

Title: Scaled Heavy-Duty Test Bench for Energy Storage and Architecture Evaluation

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Industry Partner: CrossChasm

Project Period: December 1, 2010-November 31, 2012

It is the goal of this project to design, build and test a bench-top powertrain to allow for model verification and development. Incorporating Model-Based design and Software In the Loop (SIL) into the development process will ensure component compatibility and safety. This project will prove to be a valuable asset in the development process of future hybrid powertrain vehicles for heavy vehicles. Heavy vehicle applications such as buses and refuse trucks have the potential to reap the most benefit from hybrid powertrains because of their duty cycle characteristics. Deployment of hybrid buses to the appropriate routes can affect the adoption rates of this technology if vehicle technology. While this is a simple theory in concept, to actually compare and evaluate bus routes on this basis is not a straightforward task that can be accomplished by fleet managers.

Note, this project is part of a proposal for the Modular Heavy-Duty Vehicle Testbed for Energy Storage and Architecture Evaluation, which has been reviewed by Transport Canada, and Transport Canada is supporting this overall project.

This project will support the research of electric powertrain configurations, control strategies, and system configurations (including a variety of technologies for hybrid vehicles such as flywheel, ultra-capacitor, and battery combinations as well as potentially fuel cell and air compression in ICE engines) for heavy applications as well as the associated onboard power management strategies. The objective is to develop viable control strategies and components for use in applications such as garbage trucks and buses. During the project, a test platform will be updated and configured such that control strategies and components can also be developed and tested on the bench. A 4-10 kW bench test system currently exists at UW and will be updated and instrumented to simulate the powertrains (to scale) of heavy duty vehicles. The system will also consider recharging aspects and requirements for charge depleting configurations of hybrid power trains. Specifically this project will develop and test component models for that can be used in Powertrain System Analysis Toolkit (PSAT) system models (or Autonomie which is a beta version of PSAT software evolution).