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NOME COMMESSA:

COSTRUZIONE ED ESERCIZIO IMPIANTO AGROVOLTAICO AVENTE POTENZA NOMINALE PARI A 40.000 kW E POTENZA MODULI PARI A 51.176,580 kWp, CON RELATIVO COLLEGAMENTO ALLA RETE ELETTRICA, SITO IN LATIANO (BR) AL FG.24 PART.N.1-2-6-7-8-9-11-58-59 IMPIANTO SV01

STATO DI AVANZAMENTO COMMESSA:

PROGETTO DEFINITIVO PER AUTORIZZAZIONE UNICA

CODICE COMMESSA:

HE.19.0024

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PWL Law Firm

OGGETTO:

ANALISI DELLA RISORSA SOLARE E STIMA DI PRODUZIONE ENERGIA

SCALA:

-

DATA:

FEBBRAIO 2021

NOME FILE:

NW2WAM0_AnalisiRisorsaSolare.PDF

TAVOLA:

DPE.RE01

N. REV.	DATA	REVISIONE	ELABORATO	VERIFICATO responsabile commessa	VALIDATO direttore tecnico
0	02.2021	Emissione	M.Girardi	A.Albuzzi	N.Zuech

Version 7.1.5

PVsyst - Simulation report

Grid-Connected System

Project: HE.19.0024 HEPV SV SV01

Variant: SV SV01 PVGYS SARAH 2005-2016

Tracking system with backtracking

System power: 51.18 MWp

Latiano SV01 PVGIS SARAH, COSMO or NSRDB 2005-2016 - Italy

Author

Heliopolis spa (Italy)

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Project summary

Geographical Site
Latiano SV01 PVGIS SARAH, COSMO or NSRDB 2005-2016
Italy

Situation

Latitude	40.58 °N
Longitude	17.74 °E
Altitude	81 m
Time zone	UTC+1

Project settings

Albedo	0.20

Meteo data
Latiano SV01 PVGIS SARAH, COSMO or NSRDB 2005-2016
PVGIS SARAH, COSMO or NSRDB 2005-2016 - Synthetic

System summary

Grid-Connected System
Simulation for year no 1

Tracking system with backtracking

PV Field Orientation
Tracking plane, horizontal N-S axis
Axis azimuth 0 °

Near Shadings
According to strings
Electrical effect 50 %

User's needs
Unlimited load (grid)

System information

PV Array

Nb. of modules	112476 units
Pnom total	51.18 MWp

Inverters

Nb. of units	13 units
Pnom total	40.00 MWac
Pnom ratio	1.279

Results summary

Produced Energy	95302 MWh/year	Specific production	1862 kWh/kWp/year	Perf. Ratio PR	84.36 %

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General parameters, PV Array Characteristics, System losses 3
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Special graphs 8

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General parameters

Grid-Connected System

Tracking system with backtracking

PV Field Orientation

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

Backtracking strategy	
Nb. of trackers	126 units
Sizes	
Tracker Spacing	5.50 m
Collector width	2.11 m
Ground Cov. Ratio (GCR)	38.4 %
Phi min / max	-/+ 60.0 °
Backtracking limit angle	
Phi limits	+/- 67.1 °

Models used	
Transposition	Perez
Diffuse	Perez, Meteonorm
Circumsolar	separate

Horizon
Free Horizon

Near Shadings
According to strings
Electrical effect 50 %

User's needs
Unlimited load (grid)

PV Array Characteristics

Array #1 - INV 2.800

PV module

Manufacturer	JA Solar
Model	JAM72S20-455/MR_1stMarch2021
(Custom parameters definition)	
Unit Nom. Power	455 Wp
Number of PV modules	79560 units
Nominal (STC)	36.20 MWp
Modules	3060 Strings x 26 In series
At operating cond. (50°C)	
Pmpp	33.18 MWp
U mpp	990 V
I mpp	33497 A

Inverter

Manufacturer	SMA
Model	Sunny Central 2800 UP (Preliminary)
(Custom parameters definition)	
Unit Nom. Power	2800 kWac
Number of inverters	10 units
Total power	28000 kWac
Operating voltage	921-1325 V
Pnom ratio (DC:AC)	1.29

Array #2 - INV. 4.000

PV module

Manufacturer	JA Solar
Model	JAM72S20-455/MR_1stMarch2021
(Custom parameters definition)	
Unit Nom. Power	455 Wp
Number of PV modules	32916 units
Nominal (STC)	14.98 MWp
Modules	1266 Strings x 26 In series
At operating cond. (50°C)	
Pmpp	13.73 MWp
U mpp	990 V
I mpp	13859 A

Inverter

Manufacturer	SMA
Model	Sunny Central 4000 UP
(Custom parameters definition)	
Unit Nom. Power	4000 kWac
Number of inverters	3 units
Total power	12000 kWac
Operating voltage	880-1325 V
Pnom ratio (DC:AC)	1.25

Total PV power

Nominal (STC)	51177 kWp
Total	112476 modules
Module area	249902 m²
Cell area	224484 m²

Total inverter power

Total power	40000 kWac
Nb. of inverters	13 units
Pnom ratio	1.28

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Array losses

Array Soiling Losses
Loss Fraction 1.0 %

Thermal Loss factor
Module temperature according to irradiance
Uc (const) 29.0 W/m²K
Uv (wind) 0.0 W/m²K/m/s

LID - Light Induced Degradation
Loss Fraction 1.0 %

Module Quality Loss
Loss Fraction -0.3 %

Module mismatch losses
Loss Fraction 0.7 % at MPP

Strings Mismatch loss
Loss Fraction 0.1 %

Module average degradation
Year no 1
Loss factor 1 %/year

Mismatch due to degradation
Imp RMS dispersion 0.4 %/year
Vmp RMS dispersion 0.4 %/year

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	1.000	0.985	0.943	0.840	0.000

DC wiring losses

Global wiring resistance 0.32 mΩ
Loss Fraction 1.4 % at STC

Array #1 - INV 2.800
Global array res. 0.46 mΩ
Loss Fraction 1.4 % at STC

Array #2 - INV. 4.000
Global array res. 1.1 mΩ
Loss Fraction 1.4 % at STC

System losses

Auxiliaries loss
Proportionnal to Power 4.0 W/kW
0.0 kW from Power thresh.

AC wiring losses

Inv. output line up to MV transfo
Inverter voltage 630 Vac tri
Loss Fraction 0.6 % at STC

Inverters: Sunny Central 2800 UP (Preliminary), Sunny Central 4000 UP
Wire section (13 Inv.) Copper 13 x 3 x 5000 mm²
Average wires length 165 m

MV line up to Injection
MV Voltage 30 kV
Wires Alu 3 x 2000 mm²
Length 2600 m
Loss Fraction 0.2 % at STC

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AC losses in transformers

MV transfo		
Grid Voltage	30	kV
Operating losses at STC		
Nominal power at STC (PNomac)	50049	kVA
Iron loss (24/24 Connexion)	100.10	kW
Loss Fraction	0.2	% at STC
Coils equivalent resistance	3 x 0.16	mΩ
Loss Fraction	2.0	% at STC

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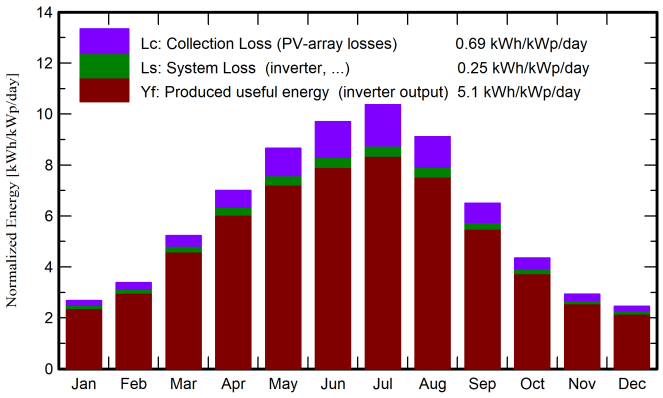
Main results

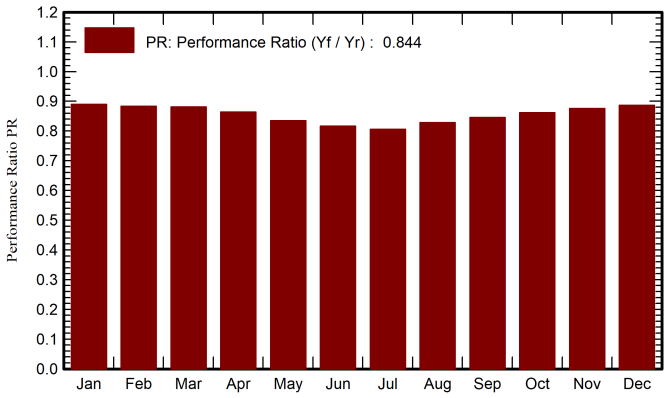
System Production

Produced Energy	95302 MWh/year	Specific production	1862 kWh/kWp/year
		Performance Ratio PR	84.36 %

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 MWh	E_Grid MWh	PR ratio
January	61.6	28.60	10.04	83.0	80.0	3977	3780	0.890
February	73.5	36.50	10.11	94.8	91.2	4503	4283	0.883
March	122.9	53.20	12.01	162.2	156.9	7666	7313	0.881
April	160.5	65.30	14.73	210.2	203.7	9739	9287	0.863
May	203.7	70.90	18.54	268.6	261.0	12043	11475	0.835
June	220.3	70.80	22.67	291.0	282.9	12762	12161	0.817
July	237.1	63.00	25.67	321.3	313.0	13907	13254	0.806
August	208.1	59.30	25.66	282.5	274.9	12564	11974	0.828
September	144.9	54.50	22.26	195.1	189.2	8848	8440	0.845
October	102.5	44.60	18.27	134.9	130.4	6239	5949	0.861
November	66.2	31.20	14.62	88.0	84.8	4142	3942	0.875
December	55.6	25.60	10.93	75.9	73.2	3629	3445	0.887
Year	1656.9	603.50	17.17	2207.5	2141.1	100018	95302	0.844

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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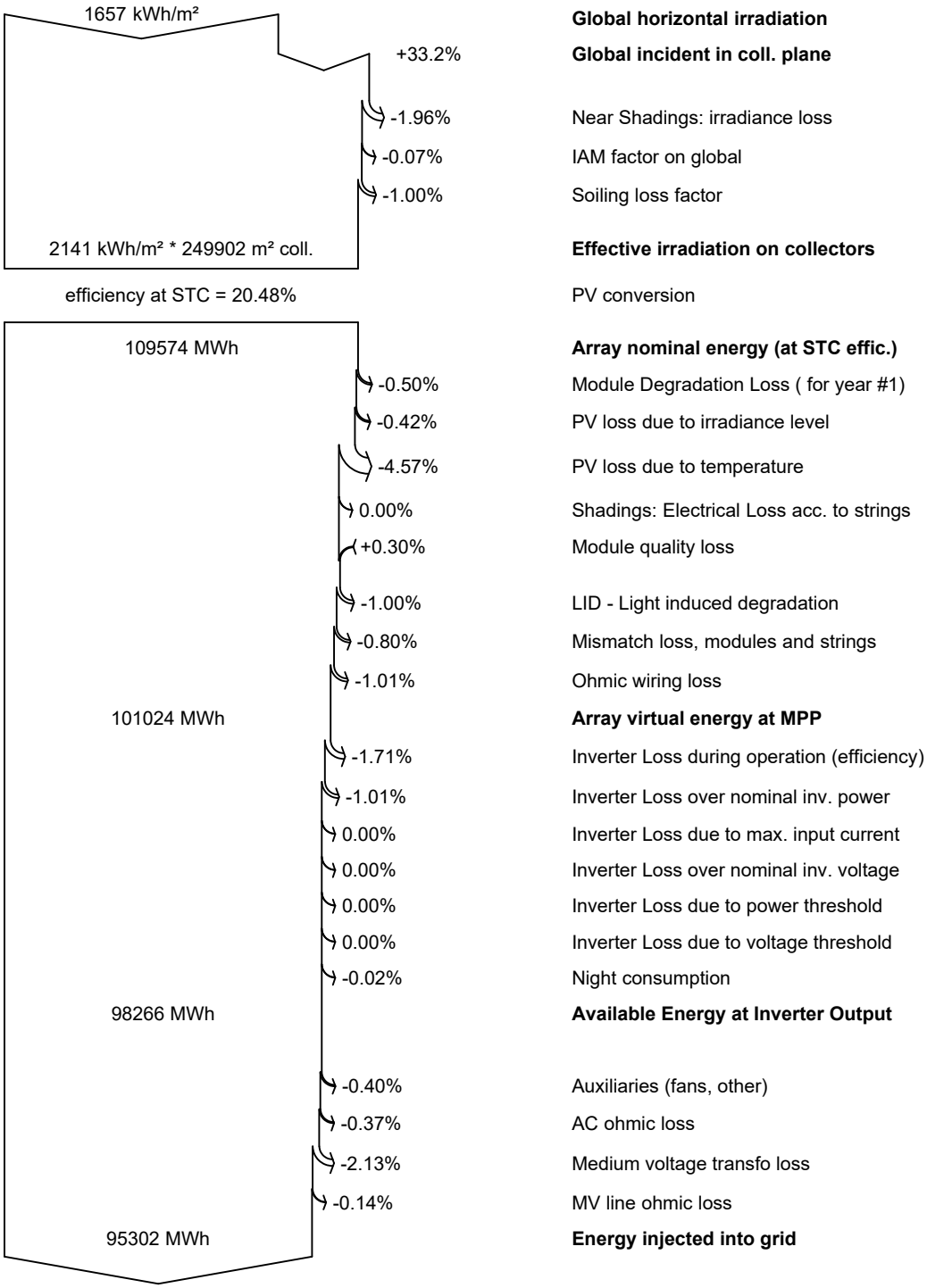
Loss diagram



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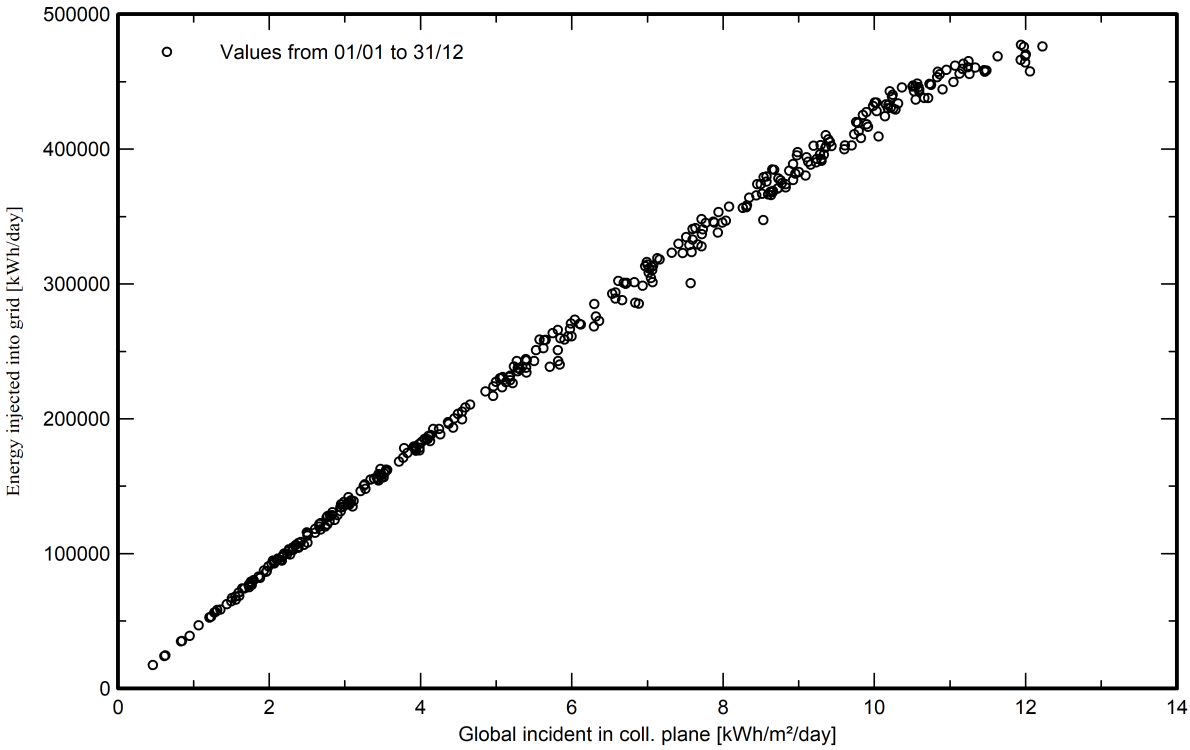
Special graphs

Daily Input/Output diagram



System Output Power Distribution