

PVsyst - Simulation report

Stand alone system

Project: Centre d'Innovation à Gorgo

Variant: Nouvelle variante de simulation

Stand alone system with batteries

System power: 11.50 kWp

Gorgo - Burkina Faso



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Project summary

Geographical Site		Situation		Project settings	
Gorgo		Latitude	12.07 °N	Albedo	0.20
Burkina Faso		Longitude	-0.37 °W		
		Altitude	275 m		
		Time zone	UTC		
Meteo data					
Gorgo					
Meteonorm 8.0 (1986-2005), Sat=100 % - Synthétique					

System summary

Stand alone system		Stand alone system with batteries			
PV Field Orientation		User's needs			
Fixed plane		Daily household consumers			
Tilt/Azimuth	15 / 0 °	Constant over the year			
		Average		43 kWh/Day	
System information					
PV Array					
Nb. of modules		20 units	Battery pack		
Pnom total		11.50 kWp	Technology	Lithium-ion, LFP	
			Nb. of units	1 unit	
			Voltage	48 V	
			Capacity	350 Ah	

Results summary

Available Energy	19525 kWh/year	Specific production	1698 kWh/kWp/year	Perf. Ratio PR	62.86 %
Used Energy	15155 kWh/year			Solar Fraction SF	96.03 %

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General parameters

Stand alone system	Stand alone system with batteries	
PV Field Orientation	Sheds configuration	
Orientation	Models used	
Fixed plane	No 3D scene defined	Transposition Perez
Tilt/Azimuth 15 / 0 °		Diffuse Perez, Meteonorm
		Circumsolar separate
User's needs		
Daily household consumers		
Constant over the year		
Average 43 kWh/Day		

PV Array Characteristics

PV module		Battery	
Manufacturer Jinkosolar		Manufacturer Felicity Solar	
Model JKM575M-7RL4-V		Model Batterie Felicity Solar 17.5kWh	
(Original PVsyst database)		Technology Lithium-ion, LFP	
Unit Nom. Power 575 Wp		Nb. of units 1 Unit	
Number of PV modules 20 units		Discharging min. SOC 10.0 %	
Nominal (STC) 11.50 kWp		Stored energy 15.1 kWh	
Modules 2 Strings x 10 In series		Battery Pack Characteristics	
At operating cond. (50°C)		Voltage 48 V	
Pmpp 10.49 kWp		Nominal Capacity 350 Ah (C10)	
U mpp 401 V		Temperature Fixed 30 °C	
I mpp 26 A			
Controller		Battery Management control	
Manufacturer Generic		Threshold commands as SOC calculation	
Model Universal controller with MPPT converter		Charging SOC = 0.96 / 0.80	
Technology MPPT converter		Discharging SOC = 0.10 / 0.35	
Temp coeff. -5.0 mV/°C/Elem.			
Converter			
Maxi and EURO efficiencies 97.0 / 95.0 %			
Total PV power			
Nominal (STC) 12 kWp			
Total 20 modules			
Module area 54.7 m ²			

Array losses

Thermal Loss factor	DC wiring losses	Serie Diode Loss						
Module temperature according to irradiance	Global array res. 253 mΩ	Voltage drop 0.7 V						
Uc (const) 20.0 W/m ² K	Loss Fraction 1.5 % at STC	Loss Fraction 0.2 % at STC						
Uv (wind) 0.0 W/m ² K/m/s								
Module Quality Loss	Module mismatch losses	Strings Mismatch loss						
Loss Fraction -0.8 %	Loss Fraction 2.0 % at MPP	Loss Fraction 0.1 %						
IAM loss factor								
Incidence effect (IAM): Fresnel AR coating, n(glass)=1.526, n(AR)=1.290								
0°	30°	50°	60°	70°	75°	80°	85°	90°
1.000	0.999	0.987	0.962	0.892	0.816	0.681	0.440	0.000



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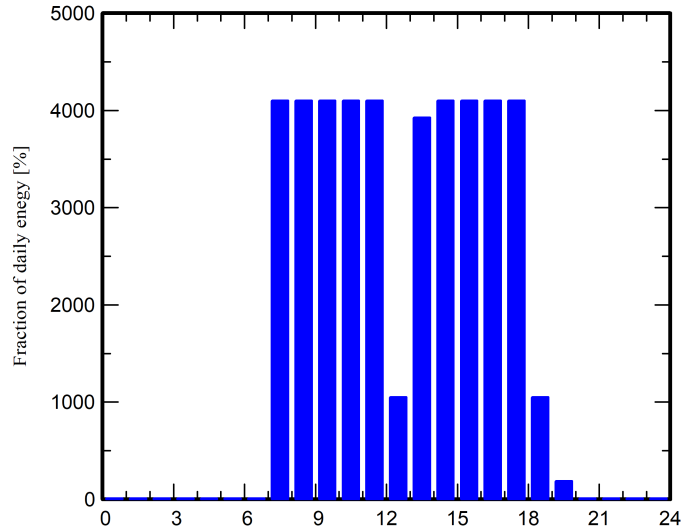
Detailed User's needs

Daily household consumers, Constant over the year, average = 43 kWh/day

Annual values

	Number	Power	Use	Energy
		W	Hour/day	Wh/day
Lampes (LED ou fluo)	1	352W/lamp	6.0	2112
TV / PC / Mobile	1	1731W/app	6.0	10386
Autres utilisations	1	3050W tot	10.0	30500
Consomm. de veille			24.0	240
Total daily energy				43238Wh/day

Hourly distribution





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Main results

System Production

Available Energy 19525 kWh/year
Used Energy 15155 kWh/year
Excess (unused) 3624 kWh/year

Loss of Load

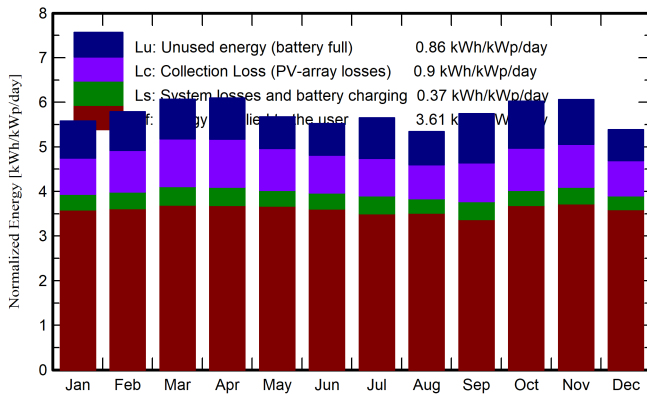
Time Fraction 5.7 %
Missing Energy 626 kWh/year

Specific production 1698 kWh/kWp/year
Performance Ratio PR 62.86 %
Solar Fraction SF 96.03 %

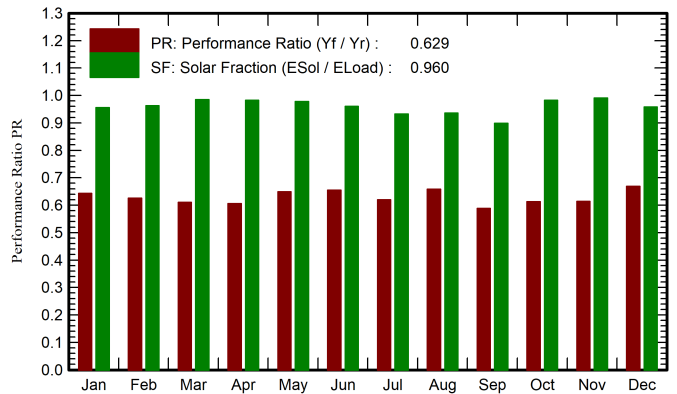
Battery aging (State of Wear)

Cycles SOW 95.8 %
Static SOW 85.9 %
Battery lifetime 7.1 years

Normalized productions (per installed kWp)



Performance Ratio PR



Balances and main results

	GlobHor kWh/m ²	GlobEff kWh/m ²	E_Avail kWh	EUnused kWh	E_Miss kWh	E_User kWh	E_Load kWh	SoIFrac ratio
January	154.0	170.0	1642	294.0	59.3	1281	1340	0.956
February	151.1	159.2	1501	276.5	45.0	1166	1211	0.963
March	183.2	184.9	1713	314.1	20.5	1320	1340	0.985
April	186.4	179.4	1660	317.6	22.1	1275	1297	0.983
May	186.6	171.7	1615	249.9	29.4	1311	1340	0.978
June	179.6	161.4	1547	242.0	50.8	1246	1297	0.961
July	189.7	170.8	1644	322.7	90.4	1250	1340	0.933
August	172.4	161.7	1563	265.1	85.5	1255	1340	0.936
September	171.0	168.8	1613	379.0	131.3	1166	1297	0.899
October	175.4	183.4	1746	372.6	23.5	1317	1340	0.982
November	161.8	178.8	1700	345.1	11.9	1285	1297	0.991
December	147.0	164.1	1581	245.1	56.6	1284	1340	0.958
Year	2058.1	2054.3	19525	3623.7	626.4	15155	15782	0.960

Legends

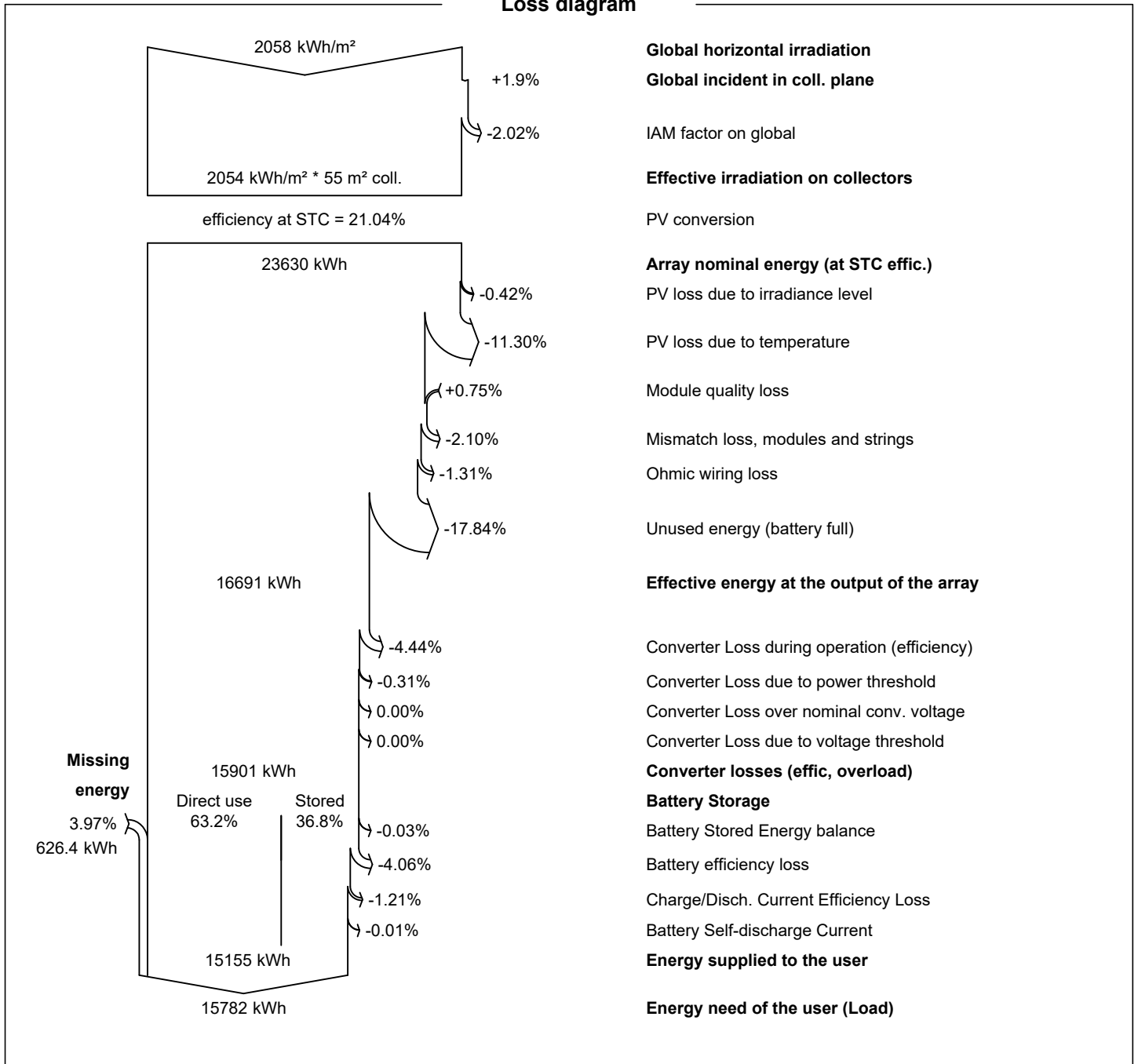
- GlobHor Global horizontal irradiation
- GlobEff Effective Global, corr. for IAM and shadings
- E_Avail Available Solar Energy
- EUnused Unused energy (battery full)
- E_Miss Missing energy
- E_User Energy supplied to the user
- E_Load Energy need of the user (Load)
- SoIFrac Solar fraction (EUsed / ELoad)



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Loss diagram





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Special graphs

Diagramme d'entrée/sortie journalier

