

Simulazione Milano 5KWp Sistema Fisso  
Progetto ECONTExK

**Grid-connected PV system: Simulation parameters**

**Project :** **MILANO 5KWp FISSO**

**Geographical site :** **Milano2** **Country** **Italy**

**Situation :** Latitude 45.3°N Longitude 9.1°E  
Time defined as : Legal time Time zone UT+1 Altitude 100 m  
Albedo 0.20

**Meteo data :** Milano , synthetic hourly data

**Simulation variant :** **Simulation variant**  
Simulation date 15/12/06 18h32

**Simulation parameters :**

**Collector Plane orientation** Tilt 35° 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 m<sup>2</sup>**

**PV array loss factors :**

Heat Loss Factor k (const) 29.0 W/m<sup>2</sup>K k (wind) 0.0 W/m<sup>2</sup>K / m/s  
=> Nominal Oper. Coll. Temp. (800 W/m<sup>2</sup>, Tamb=20°C, wind 1 m/s) NOCT 45 °C  
Wiring ohmic losses Global field res. 647.8 mOhm Loss fraction 3.0 % 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 EI**  
Manufacturer Fronius  
Inverter characteristics Operating voltage 150-400 V Unit nom. power 4.6 kW AC

**User's needs :** Unlimited load (grid)

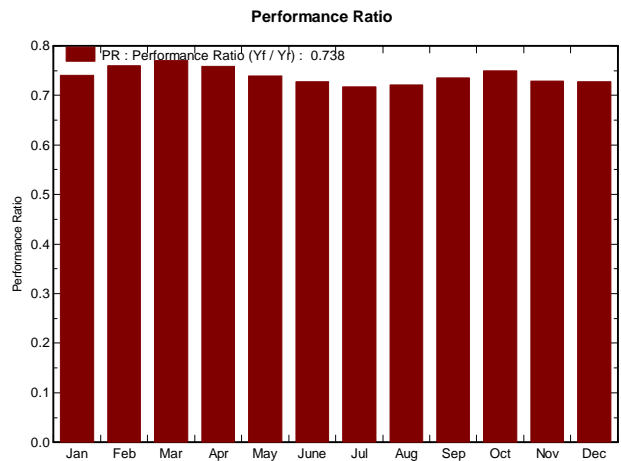
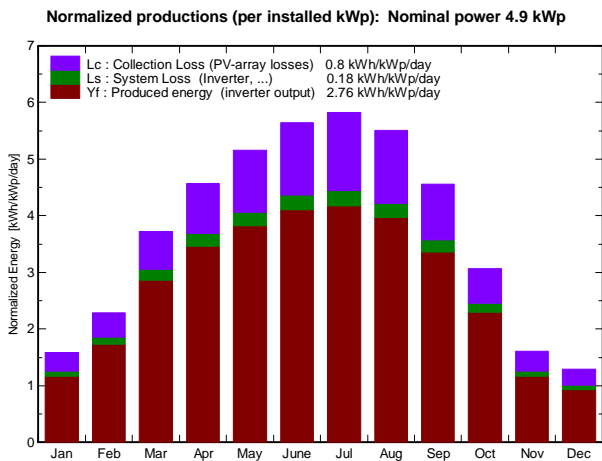
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Grid-connected PV system: Main results

**Project :** MILANO 5KWp FISSO  
**Simulation variant :** Simulation variant

<b>Main system parameters</b>	System type	<b>Grid-connected</b>		
PV field orientation	Tilt	35°	Azimut	0°
PV modules	Model	KC 175GT	Pnom	175 Wp
PV array	Nb of modules	28	Pnom total	<b>4.9 kWp</b>
Inverter	Model	IG 60 EI	Pnom	4.6 kWp ac
User's needs	Unlimited load (grid)			

<b>Main simulation results</b>				
System production	<b>Produced energy</b>	<b>4937 kWh/year</b>	Specific	1008 kWh/kWp/year
	Performance ratio PR	73.8 %		



**Simulation variant**  
**Balances and main results**

	GlobHor kWh/m <sup>2</sup>	T Amb °C	GlobInc kWh/m <sup>2</sup>	GlobEff kWh/m <sup>2</sup>	EArray kWh	EOutInv kWh	EffArrR %	EffSysR %
January	33.0	2.80	49.0	47.4	190.6	177.6	10.89	10.15
February	50.0	4.00	63.8	61.8	253.9	237.6	11.12	10.40
March	96.0	7.10	115.2	111.7	463.2	435.0	11.24	10.56
April	129.0	10.00	137.0	132.7	542.0	509.1	11.06	10.39
May	162.0	14.80	160.0	154.8	617.5	579.9	10.79	10.14
June	179.0	18.60	169.2	163.5	642.0	603.3	10.61	9.97
July	188.0	21.70	180.5	174.4	675.2	634.7	10.46	9.83
August	164.0	21.50	170.6	165.1	641.1	602.8	10.51	9.88
September	117.0	18.60	136.8	132.8	524.8	493.3	10.73	10.08
October	73.0	12.70	95.2	92.5	372.6	349.4	10.94	10.26
November	36.0	6.70	48.3	46.7	185.0	172.3	10.72	9.98
December	28.0	3.20	39.9	38.6	152.8	142.0	10.72	9.96
Yearly sum	1255.0	11.85	1365.5	1322.0	5260.8	4936.9	10.77	10.11

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

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Loss diagram over the whole year

