



System Simulation Report



File: Erinjiyan Mini Grid Site.homer

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Location: J264+G9, Erinjiyan 362106, Ekiti, Nigeria (7°36.7'N, 5°0.4'E)

Total Net Present Cost: \$3,137,719.00

Levelized Cost of Energy (\$/kWh): \$0.111

Notes:

Sensitivity variable values for this simulation

Variable	Value	Unit
Grid Max Net Grid Purchases	1,000,000,000	kWh/yr
Renewable Fraction	80.0	%



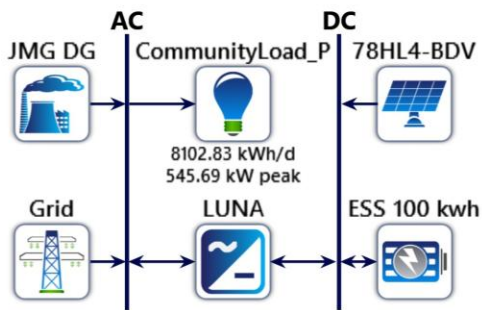
Table of Contents

System Architecture	3
Cost Summary	4
Cash Flow	5
Electrical Summary	6
Generator: JMG Diesel Generator (Diesel)	7
PV: Jinko Tiger Neo N-Type 620W	8
Storage: Huawei LUNA2000-100KWH	9
Converter: Huawei LUNA2000 Copy	10
Grid: Grid	11
Fuel Summary	13
Compare Economics	14

System Architecture

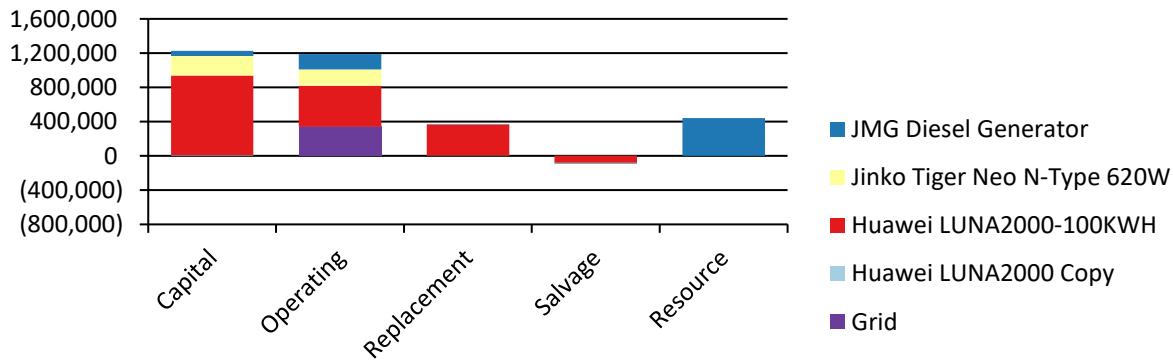
Component	Name	Size	Unit
Generator	JMG Diesel Generator	610	kW
PV	Jinko Tiger Neo N-Type 620W	2,200	kW
Storage	Huawei LUNA2000-100KWH	50	strings
System converter	Huawei LUNA2000 Copy	606	kW
Grid	Grid	999,999	kW
Dispatch strategy	HOMER Load Following		

Schematic





Cost Summary



Net Present Costs

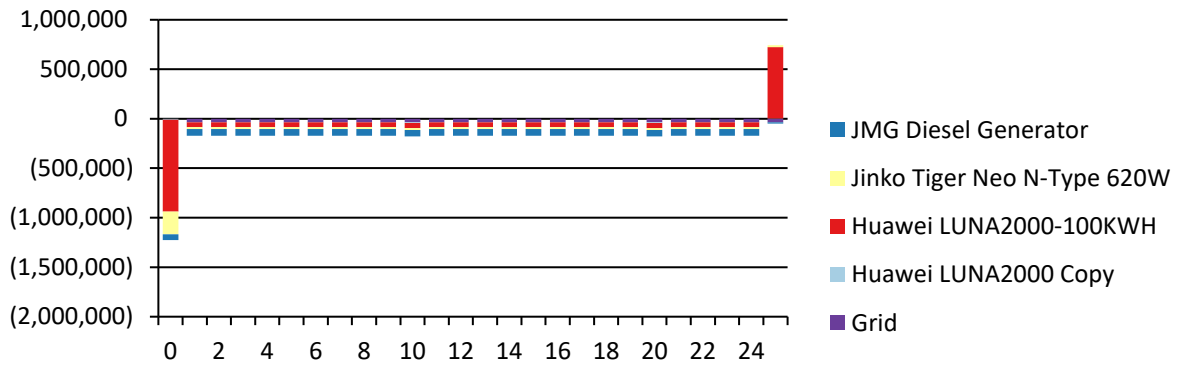
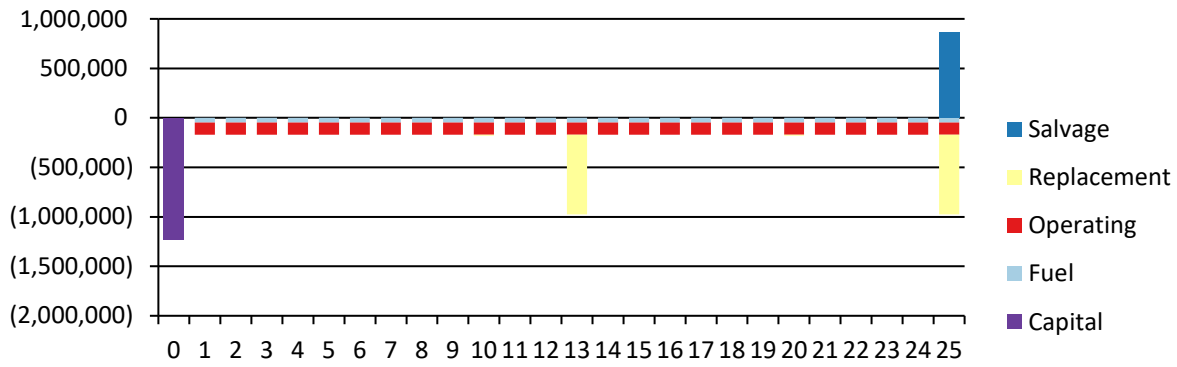
Name	Capital	Operating	Replacement	Salvage	Resource	Total
Grid	\$0.00	\$340,319	\$0.00	\$0.00	\$0.00	\$340,319
Huawei LUNA2000 Copy	\$9,483	\$538.52	\$4,649	-\$431.93	\$0.00	\$14,239
Huawei LUNA2000-100KWH	\$927,778	\$477,751	\$360,396	-\$82,668	\$0.00	\$1.68M
Jinko Tiger Neo N-Type 620W	\$229,270	\$189,189	\$0.00	-\$3,930	\$0.00	\$414,529
JMG Diesel Generator	\$61,000	\$181,851	\$6,412	-\$5,649	\$441,762	\$685,376
System	\$1.23M	\$1.19M	\$371,457	-\$92,679	\$441,762	\$3.14M

Annualized Costs

Name	Capital	Operating	Replacement	Salvage	Resource	Total
Grid	\$0.00	\$35,617	\$0.00	\$0.00	\$0.00	\$35,617
Huawei LUNA2000 Copy	\$992.50	\$56.36	\$486.56	-\$45.20	\$0.00	\$1,490
Huawei LUNA2000-100KWH	\$97,098	\$50,000	\$37,718	-\$8,652	\$0.00	\$176,165
Jinko Tiger Neo N-Type 620W	\$23,995	\$19,800	\$0.00	-\$411.31	\$0.00	\$43,383
JMG Diesel Generator	\$6,384	\$19,032	\$671.08	-\$591.21	\$46,233	\$71,729
System	\$128,470	\$124,505	\$38,876	-\$9,700	\$46,233	\$328,384



Cash Flow





Electrical Summary

Excess and Unmet

Quantity	Value	Units
Excess Electricity	526,866	kWh/yr
Unmet Electric Load	0	kWh/yr
Capacity Shortage	0	kWh/yr

Production Summary

Component	Production (kWh/yr)	Percent
Jinko Tiger Neo N-Type 620W	3,033,933	85.7
JMG Diesel Generator	150,027	4.24
Grid Purchases	356,167	10.1
Total	3,540,127	100

Consumption Summary

Component	Consumption (kWh/yr)	Percent
AC Primary Load	2,957,532	100
DC Primary Load	0	0
Deferrable Load	0	0
Total	2,957,532	100



Generator: JMG Diesel Generator (Diesel)

JMG Diesel Generator Electrical Summary

Quantity	Value	Units
Electrical Production	150,027	kWh/yr
Mean Electrical Output	240	kW
Minimum Electrical Output	152	kW
Maximum Electrical Output	525	kW

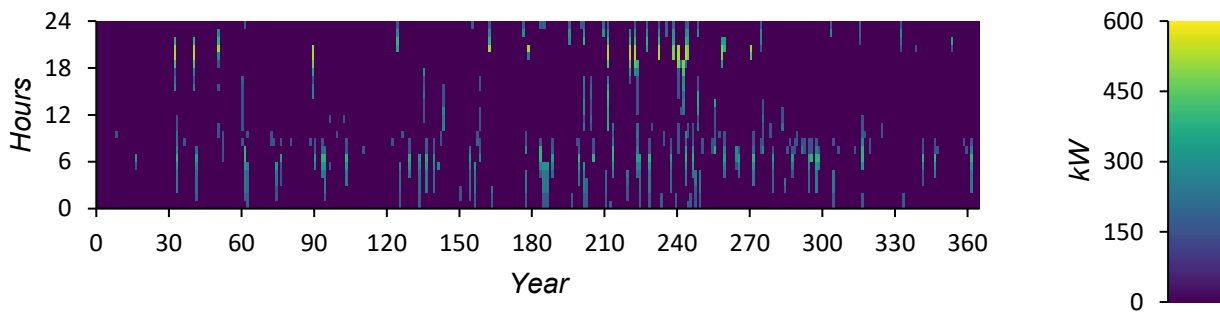
JMG Diesel Generator Fuel Summary

Quantity	Value	Units
Fuel Consumption	42,030	L
Specific Fuel Consumption	0.280	L/kWh
Fuel Energy Input	413,579	kWh/yr
Mean Electrical Efficiency	36.3	%

JMG Diesel Generator Statistics

Quantity	Value	Units
Hours of Operation	624	hrs/yr
Number of Starts	145	starts/yr
Operational Life	24.0	yr
Capacity Factor	2.81	%
Fixed Generation Cost	45.8	\$/hr
Marginal Generation Cost	0.260	\$/kWh

JMG Diesel Generator Output (kW)





PV: Jinko Tiger Neo N-Type 620W

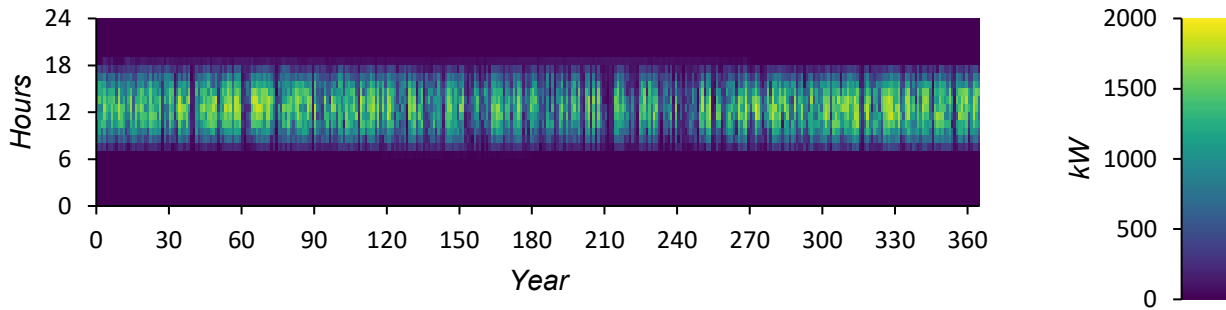
Jinko Tiger Neo N-Type 620W Electrical Summary

Quantity	Value	Units
Minimum Output	0	kW
Maximum Output	1,929	kW
PV Penetration	103	%
Hours of Operation	4,346	hrs/yr
Levelized Cost	0.0143	\$/kWh
Clipped production	0	kWh

Jinko Tiger Neo N-Type 620W Statistics

Quantity	Value	Units
Rated Capacity	2,200	kW
Mean Output	346	kW
Mean Output	8,312	kWh/d
Capacity Factor	15.7	%
Total Production	3,033,933	kWh/yr

Jinko Tiger Neo N-Type 620W Output (kW)





Storage: Huawei LUNA2000-100KWH

Huawei LUNA2000-100KWH Properties

Quantity	Value	Units
Batteries	50.0	qty.
String Size	1.00	batteries
Strings in Parallel	50.0	strings
Bus Voltage	691	V

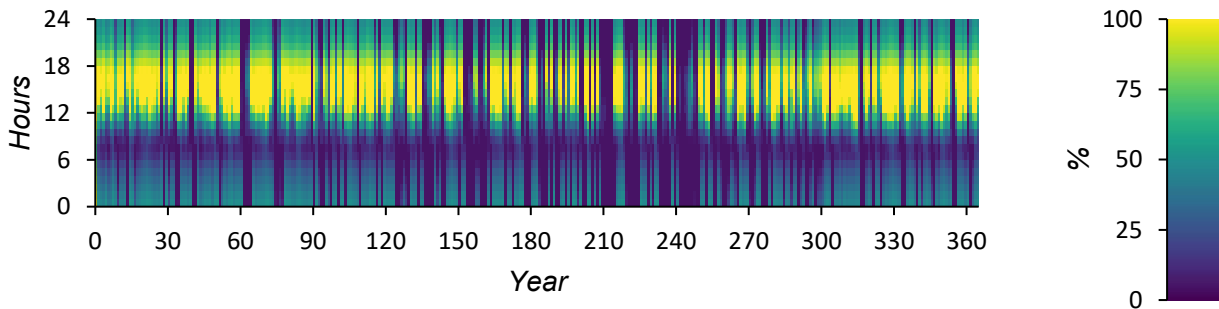
Huawei LUNA2000-100KWH Result Data

Quantity	Value	Units
Average Energy Cost	0	\$/kWh
Energy In	1,232,180	kWh/yr
Energy Out	1,216,311	kWh/yr
Storage Depletion	2,633	kWh/yr
Losses	18,503	kWh/yr
Annual Throughput	1,225,537	kWh/yr
Annual EFCs	245	1/yr
Average Daily EFCs	0.671	1/day

Huawei LUNA2000-100KWH Statistics

Quantity	Value	Units
Autonomy	14.1	hr
Storage Wear Cost	0.0541	\$/kWh
Nominal Capacity	5,001	kWh
Usable Nominal Capacity	4,751	kWh
Lifetime Throughput	15,000,000	kWh
Expected Life	12.2	yr

Huawei LUNA2000-100KWH State of Charge (%)





Converter: Huawei LUNA2000 Copy

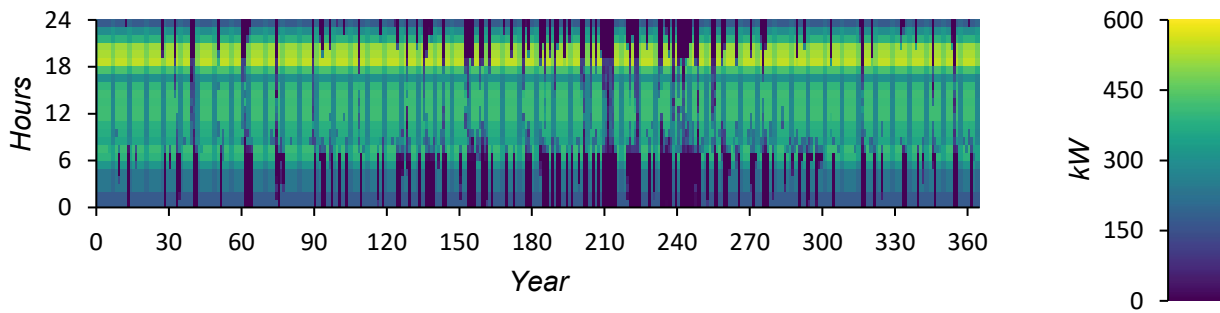
Huawei LUNA2000 Copy Electrical Summary

Quantity	Value	Units
Hours of Operation	7,796	hrs/yr
Energy Out	2,451,338	kWh/yr
Energy In	2,491,197	kWh/yr
Losses	39,859	kWh/yr

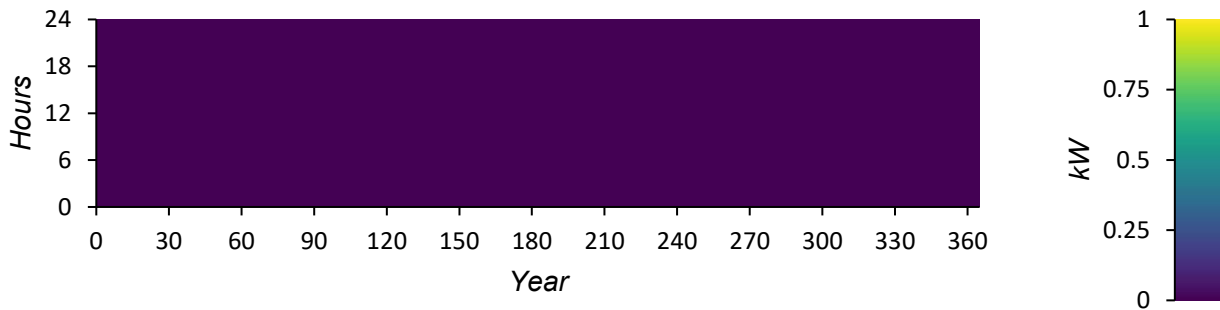
Huawei LUNA2000 Copy Statistics

Quantity	Value	Units
Capacity	606	kW
Mean Output	280	kW
Minimum Output	0	kW
Maximum Output	546	kW
Capacity Factor	46.2	%

Huawei LUNA2000 Copy Inverter Output (kW)



Huawei LUNA2000 Copy Rectifier Output (kW)





Grid: Grid

Grid rate: Demand 1

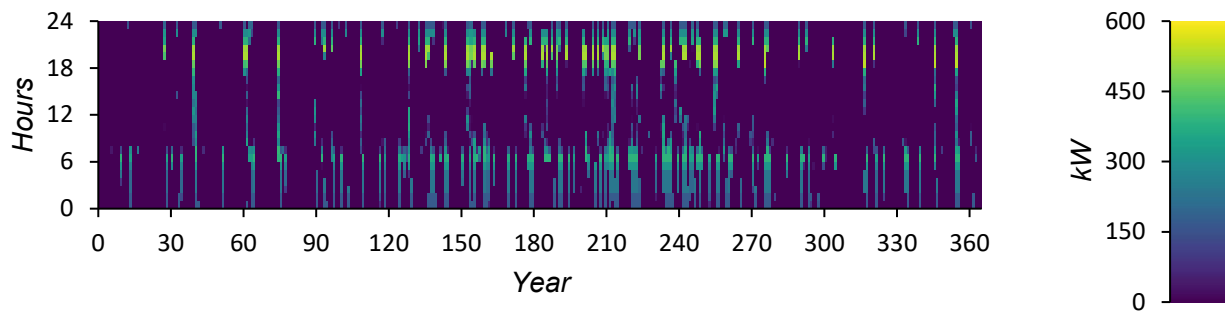
Month	Energy Purchased (kWh)	Energy Sold (kWh)	Net Energy Purchased (kWh)	Peak Demand (kW)	Energy Charge	Demand Charge
January	0	0	0	472	\$0.00	\$0.00
February	0	0	0	525	\$0.00	\$0.00
March	0	0	0	525	\$0.00	\$0.00
April	0	0	0	525	\$0.00	\$0.00
May	0	0	0	525	\$0.00	\$0.00
June	0	0	0	525	\$0.00	\$0.00
July	0	0	0	525	\$0.00	\$0.00
August	0	0	0	525	\$0.00	\$0.00
September	0	0	0	525	\$0.00	\$0.00
October	0	0	0	546	\$0.00	\$0.00
November	0	0	0	546	\$0.00	\$0.00
December	0	0	0	546	\$0.00	\$0.00
Annual	0	0	0	546	\$0.00	\$0.00

Grid rate: Rate 1

Month	Energy Purchased (kWh)	Energy Sold (kWh)	Net Energy Purchased (kWh)	Peak Demand (kW)	Energy Charge	Demand Charge
January	7,844	0	7,844	0	\$784.43	\$0.00
February	14,287	0	14,287	0	\$1,429	\$0.00
March	24,086	0	24,086	0	\$2,409	\$0.00
April	21,975	0	21,975	0	\$2,197	\$0.00
May	30,359	0	30,359	0	\$3,036	\$0.00
June	45,972	0	45,972	0	\$4,597	\$0.00
July	52,876	0	52,876	0	\$5,288	\$0.00
August	58,522	0	58,522	0	\$5,852	\$0.00
September	41,290	0	41,290	0	\$4,129	\$0.00
October	22,190	0	22,190	0	\$2,219	\$0.00
November	15,036	0	15,036	0	\$1,504	\$0.00
December	21,731	0	21,731	0	\$2,173	\$0.00
Annual	356,167	0	356,167	0	\$35,617	\$0.00

Grid rate: All

Month	Energy Purchased (kWh)	Energy Sold (kWh)	Net Energy Purchased (kWh)	Peak Demand (kW)	Energy Charge	Demand Charge
January	7,844	0	7,844	472	\$784.43	\$0.00
February	14,287	0	14,287	525	\$1,429	\$0.00
March	24,086	0	24,086	525	\$2,409	\$0.00
April	21,975	0	21,975	525	\$2,197	\$0.00
May	30,359	0	30,359	525	\$3,036	\$0.00
June	45,972	0	45,972	525	\$4,597	\$0.00
July	52,876	0	52,876	525	\$5,288	\$0.00
August	58,522	0	58,522	525	\$5,852	\$0.00
September	41,290	0	41,290	525	\$4,129	\$0.00
October	22,190	0	22,190	546	\$2,219	\$0.00
November	15,036	0	15,036	546	\$1,504	\$0.00
December	21,731	0	21,731	546	\$2,173	\$0.00
Annual	356,167	0	356,167	546	\$35,617	\$0.00

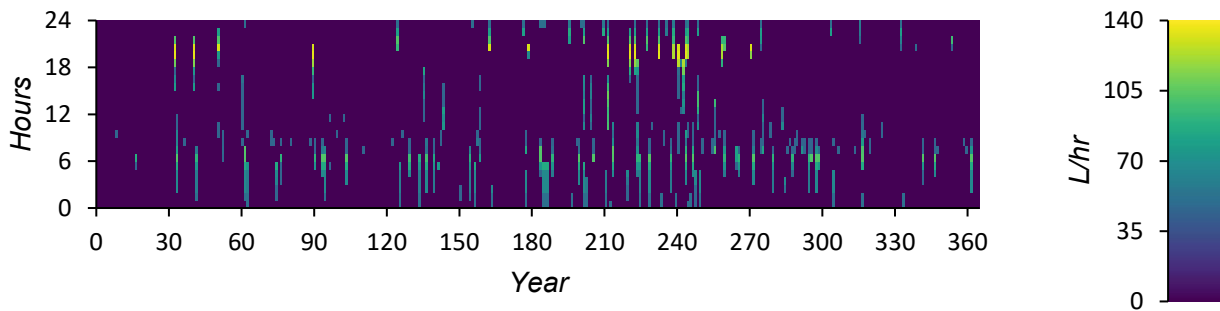
Energy Purchased From Grid (kW)**Energy Sold To Grid (kW)**

Fuel Summary

Diesel Consumption Statistics

Quantity	Value	Units
Total fuel consumed	42,030	L
Avg fuel per day	115	L/day
Avg fuel per hour	4.80	L/hour

Diesel Consumption (L/hr)



Emissions

Pollutant	Quantity	Unit
Carbon Dioxide	335,117	kg/yr
Carbon Monoxide	694	kg/yr
Unburned Hydrocarbons	30.3	kg/yr
Particulate Matter	4.20	kg/yr
Sulfur Dioxide	1,245	kg/yr
Nitrogen Oxides	1,129	kg/yr



Compare Economics

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

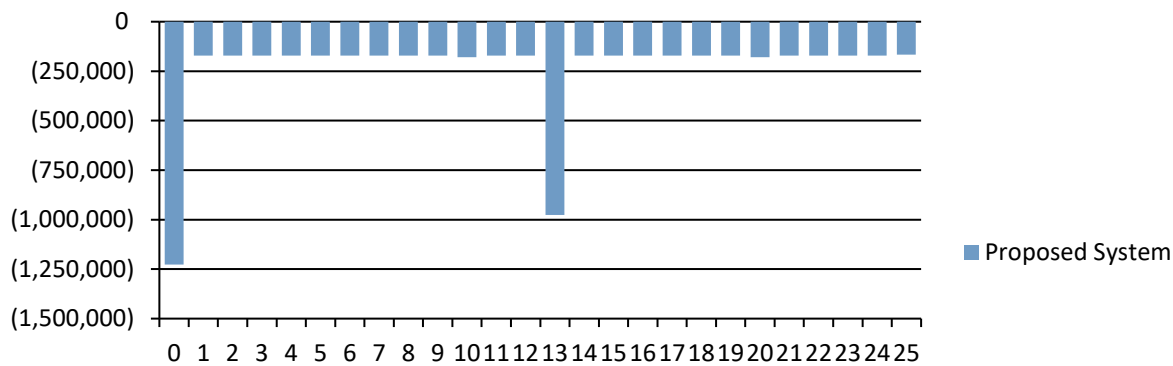
Discounted payback (yr): **N/A**

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

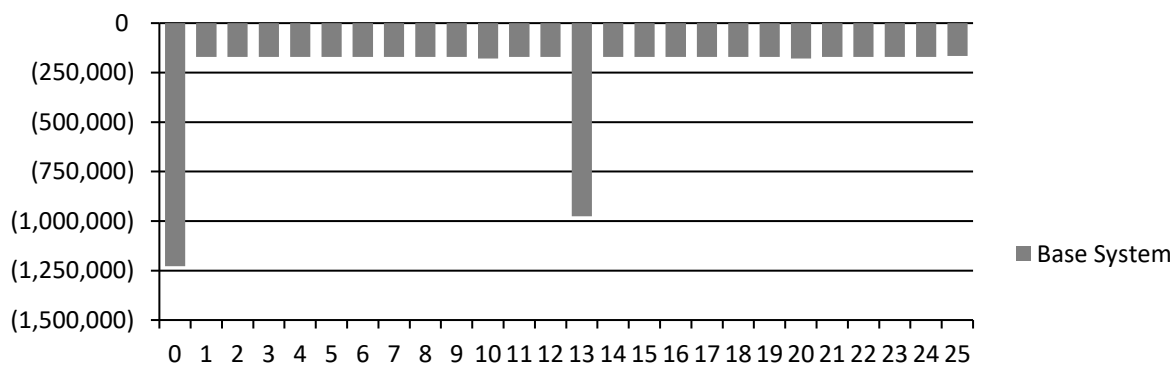
	Base System	Proposed System
Net Present Cost	\$3.14M	\$3.14M
CAPEX	\$1.23M	\$1.23M
OPEX	\$199,915	\$199,915
LCOE (per kWh)	\$0.111	\$0.111
CO2 Emitted (kg/yr)	335,117	335,117
Fuel Consumption (L/yr)	42,030	42,030



Proposed Annual Nominal Cash Flows



Base System Annual Nominal Cash Flows



Cumulative Discounted Cash Flows

