

Building the Bridge to Hydrogen Cars

By Philip D. Chizek

Ford Motor Company, Fuel Cells and Hydrogen Vehicle Programs, Research & Advanced Engineering, SMT Lab I, 15050 Commerce Drive North, Dearborn, MI 48120, U.S.A.; E-mail: pchizek@ford.com

Ford is working on a project to link the technology of its current gasoline- and diesel-fueled fleets to evolving hydrogen technology. Project concepts of energy, mobility and the future are represented by the vehicles described below. The technologies build off each other, combining efforts to produce environmentally-sound vehicles for the future.

Escape Hybrid – Energy

The Escape Hybrid is Ford's first full hybrid vehicle. It can run on either its gasoline engine or its electric battery – or both together – depending on the driving situation. It has an acceleration performance similar to a V-6 engine and achieves significant fuel economy and a range increase over the current gasoline-powered Escape. It is Ford's cornerstone vehicle to bridge from traditional vehicles to future hydrogen vehicles.

Hydrogen Hybrid Research Vehicle (H²RV) – Mobility

Using technology from the hybrid vehicle and combining an internal combustion engine powered by hydrogen and boosted by a supercharger, the H²RV stands next in line as Ford works toward replacing gasoline vehicles. Ford are the only car

manufacturer to have successfully developed the powertrain combination of hydrogen and electric charge, along with the patented Modular Hybrid Transmission System, in a car (1).

Focus Fuel Cell Vehicle (FCV) – The Future

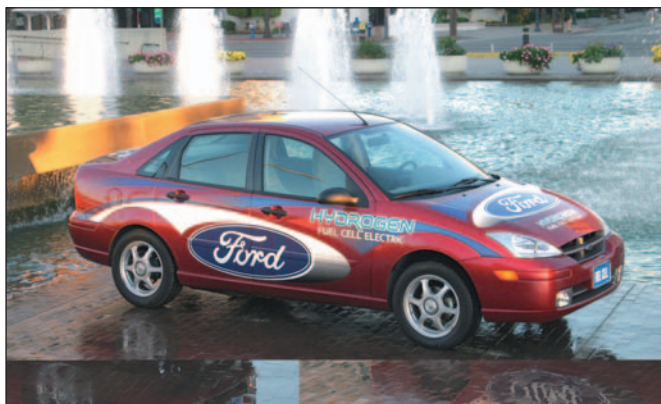
In combining the improved range and performance of hybrid technology with the overall benefits of a hydrogen fuel cell, the Focus FCV completes the vehicles in development that look towards the next decade. The fuel cell engine converts chemical energy into electrical energy via hydrogen and oxygen to power the electric drive motor. This results in a Zero Emissions Vehicle (ZEV). Water and heat are the only tailpipe emissions.

Reference

- 1 Ford, U.S. Patents 6,176,808; 2001, 6,655,989; 2003, and 6,585,066; 2003. U.S. Patents related to controls: 6,364,807; 2002, and 6,600,980; 2003

The Author

Dr Chizek is the Marketing Manager for Fuel Cells and Hydrogen Vehicle Programs within the Ford Motor Company. His main professional interests lie in the advancement of the hydrogen economy through the development of hydrogen-based vehicles' programs at Ford. He began working on advanced planning of the Hybrid Electric and Fuel Cells projects in early 1999. He is fully involved in strategic planning and customer insight development for the next generation of hydrogen vehicles.



The Focus Fuel Cell Vehicle (FCV)

This Ford vehicle combines the improved range and performance of hybrid technology with the overall benefits of a hydrogen fuel cell (it has up to two to three times the fuel economy of a 'normal' gasoline engine vehicle). The Ballard Mark 900 series PEM fuel cell provides the electrical power for the electric drive motor. This ZEV (Zero Emissions Vehicle) produces only water and heat as tailpipe emissions