

Kodiak Electric Association, Inc. Renewable Energy Vision

**Darron Scott
President/CEO**





Vision Statement



Kodiak Electric Association, Inc. shall endeavor to produce 95% of energy sales with cost effective renewable power solutions by the year 2020.





Kodiak Electric Association, Inc.



- ▶ **Locally-Owned Electric Cooperative**
- ▶ **Provides Electricity to approximately 6,000 meters**
- ▶ **Isolated Electric Grid**
- ▶ **Peak Load – 28 MW**
- ▶ **Minimum Load – 11 MW**





KEA's Current System



- ▶ **2x 10 MW Hydro Units at Terror Lake Hydro Facility**
- ▶ **1x 10 MW Hydro Unit at Terror Lake Hydro Facility *in construction***
- ▶ **3x 1.5 MW Wind Turbines (Phase I)**
- ▶ **3x 1.5 MW Wind Turbines (Phase II)**
- ▶ **2x 1.5 MW Battery Energy Storage Systems (BESS)**
- ▶ **≈30 MW assorted diesel-fired power generation**





Wind Turbine Performance before October 2012



- ▶ 40 Million kWh Generated
- ▶ 2.83 Million Gallons of Diesel Saved

98% Availability

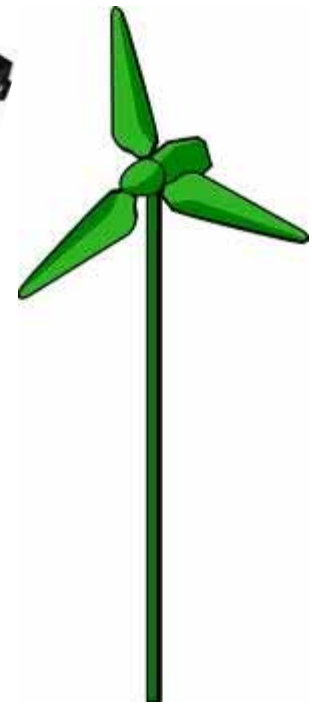




High Penetration Wind Project

Bringing Wind and Water Together with the BESS

“Bridge”





Wind Penetration Rates

Up to **80%**



Photo Courtesy of Dake Schmidt

Project Timeline



**Hydroelectric
Governor
Upgrade**

**3 - 1.5 MW
Wind Turbines**

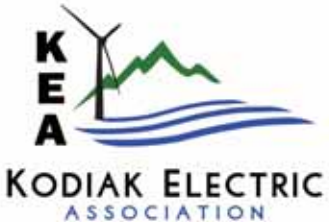
**2 - 1.5 MW Battery
Energy Storage Systems**



**System Power
Factor Upgrade**

**3 - 1.5 MW
Wind Turbines**

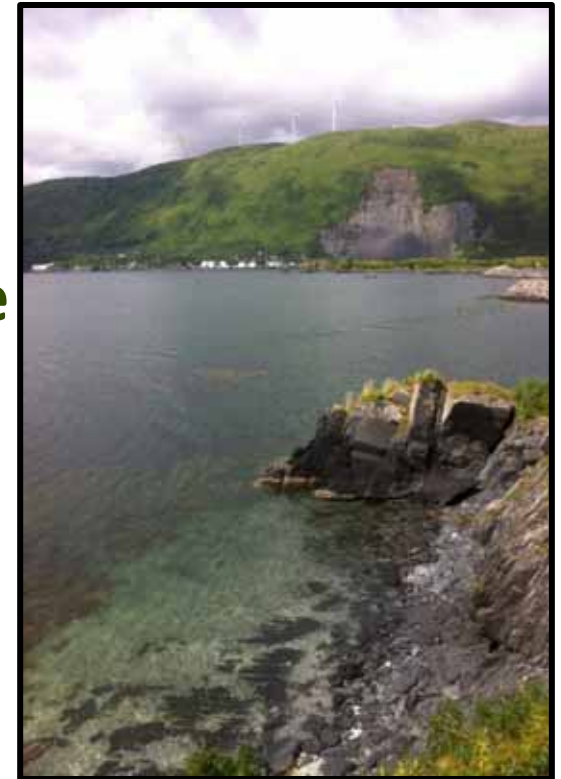
**1 - 10 MW
Hydroelectric
Turbine**





Cost of Projects

- ▶ **\$21.4 Million Wind Turbines (Phase I)**
- ▶ **\$17.4 Million Wind Turbines (Phase II)**
- ▶ **\$4.5 Million BESS**
- ▶ **\$12 Million Third Hydroelectric Turbine**
- ▶ **Remainder financed with CREB**





Wind Turbine Performance since October 2012



- ▶ **23.6 Million kWh Generated**
- ▶ **1.66 Million Gallons of Diesel Saved**





Test Performance Data

2012-11-06-15.38.19.486S1.tir : 2012-11-06 15:38:19 .486 -- Frequency1 Low

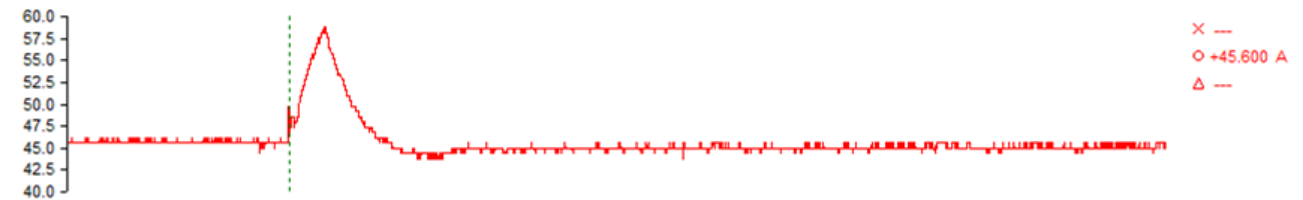
Frequency 1

High
2012/Nov/06 15:38:19.486806
Kodiak, Alaska



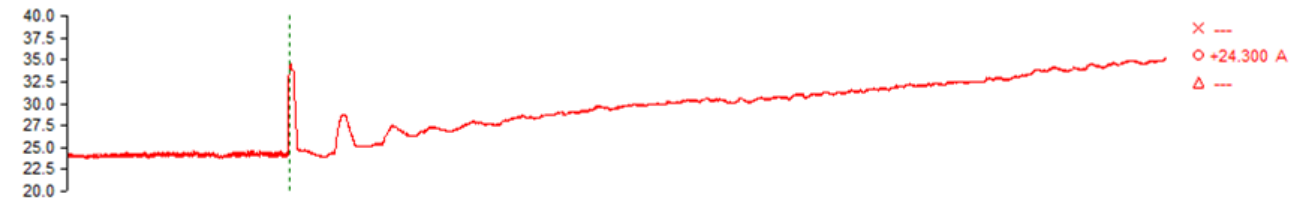
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Kodiak, Alaska



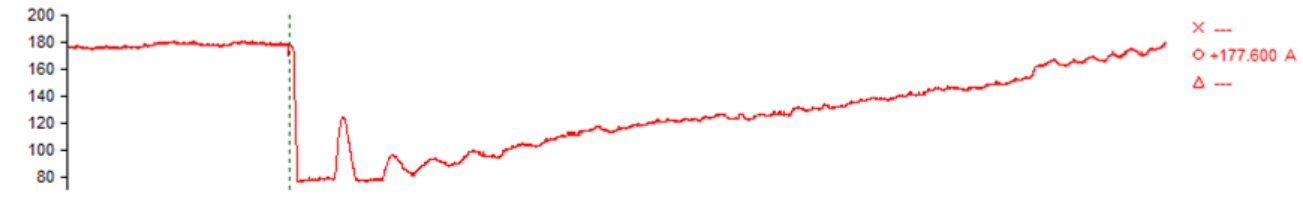
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High
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Kodiak, Alaska



MB_12.47.la.

High
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Kodiak, Alaska

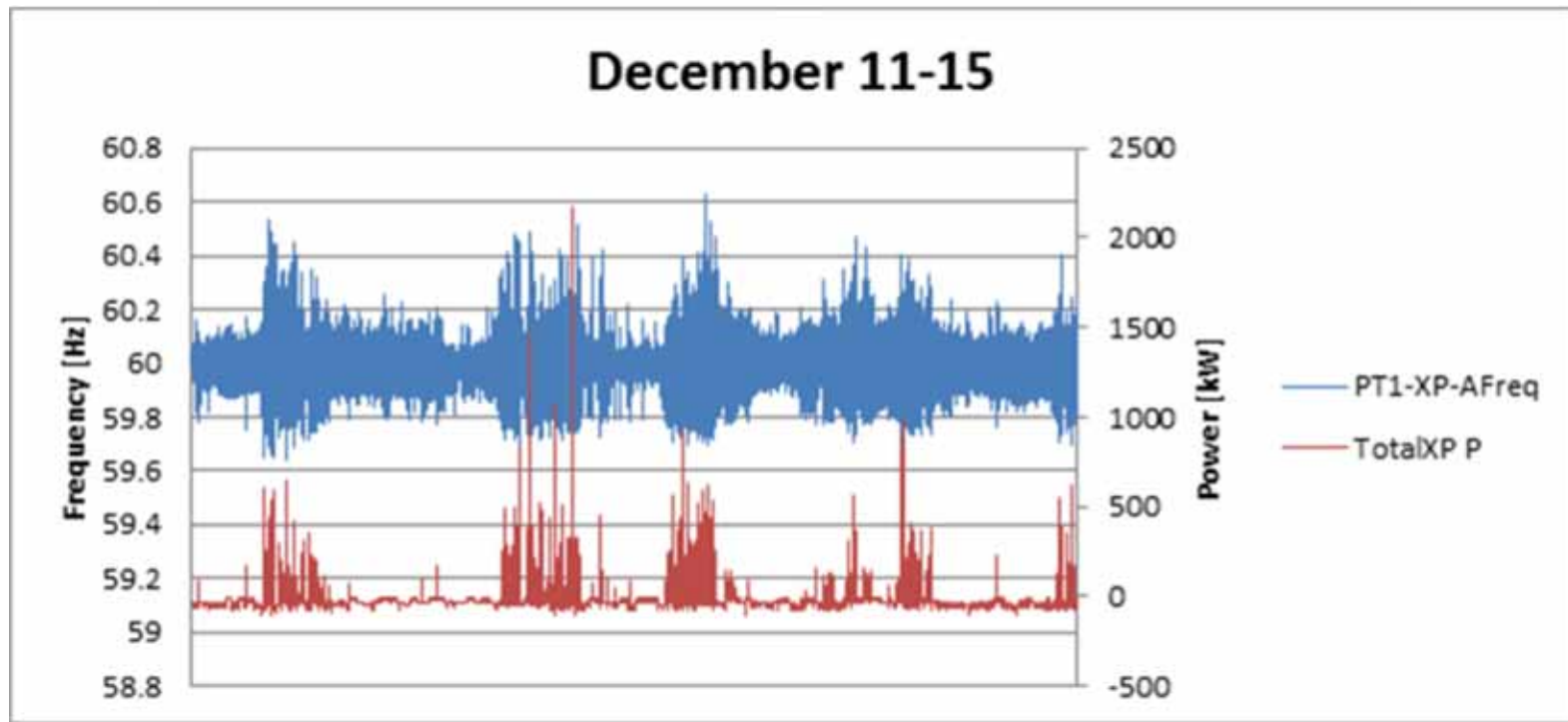


Seconds





Actual Performance Data



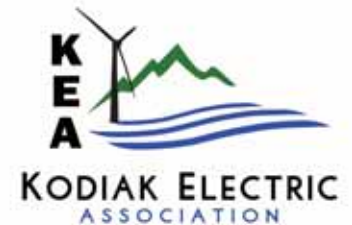
- ▶ Energy Storage System responds to frequency excursions outside of 59.8Hz
- ▶ Data resolution shown is 2 seconds



Terror Lake Hydroelectric Project



**Third hydro turbine
online this fall.**





Goal of 98% Renewable in 2014

