Hydrogen, Fuel Cells and Transportation Energy

CLEAN ENERGY TECHNOLOGIES

Hydrogen, Fuel Cells and Transportation Energy (HyFATE)

The CANMET Energy Technology Centre - Ottawa's (CETC – Ottawa) Hydrogen, Fuel Cells and Transportation Energy (HyFATE) group works in partnership with industry to develop and deploy leading-edge hydrogen, fuel cell and transportation energy technologies that minimize environmental impacts, increase the potential for job and economic growth and extend the lifespan of Canada's energy resource base.

HyFATE's work includes: research, development and demonstration (R, D&D), technology assessments, the development of safety standards and technology transfer through seminars, workshops and technical reports. HyFATE has also been helping foster the next generation of automotive engineers through its support to student vehicle challenges since the late 1980s. The group focusses on two main areas of expertise: Hydrogen and Fuel Cells, and Transportation Energy R&D.

Hydrogen and Fuel Cells

The Hydrogen and Fuel Cells area is comprised of two programs, the Hydrogen and Fuel Cell R&D Program and the Canadian Transportation Fuel Cell Alliance.

NRCan, through CETC-Ottawa/HyFATE, is a leader in the development of hydrogen and fuel cell technology. Over the past two decades NRCan has contributed $60M to support private sector research and development. This investment has led to the positioning of Ballard Power Systems (fuel cell modules), Dynetek Industries (hydrogen storage cylinders), and Hydrogenics Corporation (hydrogen production and fuel cells) as world leaders.

HyFATE is active in the areas of electric and hybrid vehicles, with current activities focused on the development of advanced battery systems and vehicle efficiency technologies such as advanced materials, driving cycle analysis, auxiliaries and regenerative systems, and energy storage.

The Hydrogen and Fuel Cell R&D Program develops hydrogen production and storage, fuel cell technologies, and codes, standards and safety.

The Canadian Transportation Fuel Cell Alliance (CTFCA) is a seven-year, $33 million program to develop a hydrogen fuelling infrastructure for fuel cell vehicles. The CTFCA is partnering with the private sector and provinces to demonstrate the emissions reductions and evaluate different fuelling routes for fuel cell vehicles, and to develop the necessary supporting framework for the fuelling infrastructure, including technical standards, codes, training, certification and safety. These activities

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are essential to ensure that fuel cell vehicles become a viable commercial option. The program is initiating the establishment of the fuelling infrastructure through a number of co-funded projects that are providing specific opportunities for learning and solving technical and economic issues associated with the introduction of fuelling systems for fuel cell vehicles.

Overall, since 2001, over 80 individual activities have been completed, are underway or planned, that address the development, testing, and demonstration of fueling system components, dispensers, hydrogen storage and flow control systems, hydrogen fuel cell vehicles, hydrogen internal combustion engine vehicles and the development of the codes and standards that govern their use.

There are currently seven operational fueling stations: two in Vancouver, one in Victoria and four in the Greater Toronto Area. Operational data are being collected and will be available by March 31, 2006. In addition, feasibility studies or preliminary engineering studies have been completed or are underway for several additional stations across Canada. On the vehicle side, there are now five Ford Focus fuel cell passenger vehicles being road tested in Vancouver and Victoria, a Purolator fuel cell delivery van being road tested in Toronto, a hybrid fuel cell bus in Winnipeg and dual fuel gasoline/hydrogen and diesel/hydrogen pick-up trucks being developed and demonstrated in Saskatchewan.

Transportation Energy R&D Program

The Transportation Energy R&D Program works with industry, universities, and governments to share the cost of transportation energy R&D. This funding goes towards the development of natural gas vehicles, bio-diesel R&D, and transportation energy.

During the last two decades the Natural Gas Vehicle (NGV) program has helped to develop an industry that is the world leader, with state of the art technology. IMW Industries of Chilliwack, B.C., is the established leader for compressors, as is and Dynetek Industries of Calgary for high pressure carbon fibre storage tanks. Today R&D work continues with NRCan developing a neural control technology (artificial intelligence) to control the complete natural gas system and monitor the safety of high pressure storage tank in partnership with the Saskatchewan Research Council, TISEC and Dynetek. Under NRCan funding, the industry developed safety standards and regulations which are being used as a benchmark for international standards.

Biodiesel is a renewable fuel that can offer significant climate change, air quality and waste management benefits to Canada. It can also have a positive impact on Canada's agricultural economy. HyFATE is responsible for the management of this initiative, which allocates $11.9 million over 4 years to address technical and market barriers to the development of a Canadian biodiesel industry. Studies have examined the development of a biodiesel infrastructure in Canada, the quantification of feedstock availability in Ontario, and the health issues related to biodiesel production from animal fats. End-use demonstration projects have highlighted the use of biodiesel in marine, bus, heavy-duty truck fleet and agricultural applications. HyFATE also supports the development of biodiesel fuel quality standards and testing procedures.

For more information:

www.ctfca.nrcan.gc.ca