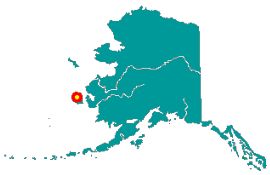
Mekoryuk Wind Farm

Mekoryuk, Alaska



Wind farm project reduces electricity rates by over 50 percent

Project Overview

In partnership with the Alaska Energy Authority (AEA), the Alaska Village Electric Cooperative (AVEC) completed the design and construction of a 200 kW wind farm. The project installed two Northern Power 100A turbines to supplement the existing power generation at the AVEC facility.

Objectives

The objectives of this project were to displace diesel fuel and provide the community of Mekoryuk with a renewable, reliable, and cost effective energy source. They achieved their objectives by installing two turbines that could integrate into their diesel generation system.

Economic Feasibility

The project became operational in November of 2010. Since then, the turbines have generated 761 megawatt-hours of electricity and displaced 51,000 gallons of diesel fuel. This displacement has saved the community $191,000 in reduced fuel costs. Although the turbines have a 20-year projected lifespan, with proper maintenance and operation it is likely that the turbines will outlast this estimate.

Project Specifications

Mekoryuk is a community of 210 people on Nunivak Island and is part of the Yukon Delta National Wildlife Refuge. Because of their remote location, they do not have access to the main power grid like urban cities. As such, their electrical and heating costs are generally much higher than average and any reduction in those costs is a huge benefit to residents. The Northern Power 100 turbines were chosen specifically for their ability to withstand harsh environmental climates similar to those in Alaska. They can operate in temperatures as cold as -40 F. The community of

Quick Facts

Total Project Costs: $3.5 million

Funding: Renewable Energy Fund & Local Match

Capital Costs

Design: $49,988
Construction: $3,774,648

Equipment Specifications

Make/Model: (2) Northern Power 100 A
Rated Capacity: 100 kW
Net Capacity Factor: 27.4%
Rotor Diameter: 19 meters
Hub Height: 32 meters
Total Rated Capacity: 200 kW

Diesel Fuel Offset

Estimated Annual: 31,307 gallons
Actual Annual: 12,000 gallons
Nov. 2010-Dec. 2014: 51,000 gallons

Fuel Savings

Estimated Annual: $108,500
Actual Annual: $47,000
Nov. 2010-Dec. 2014: $191,000

Northern Power 100A turbines, photo courtesy of AEA.

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Mekoryuk has an excellent wind class of 5. Normal wind speeds average about 16.5 miles per hour (mph) with maximum speeds of 78 mph.

Allocation of Funding

The Alaska Energy Authority's Renewable Energy Fund (REF) grant contributed $3,155,765 for design and construction of the project. The community contributed $390,493 for the same project phases.

Learning Experiences/Challenges

On March 11, 2015 a fire occurred in the base of one turbine. Emergency crews responded immediately and were able to assist the two men to safety. A post-incident investigation highlighted improper storage of combustible material in the base of the turbine. Procedures have been modified at all AVEC sites to prevent reoccurrence. Possible cable arcing was also identified and cables have been re-routed to prevent damage from workers scuffing the external wire insulation.

The original project application called for the installation of two turbines and a secondary heat load system. The system would transmit excess wind energy to an electrical boiler at the water treatment plant to help heat the facility and make further use of the renewable resource. Project costs exceeded estimates, so no money was granted for secondary heat loads. AVEC applied for the secondary heat load system in a later REF grant application.

Mekoryuk, Alaska, photo courtesy of E3alaska.com.

Community Benefits

AVEC's second REF application was accepted in 2012 and a secondary heat load system is currently being installed in the water treatment plant and washeteria. An electric boiler is being installed in addition to the other system components. This allows the community to rely on renewables and displace diesel fuel even more.

Based on a fuel price of $3.55/gallon, residents were paying almost $0.57/kWh for diesel-generated electricity. Thanks to this project and AEA's Power Cost Equalization program, rates have decreased to $0.21/kWh.

"Thanks in part to this project, Mekoryuk's electricity rates have been reduced by over 50 percent."

Northern Power turbine, photo courtesy of AEA.

Project Contact Information

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