Grid-Connected System: Simulation parameters

Project : **Grid-Connected Project at Juiz de Fora**

Geographical Site	**Juiz de Fora**		Country	**Brazil**
Situation	Latitude	21.7°S	Longitude	43.4°W
Time defined as	Legal Time	Time zone UT-2	Altitude	688 m
	Albedo	0.20		
Meteo data:	**Juiz de Fora**	Synthetic		

Simulation variant : **New simulation variant**

Simulation date 30/05/18 23h55

Simulation parameters

Collector Plane Orientation	Tilt	30°	Azimuth	0°
Models used	Transposition	Perez	Diffuse	Perez, Meteonorm
Horizon	Free Horizon			
Near Shadings	No Shadings			

PV Array Characteristics

PV module	Si-poly	Model	**JAP6-72-330/3BB**	
Original PVsyst database		Manufacturer	JA Solar	
Number of PV modules		In series	10 modules	In parallel 3 strings
Total number of PV modules		Nb. modules	30	Unit Nom. Power 330 Wp
Array global power		Nominal (STC)	**9.90 kWp**	At operating cond. 8.88 kWp (50°C)
Array operating characteristics (50°C)		U mpp	341 V	I mpp 26 A
Total area		Module area	**58.2 m²**	Cell area 52.6 m²

Inverter		Model	**Symo 12.0-3 / 208**	
Original PVsyst database		Manufacturer	Fronius USA	
Characteristics		Operating Voltage	200-500 V	Unit Nom. Power 12.0 kWac
Inverter pack		Nb. of inverters	1 * MPPT 0.60	Total Power 12.0 kWac

PV Array loss factors

Thermal Loss factor		Uc (const)	20.0 W/m²K	Uv (wind) 0.0 W/m²K / m/s
Wiring Ohmic Loss		Global array res.	221 mOhm	Loss Fraction 1.5 % 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

User's needs : Unlimited load (grid)

Grid-Connected System: Main results

Project : **Grid-Connected Project at Juiz de Fora**

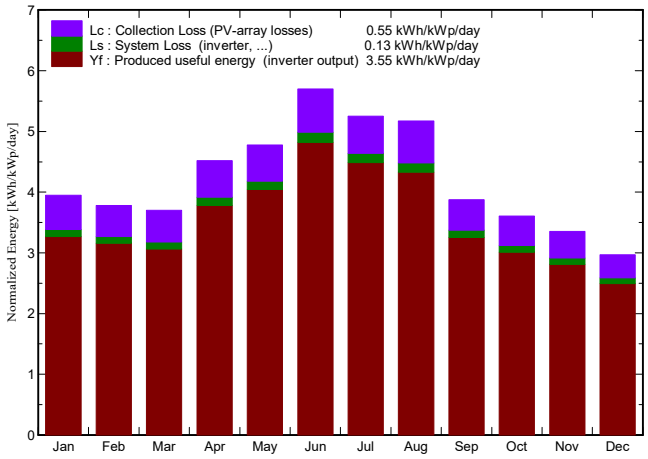
Simulation variant : **New simulation variant**

Main system parameters				
	System type	**Grid-Connected**		
PV Field Orientation	tilt	30°	azimuth	0°
PV modules	Model	JAP6-72-330/3BB	Pnom	330 Wp
PV Array	Nb. of modules	30	Pnom total	**9.90 kWp**
Inverter	Model	Symo 12.0-3 / 208	Pnom	12.00 kW ac
User's needs	Unlimited load (grid)			

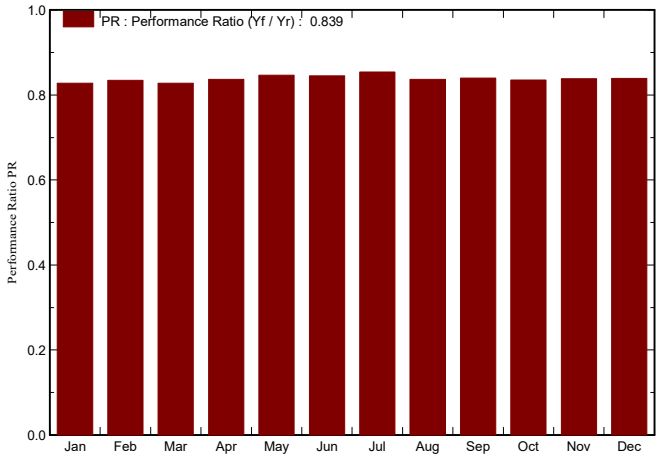
Main simulation results

System Production	**Produced Energy**	**12.81 MWh/year**	Specific prod.	1294 kWh/kWp/year
	Performance Ratio PR	83.9 %		

Normalized productions (per installed kWp): Nominal power 9.90 kWp



Performance Ratio PR



New simulation variant

Balances and main results

	GlobHor kWh/m²	T Amb °C	GlobInc kWh/m²	GlobEff kWh/m²	EArray MWh	E_Grid MWh	EffArrR %	EffSysR %
January	139.5	23.10	122.4	117.5	1.039	1.002	14.60	14.09
February	113.7	23.30	105.8	101.7	0.906	0.875	14.73	14.21
March	113.4	22.50	114.8	111.0	0.976	0.941	14.62	14.09
April	119.9	21.10	135.5	131.7	1.163	1.123	14.75	14.25
May	117.5	19.00	148.1	144.1	1.284	1.241	14.91	14.41
June	121.4	17.80	171.1	167.3	1.481	1.431	14.89	14.39
July	122.0	17.70	162.8	158.8	1.424	1.378	15.04	14.55
August	131.6	19.20	160.3	156.3	1.376	1.329	14.76	14.25
September	110.5	20.40	116.3	112.6	1.002	0.967	14.82	14.30
October	116.6	21.20	111.8	107.9	0.958	0.925	14.74	14.22
November	112.6	21.60	100.6	96.7	0.866	0.835	14.81	14.27
December	105.4	22.30	92.1	88.3	0.794	0.765	14.84	14.29
Year	1424.1	20.75	1541.5	1494.0	13.270	12.810	14.80	14.29

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