

**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 (Ecopower)
Report for the Monthly period: March 2013 **Date Submitted:** April 9, 2013

Section I. Accomplishments

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

Electrical design:

- Programmable logic control (PLC) programming for lithium technology is now completed at 80%.
- Electrical design review of the system is completed including bridging of existing crane signals in the electrical design is completed at 50%
- Sequential flow chart of operation is completed at 70%.
- Shop test planning is completed.
- Inverter has been tested individually, auto starting of the AC genset worked.
- The control and power management panel (CPMP) backpanel assembly and the relocation of components to ease connection are completed. The CPMP is physically installed within the enclosure.
- Sizing of the braking resistor is completed.
- Genset cabling and cabinet stuffing are completed.
- Inverter cabling is completed.
- Battery rack cabling and installation is fully completed.

Battery Management System (BMS):

- Module assembly for the crane is completed
- Module assembly verification, tests for fan and BMS wiring and communication testing are completed for each of the 27 modules.
- New BMS firmware is tested. Actually three firmware revisions were required. One issue is still to be solved with the battery cell values broadcasting.

Battery:

- All modules were completed using replacement cells received from manufacturer.
- Module assembly for the pack is completed. All modules were tested and are fully functional.
- Testing of the baseline emission is planned.

Thermal and mechanic:

- Installation of the generator (genset) and auxiliary equipment inside the cabinet is completed.
- Physical installation of the CPMP in the cabinet is completed.
- Installation of auxiliary equipment on fuel tank is completed
- Genset is connected and ready for commissioning.
- Genset was recalibrated by Cummins.
- Connection of heating, ventilation, and air conditioning (HVAC) condenser with evaporator by a specialized technician.
- Design of a transformer support is completed and in fabrication.
- Design of a resistor grid support is completed and in fabrication.

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 (Engineering) and Task 3 (Manufacturing) 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

- Schedule remains very tight.

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

- We are currently increasing internal effort to deliver on time

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

- Plan is finalized and the unit will be ready on time for shipping to Houston, Texas.
- 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

Electrical design:

- PLC programming for lithium technology will be fully completed.
- The CPMP testing and shop commissioning will be completed.
- Electrical interconnection will be done between CPMP, inverter, genset, and battery rack.
- Failure mode and effect analysis (FMEA) of CPMP document will be ready.
- Genset manual maintenance mode will be debugged and corrected.
- Overall electrical design review of the system will be completed.
- Sequential flow chart of operation will be completed.
- Shop test and complete simulated crane duty cycle test will be performed.
- Inverter braking chopper strategy will be tested.

BMS:

- Test of PLC communication with two BMS masters and their 27 cell group modules (216Cells).
- New BMS firmware will be validated with cell value broadcast bug fixed.

Thermal and mechanic:

- A final fuel tank modification is required and will be completed
- Decals on enclosures will be installed
- Transformer support weldment will be fabricated and ready to be installed.
- Resistor grid support will be completed.
- The complete Ecocrane assembly will be packed and ready to ship to Houston, Texas.
- Emissions testing of current equipment will occur during first week of May 2013 and will be used as reference to demonstrate emission reduction.

Date: April 9, 2013

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.*