

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

**Contract Number:** 582-11-13472-2019

**Grantee:** Transportation Power, Inc. (TransPower)

**Report for the Monthly period:** July 7, 2012 to August 10, 2012      **Date Submitted:** August 10, 2012

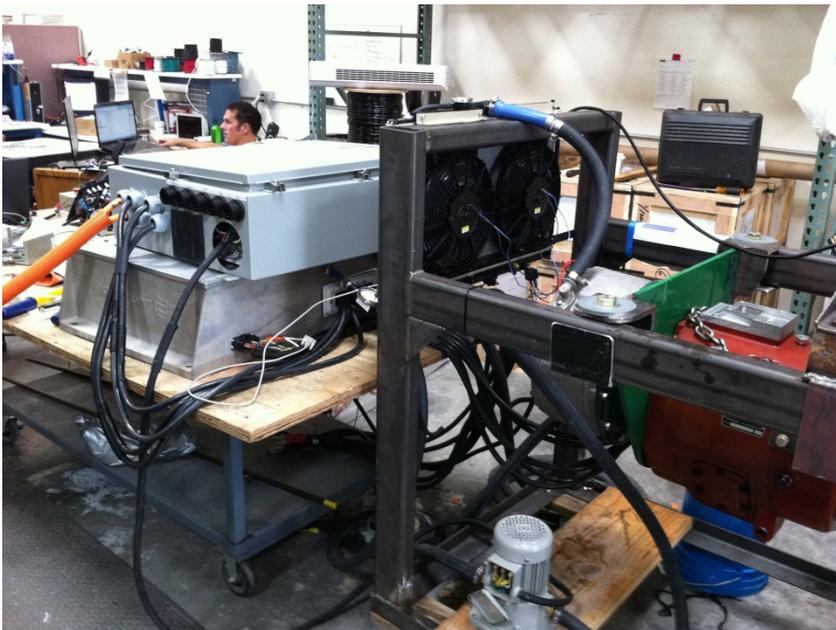
**Section I. Accomplishments**

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

- The propulsion and power transmission subsystem and the vehicle powertrain control center subsystem have been validated on the dynamometer and are being installed onto Tractor #1.

This accomplishment includes successful integration of the recently developed inverter-charger unit (ICU) into both subsystems.

The cooling loop for the ICU and main drive motor was validated on the dynamometer as well (Figure 1).



**Figure 1: Central control module and ICU on dynamometer test bench**

The testing procedures included validation of the automated manual transmission hardware and control software. Shifting algorithms were also vetted.

The mounting hardware to hold the ICU and the central control module under the yard tractor's cab has been designed, welded, and painted.

- The energy storage system (ESS) vehicle mounts for Tractor #1 have been built and painted. As soon as the paint dries they will be ready to accept Mile-Max™ modules.

All of the required materials for the fourteen Tractor #1 Mile-Max™ modules have been staged in an assembly area. Figure 2 is a picture of the Tractor #1 battery management system (BMS) modules. The BMS modules for Tractor #2 are stacked in the background.



**Figure 2: BMS modules for yard tractor #1 mounted to metal heat sinks**

Four of the Mile-Max™ modules have been fully built. The remaining eleven modules are in process.

- TransPower has committed to demonstrating Tractor #1 at the 2012 Port Tech EXPO, to be held at the Port of Los Angeles on September 5, 2012, through September 6, 2012.

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

- All of the accomplishments listed above except for the last one relate to Task 2.2.2, “Tractor 1 Installation.” The last accomplishment listed above is related to Task 2.3, “Vehicle Durability Testing.”

## Section II: Problems/Solutions

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

- a) A lack of high-fidelity computer assisted design (CAD) models of the available space underneath the yard tractor's cab has necessitated some trial and error fitment of the under-cab mounting structures that will hold the central control module and ICU.
- b) The integration of Mile-Max™ modules for TransPower's test bed truck revealed that several holes in the Mile-Max™ module physical structure needed to be widened in order to accommodate the final cable routing.
- c) An unpredicted position reporting sequence was discovered in the MasterShift automated shifter control which cause fail safe features in the vehicle controller to go to a safe state while executing shifts thus effectively disabling shifting.

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

- a) Two solutions were proposed that involved modifying the tractor cab in order to fit the components. One solution involved cutting a relief hole in a non-load bearing part of the cab in order to fit the components. Another solution was to replace the side access door on the side of the cab with a custom door that would give the components more room. In either event, a proposal was made to increase the scheduled hours for a fabrication technician to account for the time spent solving this problem.
- b) The proposed solution was to drill out the existing holes in order to make them the appropriate size.
- c) The proposed solution was to change the code such that this did not interrupt shifting sequences.

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

- a) A technician that was working part time will be working full-time in August 2012 to keep the project on schedule. The technicians ultimately decided to replace the access door with a custom panel as this was the easier modification to accomplish. The original door was intended to facilitate regular maintenance operations, such as checking the oil. There is no need for an access door since this is not a relevant function anymore, so the technicians have decided to remove the door and replace it with a custom piece of steel that will be more watertight, in order to better protect the electronics that will be under the cab.
- b) A TransPower technician created some tooling to facilitate expanding the Mile-Max™ module holes on Mile-Max™ modules that had already been welded. The drawings that generated these parts have been updated to reflect the larger hole size.
- c) TransPower modified the fail safe logic to accept this sequence while correctly handling out of range shifting signals.

### **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*

- Tractor #1 will be road tested and then demonstrated in a public forum; Tractor 2 will be in process.
- The central control module will be largely built for Tractor #2.
- Tractor #2 will be disassembled and superfluous diesel components removed

Date: 8/10/2012

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*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.*