



*Microgrid Insight Made Simple*

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# **Strengthening the Skilled Workforce in the Renewable Energy Sector**

Somali Renewable Energy Forum

Developed & Presented by Shuraako  
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Dr. Peter Lilienthal

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1790 30th St, Suite 100, Boulder, Colorado 80301, USA  
<http://www.homerenergy.com> • +1-720-565-4046

# Why Training?

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- Projects are cost-effective with local labor

# HOMER®

**HOMER Pro is the global standard for least cost design of clean, reliable, distributed power.**

- National Renewable Energy Lab: 1992-2009
- Original developers now at HOMER Energy
- 140,000+ users in 193 countries

Microgrid Decisions **Made with Confidence**



Software



Training

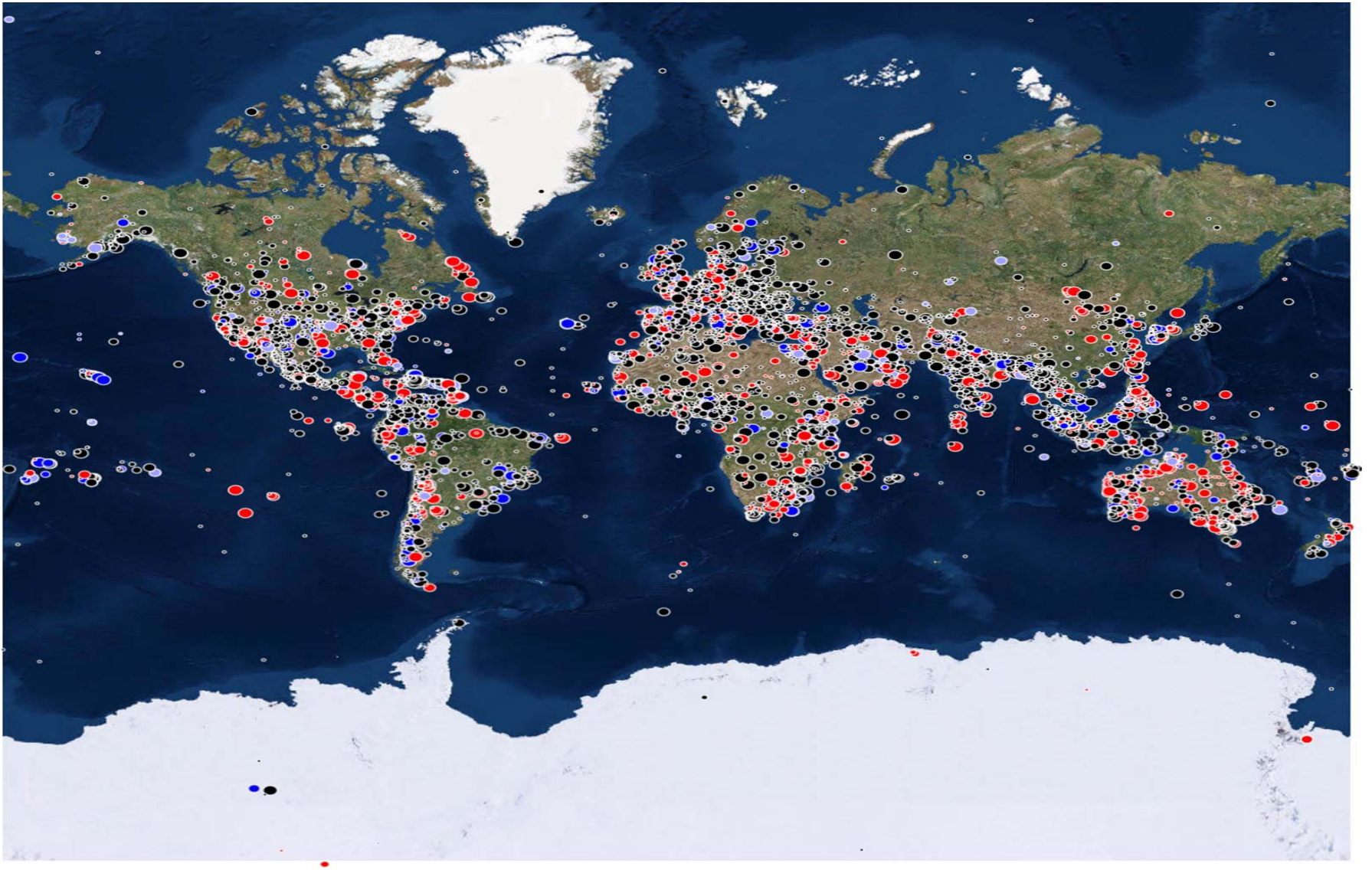


Consulting



Market Access

# 1 year of HOMER Projects



# Training for Whom?

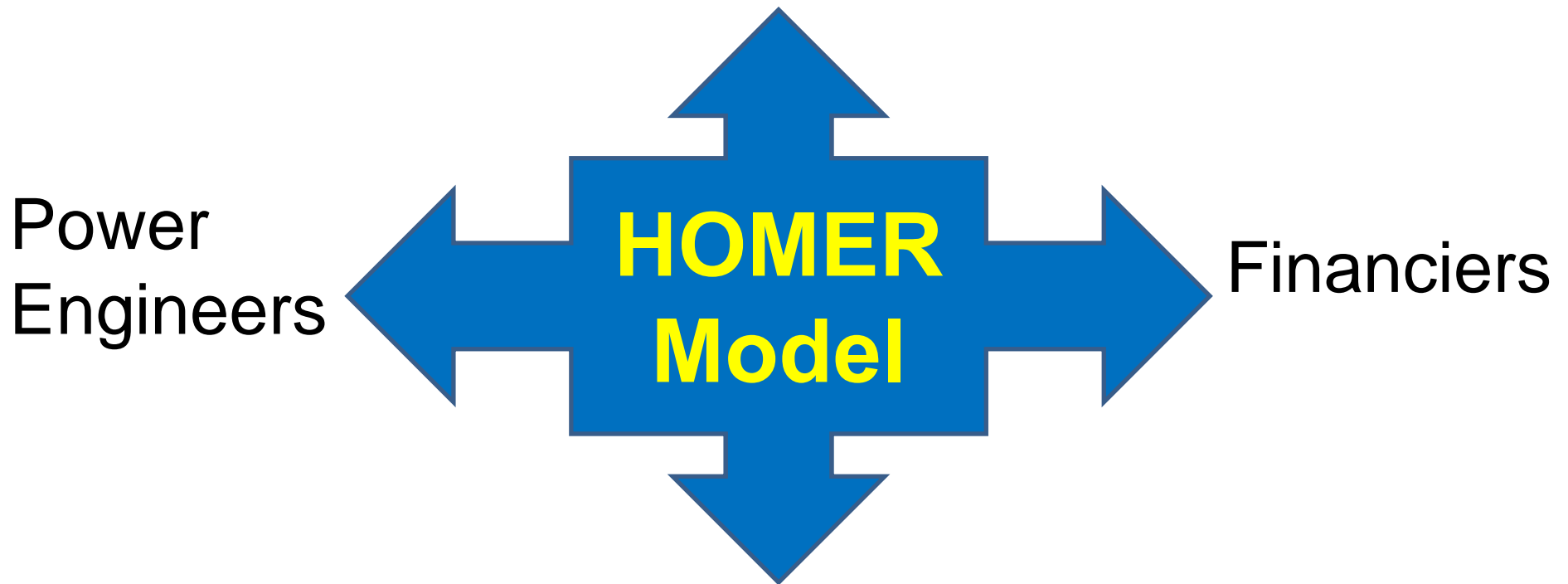
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- Energy Planners
- Utility Executives
- Power Engineers
- Funding Organizations
- Technicians
- Customers / General public

# HOMER bridges different worlds

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Renewable Advocates



Diesel Mechanics

**HOMER as a communication tool**

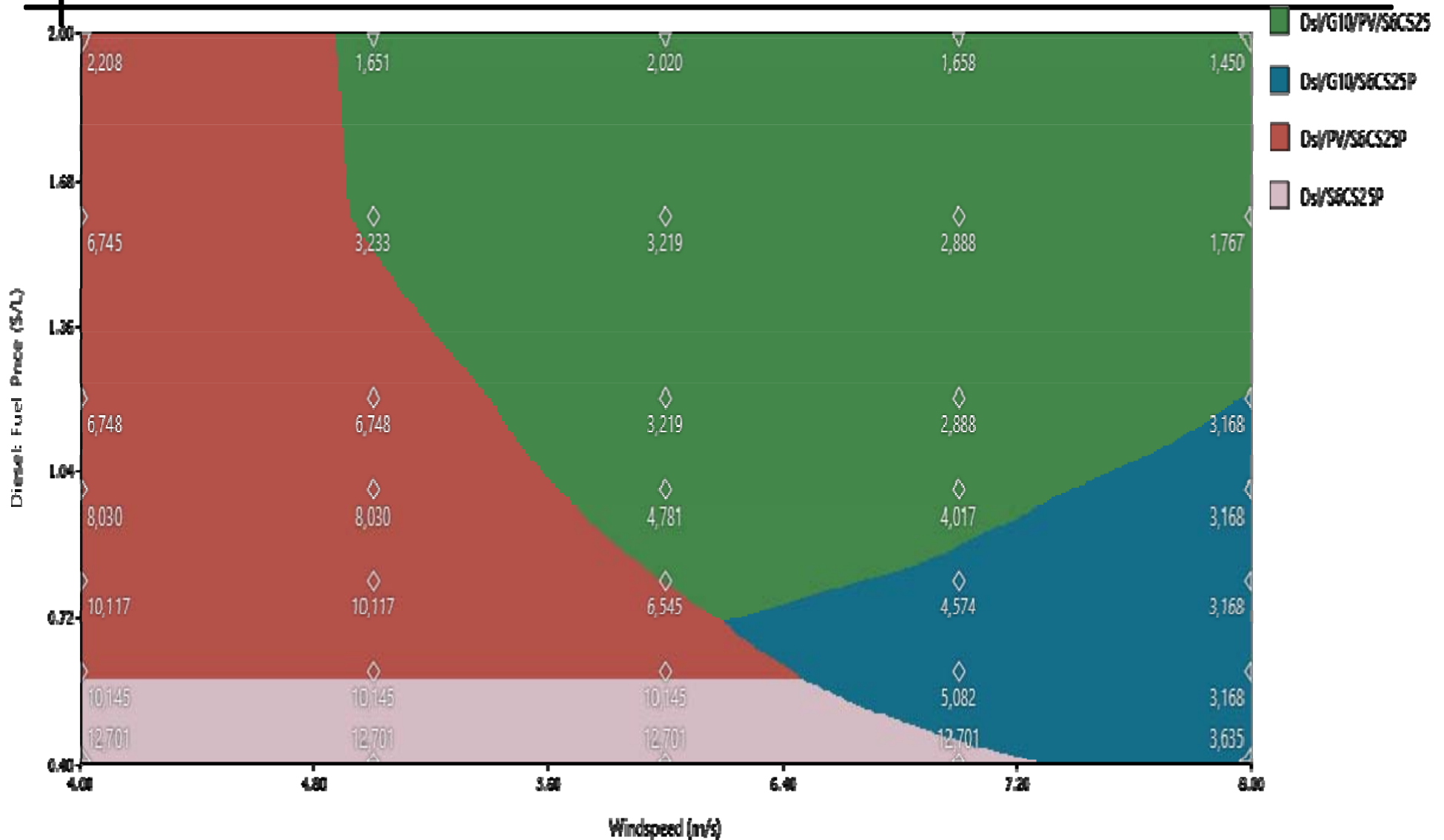
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# Questions HOMER Can Answer

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- Which technologies?
  - Is wind worth the trouble?
  - Lead-acid or lithium or ... ?
- New diesels or retrofit existing ones?
- How much fuel will it save?
- How long will the batteries last?
- Can we turn off some of the diesels?
- What is the return on investment?
- What if the load grows?

# Optimal System Type





# Optimization Results

Export...

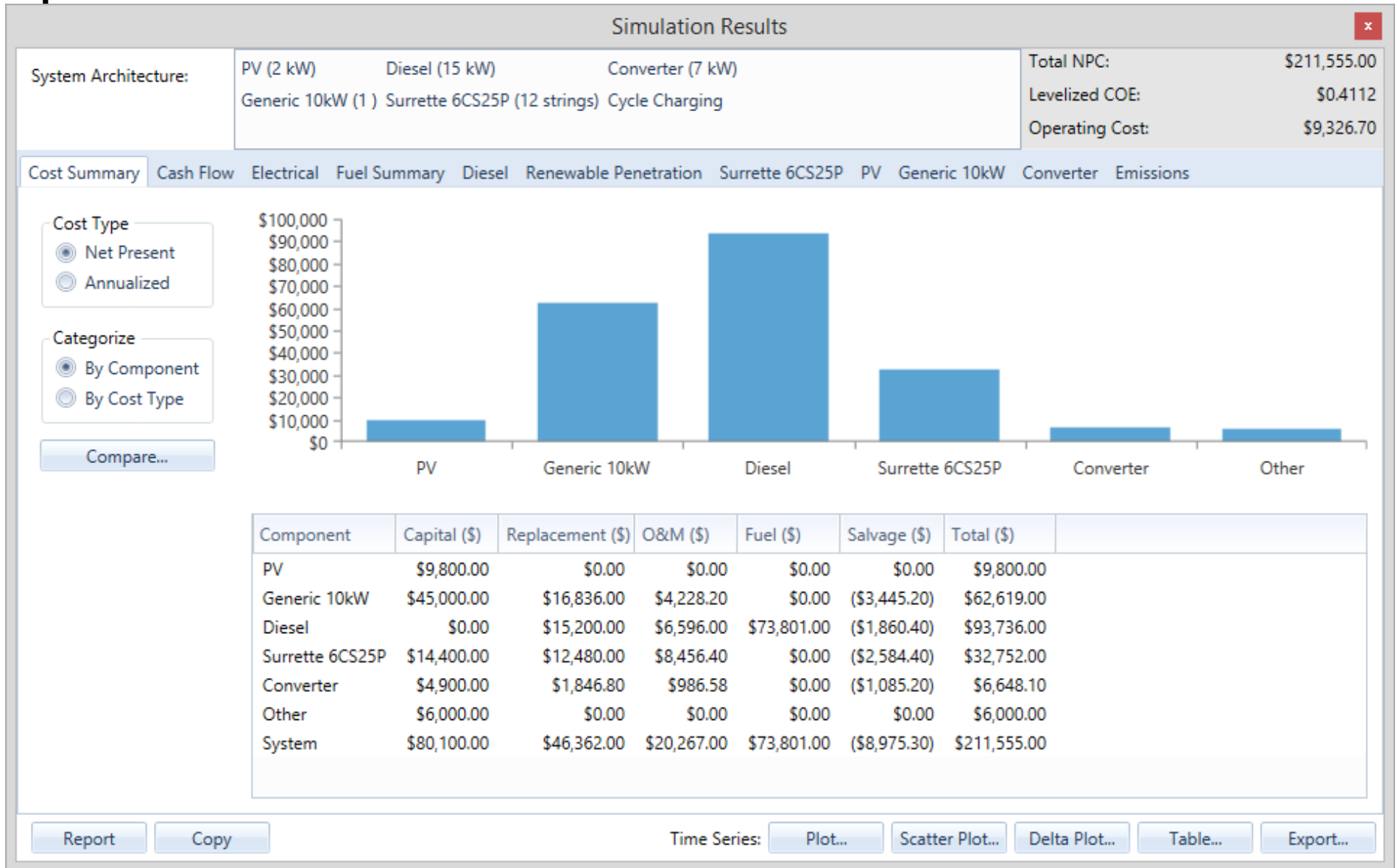
Optimization Results: Left Double Click on a particular system to see its detailed Simulation Results

☒ Categorized ☐ Overall

Architecture										Cost				System	Dsl				PV	G10	S6CS25P			
							PV (kW)	G10	Dsl (kW)	S6C S25P	Conv erter (kW)	COE (\$)	NPC (\$)	Operating cost (\$)	Initial capital (\$)	Excess Elec (kWh/yr)	Hours	Production	Fuel (L)	O&M Cost	Production	Production	Annual Throughput	Lifetime
							2.00	1	15.0	12	7.00	\$0.411	\$211,555	\$9,327	\$80,100	6389.332	2,496	21,689	6,545	468	3,235	23,593	10,820	11
							5.00		15.0	12	7.00	\$0.412	\$212,030	\$11,511	\$49,800	115.3029	3,305	34,518	10,117	620	8,087		10,914	11
								1	15.0	12	7.00	\$0.414	\$212,845	\$10,114	\$70,300	5254.031	2,726	24,018	7,231	511		23,593	11,471	10
									15.0	4	2.00	\$0.428	\$220,252	\$14,762	\$12,200	940.7152	6,360	39,359	12,702	1,192			3,762	10
									15.0			\$0.516	\$265,367	\$18,403	\$6,000	10789.63	8,760	47,290	15,765	1,642				

Return on investment (%)	12.2
Internal rate of return (%)	12.0
Simple payback (yr)	6.81

# Simulation Results



# Electrical Production

Cost Summary Cash Flow **Electrical** Fuel Summary Diesel Renewable Penetration Surrette 6CS25P PV Generic 10kW Converter Emissions

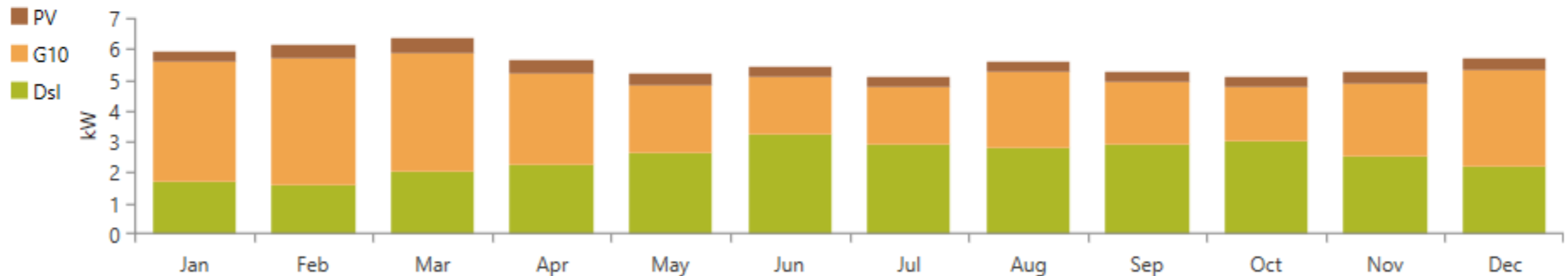
Production	kWh/yr	%
PV	3,235	6.67
Diesel	21,689	44.70
Generic 10kW	23,593	48.63
Total	48,516	100.00

Consumption	kWh/yr	%
AC Primary Load	36,500	100.00
DC Primary Load	0	0.00
Total	36,500	100.00

Quantity	kWh/yr	%
Excess Electricity	6,389.3	13.2
Unmet Electric Load	0.0	0.0
Capacity Shortage	0.0	0.0

Quantity	Value
Renewable Fraction	40.6
Max. Renew. Penetration	1,599.8

Monthly Average Electric Production



Report

Copy

Time Series:

Plot...

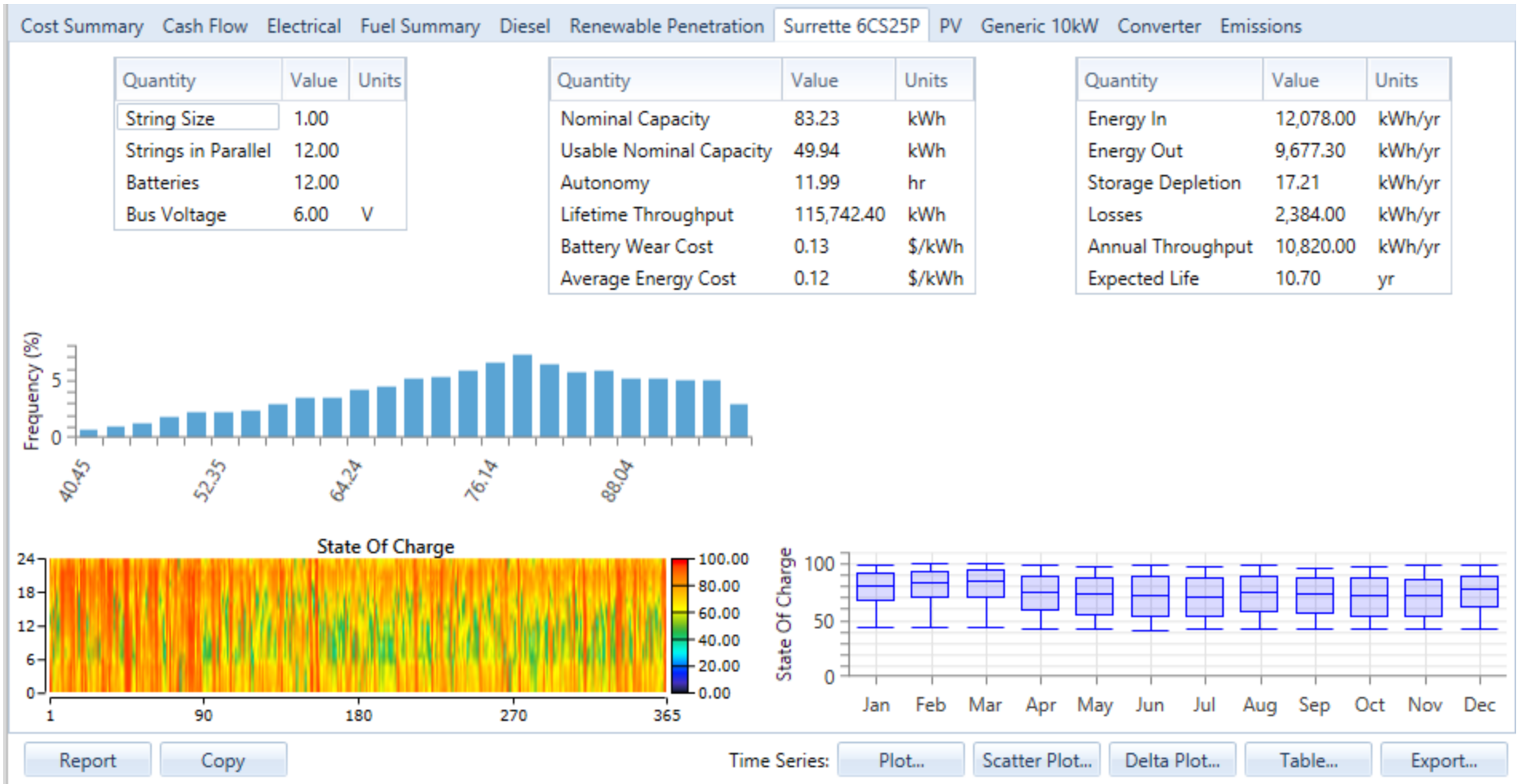
Scatter Plot...

Delta Plot...

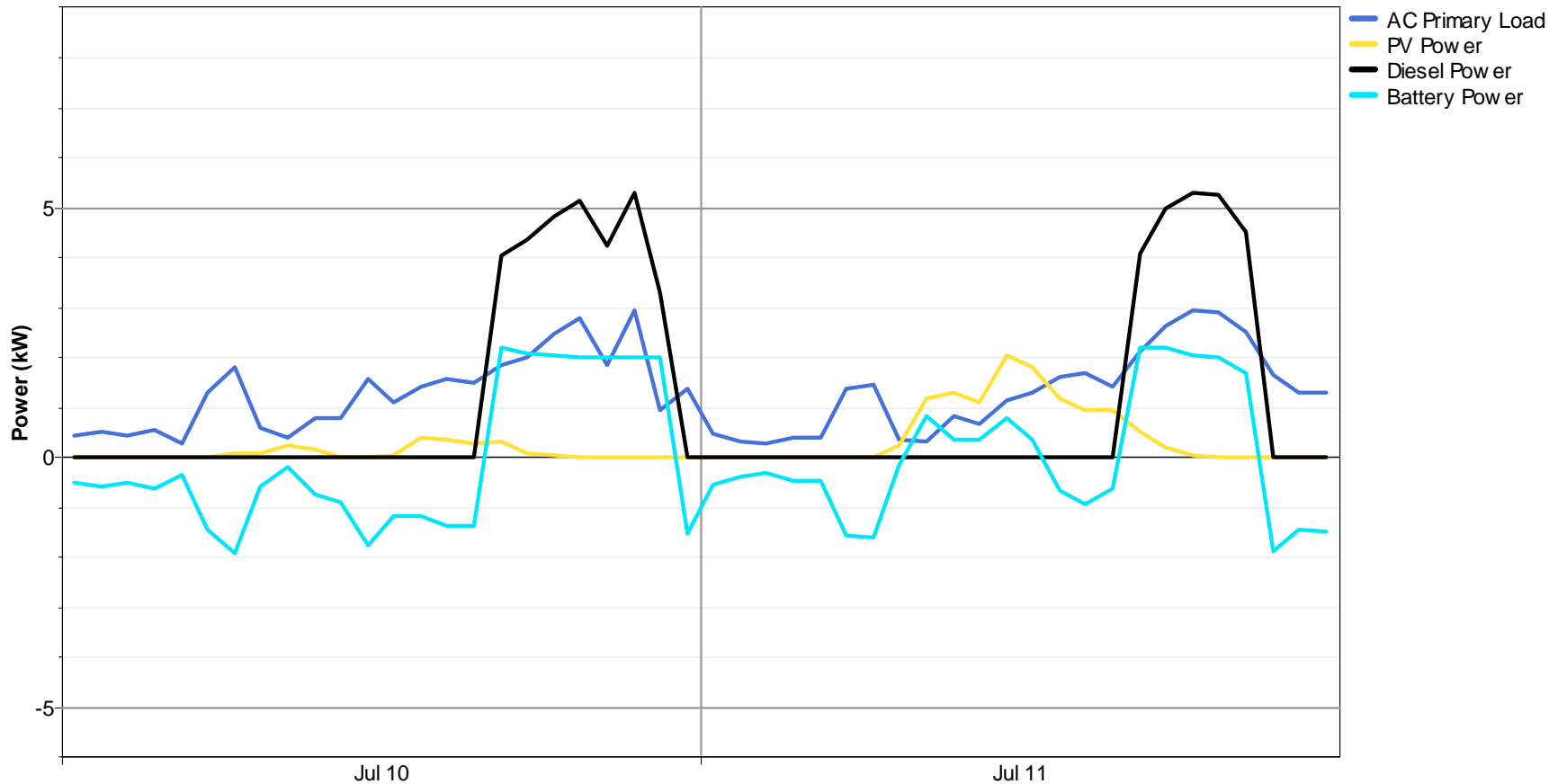
Table...

Export...

# Battery Management



# Operational Analysis



- When is backup power needed?

# Conclusions

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- **Projects are cost-effective with local labor**
- Renewables can fully electrify Africa
  - Affordable and sustainable
- These systems are different from traditional choices
- Many choices
- Hybrid systems for high quality power