

Anexo I – Fichas técnicas

Agro PERC

FRONT SIDE

260 - 275 W

› Double Glass Bifacial



Module efficiency

Module efficiency up to 14.20 %



45% Transmittance

High percentage of light can pass through it



Versatility

For greenhouses, carports or other roofs



Bifacial cell

Extra energy generated from the backside of the cell depending on albedo



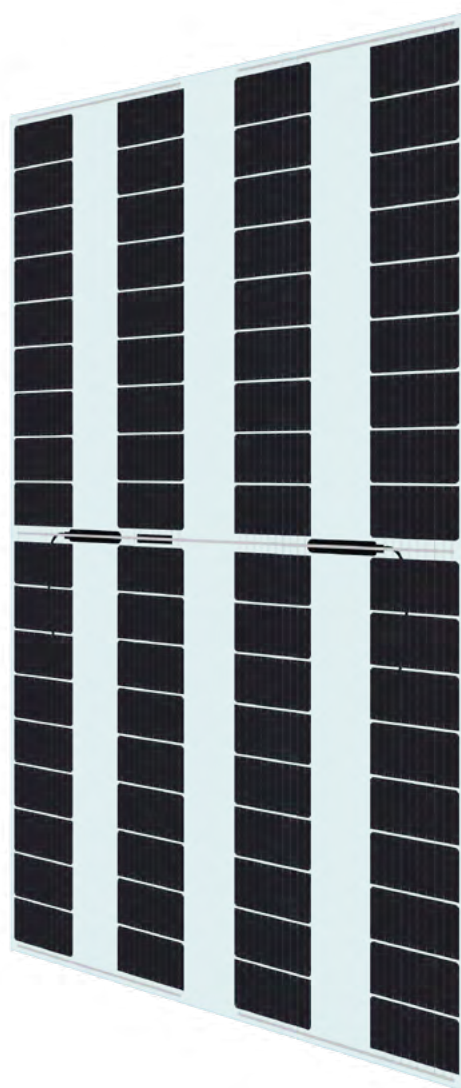
Fire rating

Class A



Hail resistance

RG3/HW3 certified



25

Years

Product Warranty

+5 years for Premium Partners

30

Years

Performance Warranty

Linear Warranty

2% First year degradation

0.55% Annual degradation

82.05% Power in year 30

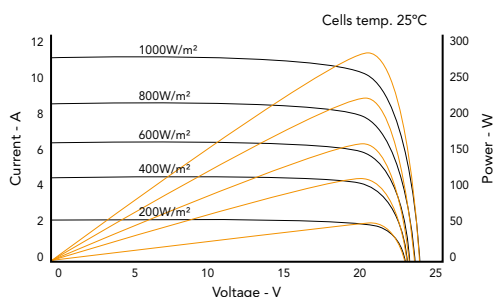
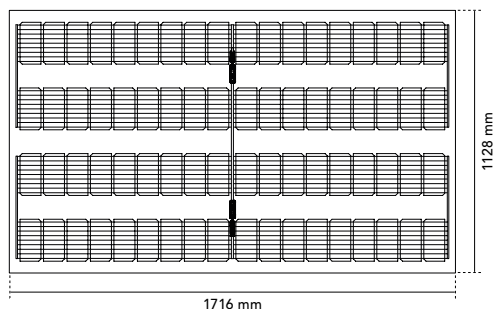
Light up your world with Eurener

Eurener's extensive portfolio of certifications and awards is testament to our unwavering commitment to our partners and our deep sense of social and ethical responsibility.





Eurener MEPV — AGRO Double Glass Bifacial 260-275W



Mechanical Specification

| | |
|--------------|--|
| Solar cells | Bifacial monocrystalline silicon cells |
| Front Glass | 2mm anti-reflective surface tempered solar glass |
| Back Glass | 2mm tempered solar glass |
| Frame | Frameless |
| Junction Box | IP68, 3 by-pass diodes |
| Connector | Connector MC4 compatible |
| Cable | 1000 mm (±20%) length and 4 mm² section |
| Dimension | 1716 x 1128 mm (±1%) |
| Area | 1.94 m² |
| Weight | 25.5 kg |

Temperature Coefficients

| | |
|--|-----------------|
| Temperature coefficient of Isc (α) | 0.04 %/°C |
| Temperature coefficient of Voc (β) | -0.28 %/°C |
| Temperature coefficient of Pmax (γ) | -0.35 %/°C |
| Temperature range | -40 °C ~ +85 °C |
| Nominal operating cell temperature (NOCT) | 43 ± 2 °C |

| | MEPV 260 | | MEPV 265 | | MEPV 270 | | MEPV 275 | |
|-----------------------------|-------------------|---------|----------|---------|----------|---------|----------|---------|
| Electrical Characteristics | STC | NOCT | STC | NOCT | STC | NOCT | STC | NOCT |
| Nominal power. Pmax | 260 Wp | 194 Wp | 265 Wp | 198 Wp | 270 Wp | 201 Wp | 275 Wp | 205 Wp |
| Short-circuit current (Isc) | 13.54 A | 10.92 A | 13.64 A | 11.02 A | 13.75 A | 11.09 A | 13.84 A | 11.18 A |
| Open-circuit voltage (Voc) | 24.21 V | 22.90 V | 24.39 V | 23.12 V | 24.69 V | 23.26 V | 24.96 V | 23.53 V |
| Maximum power current (Imp) | 12.95 A | 10.27 A | 13.06 A | 10.39 A | 13.15 A | 10.43 A | 13.19 A | 10.50 A |
| Maximum power voltage (Vmp) | 20.11 V | 18.90 V | 20.32 V | 19.03 V | 20.55 V | 19.29 V | 20.86 V | 19.50 V |
| Module efficiency | 13.45 % | | 13.71% | | 13.96% | | 14.20% | |
| Electrical Characteristics | Bifacial gain 10% | | | | | | | |
| Nominal power. Pmax | 286 Wp | | 292 Wp | | 297 Wp | | 302 Wp | |
| Short-circuit current (Isc) | 14.90 A | | 15.00 A | | 15.12 A | | 15.22 A | |
| Open-circuit voltage (Voc) | 24.21 V | | 24.39 V | | 24.69 V | | 24.96 V | |
| Maximum power current (Imp) | 14.22 A | | 14.35 A | | 14.45 A | | 14.50 A | |
| Maximum power voltage (Vmp) | 20.11 V | | 20.32 V | | 20.55 V | | 20.86 V | |

* STC: 1000 W/m², module temperature 25°C, AM 1.5

* NOCT: 800 W/m², ambient temperature 20°C, AM 1.5

Operating parameters

| | |
|--------------------------------|---------------------------------------|
| Maximum voltage | 1500 V |
| Maximum series fuse rating. Ir | 30 A |
| Power output tolerance | 0 - +3% |
| Voc and Isc tolerance | ±3% |
| Fire rating | Class A (UL 790) |
| Protection class | Class II (IEC 61140) |
| Mechanical loads | Front load 5400 Pa, Back load 2400 Pa |

Corporate and product certificates

| |
|--|
| ECOVADIS rating - Platinum medal (TOP 1%) |
| Solar Industry Forced Labor Prevention Pledge by SEIA |
| ISO9001:2015 - Quality Management Systems |
| ISO14001:2015 - Environmental Management System |
| WEEE compliance in Germany |
| PV CYCLE Italy |
| IEC 61215 - Terrestrial photovoltaic (PV) modules - Design qualification and type approval |
| IEC 61730 - Photovoltaic (PV) module safety qualification |
| IEC 61701 - Photovoltaic (PV) modules - Salt mist corrosion testing |
| IEC 62716 - Photovoltaic (PV) modules - Ammonia corrosion testing |
| IEC TS 62804 - Photovoltaic (PV) modules - Test methods for the detection of potential-induced degradation |
| Hail resistance HW3/RG3 |
| Certificate of Factory Production Control (UK) - MCS |
| Fire reaction class: 1 - LAPI |



NOTE: Read the safety and installation manual before using the product. This data sheet is not legally binding, Eurener reserves the right of final interpretation. Eurener reserves the right to change the product characteristics and/or specifications without prior notice. The latest versions of all documents can always be found on our website at www.eurener.com.

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more than
energy

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46004, Valencia, Spain

European Experts in Residential modules

Since 1997 our main purpose has been to supply quality and long-lasting photovoltaic modules that allow us and future generations, to continue generating clean energy to take care of our planet.

SG5.0/6.0/8.0/10/12RT

Inversor String Multi-MPPT para sistemas de 1000 Vdc



ALTO RENDIMIENTO

- Baja tensión de arranque y amplio rango MPPT
- Compatible con módulos bifaciales
- Función de recuperación PID integrada



GESTIÓN INTELIGENTE

- Escaneo inteligente de curva IV
- Monitorización en directo 24/7
- Actualizaciones de Firmware inalámbricas



SEGURO Y DURADERO

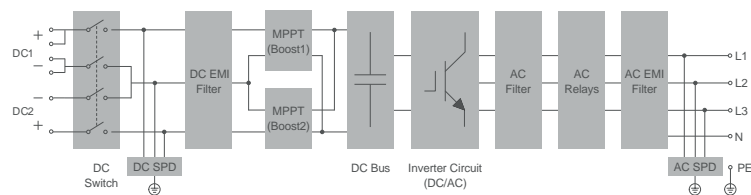
- Rápida protección AFCI
- Protección SPD Tipo II DC & AC
- « 0 @ ã @ N 0 ñ ã • • ü • ñ 8 8 @ ã ! Ó



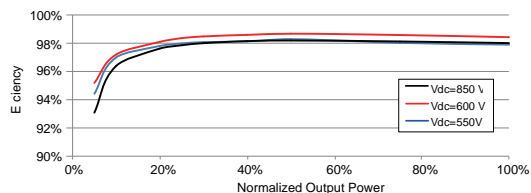
SENCILLO Y MANEJABLE

- ï Õ ø Õ 3 0 3 ã @ 0 ñ 5 • ñ N
- Conectores push-in exclusivos
- Puesta en marcha rápida y fácil vía app iSolarCloud

DIAGRAMA DEL CIRCUITO



CURVA DE EFICIENCIA



*: El inversor entra en standby cuando la tensión de entrada oscila entre 1.000V y 1.100V. Si la tensión DC máxima de la instalación puede superar los 1.000 V, no deben utilizarse los conectores MC4 incluidos en el suministro. En este caso deben utilizarse conectores MC4 Evo2.
 FF "•8• ü • â• u »üÖã¬K " N° ¬â• ³° @•üã³• •tP ³° !J ³JÖPÎ•Á °@ Öîîâ K ³JÖPÎ•Á °@ Öîîâ K ³JÎÎ•Á
 ***. WiNet-S incluido con el inversor.

SG15/20RT

Inversor String Multi-MPPT para sistemas de 1000 Vdc



ALTO RENDIMIENTO

- Baja tensión de arranque y amplio rango MPPT
- Compatible con módulos bifaciales
- Función de recuperación PID integrada

GESTIÓN INTELIGENTE

- Escaneo inteligente de curva IV
- Monitorización en directo 24/7
- Actualizaciones de Firmware inalámbricas

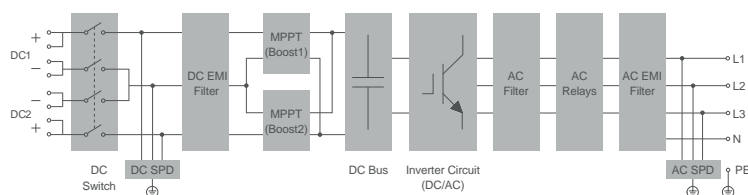
SEGURO Y DURADERO

- Rápida protección AFCI
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- « ° @ ã @ N ° ¬ ä • • ü • ¬ 8 8 @ ã ! Ó

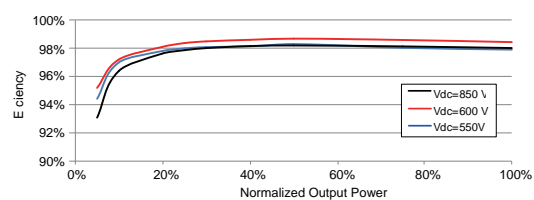
SENCILLO Y MANEJABLE

- Ì Õ ø Õ 3 ° 3 ä @ ° ¬ 5 • ¬ N
- Conectores push-in exclusivos
- Puesta en marcha rápida y fácil vía app iSolarCloud

DIAGRAMA DEL CIRCUITO



CURVA DE EFICIENCIA



| Denominación | SG15RT | SG20RT |
|---|---|------------|
| Entrada (DC) | | |
| Potencia de entrada FV máx. recomendada | Đ Đ K Ó ø á 5 | 30 kWp |
| Tensión de entrada FV máx. | 1100 V* | |
| Tensión FV mínima / Tensión de arranque | 180 V | |
| Tensión de entrada FV nominal | 600 V | |
| Rango de tensión MPP | 160 V – 1000 V | |
| N.º de entradas MPP independientes | 2 | |
| Nº de strings FV por MPPT | 2 / 2 | |
| Corriente de entrada FV máx | Ó Ĩ b Đ Ó V Đ Ó c | |
| Corriente de cortocircuito DC máx | 30A | |
| Corriente máx. por conector de entrada | 64 A (32 A / 32 A) | |
| Salida (AC) | | |
| Potencia de salida AC nominal | Ĭ Ó Ĭ Ĭ á | 20000 W |
| Potencia de salida AC máx. | Ĭ Ŏ Ó Ĭ Ĭ à F F | 22000 VA** |
| Potencia de salida AC aparente nominal | Ĭ Ŏ Ó Ĭ Ĭ à F F | 22000 VA** |
| Corriente de salida máxima AC | Đ Ó | 31,9 A |
| Corriente de salida AC nominal (a 230V) | 21,7 A | 29 A |
| Tensión AC nominal | 3 / N / PE, 220 / 380 V 3 / N / PE, 230 / 400 V Ñ V z V " 0 K Đ Ò Ĭ V Ò Ĭ Ó à | |
| Rango de tensión AC | 180 V – 276 V / 311 V – 478 V | |
| Frecuencia de red nominal | Ó Ĭ R • V Ò Ó k Ó Ó R • | |
| Rango de frecuencia de red | Ó Ĭ R • V Ó Ó k Ŏ Ó R • | |
| Armónicos (THD) | <3 % (a potencia nominal) | |
| FP en potencia nominal /FP ajustable | >0,99 / 0,8 capacitativo – 0,8 inductivo | |
| Fases de inyección / Fases de conexión | 3 / 3 | |
| 0 á ñ ā ° ñ ā • | | |
| 0 á ñ ā ° ñ ā • • t | x Ŏ K Ó Ĭ Ĭ | |
| 0 á ñ ā ° ñ ā • 0 V 8 5 ° • | 98,10 % | |
| Protección | | |
| Monitorización de red | Sí | |
| Protección contra polaridad inversa en DC | Sí | |
| Protección de cortocircuito de AC | Sí | |
| Protección contra corriente de fuga | Sí | |
| Protección de sobretensión | DC Tipo II / AC Tipo II | |
| Interruptor DC | Sí | |
| Función de extinción de arco eléctrico (AFCI) | Sí | |
| Función de recuperación PID | Sí | |
| Datos generales | | |
| Dimensiones (W*H*D) | Ñ Ŏ Ĭ F Ò Ŏ Ĭ F Ĭ x Ó | |
| Peso | Montaje en pared | |
| Método de montaje | 21 kg | |
| Topología | Sin transformador | |
| Grado de protección | x " Ŏ Ó | |
| Temperatura ambiente de funcionamiento | n Đ Ó ó ! N Ŏ Ĭ ó ! | |
| Humedad relativa admisible (sin condensación) | 0% – 100% | |
| Método de refrigeración | Refrigeración por aire forzado inteligente | |
| Altitud de funcionamiento máx | 4000 m (> 2000 m derating) | |
| Ruido (Typical) | Ŏ Ó ³ b c | |
| Pantalla | LED | |
| Comunicación | án z V 0 N Ý ° 8 ° N V « ³ Ŏ Ŏ Ó V (X V (...) | |
| Tipo de conexión DC | MC4 (Max. 6 mm²) | |
| Tipo de conexión AC | Plug and play | |
| Soporte de red | LVRT, HVRT, Control de potencia activa y reactiva y control de rampa de potencia | |
| ! ° 8 N ā á ñ • ñ ā | IEC / EN 61000-6-1/2/3/4, IEC 61000-3-2/3/11/12, IEC / EN62109-1/2, IEC 61727, IEC 62116, X 0 ! Ŏ Ĭ Ŏ Ŏ Ñ K X 0 ! Ŏ Ĭ Ŏ Ŏ n Đ n Ĭ V Đ V Ĭ Ŏ V Ñ Ĭ V Ŏ Ŏ V Đ Ŏ K X 0 ! Á ³ Ŏ Đ x Ĭ Ĭ K 0 z Ŏ Ĭ Ó Ŏ « n z n Ŏ Ĭ Ó K (X z à (Ŏ Ĭ Đ Ŏ n Ĭ n Ĭ V Ĭ K 0 z Ŏ Ĭ Ó Ŏ x n Ĭ K (0 á K à Ĭ « Đ Ĭ x K È Á Ó Ĭ Ó UNE 206006/7 IN, MEA/PEA, G98, UNE 217002:2020, NTS V2 TypeA | |

*: El inversor entra en standby cuando la tensión de entrada oscila entre 1.000V y 1.100V. Si la tensión DC máxima de la instalación puede superar los 1.000 V, no deben utilizarse los conectores MC4 incluidos en el suministro. En este caso deben utilizarse conectores MC4 Evo2.
FFJ "•8• ũ ° • ā • u » ũ Ŏ ā ñ • K " N ° ñ ā • ³ ° @ • ũ ā ³ • • t P ³ ° ! J ³ J Ĭ Ó « Á ° @ Ĭ Ó Ĭ Ĭ ā K ³ J Ĭ Ó « Á ° @ Ĭ Ó Ĭ Ĭ ā K ³ J Đ Ĭ « Á ° @ Đ Ĭ Ĭ Ĭ ā P
***: WiNet-S incluido con el inversor.

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SG125CX-P2

Inversor string multi-MPPT para sistemas de 1000 Vdc

NUEVO



ALTO RENDIMIENTO

- 12 MPPTs con eficiencia máx. 98,5%
- 15 A de entrada de corriente DC, compatible con módulo FV superior a 500W+
- Modo de optimización con sombreado dinámico



O&M INTELIGENTE

- Diagnóstico y protección de componentes clave
- Diagnóstico de curva IV inteligente
- Función de registro de fallos en la red, sencillo para O&M remoto



MENOR INVERSIÓN

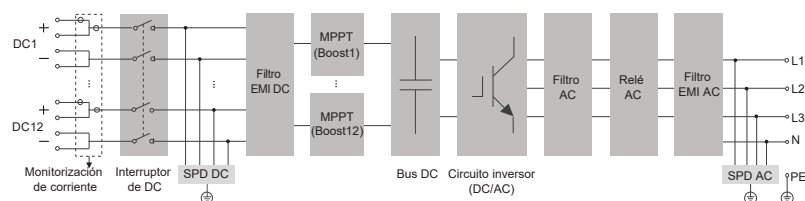
- Compatible con cables 240 mm² Al AC máx.
- Soporte para placa de sellado de cables tipo cajón con premontaje de cables AC



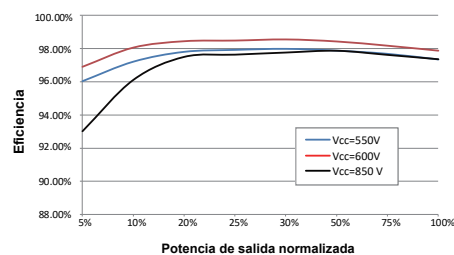
SEGURIDAD DEMOSTRADA

- Protección IP66 y anticorrosión C5
- DC Tipo I+II SPD, AC Tipo II SPD
- Soporte para función AFCI 2.0

DIAGRAMA DE CIRCUITO



CURVA DE EFICIENCIA



| Designación de tipo | SG125CX-P2 |
|--|---|
| Entrada (DC) | |
| Potencia de entrada FV máx. recomendada | 175 kW |
| Tensión de entrada FV máx. | 1100 V |
| Tensión mín. de entrada FV / Tensión de entrada de arranque | 180 V / 200 V |
| Tensión de entrada FV nominal | 600 V |
| Rango de tensión MPP | 180 – 1000 V |
| N.º de entradas MPP independientes | 12 |
| N.º de cadenas FV por MPPT | 2 |
| Corriente máx. de entrada FV | 360 A (30 A *12) |
| Corriente de cortocircuito DC máx. | 480 A (40 A * 12) |
| Corriente máx. para conector DC | 20A |
| Salida (AC) | |
| Potencia de salida AC máx. | 125 kVA |
| Potencia de salida AC nominal aparente | 125 kVA |
| Corriente máx. de salida AC | 181,1 A |
| Corriente de salida AC nominal (a 230 V) | 181,1 A |
| Tensión AC nominal | 3 / N / PE, 230 / 400 V |
| Rango de tensión AC | 320 – 480 V |
| Frecuencia nominal de red | 50 Hz / 60 Hz |
| Rango de frecuencia de red | 45 – 55 Hz / 55 – 65 Hz |
| Armónicos (THD) | < 3 % (a potencia nominal) |
| Factor de potencia a potencia nominal / Factor de potencia ajustable | > 0,99 / 0,8 anterior – 0,8 posterior |
| Fases de vertido / fases de conexión | 3 / 3-N-PE |
| Eficiencia | |
| Eficiencia máxima / Eficiencia europea | 98,5% – 98,3% |
| Protección | |
| Monitorización de red | Sí |
| Protección de polaridad inversa DC | Sí |
| Protección contra cortocircuito en AC | Sí |
| Protección contra corriente de fuga | Sí |
| Protección contra sobretensión | DC Tipo I + II / AC Tipo II |
| Monitorización de fallo a tierra | Sí |
| Interruptor de DC | Sí |
| Monitorización de string FV | Sí |
| Q en función nocturna | Sí |
| Función de extinción de arco (AFCI) | Sí |
| Función de recuperación PID | Sí |
| Datos generales | |
| Dimensiones (An*Alt*Pf) | 1020*795*360 mm |
| Método de montaje | Montaje en pared |
| Peso | 87 kg |
| Topología | Sin transformador |
| Grado de protección | IP66 |
| Corrosión | C5 |
| Consumo eléctrico nocturno | < 5 W |
| Temperatura ambiente de funcionamiento | -30 a 60 °C |
| Rango de humedad relativa permitida (sin condensación) | 0 – 100 % |
| Método de refrigeración | Refrigeración inteligente por aire forzado |
| Altitud de funcionamiento máx. | 4000 m (derating > 3000 m) |
| Pantalla | LED, Bluetooth+APP |
| Comunicación | SP600S (Opcional) |
| Tipo de conexión DC | RS485 / Opcional: WLAN, Ethernet |
| Tipo de conexión AC | Evo2 (máx. 6 mm²) |
| Certificación de red | Terminal OT / DT (Máx. 240 mm²) IEC 62109-1, EN/IEC 61000-6-1/2/3/4, IEC 61727, IEC 62116, EN 50549-1/2, UTE C15-712-1, VDE V 0126-1-1, VDE-AR-N 4105:2018, VFR 2019, NC RfG, G99, UNE 217002, NTS, CEI 0-21 2019, CEI0-16 2019, NRS-097-2-1 |
| Soporte de red | Q en función nocturna, LVRT, HVRT, control de potencia activa y reactiva, control de rampa de potencia |

Anexo II – Informes PVSystem

PVsyst - Simulation report

Grid-Connected System

Project: TFM Invernadero

Variant: Opcion 1

No 3D scene defined, no shadings

System power: 12.10 kWp

Cabriles - España



Project: TFM Invernadero

Variant: Opcion 1

PVsyst V7.4.8

VC0, Simulation date:
09/10/24 18:16
with V7.4.8

Project summary

Geographical Site

Cabriles

España

Situation

Latitude 36.77 °N

Longitude -2.83 °W

Altitude 102 m

Time zone UTC+1

Project settings

Albedo 0.20

Weather data

Cabriles

Meteonorm 8.1 (1996-2010), Sat=85% - Sintético

System summary

Grid-Connected System

No 3D scene defined, no shadings

PV Field Orientation

Fixed plane

Tilt/Azimuth 13 / -7 °

Near Shadings

No Shadings

User's needs

Unlimited load (grid)

System information

PV Array

Nb. of modules

44 units

Pnom total

12.10 kWp

Inverters

Nb. of units

1 unit

Pnom total

10.00 kWac

Pnom ratio

1.210

Results summary

| | | | | | |
|-----------------|-------------------|---------------------|-------------------|----------------|---------|
| Produced Energy | 18902.13 kWh/year | Specific production | 1562 kWh/kWp/year | Perf. Ratio PR | 77.88 % |
|-----------------|-------------------|---------------------|-------------------|----------------|---------|

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| General parameters, PV Array Characteristics, System losses | 3 |
| Horizon definition | 5 |
| Main results | 6 |
| Loss diagram | 7 |
| Predef. graphs | 8 |

**PVsyst V7.4.8**

VC0, Simulation date:
09/10/24 18:16
with V7.4.8

General parameters**Grid-Connected System****No 3D scene defined, no shadings****PV Field Orientation****Orientation**

Fixed plane

Tilt/Azimuth 13 / -7 °

Sheds configuration

No 3D scene defined

Models used

Transposition Perez
Diffuse Perez, Meteonorm
Circumsolar separate

Horizon

Average Height 2.7 °

Near Shadings

No Shadings

User's needs

Unlimited load (grid)

PV Array Characteristics**PV module**

Manufacturer

Eurener

Model

EurenerMEPV AGRO 275w

(Custom parameters definition)

Unit Nom. Power

275 Wp

Number of PV modules

44 units

Nominal (STC)

12.10 kWp

Modules

2 string x 22 In series

At operating cond. (50°C)

Pmpp

10.91 kWp

U mpp

420 V

I mpp

26 A

Total PV power

Nominal (STC)

12 kWp

Total

44 modules

Module area

85.2 m²**Inverter**

Manufacturer

Sungrow

Model

SH-10-RT

(Original PVsyst database)

Unit Nom. Power

10.00 kWac

Number of inverters

1 unit

Total power

10.0 kWac

Operating voltage

200-950 V

Pnom ratio (DC:AC)

1.21

Power sharing within this inverter

Total inverter power

Total power

10 kWac

Number of inverters

1 unit

Pnom ratio

1.21

Array losses**Array Soiling Losses**

Loss Fraction 1.5 %

Thermal Loss factor

Module temperature according to irradiance

Uc (const)

24.0 W/m²K

Uv (wind)

0.0 W/m²K/m/s**DC wiring losses**

Global array res.

180 mΩ

Loss Fraction

1.0 % at STC

LID - Light Induced Degradation

Loss Fraction 1.5 %

Module Quality Loss

Loss Fraction -0.2 %

Module mismatch losses

Loss Fraction 2.0 % at MPP

Strings Mismatch loss

Loss Fraction 0.5 %

IAM loss factor

Incidence effect (IAM): Fresnel smooth glass, n = 1.526

| 0° | 30° | 50° | 60° | 70° | 75° | 80° | 85° | 90° |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1.000 | 0.998 | 0.981 | 0.948 | 0.862 | 0.776 | 0.636 | 0.403 | 0.000 |

System losses**Unavailability of the system**

Time fraction 1.5 %
5.5 days,
3 periods

Auxiliaries loss

Proportional to Power 6.0 W/kW
0.0 kW from Power thresh.



PVsyst V7.4.8

VC0, Simulation date:
09/10/24 18:16
with V7.4.8

AC wiring losses

Inv. output line up to injection point

| | |
|------------------|---------------|
| Inverter voltage | 400 Vac tri |
| Loss Fraction | 1.50 % at STC |

Inverter: SH-10-RT

| | |
|-----------------------|-------------------------------|
| Wire section (1 Inv.) | Alu 1 x 3 x 6 mm ² |
| Wires length | 38 m |



PVsyst V7.4.8

VC0, Simulation date:
09/10/24 18:16
with V7.4.8

Horizon definition

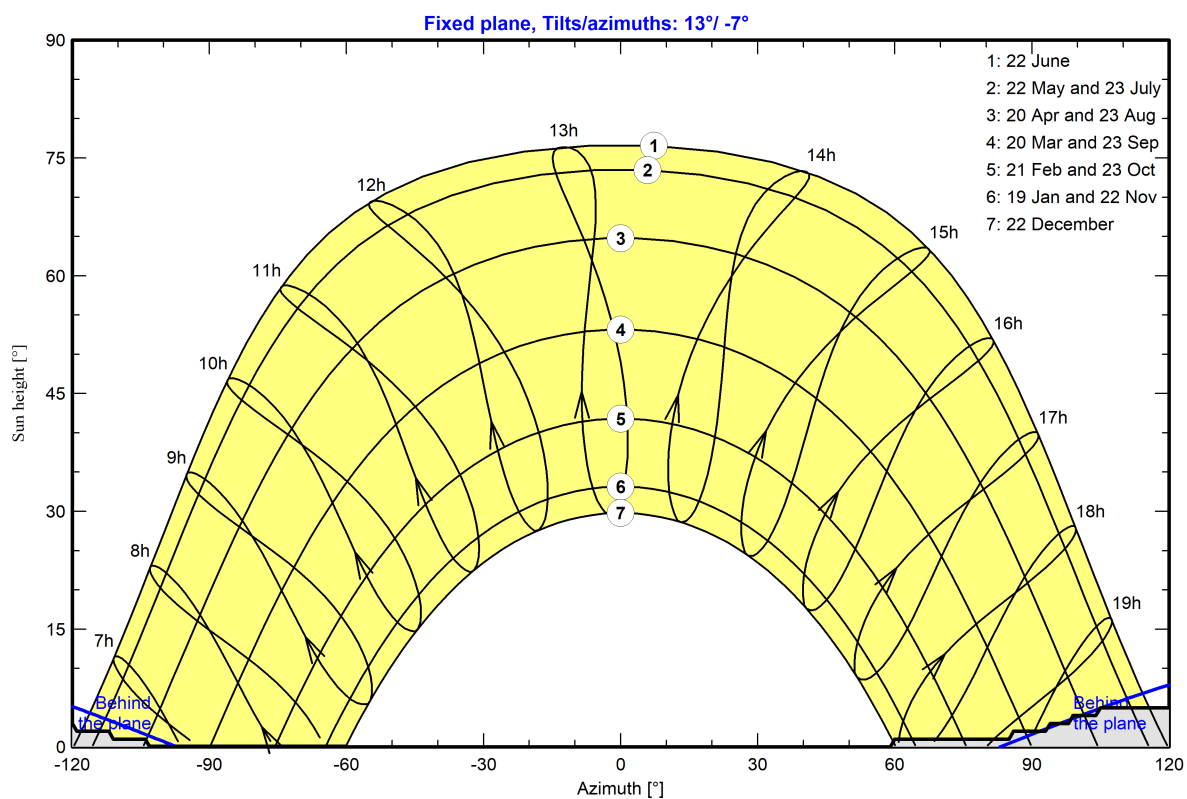
Meteonorm, lat=36,7746, lon=-2,8276

| | | | |
|----------------|-------|-----------------|-------|
| Average Height | 2.7 ° | Albedo Factor | 1.00 |
| Diffuse Factor | 1.00 | Albedo Fraction | 100 % |

Horizon profile

| | | | | | | | | | | | | | | |
|-------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Azimuth [°] | -180 | -165 | -164 | -163 | -160 | -150 | -149 | -143 | -142 | -136 | -135 | -131 | -130 | -125 |
| Height [°] | 9.0 | 9.0 | 10.0 | 9.0 | 8.0 | 8.0 | 7.0 | 7.0 | 6.0 | 6.0 | 5.0 | 5.0 | 4.0 | 4.0 |
| Azimuth [°] | -124 | -120 | -119 | -112 | -111 | -104 | -103 | 59 | 60 | 85 | 86 | 93 | 94 | 98 |
| Height [°] | 3.0 | 3.0 | 2.0 | 2.0 | 1.0 | 1.0 | 0.0 | 0.0 | 1.0 | 1.0 | 2.0 | 2.0 | 3.0 | 3.0 |
| Azimuth [°] | 99 | 104 | 105 | 128 | 129 | 136 | 137 | 139 | 140 | 143 | 144 | 145 | 146 | 148 |
| Height [°] | 4.0 | 4.0 | 5.0 | 5.0 | 4.0 | 4.0 | 3.0 | 3.0 | 4.0 | 4.0 | 3.0 | 3.0 | 4.0 | 4.0 |
| Azimuth [°] | 149 | 151 | 152 | 154 | 155 | 157 | 158 | 159 | 160 | 161 | 162 | 168 | 169 | 179 |
| Height [°] | 5.0 | 5.0 | 6.0 | 6.0 | 7.0 | 7.0 | 8.0 | 8.0 | 9.0 | 9.0 | 10.0 | 10.0 | 9.0 | 9.0 |

Sun Paths (Height / Azimuth diagram)





PVsyst V7.4.8

VC0, Simulation date:
09/10/24 18:16
with V7.4.8

Main results

System Production

Produced Energy 18902.13 kWh/year

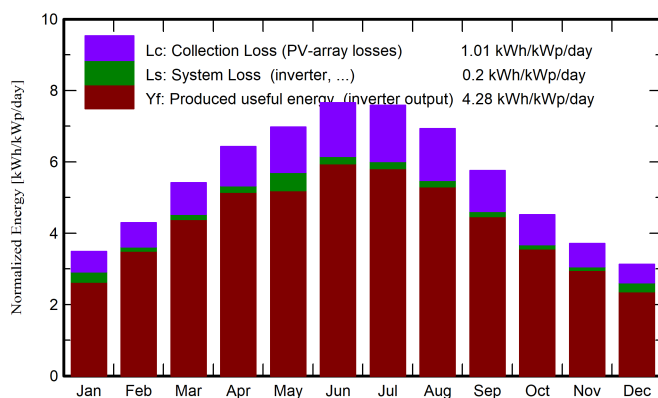
Specific production

1562 kWh/kWp/year

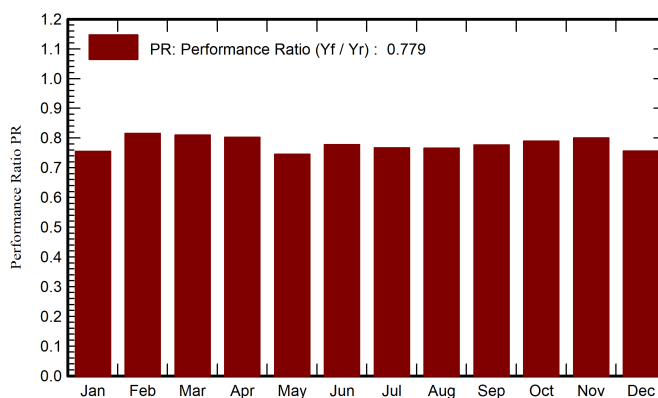
Perf. Ratio PR

77.88 %

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 | kWh | kWh | ratio |
| January | 83.4 | 31.79 | 11.87 | 108.1 | 101.6 | 1096 | 988 | 0.755 |
| February | 99.1 | 34.76 | 12.65 | 120.1 | 114.3 | 1225 | 1186 | 0.816 |
| March | 149.0 | 56.16 | 14.44 | 167.9 | 160.3 | 1701 | 1647 | 0.810 |
| April | 181.3 | 66.59 | 16.33 | 192.8 | 184.4 | 1935 | 1872 | 0.802 |
| May | 212.8 | 82.86 | 19.48 | 216.2 | 206.9 | 2141 | 1949 | 0.745 |
| June | 230.5 | 74.01 | 22.95 | 229.7 | 220.0 | 2234 | 2161 | 0.778 |
| July | 233.2 | 74.65 | 25.75 | 235.2 | 225.5 | 2257 | 2183 | 0.767 |
| August | 205.3 | 74.19 | 26.58 | 214.8 | 205.9 | 2057 | 1991 | 0.766 |
| September | 156.9 | 58.55 | 23.42 | 172.7 | 165.0 | 1677 | 1623 | 0.777 |
| October | 120.0 | 48.72 | 20.15 | 140.0 | 133.4 | 1381 | 1337 | 0.789 |
| November | 87.3 | 29.11 | 15.21 | 111.2 | 104.9 | 1112 | 1077 | 0.800 |
| December | 73.7 | 26.42 | 12.95 | 97.0 | 91.5 | 981 | 888 | 0.756 |
| Year | 1832.6 | 657.80 | 18.52 | 2005.8 | 1913.7 | 19796 | 18902 | 0.779 |

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

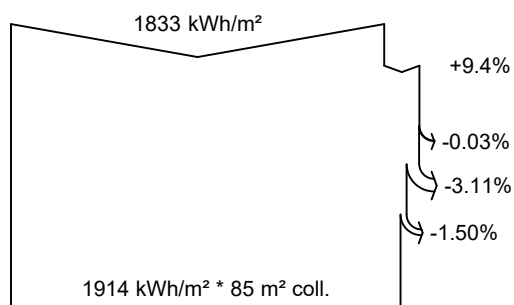
PR Performance Ratio



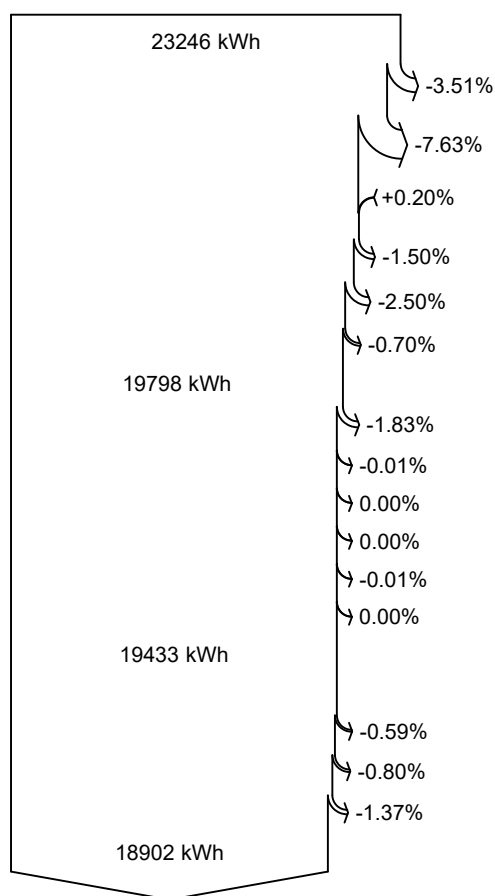
PVsyst V7.4.8

VC0, Simulation date:
09/10/24 18:16
with V7.4.8

Loss diagram



efficiency at STC = 14.26%



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

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

Available Energy at Inverter Output

Auxiliaries (fans, other)

AC ohmic loss

System unavailability

Energy injected into grid

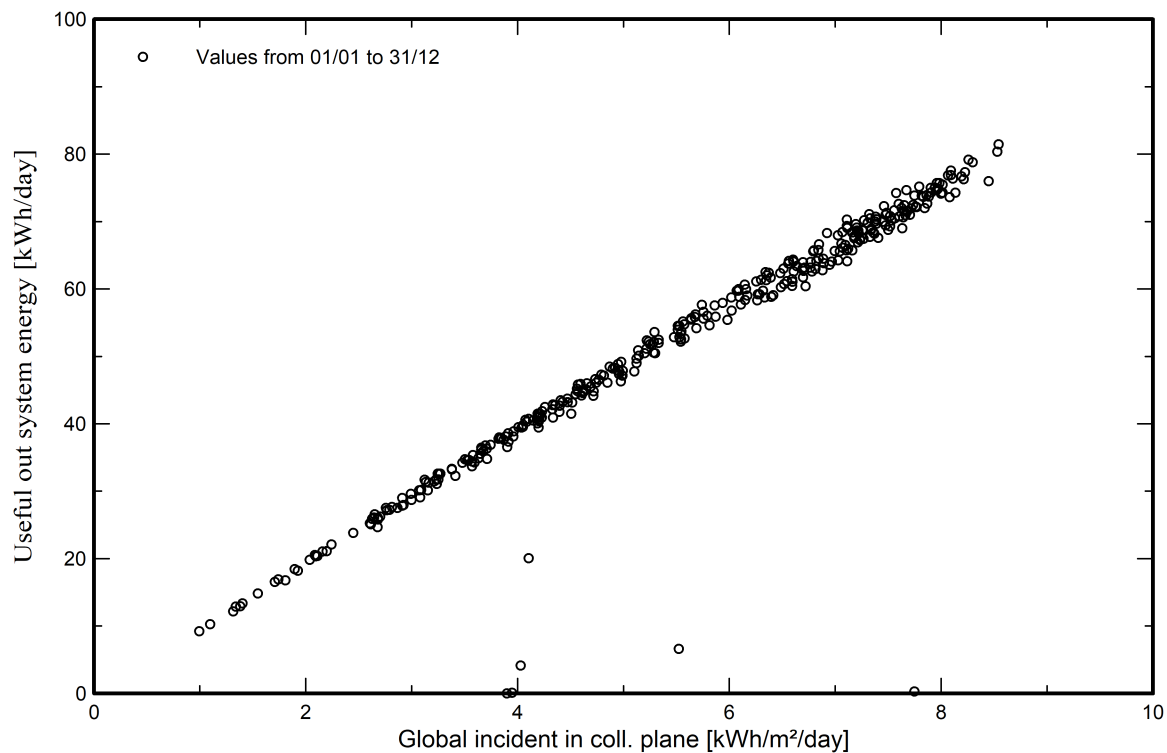


PVsyst V7.4.8

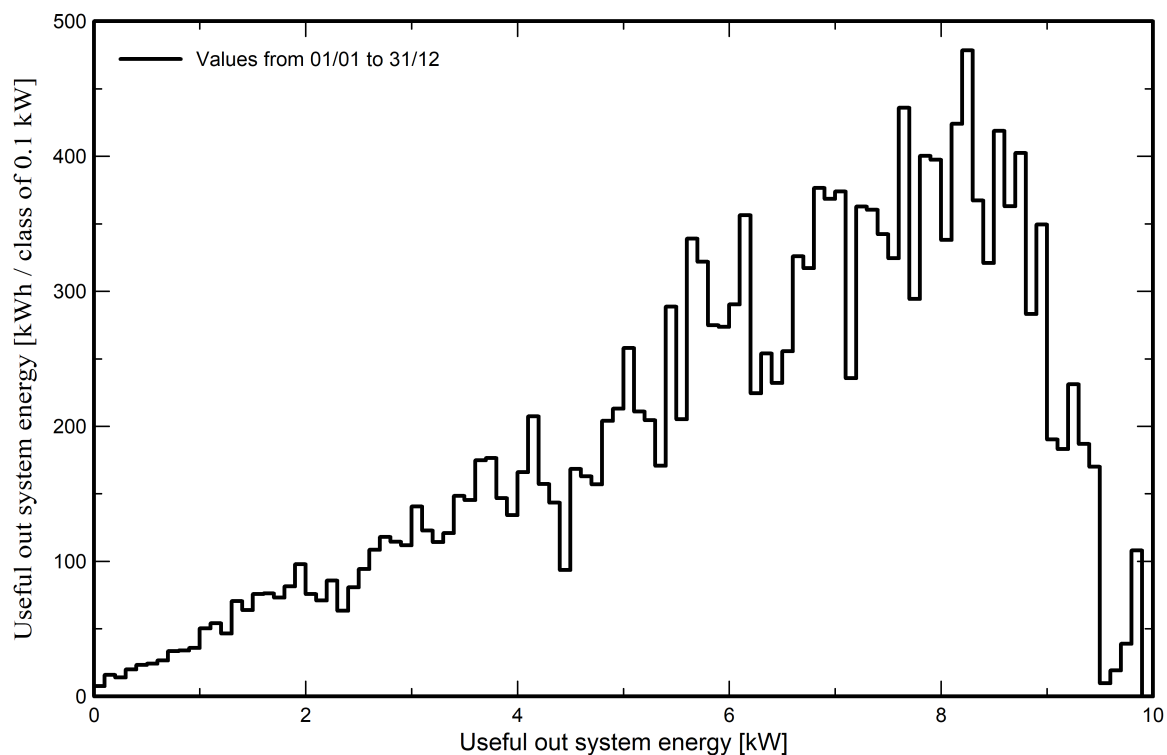
VC0, Simulation date:
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with V7.4.8

Predef. graphs

Diagrama entrada/salida diaria



Distribución de potencia de salida del sistema



PVsyst - Simulation report

Grid-Connected System

Project: TFM Invernadero

Variant: Opcion 2

No 3D scene defined, no shadings

System power: 1080 kWp

Cabriles - España

**PVsyst V7.4.8**

VC2, Simulation date:
09/10/24 18:35
with V7.4.8

Project summary**Geographical Site****Cabriles**

España

Situation

Latitude 36.77 °N

Longitude -2.83 °W

Altitude 102 m

Time zone UTC+1

Project settings

Albedo 0.20

Weather data

Cabriles

Meteonorm 8.1 (1996-2010), Sat=85% - Sintético

System summary**Grid-Connected System****No 3D scene defined, no shadings****PV Field Orientation**

Fixed plane

Tilt/Azimuth 13 / -7 °

Near Shadings

No Shadings

User's needs

Unlimited load (grid)

System information**PV Array**

Nb. of modules

3927 units

Pnom total

1080 kWp

Inverters

Nb. of units

7 units

Pnom total

875 kWac

Pnom ratio

1.234

Results summary

| | | | | | |
|-----------------|------------------|---------------------|-------------------|----------------|---------|
| Produced Energy | 1691588 kWh/year | Specific production | 1566 kWh/kWp/year | Perf. Ratio PR | 78.09 % |
|-----------------|------------------|---------------------|-------------------|----------------|---------|

Table of contents

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| General parameters, PV Array Characteristics, System losses | 3 |
| Horizon definition | 5 |
| Main results | 6 |
| Loss diagram | 7 |
| Predef. graphs | 8 |

**PVsyst V7.4.8**

VC2, Simulation date:
09/10/24 18:35
with V7.4.8

General parameters**Grid-Connected System****No 3D scene defined, no shadings****PV Field Orientation****Orientation**

Fixed plane

Tilt/Azimuth 13 / -7 °

Sheds configuration

No 3D scene defined

Models used

Transposition Perez
Diffuse Perez, Meteonorm
Circumsolar separate

Horizon

Average Height 2.7 °

Near Shadings

No Shadings

User's needs

Unlimited load (grid)

PV Array Characteristics**PV module**

Manufacturer

Eurener

Model

EurenerMEPV AGRO 275w

(Custom parameters definition)

Unit Nom. Power

275 Wp

Number of PV modules

3927 units

Nominal (STC)

1080 kWp

Modules

119 string x 33 In series

At operating cond. (50°C)

Pmpp

974 kWp

U mpp

630 V

I mpp

1546 A

Total PV power

Nominal (STC)

1080 kWp

Total

3927 modules

Module area

7601 m²**Inverter**

Manufacturer

Sungrow

Model

SG125CX-P2

(Custom parameters definition)

Unit Nom. Power

125 kWac

Number of inverters

7 units

Total power

875 kWac

Operating voltage

180-1000 V

Pnom ratio (DC:AC)

1.23

Power sharing within this inverter

Total inverter power

Total power

875 kWac

Number of inverters

7 units

Pnom ratio

1.23

Array losses**Array Soiling Losses**

Loss Fraction 1.5 %

Thermal Loss factor

Module temperature according to irradiance

Uc (const)

24.0 W/m²K

Uv (wind)

0.0 W/m²K/m/s**DC wiring losses**

Global array res.

4.5 mΩ

Loss Fraction

1.0 % at STC

LID - Light Induced Degradation

Loss Fraction 1.5 %

Module Quality Loss

Loss Fraction -0.2 %

Module mismatch losses

Loss Fraction 2.0 % at MPP

Strings Mismatch loss

Loss Fraction 0.5 %

IAM loss factor

Incidence effect (IAM): Fresnel smooth glass, n = 1.526

| 0° | 30° | 50° | 60° | 70° | 75° | 80° | 85° | 90° |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1.000 | 0.998 | 0.981 | 0.948 | 0.862 | 0.776 | 0.636 | 0.403 | 0.000 |

System losses**Unavailability of the system**

Time fraction 1.5 %
5.5 days,
3 periods

Auxiliaries loss

Proportional to Power 6.0 W/kW
0.0 kW from Power thresh.



PVsyst V7.4.8

VC2, Simulation date:
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with V7.4.8

AC wiring losses

Inv. output line up to injection point

| | |
|------------------|---------------|
| Inverter voltage | 400 Vac tri |
| Loss Fraction | 1.50 % at STC |

Inverter: SG125CX-P2

| | |
|-----------------------|---------------------------------|
| Wire section (7 Inv.) | Alu 7 x 3 x 150 mm ² |
| Average wires length | 75 m |



PVsyst V7.4.8

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with V7.4.8

Horizon definition

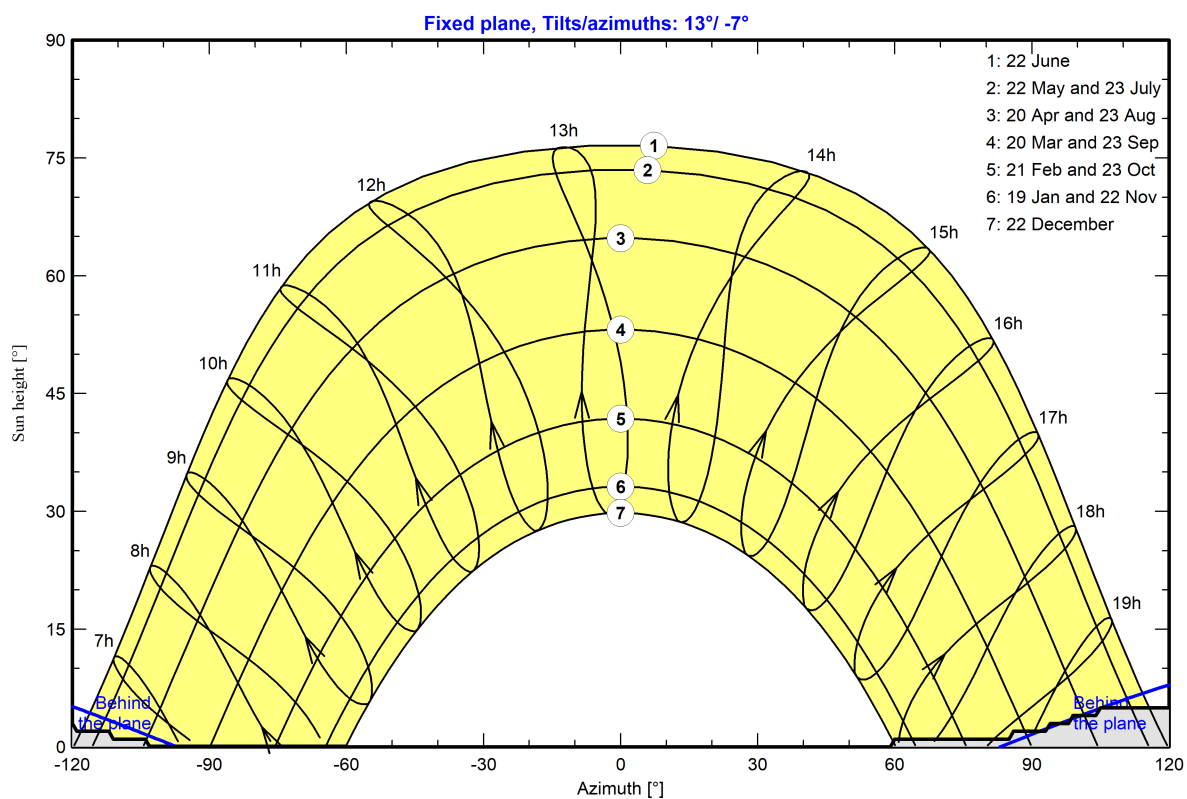
Meteonorm, lat=36,7746, lon=-2,8276

| | | | |
|----------------|-------|-----------------|-------|
| Average Height | 2.7 ° | Albedo Factor | 1.00 |
| Diffuse Factor | 1.00 | Albedo Fraction | 100 % |

Horizon profile

| | | | | | | | | | | | | | | |
|-------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Azimuth [°] | -180 | -165 | -164 | -163 | -160 | -150 | -149 | -143 | -142 | -136 | -135 | -131 | -130 | -125 |
| Height [°] | 9.0 | 9.0 | 10.0 | 9.0 | 8.0 | 8.0 | 7.0 | 7.0 | 6.0 | 6.0 | 5.0 | 5.0 | 4.0 | 4.0 |
| Azimuth [°] | -124 | -120 | -119 | -112 | -111 | -104 | -103 | 59 | 60 | 85 | 86 | 93 | 94 | 98 |
| Height [°] | 3.0 | 3.0 | 2.0 | 2.0 | 1.0 | 1.0 | 0.0 | 0.0 | 1.0 | 1.0 | 2.0 | 2.0 | 3.0 | 3.0 |
| Azimuth [°] | 99 | 104 | 105 | 128 | 129 | 136 | 137 | 139 | 140 | 143 | 144 | 145 | 146 | 148 |
| Height [°] | 4.0 | 4.0 | 5.0 | 5.0 | 4.0 | 4.0 | 3.0 | 3.0 | 4.0 | 4.0 | 3.0 | 3.0 | 4.0 | 4.0 |
| Azimuth [°] | 149 | 151 | 152 | 154 | 155 | 157 | 158 | 159 | 160 | 161 | 162 | 168 | 169 | 179 |
| Height [°] | 5.0 | 5.0 | 6.0 | 6.0 | 7.0 | 7.0 | 8.0 | 8.0 | 9.0 | 9.0 | 10.0 | 10.0 | 9.0 | 9.0 |

Sun Paths (Height / Azimuth diagram)





PVsyst V7.4.8

VC2, Simulation date:
09/10/24 18:35
with V7.4.8

Main results

System Production

Produced Energy 1691588 kWh/year

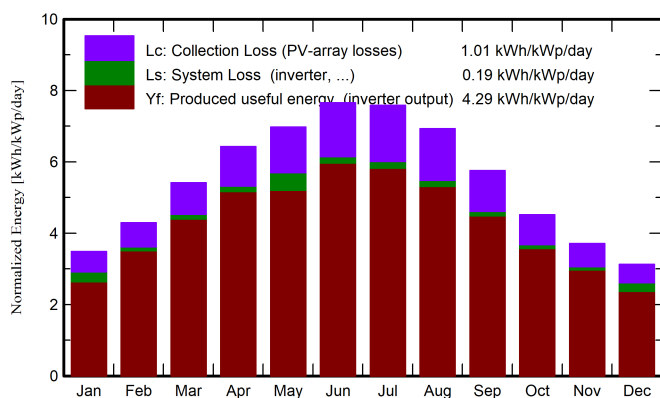
Specific production

1566 kWh/kWp/year

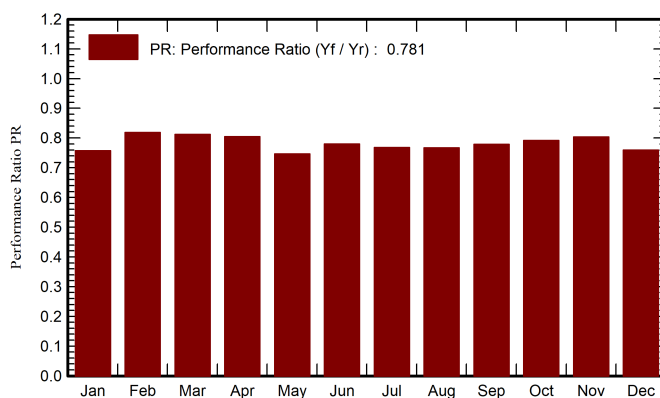
Perf. Ratio PR

78.09 %

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 | kWh | kWh | ratio |
| January | 83.4 | 31.79 | 11.87 | 108.1 | 101.6 | 97796 | 88381 | 0.757 |
| February | 99.1 | 34.76 | 12.65 | 120.1 | 114.3 | 109365 | 106193 | 0.819 |
| March | 149.0 | 56.16 | 14.44 | 167.9 | 160.3 | 151789 | 147398 | 0.813 |
| April | 181.3 | 66.59 | 16.33 | 192.8 | 184.4 | 172577 | 167563 | 0.805 |
| May | 212.8 | 82.86 | 19.48 | 216.2 | 206.9 | 190927 | 174416 | 0.747 |
| June | 230.5 | 74.01 | 22.95 | 229.7 | 220.0 | 199307 | 193390 | 0.780 |
| July | 233.2 | 74.65 | 25.75 | 235.2 | 225.5 | 201402 | 195194 | 0.769 |
| August | 205.3 | 74.19 | 26.58 | 214.8 | 205.9 | 183588 | 177970 | 0.767 |
| September | 156.9 | 58.55 | 23.42 | 172.7 | 165.0 | 149664 | 145326 | 0.779 |
| October | 120.0 | 48.72 | 20.15 | 140.0 | 133.4 | 123250 | 119771 | 0.792 |
| November | 87.3 | 29.11 | 15.21 | 111.2 | 104.9 | 99264 | 96435 | 0.803 |
| December | 73.7 | 26.42 | 12.95 | 97.0 | 91.5 | 87590 | 79552 | 0.759 |
| Year | 1832.6 | 657.80 | 18.52 | 2005.8 | 1913.7 | 1766518 | 1691588 | 0.781 |

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

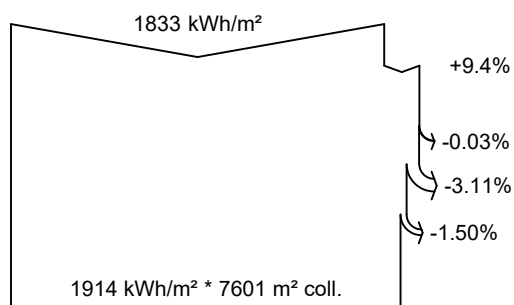
PR Performance Ratio



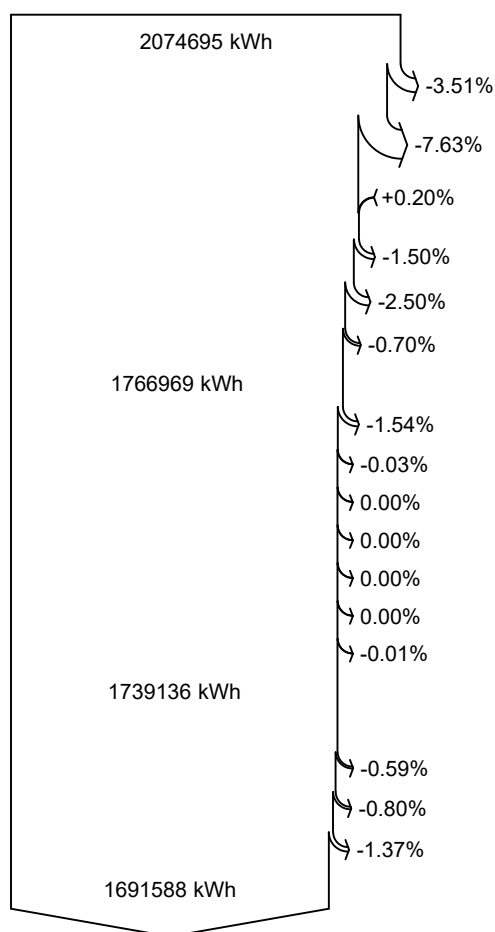
PVsyst V7.4.8

VC2, Simulation date:
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Loss diagram



efficiency at STC = 14.26%



Global horizontal irradiation

Global incident in coll. plane

Far Shadings / Horizon

IAM factor on global

Soiling loss factor

Effective irradiation on collectors

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Array nominal energy (at STC effic.)

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Array virtual energy at MPP

Inverter Loss during operation (efficiency)

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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

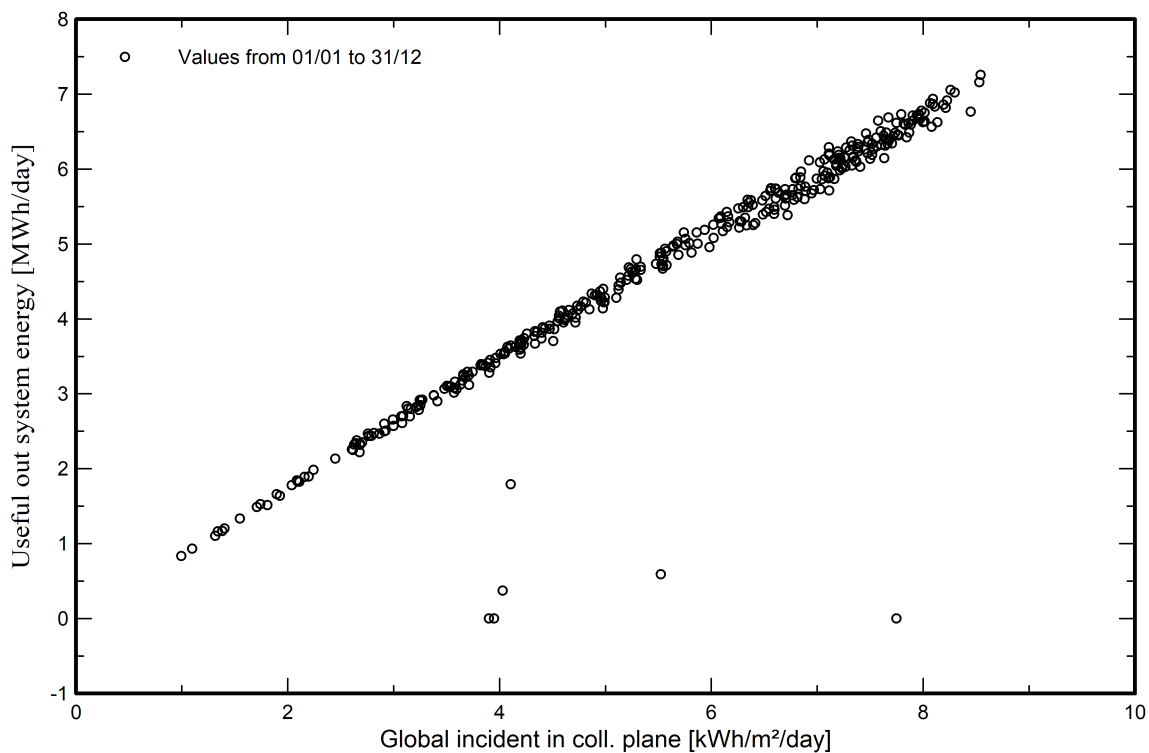


PVsyst V7.4.8

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09/10/24 18:35
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Predef. graphs

Diagrama entrada/salida diaria



Distribución de potencia de salida del sistema

