

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 13h57			
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		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 "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)		21 kWp	Total		78 modules
		Module area		130 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	329 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

78

Pnom total **21.45 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

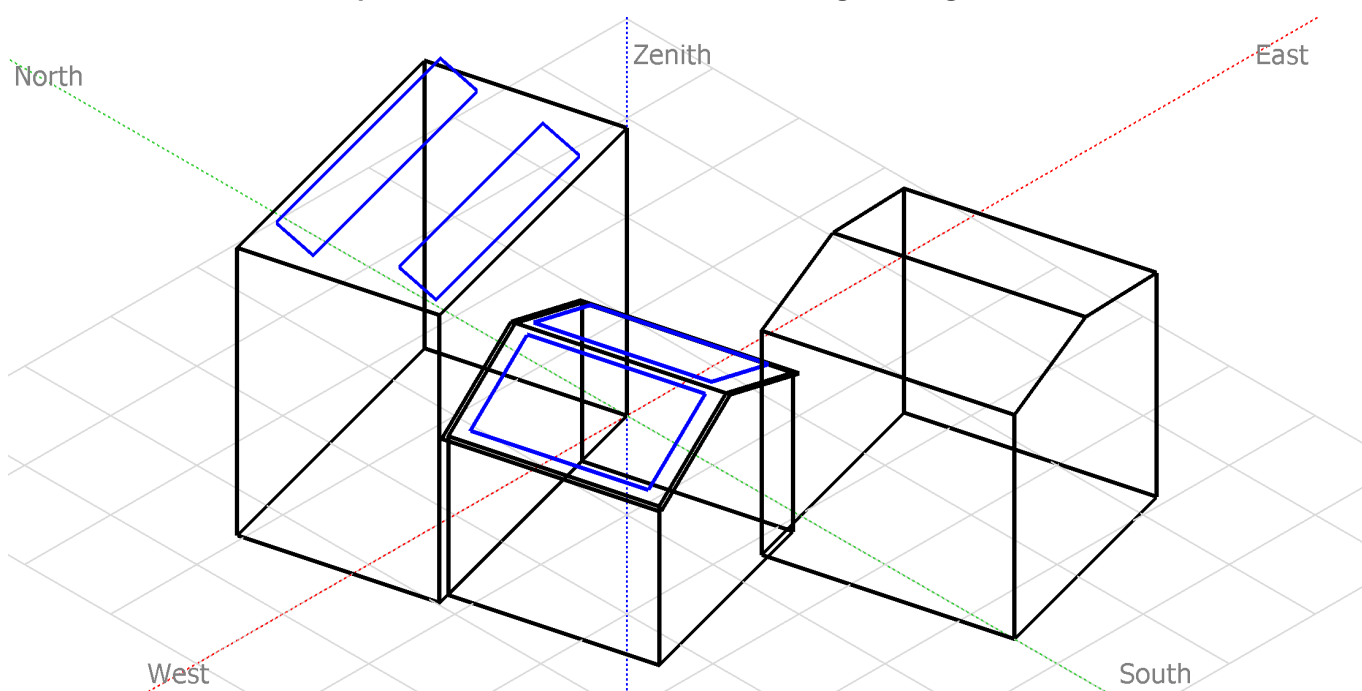
3.0

Pnom total **19.00 kW ac**

User's needs

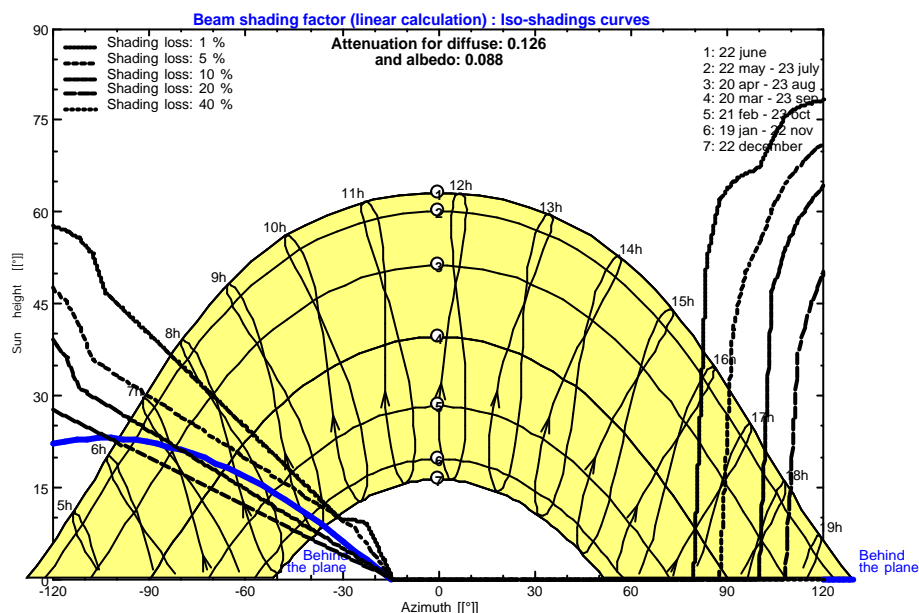
Unlimited load (grid)

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

78

Pnom total **21.45 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

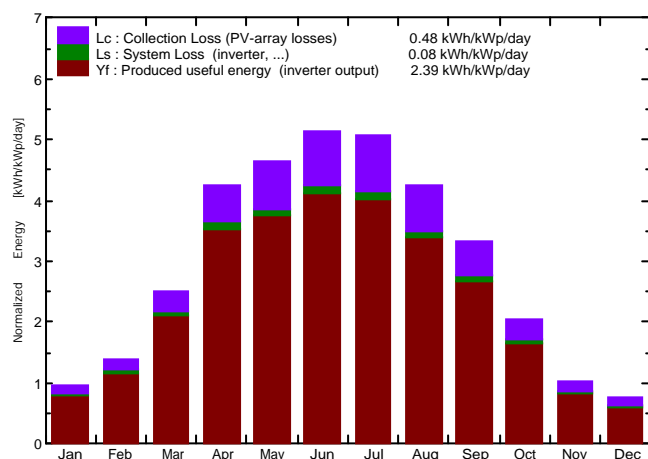
Unlimited load (grid)

Main simulation results

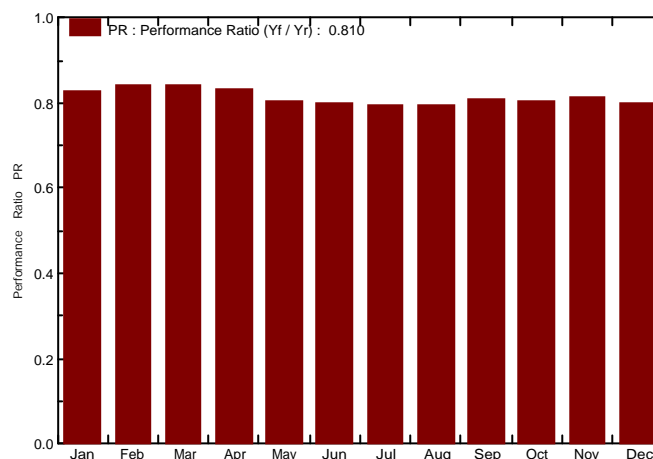
System Production

Produced Energy 18.72 MWh/year Specific prod. 873 kWh/kWp/year
Performance Ratio PR 80.95 %

Normalized productions (per installed kWp): Nominal power 21.45 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	29.6	25.5	0.550	0.526	0.828
February	34.5	23.65	-0.15	38.5	33.6	0.725	0.697	0.843
March	73.2	46.75	3.34	78.1	68.5	1.456	1.409	0.841
April	123.8	67.30	9.23	127.5	113.8	2.342	2.272	0.831
May	146.0	78.75	14.44	143.9	129.0	2.567	2.486	0.806
June	158.0	88.03	16.73	154.3	138.1	2.733	2.648	0.800
July	160.2	79.63	19.12	157.5	141.9	2.767	2.679	0.793
August	130.5	70.64	18.53	131.8	117.8	2.324	2.250	0.795
September	94.0	51.59	13.27	99.4	88.1	1.777	1.720	0.807
October	56.5	32.34	9.29	63.3	55.3	1.134	1.094	0.806
November	25.9	18.17	4.47	30.4	26.3	0.556	0.531	0.814
December	17.9	10.58	-0.23	23.6	20.0	0.427	0.406	0.801
Year	1044.0	582.16	8.95	1077.9	957.8	19.358	18.718	0.810

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

78

Symo 6.0-3-M

Symo 7.0-3-M

3.0

Pnom 275 Wp

Pnom total **21.45 kWp**

Pnom 6.00 kW ac

Pnom 7.00 kW ac

Pnom total **19.00 kW ac**

Loss diagram over the whole year

