

IMPIANTO FOTOVOLTAICO EG ULIVO SRL E OPERE CONNESSE

POTENZA IMPIANTO 38,00 MWp - COMUNE DI MARTA (VT)

Proponente

EG ULIVO S.R.L.

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Titolo Elaborato

Stima producibilità

LIVELLO PROGETTAZIONE	CODICE ELABORATO	FILE NAME	DATA
DEFINITIVO	PD_REL04	IT-2021-0142_PD_REL04.01-Stima producibilità	24/06/2022

Revisioni

REV.	DATA	DESCRIZIONE	ESEGUITO	VERIFICATO	APPROVATO
0	24/06/22	EMISSIONE PER PERMITTING	AF	PF	EG



COMUNE DI MARTA (VT)
REGIONE LAZIO



STIMA

PRODUCIBILITA'

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DATI PROGETTO

Project summary

Geographical Site		Situation		Project settings	
Marta		Latitude	42.51 °N	Albedo	0.20
Italy		Longitude	11.90 °E		
		Altitude	318 m		
		Time zone	UTC+1		
Meteo data					
Marta					
SolarGIS Monthly aver. , period not spec. - Synthetic					

System summary

Grid-Connected System		Tracking system with backtracking			
PV Field Orientation		Tracking algorithm		Near Shadings	
Orientation		Astronomic calculation		Linear shadings	
Tracking plane, horizontal N-S axis		Backtracking activated			
Axis azimuth 0 °					
System information					
PV Array					
Nb. of modules	63336 units	Inverters		9 units	
Pnom total	38.00 MWp	Pnom total		33.60 MWac	
		Grid power limit		32.80 MWac	
		Grid lim. Pnom ratio		1.159	
User's needs					
Unlimited load (grid)					

Results summary

Produced Energy	67 GWh/year	Specific production	1769 kWh/kWp/year	Perf. Ratio PR	87.97 %
Apparent energy	67213 MVAh				

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General parameters

Grid-Connected System		Tracking system with backtracking	
PV Field Orientation		Tracking algorithm	Backtracking array
Orientation		Astronomic calculation	Nb. of trackers 2639 units
Tracking plane, horizontal N-S axis		Backtracking activated	Sizes
Axis azimuth 0 °			Tracker Spacing 11.0 m
			Collector width 5.08 m
			Ground Cov. Ratio (GCR) 46.2 %
			Phi min / max. +/- 60.0 °
			Backtracking strategy
			Phi limits +/- 62.4 °
			Backtracking pitch 11.0 m
			Backtracking width 5.08 m
Models used		Near Shadings	User's needs
Transposition Perez		Linear shadings	Unlimited load (grid)
Diffuse Perez, Meteonorm			
Circumsolar separate			
Horizon			
Free Horizon			
Bifacial system			
Model	2D Calculation unlimited trackers		
Bifacial model geometry		Bifacial model definitions	
Tracker Spacing	11.00 m	Ground albedo	0.16
Tracker width	5.08 m	Bifaciality factor	80 %
GCR	46.2 %	Rear shading factor	4.0 %
Axis height above ground	2.10 m	Rear mismatch loss	3.5 %
		Shed transparent fraction	4.0 %
Grid injection point			
Grid power limitation		Power factor	
Active Power	32.80 MWac	Cos(phi) (leading)	1.000
Pnom ratio	1.159		

PV Array Characteristics

Array #1 - PV Array			
PV module		Inverter	
Manufacturer	Jinkosolar	Manufacturer	Power Electronics
Model	JKM600N-78HL4-BDV	Model	FS4200K_660V_20210422E_Preliminary
(Custom parameters definition)		(Custom parameters definition)	
Unit Nom. Power	600 Wp	Unit Nom. Power	4200 kWac
Number of PV modules	48936 units	Number of inverters	6 units
Nominal (STC)	29.36 MWp	Total power	25200 kWac
Modules	2039 Strings x 24 In series	Operating voltage	934-1500 V
At operating cond. (50°C)		Pnom ratio (DC:AC)	1.17
Pmpp	27.17 MWp		
U mpp	1005 V		
I mpp	27043 A		

PV Array Characteristics

Array #2 - Sub-array #2

PV module

Manufacturer Jinkosolar
Model JKM600N-78HL4-BDV

(Custom parameters definition)

Unit Nom. Power 600 Wp
Number of PV modules 10272 units
Nominal (STC) 6163 kWp
Modules 428 Strings x 24 In series

At operating cond. (50°C)

Pmpp 5702 kWp
U mpp 1005 V
I mpp 5677 A

Inverter

Manufacturer Power Electronics
Model FS3151KU_660V_20210422E_Preliminary

(Custom parameters definition)

Unit Nom. Power 3151 kWac
Number of inverters 2 units
Total power 6302 kWac
Operating voltage 934-1500 V
Pnom ratio (DC:AC) 0.98

Array #3 - Sub-array #3

PV module

Manufacturer Jinkosolar
Model JKM600N-78HL4-BDV

(Custom parameters definition)

Unit Nom. Power 600 Wp
Number of PV modules 4128 units
Nominal (STC) 2477 kWp
Modules 172 Strings x 24 In series

At operating cond. (50°C)

Pmpp 2292 kWp
U mpp 1005 V
I mpp 2281 A

Inverter

Manufacturer Power Electronics
Model FS2101KU_660V_20210422E_Preliminary

(Custom parameters definition)

Unit Nom. Power 2100 kWac
Number of inverters 1 unit
Total power 2100 kWac
Operating voltage 934-1500 V
Pnom ratio (DC:AC) 1.18

Total PV power

Nominal (STC) 38002 kWp
Total 63336 modules
Module area 177044 m²
Cell area 163126 m²

Total inverter power

Total power 33602 kWac
Number of inverters 9 units
Pnom ratio 1.13

Array losses

Array Soiling Losses

Loss Fraction 1.5 %

Thermal Loss factor

Module temperature according to irradiance
Uc (const) 30.0 W/m²K
Uv (wind) 1.2 W/m²K/m/s

LID - Light Induced Degradation

Loss Fraction 1.5 %

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): User defined profile

0°	30°	50°	60°	70°	75°	80°	85°	90°
1.000	1.000	1.000	1.000	0.987	0.969	0.929	0.741	0.000

DC wiring losses

Global wiring resistance 0.22 mΩ
Loss Fraction 0.7 % at STC

Array #1 - PV Array

Global array res. 0.29 mΩ
Loss Fraction 0.7 % at STC

Array #2 - Sub-array #2

Global array res. 1.3 mΩ
Loss Fraction 0.7 % at STC

Array #3 - Sub-array #3

Global array res. 3.3 mΩ
Loss Fraction 0.7 % at STC

System losses

Auxiliaries loss

Proportional to Power 4.0 W/kW
0.0 kW from Power thresh.

AC wiring losses

Inv. output line up to MV transfo

Inverter voltage 660 Vac tri
Loss Fraction 1.65 % at STC

Global System

Wire section Copper 3 x 30000 mm²
Wires length 307 m

MV line up to Injection

MV Voltage 30 kV
Wires Copper 3 x 1000 mm²
Length 20870 m
Loss Fraction 1.63 % at STC

AC losses in transformers

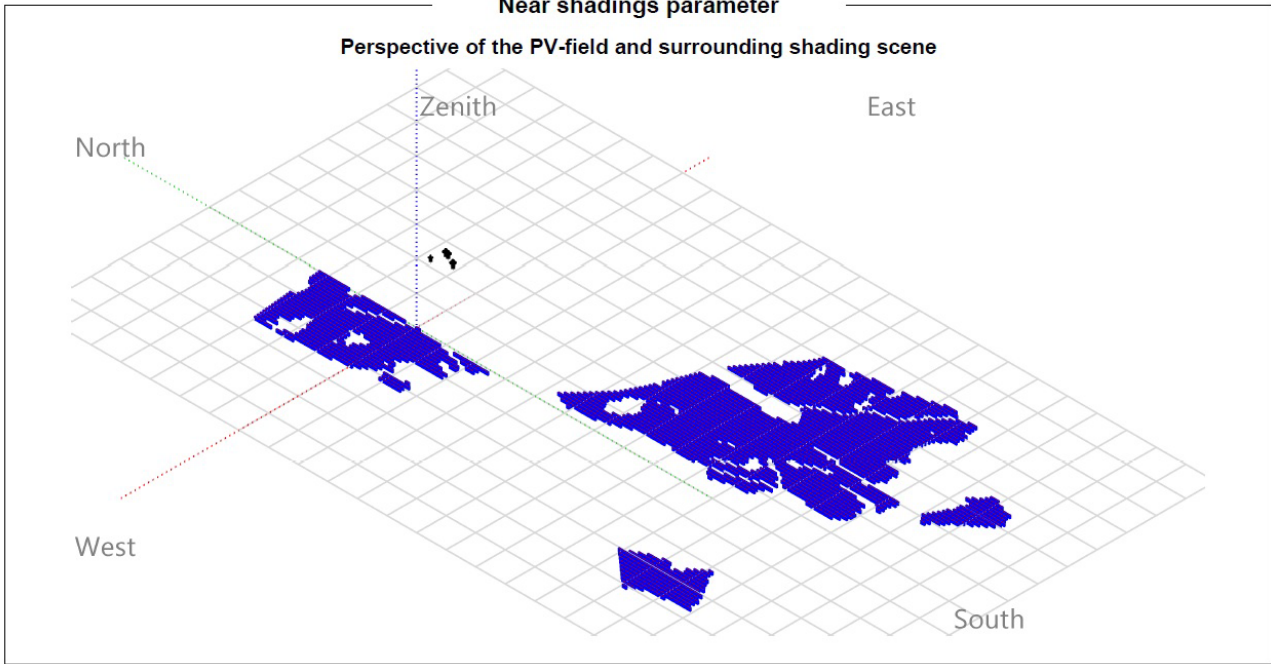
MV transfo

Grid voltage 30 kV

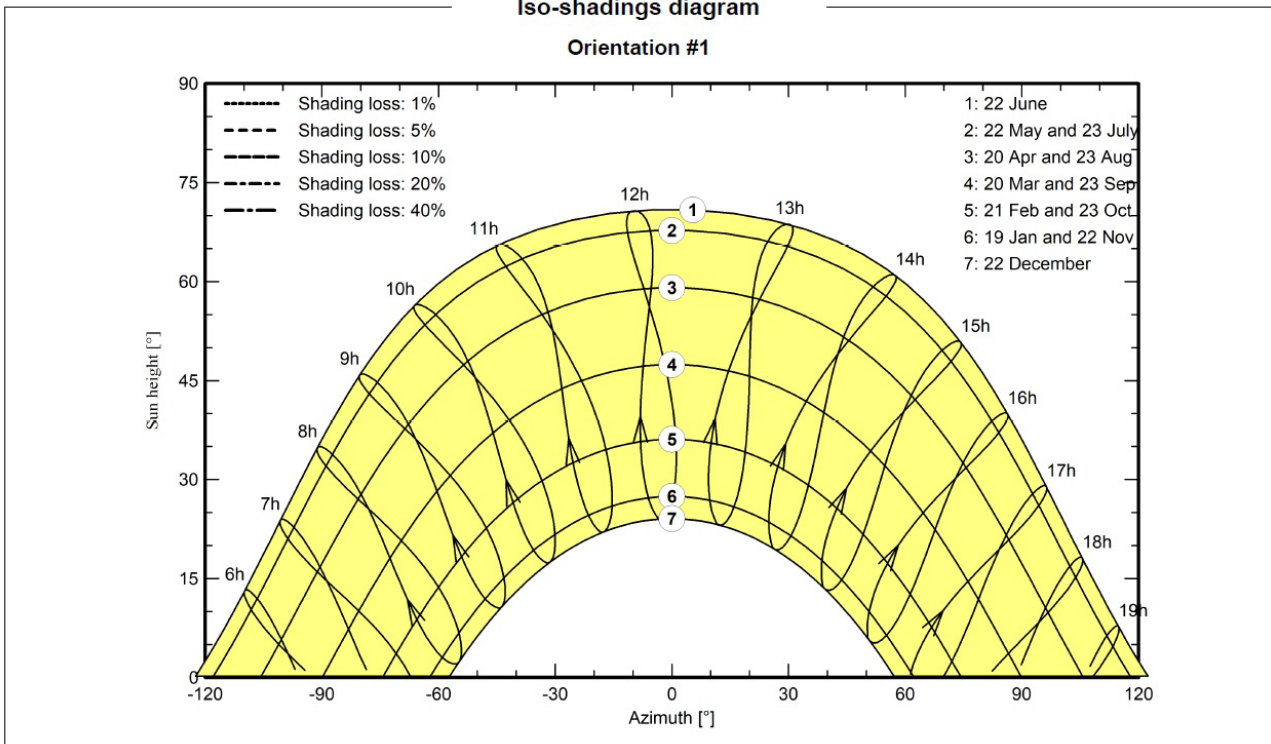
Operating losses at STC

Nominal power at STC 37392 kVA
Iron loss (24/24 Connexion) 56.09 kW
Loss Fraction 0.15 % at STC
Coils equivalent resistance 3 x 0.19 mΩ
Loss Fraction 1.65 % at STC

Near shadings parameter



Iso-shadings diagram



RISULTATI PRINCIPALI

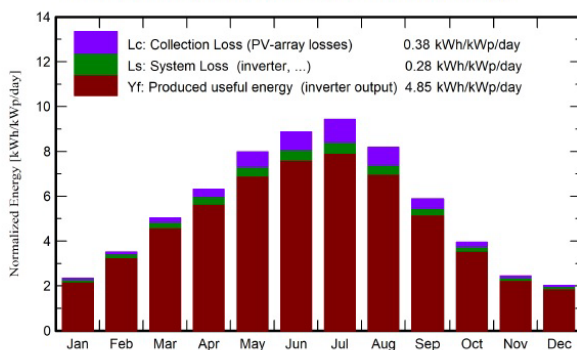
Main results

System Production

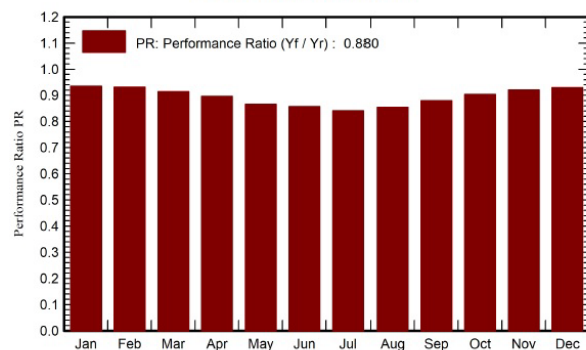
Produced Energy 67 GWh/year
Apparent energy 67213 MVAh

Specific production 1769 kWh/kWp/year
Performance Ratio PR 87.97 %

Normalized productions (per installed kWp)



Performance Ratio PR



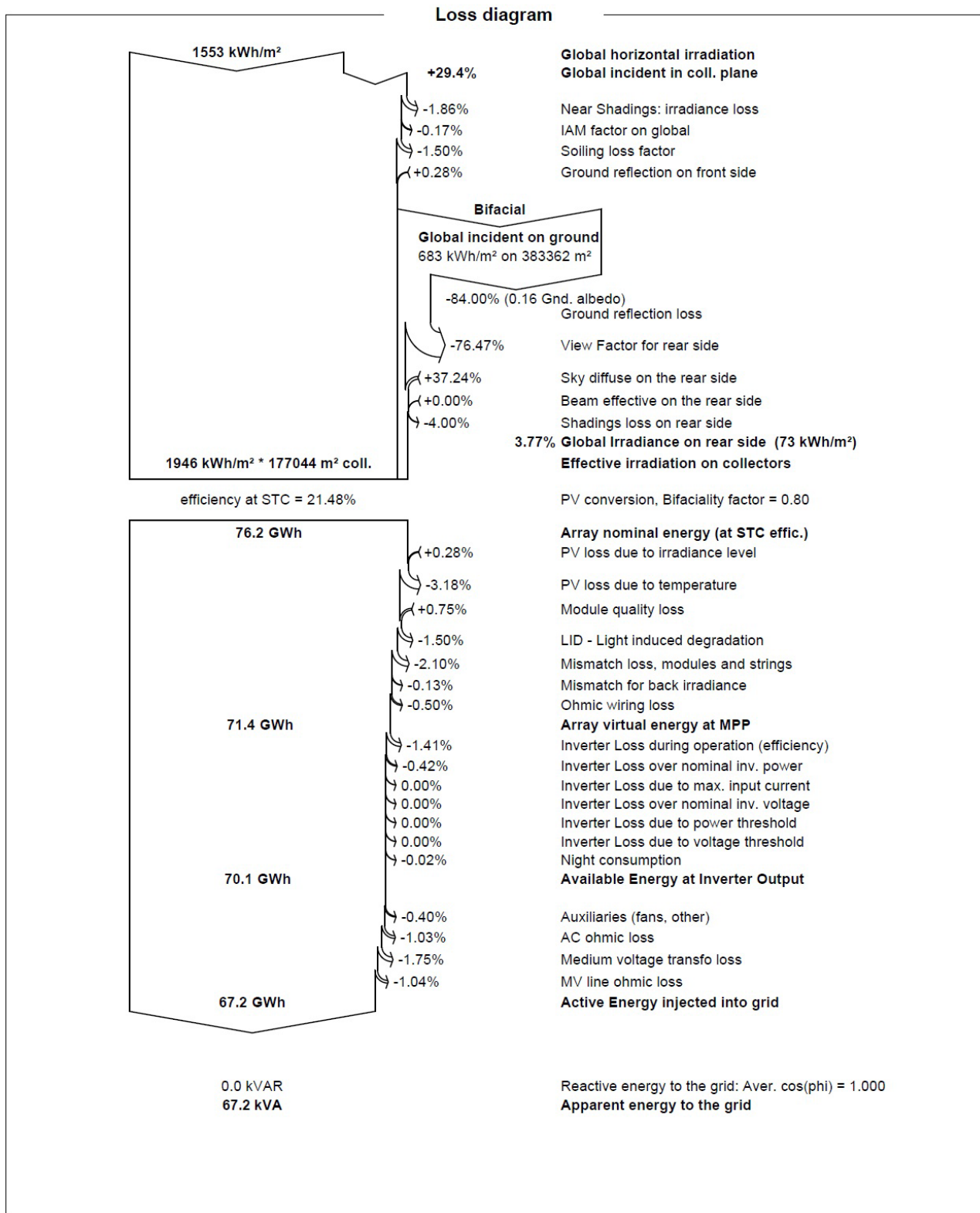
Balances and main results

	GlobHor kWh/m ²	DiffHor kWh/m ²	T_Amb °C	GlobInc kWh/m ²	GlobEff kWh/m ²	EArray GWh	E_Grid GWh	PR ratio
January	54.6	24.30	6.60	72.6	70.0	2.720	2.579	0.935
February	73.7	30.50	7.00	98.2	94.8	3.661	3.477	0.932
March	120.2	48.90	9.60	155.9	150.7	5.722	5.417	0.914
April	149.5	63.20	12.60	189.4	183.2	6.833	6.453	0.897
May	192.9	77.00	16.90	247.4	239.5	8.635	8.147	0.867
June	207.9	76.80	21.10	266.4	258.3	9.215	8.683	0.858
July	224.9	71.60	23.80	292.2	283.7	9.917	9.339	0.841
August	194.2	66.60	23.80	253.6	246.0	8.729	8.236	0.854
September	136.3	54.70	19.60	176.5	170.7	6.237	5.900	0.880
October	95.0	42.00	15.70	122.3	118.1	4.428	4.201	0.904
November	56.8	27.10	11.10	73.4	70.6	2.712	2.569	0.921
December	47.4	21.10	7.50	62.6	60.2	2.335	2.212	0.930
Year	1553.4	603.80	14.65	2010.6	1945.9	71.143	67.213	0.880

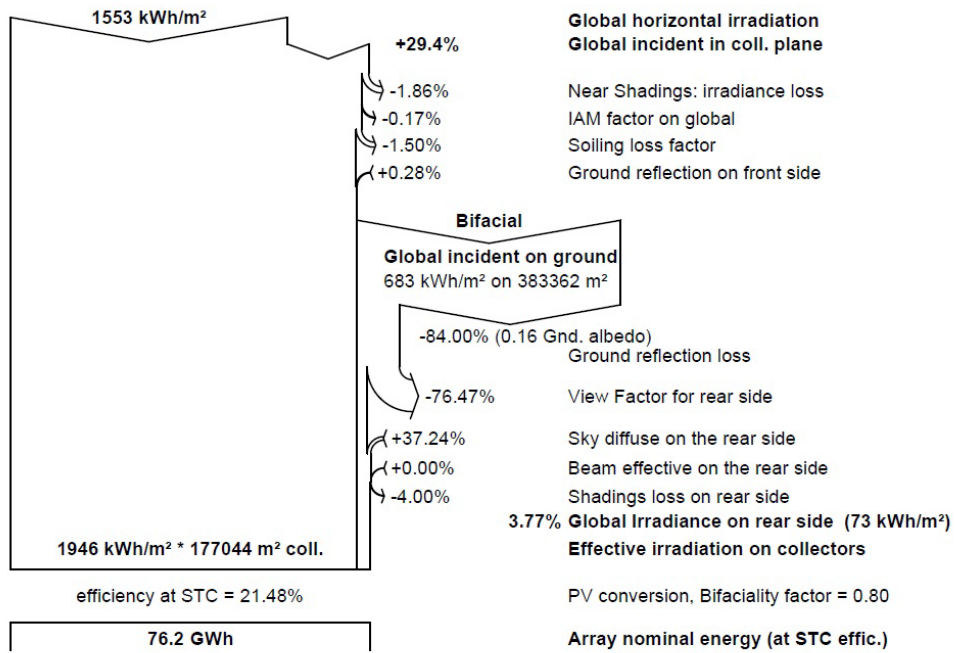
Legends

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		

GRAFICI SPECIALI

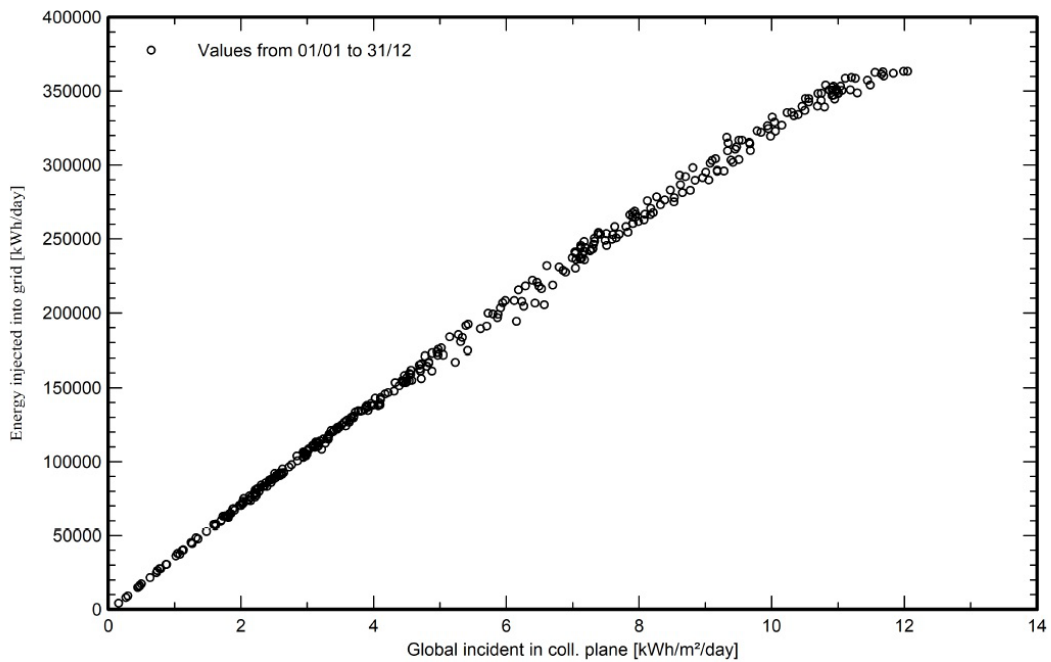


Loss diagram



Special graphs

Daily Input/Output diagram



System Output Power Distribution

