COMUNE DI TUSCANIA

Provincia di Viterbo

ISTANZA di **Valutazione di Impatto Ambientale Nazionale,**
ai sensi del D.L. 92/2021 e del D.lgs 152/2006 e s.m.i.

ENERCAPITAL Power Italia Uno S.r.l.

Corso Vercelli, 40
20145 Milano (MI)

REALIZZAZIONE di **Impianto Fotovoltaico a Terra,** Connesso alla RTN di Potenza pari a 31,040 MWp

Progettazione

Piero Farenti
03.01.2024
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GMT+00:00

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Sez. A n. 1733
Settori: civile ed ambientale industriale dell'informazione

Codice documento *Titolo documento*

VIA.REL32	STIMA PRODUCIBILITA'

Revisione Elaborato

N. REV.	DATA REV.	DESCRIZIONE REVISIONE	REDAZIONE	APPROVAZIONE
0	**Novembre 2022**	**Prima Emissione**	**Ing. Andrea Farenti**	**Ing. Piero Farenti**
1	**Novembre 2023**	**Nuovo layout**	**Ing. Andrea Farenti**	**Ing. Piero Farenti**

Impianto Fotovoltaico A Terra Della Potenza Nominale Di 31,040 MWp Connesso Alla RTN

STIMA PRODUCIBILITA'

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SOMMARIO DEL PROGETTO E DEI RISULTATI

Project summary

Geographical Site
Tuscania - Scolastici
Italy

Situation

Latitude	42.35 °N
Longitude	11.72 °E
Altitude	98 m
Time zone	UTC+1

Project settings

Albedo	0.20

Meteo data
Tuscania - Scolastici
Meteonorm 7.2 (1994-2013), Sat=89% - Sintetico

System summary

Grid-Connected System

No 3D scene defined, no shadings

PV Field Orientation

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

Near Shadings
No Shadings

System information

PV Array		Inverters	
Nb. of modules	53984 units	Nb. of units	110 units
Pnom total	31.04 MWp	Pnom total	33.00 MWac
		Pnom ratio	0.941

User's needs
Unlimited load (grid)

Results summary

Produced Energy	57749293 kWh/year	Specific production	1860 kWh/kWp/year	Perf. Ratio PR	82.43 %

Table of contents

PARAMETRI PRINCIPALI – CARATTERISTICHE CAMPO FV – PERDITE DI SISTEMA

General parameters

Grid-Connected System — **No 3D scene defined, no shadings**

PV Field Orientation

Orientation	Tracking algorithm	Trackers configuration
Tracking plane, horizontal N-S axis	Astronomic calculation	No 3D scene defined
Axis azimuth 0 °		

Models used

Transposition	Perez
Diffuse	Perez, Meteonorm
Circumsolar	separate

Horizon	Near Shadings	User's needs
Free Horizon	No Shadings	Unlimited load (grid)

PV Array Characteristics

PV module

Manufacturer	Astronergy
Model	CHSM72N(DG)/F-BH-575
(Custom parameters definition)	
Unit Nom. Power	575 Wp
Number of PV modules	53984 units
Nominal (STC)	31.04 MWp
Modules	1928 string x 28 In series
At operating cond. (50°C)	
Pmpp	28.75 MWp
U mpp	1092 V
I mpp	26331 A

Inverter

Manufacturer	Huawei Technologies
Model	SUN2000-330KTL-H1
(Original PVsyst database)	
Unit Nom. Power	300 kWac
Number of inverters	110 units
Total power	33000 kWac
Operating voltage	550-1500 V
Max. power (=>30°C)	330 kWac
Pnom ratio (DC:AC)	0.94
Power sharing within this inverter	

Total PV power

Nominal (STC)	31041 kWp
Total	53984 modules
Module area	139454 m²

Total inverter power

Total power	33000 kWac
Max. power	36300 kWac
Number of inverters	110 units
Pnom ratio	0.94

Array losses

Array Soiling Losses
Loss Fraction 3.0 %

Thermal Loss factor
Module temperature according to irradiance
Uc (const) 19.0 W/m²K
Uv (wind) 0.0 W/m²K/m/s

DC wiring losses
Global array res. 0.68 mΩ
Loss Fraction 1.5 % at STC

LID - Light Induced Degradation
Loss Fraction 2.0 %

Module Quality Loss
Loss Fraction -0.8 %

Module mismatch losses
Loss Fraction 1.0 % at MPP

Strings Mismatch loss
Loss Fraction 0.1 %

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

AC wiring losses

Inv. output line up to MV transfo

Inverter voltage	800 Vac tri
Loss Fraction	0.07 % at STC
Inverter: SUN2000-330KTL-H1	
Wire section (110 Inv.)	Copper 110 x 3 x 2500 mm²
Average wires length	200 m

MV line up to Injection

MV Voltage	20 kV
Wires	Copper 3 x 700 mm²
Length	12000 m
Loss Fraction	2.48 % at STC

AC losses in transformers

MV transfo

Medium voltage	20 kV
Transformer parameters	
Nominal power at STC	30.73 MVA
Iron Loss (night disconnect)	76.92 kVA
Iron loss fraction	0.25 % at STC
Copper loss	441.07 kVA
Copper loss fraction	1.44 % at STC
Coils equivalent resistance	3 x 0.30 mΩ

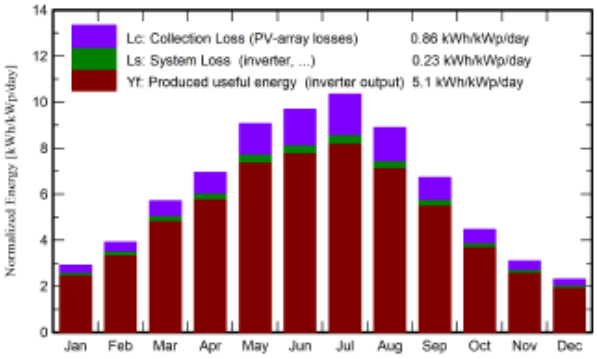
RISULTATI PRINCIPALI

Main results

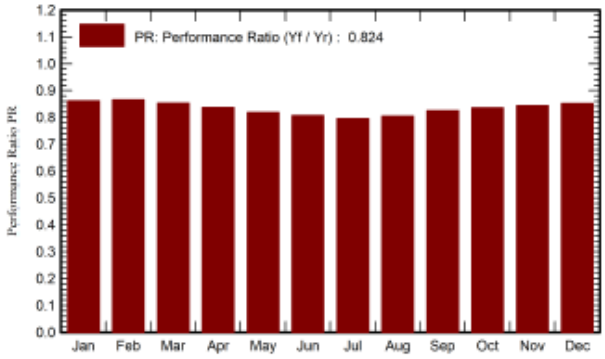
System Production

Produced Energy	57749293 kWh/year	Specific production	1860 kWh/kWp/year
		Perf. Ratio PR	82.43 %

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 kWh	E_Grid kWh	PR ratio
January	58.9	25.44	6.89	89.9	84.2	2518364	2407232	0.862
February	77.3	33.07	7.90	109.4	103.6	3069196	2941734	0.866
March	124.2	50.65	11.33	176.8	168.9	4886215	4681910	0.853
April	153.5	69.36	14.42	208.1	199.3	5647876	5406241	0.837
May	203.0	75.01	19.73	281.0	270.2	7458831	7141794	0.819
June	211.9	76.07	23.58	290.7	279.6	7598786	7276105	0.806
July	229.5	65.58	26.40	320.6	309.0	8271104	7918609	0.796
August	195.2	65.31	26.06	275.8	265.4	7184583	6889431	0.805
September	140.6	59.40	20.88	201.8	193.3	5389356	5168491	0.825
October	97.5	42.62	17.43	138.3	131.6	3749250	3591402	0.836
November	64.2	25.34	12.11	92.9	87.3	2550291	2435434	0.844
December	48.9	23.66	8.11	71.5	66.4	1985833	1890909	0.852
Year	1604.7	611.49	16.29	2256.9	2158.9	60309686	57749293	0.824

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		

DIAGRAMMA PERDITE

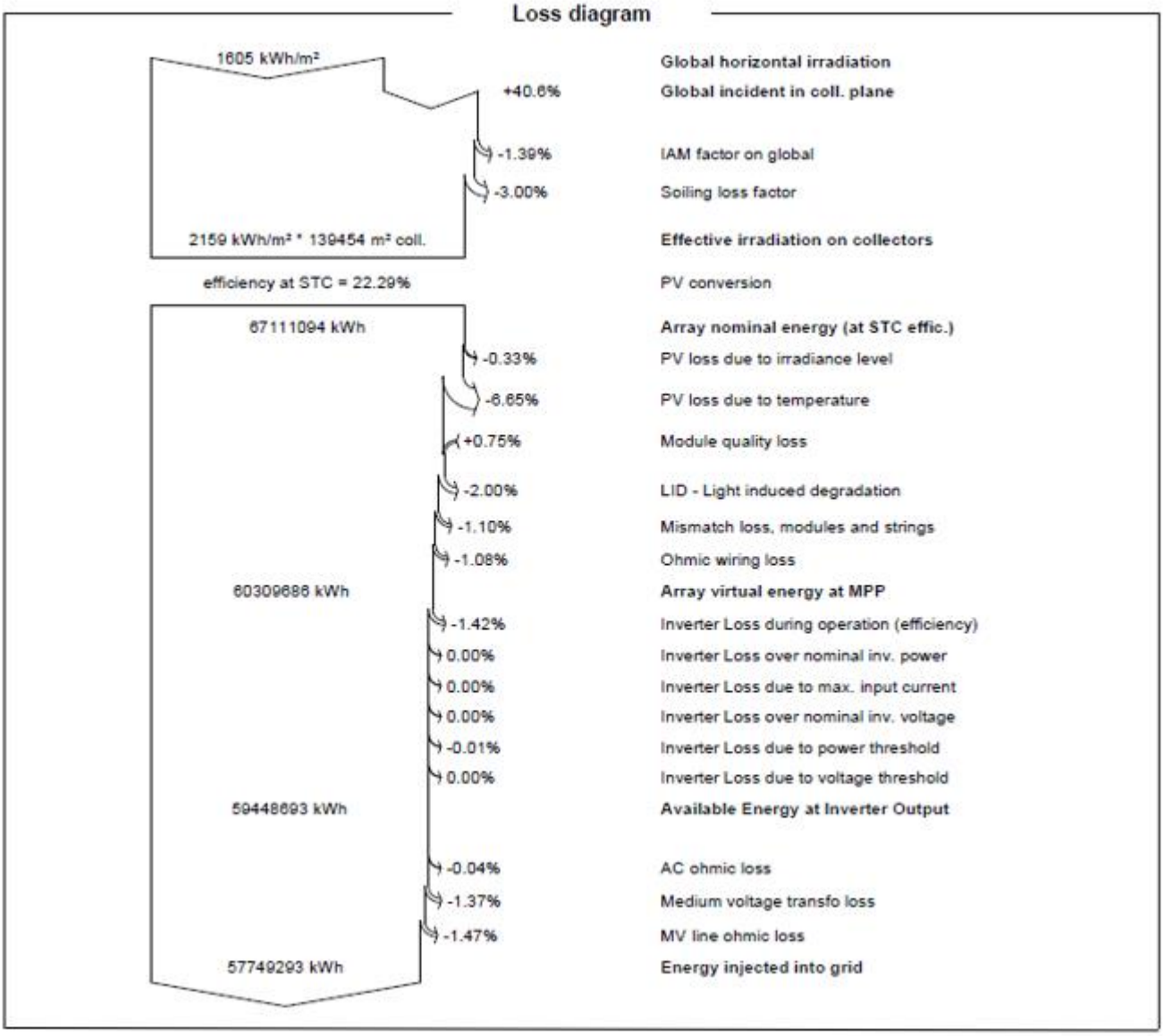


DIAGRAMMA PERDITE