

PVsyst - Simulation report

Grid-Connected System

Project: Projets Solaires St Pourcain sur Sioule

Variant: Ville CTM

No 3D scene defined, no shadings

System power: 138 kWp

Saint-Pourçain-sur-Sioule - France

Auteur

TECSOL S.A. (France)



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PVsyst V7.3.1

VCO, Simulation date:
02/02/23 10:59
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Project summary

Geographical Site Saint-Pourçain-sur-Sioule France	Situation Latitude 46.31 °N Longitude 3.29 °E Altitude 240 m Time zone UTC+1	Project settings Albedo 0.20
Meteo data Saint-Pourçain-sur-Sioule Meteonorm 8.1 (1996-2015), Sat=100 % - Synthétique		

System summary

Grid-Connected System	No 3D scene defined, no shadings	
PV Field Orientation Fixed plane Tilt/Azimuth 20 / 38 °	Near Shadings No Shadings	User's needs Unlimited load (grid)
System information		
PV Array	Inverters	
Nb. of modules 336 units	Nb. of units 2 units	
Pnom total 138 kWp	Pnom total 100 kWac	
	Pnom ratio 1.378	

Results summary

Produced Energy 171429 kWh/year	Specific production 1244 kWh/kWp/year	Perf. Ratio PR 88.11 %
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General parameters

Grid-Connected System		No 3D scene defined, no shadings	
PV Field Orientation		Sheds configuration	Models used
Orientation		No 3D scene defined	Transposition Perez
Fixed plane			Diffuse Perez, Meteonorm
Tilt/Azimuth	20 / 38 °		Circumsolar separate
Horizon		Near Shadings	User's needs
Average Height	1.5 °	No Shadings	Unlimited load (grid)

PV Array Characteristics

PV module		Inverter	
Manufacturer	Longi Solar	Manufacturer	Huawei Technologies
Model	LR5-54HPB-410M	Model	SUN2000-50KTL-M3-400V
(Original PVsyst database)		(Original PVsyst database)	
Unit Nom. Power	410 Wp	Unit Nom. Power	50.0 kWac
Number of PV modules	336 units	Number of inverters	2 units
Nominal (STC)	138 kWp	Total power	100 kWac
Modules	16 Strings x 21 In series	Operating voltage	200-1000 V
At operating cond. (50°C)		Max. power (=>35°C)	55.0 kWac
Pmpp	126 kWp	Pnom ratio (DC:AC)	1.38
U mpp	595 V	Power sharing within this inverter	
I mpp	212 A		
Total PV power		Total inverter power	
Nominal (STC)	138 kWp	Total power	100 kWac
Total	336 modules	Number of inverters	2 units
Module area	656 m ²	Pnom ratio	1.38
Cell area	604 m ²		

Array losses

Thermal Loss factor		DC wiring losses		Module Quality Loss				
Module temperature according to irradiance		Global array res.	46 mΩ	Loss Fraction	-0.4 %			
Uc (const)	20.0 W/m ² K	Loss Fraction	1.5 % at STC					
Uv (wind)	0.0 W/m ² K/m/s							
Module mismatch losses		Strings Mismatch loss						
Loss Fraction	2.0 % at MPP	Loss Fraction	0.1 %					
IAM loss factor								
Incidence effect (IAM): User defined profile								
0°	25°	45°	60°	65°	70°	75°	80°	90°
1.000	1.000	0.995	0.962	0.936	0.903	0.851	0.754	0.000



Horizon definition

Horizon from PVGIS website API, Lat=46°18'31', Long=3°17'17', Alt=240m

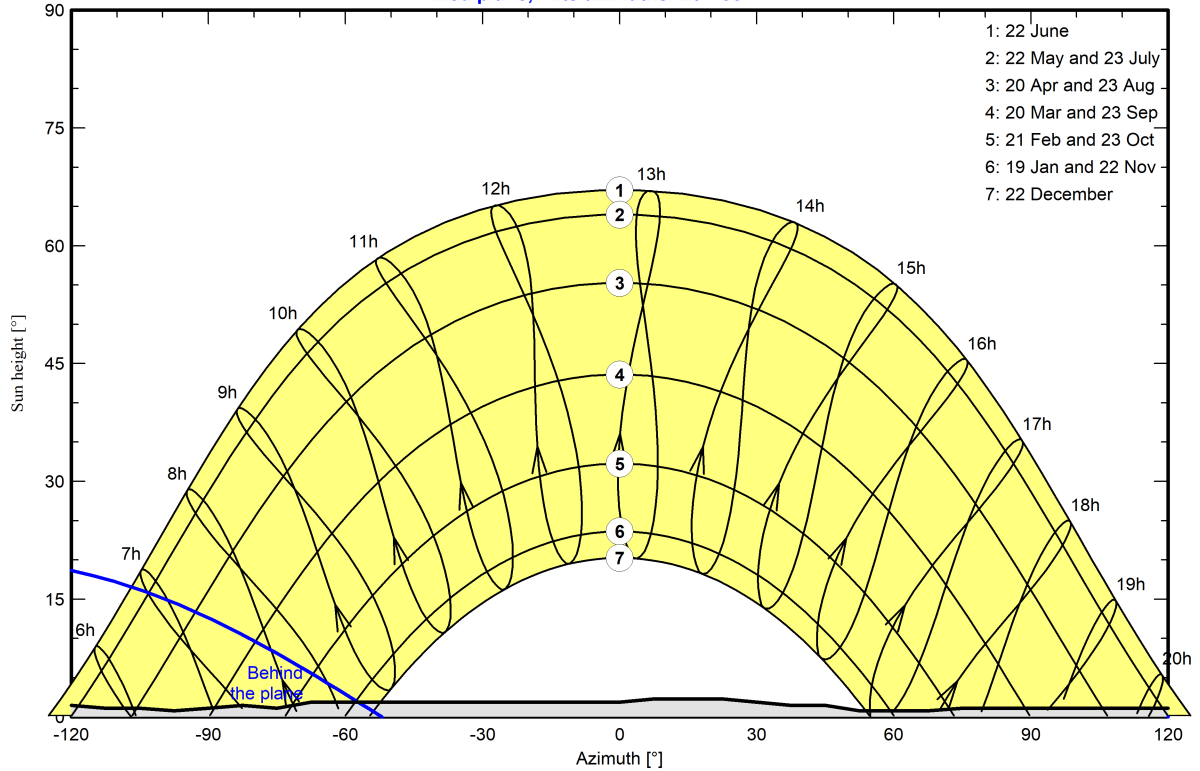
Average Height	1.5 °	Albedo Factor	0.92
Diffuse Factor	0.99	Albedo Fraction	100 %

Horizon profile

Azimuth [°]	-180	-173	-165	-128	-120	-113	-105	-98	-90	-83	-75	-68
Height [°]	0.8	1.5	1.9	1.9	1.5	1.1	1.1	0.8	1.1	1.5	1.1	1.9
Azimuth [°]	0	8	23	30	38	45	53	68	75	165	173	180
Height [°]	1.9	2.3	2.3	1.9	1.5	1.5	0.8	0.8	1.1	1.1	0.8	0.8

Sun Paths (Height / Azimuth diagram)

Fixed plane, Tilts/azimuths: 20° / 38°





Main results

System Production

Produced Energy 171429 kWh/year

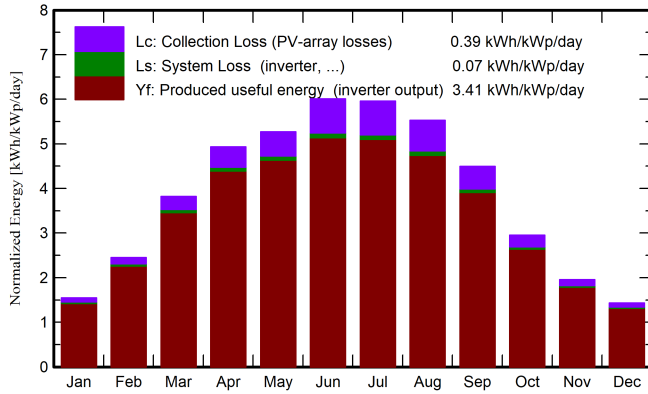
Specific production

1244 kWh/kWp/year

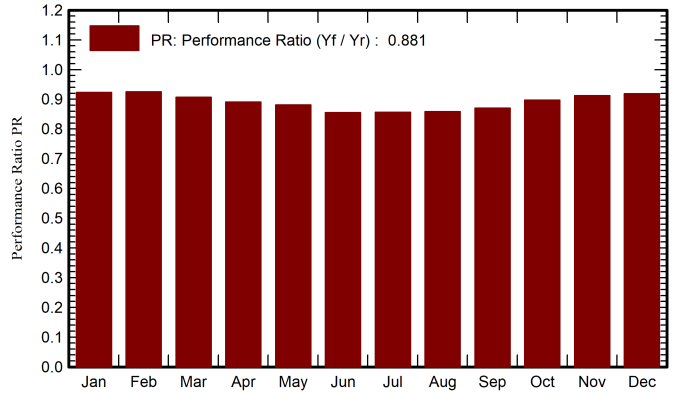
Performance Ratio PR

88.11 %

Normalized productions (per installed kWp)



Performance Ratio PR



Balances and main results

	GlobHor	DiffHor	T_Amb	GlobInc	GlobEff	EArray	E_Grid	PR
	kWh/m ²	kWh/m ²	°C	kWh/m ²	kWh/m ²	kWh	kWh	ratio
January	35.7	20.54	3.55	48.0	46.2	6227	6098	0.923
February	54.4	28.52	3.84	68.6	66.5	8927	8748	0.926
March	102.6	50.67	7.37	118.4	115.3	15096	14800	0.907
April	138.8	67.66	10.46	147.9	144.3	18525	18162	0.891
May	160.7	86.25	14.42	163.4	159.2	20217	19820	0.881
June	180.6	74.30	18.53	180.3	176.1	21690	21243	0.855
July	183.6	89.53	20.40	184.7	180.2	22234	21792	0.856
August	161.9	72.18	19.93	171.5	167.5	20708	20288	0.859
September	118.0	42.89	15.58	134.8	131.9	16505	16166	0.870
October	74.4	39.64	12.32	91.5	88.8	11522	11302	0.897
November	42.4	20.92	7.22	58.8	56.7	7538	7386	0.912
December	31.2	16.59	4.35	44.4	42.7	5743	5623	0.919
Year	1284.3	609.72	11.55	1412.4	1375.4	174931	171429	0.881

Legends

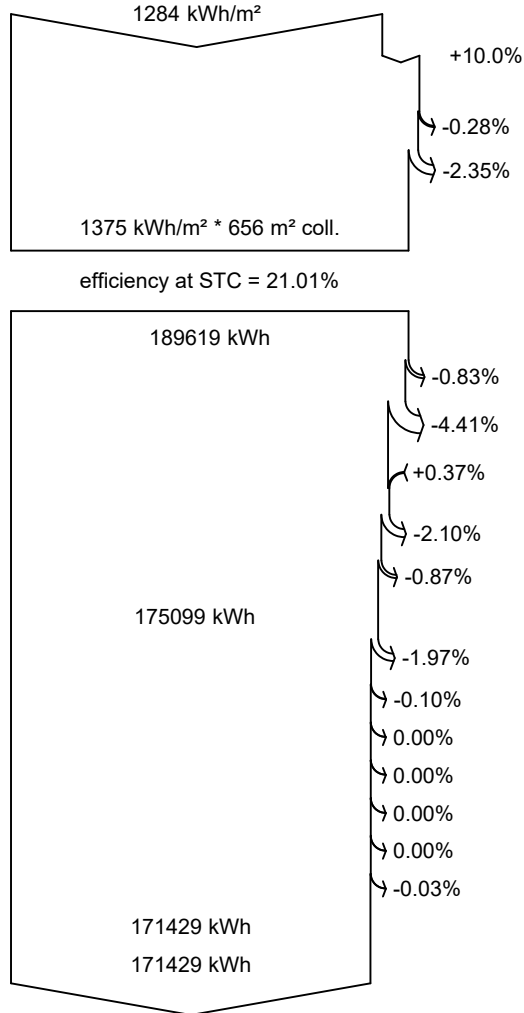
GlobHor	Global horizontal irradiation	EArray	Effective energy at the output of the array
DiffHor	Horizontal diffuse irradiation	E_Grid	Energy injected into grid
T_Amb	Ambient Temperature	PR	Performance Ratio
GlobInc	Global incident in coll. plane		
GlobEff	Effective Global, corr. for IAM and shadings		



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Loss diagram



Global horizontal irradiation

Global incident in coll. plane

Far Shadings / Horizon

IAM factor on global

Effective irradiation on collectors

PV conversion

Array nominal energy (at STC effic.)

PV loss due to irradiance level

PV loss due to temperature

Module quality loss

Mismatch loss, modules and strings

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

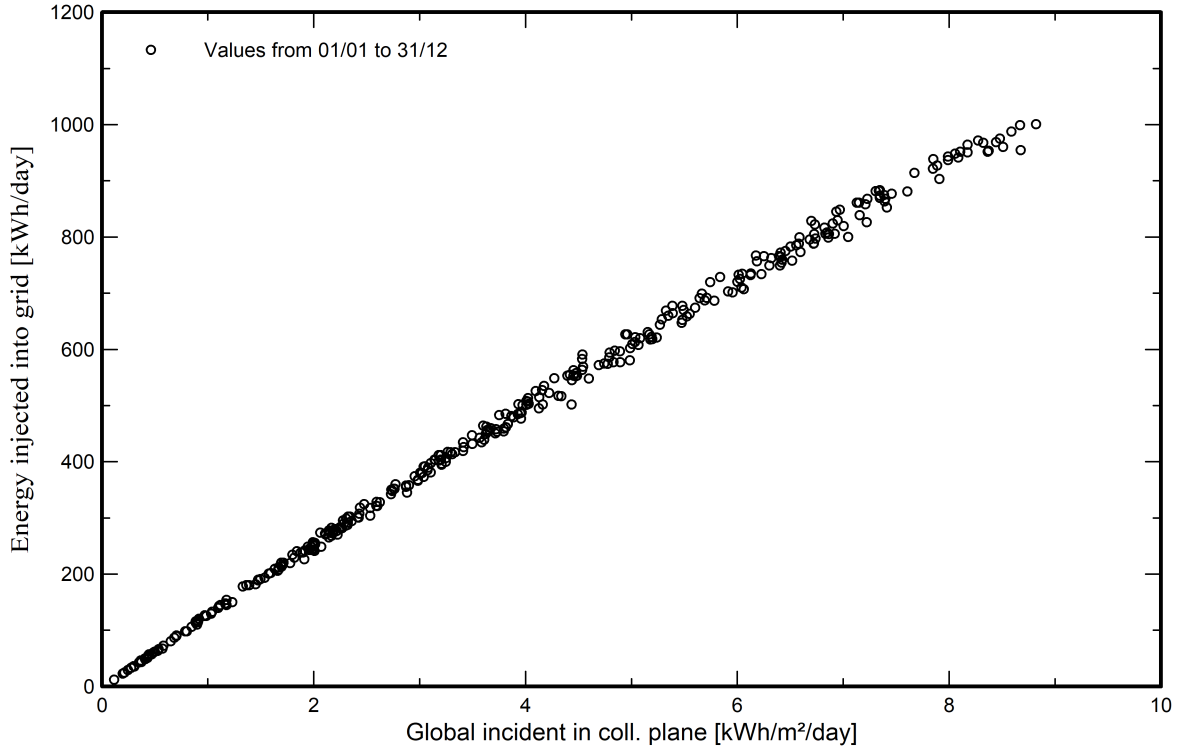


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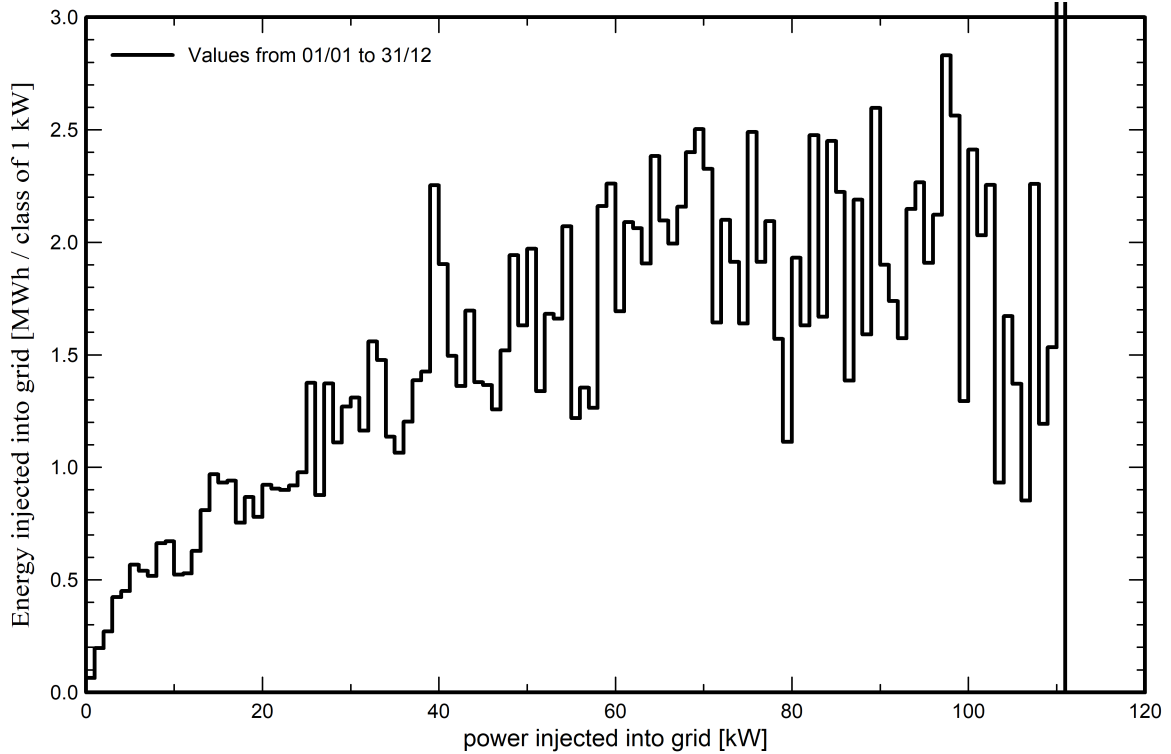
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Predef. graphs

Diagramme d'entrée/sortie journalier



Distribution de la puissance de sortie système

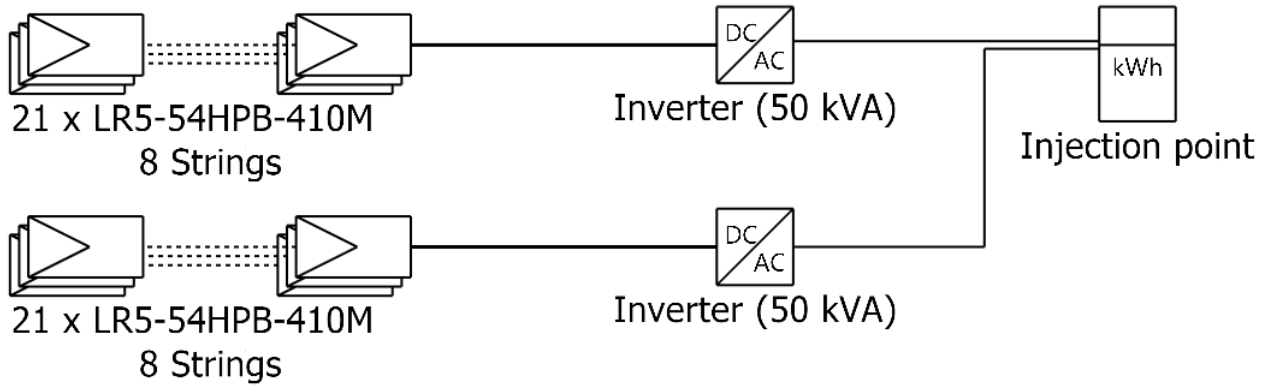




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Single-line diagram



PV module	LR5-54HPB-410M
Inverter	SUN2000-50KTL-M3-400V
String	21 x LR5-54HPB-410M

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Sioule

TECSOL S.A. (Fran

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