

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

Contract Number: 582-11-12630-3264
Grantee: EcoPower Hybrid Systems
Report for the **Date**
Monthly period: January 2012 **Submitted:** February 10, 2012

Section I. Accomplishments

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

- Richard Laliberte visited ECS on January 10, 2012, to help with bus bar issues and to support welding schedule development.
- Paul-André Lavoie visited ECS from January 19, 2012, to January 23, 2012. Objective was to review cycling results and program advancement. The module cycling protocols were completed and confirmed.

Cell Testing

- Characterization of baseline capacity at 20 degrees Celsius are completed on 6 cells.
- Power testing is completed at 3 temperatures on 5 cell types and on 2 temperatures on 1 cell. Testing of the last cell will be performed early February 2012. The higher capacity of the cell required to be tested on high power cyclers. In order to complete cell testing and without delaying module testing preparation, a second testing unit was installed and is now up and running. Testing is starting early February 2012.
- Heat rejection at 3 degrees Celsius is completed on 6 cells.

Module fabrication

- All cells required to assemble modules cells are in stock at ECS. Incoming inspection and identification of every cell including, voltage, impedance, weight is completed.
- Hardened material required to fabricate bus bars was not available in due time, Unhardened material with similar conductivity is used to assemble 26650 format cells in modules as those require welded connection. The material was procured and received.
- We realized that standard die cutting method was not suitable to fabricate the prototype testing bus bar using this soft material. An alternative production method was developed. Bus bars were water jet cut and pressed in shape in a secondary process using homemade aluminum die.



Figure 1. prototype bus bar fabricated using annealed non-hardened material

Welding issues with 26650 cells were addressed; welding schedule was established and tested. Sixties assemblies of thirty cells were completed using the first 26650 cell.

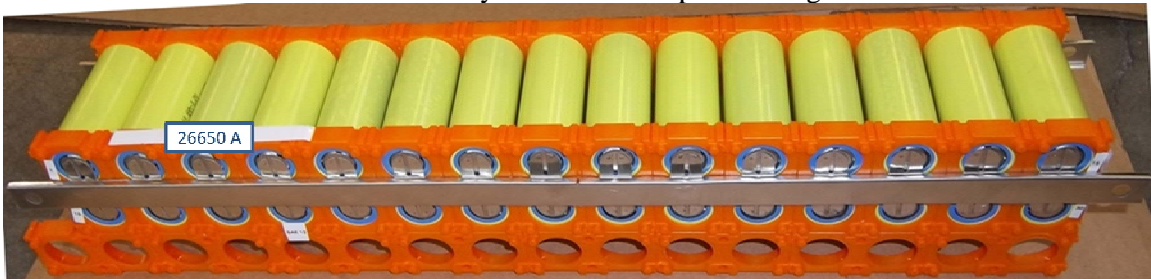


Figure 2. Thirty 26650 cells assembled using welded bus bars for module assembly

Test modules were fabricated and completed for two different cells in January.

Module testing

- Cycling protocol is completed and approved.
- We used the delay associated with module fabrication to push little further the battery management system (BMS) configuration to be used. Preliminary BMS set-up required to test three or four 4 X 3.2V modules independently to demonstrate capability to complete Crane duty cycle and check for data consistency. We have advanced BMS configuration to allow 4 X 4 X 3.2V; this allows cycling the four modules connected in serial configuration at 50.2V with the same reading accuracy than with the 4 independent modules cycling. However, the full power capacity of the cycler is required to achieve this, forcing each module configuration to be cycled one after each other.
- To achieve the 50.2V configuration test fixtures, voltage, and sense wire harnesses have been developed and built.
- Cycler code instruction to reproduce crane duty cycle is completed
- First trial run of module testing is completed. All is now functional to perform modules testing in February 2012.

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

All these realizations are related to the phase one 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

- Most of technical issues are fixed now but the testing will not be completed in due time to submit a report by end of February 2012.

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

- It is necessary to postpone reporting for phase 1 to end of March 2012.
- In order to not affect the already tight schedule, we propose that TCEQ would accept a draft of the report as base for the go-no-go decision. This report will demonstrate that the cells and the testing modules are able to achieve the crane duty cycle as this is the ultimate goal of this exercise. The final version of the report will follow when ready and completed. This will give opportunity to complete and validate some results required for the design and engineering phase.
- In parallel, testing of the commercial module manufacturer is ongoing and kept as a fall back plan.

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

- We are asking to submit final reporting of phase one before end of March 2012 in a draft format.
- We are asking this draft document demonstrating the technical feasibility to be used as base to authorize project continuation. This approach will permit to hire supplementary resources to support development pace and to procure necessary material for the next phase of this exciting project.

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

- Cell testing: To complete all testing at cell level.
- Cell manufacturer: Make an audit on the manufacturing process and quality control of potential cell manufacturers.
- Module fabrication: To complete all module assembly
- Module testing: To complete module testing and to define supplementary testing required for design and engineering phase.

Date: February 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.*