Version 7.4.0

PVsyst - Simulation report

Grid-Connected System

Project: Concorde - SolarGis

Variant: Concorde_final_año_pac_v0

Tracking system with backtracking

System power: 7546 kWp

Concorde - Chile

Autor(a)
D'E CAPITAL (Chile)

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Project summary

Geographical Site
Concorde
Chile

Situation

Latitude	-26.43 °S
Longitude	-70.30 °W
Altitude	470 m
Time zone	UTC-4

Project settings
Albedo 0.20

Meteo data
Concorde
SolarGIS Monthly aver. , period not spec. - Sintético

System summary

Grid-Connected System

Tracking system with backtracking

PV Field Orientation

Orientation	
Tracking plane, tilted axis	
Axis Tilt	2 °
Azimuth	0 °

Tracking algorithm
Astronomic calculation
Backtracking activated

Near Shadings
According to strings
Electrical effect 70 %
Diffuse shading Automatic

System information

PV Array

Nb. of modules	13720 units
Pnom total	7546 kWp

Inverters

Nb. of units	18 units
Pnom total	5760 kWac
Grid power limit	6000 kVA
Grid lim. Pnom ratio	1.258

User's needs
Unlimited load (grid)

Results summary

Produced Energy	19384097 kWh/year	Specific production	2569 kWh/kWp/year	Perf. Ratio PR	81.43 %

Table of contents

Project and results summary 2
General parameters, PV Array Characteristics, System losses 3
Horizon definition 5
Near shading definition - Iso-shadings diagram 6
Main results 7
Loss diagram 8
Predef. graphs 9
Single-line diagram 10

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VCR, Simulation date:
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General parameters

Grid-Connected System

Tracking system with backtracking

PV Field Orientation

Orientation

Tracking plane, tilted axis	
Axis Tilt	2 °
Azimuth	0 °

Tracking algorithm

Astronomic calculation	
Backtracking activated	

Backtracking array

Nb. of trackers	124 units

Sizes

Tracker Spacing	11.9 m
Collector width	4.57 m
Ground Cov. Ratio (GCR)	38.3 %
Phi min / max.	-/+ 55.0 °

Backtracking strategy

Phi limits for BT	-/+ 67.4 °
Backtracking pitch	11.9 m
Backtracking width	4.57 m

Models used

Transposition	Perez
Diffuse	Perez, Meteonorm
Circumsolar	separate

Horizon

Average Height	4.5 °

Near Shadings

According to strings	
Electrical effect	70 %
Diffuse shading	Automatic

User's needs

Unlimited load (grid)

Bifacial system

Model: 2D Calculation
unlimited trackers

Bifacial model geometry

Tracker Spacing	11.93 m
Tracker width	4.57 m
GCR	38.3 %
Axis height above ground	2.10 m

Bifacial model definitions

Ground albedo	0.14
Bifaciality factor	70 %
Rear shading factor	5.0 %
Rear mismatch loss	10.0 %
Shed transparent fraction	0.0 %

Grid power limitation

Apparent power	6000 kVA
Pnom ratio	1.258

Power factor

Cos(phi) (lagging)

PV Array Characteristics

PV module

Manufacturer	Suntech
Model	STP550S-C72/Pmh+_1500V_20V02_decap
(Custom parameters definition)	
Unit Nom. Power	550 Wp
Number of PV modules	13720 units
Nominal (STC)	7546 kWp
Modules	490 Strings x 28 In series

At operating cond. (50°C)

Pmpp	6878 kWp
U mpp	1050 V
I mpp	6548 A

Inverter

Manufacturer	Sungrow
Model	SG350HX-20A-Preliminary
(Custom parameters definition)	
Unit Nom. Power	320 kWac
Number of inverters	18 units
Total power	5760 kWac
Operating voltage	500-1500 V
Max. power (=>30°C)	352 kWac
Pnom ratio (DC:AC)	1.31
Power sharing within this inverter	

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PV Array Characteristics

Total PV power

Nominal (STC)	7546 kWp
Total	13720 modules
Module area	35458 m²
Cell area	32717 m²

Total inverter power

Total power	5760 kWac
Max. power	6336 kWac
Number of inverters	18 units
Pnom ratio	1.31

Array losses

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. 0.89 mΩ
Loss Fraction 0.5 % at STC

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

LID - Light Induced Degradation
Loss Fraction 1.5 %

Module Quality Loss
Loss Fraction -0.6 %

Module mismatch losses
Loss Fraction 1.0 % at MPP

Strings Mismatch loss
Loss Fraction 0.1 %

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

0°	30°	50°	60°	70°	75°	80°	85°	90°
1.000	1.000	1.000	0.981	0.946	0.920	0.857	0.707	0.000

System losses

Auxiliaries loss
constant (fans) 11.60 kW
0.0 kW from Power thresh.

AC wiring losses

Inv. output line up to MV transfo

Inverter voltage	800 Vac tri
Loss Fraction	0.42 % at STC

Inverter: SG350HX-20A-Preliminary

Wire section (18 Inv.)	Alu 18 x 3 x 400 mm²
Average wires length	83 m

MV line up to Injection

MV Voltage	23 kV
Wires	Alu 3 x 120 mm²
Length	2006 m
Loss Fraction	0.74 % at STC

AC losses in transformers

MV transfo
Medium voltage 23 kV

Transformer parameters

Nominal power at STC	7.43 MVA
Iron Loss (24/24 Connexion)	6.39 kVA
Iron loss fraction	0.09 % at STC
Copper loss	78.20 kVA
Copper loss fraction	1.05 % at STC
Coils equivalent resistance	3 x 0.91 mΩ

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VCR, Simulation date:
20/11/23 18:16
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Horizon definition

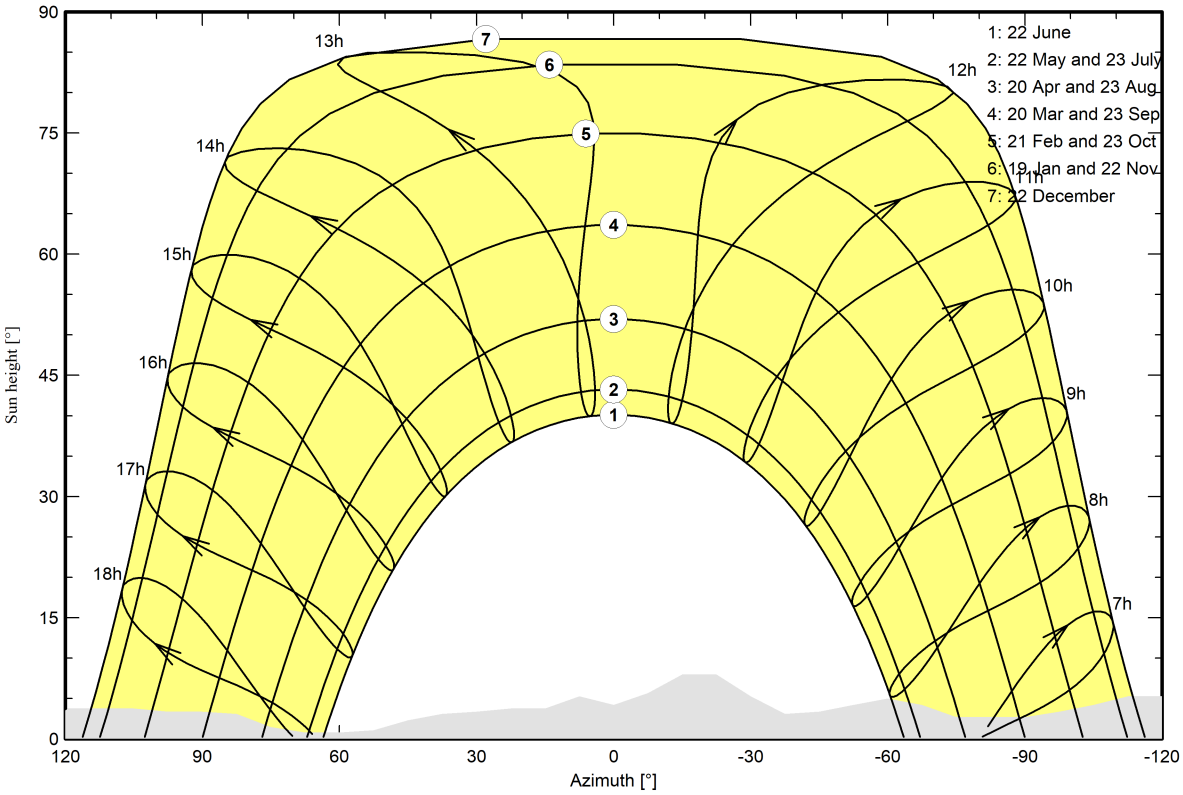
Horizon from PVGIS website API, Lat=-26°26"4', Long=-70°18"8', Alt=470m

Average Height	4.5 °	Albedo Factor	0.85
Diffuse Factor	0.96	Albedo Fraction	100 %

Horizon profile

Azimuth [°]	-180	-173	-165	-158	-150	-143	-135	-128	-120	-113	-105	-98
Height [°]	7.6	9.9	8.8	6.5	6.1	6.1	5.0	4.6	5.3	5.3	4.2	3.4
Azimuth [°]	-90	-75	-68	-60	-53	-45	-38	-30	-23	-15	-8	0
Height [°]	2.7	2.7	4.2	5.0	4.2	3.4	3.1	5.3	8.0	8.0	5.7	4.2
Azimuth [°]	8	15	23	30	38	45	53	60	68	75	83	90
Height [°]	5.3	3.8	3.8	3.4	3.1	2.3	1.1	0.8	0.8	1.5	3.1	3.4
Azimuth [°]	98	105	120	128	135	143	150	158	165	173		
Height [°]	3.4	3.8	3.8	4.2	5.0	5.3	5.3	5.7	6.9	8.0		

Sun Paths (Height / Azimuth diagram)



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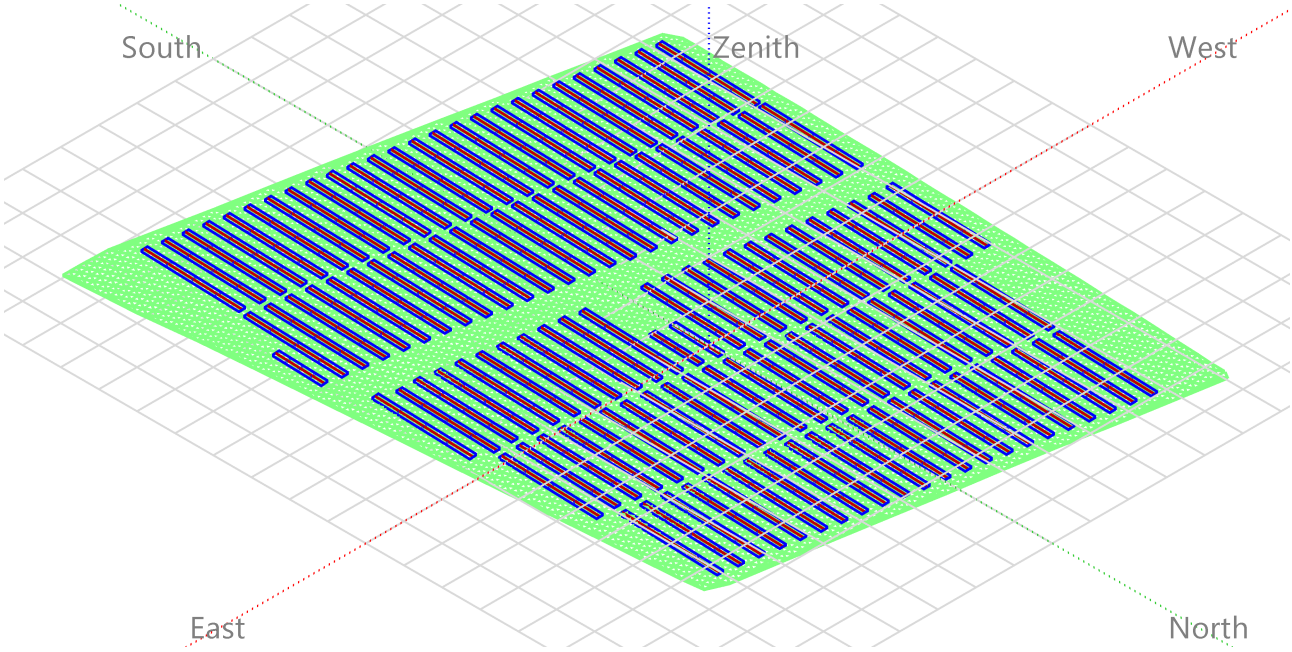
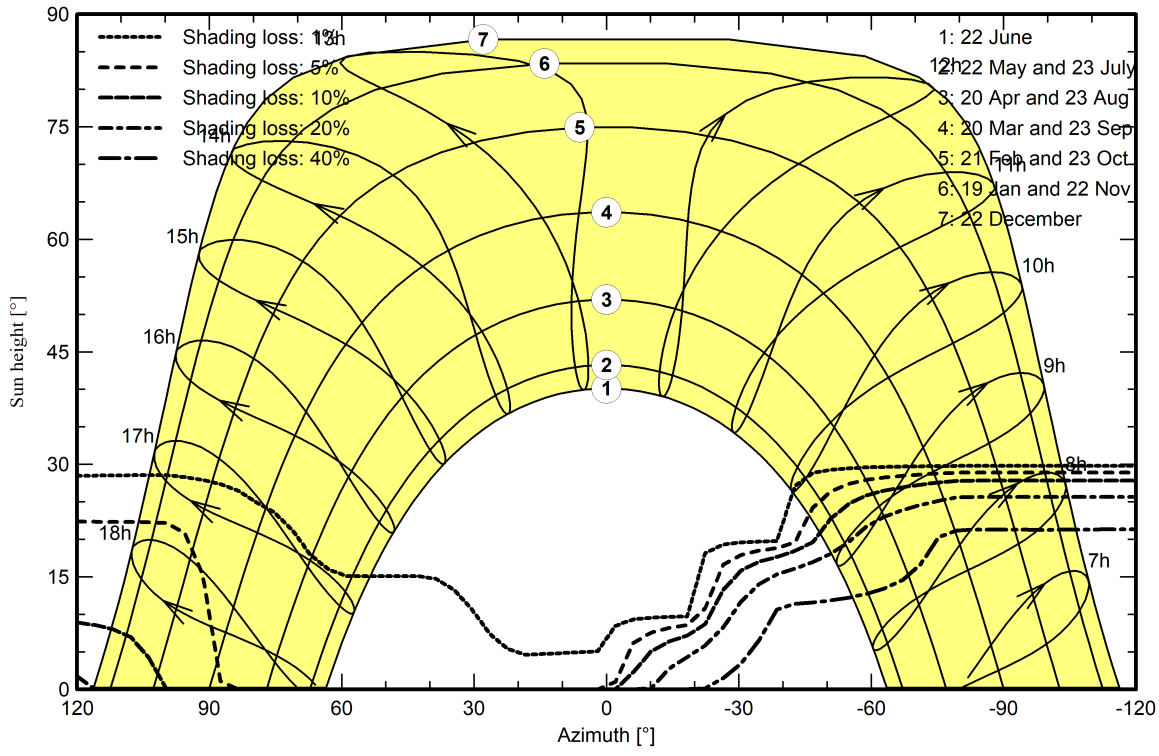
Near shadings parameter

Perspective of the PV-field and surrounding shading scene



Iso-shadings diagram

Orientation #1



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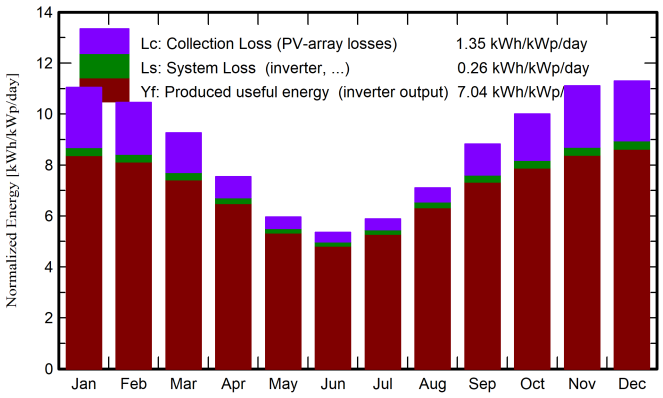
Main results

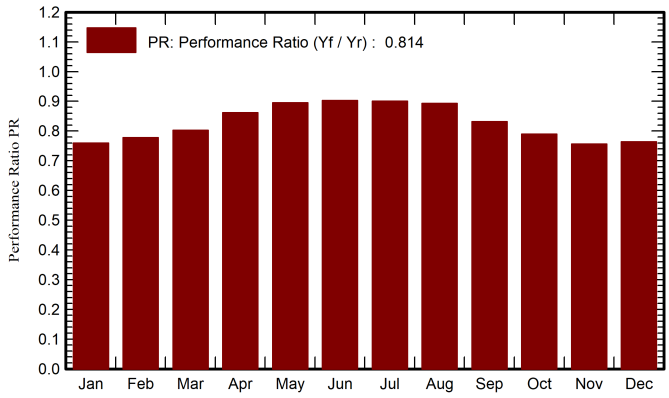
System Production

Produced Energy	19384097 kWh/year	Specific production	2569 kWh/kWp/year
		Perf. Ratio PR	81.43 %

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	261.6	65.00	20.10	342.4	335.6	2035795	1961865	0.759
February	220.2	54.80	20.10	292.9	286.5	1782764	1718006	0.777
March	213.0	52.10	19.00	287.1	279.9	1804121	1738706	0.803
April	165.2	41.90	17.20	226.2	221.1	1523696	1470365	0.861
May	134.8	37.30	15.60	184.8	180.7	1291720	1248679	0.895
June	117.2	31.70	14.10	160.6	156.8	1130887	1093984	0.903
July	130.4	33.00	13.60	182.3	178.0	1280566	1238980	0.901
August	160.4	39.40	14.60	220.0	215.8	1535240	1482945	0.893
September	193.7	48.10	15.50	264.8	259.0	1724145	1662198	0.832
October	235.2	57.60	16.40	310.0	304.1	1916914	1846894	0.789
November	251.6	58.30	17.50	333.3	324.3	1972489	1901219	0.756
December	266.4	63.00	18.79	350.3	341.5	2095720	2020255	0.764
Year	2349.7	582.20	16.86	3154.8	3083.2	20094056	19384097	0.814

Legends

GlobHor	Global horizontal irradiation	EArray	Effective energy at the output of the array
DiffHor	Horizontal diffuse irradiation	E_Grid	Energy injected into grid
T_Amb	Ambient Temperature	PR	Performance Ratio
GlobInc	Global incident in coll. plane		
GlobEff	Effective Global, corr. for IAM and shadings		

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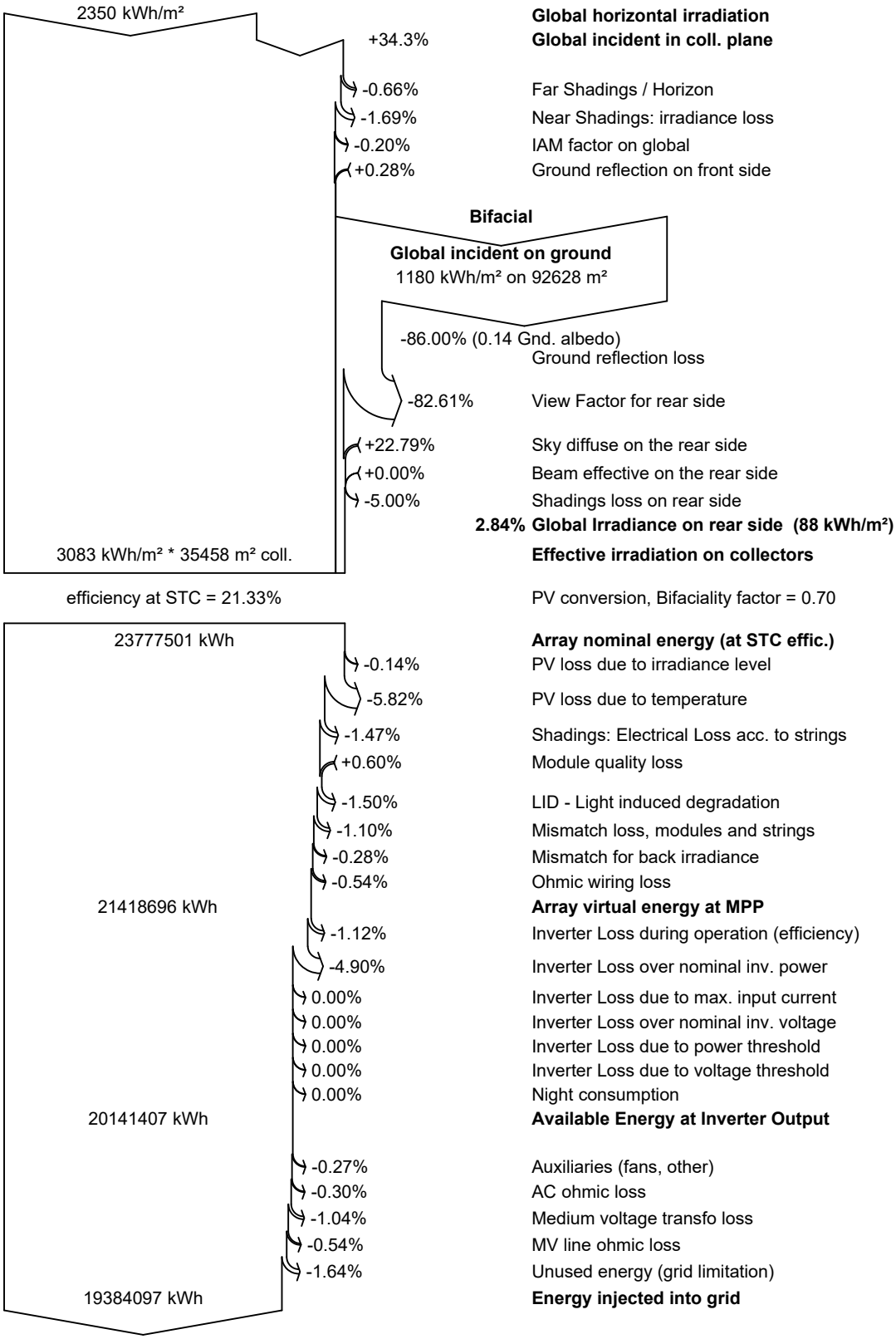
Loss diagram



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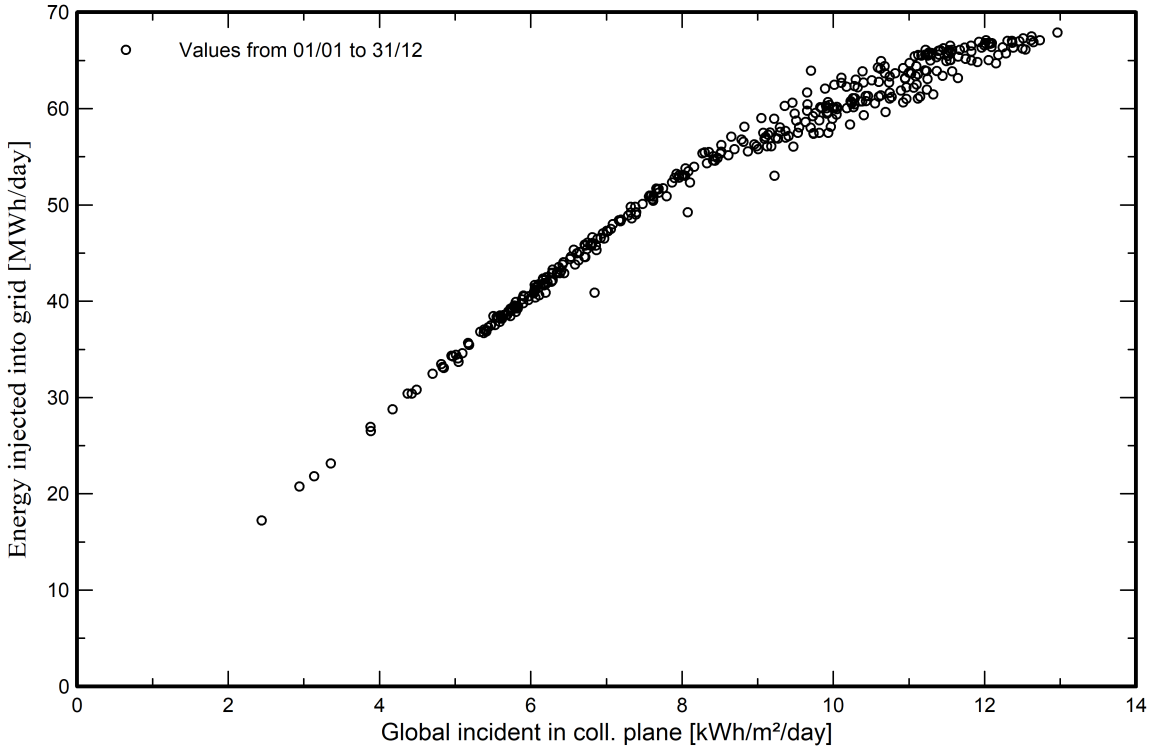
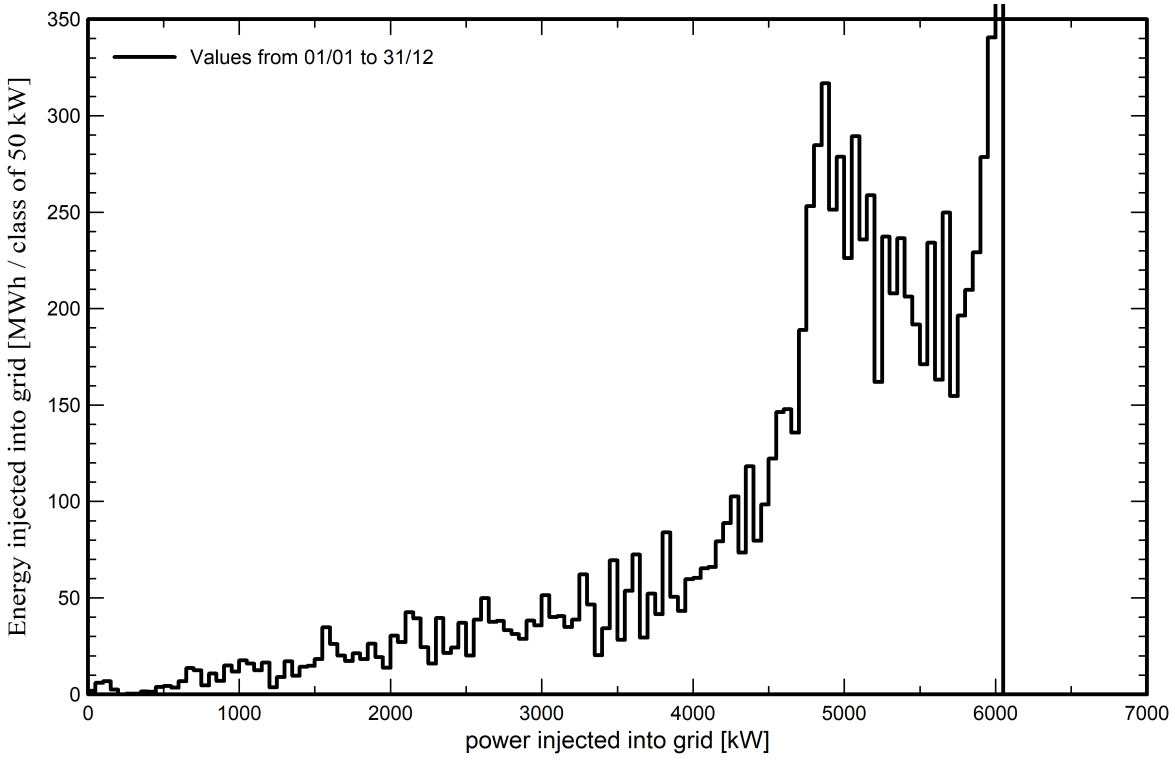
Predef. graphs

Diagrama entrada/salida diaria



Distribución de la potencia de salida del sistema



Single-line diagram

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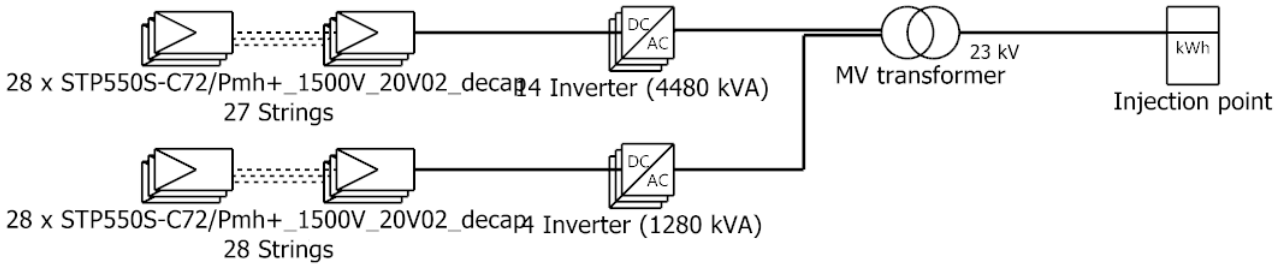

PV module	STP550S-C72/Pmh+_1500V_20V02_decap
Inverter	SG350HX-20A-Preliminary
String	28 x STP550S-C72/Pmh+_1500V_20V02_decap

Concorde - SolarGis	D'E CAPITAL (Chile)
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