

PVsyst - Simulation report

Grid-Connected System

Project: DCCO - Primavera do Leste

Variant: Inversores String Tracker string com 13

Tracking system with backtracking

System power: 6540 kWp

Primavera do Leste - Brazil

**PVsyst V7.4.4**

VC1, Simulation date:
04/12/23 15:20
with v7.4.4

Project summary**Geographical Site****Primavera do Leste**

Brazil

Situation

Latitude -15.14 °S
Longitude -54.20 °W
Altitude 625 m
Time zone UTC-4

Project settings

Albedo 0.20

Meteo data

Primavera do Leste

Meteonorm 8.1 (2008-2015), Sat=100% - Synthetic

System summary**Grid-Connected System**

Simulation for year no 10

PV Field Orientation**Orientation**

Tracking plane, horizontal N-S axis

Axis azimuth 0 °

Tracking system with backtracking**Tracking algorithm**

Astronomic calculation

Backtracking activated

Near Shadings

Linear shadings : Slow (simul.)

Diffuse shading Automatic

System information**PV Array**

Nb. of modules

9984 units

Pnom total

6540 kWp

Inverters

Nb. of units

39 units

Pnom total

4875 kWac

Pnom ratio

1.341

User's needs

Unlimited load (grid)

Results summary

Produced Energy 13358698 kWh/year Specific production 2043 kWh/kWp/year Perf. Ratio PR 76.61 %

Table of contents

Project and results summary	2
General parameters, PV Array Characteristics, System losses	3
Near shading definition - Iso-shadings diagram	5
Main results	6
Loss diagram	7
Predef. graphs	8
Single-line diagram	9



PVsyst V7.4.4

VC1, Simulation date:
04/12/23 15:20
with v7.4.4

General parameters

Grid-Connected System

PV Field Orientation

Orientation

Tracking plane, horizontal N-S axis
Axis azimuth 0 °

Models used

Transposition Perez
Diffuse Perez, Meteonorm
Circumsolar separate

Horizon

Free Horizon

Tracking system with backtracking

Tracking algorithm

Astronomic calculation
Backtracking activated

Backtracking array

Nb. of trackers 384 units

Sizes

Tracker Spacing 7.00 m
Collector width 1.30 m
Ground Cov. Ratio (GCR) 18.6 %
Phi min / max. -/+ 90.0 °

Backtracking strategy

Phi limits for BT -/+ 79.1 °
Backtracking pitch 7.00 m
Backtracking width 1.30 m
Mode Automatic

Near Shadings

Linear shadings : Slow (simul.)
Diffuse shading Automatic

User's needs

Unlimited load (grid)

PV Array Characteristics

PV module

Manufacturer Generic
Model CS7N-655MB-AG 1500V
(Original PVsyst database)

Unit Nom. Power 655 Wp
Number of PV modules 9984 units
Nominal (STC) 6540 kWp
Modules 768 string x 13 In series

At operating cond. (50°C)

Pmpp 6005 kWp
U mpp 443 V
I mpp 13546 A

Total PV power

Nominal (STC) 6540 kWp
Total 9984 modules
Module area 31014 m²

Inverter

Manufacturer Generic
Model S5-GC125K-HV
(Original PVsyst database)

Unit Nom. Power 125 kWac
Number of inverters 39 units
Total power 4875 kWac
Operating voltage 180-1000 V
Pnom ratio (DC:AC) 1.34
Power sharing within this inverter

Total inverter power

Total power 4875 kWac
Number of inverters 39 units
Pnom ratio 1.34

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. 0.54 mΩ
Loss Fraction 1.5 % at STC

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 -0.4 %



PVsyst V7.4.4

VC1, Simulation date:
04/12/23 15:20
with v7.4.4

Array losses

Module mismatch losses

Loss Fraction 2.0 % at MPP

Strings Mismatch loss

Loss Fraction 0.2 %

Module average degradation

Year no 10

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°	20°	30°	40°	50°	60°	70°	80°	90°
0.998	0.998	0.995	0.992	0.986	0.970	0.917	0.763	0.000

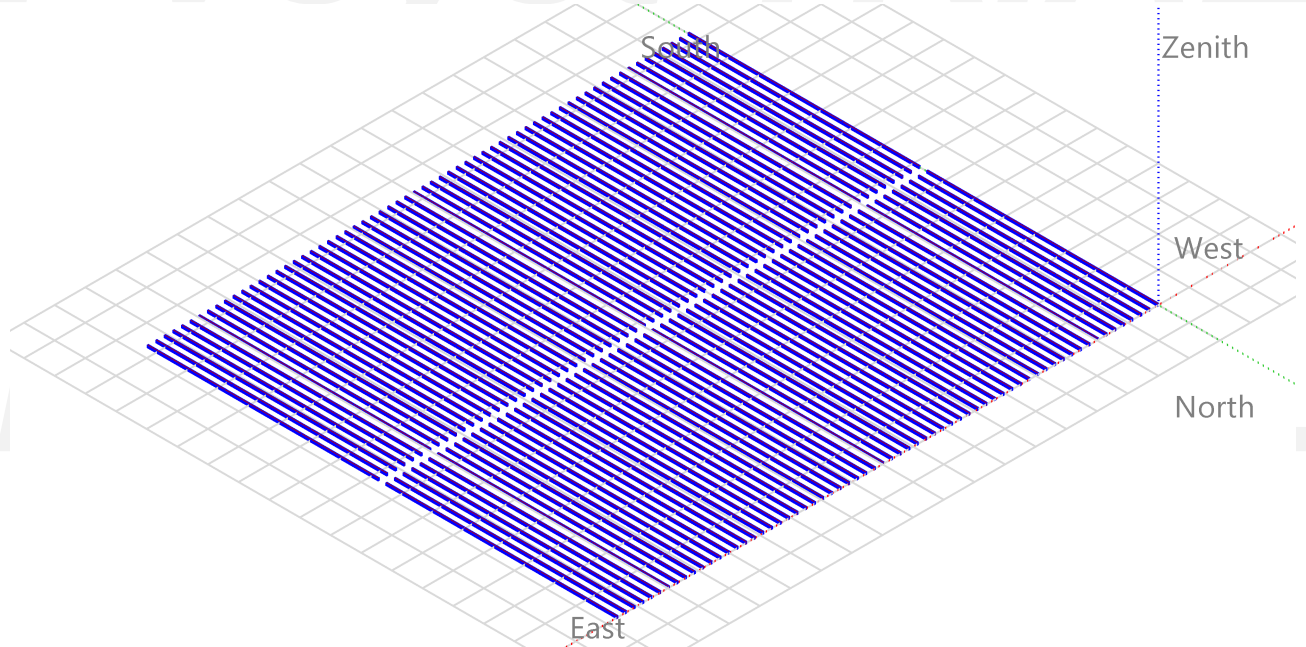


PVsyst V7.4.4

VC1, Simulation date:
04/12/23 15:20
with v7.4.4

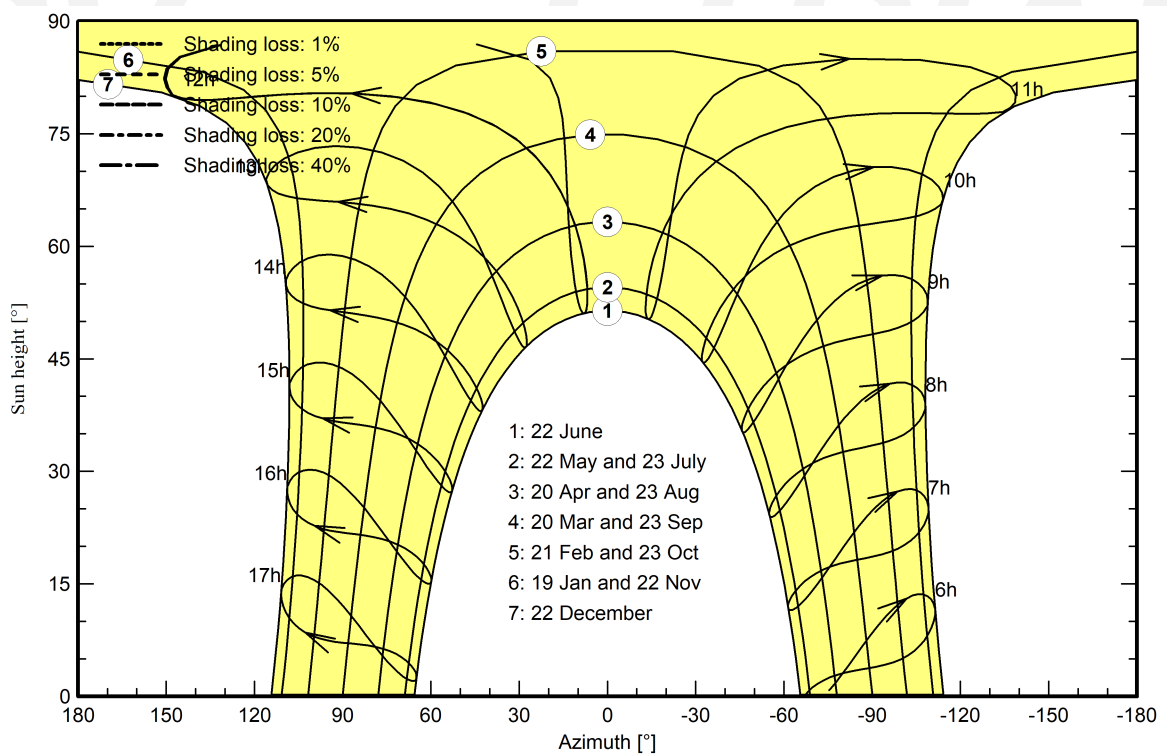
Near shadings parameter

Perspective of the PV-field and surrounding shading scene



Iso-shadings diagram

Orientation #1





Project: DCCO - Primavera do Leste
Variant: Inversores String Tracker string com 13

PVsyst V7.4.4

VC1, Simulation date:
04/12/23 15:20
with v7.4.4

Main results

System Production

Produced Energy 13358698 kWh/year

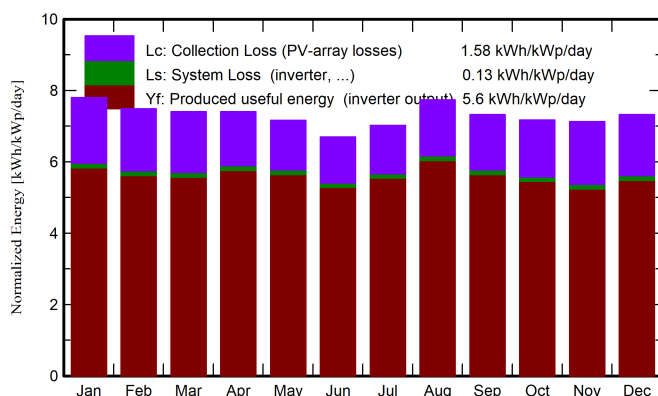
Specific production

2043 kWh/kWp/year

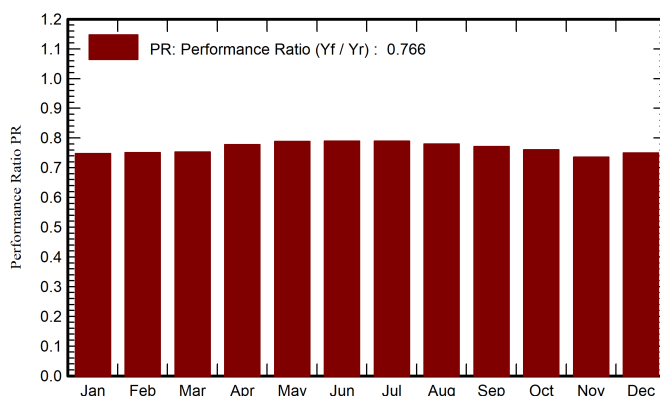
Perf. Ratio PR

76.61 %

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	189.6	83.46	24.88	241.8	229.7	1211148	1182310	0.748
February	163.4	70.15	24.98	209.7	199.2	1053929	1029114	0.750
March	176.3	72.01	25.14	229.5	218.0	1157345	1129762	0.753
April	162.7	62.37	24.53	222.0	211.1	1156536	1130009	0.778
May	157.8	45.41	23.19	222.1	211.1	1171908	1145339	0.789
June	148.0	36.26	22.24	200.8	190.7	1061498	1037425	0.790
July	158.5	41.27	21.83	217.7	206.7	1150764	1124452	0.790
August	175.6	52.29	24.63	240.0	228.4	1252828	1224294	0.780
September	168.5	70.36	25.96	219.6	208.6	1133872	1107909	0.771
October	179.2	84.12	26.45	222.5	211.0	1132878	1106225	0.760
November	174.0	74.44	25.26	213.9	203.0	1054727	1029277	0.736
December	183.7	79.90	25.20	226.9	215.3	1139783	1112581	0.750
Year	2037.3	772.04	24.52	2666.5	2532.6	13677217	13358698	0.766

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

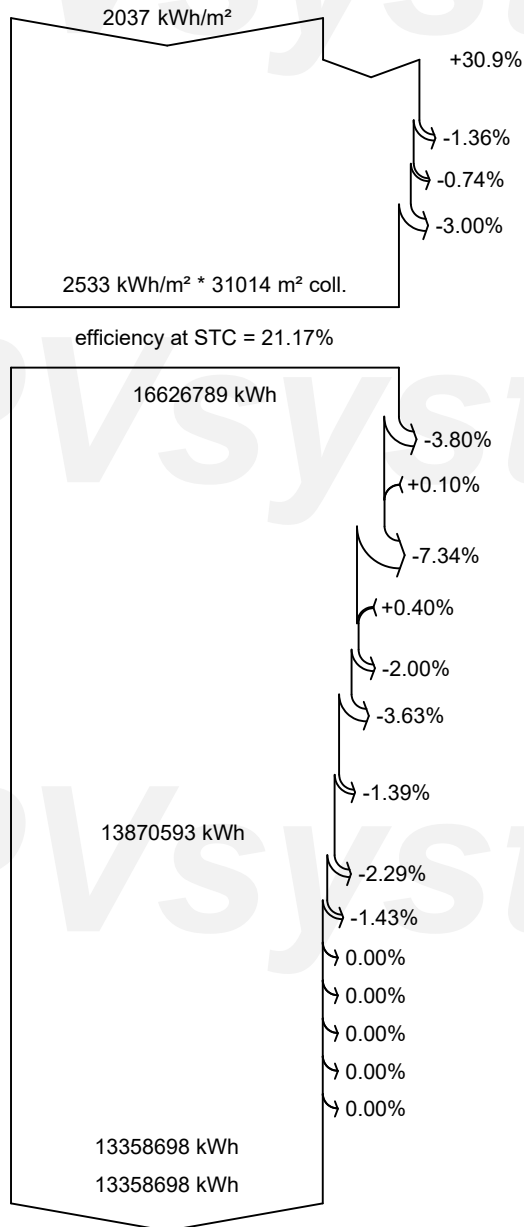
PR Performance Ratio



PVsyst V7.4.4

VC1, Simulation date:
04/12/23 15:20
with v7.4.4

Loss diagram



Global horizontal irradiation

Global incident in coll. plane

Near Shadings: irradiance loss

IAM factor on global

Soiling loss factor

Effective irradiation on collectors

PV conversion

Array nominal energy (at STC effic.)

Module Degradation Loss (for year #10)

PV loss due to irradiance level

PV loss due to temperature

Module quality loss

LID - Light induced degradation

Mismatch loss, modules and strings
(including 1.5% for degradation dispersion)

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

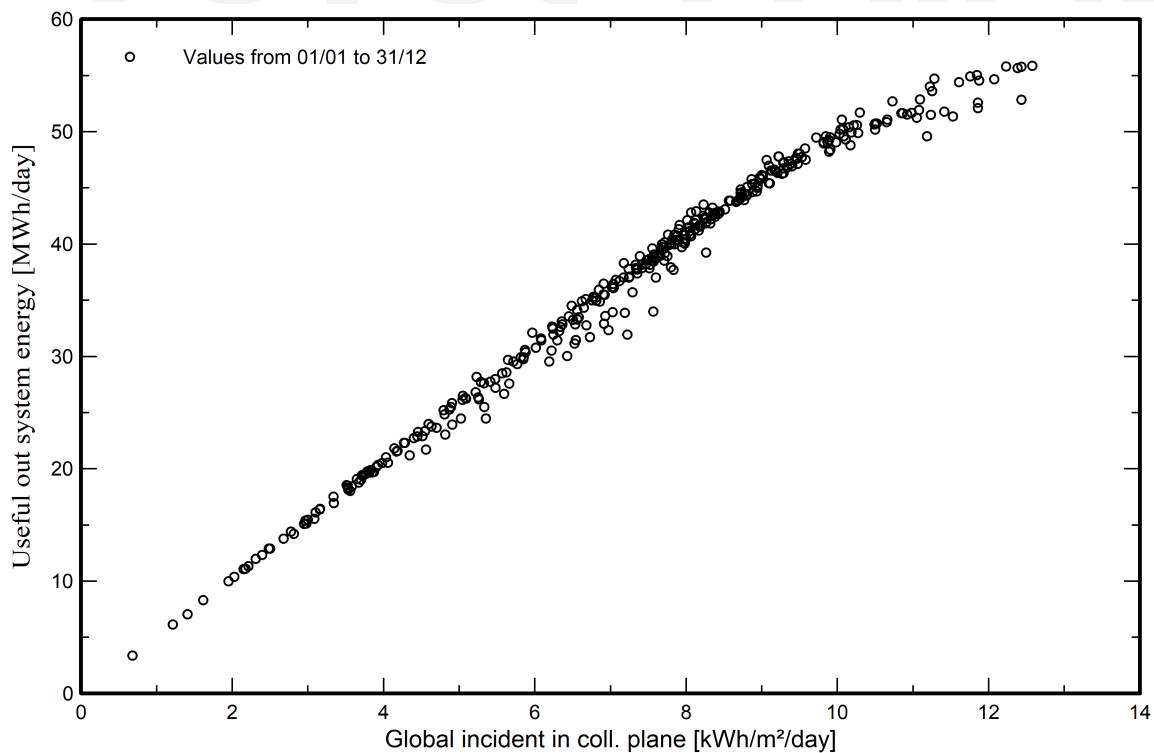


PVsyst V7.4.4

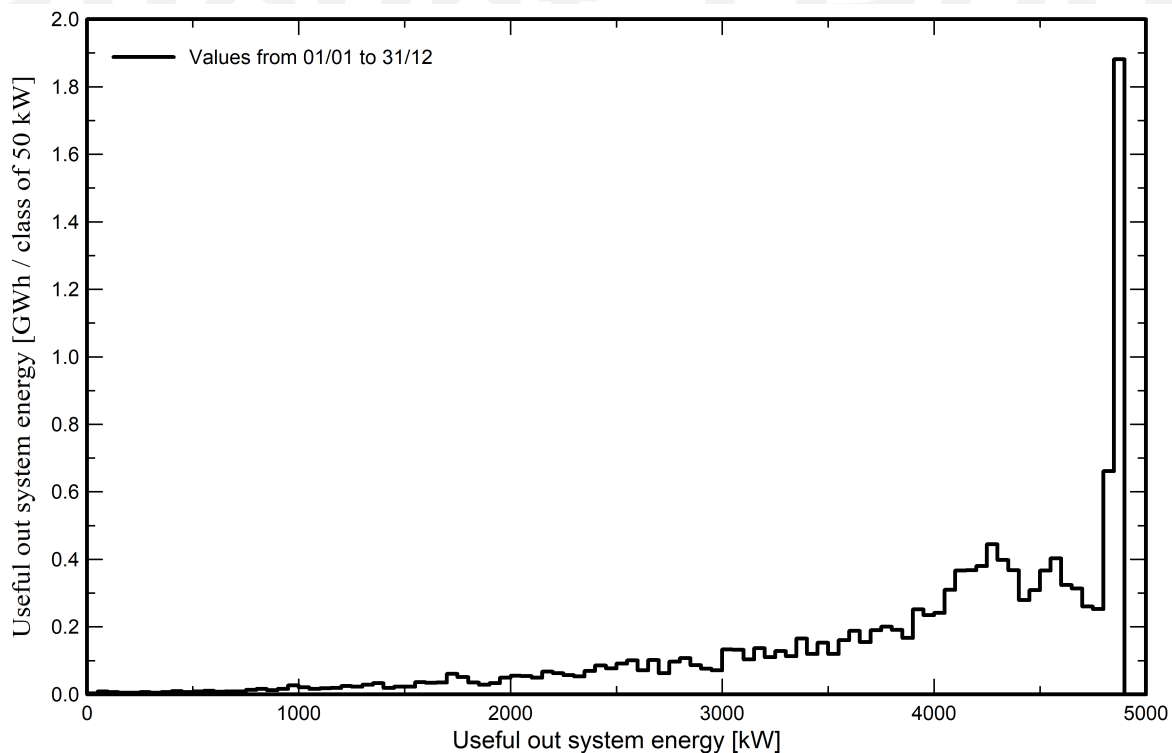
VC1, Simulation date:
04/12/23 15:20
with v7.4.4

Predef. graphs

Daily Input/Output diagram



System Output Power Distribution





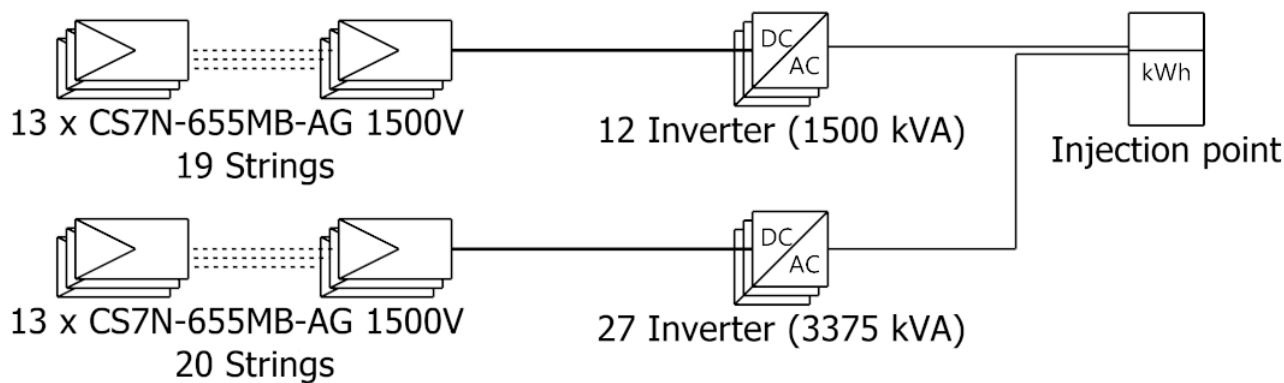
PVsyst V7.4.4

VC1, Simulation date:

04/12/23 15:20

with v7.4.4

Single-line diagram



PV module	CS7N-655MB-AG 1500V
Inverter	S5-GC125K-HV
String	13 x CS7N-655MB-AG 1500V

DCCO - Primavera do Leste

VC1 : Inversores String Tracker string
com 13

04/12/23