Version 7.2.16

PVsyst - Simulation report

Grid-Connected System

Project: ReTeste - Ceará

Variant: New simulation variant

Sheds, single array

System power: 1270 kWp

Icó2 - Brazil

Author

FIBEX (Brazil)

Project: ReTeste - Ceará

Variant: New simulation variant

FIBEX (Brazil)

Project summary

Geographical Site
Icó2
Brazil

Situation

Latitude	-6.35 °S
Longitude	-38.76 °W
Altitude	178 m
Time zone	UTC-3

Project settings

Albedo	0.20

Meteo data
Icó2
Meteonorm 8.0 (2009-2017), Sat=100% - Synthetic

System summary

Grid-Connected System
Simulation for year no 1

Sheds, single array

PV Field Orientation
Fixed plane
Tilt/Azimuth 7 / 0 °

Near Shadings
According to strings
Electrical effect 100 %

User's needs
Unlimited load (grid)

System information

PV Array

Nb. of modules	2352 units
Pnom total	1270 kWp

Inverters

Nb. of units	4 units
Pnom total	1000 kWac
Pnom ratio	1.270

Results summary

Produced Energy	2178 MWh/year	Specific production	1715 kWh/kWp/year	Perf. Ratio PR	82.07 %

Table of contents

PVsyst V7.2.16
VC0, Simulation date:
20/07/22 10:50
with v7.2.16

General parameters

Grid-Connected System

Sheds, single array

PV Field Orientation

Orientation	
Fixed plane	
Tilt/Azimuth	7 / 0 °

Sheds configuration	
Nb. of sheds	42 units
Single array	
Sizes	
Sheds spacing	7.70 m
Collector width	4.59 m
Ground Cov. Ratio (GCR)	59.6 %
Top inactive band	0.02 m
Bottom inactive band	0.02 m
Shading limit angle	
Limit profile angle	10.2 °

Models used	
Transposition	Perez
Diffuse	Perez, Meteonorm
Circumsolar	separate

Horizon
Free Horizon

Near Shadings
According to strings
Electrical effect 100 %

User's needs
Unlimited load (grid)

Bifacial system
Model 2D Calculation
unlimited sheds

Bifacial model geometry		Bifacial model definitions	
Sheds spacing	7.70 m	Ground albedo	0.16
Sheds width	4.63 m	Bifaciality factor	70 %
Limit profile angle	10.2 °	Rear shading factor	2.0 %
GCR	60.1 %	Rear mismatch loss	2.2 %
Height above ground	1.50 m	Shed transparent fraction	0.0 %

PV Array Characteristics

PV module

Manufacturer	Seraphim
Model	SRP-540-BMA-BG-182-V2.0
(Custom parameters definition)	
Unit Nom. Power	540 Wp
Number of PV modules	2352 units
Nominal (STC)	1270 kWp
Modules	84 Strings x 28 In series
At operating cond. (50°C)	
Pmpp	1163 kWp
U mpp	1050 V
I mpp	1108 A

Inverter

Manufacturer	Goodwe
Model	GW250K-HTH
(Custom parameters definition)	
Unit Nom. Power	250 kWac
Number of inverters	4 units
Total power	1000 kWac
Operating voltage	500-1500 V
Pnom ratio (DC:AC)	1.27

Total PV power

Nominal (STC)	1270 kWp
Total	2352 modules
Module area	6094 m²

Total inverter power

Total power	1000 kWac
Number of inverters	4 units
Pnom ratio	1.27

Array losses

Array Soiling Losses
Loss Fraction 3.0 %

Thermal Loss factor
Module temperature according to irradiance
Uc (const) 29.0 W/m²K
Uv (wind) 0.0 W/m²K/m/s

DC wiring losses
Global array res. 10 mΩ
Loss Fraction 1.0 % 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

Strings Mismatch loss
Loss Fraction 0.1 %

Module average degradation
Year no 1
Loss factor 0.4 %/year
Mismatch due to degradation
Imp RMS dispersion 0.4 %/year
Vmp RMS dispersion 0.4 %/year

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

10°	30°	40°	50°	60°	70°	80°	85°	90°
1.000	1.000	1.000	1.000	1.000	0.990	0.903	0.750	0.000

System losses

Unavailability of the system
Time fraction 2.0 %
7.3 days,
3 periods

Auxiliaries loss
constant (fans) 1500 W
0.0 kW from Power thresh.
Night aux. cons. 500 W

AC wiring losses

Inv. output line up to MV transfo
Inverter voltage 800 Vac tri
Loss Fraction 1.52 % at STC
Inverter: GW250K-HTH
Wire section (4 Inv.) Alu 4 x 3 x 150 mm²
Average wires length 148 m

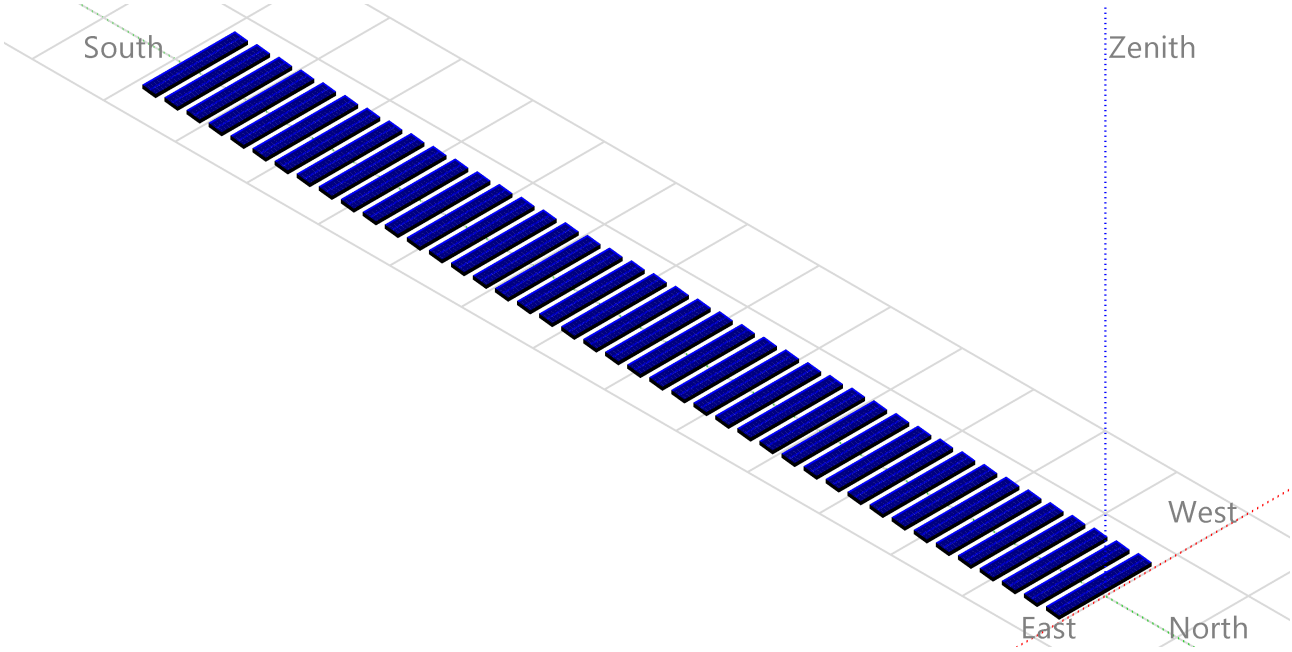
MV line up to Injection
MV Voltage 13.8 kV
Wires Copper 3 x 6 mm²
Length 50 m
Loss Fraction 0.10 % at STC

AC losses in transformers

MV transfo
Grid voltage 13.8 kV
Operating losses at STC
Nominal power at STC 1253 kVA
Iron loss (24/24 Connexion) 1.25 kW
Loss Fraction 0.10 % at STC
Coils equivalent resistance 3 x 5.11 mΩ
Loss Fraction 1.00 % at STC

Near shadings parameter

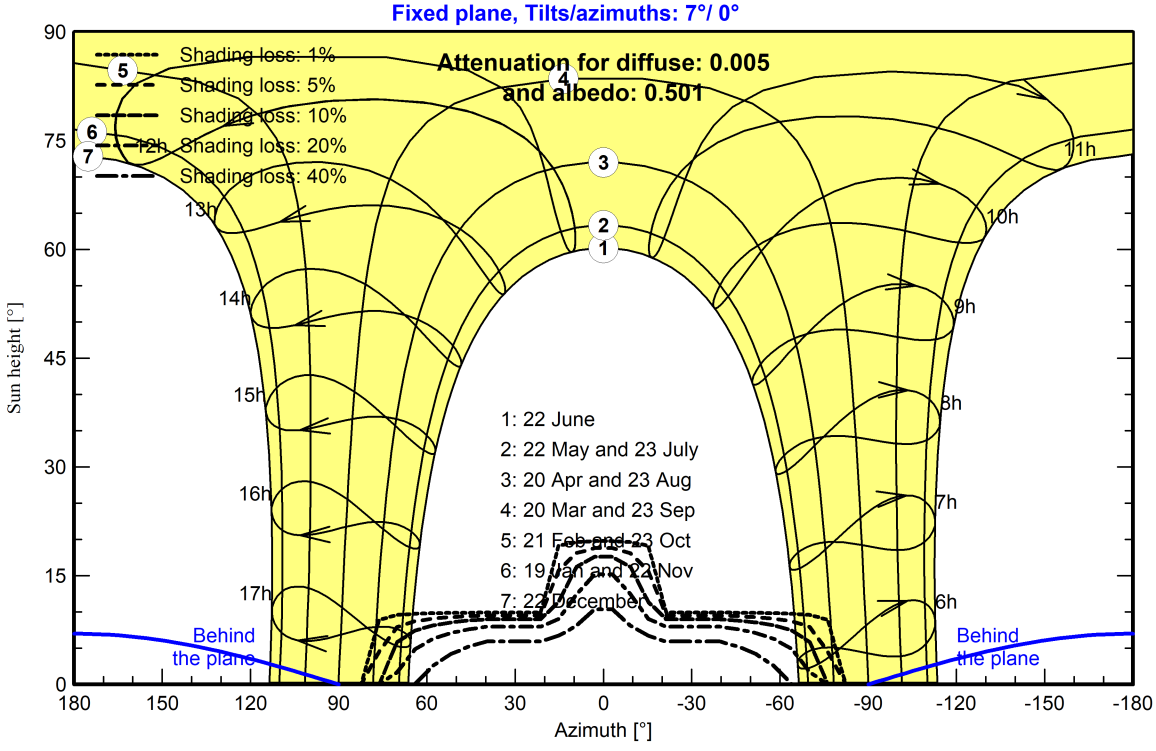
Perspective of the PV-field and surrounding shading scene



Iso-shadings diagram

Orientation #1

Fixed plane, Tilts/azimuths: 7°/ 0°



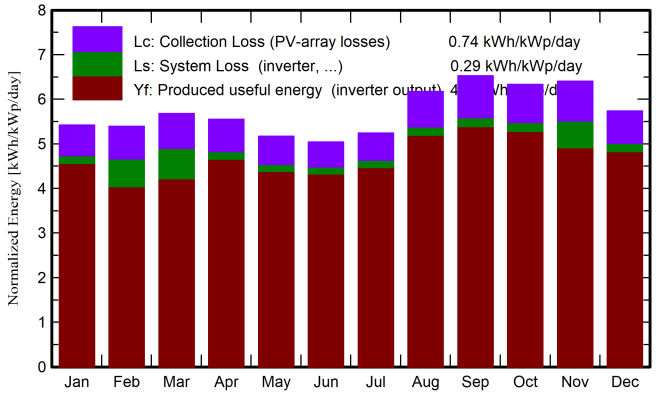
PVsyst V7.2.16
VC0, Simulation date:
20/07/22 10:50
with v7.2.16

Main results

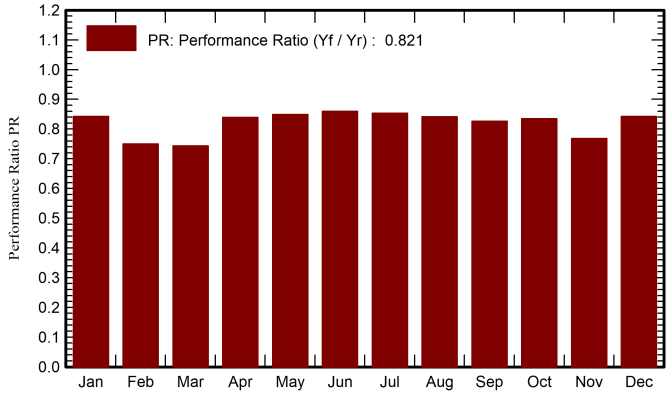
System Production

Produced Energy	2178 MWh/year	Specific production	1715 kWh/kWp/year
		Performance Ratio PR	82.07 %

Normalized productions (per installed kWp)



Performance Ratio PR



Balances and main results

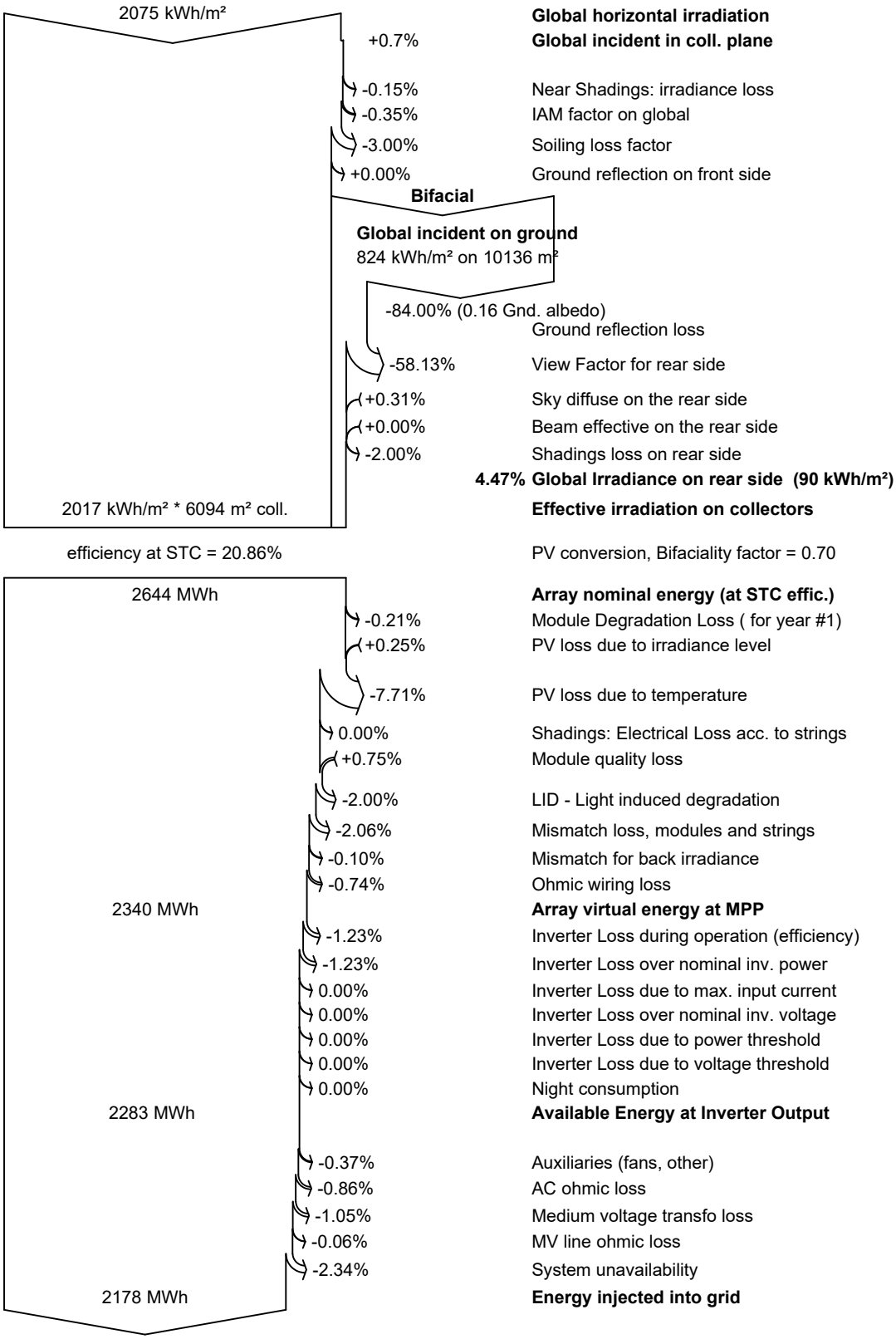
	GlobHor kWh/m²	DiffHor kWh/m²	T_Amb °C	GlobInc kWh/m²	GlobEff kWh/m²	EArray MWh	E_Grid MWh	PR ratio
January	174.6	81.33	29.61	168.0	161.9	186.5	179.8	0.843
February	153.8	73.14	29.25	151.0	145.6	165.9	143.8	0.750
March	175.4	79.03	29.29	176.2	170.0	193.1	166.4	0.744
April	162.0	66.91	28.37	166.6	160.8	184.2	177.5	0.839
May	152.5	65.63	28.78	160.3	154.7	179.1	172.8	0.849
June	142.5	62.72	27.79	151.3	146.0	171.2	165.1	0.859
July	153.2	58.79	28.12	162.4	156.8	182.6	176.1	0.854
August	183.8	62.87	28.42	191.5	184.9	212.2	204.7	0.842
September	193.0	60.93	28.63	195.8	189.2	213.1	205.5	0.826
October	198.5	80.92	29.51	196.4	189.6	215.9	208.2	0.835
November	199.5	63.07	29.42	192.1	185.5	210.5	187.5	0.769
December	186.0	75.07	29.80	177.8	171.5	197.5	190.3	0.843
Year	2075.0	830.41	28.92	2089.3	2016.5	2311.9	2177.7	0.821

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

PVsyst V7.2.16
VC0, Simulation date:
20/07/22 10:50
with v7.2.16

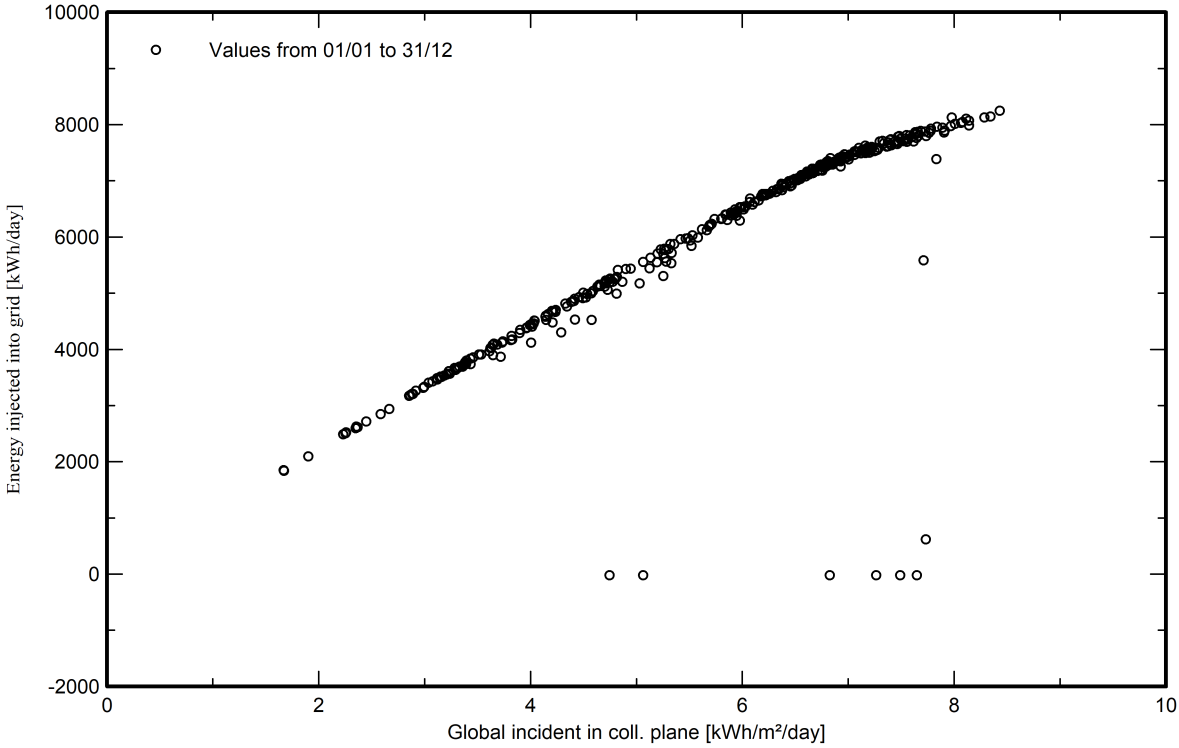
Loss diagram



PVsyst V7.2.16
VC0, Simulation date:
20/07/22 10:50
with v7.2.16

Special graphs

Daily Input/Output diagram



System Output Power Distribution