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LAMPIRAN

Lampiran 1. Kuesioner penelitian

KUESIONER PENELITIAN

(Studi Kelayakan Penambahan PLTB Pada Sistem *Hybrid* Pulau Karanrang Kabupaten Pangkep)

1. Nama : …….
2. Sumber listrik apa yang digunakan di rumah ?
   - PLN
   - Genset
   - PLTS
   - Tidak membutuhkan Listrik
   - Lainnya (Sebutkan)……
3. Apabila sumber listrik (PLN) mati, sumber apa lagi yang digunakan sebagai penggantinya ?
   - Genset
   - PLTS
   - Tidak membutuhkan listrik
   - Lainnya (Sebutkan)……..
4. Peralatan listrik apa saja yang ada dirumah bapak/ibu ?

Jenis Peralatan	Watt	Kuantitas	Lama Pemakaian
Lampu dalam			
Lampu Luar			
Televisi			
Kulkas			
Mesin cuci			
Setrika			
Pompa air			
Kipas angin			

Lampiran 2. *Inflation Rate* Indonesia

Date	Inflation Data
June 2023	3.52 %
May 2023	4 %
April 2023	4.33 %
March 2023	4.97 %
February 2023	5.47 %
January 2023	5.28 %
December 2022	5.51 %
November 2022	5.42 %
October 2022	5.71 %
September 2022	5.95 %

1 2 3 4 5 6 7 8 9 10 ...

Lampiran 3. *Discount Rate* Indonesia

Variabel	BI Rate						
	2023						
	Januari	Februari	Maret	April	Mei	Juni	Juli
BI Rate	5.75	5.75	5.75	5.75	5.75	-	-
Sumber: Bank Indonesia.							
Source Url: https://www.bps.go.id/indicator/13/379/1/bi-rate.html							
Access Time: July 15, 2023, 10:54 am							

Lampiran 4. Spesifikasi panel surya

Electrical Characteristics

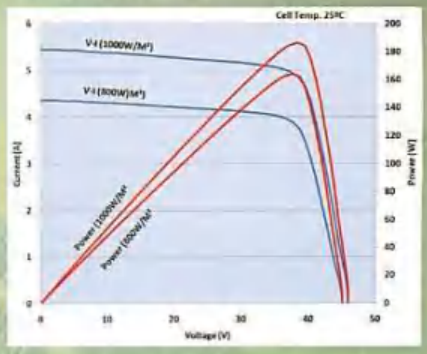
STC	Len 180 Wp - 24V Monocrystalline
Optimum Operating Voltage (Vmp)	35.6 V
Optimum Operating Current (Imp)	5.06 A
Open - Circuit Voltage (Voc)	44.1 V
Short - Circuit Current (Isc)	5.52 A
Maximum Power at STC (Pmax)	180 W
Modul Efficiency	14.5 %
Operating Module Temperature	-40 °C to +85°C
Maximum System Voltage	1000 V DC
Maximum Series Fuse Rating	20 A
Power Tolerance	+ 0 – 3 %

STC : Irradiance 1000 W/m², module temperature 25 °C, AM=1.5; Power measurement tolerance : ±3 %

NOCT	Len 180 Wp - 24V Monocrystalline
Maximum Power (W)	160 W
Maximum Power Voltage (V)	32.7 V
Maximum Power Current (A)	4.89 A
Open Circuit Voltage (Voc)	41.31 V
Short Circuit Current (Isc)	5.61 A

NOCT : Irradiance 800 W/m², module temperature 20 °C, wind speed 1 m/s; Power measurement tolerance : ±3 %

Current-Voltage & Power-Voltage Curve (Len 180 Wp - 24V Monocrystalline)



Mechanical Characteristics

Solar Cell	Monocrystalline 125 x 125 mm (5 inches)
No. of Cells	72 (6 X 12)
Dimensions	1576 X 806 X 50 mm
Weight	16.5 Kg
Front Glass	3.2 mm (0.13 inches) tempered glass
Frame	Anodized alumunium alloy
Junction Box	IP65
Output Cables	TUV (2Pfg1169:2007), UL 4703, UL 44 4 mm² (0.00375 inches²)
Connectors	RADOX® SOLAR integrated twist locking connectors

Temperature Characteristics

Nominal Operating Cell Temperature (NOCT)	45 ± 3 °C
Temperature Coefficient of Power	-0.41 %/°C
Temperature Coefficient of Voc	-0.31 %/°C
Temperature Coefficient of Isc	0.047 %/°C

4.1.180-M.I-14

PT Len Industri (Persero)
Jl. Soekarno-Hatta 442 Bandung 40254 Indonesia
Telp. : 62-22-5202682 Fax. : 62-22-5202695
Web : www.len.co.id Email : marketing@len.co.id

ISO 9001 : 2008 OHSAS 18001 : 2007
ISO 14001 : 2005 SMK3

Lampiran 5. Spesifikasi turbin angin

AWS HCM 3.3kW

AVERAGE WIND SPEED

KMPH	M/S	MPH	MONTHLY GENERATION
14.5	4.0	9	**269 kWh**
16	4.5	10	**362 kWh**
17.7	4.9	11	**476 kWh**
19.3	5.4	12	**568 kWh**

Rated Output	3300W
Rated Wind Speed	10.5m/s, 24mph
Peak Output	3650W
Cut In	2.7m/s, 6mph
Yaw System	Passive by Tail Vane
Yaw / Tower Cable	N x 360° Freedom
Generator	PM 3 phase alternator (variable speed)
Insulation Class & Efficiency	Class "H" > 87%
Stator Skew	1 slot pitch
Max Stator Core Temp	180°C
Poles	16
RPM—50Hz/60Hz	375 / 450
Over Speed Limit	525RPM / 70Hz
Rotor Diameter	4.65m / 15ft
Number of Blades	3 standard (6 for extra charge)
Blade Material	Carbon Fibre Composite ~ 0.37
Swept Area	6.4 sq.m / 175 sq.feet
Min Tip Clearance	36cm / 14in
Tip Speed Ratio	8.5
Lateral Thrust (max)	3200nts
Governor-Over Speed Limit	Uptilt tilt (Hydraulic assisted)
Govern Speed	27mph
Gov. Shut down speed/opt stop	Electro-dynamic Switch
Unit Weight (Tower Top)	77kg
Tower Top Pipe / Yaw Adapter	P 2.5" Shd 40
Voltage Options	12 to 48 LV / 60—140 HV
Electronic Controller	Included but separate
Warranty	2 years
Operating Life	20 years
Survival Wind Speed	55 m/s
Suggested Routine Maintenance	Annual Inspection

AWS HCM 5kW

AVERAGE WIND SPEED

KMPH	M/S	MPH	MONTHLY GENERATION
14.5	4.0	9	**380 kWh**
16	4.5	10	**500 kWh**
17.7	4.9	11	**660 kWh**
19.3	5.4	12	**885 kWh**

Rated Output	5100W
Rated Wind Speed	11m/s, 25mph
Peak Output	5700W
Cut In	2.7m/s, 6mph
Yaw System	Passive by Tail Vane
Yaw / Tower Cable	N x 360° Freedom
Generator	PM 3 phase alternator (variable speed)
Insulation Class & Efficiency	Class "H" > 87%
Stator Skew	1 slot pitch
Max Stator Core Temp	180°C
Poles	16
RPM—50Hz/60Hz	375 / 450
Over Speed Limit	525RPM / 70Hz
Rotor Diameter	5.24m / 17.2ft
Number of Blades	3 standard (6 for extra charge)
Blade Material	Carbon Fibre Composite ~ 0.37
Swept Area	21.4 sq.m / 230 sq.feet
Min Tip Clearance	36cm / 14in
Tip Speed Ratio	8.5
Lateral Thrust (max)	4200nts
Governor-Over Speed Limit	Uptilt tilt (Hydraulic assisted)
Govern Speed	27mph
Gov. Shut down speed/opt stop	Electro-dynamic Switch
Unit Weight (Tower Top)	99kg
Tower Top Pipe / Yaw Adapter	P 2.5" Shd 40
Voltage Options	48 LV / 60—240 HV / 380—440 EHV
Electronic Controller	Included but separate
Warranty	2 years
Operating Life	20 years
Survival Wind Speed	55 m/s
Suggested Routine Maintenance	Annual Inspection

Lampiran 6. Spesifikasi Baterai

BAE *SECURA PVV solar*

Technical Specification for Valve Regulated Lead-Acid Batteries (VRLA-GEL)

1. Application

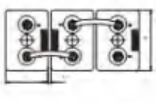
BAE *SECURA PVV solar* batteries are maintenance-free and used to store electric energy in medium and large solar photovoltaic installations. Due to the robust tubular plate design BAE PVV Batteries are excellent suited for highest requirements regarding cycling ability and long lifetime.

2. Technical data (Reference temperature 20 °C)

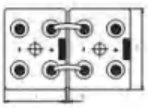
Type	C_1 h Ah	C_{10} h Ah	C_{20} h Ah	C_{72} h Ah	C_{100} h Ah	C_{120} h Ah	C_{240} h Ah	R_i1) mΩ	I_k 2) kA	Length mm	Width mm	Height mm	Weight kg
U_e [V per cell]	1.65	1.80	1.80	1.80	1.80	1.80	1.80						
2 PVV 140	74	132	143	170	180	182	189	2.400	0.84	105	208	420	15.5
3 PVV 210	100	193	210	252	264	268	277	1.600	1.27	105	208	420	17.7
4 PVV 280	136	239	262	315	329	334	348	1.200	1.70	105	208	420	20.0
5 PVV 350	165	286	314	378	394	400	415	0.960	2.15	126	208	420	23.0
6 PVV 420	198	344	378	453	473	481	499	0.800	2.57	147	208	420	28.8
5 PVV 550	252	444	496	573	587	594	609	0.710	2.88	126	208	535	32.0
6 PVV 660	303	532	596	688	705	712	732	0.600	3.46	147	208	535	36.7
7 PVV 770	341	597	666	763	785	793	813	0.510	4.04	168	208	535	41.0
6 PVV 900	391	700	794	907	932	942	979	0.450	4.58	147	208	710	52.0
8 PVV 1200	506	903	1,022	1,166	1,190	1,200	1,255	0.340	6.10	215	193	710	68.9
10 PVV 1500	647	1,150	1,312	1,504	1,530	1,548	1,620	0.270	7.63	215	235	710	84.6
12 PVV 1800	762	1,360	1,540	1,764	1,800	1,812	1,896	0.230	9.15	215	277	710	99.6
12 PVV 2280	954	1,640	1,854	2,160	2,200	2,220	2,294	0.240	8.58	215	277	855	115.0
16 PVV 3040	1,291	2,240	2,520	2,944	3,010	3,036	3,120	0.180	11.40	215	400	815	156.2
20 PVV 3800	1,618	2,820	3,160	3,700	3,780	3,816	3,936	0.144	14.30	215	490	815	195.0
22 PVV 4180	1,749	3,020	3,400	3,960	4,040	4,080	4,200	0.131	15.67	215	580	815	216.0
24 PVV 4560	1,960	3,430	3,860	4,521	4,610	4,656	4,800	0.120	17.10	215	580	815	236.0
26 PVV 4940	2,067	3,570	4,000	4,680	4,770	4,824	4,968	0.111	18.52	215	580	815	250.0

1) R_i and 2) I_k values according to IEC 60896-21
All values given in the table correspond to 100 % DOD. Please consider item 7.

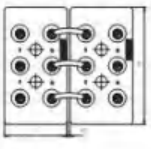
3. Terminal position



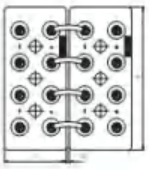
2 PVV 140 - 6 PVV 900



8 PVV 1200 to 12 PVV 2280



16 PVV 3040



20 PVV 3800 to 26 PVV 4940

ENERGY FROM BATTERIES BAE

Technical Specification of BAE *Secura PVV solar*

Terminals are designed as female poles with brass inlay M10 for flexible insulated copper cables with cross-section 25, 35, 50, 70, 95 or 120 mm² or insulated solid copper connectors with cross-section 90, 150 or 300 mm².

4. Design

Positive electrode	tubular-plate with woven polyester gauntlet and solid grids in a corrosion-resistant PbCaSn-alloy
Negative electrode	grid-plate in PbCaSn-alloy with long life expander material
Separation	microporous separator
Electrolyte	sulphuric acid with a density of 1.24 kg/l (20 °C), fixed as GEL by fumed silica
Container and lid	high impact, ABS (Acrylonitrile-Butadiene-Styrene), grey coloured, UL-94 rating: HB, on request also in UL-94 rating: V-0
Valve	valve with flame arrestor, opening pressure approx. 120 mbar
Pole-bushing	100 % gas- and electrolyte-tight, sliding, plastic-coated "Panzerpol"
Kind of protection	IP 25 regarding DIN 40050, touch protected according to VBG 4

5. Installation

BAE *Secura PVV solar* batteries are designed for indoor applications.
For outdoor applications please contact BAE.

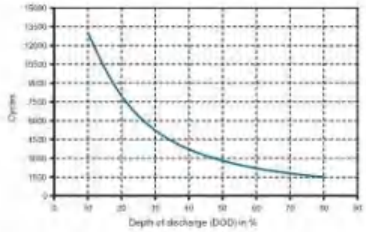
6. Maintenance

Every 6 months	check battery voltage as well as temperature
Every 12 months	check connections, record battery cell voltage as well as temperature

7. Operational data

Depth of discharge (DOD)	max. 80 % (Ue = 1.91 V/cell for discharge times >10 h; 1.74 V/cell for 1 h), deep discharges of more than 80 % DOD have to be avoided
Charge current	unlimited, the minimal charge current has to be I_{10}
Charge voltage at cyclic operation	restricted from 2.30 V to 2.40 V per cell, operating instruction is to be observed
Floating voltage/non cyclic voltage	2.25 V/cell
Adjustment of charge voltage	no adjustment necessary if battery temperature is between 10 °C and 45 °C in the monthly average, otherwise $\Delta U/\Delta T$ = -0.003 V/cell per K
Recharge to 100 %	within a period of 1 up to 4 weeks
IEC 61427 cycles	>3000 (A+B)
Battery temperature	-20 °C to 45 °C, recommended temperature range 10 °C to 30 °C
Self-discharge	approx. 2 % per month at 20 °C

8. Number of cycles as function of DOD (Depth of discharge)



9. Transport

Batteries are not subject to ADR (road transport), if the conditions of special rule 598 (chapter 3.3) are observed.

10. Standards

Test standard	IEC 60896-21, IEC 61427
Safety standard, ventilation	EN 50272-2

BAE Batterien GmbH
Wilhelminenhofstraße 69/70
12459 Berlin · Germany
P.O. Box 9 · 12442 Berlin
Tel. +49 30 53001-661
Fax +49 30 5354949
E-mail: info@bae-berlin.de
www.bae-berlin.de

Lampiran 7. Spesifikasi inverter

YASKAWA
SOLECTRIA SOLAR

PVI 50KW
PVI 60KW
PVI 75KW
PVI 85KW
PVI 100KW

COMMERCIAL INVERTERS

FEATURES

- Compliant with NEC 2014 690.11 & 690.12 arc fault and rapid shutdown requirements when coupled with ARCCOM combiner
- Highest peak and CEC efficiencies
- Modbus communications
- User-interactive LCD
- Real power curtailment

OPTIONS

- Fuse or breaker subcombiner options
- Dust filter
- Forward facing disconnects
- Stainless steel enclosure
- Web-based monitoring
- Built-in cellular connectivity
- Sub-array monitoring

SOLECTRIA.COM

COMMERCIAL INVERTERS

The PVI 50-100KW inverters are compliant with NEC 2014 690.11 & 690.12 requirement when ordered with the ARCCOM combiner. The most customizeable full line of commercial grid-tied PV inverters available today, the PVI 50-100KW series has been utilized in projects ranging from 50KW to multi-megawatt solar farms, including a 30MW solar farm. This series of inverters is capable of operating at 208 VAC, 240 VAC, 480 VAC, and 600 VAC and comes standard with AC and DC disconnects, transformer isolation, LCD, and monitoring gateway. They also contain a lightweight power stage making it easily serviceable. Options include premium efficient models, integrated fuse or breaker subcombiners, forward facing disconnects, stainless steel enclosure, web-based monitoring and sub-array monitoring, built-in cellular connectivity, and a dust filter. AC voltage and frequency settings may be customized according to utility specification.

SPECIFICATIONS		PVI 50KW	PVI 60KW	PVI 75KW	PVI 85KW	PVI 100KW
DC Input						
Absolute Maximum Input Voltage				600 VDC		
Max Power Input Voltage Range (MPPT)*				300-500 VDC		
MPPT Input Voltage Range - Low Voltage Option				285-500 VDC		
Maximum Operating Input Current		176 A	211 A	264 A	299 A	351 A
Maximum Operating Input Current - Low Voltage Option		185 A	222 A	278 A	314 A	370 A
Maximum PV Power (per MPPT)		65 kW	78 kW	97.5 kW	110.5 kW	130 kW
Strike Voltage				400 V		
Strike Voltage - Low Voltage Option				380 V		
Rapid Shutdown Bleed Down Time (to < 30V)				< 10s		
AC Output						
Nominal Output Voltage				208, 240, 480 or 600 VAC, 3-Ph (3-wire standard, 4-wire optional)		
AC Voltage Range (Standard)				-12%/+10%		
Continuous Output Power		50 kW	60 kW	75 kW	85 kW	100 kW
Continuous Output Current	208 VAC	139 A	167 A	208 A	236 A	278 A
	240 VAC	120 A	144 A	180 A	205 A	240 A
	480 VAC	60 A	72 A	90 A	102 A	120 A
	600 VAC	48 A	58 A	72 A	82 A	96 A
Maximum Backfeed Current				0 A		
Nominal Output Frequency				60 Hz		
Output Frequency Range				57.0 -60.5 Hz		
Power Factor				Adjustable - 0.9 to +0.9, factory set at 1		
Fault Current Contribution (1 Cycle RMS) (208 / 240 / 480 VAC)		167 A; 144 A; 72 A	200 A; 173 A; 86 A	250 A; 216 A; 108 A	283 A; 246 A; 122 A	334 A; 288 A; 144 A
Total Harmonic Distortion (THD) @ Rated Load				<3%		
Efficiency						
Peak Efficiency	208 VAC	96.7%	96.7%	97.3%	96.6%	96.5%
	240 VAC	97.7%	97.8%	97.1%	96.7%	96.9%
	480 or 600 VAC	96.5%	96.5%	97.2%	96.9%	96.9%
CEC Efficiency	208 VAC	96.0%	96.0%	97.0%	96.0%	96.0%
	240 VAC	97.0%	97.0%	96.0%	96.0%	96.0%
	480 VAC	96.0%	96.0%	97.0%	96.5%	96.5%
Tare Loss				< 3 W		
Subcombiner Options						
Fuses or Breakers				2-8 positions, 60-300 A		
Temperature						
Ambient Temperature Range (full power)				-40°F to +131°F (-40°C to +55°C)		
Storage Temperature Range				-40°F to +131°F (-40°C to +55°C)		
Relative Humidity (non-condensing)				0-95%		
Data Monitoring						
Optional SolrenView Web-based Monitoring				Integrated		
Optional Revenue Grade Monitoring				External		
Optional SolZone™ Sub-Array Monitoring (DC Current)				2-8 zones		
Optional Cellular Communication				SolrenView AIR		
External Communication Interface				RS-485 SunSpec Modbus RTU		
Certifications						
Safety Listings & Certifications				UL 1741/IEEE 1547, CSA C22.2#107.1, FCC part 15 B		
Certification Agency				ETL		
Warranty						
Standard				5 year		
Optional				10, 15, 20 year; extended service agreement; uptime guarantee		
Enclosure						
dBA (Decibel) Rating				< 62 dBA @ 3 m		
Transformer				Standard, fully-integrated (internal)		
AC/DC Disconnects				Standard, fully integrated		
Dimensions - Side Facing Disconnects (H x W x D) Dimensions - Forward Facing Disconnects (H x W x D)				78.2 in. x 50-53 in. x 33 in. (1987 mm x 1270-1347 mm x 839 mm)** 78.2 in. x 79-88 in. x 33 in. (1987 mm x 2007-2236 mm x 839 mm)**		
Weight		1450 lbs (658 kg)			1875 lbs (851 kg)	
Enclosure Rating				Type 3R		
Enclosure Finish				Polyester powder coated steel; Optional 316 stainless steel		

*At nominal AC voltage
**Width dependent upon rating of disconnect chosen

YASKAWA SOLECTRIA SOLAR www.solectria.com | inverters@solectria.com | 978.683.9700

Lampiran 8. *Report* skenario 1

HOMER Pro

System Simulation Report

File: Test.homer

Author: Sahid Pangampe

Location: 49VP+34P, Mattiro Bulu, North Liukang Tupabbiring, Pangkajene and Islands Regency, South Sulawesi, Indonesia (4°51.4'S, 119°23.1'E)

Total Net Present Cost: $5,666,066.00

Levelized Cost of Energy ($/kWh): $0.334

Notes: Skenario 1 (Eksisting 1)

HOMER Pro

System Architecture

Component	Name	Size	Unit
Generator #1	Danvest 131kWe Low Load Hybrid	131	kW
Generator #2	Danvest 131kWe Low Load Hybrid (1)	131	kW
Generator #3	Autosize Genset	500	kW
Dispatch strategy	HOMER Cycle Charging		

Schematic

HOMER Pro

Electrical Summary

Excess and Unmet

Quantity	Value	Units
Excess Electricity	0	kWh/yr
Unmet Electric Load	0	kWh/yr
Capacity Shortage	0	kWh/yr

Production Summary

Component	Production (kWh/yr)	Percent
Danvest 131kWe Low Load Hybrid	416,601	47.1
Danvest 131kWe Low Load Hybrid (1)	68,234	7.71
Autosize Genset	399,669	45.2
Total	884,504	100

Consumption Summary

Component	Consumption (kWh/yr)	Percent
AC Primary Load	884,504	100
DC Primary Load	0	0
Deferrable Load	0	0
Total	884,504	100

HOMER Pro

Generator: Danvest 131kWe Low Load Hybrid (Diesel)

Danvest 131kWe Low Load Hybrid Electrical Summary

Quantity	Value	Units
Electrical Production	416,601	kWh/yr
Mean Electrical Output	113	kW
Minimum Electrical Output	0.180	kW
Maximum Electrical Output	131	kW

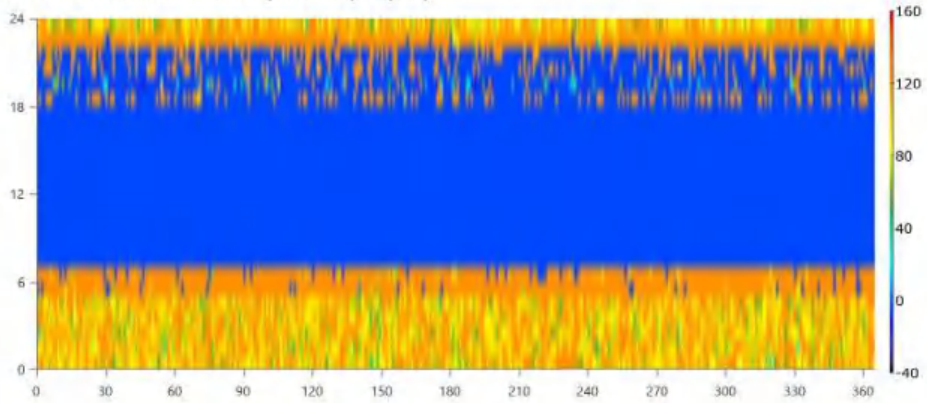
Danvest 131kWe Low Load Hybrid Fuel Summary

Quantity	Value	Units
Fuel Consumption	113,664	L
Specific Fuel Consumption	0.273	L/kWh
Fuel Energy Input	1,118,453	kWh/yr
Mean Electrical Efficiency	37.2	%

Danvest 131kWe Low Load Hybrid Statistics

Quantity	Value	Units
Hours of Operation	3,697	hrs/yr
Number of Starts	649	starts/yr
Operational Life	17.3	yr
Capacity Factor	36.3	%
Fixed Generation Cost	4.38	$/hr
Marginal Generation Cost	0.263	$/kWh

Danvest 131kWe Low Load Hybrid Output (kW)



HOMER Pro

Generator: Danvest 131kWe Low Load Hybrid (1) (Diesel)

Danvest 131kWe Low Load Hybrid (1) Electrical Summary

Quantity	Value	Units
Electrical Production	68,234	kWh/yr
Mean Electrical Output	33.0	kW
Minimum Electrical Output	0.00710	kW
Maximum Electrical Output	107	kW

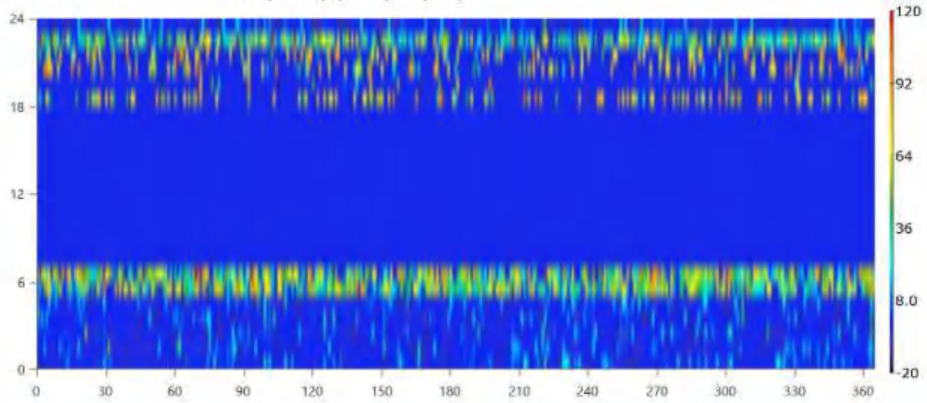
Danvest 131kWe Low Load Hybrid (1) Fuel Summary

Quantity	Value	Units
Fuel Consumption	20,423	L
Specific Fuel Consumption	0.299	L/kWh
Fuel Energy Input	200,961	kWh/yr
Mean Electrical Efficiency	34.0	%

Danvest 131kWe Low Load Hybrid (1) Statistics

Quantity	Value	Units
Hours of Operation	2,065	hrs/yr
Number of Starts	1,153	starts/yr
Operational Life	31.0	yr
Capacity Factor	5.95	%
Fixed Generation Cost	4.38	$/hr
Marginal Generation Cost	0.263	$/kWh

Danvest 131kWe Low Load Hybrid (1) Output (kW)



HOMER Pro

Generator: Autosize Genset (Diesel)

Autosize Genset Electrical Summary

Quantity	Value	Units
Electrical Production	399,669	kWh/yr
Mean Electrical Output	336	kW
Minimum Electrical Output	238	kW
Maximum Electrical Output	500	kW

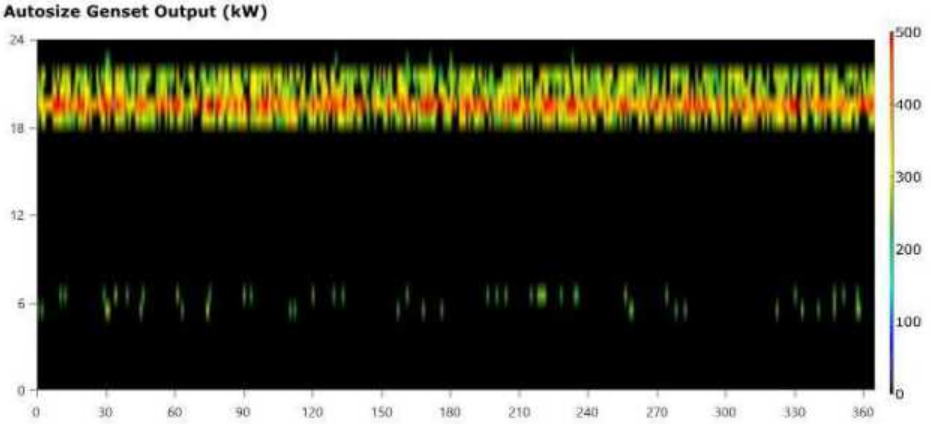
Autosize Genset Fuel Summary

Quantity	Value	Units
Fuel Consumption	104,956	L
Specific Fuel Consumption	0.263	L/kWh
Fuel Energy Input	1,032,763	kWh/yr
Mean Electrical Efficiency	38.7	%

Autosize Genset Statistics

Quantity	Value	Units
Hours of Operation	1,191	hrs/yr
Number of Starts	475	starts/yr
Operational Life	12.6	yr
Capacity Factor	9.12	%
Fixed Generation Cost	40.6	$/hr
Marginal Generation Cost	0.236	$/kWh

Autosize Genset Output (kW)



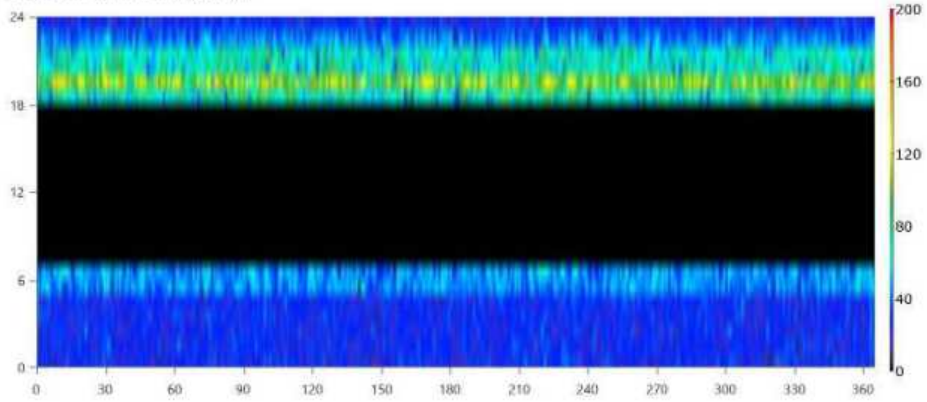
HOMER Pro

Fuel Summary

Diesel Consumption Statistics

Quantity	Value	Units
Total fuel consumed	239,042	L
Avg fuel per day	655	L/day
Avg fuel per hour	27.3	L/hour

Diesel Consumption (L/hr)



Emissions

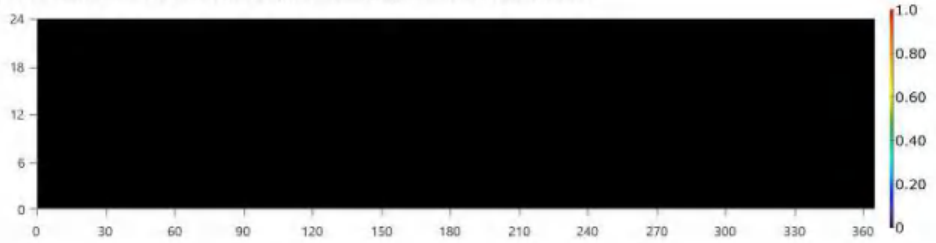
Pollutant	Quantity	Unit
Carbon Dioxide	626,587	kg/yr
Carbon Monoxide	3,393	kg/yr
Unburned Hydrocarbons	172	kg/yr
Particulate Matter	20.0	kg/yr
Sulfur Dioxide	1,532	kg/yr
Nitrogen Oxides	1,817	kg/yr

HOMER Pro

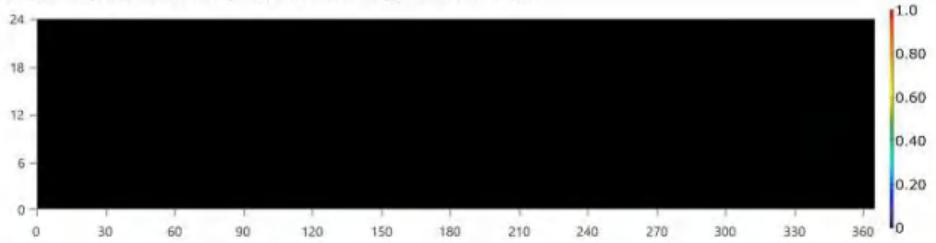
Renewable Summary

Capacity-based metrics	Value	Unit
Nominal renewable capacity divided by total nominal capacity	0	%
Usable renewable capacity divided by total capacity	0	%
Energy-based metrics	**Value**	**Unit**
Total renewable production divided by load	0	%
Total renewable production divided by generation	0	%
One minus total nonrenewable production divided by load	0	%
Peak values	**Value**	**Unit**
Renewable output divided by load (HOMER standard)	0	%
Renewable output divided by total generation	0	%
One minus nonrenewable output divided by total load	0.0000428	%

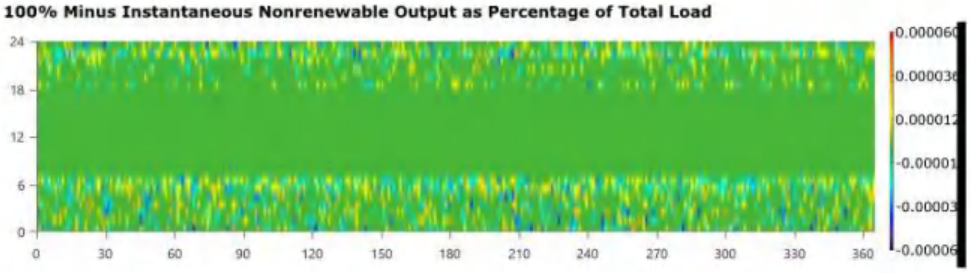
Instantaneous Renewable Output Percentage of Total Generation



Instantaneous Renewable Output Percentage of Total Load

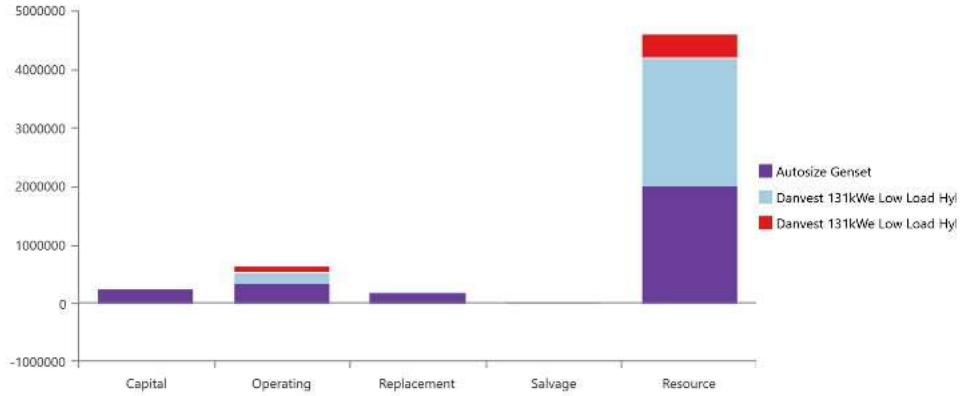


100% Minus Instantaneous Nonrenewable Output as Percentage of Total Load



HOMER Pro

Cost Summary



Net Present Costs

Name	Capital	Operating	Replacement	Salvage	Resource	Total
Autosize Genset	$250,000	$342,555	$191,146	-$2,201	$2.01M	$2.79M
Danvest 131kWe Low Load Hybrid	$0.00	$185,728	$31,703	-$14,959	$2.18M	$2.38M
Danvest 131kWe Low Load Hybrid (1)	$0.00	$103,741	$0.00	-$5,204	$391,602	$490,139
System	$250,000	$632,024	$222,849	-$22,364	$4.58M	$5.67M

Annualized Costs

Name	Capital	Operating	Replacement	Salvage	Resource	Total
Autosize Genset	$13,038	$17,865	$9,969	-$114.79	$104,956	$145,712
Danvest 131kWe Low Load Hybrid	$0.00	$9,686	$1,653	-$780.14	$113,664	$124,223
Danvest 131kWe Low Load Hybrid (1)	$0.00	$5,410	$0.00	-$271.38	$20,423	$25,562
System	$13,038	$32,961	$11,622	-$1,166	$239,042	$295,498

HOMER Pro

Compare Economics

IRR (%):**N/A**

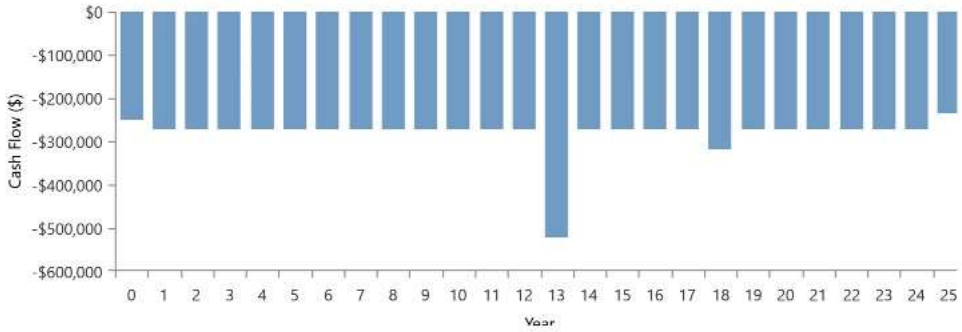
Discounted payback (yr):**N/A**

Simple payback (yr):**N/A**

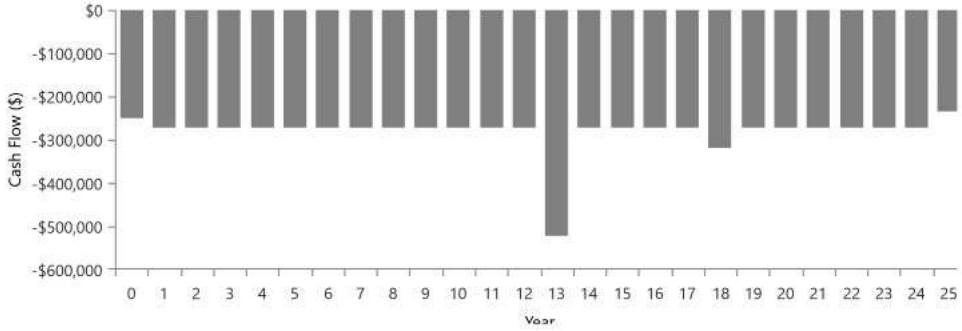
	Base System	Proposed System
Net Present Cost	$5.67M	$5.67M
CAPEX	$250,000	$250,000
OPEX	$282,460	$282,460
LCOE (per kWh)	$0.334	$0.334
CO2 Emitted (kg/yr)	626,587	626,587
Fuel Consumption (L/yr)	239,042	239,042

HOMER Pro

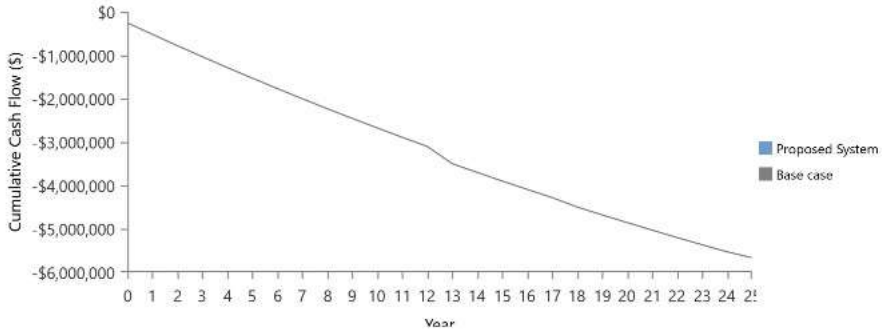
Proposed Annual Nominal Cash Flows



Base System Annual Nominal Cash Flows

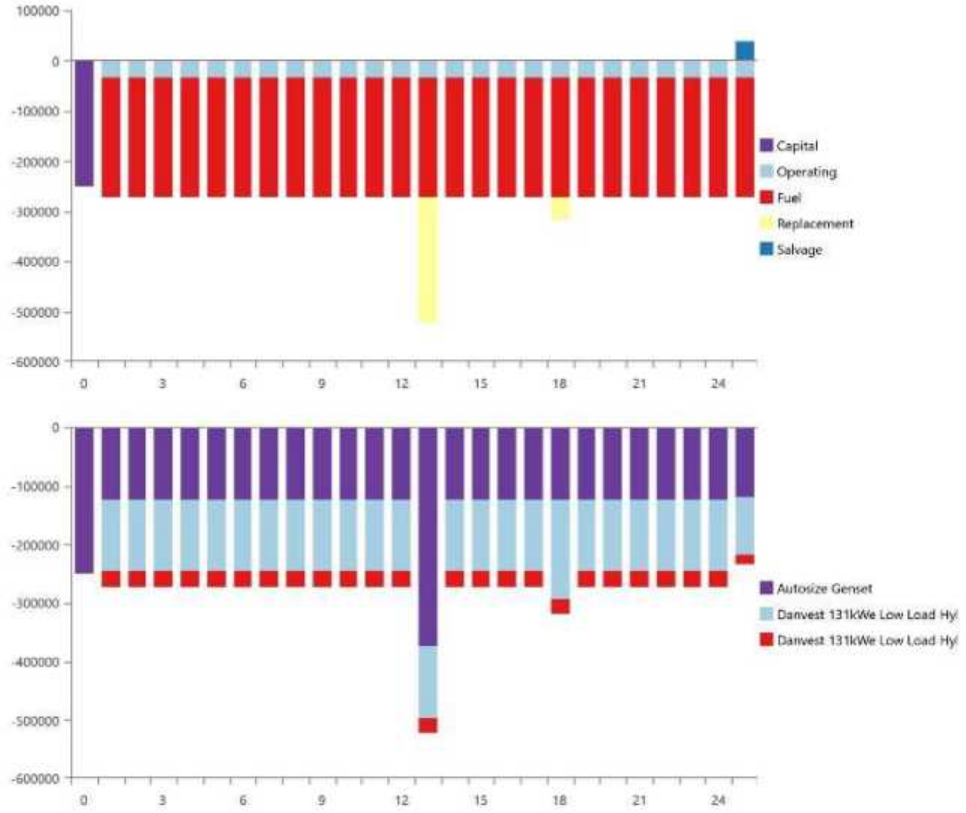


Cumulative Discounted Cash Flows



HOMER Pro

Cash Flow



Lampiran 9. *Report* skenario 2

HOMER Pro

System Simulation Report

File: Test2.homer

Author:

Location: 49VJ+8H Mattiro Bulu, Pangkajene and Islands Regency, South Sulawesi, Indonesia (4°51.4'S, 119°22.9'E)

Total Net Present Cost: $2,238,503.00

Levelized Cost of Energy ($/kWh): $0.189

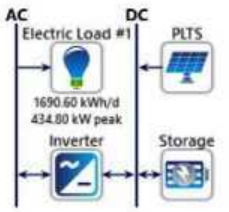
Notes: Skenario 2 (Eksisting 2)

HOMER Pro

System Architecture

Component	Name	Size	Unit
PV	Canadian Solar180CS5A-180M	1,162	kW
Storage	BAE SECURA SOLAR 10 PVV 1500	694	strings
System converter	Solectria Renewables PVI 75-208-PE	474	kW
Dispatch strategy	HOMER Cycle Charging		

Schematic



HOMER Pro

Electrical Summary

Excess and Unmet

Quantity	Value	Units
Excess Electricity	1,231,306	kWh/yr
Unmet Electric Load	0	kWh/yr
Capacity Shortage	590	kWh/yr

Production Summary

Component	Production (kWh/yr)	Percent
Canadian Solar180CS5A-180M	1,868,973	100
Total	1,868,973	100

Consumption Summary

Component	Consumption (kWh/yr)	Percent
AC Primary Load	617,069	100
DC Primary Load	0	0
Deferrable Load	0	0
Total	617,069	100

HOMER Pro

PV: Canadian Solar180CS5A-180M

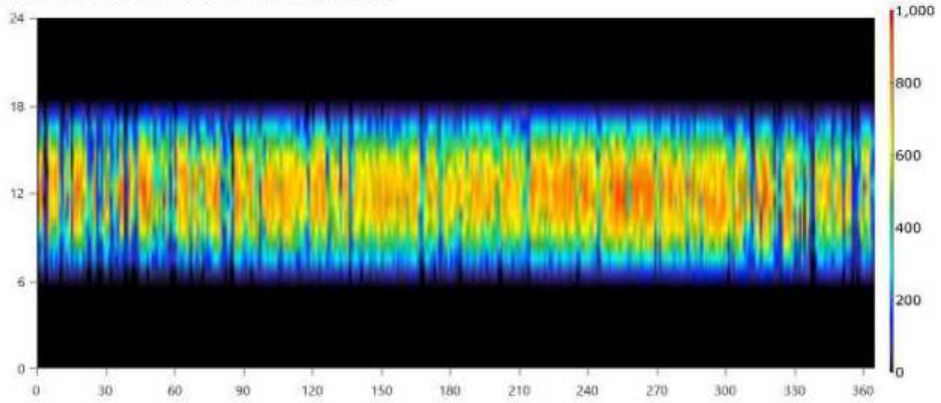
Canadian Solar180CS5A-180M Electrical Summary

Quantity	Value	Units
Minimum Output	0	kW
Maximum Output	1,000	kW
PV Penetration	303	%
Hours of Operation	4,380	hrs/yr
Levelized Cost	0.0312	$/kWh

Canadian Solar180CS5A-180M Statistics

Quantity	Value	Units
Rated Capacity	1,162	kW
Mean Output	213	kW
Mean Output	5,120	kWh/d
Capacity Factor	18.4	%
Total Production	1,868,973	kWh/yr

Canadian Solar180CS5A-180M Output (kW)



HOMER Pro

Converter: Solectria Renewables PVI 75-208-PE

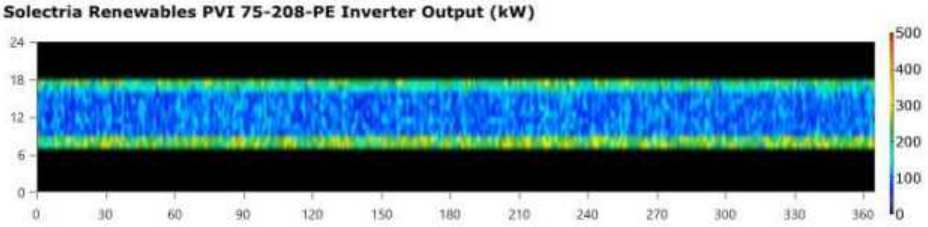
Solectria Renewables PVI 75-208-PE Electrical Summary

Quantity	Value	Units
Hours of Operation	4,015	hrs/yr
Energy Out	617,069	kWh/yr
Energy In	632,891	kWh/yr
Losses	15,822	kWh/yr

Solectria Renewables PVI 75-208-PE Statistics

Quantity	Value	Units
Capacity	474	kW
Mean Output	70.4	kW
Minimum Output	0	kW
Maximum Output	435	kW
Capacity Factor	14.9	%

Solectria Renewables PVI 75-208-PE Inverter Output (kW)



Solectria Renewables PVI 75-208-PE Rectifier Output (kW)

HOMER Pro

Storage: BAE SECURA SOLAR 10 PVV 1500

BAE SECURA SOLAR 10 PVV 1500 Properties

Quantity	Value	Units
Batteries	694	qty.
String Size	1.00	batteries
Strings in Parallel	694	strings
Bus Voltage	2.00	V

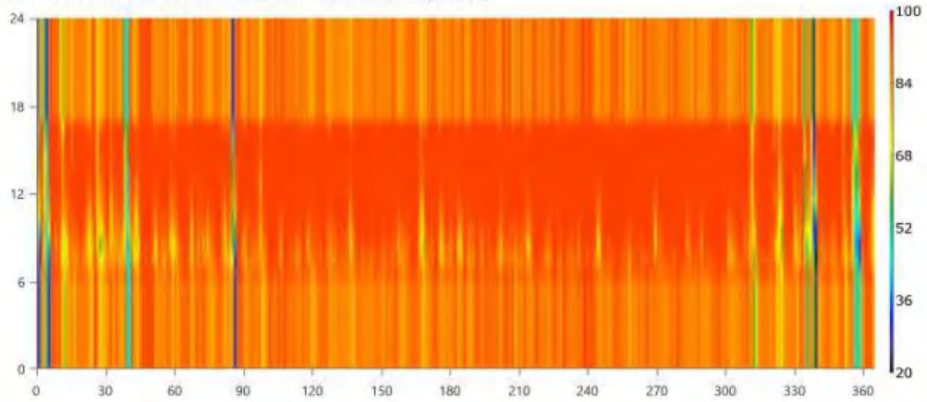
BAE SECURA SOLAR 10 PVV 1500 Result Data

Quantity	Value	Units
Average Energy Cost	0	$/kWh
Energy In	101,084	kWh/yr
Energy Out	96,309	kWh/yr
Storage Depletion	286	kWh/yr
Losses	5,061	kWh/yr
Annual Throughput	98,811	kWh/yr

BAE SECURA SOLAR 10 PVV 1500 Statistics

Quantity	Value	Units
Autonomy	23.7	hr
Storage Wear Cost	0.434	$/kWh
Nominal Capacity	2,084	kWh
Usable Nominal Capacity	1,667	kWh
Lifetime Throughput	1,976,218	kWh
Expected Life	20.0	yr

BAE SECURA SOLAR 10 PVV 1500 State of Charge (%)

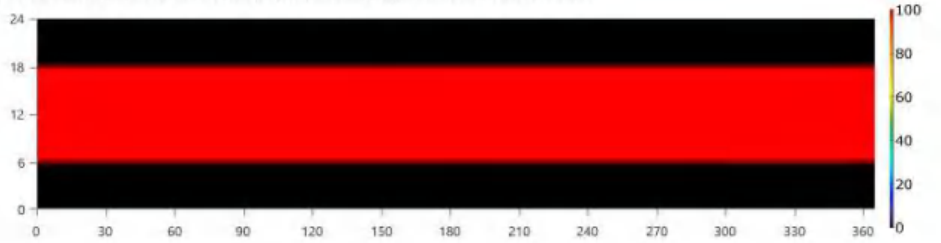


HOMER Pro

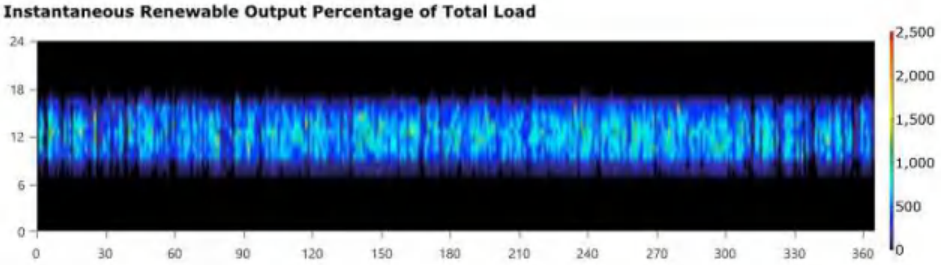
Renewable Summary

Capacity-based metrics	Value	Unit
Nominal renewable capacity divided by total nominal capacity	100	%
Usable renewable capacity divided by total capacity	100	%
Energy-based metrics	**Value**	**Unit**
Total renewable production divided by load	303	%
Total renewable production divided by generation	100	%
One minus total nonrenewable production divided by load	100	%
Peak values	**Value**	**Unit**
Renewable output divided by load (HOMER standard)	2,135	%
Renewable output divided by total generation	100	%
One minus nonrenewable output divided by total load	100	%

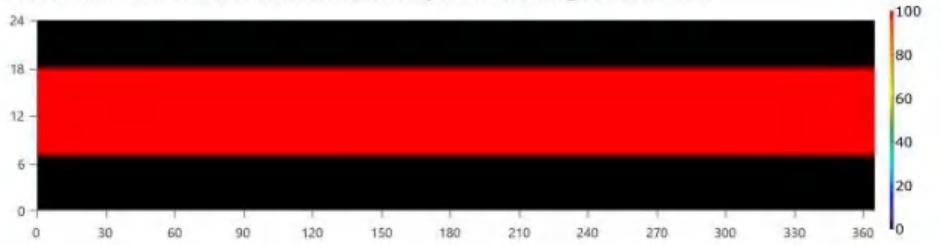
Instantaneous Renewable Output Percentage of Total Generation



Instantaneous Renewable Output Percentage of Total Load



100% Minus Instantaneous Nonrenewable Output as Percentage of Total Load



HOMER Pro

Compare Economics

IRR (%):**N/A**

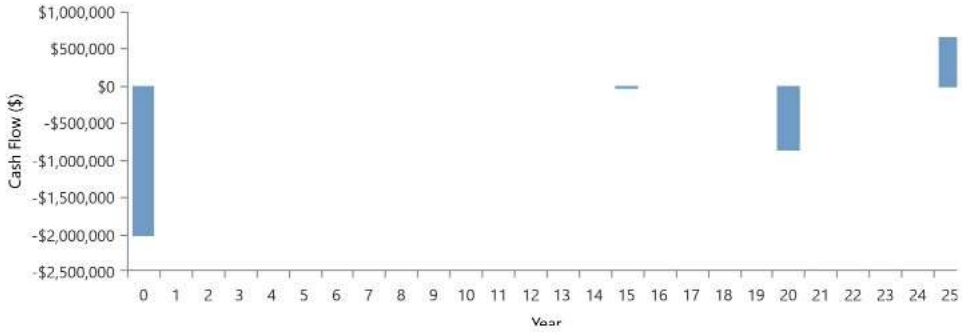
Discounted payback (yr):**N/A**

Simple payback (yr):**N/A**

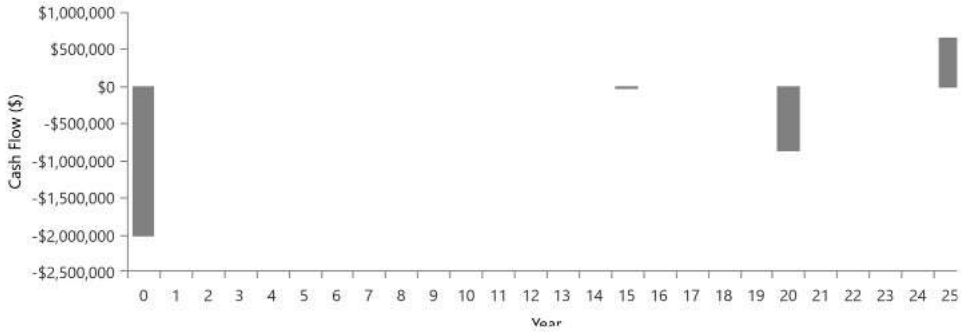
	Base System	Proposed System
Net Present Cost	$2.24M	$2.24M
CAPEX	$2.03M	$2.03M
OPEX	$10,780	$10,780
LCOE (per kWh)	$0.189	$0.189
CO2 Emitted (kg/yr)	0	0
Fuel Consumption (L/yr)	0	0

HOMER Pro

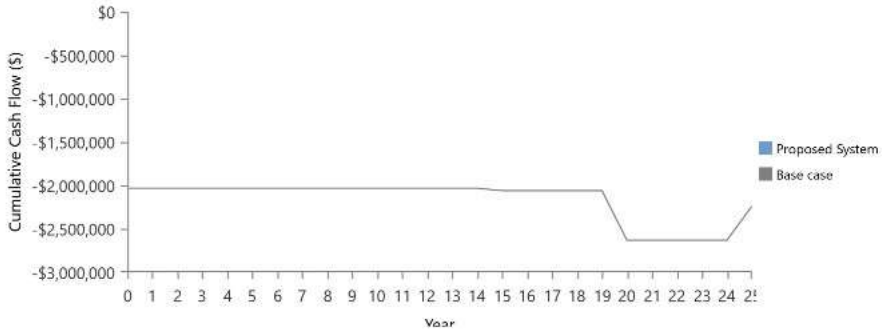
Proposed Annual Nominal Cash Flows



Base System Annual Nominal Cash Flows

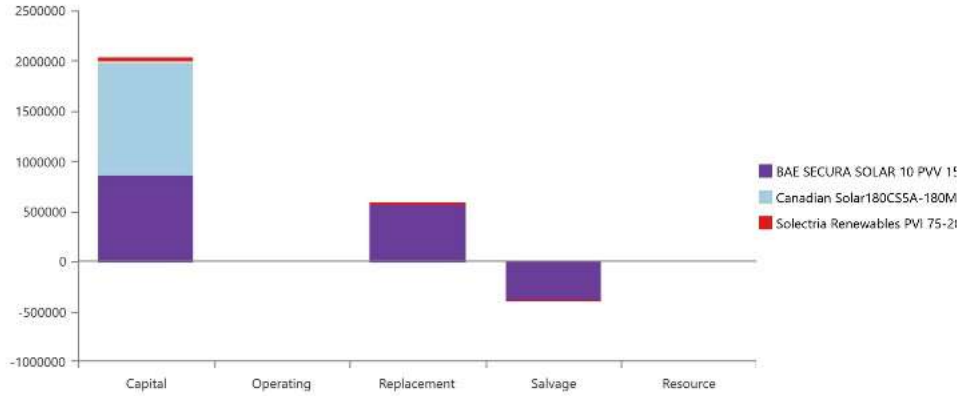


Cumulative Discounted Cash Flows



HOMER Pro

Cost Summary



Net Present Costs

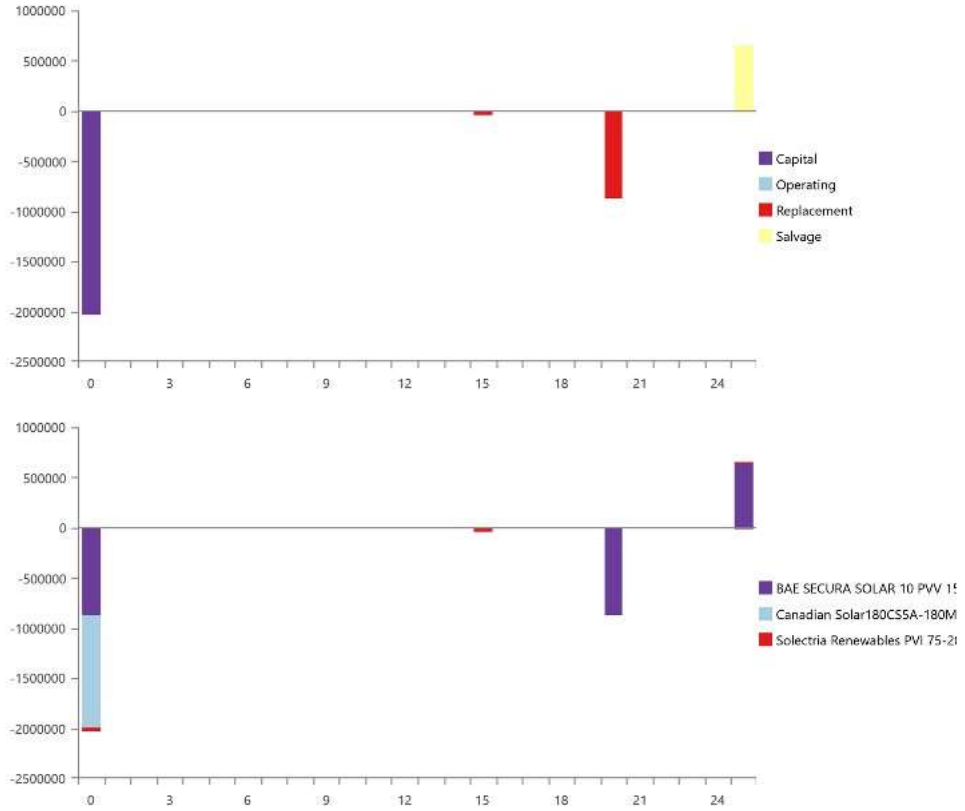
Name	Capital	Operating	Replacement	Salvage	Resource	Total
BAE SECURA SOLAR 10 PVV 1500	$874,440	$0.00	$570,963	-$384,936	$0.00	$1.06M
Canadian Solar180CS5A-180M	$1.12M	$0.00	$0.00	$0.00	$0.00	$1.12M
Solectria Renewables PVI 75-208-PE	$38,945	$6.06	$28,289	-$7,620	$0.00	$59,620
System	$2.03M	$6.06	$599,251	-$392,556	$0.00	$2.24M

Annualized Costs

Name	Capital	Operating	Replacement	Salvage	Resource	Total
BAE SECURA SOLAR 10 PVV 1500	$45,604	$0.00	$29,777	-$20,075	$0.00	$55,306
Canadian Solar180CS5A-180M	$58,328	$0.00	$0.00	$0.00	$0.00	$58,328
Solectria Renewables PVI 75-208-PE	$2,031	$0.316	$1,475	-$397.38	$0.00	$3,109
System	$105,963	$0.316	$31,252	-$20,473	$0.00	$116,743

HOMER Pro

Cash Flow



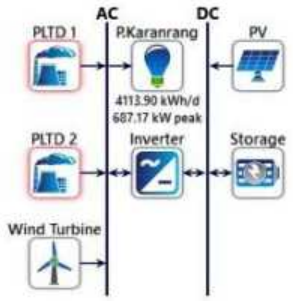
Lampiran 10. *Report* skenario 3

HOMER Pro

System Architecture

Component	Name	Size	Unit
Generator #1	Danvest 131kWe Low Load Hybrid	131	kW
Generator #2	Danvest 131kWe Low Load Hybrid (1)	131	kW
PV	Canadian Solar180CS5A-180M	673	kW
Storage	BAE SECURA SOLAR 10 PVV 1500	287	strings
Wind turbine	AWS HC 3.3kW Wind Turbine	131	ea.
System converter	Solectria Renewables PVI 75 kW-240	332	kW
Dispatch strategy	HOMER Load Following		

Schematic



HOMER Pro

Electrical Summary

Excess and Unmet

Quantity	Value	Units
Excess Electricity	819,694	kWh/yr
Unmet Electric Load	303	kWh/yr
Capacity Shortage	1,492	kWh/yr

Production Summary

Component	Production (kWh/yr)	Percent
Canadian Solar180CS5A-180M	1,081,877	46.3
Danvest 131kWe Low Load Hybrid	528,984	22.6
Danvest 131kWe Low Load Hybrid (1)	158,926	6.80
AWS HC 3.3kW Wind Turbine	568,762	24.3
Total	2,338,549	100

Consumption Summary

Component	Consumption (kWh/yr)	Percent
AC Primary Load	1,501,271	100
DC Primary Load	0	0
Deferrable Load	0	0
Total	1,501,271	100

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Generator: Danvest 131kWe Low Load Hybrid (Diesel)

Danvest 131kWe Low Load Hybrid Electrical Summary

Quantity	Value	Units
Electrical Production	528,984	kWh/yr
Mean Electrical Output	104	kW
Minimum Electrical Output	1.57	kW
Maximum Electrical Output	131	kW

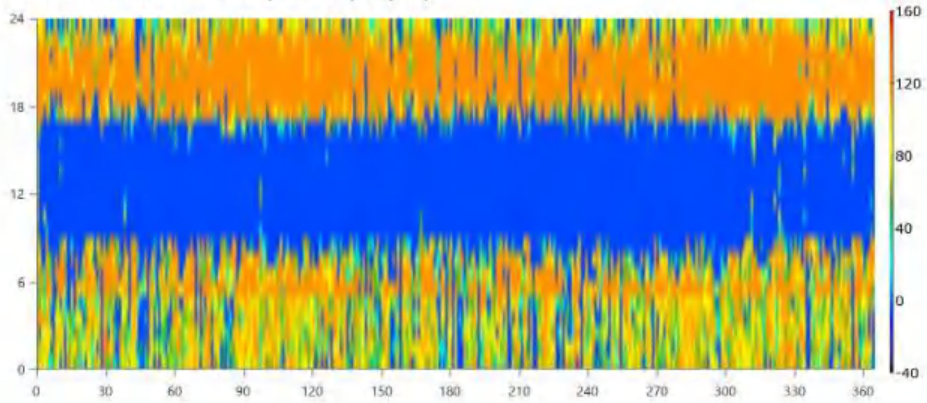
Danvest 131kWe Low Load Hybrid Fuel Summary

Quantity	Value	Units
Fuel Consumption	144,593	L
Specific Fuel Consumption	0.273	L/kWh
Fuel Energy Input	1,422,791	kWh/yr
Mean Electrical Efficiency	37.2	%

Danvest 131kWe Low Load Hybrid Statistics

Quantity	Value	Units
Hours of Operation	5,079	hrs/yr
Number of Starts	598	starts/yr
Operational Life	12.6	yr
Capacity Factor	46.1	%
Fixed Generation Cost	4.38	$/hr
Marginal Generation Cost	0.263	$/kWh

Danvest 131kWe Low Load Hybrid Output (kW)



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Generator: Danvest 131kWe Low Load Hybrid (1) (Diesel)

Danvest 131kWe Low Load Hybrid (1) Electrical Summary

Quantity	Value	Units
Electrical Production	158,926	kWh/yr
Mean Electrical Output	89.9	kW
Minimum Electrical Output	13.5	kW
Maximum Electrical Output	131	kW

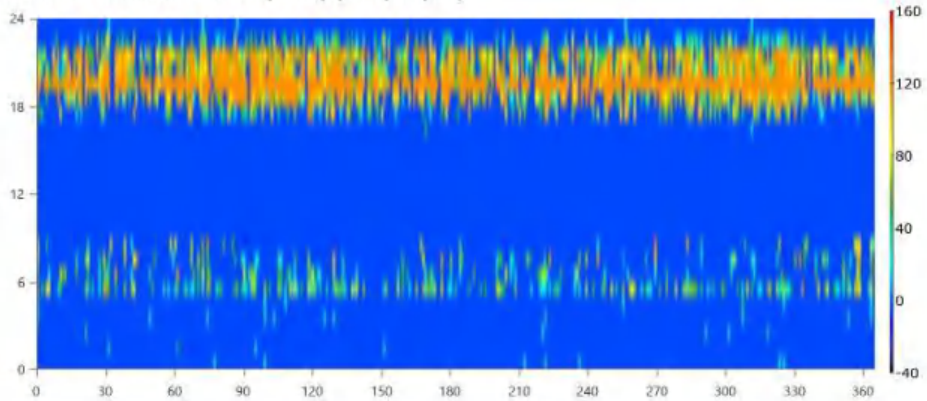
Danvest 131kWe Low Load Hybrid (1) Fuel Summary

Quantity	Value	Units
Fuel Consumption	43,701	L
Specific Fuel Consumption	0.275	L/kWh
Fuel Energy Input	430,021	kWh/yr
Mean Electrical Efficiency	37.0	%

Danvest 131kWe Low Load Hybrid (1) Statistics

Quantity	Value	Units
Hours of Operation	1,768	hrs/yr
Number of Starts	668	starts/yr
Operational Life	36.2	yr
Capacity Factor	13.8	%
Fixed Generation Cost	4.38	$/hr
Marginal Generation Cost	0.263	$/kWh

Danvest 131kWe Low Load Hybrid (1) Output (kW)



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PV: Canadian Solar180CS5A-180M

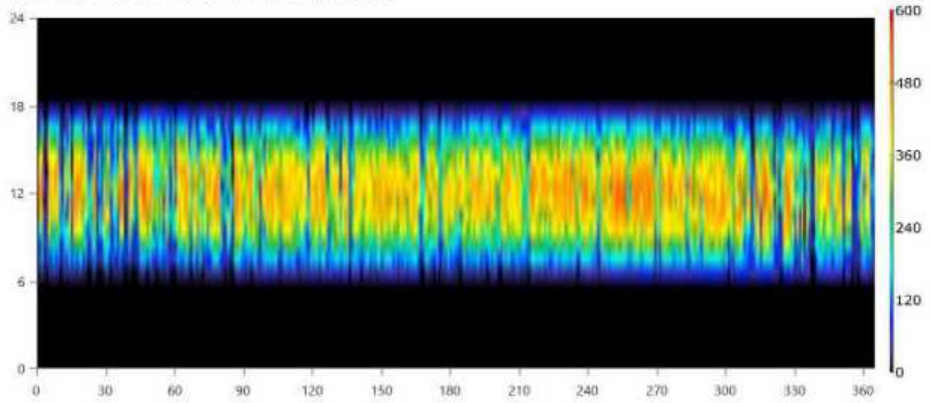
Canadian Solar180CS5A-180M Electrical Summary

Quantity	Value	Units
Minimum Output	0	kW
Maximum Output	579	kW
PV Penetration	72.0	%
Hours of Operation	4,380	hrs/yr
Levelized Cost	0.0312	$/kWh

Canadian Solar180CS5A-180M Statistics

Quantity	Value	Units
Rated Capacity	673	kW
Mean Output	124	kW
Mean Output	2,964	kWh/d
Capacity Factor	18.4	%
Total Production	1,081,877	kWh/yr

Canadian Solar180CS5A-180M Output (kW)



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Wind Turbine: AWS HC 3.3kW Wind Turbine

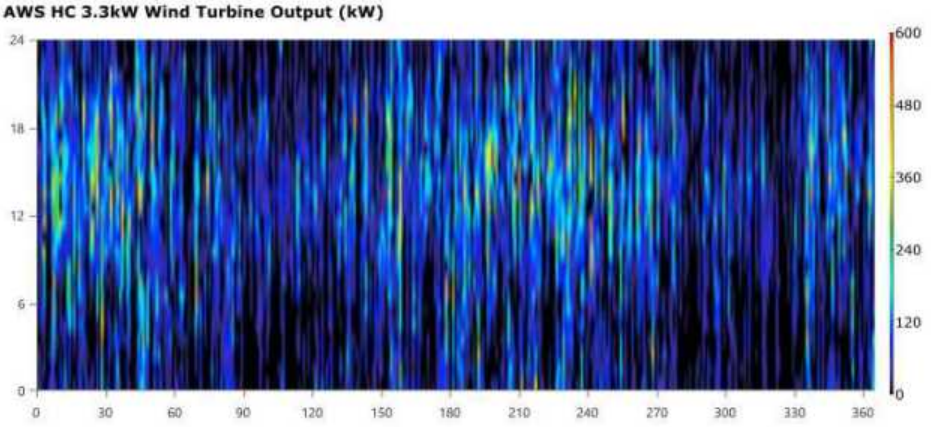
AWS HC 3.3kW Wind Turbine Electrical Summary

Quantity	Value	Units
Minimum Output	0	kW
Maximum Output	567	kW
Wind Penetration	37.9	%
Hours of Operation	7,022	hrs/yr
Levelized Cost	0.115	$/kWh

AWS HC 3.3kW Wind Turbine Statistics

Quantity	Value	Units
Total Rated Capacity	432	kW
Mean Output	64.9	kW
Capacity Factor	15.0	%
Total Production	568,762	kWh/yr

AWS HC 3.3kW Wind Turbine Output (kW)



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Storage: BAE SECURA SOLAR 10 PVV 1500

BAE SECURA SOLAR 10 PVV 1500 Properties

Quantity	Value	Units
Batteries	287	qty.
String Size	1.00	batteries
Strings in Parallel	287	strings
Bus Voltage	2.00	V

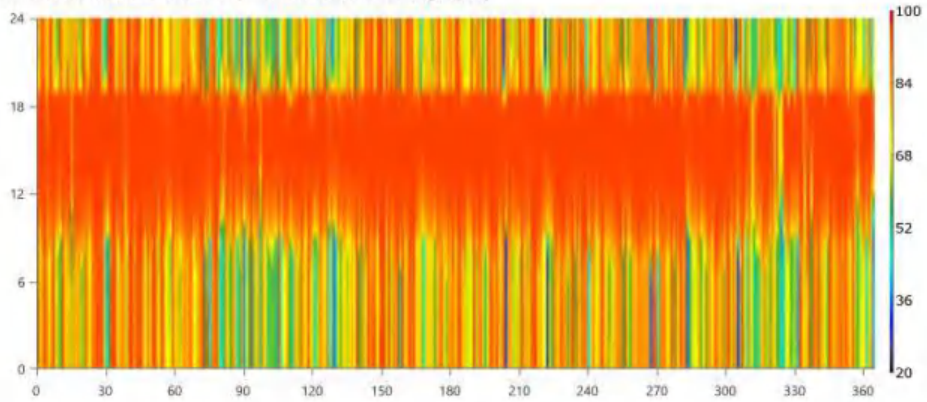
BAE SECURA SOLAR 10 PVV 1500 Result Data

Quantity	Value	Units
Average Energy Cost	0	$/kWh
Energy In	69,776	kWh/yr
Energy Out	66,507	kWh/yr
Storage Depletion	226	kWh/yr
Losses	3,495	kWh/yr
Annual Throughput	68,235	kWh/yr

BAE SECURA SOLAR 10 PVV 1500 Statistics

Quantity	Value	Units
Autonomy	4.02	hr
Storage Wear Cost	0.434	$/kWh
Nominal Capacity	862	kWh
Usable Nominal Capacity	690	kWh
Lifetime Throughput	854,112	kWh
Expected Life	12.5	yr

BAE SECURA SOLAR 10 PVV 1500 State of Charge (%)



HOMER Pro

Converter: Solectria Renewables PVI 75 kW-240

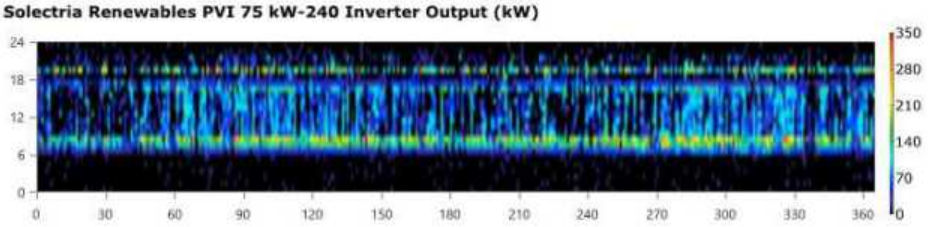
Solectria Renewables PVI 75 kW-240 Electrical Summary

Quantity	Value	Units
Hours of Operation	4,555	hrs/yr
Energy Out	343,546	kWh/yr
Energy In	357,860	kWh/yr
Losses	14,314	kWh/yr

Solectria Renewables PVI 75 kW-240 Statistics

Quantity	Value	Units
Capacity	332	kW
Mean Output	39.2	kW
Minimum Output	0	kW
Maximum Output	332	kW
Capacity Factor	11.8	%

Solectria Renewables PVI 75 kW-240 Inverter Output (kW)



Solectria Renewables PVI 75 kW-240 Rectifier Output (kW)

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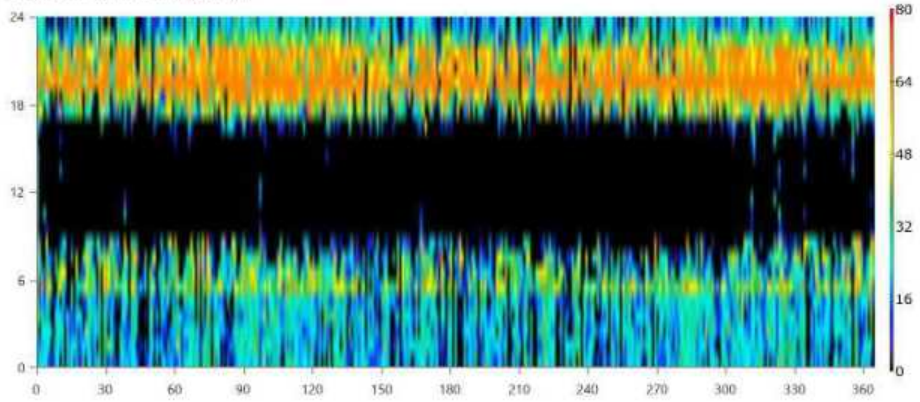
Fuel Summary

Diesel Consumption Statistics

Quantity	Value	Units
Total fuel consumed	188,294	L
Avg fuel per day	516	L/day
Avg fuel per hour	21.5	L/hour

Diesel Consumption (L/hr)



Emissions

Pollutant	Quantity	Unit
Carbon Dioxide	494,096	kg/yr
Carbon Monoxide	2,333	kg/yr
Unburned Hydrocarbons	136	kg/yr
Particulate Matter	13.4	kg/yr
Sulfur Dioxide	1,207	kg/yr
Nitrogen Oxides	267	kg/yr

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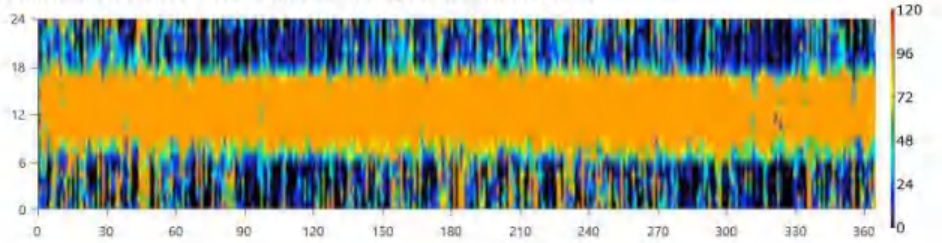
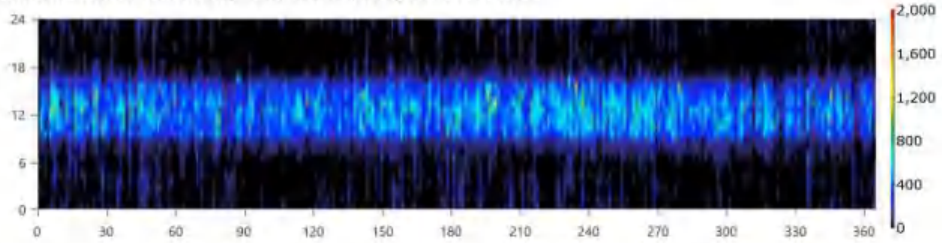
Renewable Summary

Capacity-based metrics	Value	Unit
Nominal renewable capacity divided by total nominal capacity	80.8	%
Usable renewable capacity divided by total capacity	68.7	%
Energy-based metrics	**Value**	**Unit**
Total renewable production divided by load	110	%
Total renewable production divided by generation	70.6	%
One minus total nonrenewable production divided by load	54.2	%
Peak values	**Value**	**Unit**
Renewable output divided by load (HOMER standard)	1,626	%
Renewable output divided by total generation	106	%
One minus nonrenewable output divided by total load	107	%

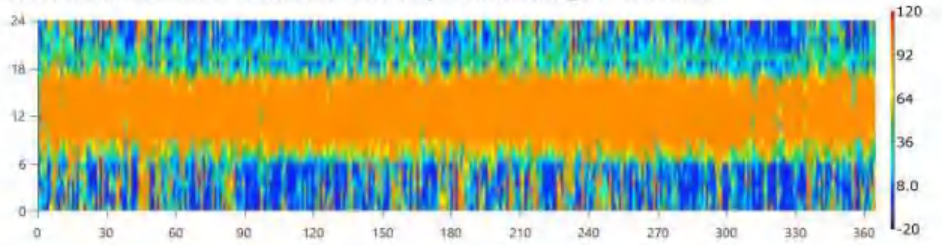
Instantaneous Renewable Output Percentage of Total Generation



Instantaneous Renewable Output Percentage of Total Load



100% Minus Instantaneous Nonrenewable Output as Percentage of Total Load



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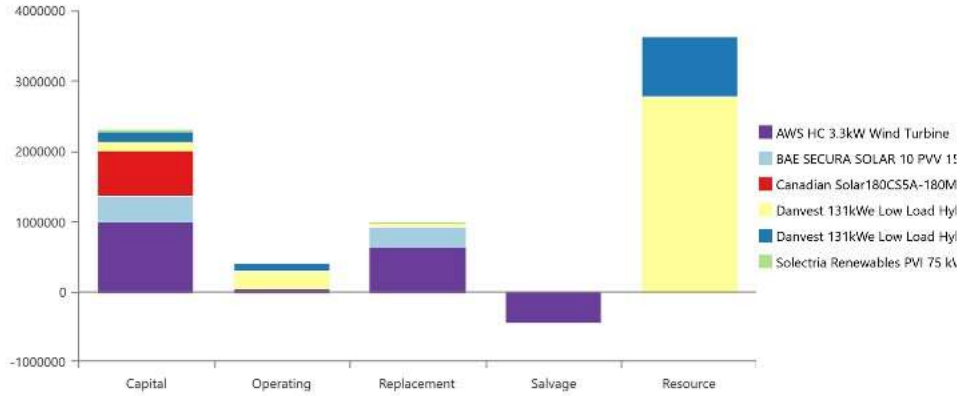
Cost Summary



Net Present Costs

Name	Capital	Operating	Replacement	Salvage	Resource	Total
AWS HC 3.3kW Wind Turbine	$995,600	$50,238	$650,074	-$438,272	$0.00	$1.26M
BAE SECURA SOLAR 10 PVV 1500	$361,620	$0.00	$276,944	-$583.10	$0.00	$637,981
Canadian Solar180CS5A-180M	$647,408	$0.00	$0.00	$0.00	$0.00	$647,408
Danvest 131kWe Low Load Hybrid	$131,000	$255,157	$35,051	-$431.00	$2.77M	$3.19M
Danvest 131kWe Low Load Hybrid (1)	$131,000	$88,820	$0.00	-$8,326	$837,958	$1.05M
Solectria Renewables PVI 75 kW-240	$27,293	$4.25	$19,825	-$5,340	$0.00	$41,782
System	$2.29M	$394,219	$981,894	-$452,951	$3.61M	$6.83M

Annualized Costs

Name	Capital	Operating	Replacement	Salvage	Resource	Total
AWS HC 3.3kW Wind Turbine	$51,923	$2,620	$33,903	-$22,857	$0.00	$65,589
BAE SECURA SOLAR 10 PVV 1500	$18,859	$0.00	$14,443	-$30.41	$0.00	$33,272
Canadian Solar180CS5A-180M	$33,764	$0.00	$0.00	$0.00	$0.00	$33,764
Danvest 131kWe Low Load Hybrid	$6,832	$13,307	$1,828	-$22.48	$144,593	$166,537
Danvest 131kWe Low Load Hybrid (1)	$6,832	$4,632	$0.00	-$434.20	$43,701	$54,731
Solectria Renewables PVI 75 kW-240	$1,423	$0.222	$1,034	-$278.48	$0.00	$2,179
System	$119,633	$20,559	$51,208	-$23,622	$188,294	$356,072

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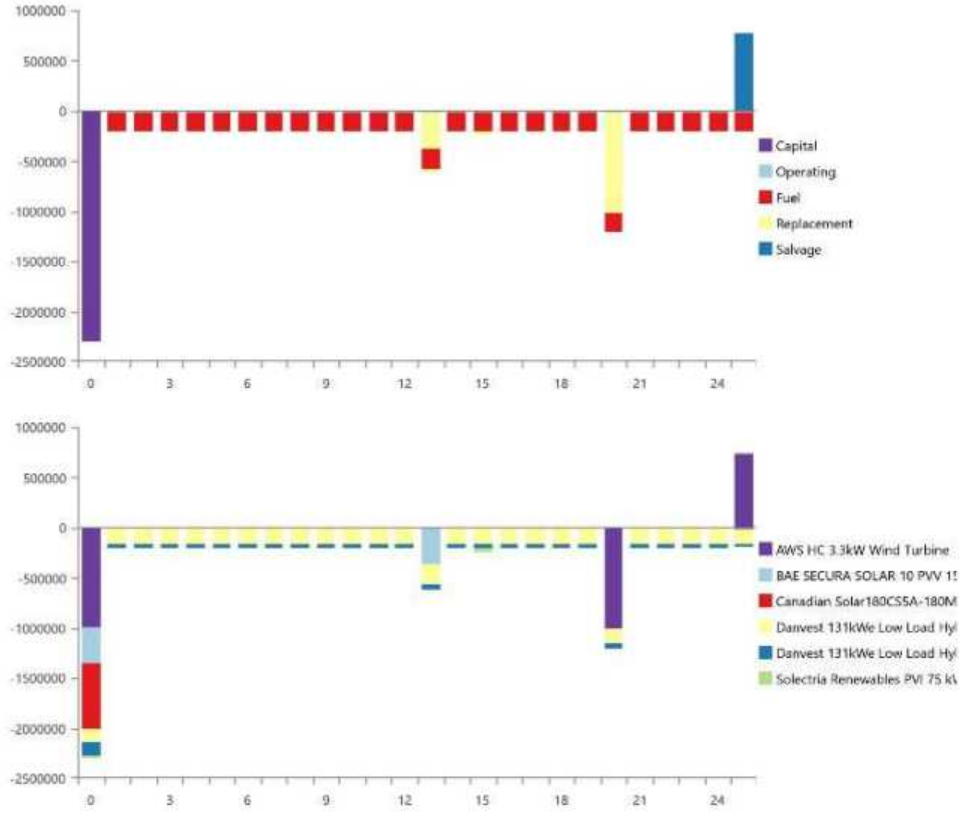
Cash Flow



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Compare Economics

IRR (%):**6.33**

Discounted payback (yr):**9.74**

Simple payback (yr):**9.50**

	Base System	Proposed System
Net Present Cost	$7.25M	$6.83M
CAPEX	$1.54M	$2.29M
OPEX	$297,775	$236,439
LCOE (per kWh)	$0.252	$0.237
CO2 Emitted (kg/yr)	639,094	494,096
Fuel Consumption (L/yr)	243,551	188,294

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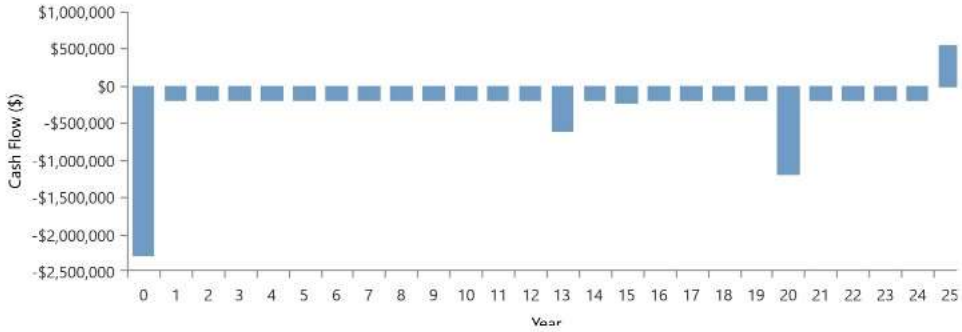
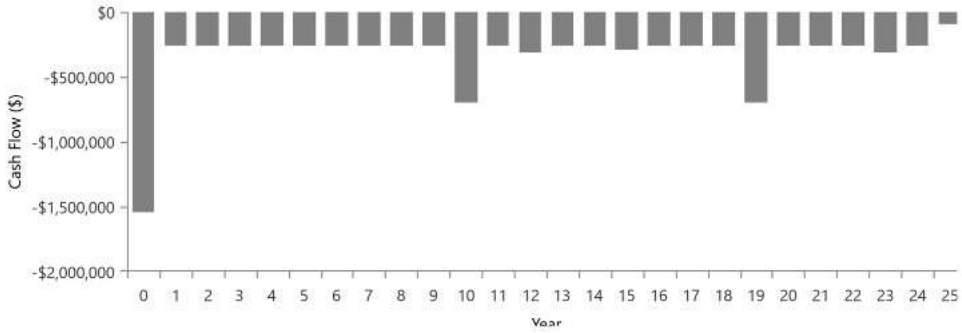
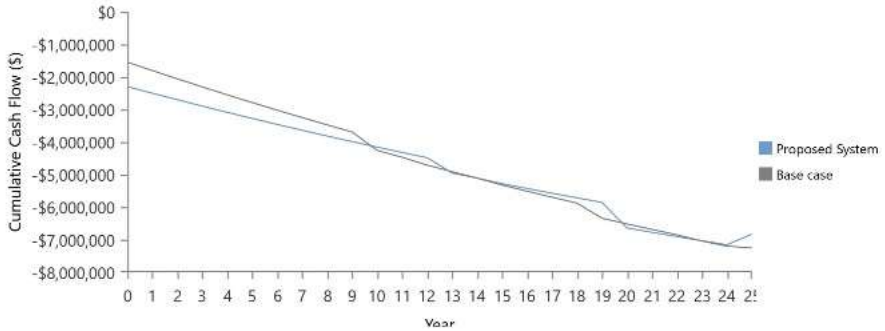
Proposed Annual Nominal Cash Flows



Base System Annual Nominal Cash Flows



Cumulative Discounted Cash Flows



Lampiran 11. *Report* skenario 4

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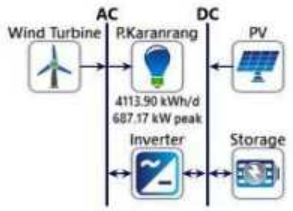
System Architecture

Component	Name	Size	Unit
PV	Canadian Solar180CS5A-180M	1,286	kW
Storage	BAE SECURA SOLAR 10 PVV 1500	2,627	strings
Wind turbine	AWS HC 3.3kW Wind Turbine	221	ea.
System converter	Solectria Renewables PVI 75 kW-240	848	kW
Dispatch strategy	HOMER Cycle Charging		

Schematic



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Electrical Summary

Excess and Unmet

Quantity	Value	Units
Excess Electricity	1,460,066	kWh/yr
Unmet Electric Load	809	kWh/yr
Capacity Shortage	1,488	kWh/yr

Production Summary

Component	Production (kWh/yr)	Percent
Canadian Solar180CS5A-180M	2,067,591	68.3
AWS HC 3.3kW Wind Turbine	959,514	31.7
Total	3,027,105	100

Consumption Summary

Component	Consumption (kWh/yr)	Percent
AC Primary Load	1,500,765	100
DC Primary Load	0	0
Deferrable Load	0	0
Total	1,500,765	100

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PV: Canadian Solar180CS5A-180M

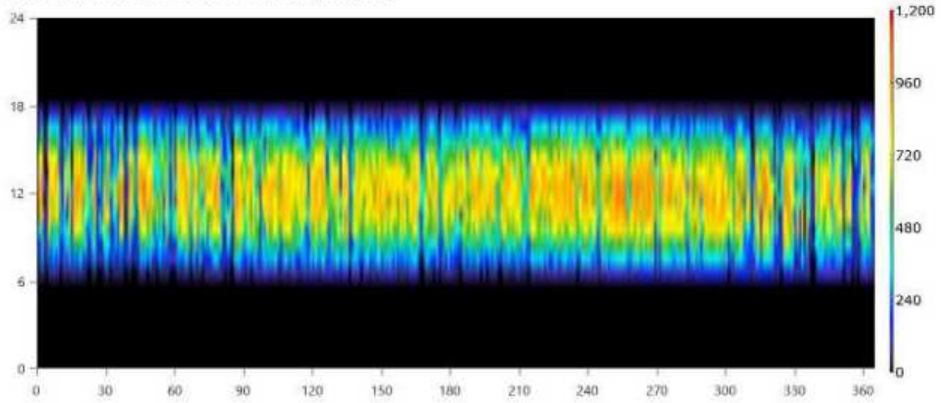
Canadian Solar180CS5A-180M Electrical Summary

Quantity	Value	Units
Minimum Output	0	kW
Maximum Output	1,106	kW
PV Penetration	138	%
Hours of Operation	4,380	hrs/yr
Levelized Cost	0.0312	$/kWh

Canadian Solar180CS5A-180M Statistics

Quantity	Value	Units
Rated Capacity	1,286	kW
Mean Output	236	kW
Mean Output	5,665	kWh/d
Capacity Factor	18.4	%
Total Production	2,067,591	kWh/yr

Canadian Solar180CS5A-180M Output (kW)



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Wind Turbine: AWS HC 3.3kW Wind Turbine

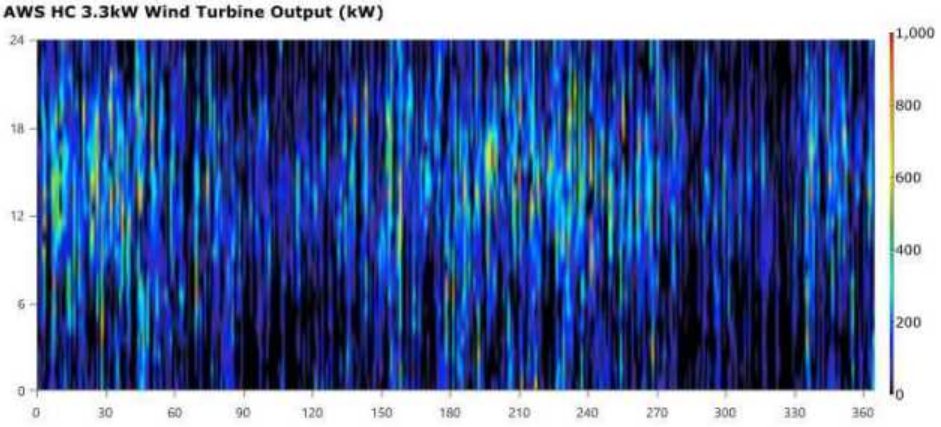
AWS HC 3.3kW Wind Turbine Electrical Summary

Quantity	Value	Units
Minimum Output	0	kW
Maximum Output	956	kW
Wind Penetration	63.9	%
Hours of Operation	7,022	hrs/yr
Levelized Cost	0.115	$/kWh

AWS HC 3.3kW Wind Turbine Statistics

Quantity	Value	Units
Total Rated Capacity	729	kW
Mean Output	110	kW
Capacity Factor	15.0	%
Total Production	959,514	kWh/yr

AWS HC 3.3kW Wind Turbine Output (kW)



HOMER Pro

Storage: BAE SECURA SOLAR 10 PVV 1500

BAE SECURA SOLAR 10 PVV 1500 Properties

Quantity	Value	Units
Batteries	2,627	qty.
String Size	1.00	batteries
Strings in Parallel	2,627	strings
Bus Voltage	2.00	V

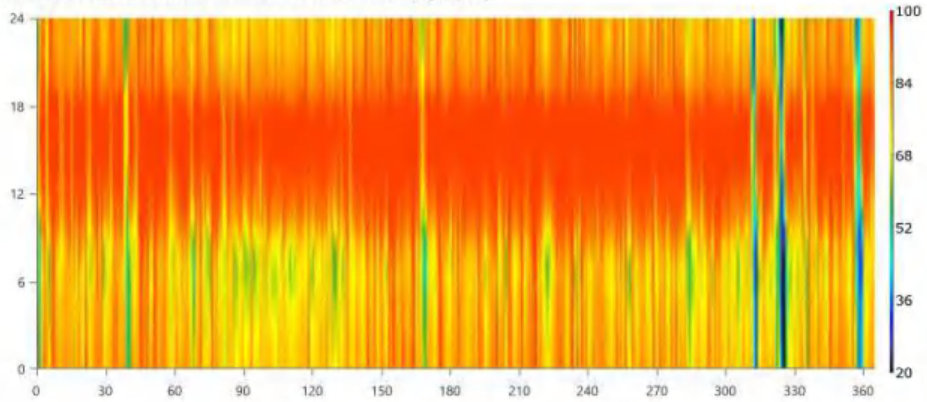
BAE SECURA SOLAR 10 PVV 1500 Result Data

Quantity	Value	Units
Average Energy Cost	0	$/kWh
Energy In	643,939	kWh/yr
Energy Out	613,247	kWh/yr
Storage Depletion	1,544	kWh/yr
Losses	32,236	kWh/yr
Annual Throughput	629,178	kWh/yr

BAE SECURA SOLAR 10 PVV 1500 Statistics

Quantity	Value	Units
Autonomy	36.8	hr
Storage Wear Cost	0.434	$/kWh
Nominal Capacity	7,890	kWh
Usable Nominal Capacity	6,312	kWh
Lifetime Throughput	7,817,952	kWh
Expected Life	12.4	yr

BAE SECURA SOLAR 10 PVV 1500 State of Charge (%)



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Converter: Solectria Renewables PVI 75 kW-240

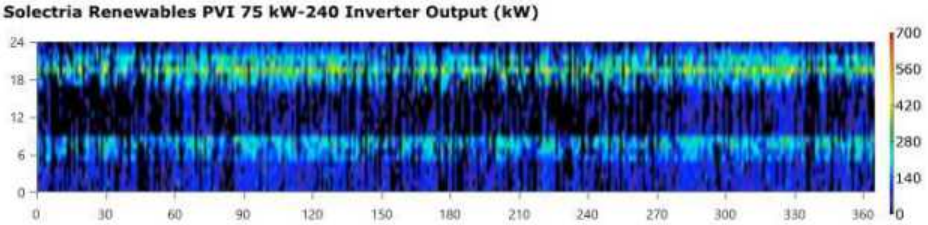
Solectria Renewables PVI 75 kW-240 Electrical Summary

Quantity	Value	Units
Hours of Operation	6,385	hrs/yr
Energy Out	853,971	kWh/yr
Energy In	889,553	kWh/yr
Losses	35,582	kWh/yr

Solectria Renewables PVI 75 kW-240 Statistics

Quantity	Value	Units
Capacity	848	kW
Mean Output	97.5	kW
Minimum Output	0	kW
Maximum Output	643	kW
Capacity Factor	11.5	%

Solectria Renewables PVI 75 kW-240 Inverter Output (kW)



Solectria Renewables PVI 75 kW-240 Rectifier Output (kW)

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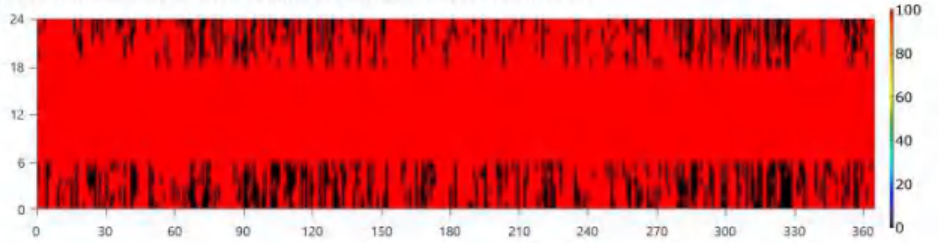
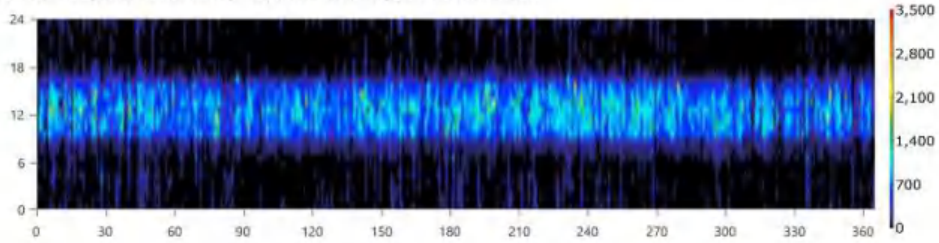
Renewable Summary

Capacity-based metrics	Value	Unit
Nominal renewable capacity divided by total nominal capacity	100	%
Usable renewable capacity divided by total capacity	100	%
Energy-based metrics	**Value**	**Unit**
Total renewable production divided by load	202	%
Total renewable production divided by generation	100	%
One minus total nonrenewable production divided by load	100	%
Peak values	**Value**	**Unit**
Renewable output divided by load (HOMER standard)	3,021	%
Renewable output divided by total generation	100	%
One minus nonrenewable output divided by total load	100	%

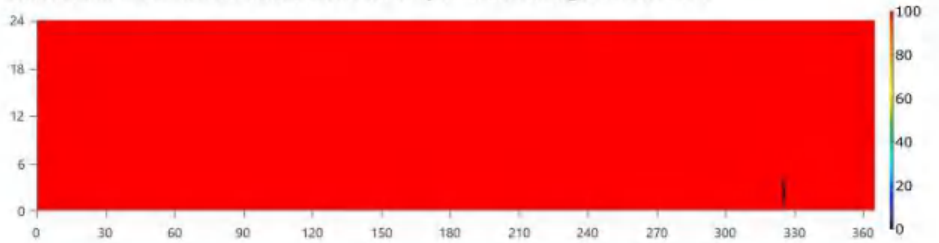
Instantaneous Renewable Output Percentage of Total Generation



Instantaneous Renewable Output Percentage of Total Load



100% Minus Instantaneous Nonrenewable Output as Percentage of Total Load



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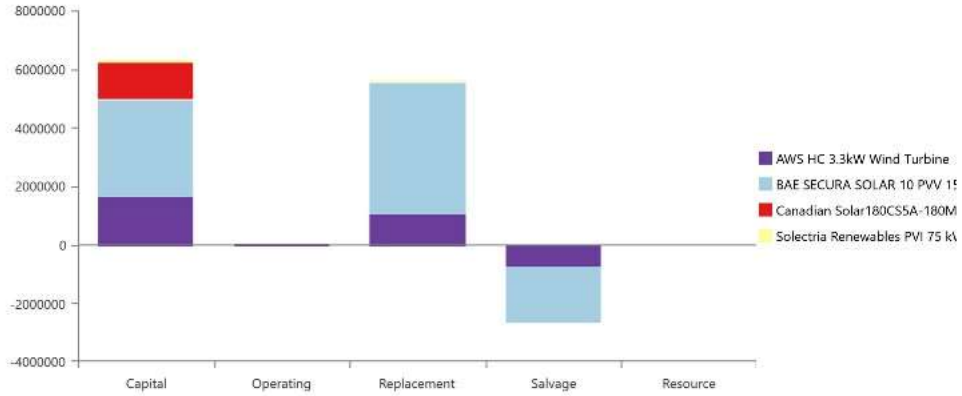
Cost Summary



Net Present Costs

Name	Capital	Operating	Replacement	Salvage	Resource	Total
AWS HC 3.3kW Wind Turbine	$1.68M	$84,752	$1.10M	-$739,374	$0.00	$2.12M
BAE SECURA SOLAR 10 PVV 1500	$3.31M	$0.00	$4.49M	-$1.92M	$0.00	$5.88M
Canadian Solar180CS5A-180M	$1.24M	$0.00	$0.00	$0.00	$0.00	$1.24M
Solectria Renewables PVI 75 kW-240	$69,684	$10.85	$50,617	-$13,634	$0.00	$106,678
System	$6.30M	$84,763	$5.64M	-$2.67M	$0.00	$9.34M

Annualized Costs

Name	Capital	Operating	Replacement	Salvage	Resource	Total
AWS HC 3.3kW Wind Turbine	$87,595	$4,420	$57,195	-$38,560	$0.00	$110,650
BAE SECURA SOLAR 10 PVV 1500	$172,625	$0.00	$234,104	-$100,109	$0.00	$306,620
Canadian Solar180CS5A-180M	$64,526	$0.00	$0.00	$0.00	$0.00	$64,526
Solectria Renewables PVI 75 kW-240	$3,634	$0.566	$2,640	-$711.02	$0.00	$5,563
System	$328,380	$4,421	$293,939	-$139,380	$0.00	$487,360

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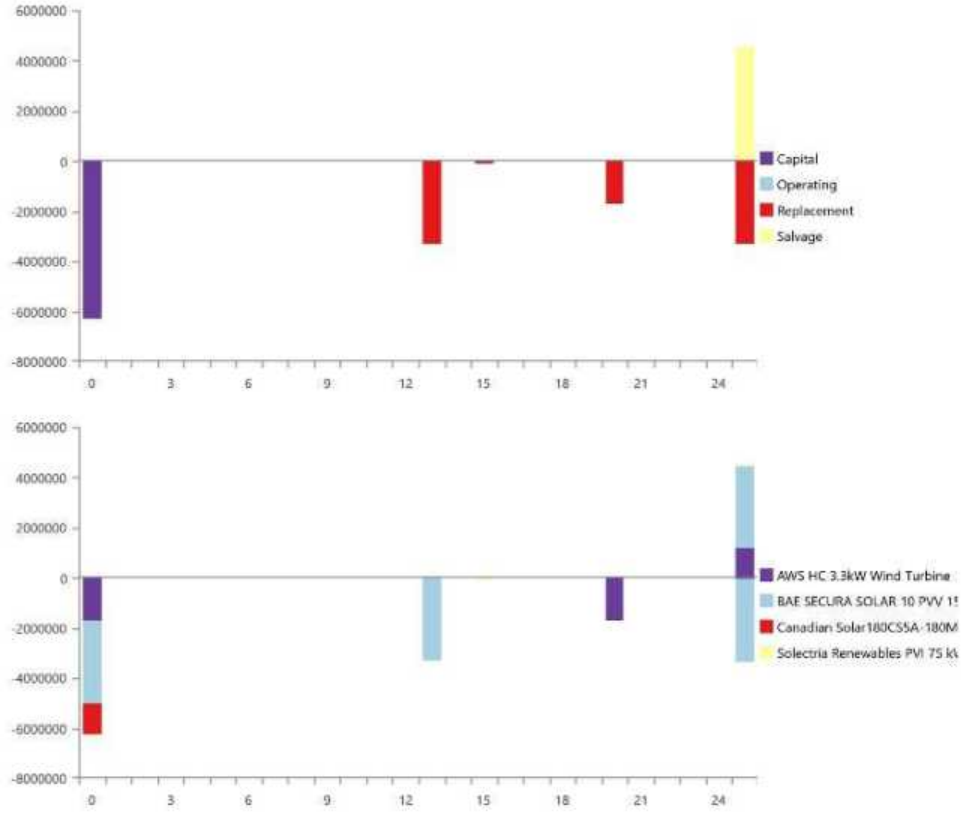
Cash Flow



HOMER Pro

Compare Economics

IRR (%):**N/A**

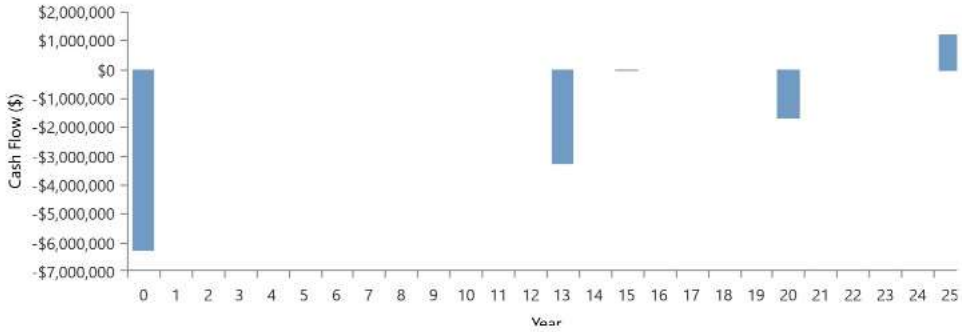
Discounted payback (yr):**N/A**

Simple payback (yr):**N/A**

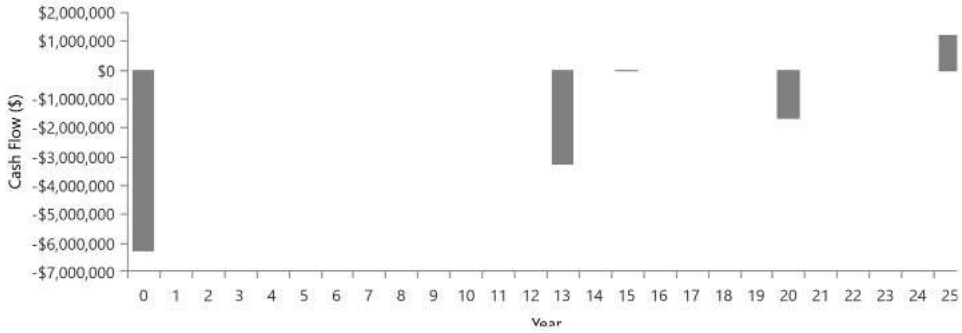
	Base System	Proposed System
Net Present Cost	$9.34M	$9.34M
CAPEX	$6.30M	$6.30M
OPEX	$158,980	$158,980
LCOE (per kWh)	$0.325	$0.325
CO2 Emitted (kg/yr)	0	0
Fuel Consumption (L/yr)	0	0

HOMER Pro

Proposed Annual Nominal Cash Flows



Base System Annual Nominal Cash Flows



Cumulative Discounted Cash Flows