

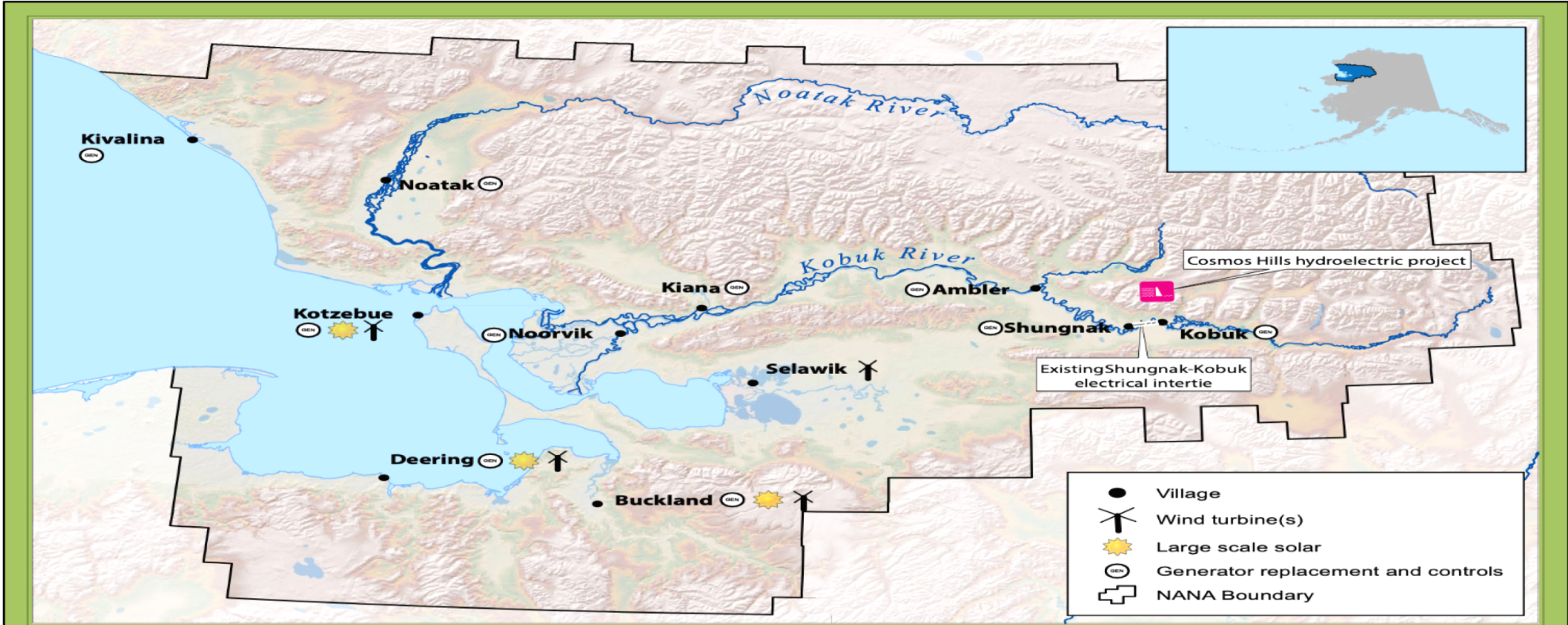
Turning the Diesels Off in Deering & Buckland: The Role of Energy Storage



**Alaska Energy
Storage Workshop
January 12, 2021**

**Brian Hirsch - DeerStone Consulting
www.deerstoneconsulting.com**

The NANA Region – Northwest Alaska



Energy Projects in the NANA Region

NOT FOR NAVIGATION Date: 7/6/2016

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Slide Courtesy of NANA Regional Corporation

NANA



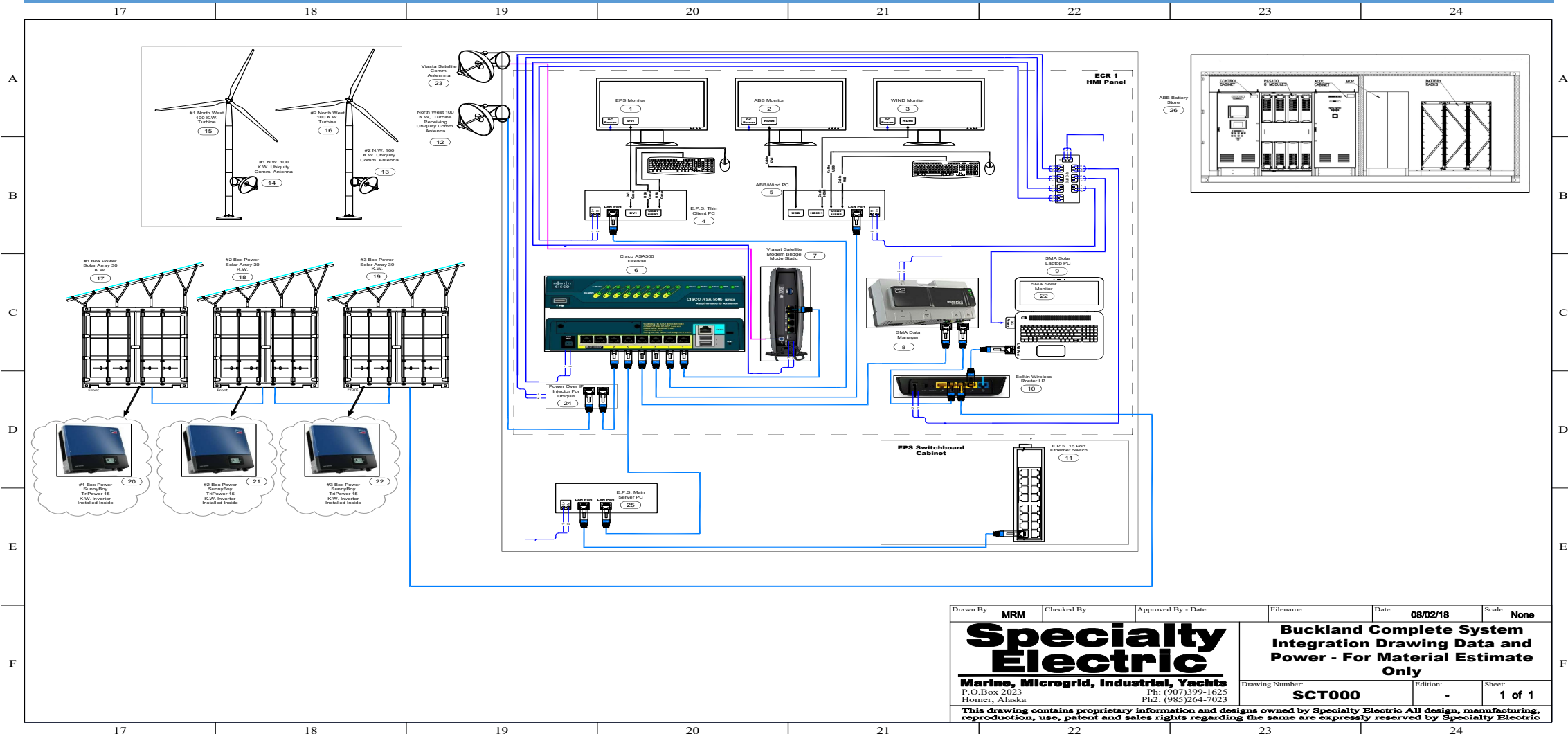


NANA's Energy Vision

- **The energy vision for the NANA Region is to be 50 percent reliant on alternative energy sources, both renewable and non-renewable.**
- 10 percent decrease of imported diesel fuels by 2020
 - ✓ **We are on-track to meet this goal through significant community effort and regional coordination**
- 25 percent decrease of imported diesel fuels by 2030
 - **Will require increased energy storage**
- 50 percent decrease of imported diesel fuels by 2050

DECREASING DEPENDENCE ON DIESEL FUEL = INCREASING RELIANCE ON LOCAL RESOURCES – BOTH NATURAL AND HUMAN. WE HAVE ABUNDANT WIND AND SOLAR AND TALENTED PEOPLE

Integrating Legacy and New Infrastructure



Drawn By: MRM	Checked By:	Approved By - Date:	Filename:	Date: 08/02/18	Scale: None
Specialty Electric Marine, Microgrid, Industrial, Yachts P.O.Box 2023 Homer, Alaska			Buckland Complete System Integration Drawing Data and Power - For Material Estimate Only Drawing Number: SCT000 Edition: - Sheet: 1 of 1		

Batteries, Inverter, & Controls - Buckland





Buckland Solar Installation Crew

New Infrastructure - Deering



Deering System Sizing – Modeled & Actual

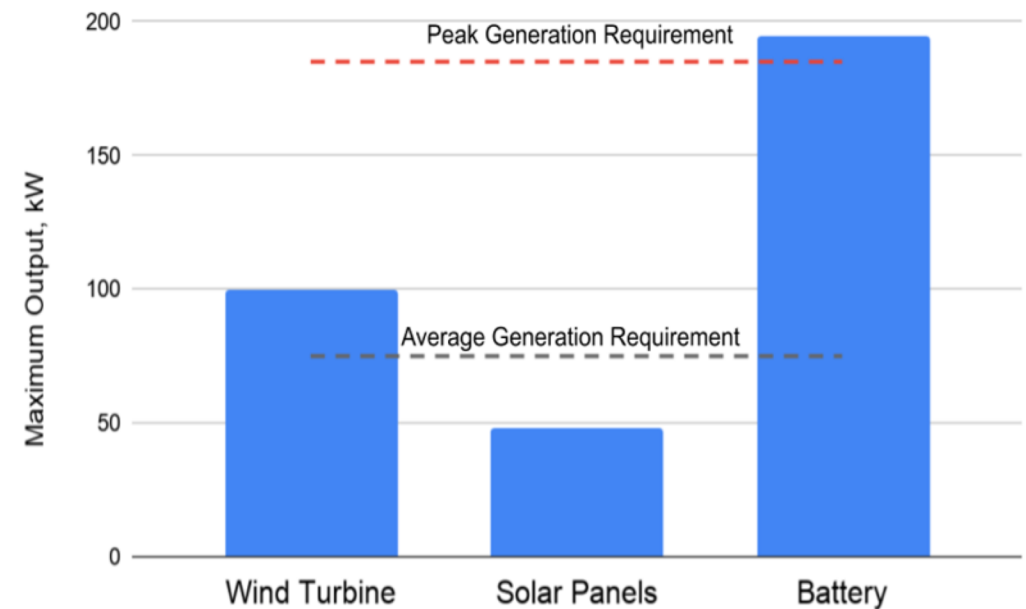
DEERING 90 kWh BATTERY

Northwind 100	PV (kW)	Battery Storage (kWh)	Diesel Off Hours	Fuel Consumption (Gal)	Wind Production (kWh)	Solar Production (kWh)	Excess Electricity (kWh)
Diesel Base	-	-	-	44,154	-	-	-
1	0	0	65	39,598	128,739	-	56,772
1	50	90	1,833	32,606	128,739	50,078	5,671
1	100	90	2,401	29,759	128,739	100,155	14,340
1	150	90	2,866	27,775	128,739	150,233	36,063
1	200	90	3,136	26,505	128,739	200,310	67,714

DEERING 180 kWh BATTERY

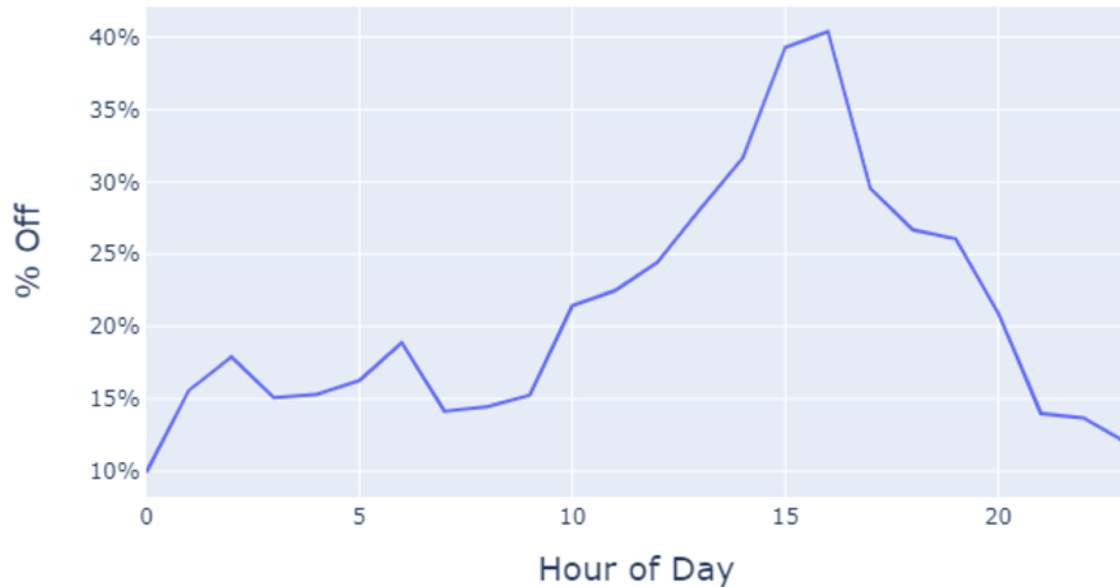
Northwind 100	PV (kW)	Battery Storage (kWh)	Diesel Off Hours	Fuel Consumption (Gal)	Wind Production (kWh)	Solar Production (kWh)	Excess Electricity (kWh)
Diesel Base	-	-	-	44,154	-	-	-
1	0	0	65	39,598	128,739	-	56,772
1	50	180	1,927	32,236	128,739	50,078	1,734
1	100	180	2,582	29,167	128,739	100,155	5,464
1	150	180	3,102	26,862	128,739	150,233	21,710
1	200	180	3,409	25,408	128,739	200,310	50,620

Deering Renewable System Sizes

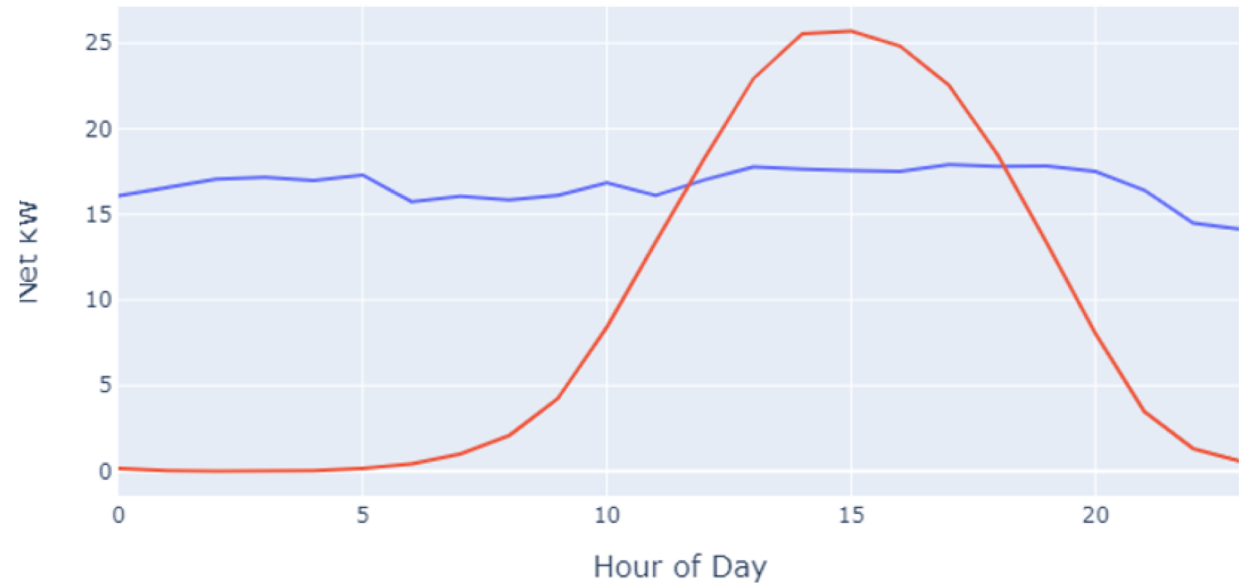


Predicting the Future ... Based on the Past

Diesel Off Percentage, Hourly Profile

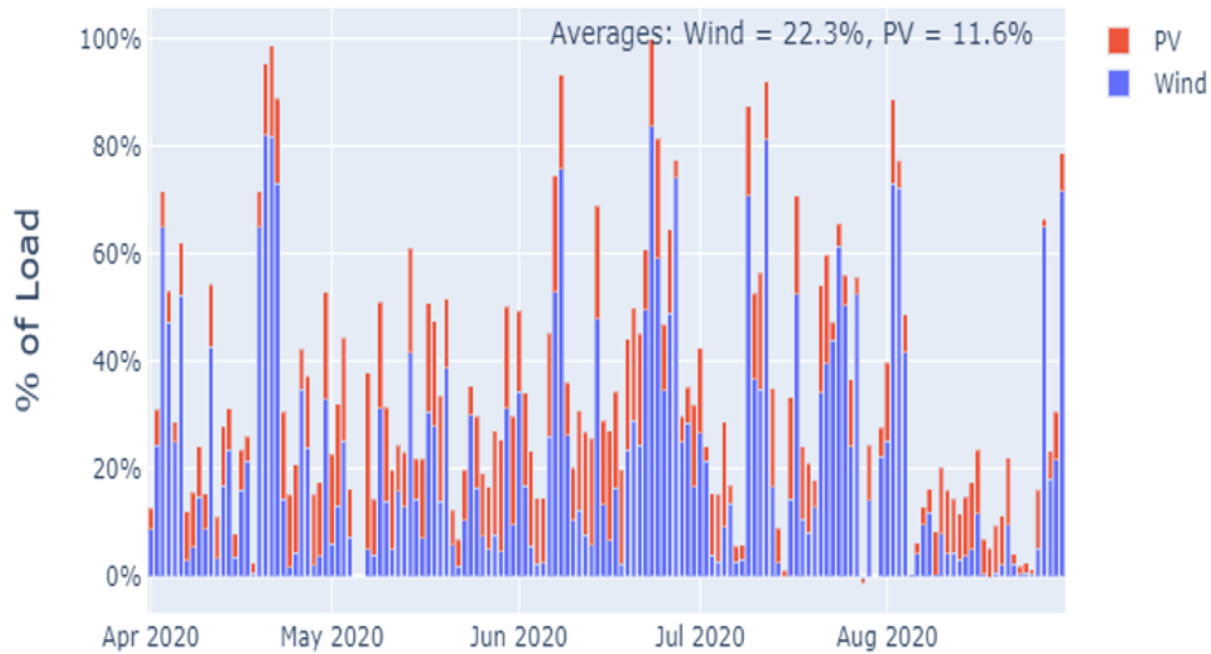


PV & Wind Net Production



Renewables System Performance

% of Load Supplied by Renewables



Capacity Factors (CF)

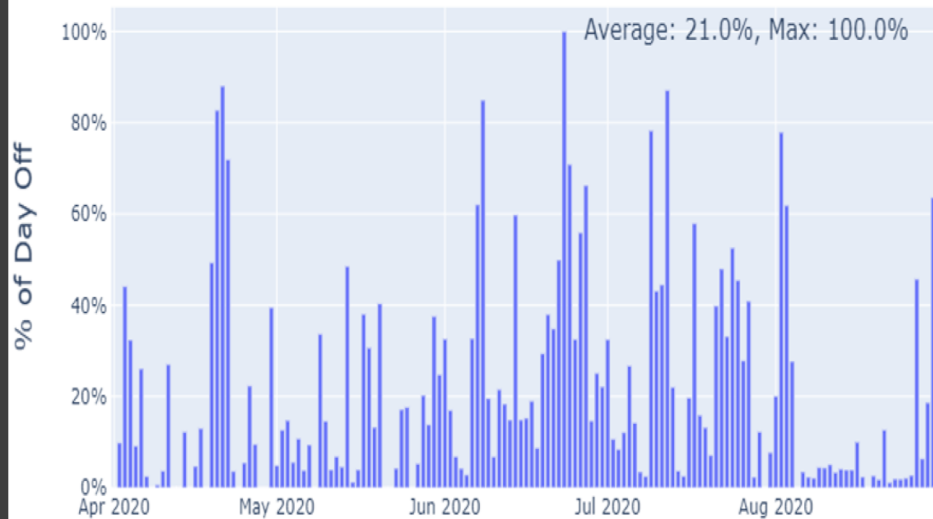
Generation Type	CF, Apr 1 - Aug 30, 2020	CF, Extrapolated to Annual Value	Estimated CF at Project Design
Wind	0.193	0.222	0.261
Solar PV	0.215	0.134	0.113

No battery losses were deducted.

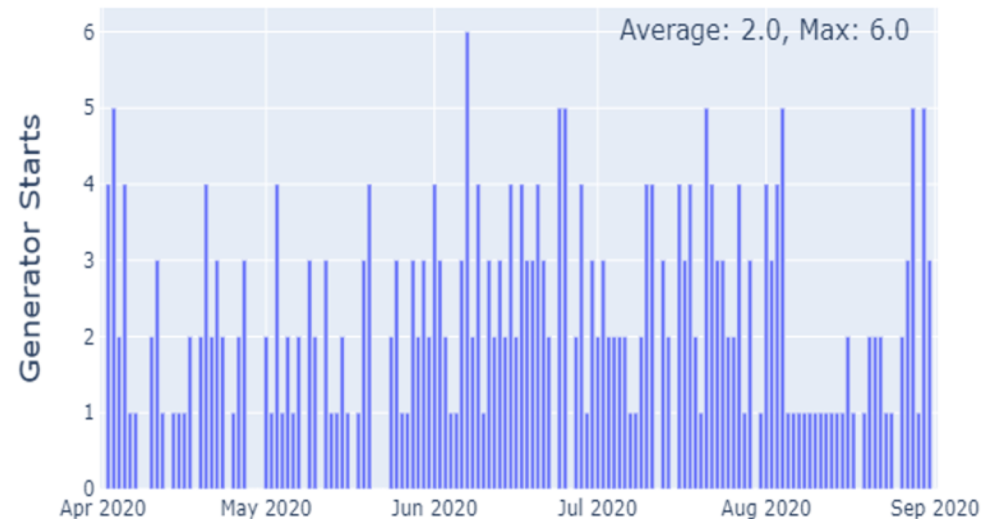
No availability adjustment made.

Turning the Diesels Off!

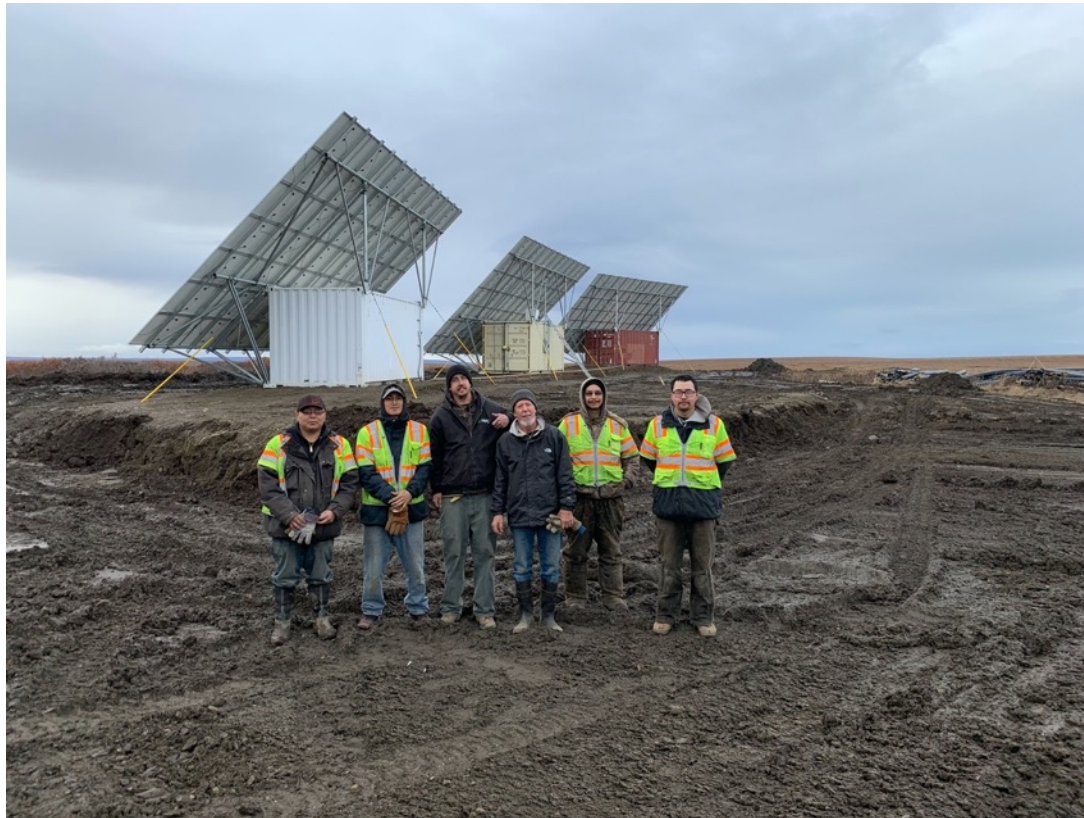
Daily Average Diesel Off Percentage



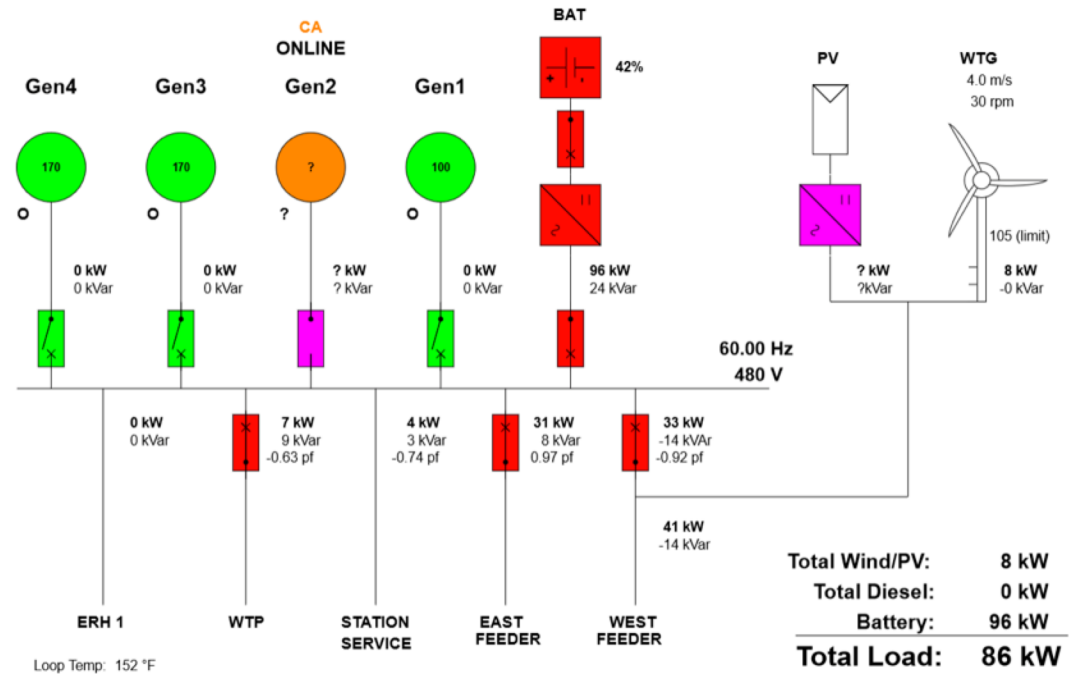
of Generator Starts by Day



Happy Crew, Happy Power Plant

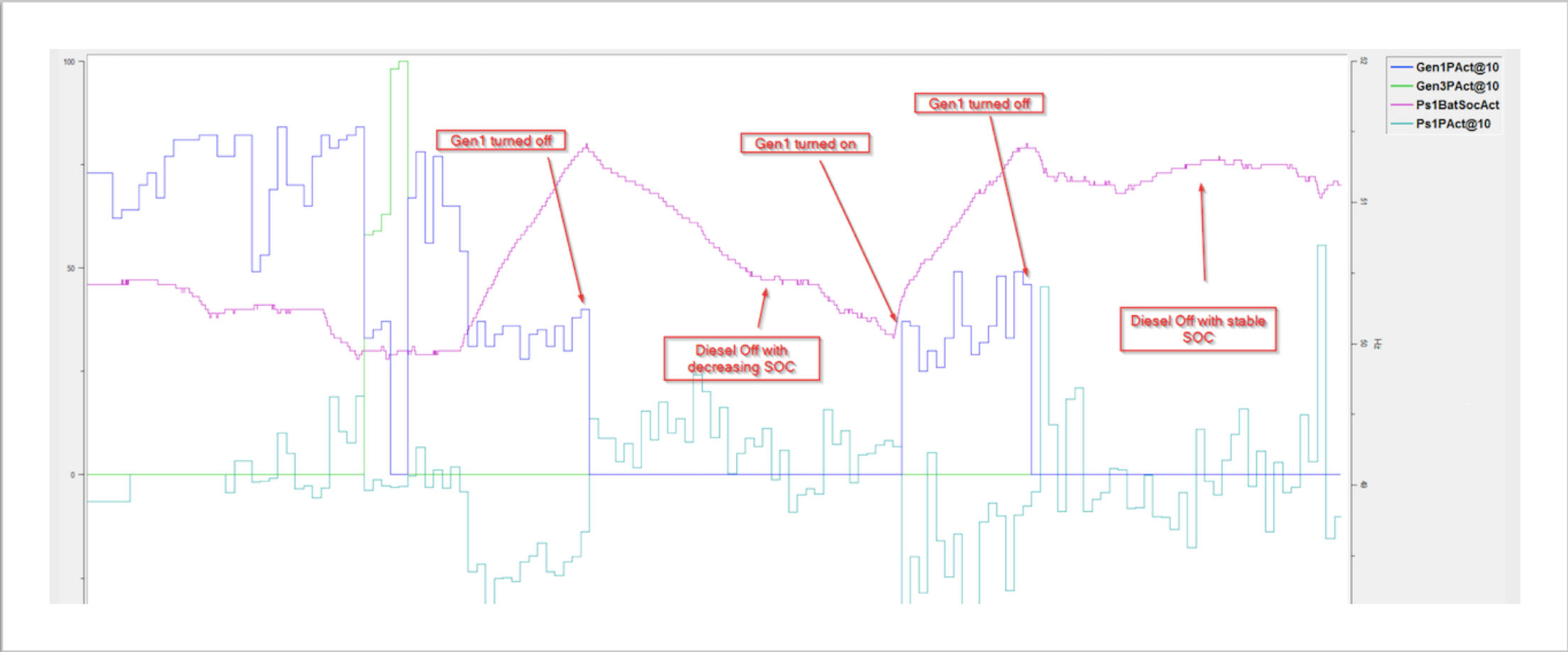


Diesels-off Screen Shot



10/12/2019; 4:57pm

A Day in the Life of A Power Plant & BESS



Next Steps

- Optimize Current Systems
 - IPP – convert fuel savings into cost savings
 - Improved internet
 - eMesh Monitoring
 - Improved local training
 - New Gen-Sets in both DRG & BKL
 - More Data Analysis
 - Battery Building Efficiency Improvements
- Replication, with some twists: Shungnak & Kobuk – now funded, construction aiming for summer 2021
- Support Kotzebue: Largest solar PV array in rural AK; more battery, more wind
- Noatak: actively pursuing funding
- Power Plant Upgrades
- Cooperation with AVEC

Replication...and continued improvement

- Shungnak & Kobuk – now funded, construction aiming for summer 2021
- Support Kotzebue: Largest solar PV array in rural AK; more battery, more wind
- Noatak: actively pursuing funding
- Power Plant Upgrades
- Cooperation with AVEC
- Reduce Costs of deployment: design, logistics, construction, ever-evolving technology



Thank You!

Questions?

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