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FUEL CELL CONNECTION - October 2007 Issue

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News on U.S. Government Fuel Cell Programs
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1. National Park Environmental Education Facility Goes "Off Grid" with Fuel Cells
The environmental education facility at Cuyahoga Valley National Park in Ohio is now grid-independent and able to operate in case of a power failure thanks to a fuel cell installed at the facility. Installation of the 5-kW solid oxide fuel cell system, provided by Acumentrics Corporation, is sponsored by the U.S. Department of Defense (DOD), the National Park Service, the Electric Power Research Institute and First Energy. This is the second Acumentrics unit at the facility.
http://www.acumentrics.com/de0ae505-60ee-40a8-82a0-b26cc01a2b64/press-releases-release-details.htm

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2. Agricultural Research Service Collaborates on Microbial Fuel Cell Research
The Agricultural Research Service (ARS) is teamed with Washington University on a project to investigate fuel cell systems that use mixtures of bacteria to treat organic wastewater and catalyze the release of electrons and protons, which can be used to produce either electricity or hydrogen fuel. The researchers are utilizing the ARS Microbial Culture Collection – which houses about 87,000 freeze-dried microbes from around the world – to search for microbes that consume biomass sugars and are electrochemically active. http://www.ars.usda.gov/is/pr/2007/071025.htm

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3. Fuel Cell Case Studies Included in NRC SBIR Assessment
Case studies of fuel cell-related projects are included in a new assessment by the National Research Council (NRC) of the Small Business Innovation Research (SBIR) program. The program was founded in 1982 to encourage small business to develop new processes and products and to provide quality research in support of the many missions of the U.S. government. The assessment details how the program has met its goals and provides recommendations on how to improve the program. http://www.nap.edu/catalog.php?record_id=11989

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4. DOE Launches Energy Curriculum Web Site with Fuel Cell, Hydrogen Lesson Plans
The U.S. Department of Energy (DOE) has launched a new K-12 energy curriculum web site that features more than 350 lesson plans and activities on energy efficiency and renewable energy. At present, the site includes a "Fuel Cells-Futuristic Battery" lesson plan for grades 5-8 and a "Hydrogen Sprint" set of activities for grades 9-12.
http://www.eere.energy.gov/education/lessonplans/

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5. AFDC and Clean Cities Web Sites Redesigned with Tools for Fleet Managers, Communities
DOE has launched redesigned web sites for the Alternative Fuels & Advanced Vehicles Data Center (AFDC) and the Clean Cities Program. The redesigned sites feature new tools for fleet managers and communities seeking to reduce petroleum use. Tools include lists of alternative fueling stations across the country as well as listings of incentives and laws for alternative fuels and vehicles in each state.
http://www1.eere.energy.gov/news/progress_alerts/progress_alert.asp?aid=251

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RFP/Solicitation News
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6. DOD Extends Hydrogen Fueling BAA Proposal Deadline
The U.S. Department of Defense (DOD) has extended the deadline for submitting proposals to its Broad Agency Announcement (BAA) for Research and Development for Hydrogen-Fueled Material Handling Equipment and Hydrogen Vehicle Fueling Station Pilot Projects. Up to $4 million is available for projects through this solicitation. More than one effort may be funded for individual topic areas. The new deadline for proposals is November 9, 2007.
http://www.fbo.gov/spg/DON/NAVSEA/N00164/N0016407R6982/listing.html

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7. DOE Issues Hydrogen Education Development Solicitation
DOE issued a solicitation for applications in support of the Hydrogen, Fuel Cells and Infrastructure Technologies (HFCIT) Education Subprogram. The three topic areas are: State and Local Government Outreach – "Hydrogen 101," state and local government partnership building; Early Deployment and Education; and University Programs. The total estimated funding available is $4.5 million, pending Congressional Appropriations. Up to thirteen projects may be selected with individual awards worth a maximum $2.75 million. Deadline for applications is December 12, 2007. http://www.hydrogen.energy.gov/news_education.html

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8. Draft Posted for Hydrogen Storage Engineering Center of Excellence FOA
A draft document detailing the scope and structure of a planned Funding Opportunity Announcement (FOA) for a DOE Hydrogen Storage Engineering Center of Excellence has been posted online. According to the document, the FOA is intended to fund one team to complement existing National Hydrogen Storage Project activities. The total funding for the FOA will be approximately $25 to $30 million over four to five years, subject to appropriations. A pre-solicitation meeting was held October 15, 2007, in San Antonio, Texas, to discuss the draft FOA. Presentation materials from the meeting have been posted online, and the questions and answers document from the meeting will also soon be available.
http://www.hydrogen.energy.gov/news_coe.html

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Contract / Funding Awards
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9. DOE Provides $30 Million Additional Funding to Bioenergy Research Centers
DOE announced the investment of nearly $30 million in end-of-fiscal-year (2007) funds to three new Bioenergy Research Centers that were selected in June 2007. The additional funds bring the total DOE Bioenergy Research Center investment to over $400 million. The Centers are located in Oak Ridge, Tennessee; Madison, Wisconsin; and near Berkeley, California.
http://energy.gov/news/5534.htm

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10. Hydrogen Projects to Receive Funding from PEDA
Two hydrogen projects are among 24 alternative and renewable energy projects that will receive funding through the Pennsylvania Energy Development Authority. HydroGen LLC was awarded $500,000 to design and install modules to clean hydrogen-rich gas from U.S. Steel's coke oven operations in the Mon Valley Works plant, for use in a fuel cell demonstration project. Penn State University was awarded $560,000 for development of a residential-scale wind, geothermal energy and hydrogen fueling system to complement an 8.7-kW solar electric and solar thermal system.
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http://www.depweb.state.pa.us/news/cwp/view.asp?Q=530498&A=3

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11. DOE Awards $750,000 Phase II Grant for Membrane Initiative
The Department of Energy has awarded a $750,000 Phase II grant to Genesis Fueltech for development of new fabrication processes and structures for hydrogen purification membranes. The membranes are for use in the manufacture of ultra-pure hydrogen from hydrogen-rich gas streams or hydrogen generator systems.
http://www.fuelcelltoday.com/online/news/articles/2007-10/Genesis-receives-Phase-II-grant-

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12. CCEF Provides $176,000 for PEMFC Diagnostic Tools
The Connecticut Clean Energy Fund (CCEF) has provided $176,000 to a research project to develop advanced optical diagnostic tools to aid in the development and operation of PEMFCs. The project partners are University of Connecticut and UTC Power. CCEF's funding will be matched by funding from UTC Power.
http://www.ctinnovations.com/news/330.php

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13. Acumentrics Receives Funding from DOE for SOFC Heat Exchanger Development
Acumentrics Corporation received an unspecified amount in Phase II funding for development of optimized manufacturing techniques and to build pre-commercial prototypes of a hybrid ceramic-metallic heat exchanger for SOFCs. Phase I of the work received funding through DOE's Small Business Innovation Research (SBIR) solicitation.
http://www.acumentrics.com/c1471b72-141b-4bd4-b212-46f2b9250ca4/press-releases-release-details.htm

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State Activities
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14. California Publishes Final Alternative Fuels Plan
The California Energy Commission has published a final committee report of its "State Alternative Fuels Plan," which recommends a five-part strategy to diversify the state's transportation fuel supply while at the same time reducing the amount of energy necessary to provide fuel for the state's transportation needs. One of the strategies includes development of "new transportation technologies, such as electric drive and hydrogen fuel cells, in the mid- to-long term." The Commission will hold a hearing on October 31, 2007, to consider adoption of the final plan.
http://www.energy.ca.gov/ab1007/documents/index.html#103107

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15. Project Driveaway to Highlight Fuel Cell Vehicle Technology
General Motors has partnered with White Plains (NY) to kick off the new "Project Driveaway" program in Westchester and the New York Metropolitan area. The White Plains program will provide 100 Chevrolet Equinox fuel cell vehicles to be test-driven by families beginning in early-2008, and is part of a national test drive that will include Los Angeles and Washington, DC.
http://media.gm.com/servlet/GatewayServlet?target=http://image.emerald.gm.com/gmnews/viewpressreldetail.do?domain=2&docid=40560

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Industry Headlines
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16. LEED-Certified School Selects Fuel Cell Power
The Middletown, Conn., High School and Vocational Agricultural Center, due to open in September 2008, has decided to install a 200-kW PureCell™ fuel cell system from UTC Power. The facility will be one of only five K-12 schools in the state to receive certification under the Leadership in Energy and Environmental Design (LEED) Green Building Rating System™.
http://www.utcpower.com/fs/com/bin/fs_com_Page/0,11491,0236,00.html

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17. Wal-Mart Orders Fuel Cells for Distribution Center Lift Trucks
Wal-Mart has placed an order for an unspecified number of GenDrive™ fuel cell power units from Plug Power, for use in lift trucks at the retailer's distribution centers. A successful beta trial of 12 fuel cell-powered pallet trucks was conducted by Wal-Mart in Ohio in 2006.
http://www.plugpower.com/news/press.cfm

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University Activities
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18. Global Venture Challenge to Fund Winning Energy Business Idea
The Oak Ridge National Laboratory announced that "Energy" is the theme of the Global Venture Challenge 2008, a business competition that seeks to launch new entrepreneurial ventures. Through the event's "Idea to Product Competition," twelve teams of graduate level students from universities around the world will pitch their business ideas to a panel of judges. The winning team will receive a $25,000 cash prize. Teams must submit an application by February 7, 2008, to be considered for the competition. Selected teams will be asked to submit a Technology Commercialization Plan for the competition.
http://www.globalventurechallenge.com/

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19. 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)

Researchers at the University of Glamorgan in Wales have developed a prototype hydrogen fuel cell-powered minibus that was exhibited at the Tenth Grove Fuel Cell Symposium. The only one of its kind in the United Kingdom, the minibus was funded by the Energy Saving Trust and supported by the Welsh Assembly Government. [26-Sept-2007, *The Western Mail*]

Engineers at Ohio State University have patented a process that uses discarded chicken eggshells to soak up carbon dioxide from a reaction that produces hydrogen fuel. It also includes a unique method for peeling the collagen-containing membrane from the inside of the shells, so that the collagen can be used commercially. http://researchnews.osu.edu/archive/eggpower.htm

On Oct. 2, U.S. Patent No. 7,276,306 was issued to the Regents of the University of California for a fuel cell system developed by Ai Quoc Pham of San Jose, Calif., and Brian Lee Anderson of Lodi, Calif. An abstract of the invention, available through the U.S. Patent Office, describes the invention as "a system for the co-generation of hydrogen gas and electricity, wherein the proportion of hydrogen to electricity can be adjusted from 0 percent to 100 percent. The system integrates fuel cell technology for power generation with fuel-assisted steam-electrolysis. A hydrocarbon fuel, a reformed hydrocarbon fuel, or a partially reformed hydrocarbon fuel can be fed into the system." http://patft.uspto.gov/netacgi/nph-Parser?Sect1=PTO1&Sect2=HITOFF&d=PALL&p=1&u=%2Fnetahtml%2FPTO%2Fsrchnum.htm&r=1&f=G&l=50&s1=7,276,306.PN.&OS=PN/7,276,306&RS=PN/7,276,306

On Oct. 4, AmberWave Systems announced an in-licensing agreement with the University of California, Santa Barbara to collaborate on, and fund, materials science research within the field of mesoporous materials. UCSB is pursuing work in the field of mesoporous and mesostructured materials, which encompasses electrical generation and storage in the form of fuel cells, high-performance batteries and ultracapacitors.
http://www.amberwave.com/newsevents/news_051.html

Researchers at the UCLA Henry Samueli School of Engineering and Applied Science have developed a model that could help engineers and scientists speed up the development of hydrogen-fueled vehicles by identifying promising hydrogen storage materials and predicting favored thermodynamic chemical reactions through which hydrogen can be reversibly stored and extracted. http://www.newsroom.ucla.edu/portal/ucla/ucla-engineering-model-advances-39646.aspx

The AtlanTICC Alliance, a sustainable energy research consortium comprised of Imperial College London, Georgia Institute of Technology and Oak Ridge National Laboratory, this month launched Global Lab at Imperial College. The new lab allows scientists in London to use and manipulate, in real-time, leading multimillion dollar scientific instruments and technology in the United States. For example, Imperial researchers will now be able to access electron microscopes at Oak Ridge to carry out important research into alternatives to fossil fuels — such as advanced fuel cells and innovative biofuels — in collaboration with their colleagues in America.
http://www.ornl.gov/info/press_releases/get_press_release.cfm?ReleaseNumber=mr20071011-00

A team of South Korean scientists say they have found a way to produce plastic films that are effective in filtering targeted molecules, which can be used to capture greenhouse gases in power plants and factories. The new chemical compound made by former and current Hanyang University members is expected to be utilized to make highly efficient carbon dioxide filters for places that burn fossil fuels. It can also be applied in the making of advanced fuel cell membranes. The research is described in the Oct. 11 issue of *Science* magazine. [12-Oct-07, *Korea Times*]
http://www.sciencemag.org/cgi/content/full/318/5848/254?maxtoshow=&HITS=10&hits=10&RESULTFORMAT=&fulltext=Lee+Young-moo&searchid=1&FIRSTINDEX=0&resourcetype=HWCIT

The Pennsylvania NanoMaterials Commercialization Center announced that it has provided HydroGen Corporation with about $230,000 to develop and manufacture enhanced performance hydrogen fuel cell electrodes. The new electrodes will use novel carbon nanotubes to improve the performance and lifetime of the electrodes, thereby reducing overall costs for fuel cell operations. HydroGen will be working in cooperation with the University of Pittsburgh on this project.
http://www.pananocenter.org/
http://nanotechwire.com/news.asp?nid=5160

Stony Brook University held a groundbreaking ceremony on Oct. 16 for its new Advanced Energy Research and Technology Center. The center is the largest facility of its kind on Long Island and is supported by $35 million in state funding. It will be located at Stony Brook's Research and Development Park adjacent to the campus and is the centerpiece of a partnership among academic institutions, research institutions, energy providers, and corporations. Its mission is to develop innovative energy research, education, and technology deployment with a focus on efficiency, conservation, renewable energy, and nanotechnology applications for new and novel sources of energy.
http://commcgi.cc.stonybrook.edu/am2/publish/General_University_News_2/Long_Island_Takes_Lead_In_Alternative_Energy_Research_Advanced_Energy_Center_Ground_Breaking_Is_Oct_16.shtml

Harvard University's Office of Technology Development and Allied Minds, a pre-seed investment corporation specializing in early stage university business ventures, announced that Allied Minds has invested $500,000 in SiEnergy Systems, LLC, a new Harvard spin-off that is commercializing solid oxide fuel cell technology developed at Harvard University's School of Engineering and Applied Sciences. http://www.sienergysystems.com/press.htm

A student team from the University of Adelaide in Australia has built a working model of a fuel cell vehicle that utilizes hydrogen gas stored in solid form in a metal hydride vessel, instead of a compressed gas tank. The prototype was one of 40 projects recently displayed at an exhibition sponsored by Santos and the Australian Institute of Energy. [18-Oct-2007, *The Advertiser*] http://www.news.com.au/adelaidenow/story/0,22606,22603937-2682,00.html

An as-yet-unidentified university in Italy will be selected to field test a new generation of fully enclosed wall-mounted residential combined heat and power units in 2008. The system was developed by Acumentrics Corporation and Merloni Termosanitari (MTS Group) and demonstrated to European utilities this month. The unit operates on natural gas and is designed to meet the power and heating needs of an average-size European home using a 1-kW SOFC in combination with a 24-kW condensing boiler. http://www.acumentrics.com/68b129f8-30c9-4d74-a638-1e2ca0765eb9/press-releases-release-details.htm

On Oct. 23, U.S. Patent No. 7,285,142 was assigned to the University of Central Florida Research Foundation, Inc. for a new method of generating hydrogen. The inventors are Nahid Mohajeri of Rockledge, Fla., and Ali Tabatabaie-Raissi of Melbourne, Fla. An abstract available through the U.S. Patent Office describes the invention as “a method of generating hydrogen [that] includes the steps of providing an amine borane (AB) complex, at least one hydrogen generation catalyst, and a solvent, and mixing these components. Hydrogen is generated. The hydrogen produced is high purity hydrogen suitable for PEM fuel cells. A hydrolytic in-situ hydrogen generator includes a first compartment that contains an amine borane (AB) complex, a second container including at least one hydrogen generation catalyst, wherein the first or second compartment includes water or other hydroxyl group containing solvent. A connecting network permits mixing contents in the first compartment with contents in the second compartment, wherein high purity hydrogen is generated upon mixing. At least one flow controller is provided for controlling a flow rate of the catalyst or AB complex.” http://patft.uspto.gov/netacgi/nph-Parser?Sect1=PTO1&Sect2=HITOFF&d=PALL&p=1&u=%2Fnetahtml%2FPTO%2Fsrchnum.htm&r=1&f=G&l=50&s1=7,285,142.PN.&OS=PN/7,285,142&RS=PN/7,285,142

At the University of Houston, Texas, a team led by Peter Strasser, assistant professor of chemical and biomolecular engineering, has developed a new class of electrocatalyst that could help to improve the capacity of fuel cells. The active phase of the catalyst consists of nanoparticles with a platinum-rich shell and a core made of an alloy of copper, cobalt, and platinum. This catalyst demonstrates the highest activity yet observed for the reduction of oxygen. [24-Oct-2007, *Space Daily*]

Researchers at the University of South Carolina’s College of Engineering and Computing unveiled a fuel cell-powered Segway to demonstrate how a Segway, usually powered by lithium-ion batteries that have to be re-charged, can have a longer “ride time.” With $50,000 from the Greater Columbia Fuel Cell Challenge, the researchers put fuel cells on two Segways. The university gave one of the Segways to the City of Columbia for the police department; the other is being used by researchers and ultimately will have a home in the Horizon Center of Innovista, the university’s research district. http://uscnews.sc.edu/ENGR307b-07.html http://sc.edu/usctimes/articles/2007-01/segway_fuel_cell.html

Singer-songwriter Tracy Lyons launched her 2007-2008 Mercury Rising Tour with a concert at Washington State University in Pullman. The “Eco-Stage” for her tour will be powered off-grid by environmentally friendly biodiesel and feature a hydrogen fuel cell. In addition to the Washington show, the singer will perform at the University of Redlands in Redlands, Calif., and as part of the

Green Festival 2007 in San Francisco, as part of an extensive college and environmental festival tour planned for 2008. http://www.tracylyons.com/content/view/59/63/

Yuan Sun, a graduate student in the Department of Materials Science and Engineering at Stony Brook University, has won the third annual Dr. Mow Shiah Lin Scholarship. The Asian Pacific American Association at the U.S. Department of Energy's Brookhaven National Laboratory initiated the scholarship, which consists of $1,000 and a plaque, to honor the distinguished late Brookhaven Lab scientist for which it is named. Currently, Sun's research focuses on the synthesis of metallic nanomaterials and their applications in hydrogen storage and fuel cells. Her earlier research has already yielded practical results. She holds a patent from China for a method to prepare highly oil-absorbent resin, and she has filed for a U.S. patent for a method to synthesize platinum nanoparticles with applications in hydrogen storage and cancer treatment. http://www.bnl.gov/bnlweb/pubaf/pr/PR_display.asp?prID=07-104

The University of South Carolina has signed an agreement with Collexis Inc. and SC Launch! that will create a partnership for hydrogen fuel research and make the university an international technology hub in that field. Using several different sources of research, Collexis will build a hydrogen fuel dashboard – similar to a virtual library – that will be available for free to the South Carolina research community and available online, for a fee, to researchers across the world. http://uscnews.sc.edu/RSRC279-07.html

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Press releases and story ideas may be forwarded to Bernadette Geyer, editor, for consideration at fuelcellconnection @ yahoo.com.

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About *Fuel Cell Connection*
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The Sponsors

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/)

National Energy Technology Laboratory -- The National Energy Technology Laboratory is federally owned and operated. Its mission is *"We Solve National Energy and Environmental Problems."* NETL performs, procures, and partners in technical research, development, and demonstration to advance technology into the commercial marketplace, thereby benefiting the environment, contributing to U.S. employment, and advancing the position of U.S. industries in the global market. (http://www.netl.doe.gov)