



Version 7.4.5

PVsyst - Simulation report

Grid-Connected System

Project: Projekt Mikita Rymasheuski Lublin

Variant: 2

Building system

System power: 6.30 kWp

Lublin - Poland

Author

Wydzial Inżynierii Srodowiska (Poland)



Project: Projekt Mikita Rymasheuski Lublin

Variant: 2

PVsyst V7.4.5

VC1, Simulation date:
29/01/24 13:30
with v7.4.5

Wydzial Inzynierii Srodowiska (Poland)

| Project summary | | | |
|---|------------------|----------|-------------------------|
| Geographical Site | Situation | | Project settings |
| Lublin | Latitude | 51.25 °N | Albedo |
| Poland | Longitude | 22.57 °E | 0.20 |
| | Altitude | 188 m | |
| | Time zone | UTC+1 | |
| Meteo data | | | |
| Lublin | | | |
| Meteonorm 8.1 (1996-2015), Sat=100% - Synthetic | | | |

| System summary | | | |
|------------------------------|--------------------------------|-----------|-----------------------|
| Grid-Connected System | Building system | | |
| PV Field Orientation | Near Shadings | | User's needs |
| Fixed plane | Linear shadings : Fast (table) | | Unlimited load (grid) |
| Tilt/Azimuth | | | |
| 35 / 10 ° | | | |
| System information | | | |
| PV Array | Inverters | | |
| Nb. of modules | Nb. of units | 1 unit | |
| Pnom total | Pnom total | 6.00 kWac | |
| | Pnom ratio | 1.050 | |

| Results summary | | | | |
|-----------------|------------------|---------------------|-------------------|----------------|
| Produced Energy | 6622.60 kWh/year | Specific production | 1051 kWh/kWp/year | Perf. Ratio PR |

| Table of contents | |
|---|---|
| Project and results summary | 2 |
| General parameters, PV Array Characteristics, System losses | 3 |
| Near shading definition - Iso-shadings diagram | 4 |
| Main results | 5 |
| Loss diagram | 6 |
| Predef. graphs | 7 |
| Single-line diagram | 8 |



PVsyst V7.4.5

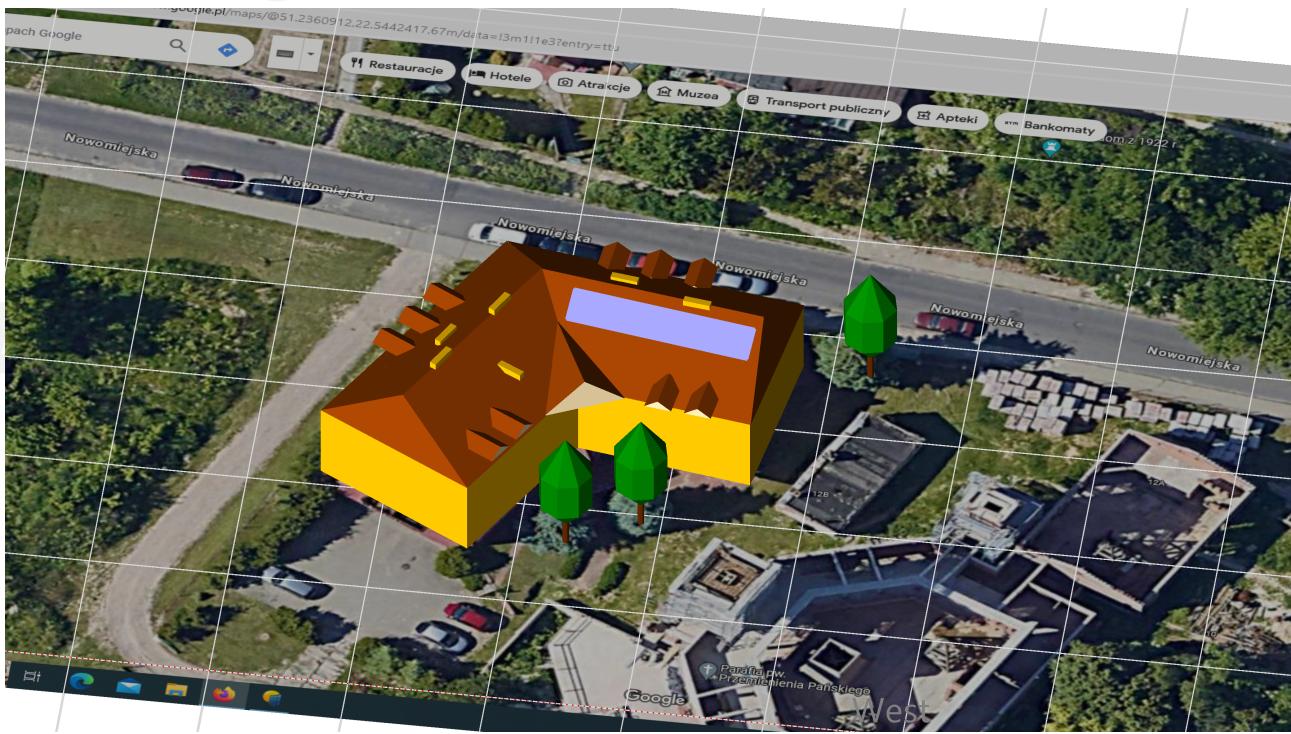
VC1, Simulation date:
29/01/24 13:30
with v7.4.5

Wydzial Inzynierii Srodowiska (Poland)

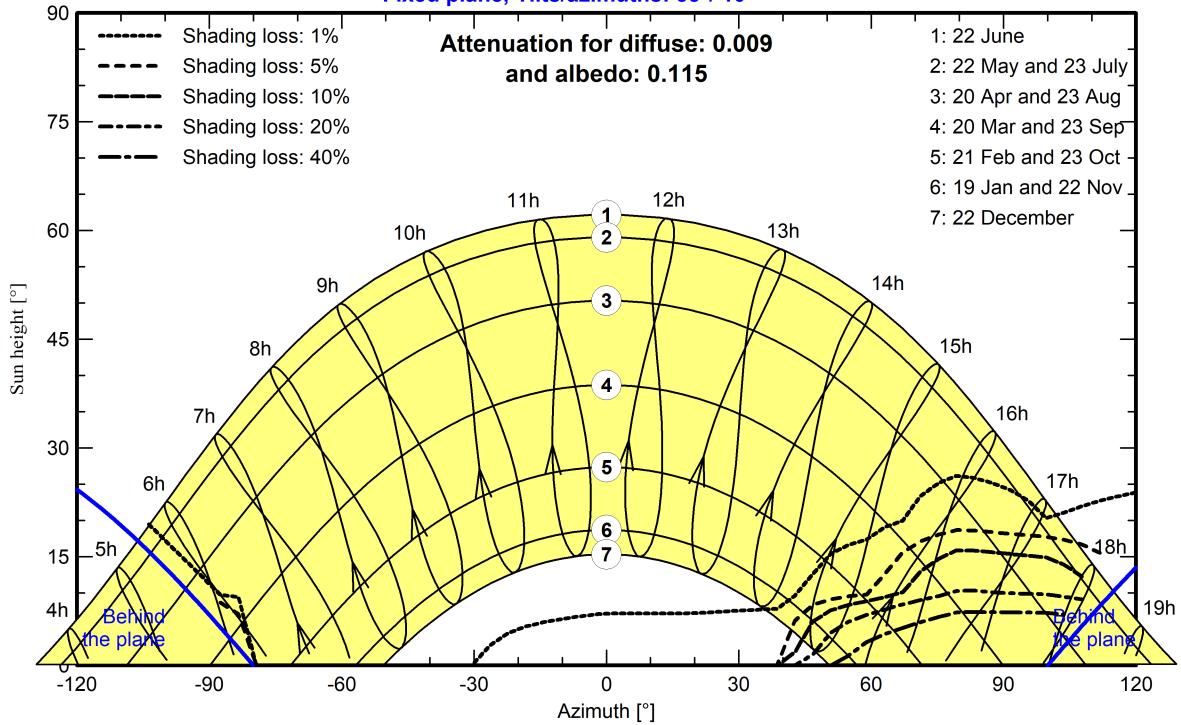
| General parameters | | |
|-----------------------------|--------------------------------|--------------------------|
| Grid-Connected System | Building system | |
| PV Field Orientation | | |
| Orientation | Sheds configuration | Models used |
| Fixed plane | | Transposition Perez |
| Tilt/Azimuth | 35 / 10 ° | Diffuse Perez, Meteonorm |
| Horizon | Near Shadings | Circumsolar |
| Free Horizon | Linear shadings : Fast (table) | separate |
| | | |
| | | User's needs |
| | | Unlimited load (grid) |

| PV Array Characteristics | | |
|----------------------------------|----------------------------|-----------------------------|
| PV module | Inverter | |
| Manufacturer | Generic | Generic |
| Model | PEM.BB-450 | SUN2000-6KTL-M1-380V |
| (Custom parameters definition) | (Original PVsyst database) | |
| Unit Nom. Power | 450 Wp | 6.00 kWac |
| Number of PV modules | 14 units | 1 unit |
| Nominal (STC) | 6.30 kWp | 6.0 kWac |
| Optimizer Array | 2 string x 7 In series | 140-980 V |
| At operating cond. (50°C) | | Max. power (>=47°C) |
| Pmpp | 5.67 kWp | 6.60 kWac |
| U mpp (sum of input PV modules) | 217 V | Pnom ratio (DC:AC) |
| U opt (optimizer string) | 217 V | 1.05 |
| I opt (optimizer string) | 26 A | |
| Huawei Optimizer | | |
| Model | SUN2000-450W-P2 | |
| Unit Nom. Power | 450 W | |
| Input modules | One module | |
| Total PV power | | Total inverter power |
| Nominal (STC) | 6 kWp | Total power |
| Total | 14 modules | 6 kWac |
| Module area | 30.6 m² | Max. power |
| Cell area | 27.8 m² | 6.6 kWac |
| | | Number of inverters |
| | | 1 unit |
| | | Pnom ratio |
| | | 1.05 |

| Array losses | | |
|--|---|---------------------|
| Thermal Loss factor | DC wiring losses | Module Quality Loss |
| Module temperature according to irradiance | | |
| Uc (const) | 20.0 W/m²K | Loss Fraction |
| Uv (wind) | 0.0 W/m²K/m/s | -0.3 % |
| Module mismatch losses | IAM loss factor | |
| Loss Fraction | ASHRAE Param.: IAM = 1 - bo (1/cos i - 1) | |
| 0.0 % at MPP | bo Param. | |
| | 0.05 | |

**Near shadings parameter****Perspective of the PV-field and surrounding shading scene****Iso-shadings diagram****Orientation #1**

Fixed plane, Tilts/azimuths: 35° / 10°





Project: Projekt Mikita Rymasheuski Lublin

Variant: 2

PVsyst V7.4.5

VC1, Simulation date:
29/01/24 13:30
with v7.4.5

Wydzial Inzynierii Srodowiska (Poland)

Main results

System Production

Produced Energy 6622.60 kWh/year

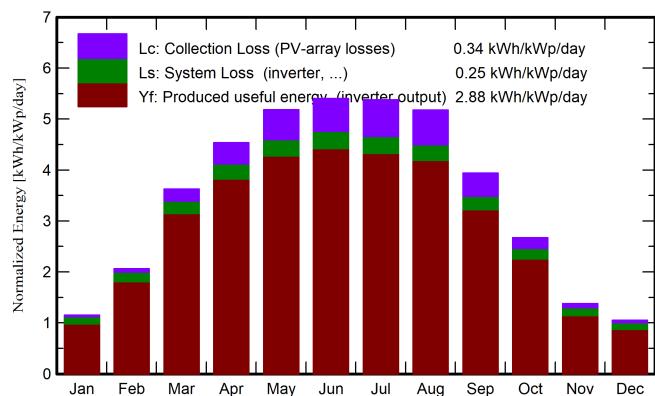
Specific production

1051 kWh/kWp/year

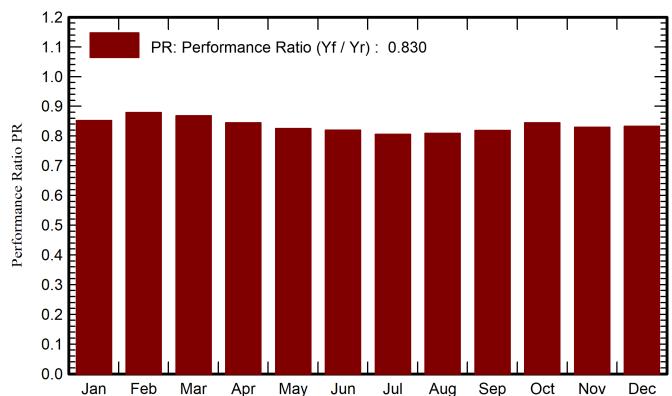
Perf. Ratio PR

82.99 %

Normalized productions (per installed kWp)



Performance Ratio PR



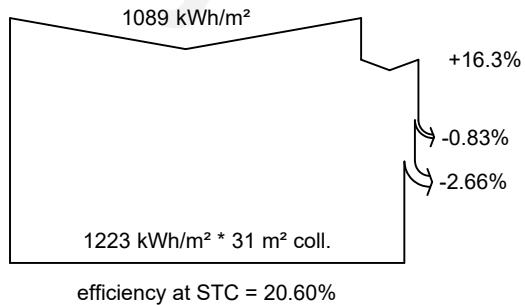
Balances and main results

| | GlobHor kWh/m ² | DiffHor kWh/m ² | T_Amb °C | GlobInc kWh/m ² | GlobEff kWh/m ² | EArray kWh | E_Grid kWh | PR ratio |
|-----------|-------------------------------|-------------------------------|-------------|-------------------------------|-------------------------------|---------------|---------------|-------------|
| January | 22.3 | 16.67 | -2.68 | 35.6 | 34.3 | 219.6 | 191.4 | 0.852 |
| February | 38.3 | 24.15 | -1.55 | 57.8 | 55.8 | 352.9 | 319.9 | 0.879 |
| March | 81.8 | 40.82 | 2.66 | 112.4 | 108.2 | 663.3 | 614.6 | 0.868 |
| April | 118.8 | 60.78 | 8.91 | 136.0 | 131.4 | 778.6 | 723.5 | 0.844 |
| May | 157.7 | 72.73 | 14.00 | 160.6 | 155.2 | 898.7 | 835.3 | 0.826 |
| June | 165.5 | 90.71 | 16.97 | 162.0 | 156.5 | 900.0 | 836.7 | 0.820 |
| July | 167.3 | 79.10 | 19.42 | 166.7 | 161.3 | 911.0 | 846.2 | 0.806 |
| August | 145.0 | 68.22 | 18.90 | 160.5 | 155.2 | 879.1 | 818.1 | 0.809 |
| September | 94.3 | 43.37 | 13.42 | 118.2 | 114.0 | 659.1 | 609.3 | 0.818 |
| October | 57.2 | 34.48 | 8.46 | 82.8 | 79.4 | 481.6 | 440.4 | 0.845 |
| November | 24.4 | 15.63 | 4.00 | 41.4 | 39.9 | 245.9 | 216.4 | 0.829 |
| December | 16.3 | 9.87 | -0.45 | 32.5 | 31.4 | 197.3 | 170.7 | 0.833 |
| Year | 1089.0 | 556.53 | 8.56 | 1266.6 | 1222.7 | 7187.1 | 6622.6 | 0.830 |

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 |

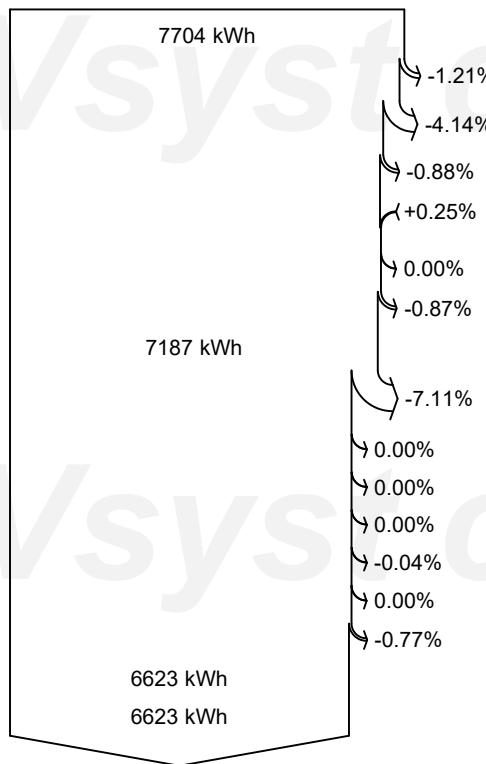
**Loss diagram****Global horizontal irradiation****Global incident in coll. plane**

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

Optimizer efficiency loss

Module quality loss

Module array mismatch loss

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

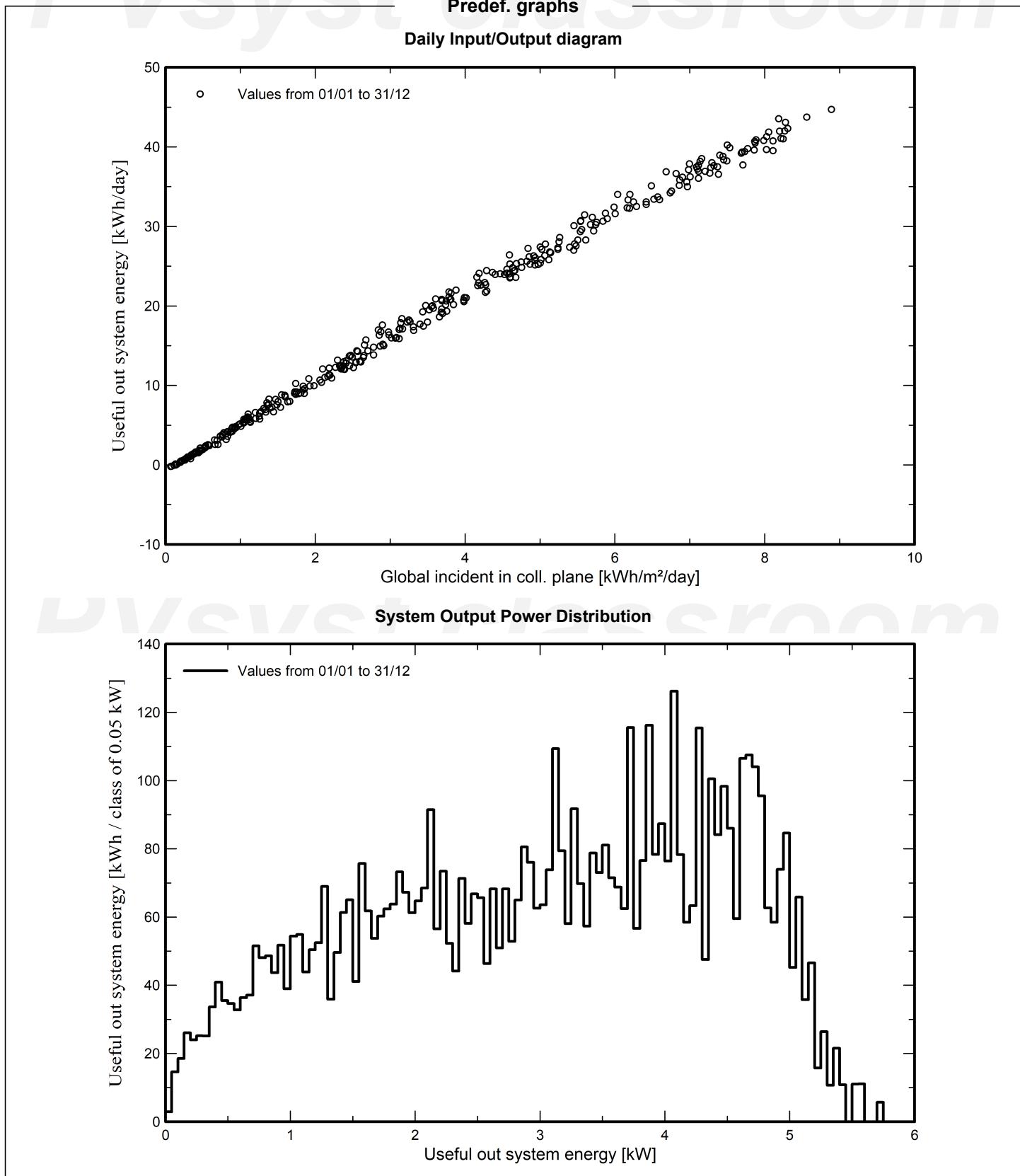
Inverter Loss over nominal inv. voltage

Inverter Loss due to power threshold

Inverter Loss due to voltage threshold

Night consumption

Available Energy at Inverter Output**Energy injected into grid**



A

B

C

D

E

F

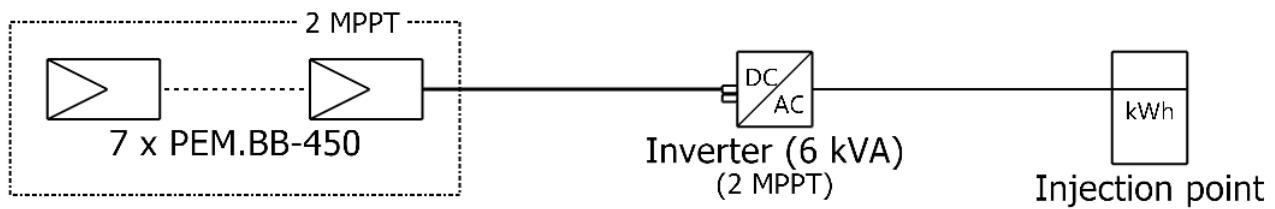
G

H

I

**PVsyst V7.4.5**VC1, Simulation date:
29/01/24 13:30
with v7.4.5

Single-line diagram



| | |
|-----------|----------------------|
| PV module | PEM.BB-450 |
| Inverter | SUN2000-6KTL-M1-380V |
| String | 7 x PEM.BB-450 |

Projekt Mikita Rymasheuski Lublin

Wydzial Inzynierii Srodotowiska (Poland)

VC1 : 2

29/01/24