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Arctic Field Testing and Power Curve Verification of the Renewegy VP-20 Wind Turbine
Northwest Arctic Borough

AEA Emerging Energy Technology Grant Application AEA-12-047

Project Title:

Arctic Field Testing and Power Curve Verification of the Renewegy VP-20 Wind Turbine

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Project Partners: **Kotzebue Electric Association (KEA)**

Renewegy

NANA Regional Corporation

Total Project Cost :	$ 348,300.00
Grant Funds requested:	$ 293,300.00
Match Committed KEA :	$ 50,000.00
Match Committed NWAB :	5,000.00

Previous REF or EETF Grants : None

Previous EETF Abstract submitted : None

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Abstract

1. **Project Summary**

a. **Project Description:**

The Renewegy VP-20 wind turbine may be a good fit for many small villages with a wind resource, but that are too small for a 100kW-class wind turbine.
This project will field test and verify performance of the VP-20 wind turbine in an Arctic environment at the KEA wind farm. KEA performed similar testing through the USDOE/NREL TVP (Turbine Verification Program) on the first Northern Power NW100 turbine in Alaska (2001).
Currently the VP-20 has been tested down to -20F in North Dakota and Minnesota, where several turbines are in operation.
The manufacturer have expressed interest in testing in Arctic conditions at Kotzebue.
If the VP-20 tests out as suitable for arctic deployment, then the test unit can be transferred, when testing is concluded, to one of the Communities with a good wind-resource, in the Northwest Arctic Borough.

b. **Project Eligibility**:
, as outlined under AS 42.45.375(c)(1-3), 3 AAC 107.715, and this RFA (sec. 4.2)

Kotzebue Electric Assocation (KEA) is an electric utility holding a certificate of public convenience and necessity under AS 42.05.).
Northwest Arctic Borough is a local government.
The project will deploy an existing technology that has not previously been demonstrated in the state.

c. **Project Innovation**:

The electric power output and self-erecting capability of the Renewegy VP-20 turbine provide a smaller scale option to 100kW class turbines. For many Alaskan villages, summer electric loads are less than 50kW and winter loads are roughly 100kW. A 20kW, commercially viable and, Arctic-proven wind turbine may allow wind to be deployed in these smaller villages without the controls needed to handle the 100kW class power output (i.e. battery storage and secondary electric loads).

d. **Priority***: as by AS 42.45.375(d) and this RFA (sec. 4.3).*

If proven cold-weather and field ready, the VP-20 turbine can be a good renewable energy option for many smaller Alaska villages with a wind resource.

2. Technology Validation and Research Methodology (sec. 4.7)
a. **Objectives**:

The project information objectives are:

1) ***Installed Cost***. Determine installation costs of the VP-20 via installation of a VP-20. Cost can be extrapolated for other areas of the state based on logistics and site conditions.
2) ***Power Curve Verification***. Verify power output of the VP-20 over a 1 year period utilizing a dedicated met tower for wind speed, direction and temperature data. Data from met tower and VP-20 power transducer collected by KEA SCADA system.
3) ***Operation Tracking.*** Collect Renewegy VP-20 operational information via an operator log. Data will be used to track downtime causes and O&M costs.

b. **Methodology**:

1) ***Installed cost.*** KEA accounting staff will set up a project cost tracking system to determine the installed cost of the VP-20 turbine.
2) ***Power Curve Verification.*** KEA's SCADA system will be utilized to collect VP-20 power and operational status data.
3) ***Operation Tracking.*** An electronic operator logon the KEA SCADA system will be employed to track the VP-20 operational status. Detailed notes on operational issues including faults, trips, power outages, damages and repairs will be kept.
4) ***Project location.*** The project would take place utilizing KEA's current wind site at Kotzebue. Temperature variations down to -45 F is expected with significant snow-load during the winter months.

3. Summary of Project Schedule and Summary of Project Budget

Schedule

Phase/Task	Month	Notes
Notice to Proceed	0	
Planning & Design	0 – 2	
Construction & Commissioning	3 – 4	
Testing	4 – 16	
Data Analysis & Final Report	16 – 18	

Budget

Phase/Task	Est. Budget	Notes
Equipment 1pc. Renewegy	$135,000	
Construction & Commissioning	$ 93,300	$ 10,000 inkind KEA
Shipping	$ 75,000	
Testing	$ 25,000	$ 25,000 inkind KEA
Data Analysis & Final Report	$ 20,000	$ 15,000 inkind KEA $ 5,000 inkind NWAB
Total	$ 348,300	

4. Project Team Qualifications

- KEA has TVP experience. SCADA system operation. 15-yr wind farm operator.
- NWAB has Grant management and Coordination
- RENEWEDGY is the manufacturer

5. Discussion of Commercialization of Funded Technology

1. The project will provide an optional size to the Skystream and the 100kW class turbines.
2. Multiple Renewegy VP-20 turbines could be a more cost effective and scalable solution for many remote Alaska Communities.
3. The project would also determine if the Renewegy technology is suitable for an Arctic environment at this point in time.

Data

- *Rated Power: 20kW*
- *Cut-in Speed: 3.5 m/s*
- *Cut-out Speed: 25.0 m/s*
- *Rotor Diameter: 9.5m*
- *Active Variable Pitch Control*

VP-20 Turbine Brochure (PDF)

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

NORTHWEST ARCTIC BOROUGH

Contracting Officer
Position/title;
Energy & Resource Coordinator
Full name: Ingemar Mathiasson

By: _____
Mayor
Date: 03.08.12