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## **FUEL CELL CONNECTION – June 2006 Issue**

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**News on U.S. Government Fuel Cell Programs**  
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*1. DOE Appoints Members of Hydrogen Technical Advisory Committee*

The Department of Energy has appointed 25 members of a new Hydrogen Technical Advisory Committee, which will advise DOE Secretary Samuel Bodman on issues related to the development of hydrogen and fuel cell technologies. The committee will give recommendations to the Secretary regarding DOE's programs, plans and activities, as well as safety, economic and environmental issues related to hydrogen.

<http://www.energy.gov/news/3758.htm>

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*2. DOE Project Tweaks GTL Technology for Hydrogen Economy*

The Department of Energy is funding research to tweak natural gas-based gas-to-liquids (GTL) technology in order to produce either hydrogen or high hydrogen content ultra-clean liquid fuels from coal. DOE is providing about \$4.3 million as part of a broader \$62.4 million in funding for clean coal research projects in the U.S. The lead partner in the project is Integrated Concepts & Research Corporation, which will further develop GTL technology by Syntroleum Corporation.

[http://www.fossil.energy.gov/news/techlines/2006/06035-Syntroleum\\_Projects\\_Show\\_Progress.html](http://www.fossil.energy.gov/news/techlines/2006/06035-Syntroleum_Projects_Show_Progress.html)

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*3. Delphi Meets SECA Phase 1 Goals for SOFC System*

Delphi Corporation announced it has met Phase I goals for its solid oxide fuel cell power system under the DOE Solid State Energy Conversion Alliance (SECA) program. The system demonstrated a peak efficiency of 37 percent, exceeding the Phase I goal of 35 percent. The system also exceeded the Phase I goal of \$800 per kW for the total power unit, assuming volume production, by achieving an estimated \$770 per kW.

[http://www.delphi.com/news/pressReleases/pr\\_2006\\_06\\_20\\_001/](http://www.delphi.com/news/pressReleases/pr_2006_06_20_001/)

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*4. Neah Fuel Cell Technology to Power Military Sensor Market*

Neah Power announced it intends to extend its fuel cell technology to power sensors used in military and homeland security applications. Neah recently received \$1.75 million for a project with the Office of Naval Research and will seek additional military funding.

[http://home.businesswire.com/portal/site/home/?epi\\_menuItemID=989a6827590d7dda9cdf6023a0908a0c&epi\\_menuID=c791260db682611740b28e347a808a0c&epi\\_baseMenuID=384979e8cc48c441ef0130f5c6908a0c&ndmViewId=news\\_view&newsLang=en&div=973078938&newsId=20060616005507](http://home.businesswire.com/portal/site/home/?epi_menuItemID=989a6827590d7dda9cdf6023a0908a0c&epi_menuID=c791260db682611740b28e347a808a0c&epi_baseMenuID=384979e8cc48c441ef0130f5c6908a0c&ndmViewId=news_view&newsLang=en&div=973078938&newsId=20060616005507)

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*5. NIST Develops New Performance Rating System for Residential Fuel Cells*

The National Institute of Standards and Technology has developed a new performance rating system for residential fuel cells, which can help prospective buyers assess the economic value of fuel cell technologies. The rating will provide the annual electrical energy produced, fuel consumed, thermal energy for domestic water heating and space heating delivered, and water used by the residential fuel cell system. Researchers expect to present their test methodology and performance rating procedures to standards organizations this summer.

[http://www.bfrl.nist.gov/863/heat\\_transfer\\_group/pubs/NIST\\_IR\\_7131.pdf](http://www.bfrl.nist.gov/863/heat_transfer_group/pubs/NIST_IR_7131.pdf)

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*6. South Korea Joins FutureGen International Partnership*

South Korea has become the second country, after India, to join the U.S. DOE's FutureGen International Partnership, which seeks to build and operate the world's first zero-emissions coal-fired power plant – producing both electricity and hydrogen, with carbon sequestration. South Korea has pledged \$10 million towards the effort.

[http://www.fossil.energy.gov/news/techlines/2006/06038-South\\_Korea\\_Joins\\_FutureGen.html](http://www.fossil.energy.gov/news/techlines/2006/06038-South_Korea_Joins_FutureGen.html)

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**RFP/Solicitation News**  
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**7. CCEF Seeks Project 100 Proposals**

The Connecticut Clean Energy Fund seeks proposals for Round 2 of "Project 100," which promotes the development and deployment of "Class I" renewable energy resources, including fuel cells. Local electric distribution companies are mandated to contract a minimum of 100 MW of clean energy resources by July 1, 2008. Round 2 proposals must be located in Connecticut and project size has been increased from 15 MW to 30 MW. Proposals are due by July 17, 2006.

<http://www.ctcleanenergy.com/investment/Project100.html>

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**8. Army Solicits Proposals for Emergency Power to 33 Installations**

The U.S. Army has issued a pre-solicitation notice for a program to provide temporary/emergency power support for up to 33 Army installations in the Mid-Atlantic and Northeastern states. The maximum contract ceiling for awards will range from \$30 million to \$60 million. Deadline for responses is July 18, 2006.

<http://www1.fbo.gov/spg/USA/COE/DACA61/W912BU-06-R-0029/SynopsisP.html>

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**9. EISG Natural Gas Program Accepting Proposals**

California's Energy Innovations Small Grant (EISG) Natural Gas Program is now accepting proposals for energy research, development and demonstration projects, including fuel cells. The program started at \$12 million in 2005. This solicitation is for the 2007 Natural Gas Program, for which the California Energy Commission is requesting \$18 million. Individual hardware projects receive up to \$95,000 and modeling projects receive up to \$50,000. The deadline for grant applications is July 31, 2006. <http://www.energy.ca.gov/contracts/smallgrant/index.html>

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**10. DOT to Fund University Transportation Research**

The Department of Transportation plans to provide \$30 million in funding to ten "Tier I" University Transportation Centers. The purpose of the Centers is to advance U.S. technology and expertise in the transportation sector through research, education, and technology transfer. Ten awards of a maximum \$3 million each are expected. Responses are due August 15, 2006.

<http://www.grants.gov/search/search.do?mode=VIEW&opId=9679>

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**Contract / Funding Awards**  
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**11. DOE Selects Six SOFC Projects Under SECA Program**

The Department of Energy has selected six R&D projects under its Solid State Energy Conversion Alliance (SECA) program. The projects will build upon earlier Phase I research on fuel cell materials and key components. A total of \$1.15 million will be divided between the six

projects, which include work on characterization of sulfur poisoning of SOFCs, glass-based SOFC seal development, and diesel injector and mixing chamber technology.  
[http://www.fossil.energy.gov/news/techlines/2006/06032-SECA\\_Phase\\_II\\_Awards.html](http://www.fossil.energy.gov/news/techlines/2006/06032-SECA_Phase_II_Awards.html)

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*12. Air Products Receives Award for Hydrogen Storage Funding*

DOE's Hydrogen Program awarded funding to Air Products for work on a "liquid-phase hydrogen carrier" that has the potential to increase overall fuel cell energy efficiency and reduce the cost of the hydrogen storage system in fuel cell vehicles.

<http://www.airproducts.com/PressRoom/CompanyNews/Archived/2006/13Jun06.htm>

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**State Activities**  
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*13. Colorado Establishes Renewable Energy Research Collaboration*

Colorado Governor Bill Owens signed into law legislation that provides funding to create the Colorado Renewable Energy Collaboratory. The Collaboratory – comprising the National Renewable Energy Laboratory, the Colorado School of Mines, Colorado State University and the University of Colorado – will receive up to \$2 million per year for three years, beginning in fiscal year 2007. Hydrogen fuel cells, ethanol and biofuels are among energy sources under the purview of the Collaboratory.

[http://www.nrel.gov/news/press/release.cfm/release\\_id=123](http://www.nrel.gov/news/press/release.cfm/release_id=123)

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*14. California Considers Changes to Zero Emission Buses Regulation*

The California Air Resources Board is considering changes to its Zero Emission Buses regulation, which was designed to encourage the operation and use of zero emission buses, including fuel cell buses. The proposed changes would reflect the Board's view of the current fuel cell bus development timetable. A workshop on the changes was held June 21, 2006.

Presentations and handouts from the workshop will be available online at the Zero Emission Buses web site. <http://www.arb.ca.gov/msprog/bus/zeb/zeb.htm>

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*15. California Fuel Cell Workshop Presentations Available*

Presentations from the workshop "Fuel Cells in California: Opportunities and Barriers" are now available online. The workshop was held in conjunction with the Public Interest Energy Research Program's Environmentally Preferred Advanced Generation area. Presentation topics include "Marketing and Commercialization Challenges for PEM Fuel Cells" and "Molten Carbonate Fuel Cells."

[http://www.energy.ca.gov/pier/conferences+seminars/2006-05-31\\_fuel\\_cell\\_workshop/index.html](http://www.energy.ca.gov/pier/conferences+seminars/2006-05-31_fuel_cell_workshop/index.html)

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**Industry Headlines**  
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*16. MTI MicroFuel Cells Announces 30% Increase in Fuel Efficiency*

MTI MicroFuel Cells announced it has achieved a more than 30% increase in fuel efficiency of its 30-Watt Mobion® laboratory test unit, with an energy density of over 1.3 Watt-hours per cc of fuel. The Mobion® technology uses methanol fuel and is being designed for portable applications, including soldier field use.

<http://www.mtimicrofuelcells.com/news/article.asp?id=249>

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*17. Cellkraft to Install Fuel Cells on Antarctica*

Cellkraft has received an order from The Australian Antarctic Division for a complete fuel cell system to provide 230 volts of AC power to a scientific station close to the Mawson base on Antarctica. The system will be delivered in the end of September 2006.

[http://www.cellkraft.se/nyheter/en\\_main.shtm](http://www.cellkraft.se/nyheter/en_main.shtm)

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*18. Californians Get Driver's License in a Fuel Cell-Powered Car*

Over the past year, some Californians have had the opportunity to get their driver's licenses in a Mercedes-Benz F-Cell fuel cell-powered vehicle.

<http://www.theautochannel.com/news/2006/05/31/009139.html>

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*19. Fuel Cell Vehicles at World Cup Soccer Tournament*

A Hyundai fuel cell bus and two Hyundai Tucson fuel cell-powered vehicles were used at the 2006 World Cup Soccer tournament in Germany.

[http://home.businesswire.com/portal/site/home/?epi\\_menuItemID=989a6827590d7dda9cdf6023a0908a0c&epi\\_menuID=c791260db682611740b28e347a808a0c&epi\\_baseMenuID=384979e8cc48c441ef0130f5c6908a0c&ndmViewId=news\\_view&newsLang=en&div=973078938&newsId=20060619005977](http://home.businesswire.com/portal/site/home/?epi_menuItemID=989a6827590d7dda9cdf6023a0908a0c&epi_menuID=c791260db682611740b28e347a808a0c&epi_baseMenuID=384979e8cc48c441ef0130f5c6908a0c&ndmViewId=news_view&newsLang=en&div=973078938&newsId=20060619005977)

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**University Activities**  
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*20. University Fuel Cell Roundup*

(summaries contributed by Kathy Haq, Dir. of Outreach and Communications, National Fuel Cell Research Center, UC Irvine, [khaq@nfcrc.uci.edu](mailto:khaq@nfcrc.uci.edu))

A team of more than a dozen University of Florida engineering faculty and graduate students has developed a tiny, inexpensive sensor that can detect hydrogen leaks and sound an alarm via wireless communication. The device, called a sensor node because it is designed to work in tandem with dozens or hundreds more like it, has the ability to draw its power from a tiny internal power source that harvests energy from small vibrations. That means future versions could one day operate continuously without batteries or maintenance when affixed to cars, refrigerators, pumps, motors or any other machine that gives off a slight vibration. "You need lots of hydrogen sensors to detect leaks, but you don't want to have to maintain them or change the battery every couple of months," said Jenshan Lin, an associate professor of electrical and computer engineering and the lead investigator on the NASA-funded sensor project. "Our sensor can operate completely independently." Lin and his colleagues developed the sensor node over the past two years as a part of the NASA Hydrogen Research Program. [24-May-2006, *Ascribe Newswire*]

In a feasibility study funded by the Engineering and Physical Sciences Research Council, bioscientists at the University of Birmingham have demonstrated that bacteria give off hydrogen gas as they consume high-sugar waste produced by the confectionery industry. The hydrogen has been used to generate clean electricity via a fuel cell. Looking to the future, it could also be used to power the hydrogen-fueled road vehicles of tomorrow. The technique could provide the confectionery industry, and potentially other foodstuff manufacturers, with a useful outlet for waste generated by their manufacturing processes. Much of this waste is currently disposed of in landfill sites. Professor Lynne Macaskie of the University of Birmingham's School of Biosciences led the research team, which is engaged in follow-up work that is expected to produce a clearer

picture of the overall potential for turning a wider range of high-sugar wastes into clean energy using the same basic technique. [29-May-2006, *Space Daily*]

On June 1, the Tennessee Valley Authority (TVA) turned over its one-mile, oval track near the Chickamauga Dam to the University of Tennessee at Chattanooga (UTC) and the Advanced Transportation Technology Institute (ATTI), in Chattanooga. TVA built the track with \$500,000 of federal funds in 1981 as part of the utility's early research into electric-powered cars. The program was suspended in 1988, however, when former Ford and Nissan executive Marvin Runyon was named chairman of TVA and questioned the value of the battery-powered vehicles. UTC and ATTI plan to use the track to try out several new types of alternative fuels and transportation technologies, including the early tests for a hydrogen fuel cell a Tennessee company plans to put into shuttle buses operated by the Chattanooga Area Regional Transportation Authority within the next year. [2-June-2006, *Chattanooga Times and Free Press* (Tennessee)]

U.S. Secretary of Energy Samuel W. Bodman toured the Connecticut Global Fuel Cell Center on the University of Connecticut's Depot Campus on June 2. After the tour, Bodman announced that the U.S. Department of Energy will award a total of \$34.6 million to states, five territories and the District of Columbia to improve energy efficiency throughout the nation. The funding, from DOE's State Energy Program (SEP), is expected to provide significant savings for consumers, businesses and states to increase energy efficiency of homes and buildings. [2-June-2006, *Congressional Quarterly, Inc.*]

A research group led by Professor Kazunari Domen at Tokyo University and Professor Yasunobu Inoue at Nagaoka University of Technology has succeeded in developing a photocatalyst that efficiently decomposes water to produce hydrogen under visible light. The researchers reported their findings in the March 16, 2006, issue of British science journal *Nature*. The newly developed catalyst is a solid solution of gallium nitride and zinc oxide, which is modified with a mixture of rhodium and chromium oxide nanoparticles on its surface. Because it reacts under visible light, which accounts for 90 percent of sunlight, the mixture is expected to function as an efficient photocatalyst for hydrogen production. [6-June-2006, *FuelCellWorks.com*]

George S. Howard, the Joseph Morahan Director of the College Seminar Program and Professor of Psychology at the University of Notre Dame, recently completed a biography of Stan Ovshinsky, who was called the "Edison of the 21st Century" and a "Hero of the Planet" by *Time* magazine. Ovshinsky's inventions include batteries for hybrid cars, solar panels that produce electricity even in overcast environments, and nanostructured disordered catalytic material to safely store hydrogen. *Stan Ovshinsky and the Hydrogen Economy: Creating a Better World* is described as "the biography of a man and his nearly 50-year mission to create an environmentally clean and renewable energy loop." [13-June-2006, *PRNewswire*]

A research team at Northwestern University has produced the first three-dimensional images of the interior of a fuel cell. The technology – developed by the research team led by Scott Barnett, a professor of materials science and engineering at Northwestern University – is expected to become a new tool for the study and development of fuel cells. "Much like magnetic resonance imaging produces a view inside the human body, we now can look in fuel cells," said Barnett. "The dual-beam focused-ion-beam microscope used in the study provides much higher resolution than an MRI, showing nanometer-scale features. These pictures will help us and other researchers to unravel how fuel cells work so they can eventually be improved and made to work longer without failing." The imaging technique also will enable manufacturers to maintain quality by checking batches of fuel cells for structural changes that might hurt the fuel cells' characteristics, Barnett said. The research was reported in a paper published this month by the journal *Nature Materials*. [19-June-2006, *United Press International, Inc.*]

A team of researchers led by P.V. Ramachandran, an associate professor of chemistry at Purdue University, is looking at new ways to store, ship and recycle hydrogen. "Our research involves

working on hydrogen storage materials for fuel cells, release of the hydrogen, and how to recycle it," said Ramachandran, who has a quarter of a century of experience in borane research. "The big question is how to store and ship hydrogen safely because nobody wants to sit on a gas tank filled with hydrogen." The team's research, which promises substantial cost reduction, has not been published. [26-June-2006, *The (Purdue) Exponent*]

Alchemy Enterprises Ltd. announced that it has executed a license agreement to acquire exclusive rights to certain fuel cell system patents and technologies developed in conjunction with NASA/Jet Propulsion Laboratories (JPL) and the California Institute of Technology. As the managing partner of JPL, Cal Tech, under the terms of the agreement, has now become an 8 percent shareholder of Alchemy. JPL is a federally funded research and development center sponsored by the National Aeronautics and Space Administration and operated by Cal Tech. Cal Tech will also receive a nominal annual fee. [26-June-2006, *Business Wire*]

A fuel cell exhibit presented by the National Fuel Cell Research Center at the University of California, Irvine, will be one of the featured attractions at the Orange County Fair, which runs from July 7-30, 2006. The exhibit, made possible by a gift from Toyota Motor Sales, U.S.A., Inc., originally was shown in the U.S. Pavilion at the 2005 World's Fair in Aichi, Japan. It has been modified slightly to take advantage of the space provided at the fairgrounds in Costa Mesa. The exhibit, designed to introduce the public to fuel cells and their potential, includes a 5-kilowatt stationary fuel cell; a one-of-a-kind waste-heat recovery demonstration unit; images of current and future fuel cell technologies; a brief, animated video; an architectural model showing how photovoltaic technology in combination with a fuel cell could someday provide energy to a family home; and an endorsement of fuel cell technology by California Gov. Arnold Schwarzenegger. [NFCRC]

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**Administration**  
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Press releases and story ideas may be forwarded to Bernadette Geyer, editor, for consideration at [fuelcellconnection @ comcast.net](mailto:fuelcellconnection@comcast.net).

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*US Fuel Cell Council* -- The US Fuel Cell Council is the business association for anyone seeking to foster the commercialization of fuel cells in the United States. Our membership includes producers of all types of fuel cells, as well as major suppliers and customers. The Council is member driven, with eight active Working Groups focusing on: Codes & Standards; Transportation; Power Generation; Portable Power; Stack Materials and Components; Sustainability; Government Affairs; and Education & Marketing. The Council provides its members with an opportunity to develop policies and directions for the fuel cell industry, and also gives every member the chance to benefit from one-on-one interaction with colleagues and opinion leaders important to the industry. Members also have access to exclusive data, studies, reports and analyses prepared by the Council, and access to the "Members Only" section of its web site. (<http://www.usfcc.com/>)

*National Fuel Cell Research Center* -- The mission of the NFCRC is to promote and support the genesis of a fuel cell industry by providing technological leadership within a vigorous program of research, development and demonstration. By serving as a locus for academic talent of the highest caliber and a non-profit site for the objective evaluation and improvement of industrial products, NFCRC's goal is to become a focal point for advancing fuel cell technology. By supporting industrial research and development, creating partnerships with State and Federal agencies, including the U.S. Department of Energy (DOE) and California Energy Commission (CEC), and overcoming key technical obstacles to fuel cell utilization, the NFCRC can become an invaluable technological incubator for the fuel cell industry. (<http://www.nfcrc.uci.edu/>)

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