

PVsyst - Simulation report

Grid-Connected System

Project: PV-TLL Ltd.

Variant: PV simulation EW, V10, A15

No 3D scene defined, no shadings

System power: 69.1 kWp

Iliyantsi - Bulgaria



Project: PV-TLL Ltd.

Variant: PV simulation sgrada-3 EW V10, A15, 1x 50kW, 144x 480Wp

PVsyst V7.4.7

VC6, Simulation date:
10/10/24 12:19
with V7.4.7

Project summary

Geographical Site

Iliyantsi

Bulgaria

Situation

Latitude 42.75 °N

Longitude 23.32 °E

Altitude 519 m

Time zone UTC+2

Project settings

Albedo 0.20

Weather data

Iliyantsi

Meteonorm 8.0 (1991-2010), Sat=8% - Synthetic

System summary

Grid-Connected System

No 3D scene defined, no shadings

PV Field Orientation

Fixed planes 2 orientations

Tilts/azimuths 10 / 105 °

10 / -75 °

Near Shadings

No Shadings

User's needs

Unlimited load (grid)

System information

PV Array

Nb. of modules

144 units

Pnom total

69.1 kWp

Inverters

Nb. of units

1 unit

Pnom total

50.0 kWac

Pnom ratio

1.382

Results summary

Produced Energy 73.34 MWh/year Specific production 1061 kWh/kWp/year Perf. Ratio PR 85.76 %

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General parameters**Grid-Connected System****No 3D scene defined, no shadings****PV Field Orientation****Orientation**

Fixed planes 2 orientations
Tilts/azimuths 10 / 105 °
10 / -75 °

Sheds configuration

No 3D scene defined

Models used

Transposition Perez
Diffuse Perez, Meteonorm
Circumsolar separate

Horizon

Free Horizon

Near Shadings

No Shadings

User's needs

Unlimited load (grid)

PV Array Characteristics**PV module**

Manufacturer Jinkosolar
Model 60HL4-(V)-480W

(Custom parameters definition)

Unit Nom. Power 480 Wp
Number of PV modules 144 units
Nominal (STC) 69.1 kWp
Modules 8 string x 18 In series

At operating cond. (50°C)

Pmpp 64.2 kWp
U mpp 605 V
I mpp 106 A

Total PV power

Nominal (STC) 69 kWp
Total 144 modules
Module area 318 m²

Inverter

Manufacturer Huawei Technologies
Model SUN2000-50KTL-M3-400V

(Custom parameters definition)

Unit Nom. Power 50.0 kWac
Number of inverters 4 * MPPT 25% 1 unit
Total power 50.0 kWac
Operating voltage 200-1000 V
Max. power (=>35°C) 55.0 kWac
Pnom ratio (DC:AC) 1.38
No power sharing between MPPTs

Total inverter power

Total power 50 kWac
Number of inverters 1 unit
Pnom ratio 1.38

Array losses**Array Soiling Losses**

Loss Fraction 3.0 %

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. 93 mΩ
Loss Fraction 1.5 % at STC

Module Quality Loss

Loss Fraction -0.8 %

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

AC wiring losses**Inv. output line up to injection point**

Inverter voltage 400 Vac tri
Loss Fraction 0.00 % at STC

Inverter: SUN2000-50KTL-M3-400V

Wire section (1 Inv.) Copper 1 x 3 x 25 mm²
Wires length 0 m



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Main results

System Production

Produced Energy 73.34 MWh/year

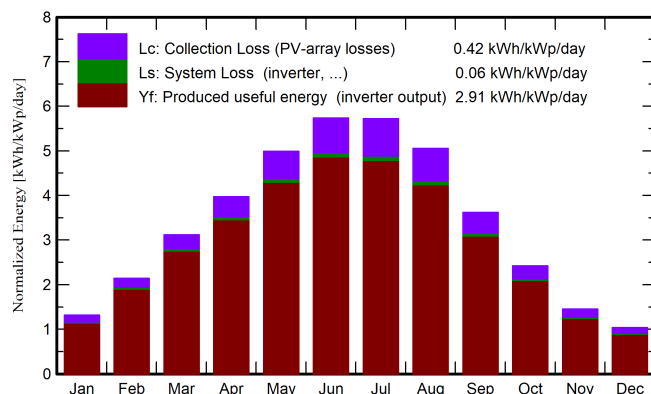
Specific production

1061 kWh/kWp/year

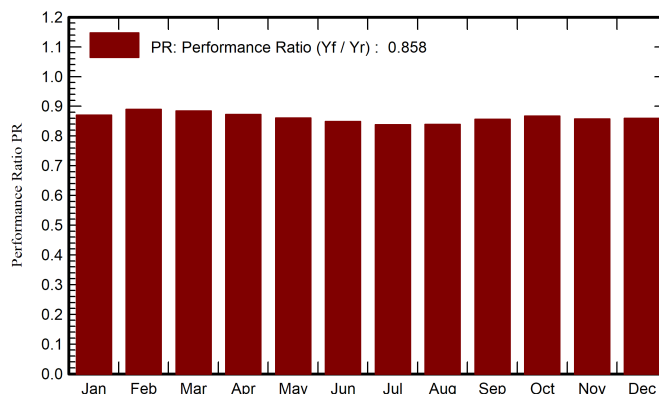
Perf. Ratio PR

85.76 %

Normalized productions (per installed kWp)



Performance Ratio PR



Balances and main results

	GlobHor	DiffHor	T_Amb	GlobInc	GlobEff	EArray	E_Grid	PR
	kWh/m ²	kWh/m ²	°C	kWh/m ²	kWh/m ²	MWh	MWh	ratio
January	41.0	23.20	-1.44	40.8	36.5	2.51	2.45	0.870
February	60.6	32.16	1.27	60.0	55.3	3.77	3.69	0.890
March	97.6	53.29	6.27	96.7	90.3	6.03	5.91	0.885
April	120.0	63.77	10.99	119.1	111.8	7.32	7.18	0.872
May	156.0	86.24	16.03	154.8	145.7	9.39	9.21	0.861
June	173.1	87.73	19.55	172.1	162.3	10.29	10.09	0.849
July	178.6	85.66	22.45	177.4	167.4	10.48	10.27	0.838
August	157.9	75.18	22.33	156.8	147.7	9.28	9.10	0.840
September	109.5	56.64	16.85	108.6	101.6	6.55	6.43	0.856
October	75.7	48.61	11.53	75.0	69.5	4.58	4.50	0.867
November	44.1	22.24	6.10	43.7	39.7	2.64	2.59	0.857
December	32.4	18.72	0.43	32.1	28.7	1.96	1.91	0.860
Year	1246.6	653.45	11.08	1237.1	1156.6	74.80	73.34	0.858

Legends

GlobHor Global horizontal irradiation

DiffHor Horizontal diffuse irradiation

T_Amb Ambient Temperature

GlobInc Global incident in coll. plane

GlobEff Effective Global, corr. for IAM and shadings

EArray Effective energy at the output of the array

E_Grid Energy injected into grid

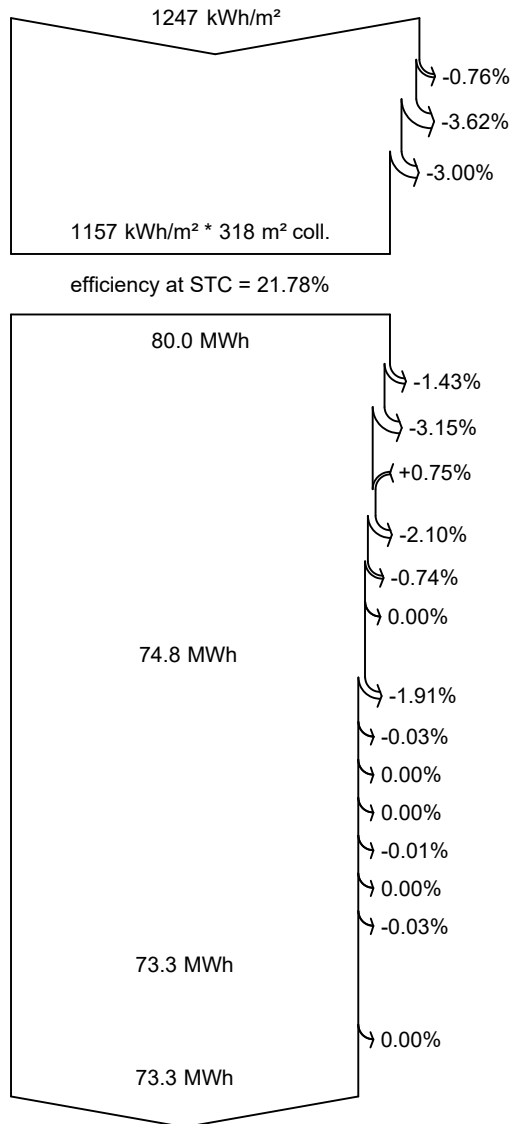
PR Performance Ratio



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Loss diagram



Global horizontal irradiation

Global incident in coll. plane

IAM factor on global

Soiling loss factor

Effective irradiation on collectors

PV conversion

Array nominal energy (at STC effic.)

PV loss due to irradiance level

PV loss due to temperature

Module quality loss

Mismatch loss, modules and strings

Ohmic wiring loss

Mixed orientation mismatch loss

Array virtual energy at MPP

Inverter Loss during operation (efficiency)

Inverter Loss over nominal inv. power

Inverter Loss due to max. input current

Inverter Loss over nominal inv. voltage

Inverter Loss due to power threshold

Inverter Loss due to voltage threshold

Night consumption

Available Energy at Inverter Output

AC ohmic loss

Energy injected into grid

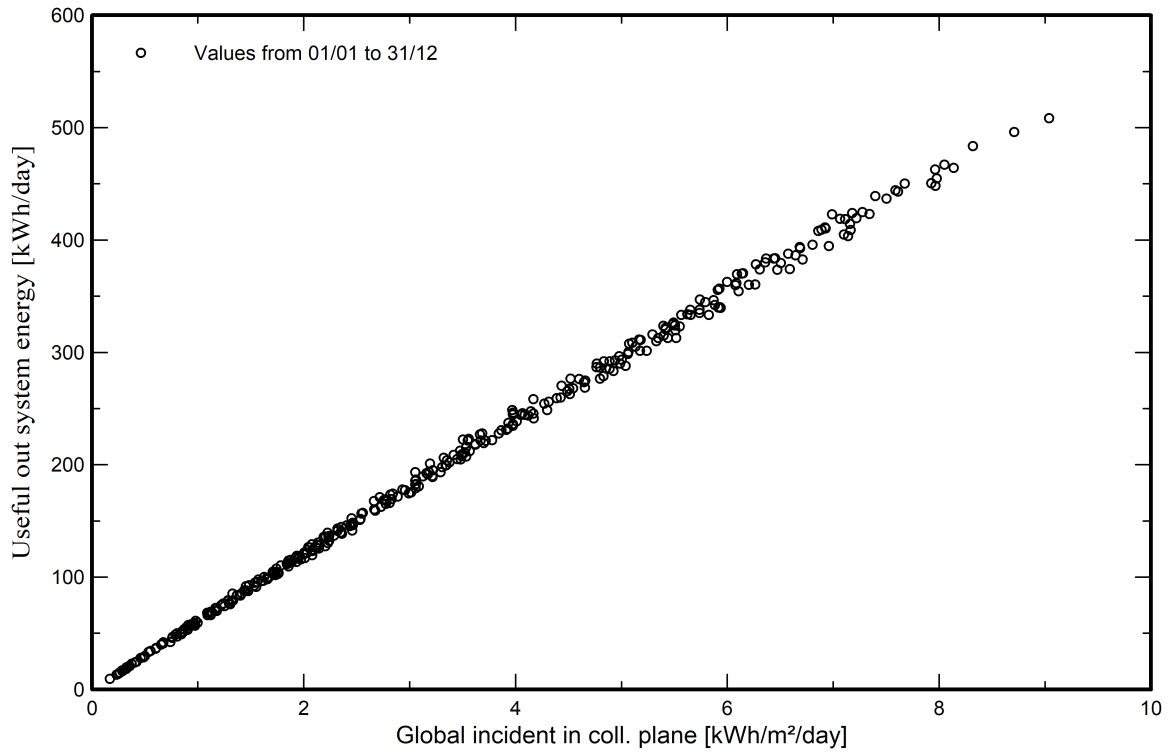


PVsyst V7.4.7

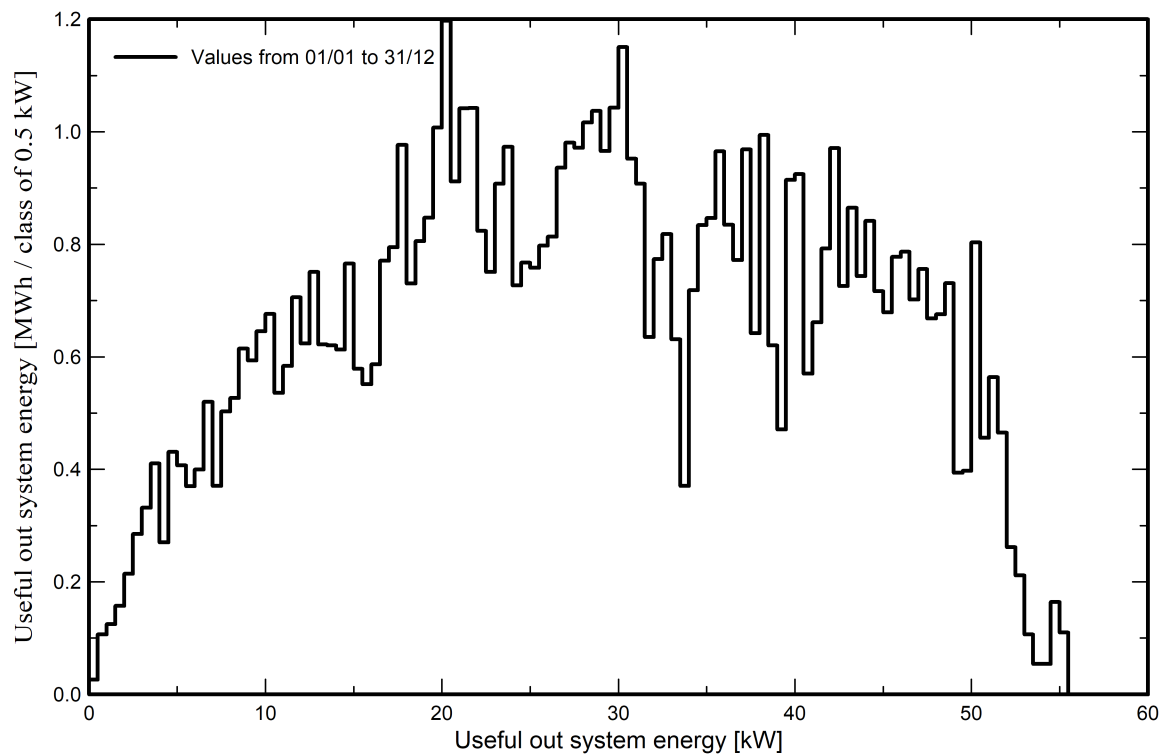
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Predef. graphs

Daily Input/Output diagram



System Output Power Distribution

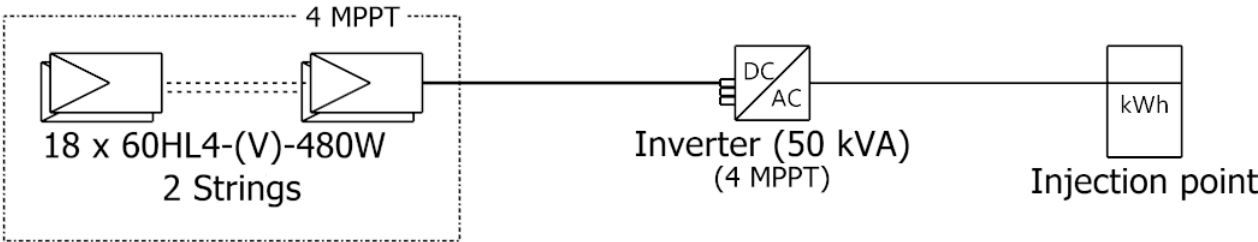




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Single-line diagram



PV module	60HL4-(V)-480W
Inverter	SUN2000-50KTL-M3-400V
String	18 x 60HL4-(V)-480W

PV-TLL Ltd

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A15, 1x 50kW, 144x 480Wp

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