

PVsyst - Simulation report

Grid-Connected System

Project: CEPV_Balti_30kW

System power: 30.6 kWp

Bălți - Republic Of Moldova





PVsyst V7.2.5

VC0, Simulation date:
10/07/23 13:25
with v7.2.5

Project summary

Geographical Site

Bălți
Republic Of Moldova

Situation

Latitude 47.76 °N
Longitude 27.93 °E
Altitude 107 m
Time zone UTC+2

Project settings

Albedo 0.20

Meteo data

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

System summary

Grid-Connected System

PV Field Orientation

Fixed plane
Tilt/Azimuth 35 / -2 °

System information

PV Array

Nb. of modules 51 units
Pnom total 30.6 kWp

Tables on a building

Near Shadings

Detailed electrical calculation
acc. to module layout

User's needs

Unlimited load (grid)

Inverters

Nb. of units 1 Unit
Pnom total 30.0 kWac
Pnom ratio 1.020

Results summary

Produced Energy 37.80 MWh/year Specific production 1235 kWh/kWp/year Perf. Ratio PR 82.86 %

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

Fixed plane

Tilt/Azimuth 35 / -2 °

Horizon

Free Horizon

Tables on a building**Sheds configuration****Near Shadings**

Detailed electrical calculation
acc. to module layout

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

51 units

Nominal (STC)

30.6 kWp

Modules

3 Strings x 17 In series

At operating cond. (50°C)

Pmpp

27.52 kWp

U mpp

521 V

I mpp

53 A

Total PV power

Nominal (STC)

31 kWp

Total

51 modules

Module area

146 m²

Cell area

84.5 m²**Inverter**

Manufacturer

Generic

Model

Invst Solar Technology XG30KTR

(Custom parameters definition)

Unit Nom. Power

30.0 kWac

Number of inverters

3 * MPPT 33% 1 unit

Total power

30.0 kWac

Operating voltage

200-1100 V

Pnom ratio (DC:AC)

1.02

Total inverter power

Total power

30 kWac

Nb. of inverters

1 Unit

Pnom ratio

1.02

Array losses**Thermal Loss factor**

Module temperature according to irradiance

Uc (const) 20.0 W/m²KUv (wind) 0.0 W/m²K/m/s**DC wiring losses**

Global array res.

166 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

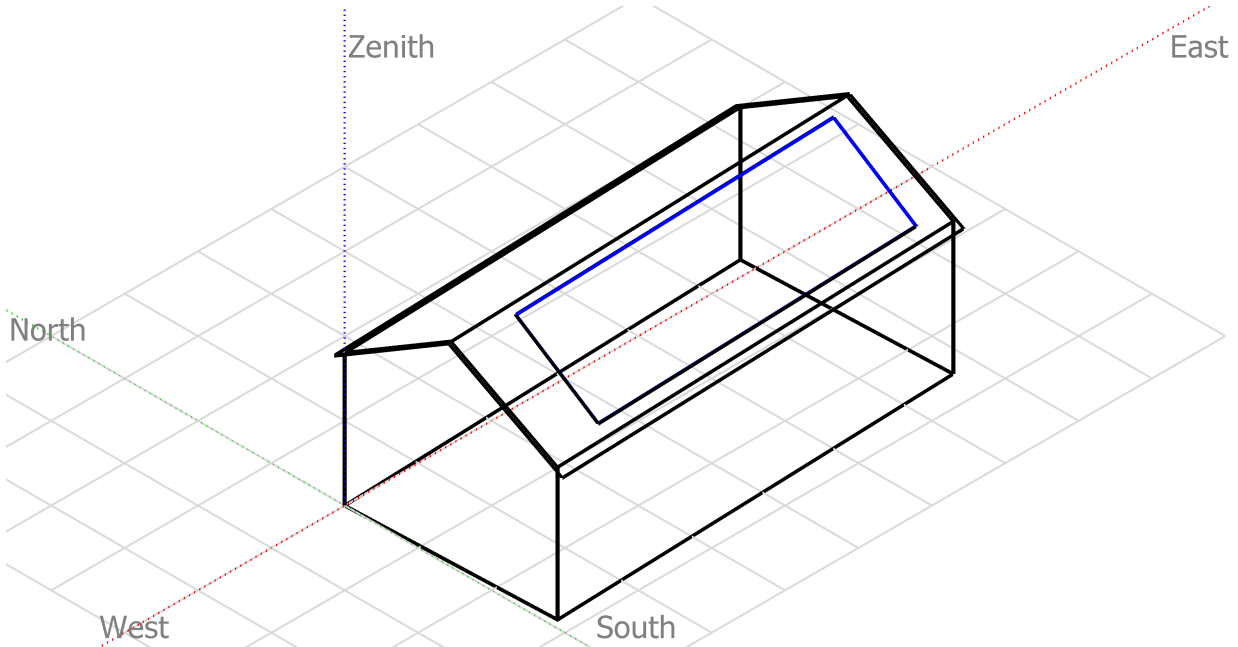


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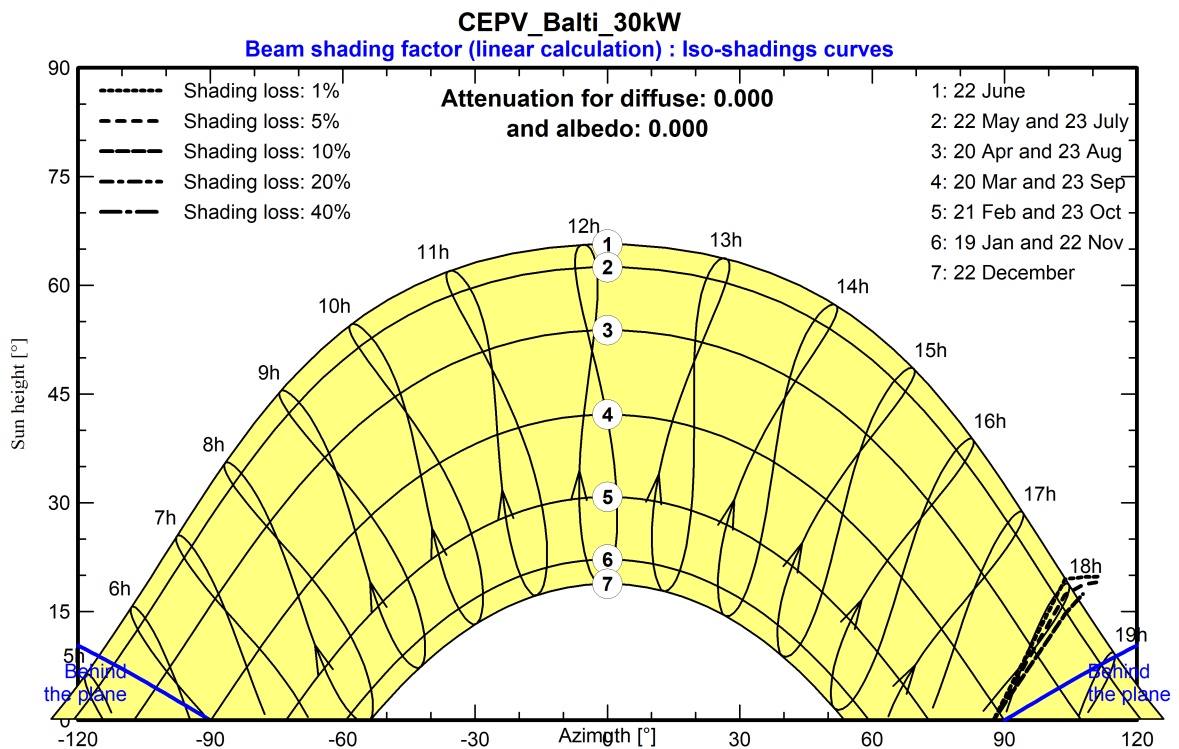
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Near shadings parameter

Perspective of the PV-field and surrounding shading scene



Iso-shadings diagram





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Main results

System Production

Produced Energy

37.80 MWh/year

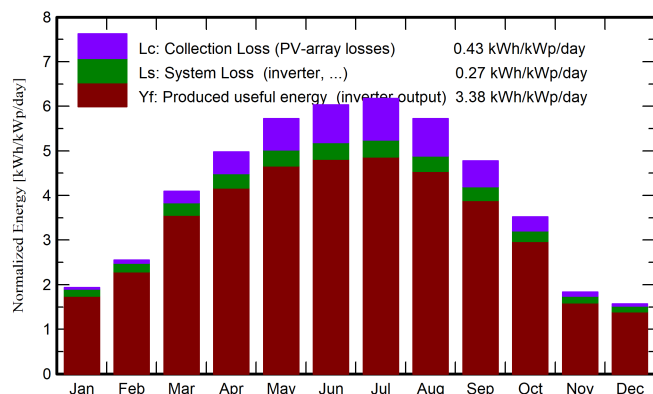
Specific production

1235 kWh/kWp/year

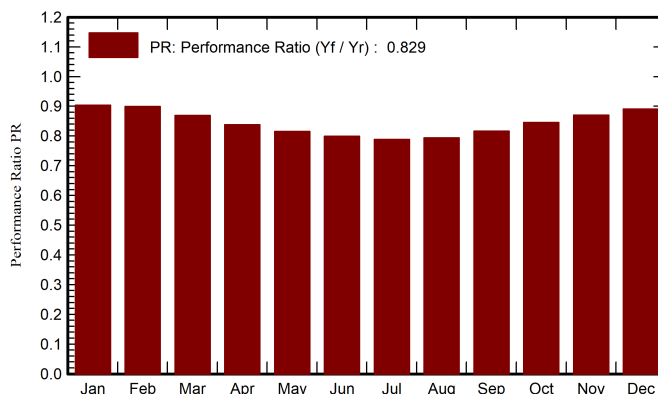
Performance Ratio PR

82.86 %

Normalized productions (per installed kWp)



Performance Ratio PR



Balances and main results

	GlobHor	DiffHor	T_Amb	GlobInc	GlobEff	EArray	E_Grid	PR
	kWh/m²	kWh/m²	°C	kWh/m²	kWh/m²	MWh	MWh	ratio
January	32.7	18.28	-2.28	60.0	59.1	1.805	1.660	0.904
February	48.3	29.04	-0.71	71.4	70.1	2.129	1.964	0.899
March	95.9	45.03	4.79	127.0	124.3	3.643	3.377	0.869
April	132.4	68.79	10.99	149.2	146.0	4.126	3.828	0.838
May	174.8	86.20	16.83	177.5	173.2	4.772	4.430	0.816
June	186.9	83.39	19.97	181.0	176.7	4.770	4.424	0.799
July	192.6	78.53	22.26	191.5	187.0	4.980	4.619	0.788
August	162.8	70.26	21.75	177.5	173.5	4.641	4.310	0.793
September	114.4	50.34	15.84	143.2	140.0	3.855	3.577	0.816
October	74.3	35.66	10.11	109.0	107.0	3.046	2.822	0.846
November	34.5	22.02	5.24	55.1	54.1	1.603	1.467	0.871
December	26.0	15.94	-0.06	48.5	47.6	1.449	1.323	0.891
Year	1275.7	603.46	10.46	1490.8	1458.6	40.819	37.801	0.829

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

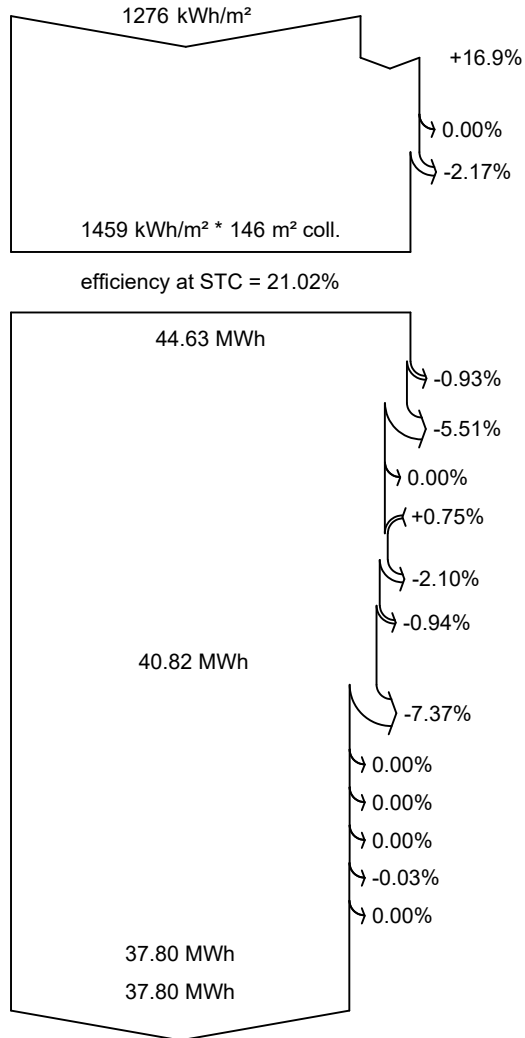
PR Performance Ratio



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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

Shadings: Electrical Loss detailed module calc.

Module quality loss

Mismatch loss, modules and strings

Ohmic wiring 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

Available Energy at Inverter Output

Energy injected into grid

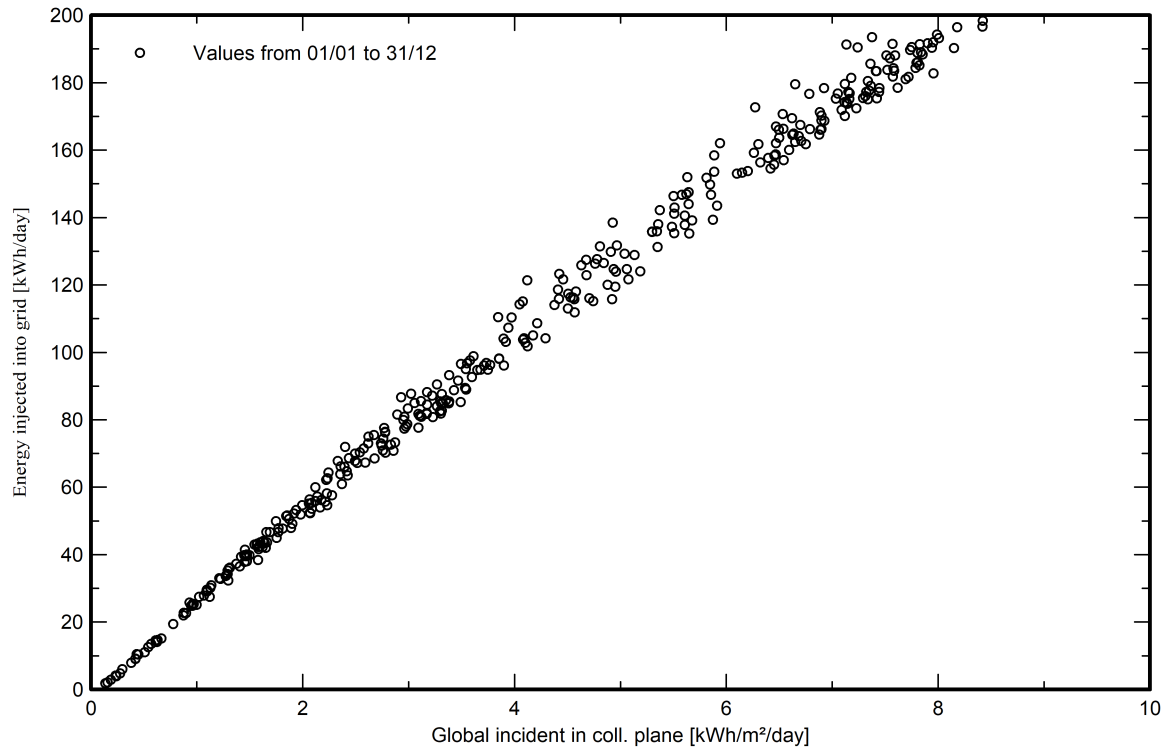


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Special graphs

Daily Input/Output diagram



System Output Power Distribution

