Version 7.3.4

PVsyst - Simulation report

Grid-Connected System

Project: Test Bifi SAT

Variant: SAT Alb020 (bifi)

Trackers single array, with backtracking

System power: 2558 kWp

Sacramento/McClellan Park - United States

Author

DNV (USA)

Project: Test Bifi SAT

Variant: SAT Alb020 (bifi)

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Project summary

Geographical Site
Sacramento/McClellan Park
United States

Situation

Latitude	38.67 °N
Longitude	-121.40 °W
Altitude	18 m
Time zone	UTC-8

Project settings

Albedo	0.20

Meteo data
Sacramento/McClellan Park
MeteoNorm 8.1 station - Synthetic

System summary

Grid-Connected System

Trackers single array, with backtracking

PV Field Orientation

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

Tracking algorithm	
Astronomic calculation	
Backtracking activated	

Near Shadings

Linear shadings	
Diffuse shading	Automatic

System information

PV Array		**Inverters**	
Nb. of modules	4410 units	Nb. of units	1 unit
Pnom total	2558 kWp	Pnom total	2200 kWac
		Pnom ratio	1.163

User's needs
Unlimited load (grid)

Results summary

Produced Energy	5342177 kWh/year	Specific production	2089 kWh/kWp/year	Perf. Ratio PR	89.56 %

Table of contents

General parameters

Grid-Connected System — **Trackers single array, with backtracking**

PV Field Orientation

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

Tracking algorithm
Astronomic calculation
Backtracking activated

Backtracking array
Nb. of trackers 49 units
Single array

Sizes
Tracker Spacing 5.00 m
Collector width 2.47 m
Ground Cov. Ratio (GCR) 49.3 %
Phi min / max. -/+ 60.0 °

Backtracking strategy
Phi limits for BT -/+ 60.3 °
Backtracking pitch 5.00 m
Backtracking width 2.47 m

Models used
Transposition Perez
Diffuse Perez, Meteonorm
Circumsolar separate

Horizon
Free Horizon

Near Shadings
Linear shadings
Diffuse shading Automatic

User's needs
Unlimited load (grid)

Bifacial system

Model 2D Calculation
unlimited trackers

Bifacial model geometry

Tracker Spacing	5.00 m
Tracker width	2.47 m
GCR	49.3 %
Axis height above ground	2.10 m

Bifacial model definitions

Ground albedo	0.20
Bifaciality factor	70 %
Rear shading factor	5.0 %
Rear mismatch loss	10.0 %
Shed transparent fraction	0.0 %

PV Array Characteristics

PV module

Manufacturer HT-SAAE
Model HT78-18X-580 Bifacial
(Original PVsyst database)
Unit Nom. Power 580 Wp
Number of PV modules 4410 units
Nominal (STC) 2558 kWp
Modules 245 Strings x 18 In series

At operating cond. (50°C)
Pmpp 2351 kWp
U mpp 731 V
I mpp 3219 A

Inverter

Manufacturer SMA
Model Sunny Central 2200
(Original PVsyst database)
Unit Nom. Power 2200 kWac
Number of inverters 1 unit
Total power 2200 kWac
Operating voltage 570-950 V
Pnom ratio (DC:AC) 1.16

Total PV power

Nominal (STC) 2558 kWp
Total 4410 modules
Module area 12327 m²
Cell area 11351 m²

Total inverter power

Total power 2200 kWac
Number of inverters 1 unit
Pnom ratio 1.16

Array losses

Thermal Loss factor
Module temperature according to irradiance
Uc (const) 25.0 W/m²K
Uv (wind) 1.2 W/m²K/m/s

DC wiring losses
Global array res. 3.7 mΩ
Loss Fraction 1.5 % at STC

LID - Light Induced Degradation
Loss Fraction 1.0 %

Module Quality Loss
Loss Fraction -0.8 %

Module mismatch losses
Loss Fraction 1.0 % at MPP

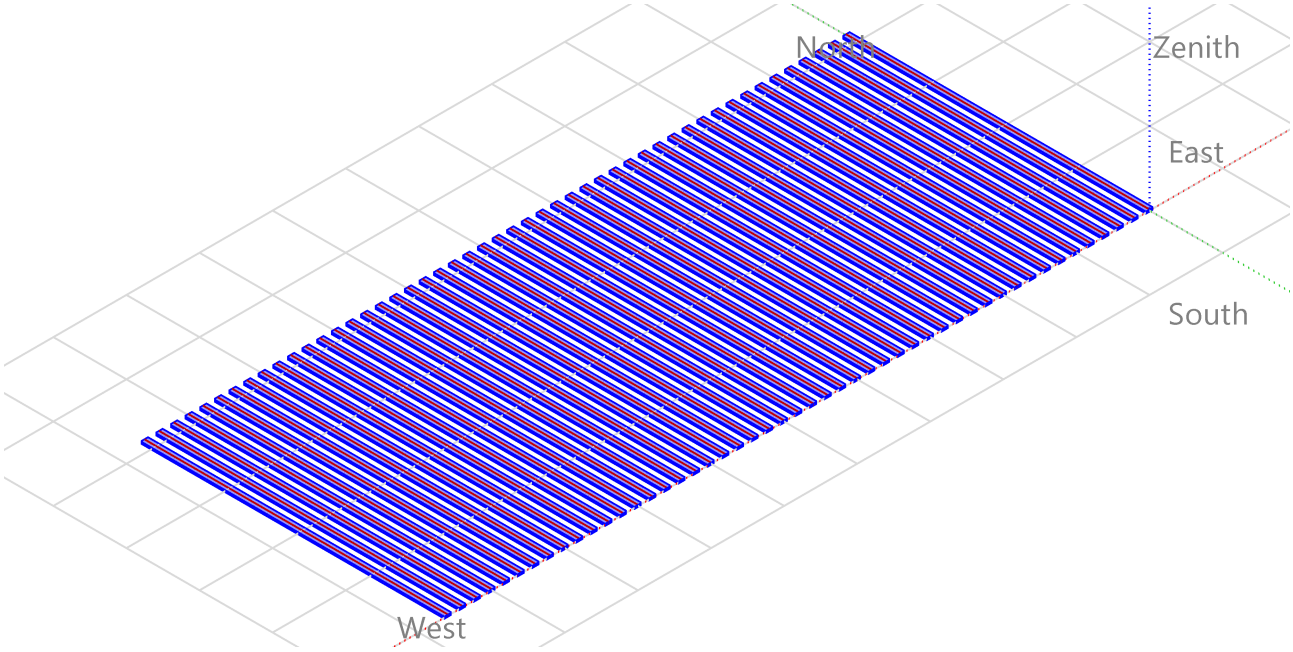
Strings Mismatch loss
Loss Fraction 0.2 %

IAM loss factor
Incidence effect (IAM): Fresnel smooth glass, n = 1.526

0°	30°	50°	60°	70°	75°	80°	85°	90°
1.000	0.998	0.981	0.948	0.862	0.776	0.636	0.403	0.000

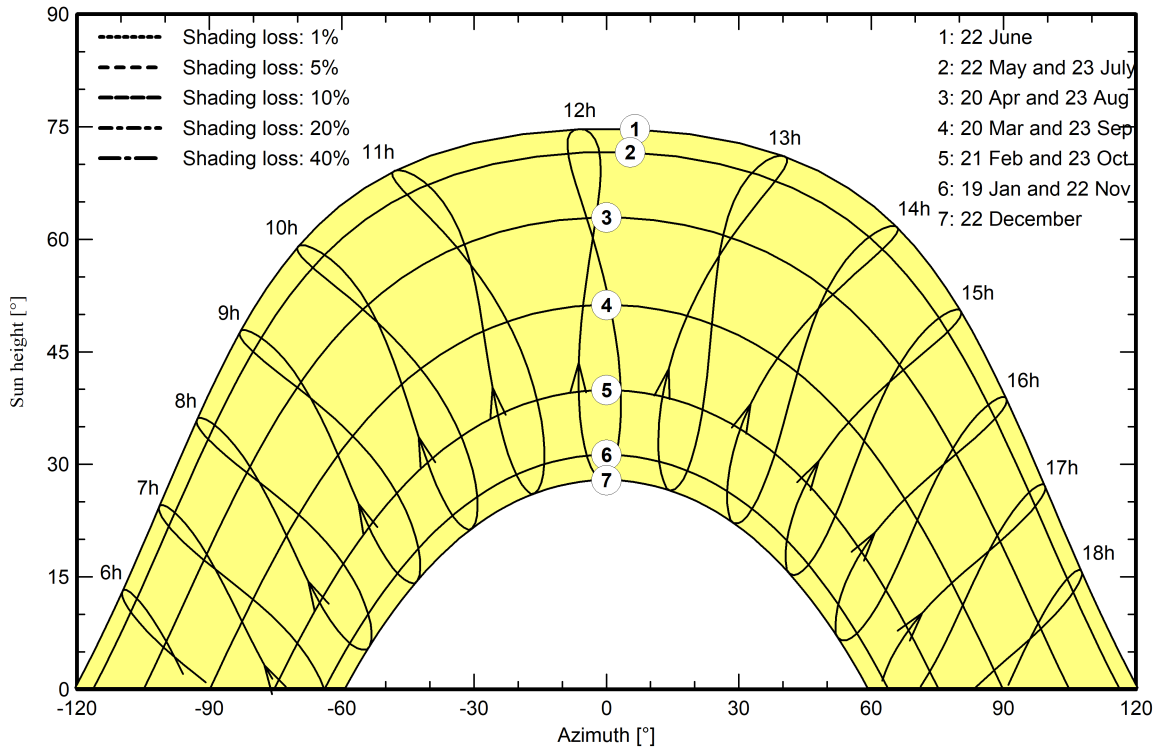
Near shadings parameter

Perspective of the PV-field and surrounding shading scene



Iso-shadings diagram

Orientation #1

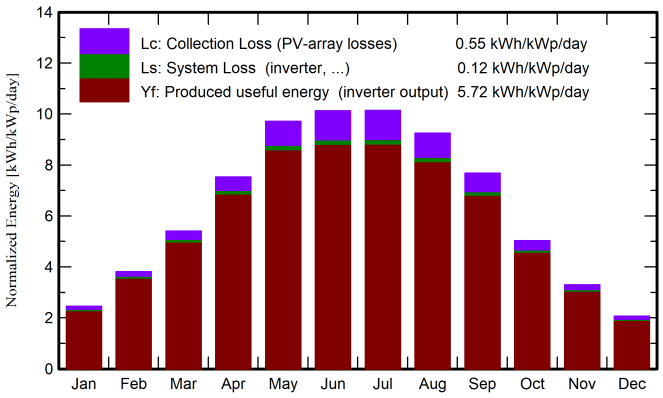


Main results

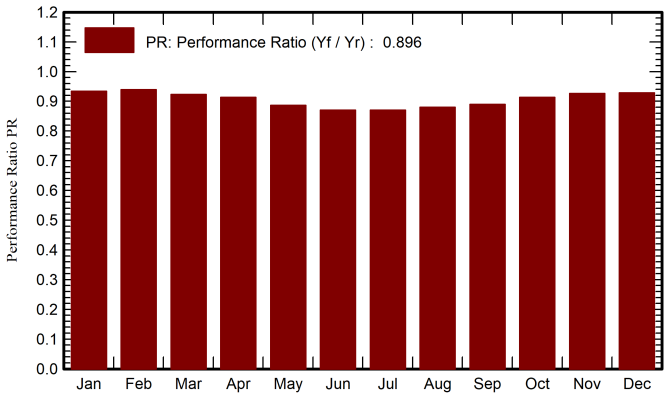
System Production

Produced Energy	5342177 kWh/year	Specific production	2089 kWh/kWp/year
		Perf. Ratio PR	89.56 %

Normalized productions (per installed kWp)



Performance Ratio PR



Balances and main results

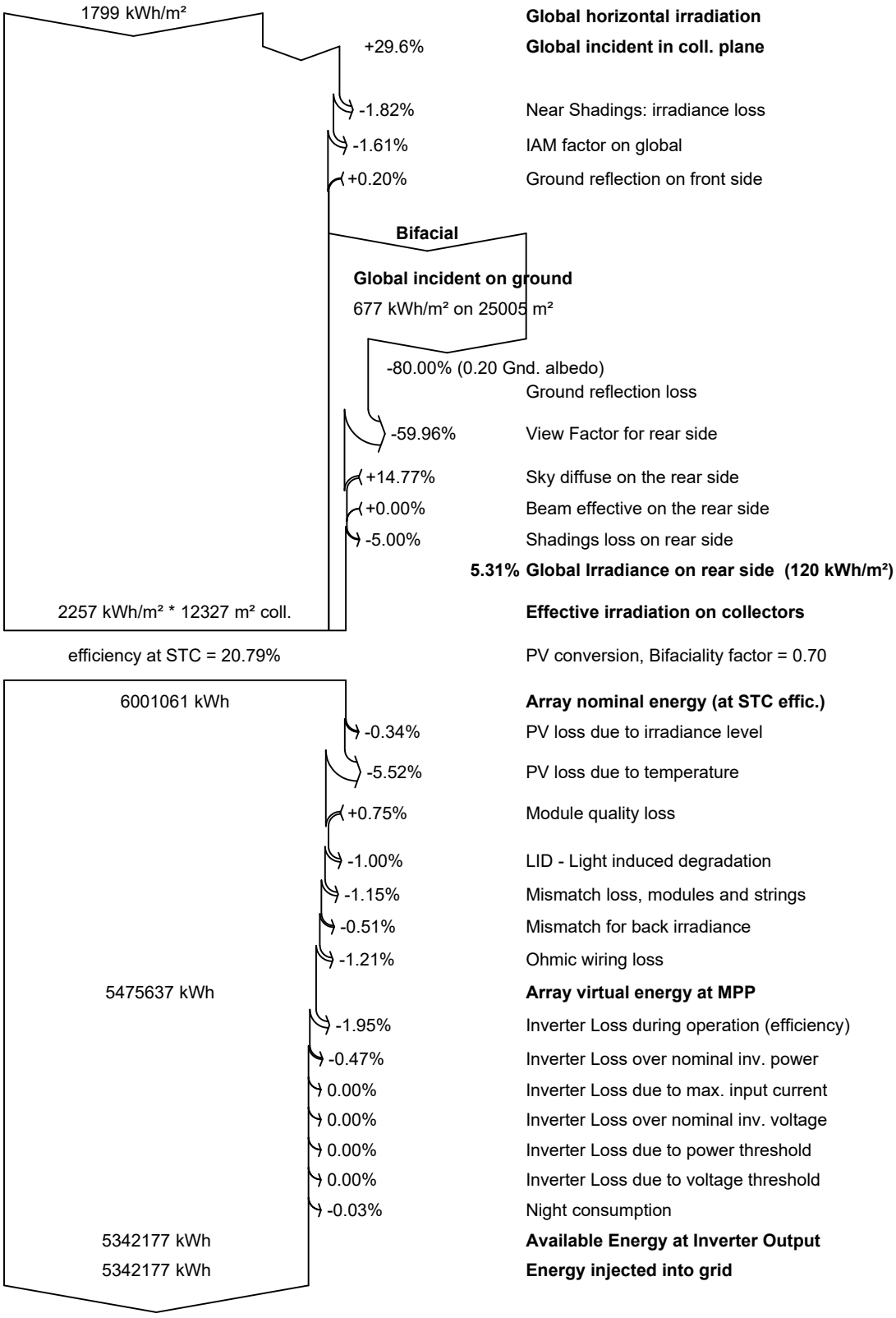
	GlobHor kWh/m²	DiffHor kWh/m²	T_Amb °C	GlobInc kWh/m²	GlobEff kWh/m²	EArray kWh	E_Grid kWh	PR ratio
January	61.4	32.80	7.00	76.3	71.3	185998	182135	0.934
February	83.2	36.20	9.10	106.7	101.6	261356	256207	0.939
March	133.6	60.00	12.60	167.6	161.0	403528	395520	0.923
April	176.1	61.40	15.30	225.8	219.2	538501	527731	0.914
May	231.1	61.70	19.70	301.1	293.8	697048	682926	0.887
June	234.9	64.30	23.20	304.0	296.4	690500	676709	0.870
July	241.8	61.00	24.80	314.5	307.1	714553	700350	0.871
August	217.5	51.60	23.70	286.8	280.4	658986	646037	0.881
September	172.8	39.60	20.90	230.5	224.1	534631	524249	0.889
October	119.1	40.70	16.40	155.8	149.7	370954	363927	0.913
November	76.5	30.60	10.40	99.0	93.5	239185	234483	0.926
December	51.3	27.00	6.70	63.9	59.3	155229	151903	0.929
Year	1799.3	566.90	15.85	2332.1	2257.3	5450469	5342177	0.896

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 V7.3.4
VC1, Simulation date:
12/28/23 19:11
with v7.3.4

Loss diagram



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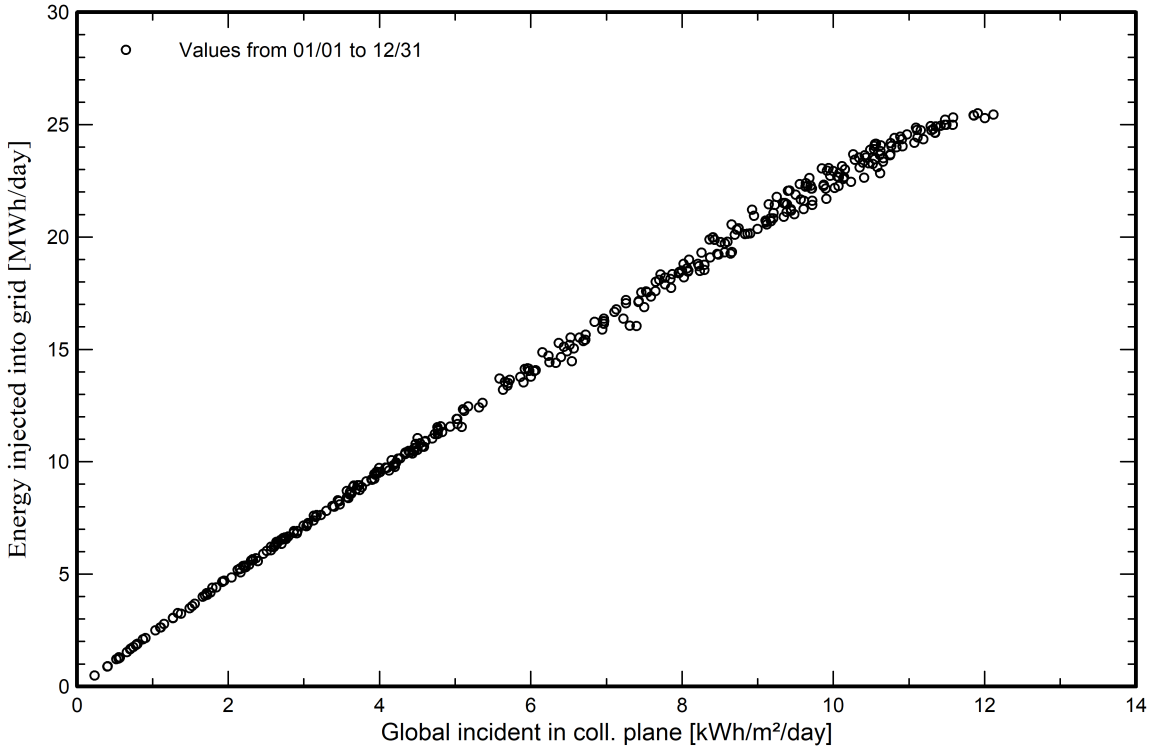
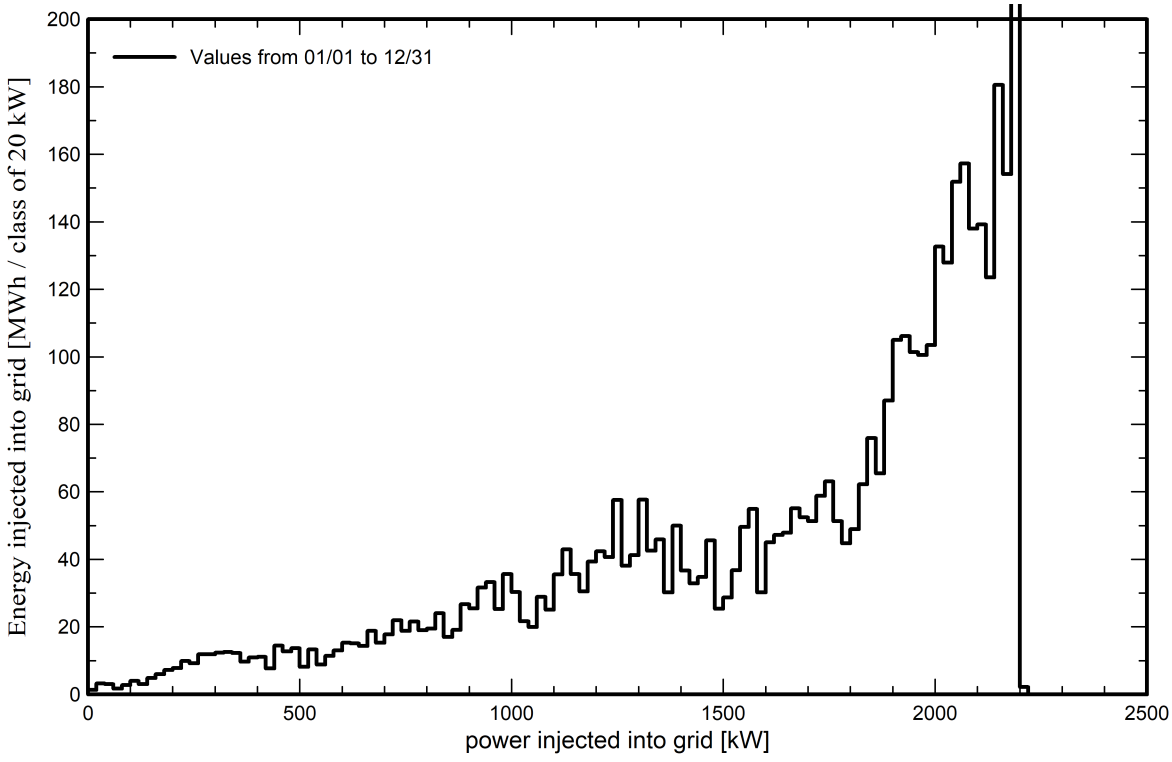
VC1, Simulation date:
12/28/23 19:11
with v7.3.4

Predef. graphs

Daily Input/Output diagram



System Output Power Distribution



Single-line diagram

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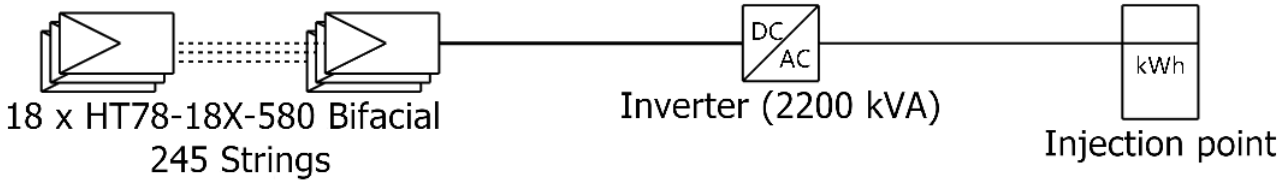

PV module	HT78-18X-580 Bifacial
Inverter	Sunny Central 2200
String	18 x HT78-18X-580 Bifacial

	Test Bifi SAT	DNV (USA)
	VC1 : SAT Alb020 (bifi)	12/28/23