Simulazione Roma 10KWp Sistema inseguito +45 -45 Est-Ovest
Progetto ECONTEK

Grid-connected PV system: Simulation parameters

Project :	**Roma 5KWp**				
Geographical site :	**Roma**		**Country**	**Italy**	
Situation :	Latitude	42.1°N	Longitude	12.3°E	
Time defined as :	Legal time	Time zone UT+1	Altitude	15 m	
	Albedo	0.20			
Meteo data :	Roma , synthetic hourly data				

Simulation variant :	**Simulation variant**			
	Simulation date	15/12/06 18h02		

Simulation parameters :

Tracking plane, tilted axis	Axis tilt	0°	Axis Azimuth	34°
Rotation limitations	Minimum Phi	-45°	Maximum Phi	45°
Horizon	Free horizon			
Near shadings	No Shadings			

PV array characteristics :

PV module: Si-poly	Module name	**KC 175GT**		
	Manufacturer	Kyocera		
Number of PV modules :	in serie	10 modules	in parallel	6 strings
Total number of PV modules :	Nb. modules	60	unit nom. power	175 Wp
Array global power	Nominal (STC)	**11 kWp**	At oper. cond.	9.1 kWp (50°C)
Array operating characteristics (50°C)	U mpp	207 V	I mpp	44 A
Total area	Module area	**76.6 m²**		

PV array loss factors :

Heat Loss Factor	k (const)	29.0 W/m²K	k (wind)	0.0 W/m²K / m/s
=> Nominal Oper. Coll. Temp. (800 W/m², Tamb=20°C, wind 1 m/s)			NOCT	45 °C
Wiring ohmic losses	Global field res.	154.4 mOhm	Loss fraction	3.0 % at STC
Serie diode loss	Voltage drop	0.7 V	Loss fraction	0.3 % at STC
Module quality losses			Loss fraction	3.0 %
Module mismatch losses			Loss fraction	2.0 % at mpp
Incidence effect: "Ashrae" parametrization	IAM =	1-bo (1/cos i - 1)	bo	0.05

System parameter:	System type	**Grid-connected**		
Inverter	Model	**IG 30 El**		
	Manufacturer	Fronius		
Inverter characteristics	Operating voltage	150-400 V	Unit nom. power	2.5 kW AC
Inverter pack	Number of inverters	3 units	Total power	7.5 kW AC

User's needs : Unlimited load (grid)

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Grid-connected PV system: Main results

Project : **Roma 5KWp**

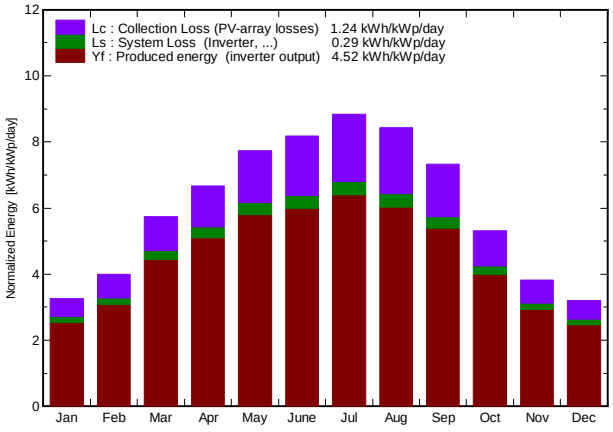
Simulation variant : **Simulation variant**

Main system parameters		System type	**Grid-connected**		
PV field orientation	Tracking, tilted axis,	axis tilt:	34°	axis azimut	0°
PV modules		Model	KC 175GT	Pnom	175 Wp
PV array		Nb of modules	60	Pnom total	**11 kWp**
Inverter		Model	IG 30 El	Pnom	2.50 kWp ac
Inverter pack		Nb of units	3	Pnom total	**7.5 kWp ac**
User's needs		Unlimited load (grid)			

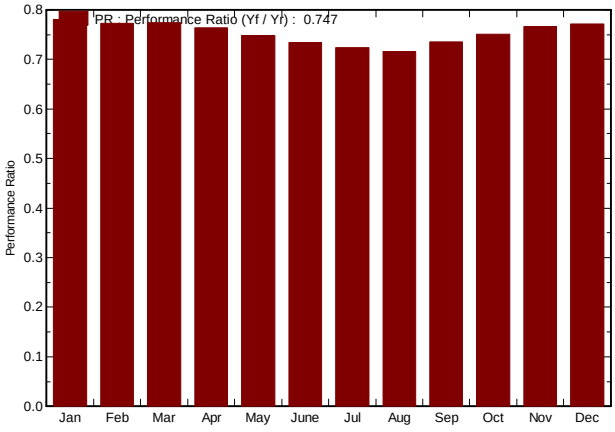
Main simulation results

System production	**Produced energy**	**17.33 MWh/year**	Specific	1650 kWh/kWp/year
	Performance ratio PR	74.7 %		

Normalized productions (per installed kWp): Nominal power 11 kWp



Performance Ratio



Simulation variant

Balances and main results

	GlobHor	T Amb	GlobInc	GlobEff	EArray	EOutInv	EffArrR	EffSysR
	kWh/m²	°C	kWh/m²	kWh/m²	kWh	kWh	%	%
January	56.0	8.00	101.0	98.8	883	828	11.41	10.70
February	71.0	8.90	111.7	109.4	966	906	11.29	10.59
March	120.0	11.00	177.8	174.4	1537	1444	11.28	10.60
April	153.0	13.30	200.3	196.4	1710	1606	11.14	10.46
May	191.0	17.40	239.7	235.2	2007	1884	10.92	10.26
June	203.0	21.30	245.2	240.3	2011	1889	10.70	10.05
July	217.0	24.20	274.2	269.1	2216	2082	10.55	9.91
August	189.0	24.80	261.6	257.4	2093	1966	10.44	9.80
September	141.0	21.70	220.1	216.7	1807	1698	10.72	10.07
October	99.0	17.30	165.0	162.2	1384	1300	10.95	10.28
November	61.0	11.90	114.5	112.3	981	920	11.19	10.49
December	48.0	9.20	99.2	97.4	858	804	11.28	10.57
Yearly sum	1549.0	15.79	2210.3	2169.5	18454	17325	10.90	10.23

Legends:

GlobHor	Horizontal global irradiation	EArray	Effective energy at the output of the array
T Amb	Ambient Temperature	EOutInv	Available Energy at Inverter Output
GlobInc	Global incident in coll. plane	EffArrR	Effic. Eout array / rough area
GlobEff	"Effective" Global, corr. for IAM and shadings	EffSysR	Effic. Eout system / rough area

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Grid-connected PV system: Loss diagram

Project : **Roma 5KWp**

Simulation variant : **Simulation variant**

Main system parameters	System type	**Grid-connected**			
PV field orientation	Tracking, tilted axis, axis tilt:	34°	axis azimut	0°	
PV modules	Model	KC 175GT	Pnom	175 Wp	
PV array	Nb of modules	60	Pnom total	**11 kWp**	
Inverter	Model	IG 30 El	Pnom	2.50 kWp ac	
Inverter pack	Nb of units	3	Pnom total	**7.5 kWp ac**	
User's needs	Unlimited load (grid)				

Loss diagram over the whole year