

COMUNE DI

CARPI (MO)

PROGETTO

PROGETTO DI FATTIBILITA' TECNICO-ECONOMICA PER LA COSTRUZIONE E L'ESERCIZIO DI UN IMPIANTO AGRIVOLTAICO, DENOMINATO "CASCINETTO", AVENTE POTENZA NOMINALE DI 18,97 MWp, POTENZA IN IMMISSIONE RICHIESTA 17,4 MW, E RELATIVE OPERE DI CONNESSIONE ALLA RETE ELETTRICA NAZIONALE



ELABORATO

VALUTAZIONE PRELIMINARE PRODUZIONE ENERGIA ELETTRICA FOTOVOLTAICA

IDENTIFICAZIONE ELABORATO

LIV. PROG.	TIPO DOC.	COD. CART.	CODICE PROGETTO	CODICE ELABORATO	DATA	SCALA
PFTE	REL	AU_02; ASS_VIA_02	ITOMY171	ITOMY171.PFTE_02_PROGETTO_VPPEEF	12/23	---

REVISIONI

REV	DATA	AUTORE	DESCRIZIONE	VERIFICATO	APPROVATO
01	12/23	ILIOS	Verifica Preliminare Produzione Energia Elettrica Fotovoltaica	IVC	IVC

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SPAZIO RISERVATO AGLI ENTI

(TIMBRO E FIRMA PER BENESTARE)

RICHIEDENTE



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PVsyst - Simulation report

Grid-Connected System

Project: CASCINETTO

Variant: Proj.Cascinetto - 18,97 MWp

Unlimited Trackers with backtracking

System power: 18.97 MWp

Cascinetto - Italy

Autore

ILIOS S.r.l. (Italy)



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Project summary

Geographical Site

Cascinetto

Italy

Situation

Latitude 44.84 °N

Longitude 10.90 °E

Altitude 19 m

Time zone UTC+1

Project settings

Albedo 0.20

Meteo data

Carpi_Cascinetto-Magarotto

SolarGis - Sintetico

System summary

Grid-Connected System

Unlimited Trackers with backtracking

PV Field Orientation

Orientation

Tracking horizontal axis

Tracking algorithm

Astronomic calculation

Backtracking activated

Near Shadings

No Shadings

System information

PV Array

Nb. of modules

32708 units

Pnom total

18.97 MWp

Inverters

Nb. of units

58 units

Pnom total

17.40 MWac

Pnom ratio

1.090

User's needs

Unlimited load (grid)

Results summary

Produced Energy 29810198 kWh/year Specific production 1571 kWh/kWp/year Perf. Ratio PR 86.77 %

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General parameters

Grid-Connected System

Unlimited Trackers with backtracking

PV Field Orientation

Orientation

Tracking horizontal axis

Tracking algorithm

Astronomic calculation

Backtracking activated

Backtracking array

Nb. of trackers 999 units

Unlimited trackers

Sizes

Tracker Spacing 9.00 m

Collector width 4.58 m

Ground Cov. Ratio (GCR) 50.8 %

Left inactive band 0.02 m

Right inactive band 0.02 m

Phi min / max. -/+ 55.0 °

Backtracking strategy

Phi limits for BT -/+ 59.1 °

Backtracking pitch 9.00 m

Backtracking width 4.58 m

Mode Automatic

Models used

Transposition Perez

Diffuse Perez, Meteonorm

Circumsolar separate

Horizon

Free Horizon

Near Shadings

No Shadings

User's needs

Unlimited load (grid)

Bifacial system

Model 2D Calculation
unlimited trackers

Bifacial model geometry

Tracker Spacing 9.00 m

Tracker width 4.62 m

GCR 51.3 %

Axis height above ground 2.50 m

Bifacial model definitions

Ground albedo 0.30

Bifaciality factor 80 %

Rear shading factor 5.0 %

Rear mismatch loss 10.0 %

Shed transparent fraction 0.0 %

PV Array Characteristics

PV module

Manufacturer Astronergy

Model CHSM72N(DG)/F-BH-580

(Original PVsyst database)

Unit Nom. Power 580 Wp

Number of PV modules 32708 units

Nominal (STC) 18.97 MWp

Modules 1258 string x 26 In series

At operating cond. (50°C)

Pmpp 17.57 MWp

U mpp 1017 V

I mpp 17278 A

Total PV power

Nominal (STC) 18971 kWp

Total 32708 modules

Module area 84493 m²

Inverter

Manufacturer Huawei Technologies

Model SUN2000-330KTL-H1 (300 Pnom)

(Custom parameters definition)

Unit Nom. Power 300 kWac

Number of inverters 58 units

Total power 17400 kWac

Operating voltage 500-1500 V

Pnom ratio (DC:AC) 1.09

Power sharing within this inverter

Total inverter power

Total power 17400 kWac

Number of inverters 58 units

Pnom ratio 1.09



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Array losses

Array Soiling Losses

Loss Fraction 2.0 %

Thermal Loss factor

Module temperature according to irradiance

Uc (const) 29.0 W/m²KUv (wind) 0.0 W/m²K/m/s

DC wiring losses

Global array res. 0.96 mΩ

Loss Fraction 1.5 % at STC

Module Quality Loss

Loss Fraction -0.8 %

Module mismatch losses

Loss Fraction 2.0 % at MPP

Strings Mismatch loss

Loss Fraction 0.2 %

IAM loss factor

Incidence effect (IAM): Fresnel smooth glass, n = 1.526

0°	30°	50°	60°	70°	75°	80°	85°	90°
1.000	0.998	0.981	0.948	0.862	0.776	0.636	0.403	0.000

System losses

Unavailability of the system

Time fraction 2.0 %
7.3 days,
3 periods

Auxiliaries loss

constant (fans) 50.0 kW
0.0 kW from Power thresh.

AC wiring losses

Inv. output line up to MV transfo

Inverter voltage 800 Vac tri
Loss Fraction 1.71 % at STC

Inverter: SUN2000-330KTL-H1 (300 Pnom)

Wire section (58 Inv.) Alu 58 x 3 x 185 mm²
Average wires length 200 m

MV line up to Injection

MV Voltage 36 kV
Average each inverter
Wires Alu 3 x 95 mm²
Length 2450 m
Loss Fraction 0.17 % at STC

AC losses in transformers

MV transfo

Medium voltage 36 kV

One transfo parameters

Nominal power at STC 2.67 MVA
Iron Loss (24/24 Connexion) 5.06 kVA
Iron loss fraction 0.19 % at STC
Copper loss 23.19 kVA
Copper loss fraction 0.87 % at STC
Coils equivalent resistance 3 x 2.09 mΩ

Operating losses at STC (full system)

Nb. identical MV transfos 7
Nominal power at STC 18.66 MVA
Iron loss (24/24 Connexion) 35.45 kVA
Copper loss 162.32 kVA



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Main results

System Production

Produced Energy 29810198 kWh/year

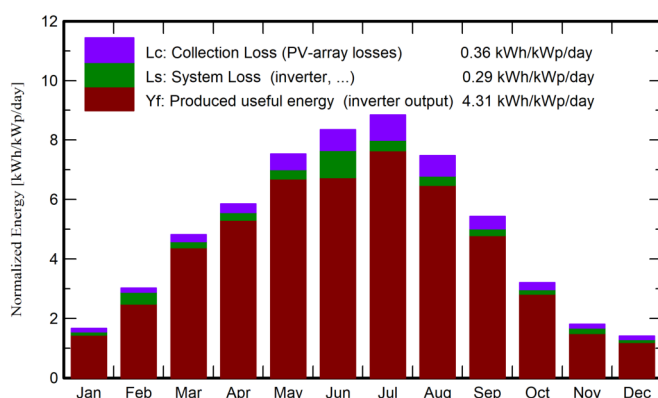
Specific production

1571 kWh/kWp/year

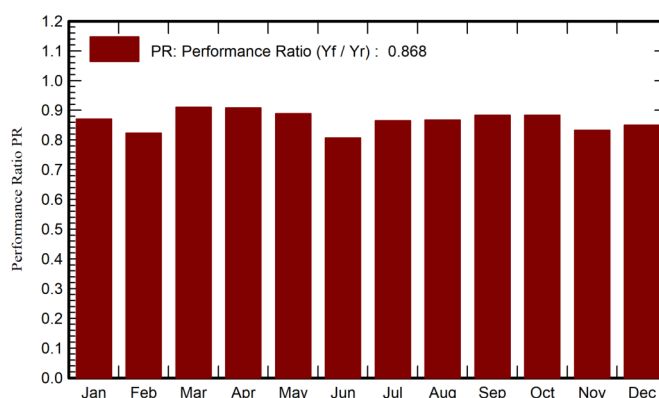
Perf. Ratio PR

86.77 %

Normalized productions (per installed kWp)



Performance Ratio PR



Balances and main results

	GlobHor	DiffHor	T_Amb	GlobInc	GlobEff	EArray	E_Grid	PR
	kWh/m²	kWh/m²	°C	kWh/m²	kWh/m²	kWh	kWh	ratio
January	41.0	22.00	3.30	51.4	45.8	912396	848874	0.870
February	65.6	28.80	4.80	84.6	78.1	1537533	1321025	0.823
March	116.2	48.40	8.80	149.3	139.6	2701520	2578167	0.910
April	139.6	60.90	11.80	175.7	165.6	3168324	3024867	0.908
May	185.1	79.00	17.40	233.6	221.0	4124513	3938911	0.889
June	198.9	81.90	22.00	250.6	237.6	4359182	3837686	0.807
July	214.6	76.90	24.90	274.0	260.5	4708272	4495601	0.865
August	181.0	69.10	24.80	231.9	219.8	3996095	3814673	0.867
September	128.2	53.70	19.30	162.9	153.0	2860252	2728993	0.883
October	79.1	40.30	14.20	99.2	91.4	1752903	1661511	0.883
November	43.3	23.40	8.10	54.1	48.9	961547	855348	0.833
December	34.8	18.60	3.70	43.7	38.6	764008	704541	0.850
Year	1427.4	603.00	13.64	1811.0	1699.8	31846545	29810198	0.868

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

