PVsyst - Simulation report

Grid-Connected System

Project: PTAR SAMACA

Variant: Mesas 2x14 Trina710Wbf-Sun2000-100KTL-M2

Sheds on ground

System power: 119 kWp

PTARSamacá - Colombia

Author

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CALLE 98 #8-28

PVsyst V8.0.15
VC2, Simulation date:
23/08/25 17:02
with V8.0.15

Project summary

Geographical Site
PTARSamacá
Colombia

Situation

Latitude	5.51 °(N)
Longitude	-73.49 °(W)
Altitude	2587 m
Time zone	UTC-5

Project settings

Albedo	0.20

Weather data
PTARSamacá
Meteonorm 8.2 (2016-2021), Sat=100% - Synthetic

System summary

Grid-Connected System

Sheds on ground

Orientation #1
Fixed plane

Tilt/Azimuth	10 / 0 °

Near Shadings
According to strings : Fast (table)

Electrical effect	100 %

Shadings of thin objects
According to strings : Fast (table)

Electrical effect	40 %

System information

PV Array

Nb. of modules	168 units
Pnom total	119 kWp

Inverters

Nb. of units	1 unit
Total power	100 kWac
Pnom ratio	1.19

User's needs
Fixed constant load
38.5 kW
Global
337 MWh/Year

Results summary

Produced Energy	212.67 MWh/year	Specific production	1783 kWh/kWp/year	Perf. Ratio PR	84.76 %
Used Energy	337.27 MWh/year			Solar Fraction SF	36.69 %

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

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General parameters

Grid-Connected System

Sheds on ground

Orientation #1

Fixed plane
Tilt/Azimuth 10 / 0 °

Sheds configuration
Nb. of sheds 6 units
Identical arrays
Shading limit angle
Limit profile angle 22.5 °

Sizes
Sheds spacing 6.75 m
Sensitive width 4.79 m
GCR Shading 71.2 %
Top inactive band 0.02 m
Bottom inactive band 0.02 m

Models used
Transposition Perez
Diffuse Perez, Meteonorm
Circumsolar separate

Horizon
Free Horizon

Near Shadings
According to strings : Fast (table)
Electrical effect 100 %

Shadings of thin objects
According to strings : Fast (table)
Electrical effect 40 %

User's needs
Fixed constant load
38.5 kW
Global
337 MWh/Year

PV Array Characteristics

PV module
Manufacturer Trina Solar
Model TSM-710NEG21C.20
(Custom parameters definition)
TSM-710NEG21C.20 (3) (1).PAN
Unit Nom. Power 710 Wp
Number of PV modules 168 units
Nominal (STC) 119 kWp
Modules 12 string x 14 In series
At operating cond. (50°C)
Pmpp 111 kWp
U mpp 526 V
I mpp 210 A

Inverter
Manufacturer Huawei Technologies
Model SUN2000-100KTL-M2-480Vac
(Original PVsyst database)
Unit Nom. Power 100 kWac
Number of inverters 1 unit
Total power 100 kWac
Operating voltage 200-1000 V
Max. power (=>40°C) 110 kWac
Pnom ratio (DC:AC) 1.19
Power sharing within this inverter

Total PV power
Nominal (STC) 119 kWp
Total 168 modules
Module area 522 m²
Cell area 489 m²

Total inverter power
Total power 100 kWac
Max. power 110 kWac
Number of inverters 1 unit
Pnom ratio 1.19

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. 41 mΩ
Loss Fraction 1.50 % at STC

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

Module Quality Loss
Loss Fraction -0.75 %

Module mismatch losses
Loss Fraction 2.00 % at MPP

IAM loss factor
ASHRAE Param.: IAM = 1 - bo (1/cosi -1)
bo Param. 0.05

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Array losses

Spectral correction

FirstSolar model

Precipitable water estimated from relative humidity

Coefficient Set	C0	C1	C2	C3	C4	C5
Monocrystalline Si	0,85914	-0,02088	-0,0058853	0,12029	0,026814	-0,001781

System losses

Unavailability of the system

Time fraction 2.0 %
7.3 days,
3 periods

AC wiring losses

Inv. output line up to injection point

Inverter voltage 480 Vac tri
Loss Fraction 0.00 % at STC

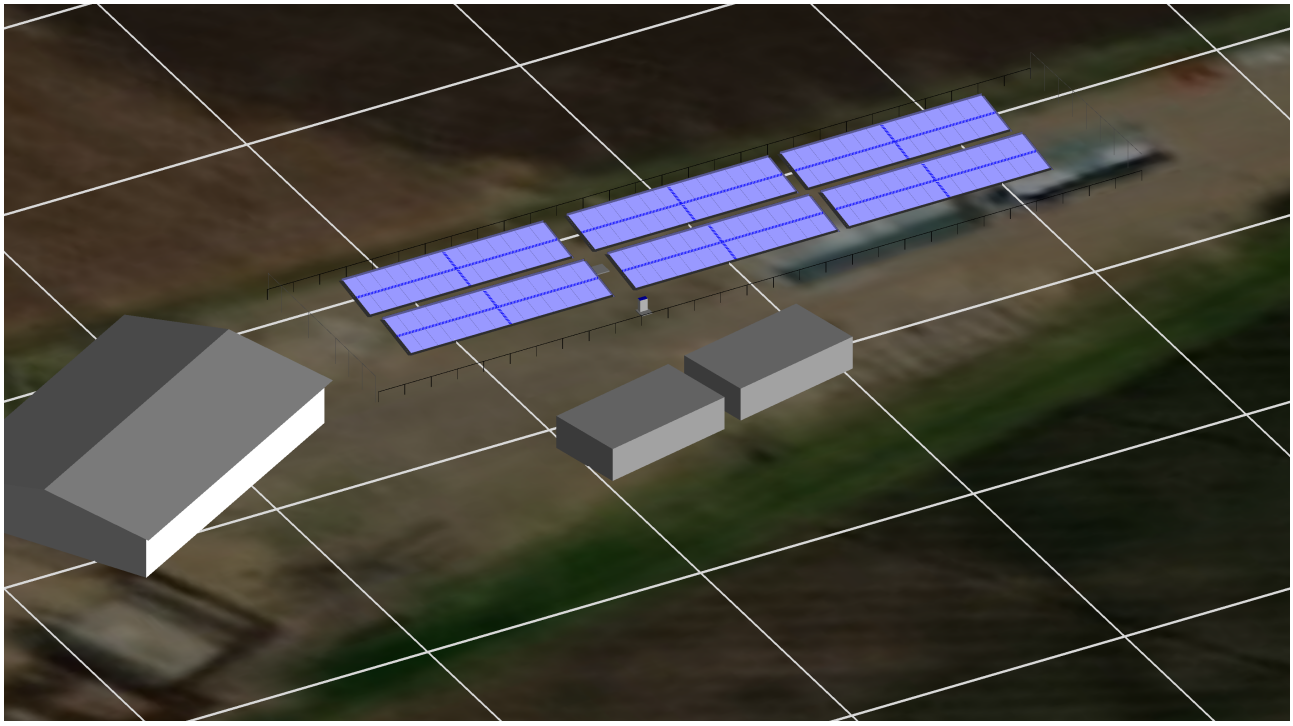
Inverter: SUN2000-100KTL-M2-480Vac

Wire section (1 Inv.) Copper 1 x 3 x 50 mm²
Wires length 0 m

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Near shadings parameter

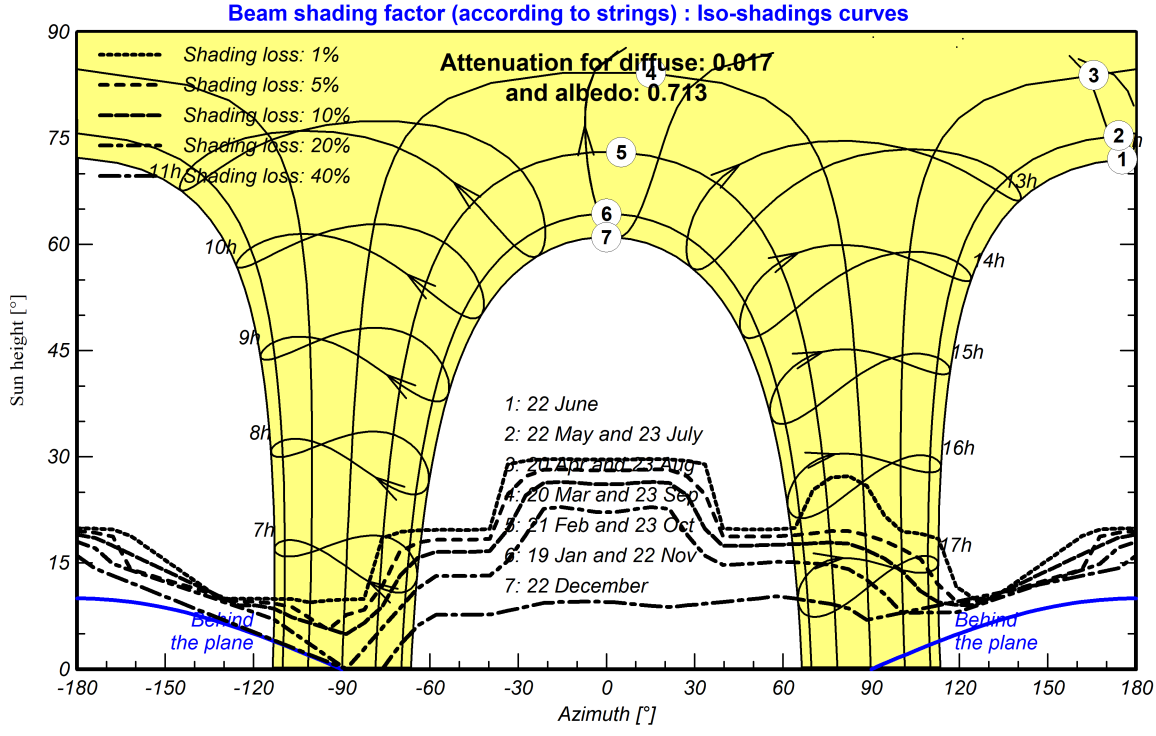
Perspective of the PV-field and surrounding shading scene



Iso-shadings diagram

Orientation #1 - Fixed plane, Tilts/azimuths: 10°/ 0°

Beam shading factor (according to strings) : Iso-shadings curves



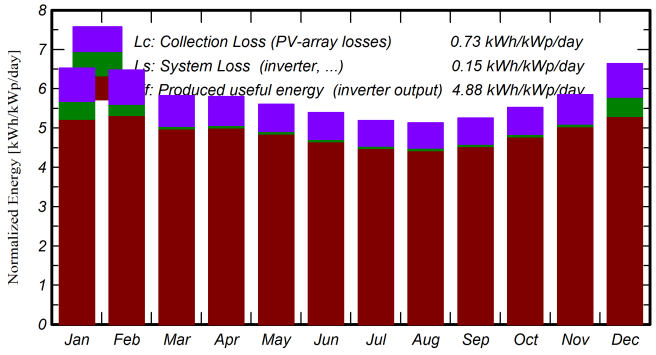
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Main results

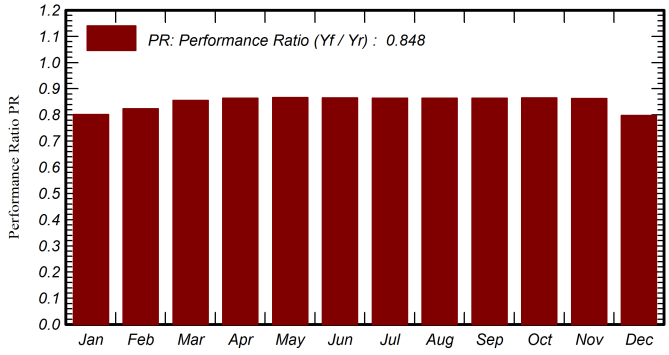
System Production

Produced Energy	212.67 MWh/year	Specific production	1783 kWh/kWp/year
Used Energy	337.27 MWh/year	Perf. Ratio PR	84.76 %
		Solar Fraction SF	36.69 %

Normalized productions (per installed kWp)



Performance Ratio PR



Balances and main results

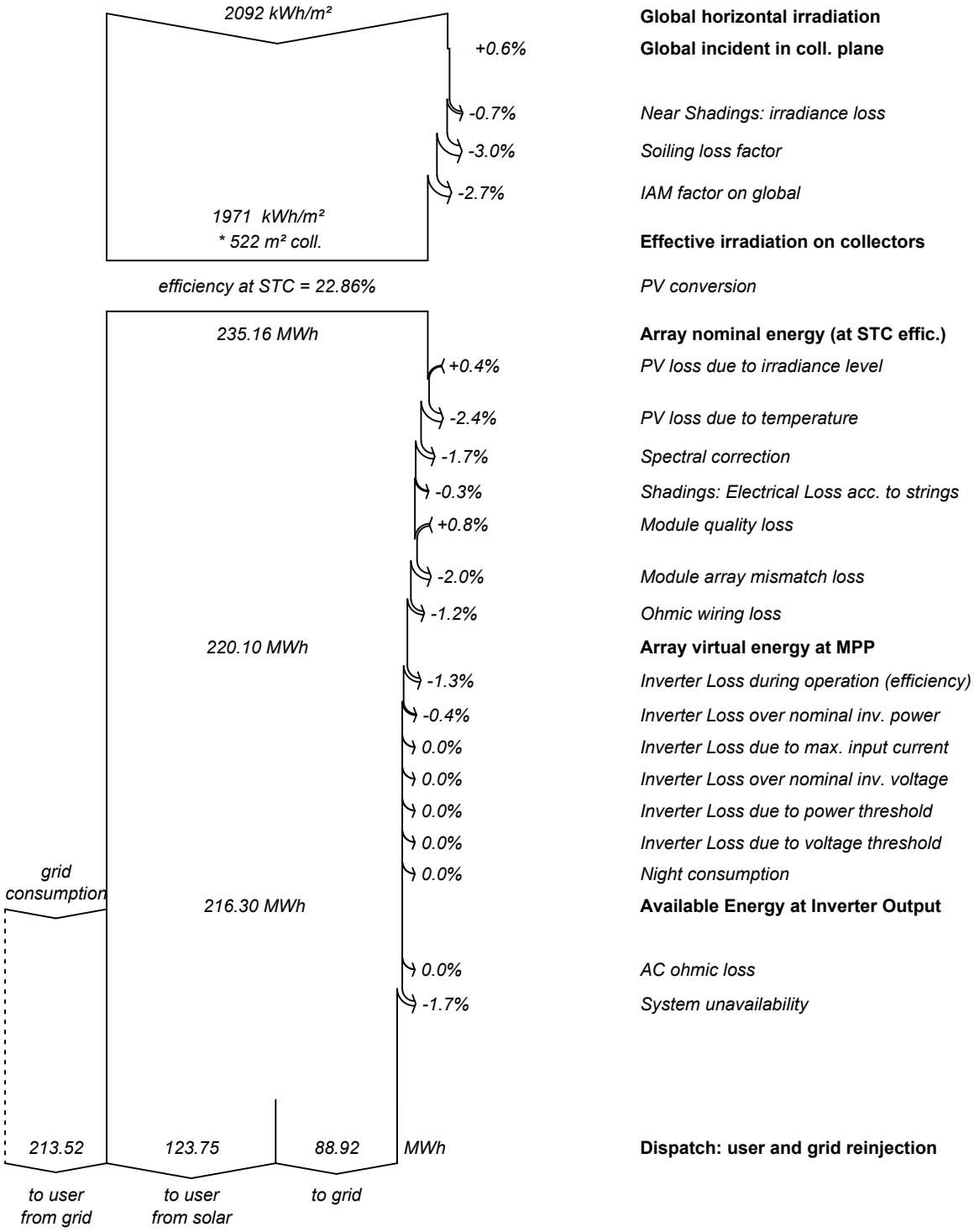
	GlobHor kWh/m²	DiffHor kWh/m²	T_Amb °C	GlobInc kWh/m²	GlobEff kWh/m²	EArray MWh	E_User MWh	E_Solar MWh	E_Grid MWh	EFrGrid MWh
January	187.5	57.80	13.20	202.2	190.8	21.01	28.64	10.31	9.02	18.33
February	172.0	53.52	13.55	181.2	170.4	18.73	25.87	9.33	8.46	16.54
March	179.2	72.39	13.78	180.6	169.4	18.67	28.64	10.85	7.57	17.79
April	178.8	67.05	13.79	174.0	163.3	18.17	27.72	10.41	7.52	17.31
May	184.2	77.59	13.97	173.7	162.0	18.20	28.64	11.09	6.87	17.56
June	174.9	60.72	13.49	161.7	150.3	16.89	27.72	10.12	6.55	17.60
July	172.5	64.21	13.59	160.9	149.5	16.80	28.64	10.33	6.26	18.32
August	165.8	64.44	13.50	159.1	148.6	16.62	28.64	10.06	6.33	18.58
September	158.2	68.66	13.17	157.5	147.9	16.45	27.72	9.86	6.37	17.86
October	166.6	79.88	13.45	171.3	160.6	17.92	28.64	10.81	6.88	17.84
November	164.1	60.26	13.38	175.5	164.6	18.28	27.72	10.33	7.72	17.40
December	188.3	56.88	13.38	205.9	193.7	21.41	28.64	10.24	9.36	18.40
Year	2092.1	783.43	13.52	2103.6	1971.1	219.16	337.27	123.75	88.92	213.52

Legends

GlobHor	Global horizontal irradiation	EArray	Effective energy at the output of the array
DiffHor	Horizontal diffuse irradiation	E_User	Energy supplied to the user
T_Amb	Ambient Temperature	E_Solar	Energy from the sun
GlobInc	Global incident in coll. plane	E_Grid	Energy injected into grid
GlobEff	Effective Global, corr. for IAM and shadings	EFrGrid	Energy from the grid

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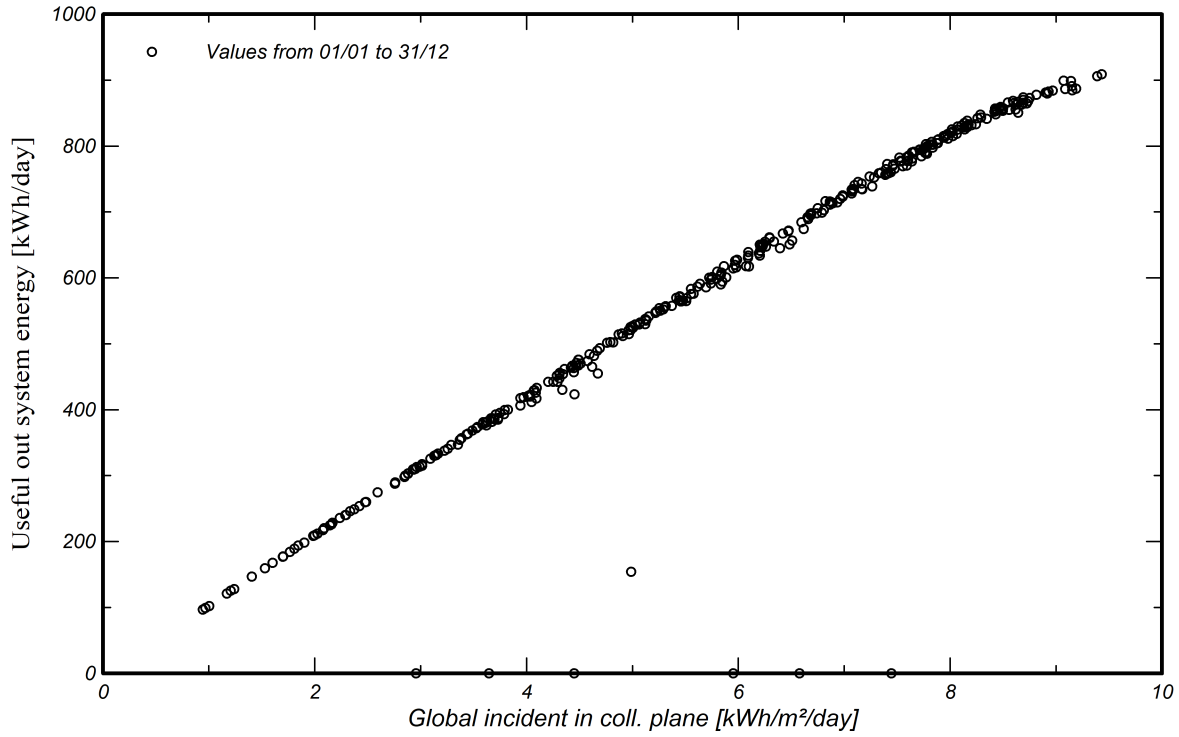
Loss diagram



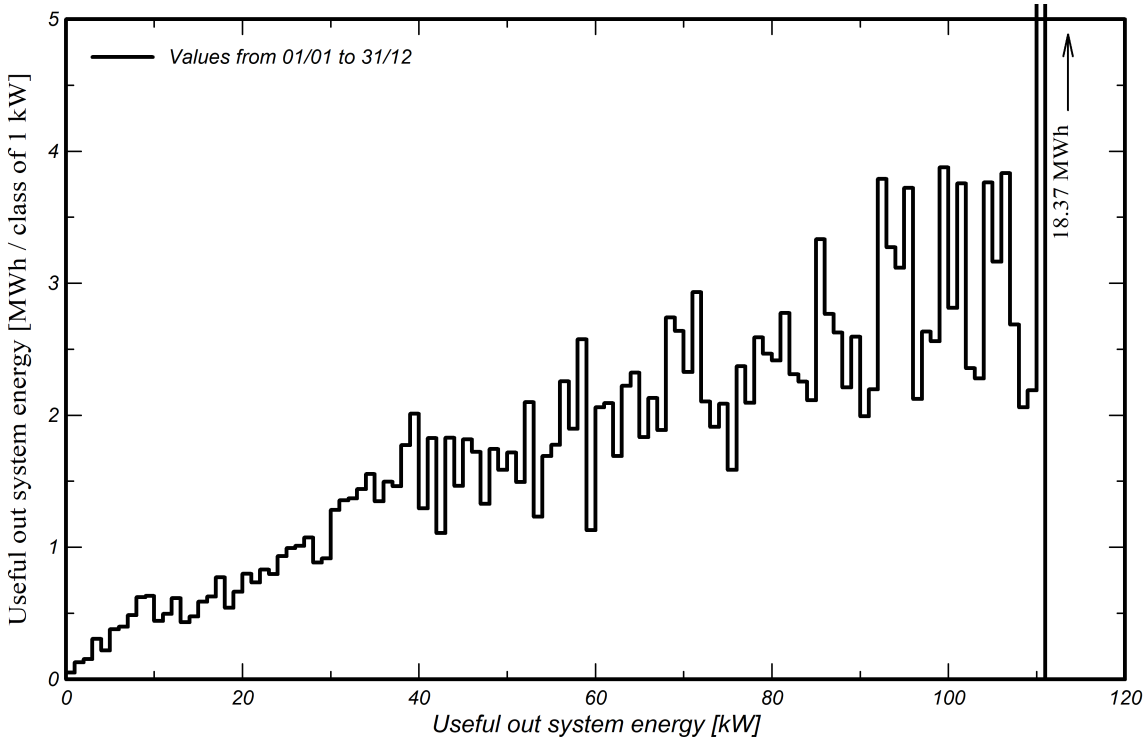
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Predef. graphs

Daily Input/Output diagram

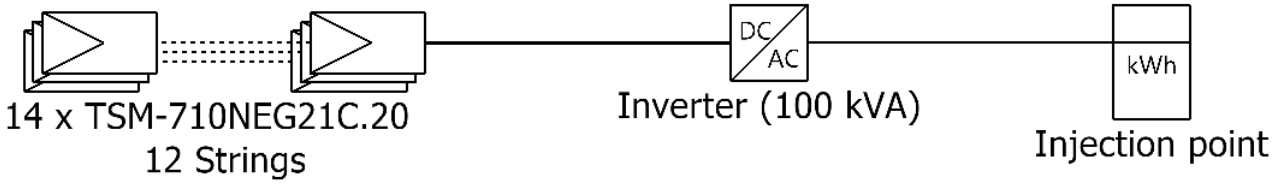


System Output Power Distribution



Single-line diagram

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PV module	TSM-710NEG21C.20
Inverter	SUN2000-100KTL-M2-480Vac
String	14 x TSM-710NEG21C.20

	PTAR SAMACA	FEM ENERGIA SAS (Colombi
	VC2 : Mesas 2x14 Trina710Wbf-Sun2000-100KTL-M2	23/08/25