



## Media Issue Brief

### ENVIRONMENTAL TECHNOLOGY

Honda is continuing its industry-leading efforts to address the environmental challenges of global climate change, emissions reduction, and energy sustainability through a comprehensive approach that involves further improvements to gasoline engine fuel efficiency; the development of real-world alternatives to gasoline, including natural gas and the hydrogen-powered fuel cell car; and technology for refueling alternative fuel vehicles. Additionally, Honda is pursuing advances in technology related to energy systems such as solar cells, electrical co-generation, and the efficient creation of renewable bio-fuels as part of its effort to develop real world solutions to environmental challenges.

#### **Improving Fuel Efficiency**

- ◆ Over the past 15 years, Honda has achieved the highest fleet-average automobile fuel efficiency of any automaker in the U.S., and is a leader in the development and application of technology to further improve the fuel efficiency of the gasoline engine.
- ◆ Honda is committed to further advancements in gasoline engine efficiency, with a focus on the broad application of fuel-efficient technologies, and with the introduction of more affordable hybrid vehicles.
  - The most affordable hybrid available on the road today – the new five-passenger five-door Insight, which utilizes a new interactive, driver-focused fuel economy enhancement technology named the Ecological Drive Assist System.
  - A new sporty hybrid car based on the CR-Z Concept car will be the next small hybrid to be introduced to the U.S. market within the next couple of years
  - Second-generation Variable Cylinder Management™ (VCM™) technology – with three, four and six cylinder operation – applied to the Accord V6 Sedan and Coupe, the all-new 2009 Pilot SUV and most versions of the Odyssey minivan.
  - Advanced materials such as aluminum and high strength steel that improve fuel economy while enhancing safety.

#### **Reducing Emissions**

- ◆ Honda has led all automakers in the introduction of virtually every low emissions vehicle technology requirement, including:
  - First gasoline-powered LEV, ULEV, SULEV, and AT-PZEV vehicles introduced to U.S. consumers.
  - For model year 2009, all new Honda and Acura vehicles meet or exceed U.S. EPA Tier 2 Bin 5 emissions standards.
  - Honda has been a leader in the application of cleaner, quieter and more efficient overhead valve (OHV) 4-stroke engines to its powersports and power equipment product lines. For model year 2008, all Honda motorcycles, including competition models, and all Honda power equipment lines, including more than 2 million small-displacement engines, use OHV 4-stroke engine technology.

#### **Fuel Cell Technology**

- ◆ **Fuel Cells** – Honda has outpaced the industry in the development and deployment of zero-emissions hydrogen-powered fuel cell technology as well as the refueling infrastructure that will be required to take it to the mass market.
  - Honda introduced the world's first production fuel cell vehicle and first EPA-certified fuel cell car, the Honda FCX, in the U.S. and Japan in October 2002.

- Honda's next-generation fuel cell car, the FCX Clarity, is the only fuel cell vehicle (FCV) built from the ground up as a FCV, and it is the first to be mass produced on a dedicated production line.
- The FCX Clarity, with Honda's originally developed, compact and efficient V Flow fuel cell stack, achieves performance on par with a four-cylinder, five-passenger gasoline-powered sedan but with three times the fuel efficiency.
- Honda aims to lease 200 FCX Clarity fuel cell cars over the next three years to fleet and retail customers around the world, with the vast majority going to the North America.

### **Energy production and distribution**

- ◆ Honda is also developing refueling infrastructure to support fuel cell vehicles, including the fourth-generation development of its experimental Home Energy Station, which provides hydrogen from natural gas for vehicle refueling, heat for domestic hot water use and electricity for the home.
  - **Solar** - Honda R&D operates an experimental solar cell-powered hydrogen refueling station in Torrance, California. The station uses renewable energy to create hydrogen in a carbon-free energy cycle and employs next-generation, Honda-developed CIGS solar cells.
  - **Natural Gas** – Honda has sought to establish a pathway from gasoline to gaseous fuel alternatives with its natural gas-powered Civic GX..
    - The GX reduces CO<sub>2</sub> output by 25 percent (compared to gasoline-powered compact car) and is certified as a Inherently Low Emissions Vehicle (ILEV). It is the only natural-gas powered passenger car available for sale in all 50 states, and it is eligible for a \$4,000 federal tax credit.
    - In 2005, Honda began sales of the natural gas-powered Civic GX to retail customers in California. Retail sales were expanded to dealers in New York State in 2006.

### **Advanced Cleaner Energy Research**

- ◆ Honda's efforts have gone beyond developing new vehicle technologies. Honda has focused its research and development resources on the creation of new sources of cleaner power to provide the energy required for future mobility.
  - **Solar Cell** – Honda-developed CIGS solar cells reduce by half the energy and CO<sub>2</sub> emissions involved in their manufacture<sup>1</sup>. Honda began sales of the thin film compound solar cells in limited quantities in Japan in March 2007, and mass production is set to begin at its Kumamoto factory in fall 2007. Honda is utilizing the cells in an array at Honda R&D Americas U.S. headquarters, where solar energy is used to reform water in to hydrogen for refueling the Honda FCX fuel cell vehicle in a completely carbon free energy cycle.
  - **FFVs** – Honda has developed a new flexible fuel vehicle system that enables engines to operate on either 100 percent ethanol or a wide range of ethanol-gasoline fuel mixtures. In late 2006, Honda began sales of a flex-fuel Fit subcompact and Civic sedan in Brazil, where bio-ethanol derived from plant sources such as sugar cane has gained in popularity.
  - **Bio-fuel** – To address the need for more efficient means of producing bio-ethanol, Honda R&D and the Research Institute of Innovative Technology for the Earth (RITE) are researching new technology to more efficiently produce ethanol from soft-biomass, a renewable resource of plant-derived material. The company has set up an experimental production facility at its Wako, Japan, R&D campus to further study the market potential of this technology.
  - **MCHP** – Honda in partnership with Climate Energy, LLC, has begun marketing a micro-combined heat and power cogeneration (MCHP) appliance called freewatt™ to residential customer in the Northeastern U.S. The freewatt system generates electricity and heat for the home with an approximate 30-percent reduction in energy use and CO<sub>2</sub> emissions.

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<sup>1</sup> compared to conventional crystal silicon solar cells.

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