Stand alone system: Simulation parameters

Project : **IUBOffGrid**

Geographical Site	**IUB,Dhaka,Bangladesh**		Country	**Bangladesh**
Situation	Latitude	23.82° N	Longitude	90.43° E
Time defined as	Legal Time	Time zone UT+6	Altitude	4 m
	Albedo	0.20		
Meteo data:	**IUB,Dhaka,Bangladesh**	Meteonorm 7.2 (1981-2010), Sat=100% - Synthetic		

Simulation variant : **New simulation variant**

Simulation date 17/04/22 20h22

Simulation parameters	System type	**Stand alone system with batteries**		
Collector Plane Orientation	Tilt	30°	Azimuth	0°
Models used	Transposition	Perez	Diffuse	Perez, Meteonorm
User's needs :	Daily household consumers	Constant over the year		
	average	0.6 kWh/Day		

PV Array Characteristics

PV module	Si-mono	Model	**TDB125X125-36-P 100W**		
Original PVsyst database		Manufacturer	Sun Earth Solar Power Co Ltd		
Number of PV modules		In series	2 modules	In parallel	1 strings
Total number of PV modules		Nb. modules	2	Unit Nom. Power	100 Wp
Array global power		Nominal (STC)	**200 Wp**	At operating cond.	179 Wp (50°C)
Array operating characteristics (50°C)		U mpp	34 V	I mpp	5.3 A
Total area		Module area	**1.3 m²**	Cell area	1.1 m²

System Parameter		System type	**Stand alone system**		
Battery		Model	**Sun power VL OPzS 12-130**		
		Manufacturer	Hoppecke		
Battery Pack Characteristics		Nb. of units	2 in series		
		Voltage	24 V	Nominal Capacity	101 Ah
		Discharging min. SOC	20.0 %	Stored energy	1.9 kWh
		Temperature	Fixed (20°C)		
Controller		Model	Universal direct controller		
		Technology	Series	Temp coeff.	-5.0 mV/°C/elem.
Battery Management control		Threshold commands as	SOC calculation		
		Charging	SOC = 0.92 / 0.75	i.e. approx.	27.2 / 25.1 V
		Discharging	SOC = 0.20 / 0.45	i.e. approx.	23.3 / 24.4 V

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.	108 mOhm	Loss Fraction	1.5 % at STC
Serie Diode Loss	Voltage Drop	0.7 V	Loss Fraction	1.8 % at STC
Module Quality Loss			Loss Fraction	1.5 %
Module Mismatch Losses			Loss Fraction	2.5 % (fixed voltage)
Strings Mismatch loss			Loss Fraction	0.10 %
Incidence effect, ASHRAE parametrization	IAM =	1 - bo (1/cos i - 1)	bo Param.	0.05

Stand alone system: Detailed User's needs

Project : **IUBOffGrid**

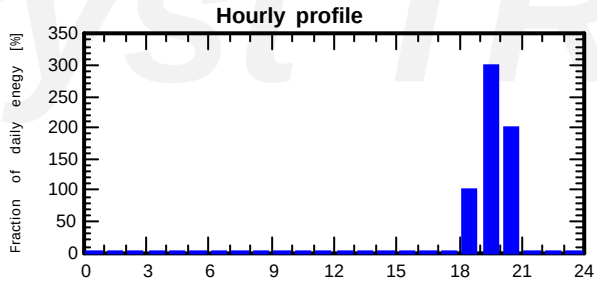
Simulation variant : **New simulation variant**

Main system parameters	System type	**Stand alone system with batteries**		
PV Field Orientation	tilt	30°	azimuth	0°
PV modules	Model	TDB125X125-36-P 100W	Pnom	100 Wp
PV Array	Nb. of modules	2	Pnom total	**200 Wp**
Battery	Model	Sun power VL OPzS 12-130		Lead-acid, vented, tubular
Battery Pack	Nb. of units	2	Voltage / Capacity	**24 V / 101 Ah**
User's needs	Daily household consumers	Constant over the year	Global	228 kWh/year

Daily household consumers, Constant over the year, average = 0.6 kWh/day

Annual values

	Number	Power	Use	Energy
Lamps (LED or fluo)	4	25 W/lamp	3 h/day	300 Wh/day
TV / PC / Mobile	1	100 W/app	2 h/day	200 Wh/day
Domestic appliances	1	100 W/app	1 h/day	100 Wh/day
Stand-by consumers			24 h/day	24 Wh/day
Total daily energy				624 Wh/day



Stand alone system: Main results

Project : **IUBOffGrid**

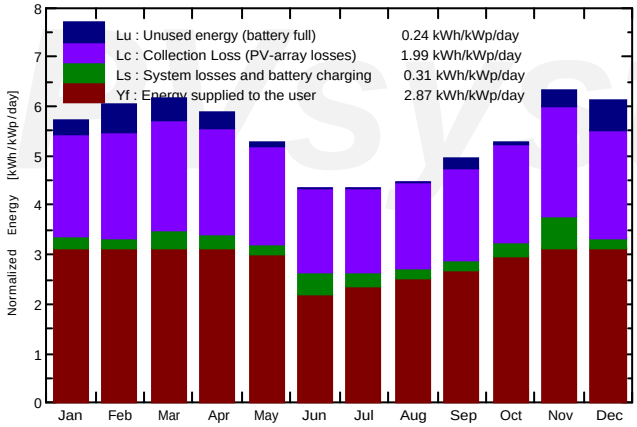
Simulation variant : **New simulation variant**

Main system parameters	System type	**Stand alone system with batteries**		
PV Field Orientation	tilt	30°	azimuth	0°
PV modules	Model	TDB125X125-36-P 100W	Pnom	100 Wp
PV Array	Nb. of modules	2	Pnom total	**200 Wp**
Battery	Model	Sun power VL OPzS 12-130		Lead-acid, vented, tubular
Battery Pack	Nb. of units	2	Voltage / Capacity	**24 V / 101 Ah**
User's needs	Daily household consumers	Constant over the year	Global	228 kWh/year

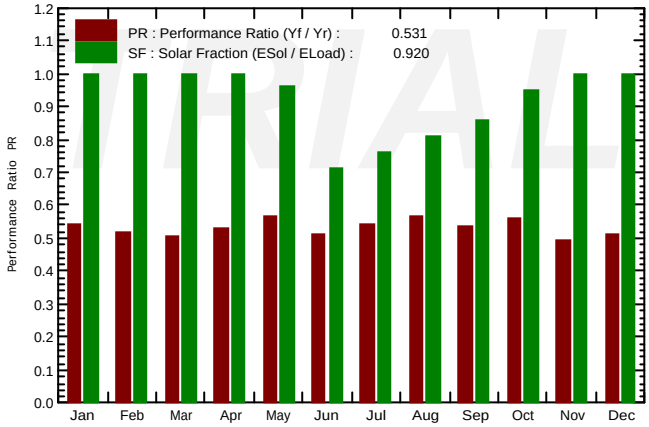
Main simulation results

System Production	**Available Energy**	**249.3 kWh/year**	Specific prod.	1247 kWh/kWp/year
	Used Energy	209.5 kWh/year	Excess (unused)	17.3 kWh/year
	Performance Ratio PR	53.13 %	Solar Fraction SF	91.99 %
Loss of Load	Time Fraction	11.2 %	Missing Energy	18.2 kWh/year
Battery ageing (State of Wear)	Cycles SOW	94.5%	Static SOW	90.0%
	Battery lifetime	10.0 years		

Normalized productions (per installed kWp): Nominal power 200 Wp



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	130.1	173.6	22.89	1.876	0.000	19.34	19.34	1.000
February	137.3	165.0	21.81	3.082	0.000	17.47	17.47	1.000
March	173.2	186.3	24.53	2.898	0.000	19.34	19.34	1.000
April	179.6	170.3	22.40	1.886	0.000	18.72	18.72	1.000
May	180.4	157.3	20.29	0.312	0.802	18.54	19.34	0.959
June	148.2	125.6	15.93	0.000	5.397	13.32	18.72	0.712
July	153.1	130.0	16.52	0.000	4.660	14.68	19.34	0.759
August	147.2	133.3	16.91	0.000	3.693	15.65	19.34	0.809
September	144.0	144.6	18.67	1.266	2.683	16.04	18.72	0.857
October	141.3	159.4	20.52	0.408	1.003	18.34	19.34	0.948
November	139.5	185.2	24.33	1.767	0.000	18.72	18.72	1.000
December	131.4	185.8	24.55	3.809	0.000	19.34	19.34	1.000
Year	1805.3	1916.2	249.35	17.304	18.238	209.52	227.76	0.920

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)

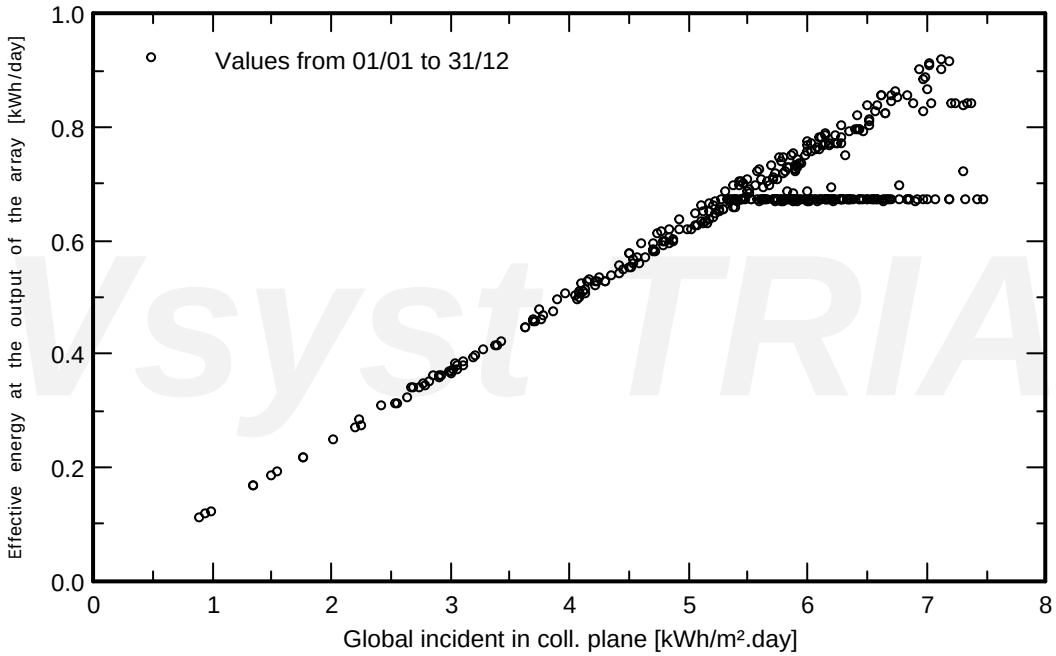
Stand alone system: Special graphs

Project : **IUBOffGrid**

Simulation variant : **New simulation variant**

Main system parameters	System type	**Stand alone system with batteries**		
PV Field Orientation	tilt	30°	azimuth	0°
PV modules	Model	TDB125X125-36-P 100W	Pnom	100 Wp
PV Array	Nb. of modules	2	Pnom total	**200 Wp**
Battery	Model	Sun power VL OPzS 12-130		Lead-acid, vented, tubular
Battery Pack	Nb. of units	2	Voltage / Capacity	**24 V / 101 Ah**
User's needs	Daily household consumers	Constant over the year	Global	228 kWh/year

Daily Input/Output diagram



Stand alone system: Loss diagram

Project : **IUBOffGrid**

Simulation variant : **New simulation variant**

Main system parameters	System type	**Stand alone system with batteries**			
PV Field Orientation	tilt	30°	azimuth	0°	
PV modules	Model	TDB125X125-36-P 100W	Pnom	100 Wp	
PV Array	Nb. of modules	2	Pnom total	**200 Wp**	
Battery	Model	Sun power VL OPzS 12-130		Lead-acid, vented, tubular	
Battery Pack	Nb. of units	2	Voltage / Capacity	**24 V / 101 Ah**	
User's needs	Daily household consumers	Constant over the year	Global	228 kWh/year	

Loss diagram over the whole year