

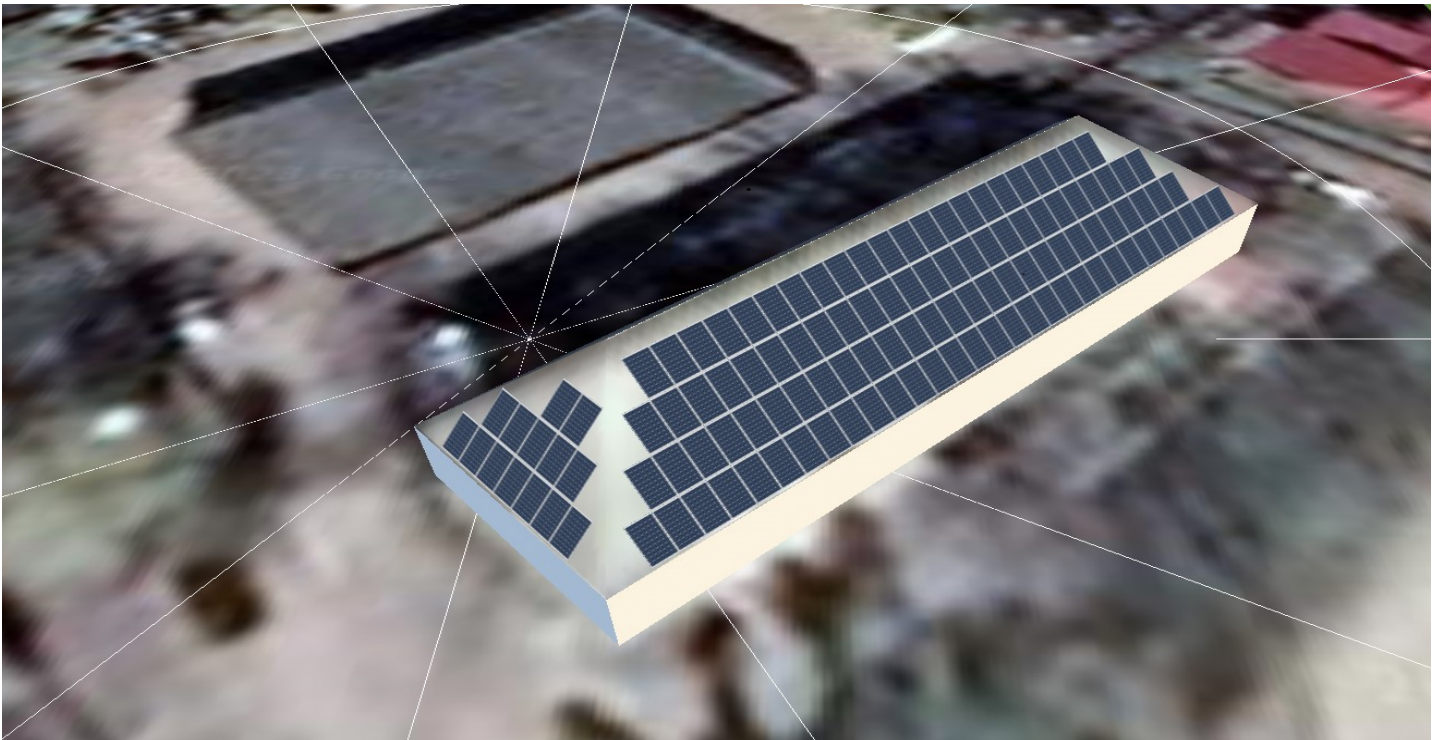
# PVsyst - Simulation report

## Grid-Connected System

Project: CEPV\_Soroca\_50kW

System power: 50.4 kWp

Soroca - Republic Of Moldova





## Project: CEPV\_Soroca\_50kW

### PVsyst V7.2.5

VC0, Simulation date:  
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### Project summary

#### Geographical Site

**Soroca**  
Republic Of Moldova

#### Situation

Latitude 48.15 °N  
Longitude 28.28 °E  
Altitude 244 m  
Time zone UTC+2

#### Project settings

Albedo 0.20

#### Meteo data

Soroca  
Meteonorm 8.0 (1991-2014), Sat=100% - Synthetic

### System summary

#### Grid-Connected System

##### PV Field Orientation

Fixed planes 2 orientations  
Tilts/azimuths 30 / -50 °  
30 / 40 °

#### Tables on a building

##### Near Shadings

Linear shadings

#### User's needs

Unlimited load (grid)

#### System information

##### PV Array

Nb. of modules 84 units  
Pnom total 50.4 kWp

##### Inverters

Nb. of units 1 Unit  
Pnom total 50.0 kWac  
Pnom ratio 1.008

### Results summary

Produced Energy 61.80 MWh/year Specific production 1226 kWh/kWp/year Perf. Ratio PR 87.30 %

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**General parameters****Grid-Connected System****PV Field Orientation****Orientation**

Fixed planes 2 orientations  
Tilts/azimuths 30 / -50 °  
30 / 40 °

**Horizon**

Free Horizon

**Tables on a building****Sheds configuration**

Nb. of sheds 7 units  
Averages of diff. arrays

**Sizes**

Sheds spacing 2.52 m  
Collector width 5.55 m  
Ground Cov. Ratio (GCR) 220.2 %

**Shading limit angle**

Limit profile angle 129.5 °

**Near Shadings**

Linear shadings

**Models used**

Transposition Perez  
Diffuse Perez, Meteonorm  
Circumsolar separate

**User's needs**

Unlimited load (grid)

**PV Array Characteristics****PV module**

Manufacturer Generic  
Model Yangtze Solar

(Custom parameters definition)

Unit Nom. Power 600 Wp  
Number of PV modules 84 units  
Nominal (STC) 50.4 kWp  
Modules 4 Strings x 21 In series

**At operating cond. (50°C)**

Pmpp 45.3 kWp  
U mpp 644 V  
I mpp 70 A

**Total PV power**

Nominal (STC) 50 kWp  
Total 84 modules  
Module area 240 m<sup>2</sup>  
Cell area 139 m<sup>2</sup>

**Inverter**

Manufacturer Goodwe  
Model INVT\_50kW

(Custom parameters definition)

Unit Nom. Power 50.0 kWac  
Number of inverters 4 \* MPPT 25% 1 unit  
Total power 50.0 kWac  
Operating voltage 250-1000 V  
Max. power (=>30°C) 55.0 kWac  
Pnom ratio (DC:AC) 1.01

**Total inverter power**

Total power 50 kWac  
Nb. of inverters 1 Unit  
Pnom ratio 1.01

**Array losses****Thermal Loss factor**

Module temperature according to irradiance  
Uc (const) 20.0 W/m<sup>2</sup>K  
Uv (wind) 0.0 W/m<sup>2</sup>K/m/s

**DC wiring losses**

Global array res. 154 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

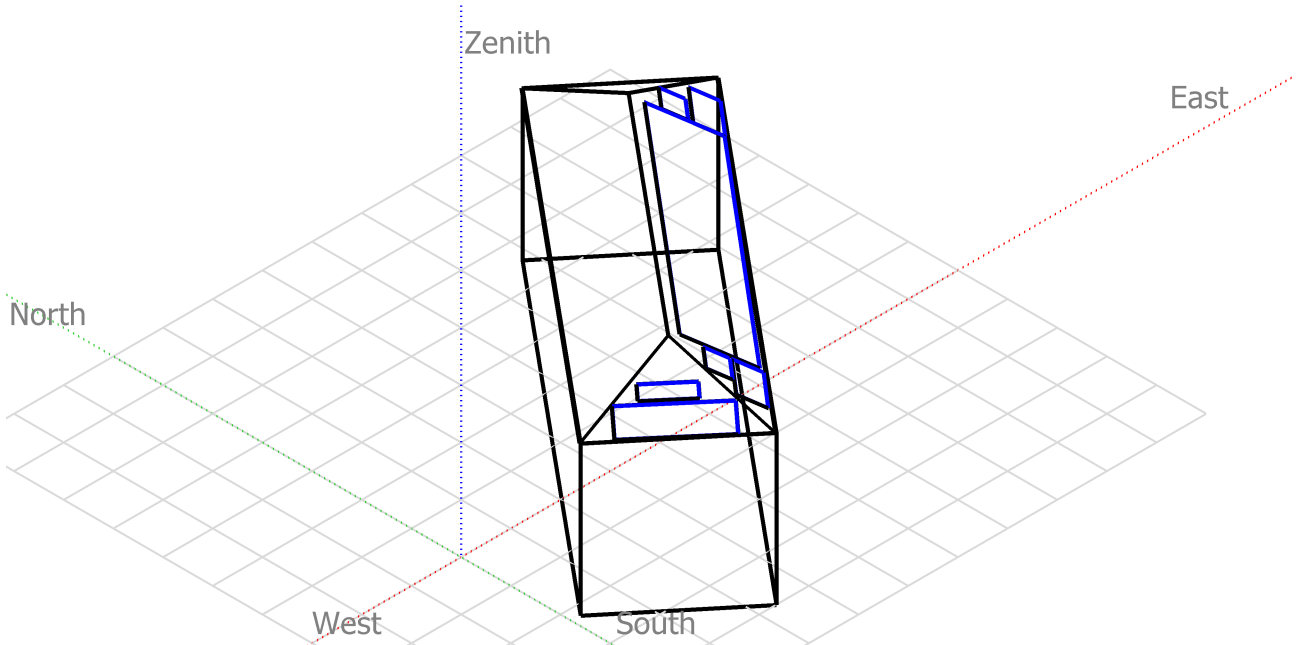


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**Near shadings parameter**

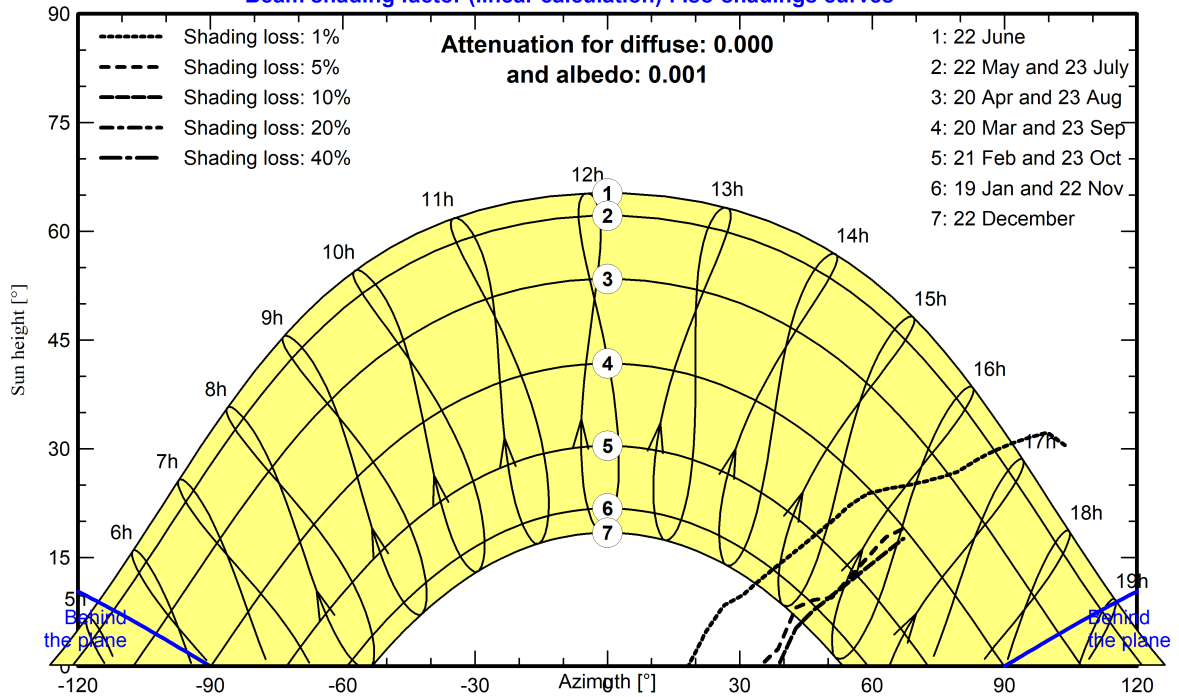
**Perspective of the PV-field and surrounding shading scene**



**Iso-shadings diagram**

**CEPV\_Soroca\_50kW**

**Beam shading factor (linear calculation) : Iso-shadings curves**





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## Main results

## System Production

Produced Energy 61.80 MWh/year

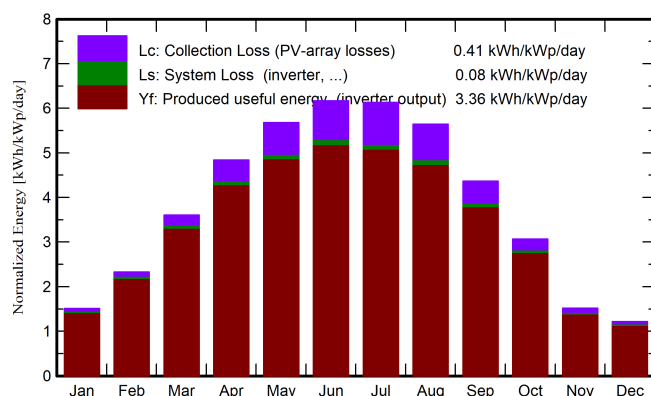
Specific production

1226 kWh/kWp/year

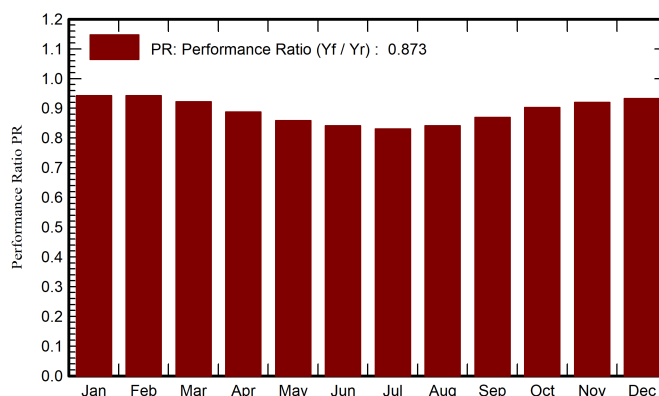
Performance Ratio PR

87.30 %

Normalized productions (per installed kWp)



Performance Ratio PR



## Balances and main results

	GlobHor	DiffHor	T_Amb	GlobInc	GlobEff	EArray	E_Grid	PR
	kWh/m <sup>2</sup>	kWh/m <sup>2</sup>	°C	kWh/m <sup>2</sup>	kWh/m <sup>2</sup>	MWh	MWh	ratio
January	31.2	18.27	-2.34	46.9	45.5	2.291	2.229	0.943
February	47.6	25.70	-1.18	65.1	63.4	3.170	3.095	0.943
March	95.2	53.32	4.08	111.7	109.1	5.302	5.190	0.922
April	132.4	63.08	10.46	145.2	141.8	6.637	6.496	0.888
May	174.1	80.29	16.44	176.0	171.8	7.777	7.614	0.858
June	187.1	77.45	19.58	185.1	180.8	8.021	7.846	0.841
July	190.4	71.73	21.89	190.1	185.7	8.129	7.952	0.830
August	162.1	71.96	21.06	175.0	171.2	7.580	7.421	0.842
September	113.0	51.67	15.13	131.1	128.0	5.869	5.745	0.870
October	72.8	37.11	9.26	95.2	92.7	4.424	4.329	0.903
November	33.1	21.90	4.82	45.4	44.0	2.165	2.107	0.920
December	24.5	15.61	-0.38	37.8	36.4	1.831	1.775	0.933
Year	1263.5	588.08	9.96	1404.5	1370.5	63.196	61.799	0.873

## 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

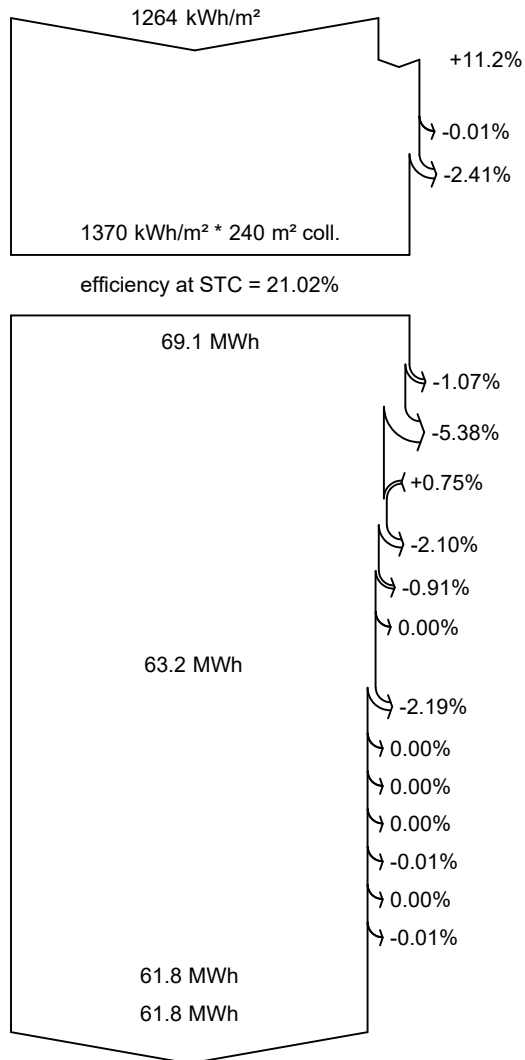
PR Performance Ratio



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**Loss diagram**



**Global horizontal irradiation**

**Global incident in coll. plane**

Near Shadings: irradiance loss

IAM factor on global

**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**

**Energy injected into grid**

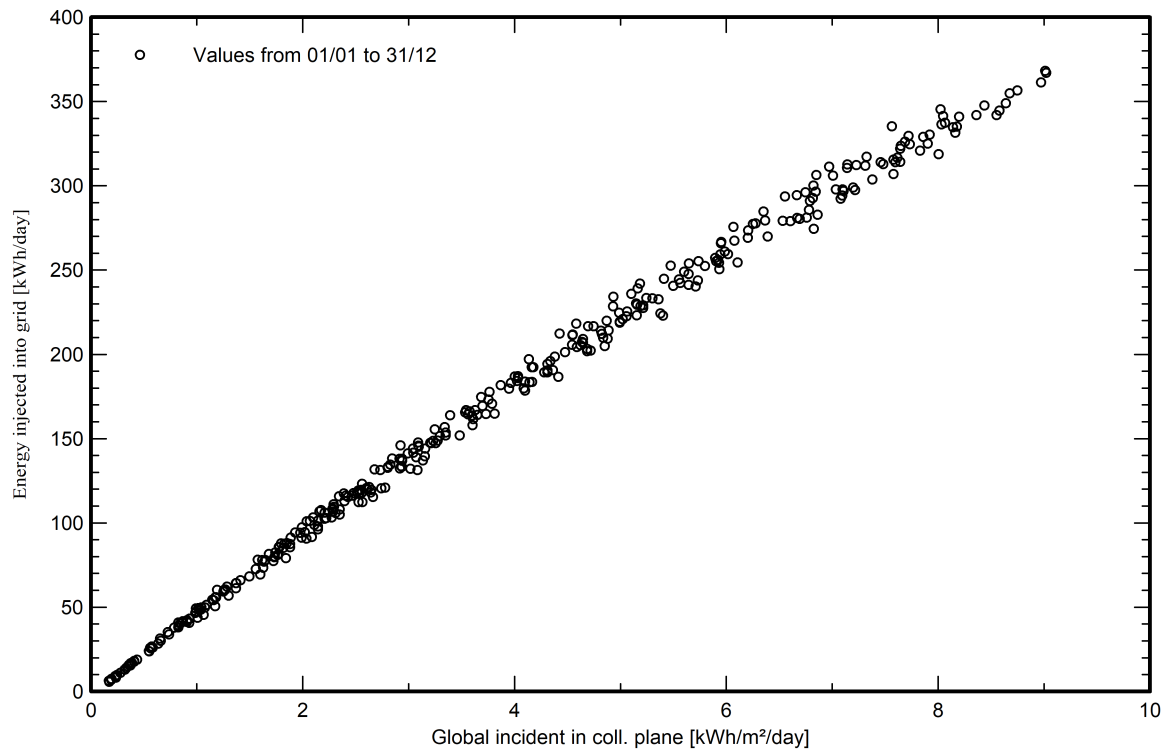


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**Special graphs**

**Daily Input/Output diagram**



**System Output Power Distribution**

