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## **FUEL CELL CONNECTION - December 2007 Issue**

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## Administration

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## News on U.S. Government Fuel Cell Programs

### 1. PNNL Reformers Part of Successful Demonstration of JP-8 Fueled Fuel Cell

A fuel desulfurization system and a fuel reforming system developed at Pacific Northwest National Laboratory (PNNL) contributed to the successful demonstration of a portable fuel cell system running on JP-8 military jet fuel. Researchers at PNNL plan to further develop the technologies for use with diesel and other liquid fuels.

<http://www.pnl.gov/news/release.asp?id=282>

### 2. BNL Researchers Discover Reason for Efficient Catalyst Activity

Researchers at Brookhaven National Laboratory (BNL) have unveiled important details about the activity of a class of catalysts that could improve the performance of fuel cells. Using “inverse model catalysts,” the researchers determined why gold-cerium oxide and gold-titanium oxide are very efficient catalysts for the water-gas shift reaction for producing very pure hydrogen. While neither bulk gold nor bulk ceria and titania are active as catalysts, the researchers were able to determine that the catalysts’ oxides are the reason for their high activity.

[http://www.bnl.gov/bnlweb/pubaf/pr/PR\\_display.asp?prID=07-122](http://www.bnl.gov/bnlweb/pubaf/pr/PR_display.asp?prID=07-122)

### 3. New Polymer for Fuel Cells Becomes “Wetter” as Temperature Increases

Scientists at Lawrence Berkeley National Laboratory (LBNL) have developed a new polymer membrane that increases its moisture uptake from the surrounding air as the temperature rises – meaning the polymer gets “wetter” as it gets hotter. The scientists say the material has the potential to increase the efficiency of PEM fuel cells.

<http://www.lbl.gov/Science-Articles/Archive/sabl/2007/Nov/polymer.html>

### 4. NREL Offers Fuel Cell, Hydrogen Technologies for Licensing

The National Renewable Energy Laboratory (NREL) has announced licensing opportunities for several hydrogen and fuel cell technologies, including hydrogen production techniques and protective coatings for catalytic surfaces. License rights may be issued on an exclusive or nonexclusive basis. Organizations interested in commercializing NREL technologies must provide their own financial resources to commercialize the technology. Deadline for responses is June 20, 2008. <http://www.fbo.gov/spg/DOE/NREL/NR/TTO-General/Synopsis.html>

### 5. FutureGen Alliance Announces Site Selection, DOE Seeks Reassessment of Program

The FutureGen Alliance, formed to conduct R&D in support of the U.S. Department of Energy FutureGen Program, has announced the selection of Mattoon, Illinois, as the final site to host the FutureGen power plant. The FutureGen program seeks to design and build a near-zero emissions coal-fueled power plant that produces both electricity and hydrogen while sequestering carbon. Following the Alliance’s announcement, the Department of Energy issued a statement that “projected cost overruns require a reassessment of FutureGen’s design.” DOE says restructuring of FutureGen is required “to maximize the role of private sector innovation, facilitate the most productive public-private partnership, and prevent further cost escalation.”

[http://www.futuregenalliance.org/news/releases/pr\\_12-18-07.stm](http://www.futuregenalliance.org/news/releases/pr_12-18-07.stm)

[http://www.fossil.energy.gov/news/techlines/2007/07085-FE\\_Statement\\_on\\_FutureGen.html](http://www.fossil.energy.gov/news/techlines/2007/07085-FE_Statement_on_FutureGen.html)

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**RFP/Solicitation News**  
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*6. DOE Requests Suggestions of Potential Topic Areas for Fuel Cell RD&D*

The U.S. Department of Energy (DOE) issued a Request for Information (RFI) regarding potential topic areas for research, development and demonstration of fuel cell technologies for automotive, stationary, portable power and early market applications. Results of the RFI will be used for the purposes of issuing a planned Funding Opportunity Announcement (FOA) in the future. Responses to the RFI are due by January 14, 2008. A pre-solicitation workshop will be held January 23-24, 2008, at the DOE Golden Field Office in Colorado. Deadline for registering for the workshop is January 14, 2008. <https://e-center.doe.gov/iips/faopor.nsf/UNID/62F5563AD79B55868525739900615279?OpenDocument>

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*7. DARPA Office Extends Deadline for Strategic Technologies BAA*

The Defense Advanced Research Projects Agency (DARPA) Strategic Technology Office has extended its deadline for the Strategic Technologies Broad Agency Announcement (BAA). Technical topic areas include next generation power systems and size-weight-power reduced soldier electronics. The new deadline for submissions is January 31, 2008. <http://www.fbo.gov/spg/ODA/DARPA/CMO/BAA07-01/Modification%2005.html>

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*8. PIER EISG Program Issues Solicitation for Energy R&D*

California's Public Interest Energy Research (PIER) Energy Innovations Small Grant (EISG) Program has issued a solicitation for proposals to determine the feasibility of energy research and development concepts relating to the PIER program. A total of \$2.6 million is available under this solicitation. Maximum funding per project is \$95,000 for hardware projects requiring physical testing and \$50,000 for modeling projects. No matching funds are required. Pre-proposal abstracts are optional and will be accepted through January 2, 2008. The deadline for full grant applications is January 31, 2008. <http://www.energy.ca.gov/contracts/smallgrant/index.html>

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*9. NHTSA Seeks Hydrogen Vehicle Fuel System Safety Research*

The U.S. Department of Transportation, National Highway Traffic Safety Administration (NHTSA) has issued a solicitation for Hydrogen Vehicle Fuel System Safety Research. The objective of the solicitation is to generate data to assess the safety performance of hydrogen fuel cell vehicle fuel systems under crash conditions similar to those prescribed in the existing Federal Motor Vehicle Safety Standards (FMVSS). Questions regarding this solicitation are due by January 7, 2008. Deadline for proposals is February 8, 2008. <http://www.fbo.gov/spg/DOT/NHTSA/NHTSAHQ/DTNH22-08-R-00092/listing.html>

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*10. Funding Announcement for Alternative Transportation in Parks and Public Lands*

The U.S. Department of Transportation, Federal Transit Administration (FTA) announced a funding opportunity for the Alternative Transportation in Parks and Public Lands Program. More than \$23 million is available for this solicitation, with an individual award ceiling of \$5.945 million. Goals of the program are to conserve natural, historical and cultural resources; reduce congestion and pollution; improve visitor mobility and accessibility; enhance visitor experience; and ensure access to all, including persons with disabilities. Deadline for proposals is February 29, 2008.

<http://www.grants.gov/search/search.do;jsessionid=Hz0fGV5hxms235yBpnLwNp2rBSm07pVhYpH0nVv18RnL8VV5YLSS!1488660289?oppld=40224&flag2006=false&mode=VIEW>

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*11. Fuel Cell Area of Technology Interest in Army Research Lab BAA*

The U.S. Army Research Laboratory (ARL) issued a Broad Agency Announcement (BAA) seeking proposals for a wide variety of topic areas, including "Electrochemical Power Production and Energy Storage," which includes "Fuel Cells" as a specific area of technology interest. Potential proposers are encouraged "to make preliminary inquiries [to topic contacts] as to the general need for the type of research effort contemplated." The BAA states that "Due to Government budget uncertainties, no specific dollars have been reserved for awards under this BAA." Prospective proposers must submit white papers prior to the submittal of a complete proposal. Based on the assessment of the white papers, feedback will be provided to either encourage or discourage submittal of a full proposal. The BAA is a continuously open announcement valid through September 30, 2011, unless announced otherwise.

<http://www.fbo.gov/spg/USA/USAMC/DAAD19/W911NF-07-R-0001/listing.html>

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**Contract / Funding Awards**  
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*12. DOE Awards National Labs Pre-Venture Capital Funding*

DOE announced it will make available up to \$7.2 million to three of its national laboratories as part of a Technology Commercialization Development Fund (TCDF) to support commercialization of clean energy technologies. The National Renewable Energy Laboratory will receive up to \$4 million; Oak Ridge National Laboratory will receive up to \$2.5 million and Sandia National Laboratory will receive up to \$700,000. <http://www.energy.gov/news/5752.htm>

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*13. NASA Awards Funding for Hydrogen Purity Monitor Development*

The National Aeronautics and Space Administration (NASA) has awarded funding to Mississippi Ethanol, LLC, for a project to develop a technology to monitor impurities in hydrogen fuel. The technology should be able to measure various impurities simultaneously. The award was made under NASA's Small Business Technology Transfer (STTR) solicitation.

<http://sbir.gsfc.nasa.gov/SBIR/sttr2007/phase1/awards/2007topic.html>

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*14. U.S. Air Force Awards \$1.5 Million Contract for Fuel Cells*

The U.S. Air Force awarded a \$1.5 million contract to Capitol Connections LLC, the U.S. partner of SFC Smart Fuel Cell AG, for more than 500 Power Manager modules, which can recharge batteries in the field, or power electrical equipment carried by soldiers.

[http://www.efoy.de/index.php?option=com\\_content&task=blogcategory&id=13&Itemid=177&lang=en](http://www.efoy.de/index.php?option=com_content&task=blogcategory&id=13&Itemid=177&lang=en)

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*15. UTC Power Signs Contract to Develop Fuel Cell for Spanish Submarine*

UTC Power signed a contract with Navantia, S.A., for the development of a 300-kW PEM fuel cell for use in the Spanish Navy's S-80 submarine. The fuel cell would operate on reformed ethanol and pure oxygen, allowing the S-80 to stay submerged for longer periods than diesel electric submarines. [http://www.utcpower.com/fs/com/bin/fs\\_com\\_Page/0,11491,0238,00.html](http://www.utcpower.com/fs/com/bin/fs_com_Page/0,11491,0238,00.html)

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## State Activities

### 16. Vermont Modifications Simplify and Expand Net Metering Rules

The Vermont Public Service Board's Rule 5.100 became effective on November 1, 2007, simplifying and expanding the state's net metering regulations. Changes include standardization of interconnection specifications as well as an allowance for customers to retain net metering credits for a twelve month period before the credit reverts to the utility.

<http://www.irecusa.org/index.php?id=33>

### 17. Fuel Cells Certified as Meeting California Rule 21 Testing Requirements

Fuel cells built by Fuel Cell Energy and Plug Power have been certified as having met the Type Testing and Production Testing requirements of California Rule 21, which specifies standard interconnection, operating and metering requirements for Distributed Energy Resources in California. <http://www.energy.ca.gov/distgen/interconnection/certification.html>

## Legislation / Regulation

### 18. President Bush Signs Energy Independence and Security Act of 2007

President George W. Bush signed into law the Energy Independence and Security Act of 2007, which aims to improve U.S. fuel economy and reduce oil dependence. The Act sets a mandatory Renewable Fuel Standard, requiring fuel producers to use at least 36 billion gallons of biofuels in 2022. The Act also sets a national fuel economy standard of 35 miles per gallon by 2020, a 40 percent increase over the current standard. The Act calls for establishment of an Energy Storage Advisory Council, as well as authorizing funding for four (4) Energy Storage Research Centers to conduct research in support of advanced energy storage technologies including hydrogen (as an energy storage medium), ultracapacitors and flywheels. Additionally, the Act directs the Secretary of Energy to carry out the H-Prize, "a program to competitively award cash prizes ... to advance the research, development, demonstration, and commercial application of hydrogen energy technologies." <http://www.whitehouse.gov/news/releases/2007/12/20071219-6.html>

### 19. ICAO Technical Instructions Expand Fuel Cell Transport

The International Civil Aviation Organization (ICAO) has concluded that fuel cells and fuel cartridges for fuel cells of all types may be transported both as cargo and as carry-on baggage on both passenger and cargo aircraft. This decision expands earlier regulations previously applicable only to methanol, formic acid and butane fuel cells. The new recommendations will be published in the ICAO's "Technical Instructions for the Safe Transport of Dangerous Goods by Air," which will take effect January 1, 2009. The instructions can then be considered for adoption by ICAO member countries. <http://www.usfcc.com/EM-ICAOPressRelease-07-021.pdf>

## University Activities

### 20. DOE and GM to Sponsor EcoCAR Competition

DOE and General Motors are sponsoring a new collegiate competition that challenges teams of university students to re-engineer a production Chevrolet Equinox to reduce fuel consumption

and emissions. "EcoCAR: The NeXt Challenge" will require student teams to explore advanced propulsion technologies such as fuel cells or hybrids, as well as alternative fuels, lightweight materials, and improved aerodynamics. EcoCAR will replace the Challenge X competition, which concludes in May 2008. Teams selected for the competition will receive a GM production vehicle, \$10,000 in seed money, advanced powertrain components, and technical and mentoring support. Interested teams must complete an online form in order to receive the official Request for Proposals (RFP) for the competition. Responses to the RFP are due by March 3, 2008. Teams will be selected in April 2008. [http://www.challengex.org/pdfs/ecocar\\_nopi\\_final.pdf](http://www.challengex.org/pdfs/ecocar_nopi_final.pdf)

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#### 21. 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 research team headed by Professor Masahiro Oshima of Kyoto University, working in conjunction with Mitsubishi Plastics, has announced the development of a plastic sheet covered with minute, evenly sized holes measuring 40-500 nanometers in size. According to Oshima, possible applications include its use as an electrolytic membrane in fuel cells to improve their efficiency. (25-Nov-2007, *Financial Times Information*)

The University of Massachusetts Amherst will create a new research center focused on hydrogen fuel cell science, the Fueling the Future Chemical Bonding Center, with a three-year, \$1.5 million grant from the National Science Foundation. The center is one of only three in the nation funded through the NSF chemistry program that focuses on renewable energy. (27-Nov-2007) <http://www.umass.edu/newsoffice/newsreleases/articles/69409.php>

Intel Corp. named Italy's Polytechnic of Milan one of two runners-up in the Intel University Competition On Renewable Energy (CORE) and rewarded the school with a state-of-the-art laptop computer. The seven-month competition involved university teams from European universities vying to design a device capable of powering laptops by using renewable, sustainable energy sources. The Italian team devised a method of utilizing a hydrogen-fueled fuel cell to power a laptop. (28-Nov-2007) [http://www.intel.com/pressroom/archive/releases/20071128comp\\_a.htm](http://www.intel.com/pressroom/archive/releases/20071128comp_a.htm)

A new type of fuel cell powered with glucose derived from biomass is described in the latest issue of the *International Journal of Global Energy Issues*. The experimental device works by using sunlight to convert glucose into hydrogen to power the fuel cell, which produces several hundred millivolts. Chemists Yutaka Amao and Yumi Takeuchi of Oita University, in Dannoharu, Japan, built their glucose-powered fuel cell with a transparent conductive glass electrode coated with a highly colored molecule that can mimic the natural process of photosynthesis. (29-Nov-2007, *Space Daily*) [http://www.inderscience.com/search/index.php?action=record&rec\\_id=15881&prevQuery=&ps=10&m=or](http://www.inderscience.com/search/index.php?action=record&rec_id=15881&prevQuery=&ps=10&m=or)

Researchers from Asahi Kasei Corp., Kyushu University and the Noguchi Institute have developed a new fuel cell catalyst that does not use platinum. The catalyst is a type of substance called a dithiooxamide-based metal complex. Centered around copper, which is used in oxidizing catalysts for alcohol, it breaks down ethanol and causes it to react with oxygen, producing electricity. It was designed for use in direct ethanol fuel cells. While its efficiency and output are low at present, the researchers aim to create a prototype of a high-efficiency compact fuel cell in three years by improving the catalyst, the goal being an output of 60 milliwatts per square centimeter. (29-Nov-2007, *Asia Pulse*)

A research team led by Klaus Schmidt-Rohr, a professor of chemistry at Iowa State University and staff scientist at the U.S. Department of Energy's Ames Laboratory, has a new model that claims to provide the best explanation to date for how the fuel cell's central component – the



<http://www.ameslab.gov/final/News/2007rel/Nafion.html>  
<http://www.nature.com/nmat/journal/vaop/ncurrent/full/nmat2074.html>

On Dec. 11, Patent No. 7,307,360 was issued to the Arizona Board of Regents in Tempe, Ariz., for uninterruptible power supplies for computers developed by Govindasamy Tamizhmani and Liang-Jun Ji, both of Gilbert, Ariz., James Gonzales of Mesa, Ariz., and Bradley Rogers of Chandler, Ariz. An abstract of the invention, available through the U.S. Patent Office, says, "Uninterruptible power supplies (UPSs) are generally discussed herein with particular discussions extended to fuel cell-based UPSs used in conjunction with DC power supplies for improved operating efficiencies. With a wide voltage DC power supply, a DC-AC inverter may be omitted from the UPS and power from a backup power source, such as a battery or a fuel cell, may be applied directly to the DC power supply without performing two power conversions. The end result is a more efficient system capable of longer operating time."

<http://patft.uspto.gov/netacgi/nph-Parser?Sect1=PTO1&Sect2=HITOFF&d=PALL&p=1&u=%2Fnethtml%2FPTO%2FSrchnum.htm&r=1&f=G&l=50&s1=7,307,360.PN.&OS=PN/7,307,360&RS=PN/7,307,360>

On Dec. 13, FirstEnergy Corp. announced a \$2 million pledge to The University of Akron to establish the FirstEnergy Fund for Advanced Energy Research. The fund will be used to create the FirstEnergy Advanced Energy Research Center at the university and support development of carbon capture and coal-based fuel cells. FirstEnergy also secured a \$250,000 contribution to the fund from CONSOL Energy, one of the nation's leading coal producers and a major fuel supplier to the electric power industry in the northeast United States.

[http://www.uakron.edu/news/articles/uamain\\_1913.php](http://www.uakron.edu/news/articles/uamain_1913.php)

The government of Canada reconfirmed its support for research and development-based partnerships among all levels of government, the private sector and university researchers by investing \$118 million over three years in six National Research Council technology cluster initiatives. The investment supports the following priority areas: hydrogen and fuel cell technologies in Vancouver, nanotechnology in Edmonton, plants for health and wellness in Saskatoon, biomedical technologies in Winnipeg, photonics in Ottawa, and aluminum transformation in the Saguenay-Lac-Saint-Jean region. (18-Dec-2007, *Marketwire*)

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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 @ yahoo.com](mailto:fuelcellconnection@yahoo.com).

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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/>)

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