evs 27
The 27th INTERNATIONAL ELECTRIC VEHICLE SYMPOSIUM & EXHIBITION.
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The 27th International Battery, Hybrid and Fuel Cell Electric Vehicle Symposium
Barcelona, Spain, November 17-20, 2013

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Electric Vehicle Technology & Education Centre

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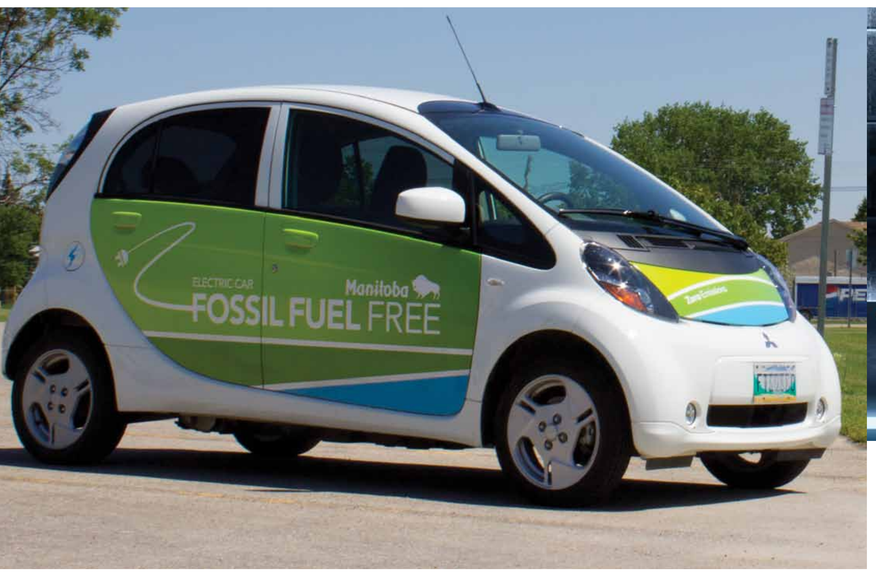

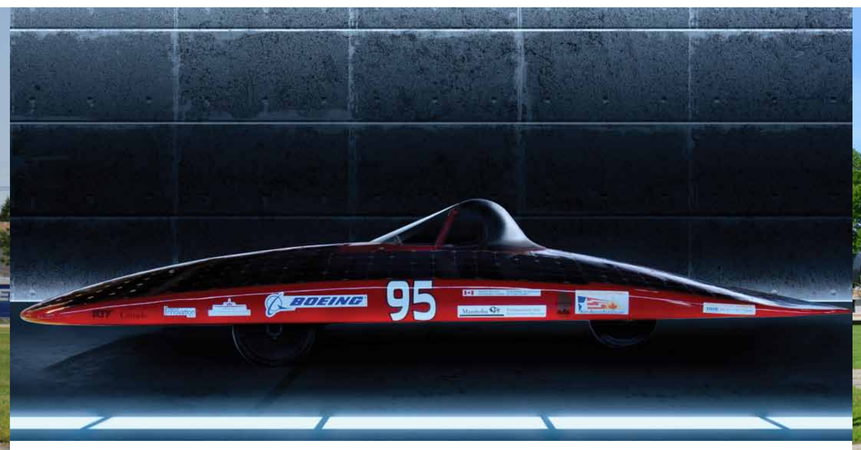

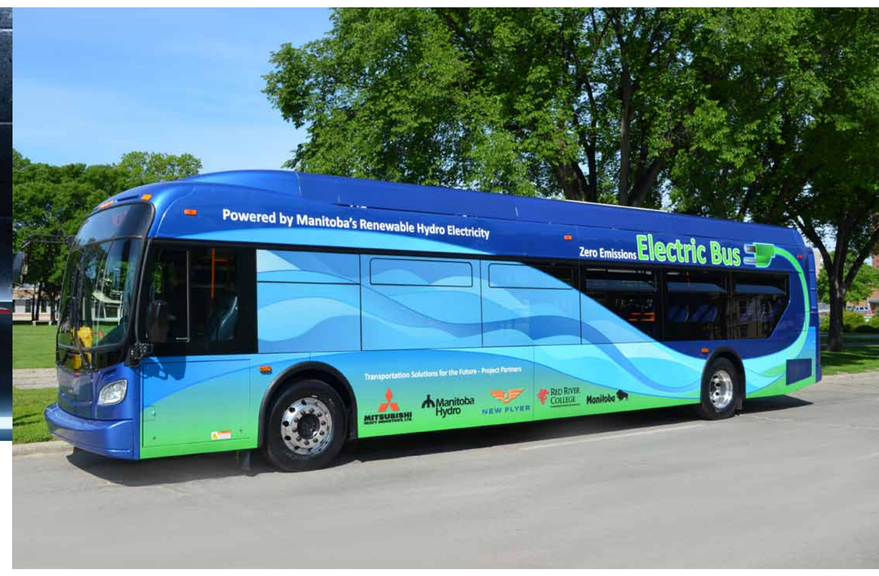

Introduction

The Province of Manitoba has supported a number of applied research projects at Red River College, located in Winnipeg, Manitoba Canada over the years, including the Red River Raycer (solar car), Hybrid Hydrogen Internal Combustion Engine and Hydrogen Fuel Cell bus demonstrations, and the Plug-in Hybrid Electric Vehicle fleet conversion, demonstration and evaluation [1].

In 2011, the Province of Manitoba provided $645,000 (Canadian) to establish and start up the Electric Vehicle Technology & Energy Centre.

EVTEC, which directly complements and supports Province of Manitoba policy [2] concerning sustainable transportation has a mission to:

- support electric vehicle (EV) innovation amongst Manitoba's transportation sector;
- enhance electric vehicle education at the College and in the region; and
- increase public awareness of electric vehicle technology.

Innovation & Applied Research: to support innovation amongst Manitoba's transport sector, Applied Research & Commercialization (AR&C) and the School of Transportation Aviation & Manufacturing (TAM) are leading EVTEC project development and management. With a strong industry network and a history of partnering with business to conduct practical applied research projects, the College is applying its successful model of supporting innovation to enhance and improve electric vehicle technology.

Education & Training: to support education enhancement in the area of electric vehicles, TAM is providing full-time instructor support to develop curriculum and training to include an enhanced focus on electric and hybrid vehicles.

Awareness & Outreach: to support public awareness and network building, EVTEC uses traditional and digital tools, targeted at the public and/or industry professionals.

Discussion

EVTEC is responsible for applied research and innovation projects concerning ground transportation electric and hybrid vehicles that utilize renewable fuels, including bio-diesel (used for auxiliary systems, such as on-board heating, ventilation and air conditioning). A particular focus is improving fuel efficiency and extreme-weather operation, especially in cold-climate conditions.

The flagship project is the international consortia project to develop an all-electric battery transit bus involving the Province of Manitoba, Manitoba Hydro, Mitsubishi Heavy Industries (Japan), New Flyer Industries and Red River College. This three-year, $3,000,000 (Canadian) project has developed a prototype "zero emissions" bus and related charging infrastructure [3]. The bus prototype and associated charging technologies are being tested and evaluated over a two-year period in Winnipeg. The batteries provide direct current power to a nominal 650-volt system, using a 120 kWh battery that is targeted to be the same weight as the engine and fuel on a diesel bus. The prototype bus has a range of 80 kms/four hours in typical stop-and-go transit operation, and is the first of its kind in Canada.

New Flyer Industries has led a new consortium application to Sustainable Development Technology Canada and secured another $3,400,000 (Canadian) to develop a small fleet of four additional prototypes to undertake a four-season, four-year demonstration with Winnipeg Transit under regular transit operating conditions. The total investment in these two projects will be $10,000,000 (Canadian) and will serve to enhance EV-related research, development, testing and manufacturing capabilities in Manitoba.

RED RIVER COLLEGE
OF APPLIED ARTS, SCIENCE AND TECHNOLOGY

EVTEC
ELECTRIC VEHICLE TECHNOLOGY & EDUCATION CENTRE

All-Electric Battery Transit Bus

FAST FACTS

- 100% battery powered
- First of its kind in Canada
- No tailpipe
- Zero emissions
- Travels 80 km on one charge (approximately four hours in typical Winnipeg stop-and-go transit operation)
- Can be fully charged in 30 to 40 minutes
- Significantly quieter than a typical diesel-engine transit bus
- The bus's battery is 120 kWh and weighs the same as the engine and fuel tank on a diesel-engine bus
- Bus's electrical power is equivalent to 25,000 AA batteries

INTERNATIONAL R&D CONSORTIA FOR ALL-ELECTRIC BATTERY TRANSIT BUS FLEET DEVELOPMENT & DEMONSTRATION

With respect to passenger EVs, EVTEC is managing demonstrations and testing of commercially available vehicles; such as the Chevrolet Volt, Mitsubishi iMiEV, and Nissan Leaf; in Manitoba's extreme-climate conditions. EVTEC will not be providing recommendations to consumers concerning commercially-available electric vehicles.

EVTEC has also complemented resources from the National Research Council of Canada's Industrial Research Assistance Program, which have supported development of a publication concerning the application of lithium ion batteries for ground transportation vehicles, as well as a cluster map of sustainable transportation technologies in Manitoba.

The School of Transportation and Manufacturing has dedicated a full-time instructor to support EVTEC. RRC has already developed a curriculum module for apprentices in automotive mechanics. Discussions are underway concerning First Responder training, in partnership with industry. In addition, RRC has developed a licensed bio-diesel refinery – which produces bio-diesel from used cooking oil – and is invaluable in the support of applied research and training.

To raise awareness of EV and hybrid technology, EVTEC has offered events including "lunch & learns", a car and truck show with "drive-n-rides" and public exhibits of EVs. Technical publications are produced to share knowledge, and public presentations are made at professional and trade events [4]. And, upon request, media are provided with technical information to help increase their knowledge of EVs and hybrid technologies.

Results & Impacts

EVTEC is complementing the Province of Manitoba's policy and direction concerning sustainable transportation, while serving to support electric vehicle applied research and innovation amongst Manitoba's transportation sector; enhance electric vehicle education at the College and in the region; and increase public awareness of electric vehicle technology.

Impacts are being found not only in the highly qualified personnel who have broadened their knowledge and applied learning experience while engaged in EVTEC; but also industry partners who commercialize EVTEC research results and the Province of Manitoba whose economy benefits as a result.

EVTEC is an investment in the future that will have long-term economic development benefits on intellectual capital, sustainability and the manufacturing sector.

Acknowledgements: The generous support of the Province of Manitoba – Innovation Energy and Mines and the Council on Post-Secondary Education – to establish the Electric Vehicle Technology & Education Centre is greatly appreciated.

Manitoba

References:
[1] Ray Hoemsen and Ken Webb, Advanced Transportation & Energy, Presentation to the Standing Senate Committee (of Canada) on Energy, the Environment and Natural Resources, Winnipeg Manitoba, 2012.
[2] Province of Manitoba (EV Road Map etc.), http://www.manitoba.ca/iem/energy/transportation/index.html, accessed January 2013.
[3] Ray Hoemsen and Dale Friesen, Moving Forward with a Green Economy Through the Development & Integration of Electric Vehicles, Second Annual Electric Vehicle Infrastructure Summit, Toronto Ontario, 2013.
[4] Robert V. Parsons and Ray Hoemsen, Advancing Electric Vehicle Adoption: Insights from Manitoba Experience, EV2012VÉ, Montreal Quebec, 2012.

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