



System Simulation Report



File: Ikogosi Site.homer

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Location: HXQR+QXC, Ikogosi 362105, Ekiti, Nigeria (7°35.4'N, 4°59.5'E)

Total Net Present Cost: \$4,464,348.00

Levelized Cost of Energy (\$/kWh): \$0.126

Notes:

Sensitivity variable values for this simulation

Variable	Value	Unit
Renewable Fraction	0	%



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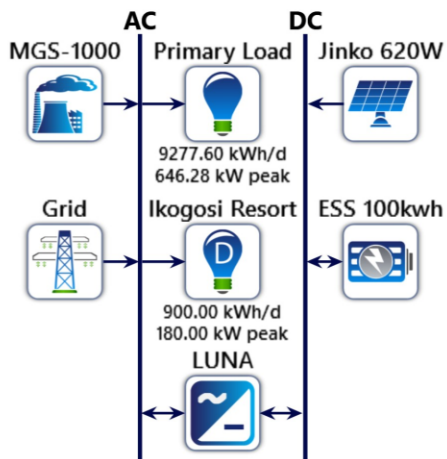
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System Architecture

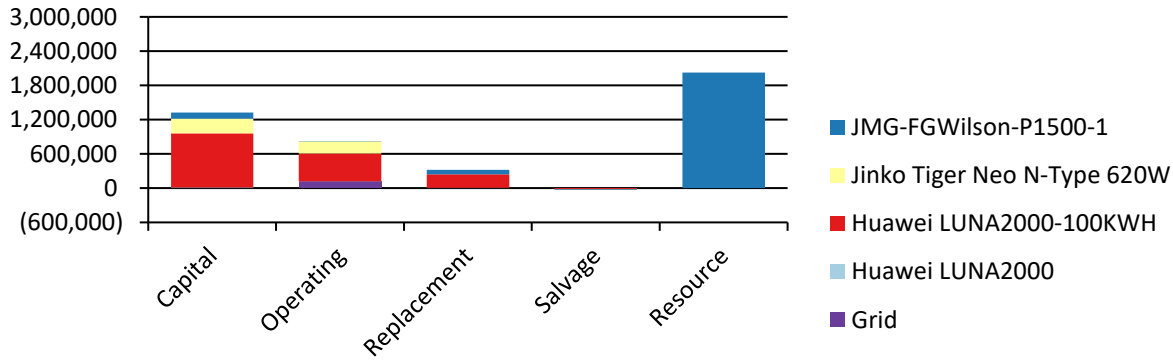
Component	Name	Size	Unit
Generator	JMG-FGWilson-P1500-1	1,080	kW
PV	Jinko Tiger Neo N-Type 620W	2,500	kW
Storage	Huawei LUNA2000-100KWH	51	strings
System converter	Huawei LUNA2000	800	kW
Grid	Grid	645	kW
Dispatch strategy	HOMER Load Following		

Schematic





Cost Summary



Net Present Costs

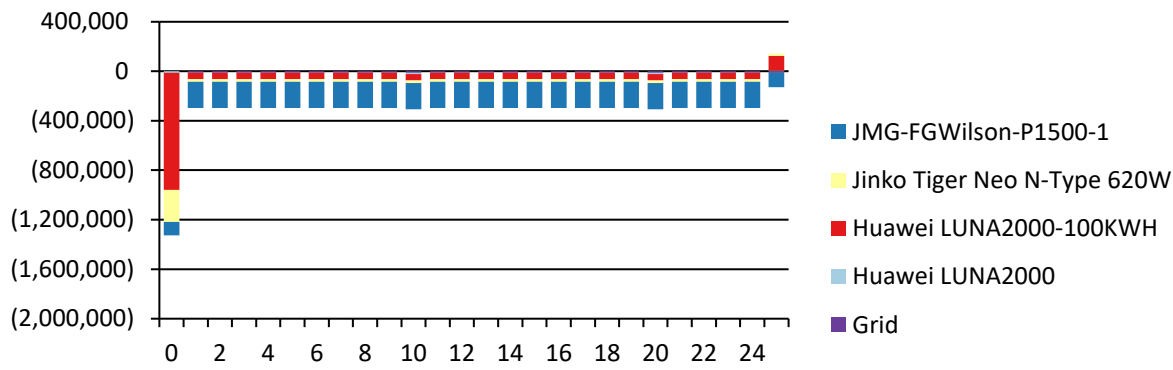
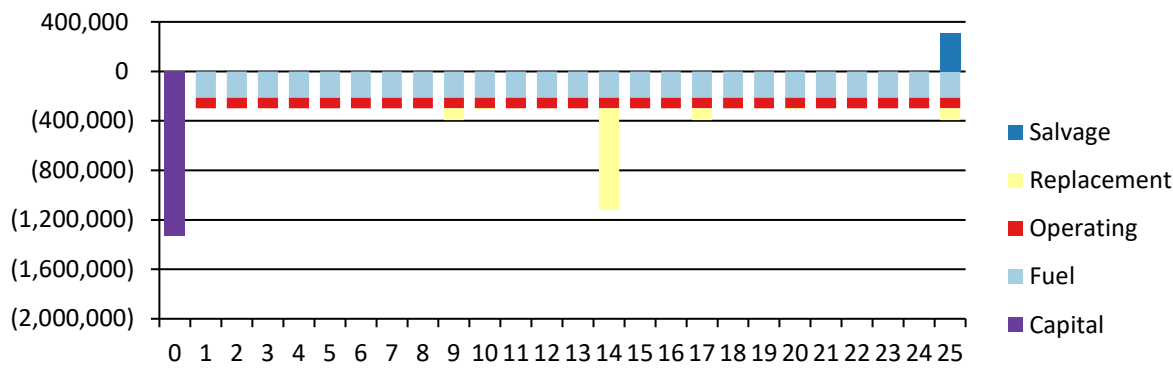
Name	Capital	Operating	Replacement	Salvage	Resource	Total
Grid	\$0.00	\$118,606	\$0.00	\$0.00	\$0.00	\$118,606
Huawei LUNA2000	\$12,200	\$650.23	\$5,775	-\$537.08	\$0.00	\$18,088
Huawei LUNA2000-100KWH	\$946,222	\$487,673	\$236,681	-\$18,271	\$0.00	\$1.65M
Jinko Tiger Neo N-Type 620W	\$260,204	\$215,150	\$0.00	-\$4,476	\$0.00	\$470,878
JMG-FGWilson-P1500-1	\$108,000	\$1,151	\$78,911	-\$10,336	\$2.03M	\$2.20M
System	\$1.33M	\$823,230	\$321,366	-\$33,620	\$2.03M	\$4.46M

Annualized Costs

Name	Capital	Operating	Replacement	Salvage	Resource	Total
Grid	\$0.00	\$12,404	\$0.00	\$0.00	\$0.00	\$12,404
Huawei LUNA2000	\$1,276	\$68.00	\$603.93	-\$56.17	\$0.00	\$1,892
Huawei LUNA2000-100KWH	\$98,954	\$51,000	\$24,752	-\$1,911	\$0.00	\$172,795
Jinko Tiger Neo N-Type 620W	\$27,212	\$22,500	\$0.00	-\$468.06	\$0.00	\$49,244
JMG-FGWilson-P1500-1	\$11,294	\$120.40	\$8,252	-\$1,081	\$211,954	\$230,540
System	\$138,736	\$86,092	\$33,608	-\$3,516	\$211,954	\$466,874



Cash Flow





Electrical Summary

Excess and Unmet

Quantity	Value	Units
Excess Electricity	319,058	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	3,448,690	81.7
JMG-FGWilson-P1500-1	649,454	15.4
Grid Purchases	124,036	2.94
Total	4,222,180	100

Consumption Summary

Component	Consumption (kWh/yr)	Percent
AC Primary Load	3,386,324	91.2
DC Primary Load	0	0
Deferrable Load	328,238	8.84
Total	3,714,562	100



Generator: JMG-FGWilson-P1500-1 (Diesel)

JMG-FGWilson-P1500-1 Electrical Summary

Quantity	Value	Units
Electrical Production	649,454	kWh/yr
Mean Electrical Output	270	kW
Minimum Electrical Output	216	kW
Maximum Electrical Output	790	kW

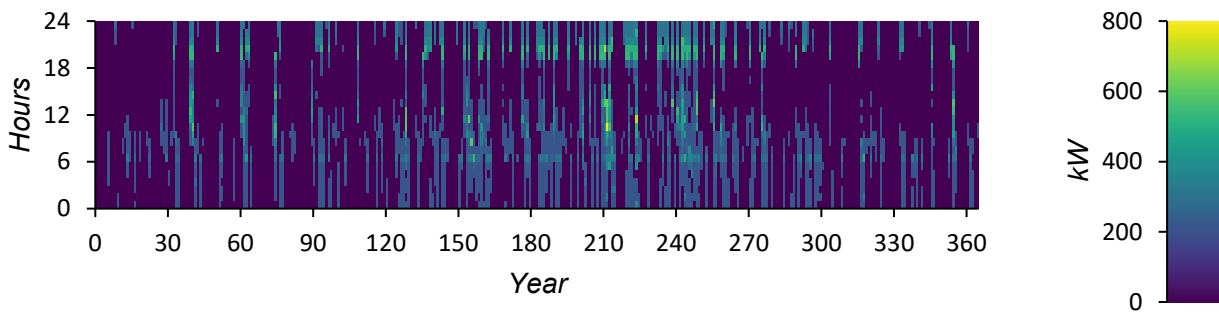
JMG-FGWilson-P1500-1 Fuel Summary

Quantity	Value	Units
Fuel Consumption	176,628	L
Specific Fuel Consumption	0.272	L/kWh
Fuel Energy Input	1,738,020	kWh/yr
Mean Electrical Efficiency	37.4	%

JMG-FGWilson-P1500-1 Statistics

Quantity	Value	Units
Hours of Operation	2,408	hrs/yr
Number of Starts	270	starts/yr
Operational Life	8.31	yr
Capacity Factor	6.86	%
Fixed Generation Cost	13.9	\$/hr
Marginal Generation Cost	0.293	\$/kWh

JMG-FGWilson-P1500-1 Output (kW)





PV: Jinko Tiger Neo N-Type 620W

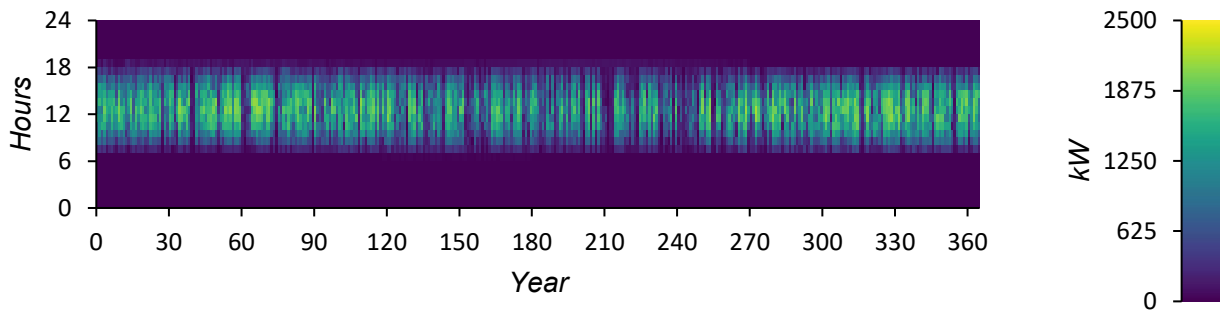
Jinko Tiger Neo N-Type 620W Electrical Summary

Quantity	Value	Units
Minimum Output	0	kW
Maximum Output	2,192	kW
PV Penetration	102	%
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	2,500	kW
Mean Output	394	kW
Mean Output	9,448	kWh/d
Capacity Factor	15.7	%
Total Production	3,448,690	kWh/yr

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





Storage: Huawei LUNA2000-100KWH

Huawei LUNA2000-100KWH Properties

Quantity	Value	Units
Batteries	51.0	qty.
String Size	1.00	batteries
Strings in Parallel	51.0	strings
Bus Voltage	691	V

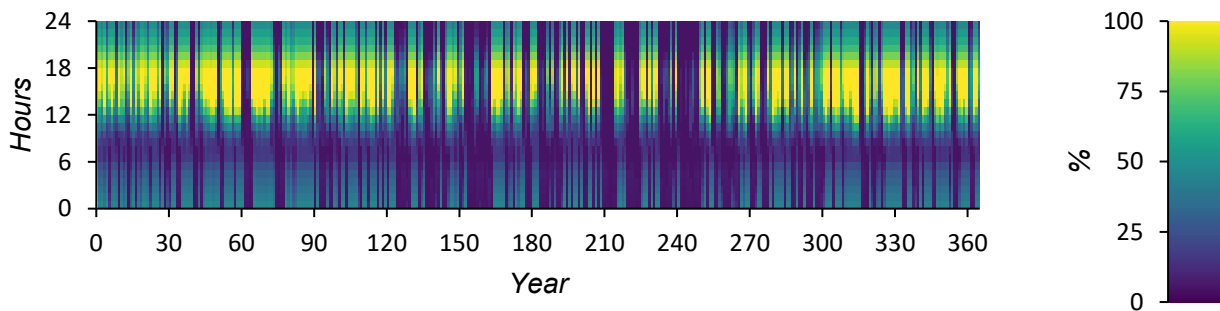
Huawei LUNA2000-100KWH Result Data

Quantity	Value	Units
Average Energy Cost	0	\$/kWh
Energy In	1,101,244	kWh/yr
Energy Out	1,089,015	kWh/yr
Storage Depletion	4,322	kWh/yr
Losses	16,551	kWh/yr
Annual Throughput	1,097,275	kWh/yr
Annual EFCs	215	1/yr
Average Daily EFCs	0.589	1/day

Huawei LUNA2000-100KWH Statistics

Quantity	Value	Units
Autonomy	11.4	hr
Storage Wear Cost	0.0541	\$/kWh
Nominal Capacity	5,101	kWh
Usable Nominal Capacity	4,846	kWh
Lifetime Throughput	15,300,000	kWh
Expected Life	13.9	yr

Huawei LUNA2000-100KWH State of Charge (%)





Converter: Huawei LUNA2000

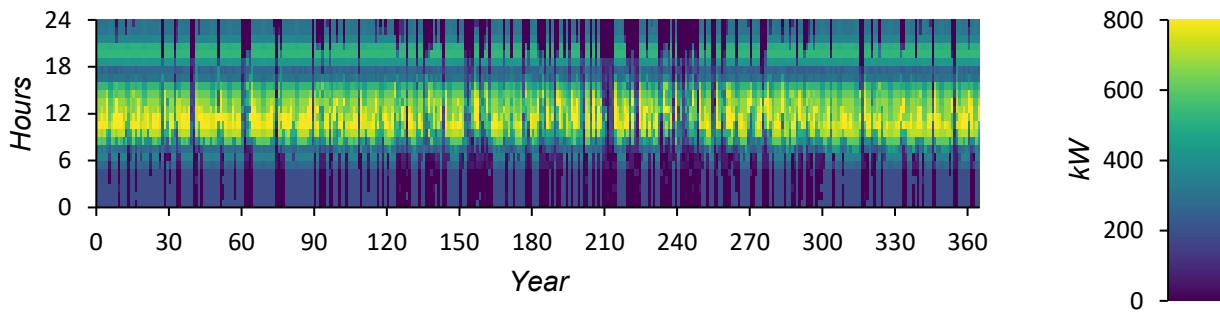
Huawei LUNA2000 Electrical Summary

Quantity	Value	Units
Hours of Operation	7,555	hrs/yr
Energy Out	2,957,208	kWh/yr
Energy In	3,132,636	kWh/yr
Losses	175,428	kWh/yr

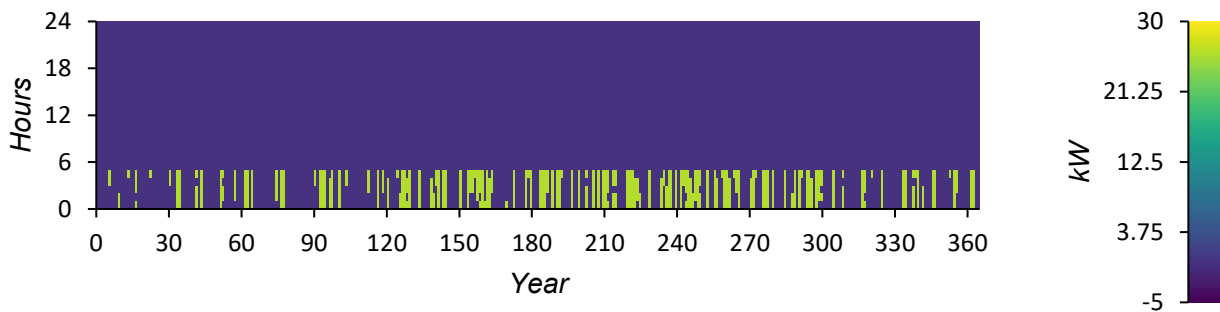
Huawei LUNA2000 Statistics

Quantity	Value	Units
Capacity	800	kW
Mean Output	338	kW
Minimum Output	0	kW
Maximum Output	800	kW
Capacity Factor	42.2	%

Huawei LUNA2000 Inverter Output (kW)



Huawei LUNA2000 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	533	\$0.00	\$0.00
February	0	0	0	527	\$0.00	\$0.00
March	0	0	0	533	\$0.00	\$0.00
April	0	0	0	418	\$0.00	\$0.00
May	0	0	0	533	\$0.00	\$0.00
June	0	0	0	533	\$0.00	\$0.00
July	0	0	0	637	\$0.00	\$0.00
August	0	0	0	527	\$0.00	\$0.00
September	0	0	0	538	\$0.00	\$0.00
October	0	0	0	527	\$0.00	\$0.00
November	0	0	0	527	\$0.00	\$0.00
December	0	0	0	527	\$0.00	\$0.00
Annual	0	0	0	637	\$0.00	\$0.00

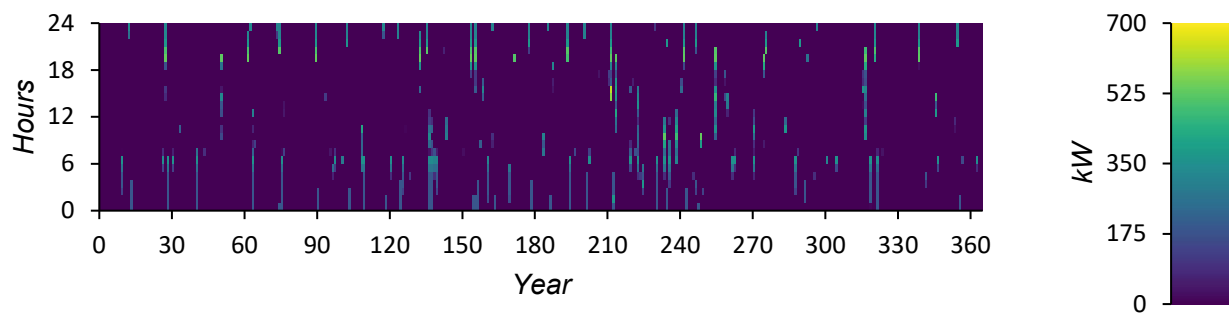
Grid rate: Rate 1

Month	Energy Purchased (kWh)	Energy Sold (kWh)	Net Energy Purchased (kWh)	Peak Demand (kW)	Energy Charge	Demand Charge
January	7,622	0	7,622	0	\$762.25	\$0.00
February	3,878	0	3,878	0	\$387.76	\$0.00
March	10,402	0	10,402	0	\$1,040	\$0.00
April	7,638	0	7,638	0	\$763.79	\$0.00
May	14,829	0	14,829	0	\$1,483	\$0.00
June	13,362	0	13,362	0	\$1,336	\$0.00
July	11,766	0	11,766	0	\$1,177	\$0.00
August	21,745	0	21,745	0	\$2,174	\$0.00
September	10,837	0	10,837	0	\$1,084	\$0.00
October	6,187	0	6,187	0	\$618.66	\$0.00
November	9,758	0	9,758	0	\$975.81	\$0.00
December	6,012	0	6,012	0	\$601.22	\$0.00
Annual	124,036	0	124,036	0	\$12,404	\$0.00

Grid rate: All

Month	Energy Purchased (kWh)	Energy Sold (kWh)	Net Energy Purchased (kWh)	Peak Demand (kW)	Energy Charge	Demand Charge
January	7,622	0	7,622	533	\$762.25	\$0.00
February	3,878	0	3,878	527	\$387.76	\$0.00
March	10,402	0	10,402	533	\$1,040	\$0.00
April	7,638	0	7,638	418	\$763.79	\$0.00
May	14,829	0	14,829	533	\$1,483	\$0.00
June	13,362	0	13,362	533	\$1,336	\$0.00
July	11,766	0	11,766	637	\$1,177	\$0.00
August	21,745	0	21,745	527	\$2,174	\$0.00
September	10,837	0	10,837	538	\$1,084	\$0.00
October	6,187	0	6,187	527	\$618.66	\$0.00
November	9,758	0	9,758	527	\$975.81	\$0.00
December	6,012	0	6,012	527	\$601.22	\$0.00
Annual	124,036	0	124,036	637	\$12,404	\$0.00

Energy Purchased From Grid (kW)



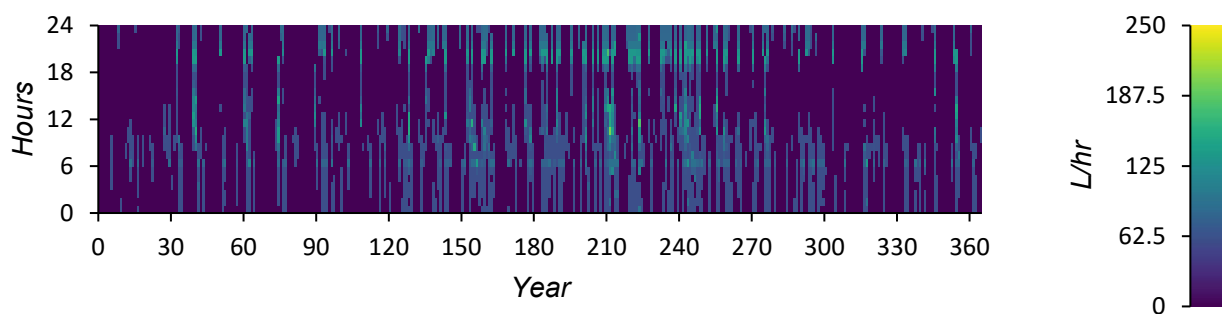
Energy Sold To Grid (kW)

Fuel Summary

Diesel Consumption Statistics

Quantity	Value	Units
Total fuel consumed	176,628	L
Avg fuel per day	484	L/day
Avg fuel per hour	20.2	L/hour

Diesel Consumption (L/hr)



Emissions

Pollutant	Quantity	Unit
Carbon Dioxide	544,258	kg/yr
Carbon Monoxide	894	kg/yr
Unburned Hydrocarbons	19.4	kg/yr
Particulate Matter	45.9	kg/yr
Sulfur Dioxide	1,498	kg/yr
Nitrogen Oxides	4,799	kg/yr



Compare Economics

IRR (%):**59.6**

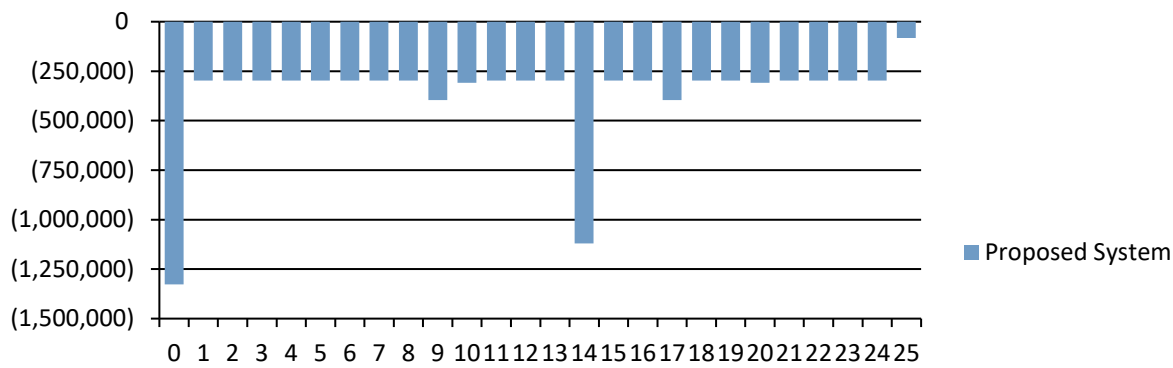
Discounted payback (yr):**1.96**

Simple payback (yr):**1.72**

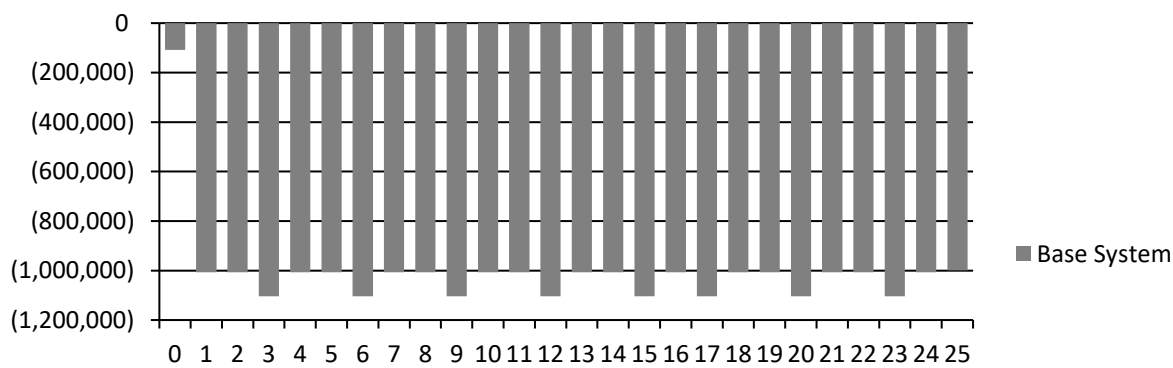
	Base System	Proposed System
Net Present Cost	\$10.0M	\$4.46M
CAPEX	\$108,000	\$1.33M
OPEX	\$1.04M	\$328,138
LCOE (per kWh)	\$0.283	\$0.126
CO2 Emitted (kg/yr)	2,543,076	544,258
Fuel Consumption (L/yr)	772,328	176,628



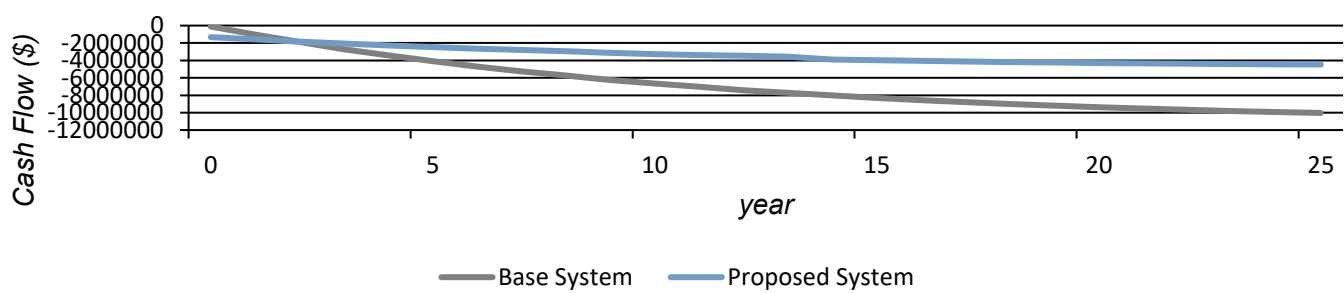
Proposed Annual Nominal Cash Flows



Base System Annual Nominal Cash Flows

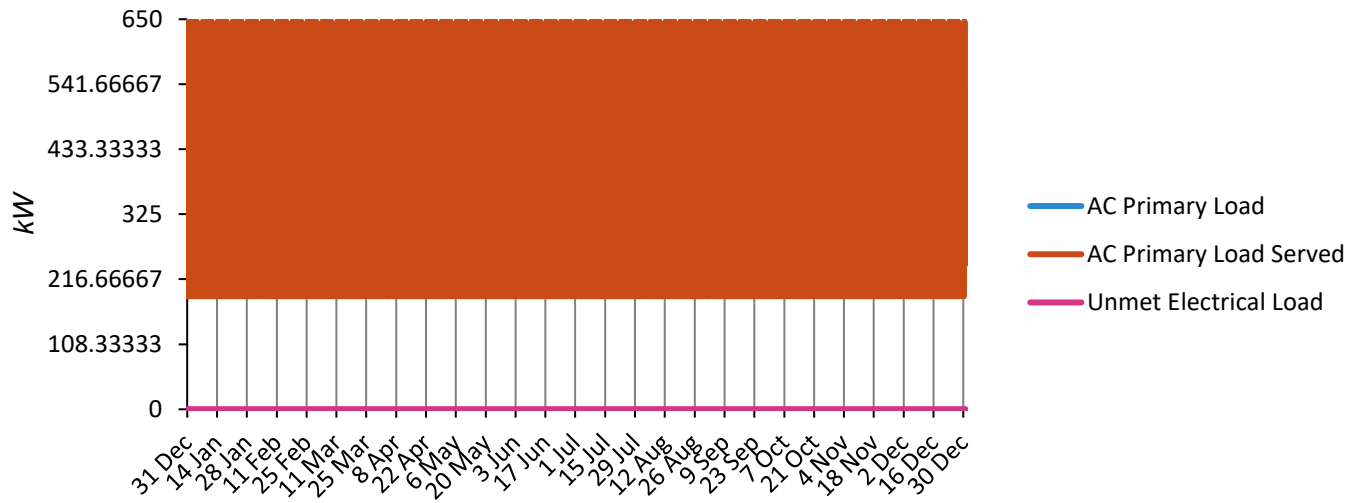


Cumulative Discounted Cash Flows



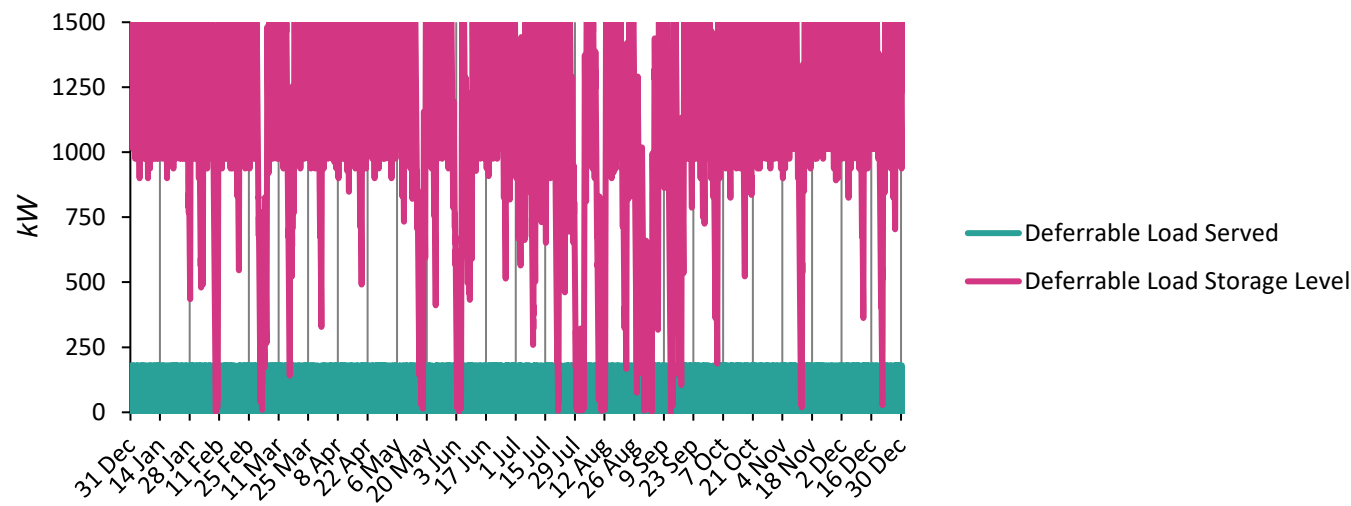


Time series charts:





Time series charts:





Time series charts:

