FUEL CELL QUARTERLY

Volume 6, Issue 3 Fall 2003

Contents:

Feature Story	*Pg.*
New Cars, New Commitments	1
Inside This Issue	
"Who Said That?"	2
Partnering Up	3
Industry Watch	4
Ask Fuel Cells 2000	4

Fuel Cell Quarterly is a publication of Fuel Cells 2000, a non-aligned, non-profit educational activity of the Breakthrough Technologies Institute, a 501(c)(3) organization. Contributions to Fuel Cells 2000 generally are tax deductible and are most welcome.

Initial support for *Fuel Cell Quarterly* has been provided by grants from Argonne National Laboratory and the W. Alton Jones Foundation.

Jennifer Gangi, writer/editor
email: jennifer@fuelcells.org

New Cars, New Commitments

With several automakers placing fuel cell vehicles on the road and even airing commercials on television, more and more consumers are getting a glimpse of their driving future. In the past few months, several new vehicles were introduced and a few companies increased estimates of the number of cars they will introduce onto the roads in the next few years.

Showing it Up in Tokyo

At the 37th Tokyo Motor Show, four new fuel cell concept cars were introduced, in addition to the many other fuel cell vehicles showcased.

Honda introduced the **Kiwami**, which stores the hydrogen tank in the center of the car, enabling a low body height of 1.25 meters. The fuel cell powertrain can operate below freezing, overcoming a major obstacle in fuel cell vehicle development.

Honda's Kiwami

Nissan's contribution to the concept car pool was the **Effis**, a city commuter vehicle that combines Nissan's newly developed Super Motor and Compact Lithium-ion battery with a fuel cell stack. The fuel cell stack, inverter and Compact Lithium-ion battery are all located under the floor which increases the size of the interior. The 3-meter long Effis can seat four, uses aluminium and plastic body panels to make the car lighter, and has injection-molded front seats. The hydrogen tank is located under the rear seat.

The Jeep **Treo** (shown right) is a three-passenger fuel cell concept car combining a hydrogen-powered fuel cell and an electric drive powertrain on both the front and rear wheels, giving the four-wheel drive capability of Jeep's conventional line of vehicles. There are two seats in the front and a rear single-person jump seat that can fold down for more storage space. The Treo uses drive-by-wire technology and the by-wire controls (steering wheel and column, braking and acceleration controls, and instrument cluster) are all contained in a single module that can be shifted from one side of the vehicle to the other, so either front occupant can take control.

Suzuki rolled out the **Mobile Terrace**, a six-passenger van which also uses drive-by-wire technology, based on General Motors' Hy-Wire platform. The fuel cell and motor are placed under the floor, allowing the Mobile Terrace to

(cont'd on page 2)

have three rows of seats. The car is 13 feet long. The doors and roof slide open for easy entry and a roomy and spacious feel.


Mitsubishi Grandis fuel cell minivan

Entering the Ring

Other automakers are introducing new fuel cell vehicles as well. A few months before the Tokyo Motor Show, Mitsubishi Motor Corp. stepped up to the plate with its first fuel cell vehicle, a **Grandis** minivan powered by a Ballard fuel cell engine. Mitsubishi is joining other automakers participating in the Japan Hydrogen & Fuel Cell Demonstration Project, funded by the Japanese Ministry of Economy, Trade and Industry.

FIAT is working with Nuvera Fuel Cells to integrate Nuvera's automotive fuel cell technology into its cars. FIAT recently demonstrated a FIAT **Seicento** with a 40-kW Nuvera fuel cell stack, and a prototype of FIAT's next-generation fuel cell vehicle, the **Panda Hydrogen**, which featured an advanced Nuvera Andromeda™ fuel cell stack concept.

Already on the Road

Honda and Toyota delivered their first fuel cell vehicles in California and Japan a year ago. More are on the way in 2004.

In addition to its contract with the city of Los Angeles to lease five FCX hydrogen-powered fuel cell vehicles, Honda will also supply two FCX vehicles to the city of San Francisco.

Toyota plans to lease two additional hydrogen-powered Fuel Cell Hybrid Vehicles (FCHVs) to the University of California-Irvine's (UC-Irvine) National Fuel Cell Research Center and UC-Davis' Institute of Transportation Studies. The automaker already has leased six vehicles to the two campuses.

DaimlerChrysler Japan Co., Ltd. will provide Tokyo Gas Co., Ltd. and Bridgestone Corp. each with one F-Cell car to use for 36 months (temporarily returned for two months each year).

Not to be left out, Hyundai Motor Company and Kia Motors Corporation announced plans to test 32 hydrogen fuel cell vehicles in the U.S. beginning next year. Both Hyundai and Kia expect to launch approximately 10,000 fuel cell vehicles in Korea by the end of the decade, with commercial production of such vehicles to follow in 2020.

Fuel cell vehicles still have a long road ahead before they enter the showrooms, but with each demonstration and delivery, developers and consumers eagerly anticipate the journey.

Who Said That?

It is not enough for us to be successful 100 years from now. Not even 50 years from now. We need to acheive tangible results in the next two decades.

Hydrogen Stations Sprouting Up

In the past few months, several hydrogen fueling stations have opened in Europe and Asia.

Stuart Energy opened two stations in Sweden – one in Malmo with Sydkraft, and the other in Stockholm with Fortum AB. The Malmo station provides both pure hydrogen and a blend of hydrogen and natural gas fuel. The Stockholm station will supply clean hydrogen fuel to three DaimlerChrysler Citaro fuel cell buses as part of the Clean Urban Transport Europe (CUTE) program, a European Union initiative to demonstrate the feasibility of an innovative, highly energy efficient, clean urban public transport system. The station is capable of producing approximately 120 kg per day of high-purity, high-pressure hydrogen using Stuart Energy's proprietary IMET® technology. Each fuel cell bus carries approximately 40 kg of hydrogen at 350 bar (5,000 psi).


Stuart's Malmo Hyrdogen Station

In Luxembourg, the first Shell hydrogen refueling station recently opened at the main bus depot. This station will also supply hydrogen to three CUTE fuel cell buses.

Showa Shell Seikyu KK opened the first liquid hydrogen refueling station in Tokyo, under the Hydrogen Refueling Station Pilot Program. The station is part of the Japan Hydrogen and Fuel Cell Demonstration Project, a program sponsored by the Ministry of Economy, Trade and Industry to build five hydrogen fueling stations in the Tokyo metropolitan area. The 1,800-square-meter station will provide liquid and compressed hydrogen to a fleet of prototype fuel cell vehicles provided by several automotive companies.

For a complete and comprehensive chart showcasing all of the world's exisiting and planned hydrogen fueling stations, please go to http://www.fuelcells.org/H2FuelingStations.pdf.


Shell Hydrogen Station in Tokyo

BTI has released a new study, **Fuel Cells at the Crossroads, Attitudes Regarding the Investment Climate for the U.S. Fuel Cell Industry and a Projection of Industry Job Creation**, which can be downloaded free at **http://www.fuelcells.org/economicstudy.pdf**

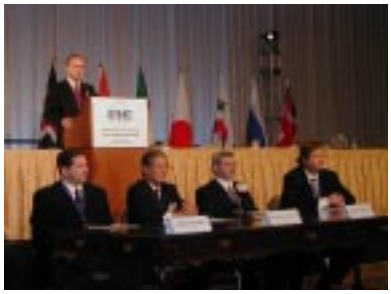
Joint Efforts Pledge to Bring Fuel Cells and Hydrogen Forward

In order for fuel cells to be commercialized and the hydrogen economy to come about, everyone needs to work together. That is exactly what is happening as of late, with governments, major associations and organizations and companies all pledging solidarity in order to bring the fuel cell and hydrogen future to the present as soon as possible.

U.S. Energy Secretary Spencer Abraham, along with Ministers representing fourteen nations and the European Commission, signed an agreement formally establishing the International Partnership for the Hydrogen Economy (IPHE). The IPHE brings together representatives from Australia, Brazil, Canada, China, European Commission (EC), France, Germany, Iceland, India, Italy, Japan, Korea, Norway, Russia, UK and the United States to coordinate hydrogen research and hydrogen technology development and deployment.

The purpose of the IPHE is to provide a way to organize and evaluate all of the multinational research under way today, as well as coordinate future collaborative efforts. Public-private partnerships will be championed, as well as the development of uniform codes and standards for tfuel cell vehicles and the hydrogen infrastructure.

During the IPHE meetings, the U.S. Fuel Cell Council (USFCC), the Fuel Cell Commercialization Conference of Japan, Fuel Cells Canada, the World Fuel Cell Council and Fuel Cell Europe signed a Memorandum of Understanding (MOU) focusing more on fuel cell commercialization. The MOU seeks a consistent industry view on education and regulation as well as encourage technical exchange and information sharing. Collectively, the five participating organizations represent more than 300 worldwide businesses, research institutions and other organizations involved with fuel cells and hydrogen and will collaborate in such areas as technical cooperation, advocacy, product specifications and safety standards.


Representatives sign MOU

In its first activities, the partners agreed to support a proposal to change the regulation of air transport of methanol fuel cell cartridges; explore other avenues of cooperation and information exchange on regulatory issues; and share research on test protocols for some proton exchange membrane (PEM) fuel cell components.

Overseas, the European Hydrogen and Fuel Cells Technology Partnership was recently launched in Brussels. The Partnership, steered by an Advisory Council, will devise a Hydrogen Research Strategic Agenda and will include all major hydrogen stakeholders, private and public, at the EU level. Main areas of concentration will include funding and fostering public-private initiatives and hydrogen research projects to promote commercialization, business development, and a consistent policy framework.

The Partnership will also identify a realistic deployment strategy, boost international cooperation, and promote education, training, information and dissemination of results in the hydrogen research and development area. The European Partnership will coordinate and promote cooperation between the European hydrogen strategy and international initiatives, such as the IPHE.

These partnerships and international collaborations are crucial to making fuel cells commercially ready and cost competitive and to educate and prepare the world for the hydrogen economy.

The framework for the Internaional Partnership for the Hydrogen Economy can be found at - http://www.eere.energy.gov/hydrogenandfuelcells/pdfs/iphe_framework_final.pdf.

The European Hydrogen and Fuel Cell Technology Platform is located at - http://europa.eu.int/comm/research/energy/pdf/h_fc_tp_concept_v36.pdf.

Yes! **I would like to support Fuel Cells 2000's educational efforts. ($25.00 contributors receive the *Fuel Cell Quarterly* for a full year. Contributors of $150 or more also receive the most recent *Fuel Cell Directory*.)**

Circle contribution level: $25 $50 $100 $150 Other _____

Name _____ Company _____ Country _____

Address _____ City _____ State/Prov. _____ Zip/Post Code _____

Credit Card Payment (circle type): Visa / Mastercard Number: _____ Exp Date: _____

Name on Card: _____ Signature: _____

Make check or money order payable to "Breakthrough Technologies Institute" in U.S. dollars only, and send to:
Fuel Cells 2000, 1625 K Street, NW, #725, Washington, DC 20006 USA; Phone (202) 785-4222; Fax (202) 785-4313

Industry Watch

Acumentrics Corporation and Sumitomo Corporation have formed **Acumentrics Japan Co.** and will initially concentrate on modifying Acumentrics' prototype natural gas powered, rapid-start tubular solid oxide fuel cell "T-SOFC" systems for the Japanese market, specifically targeting 2- 10 kilowatt residential and small commercial applications.

Giner Electrochemical Systems has formed a wholly-owned new company named **MCell Products, Inc.**, to commercialize its direct methanol fuel cell technology.

HERA, Hydrogen Storage Systems, Inc., has purchased the hydrogen business of New Jersey-based Ergenics, Inc.

Global Thermoelectric, Inc., has completed its merger with FuelCell Energy, Inc.

WestStart-CALSTART is coordinating the **National Fuel Cell Bus Technology Initiative** - a six-year, $150-million development proposal that would address commercialization challenges, focus on reducing technical and cost barriers for fuel cell and hydrogen use in the transit sector, and use transit demonstrations as rolling classrooms for fuel cell and hydrogen education. Funding is being sought.

Ask Fuel Cells 2000

If I am interested in studying fuel cells in college, what school should I go to?

Many universities are establishing fuel cell research centers and course tracks. Worcester Polytechnic Institute (WPI), Kettering, University of California – Irvine, and Wayne State University are just a few in the United States. Other universities have engineering degrees and conduct fuel cell research either in a dedicated fuel cell center or in the laboratory. For a list of colleges and universities worldwide that offer fuel cell courses and research, go to http://www.fuelcells.org/career/university.htm.

At http://www.fuelcells.org/career/baxter.htm and http://www.fuelcells.org/career/gangi.htm, you can read articles reviewing the different areas of study available to those interested in pursuing a career in the fuel cell industry.

Answer:

Energy Secretary Spencer Abraham

FUEL CELLS 2000
www.fuelcells.org

1625 K Street, NW., Suite 725
Washington, DC 20006

Non-Profit Org.
U.S. Postage
PAID
Washington, DC
Permit No.
1850

A fuel cell produces electricity by harnessing the chemical reaction of oxygen and hydrogen. Inside the fuel cell, hydrogen combines with oxygen from the air to produce electricity, useful heat and pure water.