Power Electronics Review
Emerging Technology Fund
Quarterly Report IV

October 2010-December 2010

Recent Activity

Power Electronics Report

The Power Electronics Review – a prerequisite for Phase I of the Project – was completed in September 2010. The report was circulated to AEA, NREL, and the Denali Commission, for feedback and general observations/recommendations prior to final edit. The final, edited version is now available in electronic form; it is expected that this will be posted online at the ACEP site for ease of access. Hard copies shall be available soon (if/when required).

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Project Status

Budgetary Issues

Funds committed to the first round of equipment purchase has either been paid or in the process of being disbursed to the supplier. The balance of the funds ($110K) has been earmarked for purchase of additional components that are necessary for complete functionality of the test bed. Of essence are a Hybrid System Supervisory Controller (HSSC) and a secondary load controller, since it would be a challenge to perform pertinent tests with only the WTS and inverter. The HSSC is to effect automatic monitoring and supervisory control of the WTS as well as data-logging and historic data visualization. It also allows for a thermal storage unit to be incorporated in the system.

Initial quotations received indicate that these components will cost about $275K, and we are still sourcing for incremental funding to meet the difference of $165K. The Hybrid System

Supervisory Controller is the most critical additional component and costs $160,000. The next most critical component is a Secondary Load Controller which costs $85,000. Of additional interest is the Synchronous Condenser and Controller which will cost $85,000. Each component has an added expense of 10% for a support contract.

Ordered Equipment

The 100kW Wind Turbine Simulator ordered from Sustainable Automation Inc is progressing well: the skid assembly is complete, with the motor and generator precision aligned; all major parts for the control cabinet are on ground; and company technical staff are making some improvements to the control software. It is expected that once the controls are fully assembled, testing and debugging will commence for a period of about 2 weeks prior to shipping.

Fig. 1: Part of the skid assembly, October 2010.

It is highly anticipated that the ordered parts, namely:

1. Wind turbine simulator (WTS)

2. Lead-acid battery bank
3. Grid-forming energy storage power converter,
4. Transformer (and isolation)

shall be delivered in the first quarter of 2011.

Test Bed Facility and Installation

The premises to house the test bed at the GVEA Bidwill Avenue facility have been set up accordingly (power, telephone/internet, potable water, etc).

Timeline and Schedules

Overall, the project is on schedule.
The logistics for installation now include initial testing and commissioning by Marsh Creek in Anchorage (this is the contractor that shall perform the installation).