



## System Simulation Report

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**File:** Microgrid Ouessant 2016.homer

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**Location:** D81, 29242 Ouessant, France (48°27.7'N, 5°5.5'W)

**Total Net Present Cost:** \$14,615,700.00

**Levelized Cost of Energy (\$/kWh):** \$0.167

**Notes:** Démo d'HOMER juin 2019

- \* Analyse de l'île d'Ouessant avec les données réelles de consommation pour l'année 2016
- \* Coûts d'installation des EnR plutôt bas.



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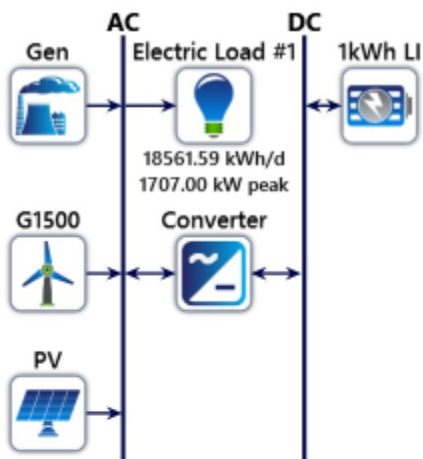
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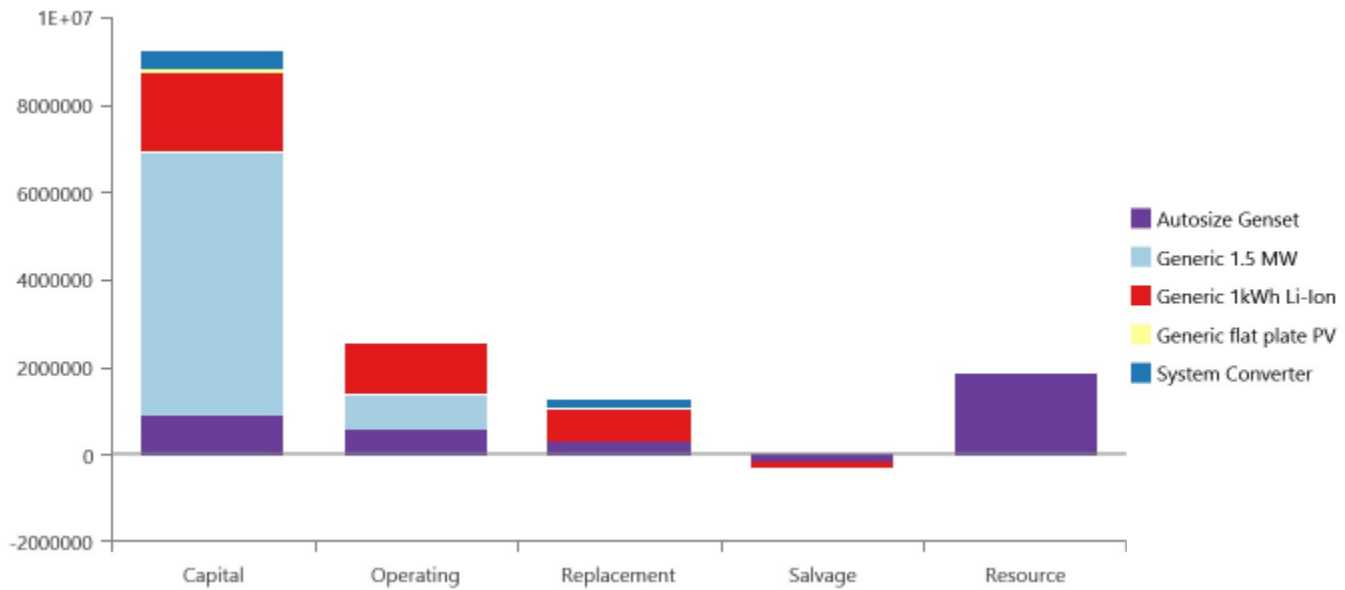
## System Architecture

Component	Name	Size	Unit
Generator	Autosize Genset	1,900	kW
PV	Generic flat plate PV	51.7	kW
Storage	Generic 1kWh Li-Ion	8,927	strings
Wind turbine	Generic 1.5 MW	2	ea.
System converter	System Converter	1,447	kW
Dispatch strategy	HOMER Load Following		

## Schematic



## Cost Summary



### Net Present Costs

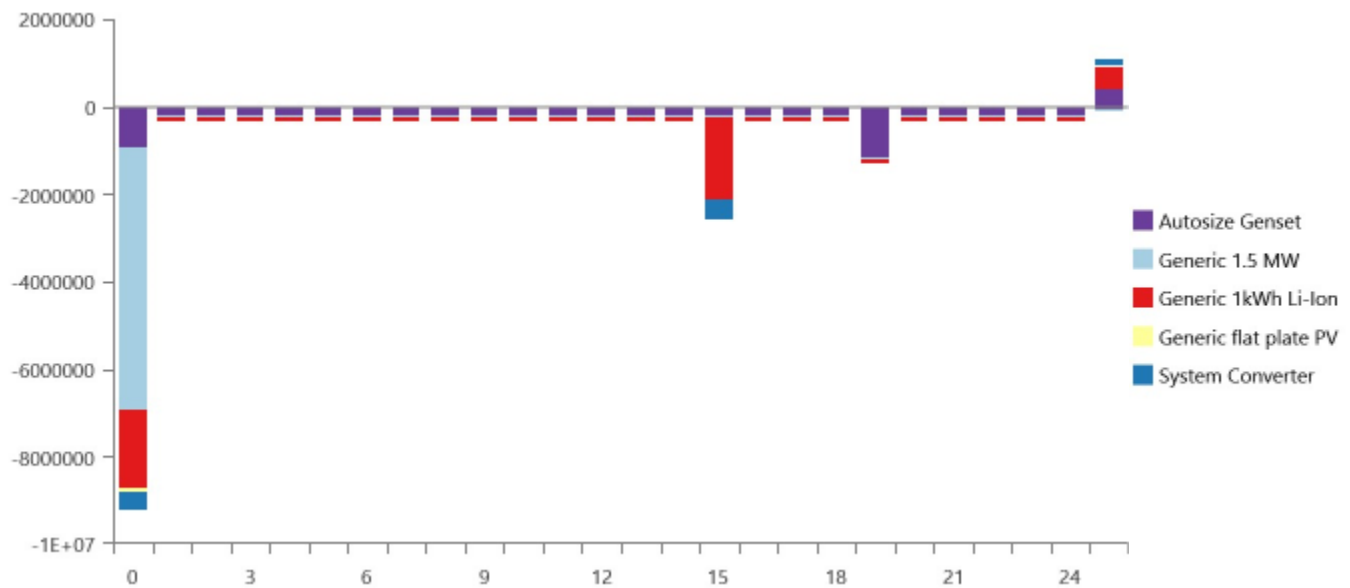
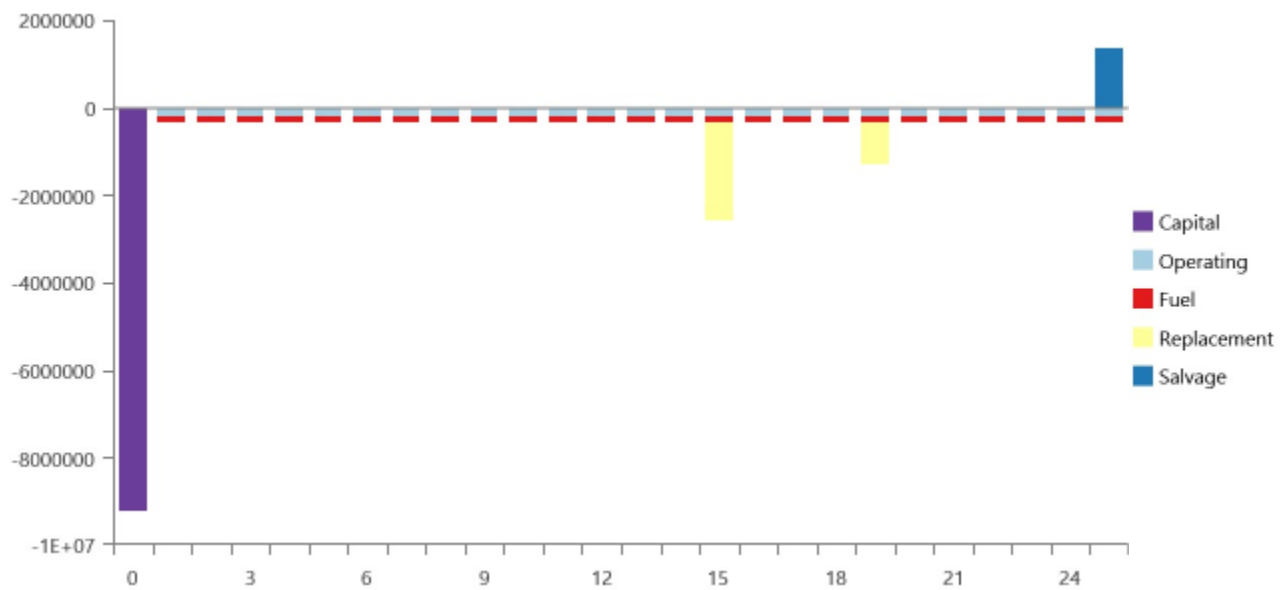
Name	Capital	Operating	Replacement	Salvage	Resource	Total
<b>Autosize Genset</b>	\$950,000	\$598,337	\$330,491	-\$147,168	\$1.91M	\$3.64M
<b>Generic 1.5 MW</b>	\$6.00M	\$775,651	\$0.00	\$0.00	\$0.00	\$6.78M
<b>Generic 1kWh Li-Ion</b>	\$1.79M	\$1.15M	\$757,498	-\$142,569	\$0.00	\$3.55M
<b>Generic flat plate PV</b>	\$51,748	\$6,690	\$0.00	\$0.00	\$0.00	\$58,438
<b>System Converter</b>	\$434,181	\$0.00	\$184,212	-\$34,671	\$0.00	\$583,723
<b>System</b>	\$9.22M	\$2.53M	\$1.27M	-\$324,408	\$1.91M	\$14.6M

### Annualized Costs

Name	Capital	Operating	Replacement	Salvage	Resource	Total
<b>Autosize Genset</b>	\$73,487	\$46,284	\$25,565	-\$11,384	\$147,891	\$281,842
<b>Generic 1.5 MW</b>	\$464,126	\$60,000	\$0.00	\$0.00	\$0.00	\$524,126
<b>Generic 1kWh Li-Ion</b>	\$138,109	\$89,270	\$58,596	-\$11,028	\$0.00	\$274,946
<b>Generic flat plate PV</b>	\$4,003	\$517.48	\$0.00	\$0.00	\$0.00	\$4,520
<b>System Converter</b>	\$33,586	\$0.00	\$14,250	-\$2,682	\$0.00	\$45,153
<b>System</b>	\$713,310	\$196,071	\$98,410	-\$25,094	\$147,891	\$1.13M



## Cash Flow



## Electrical Summary

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### Excess and Unmet

Quantity	Value	Units
Excess Electricity	5,885,626	kWh/yr
Unmet Electric Load	0	kWh/yr
Capacity Shortage	0	kWh/yr

### Production Summary

Component	Production (kWh/yr)	Percent
Generic flat plate PV	58,797	0.454
Autosize Genset	528,662	4.08
Generic 1.5 MW	12,369,075	95.5
Total	12,956,534	100

### Consumption Summary

Component	Consumption (kWh/yr)	Percent
AC Primary Load	6,774,979	100
DC Primary Load	0	0
Deferrable Load	0	0
Total	6,774,979	100

## Generator: Autosize Genset (Diesel)

### Autosize Genset Electrical Summary

Quantity	Value	Units
Electrical Production	528,662	kWh/yr
Mean Electrical Output	651	kW
Minimum Electrical Output	475	kW
Maximum Electrical Output	1,637	kW

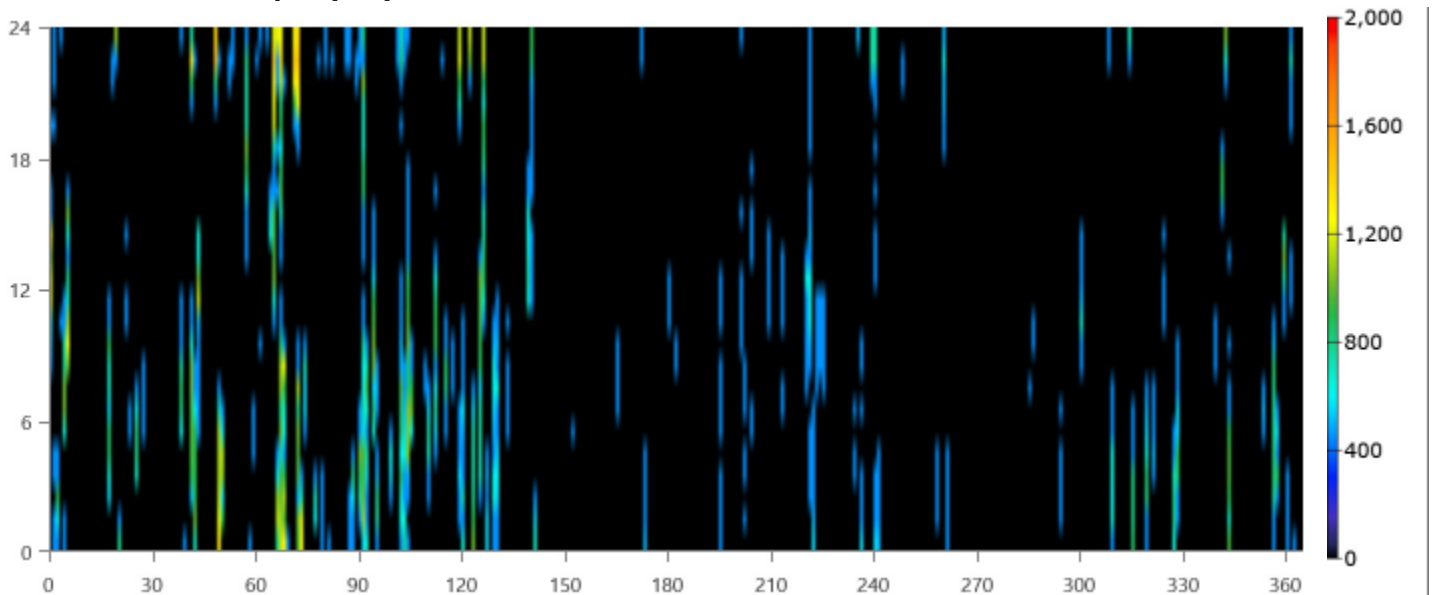
### Autosize Genset Fuel Summary

Quantity	Value	Units
Fuel Consumption	147,891	L
Specific Fuel Consumption	0.280	L/kWh
Fuel Energy Input	1,455,243	kWh/yr
Mean Electrical Efficiency	36.3	%

### Autosize Genset Statistics

Quantity	Value	Units
Hours of Operation	812	hrs/yr
Number of Starts	152	starts/yr
Operational Life	18.5	yr
Capacity Factor	3.18	%
Fixed Generation Cost	149	\$/hr
Marginal Generation Cost	0.236	\$/kWh

### Autosize Genset Output (kW)



## PV: Generic flat plate PV

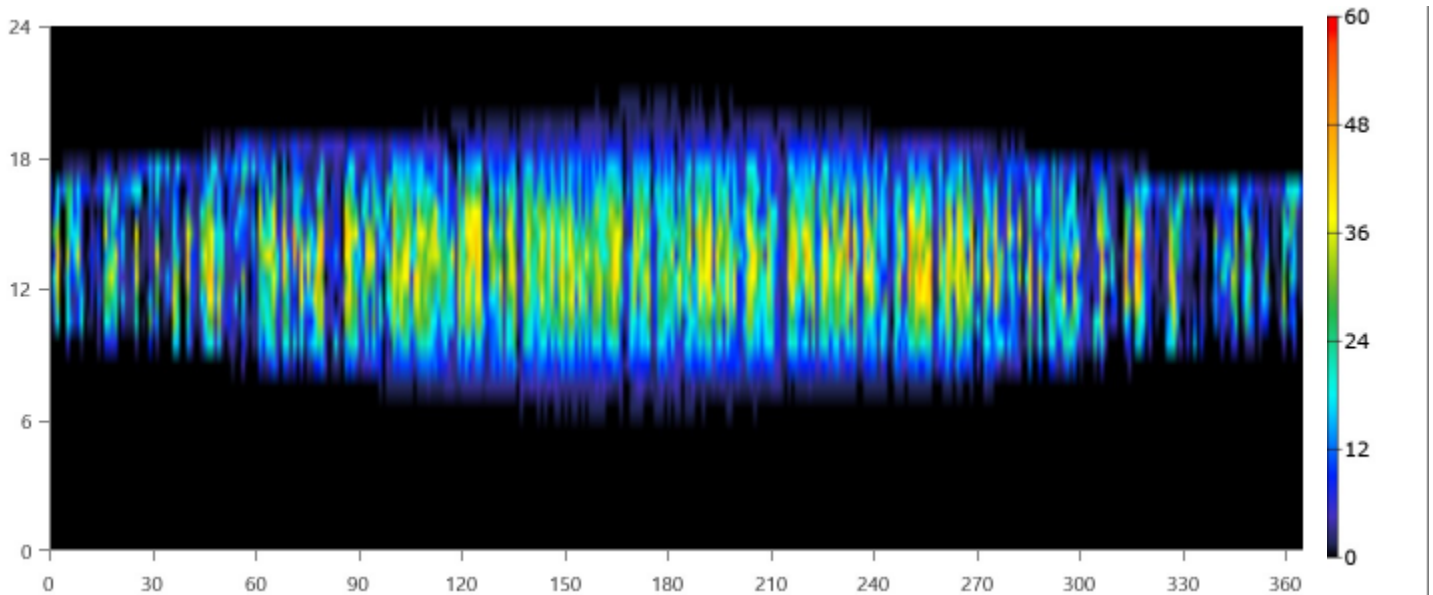
### Generic flat plate PV Electrical Summary

Quantity	Value	Units
Minimum Output	0	kW
Maximum Output	52.0	kW
PV Penetration	0.868	%
Hours of Operation	4,374	hrs/yr
Levelized Cost	0.0769	\$/kWh

### Generic flat plate PV Statistics

Quantity	Value	Units
Rated Capacity	51.7	kW
Mean Output	6.71	kW
Mean Output	161	kWh/d
Capacity Factor	13.0	%
Total Production	58,797	kWh/yr

### Generic flat plate PV Output (kW)



# Wind Turbine: Generic 1.5 MW

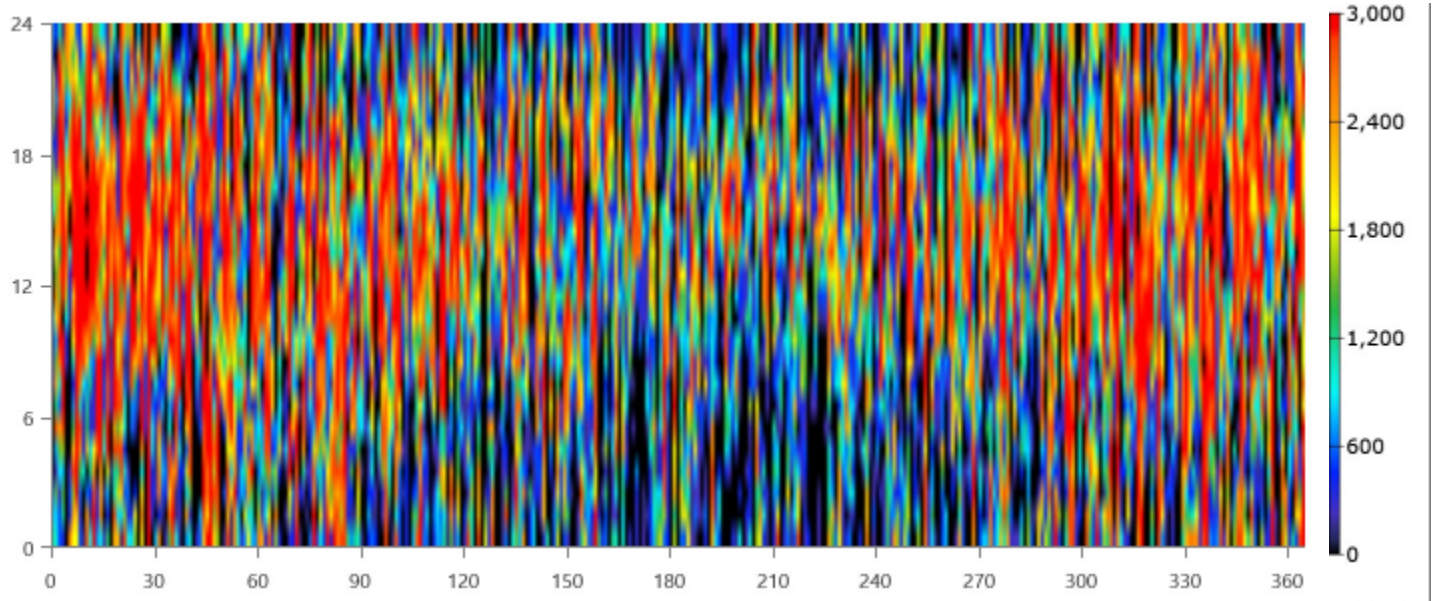
## Generic 1.5 MW Electrical Summary

Quantity	Value	Units
Minimum Output	0	kW
Maximum Output	3,000	kW
Wind Penetration	183	%
Hours of Operation	7,366	hrs/yr
Levelized Cost	0.0424	\$/kWh

## Generic 1.5 MW Statistics

Quantity	Value	Units
Total Rated Capacity	3,000	kW
Mean Output	1,412	kW
Capacity Factor	47.1	%
Total Production	12,369,075	kWh/yr

## Generic 1.5 MW Output (kW)



## Storage: Generic 1kWh Li-Ion

### Generic 1kWh Li-Ion Properties

Quantity	Value	Units
Batteries	8,927	qty.
String Size	1.00	batteries
Strings in Parallel	8,927	strings
Bus Voltage	6.00	V

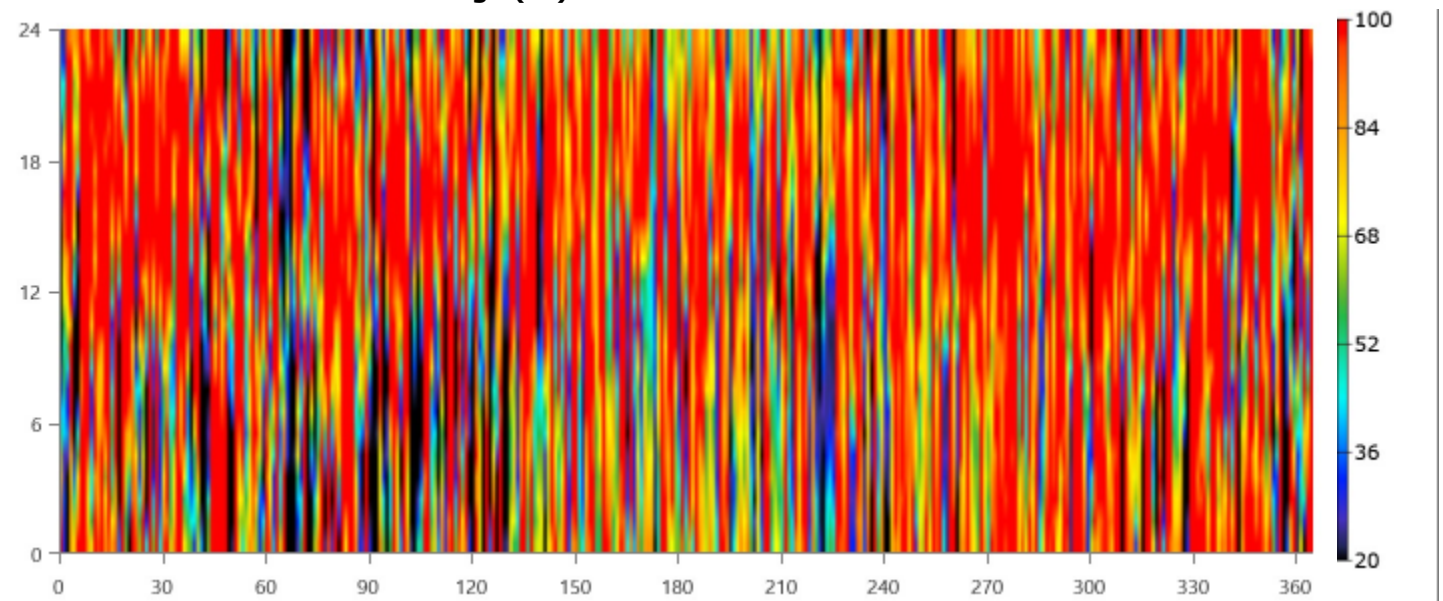
### Generic 1kWh Li-Ion Result Data

Quantity	Value	Units
Average Energy Cost	0	\$/kWh
Energy In	1,499,241	kWh/yr
Energy Out	1,349,705	kWh/yr
Storage Depletion	409	kWh/yr
Losses	149,945	kWh/yr
Annual Throughput	1,422,714	kWh/yr

### Generic 1kWh Li-Ion Statistics

Quantity	Value	Units
Autonomy	9.23	hr
Storage Wear Cost	0.0703	\$/kWh
Nominal Capacity	8,927	kWh
Usable Nominal Capacity	7,142	kWh
Lifetime Throughput	21,340,709	kWh
Expected Life	15.0	yr

### Generic 1kWh Li-Ion State of Charge (%)





## Converter: System Converter

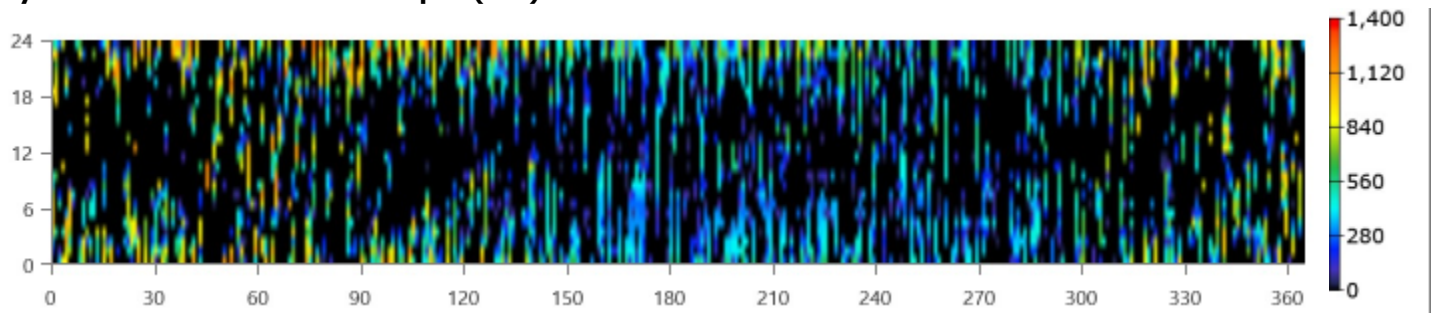
### System Converter Electrical Summary

Quantity	Value	Units
Hours of Operation	2,935	hrs/yr
Energy Out	1,282,220	kWh/yr
Energy In	1,349,705	kWh/yr
Losses	67,485	kWh/yr

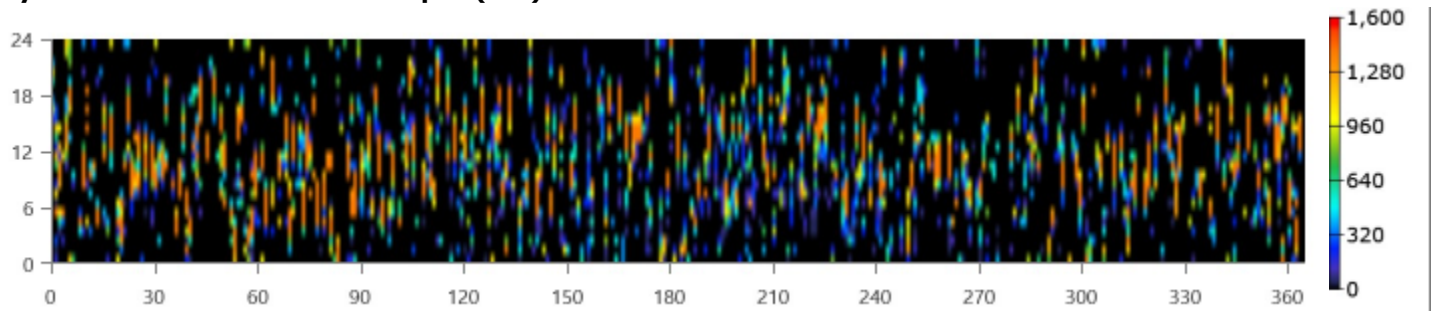
### System Converter Statistics

Quantity	Value	Units
Capacity	1,447	kW
Mean Output	146	kW
Minimum Output	0	kW
Maximum Output	1,300	kW
Capacity Factor	10.1	%

### System Converter Inverter Output (kW)



### System Converter Rectifier Output (kW)

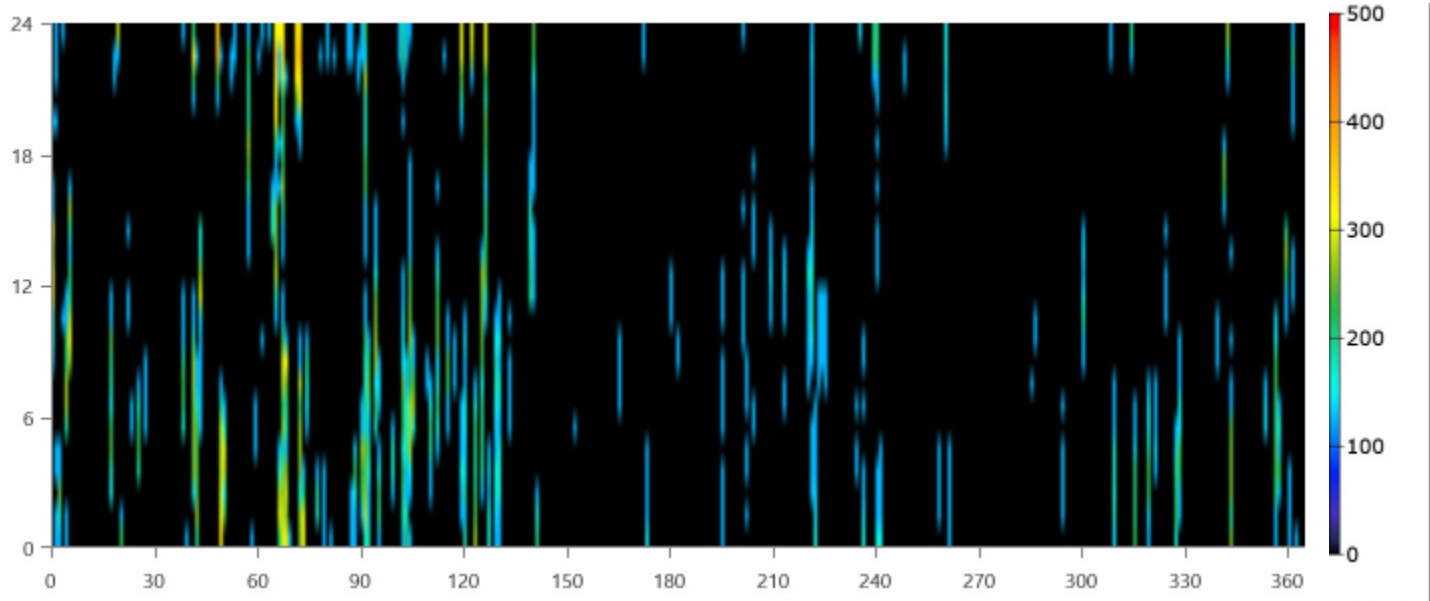


# Fuel Summary

## Diesel Consumption Statistics

Quantity	Value	Units
Total fuel consumed	147,891	L
Avg fuel per day	405	L/day
Avg fuel per hour	16.9	L/hour

## Diesel Consumption (L/hr)



## Emissions

Pollutant	Quantity	Unit
Carbon Dioxide	387,121	kg/yr
Carbon Monoxide	2,440	kg/yr
Unburned Hydrocarbons	106	kg/yr
Particulate Matter	14.8	kg/yr
Sulfur Dioxide	948	kg/yr
Nitrogen Oxides	2,292	kg/yr