Grid-Connected System: Simulation parameters

Project : **Mykolayiv**

Geographical Site	**Mykolayiv**		Country	**Ukraine**
Situation	Latitude	46.96° N	Longitude	32.00° E
Time defined as	Legal Time	Time zone UT+2	Altitude	13 m
	Albedo	0.20		
Meteo data:	**Mykolayiv**	Meteonorm 7.2 (1991-2010), Sat=100% - Synthetic		

Simulation variant : **20kW**

	Simulation date	05/04/20 12h55

Simulation parameters	System type	**No 3D scene defined, no shadings**		
Collector Plane Orientation	Tilt	25°	Azimuth	0°
Models used	Transposition	Perez	Diffuse	Perez, Meteonorm
Horizon	Free Horizon			
Near Shadings	No Shadings			
User's needs :	Unlimited load (grid)			

PV Array Characteristics

PV module	Si-poly	Model	**CS3L-330P HE**		
Original PVsyst database		Manufacturer	Canadian Solar Inc.		
Number of PV modules		In series	20 modules	In parallel	3 strings
Total number of PV modules		Nb. modules	60	Unit Nom. Power	330 Wp
Array global power		Nominal (STC)	**19.80 kWp**	At operating cond.	17.95 kWp (50°C)
Array operating characteristics (50°C)		U mpp	582 V	I mpp	31 A
Total area		Module area	**111 m²**	Cell area	99.2 m²
Inverter		Model	**GW20K-DT**		
Custom parameters definition		Manufacturer	Goodwe		
Characteristics		Operating Voltage	260-850 V	Unit Nom. Power	20.0 kWac
Inverter pack		Nb. of inverters	1 units	Total Power	20 kWac
				Pnom ratio	0.99

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.	314 mOhm	Loss Fraction	1.5 % at STC
Module Quality Loss			Loss Fraction	-0.4 %
Module Mismatch Losses			Loss Fraction	1.0 % at MPP
Strings Mismatch loss			Loss Fraction	0.10 %

Incidence effect (IAM): User defined profile

10°	20°	30°	40°	50°	60°	70°	80°	90°
1.000	1.000	1.000	0.990	0.990	0.970	0.920	0.760	0.000

Grid-Connected System: Main results

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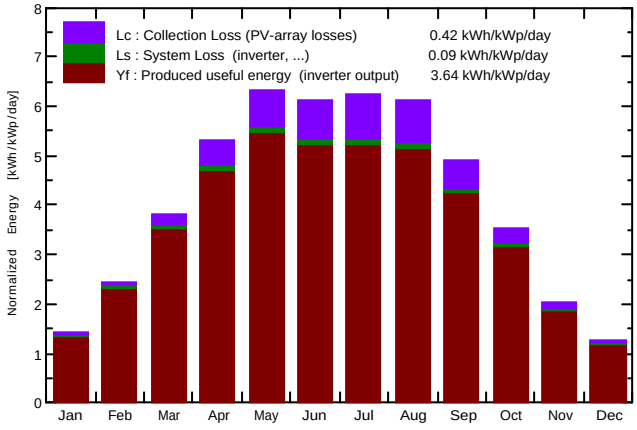
Main system parameters	System type	**No 3D scene defined, no shadings**			
PV Field Orientation	tilt	25°	azimuth	0°	
PV modules	Model	CS3L-330P HE	Pnom	330 Wp	
PV Array	Nb. of modules	60	Pnom total	**19.80 kWp**	
Inverter	Model	GW20K-DT	Pnom	20.00 kW ac	
User's needs	Unlimited load (grid)				

Main simulation results

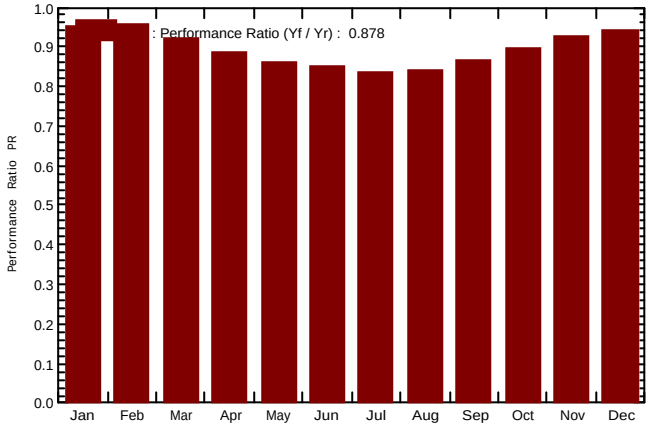
System Production — **Produced Energy** **26.27 MWh/year** — Specific prod. 1327 kWh/kWp/year

Performance Ratio PR 87.81 %

Normalized productions (per installed kWp): Nominal power 19.80 kWp



Performance Ratio PR



20kW

Balances and main results

	GlobHor kWh/m²	DiffHor kWh/m²	T_Amb °C	GlobInc kWh/m²	GlobEff kWh/m²	EArray MWh	E_Grid MWh	PR
January	31.4	22.27	-1.32	44.5	43.4	0.865	0.840	0.953
February	49.3	28.27	-0.76	68.2	66.7	1.322	1.290	0.955
March	95.3	48.62	4.33	118.5	116.0	2.213	2.162	0.921
April	139.6	59.09	10.41	159.0	155.7	2.862	2.798	0.889
May	188.8	79.72	16.75	196.5	192.4	3.438	3.361	0.864
June	184.8	85.23	20.42	184.1	180.0	3.180	3.108	0.852
July	190.2	81.57	23.94	193.2	189.1	3.280	3.207	0.838
August	172.4	72.45	23.27	189.4	185.7	3.233	3.162	0.843
September	122.2	54.00	17.01	147.3	144.1	2.590	2.534	0.869
October	77.8	32.95	11.17	110.0	107.8	2.004	1.958	0.899
November	38.3	19.35	5.22	60.8	59.4	1.144	1.114	0.925
December	26.2	18.07	0.35	39.5	38.6	0.762	0.738	0.944
Year	1316.2	601.58	10.97	1511.2	1479.0	26.893	26.273	0.878

Legends:

GlobHor	Horizontal global irradiation	GlobEff	Effective Global, corr. for IAM and shadings
DiffHor	Horizontal diffuse 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	PR	Performance Ratio

Grid-Connected System: Special graphs

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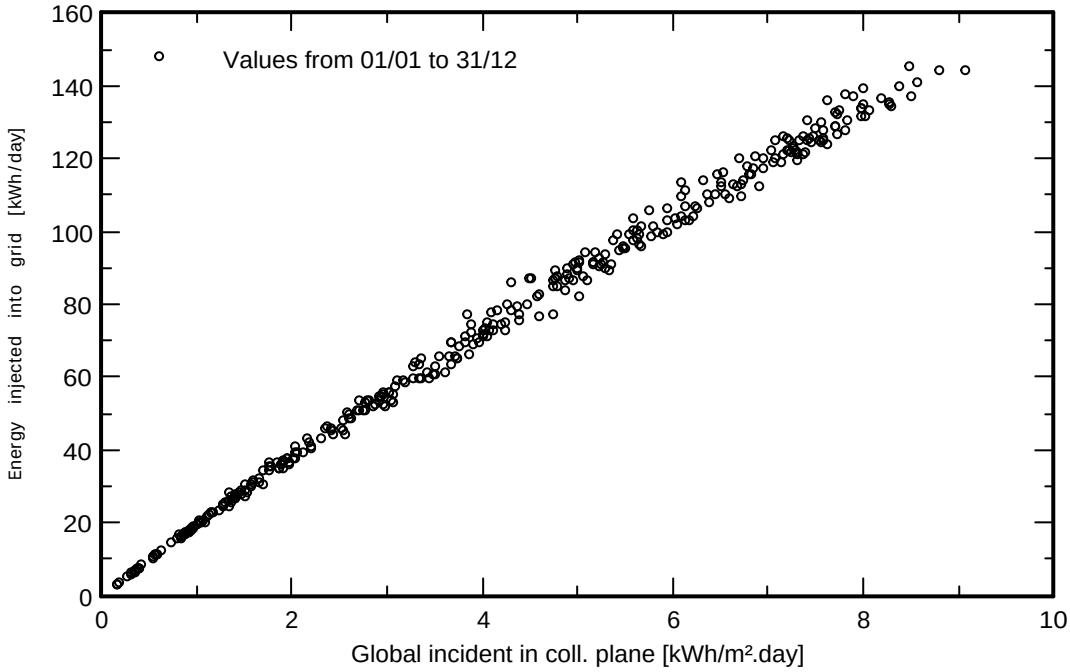
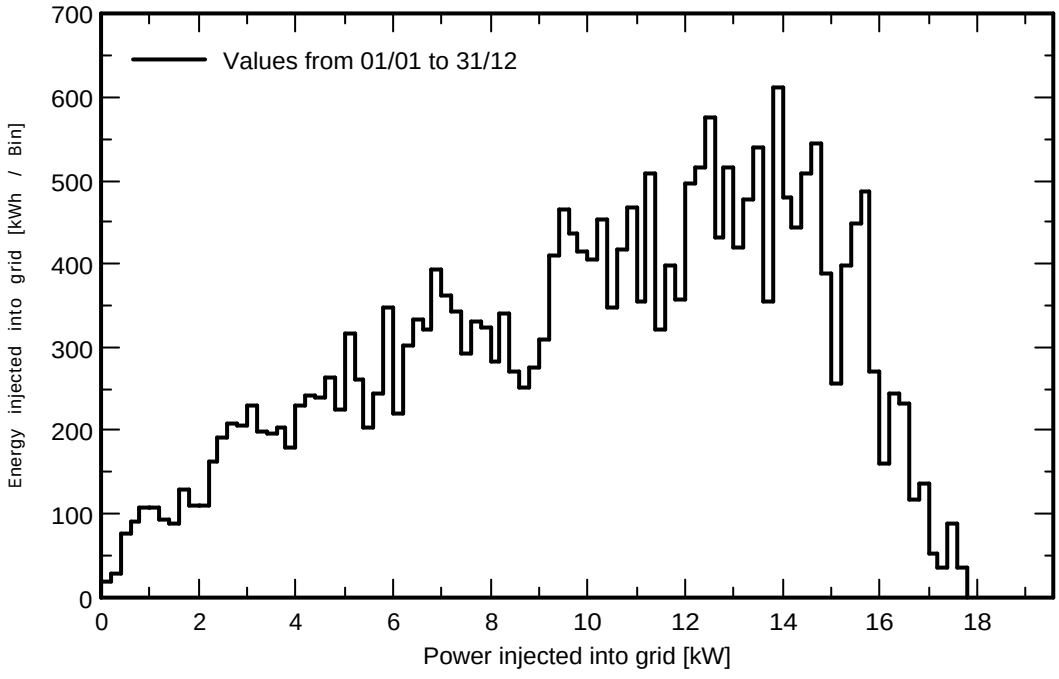
Daily Input/Output diagram



System Output Power Distribution



Grid-Connected System: Loss diagram

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Loss diagram over the whole year