REGIONE PUGLIA | COMUNE DI POGGIO IMPERIALE | COMUNE DI LESINA | COMUNE DI SAN PAOLO CIVITATE | COMUNE DI APRICENA

Nome Progetto / Projet Name

IMPIANTO AGRIVOLTAICO, DENOMINATO POGGIO 3 POTENZA INSTALLATA 18,06 MW CON PANNELLI SU SUPPORTO TRACKER AD ASSE ORIZZONTALE IN AGRO DI POGGIO IMPERIALE, SAN PAOLO CIVITATE, APRICENA E RELATIVE OPERE DI CONNESSIONE

committente

GC POGGIO III

MILIO FABRIZIO
2023.03.16 20:43:26
Signer:
CN=MILIO FABRIZIO
C=IT
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2.5.4.42=FABRIZIO
Public key:
RSA/2048 bits

Titolo documento /Document title

Relazione sulla producibilità

Tavola /Pannel: 01

Codice elaborato /Code processed: PG3_REL_FV_PRD_005

N.	Data Revisione	Descrizione revisione	Preparato	Vagliato	Approvato
00	31/10/2022	PROGETTO DEFINITIVO	P.D.B.		

Specialista / Specialist

Ing. Pasquale DE BONIS

Sviluppatore / Developer

RENEWABLE CONSULTING

Progettisti / Planner

RENEWABLE CONSULTING S.R.L.

ORDINE DEGLI INGEGNERI DELLA PROVINCIA DI FOGGIA
Dott. Ing. Pasquale DE BONIS
N° 832
Sezione: B
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DE BONIS PASQUALE
13.03.2023 16:19:43 UTC

Nome file	Dimensione cartiglio	Scala
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SOMMARIO

ALLEGATI:

- REPORT PVSYST

1. PREMESSA

Il presente documento è parte integrante del progetto definitivo redatto per la realizzazione della connessione elettrica alla rete di Terna SpA, in riferimento all'impianto di produzione di energia elettrica da fonte fotovoltaica denominato **GC POGGIO IMP III**, da realizzarsi in agro dei comuni di Poggio Imperiale (FG), caratterizzato da una potenza di 18,06 MWp.

2. CALCOLO PRODUCIBILITà IMPIANTO

La valutazione della producibilità è stata eseguita tramite simulazione software con l'inserimento dei dati geometrici ed elettrici dell'impianto, geolocalizzando il sito per i dati meteorologici annuali calcolando quindi puntualmente i diversi orientamenti ottenuti dal movimento delle strutture ad inseguimento durante la giornata.
Da tale report si evince che la producibilità attesa media annua dell'impianto è pari a **29040 MWh/anno** con una produzione specifica pari a **1608 kWh/kWp/a**.

Version 7.2.21

PVsyst - Simulation report

Grid-Connected System

Project: STMG 3

Variant: interasse 5m

Tracking system

System power: 18.06 MWp

Poggio Imperiale - Italy

Author

ING. PASQUALE DE BONIS (Italy)

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Project summary

Geographical Site
Poggio Imperiale
Italy

Situation

Latitude	41.83 °N
Longitude	15.37 °E
Altitude	68 m
Time zone	UTC+1

Project settings
Albedo 0.20

Meteo data
Poggio Imperiale
Meteonorm 7.3 (1991-2010), Sat=74% - Sintetico

System summary

Grid-Connected System

Tracking system

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

Tracking algorithm
Astronomic calculation

Near Shadings
Linear shadings

System information

PV Array		Inverters	
Nb. of modules	29848 units	Nb. of units	45 units
Pnom total	18.06 MWp	Pnom total	14.40 MWac
		Pnom ratio	1.254

User's needs
Unlimited load (grid)

Results summary

Produced Energy	29.04 GWh/year	Specific production	1608 kWh/kWp/year	Perf. Ratio PR	78.90 %

Table of contents

General parameters

Grid-Connected System

Tracking system

PV Field Orientation

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

Tracking algorithm
Astronomic calculation

Trackers configuration
Nb. of trackers 455 units

Sizes
Tracker Spacing 5.00 m
Collector width 2.26 m
Ground Cov. Ratio (GCR) 45.1 %
Phi min / max. -/+ 60.0 °

Shading limit angles
Phi limits +/- 63.0 °

Models used
Transposition Perez
Diffuse Perez, Meteonorm
Circumsolar separate

Horizon
Free Horizon

Near Shadings
Linear shadings

User's needs
Unlimited load (grid)

PV Array Characteristics

PV module

Manufacturer	Risen Energy Co., Ltd
Model	RSM120-8-605M
(Custom parameters definition)	
Unit Nom. Power	605 Wp
Number of PV modules	29848 units
Nominal (STC)	18.06 MWp
Modules	1148 Strings x 26 In series
At operating cond. (50°C)	
Pmpp	16.53 MWp
U mpp	821 V
I mpp	20148 A

Inverter

Manufacturer	Sungrow
Model	SG350HX-20A-Preliminary
(Custom parameters definition)	
Unit Nom. Power	320 kWac
Number of inverters	45 units
Total power	14400 kWac
Operating voltage	500-1500 V
Max. power (=>30°C)	352 kWac
Pnom ratio (DC:AC)	1.25

Total PV power

Nominal (STC)	18058 kWp
Total	29848 modules
Module area	84473 m²
Cell area	79157 m²

Total inverter power

Total power	14400 kWac
Number of inverters	45 units
Pnom ratio	1.25

Array losses

Thermal Loss factor
Module temperature according to irradiance
Uc (const) 20.0 W/m²K
Uv (wind) 0.0 W/m²K/m/s

DC wiring losses
Global array res. 0.67 mΩ
Loss Fraction 1.5 % at STC

LID - Light Induced Degradation
Loss Fraction 1.6 %

Module Quality Loss
Loss Fraction -0.8 %

Module mismatch losses
Loss Fraction 2.0 % at MPP

Strings Mismatch loss
Loss Fraction 0.1 %

IAM loss factor
Incidence effect (IAM): Fresnel, AR coating, n(glass)=1.526, n(AR)=1.290

0°	30°	50°	60°	70°	75°	80°	85°	90°
1.000	0.999	0.987	0.962	0.892	0.816	0.681	0.440	0.000

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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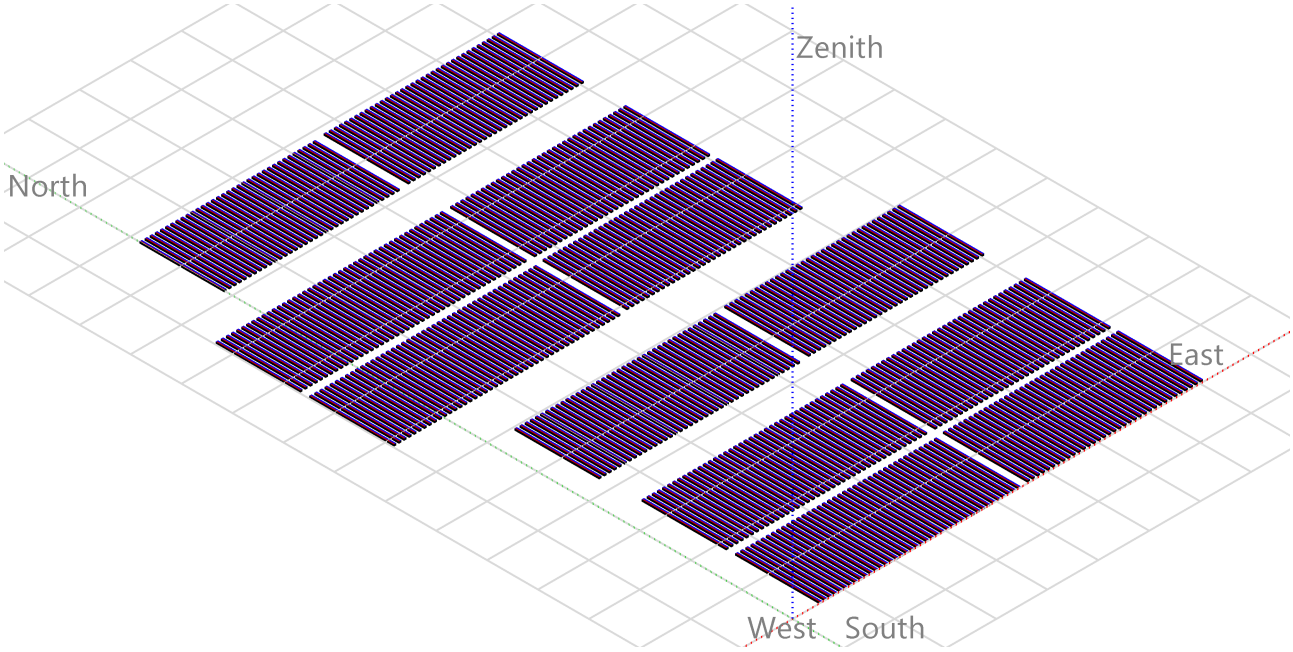
with v7.2.21

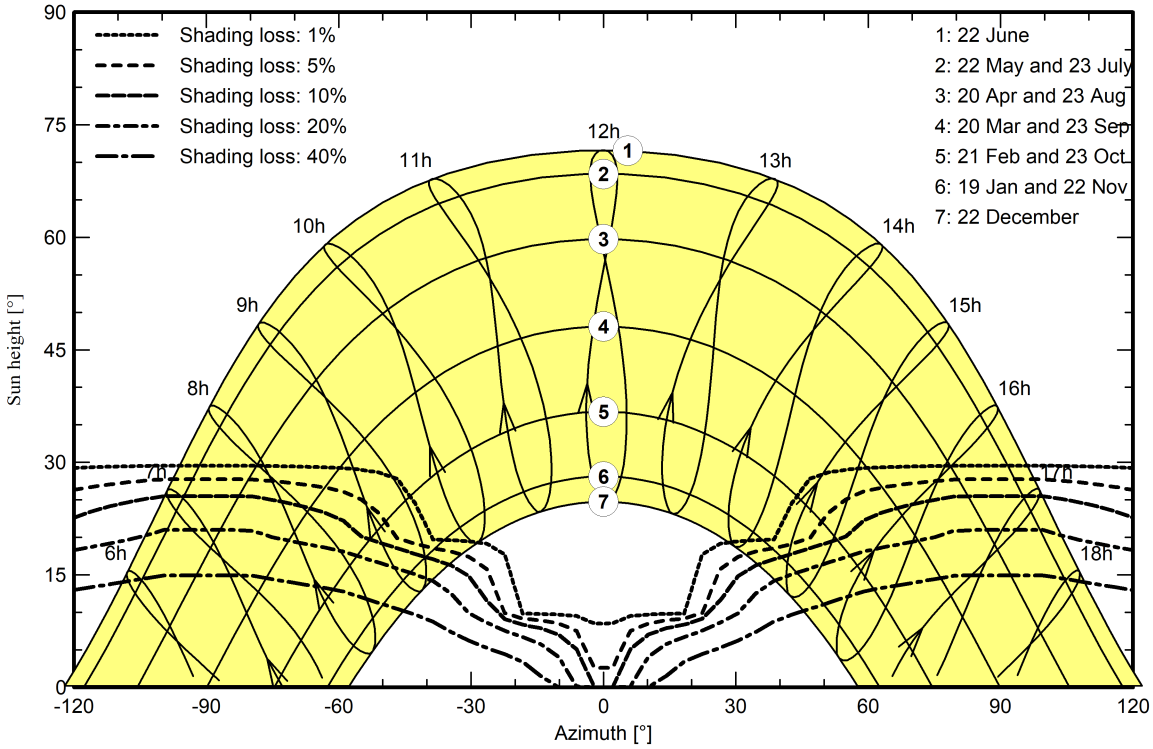
Near shadings parameter

Perspective of the PV-field and surrounding shading scene



Iso-shadings diagram

Orientation #1



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05/11/22 10:30
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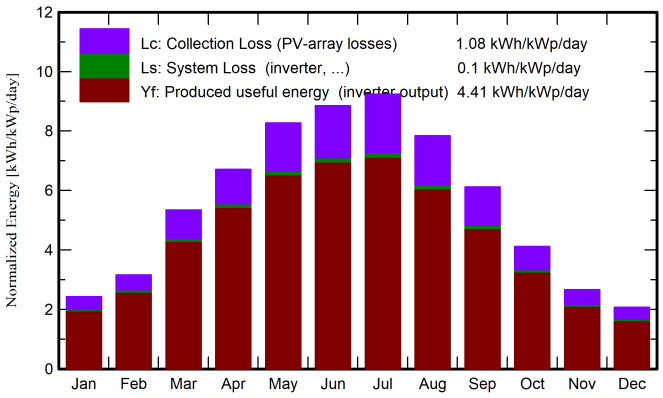
Main results

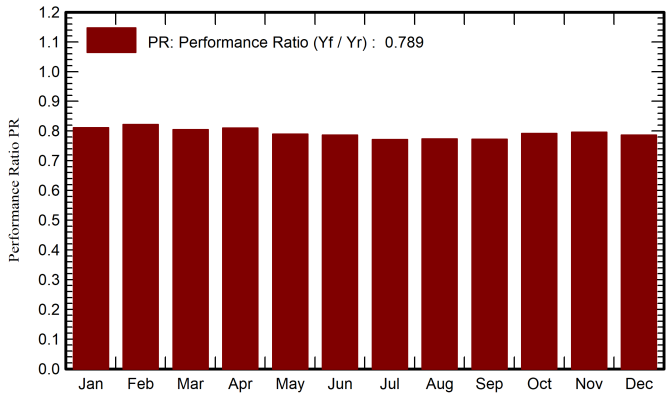
System Production

Produced Energy	29.04 GWh/year	Specific production	1608 kWh/kWp/year
		Performance Ratio PR	78.90 %

Normalized productions (per installed kWp)



Performance Ratio PR



Balances and main results

	GlobHor kWh/m²	DiffHor kWh/m²	T_Amb °C	GlobInc kWh/m²	GlobEff kWh/m²	EArray GWh	E_Grid GWh	PR ratio
January	53.3	24.19	7.70	75.2	64.5	1.132	1.101	0.811
February	67.4	39.13	8.01	88.4	77.1	1.345	1.311	0.821
March	118.5	50.86	11.13	165.7	146.2	2.461	2.407	0.804
April	151.2	68.61	13.83	201.4	181.9	3.010	2.947	0.810
May	191.3	81.29	19.83	256.4	233.7	3.734	3.658	0.790
June	202.1	86.08	23.99	265.8	245.3	3.852	3.775	0.787
July	212.8	86.25	27.14	286.7	262.6	4.074	3.993	0.771
August	180.1	77.57	26.64	243.1	221.5	3.468	3.397	0.774
September	132.4	58.39	20.93	183.7	162.0	2.619	2.563	0.773
October	92.8	45.36	17.58	127.8	112.0	1.871	1.828	0.792
November	57.3	29.44	12.34	79.8	68.6	1.179	1.147	0.796
December	45.5	24.19	9.02	64.4	53.7	0.942	0.914	0.786
Year	1504.7	671.36	16.57	2038.4	1829.0	29.686	29.042	0.789

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

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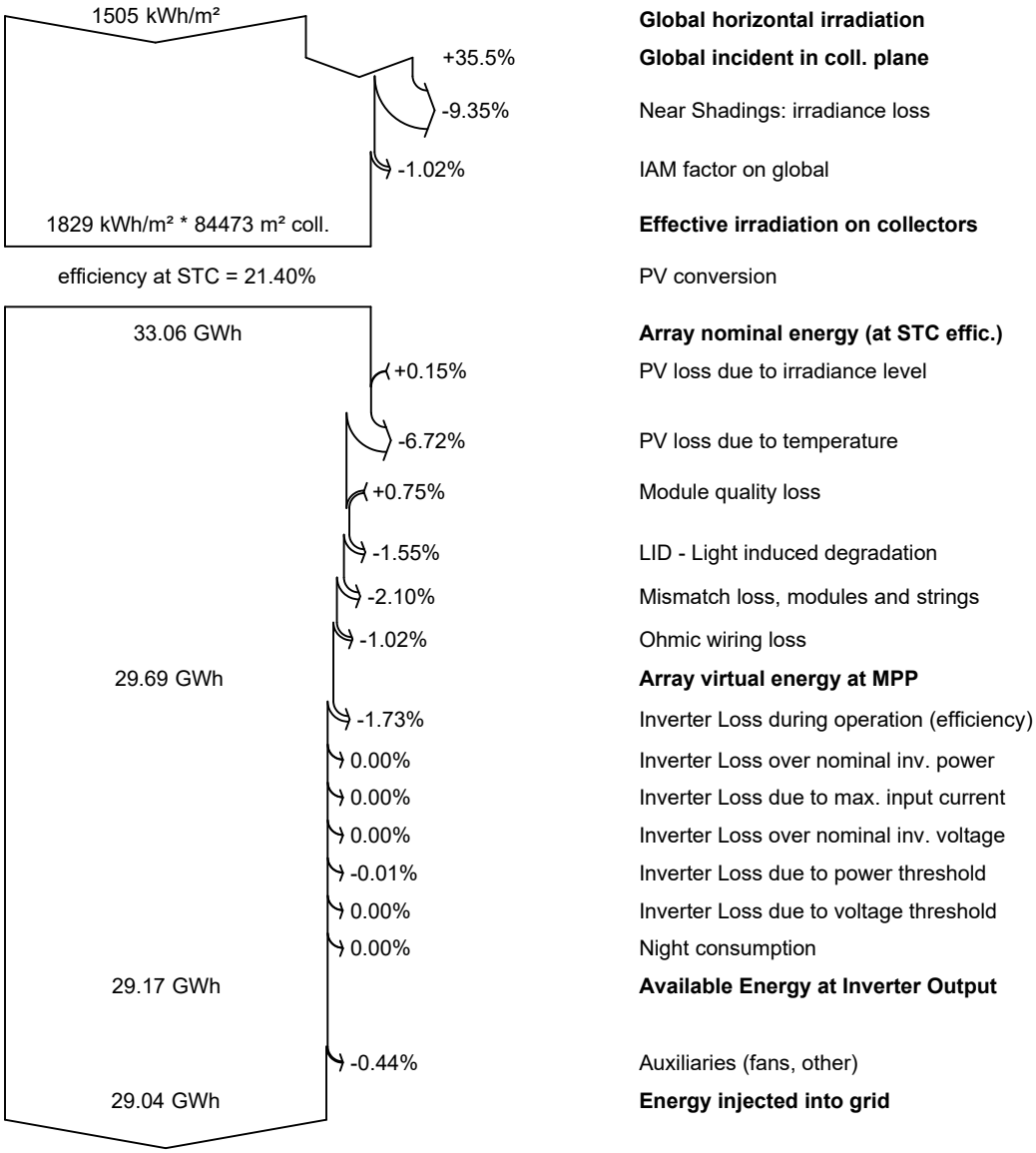
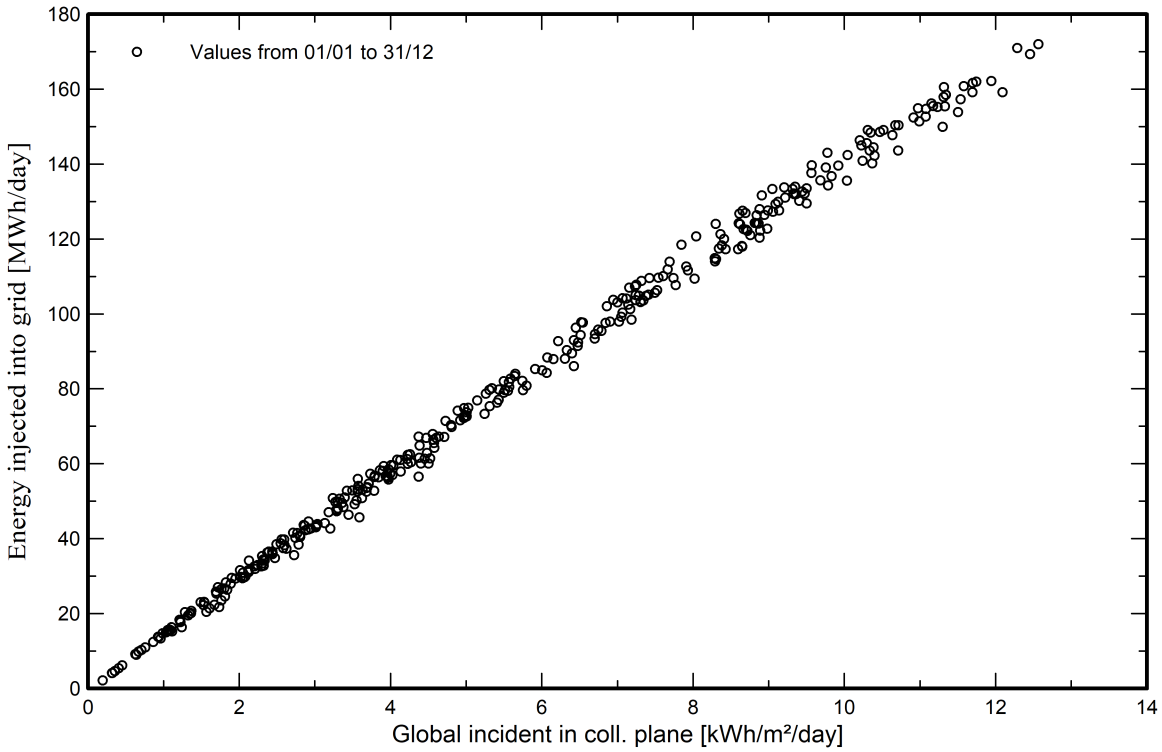
VC2, Simulation date:
05/11/22 10:30
with v7.2.21

Loss diagram

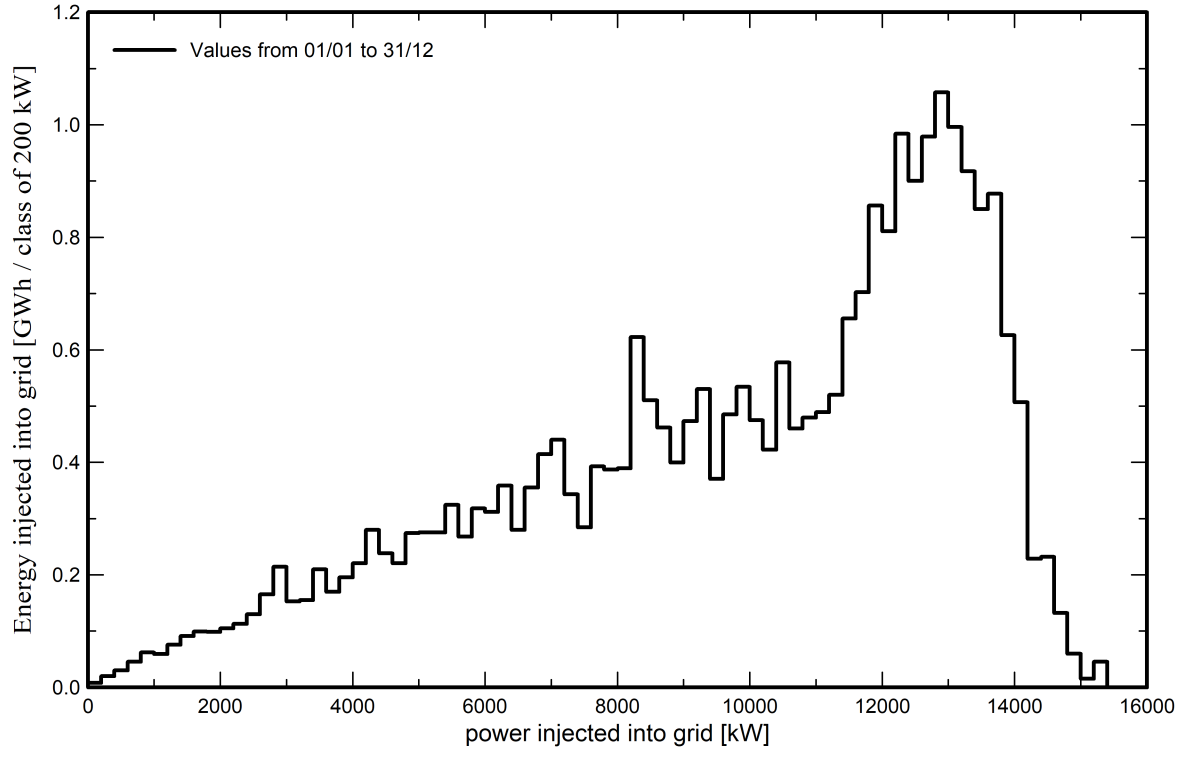


Special graphs

Diagramma giornaliero entrata/uscita



Distribuzione potenza in uscita sistema



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VC2, Simulation date:
05/11/22 10:30
with v7.2.21

P50 - P90 evaluation

Meteo data

Source	Meteonorm 7.3 (1991-2010), Sat=74%
Kind	Not defined
Year-to-year variability(Variance)	0.5 %
Specified Deviation	

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 %

Global variability (meteo + system)

Variability (Quadratic sum)	1.9 %

Annual production probability

Variability	0.54 GWh
P50	29.04 GWh
P90	28.35 GWh
P95	28.15 GWh

Probability distribution