

Grid-Connected System: Simulation parameters

Project : **Grid-Connected Project at Athinai**

Geographical Site **Athinai** **Country** **Greece**

Situation Latitude 38.0°N Longitude 23.4°E
 Time defined as Solar Time Altitude 107 m
 Albedo 0.20

Meteo data : Athinai, Synthetic Hourly data

Simulation variant : **No shading effects**

Simulation date 27/01/10 18h26

Simulation parameters

Collector Plane Orientation Tilt 30° Azimuth 0°

Horizon Free Horizon

Near Shadings No Shadings

PV Array Characteristics

PV module Si-poly Model **MPE 200 PS 05**

Manufacturer Schueco

Number of PV modules In series 15 modules In parallel 1 strings

Total number of PV modules Nb. modules 15 Unit Nom. Power 200 Wp

Array global power Nominal (STC) **3.0 kWp** At operating cond. 2.70 kWp (50°C)

Array operating characteristics (50°C) U mpp 359 V I m pp 8 A

Total area Module area **22.4 m²** Cell area 19.7 m²

Inverter Model **Sunny Boy SB 3000**

Manufacturer SMA

Characteristics Operating Voltage 268-480 V Unit Nom. Power 2.8 kW AC

PV Array loss factors

Thermal Loss factor U_c (const) 29.0 W/m²K U_v (wind) 0.0 W/m²K / m/s
 => Nominal Oper. Coll. Temp. (G=800 W/m², T_{amb}=20°C, Wind velocity = 1m/s.) NOCT 45 °C

Wiring Ohmic Loss Global array res. 790 mOhm Loss Fraction 1.5 % at STC

Serie Diode Loss Voltage Drop 0.7 V Loss Fraction 0.2 % at STC

Module Quality Loss Loss Fraction 0.1 %

Module Mismatch Losses Loss Fraction 2.0 % at MPP

Incidence effect, ASHRAE parametrization IAM = 1 - bo (1/cos i - 1) bo Parameter 0.05

User's needs : Unlimited load (grid)

Grid-Connected System: Main results

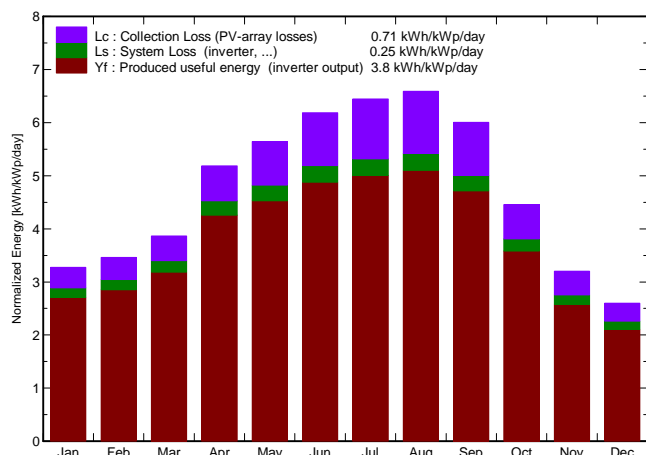
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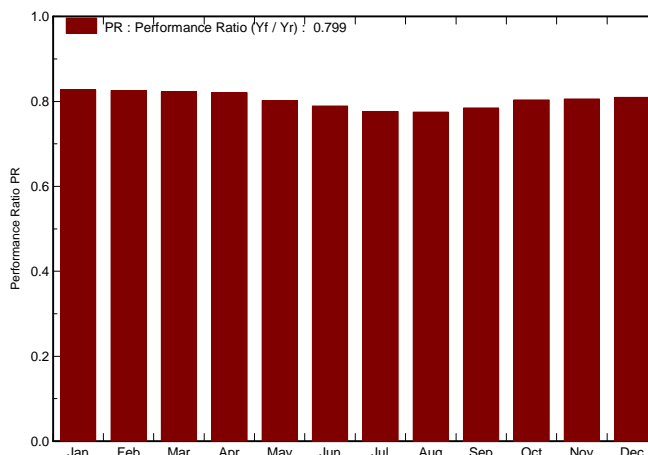
Main system parameters		System type	Grid-Connected	
PV Field Orientation		tilt	30°	azimuth 0°
PV modules		Model	MPE 200 PS 05	Pnom 200 Wp
PV Array		Nb. of modules	15	Pnom total 3.0 kWp
Inverter		Model	Sunny Boy SB 3000	Pnom 2.75 kW ac
User's needs		Unlimited load (grid)		

Main simulation results				
System Production	Produced Energy	4156 kWh/year	Specific prod.	1385 kWh/kWp/year
	Performance Ratio PR	79.9 %		

Normalized productions (per installed kWp): Nominal power 3.0 kWp



Performance Ratio PR



New simulation variant Balances and main results

	GlobHor kWh/m ²	T Amb °C	GlobInc kWh/m ²	GlobEff kWh/m ²	EArray kWh	E_Grid kWh	EffArrR %	EffSysR %
January	66.0	11.60	101.4	98.3	268.6	251.8	11.80	11.06
February	74.0	10.90	96.9	94.1	256.0	239.8	11.77	11.03
March	104.0	11.80	119.9	116.3	316.2	296.1	11.75	11.01
April	147.0	13.90	155.5	151.1	407.5	383.1	11.67	10.97
May	182.0	18.00	175.0	169.5	448.4	421.1	11.42	10.72
June	201.0	22.10	185.5	179.8	467.2	439.2	11.22	10.54
July	213.0	25.60	199.8	193.8	494.8	465.2	11.03	10.37
August	200.0	26.30	204.3	198.4	504.2	474.7	11.00	10.35
September	155.0	24.30	180.2	175.1	450.7	424.2	11.14	10.49
October	106.0	20.50	138.2	134.5	354.3	333.2	11.42	10.74
November	66.0	16.40	96.0	93.2	248.1	232.1	11.52	10.77
December	52.0	13.50	80.6	78.0	210.2	195.6	11.62	10.82
Year	1566.0	17.95	1733.3	1682.1	4426.3	4156.1	11.38	10.68

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|----------|---------|--|---------|---|
| Legends: | GlobHor | Horizontal global irradiation | EArray | Effective energy at the output of the array |
| | T Amb | Ambient Temperature | E_Grid | Energy injected into grid |
| | 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 |

Grid-Connected System: Loss diagram

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Loss diagram over the whole year

