

**PROGETTO PER LA REALIZZAZIONE DI UN IMPIANTO AGRIVOLTAICO
DENOMINATO "AGRO-SOLARE FISCAGLIA" DA UBICARSI IN AGRO DI
FISCAGLIA (FE) E DELLE RELATIVE OPERE DI CONNESSIONE**

Potenza nominale: 51,86 MWp - Potenza in immissione: 40,00 MW



ELABORATO

SIMULAZIONE ENERGETICA (PVSYST)

CODIFICA

PD01_20

SCALA

-

GRUPPO DI PROGETTAZIONE

NRG

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REV.	DATA	DESCRIZIONE	REDATTO	VERIFICATO	APPROVATO
0	Maggio 2026	PRESENTAZIONE ISTANZA	Ing. A. Milella	Ing. A. Milella	Ing. M. De Donno

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PVsyst - Simulation report

Grid-Connected System

ITS4FS-Fiscaglia

Variant: PD01_20 - Simulazione Energetica (PVsyst)

Impianto Agro-Solare "Fiscaglia"

System power: 51.87 MWp

La Chiarina - Italy

**PVsyst V8.0.6**

VC3, Simulation date:
29/05/26 08:31
with V8.0.6

Project summary**Geographical Site**

La Chiarina

Italy

Situation

Latitude 44.78 °N

Longitude 12.04 °E

Altitude 11 m

Time zone UTC+1

Project settings

Albedo 0.20

Weather data

La Chiarina

PVGIS-SARAH2 - 2020

System summary**Grid-Connected System**

Simulation for year no 1

Impianto Agro-Solare "Fiscaglia"**Orientation #1****Tracking plane, horizontal N-S axis**

Avg axis azim. 0 °

Phi min / max. +/- 60 °

Diffuse shading all trackers

Tracking algorithm

Astronomic calculation

Backtracking activated

Near Shadings

According to strings : Fast (table)

Electrical effect 100 %

User's needs

Unlimited load (grid)

System information**PV Array**

Nb. of modules 75168 units

Pnom total 51.87 MWp

Inverters

Nb. of units 158 units

Pnom total 47.40 MWac

Grid power limit 40.00 MWac

Grid lim. Pnom ratio 1.297

Results summary

Produced Energy	89379 MWh/year	Specific production	1723 kWh/kWp/year	Perf. Ratio PR	85.03 %
Apparent energy	95013 MVAh/year				

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General parameters**Grid-Connected System****Impianto Agro-Solare "Fiscaglia"****Models used**

Transposition	Perez
Diffuse	Imported DHI
Circumsolar	separate

Orientation #1**Tracking plane, horizontal N-S axis**

Avg axis azim.	0 °
Phi min / max.	-/+ 60 °
Diffuse shading	all trackers

Field properties

Nb. of trackers	1740 units
Tracking plane, horizontal N-S axis	

Sizes

Tracker Spacing	5.60 m
Collector width	2.38 m
Average GCR	42.5 %

Backtracking limit angle

Phi limits	+/- 64.8 °
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Backtracking parameters

Backtracking pitch	5.60 m
Backtracking width	2.38 m
Left inactive band	0.00 m
Right inactive band	0.00 m
Backtracking GCR	42.5 %
Parameters choice:	Automatic

Horizon

Free Horizon

Near Shadings

According to strings : Fast (table)	
Electrical effect	100 %

User's needs

Unlimited load (grid)

Bifacial system definition**Orientation #1****Bifacial system**

Model	Unlimited Trackers 2D model
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Bifacial model geometry

Tracker Spacing	5.60 m
Tracker width	2.38 m
GCR	42.5 %
Axis height above ground	3.13 m
Nb. of sheds	1740 units

Bifacial model definitions

Ground albedo	0.20
Bifaciality factor	75 %
Rear shading factor	5.0 %
Rear mismatch loss	10.0 %
Shed transparent fraction	0.0 %

Grid injection point**Grid power limitation**

Active power	40.00 MWac
Pnom ratio	1.297

Power factor

Cos(phi) (lagging)	0.944
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PV Array Characteristics**PV module**

Manufacturer	AIKO
Model	STELLAR AIKO-A690-GRH66Dw
(Custom parameters definition)	
Unit Nom. Power	690 Wp
Number of PV modules	75168 units
Nominal (STC)	51.87 MWp
Modules	3132 string x 24 In series



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PV Array Characteristics

PV module

At operating cond. (47°C)

Pmpp	49.00 MWp
U mpp	955 V
I mpp	51322 A

Inverter

Manufacturer	Huawei Technologies
Model	SUN2000-330KTL-H1
(Original PVsyst database)	

Unit Nom. Power	300 kWac
Number of inverters	158 units
Total power	47400 kWac
Operating voltage	550-1500 V
Max. power (=>30°C)	330 kWac
Pnom ratio (DC:AC)	1.09
Power sharing within this inverter	

Total PV power

Nominal (STC)	51866 kWp
Total	75168 modules
Module area	203043 m ²

Total inverter power

Total power	47400 kWac
Max. power	52140 kWac
Number of inverters	158 units
Pnom ratio	1.09
Inverter PNom limit defined as apparent power	

Array losses

Array Soiling Losses

Loss Fraction	2.0 %
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Thermal Loss factor

Module temperature according to irradiance	
Uc (const)	29.0 W/m ² K
Uv (wind)	0.0 W/m ² K/m/s

DC wiring losses

Global array res.	0.30 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 %
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Module Quality Loss

Loss Fraction	-0.8 %
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Module mismatch losses

Loss Fraction	2.0 % at MPP
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Strings Mismatch loss

Loss Fraction	0.1 %
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Module average degradation

Year no	1
Loss factor	0.4 %/year
I _{mp} / V _{mp} contributions	80% / 20%

Mismatch due to degradation

I _{mp} RMS dispersion	0.4 %/year
V _{mp} RMS dispersion	0.4 %/year

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	0.963	0.892	0.814	0.679	0.438	0.000

System losses

Auxiliaries loss

constant (fans)	20.0 kW
0.0 kW from Power thresh.	
Night aux. cons.	10.0 kW

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AC wiring losses**Inv. output line up to MV transfo**

Inverter voltage 800 Vac tri
Loss Fraction 1.46 % at STC

Inverter: SUN2000-330KTL-H1

Wire section (158 Inv.) Alu 158 x 3 x 185 mm²
Average wires length 150 m

MV line up to Injection

MV Voltage 36 kV
Wires Alu 3 x 1000 mm²
Length 7700 m
Loss Fraction 1.08 % at STC

AC losses in transformers**MV transfo**

Medium voltage 36 kV

Transformer parameters

Nominal power at STC 51.33 MVA
Iron Loss (24/24 Connexion) 47.40 kVA
Iron loss fraction 0.09 % at STC
Copper loss 555.31 kVA
Copper loss fraction 1.08 % at STC
Coils equivalent resistance 3 x 0.13 mΩ

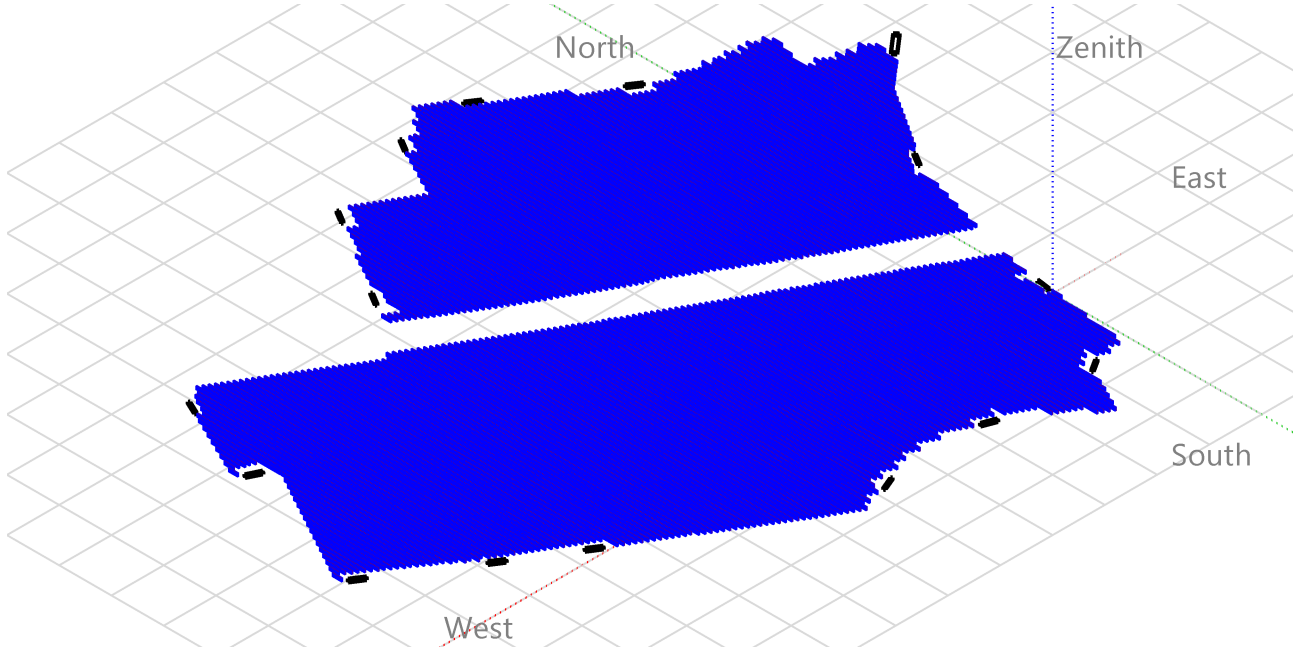


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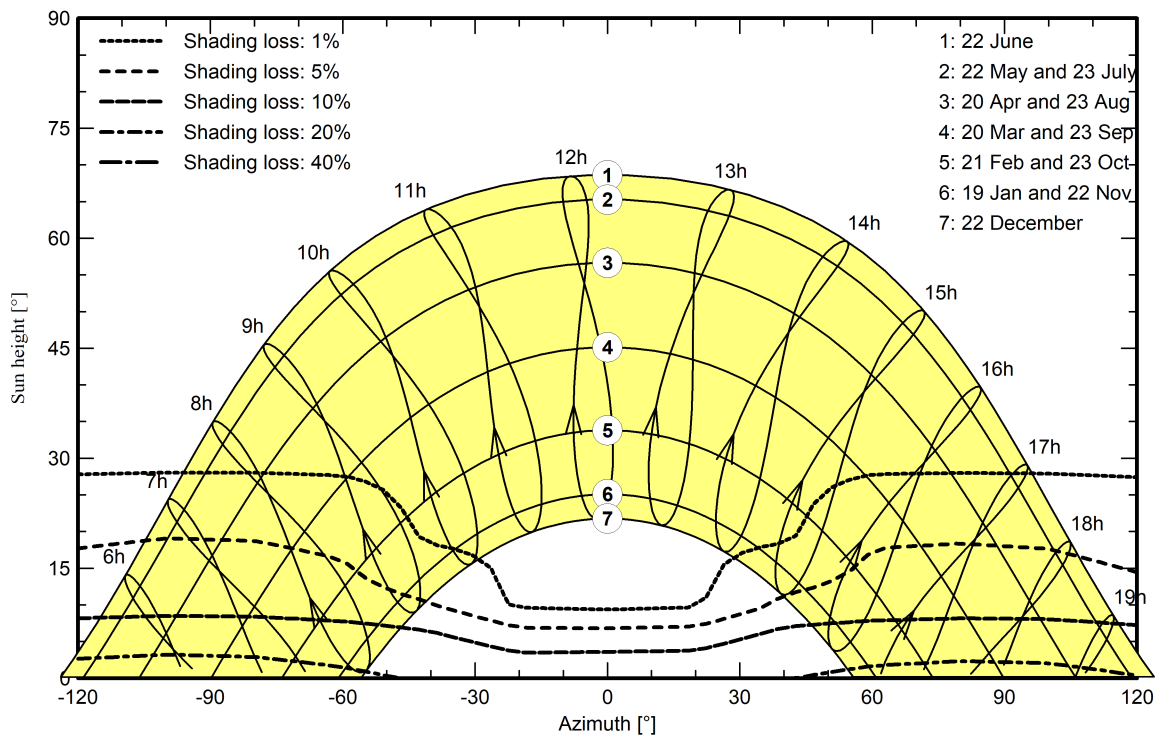
Near shadings parameter

Perspective of the PV-field and surrounding shading scene



Iso-shadings diagram

Orientation #1





PVsyst V8.0.6

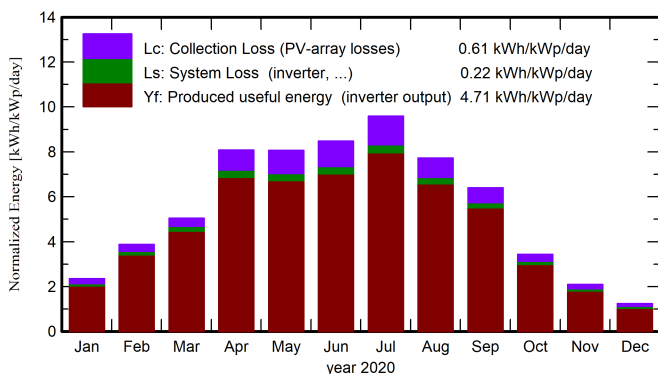
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Main results

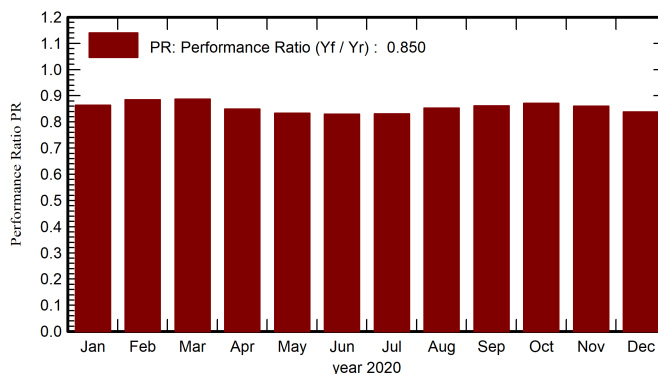
System Production

Produced Energy (P50)	89379 MWh/year	Specific production (P50)	1723 kWh/kWp/year	Perf. Ratio PR	85.03 %
Produced Energy (P90)	80318 MWh/year	Specific production (P90)	1549 kWh/kWp/year		
Produced Energy (P95)	77768 MWh/year	Specific production (P95)	1499 kWh/kWp/year		
Apparent energy	95013 MVAh/year				

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 MWh	E_Grid MWh	PR ratio
Jan. 20	53.7	23.22	5.53	73.0	66.5	3445	3273	0.864
Feb. 20	82.5	31.21	8.93	112.4	105.1	5385	5157	0.884
Mar. 20	119.9	47.82	9.84	156.6	147.8	7532	7201	0.887
Apr. 20	181.8	51.34	14.19	242.7	231.3	11195	10694	0.850
May 20	195.4	73.20	19.02	250.1	238.0	11316	10818	0.834
June 20	198.3	73.13	22.67	254.3	242.1	11450	10941	0.829
July 20	227.0	67.14	25.57	297.3	284.2	13395	12806	0.830
Aug. 20	182.5	65.88	26.32	239.6	228.2	11058	10590	0.852
Sep. 20	143.4	54.52	22.18	192.1	182.0	8946	8582	0.862
Oct. 20	83.2	41.29	15.41	106.7	99.4	5047	4818	0.871
Nov. 20	49.6	26.65	10.91	63.1	57.7	2979	2816	0.860
Dec. 20	32.3	21.33	7.66	38.7	34.8	1824	1684	0.838
Year	1549.6	576.71	15.70	2026.6	1917.0	93572	89379	0.850

Legends

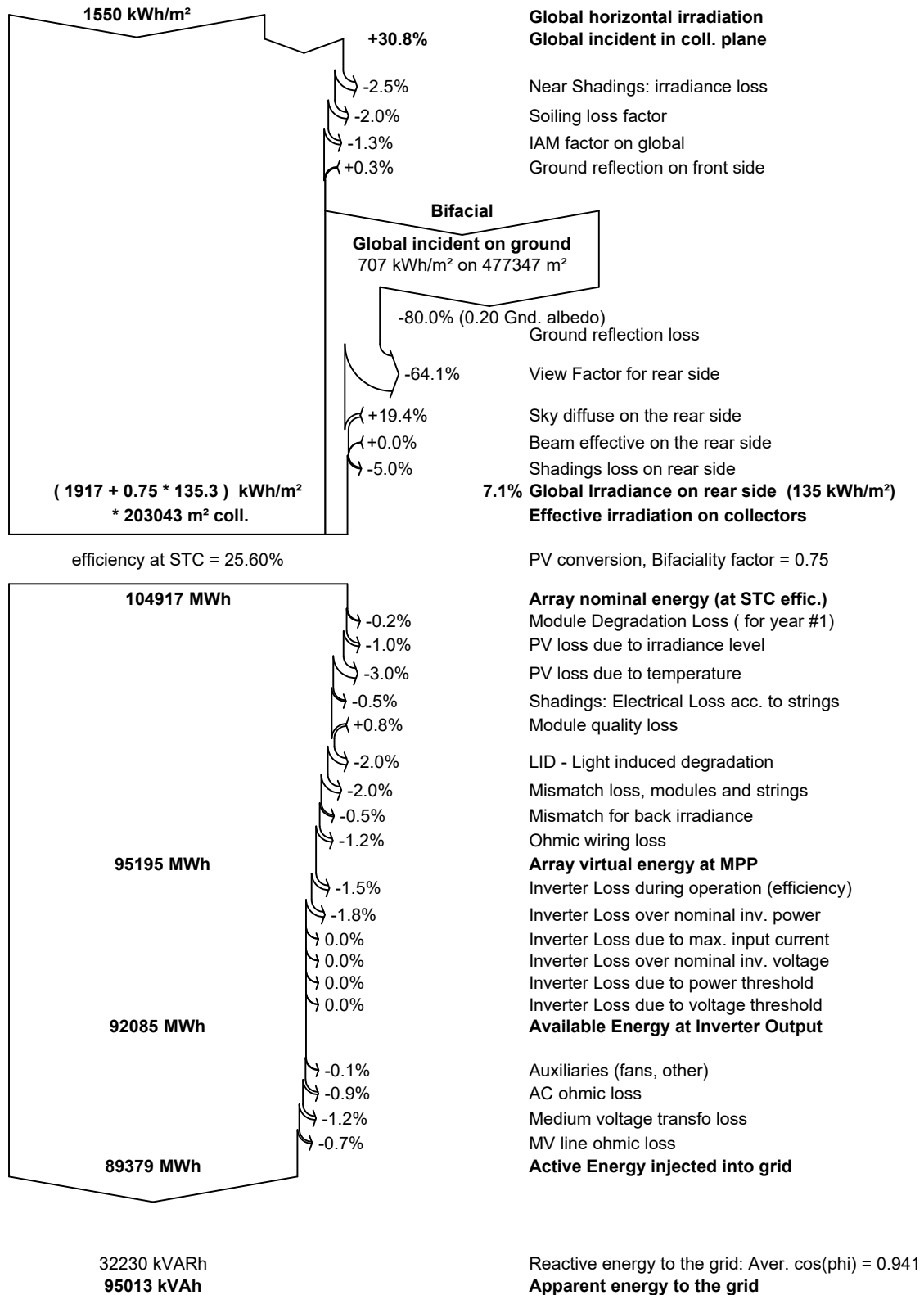
GlobHor	Global horizontal irradiation	EArray	Effective energy at the output of the array
DiffHor	Horizontal diffuse irradiation	E_Grid	Energy injected into grid
T_Amb	Ambient Temperature	PR	Performance Ratio
GlobInc	Global incident in coll. plane		
GlobEff	Effective Global, corr. for IAM and shadings		



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Loss diagram



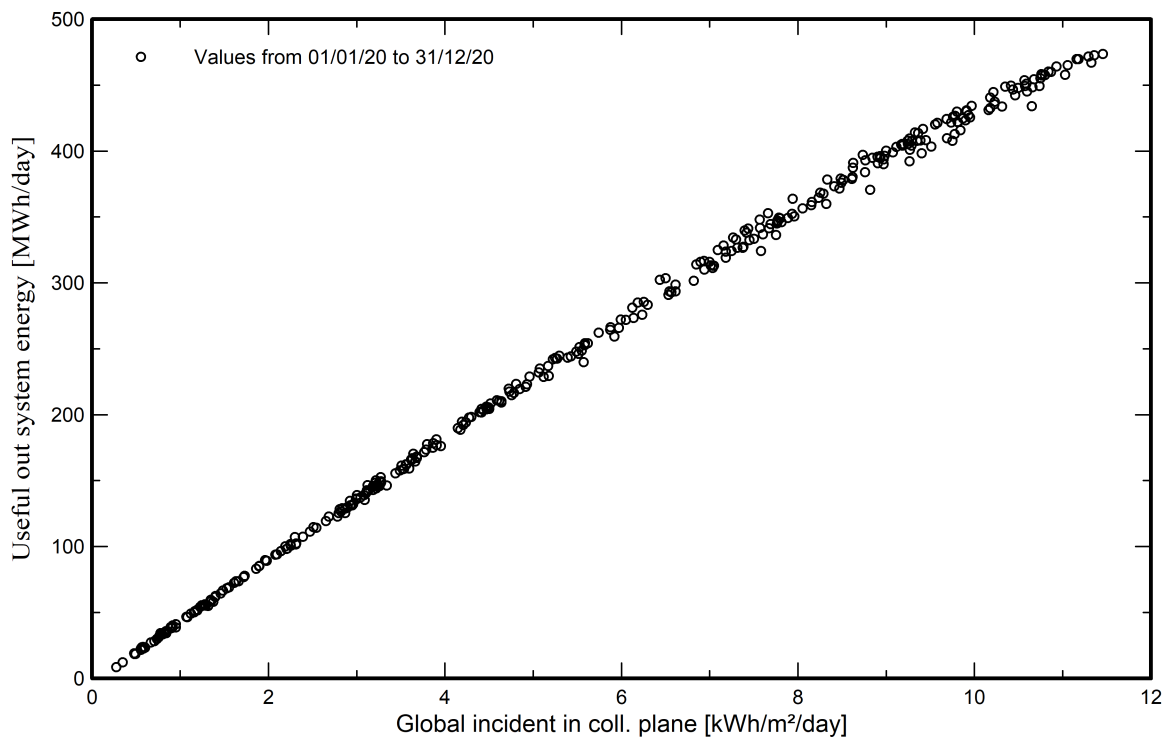


PVsyst V8.0.6

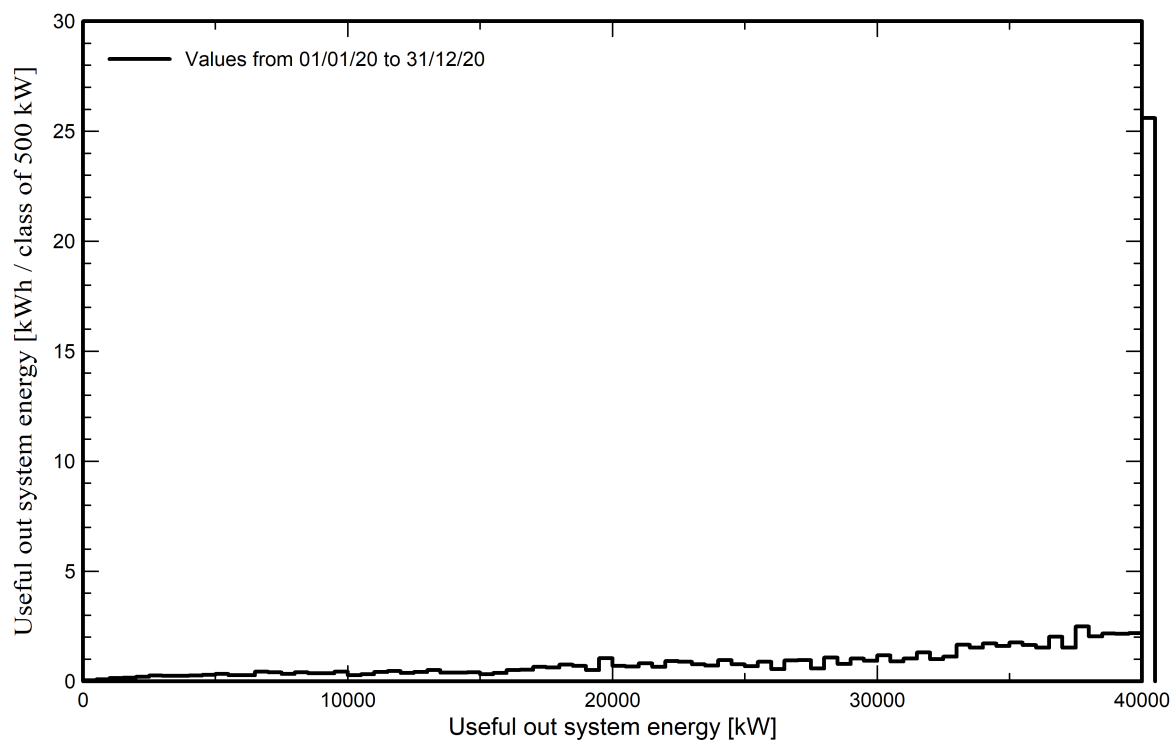
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Predef. graphs

Diagramma giornaliero entrata/uscita



Distribuzione potenza in uscita sistema





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Aging Tool

Aging Parameters

Time span of simulation 30 years

Module average degradation

Loss factor 0.4 %/year

Mismatch due to degradation

Imp RMS dispersion 0.4 %/year

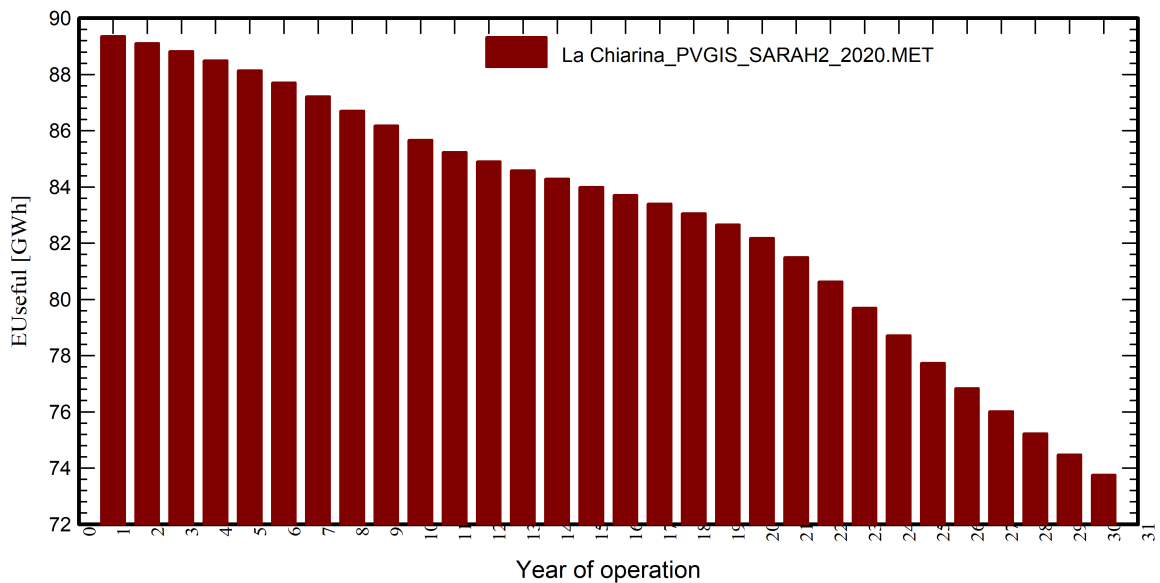
Vmp RMS dispersion 0.4 %/year

Weather data used in the simulation

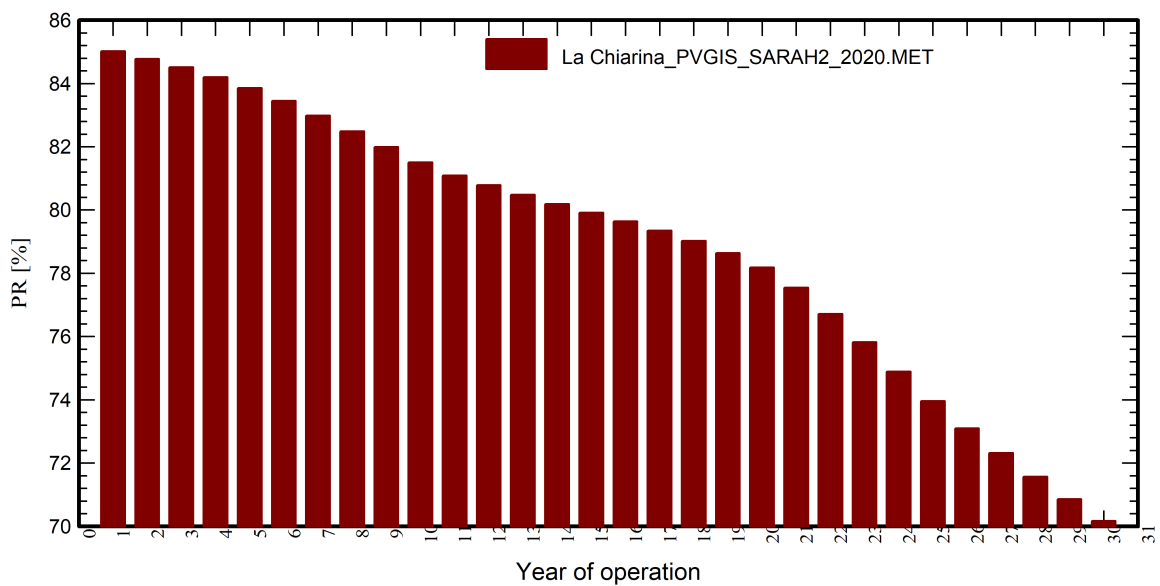
La Chiarina PVGIS SARAH2

Years 2020

Useful out system energy



Performance Ratio



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Aging Tool**Aging Parameters**

Time span of simulation 30 years

Module average degradation

Loss factor 0.4 %/year

Mismatch due to degradation

Imp RMS dispersion 0.4 %/year

Vmp RMS dispersion 0.4 %/year

Weather data used in the simulation

La Chiarina PVGIS SARA2

Years 2020

	EUseful	PR	PR loss
Year	GWh	%	%
1	89.37	85.02	-0.14
2	89.11	84.78	-0.42
3	88.83	84.51	-0.74
4	88.50	84.20	-1.10
5	88.14	83.85	-1.52
6	87.71	83.45	-1.98
7	87.22	82.98	-2.54
8	86.70	82.49	-3.11
9	86.18	81.99	-3.70
10	85.67	81.50	-4.28
11	85.24	81.09	-4.76
12	84.91	80.78	-5.12
13	84.59	80.48	-5.47
14	84.29	80.19	-5.81
15	84.00	79.91	-6.14
16	83.71	79.64	-6.46
17	83.41	79.35	-6.80
18	83.06	79.02	-7.19
19	82.66	78.64	-7.63
20	82.18	78.18	-8.17
21	81.50	77.54	-8.93
22	80.64	76.71	-9.90
23	79.70	75.82	-10.95
24	78.72	74.89	-12.04
25	77.74	73.96	-13.13
26	76.84	73.10	-14.14
27	76.02	72.32	-15.06
28	75.23	71.57	-15.94
29	74.48	70.86	-16.77
30	73.76	70.17	-17.58

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P50 - P90 evaluation**Weather data**

Source	PVGIS-SARAH2
Kind	Monthly averages
2020 - Multi-year average	
Year-to-year variability(Variance)	7.7 %

Specified Deviation

Climate change	0.0 %
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Global variability (weather data + system)

Variability (Quadratic sum)	7.9 %
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Simulation and parameters uncertainties

PV module modelling/parameters	1.0 %
Inverter efficiency uncertainty	0.5 %
Soiling and mismatch uncertainties	1.0 %
Degradation uncertainty	1.0 %

Annual production probability

Variability	7.07 GWh
P50	89.38 GWh
P90	80.32 GWh
P95	77.77 GWh

Probability distribution