

Banner Peak Wind Farm Expansion



Nome, Alaska



Wind farm expansion further reduces energy prices

Project Overview

In partnership with the Alaska Energy Authority (AEA), Nome Joint Utility Systems (NJUS) expanded the capacity of the Banner Peak Wind Farm by 1.8 MW. Two new 900 kW EWT DirectWind turbines were added to the existing 16 Entegriy 65 kW turbines for a total capacity of 2.8 MW.

Objectives

The objective of the project was to provide Nome and the surrounding area with a reliable, renewable, and cost-effective source of energy. Introducing wind energy allowed them to reduce their reliance on fluctuating and expensive diesel fuel.

Economic Feasibility

The turbines became operational in August of 2013. Between August of 2013 and December of 2014, they have produced 1,895 megawatt-hours of electricity and displaced 116,000 gallons of diesel fuel. This displacement saved the community \$388,000 in the first 17 months. Over its 20 year projected lifespan, the project has a calculated benefit/cost ratio of 1.44.

Project Specifications

Wind energy is ranked on a scale from 1 to 7, 1 being poor and 7 being superb. Much of the Bering Straits region ranges from Class 4 to Class 7 winds, so projects there tend to be more economical. The EWT turbines were chosen after a detailed analysis of their specific suitability for village installations. EWT turbines have complex controls, variable pitch blades, and state-of-the-art power electronics. They can be integrated directly into existing utility grids and monitored and controlled through internet connections. The original Banner Peak wind project called for a power sales agreement between NJUS and Banner Wind LLC in which NJUS purchased power from

Quick Facts

Total Project Costs: \$9.6 million

Funding: Renewable Energy Fund & Local Match

Capital Costs

Design: \$668,356

Construction: \$8,929,454

Equipment

Make/Model: (2) EWT DirectWind 52s

Rated Capacity: 900 KW

Net Capacity Factor: 29%

Rotor Diameter: 52 meters

Hub Height: 50 meters

Total Rated Capacity (all turbines): 2.8 MW

Diesel Fuel Offset

Estimated Annual: Up to 200,000 gallons

Actual Annual: 78,000 gallons

Aug. 2013-Dec. 2014: 116,000 gallons

Fuel Savings

Estimated Annual: \$744,000

Actual Annual: \$266,000

Aug. 2013-Dec. 2014: \$388,000

Benefit/Cost Ratio: 1.44



900 kW EWT DirectWind turbines, photo courtesy of AEA.

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Banner Wind for \$0.18/kWh. As of January 1, 2015, this agreement was terminated when Banner Wind turned the wind farm over to NJUS. NJUS no longer has to purchase power.

Allocation of Funding

The Alaska Energy Authority's Renewable Energy Fund (REF) granted \$8,069,000 for design and construction of the project. Local matching funds contributed \$884,088 for the same project phases. In a different REF application, the state granted \$801,000 and local matches gave \$89,000 for a transmission line that would transfer power to NJUS communities.

Learning Experiences/Challenges

The expansion application originally sought to install five 600 kW turbines on Newton Peak at a cost of \$13.9 million. Due to a \$4 million cap on all Renewable Energy Fund (REF) projects, AEA recommended partial funding of this project for \$4,000,000. In response, the wind farm was reduced to two EWT 900 wind turbines with an additional grant request of \$4 million in 2013. The location was also changed from Newton Peak to Anvil Mountain and then to Banner Peak due to icing concerns and transmission costs.

The original Banner project began production in late 2008. Entegriy's bankruptcy shortly thereafter impacted the initial operation during 2009 due to a lack of spare parts and support. Banner was able to source parts from elsewhere, and by the time they applied for the expansion project they found turbines from Emergya Wind Technologies that met their needs.

Community Benefits

The Bering Straits Native Corporation Board of Directors passed a resolution requiring that 50% of all their profits from the Entegriy turbines be reinvested in



Banner Peak turbines, photo courtesy of AEA.

renewable energy projects in the 17 villages that make up the Bering Straits Region. This will enable more cost effective, better maintained village projects in the future while continually creating annual revenues to support more development.

The majority of villages in the region have a subsistence lifestyle, as they lack a true cash economy. High energy costs for gas, fuel oil, and electricity put an even higher burden of distress on these residents. Adding wind generation allows residents to continue thriving off of their environment and greatly reduces the need for diesel fuel. This project has reduced residential electricity costs by twelve cents per kilowatt hour.

"EWT turbines have complex controls, variable pitch blades, and state of the art power electronics."

Meteorological tower, photo courtesy of AEA.



Project Contact Information

Owner:	Nome Joint Utility Systems (NJUS) Phone: 907-443-6587
NJUS Contact:	John Handeland Email: johnh@njus.org
Electrical Engineer:	Electrical Power Systems Phone: 907-522-1953
Civil Engineer:	BBFM Engineers, Inc. Phone: 907-274-2236
Case Study Author:	Zoe Tressel, AEA Site: Akenergyauthority.org Phone: 907-771-3000

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