

Grid-Connected System: Simulation parameters

Project : **10 kW**

Geographical Site **Kaunas** Country **Lithuania**

Situation Latitude 54.88° N Longitude 23.88° E
Time defined as Legal Time Time zone UT+2 Altitude 69 m

Albedo 0.20

Meteo data: **Kaunas** MeteoNorm 7.1 station - Synthetic

Simulation variant : **New simulation variant**

Simulation date 23/06/20 12h23

Simulation parameters

Collector Plane Orientation Tilt 35° Azimuth 0°

Models used Transposition Perez Diffuse Perez, Meteonorm

Horizon Free Horizon

Near Shadings No Shadings

PV Array Characteristics

PV module	Si-mono	Model	Solid Pro 320 W M60	
Custom parameters definition		Manufacturer	SoliTek	
Number of PV modules		In series	15 modules	In parallel 2 strings
Total number of PV modules		Nb. modules	30	Unit Nom. Power 320 Wp
Array global power		Nominal (STC)	9.60 kWp	At operating cond. 8.80 kWp (50°C)
Array operating characteristics (50°C)		U mpp	460 V	I mpp 19 A
Total area		Module area	49.7 m²	Cell area 44.2 m ²

Inverter

Custom parameters definition	Model	SUN2000-10KTL-M1		
Characteristics	Manufacturer	Huawei Technologies		
	Operating Voltage	140-980 V	Unit Nom. Power	10.0 kWac
			Max. power (=>50°C)	11.0 kWac
Inverter pack	Nb. of inverters	2 * MPPT 50 %	Total Power	10.0 kWac

PV Array loss factors

Thermal Loss factor	Uc (const)	20.0 W/m ² K	Uv (wind)	0.0 W/m ² K / m/s
Wiring Ohmic Loss	Global array res.	394 mOhm	Loss Fraction	1.5 % at STC
LID - Light Induced Degradation			Loss Fraction	0.5 %
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)

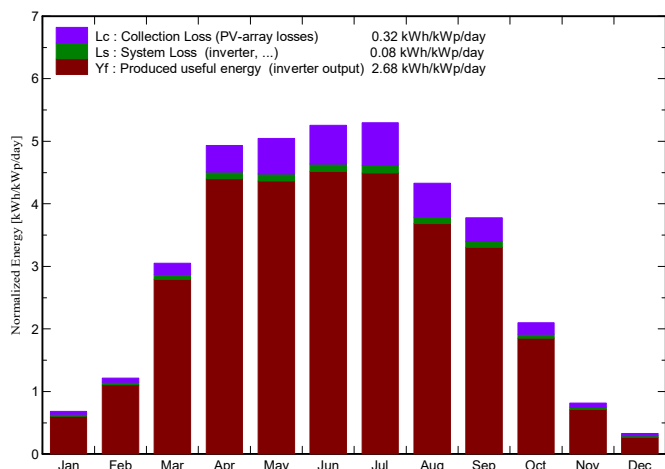
Grid-Connected System: Main results

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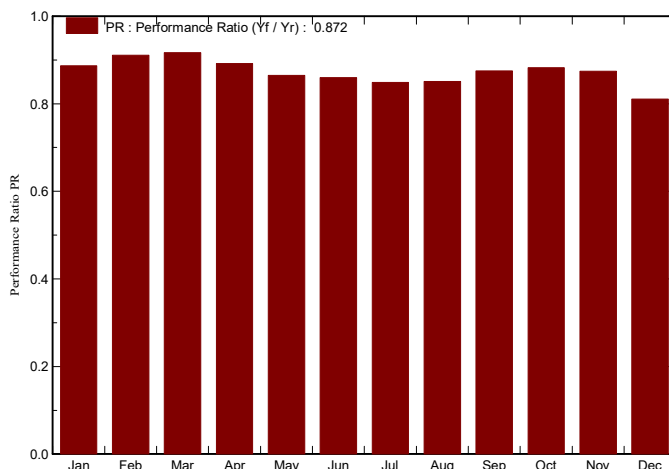
Main system parameters		System type	Grid-Connected	
PV Field Orientation		tilt	35°	azimuth 0°
PV modules		Model	Solid Pro 320 W M60	Pnom 320 Wp
PV Array		Nb. of modules	30	Pnom total 9.60 kWp
Inverter		Model	SUN2000-10KTL-M1	Pnom 10.00 kW ac
User's needs		Unlimited load (grid)		

Main simulation results
 System Production **Produced Energy 9398 kWh/year** Specific prod. 979 kWh/kWp/year
 Performance Ratio PR 87.15 %

Normalized productions (per installed kWp): Nominal power 9.60 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	11.9	-2.76	21.2	20.3	190	180	18.04	17.13
February	23.5	-2.98	34.0	32.7	309	297	18.32	17.60
March	68.3	0.85	94.5	91.6	854	831	18.18	17.70
April	124.5	7.70	148.0	143.2	1299	1267	17.66	17.23
May	150.9	13.01	156.4	151.0	1333	1299	17.15	16.71
June	158.3	15.38	157.7	152.3	1336	1301	17.05	16.60
July	161.4	18.80	164.1	158.6	1374	1337	16.84	16.39
August	122.8	17.72	134.2	129.9	1127	1096	16.90	16.43
September	87.1	12.61	113.4	109.9	979	953	17.37	16.90
October	42.4	7.46	65.1	63.1	570	552	17.60	17.04
November	15.1	2.87	24.4	23.5	216	205	17.78	16.89
December	7.4	-0.88	10.3	9.7	88	80	17.26	15.67
Year	973.6	7.54	1123.3	1085.8	9674	9398	17.33	16.83

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

