

**Texas Commission on Environmental Quality
New Technology Research & Development (NTRD) Program
Monthly Project Status Report**

Contract Number:	<u>582-11-12630-3264</u>		
Grantee:	<u>EcoPower Hybrid Systems (Ecopower)</u>		
Report for the Monthly period:	<u>July 2012</u>	Date Submitted:	<u>August 10, 2012</u>

Section I. Accomplishments

Provide a bulleted list of project accomplishments as well as a description of their importance to the project.

- New budget reflecting work reorganization was modified, completed, and submitted to TCEQ on July 23, 2012.
- Two engineers from EcoPower team were in Houston, Texas, July 11, 2012, to July 13, 2012, to survey rubber tire gantry (RTG) cranes in Houston to validate details for completion of electrical integration analysis.
- Power monitoring system was installed to measure power usage and to confirm and follow duty cycle. Tests are on-going and results are transferred on a regular basis.

Electrical design and battery monitoring and control:

- To complete battery management system (BMS) testing at module level, two BMS were compared for voltage and temperature accuracy, quality of user interface, time delay when critical conditions are reached, easiness of installation, charge algorithm, and the mechanical reliability.
- A third BMS is ordered; same tests will be performed
- One of the two BMS presents advantage in most categories. We are now testing battery charging and balancing using the first prototype module.
- Preliminary electrical design is started. Calculation for short circuit protection is completed. Test to validate results are ordered to battery supplier.

Mechanical design and thermal monitoring and control:

Enclosure:

- Final design of battery pack enclosure is completed.
- Preliminary results of crane battery enclosure finite element analysis (FEA) for mechanical analysis were received.
- Request for quote were sent for prototype battery enclosure parts and assembly.
- First thermal results were obtained from computational fluid dynamics (CFD) thermal analysis of the battery enclosure incorporating results obtained from module simulation.

Module:

- Parts were received and first prototype module was assembled.
- First ventilation test were performed to confirm air flow obtain by FEA for thermal analysis.

Indicate which part of the Grant Activities as defined in the grant agreement, the above accomplishments are related to:

All realizations are related to task 2 of the project.

Section II: Problems/Solutions

Problem(s) Identified: Report anticipated or unanticipated problem(s) encountered and its effect on the progress of the project

- No technical problems are identified at this point.
- Schedule remains very tight.

Proposed Solution(s): Report any possible solution(s) to the problem(s) that were considered/encountered

- NA

Action(s) Conducted and Results: Describe the action(s) taken to resolve the problem(s) and its effect

- We are still following carefully all activities to mitigate any potential delay on schedule.

Section III. Goals and Issues for Succeeding Period:

Provide a brief description of the goal(s) you hope to realize in the coming period and identify any notable challenges that can be foreseen

BMS:

- To complete communication protocol between BMS and the hybrid power plant programmable logic controller (PLC) interfacing with the RTG crane.
- To test and confirm time needed to balance module after cycling using BMS resistance.
- To test electromagnetic interference sensitivity of BMS communication.
- To design and test redundancy using a second BMS in parallel on one module. Second set of BMS will be delivered early August 2012.
- To check temperature accuracy of the BMS card mounted temperature sensor compared with direct monitoring of cell temperature using reference system.

Thermal and mechanic

- To charge and discharge prototype module to test ventilation and to validate CFD thermal model for a single module.
- To validate mechanical FEA with module vibration testing.

Electrical

- To receive report of short circuit testing on 5 cells connected in parallel configuration from battery supplier.
- To order a crane hoist drive for in house preliminary testing.
- To validate connection path and performance of the real drive.

Date: August 10, 2012

Authorized Project Representative's Signature

NOTE: *Please attach any additional information that you feel should be a part of your report or that may be required to meet the deliverable requirements for tasks completed during this reporting period.*