Stand alone system: Simulation parameters

Project : **New Project**

Geographical Site	**Canberra**		Country	**Australia**
Situation	Latitude	-35.28° S	Longitude	149.13° E
Time defined as	Legal Time	Time zone UT+10	Altitude	0 m
	Albedo	0.20		
Meteo data:	**Canberra**	Meteonorm 7.2 (1991-2010), Sat=79% - Synthetic		

Simulation variant : **New simulation variant**

Simulation date 17/05/23 15h12

Simulation parameters	System type	**Stand alone system with batteries**		
Collector Plane Orientation	Tilt	60°	Azimuth	0°
Models used	Transposition	Perez	Diffuse	Perez, Meteonorm
User's needs :	daily profile	Constant over the year		
	average	557 kWh/Day		

	0 h	1 h	2 h	3 h	4 h	5 h	6 h	7 h	8 h	9 h	10 h	11 h	
	12 h	13 h	14 h	15 h	16 h	17 h	18 h	19 h	20 h	21 h	22 h	23 h	
Hourly load	25.00	25.00	25.00	25.00	25.00	25.00	25.00	32.00	38.00	38.00	19.00	19.00	kW
	19.00	19.00	19.00	19.00	19.00	19.00	15.00	6.00	6.00	45.00	25.00	25.00	kW

PV Array Characteristics

PV module	Si-mono	Model	SPR-E20-327		
Original PVsyst database		Manufacturer	SunPower		
Number of PV modules		In series	2 modules	In parallel	242 strings
Total number of PV modules		Nb. modules	484	Unit Nom. Power	327 Wp
Array global power		Nominal (STC)	158 kWp	At operating cond.	144 kWp (50°C)
Array operating characteristics (50°C)		U mpp	97 V	I mpp	1478 A
Total area		Module area	789 m²	Cell area	712 m²

System Parameter

System type: Stand alone system

Battery

Battery		Model	Block PVV solar 26 PVV 2067		
		Manufacturer	BAE Secura		
Battery Pack Characteristics		Nb. of units	30 in series x 12 in parallel		
		Voltage	60 V	Nominal Capacity	42840 Ah
		Discharging min. SOC	20.0 %	Stored energy	2056.3 kWh
		Temperature	Fixed (20°C)		

Controller

Controller		Model	FLEXmax 80 - 60V		
		Manufacturer	Outback	Nb. units	23
		Technology	MPPT converter	Temp coeff.	-5.0 mV/°C/elem.
Converter	Maxi and EURO efficiencies		97.5 / 96.0 %		
Battery Management control	Threshold commands as		Battery voltage		
		Charging	66.5 / 62.7 V	Corresp. SOC	0.90 / 0.75
		Discharging	58.6 / 61.1 V	Corresp. SOC	0.18 / 0.45

PV Array loss factors

Thermal Loss factor		Uc (const)	20.0 W/m²K	Uv (wind)	0.0 W/m²K / m/s
Wiring Ohmic Loss		Global array res.	1.1 mOhm	Loss Fraction	1.5 % at STC
Serie Diode Loss		Voltage Drop	0.7 V	Loss Fraction	0.7 % at STC

Stand alone system: Simulation parameters

Module Quality Loss	Loss Fraction	-1.3 %
Module Mismatch Losses	Loss Fraction	1.0 % at MPP
Strings Mismatch loss	Loss Fraction	0.10 %

Incidence effect (IAM): User defined profile

0°	50°	60°	65°	70°	75°	82°	88°	90°
1.000	1.000	0.990	0.970	0.940	0.890	0.770	0.620	0.000

Stand alone system: Detailed User's needs

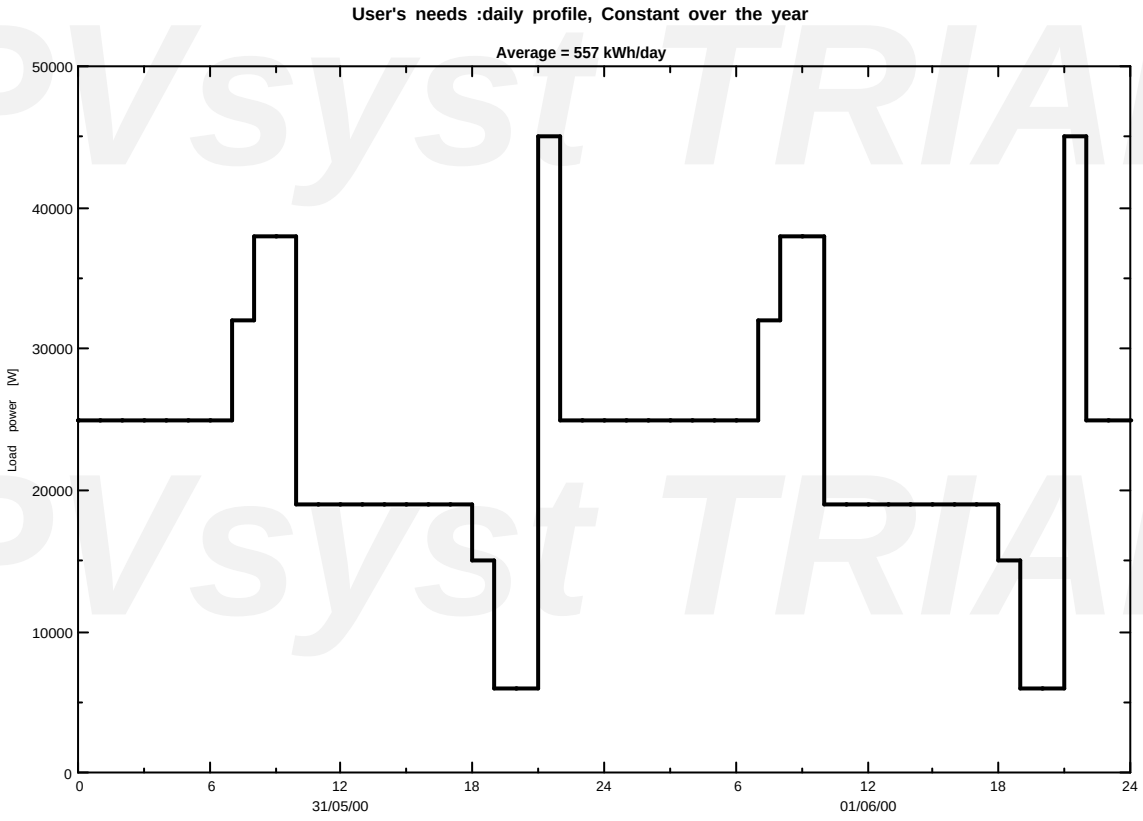
Project : **New Project**

Simulation variant : **New simulation variant**

Main system parameters	System type	**Stand alone system with batteries**		
PV Field Orientation	tilt	60°	azimuth	0°
PV modules	Model	SPR-E20-327	Pnom	327 Wp
PV Array	Nb. of modules	484	Pnom total	**158 kWp**
Battery	Model	Block PVV solar 26 PVV 2067		Lead-acid, sealed, Gel
Battery Pack	Nb. of units	360	Voltage / Capacity	**60 V / 42840 Ah**
User's needs	daily profile	Constant over the year	Global	203 MWh/year

daily profile, Constant over the year, average = 557 kWh/day

	0 h	1 h	2 h	3 h	4 h	5 h	6 h	7 h	8 h	9 h	10 h	11 h	
	12 h	13 h	14 h	15 h	16 h	17 h	18 h	19 h	20 h	21 h	22 h	23 h	
Hourly load	25.00	25.00	25.00	25.00	25.00	25.00	25.00	32.00	38.00	38.00	19.00	19.00	kW
	19.00	19.00	19.00	19.00	19.00	19.00	15.00	6.00	6.00	45.00	25.00	25.00	kW



Stand alone system: Main results

Project : **New Project**

Simulation variant : **New simulation variant**

Main system parameters	System type	**Stand alone system with batteries**		
PV Field Orientation	tilt	60°	azimuth	0°
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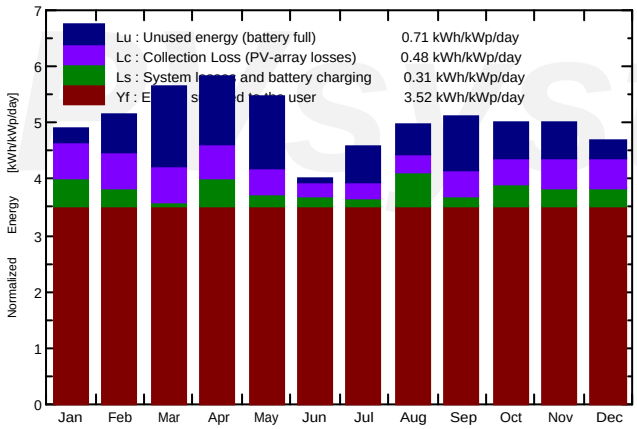
User's needs	daily profile	Constant over the year	Global	203 MWh/year

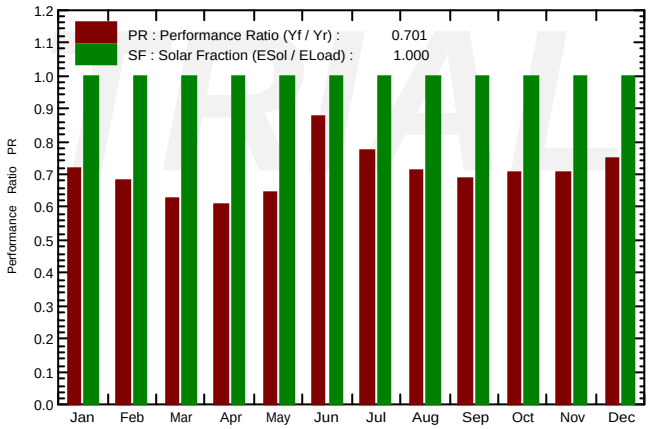
Main simulation results

System Production	**Available Energy**	**254202 kWh/year**	Specific prod.	1606 kWh/kWp/year
	Used Energy	203305 kWh/year	Excess (unused)	41056 kWh/year
	Performance Ratio PR	70.13 %	Solar Fraction SF	100.00 %
Loss of Load	Time Fraction	0.0 %	Missing Energy	0 kWh/year
Battery ageing (State of Wear)	Cycles SOW	97.6%	Static SOW	90.0%
	Battery lifetime	10.0 years		

Normalized productions (per installed kWp): Nominal power 158 kWp



Performance Ratio PR and Solar Fraction SF



New simulation variant

Balances and main results

	GlobHor kWh/m²	GlobEff kWh/m²	E_Avail kWh	EUnused kWh	E_Miss kWh	E_User kWh	E_Load kWh	SolFrac
January	220.9	148.8	20272	1288	0.000	17267	17267	1.000
February	172.3	141.7	19364	3033	0.000	15596	15596	1.000
March	166.6	172.3	23705	6781	0.000	17267	17267	1.000
April	123.9	172.9	24093	5666	0.000	16710	16710	1.000
May	96.0	168.1	23853	6171	0.000	17267	17267	1.000
June	67.0	120.2	17342	439	0.000	16710	16710	1.000
July	77.9	140.9	20387	3062	0.000	17267	17267	1.000
August	103.4	152.5	22108	2554	0.000	17267	17267	1.000
September	132.6	151.5	21489	4497	0.000	16710	16710	1.000
October	175.0	152.6	21483	3060	0.000	17267	17267	1.000
November	207.3	146.7	20451	2926	0.000	16710	16710	1.000
December	221.4	142.1	19654	1579	0.000	17267	17267	1.000
Year	1764.1	1810.4	254202	41056	0.000	203305	203305	1.000

Legends:

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

Stand alone system: Special graphs

Project : **New Project**

Simulation variant : **New simulation variant**

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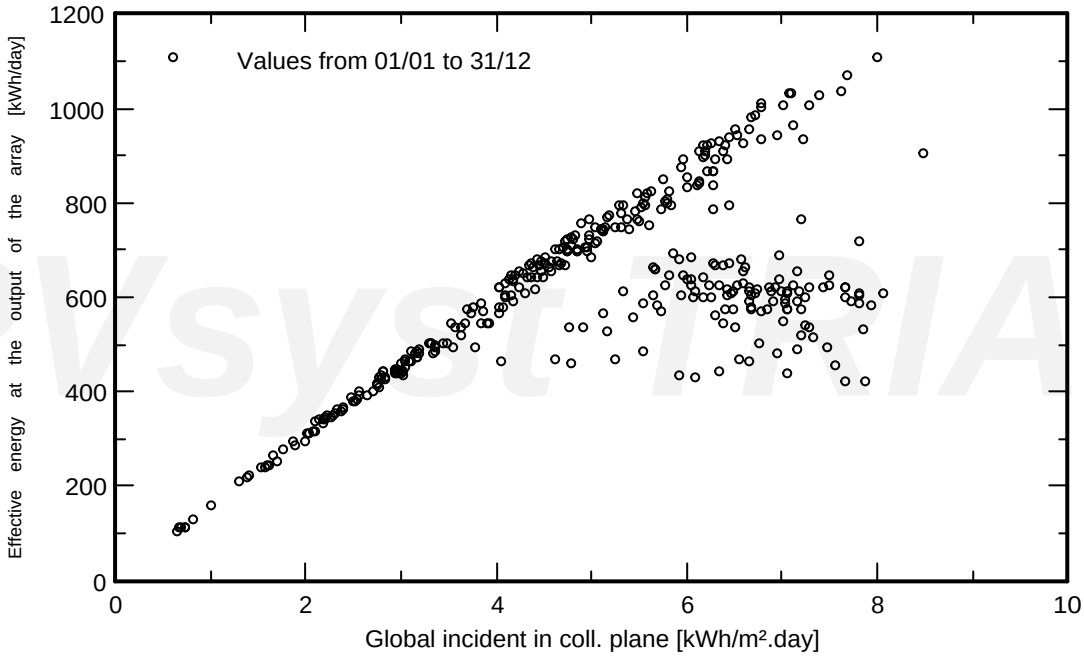
PV Array	Nb. of modules	484	Pnom total	**158 kWp**
Battery	Model	Block PVV solar 26 PVV 2067		Lead-acid, sealed, Gel
Battery Pack	Nb. of units	360	Voltage / Capacity	**60 V / 42840 Ah**
User's needs	daily profile	Constant over the year	Global	203 MWh/year

Daily Input/Output diagram



Stand alone system: Loss diagram

Project : **New Project**

Simulation variant : **New simulation variant**

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PV Field Orientation	tilt	60°	azimuth	0°
PV modules	Model	SPR-E20-327	Pnom	327 Wp
PV Array	Nb. of modules	484	Pnom total	**158 kWp**
Battery	Model	Block PVV solar 26 PVV 2067		Lead-acid, sealed, Gel
Battery Pack	Nb. of units	360	Voltage / Capacity	**60 V / 42840 Ah**
User's needs	daily profile	Constant over the year	Global	203 MWh/year

Loss diagram over the whole year