



## Media Issue Brief

### FUEL CELL TECHNOLOGY

Based on its vision of “Blue Skies for our Children”, Honda has worked for more than thirty years at reducing the environmental impact of the automobile, including industry-leading efforts to advance the hydrogen fuel cell vehicle – a technology that Honda believes holds the ultimate promise for a clean and sustainable transportation future. As always, Honda has sought to apply its latest technology in real-world settings and to exceed customers’ expectations for the performance, quality and safety of its fuel cell vehicles. Honda’s original technology has broken through technical barriers for fuel cell vehicles including cold-weather start-up, operating range and efficiency, and compact packaging. Uniquely, Honda is also developing technology to answer the “chicken and the egg” dilemma of the deploying hydrogen-powered vehicles and the refueling infrastructure to support them.

#### NEXT-GENERATION HONDA FUEL CELL TECHNOLOGY

- ◆ **In November 2007, Honda introduced the all-new FCX Clarity** – its next-generation fuel cell vehicle that delivers performance, range, efficiency, and style previously unachievable in a fuel cell vehicle. The FCX Clarity is being leased to retail customers on a regular and continuing basis – the first customer deliveries having taken place in July 2008.
  - The FCX Clarity is based on Honda’s all-new V Flow fuel cell vehicle platform and is powered by the revolutionary new Honda V Flow fuel cell stack that delivers more power in less space with improved efficiency, power output, driving range, reliability, and cold-weather performance.
  - The V Flow stack employs a revolutionary new cell configuration and vertical layout that more than doubles the stack’s power-to-weight density versus the previous generation Honda FC stack.
  - With the Honda V Flow fuel cell platform, the size of the total powertrain has been reduced by 45 percent to roughly the same size as a V6 hybrid powertrain, while vehicle fuel efficiency is up to an EPA combined city-highway fuel-economy rating of <sup>1</sup>60 miles per kilogram hydrogen (kg/H<sub>2</sub>). Based on this increase in efficiency and a 10-percent increase in fuel tank volume, driving range is increased to 240 miles.
  - The V Flow platform incorporates a compact and efficient new lithium ion battery pack that is 50 percent smaller and 40 percent lighter than the ultracapacitor in the previous FCX. It marks the first commercial deployment of lithium ion battery technology in an automobile as a source of motive power.
  - Honda aims to gain further real-world experience and exposure for advanced fuel cell technology with the lease of 200 FCX Clarity fuel cell cars to fleet and retail customers around the world, primarily in North America, over the next three years.
  - Production of the FCX Clarity on the world’s first dedicated fuel cell vehicle assembly line began on June 16, 2008, at Honda’s New Model Center, in Takenazawa, Tochigi prefecture, Japan.

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<sup>1</sup> Official U.S. EPA city/highway combined fuel economy rating. One mile per kilogram of hydrogen (kg-H<sub>2</sub>) is roughly the equivalent of one mile per gallon (mpg) of gasoline.

### **FUEL CELL ACHIEVEMENTS**

- ◆ Other pioneering achievements in the fuel cell arena include:
  - First government-certified fuel cell vehicle: EPA and CARB certified, and certified to meet all applicable federal motor vehicle safety standards (July 2002)
  - First commercial lease of a fuel cell vehicle (December 2002)
  - First fuel cell vehicle to start and operate in sub-freezing temperatures (2003)
  - First long-term lease to customers in extreme climates (Las Vegas, New York - 2004)
  - First fuel cell vehicle placed in the hands of an individual customer (June 2005)
  - Lease of FCX to the world's youngest fuel cell customer (March 2007)
  - Start up of world's first dedicated fuel cell vehicle and powertrain production facility (June 2008)
- ◆ In over five years of use with fleet and retail customers, including government entities in California, Nevada and the state of New York, and retail customers in California, the first-generation FCX has performed well under often harsh conditions, with minimal service support, even in the extreme heat of the Western deserts and the bitter cold of the Northeast.

### **HYDROGEN HOME ENERGY STATION & IMPROVED SOLAR-CELL TECHNOLOGY**

- ◆ Uniquely, Honda is also developing technology to answer the “chicken and the egg” dilemma of the hydrogen-powered vehicle and the refueling infrastructure.
- ◆ This includes the fourth-generation of development of its experimental Home Energy Station and Honda-developed solar cell technology to power its own fuel cell vehicles in a completely carbon-free energy system.
- ◆ Honda is testing the fourth-generation Home Energy Station developed in partnership with Plug Power, Inc., and in operation at Honda R&D America's headquarters in Torrance, Calif. A second-generation system is also in operation at Plug Power headquarters in Albany, NY.
  - The Home Energy Station is aimed at the development of a home refueling unit that produces hydrogen from the natural gas to provide for fuel cell vehicle refueling, as well as providing hot water and electricity for the home.
  - Home Energy Station IV is 75 percent smaller than the original unit with 30 percent less CO2 emissions.
- ◆ Honda R&D is also operating an experimental solar cell powered hydrogen refueling station in Torrance, Calif. The station employs next-generation CIGS thin-film solar cells, developed by Honda Engineering Co., Ltd., and being mass produced and sold in Japan by Honda Soltec, LLC. The Honda cells require half the energy in the production phase compared to conventional crystalline silicon cells.

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