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## **FUEL CELL CONNECTION - January 2006 Issue**

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

### 1. DOE Kicks Off DC Auto Show with Major Fuel Cell Announcements

DOE Secretary Samuel Bodman kicked off the Washington DC Auto Show with the announcement of \$119 million in funding and a research "roadmap" to identify and overcome hydrogen and fuel cell technology development challenges. DOE will provide up to \$100 million over four years for fuel cell research projects. Bodman also announced the selection of 12 projects that will receive \$19 million in federal funding over five years for polymer membrane research. DOE is now accepting public comment on the 80-page "Roadmap on Manufacturing R&D for the Hydrogen Economy." Comments are due within 45 days of the document's release date of January 24, 2006.

<http://www.hydrogen.energy.gov/manufacturing.html>

<http://www.energy.gov/news/3098.htm>

### 2. DOE Signs Agreement with FutureGen Industrial Alliance

The Department of Energy has signed an agreement with the FutureGen Industrial Alliance to build FutureGen, a prototype power plant that will produce both electricity and hydrogen with zero emissions. The Alliance will contribute \$250 million to the \$1 billion project.

[http://www.fossil.energy.gov/news/techlines/2005/tl\\_futuregen\\_signing.html](http://www.fossil.energy.gov/news/techlines/2005/tl_futuregen_signing.html)

### 3. Fuel Cell Micro-grid Installed at Air Force Base

Ten fuel cells installed at Robins Air Force Base as part of the base's Fuel Cell Micro-grid project are expected to supply 275,000 kilowatt hours of electricity in 2006. The five-kilowatt size fuel cells, designed and built by Plug Power, will operate on propane but can also use jet fuel and natural gas. [http://www.af.mil/news/story\\_print.asp?storyID=123013318](http://www.af.mil/news/story_print.asp?storyID=123013318)

### 4. Tax Incentives Assistance Project Launches Web Site

The Tax Incentives Assistance Project – a coalition of non-profit organizations, government agencies and energy efficiency industry leaders – has launched a web site to help consumers and businesses take advantage of tax incentives in the Energy Policy Act of 2005, including incentives for the purchase and installation of fuel cells.

<http://www.energytaxincentives.org>

### 5. NETL Laboratory Facilities Advance Hydrogen Economy

An article in a recent issue of *DOE Pulse* highlights the National Energy Technology Laboratory's efforts to advance the hydrogen economy. The article notes contributions to the Solid-State Energy Conversion Alliance (SECA) Program by NETL's Solid Oxide Fuel Cell Experimental Laboratory and the new DOE Fuel Cell Testing Facility.

[http://www.ornl.gov/info/news/pulse/pulse\\_v199\\_05.htm](http://www.ornl.gov/info/news/pulse/pulse_v199_05.htm)

6. *Fuel Cell Demonstrated Using JP8 Military Logistics Fuel*

Gas Technology Institute demonstrated a solid oxide fuel cell using military logistics fuel, also known as JP8, containing 600 to 700 ppm of sulfur. The 800-Watt SOFC stack was supplied by Versa Power Systems. The next demonstration will increase the size of the SOFC stack to achieve the 3 to 10 kW power goal.

<http://www.gastechnology.org/webroot/app/xn/xd.aspx?it=enweb&xd=6newsroom\2006\sofconjp8.xml>

7. *DOE Science Bowl Features Hydrogen & Fuel Cell Model Car Challenge*

DOE's National Science Bowl kicked off on January 20, 2006, with the first regional tournament for high school students. The Science Bowl also features a Hydrogen and Fuel Cell Model Car Challenge, in which 16 student teams will design and construct model hydrogen cars. Designers of winning cars receive \$9,000 in prizes for their schools.

<http://www.scied.science.doe.gov/nsb/pdf/1-19%20DOE%20Science%20Bowl%20%20Launch%20Release.pdf>

8. *NREL Report Identifies PEMFC Operations in Sub-Freezing Weather*

The National Renewable Energy Laboratory recently released a report, "PEM Fuel Cell Freeze and Rapid Startup Investigation," which identifies issues for rapid startup of PEMFCs in sub-freezing temperatures. The report also investigates proposed solutions and strategies for cold weather startup.

[http://www.nrel.gov/hydrogen/pdfs/pem\\_fc\\_freeze\\_milestone.pdf](http://www.nrel.gov/hydrogen/pdfs/pem_fc_freeze_milestone.pdf)

9. *Sandia Signs Fuel Cell Research Agreement with Sharp*

Sandia National Laboratory has signed a Cooperative Research and Development Agreement with Sharp Corporation for work on renewable and alternative energy technologies including fuel cells. Sandia will provide direct methanol fuel cells for testing in Sharp's target applications.

<http://www.sandia.gov/news-center/news-releases/2006/renew-energy-batt/sharp-agreement.html>

**RFP/Solicitation News**

10. *CCEF to Fund \$21 Million in DG Technologies*

Connecticut Clean Energy Fund is accepting applications for its \$21 million On-site Renewable Distributed Generation Program, which includes fuel cell projects as eligible technologies. Funding for individual fuel cell projects is capped at \$4.70 per Watt. The solicitation closing date is June 30, 2007.

[http://www.ctcleanenergy.com/investment/onsite\\_renewable\\_dg\\_program.html](http://www.ctcleanenergy.com/investment/onsite_renewable_dg_program.html)

11. *DOD Climate Change Fuel Cell Program Solicits Applications for Re-Obligated Funds*

Approximately \$1 million has been made available through the DOD 2003 Climate Change Fuel Cell Program. One project under the 2003 solicitation is no longer viable; therefore, the funding is being re-obligated. Grants are \$1,000/kW of installed fuel cell capacity up to one-third of the total project cost. Power plants purchased before October 1, 2003, are not eligible. The deadline for proposals is March 31, 2006.

<http://www.bpa.gov/Energy/N/projects/fuel%5Fcell/dod%5Fclimate%5Fchange/>

12. *Codes & Standards for the Hydrogen Economy*

DOE is soliciting proposals from potential partners for facilitating the development of codes and standards for hydrogen and fuel cell technologies and infrastructure. \$6 million is expected to be available for one award. Responses are due March 10, 2006.

<https://e-center.doe.gov/iips/faopor.nsf/UNID/286D2200BB174C36852570D00056E820?OpenDocument>

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*13. USDA Offers \$18.8 Million in Loans and Grants for Renewable Energy Projects*

The U.S. Department of Agriculture Rural Development Intermediary Relending Program and Rural Economic Development Loan and Grant Program have made available \$18.8 million in loans and grants for renewable energy projects, including use of biomass to generate energy. Up to \$300,000 is available per project for working capital grants. Applications must be received by March 31, 2006.

[http://www.usda.gov/wps/portal/!ut/p/s.7.0.A/7.0.1OB/.cmd/ad/.ar/sa.retrievecontent/.c/6.2.1.UH/.ce/7.2.5JM/.p/5.2.4TQ/.d/1/th/J.2.9D/s.7.0.A/7.0.1OB?PC.7.2.5JM.contentid=2006%2F01%2F0002.xml&PC.7.2.5JM.navtype=RT&PC.7.2.5JM.parentnav=LATEST\\_RELEASES&PC.7.2.5JM.navid=NEWS\\_RELEASE#7.2.5JM](http://www.usda.gov/wps/portal/!ut/p/s.7.0.A/7.0.1OB/.cmd/ad/.ar/sa.retrievecontent/.c/6.2.1.UH/.ce/7.2.5JM/.p/5.2.4TQ/.d/1/th/J.2.9D/s.7.0.A/7.0.1OB?PC.7.2.5JM.contentid=2006%2F01%2F0002.xml&PC.7.2.5JM.navtype=RT&PC.7.2.5JM.parentnav=LATEST_RELEASES&PC.7.2.5JM.navid=NEWS_RELEASE#7.2.5JM)

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**Contract / Funding Awards**  
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*14. DOE Funding Awarded to Proton Energy for Hydrogen Station*

The Univ. of Nevada Las Vegas Research Foundation awarded \$1.9 million to Proton Energy Systems to continue development of a hydrogen fueling station at the Las Vegas Valley Water District. The third phase award was funded by the DOE.

<http://www.renewableenergyaccess.com/rea/market/business/viewstory?id=39928>

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*15. DOE Selects Minority Universities for Energy Research Grants*

DOE has selected six institutions to receive grants for energy research through its Historically Black Colleges and Universities and Other Minority Institutions (HBCU/OMI) program. A \$200,000 award to Hampton University in Virginia will fund research into Fischer-Tropsch synthesis, for deriving hydrogen from fossil fuels.

[http://www.fossil.energy.gov/news/techlines/2005/tl\\_hbcu\\_awards1.html](http://www.fossil.energy.gov/news/techlines/2005/tl_hbcu_awards1.html)

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*16. TACOM Phase I SBIR Contract Awarded to Millennium Cell*

The U.S. Army Tank-automotive and Armaments Command (TACOM) has awarded a Phase I SBIR contract to Millennium Cell for an assessment of the feasibility of operating its hydrogen battery technology in conjunction with a 5-kW PEMFC using water containing a variety of impurities.

<http://www.millenniumcell.com/fw/main/default.asp?DocID=92&reqid=791382>

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*17. Fuel Cell Project Receives Funding from CCEF Program*

A 4-MW fuel cell project by PPL Energy Services Holding LLC was one of three renewable energy projects selected to receive funding by the Connecticut Clean Energy Fund through its Project 100 program, which seeks to deploy 100 MW of renewable energy capacity.

<http://www.ctcleanenergy.com/admin/PressReleaseArchive.php?Year=2005>

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*18. Hydrogen Production Projects Selected by DOE Coal & Power Program*

Two hydrogen production projects were among recipients of funding through the DOE Coal and Power R&D Program. Research Triangle Institute will receive approximately \$2.57 million to develop a process for co-producing hydrogen and electricity. West Virginia University Research Corporation will receive approximately \$2.54 million to integrate a coal extraction process into a central-station hydrogen production facility.

[http://www.fossil.energy.gov/news/techlines/2005/05069-Coproduction\\_Awards.html](http://www.fossil.energy.gov/news/techlines/2005/05069-Coproduction_Awards.html)

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*19. Air Force Selects Northrop Grumman, Protonex for Fuel Cell Projects*

The U.S. Air Force has selected the team of Northrop Grumman and Protonex to design and develop a lightweight fuel cell system to power equipment used by airmen on the battlefield. The system will be based on Protonex's P2 fuel cell product. The Air Force also selected Protonex to develop fuel cell power systems for unmanned aircraft.

<http://www.protonex.com/NG-Protonex%20Power%20Pack.pdf>

<http://www.protonex.com/UAV%20Award%20FINAL.pdf>

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*20. DOD Awards Funding to Fuel Cell Project for Satellite Backup Power*

The Department of Defense has awarded \$2 million to Plug Power and Ballard Power Systems to develop an advanced prototype PEMFC to support Defense Continuity of Operations (COOP).

The project is the first phase of a collaboration that could lead to development of portable backup power for COOP satellite locations.

<http://www.plugpower.com/news/press.cfm>

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*21. PA EDA Awards \$8.5 Million for Clean Energy Projects*

Pennsylvania's Energy Development Authority approved \$8.5 million in grants and loans for clean energy projects, including funding for two fuel cell projects. \$150,000 was awarded to Phipps Conservatory and Botanical Gardens for installation and operation of a solid oxide fuel cell. \$408,737 was awarded to Franklin Fuel Cells for development of a core direct oxidation SOFC technology.

[http://www.dep.state.pa.us/dep/deputate/pollprev/PA\\_Energy/PAENERGY/PDF\\_files/PEDApress\\_release\\_011106.pdf](http://www.dep.state.pa.us/dep/deputate/pollprev/PA_Energy/PAENERGY/PDF_files/PEDApress_release_011106.pdf)

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*22. Safe Hydrogen Receives SEED Funding for Hydrogen Demonstration Project*

Safe Hydrogen, LLC, received \$308,000 from the Massachusetts Renewable Energy Trust Sustainable Energy Economic Development (SEED) Program for completion of a project to validate the cost and efficiency of the company's technology to store, transport and generate hydrogen.

[http://home.businesswire.com/portal/site/home/?epi\\_menuItemID=989a6827590d7dda9cdf6023a0908a0c&epi\\_menuID=c791260db682611740b28e347a808a0c&epi\\_baseMenuID=384979e8cc48c441ef0130f5c6908a0c&ndmViewId=news\\_view&newsLang=en&div=973078938&newsId=20060116005363](http://home.businesswire.com/portal/site/home/?epi_menuItemID=989a6827590d7dda9cdf6023a0908a0c&epi_menuID=c791260db682611740b28e347a808a0c&epi_baseMenuID=384979e8cc48c441ef0130f5c6908a0c&ndmViewId=news_view&newsLang=en&div=973078938&newsId=20060116005363)

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**State Activities**  
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*23. Idaho Wind Project to Produce Hydrogen*

A project to produce hydrogen using wind energy has received a \$200,000 grant from the U.S. Department of Agriculture Rural Development Program. Idaho Synthetic Energy will produce hydrogen at the Lewandowski Wind Farm.

[http://www.eere.energy.gov/state\\_energy\\_program/project\\_brief\\_detail.cfm/pb\\_id=924](http://www.eere.energy.gov/state_energy_program/project_brief_detail.cfm/pb_id=924)

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**Industry Headlines**  
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*24. Fuel Cell Meets New Standards for the Technology*

UTC Power announced that its PureCell™ 200 fuel cell has been certified to meet the ANSI/CSA America FC 1-2004 Stationary Fuel Cell Power Systems Standard. This new standard, by CSA International, sets design, construction, operating and quality requirements for stationary fuel cell power systems.

[http://www.utcpower.com/fs/com/bin/fs\\_com\\_Page/0.5433.03629.00.html](http://www.utcpower.com/fs/com/bin/fs_com_Page/0.5433.03629.00.html)

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*25. FuelCell Energy Sells First Megawatt Power Plant in Japan*

FuelCell Energy has announced the sale of its first 1-MW Direct FuelCell® power plant for a Sharp Corp. production facility in Japan. The fuel cell system will provide base load power as part of a green on-site generation power system that includes a photovoltaic array for peaking power.

[http://www.corporate-ir.net/ireye/ir\\_site.zhtml?ticker=FCEL&script=410&item\\_id=807657&layout=23](http://www.corporate-ir.net/ireye/ir_site.zhtml?ticker=FCEL&script=410&item_id=807657&layout=23)

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**University Activities**  
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*26. 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))

Researchers at the University of Texas at Austin have successfully used palladium in place of platinum in fuel cell production. The university reports that the synthesized alloy is about five times less expensive than platinum and could allow for the production of "cheaper, longer-lasting fuel cells." The breakthrough was reported in The Journal of Physical Chemistry in November. The research team is headed by Mechanical Engineering Professor Arumugam "Ram" Manthiram. [15-Nov-2005, The University of Texas at Austin]

Tongji University, Shell Hydrogen BV and Shell (China) Limited have signed an agreement to build Shanghai's first hydrogen filling station for fuel cell vehicles. The partners will build the new station at Shanghai International Automotive City, working together on the design, construction, maintenance and operations. The station, which is scheduled to be completed by the end of this year, is part of the Ministry of Science and Technology's national program to develop electric vehicles in China. In 2006 Shanghai will be operating 10 fuel cell vehicles, and this is planned to grow to 1,000 by 2010, including fuel cell buses sponsored by the Global Environmental Facility through the United Nations Development Program. Tongji University is responsible for the development and operation of the new hydrogen station with Shell contributing technical advice and funding. [22-Dec-2005, Shell press release]

"Mr. Freeze," the Chem-E car designed by chemical engineering students at the University at Buffalo School of Engineering and Applied Sciences, finished fourth in the 7th Annual Chem-E CAR competition held recently in Cincinnati. The competition, which kicked off the annual meeting of the American Institute of Chemical Engineers, attracted students from 31 universities. The institutions that participated had placed first, second or third in regional competitions across the country to qualify for the national competition. UB's team placed second at the regional

conference in April 2005 in Easton, Pa., in order to qualify for the final competition, according to Sue Wuetcher of UB News Services. She explained the competition requires students to power shoe box cars via a chemical reaction and carry a specified payload for a given distance. Participants are not given the payload or distance until one hour before the competition. "The car was powered by a sodium borohydride electrolyte fuel cell and was stopped by dissolving magnesium ribbon in hydrochloric acid," said team member Lindsay Mroz. "As the magnesium was connected in series with the fuel cells, the car stopped when the ribbon broke, due to an incomplete circuit." [3-Jan-2006, *The Buffalo News* (New York)]

Bouncing, fuel cell-powered microscopic robots capable of exploring planets are among the ideas proposed by scientists funded by NASA's forward-thinking Institute for Advanced Concepts, or NIAC. The dozen or so projects chosen each year for funding tend to be long-term, perhaps coming to fruition within 10 to 40 years. At a recent meeting in Colorado, scientists heard about the projects funded last year. Penelope Boston, of New Mexico Tech, and Steven Dubowsky, of the Massachusetts Institute of Technology's space robotics laboratory, looked at space exploration. Their idea was to beef up the capabilities of probes orbiting planets, and of robotic rovers, with thousands of 10 cm-wide ball-shaped robots scattered on the planet's surface. "The microbots employ hopping, bouncing, and rolling as a locomotion mode to reach scientifically interesting features in very rugged terrain," said the scientists. Powered by fuel cells, the microbots would explore, sharing information so as to build up a map of the planetary surface. Dubowsky's microbots will be tested in New Mexico this year; his team hopes to have prototypes built by March. The deadline for 2006 NIAC proposals is midnight, Feb. 13. [4-Jan-2006, *The Guardian* (London)]

Delaware State University is to receive \$3.25 million in federal funding for a Hydrogen Storage Facility on campus, Delaware Sen. Tom Carpenter announced earlier this month. The Center for Hydrogen Storage Research will compliment the fuel cell technology that currently exists in the state. The primary focus of the center will be finding novel materials that can store and release large quantities of hydrogen gas for vehicular propulsion. Materials now under consideration include metal hydrides and certain types of complex hydrides known as alanates. The center will be involved in all aspects of hydrogen storage research including: fabricating and testing the materials, determining the amount of hydrogen that can be absorbed and released, determining the thermodynamic stability of the materials, and measuring the kinetics of uptake and release. [4-Jan-2006, *States News Service*]

An innovative fuel cell unit developed by Ion America of Mountain View, Calif., will be tested at the University of Tennessee at Chattanooga SimCenter. The unit is about the size of a large refrigerator and is designed to give off hydrogen that its promoters say could be used to power fuel cell vehicles. It will produce 5 kilowatts of electricity, enough to meet the energy needs of an average-size house. If the demonstration at the SimCenter goes well, the aim is to develop and test a more powerful device later this year that could produce between 100 and 200 kilowatts, which is enough energy to power a commercial building. In 2004, Congress allocated \$2.5 million for Ion America to test its technologies in Chattanooga. The fuel cell unit will be in operation by mid-February. Testing is expected to run through October. [7-Jan-2006 *Chattanooga Times Free Press* (Tennessee)]

The University of South Carolina, South Carolina State University and Clemson University have seats on the board of directors of the South Carolina Hydrogen and Fuel Cell Alliance, a new nonprofit corporation formed by the South Carolina Department of Commerce. Other directors represent Savannah River National Laboratory and Aiken County's Center for Hydrogen Research. "What we've seen in the past were embryonic efforts," said Fred Humes, the executive director of the Economic Development Partnership for Aiken and Edgefield counties. "We've finally reached the point with everyone in the state ... where we've developed that synergy of moving everybody along." Among the Alliance's first steps will be expanding its five-member board of directors and involving industrial members, Mr. Humes said. [14-Jan-2006, *The Augusta Chronicle* (Georgia)]



University of Rochester researchers say they've created a mathematical model that will allow scientists to simulate and understand phase changes. Modeling the transformation process involved when matter moves from one phase to another, such as from liquid to gas, has been all but impossible due to the increasingly complex manner in which molecules behave as they approach that point. The University of Rochester scientists say their math model could have an impact on everything from decaffeinating coffee to improving fuel cell efficiency in cars of the future. "This problem has baffled scientists for decades," said Yonathan Shapir, professor of physics and chemical engineering and co-author of the paper. "This is the first time a computer program could simulate a phase transition because the computers would always bog down at what's known as the 'critical slowdown.' We figured out a way to perform a kind of end-run around that critical point slowdown and the results allow us to calculate certain critical point properties for the first time." The team's findings are presented in the journal *Physical Review Letters*. [17-Jan-2006, UPI]

Astris Energi Inc. of Ontario, Canada, has initiated projects with Queen's-RMC Fuel Cell Research Center and the Queen's Fuel Cell Team. The Queen's-RMC Fuel Cell Research Center is Canada's leading university-based research and development organization addressing the key technology challenges to the adoption of fuel cell applications. The initial project between Astris and FCRC is funded in excess of 57 percent by a grant from Materials and Manufacturing Ontario (MMO) and is expected to be followed up by future projects that address commercialization and manufacturing of Astris' fuel cell technology. The Queen's Fuel Cell Team is developing of a fuel cell system to power a golf car that is based on the Astris POWERSTACK™ MC250 which QFCT purchased. The Astris fuel cell was selected due to price and availability when compared to other similar fuel cells on the market. [23-Jan-2006, *Canadian Corporate Newswire*]

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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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**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>)