

System Report - neopowerDG12.hmr

Sensitivity case

Solar Data Scaled Average: 4.06 kWh/m²/d

Wind Data Scaled Average: 6.7 m/s

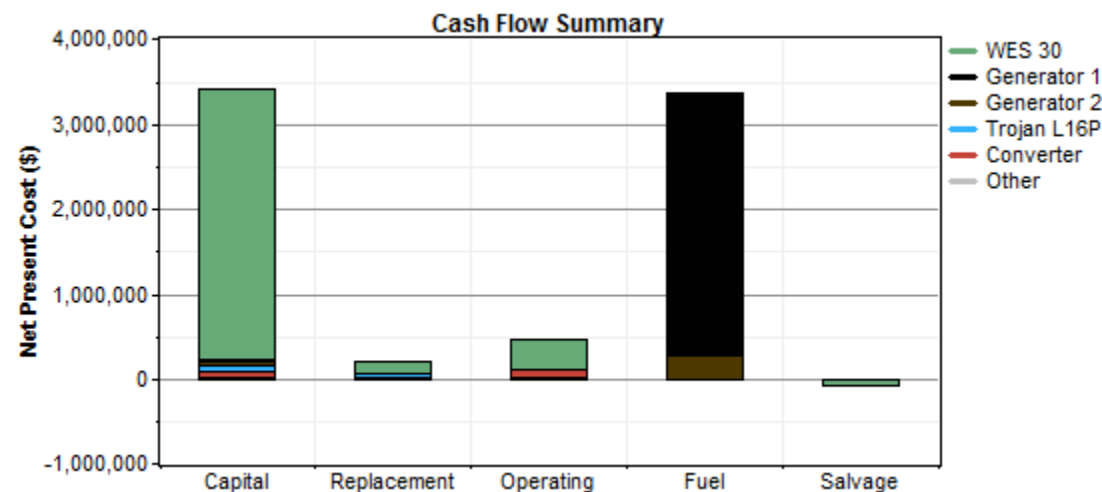
Diesel Price: 1.6 \$/L

System architecture

Wind turbine	1 WES 30
Generator 1	150 kW
Generator 2	150 kW
Battery	240 Trojan L16P
Inverter	400 kW
Rectifier	400 kW
Dispatch strategy	Cycle Charging

Cost summary

Total net present cost	\$ 7,375,346
Levelized cost of energy	\$ 0.695/kWh
Operating cost	\$ 344,671/yr



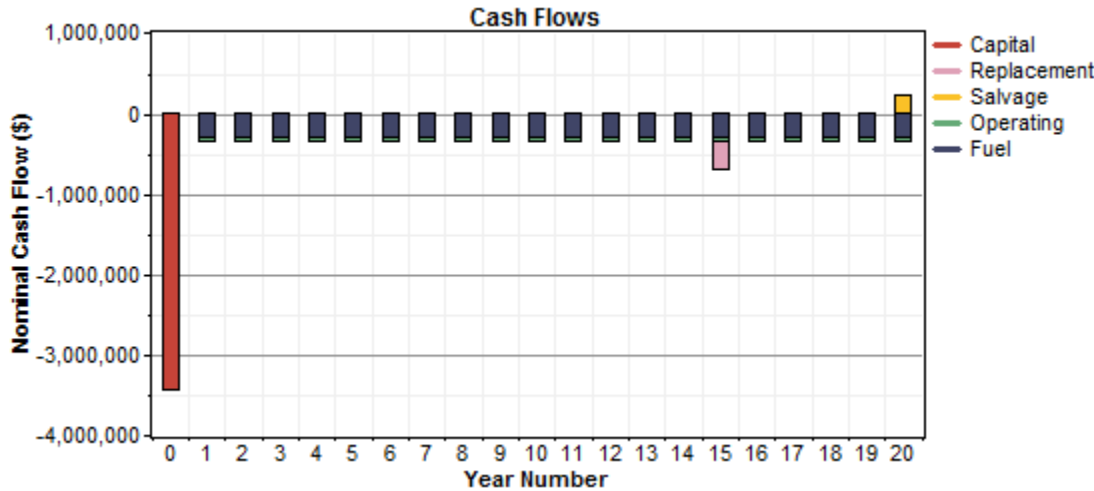
Net Present Costs

Component	Capital	Replacement	O&M	Fuel	Salvage	Total
	(\$)	(\$)	(\$)	(\$)	(\$)	(\$)
WES 30	3,200,000	133,525	367,038	0	-66,518	3,634,045
Generator 1	30,000	10,270	0	3,094,466	-233	3,134,502
Generator 2	30,000	0	0	270,646	-251	300,395
Trojan L16P	72,000	40,796	0	0	-1,483	111,313
Converter	80,000	10,014	91,759	0	-4,989	176,785
Other	10,000	0	8,308	0	0	18,308
System	3,422,000	194,606	467,105	3,365,111	-73,475	7,375,348

Annualized Costs

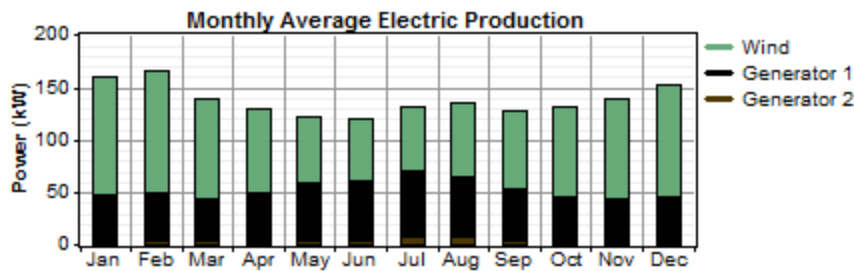
Component	Capital	Replacement	O&M	Fuel	Salvage	Total
	(\$/yr)	(\$/yr)	(\$/yr)	(\$/yr)	(\$/yr)	(\$/yr)
WES 30						
Generator 1						
Generator 2						
Trojan L16P						
Converter						
Other						
System						

WES 30	278,991	11,641	32,000	0	-5,799	316,833
Generator 1	2,616	895	0	269,790	-20	273,280
Generator 2	2,616	0	0	23,596	-22	26,190
Trojan L16P	6,277	3,557	0	0	-129	9,705
Converter	6,975	873	8,000	0	-435	15,413
Other	872	0	724	0	0	1,596
System	298,346	16,967	40,724	293,386	-6,406	643,016



Electrical

Component	Production	Fraction
	(kWh/yr)	
Wind turbine	745,696	62%
Generator 1	431,449	36%
Generator 2	32,638	3%
Total	1,209,784	100%



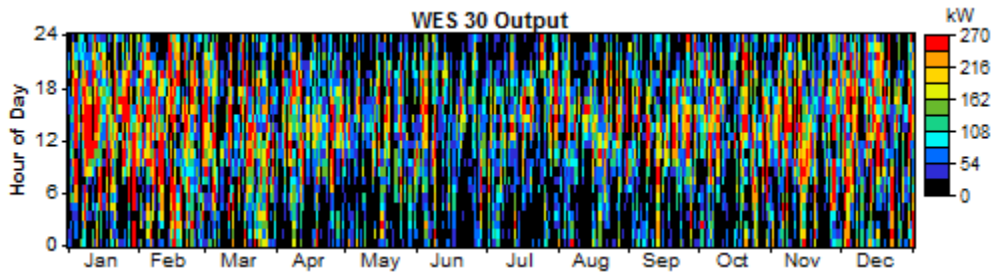
Load	Consumption	Fraction
	(kWh/yr)	
AC primary load	925,636	100%
Total	925,636	100%

Quantity	Value	Units
Excess electricity	224,831	kWh/yr
Unmet load	-0.0000801	kWh/yr
Capacity shortage	0.00	kWh/yr
Renewable fraction	0.616	

AC Wind Turbine: WES 30

Variable	Value	Units
Total rated capacity	250	kW
Mean output	85.1	kW
Capacity factor	34.1	%
Total production	745,696	kWh/yr

Variable	Value	Units
Minimum output	0.00	kW
Maximum output	260	kW
Wind penetration	80.6	%
Hours of operation	7,754	hr/yr
Levelized cost	0.425	\$/kWh

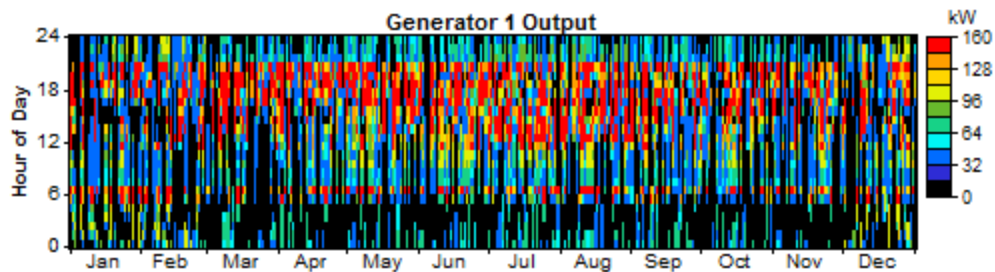


Generator 1

Quantity	Value	Units
Hours of operation	5,063	hr/yr
Number of starts	448	starts/yr
Operational life	2.96	yr
Capacity factor	32.8	%
Fixed generation cost	19.4	\$/hr
Marginal generation cost	0.401	\$/kWhyr

Quantity	Value	Units
Electrical production	431,449	kWh/yr
Mean electrical output	85.2	kW
Min. electrical output	45.0	kW
Max. electrical output	150	kW

Quantity	Value	Units
Fuel consumption	168,618	L/yr
Specific fuel consumption	0.391	L/kWh
Fuel energy input	1,659,206	kWh/yr
Mean electrical efficiency	26.0	%

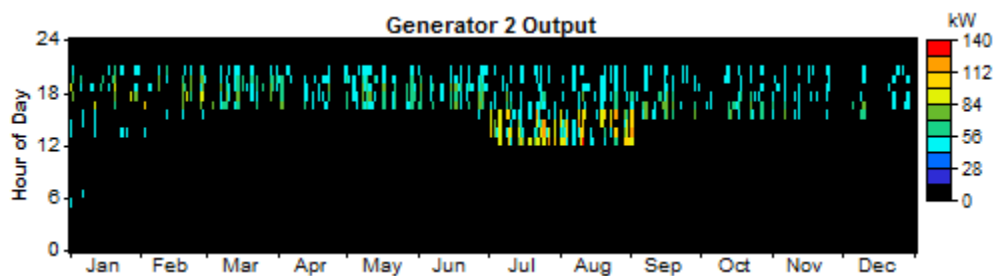


Generator 2

Quantity	Value	Units
Hours of operation	549	hr/yr
Number of starts	258	starts/yr
Operational life	27.3	yr
Capacity factor	2.48	%
Fixed generation cost	19.4	\$/hr
Marginal generation cost	0.401	\$/kWwhr

Quantity	Value	Units
Electrical production	32,638	kWh/yr
Mean electrical output	59.5	kW
Min. electrical output	45.0	kW
Max. electrical output	129	kW

Quantity	Value	Units
Fuel consumption	14,748	L/yr
Specific fuel consumption	0.452	L/kWh
Fuel energy input	145,116	kWh/yr
Mean electrical efficiency	22.5	%



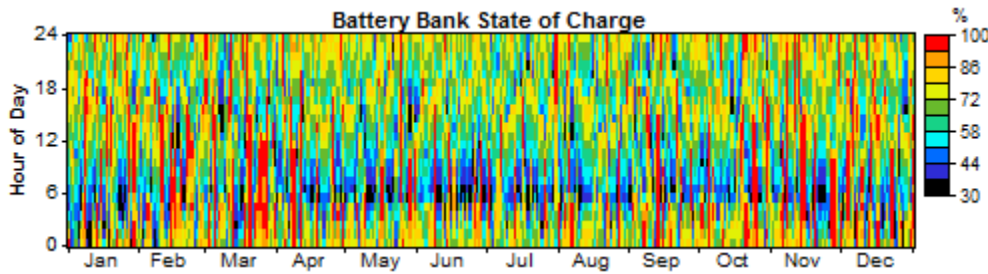
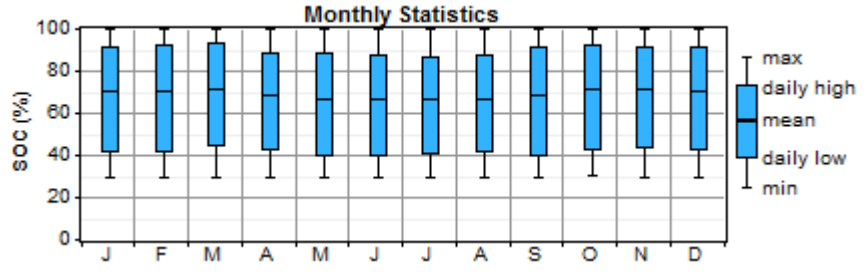
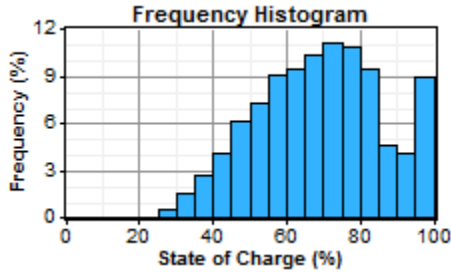
Battery

Quantity	Value
String size	40
Strings in parallel	6
Batteries	240
Bus voltage (V)	240

Quantity	Value	Units
Nominal capacity	518	kWh
Usable nominal capacity	363	kWh
Autonomy	3.43	hr

Lifetime throughput	258,000	kWh
Battery wear cost	0.030	\$/kWh
Average energy cost	0.246	\$/kWh

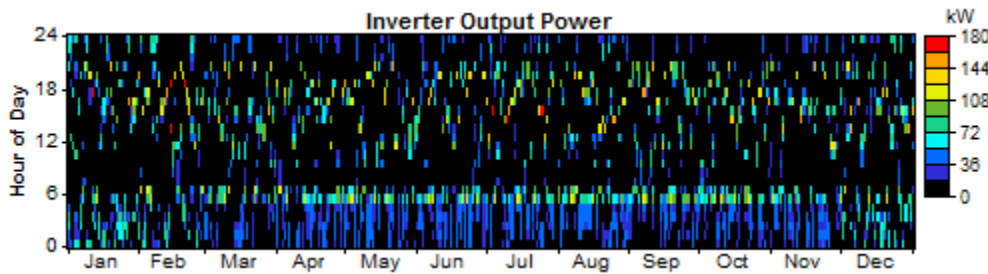
Quantity	Value	Units
Energy in	144,496	kWh/yr
Energy out	122,967	kWh/yr
Storage depletion	151	kWh/yr
Losses	21,378	kWh/yr
Annual throughput	133,376	kWh/yr
Expected life	1.93	yr

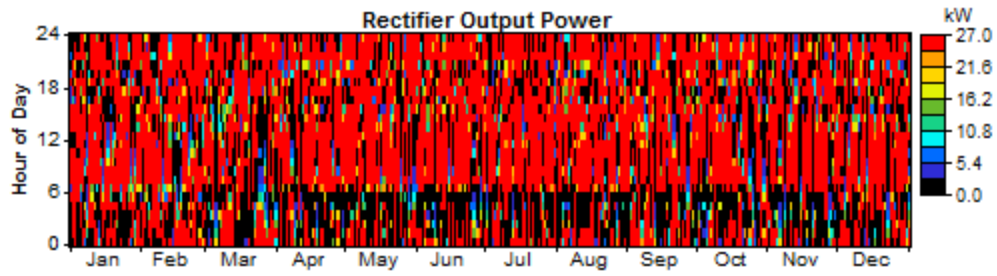


Converter

Quantity	Inverter	Rectifier	Units
Capacity	400	400	kW
Mean output	13	16	kW
Minimum output	0	0	kW
Maximum output	170	26	kW
Capacity factor	3.2	4.1	%

Quantity	Inverter	Rectifier	Units
Hours of operation	2,214	6,546	hrs/yr
Energy in	122,967	169,988	kWh/yr
Energy out	110,670	144,496	kWh/yr
Losses	12,297	25,492	kWh/yr





Emissions

Pollutant	Emissions (kg/yr)
Carbon dioxide	482,863
Carbon monoxide	1,192
Unburned hydrocarbons	132
Particulate matter	89.8
Sulfur dioxide	970
Nitrogen oxides	10,635