

PVSYST V6.67				27/02/18		Page 1/5	
Grid-Connected System: Simulation parameters							
Project :		Guido					
Geographical Site		Zabrze		Country		Poland	
Situation		Latitude 50.31° N		Longitude		18.74° E	
Time defined as		Legal Time Time zone UT+1		Altitude		228 m	
		Albedo 0.20					
Meteo data:		Zabrze		Meteonorm 7.1 (1991-2010), Sat=100% - Synthetic			
Simulation variant :		Guido 1					
		Simulation date		27/02/18 13h30			
Simulation parameters							
3 orientations		Tilts/Azimuths		23°/75°, 23°/-105°, 30°/-15°			
Models used		Transposition		Perez	Diffuse	Perez, Meteonorm	
Horizon		Free Horizon					
Near Shadings		Linear shadings					
PV Arrays Characteristics (4 kinds of array defined)							
PV module		Si-poly	Model	SV60P 4-275			
Original PVsyst database		Manufacturer		Selfa GE S.A.			
Sub-array "zachód"		Orientation		#1	Tilt/Azimuth	23°/75°	
Number of PV modules		In series		12 modules	In parallel	2 strings	
Total number of PV modules		Nb. modules		24	Unit Nom. Power	275 Wp	
Array global power		Nominal (STC)		6.60 kWp	At operating cond.	5.95 kWp (50°C)	
Array operating characteristics (50°C)		U mpp		341 V	I mpp	17 A	
Sub-array "wschód"		Orientation		#2	Tilt/Azimuth	23°/-105°	
Number of PV modules		In series		13 modules	In parallel	2 strings	
Total number of PV modules		Nb. modules		26	Unit Nom. Power	275 Wp	
Array global power		Nominal (STC)		7.15 kWp	At operating cond.	6.45 kWp (50°C)	
Array operating characteristics (50°C)		U mpp		370 V	I mpp	17 A	
Sub-array "Poludnie 1"		Orientation		#3	Tilt/Azimuth	30°/-15°	
Number of PV modules		In series		14 modules	In parallel	1 strings	
Total number of PV modules		Nb. modules		14	Unit Nom. Power	275 Wp	
Array global power		Nominal (STC)		3850 Wp	At operating cond.	3473 Wp (50°C)	
Array operating characteristics (50°C)		U mpp		398 V	I mpp	8.7 A	
Sub-array "Poludnie 2"		Orientation		#3	Tilt/Azimuth	30°/-15°	
Number of PV modules		In series		16 modules	In parallel	1 strings	
Total number of PV modules		Nb. modules		16	Unit Nom. Power	275 Wp	
Array global power		Nominal (STC)		4400 Wp	At operating cond.	3969 Wp (50°C)	
Array operating characteristics (50°C)		U mpp		455 V	I mpp	8.7 A	
Total Arrays global power		Nominal (STC)		22 kWp	Total	80 modules	
		Module area		133 m²			
Sub-array "zachód" : Inverter							
Original PVsyst database		Model		Symo 6.0-3-M			
Characteristics		Manufacturer		Fronius International			
Inverter pack		Operating Voltage		150-800 V	Unit Nom. Power	6.00 kWac	
		Nb. of inverters		2 * MPPT 50 %	Total Power	6.0 kWac	
Sub-array "wschód" : Inverter							
Original PVsyst database		Model		Symo 6.0-3-M			
Characteristics		Manufacturer		Fronius International			
Inverter pack		Operating Voltage		150-800 V	Unit Nom. Power	6.00 kWac	
		Nb. of inverters		2 * MPPT 50 %	Total Power	6.0 kWac	

Grid-Connected System: Simulation parameters (continued)

Sub-array "Poludnie 1" : Inverter

Original PVsyst database	Model	Symo 7.0-3-M		
Characteristics	Manufacturer	Fronius International		
Inverter pack	Operating Voltage	150-800 V	Unit Nom. Power	7.00 kWac
	Nb. of inverters	1 * MPPT 50 %	Total Power	3.5 kWac

Sub-array "Poludnie 2" : Inverter

Original PVsyst database	Model	Symo 7.0-3-M		
Characteristics	Manufacturer	Fronius International		
Inverter pack	Operating Voltage	150-800 V	Unit Nom. Power	7.00 kWac
	Nb. of inverters	1 * MPPT 50 %	Total Power	3.5 kWac

Total	Nb. of inverters	3	Total Power	19 kWac
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PV Array loss factors

Thermal Loss factor	Uc (const)	20.0 W/m²K	Uv (wind)	0.0 W/m²K / m/s
Wiring Ohmic Loss	Array#1	329 mOhm	Loss Fraction	1.5 % at STC
	Array#2	356 mOhm	Loss Fraction	1.5 % at STC
	Array#3	767 mOhm	Loss Fraction	1.5 % at STC
	Array#4	188 mOhm	Loss Fraction	0.3 % at STC
	Global		Loss Fraction	0.9 % at STC
Module Quality Loss			Loss Fraction	-0.8 %
Module Mismatch Losses			Loss Fraction	1.0 % at MPP
Strings Mismatch loss			Loss Fraction	0.10 %
Incidence effect, ASHRAE parametrization	IAM =	1 - bo (1/cos i - 1)	bo Param.	0.05

User's needs : Unlimited load (grid)

Grid-Connected System: Near shading definition

Project : Guido
Simulation variant : Guido 1

Main system parameters

System type **Grid-Connected**

Near Shadings

PV Field Orientation

Linear shadings

3 orientations

Tilt/Azimuth = 23°/75°, 23°/-105°, 30°/-15°

PV modules

Model

SV60P 4-275

Pnom 275 Wp

PV Array

Nb. of modules

80

Pnom total **22.00 kWp**

Inverter

Model

Symo 6.0-3-M

Pnom 6.00 kW ac

Inverter

Model

Symo 7.0-3-M

Pnom 7.00 kW ac

Inverter pack

Nb. of units

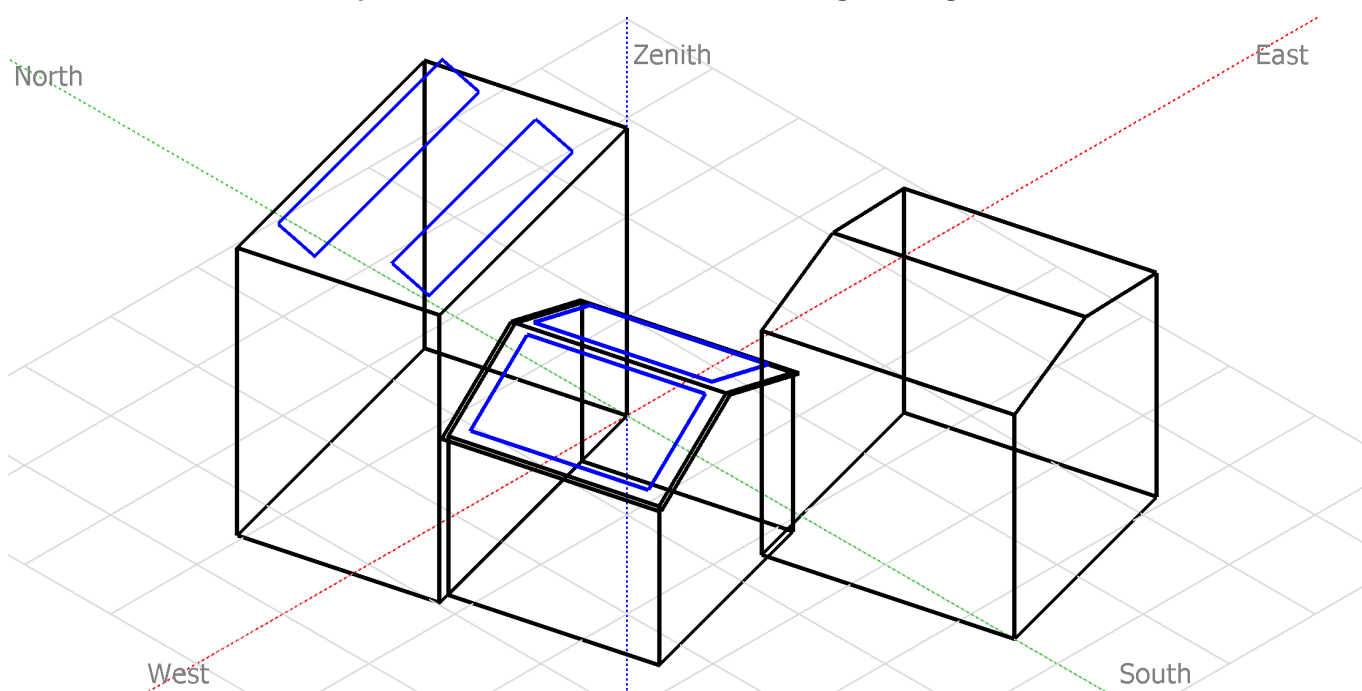
3.0

Pnom total **19.00 kW ac**

User's needs

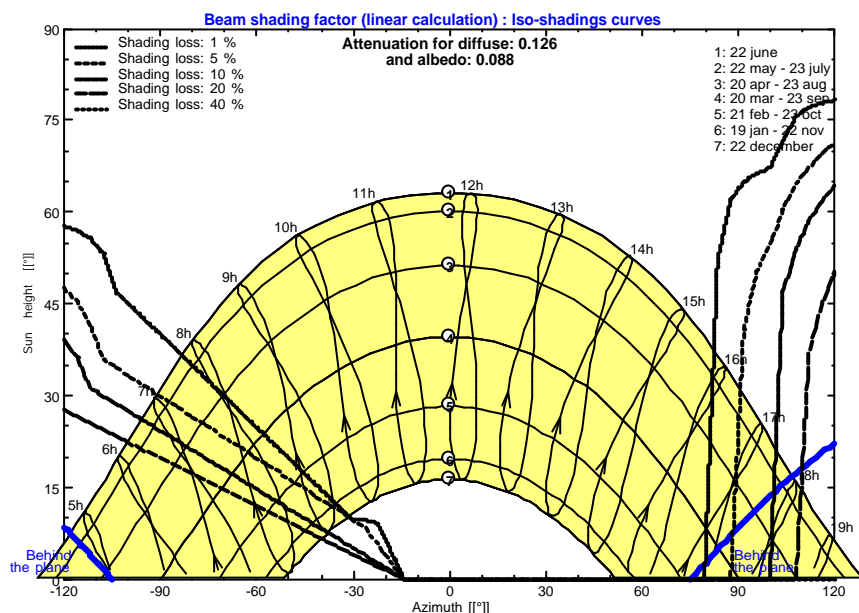
Unlimited load (grid)

Perspective of the PV-field and surrounding shading scene



Iso-shadings diagram

Guido



Grid-Connected System: Main results

Project : Guido
Simulation variant : Guido 1

Main system parameters

System type **Grid-Connected**

Near Shadings

Linear shadings

PV Field Orientation

3 orientations

Tilt/Azimuth = 23°/75°, 23°/-105°, 30°/-15°

PV modules

Model

SV60P 4-275

Pnom 275 Wp

PV Array

Nb. of modules

80

Pnom total **22.00 kWp**

Inverter

Model

Symo 6.0-3-M

Pnom 6.00 kW ac

Inverter

Model

Symo 7.0-3-M

Pnom 7.00 kW ac

Inverter pack

Nb. of units

3.0

Pnom total **19.00 kW ac**

User's needs

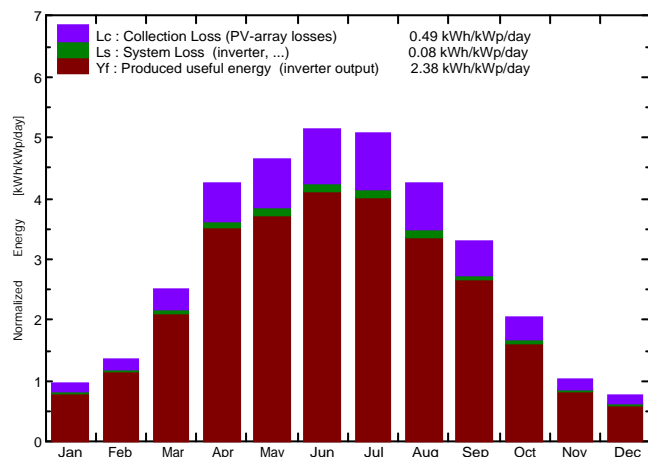
Unlimited load (grid)

Main simulation results

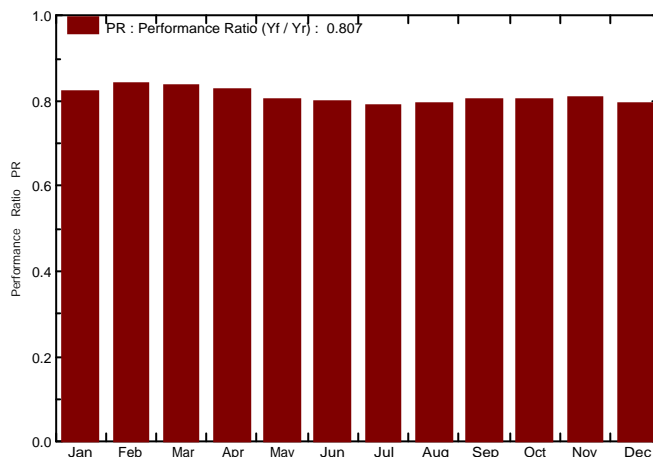
System Production

Produced Energy 19.10 MWh/year Specific prod. 868 kWh/kWp/year
Performance Ratio PR 80.74 %

Normalized productions (per installed kWp): Nominal power 22.00 kWp



Performance Ratio PR



Guido 1

Balances and main results

	GlobHor kWh/m ²	DiffHor kWh/m ²	T Amb °C	GlobInc kWh/m ²	GlobEff kWh/m ²	EArray MWh	E_Grid MWh	PR
January	23.4	14.73	-1.30	29.3	25.1	0.555	0.531	0.822
February	34.5	23.65	-0.15	38.3	33.2	0.735	0.707	0.840
March	73.2	46.75	3.34	77.8	67.9	1.481	1.434	0.838
April	123.8	67.30	9.23	127.2	113.1	2.389	2.319	0.829
May	146.0	78.75	14.44	143.7	128.5	2.625	2.544	0.804
June	158.0	88.03	16.73	154.3	137.7	2.797	2.711	0.799
July	160.2	79.63	19.12	157.4	141.5	2.830	2.742	0.792
August	130.5	70.64	18.53	131.7	117.3	2.374	2.300	0.794
September	94.0	51.59	13.27	99.0	87.4	1.809	1.752	0.805
October	56.5	32.34	9.29	63.0	54.7	1.152	1.112	0.802
November	25.9	18.17	4.47	30.2	25.9	0.562	0.538	0.809
December	17.9	10.58	-0.23	23.4	19.6	0.429	0.409	0.793
Year	1044.0	582.16	8.95	1075.2	952.0	19.736	19.099	0.807

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: Loss diagram

Project : Guido

Simulation variant : Guido 1

Main system parameters

System type **Grid-Connected**

Near Shadings

PV Field Orientation

PV modules

PV Array

Inverter

Inverter

Inverter pack

User's needs

Linear shadings

3 orientations

Model

Nb. of modules

Model

Model

Nb. of units

Unlimited load (grid)

Tilt/Azimuth = 23°/75°, 23°/-105°, 30°/-15°

SV60P 4-275

80

Symo 6.0-3-M

Symo 7.0-3-M

3.0

Pnom 275 Wp

Pnom total **22.00 kWp**

Pnom 6.00 kW ac

Pnom 7.00 kW ac

Pnom total **19.00 kW ac**

Loss diagram over the whole year

