Version 7.4.7

PVsyst - Simulation report

Grid-Connected System

Project: 1.58MWp_Commercial_Rooftop_Cairo

Variant: Grid_Connected_1.58MWp

No 3D scene defined, no shadings

System power: 1580 kWp

Cairo - Egypt

Eng Kareem Shaaban

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Project summary

Geographical Site
Cairo
Egypt

Situation

Latitude	30.08 °N
Longitude	31.28 °E
Altitude	0 m
Time zone	UTC+2

Project settings

Albedo	0.20

Weather data
Cairo
MeteoNorm 8.1 station - Synthetic

System summary

Grid-Connected System

No 3D scene defined, no shadings

PV Field Orientation
Fixed plane
Tilt/Azimuth 10 / 0 °

Near Shadings
No Shadings

User's needs
Unlimited load (grid)

System information

PV Array

Nb. of modules	2431 units
Pnom total	1580 kWp

Inverters

Nb. of units	13 units
Pnom total	1430 kWac
Pnom ratio	1.105

Results summary

Produced Energy	2534815 kWh/year	Specific production	1604 kWh/kWp/year	Perf. Ratio PR	81.04 %

Table of contents

Project and results summary 2
General parameters, PV Array Characteristics, System losses 3
Main results 5
Loss diagram 6
Predef. graphs 7
Single-line diagram 8

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VC0, Simulation date:
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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	10 / 0 °		Diffuse	Perez, Meteonorm
			Circumsolar	separate

Horizon
Free Horizon

Near Shadings
No Shadings

User's needs
Unlimited load (grid)

PV Array Characteristics

PV module

Manufacturer	Jinko Solar Co., Ltd.
Model	JKM650N-66QL6-BDV
(Custom parameters definition)	
Unit Nom. Power	650 Wp
Number of PV modules	2431 units
Nominal (STC)	1580 kWp

Inverter

Manufacturer	Huawei Technologies
Model	SUN2000-110KTL-M0
(Original PVsyst database)	
Unit Nom. Power	110 kWac
Number of inverters	13 units
Total power	1430 kWac

Array #1 - PV Array

Number of PV modules	935 units	Number of inverters	5 units
Nominal (STC)	608 kWp	Total power	550 kWac
Modules	55 string x 17 In series		
At operating cond. (50°C)		Operating voltage	200-1000 V
Pmpp	567 kWp	Max. power (=>30°C)	121 kWac
U mpp	658 V	Pnom ratio (DC:AC)	1.11
I mpp	862 A	Power sharing within this inverter	

Array #2 - Sub-array #2

Number of PV modules	935 units	Number of inverters	5 units
Nominal (STC)	608 kWp	Total power	550 kWac
Modules	55 string x 17 In series		
At operating cond. (50°C)		Operating voltage	200-1000 V
Pmpp	567 kWp	Max. power (=>30°C)	121 kWac
U mpp	658 V	Pnom ratio (DC:AC)	1.11
I mpp	862 A	Power sharing within this inverter	

Array #3 - Sub-array #3

Number of PV modules	561 units	Number of inverters	3 units
Nominal (STC)	365 kWp	Total power	330 kWac
Modules	33 string x 17 In series		
At operating cond. (50°C)		Operating voltage	200-1000 V
Pmpp	340 kWp	Max. power (=>30°C)	121 kWac
U mpp	658 V	Pnom ratio (DC:AC)	1.11
I mpp	517 A	Power sharing within this inverter	

Total PV power

Nominal (STC)	1580 kWp
Total	2431 modules
Module area	6567 m²

Total inverter power

Total power	1430 kWac
Max. power	1573 kWac
Number of inverters	13 units
Pnom ratio	1.11

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09/28/26 16:46
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Array losses

Array Soiling Losses
Loss Fraction 6.0 %

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

Serie Diode Loss
Voltage drop 0.7 V
Loss Fraction 0.1 % at STC

LID - Light Induced Degradation
Loss Fraction 2.0 %

Module Quality Loss
Loss Fraction -0.8 %

Module mismatch losses
Loss Fraction 2.0 % at MPP

IAM loss factor
Incidence effect (IAM): User defined profile

0°	20°	50°	60°	70°	75°	80°	85°	90°
1.000	1.000	0.990	0.972	0.912	0.841	0.708	0.461	0.000

DC wiring losses

Global wiring resistance 4.8 mΩ
Loss Fraction 1.5 % at STC

Array #1 - PV Array
Global array res. 12 mΩ
Loss Fraction 1.5 % at STC

Array #2 - Sub-array #2
Global array res. 12 mΩ
Loss Fraction 1.5 % at STC

Array #3 - Sub-array #3
Global array res. 21 mΩ
Loss Fraction 1.5 % at STC

AC wiring losses

Inv. output line up to injection point
Inverter voltage 400 Vac tri
Loss Fraction 0.72 % at STC
Inverter: SUN2000-110KTL-M0
Wire section (13 Inv.) Copper 13 x 3 x 70 mm²
Average wires length 36 m

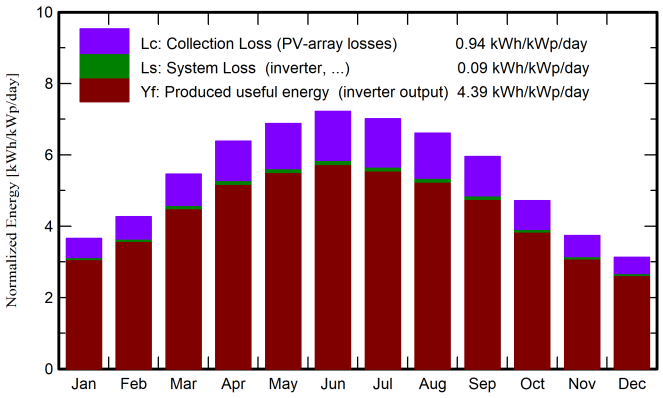
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Main results

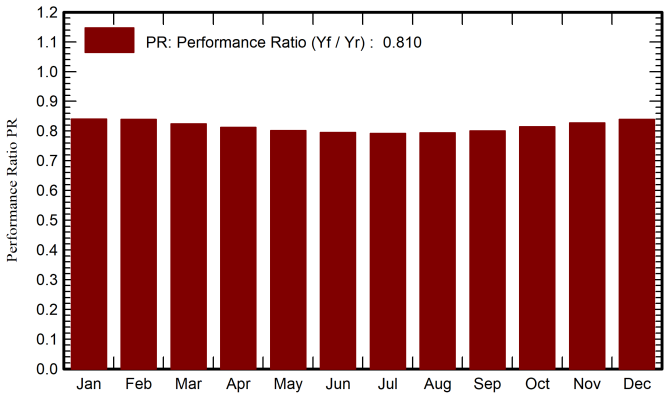
System Production

Produced Energy	2534815 kWh/year	Specific production	1604 kWh/kWp/year
		Perf. Ratio PR	81.04 %

Normalized productions (per installed kWp)



Performance Ratio PR



Balances and main results

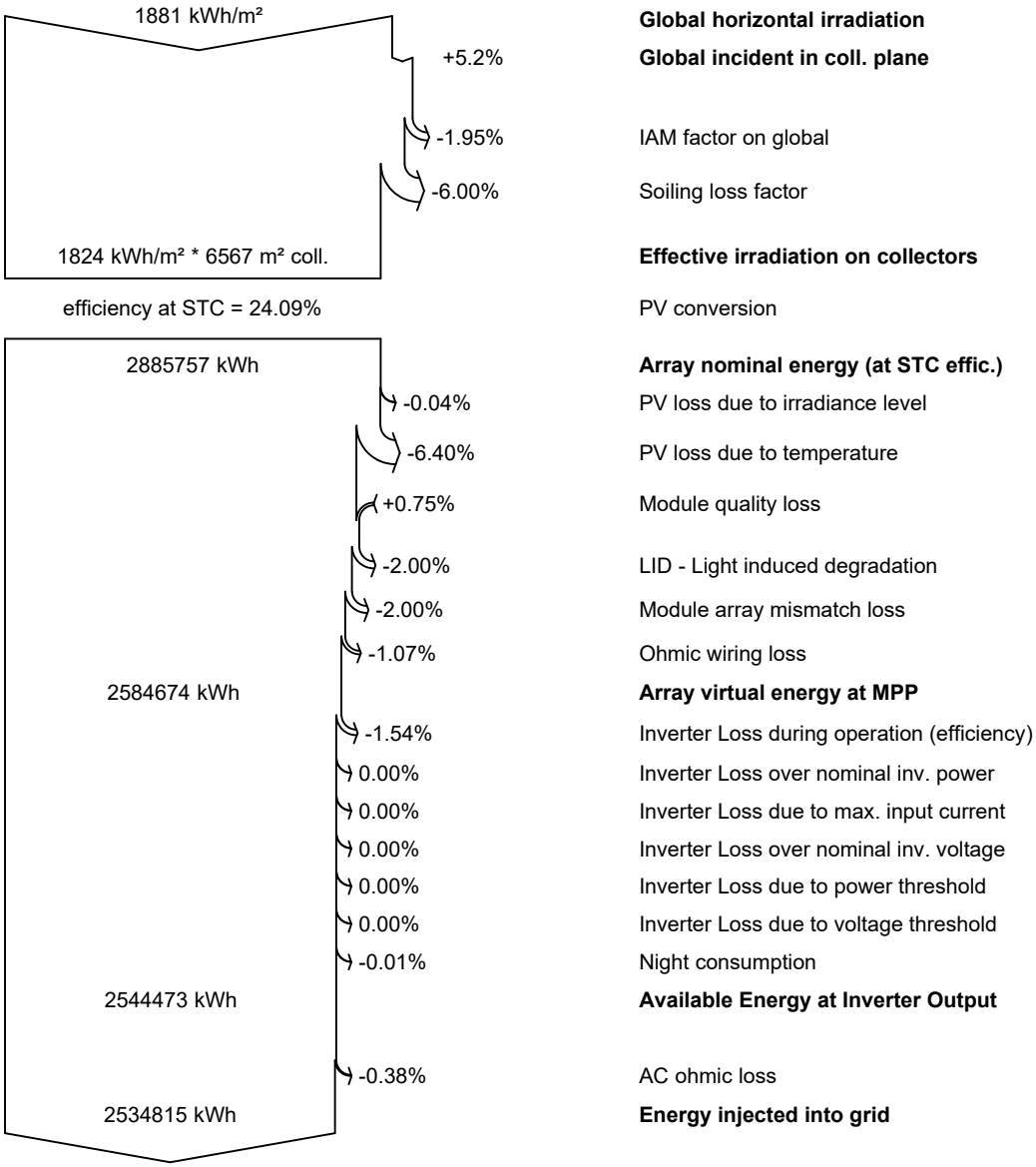
	GlobHor kWh/m²	DiffHor kWh/m²	T_Amb °C	GlobInc kWh/m²	GlobEff kWh/m²	EArray kWh	E_Grid kWh	PR ratio
January	98.0	48.80	14.70	113.4	103.7	153237	150465	0.840
February	108.1	60.20	15.80	119.5	109.9	161410	158422	0.839
March	158.2	79.20	18.90	169.2	156.1	224733	220358	0.824
April	185.0	87.00	22.20	191.4	176.7	250597	245649	0.812
May	212.1	94.70	26.20	213.3	197.2	275474	269987	0.801
June	218.6	86.40	28.40	216.5	200.0	277438	271910	0.795
July	218.0	82.90	29.90	217.4	201.0	277612	272074	0.792
August	200.6	85.20	30.00	204.9	189.3	262092	256966	0.794
September	168.4	69.40	27.60	178.5	164.5	230117	225682	0.800
October	133.3	67.50	24.70	146.2	134.5	191624	188090	0.814
November	97.6	44.20	20.00	112.2	102.9	149287	146524	0.827
December	83.1	41.40	15.59	97.0	88.9	131054	128689	0.839
Year	1881.0	846.90	22.87	1979.4	1824.5	2584674	2534815	0.810

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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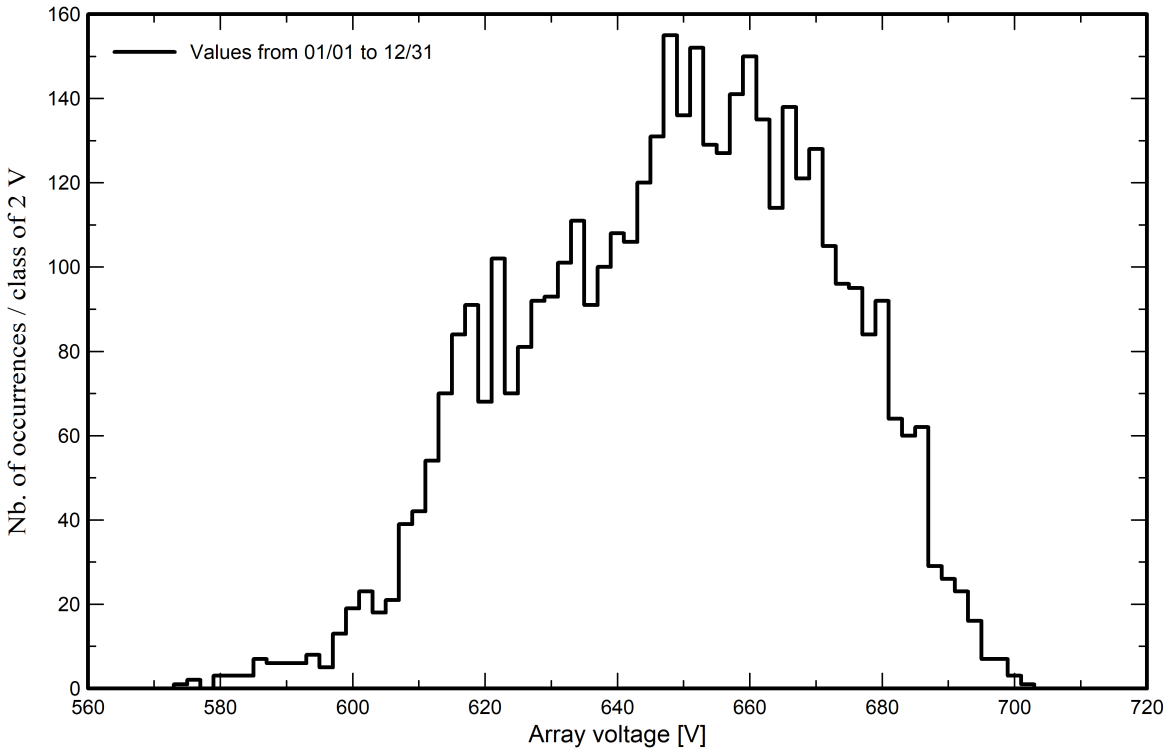
Loss diagram



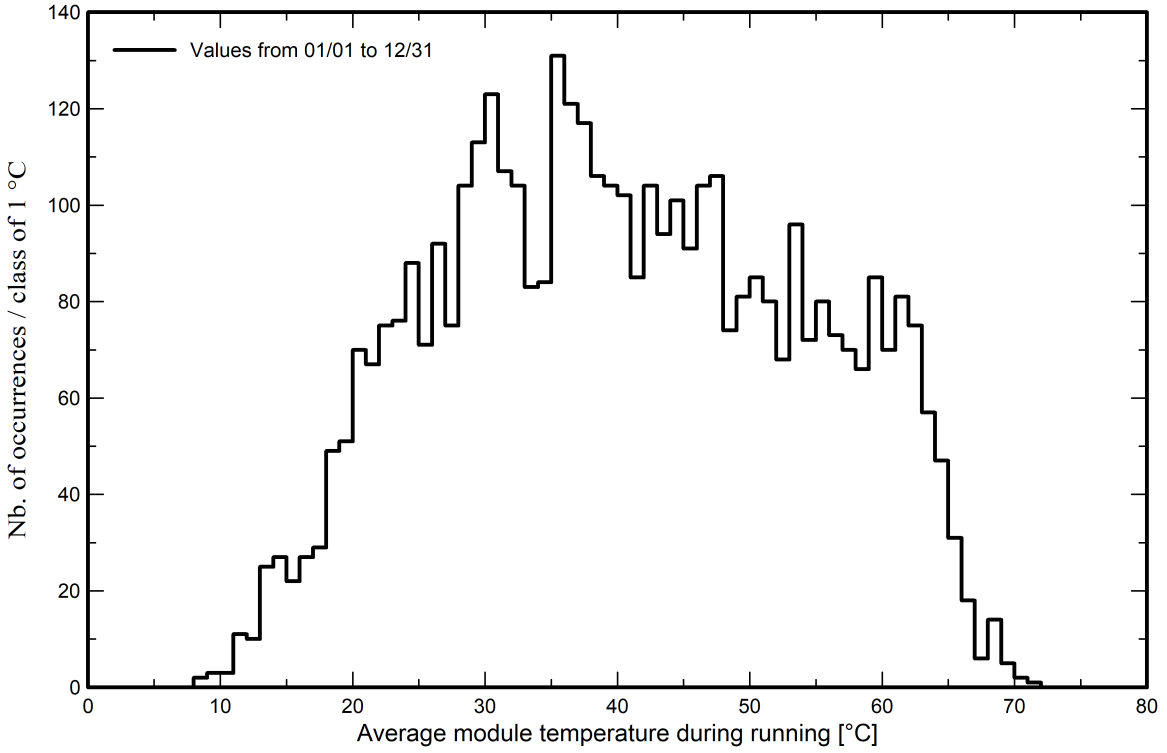
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Predef. graphs

Array Voltage Distribution

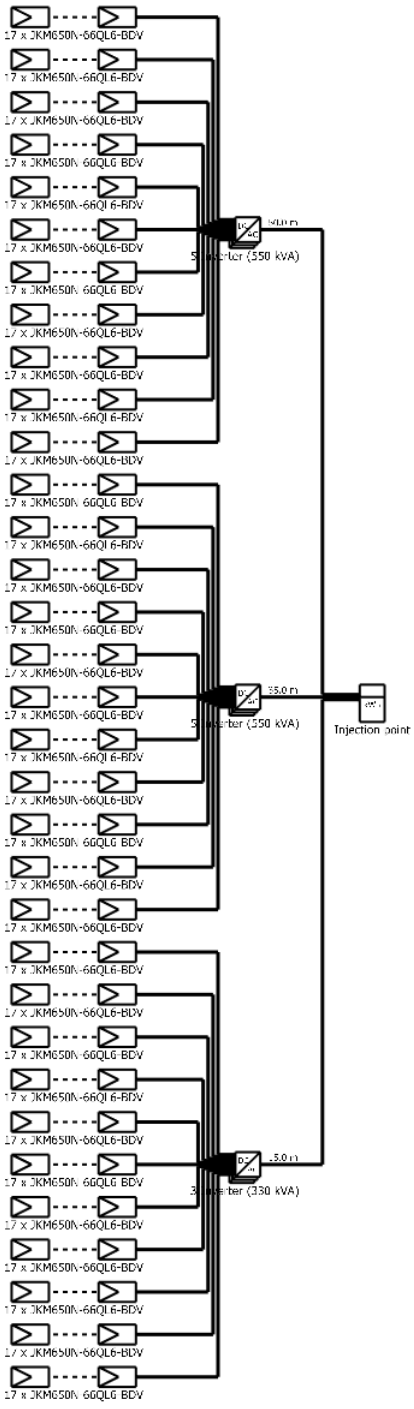


Array Temperature Distribution during running



Single-line diagram

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PV module	JKM650N-66QL6-BDV
Inverter	SUN2000-110KTL-M0
String	17 x JKM650N-66QL6-BDV

	1	
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