



**Universidad
Europea**

MÁSTER EN ENERGÍAS RENOVABLES

ANEXOS DE ESTUDIO DE VIABILIDAD ENERGÉTICA DE UN PUEBLO 100% RENOVABLE

GRUPO 5:

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Anexo I: Cálculo de separación entre filas para un parque solar

La distancia mínima entre filas de módulos para los parques solares (d) dimensionado en este proyecto se han calculado según el Pliego de Condiciones Técnicas de Instalaciones Conectadas a Red elaborado por el Instituto para la Diversificación y Ahorro de la Energía (IDAE). Así, esta distancia es tal que se garanticen al menos 4 horas de sol en torno al mediodía del solsticio de invierno.

De esta forma:

$$d = h * k$$

Donde:

$$k = \frac{1}{\tan (61^{\circ} - \textit{latitud})}$$

h = a diferencia de alturas entre la parte alta de una fila y la parte baja de la posterior, según se indica en la imagen siguiente:

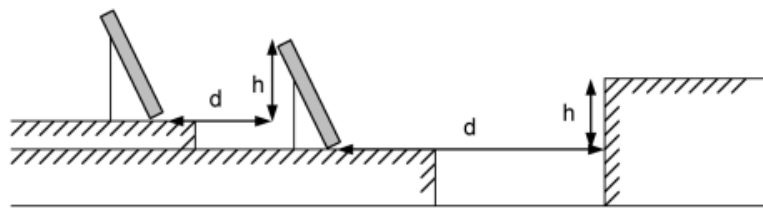


Figura 1. Variables para el cálculo de la separación entre filas según el IDAE.

Anexo II: Planos de los parques fotovoltaicos

Parcela 1

Parcela 2

Parcela 3

Parcela 4

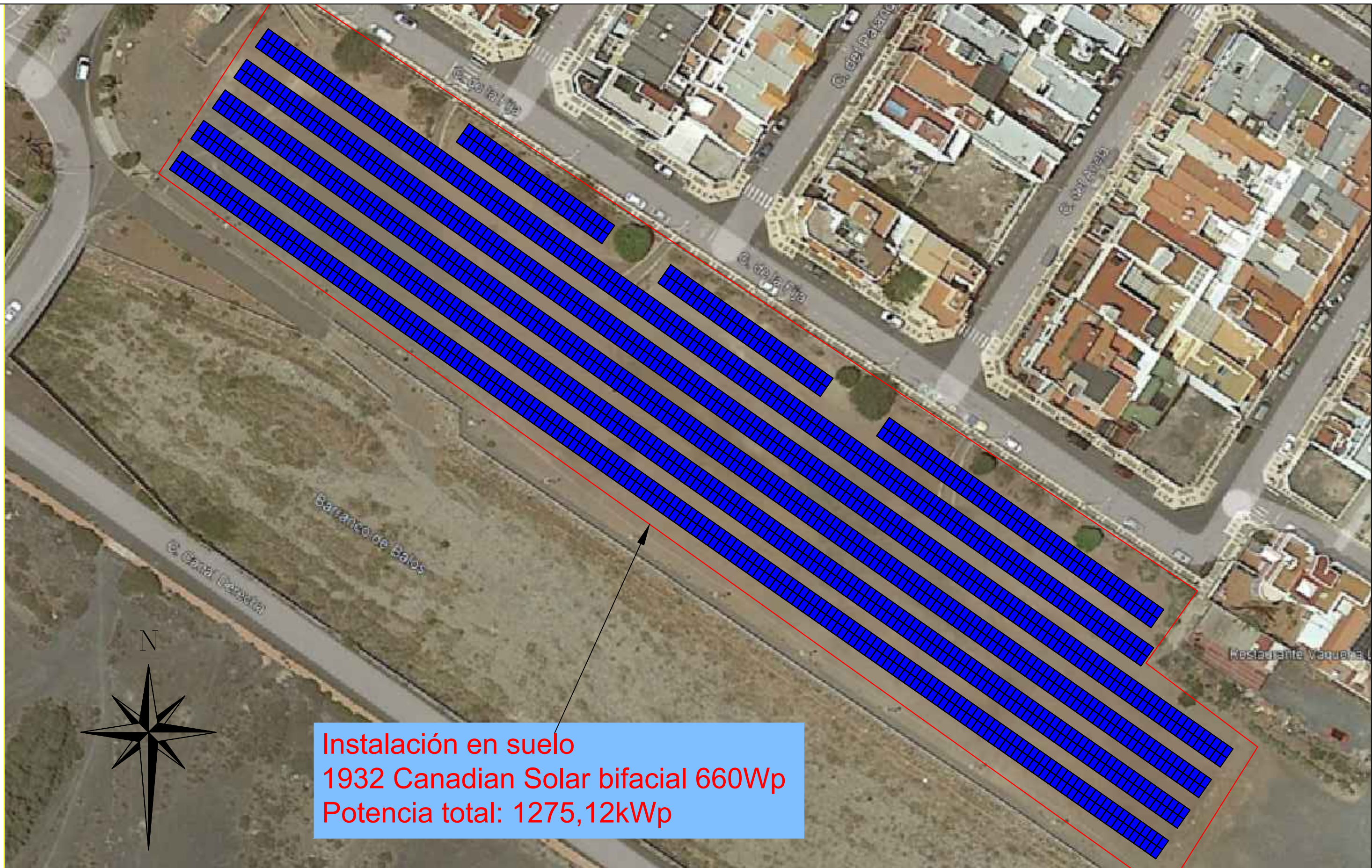


Instalación en suelo
9856 Canadian Solar bifacial 660Wp
Potencia total: 6504,96kWp

Características de la instalación

TIPO DE INSTALACIÓN :	MÓDULOS :	INYECTION VOLTAGE :
SUELO	9856	800V
AZIMUT:	INVERSORES :	
30°	43_SUN2000-125KTL-M0	
INCLINACIÓN :	POTENCIA PICO :	
25°	6,5MWp	

TFM_GRUPO_5_PARCELA_1



Instalación en suelo
1932 Canadian Solar bifacial 660Wp
Potencia total: 1275,12kWp

Características de la instalación

TIPO DE INSTALACIÓN :	MÓDULOS :	INJECTION VOLTAGE :
SUELO	1932	400V
AZIMUT:	INVERSORES :	
35°	11_SUN2000-100KTL-M1	
INCLINACIÓN :	POTENCIA PICO :	
25°	1275,12KWP	

TFM_GRUPO_5_PARCELA_2



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2





Características de la instalación

TIPO DE INSTALACIÓN :	MÓDULOS :	INJECTION VOLTAGE :
SUELO	36393	800V
AZIMUT:	INVERSORES :	
33°	56_SG350-HX	
INCLINACIÓN :	POTENCIA PICO :	
25°	24MWp	

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Características de la instalación

TIPO DE INSTALACIÓN :	MÓDULOS :	INJECTION VOLTAGE :
SUELO	21386	800V
AZIMUT:	INVERSORES :	
34°	94_SUN2000-125KTL-M0	
INCLINACIÓN :	POTENCIA PICO :	
25°	14,115MWP	

TFM_GRUPO_5_PARCELA_4

Anexo III: Gráficas de consumo de energía

A continuación, se muestran en detalle los perfiles de consumo por sectores económicos, utilizados en los cálculos del sistema lineal de este proyecto.

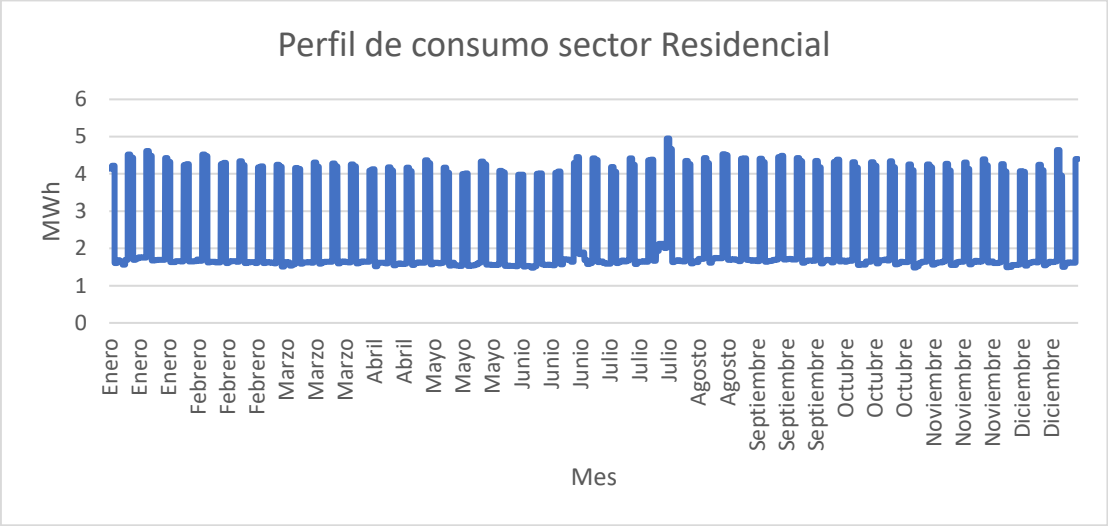


Figura 2. Perfil de consumo del sector residencial en Agüimes

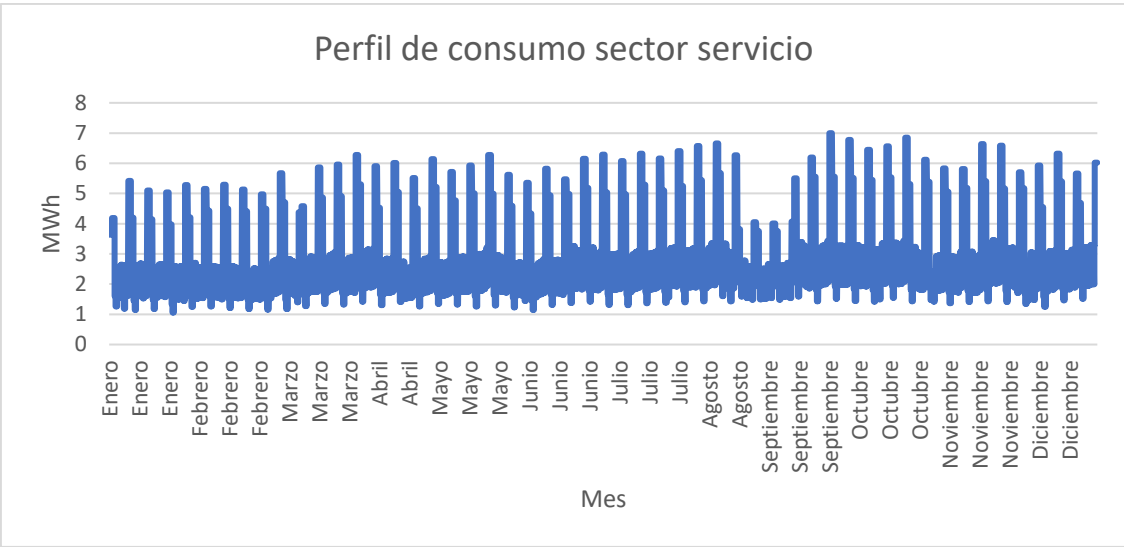


Figura 3. Perfil de consumo del sector servicios en Agüimes

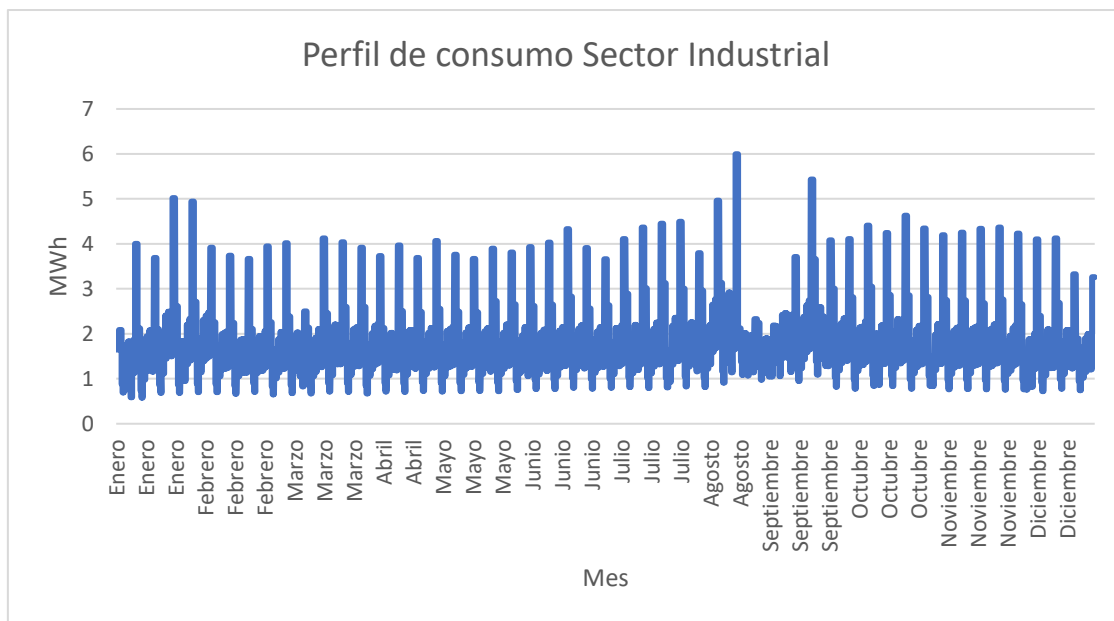


Figura 4. Perfil de consumo del sector industrial en Agüimes

Anexo IV: Información del aerogenerador Enercon 1 MW

A continuación, se muestran las características principales del aerogenerador utilizado en el apartado 2.4.1. para la evaluación del recurso eólico disponible:

Potencia nominal	1MW
Velocidad del viento	2.5 m/s
Velocidad nominal del viento	12.0 m/s
Velocidad del viento de corte	34.0 m/s
Velocidad del viento de supervivencia	60.0 m/s
Clase	III
Control	C5-58b
Diámetro	58.6 m
Superficie rotor	2,6997.0 m ²
Palas	3
Velocidad punta	74 m/s
Designación	AERO E-58
Esencial	GFK / Epoxy
Densidad de potencia 1	370.8 W/ m ²
Densidad de potencia 2	2.7 m ² /kW
Altura del buje	71 m
Planear	Steel tower
Moldear	Conical

Además, se muestra la curva de potencia del aerogenerador propuesto. (Bauer, 2023)

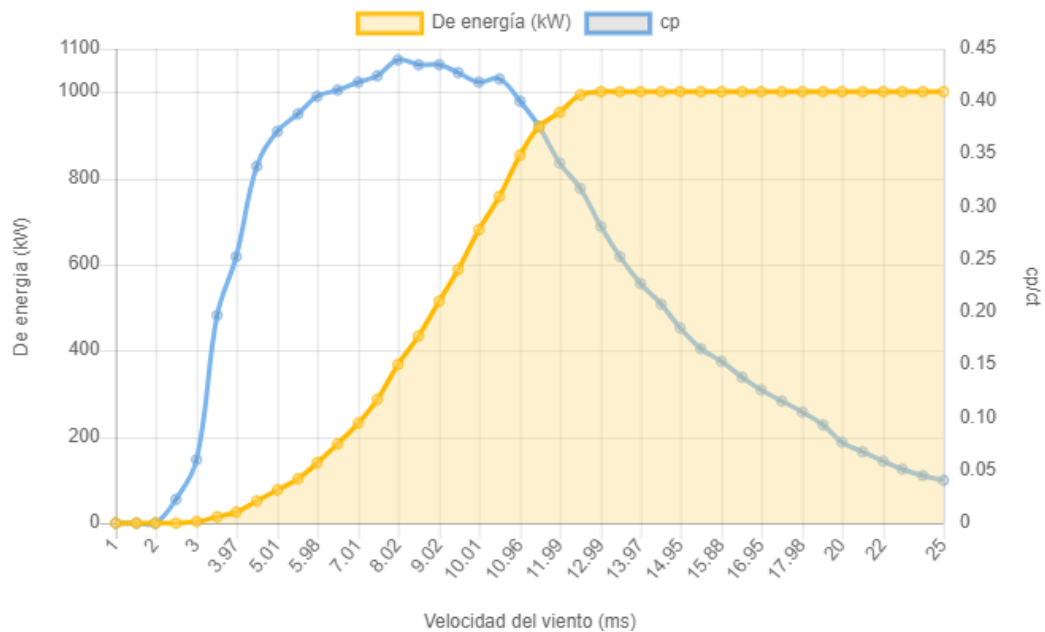


Figura 5. Curva de potencia Aerogenerador Enercon 1 MW

Anexo V: Ficha técnica del electrolizador

A continuación, se detallan las características principales y las especificaciones técnicas del electrolizador de su ficha técnica:

Tabla 1. Ficha técnica - Características principales del electrolizador

	HyLYZER® - 4000
Technology	PEM water electrolysis
Hydrogen production	4000 Nm ³ /h (8630 kg/day)
H ₂ delivery pressure	30 bar _g (435 psig) without a compressor
H ₂ quality max impurities	99.99% dry basis, gas is fully saturated with water O ₂ < 100 ppm Optional > 99.998% with hydrogen purification system

Tabla 2. Ficha técnica - Especificaciones técnicas del electrolizador

	HyLYZER® - 4000
Operating range	5-125%
DC power consumption at stack	40 to 50 kWh/kg, 48 at nominal load (3.6 to 4.5 kWh/Nm ³ , 4.3 at nominal load)
System specific consumption*	≤ 51 kWh/kg
Utilities required to operate the plant	Electrical power, demineralized water, cooling water, HVAC, instrument air, nitrogen for purge
Rectifier specifications	4.1 to 30kV 50/60 Hz, 23 MVA 97% efficiency
Auxiliary installed power	150 kVA (estimated)
Demineralized Water Consumption and Recommended Water Quality	~0.8 L/Nm ³ of H ₂ [9 L/kg of H ₂] ASTM D1193 Type
Total footprint (including maintenance area)	Electrolyzer dimensions (estimated) = 10 m x 15 m (34 x 50 ft) Rectifier dimensions (estimated) = 10 x 15 m (34 x 50 ft)
Installation environment	Indoors 5°C to 40°C / 41°F to 104°F

Anexo VI: Informes de generación (PVsyst) de los parques fotovoltaicos

Parcela 1

Parcela 2

Parcela 3

Parcela 4

Fotovoltaica preexistente

PVsyst - Informe de simulación

Sistema conectado a la red

Proyecto: Parcela 1

Variante: Nueva variante de simulación

Sin escena 3D definida, sin sombras

Potencia del sistema: 6505 kWp

Arinaga - Spain





Proyecto: Parcela 1

Variante: Nueva variante de simulación

PVsyst V7.4.2

VC0, Fecha de simulación:
21/09/23 22:24
con v7.4.2

Groupe Casino IGC S (France)

Resumen del proyecto

Sitio geográfico

Arinaga

España

Situación

Latitud 27.86 °N
Longitud -15.38 °W
Altitud 0 m
Zona horaria UTC

Configuración del proyecto

Albedo 0.20

Datos meteo

Arinaga

Meteonorm 8.1 (1998-2010), Sat=52% - Sintético

Resumen del sistema

Sistema conectado a la red

Orientación campo FV

Plano fijo

Inclinación/Azimut 25 / 30 °

Sin escena 3D definida, sin sombras

Sombreados cercanos

Sin sombreados

Necesidades del usuario

Carga ilimitada (red)

Información del sistema

Generador FV

Núm. de módulos

Pnom total

9856 unidades

6505 kWp

Inversores

Núm. de unidades

Pnom total

Proporción Pnom

43 unidades

5375 kWca

1.210

Resumen de resultados

Energía producida 10799419 kWh/año Producción específica 1660 kWh/kWp/año Proporción rend. PR 81.66 %

Tabla de contenido

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Resultados principales	6
Diagrama de pérdida	7
Gráficos predefinidos	8
Diagrama unifilar	9



Proyecto: Parcela 1

Variante: Nueva variante de simulación

PVsyst V7.4.2

VC0, Fecha de simulación:
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con v7.4.2

Groupe Casino IGC S (France)

Parámetros generales

Sistema conectado a la red

Sin escena 3D definida, sin sombras

Orientación campo FV

Orientación

Plano fijo

Inclinación/Azimut 25 / 30 °

Configuración de cobertizos

Sin escena 3D definida

Modelos usados

Transposición Perez
Difuso Perez, Meteonorm
Circunsolar separado

Horizonte

Altura promedio 1.5 °

Sombreados cercanos

Sin sombreados

Necesidades del usuario

Carga ilimitada (red)

Características del generador FV

Módulo FV

Fabricante CSI Solar
Modelo CS7N-660MB-AG 1500V

(Base de datos PVsyst original)

Unidad Nom. Potencia 660 Wp
Número de módulos FV 9856 unidades
Nominal (STC) 6505 kWp
Módulos 448 Cadenas x 22 En series

En cond. de funcionam. (50°C)

Pmpp 5966 kWp
U mpp 756 V
I mpp 7896 A

Potencia FV total

Nominal (STC) 6505 kWp
Total 9856 módulos
Área del módulo 30616 m²

Inversor

Fabricante Huawei Technologies
Modelo SUN2000-125KTL-M0

(Base de datos PVsyst original)

Unidad Nom. Potencia 125 kWca
Número de inversores 43 unidades
Potencia total 5375 kWca
Voltaje de funcionamiento 200-1000 V
Potencia máx. ($\geq 30^{\circ}\text{C}$) 138 kWca
Proporción Pnom (CC:CA) 1.21
Reparto de potencia en este inversor

Potencia total del inversor

Potencia total 5375 kWca
Potencia máx. 5913 kWca
Número de inversores 43 unidades
Proporción Pnom 1.21

Pérdidas del conjunto

Pérdidas de suciedad del conjunto

Frac. de pérdida 3.0 %

Factor de pérdida térmica

Temperatura módulo según irradiancia
Uc (const) 29.0 W/m²K
Uv (viento) 0.0 W/m²K/m/s

Pérdidas de cableado CC

Res. conjunto global 1.6 mΩ
Frac. de pérdida 1.5 % en STC

Pérdida diodos serie

Caída de tensión 0.7 V
Frac. de pérdida 0.1 % en STC

LID - Degradación Inducida por Luz

Frac. de pérdida 2.0 %

Pérdida de calidad módulo

Frac. de pérdida -0.4 %

Pérdidas de desajuste de módulo

Frac. de pérdida 2.0 % en MPP

Pérdidas de desajuste de cadenas

Frac. de pérdida 0.2 %

Factor de pérdida IAM

Efecto de incidencia (IAM): Vidrio liso Fresnel, $n = 1.526$

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

Pérdidas del sistema.



Proyecto: Parcela 1

Variante: Nueva variante de simulación

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Pérdidas del sistema.

Indisponibilidad del sistema

Frac. de tiempo	2.0 %
	7.3 días,
	3 periodos

Pérdidas de cableado CA

Línea de salida del inv. hasta el punto de inyección

Voltaje inversor	500 Vca tri
Frac. de pérdida	1.50 % en STC

Inversor: SUN2000-125KTL-M0

Sección cables (43 Inv.)	Cobre 43 x 3 x 70 mm ²
Longitud media de los cables	95 m



Proyecto: Parcela 1

Variante: Nueva variante de simulación

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Definición del horizonte

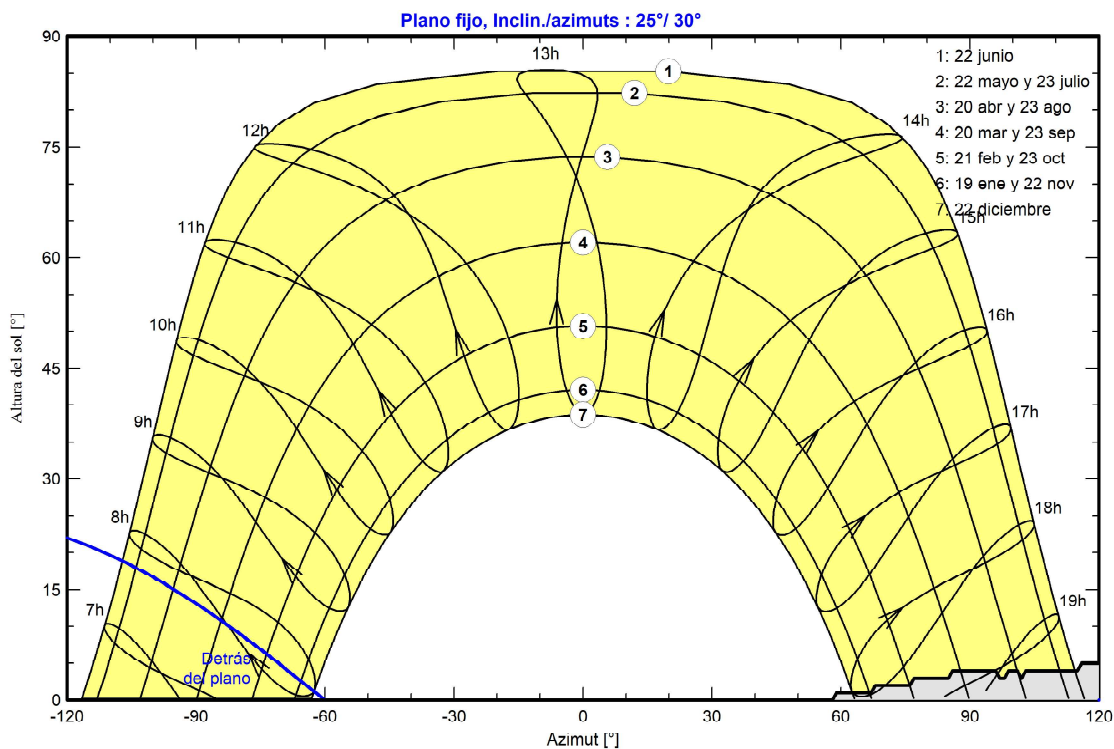
Horizonte del servicio web de Meteonorm, lat=27,8624, lon=-15,38363

Altura promedio	1.5 °	Factor Albedo	0.98
Factor difuso	1.00	Fracción de albedo	100 %

Perfil del horizonte

Azimut [°]	-180	-166	-165	58	59	67	68	76	77	85	86	96	97
Altura [°]	1.0	1.0	0.0	0.0	1.0	1.0	2.0	2.0	3.0	3.0	4.0	4.0	3.0
Azimut [°]	98	99	101	102	103	115	116	120	121	124	125	146	147
Altura [°]	3.0	4.0	4.0	3.0	4.0	4.0	5.0	5.0	7.0	7.0	8.0	8.0	7.0
Azimut [°]	151	152	161	162	163	164	165	166	167	168	169	170	179
Altura [°]	7.0	6.0	6.0	5.0	5.0	4.0	4.0	3.0	3.0	2.0	2.0	1.0	1.0

Recorridos solares (diagrama de altura / azimut)





Proyecto: Parcela 1

Variante: Nueva variante de simulación

PVsyst V7.4.2

VC0, Fecha de simulación:
21/09/23 22:24
con v7.4.2

Groupe Casino IGC S (France)

Resultados principales

Producción del sistema

Energía producida

10799419 kWh/año

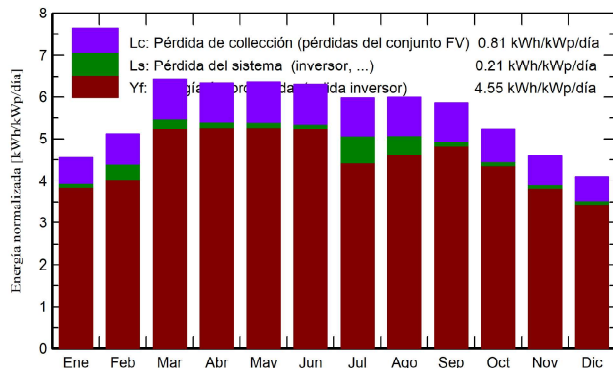
Producción específica

1660 kWh/kWp/año

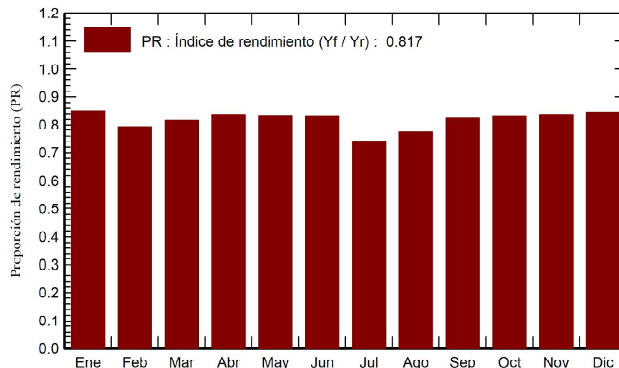
Proporción rend. PR

81.66 %

Producciones normalizadas (por kWp instalado)



Proporción de rendimiento (PR)



Balances y resultados principales

	GlobHor kWh/m²	DiffHor kWh/m²	T_Amb °C	GlobInc kWh/m²	GlobEff kWh/m²	EArray kWh	E_Grid kWh	PR proporción
Enero	108.7	45.38	17.57	141.1	132.9	796706	779916	0.850
Febrero	119.1	46.84	18.10	142.9	135.0	803867	738525	0.794
Marzo	177.2	60.38	18.34	198.7	187.4	1106253	1055005	0.816
Abril	185.9	70.13	18.89	189.9	179.2	1057751	1033490	0.837
Mayo	206.9	78.89	20.24	196.8	185.6	1092262	1067501	0.834
Junio	204.5	87.11	21.50	189.0	178.2	1047133	1023915	0.833
Julio	195.7	97.52	23.47	185.5	174.9	1023108	895565	0.742
Agosto	188.0	94.41	23.97	185.9	175.6	1024217	933751	0.772
Septiembre	164.3	64.30	23.67	175.9	166.1	964759	942891	0.824
Octubre	139.9	62.37	23.01	162.8	154.0	901298	881792	0.832
Noviembre	106.3	40.51	20.44	137.5	129.5	765325	748732	0.837
Diciembre	94.7	40.49	18.92	127.2	119.6	713109	698334	0.844
Año	1891.2	788.32	20.69	2033.0	1917.9	11295787	10799419	0.817

Leyendas

GlobHor Irradiación horizontal global

DiffHor Irradiación difusa horizontal

T_Amb Temperatura ambiente

GlobInc Global incidente plano receptor

GlobEff Global efectivo, corr. para IAM y sombreados

EArray Energía efectiva a la salida del conjunto

E_Grid Energía inyectada en la red

PR Proporción de rendimiento



Proyecto: Parcela 1

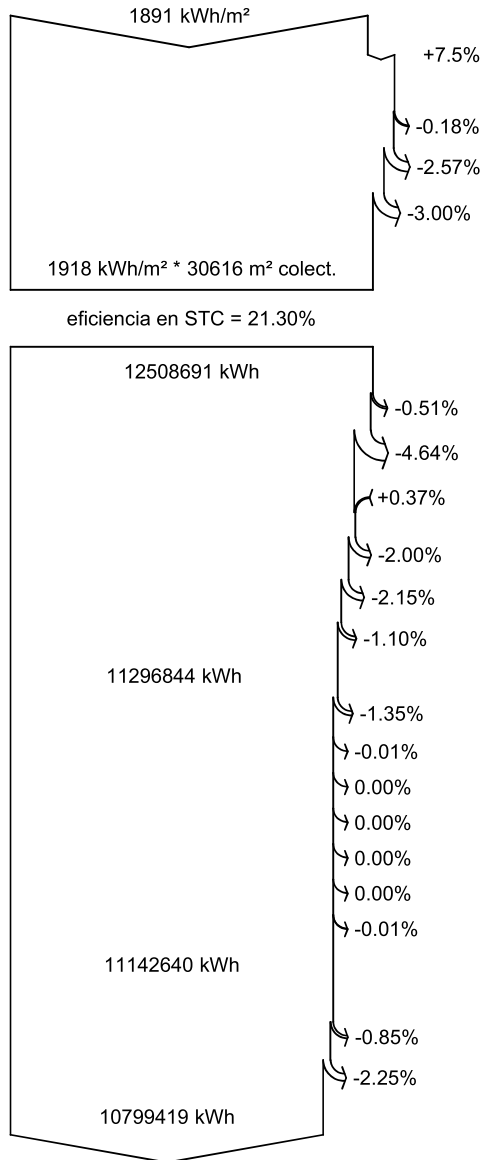
Variante: Nueva variante de simulación

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Diagrama de pérdida



Irradiación horizontal global

Global incidente plano receptor

Sombreados lejanos / Horizonte

Factor IAM en global

Factor de pérdida de suciedad

Irradiancia efectiva en colectores

Conversión FV

Conjunto de energía nominal (con efic. STC)

Pérdida FV debido al nivel de irradiancia

Pérdida FV debido a la temperatura.

Pérdida calidad de módulo

LID - Degradación inducida por luz

Pérdidas de desajuste, módulos y cadenas

Pérdida óhmica del cableado

Energía virtual del conjunto en MPP

Pérdida del inversor durante la operación (eficiencia)

Pérdida del inversor sobre potencia inv. nominal

Pérdida del inversor debido a la corriente de entrada máxima

Pérdida de inversor sobre voltaje inv. nominal

Pérdida del inversor debido al umbral de potencia

Pérdida del inversor debido al umbral de voltaje

Consumo nocturno

Energía disponible en la salida del inversor

Pérdidas óhmicas CA

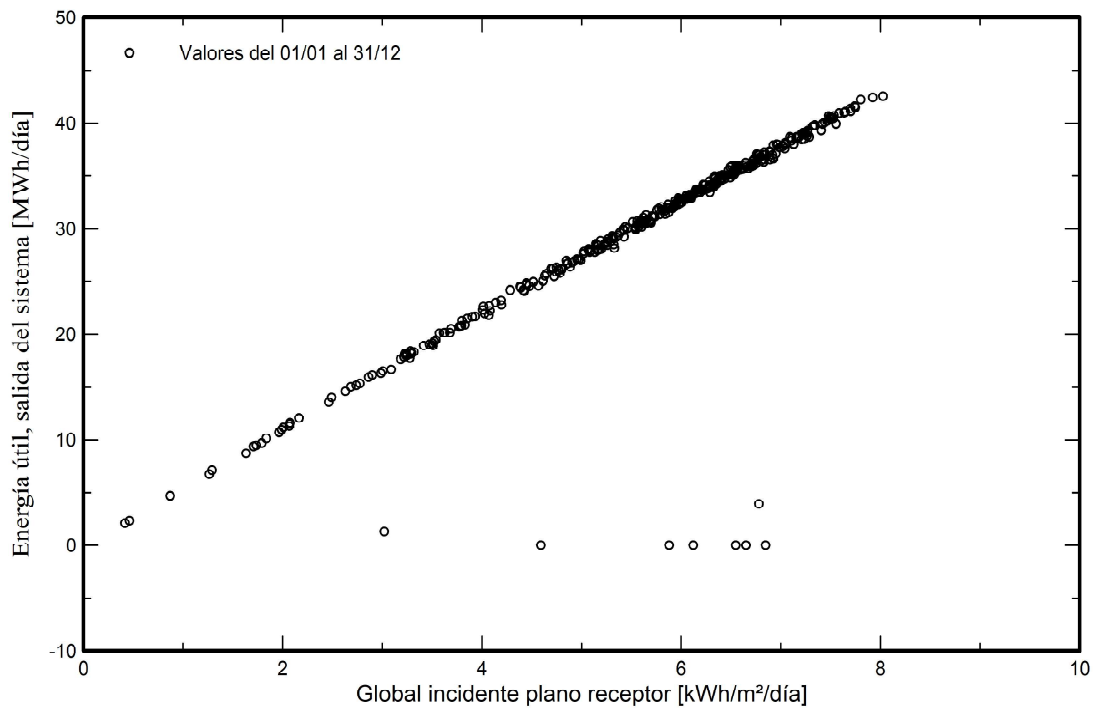
Indisponibilidad del sistema

Energía inyectada en la red

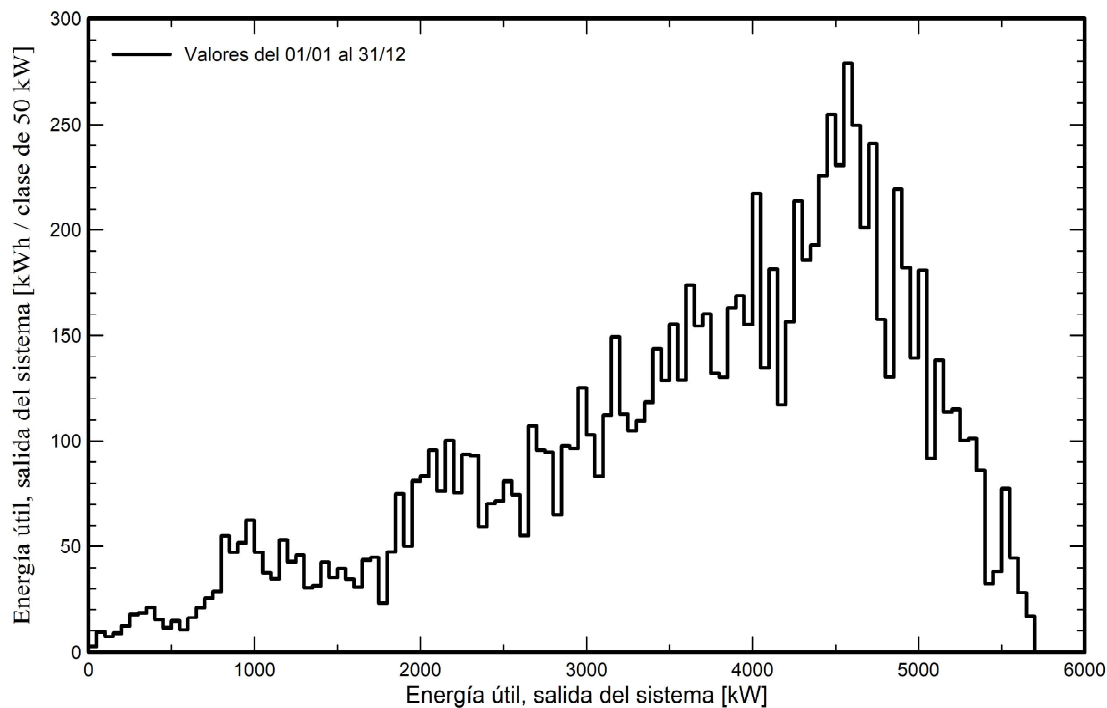


Gráficos predefinidos

Diagrama entrada/salida diaria



Distribución de potencia de salida del sistema

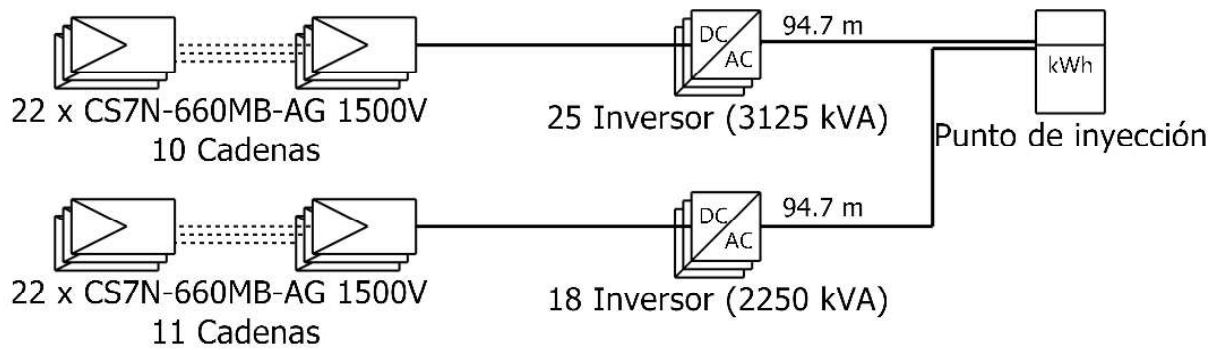




PVsyst V7.4.2

VC0, Fecha de simulación:
21/09/23 22:24
con v7.4.2

Diagrama unifilar



Módulo FV	CS7N-660MB-AG 1500V
Inversor	SUN2000-125KTL-M0
Cadena	22 x CS7N-660MB-AG 1500V

Parcela 1

Groupe Casino IGC
S (France)

VC0 : Nueva variante de simulación

21/09/23

PVsyst - Simulation report

Grid-Connected System

Project: Parcela 2

Variant: Nueva variante de simulación

No 3D scene defined, no shadings

System power: 1275 kWp

Arinaga - Spain





Project: Parcela 2

Variant: Nueva variante de simulación

PVsyst V7.4.2

VC0, Simulation date:
22/09/23 17:07
with v7.4.2

Groupe Casino IGC S (France)

Project summary

Geographical Site

Arinaga

Spain

Situation

Latitude 27.86 °N
Longitude -15.38 °W
Altitude 0 m
Time zone UTC

Project settings

Albedo 0.20

Meteo data

Arinaga

Meteonorm 8.1 (1998-2010), Sat=52% - Sintético

System summary

Grid-Connected System

No 3D scene defined, no shadings

PV Field Orientation

Fixed plane

Tilt/Azimuth 25 / 35 °

Near Shadings

No Shadings

User's needs

Unlimited load (grid)

System information

PV Array

Nb. of modules 1932 units
Pnom total 1275 kWp

Inverters

Nb. of units 10 units
Pnom total 1000 kWac
Pnom ratio 1.275

Results summary

Produced Energy 2096321 kWh/year Specific production 1644 kWh/kWp/year Perf. Ratio PR 81.32 %

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General parameters, PV Array Characteristics, System losses	3
Horizon definition	5
Main results	6
Loss diagram	7
Predef. graphs	8
Single-line diagram	9



Project: Parcela 2

Variant: Nueva variante de simulación

PVsyst V7.4.2

VC0, Simulation date:
22/09/23 17:07
with v7.4.2

Groupe Casino IGC S (France)

General parameters

Grid-Connected System

No 3D scene defined, no shadings

PV Field Orientation

Orientation

Fixed plane

Tilt/Azimuth 25 / 35 °

Sheds configuration

No 3D scene defined

Models used

Transposition Perez
Diffuse Perez, Meteonorm
Circumsolar separate

Horizon

Average Height 1.5 °

Near Shadings

No Shadings

User's needs

Unlimited load (grid)

PV Array Characteristics

PV module

Manufacturer

CSI Solar

Model

CS7N-660MB-AG 1500V

(Original PVsyst database)

Unit Nom. Power

660 Wp

Number of PV modules

1932 units

Nominal (STC)

1275 kWp

Modules

92 Strings x 21 In series

At operating cond. (50°C)

Pmpp

1169 kWp

U mpp

721 V

I mpp

1621 A

Total PV power

Nominal (STC)

1275 kWp

Total

1932 modules

Module area

6001 m²

Inverter

Manufacturer

Huawei Technologies

Model

SUN2000-100KTL-M1-400Vac

(Original PVsyst database)

Unit Nom. Power

100 kWac

Number of inverters

10 units

Total power

1000 kWac

Operating voltage

200-1000 V

Max. power (=>33°C)

110 kWac

Pnom ratio (DC:AC)

1.28

Power sharing within this inverter

Total inverter power

Total power

1000 kWac

Max. power

1100 kWac

Number of inverters

10 units

Pnom ratio

1.28

Array losses

Array Soiling Losses

Loss Fraction 3.0 %

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. 7.4 mΩ

Loss Fraction 1.5 % at STC

Serie Diode Loss

Voltage drop 0.7 V

Loss Fraction 0.1 % at STC

LID - Light Induced Degradation

Loss Fraction 2.0 %

Module Quality Loss

Loss Fraction -0.4 %

Module mismatch losses

Loss Fraction 2.0 % at MPP

Strings Mismatch loss

Loss Fraction 0.2 %

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



PVsyst V7.4.2

VC0, Simulation date:
22/09/23 17:07
with v7.4.2

Groupe Casino IGC S (France)

System losses

Unavailability of the system

Time fraction 2.0 %
 7.3 days,
 3 periods

AC wiring losses

Inv. output line up to injection point

Inverter voltage 400 Vac tri
Loss Fraction 1.50 % at STC

Inverter: SUN2000-100KTL-M1-400Vac

Wire section (10 Inv.) Copper 10 x 3 x 70 mm²
Average wires length 72 m



Project: Parcela 2

Variant: Nueva variante de simulación

PVsyst V7.4.2

VC0, Simulation date:
22/09/23 17:07
with v7.4.2

Groupe Casino IGC S (France)

Horizon definition

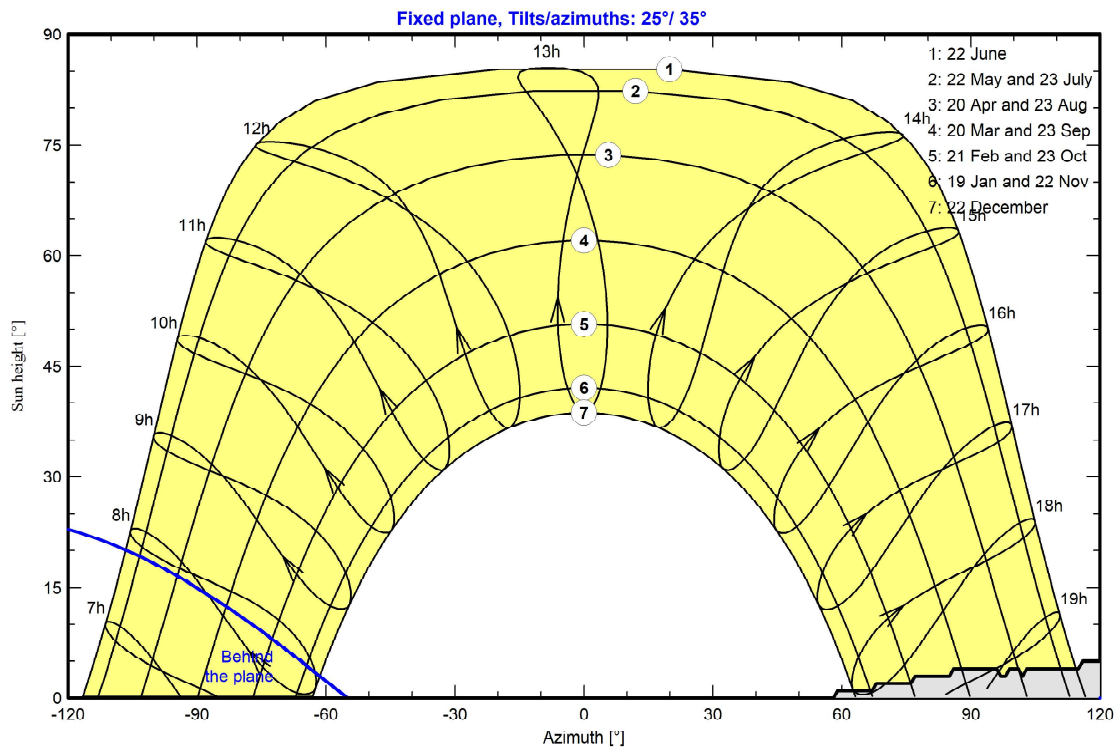
Horizonte del servicio web de Meteonorm, lat=27,8624, lon=-15,38363

Average Height	1.5 °	Albedo Factor	0.97
Diffuse Factor	1.00	Albedo Fraction	100 %

Horizon profile

Azimuth [°]	-180	-166	-165	58	59	67	68	76	77	85	86	96	97
Height [°]	1.0	1.0	0.0	0.0	1.0	1.0	2.0	2.0	3.0	3.0	4.0	4.0	3.0
Azimuth [°]	98	99	101	102	103	115	116	120	121	124	125	146	147
Height [°]	3.0	4.0	4.0	3.0	4.0	4.0	5.0	5.0	7.0	7.0	8.0	8.0	7.0
Azimuth [°]	151	152	161	162	163	164	165	166	167	168	169	170	179
Height [°]	7.0	6.0	6.0	5.0	5.0	4.0	4.0	3.0	3.0	2.0	2.0	1.0	1.0

Sun Paths (Height / Azimuth diagram)





Project: Parcela 2

Variant: Nueva variante de simulación

PVsyst V7.4.2

VC0, Simulation date:
22/09/23 17:07
with v7.4.2

Groupe Casino IGC S (France)

Main results

System Production

Produced Energy 2096321 kWh/year

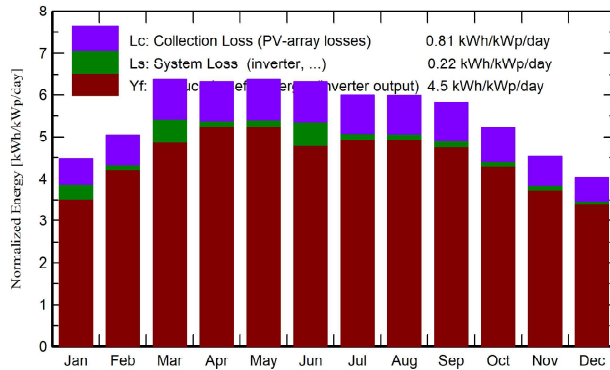
Specific production

1644 kWh/kWp/year

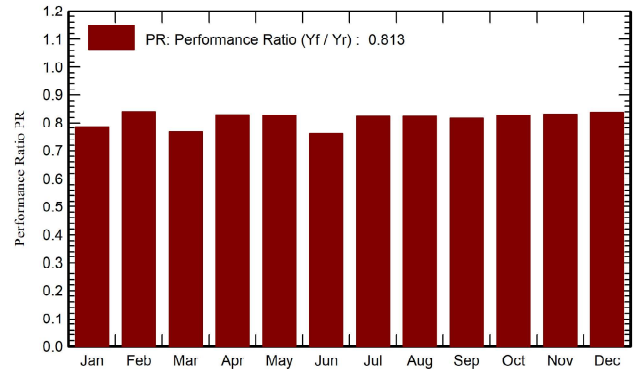
Perf. Ratio PR

81.32 %

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	108.7	45.38	17.57	138.8	130.7	153602	139322	0.787
February	119.1	46.84	18.10	141.0	133.1	155350	150970	0.840
March	177.2	60.38	18.34	197.3	186.0	214912	192909	0.767
April	185.9	70.13	18.89	189.5	178.8	206476	200484	0.830
May	206.9	78.89	20.24	197.1	185.9	214241	208091	0.828
June	204.5	87.11	21.50	189.4	178.5	205565	183894	0.762
July	195.7	97.52	23.47	185.8	175.2	200895	195381	0.825
August	188.0	94.41	23.97	185.6	175.2	200384	194906	0.824
September	164.3	64.30	23.67	174.9	165.0	187659	182316	0.818
October	139.9	62.37	23.01	161.4	152.6	174987	170212	0.827
November	106.3	40.51	20.44	135.7	127.6	147905	143850	0.831
December	94.7	40.49	18.92	125.3	117.7	137607	133984	0.838
Year	1891.2	788.32	20.69	2021.8	1906.3	2199582	2096321	0.813

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



Project: Parcela 2

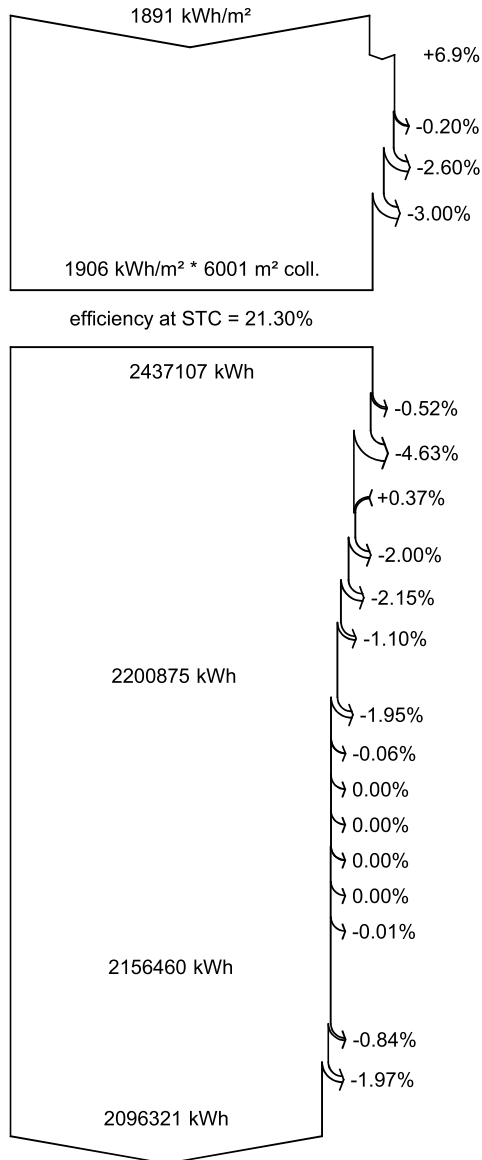
Variant: Nueva variante de simulación

PVsyst V7.4.2

VC0, Simulation date:
22/09/23 17:07
with v7.4.2

Groupe Casino IGC S (France)

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

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

AC ohmic loss

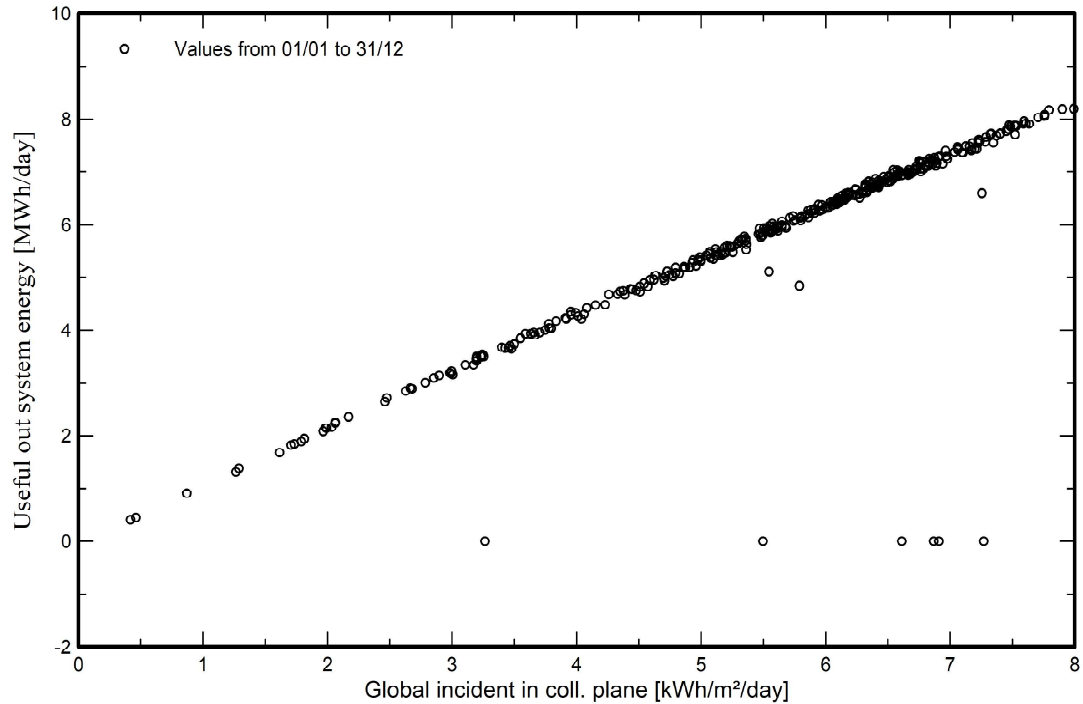
System unavailability

Energy injected into grid

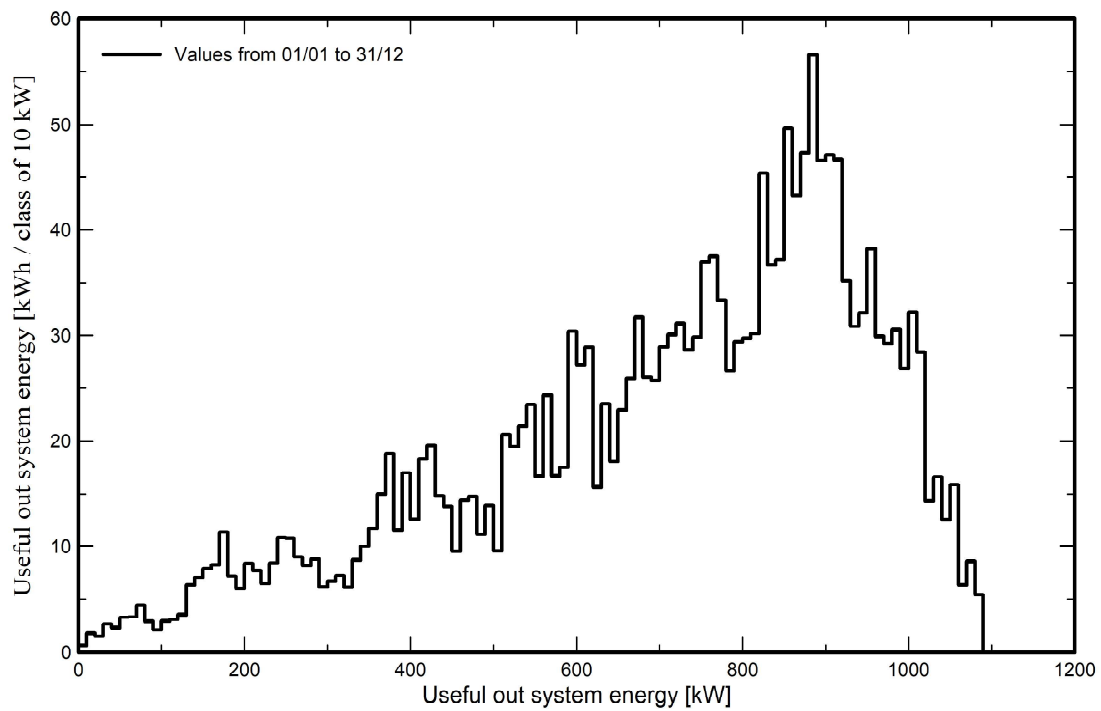


Predef. graphs

Diagrama entrada/salida diaria



Distribución de potencia de salida del sistema

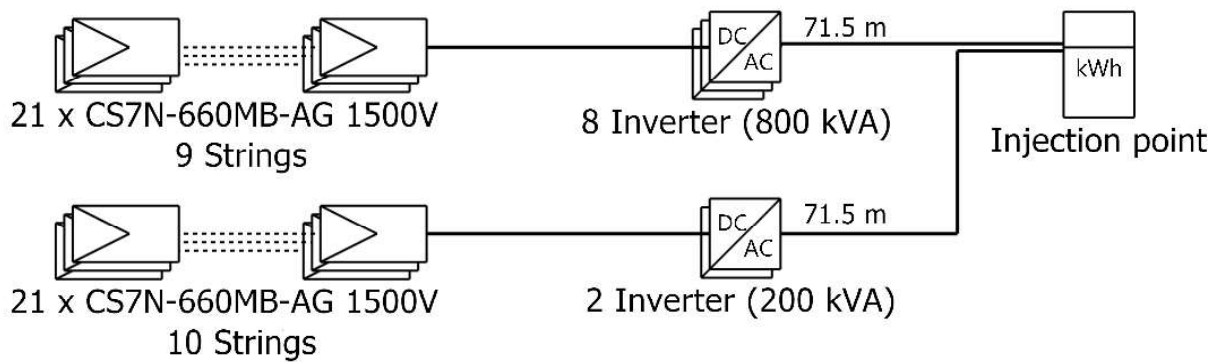




PVsyst V7.4.2

VC0, Simulation date:
22/09/23 17:07
with v7.4.2

Single-line diagram



PV module	CS7N-660MB-AG 1500V
Inverter	SUN2000-100KTL-M1-400Vac
String	21 x CS7N-660MB-AG 1500V

Parcela 2

Groupe Casino IGC
S (France)

VC0 : Nueva variante de simulación

22/09/23

PVsyst - Simulation report

Grid-Connected System

Project: Parcela 3

Variant: Nueva variante de simulación

No 3D scene defined, no shadings

System power: 24.02 MWp

Arinaga - Spain





Project: Parcela 3

Variant: Nueva variante de simulación

PVsyst V7.4.2

VC0, Simulation date:
22/09/23 18:18
with v7.4.2

Groupe Casino IGC S (France)

Project summary

Geographical Site

Arinaga

Spain

Situation

Latitude 27.86 °N
Longitude -15.38 °W
Altitude 0 m
Time zone UTC

Project settings

Albedo 0.20

Meteo data

Arinaga

Meteonorm 8.1 (1998-2010), Sat=52% - Sintético

System summary

Grid-Connected System

No 3D scene defined, no shadings

PV Field Orientation

Fixed plane

Tilt/Azimuth 25 / 33 °

Near Shadings

No Shadings

User's needs

Unlimited load (grid)

System information

PV Array

Nb. of modules 36393 units
Pnom total 24.02 MWp

Inverters

Nb. of units 56 units
Pnom total 19.60 MWac
Pnom ratio 1.225

Results summary

Produced Energy 40127334 kWh/year Specific production 1671 kWh/kWp/year Perf. Ratio PR 82.44 %

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Project: Parcela 3

Variant: Nueva variante de simulación

PVsyst V7.4.2

VC0, Simulation date:
22/09/23 18:18
with v7.4.2

Groupe Casino IGC S (France)

General parameters

Grid-Connected System

No 3D scene defined, no shadings

PV Field Orientation

Orientation

Fixed plane

Tilt/Azimuth 25 / 33 °

Sheds configuration

No 3D scene defined

Models used

Transposition Perez
Diffuse Perez, Meteonorm
Circumsolar separate

Horizon

Average Height 1.5 °

Near Shadings

No Shadings

User's needs

Unlimited load (grid)

PV Array Characteristics

PV module

Manufacturer

CSI Solar

Model

CS7N-660MB-AG 1500V

(Original PVsyst database)

Unit Nom. Power

660 Wp

Number of PV modules

36393 units

Nominal (STC)

24.02 MWp

Modules

1733 Strings x 21 In series

At operating cond. (50°C)

Pmpp

22.03 MWp

U mpp

721 V

I mpp

30544 A

Total PV power

Nominal (STC)

24019 kWp

Total

36393 modules

Module area

113049 m²

Inverter

Manufacturer

Sungrow

Model

SG350-HX

(Original PVsyst database)

Unit Nom. Power

350 kWac

Number of inverters

56 units

Total power

19600 kWac

Operating voltage

500-1450 V

Pnom ratio (DC:AC)

1.23

Power sharing within this inverter

Total inverter power

Total power

19600 kWac

Number of inverters

56 units

Pnom ratio

1.23

Array losses

Array Soiling Losses

Loss Fraction 3.0 %

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.

0.39 mΩ

Loss Fraction

1.5 % at STC

Serie Diode Loss

Voltage drop

0.7 V

Loss Fraction

0.1 % at STC

LID - Light Induced Degradation

Loss Fraction

2.0 %

Module Quality Loss

Loss Fraction

-0.4 %

Module mismatch losses

Loss Fraction

2.0 % at MPP

Strings Mismatch loss

Loss Fraction

0.2 %

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

2.0 %

7.3 days,

3 periods



Project: Parcela 3

Variant: Nueva variante de simulación

PVsyst V7.4.2

VC0, Simulation date:
22/09/23 18:18
with v7.4.2

Groupe Casino IGC S (France)

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 (56 Inv.)	Copper 56 x 3 x 150 mm ²
Average wires length	180 m



Project: Parcela 3

Variant: Nueva variante de simulación

PVsyst V7.4.2

VC0, Simulation date:
22/09/23 18:18
with v7.4.2

Groupe Casino IGC S (France)

Horizon definition

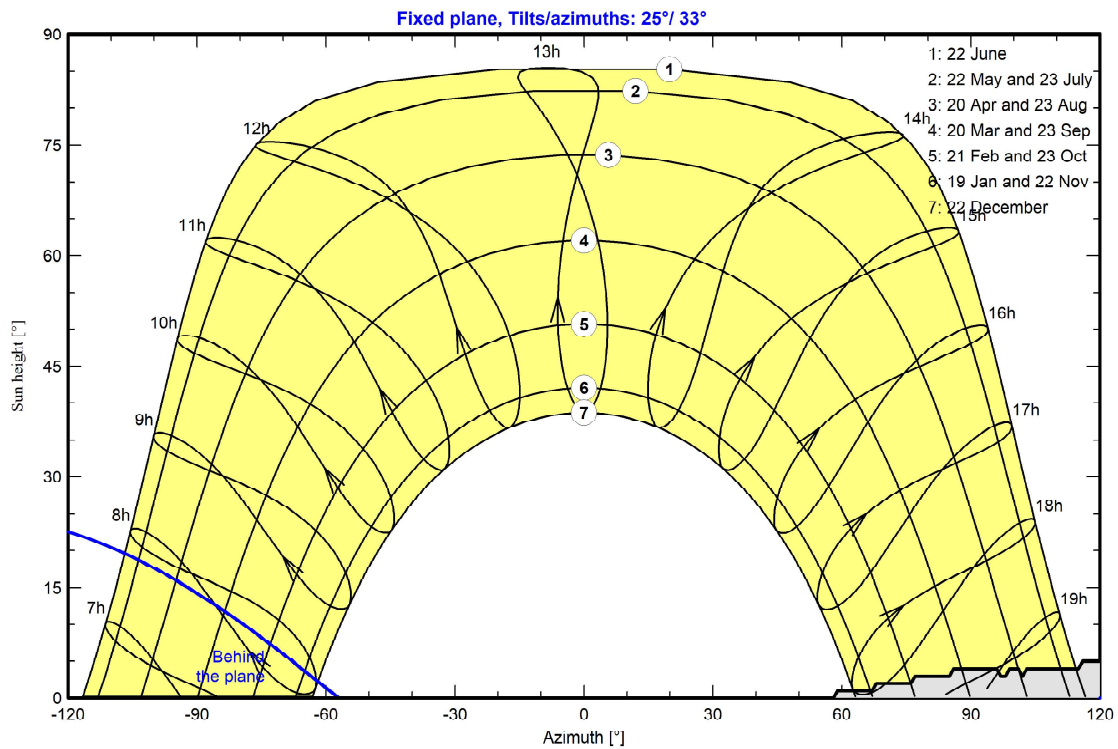
Horizonte del servicio web de Meteonorm, lat=27,8624, lon=-15,38363

Average Height	1.5 °	Albedo Factor	0.97
Diffuse Factor	1.00	Albedo Fraction	100 %

Horizon profile

Azimuth [°]	-180	-166	-165	58	59	67	68	76	77	85	86	96	97
Height [°]	1.0	1.0	0.0	0.0	1.0	1.0	2.0	2.0	3.0	3.0	4.0	4.0	3.0
Azimuth [°]	98	99	101	102	103	115	116	120	121	124	125	146	147
Height [°]	3.0	4.0	4.0	3.0	4.0	4.0	5.0	5.0	7.0	7.0	8.0	8.0	7.0
Azimuth [°]	151	152	161	162	163	164	165	166	167	168	169	170	179
Height [°]	7.0	6.0	6.0	5.0	5.0	4.0	4.0	3.0	3.0	2.0	2.0	1.0	1.0

Sun Paths (Height / Azimuth diagram)





Project: Parcela 3

Variant: Nueva variante de simulación

PVsyst V7.4.2

VC0, Simulation date:
22/09/23 18:18
with v7.4.2

Groupe Casino IGC S (France)

Main results

System Production

Produced Energy 40127334 kWh/year

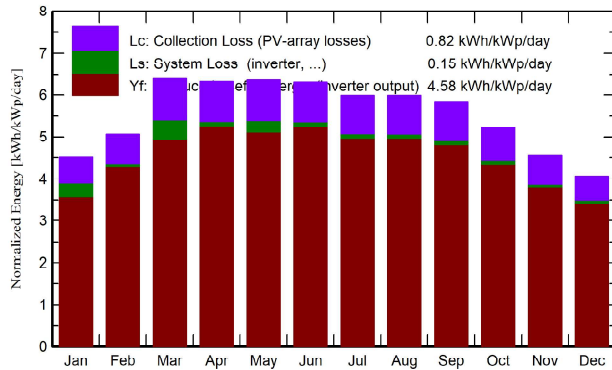
Specific production

1671 kWh/kWp/year

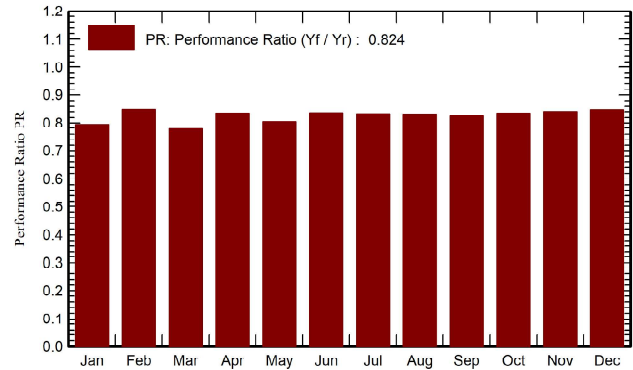
Perf. Ratio PR

82.44 %

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	108.7	45.38	17.57	139.7	131.6	2913543	2668098	0.795
February	119.1	46.84	18.10	141.8	133.9	2941328	2887600	0.848
March	177.2	60.38	18.34	197.9	186.6	4039048	3693814	0.777
April	185.9	70.13	18.89	189.6	179.0	3875519	3804687	0.835
May	206.9	78.89	20.24	197.0	185.8	4027006	3815255	0.806
June	204.5	87.11	21.50	189.2	178.4	3870210	3797574	0.835
July	195.7	97.52	23.47	185.7	175.1	3782085	3712598	0.832
August	188.0	94.41	23.97	185.7	175.4	3777644	3710623	0.832
September	164.3	64.30	23.67	175.3	165.5	3538848	3473212	0.825
October	139.9	62.37	23.01	162.0	153.2	3307958	3248193	0.835
November	106.3	40.51	20.44	136.4	128.4	2802760	2751978	0.840
December	94.7	40.49	18.92	126.1	118.5	2609373	2563703	0.846
Year	1891.2	788.32	20.69	2026.5	1911.3	41485321	40127334	0.824

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



Project: Parcela 3

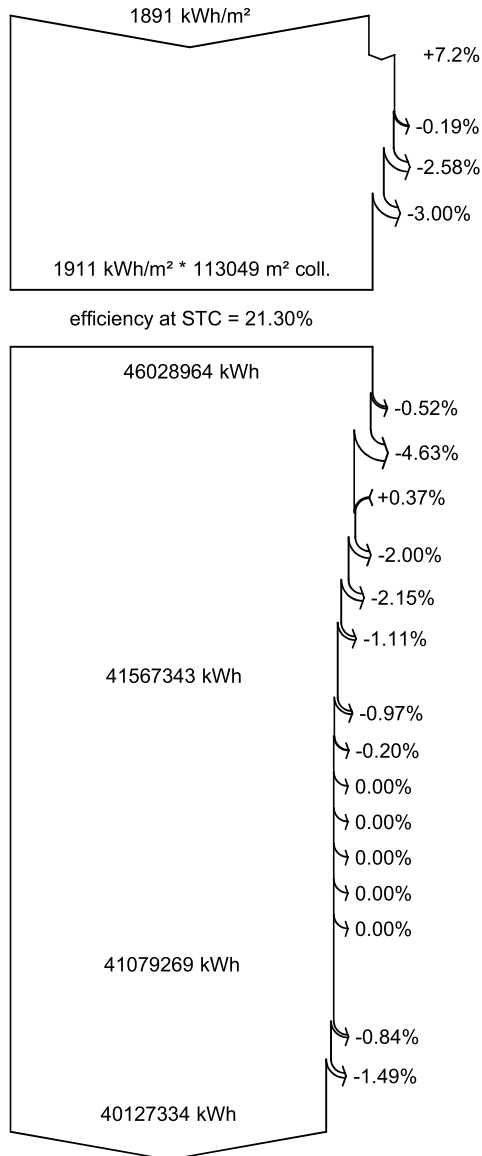
Variant: Nueva variante de simulación

PVsyst V7.4.2

VC0, Simulation date:
22/09/23 18:18
with v7.4.2

Groupe Casino IGC S (France)

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

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

AC ohmic loss

System unavailability

Energy injected into grid



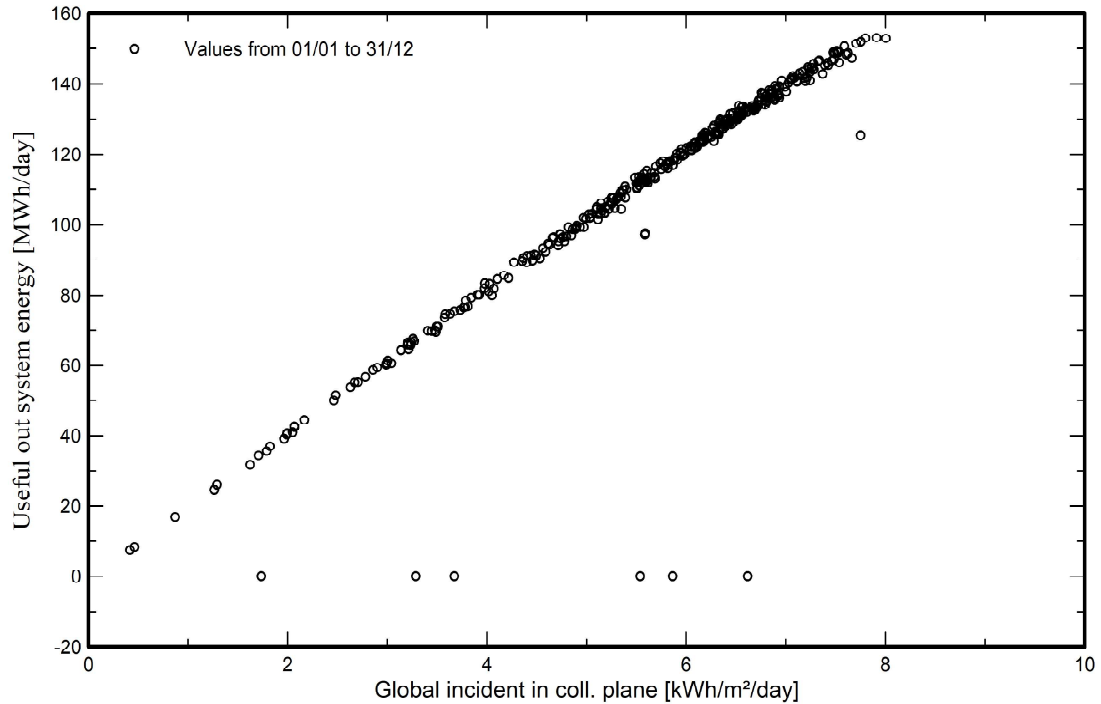
PVsyst V7.4.2

VC0, Simulation date:
22/09/23 18:18
with v7.4.2

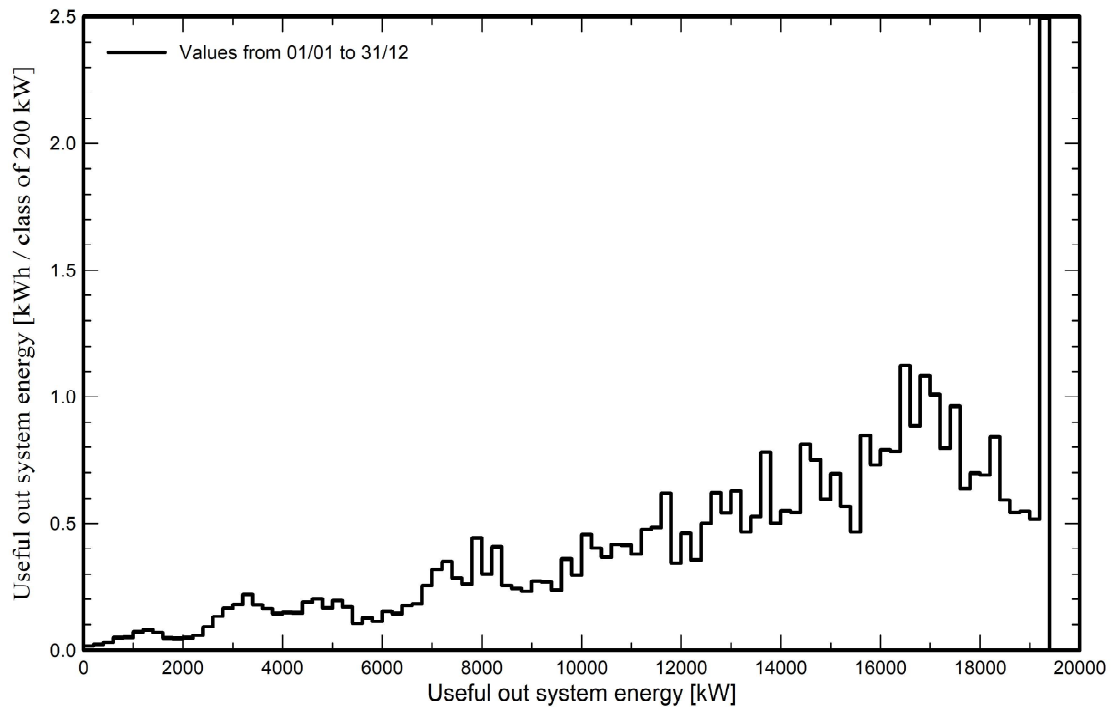
Groupe Casino IGC S (France)

Predef. graphs

Diagrama entrada/salida diaria



Distribución de potencia de salida del sistema

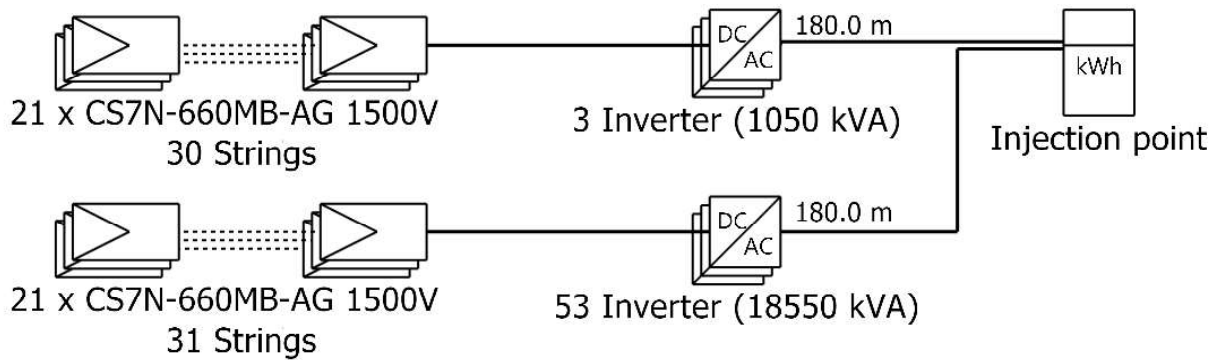




PVsyst V7.4.2

VC0, Simulation date:
22/09/23 18:18
with v7.4.2

Single-line diagram



PV module	CS7N-660MB-AG 1500V
Inverter	SG350-HX
String	21 x CS7N-660MB-AG 1500V

Parcela 3

Groupe Casino IGC
S (France)

VC0 : Nueva variante de simulación

22/09/23

PVsyst - Simulation report

Grid-Connected System

Project: Parcela 4

Variant: Nueva variante de simulación

No 3D scene defined, no shadings

System power: 14.11 MWp

Arinaga - Spain





Project: Parcela 4

Variant: Nueva variante de simulación

PVsyst V7.4.2

VC0, Simulation date:
23/09/23 12:56
with v7.4.2

Groupe Casino IGC S (France)

Project summary

Geographical Site

Arinaga

Spain

Situation

Latitude 27.86 °N
Longitude -15.38 °W
Altitude 0 m
Time zone UTC

Project settings

Albedo 0.20

Meteo data

Arinaga

Meteonorm 8.1 (1998-2010), Sat=52% - Sintético

System summary

Grid-Connected System

No 3D scene defined, no shadings

PV Field Orientation

Fixed plane

Tilt/Azimuth 25 / 34 °

Near Shadings

No Shadings

User's needs

Unlimited load (grid)

System information

PV Array

Nb. of modules 21386 units
Pnom total 14.11 MWp

Inverters

Nb. of units 94 units
Pnom total 11.75 MWac
Pnom ratio 1.201

Results summary

Produced Energy 23264529 kWh/year Specific production 1648 kWh/kWp/year Perf. Ratio PR 81.43 %

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Project: Parcela 4

Variant: Nueva variante de simulación

PVsyst V7.4.2

VC0, Simulation date:
23/09/23 12:56
with v7.4.2

Groupe Casino IGC S (France)

General parameters

Grid-Connected System

No 3D scene defined, no shadings

PV Field Orientation

Orientation

Fixed plane

Tilt/Azimuth 25 / 34 °

Sheds configuration

No 3D scene defined

Models used

Transposition Perez
Diffuse Perez, Meteonorm
Circumsolar separate

Horizon

Average Height 1.5 °

Near Shadings

No Shadings

User's needs

Unlimited load (grid)

PV Array Characteristics

PV module

Manufacturer

CSI Solar

Model

CS7N-660MB-AG 1500V

(Original PVsyst database)

Unit Nom. Power

660 Wp

Number of PV modules

21386 units

Nominal (STC)

14.11 MWp

Modules

1258 Strings x 17 In series

At operating cond. (50°C)

Pmpp

12.94 MWp

U mpp

584 V

I mpp

22172 A

Total PV power

Nominal (STC)

14115 kWp

Total

21386 modules

Module area

66432 m²

Inverter

Manufacturer

Huawei Technologies

Model

SUN2000-125KTL-M0

(Original PVsyst database)

Unit Nom. Power

125 kWac

Number of inverters

94 units

Total power

11750 kWac

Operating voltage

200-1000 V

Max. power (=>30°C)

138 kWac

Pnom ratio (DC:AC)

1.20

Power sharing within this inverter

Total inverter power

Total power

11750 kWac

Max. power

12925 kWac

Number of inverters

94 units

Pnom ratio

1.20

Array losses

Array Soiling Losses

Loss Fraction 3.0 %

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. 0.44 mΩ

Loss Fraction 1.5 % at STC

Serie Diode Loss

Voltage drop 0.7 V

Loss Fraction 0.1 % at STC

LID - Light Induced Degradation

Loss Fraction 2.0 %

Module Quality Loss

Loss Fraction -0.4 %

Module mismatch losses

Loss Fraction 2.0 % at MPP

Strings Mismatch loss

Loss Fraction 0.2 %

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



Project: Parcela 4

Variant: Nueva variante de simulación

PVsyst V7.4.2

VC0, Simulation date:
23/09/23 12:56
with v7.4.2

Groupe Casino IGC S (France)

System losses

Unavailability of the system

Time fraction 2.0 %
 7.3 days,
 3 periods

AC wiring losses

Inv. output line up to injection point

Inverter voltage 500 Vac tri
Loss Fraction 1.50 % at STC

Inverter: SUN2000-125KTL-M0

Wire section (94 Inv.) Copper 94 x 3 x 70 mm²
Average wires length 95 m



Project: Parcela 4

Variant: Nueva variante de simulación

PVsyst V7.4.2

VC0, Simulation date:
23/09/23 12:56
with v7.4.2

Groupe Casino IGC S (France)

Horizon definition

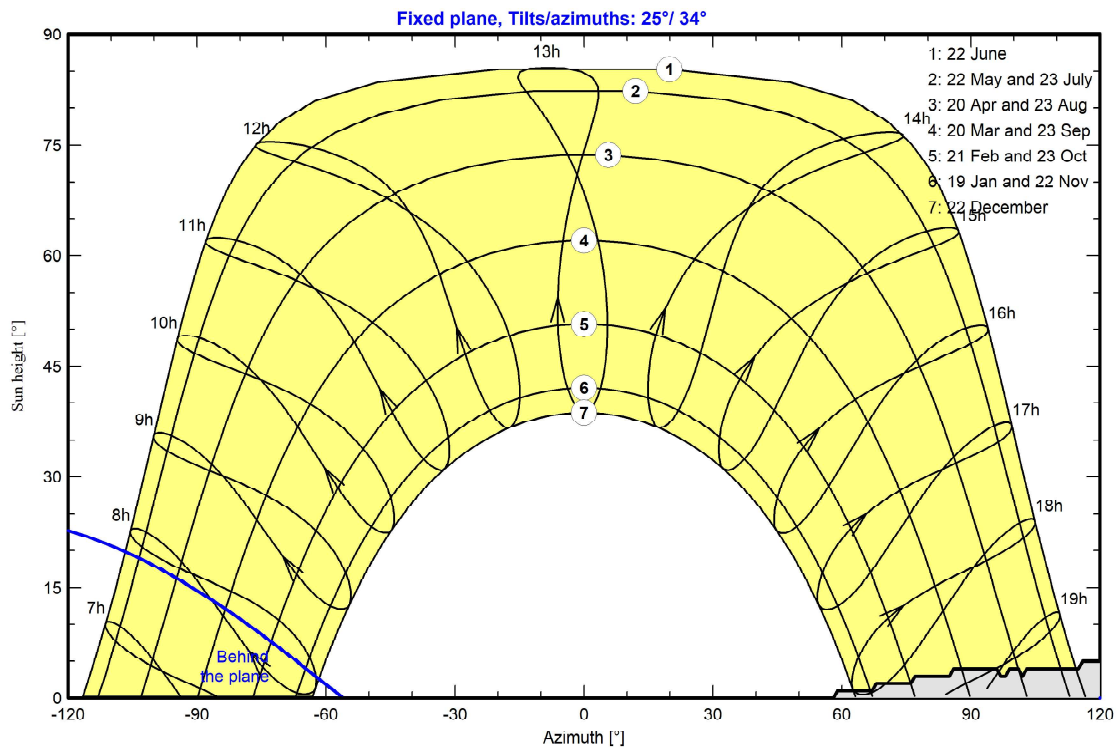
Horizonte del servicio web de Meteonorm, lat=27,8624, lon=-15,38363

Average Height	1.5 °	Albedo Factor	0.97
Diffuse Factor	1.00	Albedo Fraction	100 %

Horizon profile

Azimuth [°]	-180	-166	-165	58	59	67	68	76	77	85	86	96	97
Height [°]	1.0	1.0	0.0	0.0	1.0	1.0	2.0	2.0	3.0	3.0	4.0	4.0	3.0
Azimuth [°]	98	99	101	102	103	115	116	120	121	124	125	146	147
Height [°]	3.0	4.0	4.0	3.0	4.0	4.0	5.0	5.0	7.0	7.0	8.0	8.0	7.0
Azimuth [°]	151	152	161	162	163	164	165	166	167	168	169	170	179
Height [°]	7.0	6.0	6.0	5.0	5.0	4.0	4.0	3.0	3.0	2.0	2.0	1.0	1.0

Sun Paths (Height / Azimuth diagram)





Project: Parcela 4

Variant: Nueva variante de simulación

PVsyst V7.4.2

VC0, Simulation date:
23/09/23 12:56
with v7.4.2

Groupe Casino IGC S (France)

Main results

System Production

Produced Energy 23264529 kWh/year

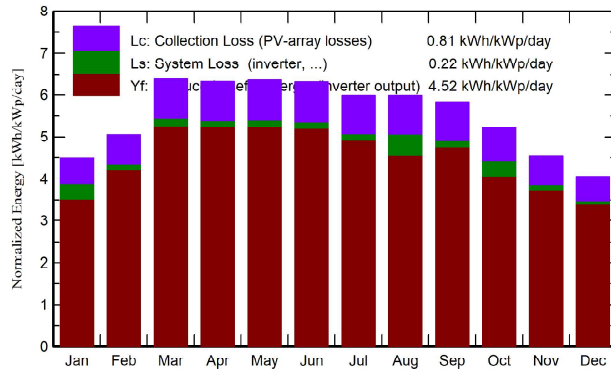
Specific production

1648 kWh/kWp/year

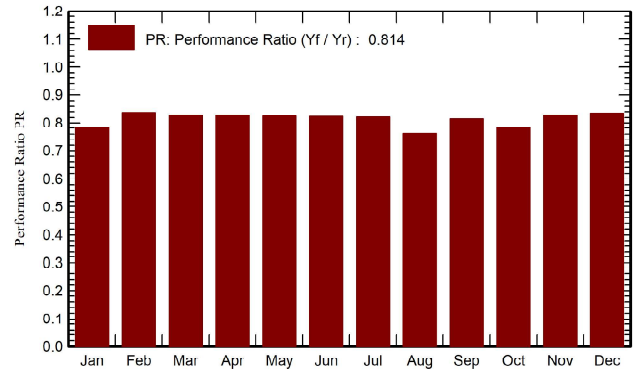
Perf. Ratio PR

81.43 %

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	108.7	45.38	17.57	139.3	131.1	1705733	1541999	0.784
February	119.1	46.84	18.10	141.4	133.5	1724659	1671119	0.837
March	177.2	60.38	18.34	197.6	186.3	2386875	2309693	0.828
April	185.9	70.13	18.89	189.6	178.9	2290617	2217302	0.829
May	206.9	78.89	20.24	197.1	185.8	2372107	2296763	0.826
June	204.5	87.11	21.50	189.3	178.4	2274175	2203104	0.825
July	195.7	97.52	23.47	185.8	175.1	2222412	2154040	0.822
August	188.0	94.41	23.97	185.7	175.3	2218487	1995184	0.761
September	164.3	64.30	23.67	175.1	165.2	2081589	2015428	0.816
October	139.9	62.37	23.01	161.7	152.9	1940770	1786433	0.783
November	106.3	40.51	20.44	136.1	128.0	1641758	1591165	0.829
December	94.7	40.49	18.92	125.7	118.1	1527890	1482298	0.835
Year	1891.2	788.32	20.69	2024.2	1908.7	24387071	23264529	0.814

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

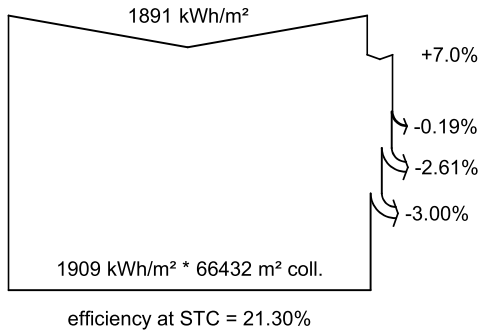


PVsyst V7.4.2

VC0, Simulation date:
23/09/23 12:56
with v7.4.2

Groupe Casino IGC S (France)

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
Module quality loss

LID - Light induced degradation
Mismatch loss, modules and strings
Ohmic wiring loss

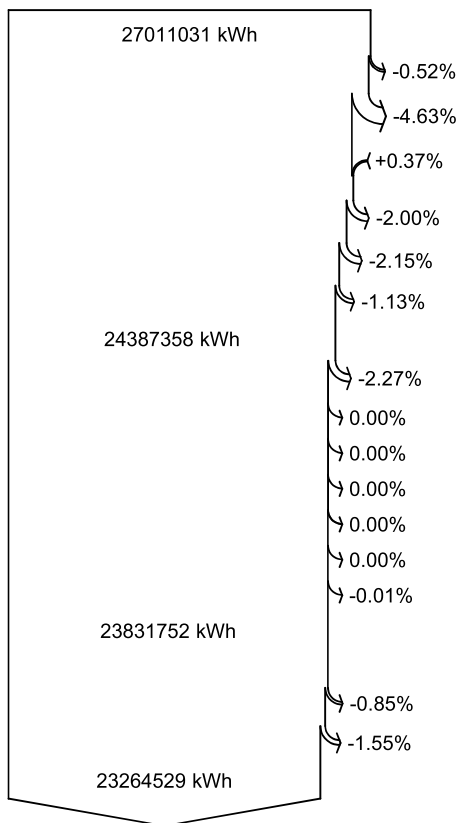
Array virtual energy at MPP

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

AC ohmic loss
System unavailability

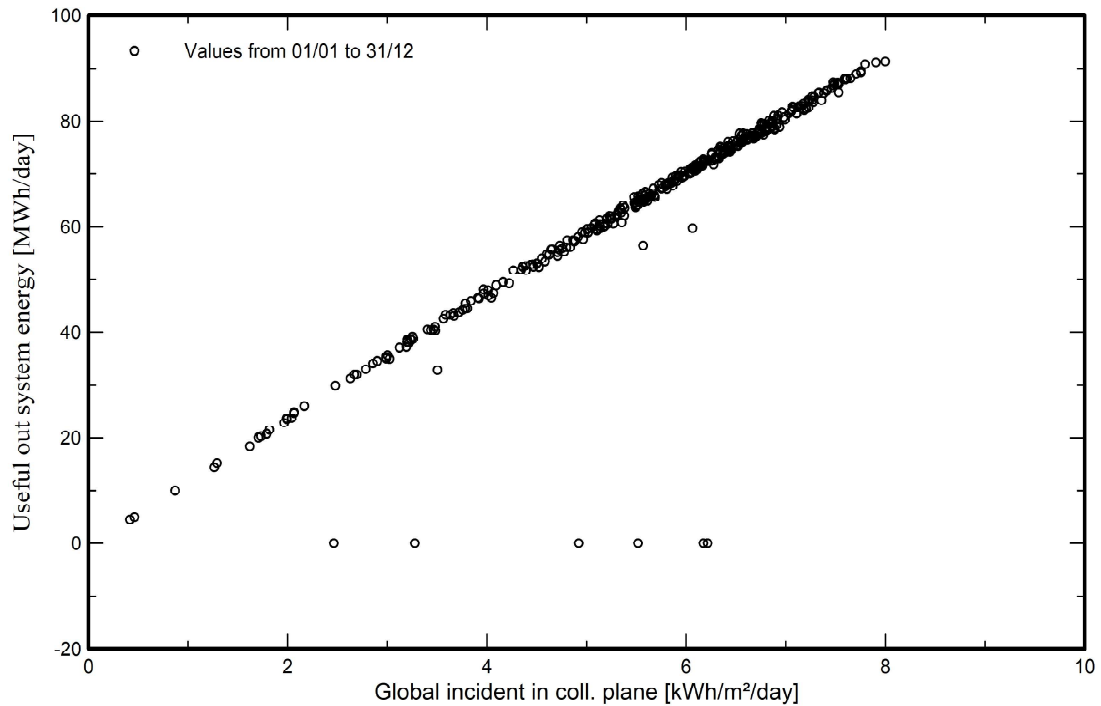
Energy injected into grid



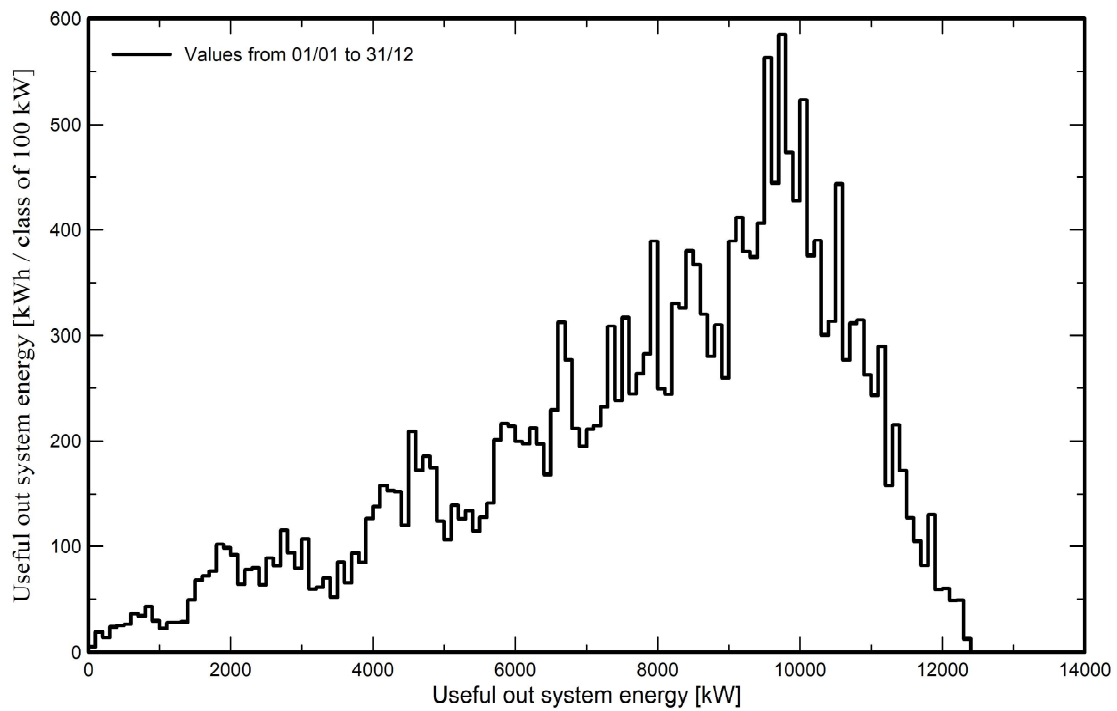


Predef. graphs

Diagrama entrada/salida diaria



Distribución de potencia de salida del sistema

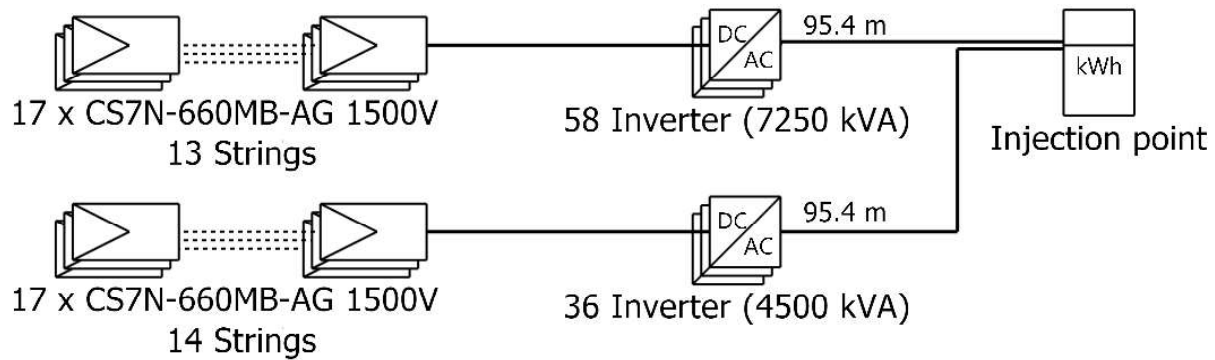




PVsyst V7.4.2

VC0, Simulation date:
23/09/23 12:56
with v7.4.2

Single-line diagram



PV module	CS7N-660MB-AG 1500V
Inverter	SUN2000-125KTL-M0
String	17 x CS7N-660MB-AG 1500V

Parcela 4

Groupe Casino IGC
S (France)

VC0 : Nueva variante de simulación

23/09/23

PVsyst - Simulation report

Grid-Connected System

Proyecto: PV Existente

Variante: Generación existente en Agüimes

No 3D scene defined, no shadings

System power: 2786 kWp

Arinaga - España



Project: Parcela 4

Variant: Generación existente en Arinaga

PVsyst V7.4.2

VC1, Simulation date:
02/10/23 21:11
with v7.4.2

Groupe Casino IGC S (France)

Project summary

Geographical Site

Arinaga

España

Situation

Latitude 27.86 °N
Longitude -15.38 °W
Altitude 0 m
Time zone UTC

Project settings

Albedo 0.20

Meteo data

Arinaga

Meteonorm 8.1 (1998-2010), Sat=52% - Sintético

System summary

Grid-Connected System

No 3D scene defined, no shadings

PV Field Orientation

Fixed plane

Tilt/Azimuth 15 / 35 °

Near Shadings

No Shadings

User's needs

Unlimited load (grid)

System information

PV Array

Nb. of modules 4221 units
Pnom total 2786 kWp

Inverters

Nb. of units 19 units
Pnom total 2375 kWac
Pnom ratio 1.173

Results summary

Produced Energy 4583911 kWh/year Specific production 1645 kWh/kWp/year Perf. Ratio PR 82.17 %

Table of contents

Project and results summary	2
General parameters, PV Array Characteristics, System losses	3
Horizon definition	5
Main results	6
Loss diagram	7
Predef. graphs	8
Single-line diagram	9



Project: Parcela 4

Variant: Generación existente en Arinaga

PVsyst V7.4.2

VC1, Simulation date:
02/10/23 21:11
with v7.4.2

Groupe Casino IGC S (France)

General parameters

Grid-Connected System

No 3D scene defined, no shadings

PV Field Orientation

Orientation

Fixed plane

Tilt/Azimuth 15 / 35 °

Sheds configuration

No 3D scene defined

Models used

Transposition Perez
Diffuse Perez, Meteonorm
Circumsolar separate

Horizon

Average Height 1.5 °

Near Shadings

No Shadings

User's needs

Unlimited load (grid)

PV Array Characteristics

PV module

Manufacturer

CSI Solar

Model

CS7N-660MB-AG 1500V

(Original PVsyst database)

Unit Nom. Power

660 Wp

Number of PV modules

4221 units

Nominal (STC)

2786 kWp

Modules

201 Strings x 21 In series

At operating cond. (50°C)

Pmpp

2555 kWp

U mpp

721 V

I mpp

3543 A

Total PV power

Nominal (STC)

2786 kWp

Total

4221 modules

Module area

13112 m²

Inverter

Manufacturer

Huawei Technologies

Model

SUN2000-125KTL-M0

(Original PVsyst database)

Unit Nom. Power

125 kWac

Number of inverters

19 units

Total power

2375 kWac

Operating voltage

200-1000 V

Max. power (=>30°C)

138 kWac

Pnom ratio (DC:AC)

1.17

Power sharing within this inverter

Total inverter power

Total power

2375 kWac

Max. power

2613 kWac

Number of inverters

19 units

Pnom ratio

1.17

Array losses

Array Soiling Losses

Loss Fraction 3.0 %

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.

3.4 mΩ

Loss Fraction

1.5 % at STC

Serie Diode Loss

Voltage drop

0.7 V

Loss Fraction

0.1 % at STC

LID - Light Induced Degradation

Loss Fraction

2.0 %

Module Quality Loss

Loss Fraction

-0.4 %

Module mismatch losses

Loss Fraction

2.0 % at MPP

Strings Mismatch loss

Loss Fraction

0.2 %

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



Project: Parcela 4

Variant: Generación existente en Arinaga

PVsyst V7.4.2

VC1, Simulation date:
02/10/23 21:11
with v7.4.2

Groupe Casino IGC S (France)

System losses

Unavailability of the system

Time fraction	2.0 %
	7.3 days,
	3 periods

AC wiring losses

Inv. output line up to injection point

Inverter voltage	500 Vac tri
Loss Fraction	1.47 % at STC

Inverter: SUN2000-125KTL-M0

Wire section (19 Inv.)	Copper 19 x 3 x 70 mm ²
Average wires length	95 m



Project: Parcela 4

Variant: Generación existente en Arinaga

PVsyst V7.4.2

VC1, Simulation date:
02/10/23 21:11
with v7.4.2

Groupe Casino IGC S (France)

Horizon definition

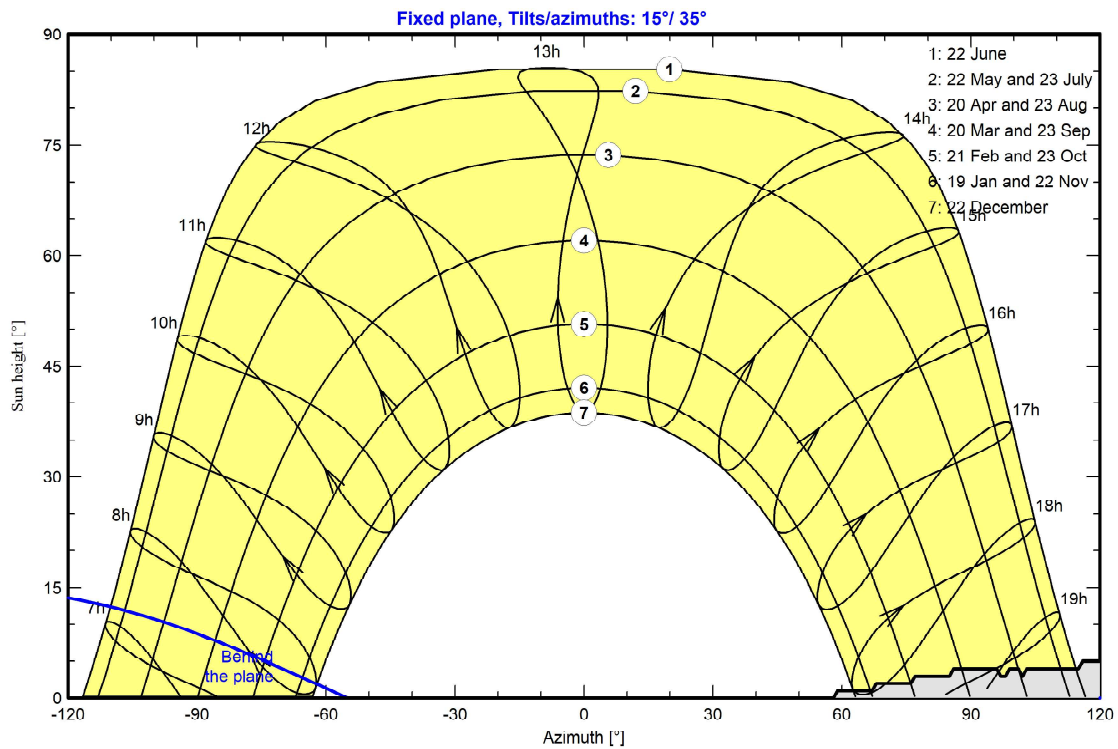
Horizonte del servicio web de Meteonorm, lat=27,8624, lon=-15,38363

Average Height	1.5 °	Albedo Factor	0.97
Diffuse Factor	1.00	Albedo Fraction	100 %

Horizon profile

Azimuth [°]	-180	-166	-165	58	59	67	68	76	77	85	86	96	97
Height [°]	1.0	1.0	0.0	0.0	1.0	1.0	2.0	2.0	3.0	3.0	4.0	4.0	3.0
Azimuth [°]	98	99	101	102	103	115	116	120	121	124	125	146	147
Height [°]	3.0	4.0	4.0	3.0	4.0	4.0	5.0	5.0	7.0	7.0	8.0	8.0	7.0
Azimuth [°]	151	152	161	162	163	164	165	166	167	168	169	170	179
Height [°]	7.0	6.0	6.0	5.0	5.0	4.0	4.0	3.0	3.0	2.0	2.0	1.0	1.0

Sun Paths (Height / Azimuth diagram)





Project: Parcela 4

Variant: Generación existente en Arinaga

PVsyst V7.4.2

VC1, Simulation date:
02/10/23 21:11
with v7.4.2

Groupe Casino IGC S (France)

Main results

System Production

Produced Energy

4583911 kWh/year

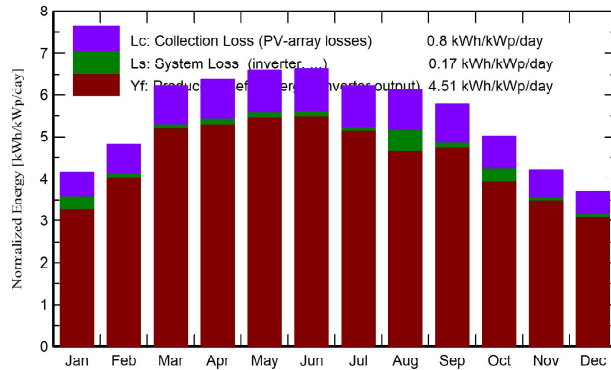
Specific production

1645 kWh/kWp/year

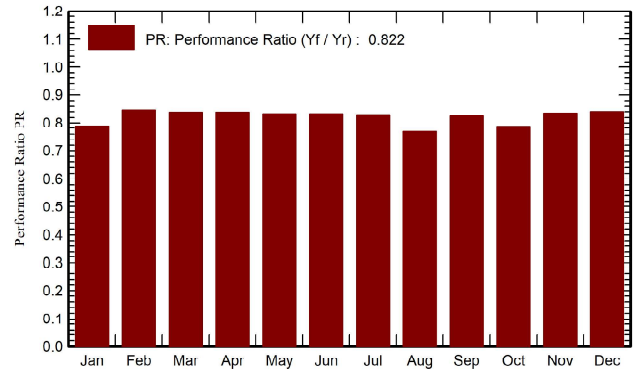
Perf. Ratio PR

82.17 %

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
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February	119.1	46.84	18.10	134.7	126.6	323946	317098	0.845
March	177.2	60.38	18.34	192.8	181.6	460505	449885	0.838
April	185.9	70.13	18.89	190.9	180.2	455998	445496	0.838
May	206.9	78.89	20.24	204.3	192.6	485285	474022	0.833
June	204.5	87.11	21.50	198.6	187.5	471216	460425	0.832
July	195.7	97.52	23.47	192.7	181.9	455402	445186	0.829
August	188.0	94.41	23.97	189.4	179.0	447219	405142	0.768
September	164.3	64.30	23.67	173.3	163.5	407514	398082	0.825
October	139.9	62.37	23.01	155.5	146.5	368266	341753	0.789
November	106.3	40.51	20.44	126.2	117.9	299715	293538	0.835
December	94.7	40.49	18.92	115.1	107.1	274705	269392	0.840
Year	1891.2	788.32	20.69	2002.5	1884.8	4760337	4583911	0.822

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



Project: Parcela 4

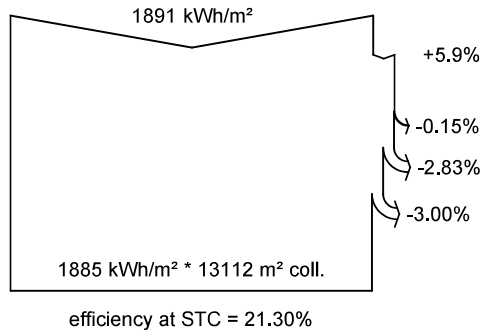
Variant: Generación existente en Arinaga

PVsyst V7.4.2

VC1, Simulation date:
02/10/23 21:11
with v7.4.2

Groupe Casino IGC S (France)

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

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

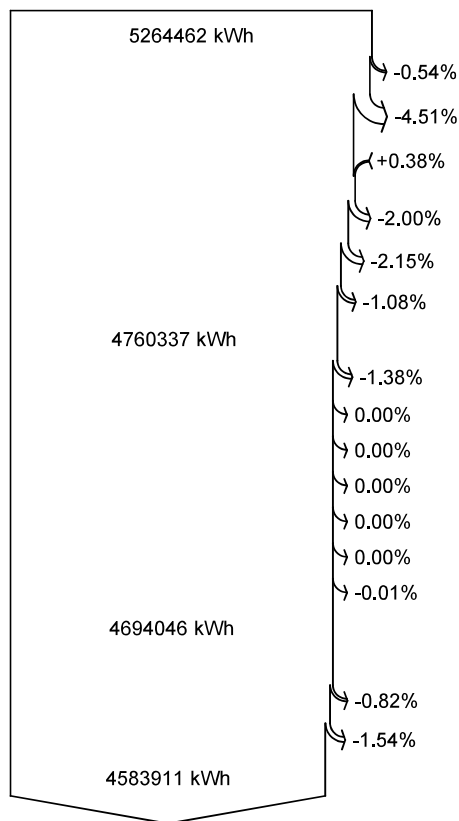
Night consumption

Available Energy at Inverter Output

AC ohmic loss

System unavailability

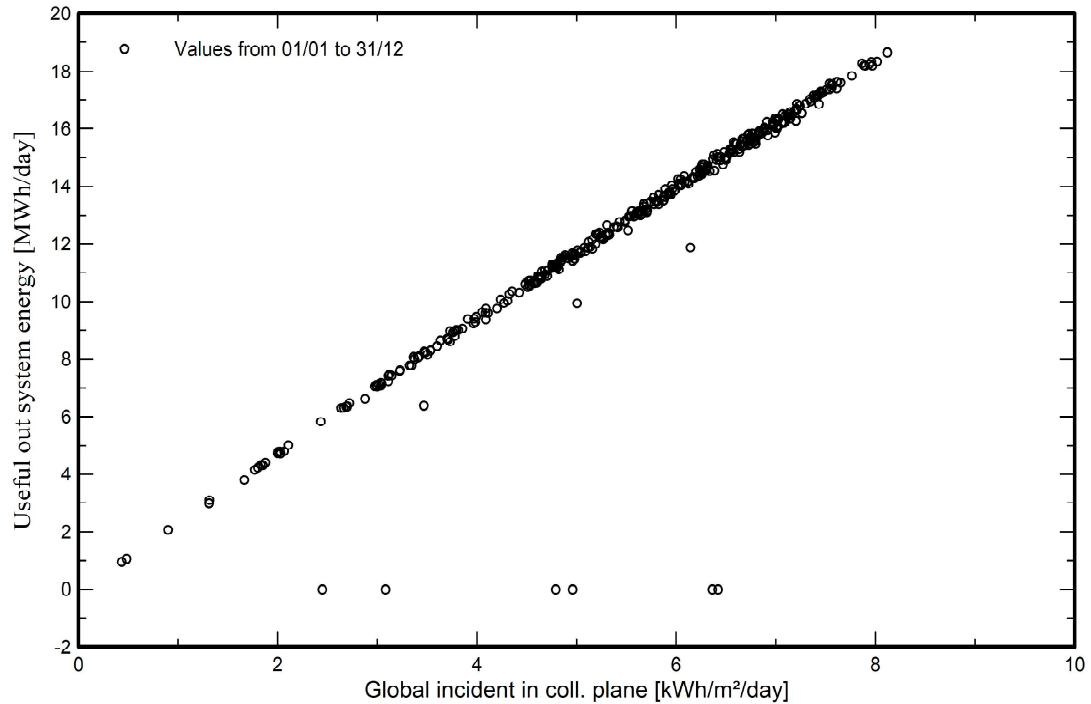
Energy injected into grid



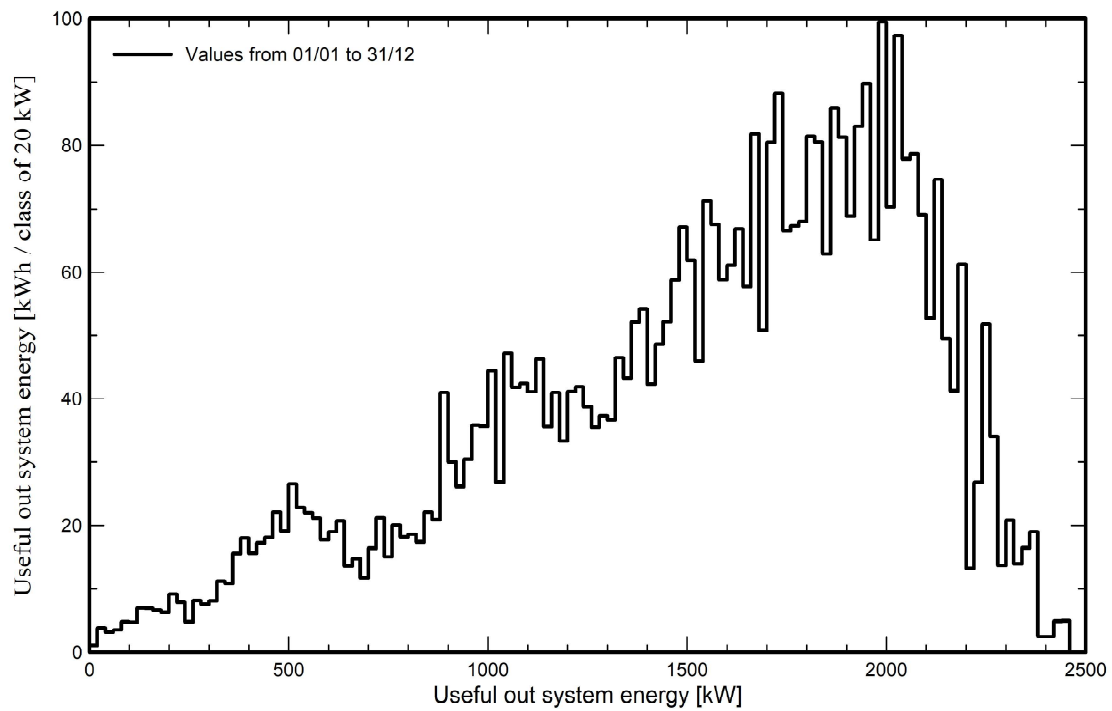


Predef. graphs

Diagrama entrada/salida diaria



Distribución de potencia de salida del sistema

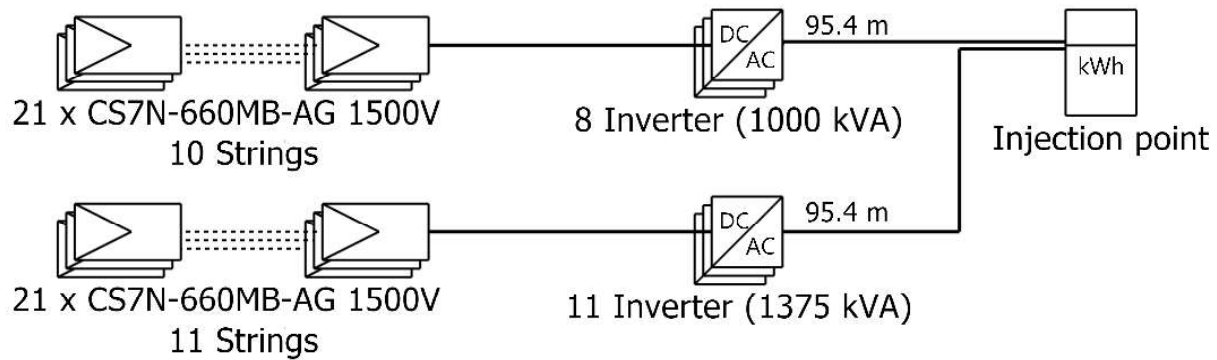




PVsyst V7.4.2

VC1, Simulation date:
02/10/23 21:11
with v7.4.2

Single-line diagram



PV module	CS7N-660MB-AG 1500V
Inverter	SUN2000-125KTL-M0
String	21 x CS7N-660MB-AG 1500V

Parcela 4

Groupe Casino IGC
S (France)

VC1 : Generación existente en Arinaga

30/10/23