Grid-Connected System: Simulation parameters

Project : **Valladolid_Grid**

Geographical Site	**Bari**		Country	**Italy**
Situation	Latitude	41.12° N	Longitude	16.87° E
Time defined as	Legal Time	Time zone UT+1	Altitude	14 m
	Albedo	0.20		
Meteo data:	**Bari**	Meteonorm 7.2 (1986-2005), Sat=100% - Synthetic		

Simulation variant : **New simulation with losses**

Simulation date	17/05/23 11h36
Simulation for the	**10th year of operation**

Simulation parameters	System type	**No 3D scene defined, no shadings**		
Collector Plane Orientation	Tilt	38°	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	**Q.PLUS L-G4.1 340**	
Original PVsyst database		Manufacturer	Hanwha Q Cells	
Number of PV modules		In series	15 modules	In parallel 11 strings
Total number of PV modules		Nb. modules	165	Unit Nom. Power 340 Wp
Array global power		Nominal (STC)	**56.1 kWp**	At operating cond. 50.5 kWp (50°C)
Array operating characteristics (50°C)		U mpp	510 V	I mpp 99 A
Total area		Module area	**329 m²**	Cell area 289 m²

Inverter		Model	**Ingecon Sun 50**	
Original PVsyst database		Manufacturer	Ingeteam	
Characteristics		Operating Voltage	405-750 V	Unit Nom. Power 50.0 kWac
Inverter pack		Nb. of inverters	1 units	Total Power 50 kWac
				Pnom ratio 1.12

PV Array loss factors

Array Soiling Losses			Loss Fraction	3.0 %
Thermal Loss factor	Uc (const)	29.0 W/m²K	Uv (wind)	0.0 W/m²K / m/s
Wiring Ohmic Loss	Global array res.	86 mOhm	Loss Fraction	1.5 % at STC
Serie Diode Loss	Voltage Drop	0.7 V	Loss Fraction	0.1 % at STC
LID - Light Induced Degradation			Loss Fraction	2.0 %
Module Quality Loss			Loss Fraction	-0.4 %
Module Mismatch Losses			Loss Fraction	1.0 % at MPP
Strings Mismatch loss			Loss Fraction	0.10 %
Module average degradation	Year no	10	Loss factor	0.4 %/year
Mismatch due to degradation	Imp RMS dispersion	0.4 %/year	Vmp RMS dispersion	0.4 %/year

Incidence effect (IAM): User defined profile

0°	20°	40°	60°	70°	75°	80°	85°	90°
1.000	1.000	1.000	0.970	0.900	0.830	0.690	0.440	0.000

Spectral correction FirstSolar model. Precipitable water estimated from relative humidity

Coefficient Set	C0	C1	C2	C3	C4	C5
Polycrystalline Si	0,8409	-0,027539	-0,0079224	0,1357	0,038024	-0,0021218

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Unavailability of the system	7.3 days, 3 periods	Time fraction	2.0 %

Grid-Connected System: Main results

Project : **Valladolid_Grid**

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Simulation for the 10th year of operation

Main system parameters				
System type	**No 3D scene defined, no shadings**			
PV Field Orientation	tilt	38°	azimuth	0°
PV modules	Model	Q.PLUS L-G4.1 340	Pnom	340 Wp
PV Array	Nb. of modules	165	Pnom total	**56.1 kWp**
Inverter	Model	Ingecon Sun 50	Pnom	50.0 kW ac
User's needs	Unlimited load (grid)			

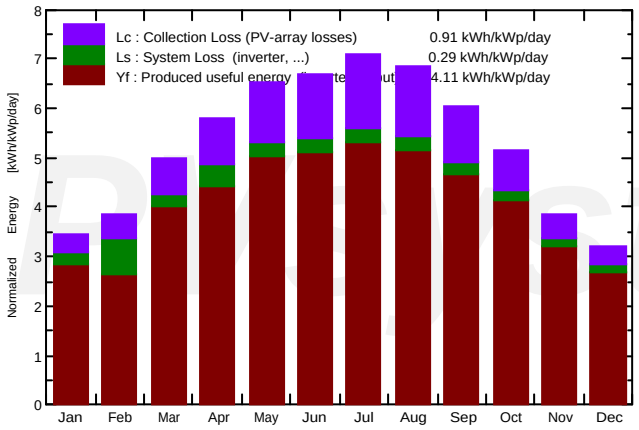
Main simulation results

System Production

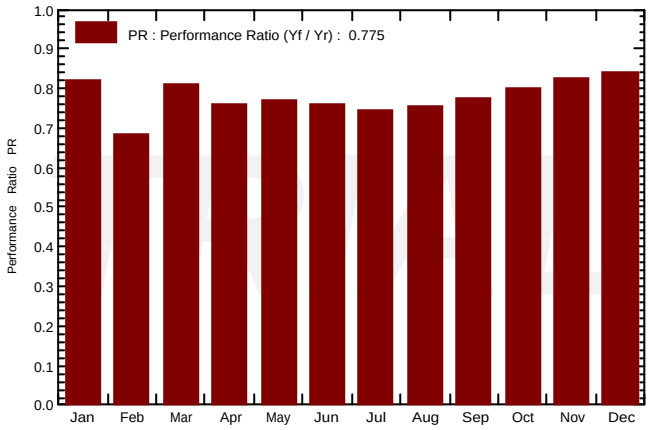
Produced Energy **84.24 MWh/year** Specific prod. 1502 kWh/kWp/year

Performance Ratio PR 77.51 %

Normalized productions (per installed kWp): Nominal power 56.1 kWp



Performance Ratio PR



New simulation with losses

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	61.2	27.37	7.99	107.5	102.9	5.358	4.937	0.818
February	72.7	31.71	8.02	108.1	103.2	5.283	4.140	0.683
March	122.6	54.07	11.07	154.7	147.3	7.395	7.023	0.809
April	161.1	62.21	13.62	174.6	165.4	8.162	7.430	0.759
May	209.5	74.71	18.93	202.4	191.4	9.239	8.768	0.772
June	219.4	81.72	22.68	201.1	190.0	9.055	8.598	0.762
July	236.0	62.40	25.68	220.0	208.0	9.717	9.222	0.747
August	201.8	60.83	25.17	212.5	201.5	9.450	8.982	0.753
September	148.8	50.43	20.43	180.6	171.7	8.271	7.865	0.776
October	109.2	38.94	17.04	159.9	152.8	7.552	7.187	0.801
November	68.9	29.16	12.48	116.3	111.2	5.674	5.393	0.827
December	53.0	22.66	9.28	99.6	95.3	4.948	4.695	0.841
Year	1664.3	596.20	16.08	1937.2	1840.6	90.104	84.239	0.775

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	T amb.	E_Grid	Energy injected into grid
GlobInc	Global incident in coll. plane	PR	Performance Ratio

Grid-Connected System: Special graphs

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Simulation for the 10th year of operation

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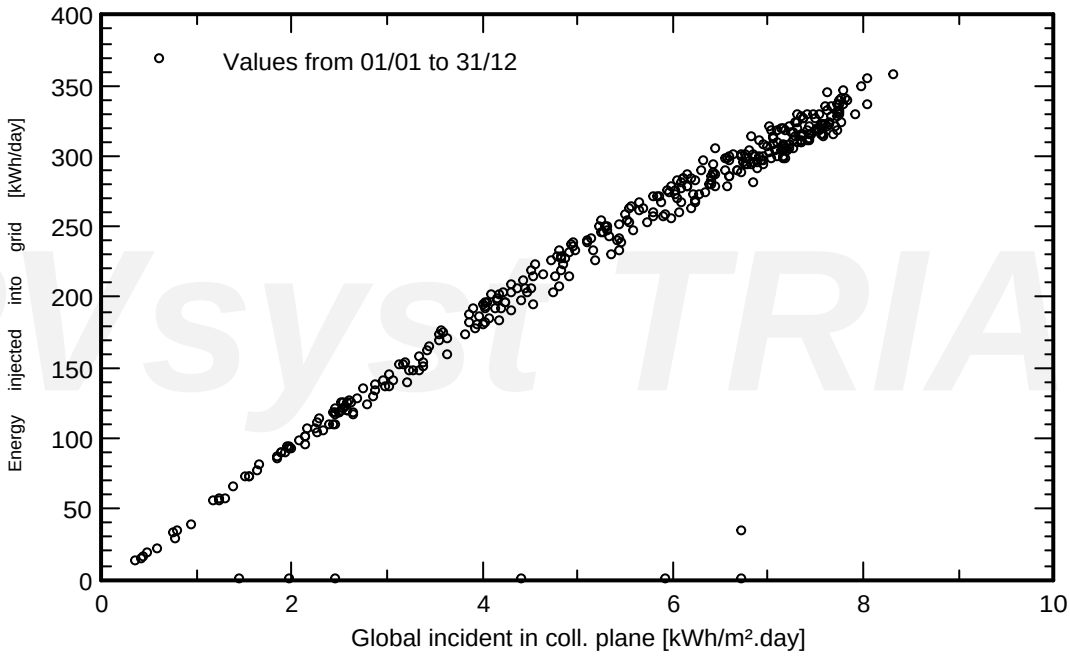
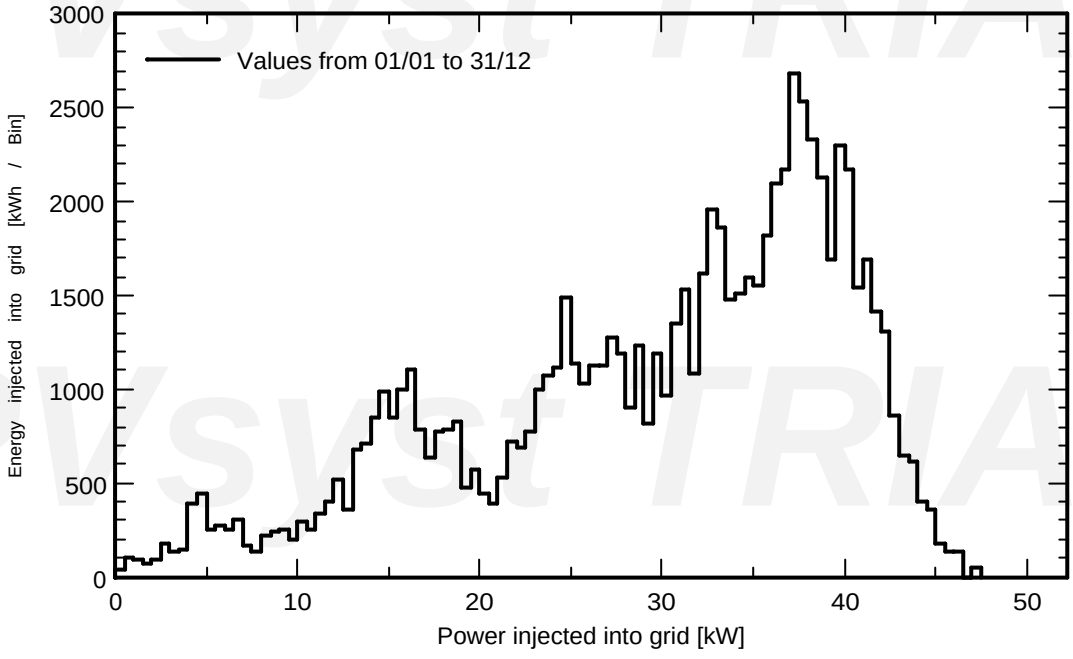
PV Field Orientation		tilt	38°	azimuth	0°
PV modules		Model	Q.PLUS L-G4.1 340	Pnom	340 Wp
PV Array		Nb. of modules	165	Pnom total	**56.1 kWp**
Inverter		Model	Ingecon Sun 50	Pnom	50.0 kW ac
User's needs		Unlimited load (grid)			

Daily Input/Output diagram



System Output Power Distribution



Grid-Connected System: Loss diagram

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Simulation variant : **New simulation with losses**

Simulation for the 10th year of operation

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PV modules	Model	Q.PLUS L-G4.1 340	Pnom	340 Wp
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User's needs	Unlimited load (grid)			

Loss diagram over the whole year