

20.0 W/m²K

Uv (wind)

0.0 W/m²K/m/s

DC wiring losses

Global array res.

65 mΩ

Loss Fraction

1.5 % at STC

LID - Light Induced Degradation

Loss Fraction

1.6 %

Module Quality Loss

Loss Fraction

-0.8 %

Module mismatch losses

Loss Fraction

2.0 % at MPP

Strings Mismatch loss

Loss Fraction

0.1 %

IAM loss factor

Incidence effect (IAM): User defined profile

0°	20°	40°	60°	70°	75°	80°	85°	90°
1.000	1.000	1.000	1.000	0.992	0.978	0.946	0.850	0.000



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Main results

System Production

Produced Energy 399.9 MWh/year

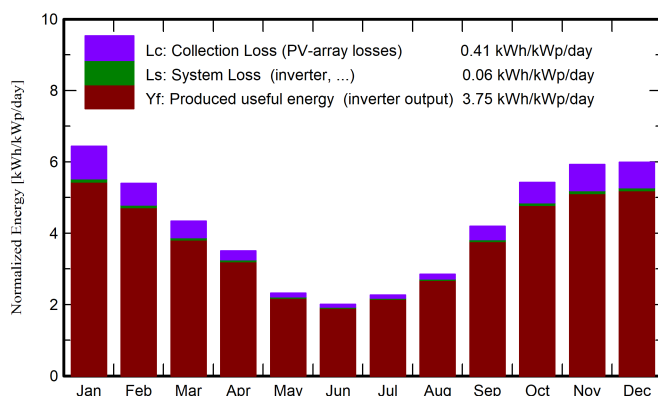
Specific production

1367 kWh/kWp/year

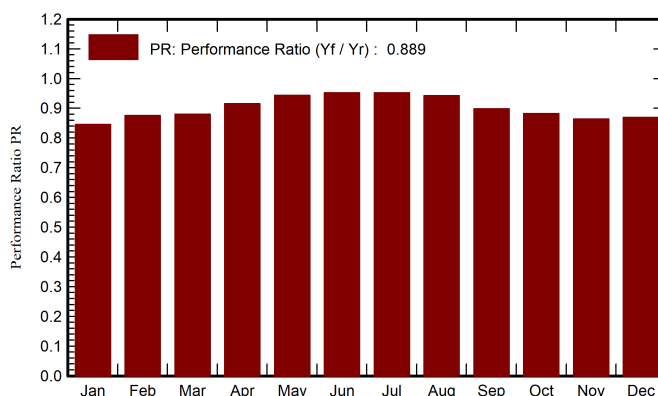
Performance Ratio PR

88.87 %

Normalized productions (per installed kWp)



Performance Ratio PR



Balances and main results

	GlobHor	DiffHor	T_Amb	GlobInc	GlobEff	EArray	E_Grid	PR
	kWh/m²	kWh/m²	°C	kWh/m²	kWh/m²	MWh	MWh	ratio
January	197.4	78.20	17.30	199.5	198.8	50.13	49.34	0.846
February	142.6	81.90	15.80	151.1	150.7	39.30	38.70	0.875
March	117.3	62.10	14.30	134.6	134.2	35.17	34.63	0.880
April	81.4	37.90	11.40	105.2	104.9	28.58	28.15	0.915
May	50.2	26.60	8.80	71.9	71.7	20.12	19.84	0.944
June	39.2	19.00	6.50	60.1	60.0	16.97	16.73	0.952
July	46.4	22.30	5.70	70.1	70.0	19.81	19.54	0.953
August	67.6	37.90	7.60	88.4	88.2	24.70	24.36	0.942
September	104.3	42.00	9.30	125.9	125.6	33.60	33.11	0.899
October	151.2	62.80	10.90	168.2	167.7	44.07	43.40	0.882
November	174.2	84.90	12.80	177.8	177.2	45.61	44.92	0.864
December	185.8	83.50	14.79	185.5	184.9	47.91	47.17	0.869
Year	1357.6	639.10	11.24	1538.3	1534.0	405.96	399.90	0.889

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		



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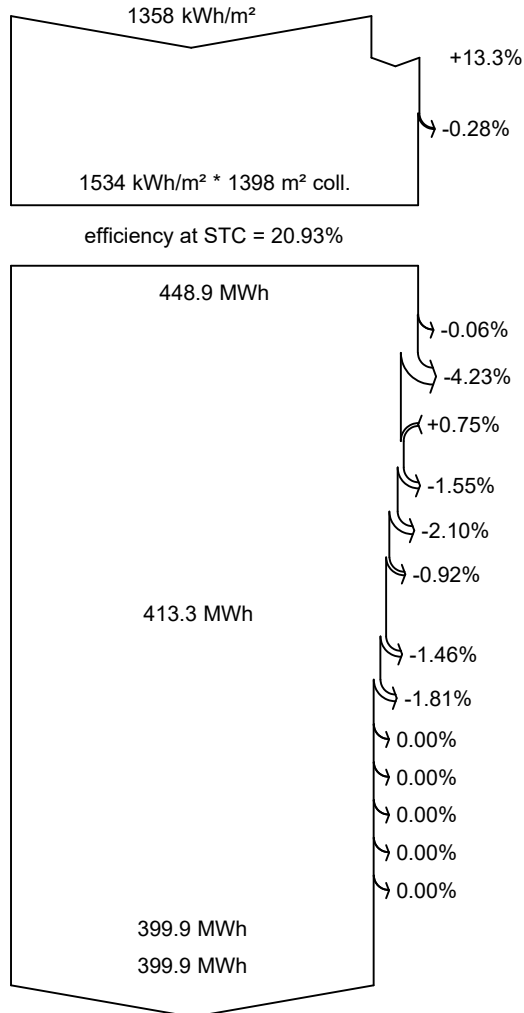
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Loss diagram



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

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

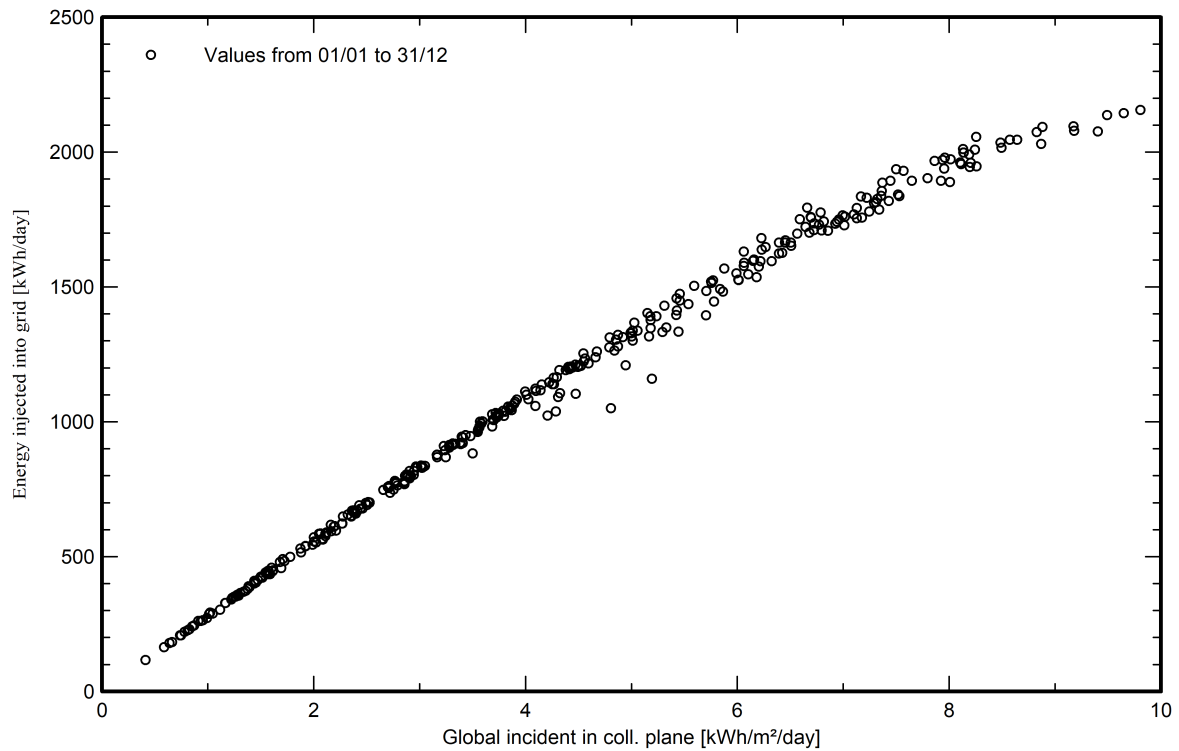


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Special graphs

Daily Input/Output diagram



System Output Power Distribution

