COMUNE DI ROSOLINI

Libero Consorzio Comunale - Siracusa

SIMULAZIONE PARAMETRI IMPIANTO

RIDUZIONE DEI CONSUMI NELL'EDIFICIO SCOLASTICO SACRO CUORE E REALIZZAZIONE DI UN IMPIANTO FOTOVOLTAICO A SERVIZIO DEI CONSUMI

COMUNE DI ROSOLINI

VIA DANTE ALIGHIERI, 96019, ROSOLINI (SR)

Allegati:

- *Simulazione parametri impianto.*

DATA

03/06/2019

IL TECNICO

Ing. Corrado Mingo

Geom. Gaetano Borgia

Grid-Connected System: Simulation parameters

Project : **PLESSO SCOLASTICO SACRO CUORE**

Geographical Site	**ROSOLINI CMSF**		Country	**Italy**
Situation	Latitude	36.82° N	Longitude	14.95° E
Time defined as	Legal Time	Time zone UT	Altitude	151 m
	Albedo	0.20		
Meteo data:	**ROSOLINI CMSF**	PVGIS CM SAF, satellite 1998-2011 - Synthetic		

Simulation variant : **New simulation variant**

Simulation date 03/06/19 14h08

Simulation parameters

Collector Plane Orientation	Tilt	30°	Azimuth	0°
Models used	Transposition	Perez	Diffuse	Perez, Meteonorm
Horizon	Free Horizon			
Near Shadings	Linear shadings			

PV Array Characteristics

PV module Si-mono	Model	**CS3K-300MS**		
Original PVsyst database	Manufacturer	Canadian Solar Inc.		
Number of PV modules	In series	15 modules	In parallel	6 strings
Total number of PV modules	Nb. modules	90	Unit Nom. Power	300 Wp
Array global power	Nominal (STC)	**27.00 kWp**	At operating cond.	24.52 kWp (50°C)
Array operating characteristics (50°C)	U mpp	439 V	I mpp	56 A
Total area	Module area	**150 m²**	Cell area	132 m²

Inverter	Model	**TRIO-8.5-TL-OUTD-400**		
Original PVsyst database	Manufacturer	ABB		
Characteristics	Operating Voltage	175-950 V	Unit Nom. Power	8.50 kWac
Inverter pack	Nb. of inverters	3 units	Total Power	26 kWac

PV Array loss factors

Array Soiling Losses			Loss Fraction	2.0 %
Thermal Loss factor	Uc (const)	20.0 W/m²K	Uv (wind)	0.0 W/m²K / m/s
Wiring Ohmic Loss	Global array res.	116 mOhm	Loss Fraction	1.3 % at STC
LID - Light Induced Degradation			Loss Fraction	1.4 %
Module Quality Loss			Loss Fraction	-0.5 %
Module Mismatch Losses			Loss Fraction	1.0 % at MPP
Strings Mismatch loss			Loss Fraction	0.10 %

Incidence effect (IAM): User defined IAM profile

10°	20°	30°	40°	50°	60°	70°	80°	90°
0.998	0.998	0.995	0.992	0.986	0.970	0.917	0.763	0.000

System loss factors

Wiring Ohmic Loss	Wires: 3x10.0 mm²	49 m	Loss Fraction	1.5 % at STC
Unavailability of the system	3.6 days, 3 periods		Time fraction	1.0 %

User's needs :	Unlimited load (grid)			
Auxiliaries loss	constant (fans)	100 W	... from Power thresh.	0.0 kW

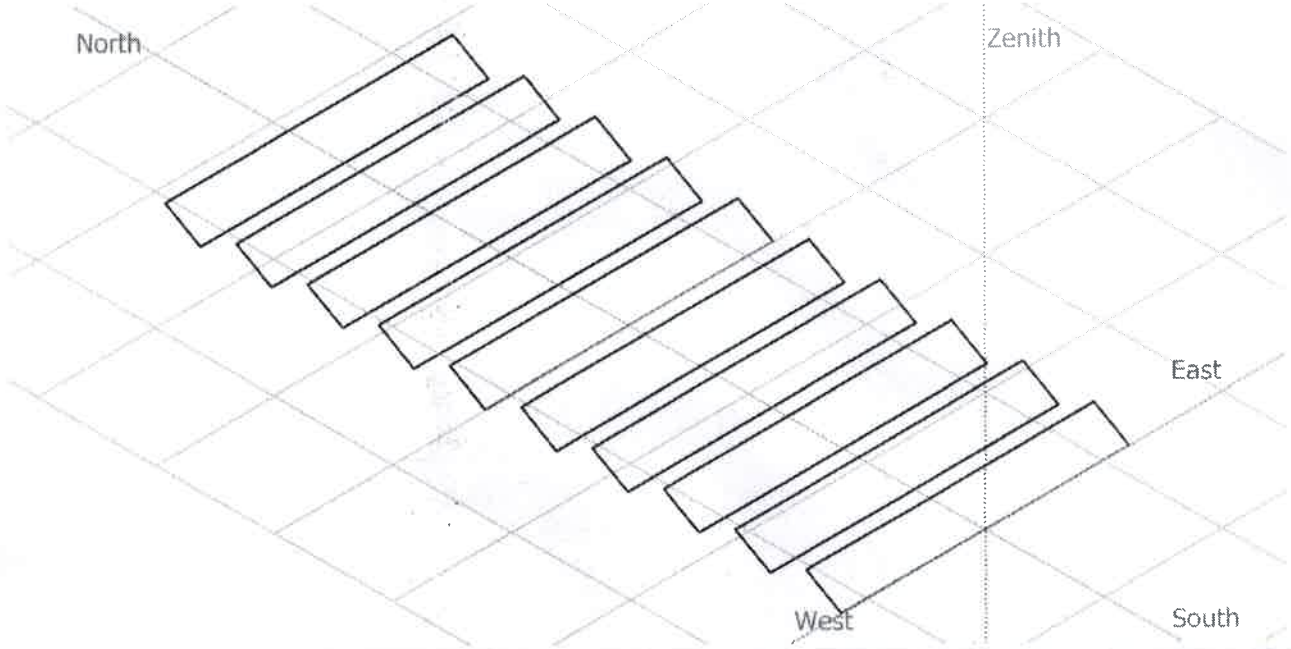
Grid-Connected System: Near shading definition

Project : **PLESSO SCOLASTICO SACRO CUORE**

Simulation variant : **New simulation variant**

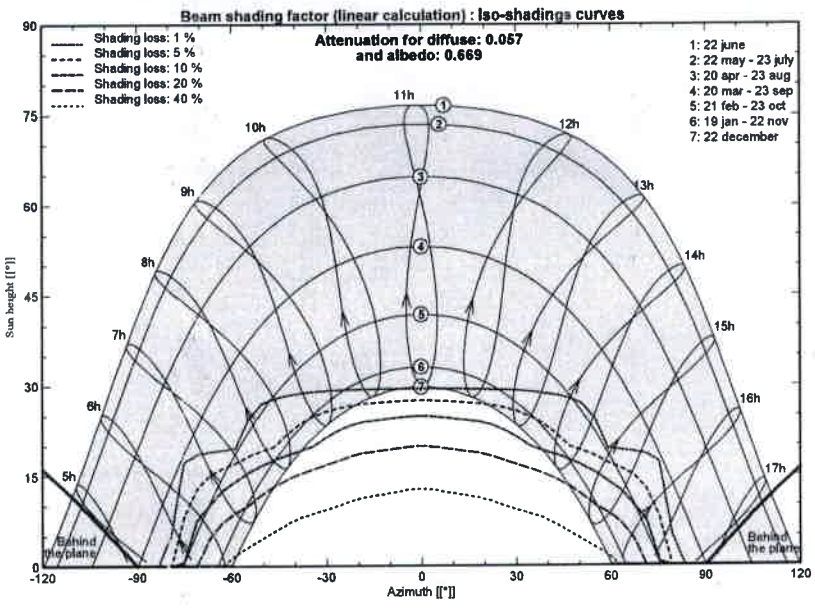
Main system parameters	System type	**Grid-Connected**			
Near Shadings	Linear shadings				
PV Field Orientation	tilt	30°	azimuth	0°	
PV modules	Model	CS3K-300MS	Pnom	300 Wp	
PV Array	Nb. of modules	90	Pnom total	**27.00 kWp**	
Inverter	Model	TRIO-8.5-TL-OUTD-400	Pnom	8.50 kW ac	
Inverter pack	Nb. of units	3.0	Pnom total	**25.50 kW ac**	
User's needs	Unlimited load (grid)				

Perspective of the PV-field and surrounding shading scene



Iso-shadings diagram

PLESSO SCOLASTICO SACRO CUORE



Grid-Connected System: Main results

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Simulation variant : **New simulation variant**

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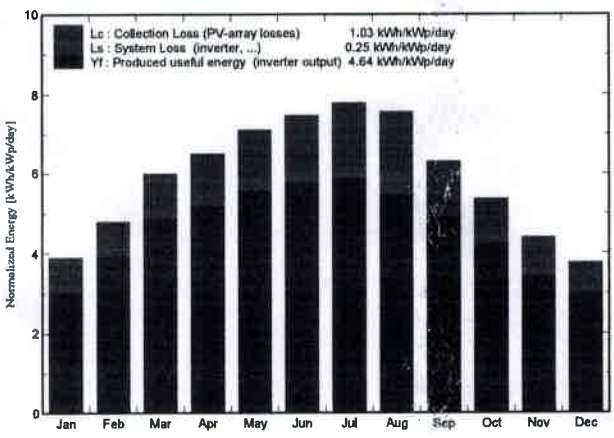
User's needs	Unlimited load (grid)				

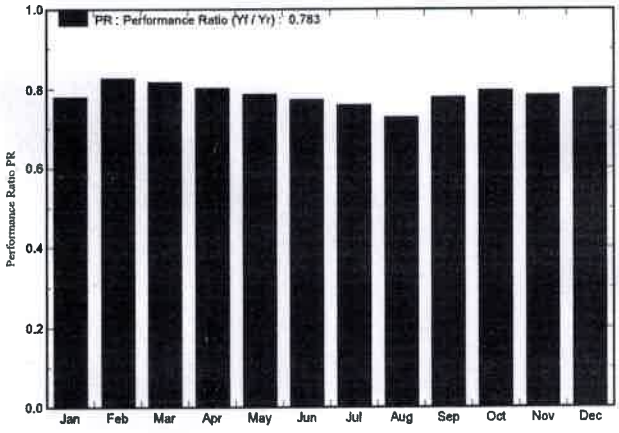
Main simulation results

System Production	**Produced Energy**	**45.68 MWh/year**	Specific prod.	1692 kWh/kWp/year
	Performance Ratio PR	78.32 %		

Normalized productions (per installed kWp): Nominal power 27.00 kWp



Performance Ratio PR



New simulation variant

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
January	79.0	32.41	11.10	120.9	110.6	2.764	2.547	0.780
February	96.3	37.57	10.90	134.2	125.1	3.131	2.998	0.827
March	152.2	60.88	12.60	185.8	173.6	4.283	4.101	0.818
April	180.9	59.70	15.70	195.1	182.1	4.417	4.228	0.802
May	225.4	67.61	19.20	220.3	205.6	4.906	4.686	0.788
June	242.1	55.68	23.50	224.4	209.9	4.909	4.690	0.774
July	254.8	48.42	26.80	241.3	226.8	5.190	4.956	0.761
August	224.1	49.31	26.90	234.3	220.3	5.046	4.608	0.729
September	161.1	51.55	24.00	189.3	177.3	4.164	3.983	0.779
October	125.2	50.10	20.30	166.3	155.3	3.733	3.573	0.796
November	86.4	33.70	16.30	131.8	121.1	2.977	2.791	0.785
December	71.9	28.77	12.30	116.6	105.2	2.637	2.521	0.801
Year	1899.6	575.69	18.34	2160.3	2012.8	48.156	45.683	0.783

Legends:

GlobHor	Horizontal global irradiation	GlobEff	Effective Global, corr. for IAM and shadings
DiffHor	Horizontal diffuse irradiation	EArray	Effective energy at the output of the array
T Amb	Ambient Temperature	E_Grid	Energy injected into grid
GlobInc	Global incident in coll. plane	PR	Performance Ratio

Grid-Connected System: Loss diagram

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Simulation variant : New simulation variant

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Loss diagram over the whole year