

IMPIANTO FOTOVOLTAICO EG PASCOLO SRL E OPERE CONNESSE

POTENZA IMPIANTO 92.7 MWp
COMUNE DI PORTOMAGGIORE E ARGENTA (FE)

Proponente

EG PASCOLO S.R.L.

VIA DEI PELLEGRINI 22 · 20122 MILANO (MI) · P.IVA: 12084640965 · PEC: egpascolo@pec.it

Progettazione

META STUDIO S.R.L.

Via SETTEMBRINI, 1 - 65123 PESCARA (PE)

P.IVA: 02164240687 · PEC: metastudiosrl@pec.it

Collaboratori

Progettazione Generale: Ing. Corrado Pluchino

Progettazione Geotecnica-Strutturale: Dott. Matteo Lana

Progettazione Ambientale e Paesaggistica: Dott.ssa Eleonora Lamanna

Progettazione Opere di Connessione: Brulli Trasmissione S.r.l.

Progettazione Civile e Idraulica: Ing. Fabio Lassini

Progettazione Elettrica: Ing. Andrea Fronteddu

Coordinamento progettuale

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Titolo Elaborato

STIMA PRODUCIBILITÀ

LIVELLO PROGETTAZIONE	CODICE ELABORATO	FILENAME	RIFERIMENTO	DATA	SCALA
	DOC_REL_04			12.09.22	-

Revisioni

REV.	DATA	DESCRIZIONE	ESEGUITO	VERIFICATO	APPROVATO
00	12.09.2022	Stima producibilità	GPe	CP	CP



COMUNE DI PORTOMAGGIORE (FE)
COMUNE DI ARGENTA (FE)
REGIONE EMILIA ROMAGNA





STIMA PRODUCIBILITÁ



PVsyst - Simulation report

Grid-Connected System

Project: Bando di Argenta

Variant: Bando d'argenta TS590W 8.5m 4HF 92.7008MWp_ingeteam - 1413

Ground system (tables) on a hill

System power: 92.70 MWp

IT_Bando di Argenta - Italy

Author

Enfinity Iberia SLU (Spain)



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Project summary

Geographical Site IT_Bando di Argenta Italy	Situation Latitude 44.67 °N Longitude 11.89 °E Altitude -3 m Time zone UTC	Project settings Albedo 0.20
Meteo data IT_Bando di Argenta SolarGIS Monthly aver. , period not spec. - Synthetic		

System summary

Grid-Connected System	Ground system (tables) on a hill		User's needs Unlimited load (grid)
PV Field Orientation Fixed plane Tilt/Azimuth 22 / 0 °	Near Shadings According to strings Electrical effect 80 %		
System information			
PV Array		Inverters	
Nb. of modules 157120 units		Nb. of units 22 units	
Pnom total 92.70 MWp		Pnom total 78.03 MWac	
		Grid power limit 74.50 MWac	
		Grid lim. Pnom ratio 1.244	

Results summary

Produced Energy 131 GWh/year	Specific production 1413 kWh/kWp/year	Perf. Ratio PR 86.00 %
Apparent energy 130973 MVAh		

Table of contents

Project and results summary	2
General parameters, PV Array Characteristics, System losses	3
Near shading definition - Iso-shadings diagram	5
Main results	6
Loss diagram	7
Special graphs	8
P50 - P90 evaluation	9



Project: Bando di Argenta

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General parameters

Grid-Connected System

PV Field Orientation

Orientation

Fixed plane
Tilt/Azimuth 22 / 0 °

Horizon

Free Horizon

Bifacial system

Model 2D Calculation
unlimited sheds

Bifacial model geometry

Sheds spacing 8.50 m
Sheds width 5.27 m
Limit profile angle 28.7 °
GCR 62.0 %
Height above ground 1.50 m

Ground system (tables) on a hill

Sheds configuration

Nb. of sheds 1524 units

Sizes

Sheds spacing 8.50 m
Collector width 5.27 m
Ground Cov. Ratio (GCR) 62.0 %

Shading limit angle

Limit profile angle 28.7 °

Near Shadings

According to strings
Electrical effect 80 %

Models used

Transposition Perez
Diffuse Perez, Meteororm
Circumsolar separate

User's needs

Unlimited load (grid)

Monthly ground albedo values

Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Year
0.11	0.14	0.16	0.17	0.17	0.19	0.18	0.16	0.14	0.13	0.11	0.12	0.15

Grid injection point

Grid power limitation

Active Power 74.50 MWac
Pnom ratio 1.244

Power factor

Cos(phi) (leading) 1.000

PV Array Characteristics

PV module

Manufacturer Trina Solar
Model TSM-590DEG20C.20
(Custom parameters definition)

Unit Nom. Power 590 Wp
Number of PV modules 157120 units
Nominal (STC) 92.70 MWp
Modules 4910 Strings x 32 In series

At operating cond. (50°C)

Pmpp 84.84 MWp
U mpp 990 V
I mpp 85694 A

Total PV power

Nominal (STC) 92701 kWp
Total 157120 modules
Module area 444668 m²
Cell area 415740 m²

Inverter

Manufacturer Ingeteam
ModelS_3Power_3825TL_C640_IP65 [2021-12-03_up to 50°C]
(Custom parameters definition)

Unit Nom. Power 3547 kWac
Number of inverters 22 units
Total power 78034 kWac
Operating voltage 909-1300 V
Pnom ratio (DC:AC) 1.19

Total inverter power

Total power 78034 kWac
Number of inverters 22 units
Pnom ratio 1.19

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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

DC wiring losses

Global array res. 0.20 mΩ

Loss Fraction 1.6 % at STC

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°	40°	50°	60°	70°	75°	80°	85°	90°
1.000	1.000	0.998	0.992	0.983	0.961	0.933	0.853	0.000

System losses**Auxiliaries loss**

Proportionnal to Power 4.0 W/kW

20.0 kW from Power thresh.

Night aux. cons. 5.00 kW

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

Inverter voltage 640 Vac tri

Loss Fraction 0.90 % at STC

Inverter: IS_3Power_3825TL_C640_IP65 [2021-12-03_up to 50°C]

Wire section (22 Inv.) Copper 22 x 3 x 100000 mm²

Average wires length 4725 m

MV line up to Injection

MV Voltage 30 kV

Wires Copper 3 x 1200 mm²

Length 3100 m

Loss Fraction 0.49 % at STC

AC losses in transformers**MV transfo**

Grid voltage 30 kV

Operating losses at STC

Nominal power at STC 91109 kVA

Iron loss (night disconnect) 91.11 kW

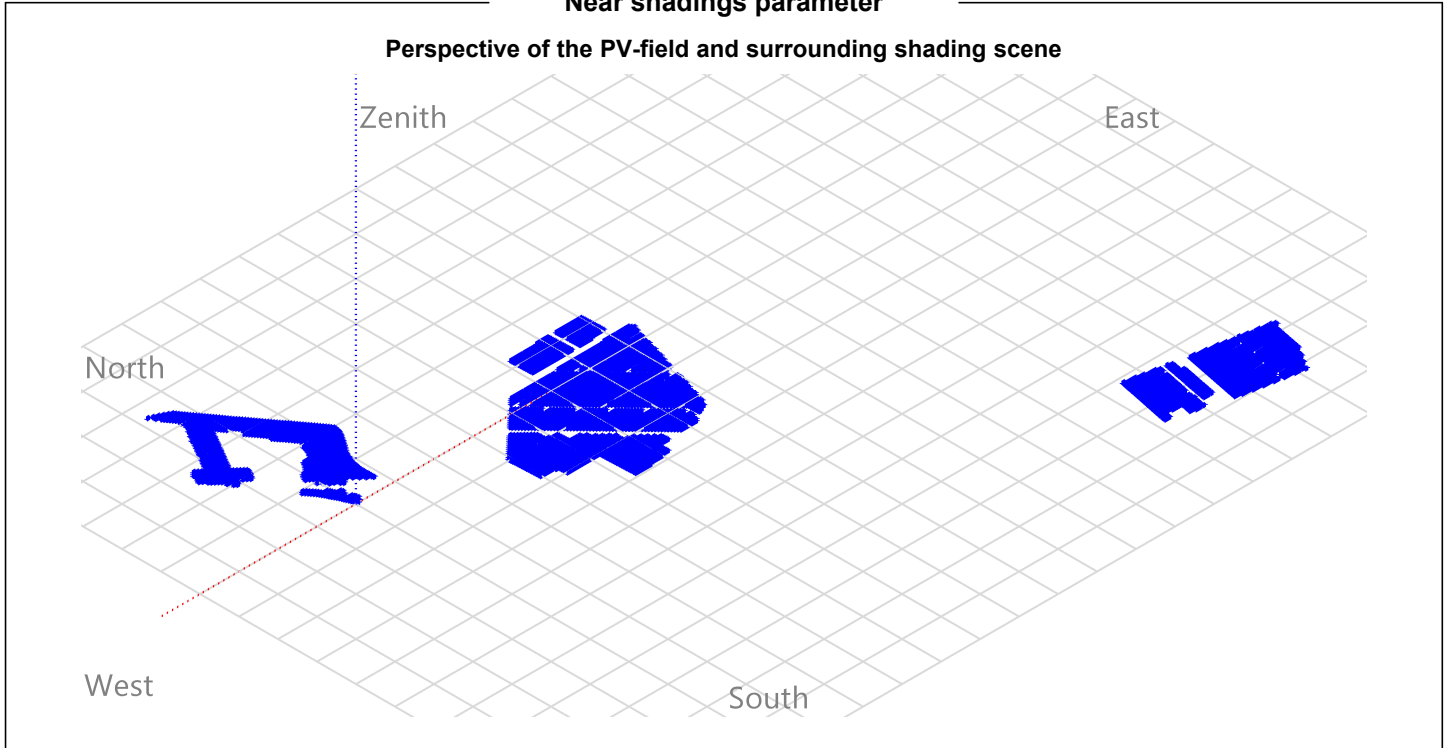
Loss Fraction 0.10 % at STC

Coils equivalent resistance 3 x 0.05 mΩ

Loss Fraction 1.10 % at STC



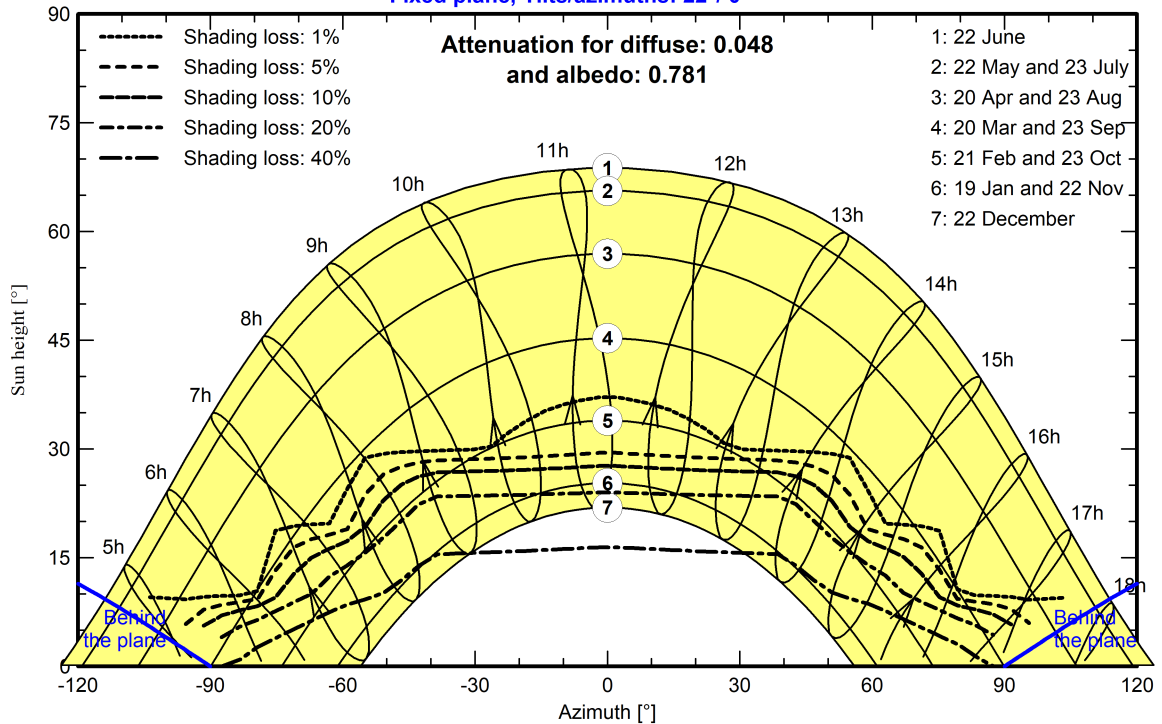
Near shadings parameter



Iso-shadings diagram

Orientation #1

Fixed plane, Tilts/azimuths: 22°/ 0°





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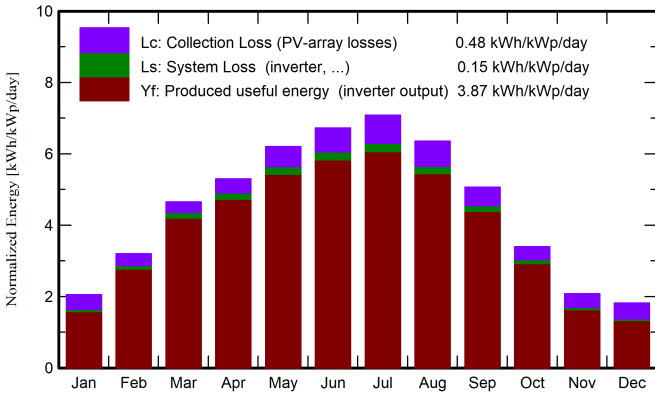
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Main results

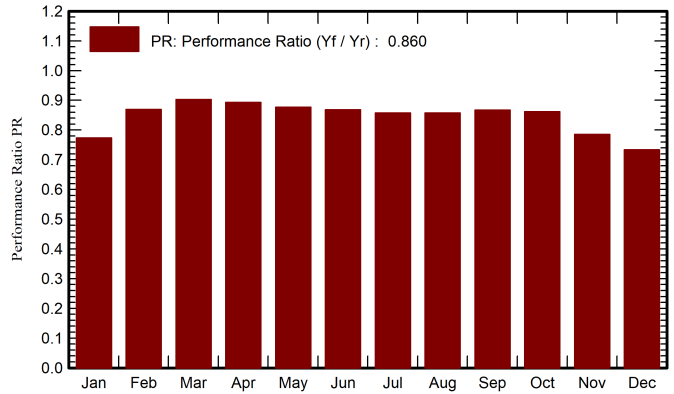
System Production

Produced Energy (P50) 131 GWh/year Specific production (P50) 1413 kWh/kWp/year Performance Ratio PR 86.00 %
 Produced Energy (P90) 127.9 GWh/year Specific production (P90) 1380 kWh/kWp/year
 Produced Energy (P95) 127.1 GWh/year Specific production (P95) 1371 kWh/kWp/year
 Apparent energy 130973 MVAh

Normalized productions (per installed kWp)



Performance Ratio PR



Balances and main results

	GlobHor	DiffHor	T_Amb	GlobInc	GlobEff	EArray	E_Grid	PR
	kWh/m ²	kWh/m ²	°C	kWh/m ²	kWh/m ²	GWh	GWh	ratio
January	42.3	22.80	4.60	63.6	54.9	4.73	4.56	0.773
February	64.5	30.40	6.00	89.4	83.9	7.47	7.20	0.869
March	115.5	49.50	10.20	144.2	138.8	12.53	12.07	0.903
April	142.8	63.00	14.30	159.0	153.4	13.67	13.16	0.893
May	186.6	78.20	19.50	192.3	185.4	16.22	15.62	0.877
June	200.2	81.60	24.00	201.7	194.8	16.85	16.23	0.868
July	214.5	77.60	26.40	219.5	212.4	18.12	17.45	0.857
August	180.8	69.80	25.70	197.1	190.5	16.26	15.67	0.858
September	127.8	54.80	20.80	151.9	146.5	12.67	12.21	0.867
October	81.0	41.20	15.80	105.3	99.7	8.72	8.41	0.862
November	44.1	24.50	10.40	62.4	55.6	4.72	4.55	0.786
December	35.3	19.10	5.19	56.2	46.3	3.97	3.82	0.733
Year	1435.4	612.50	15.29	1642.8	1562.1	135.92	130.97	0.860

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		

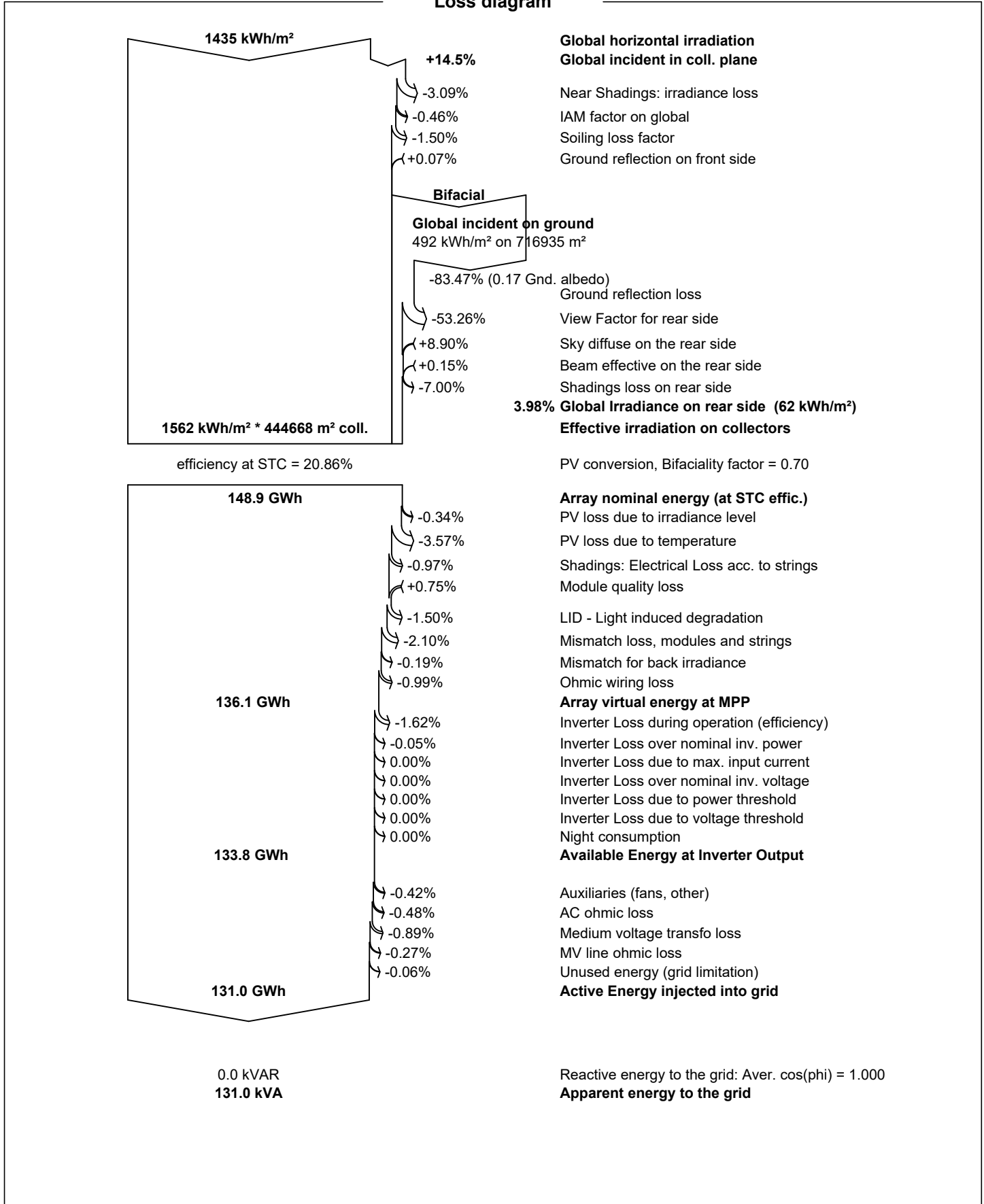


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Loss diagram





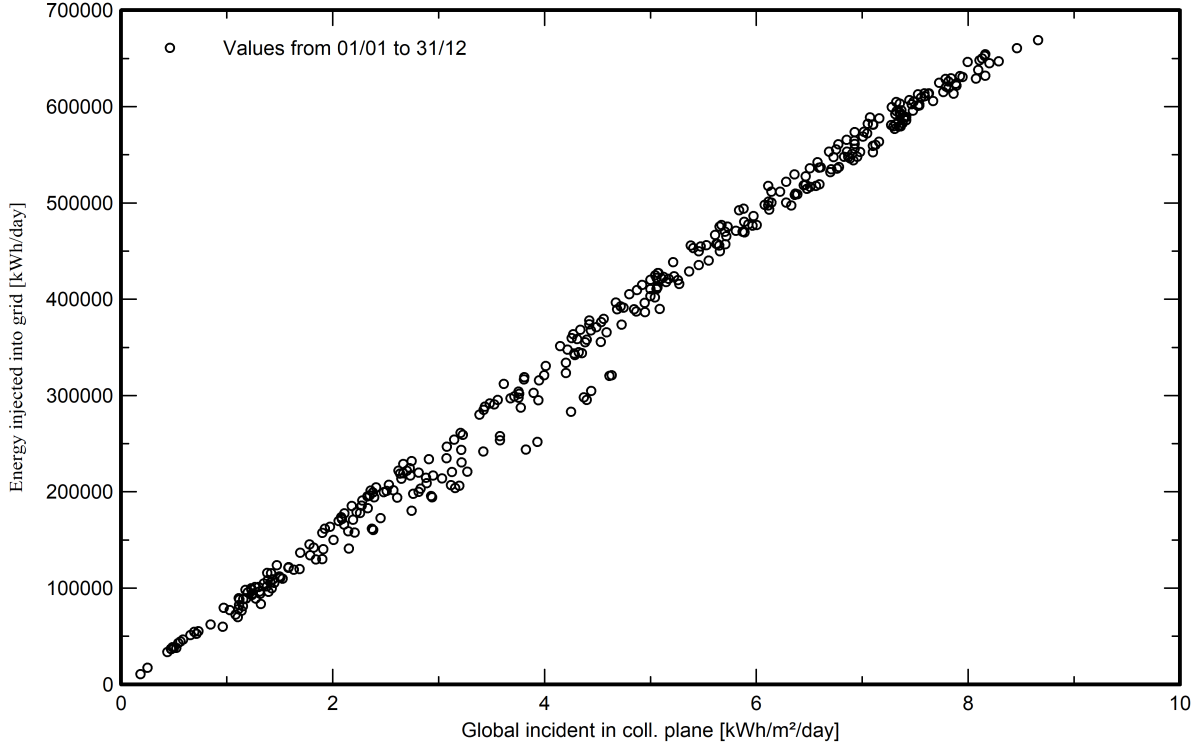
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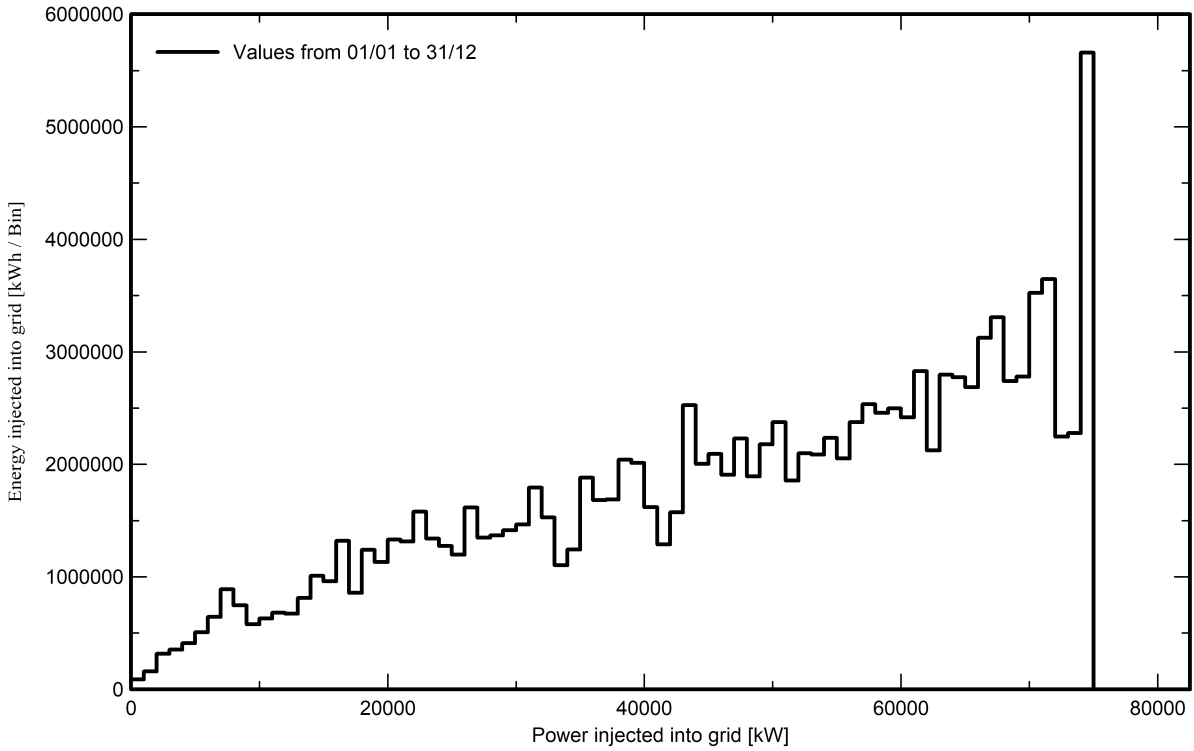
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Special graphs

Daily Input/Output diagram



System Output Power Distribution





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P50 - P90 evaluation

Meteo data

Source SolarGIS Monthly aver. , period not spec.
Kind Not defined
Year-to-year variability(Variance) 0.0 %

Specified Deviation

Global variability (meteo + system)

Variability (Quadratic sum) 1.8 %

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 2.36 GWh
P50 130.97 GWh
P90 127.94 GWh
P95 127.09 GWh

Probability distribution

