

Simulazione Milano 1KWp Sistema Fisso
Progetto ECONSTEK

Grid-connected PV system: Simulation parameters

Project : **MILANO 1KWp 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 18h27

Simulation parameters :

Collector Plane orientation Tilt 35° Azimuth 0°

Horizon Free horizon

Near shadings No Shadings

PV array characteristics :

PV module: Si-mono Module name **STP 170S-24/Ac**
Manufacturer Suntech

Number of PV modules : in serie 6 modules in parallel 1 strings

Total number of PV modules : Nb. modules 6 unit nom. power 170 Wp

Array global power Nominal (STC) **1.02 kWp** At oper. cond. 918 Wp (50°C)

Array operating characteristics (50°C) U mpp 192 V I mpp 5 A

Total area Module area **7.7 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. 1351.4 mOhm Loss fraction 3.1 % 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 **Sunny Boy SWR 1100E**
Manufacturer SMA

Inverter characteristics Operating voltage 139-400 V Unit nom. power 1.0 kW AC

User's needs : Unlimited load (grid)

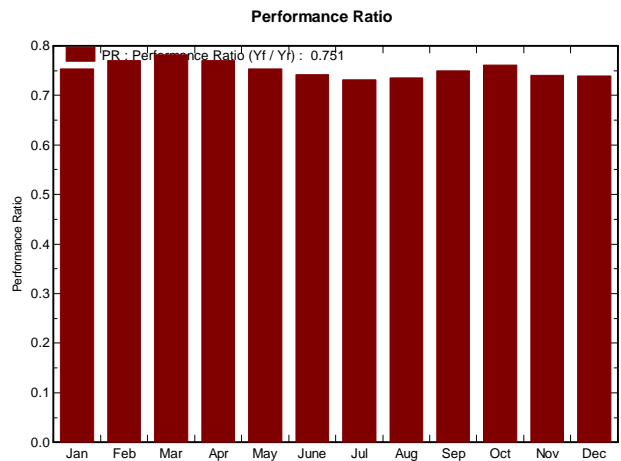
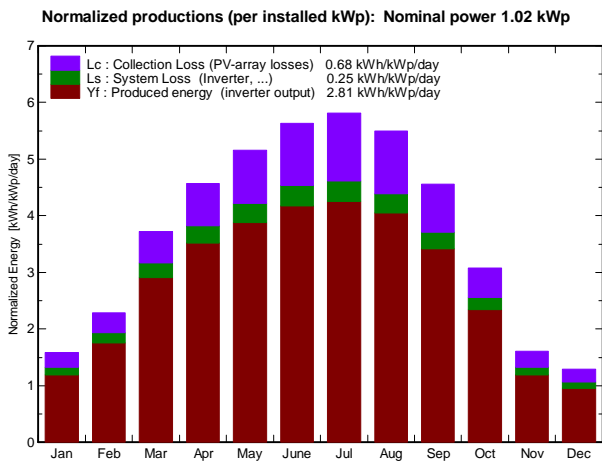
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Grid-connected PV system: Main results

Project : MILANO 1KWp FISSO
Simulation variant : Simulation variant

Main system parameters	System type	Grid-connected		
PV field orientation	Tilt	35°	Azimut	0°
PV modules	Model	STP 170S-24/Ac	Pnom	170 Wp
PV array	Nb of modules	6	Pnom total	1.02 kWp
Inverter	Model	Sunny Boy SWR 1100E	Pnom	1.00 kWp ac
User's needs	Unlimited load (grid)			

Main simulation results
System production **Produced energy 1045 kWh/year** Specific 1025 kWh/kWp/year
Performance ratio PR **75.1 %**



Simulation variant
Balances and main results

	GlobHor kWh/m ²	T Amb °C	GlobInc kWh/m ²	GlobEff kWh/m ²	EArray kWh	EOutInv kWh	EffArrR %	EffSysR %
January	33.0	2.80	49.1	47.5	41.7	37.7	11.10	10.03
February	50.0	4.00	63.9	61.9	55.2	50.2	11.28	10.26
March	96.0	7.10	115.3	111.8	100.0	91.9	11.33	10.41
April	129.0	10.00	136.9	132.6	117.0	107.6	11.15	10.26
May	162.0	14.80	159.7	154.5	133.3	122.6	10.90	10.03
June	179.0	18.60	168.8	163.2	138.6	127.7	10.72	9.87
July	188.0	21.70	180.1	174.0	145.9	134.4	10.57	9.74
August	164.0	21.50	170.4	164.9	138.6	127.8	10.62	9.79
September	117.0	18.60	136.9	132.8	113.5	104.5	10.83	9.97
October	73.0	12.70	95.3	92.6	80.8	74.0	11.06	10.14
November	36.0	6.70	48.3	46.8	40.5	36.5	10.95	9.86
December	28.0	3.20	39.9	38.7	33.6	30.1	10.99	9.85
Yearly sum	1255.0	11.85	1364.7	1321.1	1138.8	1045.3	10.89	10.00

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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Simulation variant : Simulation variant

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PV array	Nb of modules	6	Pnom total	1.02 kWp
Inverter	Model	Sunny Boy SWR 1100E	Pnom	1.00 kWp ac
User's needs	Unlimited load (grid)			

Loss diagram over the whole year

