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 4 POTENZA INSTALLATA 14,99 MW CON PANNELLI SU SUPPORTO TRACKER AD ASSE ORIZZONTALE IN AGRO DI POGGIO IMPERIALE, SAN PAOLO DI CIVITATE, LESINA E RELATIVE OPERE DI CONNESSIONE

committente

GC POGGIO IMP IV

MILIO FABRIZIO
2023.03.16 21:17:41
Signer:
CN=MILIO FABRIZIO
C=IT
2.5.4.4=MILIO
2.5.4.42=FABRIZIO
Public key:
RSA/2048 bits

Titolo documento /Document title

Relazione tecnica sulla producibilità

Tavola /Pannel

Codice elaborato /Code processed

PG4_REL_FV_PRD_005

N.	Data Revisione	Descrizione revisione	Preparato	Vagliato	Approvato
00	11/2022	PROGETTO DEFINITIVO			

Specialista / Specialist

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RENEWABLE CONSULTING

Progettisti / Planner

Renewable Consulting Srl

Nome file	Dimensione cartiglio	Scala

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 IV**, da realizzarsi in agro dei comuni di Poggio Imperiale (FG), caratterizzato da una potenza di 14,99 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 **24085 MWh/anno** con una produzione specifica pari a **1607 kWh/kWp/a**.

Version 7.2.21

PVsyst - Simulation report

Grid-Connected System

Project: STMG 4

Variant: interasse 5m

Tracking system

System power: 14.99 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	24778 units	Nb. of units	39 units
Pnom total	14.99 MWp	Pnom total	12.48 MWac
		Pnom ratio	1.201

User's needs
Unlimited load (grid)

Results summary

Produced Energy	24.09 GWh/year	Specific production	1607 kWh/kWp/year	Perf. Ratio PR	78.82 %

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 382 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 24778 units
Nominal (STC) 14.99 MWp

Inverter
Manufacturer Sungrow
Model SG350HX-20A-Preliminary
(Custom parameters definition)
Unit Nom. Power 320 kWac
Number of inverters 39 units
Total power 12480 kWac

Array #1 - Sottocampo #1
Number of PV modules 5486 units
Nominal (STC) 3319 kWp
Modules 211 Strings x 26 In series
At operating cond. (50°C)
Pmpp 3039 kWp
U mpp 821 V
I mpp 3703 A

Number of inverters 9 units
Total power 2880 kWac
Operating voltage 500-1500 V
Max. power (=>30°C) 352 kWac
Pnom ratio (DC:AC) 1.15

Array #2 - Sottocampo #2
Number of PV modules 19292 units
Nominal (STC) 11.67 MWp
Modules 742 Strings x 26 In series
At operating cond. (50°C)
Pmpp 10.69 MWp
U mpp 821 V
I mpp 13022 A

Number of inverters 30 units
Total power 9600 kWac
Operating voltage 500-1500 V
Max. power (=>30°C) 352 kWac
Pnom ratio (DC:AC) 1.22

Total PV power
Nominal (STC) 14991 kWp
Total 24778 modules
Module area 70125 m²
Cell area 65711 m²

Total inverter power
Total power 12480 kWac
Number of inverters 39 units
Pnom ratio 1.20

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Array losses

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

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

DC wiring losses

Global wiring resistance 0.80 mΩ
Loss Fraction 1.5 % at STC

Array #1 - Sottocampo #1
Global array res. 3.6 mΩ
Loss Fraction 1.5 % at STC

Array #2 - Sottocampo #2
Global array res. 1.0 mΩ
Loss Fraction 1.5 % at STC

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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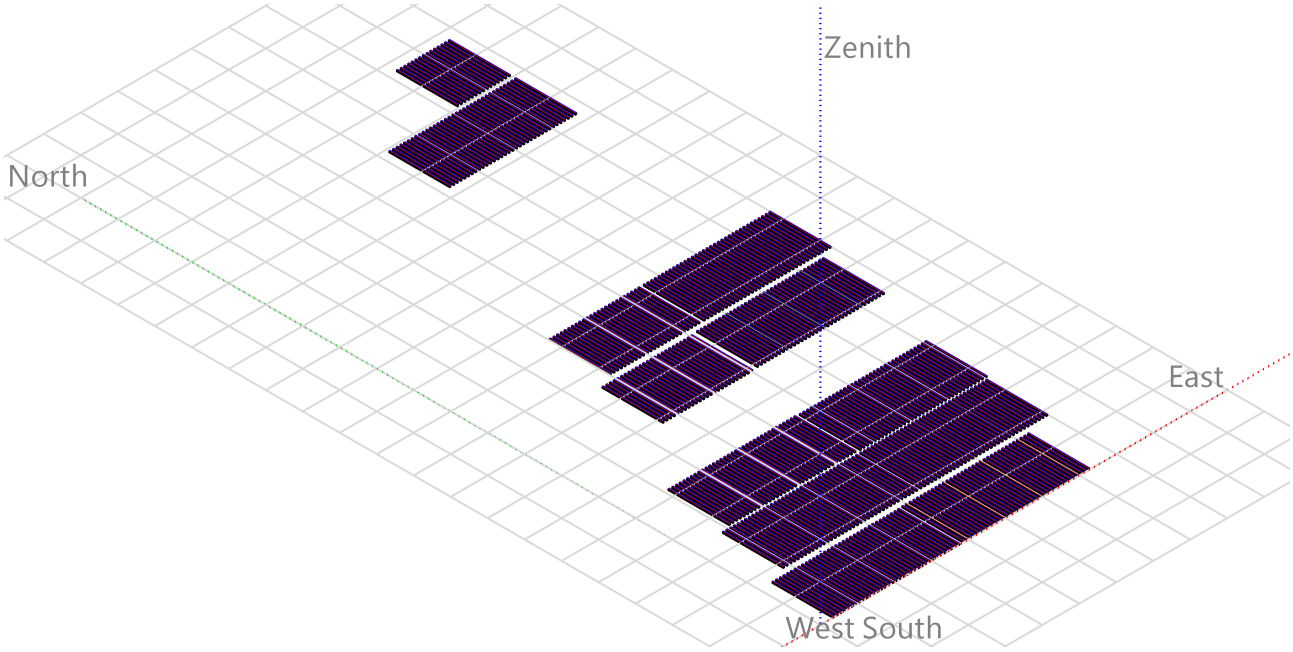
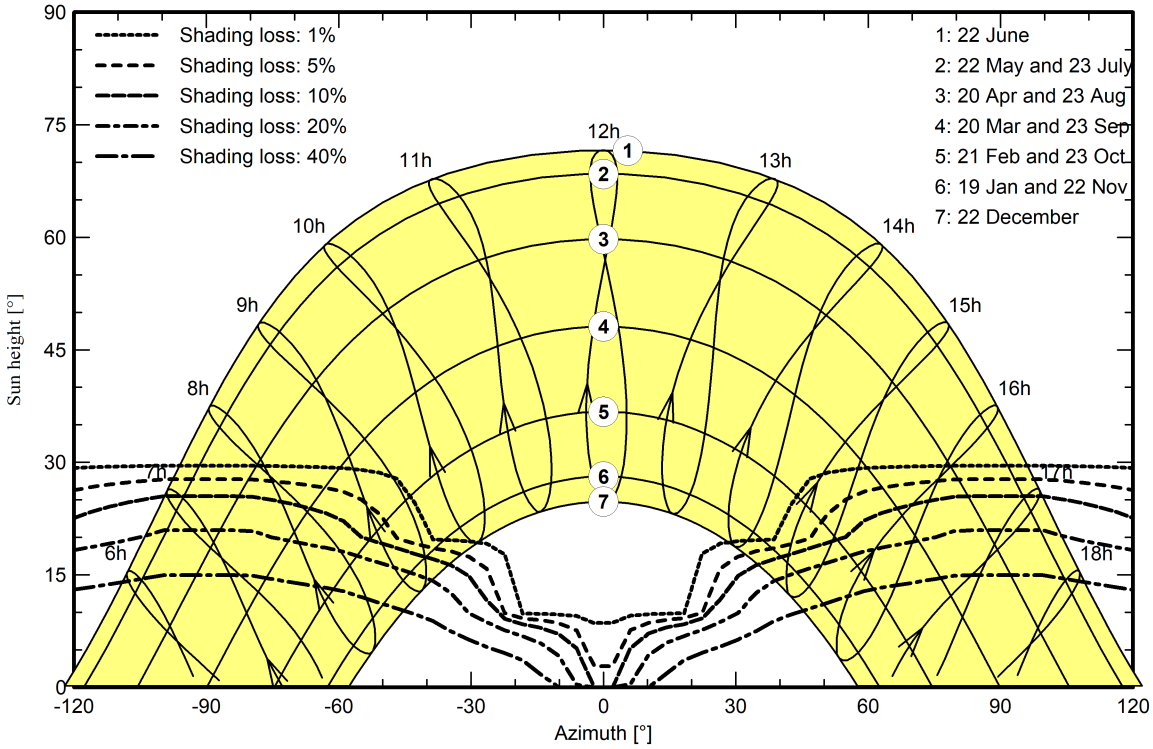
Near shadings parameter

Perspective of the PV-field and surrounding shading scene



Iso-shadings diagram

Orientation #1

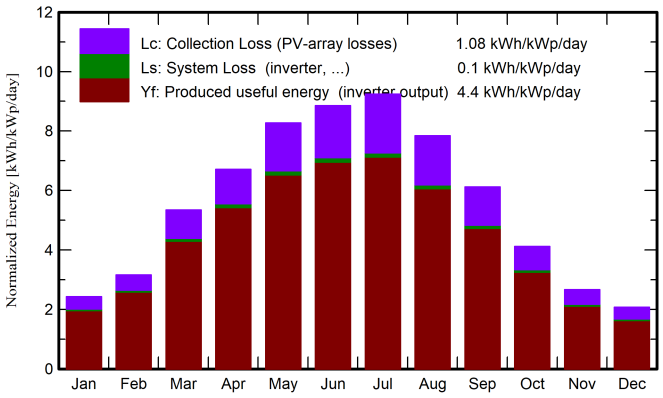


Main results

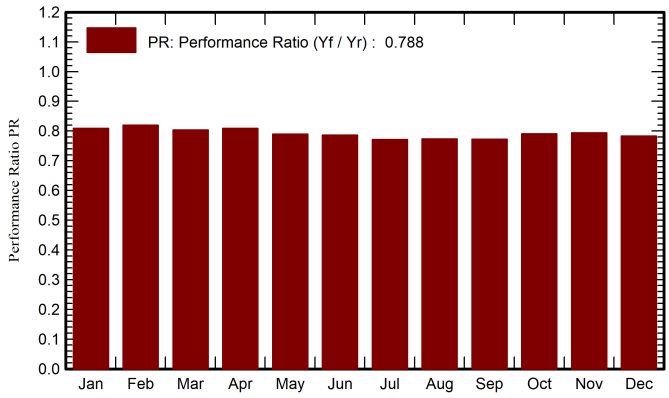
System Production

Produced Energy	24.09 GWh/year	Specific production	1607 kWh/kWp/year
		Performance Ratio PR	78.82 %

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	0.940	0.912	0.809
February	67.4	39.13	8.01	88.4	77.1	1.116	1.087	0.820
March	118.5	50.86	11.13	165.7	146.2	2.043	1.996	0.804
April	151.2	68.61	13.83	201.4	181.9	2.498	2.445	0.810
May	191.3	81.29	19.83	256.4	233.7	3.100	3.035	0.790
June	202.1	86.08	23.99	265.8	245.3	3.198	3.132	0.786
July	212.8	86.25	27.14	286.7	262.6	3.382	3.313	0.771
August	180.1	77.57	26.64	243.1	221.5	2.879	2.818	0.773
September	132.4	58.39	20.93	183.7	162.0	2.174	2.126	0.772
October	92.8	45.36	17.58	127.8	112.0	1.553	1.515	0.791
November	57.3	29.44	12.34	79.8	68.5	0.978	0.950	0.794
December	45.5	24.19	9.02	64.4	53.7	0.781	0.756	0.784
Year	1504.7	671.36	16.57	2038.4	1828.8	24.642	24.085	0.788

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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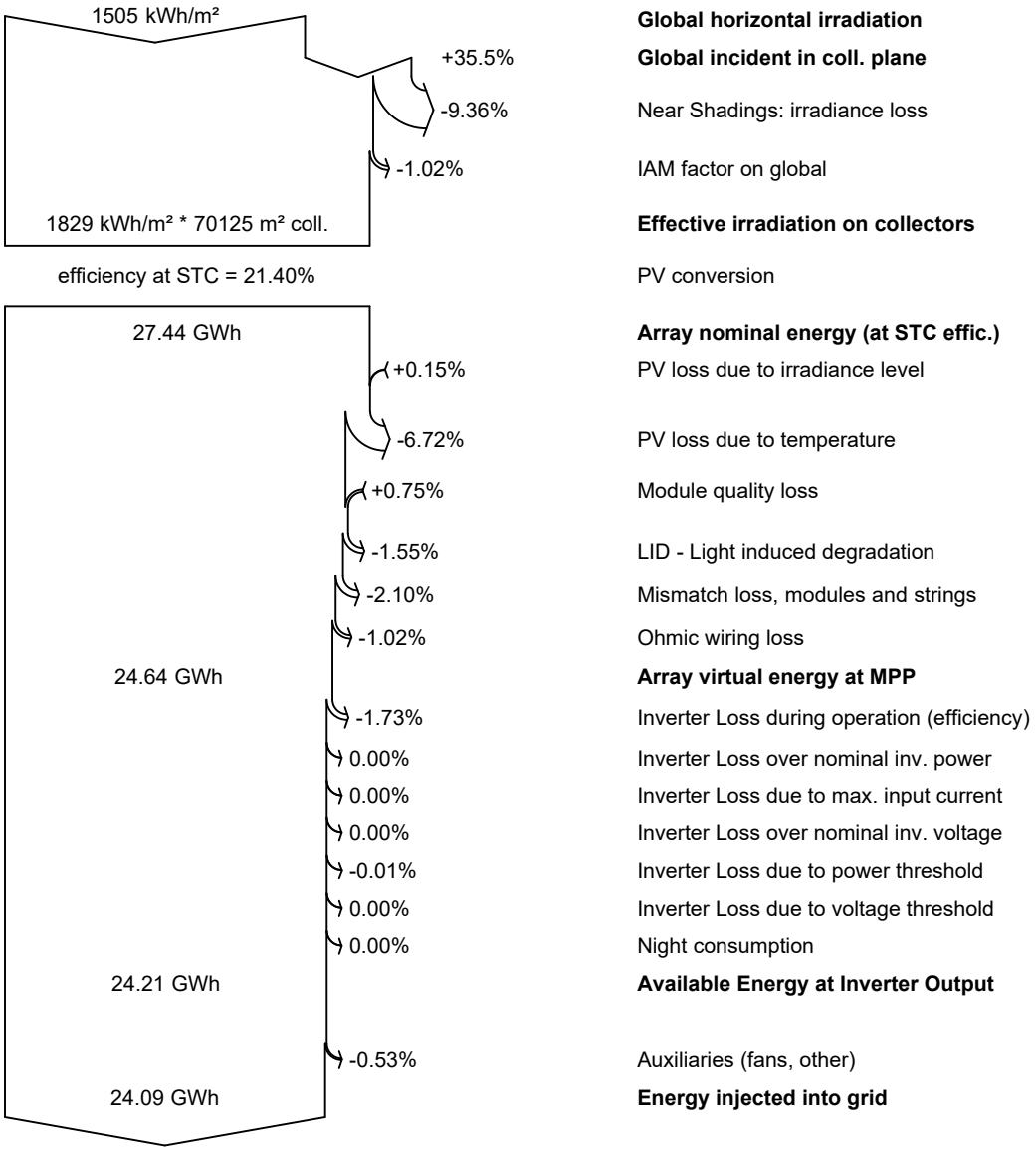
Loss diagram



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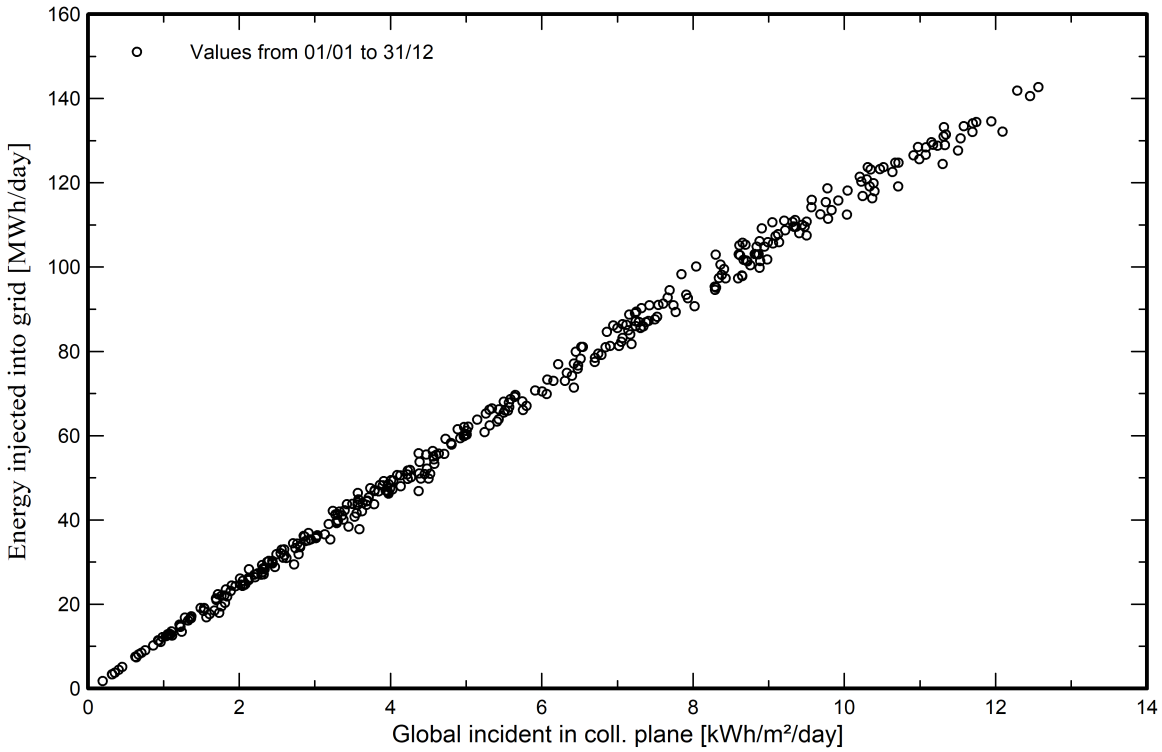
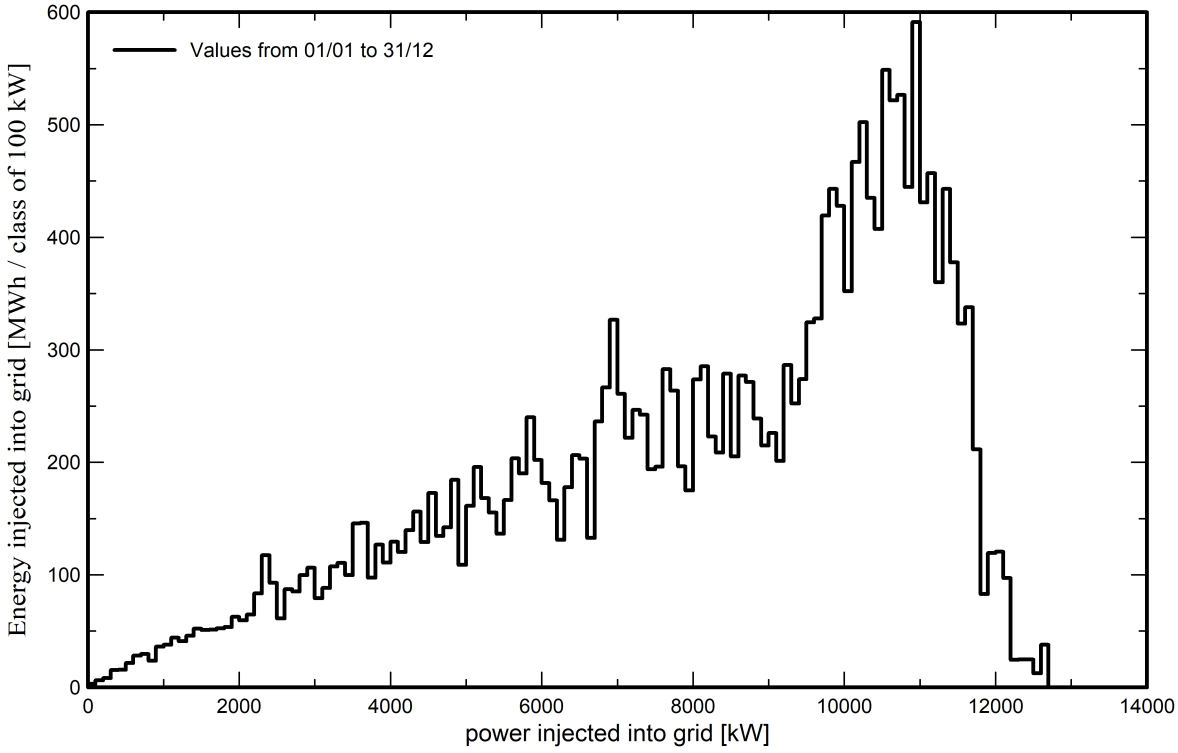
Special graphs

Diagramma giornaliero entrata/uscita



Distribuzione potenza in uscita sistema



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	0.45 GWh
P50	24.09 GWh
P90	23.51 GWh
P95	23.34 GWh

Probability distribution