Version 7.3.4

PVsyst - Simulation report

Grid-Connected System

Project: Test Bifi Sheds

Variant: FT30 Az0 Alb060 (bifi)

Sheds, single array

System power: 2558 kWp

Sacramento/McClellan Park - United States

Author
DNV (USA)

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with v7.3.4

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
Sheds, single array

PV Field Orientation

Fixed plane	
Tilt/Azimuth	30 / 0 °

Near Shadings

According to strings	
Electrical effect	70 %

User's needs
Unlimited load (grid)

System information

PV Array

Nb. of modules	4410 units
Pnom total	2558 kWp

Inverters

Nb. of units	1 unit
Pnom total	2200 kWac
Pnom ratio	1.163

Results summary

Produced Energy	4917519 kWh/year	Specific production	1923 kWh/kWp/year	Perf. Ratio PR	94.26 %

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General parameters

Grid-Connected System — **Sheds, single array**

PV Field Orientation

Orientation		Sheds configuration		Models used	
Fixed plane		Nb. of sheds	49 units	Transposition	Perez
Tilt/Azimuth	30 / 0 °	Single array		Diffuse	Perez, Meteonorm
		Sizes		Circumsolar	separate
		Sheds spacing	5.00 m		
		Collector width	2.47 m		
		Ground Cov. Ratio (GCR)	49.3 %		
		Top inactive band	0.02 m		
		Bottom inactive band	0.02 m		
		Shading limit angle			
		Limit profile angle	23.6 °		

Horizon	Near Shadings	User's needs
Free Horizon	According to strings	Unlimited load (grid)
	Electrical effect 70 %	

Bifacial system

Model: 2D Calculation, unlimited sheds

Bifacial model geometry		Bifacial model definitions	
Sheds spacing	5.00 m	Ground albedo	0.60
Sheds width	2.51 m	Bifaciality factor	70 %
Limit profile angle	23.6 °	Rear shading factor	5.0 %
GCR	50.1 %	Rear mismatch loss	10.0 %
Height above ground	1.50 m	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

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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 0.5 %

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

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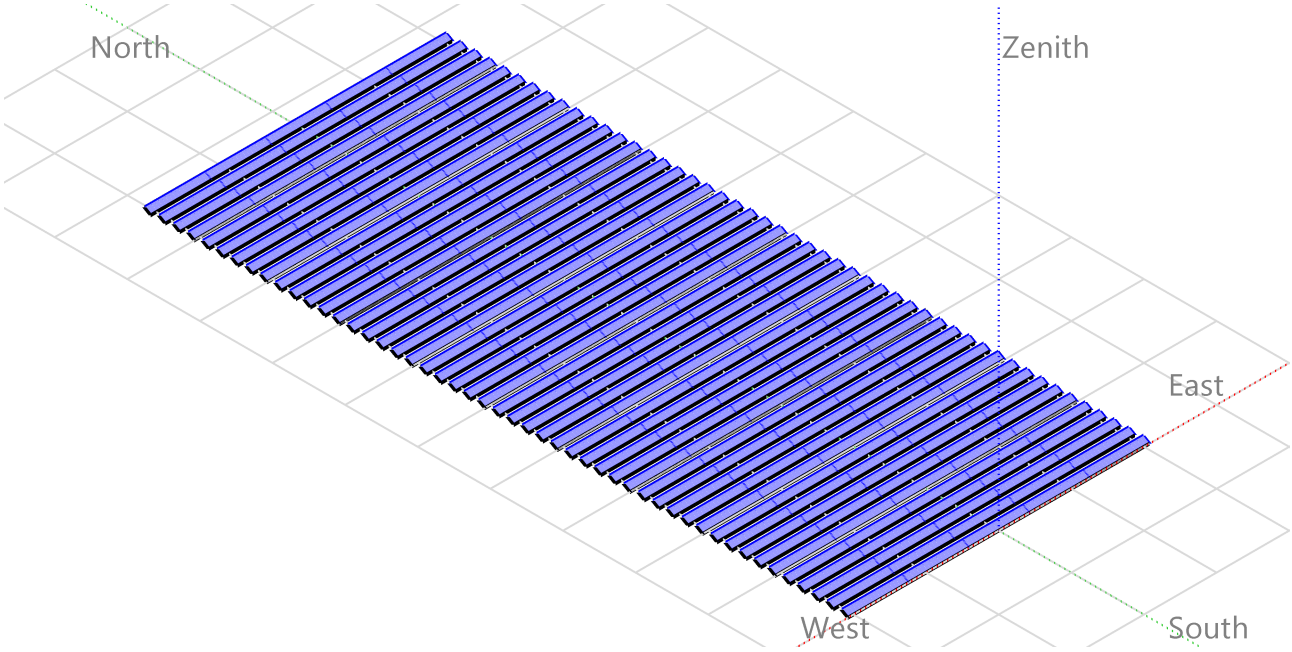
Near shadings parameter

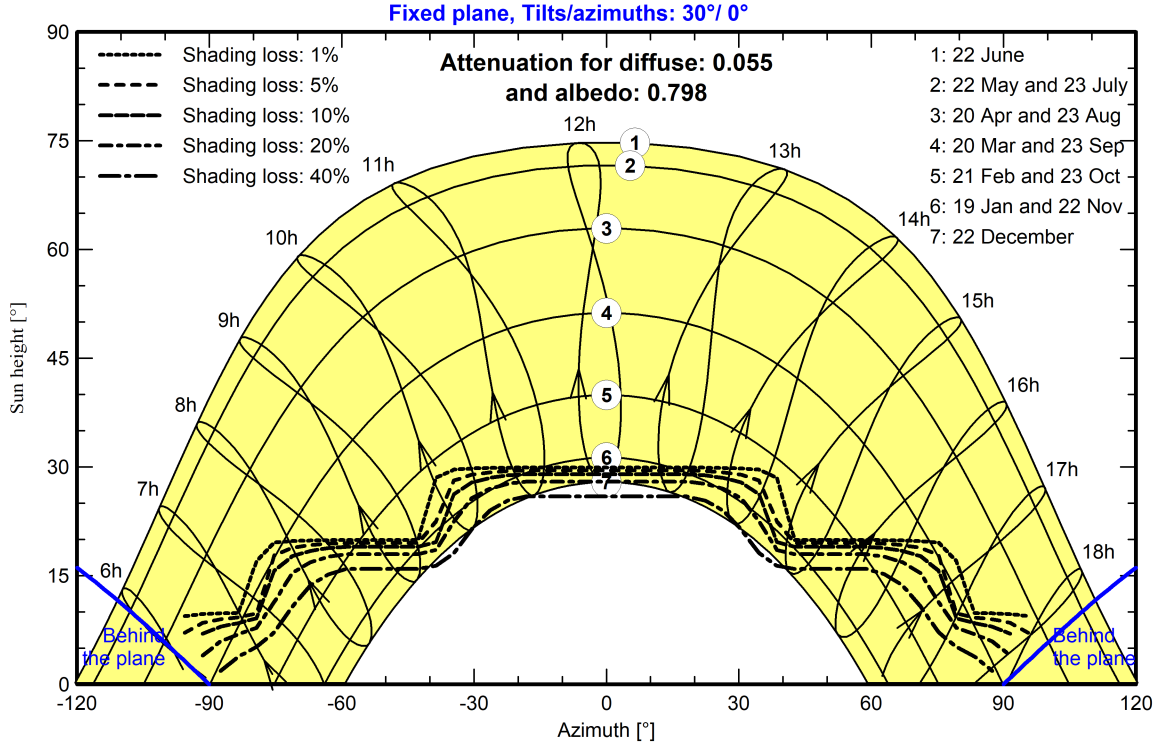
Perspective of the PV-field and surrounding shading scene



Iso-shadings diagram

Orientation #1

Fixed plane, Tilts/azimuths: 30°/ 0°



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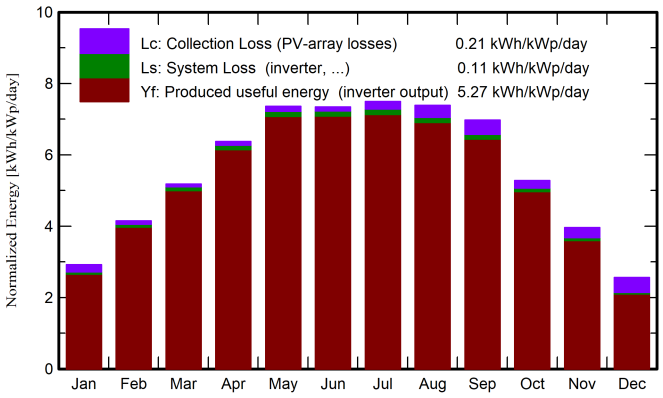
Main results

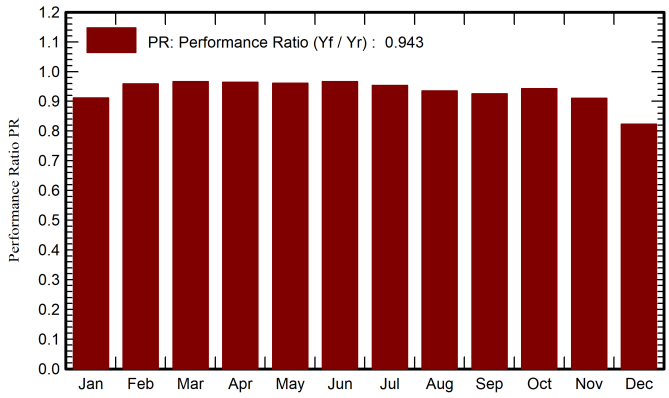
System Production

Produced Energy	4917519 kWh/year	Specific production	1923 kWh/kWp/year
		Perf. Ratio PR	94.26 %

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	90.6	84.6	215733	211220	0.912
February	83.2	36.20	9.10	116.3	111.4	291040	285108	0.958
March	133.6	60.00	12.60	160.5	154.1	404970	396661	0.966
April	176.1	61.40	15.30	191.3	183.9	481494	471750	0.964
May	231.1	61.70	19.70	228.3	220.0	572883	561275	0.961
June	234.9	64.30	23.20	220.3	212.1	555444	544357	0.966
July	241.8	61.00	24.80	232.3	223.9	577644	566118	0.953
August	217.5	51.60	23.70	229.1	221.3	559298	548104	0.935
September	172.8	39.60	20.90	209.1	202.4	504908	494739	0.925
October	119.1	40.70	16.40	163.6	157.8	402510	394529	0.943
November	76.5	30.60	10.40	118.9	112.7	282351	276659	0.910
December	51.3	27.00	6.70	79.4	73.2	170623	166998	0.822
Year	1799.3	566.90	15.85	2039.6	1957.5	5018896	4917519	0.943

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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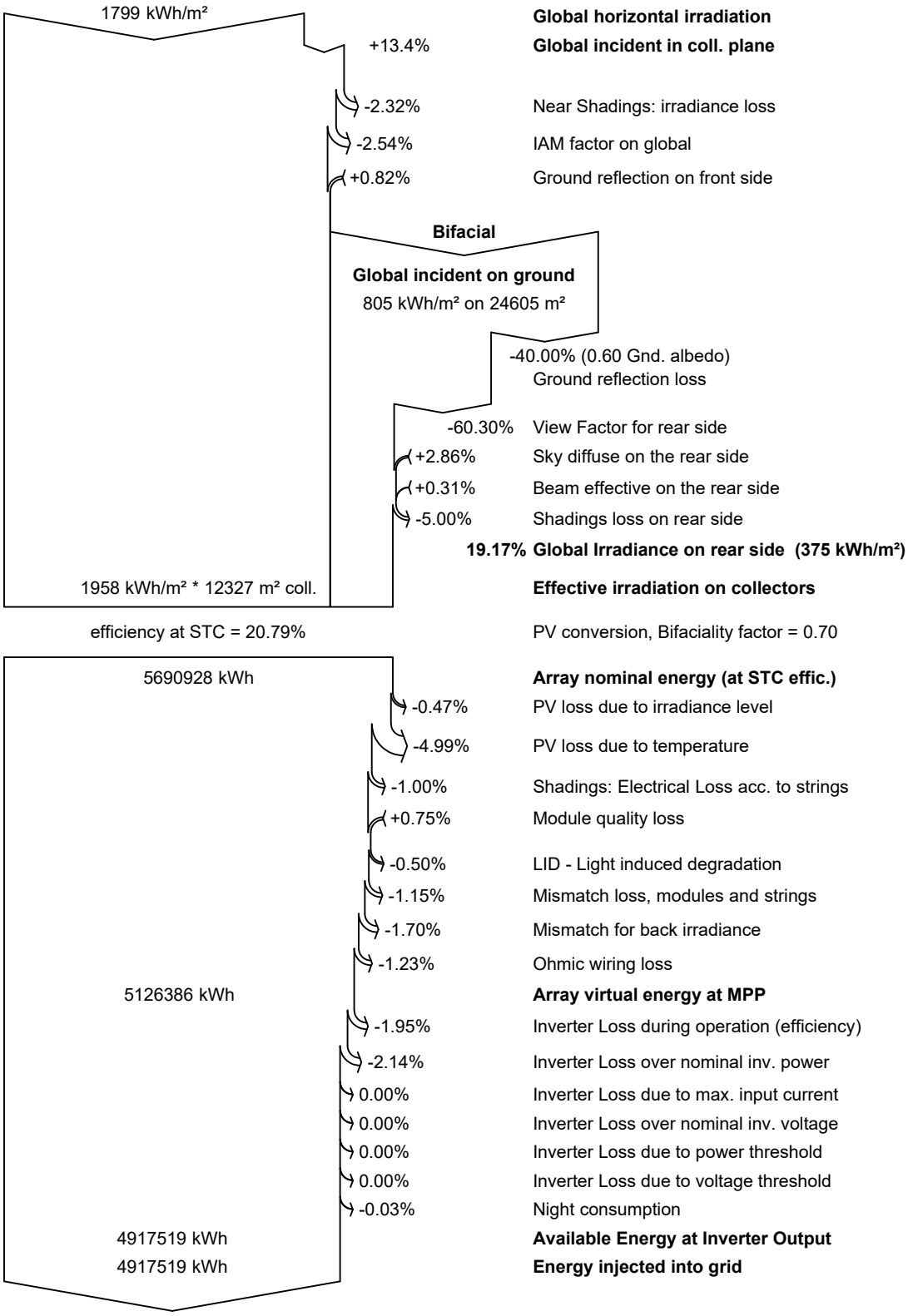
Loss diagram



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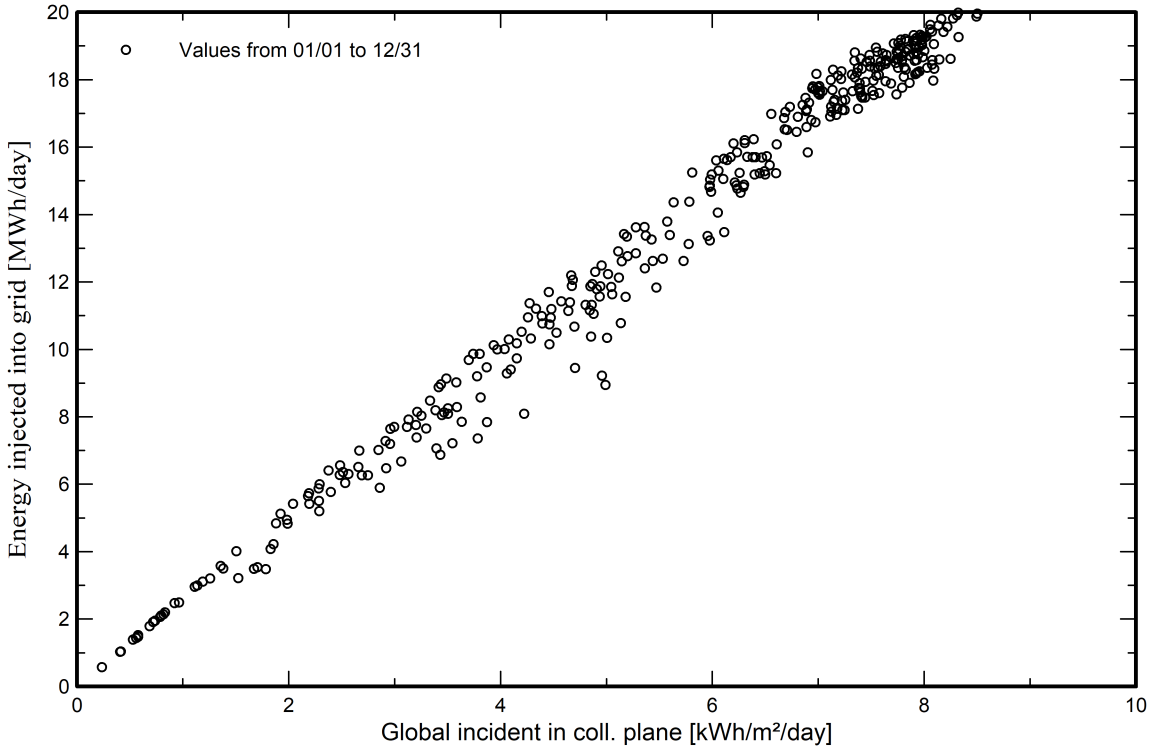
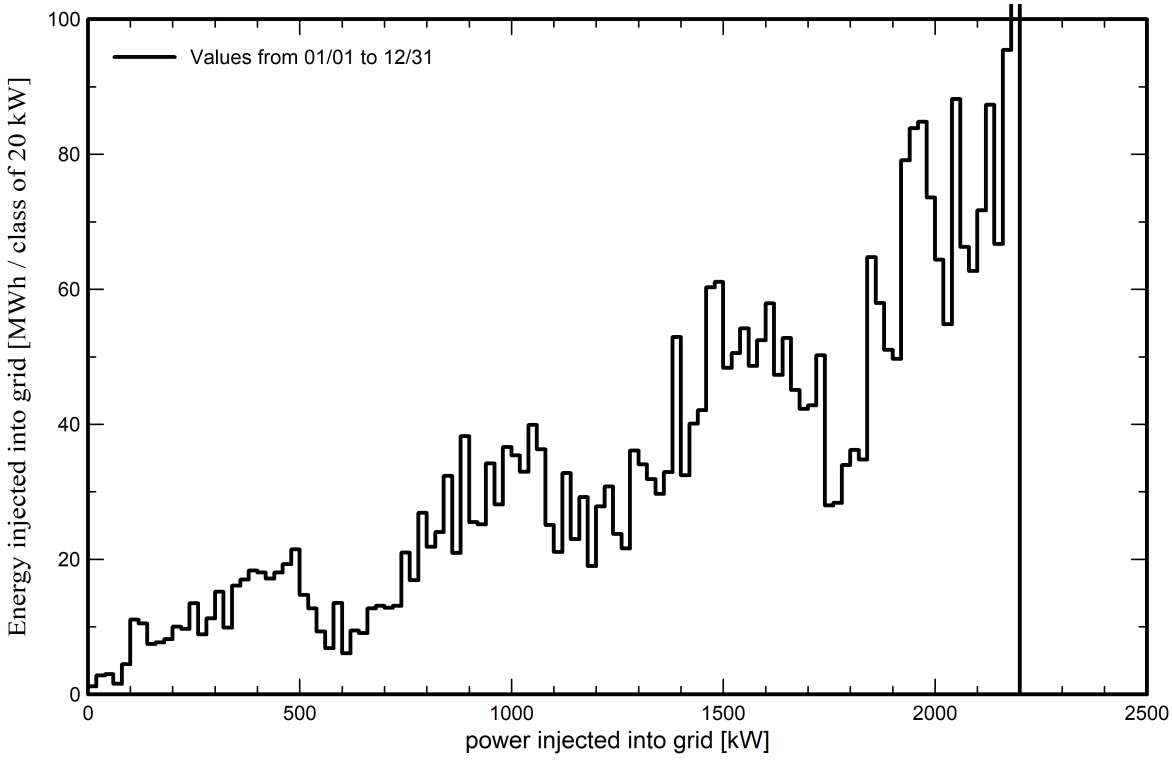
Predef. graphs

Daily Input/Output diagram



System Output Power Distribution



Single-line diagram

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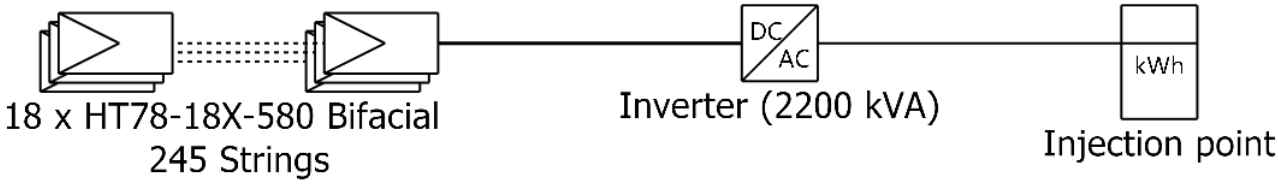

PV module	HT78-18X-580 Bifacial
Inverter	Sunny Central 2200
String	18 x HT78-18X-580 Bifacial

	Test Bifi Sheds	DNV (USA)
	VC3 : FT30 Az0 Alb060 (bifi)	12/28/23