Simulazione Roma 5KWp Sistema Fisso
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 17h56			

Simulation parameters :

Collector Plane orientation	Tilt	34°	Azimuth	0°	
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	14 modules	in parallel	2 strings
Total number of PV modules :		Nb. modules	28	unit nom. power	175 Wp
Array global power		Nominal (STC)	**4.9 kWp**	At oper. cond.	4.2 kWp (50°C)
Array operating characteristics (50°C)		U mpp	289 V	I mpp	15 A
Total area		Module area	**35.8 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.	661.3 mOhm	Loss fraction	3.1 % at STC
Serie diode loss	Voltage drop	0.7 V	Loss fraction	0.2 % 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 60 El**			
	Manufacturer	Fronius			
Inverter characteristics	Operating voltage	150-400 V	Unit nom. power	4.6 kW AC	

User's needs : Unlimited load (grid)

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Grid-connected PV system: Main results

Project : **Roma 5KWp**

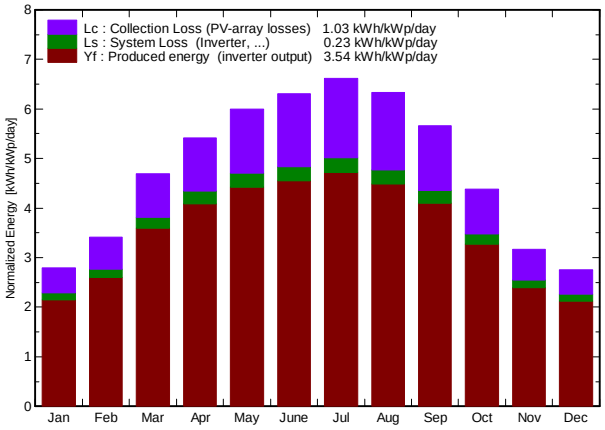
Simulation variant : **Simulation variant**

Main system parameters	System type	**Grid-connected**		
PV field orientation	Tilt	34°	Azimut	0°
PV modules	Model	KC 175GT	Pnom	175 Wp
PV array	Nb of modules	28	Pnom total	**4.9 kWp**
Inverter	Model	IG 60 El	Pnom	4.6 kWp ac
User's needs	Unlimited load (grid)			

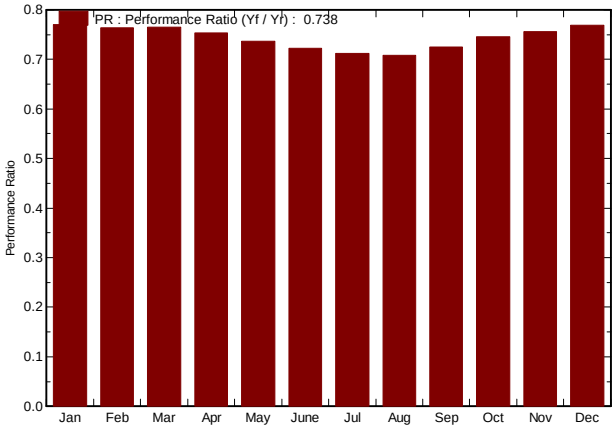
Main simulation results

System production	**Produced energy**	**6340 kWh/year**	Specific	1294 kWh/kWp/year
	Performance ratio PR	73.8 %		

Normalized productions (per installed kWp): Nominal power 4.9 kWp



Performance Ratio



Simulation variant

Balances and main results

	GlobHor kWh/m²	T Amb °C	GlobInc kWh/m²	GlobEff kWh/m²	EArray kWh	EOutInv kWh	EffArrR %	EffSysR %
January	56.0	8.00	86.4	83.8	347.1	325.9	11.23	10.55
February	71.0	8.90	95.4	92.6	380.4	357.4	11.15	10.47
March	120.0	11.00	145.5	141.2	579.7	545.3	11.14	10.48
April	153.0	13.30	162.6	157.7	638.7	600.7	10.98	10.33
May	191.0	17.40	186.0	180.4	714.5	671.9	10.74	10.10
June	203.0	21.30	189.1	183.1	711.5	669.2	10.52	9.90
July	217.0	24.20	205.2	198.8	760.8	715.7	10.37	9.75
August	189.0	24.80	196.1	190.3	723.6	680.7	10.32	9.71
September	141.0	21.70	169.6	164.7	640.6	602.7	10.56	9.94
October	99.0	17.30	135.9	132.2	527.6	496.2	10.86	10.21
November	61.0	11.90	95.1	92.4	375.0	352.2	11.02	10.35
December	48.0	9.20	85.5	83.2	343.2	322.3	11.22	10.54
Yearly sum	1549.0	15.79	1752.5	1700.3	6742.8	6340.2	10.76	10.12

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**

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PV modules	Model	KC 175GT	Pnom	175 Wp	
PV array	Nb of modules	28	Pnom total	**4.9 kWp**	
Inverter	Model	IG 60 El	Pnom	4.6 kWp ac	
User's needs	Unlimited load (grid)				

Loss diagram over the whole year