

Grid-Connected System: Simulation parameters

Project : **Grid-Connected Project at Montemor-o-Novo_Sagim**

Geographical Site **Montemor-o-Novo_Sagim** **Country** **Portugal**

Situation Latitude 38.6°N Longitude 8.2°W
 Time defined as Legal Time Time zone UT Altitude 241 m
 Albedo 0.20

Meteo data: **Montemor-o-Novo_Sagim** Synthetic - Meteonorm 6.1

Simulation variant : **New simulation variant**

Simulation date 16/12/14 17h02

Simulation parameters

Collector Plane Orientation Tilt 30° Azimuth 0°

Models used Transposition Perez Diffuse Measured

Horizon Free Horizon

Near Shadings No Shadings

PV Array Characteristics

PV module Si-poly Model **REC 245PE**
 Manufacturer REC
 Number of PV modules In series 19 modules In parallel 3 strings
 Total number of PV modules Nb. modules 57 Unit Nom. Power 245 Wp
 Array global power Nominal (STC) **13.96 kWp** At operating cond. 12.70 kWp (50°C)
 Array operating characteristics (50°C) U mpp 514 V I mpp 25 A
 Total area Module area **94.1 m²** Cell area 83.2 m²

Inverter Model **Fronius Symo 12.5-3-M**
 Manufacturer Fronius International GmbH
 Characteristics Operating Voltage 200-800 V Unit Nom. Power 12.5 kW AC

PV Array loss factors

Array Soiling Losses Loss Fraction 1.0 %
 Thermal Loss factor U_c (const) 29.0 W/m²K U_v (wind) 0.0 W/m²K / m/s
 Wiring Ohmic Loss Global array res. 147 mOhm Loss Fraction 0.6 % at STC
 Module Quality Loss Loss Fraction -0.8 %
 Module Mismatch Losses Loss Fraction 1.0 % at MPP
 Incidence effect, ASHRAE parametrization IAM = 1 - bo (1/cos i - 1) bo Param. 0.05

System loss factors

Wiring Ohmic Loss Wires 20 m 3x6 mm² Loss Fraction 2.2 % at STC

User's needs : Ext. defined as file Consumos monte.csv

Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Year	
3287	4030	4921	3676	2822	3246	3213	3275	2529	3067	3236	4146	41448	kWh

Grid-Connected System: Main results

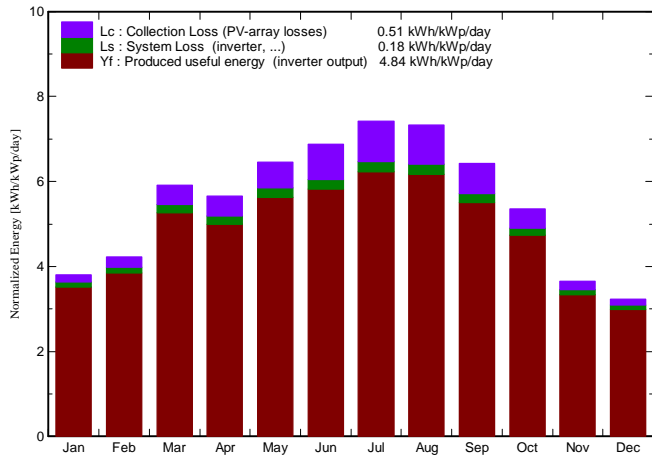
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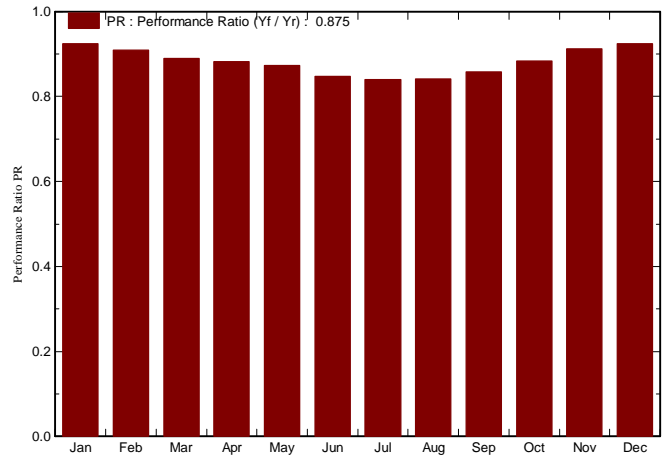
Main system parameters		System type	Grid-Connected		
PV Field Orientation		tilt	30°	azimuth	0°
PV modules		Model	REC 245PE	Pnom	245 Wp
PV Array		Nb. of modules	57	Pnom total	13.96 kWp
Inverter		Model	Fronius Symo 12.5-3-M	Pnom	12.50 kW ac
User's needs		Ext. defined as file	Consumos monte.csv	global	41.4 MWh/year

Main simulation results	
System Production	Produced Energy 24.69 MWh/year Specific prod. 1768 kWh/kWp/year
	Performance Ratio PR 87.5 % Solar Fraction SF 37.8 %

Normalized productions (per installed kWp): Nominal power 13.96 kWp



Performance Ratio PR



New simulation variant Balances and main results

	GlobHor	T Amb	GlobInc	GlobEff	EArray	E Load	E User	E_Grid
	kWh/m ²	°C	kWh/m ²	kWh/m ²	MWh	MWh	MWh	MWh
January	73.0	8.94	117.8	113.4	1.577	3.287	1.057	0.464
February	83.5	10.30	118.4	114.0	1.561	4.030	1.168	0.335
March	147.0	13.08	183.5	176.8	2.365	4.921	1.778	0.500
April	157.1	13.98	169.8	162.8	2.172	3.676	1.429	0.663
May	203.4	17.13	199.9	191.2	2.531	2.822	1.264	1.174
June	220.6	21.97	206.2	196.9	2.535	3.246	1.612	0.829
July	239.6	23.73	229.9	220.4	2.801	3.213	1.514	1.183
August	216.3	23.94	227.4	218.5	2.775	3.275	1.540	1.133
September	161.4	21.12	192.8	185.9	2.398	2.529	1.095	1.213
October	119.2	16.98	166.2	160.2	2.126	3.067	1.146	0.903
November	71.3	11.93	109.8	105.6	1.449	3.236	0.985	0.412
December	60.7	9.73	100.2	96.3	1.340	4.146	1.088	0.205
Year	1753.1	16.10	2021.7	1942.0	25.628	41.448	15.676	9.015

Legends:	GlobHor Horizontal global irradiation	EArray Effective energy at the output of the array
	T Amb Ambient Temperature	E Load Energy need of the user (Load)
	GlobInc Global incident in coll. plane	E User Energy supplied to the user
	GlobEff Effective Global, corr. for IAM and shadings	E_Grid Energy injected into grid

Grid-Connected System: Loss diagram

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Inverter	Model	Fronius Symo 12.5-3-M	Pnom 12.50 kW ac
User's needs	Ext. defined as file	Consumos monte.csv	global 41.4 MWh/year

Loss diagram over the whole year

