

Simulazione Catania Caltagirone 1KWp Sistema fisso  
Progetto ECONSTEK

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

**Project :** **CATANIA 1KWp**

**Geographical site :** **Caltagirone (CT)** **Country** **Italy**

**Situation :** Latitude 37.1°N Longitude 14.3°E  
Time defined as : Legal time Time zone UT+1 Altitude 500 m  
Albedo 0.20

**Meteo data :** Caltagirone (CT) , synthetic hourly data

**Simulation variant :** **Simulation variant**  
Simulation date 15/12/06 18h07

**Simulation parameters :**

**Collector Plane orientation** Tilt 30° Azimuth 0°

**Horizon** Free horizon

**Near shadings** No Shadings

**PV array characteristics :**

**PV module:** Si-mono Module name **STP 170S-24/Ab**  
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. 904 Wp (50°C)  
Array operating characteristics (50°C) U mpp 190 V I mpp 5 A  
Total area Module area **7.7 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. 1325.2 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)

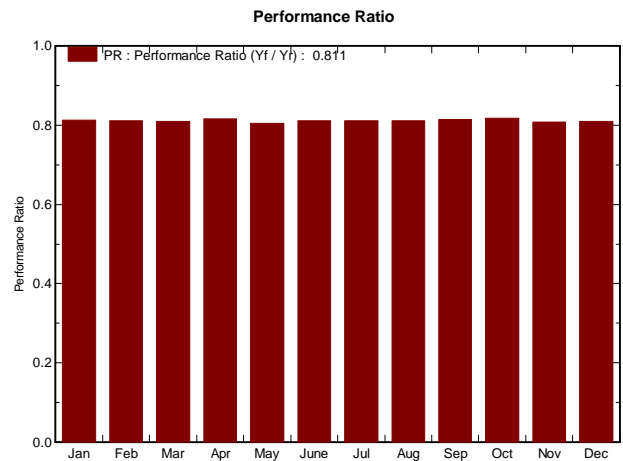
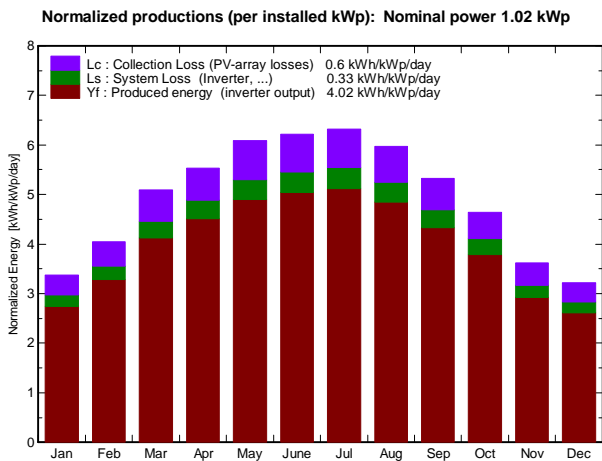
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Grid-connected PV system: Main results

**Project :** CATANIA 1KWp  
**Simulation variant :** Simulation variant

<b>Main system parameters</b>	System type	<b>Grid-connected</b>		
PV field orientation	Tilt	30°	Azimut	0°
PV modules	Model	STP 170S-24/Ab	Pnom	170 Wp
PV array	Nb of modules	6	Pnom total	<b>1.02 kWp</b>
Inverter	Model	Sunny Boy SWR 1100E	Pnom	1.00 kWp ac
User's needs	Unlimited load (grid)			

**Main simulation results**  
System production **Produced energy 1498 kWh/year** Specific 1469 kWh/kWp/year  
Performance ratio PR 81.1 %



**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	71.6	-0.00	104.6	101.5	94.1	86.7	11.75	10.83
February	87.9	0.00	113.3	109.9	101.5	93.7	11.70	10.80
March	133.6	-0.00	157.8	153.3	141.0	130.3	11.66	10.78
April	159.9	0.00	166.1	160.9	149.3	138.1	11.74	10.86
May	196.2	-0.00	188.7	182.8	167.6	154.8	11.59	10.71
June	202.5	0.00	186.6	180.6	167.0	154.4	11.68	10.80
July	208.3	0.00	195.8	189.6	175.2	162.0	11.68	10.81
August	184.1	-0.00	185.2	179.6	165.8	153.3	11.68	10.81
September	142.5	-0.00	159.8	155.1	143.5	132.7	11.73	10.84
October	112.8	-0.00	144.0	139.9	129.8	120.0	11.77	10.87
November	75.9	0.00	108.7	105.5	97.1	89.5	11.66	10.74
December	66.3	-0.00	99.9	96.8	89.6	82.4	11.71	10.78
Yearly sum	1641.8	-0.00	1810.4	1755.6	1621.4	1497.9	11.69	10.80

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	<b>1.02 kWp</b>
Inverter	Model	Sunny Boy SWR 1100E	Pnom	1.00 kWp ac
User's needs	Unlimited load (grid)			

Loss diagram over the whole year

