

PVsyst - Simulation report

Stand alone system

Project: Villanueva_La Guajira

Variant: Villanueva_La Guajira_2508W_vivienda

Stand alone system with batteries

System power: 900 Wp

Villanueva - Colombia



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PVsyst V7.2.4

VC0, Simulation date:
02/11/22 07:33
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Project summary

Geographical Site

Villanueva
Colombia

Situation

Latitude 10.61 °N
Longitude -72.97 °W
Altitude 238 m
Time zone UTC-5

Project settings

Albedo 0.20

Meteo data

Villanueva
Meteonorm 8.0 (1991-2007), Sat=100% - Sintético

System summary

Stand alone system

PV Field Orientation

Fixed plane
Tilt/Azimuth 11 / 0 °

Stand alone system with batteries

User's needs

Daily household consumers
Constant over the year
Average 2.5 kWh/Day

System information

PV Array

Nb. of modules 2 units
Pnom total 900 Wp

Battery pack

Technology Lithium-ion, LFP
Nb. of units 1 Unit
Voltage 26 V
Capacity 150 Ah

Results summary

Available Energy	1445 kWh/year	Specific production	1605 kWh/kWp/year	Perf. Ratio PR	50.53 %
Used Energy	905 kWh/year			Solar Fraction SF	98.86 %

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General parameters

Stand alone system

PV Field Orientation

Orientation

Fixed plane
Tilt/Azimuth 11 / 0 °

User's needs

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Average 2.5 kWh/Day

Stand alone system with batteries

Sheds configuration

No 3D scene defined

Models used

Transposition Perez
Diffuse Perez, Meteonorm
Circumsolar separate

PV Array Characteristics

PV module

Manufacturer Astronergy
Model CHSM72M-HC-450
(Original PVsyst database)
Unit Nom. Power 450 Wp
Number of PV modules 2 units
Nominal (STC) 900 Wp
Modules 1 String x 2 In series

At operating cond. (50°C)

Pmpp 821 Wp
U mpp 75 V
I mpp 11 A

Controller

Universal controller
Technology MPPT converter
Temp coeff. -5.0 mV/°C/Elem.

Converter

Maxi and EURO efficiencies 97.0 / 95.0 %

Total PV power

Nominal (STC) 1 kWp
Total 2 modules
Module area 4.4 m²

Battery

Manufacturer INTI
Model INTI 3.840 24V - 150Ah
Technology Lithium-ion, LFP
Nb. of units 1 Unit
Discharging min. SOC 20.0 %
Stored energy 3.2 kWh

Battery Pack Characteristics

Voltage 26 V
Nominal Capacity 150 Ah (C10)
Temperature Fixed 20 °C

Battery Management control

Threshold commands as SOC calculation
Charging SOC = 0.96 / 0.80
Discharging SOC = 0.20 / 0.50

Array losses

Thermal Loss factor

Module temperature according to irradiance
Uc (const) 20.0 W/m²K
Uv (wind) 0.0 W/m²K/m/s

DC wiring losses

Global array res. 114 mΩ
Loss Fraction 1.5 % at STC

Series Diode Loss

Voltage drop 0.7 V
Loss Fraction 0.8 % at STC

Module Quality Loss

Loss Fraction -0.8 %

Module mismatch losses

Loss Fraction 2.0 % at MPP

Strings Mismatch loss

Loss Fraction 0.1 %

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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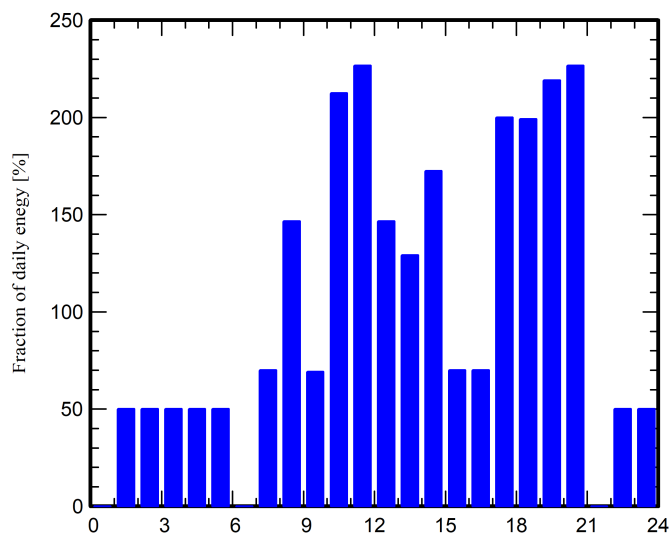
Detailed User's needs

Daily household consumers, Constant over the year, average = 2.5 kWh/day

Annual values

	Number	Power	Use	Energy
		W	Hour/day	Wh/day
Lámparas (LED o fluo)	4	10W/lamp	5.0	200
Licuadaora	1	80W/app	0.5	40
Ventilador	2	100W/app	4.0	800
Nevera	1		9	900
Tv+radio	1		4	373
Toma Multiproposito	2	30W tot	3.0	180
Cargador de Celular	1	5W tot	3.0	15
Total daily energy				2508Wh/day

Hourly distribution





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Main results

System Production

Available Energy 1445 kWh/year
Used Energy 905 kWh/year
Excess (unused) 522 kWh/year

Loss of Load

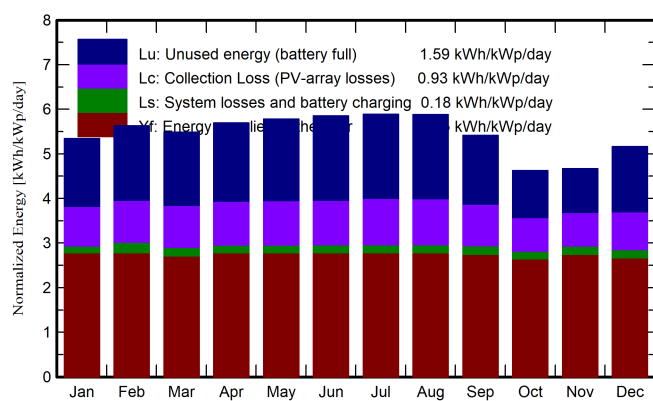
Time Fraction 1.4 %
Missing Energy 10 kWh/year

Specific production 1605 kWh/kWp/year
Performance Ratio PR 50.53 %
Solar Fraction SF 98.86 %

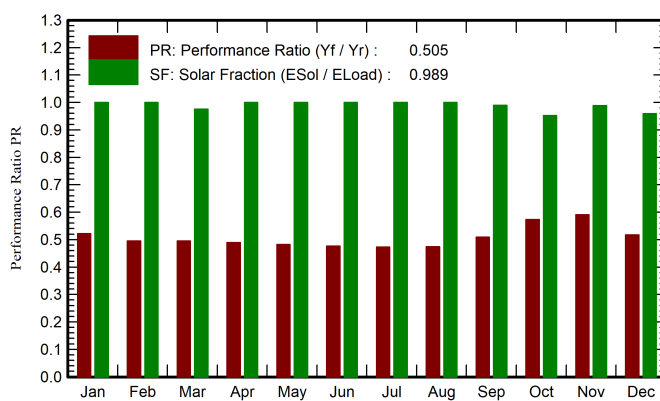
Battery aging (State of Wear)

Cycles SOW 98.1 %
Static SOW 90.0 %
Battery lifetime 10.0 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	SolFrac ratio
January	151.6	161.4	120.7	42.24	0.000	77.74	77.74	1.000
February	148.4	153.8	114.9	41.98	0.000	70.22	70.22	1.000
March	166.8	165.4	123.2	45.67	1.875	75.87	77.74	0.976
April	173.4	166.0	123.6	47.26	0.000	75.23	75.23	1.000
May	188.4	173.4	129.7	50.73	0.000	77.74	77.74	1.000
June	187.1	169.8	127.9	51.12	0.000	75.23	75.23	1.000
July	193.4	176.4	131.9	52.52	0.000	77.74	77.74	1.000
August	187.4	176.9	131.6	52.53	0.000	77.74	77.74	1.000
September	161.6	157.7	117.4	41.47	0.829	74.40	75.23	0.989
October	138.5	139.0	104.5	29.21	3.752	73.99	77.74	0.952
November	130.3	135.3	102.1	26.35	0.832	74.40	75.23	0.989
December	145.0	155.8	117.0	40.63	3.162	74.58	77.74	0.959
Year	1972.0	1930.9	1444.6	521.71	10.450	904.90	915.35	0.989

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

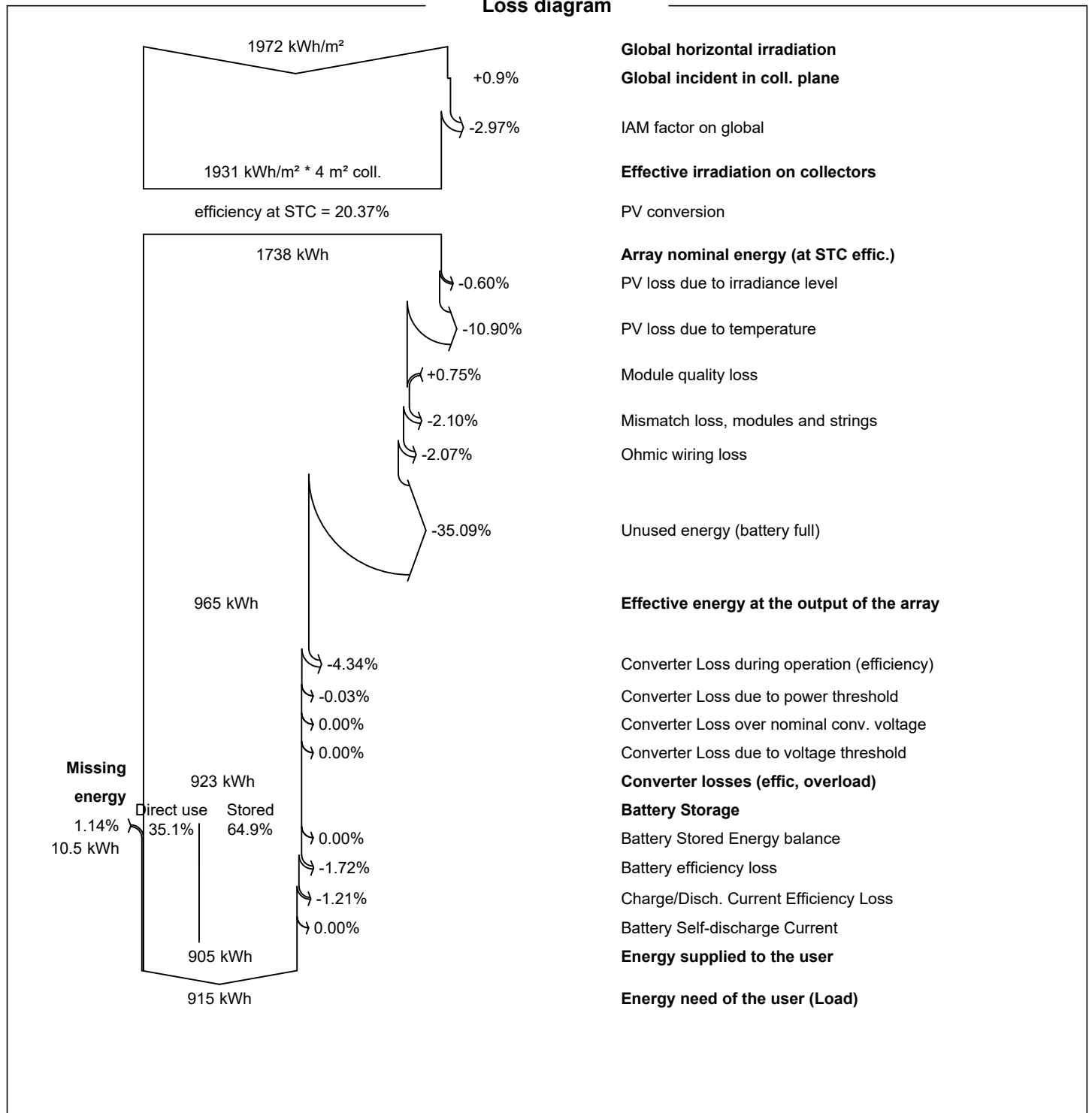
E_User Energy supplied to the user
E_Load Energy need of the user (Load)
SolFrac Solar fraction (EUsed / ELoad)



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Loss diagram





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Special graphs

Diagrama entrada/salida diaria

