

PVsyst - Simulation report

Grid-Connected System

Project: Planta Solar Tarifa

Variant: 54,6 MW

No 3D scene defined, no shadings

System power: 54.60 MWp

Tarifa - Spain

Author

Universidad Europea (Spain)



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PVsyst V7.4.6

VC0, Simulation date:
20/10/24 09:26
with V7.4.6

Universidad Europea (Spain)

Project summary

Geographical Site

Tarifa
Spain

Situation

Latitude 36.23 °N
Longitude -5.76 °W
Altitude 15 m
Time zone UTC

Project settings

Albedo 0.20

Weather data

Tarifa
SolarGIS Monthly aver. , period not spec. - Sintético

System summary

Grid-Connected System

No 3D scene defined, no shadings

PV Field Orientation

Orientation

Tracking plane, horizontal N-S axis
Axis azimuth 0 °

Tracking algorithm

Astronomic calculation

Near Shadings

No Shadings

System information

PV Array

Nb. of modules 78000 units
Pnom total 54.60 MWp

Inverters

Nb. of units 150 units
Pnom total 45.00 MWac
Pnom ratio 1.213

User's needs

Unlimited load (grid)

Results summary

Produced Energy 120165627 kWh/year Specific production 2201 kWh/kWp/year Perf. Ratio PR 87.03 %

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General parameters

Grid-Connected System

No 3D scene defined, no shadings

PV Field Orientation

Orientation

Tracking plane, horizontal N-S axis

Axis azimuth 0 °

Models used

Transposition Perez

Diffuse Perez, Meteonorm

Circumsolar separate

Tracking algorithm

Astronomic calculation

Trackers configuration

No 3D scene defined

Horizon

Average Height 1.8 °

Near Shadings

No Shadings

User's needs

Unlimited load (grid)

PV Array Characteristics

PV module

Manufacturer

Generic

Model

CS7N-700TB-AG 1500V

(Custom parameters definition)

Unit Nom. Power

700 Wp

Number of PV modules

78000 units

Nominal (STC)

54.60 MWp

Modules

2600 string x 30 In series

At operating cond. (50°C)

Pmpp

50.68 MWp

U mpp

1099 V

I mpp

46127 A

Total PV power

Nominal (STC)

54600 kWp

Total

78000 modules

Module area

242295 m²

Inverter

Manufacturer

Generic

Model

SUN2000-330KTL-H1-Preliminary V0.1

(Custom parameters definition)

Unit Nom. Power

300 kWac

Number of inverters

150 units

Total power

45000 kWac

Operating voltage

500-1500 V

Max. power (=>30°C)

330 kWac

Pnom ratio (DC:AC)

1.21

Power sharing within this inverter

Total inverter power

Total power

45000 kWac

Max. power

49500 kWac

Number of inverters

150 units

Pnom ratio

1.21

Array losses

Array Soiling Losses

Loss Fraction 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.

0.13 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): 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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System losses

Auxiliaries loss

constant (fans)	14.00 kW
0.0 kW from Power thresh.	
Proportionnal to Power	2.0 W/kW
0.0 kW from Power thresh.	
Night aux. cons.	3.50 kW

AC wiring losses

Inv. output line up to MV transfo

Inverter voltage	800 Vac tri
Loss Fraction	1.00 % at STC
Inverter: SUN2000-330KTL-H1-Preliminary V0.1	
Wire section (150 Inv.)	Alu 150 x 3 x 400 mm ²
Average wires length	227 m

MV line up to Injection

MV Voltage	30 kV
Average each inverter	
Wires	Alu 3 x 1000 mm ²
Length	5328 m
Loss Fraction	0.14 % at STC

AC losses in transformers

MV transfo

Medium voltage	30 kV
One transfo parameters	
Nominal power at STC	7.66 MVA
Iron Loss (24/24 Connexion)	7.66 kVA
Iron loss fraction	0.10 % at STC
Copper loss	84.27 kVA
Copper loss fraction	1.10 % at STC
Coils equivalent resistance	3 x 0.92 mΩ

Operating losses at STC (full system)

Nb. identical MV transfos	7
Nominal power at STC	53.62 MVA
Iron loss (24/24 Connexion)	53.62 kVA
Copper loss	589.86 kVA



Horizon definition

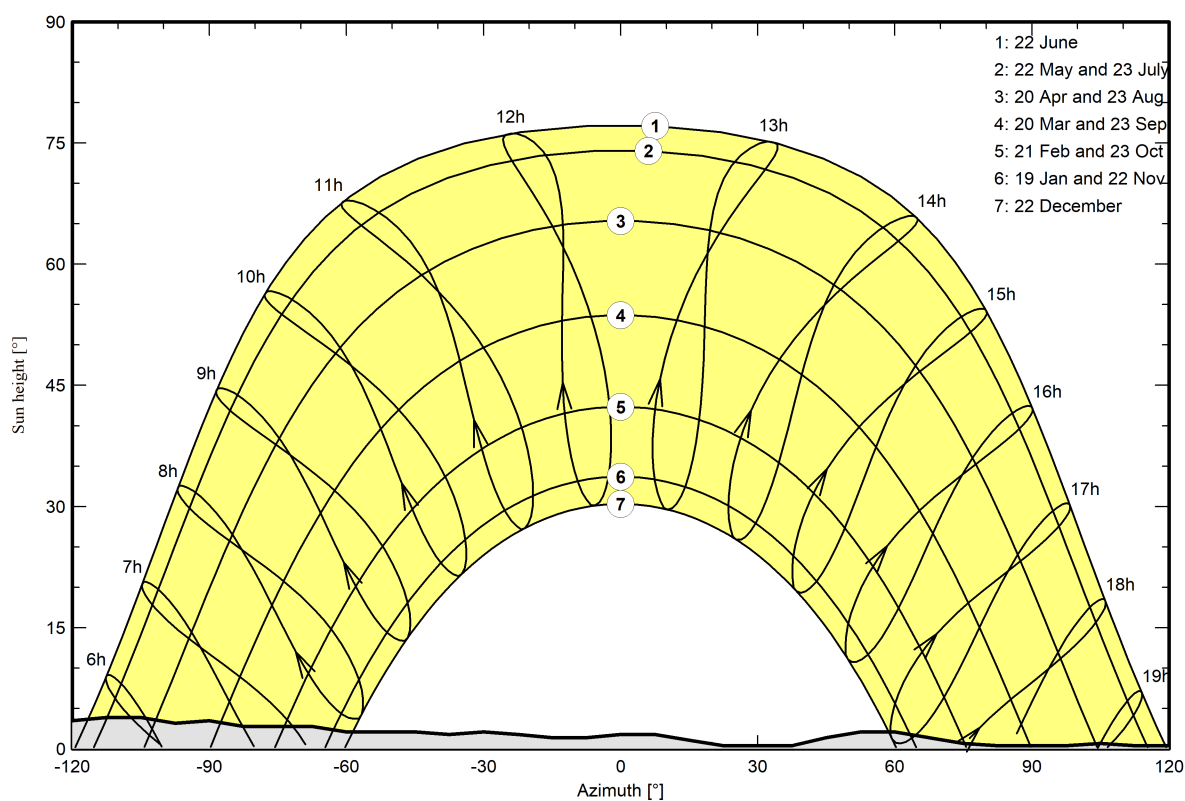
Archivo de horizonte CSV, lat:36.23221018688028, lng:-5.758981704711914, exparte

Average Height	1.8 °	Albedo Factor	0.00
Diffuse Factor	1.00	Albedo Fraction	100 %

Horizon profile

Azimuth [°]	-180	-173	-165	-158	-150	-143	-135	-128	-120	-113	-105
Height [°]	1.4	1.8	2.5	2.8	2.5	3.2	3.2	2.8	3.5	3.9	3.9
Azimuth [°]	-98	-90	-83	-68	-60	-45	-38	-30	-23	-15	-8
Height [°]	3.2	3.5	2.8	2.8	2.1	2.1	1.8	2.1	1.8	1.4	1.4
Azimuth [°]	0	8	15	23	38	45	53	60	68	75	83
Height [°]	1.8	1.8	1.1	0.4	0.4	1.4	2.1	2.1	1.4	0.7	0.4
Azimuth [°]	98	105	113	120	128	135	143	150	158	165	173
Height [°]	0.4	0.7	0.4	0.4	0.7	1.1	1.4	1.4	1.1	1.1	1.4

Sun Paths (Height / Azimuth diagram)





Main results

System Production

Produced Energy 120165627 kWh/year

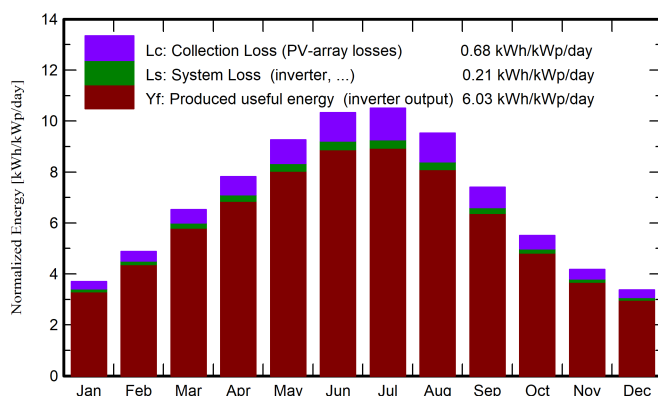
Specific production

2201 kWh/kWp/year

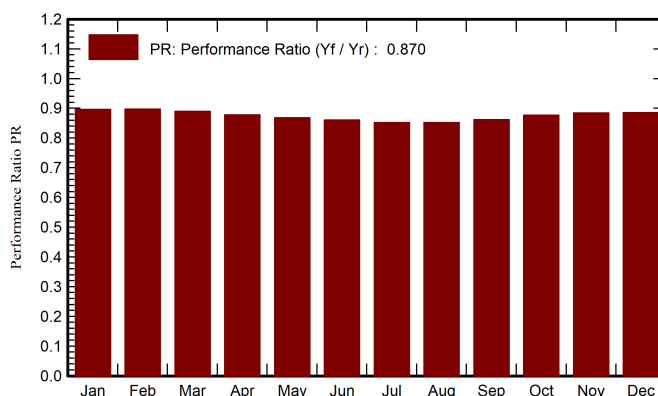
Perf. Ratio PR

87.03 %

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	79.9	31.50	12.30	114.6	110.0	5791608	5604552	0.896
February	97.2	38.20	12.80	136.6	131.8	6911906	6691984	0.897
March	143.1	54.10	14.30	202.4	196.2	10167688	9832731	0.890
April	173.7	64.30	15.90	234.7	227.6	11652464	11250444	0.878
May	211.1	72.90	18.60	287.3	279.7	14118612	13621290	0.868
June	229.1	71.80	21.90	309.9	302.1	15101680	14563259	0.861
July	238.8	70.70	24.30	325.6	317.6	15708621	15142970	0.852
August	212.1	66.10	24.60	295.2	286.6	14230507	13730233	0.852
September	161.4	56.20	22.30	222.3	215.8	10839340	10462824	0.862
October	121.9	47.90	19.70	170.6	165.0	8446612	8171012	0.877
November	84.8	32.40	15.70	125.3	119.7	6243798	6047643	0.884
December	70.7	28.00	13.49	104.4	99.2	5213582	5046688	0.886
Year	1823.8	634.10	18.02	2528.8	2451.3	124426417	120165627	0.870

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

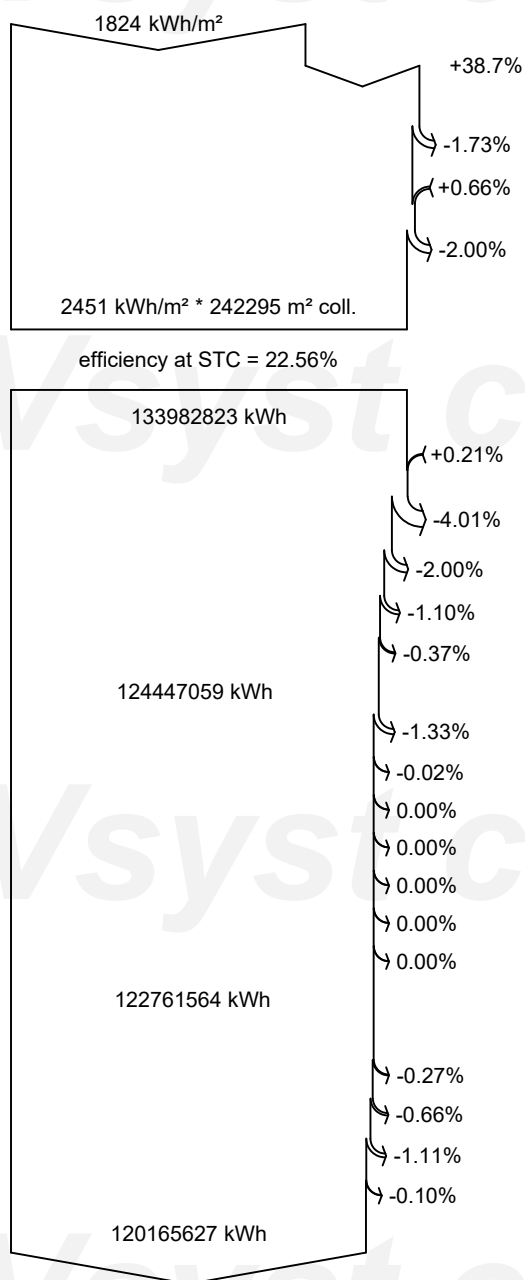
EArray Effective energy at the output of the array

E_Grid Energy injected into grid

PR Performance Ratio



Loss diagram



Global horizontal irradiation

Global incident in coll. plane

Far Shadings / Horizon

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

Medium voltage transfo loss

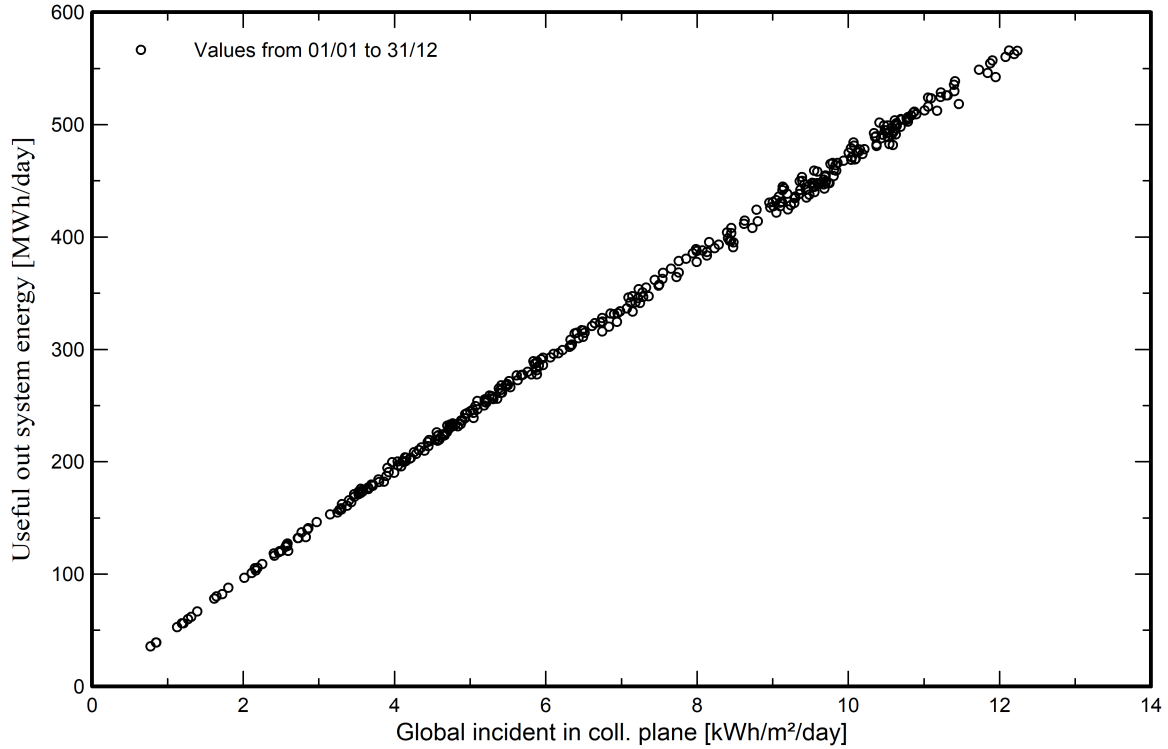
MV line ohmic loss

Energy injected into grid

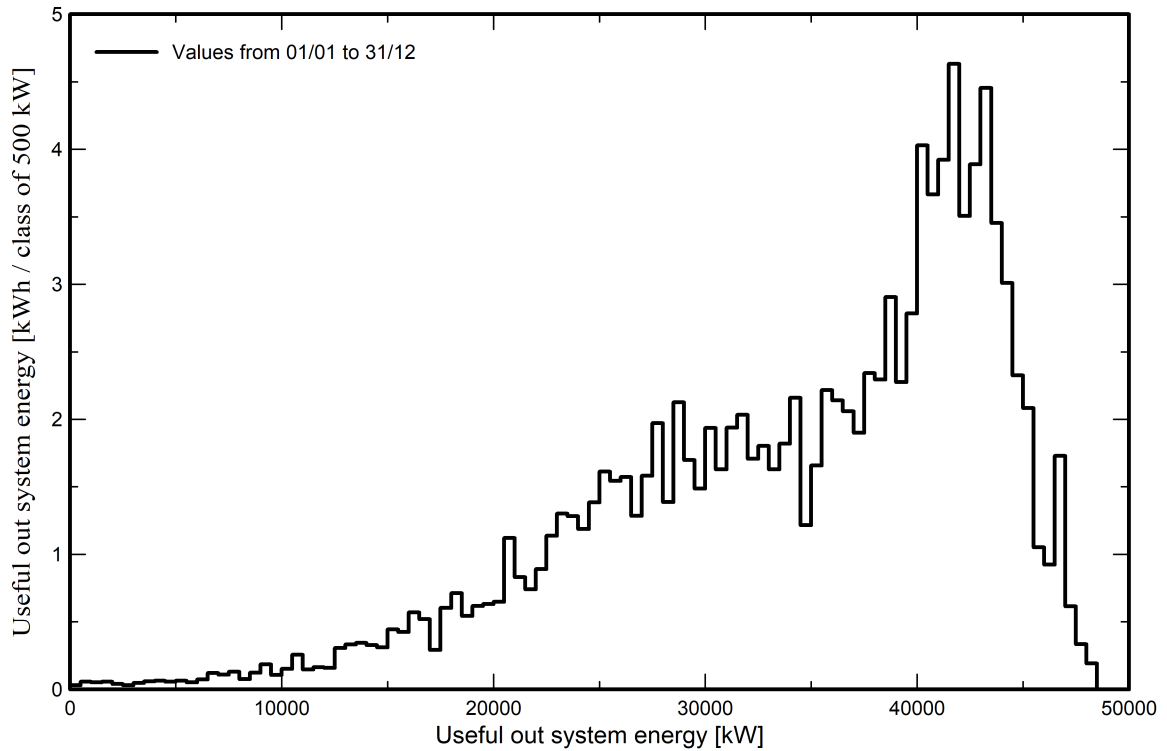


Predef. graphs

Diagrama entrada/salida diaria



Distribución de potencia de salida del sistema

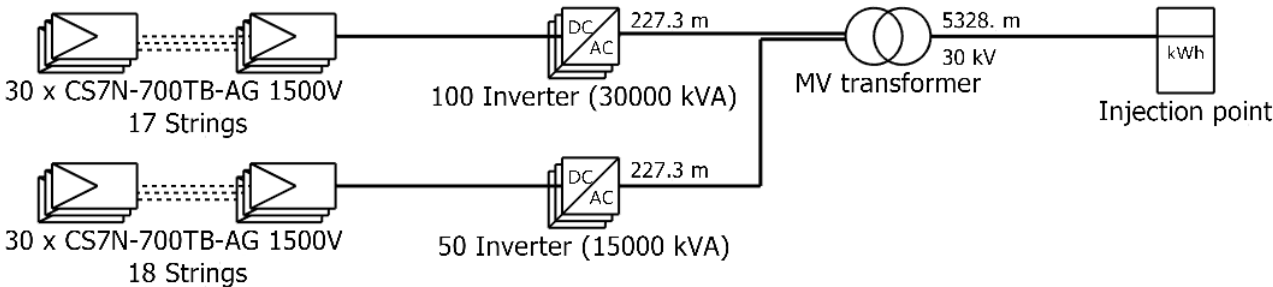




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Single-line diagram



PV module	CS7N-700TB-AG 1500V
Inverter	SUN2000-330KTL-H1-Preliminary V0.1
String	30 x CS7N-700TB-AG 1500V

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VC0 : 54,6 MW

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