Kotzebue Electric Association, Inc
3/31/2011
Quarterly Project Report

Wales Diesel-Off High Penetration Wind System

Total Project Budget	**155,000**
Denali Commission	155,000
total	**155,000**

Wales Diesel-Off High Penetration Wind System

Kotzebue Electric Association

Timeline

Phase One-Project Design and Engineering		**Start dates**
Task 1.1	Create Project Plan	1-Jan-10
	KEA	
	AVEC	
	Consultant	
Task 1.2	Evaluate Existing System-Create Prelim. Report	15-Aug-10
	KEA	
	AVEC	
	Consultant	
Task 1.3	Trip to Wales for Analysis	1-Nov-10
	Airfare x 3	
	KEA	
	AVEC	
Task 1.4	Construct Preliminary Engineering Design	1-Feb-11
	KEA	
	AVEC	
Phase Two-Installation		
Task 2.1	Procure Equipment	15-Apr-11
	Satellite Gear	
	Radio Upgrades	
	Wind Turbine Parts	
	Miscellaneous	
Task 2.2 Installation	Wind Turbine Repair	15-May-11
	Wind Technician	
	Travel Kotzebue to Wales	
Task 2.3	Electrical installation	15-June-11
	Travel from Anchorage to Wales x 2	
	KEA	
	AVEC	
	Consultant	
Task 2.4	Final Troubleshooting	15-July-11
	Travel from Anchorage to Wales x 2	
	KEA	
	AVEC	
	Travel Kotzebue to Wales	
	KEA Wind Technician	
Phase Three-Data Analysis		
Task 3.1	Review of Past System Performance	15-Dec-10
	Consultant	
Task 3.2	3 months of Data Evaluation	1-Sep-11

	Data Network Established	
	Ongoing Data Analysis-ACEP	
Task 3.3	6 month Preliminary Report	1-Dec-11
	KEA	
Task 3.4	Close out Report	
		31-Dec-11

1.0 Current Status of Schedule and Budget

Currently KEA has had to adjust the original schedule of tasks, beginning on task 1.4, moving the timeline for completion back. This is due primarily to the need for repairs on the turbine blades which are critical to the safe operation of the system. In June, 2010, KEA contracted Western Community Energy to visit Wales and complete a detailed diagnostic of the two AOC wind turbines. Complete diagnostic details, repairs and recommendations were reported last quarter.

As mentioned in KEA's January's Quarterly Report to the Commission, further operating tests need to take place on the Wales system; however, cracks in the turbine blades currently prevent operation of the system. Severe weather and cold temperatures will prevent the repair of the turbines until sometime in the spring of 2011 (this is due to the epoxy's reluctance to bond in cold temperatures). The exact date of repairs is weather dependent.

As of March 2010 the Wales Diesel-off High Penetration Wind System project is on budget—mostly due to the fact that very few tasks have been completed and KEA has had minimal financial outlays to date.

2.0 Tasks for Next Quarter

Prior to further operational testing, which will be done after turbine blade repair, KEA will continue to work with involved parties on the system designs and control upgrades. In order to gain long term wind and climate data KEA has also been in discussion with AVEC and have opened communications with the Alaska Energy Authority to aid in the placement of a met tower in Wales. AEA is currently investigating the availability of a met tower for this purpose. Having updated wind monitoring equipment will give a more complete answer to wind shear and turbulence issues at the wind site.

KEA and AVEC have also been in discussions concerning improvements to the communications to the project. Unexpected issues such as a revolving IP address system used by local telephone exchange severely limited informational flow. Further evaluation of either a HughsNet or Starband system is being discussed.

So far from the review of the wind turbines and the November visit to Wales it appears that the system including the ESS (energy storage system) the controller and the thermal

storage units are intact. Although it can't be verified that they system in it's entirely will work until the blades are repaired and KEA is able to run the system. Once the system in operational KEA can evaluate the system performance to (1) ensure that there are no significant safety issues and (2) ensure that they system will not damage any of the power plant systems. At this point there are issues with the power plant that need to be understood before any evaluation can be done. Currently they are experiencing problems with the diesel engines being able to synchronize. KEA will be meeting with AVEC to understand what the issue is, and to determine if there other potential power plant problems that need to be addressed before the wind/diesel system can be operated. This discussion is ongoing. It will be critical to see the system run in its entirety in order to make recommendations for system upgrades, but it must be done safely.

There will also need to be a discussion concerning the upgrades to the wind turbines. The upgrades that have been recommended will need to be evaluated to determine which will enhance the turbine performance for system testing, and which will need to be deferred. The original grant request anticipated that the turbines were operational with minimum maintenance. The turbines had been repaired approximately 6 months before the grant was submitted, and other than an issue with the speed sensor they could have been operational. Since that repair a number of other significant issues have developed. This has complicated the entire budget outlook as more funding will need to go to the turbine repair than was anticipated. In this case a review of the budget will be needed to see if there are available funds from other categories that could be shifted without affecting the overall outcome of the project.
The main goal of the project is to get the system up and running again.

5.0 Tasks to be Completed Next Quarter

- Preliminary Engineering Design-*ongoing.*
- Evaluate Equipment for: Satellite Gear, Radio Upgrades, Wind Turbine Parts, Misc.- *ongoing.*
- Repair of turbine blades, dependent on weather conditions.

6.0 Conclusion

Currently the wind-diesel hybrid power system in Wales is not functional. The repair of the turbine blades is critical for the functioning of the system as well as completing all diagnostic testing in order to further upgrade the system in accordance with the goals of this project.

Based on observations from Matt Bergan and ACEP staff, and talking with Bill Crisci, the hybrid wind-diesel control system is still functional. Bill still uses the wind-diesel control to switch engines however there are some issues with the paralleling gear in the AVEC switchgear that is causing him some headaches. This will need to be evaluated as it pertains to the rest of the project.

Additionally, the battery connex (ESS) has been kept warm and the batteries are still full of water, though they are probably due for a cycle charge before re-commissioning.

This project is currently on budget but behind schedule. The adjusted schedule (above) should prove sufficient for completion of the milestones, though at a delayed date.