Stand Alone System: Simulation parameters

Project : **Skripsi Analisa PLTS Cendi Manik**

Geographical Site **PLTS Cendi Manik** **Country** **Indonesia**

Situation Latitude 8.7°S Longitude 116.3°E
Time defined as Legal Time Time zone UT+7 Altitude 200 m
Monthly albedo values

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
Albedo	0.15	0.16	0.13	0.12	0.11	0.10	0.11	0.12	0.12	0.14	0.15	0.15

Meteo data : PLTS Cendi Manik, Synthetic Hourly data

Simulation variant : **New simulation variant**

Simulation date 06/02/17 23h48

Simulation parameters

Collector Plane Orientation Tilt 10° Azimuth 0°

PV Array Characteristics

PV module Si-poly Model **SPU-100P**
Manufacturer Swadaya Prima Utama
Number of PV modules In series 5 modules In parallel 30 strings
Total number of PV modules Nb. modules 150 Unit Nom. Power 100 Wp
Array global power Nominal (STC) **15.00 kWp** At operating cond. 12.99 kWp (50°C)
Array operating characteristics (50°C) U mpp 77 V I mpp 169 A
Total area Module area **110 m²**

PV Array loss factors

Thermal Loss factor Uc (const) 20.0 W/m²K Uv (wind) 0.0 W/m²K / m/s
=> Nominal Oper. Coll. Temp. (G=800 W/m², Tamb=20°C, Wind=1 m/s.) NOCT 56 °C
Wiring Ohmic Loss Global array res. 7.6 mOhm Loss Fraction 1.5 % at STC
Module Quality Loss Loss Fraction 1.5 %
Module Mismatch Losses Loss Fraction 2.0 % at MPP
Incidence effect, ASHRAE parametrization IAM = 1 - bo (1/cos i - 1) bo Parameter 0.05

System Parameter System type **Stand Alone System**

Battery Model **GFMJ-1000**
Manufacturer Shoto
Battery Pack Characteristics Voltage 48 V Nominal Capacity 3000 Ah
Nb. of units 24 in series x 3 in parallel
Temperature Fixed (20°C)
Regulator Model SCB-151 x 3
Manufacturer Leonics
Technology MPPT converter Temp coeff. -5.0 mV/°C/elem.
Converter Maxi and EURO efficiencies 98.0/94.0 %
Battery Management Thresholds Charging 116.0/64.0 V Discharging 46.0/54.0 V
Back-Up Genset Command 47.3/51.6 V

User's needs : Daily household consumers Constant over the year
average 26.9 kWh/Day

Stand Alone System: Detailed User's needs

Project : **Skripsi Analisa PLTS Cendi Manik**

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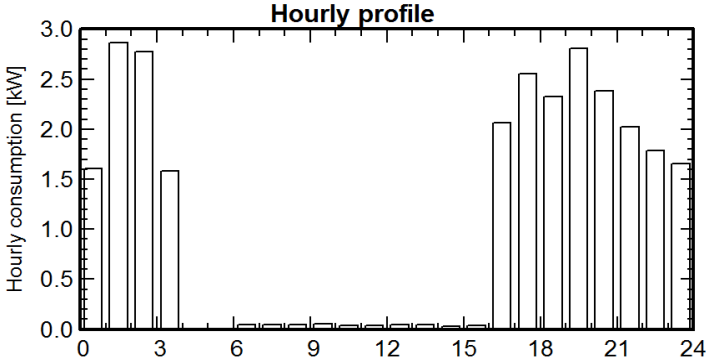
Main system parameters	System type	**Stand alone**		
PV Field Orientation	tilt	10°	azimuth	0°
PV Array	Nb. of modules	150	Pnom total	**15.00 kWp**
Battery	Model	GFMJ-1000	Technology	sealed, Gel
battery Pack	Nb. of units	72	Voltage / Capacity	**48 V / 3000 Ah**
User's needs	Daily household consumers	Constant over the year	global	9802 kWh/year

Daily household consumers, Constant over the year, average = 26.9 kWh/day

Annual values

	Number	Power	Use	Energy
Stand-by consumers		1119 W tot	24 h/day	26856 Wh/day
Total daily energy				26856 Wh/day

Hourly profile



Stand Alone System: Main results

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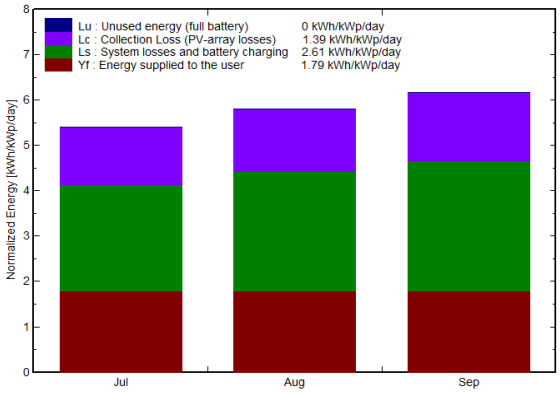
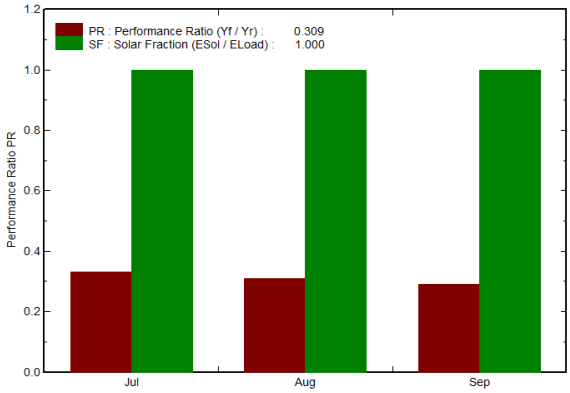
Main simulation results				
System Production	**Available Energy**	**5.70 MWh**	Specific prod.	380 kWh/kWp
	Used Energy	2.47 MWh	Excess (unused)	0.00 MWh
	Performance Ratio PR	30.9 %	Solar Fraction SF	100.0 %
Loss of Load	Time Fraction	0.0 %	Missing Energy	0.00 MWh

Normalized productions (per installed kWp): Nominal power 15.00 kWp



Performance Ratio PR and Solar Fraction SF



New simulation variant

Balances and main results

	GlobHor kWh/m²	GlobEff kWh/m²	E Avail MWh	EUnused MWh	E Miss MWh	E User MWh	E Load MWh	SolFrac
July	153.8	162.6	1.797	0.000	0.000	0.833	0.833	1.000
August	169.6	174.8	1.933	0.001	0.000	0.833	0.833	1.000
September	181.8	180.1	1.969	0.000	0.000	0.806	0.806	1.000
Period	505.1	517.5	5.699	0.001	0.000	2.471	2.471	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 (full battery) loss	SolFrac	Solar fraction (EUsed / ELoad)

Stand Alone System: Loss diagram

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Loss diagram over the whole year