

Alaska Energy Authority Emerging

Energy Technology Fund Grant

Application

March 2012

Project Title: Electric All Terrain Vehicles for Utility Field Operations

Applicant: Chaninik Wind Group

Contact Information: William Igkurak
President Chaninik Wind Group and
General Manager Kwig Power Company

Tel: 1-907-588-8626

wmigukurak@hughes.net

Partners:

US Department of Energy Tribal Energy Program

Total Project Cost: \$80,000

Grant Funds Requested: \$80,000

Match Committed:

Previous Project Title from the Renewable Energy Fund:

Kwigillingok Wind Farm Construction

Abstract

TECHNICAL SYNOPSIS

1. Project Description:

This project calls for the procurement and delivery of electric powered All Terrain Vehicles (ATVs) to support field operations of the four utilities that comprise the Chaninik Wind Group. The Chaninik Wind Group has erected wind turbines in the native villages of Kipnuk, Kongiganak, Kwigillingok and Tuntutuliak. The wind turbines create electrical power in excess of the villages’ needs. This excess power can be used within the village to offset transportation and heating fuel usage. The ATV would use this excess power to maintain the charge of the ATV batteries. The electric utilities in each of the four villages would utilize the ATVs to support field operations (e.g. outage restoration, down poles, transformer maintenance. etc.). The ATV’s will be used to support many of the new construction projects in the villages. The ATV’s will be used within the villages only on boardwalks and village roads; not off road in marshy areas.

2. Innovation and scientific concept:

Electric powered ATVs are not in service in Western Alaska because of the current high cost electric power. Wind energy changes the electric power cost paradigm since wind energy can be delivered at 10¢/kilowatt hour (KWH) versus the 50¢/KWH cost of diesel power. The ATVs in this proposed project would be charged exclusively from wind power. This application of wind power is the first for Western Alaska and one of the few worldwide.

Operating Costs:

Conventional ATV’s operating in hostile environments use considerable fuel as compared to zero emission vehicles such as the one proposed here. These all-electric vehicles would strictly operate on currently surplus electric power at an estimated cost of 10¢/KWH versus 50¢/KWH using diesel power for generation. Further, when compared to conventional gasoline powered vehicles by the same manufacturer, the savings are even more dramatic.

<u>Gasoline powered</u>	Electric Powered:
20 mpg. @ \$7.00 per gallon	10¢/KWH x11.7 hours = \$1.1725 miles per charge x 4charges =
= \$35/100 miles	\$4.68 cost per 100 miles
Electric ATV Savings per 100 miles: \$30.32 cents per hundred miles	

3-Year Cost projections Per vehicle:*

Avoided Gasoline Use	Avoided Gasoline Costs	Total Electrical Costs:
975 Gallons	\$6825.00**	\$912.60

The power equivalent to gasoline is about \$4.68 for a “full tank of volts”!

***Assuming each vehicle travels 125 miles per week over three years.**

**** Gasoline @ \$7/Gallon. Does not factor in routine maintenance for gas powered vehicle which will incur additional costs.**

Other Factors:

There will also cost savings through the elimination of routine oil changes, tune-ups, filter changes, and other maintenance items required by internal combustion engines, but not by electric ATVs.

Unlike gasoline powered ATVs, electric powered ATVs can be kept indoors without the risk of fire. The four utilities would store the ATV's indoors when not in use, permitting a more rapid charge as well as prolonging the battery life. The indoor storage of the electric ATVs will also lead to increased longevity of components because they will not be exposed to overnight weather and extreme winter conditions, as will gasoline powered vehicles.

Electric ATVs will also improve air quality in the villages because they utilize wind power which has a zero emission footprint. It will also improve the quality of life in these communities by reducing the overall noise levels, because the electric ATVs are almost silent in their operation.

3. Technical Readiness

This proposal is based on using commercially available ATVs from Polaris, a leading ATV manufacturer. The Polaris 2012 Ranger EV (electric vehicle) LSV is powered exclusively by 110 volt wind turbine power, which typically will be recharged overnight, when there is excess generating capacity.



The vehicles are powered by a single, 48 volt, 30 horsepower high-efficiency AC induction motor powered by an on-board battery pack which can yield up to a claimed 50 miles of travel per charge. There is also an electronic on-board monitoring system which can alert the operator about the remaining battery life, an over-heating alert system in case of malfunctions, as well as a digital hour meter. The three speed transmission coupled with forward and reverse has proven rugged and capable of going off-road and can also handle moderate inclines and slopes as well as traversing streams when needed.

This vehicle carries two people and is rated for a 500 lb. cargo carrying capacity in its tool bed, in addition to passenger weight. It also has a hitch towing rating of 1,250 lbs., utilizing a standard 2" receiver hitch system, thus making it available to an infinite number of towing vehicles and options currently on the market, adding utility while increasing mission flexibility and utility.



Safety Standards and Certifications:

It is important to point out that there are no safety compromises in this vehicle as it meets all current federal safety guidelines.

Quick Charge Option:

In addition to the on-board charger system, there is also an available quick charger system available in case the vehicle is away from its home base. • This device not only de-tethers the vehicle from its home base but also reduces RANGER EV charging time by 40%. It is easily capable of being mounted to the vehicle in the battery box and requires 220v or 30-amp household connections for correct performance battery life.



Validation and Research Methodology:

1. Methodology:

Every week, utilizing the built-in Digital Hour meter on the vehicle dash, the operational hours of each Electric Vehicle will be recorded along with any service provided as well as other pertinent factors, such as distance travelled. Records will be made available to the Grantor upon request. Records will be kept at the Grantee Office through the grant period and be included in the Final Grant Report.

Phase 1: Procurement: \$10,669 MSRP FOB

Match: Furthermore the ATVs will be transported from Bethel using the Snow Cat of the Chaninik Wind Group. The Snow Cat was used to haul many components of the wind turbines to the four villages at an extremely advantageous cost compared to the available air shipment rates at this writing. Transportation of bulky load with the Snow Cat has proven to be far cheaper than transporting bulky loads by air.

Phase 2 Logistics

Ship to Bethel

Factors: 1700 lbs. dry weight.

Site and Facilities:

Each of the four utilities will have a plug in station at the utility office or power plant to recharge the ATVs. The four utilities are:

Kipnuk Light Plant
Kipnuk, AK 99614

Puvurna Power Company
Kongiganak, AK 99559-5009

Kwig Power Company
Kwigillingok, AK 99622-0049

Tuntutuliak Community Service Association, Inc.
Tuntutuliak, AK 99680-0127

PROJECT TEAM CAPABILITIES:

1. Project Team:

Dennis Meiners, CEO of the Anchorage-base Intelligent Energy systems will be the Project Manager. Roderick xx of the Chaninik Wind Group will be responsible for the transport from Bethel to the villages. At the villages William Igkurak, President of the Chaninik Wind Group, will oversee that proper charging facilities are in place and that record keeping is setup,

1. Financing:

Cost: \$10,699 FOB Manufacturer.

MSRP excludes applicable taxes, title, registration, license, and documentary, installation, setup and destination fees.

Grant Match: Shipping from Bethel will be provided by the Chaninik Wind Group on their Snow Cat, with the costs borne utilized as the match to the grant. Estimated shipping costs will be \$1,190 per vehicle, calculated at \$.70/lb., comparable to commercial quotes.

MARKET:

1. Potential Market Defined:

Immediately, the four villages of the Chaninik Wind Group would see gasoline powered ATVs replaced with electric ATVs. Each village has about 20 ATVs currently. Other villages would adopt electric ATVs as wind and other alternative energy sources become available.

2. Potential Market Size:

Twenty electric ATVs per village x 100 villages = 2000 electric ATVs in Western Alaska

3. Potential Public Benefit:

3-Year Cost Comparison projections:		
Gasoline	Electric	Total Savings:
\$13,750,000	\$1,825,200	\$11,924,800

Proof of Eligibility:

See attached letter

Signed Application Certification:

“By signature on this application, I certify that we are complying and will comply with the amount of matching funds being offered.”

William Igkurak, President, Chaninik Wind Group

Date