

PVsyst - Simulation report

Grid-Connected System

Project: Tongatapu FV2 Utulau SIN BATERIA

Variant: Utulau sin bateria

No 3D scene defined, no shadings

System power: 5002 kWp

Utulau - Tonga

Autor(a)

Universidad Europea (Spain)



Project: Tongatapu FV2 Utulau SIN BATERIA

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PVsyst V7.3.4

VC0, Simulation date:
15/10/23 16:25
with v7.3.4

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Project summary

Geographical Site

Utulau

Tonga

Situation

Latitude -21.18 °S

Longitude -175.27 °W

Altitude 20 m

Time zone UTC+12

Project settings

Albedo 0.20

Meteo data

Utulau

Meteonorm 8.1 (2016-2021), Sat=100% - Sintético

System summary

Grid-Connected System

No 3D scene defined, no shadings

PV Field Orientation

Fixed plane

Tilt/Azimuth 21 / 180 °

Near Shadings

No Shadings

User's needs

Unlimited load (grid)

System information

PV Array

Nb. of modules

7695 units

Pnom total

5002 kWp

Inverters

Nb. of units

4 units

Pnom total

4080 kWac

Pnom ratio

1.226

Results summary

Produced Energy 7709670 kWh/year Specific production 1541 kWh/kWp/year Perf. Ratio PR 84.42 %

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General parameters

Grid-Connected System

No 3D scene defined, no shadings

PV Field Orientation

Orientation

Fixed plane

Tilt/Azimuth 21 / 180 °

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

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

Generic

RSM-132-8-650-M

650 Wp

7695 units

5002 kWp

405 Strings x 19 In series

4577 kWp

652 V

7015 A

5002 kWp

7695 modules

23903 m²

Inverter

Manufacturer

Model

(Original PVsyst database)

Unit Nom. Power

Number of inverters

Total power

Operating voltage

Max. power (=>35°C)

Pnom ratio (DC:AC)

Generic

Ingecon Sun 1110TL B400 IP54 H1000

1020 kWac

4 units

4080 kWac

573-820 V

1109 kWac

1.23

Total inverter power

Total power

Max. power

Number of inverters

Pnom ratio

4080 kWac

4436 kWac

4 units

1.23

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.

1.5 mΩ

Loss Fraction

1.5 % at STC

Module Quality Loss

Loss Fraction

-0.8 %

Module mismatch losses

Loss Fraction

2.0 % at MPP

Strings Mismatch loss

Loss Fraction

0.2 %

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



Main results

System Production

Produced Energy

7709670 kWh/year

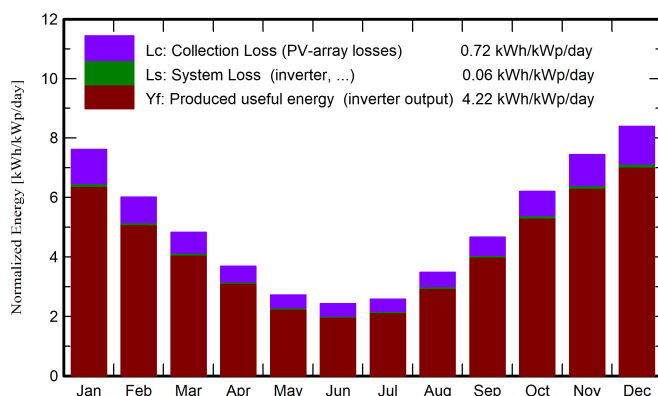
Specific production

1541 kWh/kWp/year

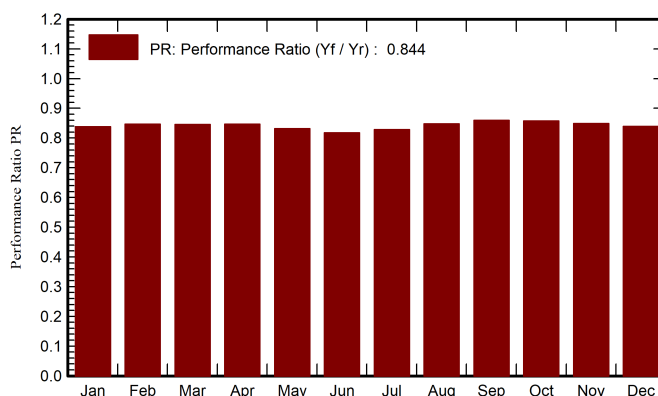
Perf. Ratio PR

84.42 %

Normalized productions (per installed kWp)



Performance Ratio PR



Balances and main results

	GlobHor kWh/m ²	DiffHor kWh/m ²	T_Amb °C	GlobInc kWh/m ²	GlobEff kWh/m ²	EArray kWh	E_Grid kWh	PR ratio
January	237.3	73.71	26.47	236.2	231.9	1004829	990671	0.838
February	179.2	78.88	26.84	168.5	164.2	723340	713342	0.846
March	174.0	67.59	26.57	149.5	144.1	641615	632388	0.846
April	141.3	60.56	25.10	110.8	105.1	476296	469158	0.847
May	121.1	48.46	24.14	84.3	77.8	356494	350388	0.831
June	113.6	42.84	22.58	72.8	65.6	303063	297464	0.817
July	120.3	47.56	21.73	80.0	72.9	337381	331464	0.828
August	147.9	50.88	21.80	108.1	101.3	465820	458721	0.848
September	169.0	57.04	21.90	139.9	134.3	610365	601738	0.860
October	212.7	68.76	23.33	192.4	187.6	836580	824831	0.857
November	227.3	70.24	24.15	223.5	219.1	962146	948521	0.849
December	254.6	65.75	25.74	260.0	255.5	1106664	1090984	0.839
Year	2098.5	732.28	24.18	1826.0	1759.4	7824594	7709670	0.844

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

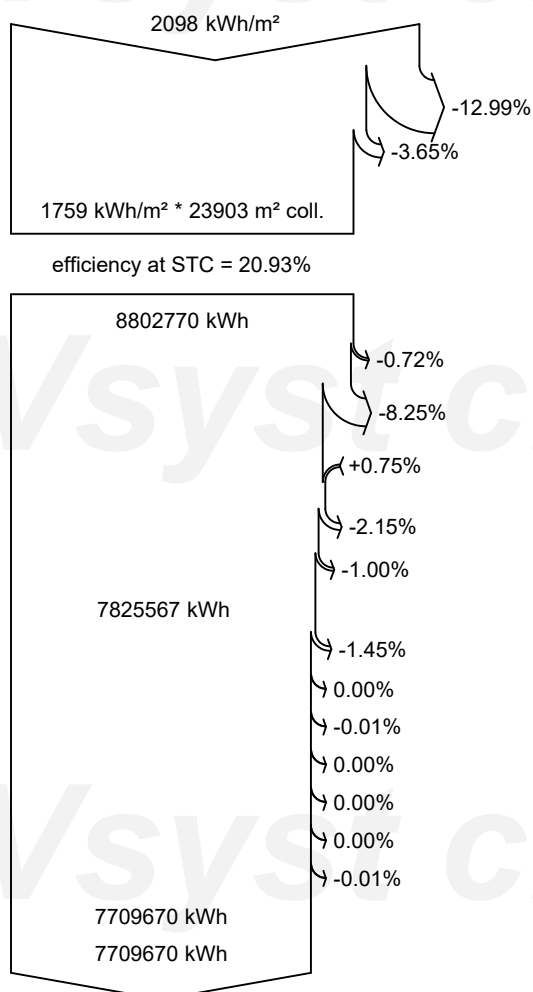
EArray Effective energy at the output of the array

E_Grid Energy injected into grid

PR Performance Ratio



Loss diagram



Global horizontal irradiation

Global incident in coll. plane

IAM factor on global

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

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

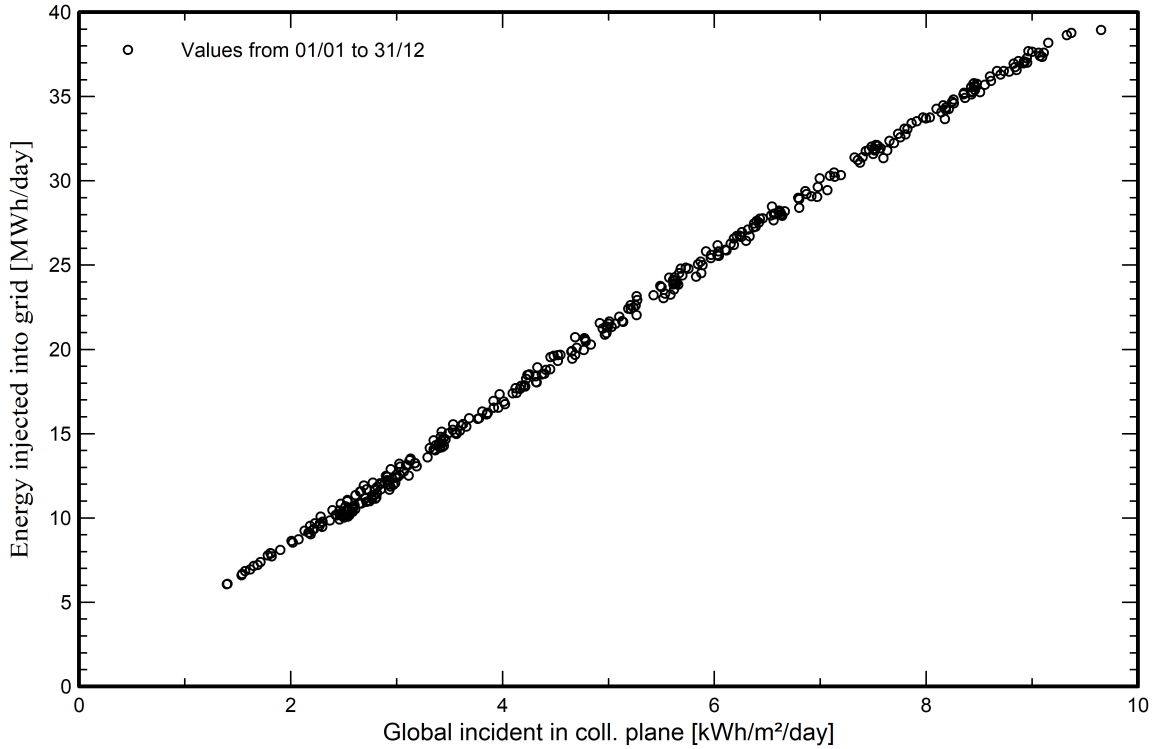
Available Energy at Inverter Output

Energy injected into grid

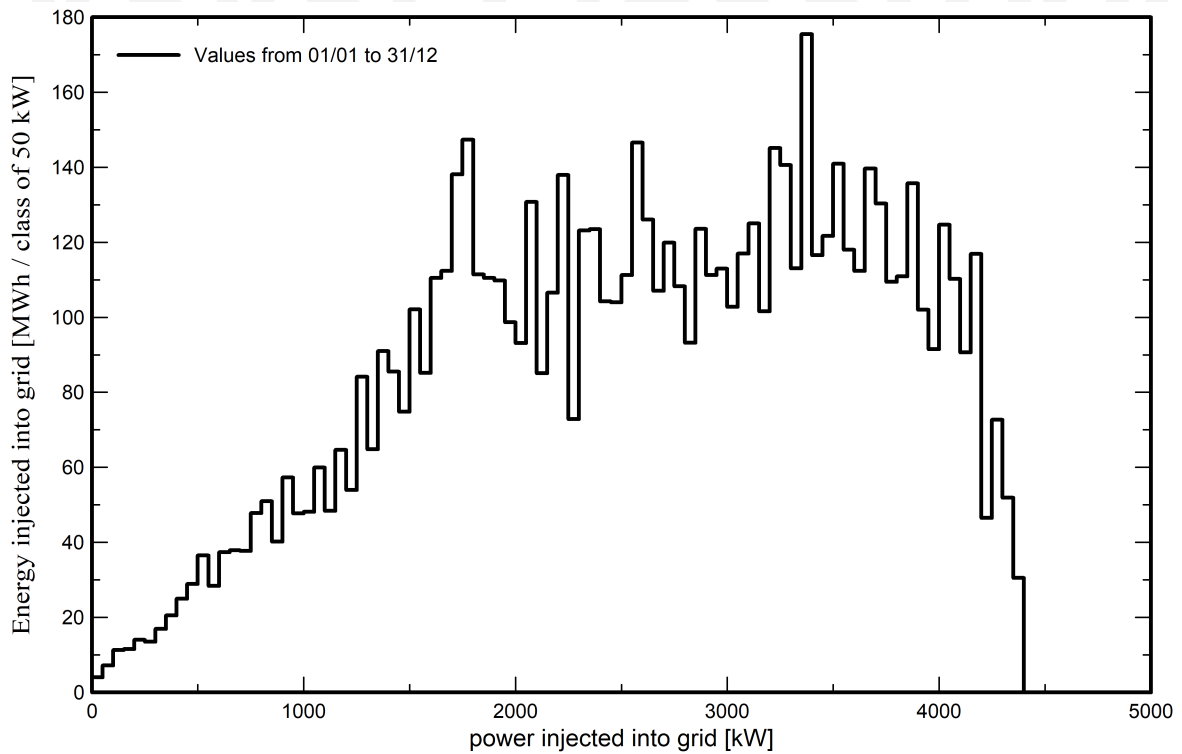


Predef. graphs

Diagrama entrada/salida diaria



Distribución de potencia de salida del sistema

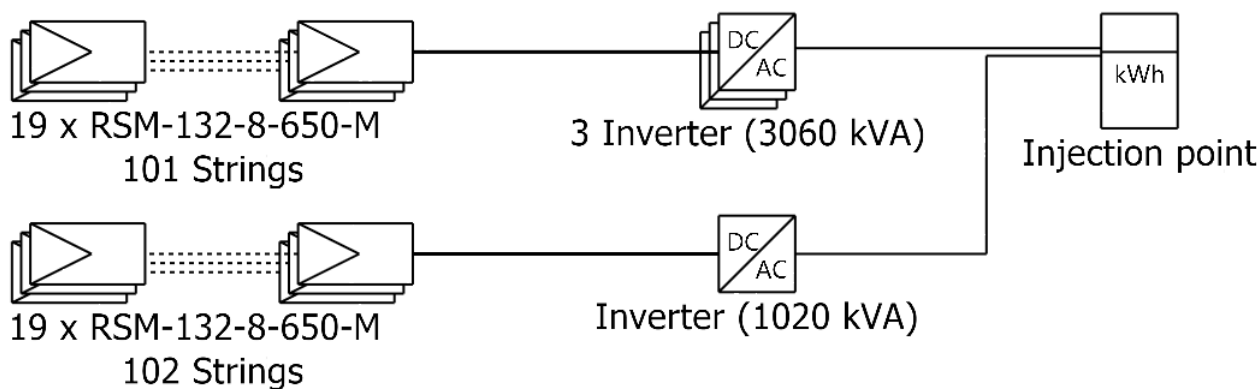




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Single-line diagram



PV module	RSM-132-8-650-M
Inverter	Ingecon Sun 1110TL B400 IP54 H1000
String	19 x RSM-132-8-650-M

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RIA

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