Version 7.2.8

PVsyst - Simulation report

Grid-Connected System

Project: Luisa Di Francesco

Variant: New simulation variant

No 3D scene defined, no shadings

System power: 4505 Wp

Thessaloniki/Livadákion - Greece

Author

PVsyst V7.2.8
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with v7.2.8

Project summary

Geographical Site
Thessaloniki/Livadákion
Greece

Situation

Latitude	40.52 °N
Longitude	22.97 °E
Altitude	4 m
Time zone	UTC+2

Project settings

Albedo	0.20

Meteo data
Thessaloniki/Livadákion
PVGIS api TMY

System summary

Grid-Connected System

No 3D scene defined, no shadings

PV Field Orientation
Fixed plane
Tilt/Azimuth 35 / 0 °

Near Shadings
No Shadings

User's needs
Daily household consumers
Seasonal modulation
Average 11.0 kWh/Day

System information

PV Array

Nb. of modules	17 units
Pnom total	4505 Wp

Inverters

Nb. of units	17 units
Pnom total	4080 W
Grid power limit	3600 W
Grid lim. Pnom ratio	1.251

Battery pack

Storage strategy: Self-consumption	
Nb. of units	10 units
Voltage	20 V
Capacity	1030 Ah

Results summary

Produced Energy	7.27 MWh/year	Specific production	1614 kWh/kWp/year	Perf. Ratio PR	77.95 %
Used Energy	4.00 MWh/year			Solar Fraction SF	96.38 %

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General parameters

Grid-Connected System — **No 3D scene defined, no shadings**

PV Field Orientation

Orientation		Sheds configuration	Models used	
Fixed plane		No 3D scene defined	Transposition	Perez
Tilt/Azimuth	35 / 0 °		Diffuse	Imported
			Circumsolar	separate

Horizon		Near Shadings	User's needs	
Average Height	1.6 °	No Shadings	Daily household consumers	
			Seasonal modulation	
			Average	11.0 kWh/Day

Storage

Kind	Self-consumption		Grid power limitation	
Charging strategy		**Discharging strategy**	Active Power	3600 W
When excess solar power is available		As soon as power is needed	Pnom ratio	1.251

PV Array Characteristics

PV module

Manufacturer	Generic
Model	AS-P606B-265
(Original PVsyst database)	
Unit Nom. Power	265 Wp
Number of PV modules	17 units
Nominal (STC)	4505 Wp
Modules	17 Strings x 1 In series
At operating cond. (50°C)	
Pmpp	4062 Wp
U mpp	28 V
I mpp	146 A

Inverter

Manufacturer	Generic
Model	IQ7-60-x-INT
(Original PVsyst database)	
Unit Nom. Power	0.240 kWac
Number of inverters	17 units
Total power	4.1 kWac
Operating voltage	16-37 V
Max. power (=>60°C)	0.250 kWac
Pnom ratio (DC:AC)	1.10

Total PV power

Nominal (STC)	5 kWp
Total	17 modules
Module area	27.7 m²

Total inverter power

Total power	4.1 kWac
Nb. of inverters	17 units
Pnom ratio	1.10

Battery Storage

Battery

Manufacturer	Generic
Model	BAE Secura Block Solar 2 V 18 PVV 1260

Battery pack

Nb. of units	10 in series
Discharging min. SOC	20.0 %
Stored energy	16.5 kWh

Battery Pack Characteristics

Voltage	20 V
Nominal Capacity	1030 Ah (C10)
Temperature	Fixed 20 °C

Battery input charger

Model	Generic
Max. charg. power	4.0 kWdc
Max./Euro effic.	97.0/95.0 %

Battery to Grid inverter

Model	Generic
Max. disch. power	4.0 kWac
Max./Euro effic.	97.0/95.0 %

Array losses

Thermal Loss factor
Module temperature according to irradiance
Uc (const) 20.0 W/m²K
Uv (wind) 0.0 W/m²K/m/s

DC wiring losses
Global array res. 3.2 mΩ
Loss Fraction 1.5 % at STC

Module Quality Loss
Loss Fraction -0.5 %

Module mismatch losses
Loss Fraction 2.0 % at MPP

Strings Mismatch loss
Loss Fraction 0.1 %

IAM loss factor
Incidence effect (IAM): Fresnel AR coating, n(glass)=1.526, n(AR)=1.290

0°	30°	50°	60°	70°	75°	80°	85°	90°
1.000	0.999	0.987	0.962	0.892	0.816	0.681	0.440	0.000

Horizon definition

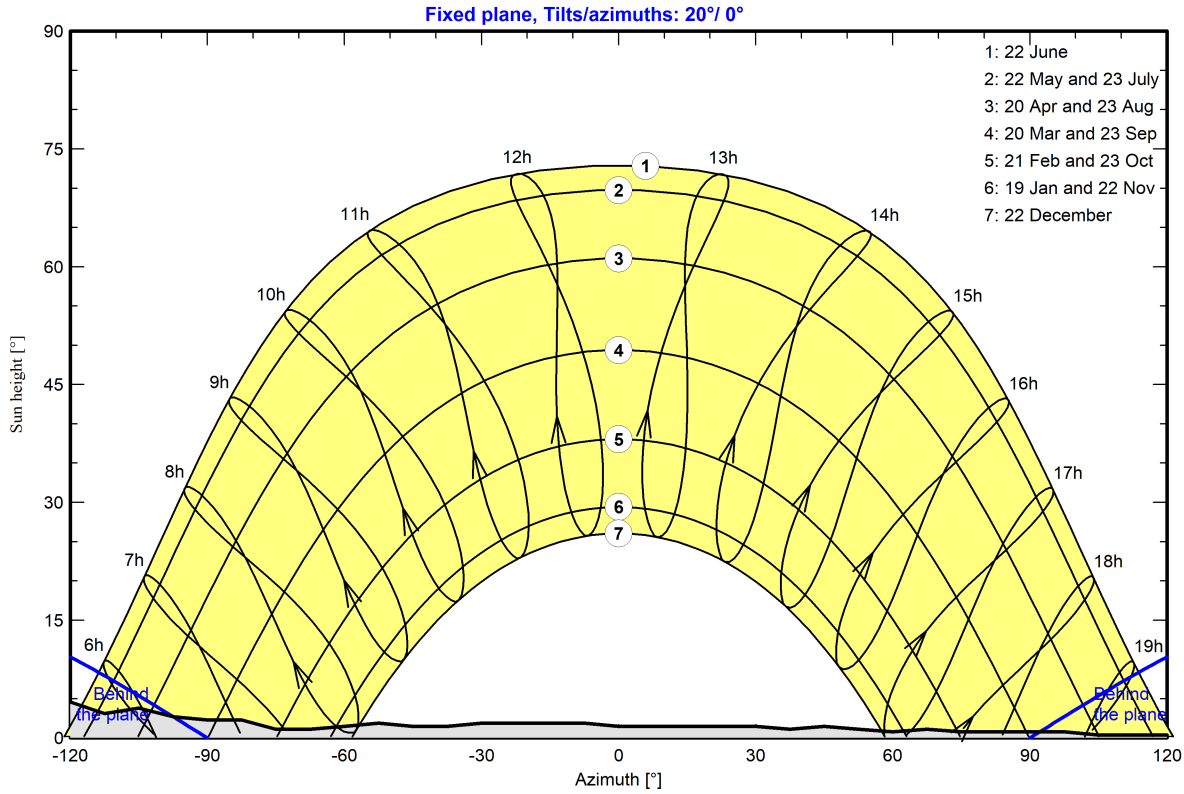
CSV horizon file, Latitude 40.520, Longitude 22.970

Average Height	1.6 °	Albedo Factor	0.92
Diffuse Factor	0.98	Albedo Fraction	100 %

Horizon profile

Azimuth [°]	-180	-173	-165	-158	-150	-143	-135	-128	-120	-113	-105	-98	-90
Height [°]	0.8	1.5	1.9	1.9	2.7	2.3	2.3	3.8	4.6	3.1	3.8	2.7	2.3
Azimuth [°]	-83	-75	-68	-60	-53	-45	-38	-30	-8	0	30	38	45
Height [°]	2.3	1.1	1.1	1.5	1.9	1.5	1.5	1.9	1.9	1.5	1.5	1.1	1.5
Azimuth [°]	53	60	68	75	98	105	120	128	135	143	150	180	
Height [°]	1.1	0.8	1.1	0.8	0.8	0.4	0.4	0.8	0.8	0.4	0.8	0.8	

Sun Paths (Height / Azimuth diagram)



Detailed User's needs

Daily household consumers, Seasonal modulation, average = 11.0 kWh/day

Summer (Jun-Aug)

	Number	Power	Use	Energy
		W	Hour/day	Wh/day
Lamps (LED or fluo)	10	10W/lamp	5.0	500
TV / PC / Mobile	2	100W/app	5.0	1000
Domestic appliances	1	500W/app	4.0	2000
Fridge / Deep-freeze	2		24	1598
Dish- & Cloth-washers	1		2	2000
Ventilation	1	100W tot	24.0	2400
Air conditioning	1	1000W tot	3.0	3000
Stand-by consumers			24.0	144
Total daily energy				12642Wh/day

Autumn (Sep-Nov)

	Number	Power	Use	Energy
		W	Hour/day	Wh/day
Lamps (LED or fluo)	10	10W/lamp	5.0	500
TV / PC / Mobile	2	100W/app	5.0	1000
Domestic appliances	1	500W/app	5.0	2500
Fridge / Deep-freeze	2		24	1598
Dish- & Cloth-washers	1		2	2000
Ventilation	1	100W tot	24.0	2400
Stand-by consumers			24.0	144
Total daily energy				10142Wh/day

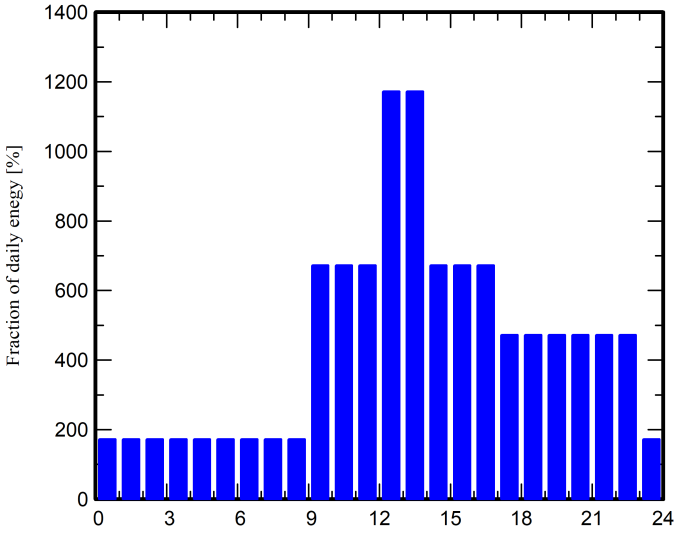
Winter (Dec-Feb)

	Number	Power	Use	Energy
		W	Hour/day	Wh/day
Lamps (LED or fluo)	10	10W/lamp	6.0	600
TV / PC / Mobile	2	100W/app	6.0	1200
Domestic appliances	1	500W/app	6.0	3000
Fridge / Deep-freeze	2		24	1598
Dish- & Cloth-washers	1		2	2000
Ventilation	1	100W tot	24.0	2400
Stand-by consumers			24.0	144
Total daily energy				10942Wh/day

Spring (Mar-May)

	Number	Power	Use	Energy
		W	Hour/day	Wh/day
Lamps (LED or fluo)	10	10W/lamp	5.0	500
TV / PC / Mobile	2	100W/app	5.0	1000
Domestic appliances	1	500W/app	5.0	2500
Fridge / Deep-freeze	2		24	1598
Dish- & Cloth-washers	1		2	2000
Ventilation	1	100W tot	24.0	2400
Stand-by consumers			24.0	144
Total daily energy				10142Wh/day

Hourly distribution



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Main results

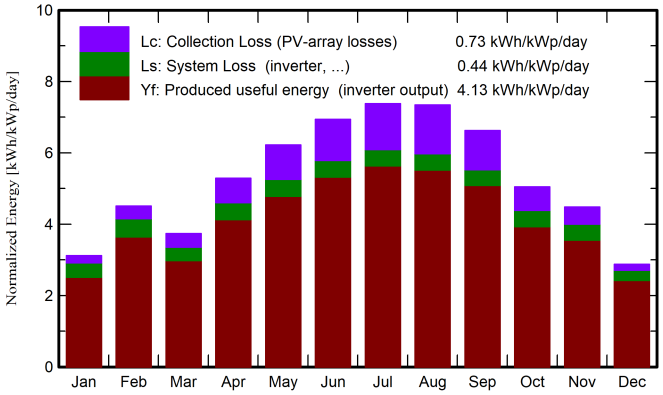
System Production

Produced Energy	7.27 MWh/year	Specific production	1614 kWh/kWp/year
Used Energy	4.00 MWh/year	Performance Ratio PR	77.95 %
		Solar Fraction SF	96.38 %

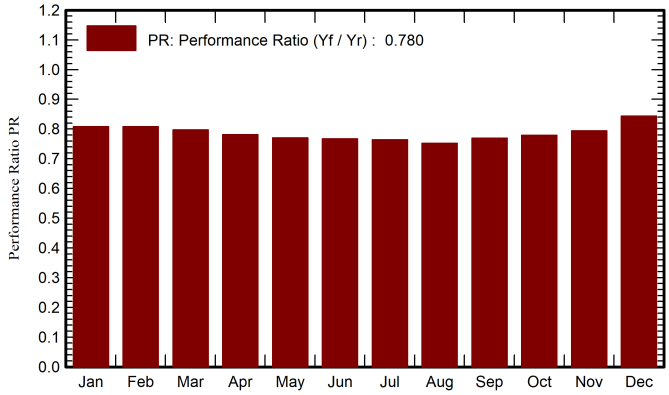
Battery aging (State of Wear)

Cycles SOW	94.8 %
Static SOW	90.0 %
Battery lifetime	10.0 years

Normalized productions (per installed kWp)



Performance Ratio PR



Balances and main results

	GlobHor kWh/m²	DiffHor kWh/m²	T_Amb °C	GlobInc kWh/m²	GlobEff kWh/m²	EArray MWh	E_User MWh	E_Solar MWh	E_Grid MWh	EFrGrid MWh
January	57.4	25.91	4.38	96.7	94.9	0.408	0.339	0.316	0.036	0.024
February	85.5	34.77	4.15	126.2	123.8	0.524	0.306	0.287	0.173	0.020
March	96.1	46.76	7.95	115.9	113.0	0.469	0.314	0.261	0.155	0.053
April	147.4	64.32	14.17	158.8	154.7	0.622	0.304	0.304	0.254	0.000
May	195.9	70.55	19.94	192.8	187.6	0.734	0.314	0.314	0.355	0.000
June	221.8	67.42	22.71	208.1	202.5	0.783	0.379	0.379	0.340	0.000
July	236.7	65.56	25.14	228.7	222.8	0.851	0.392	0.392	0.395	0.000
August	213.1	59.72	27.21	227.8	222.8	0.835	0.392	0.392	0.380	0.000
September	162.4	49.98	22.11	198.7	194.5	0.748	0.304	0.304	0.384	0.000
October	110.1	43.72	16.39	156.5	153.5	0.614	0.314	0.311	0.238	0.004
November	79.5	28.78	11.85	134.5	132.4	0.542	0.304	0.304	0.176	0.000
December	51.2	24.93	3.09	89.3	87.4	0.379	0.339	0.294	0.045	0.045
Year	1657.1	582.41	14.98	1933.7	1890.0	7.509	4.004	3.859	2.932	0.145

Legends

GlobHor	Global horizontal irradiation	EArray	Effective energy at the output of the array
DiffHor	Horizontal diffuse irradiation	E_User	Energy supplied to the user
T_Amb	Ambient Temperature	E_Solar	Energy from the sun
GlobInc	Global incident in coll. plane	E_Grid	Energy injected into grid
GlobEff	Effective Global, corr. for IAM and shadings	EFrGrid	Energy from the grid

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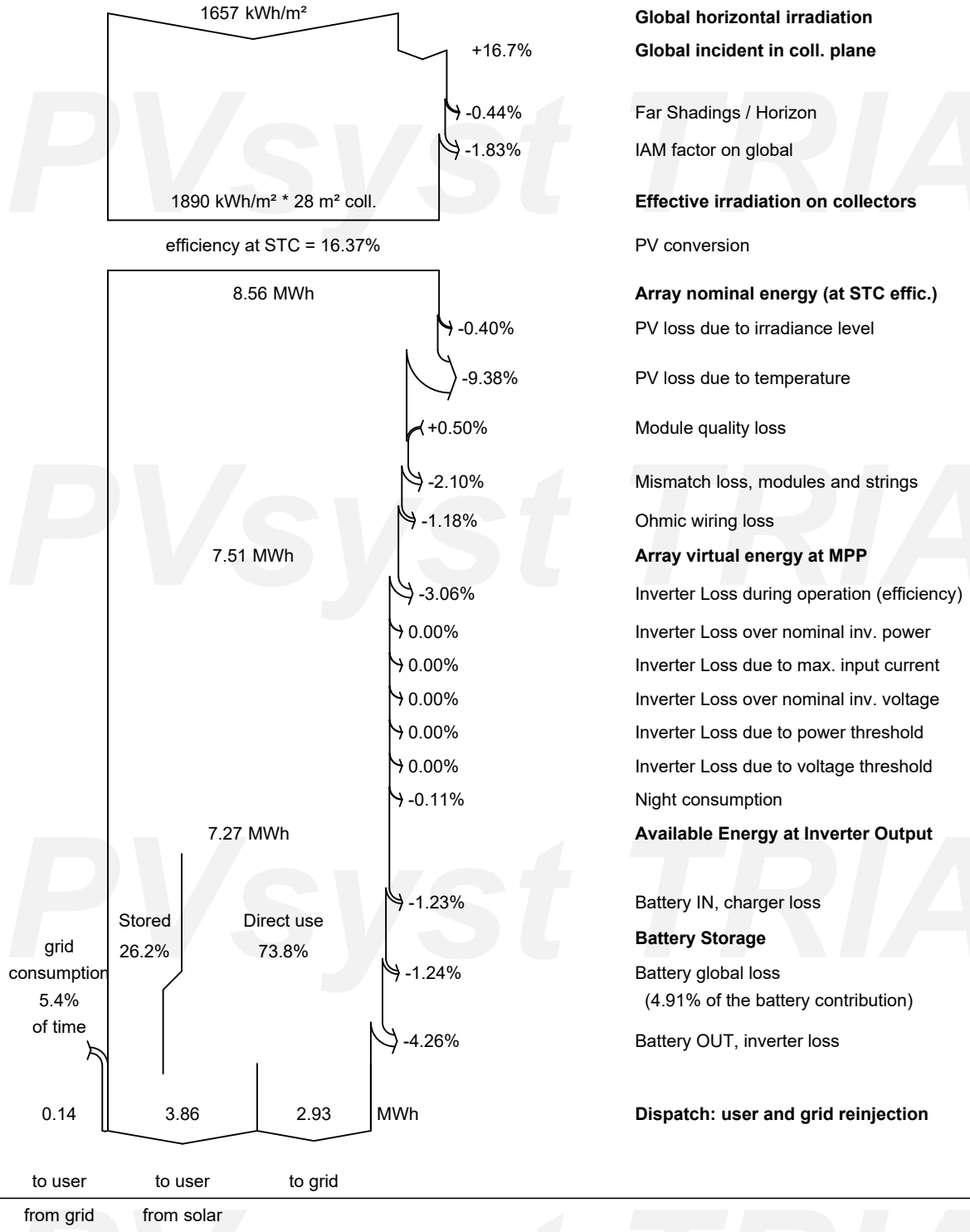
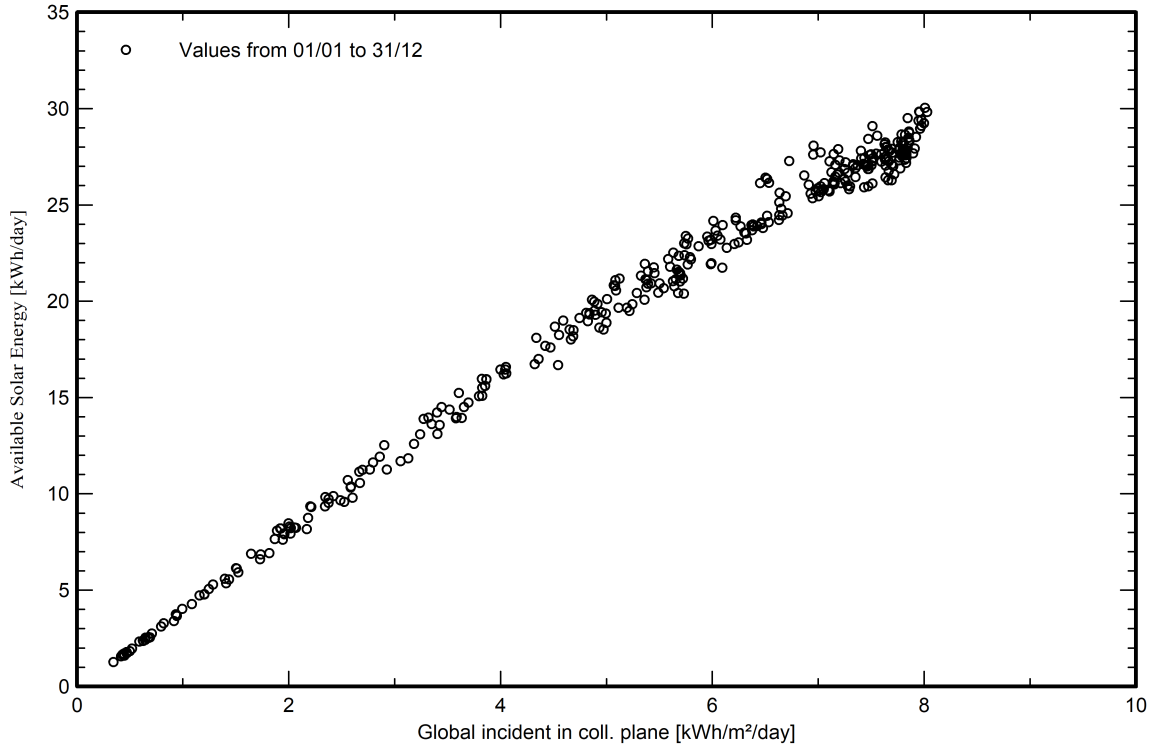
Loss diagram



Special graphs

Daily Input/Output diagram



System Output Power Distribution