

2007 ANNUAL REPORT



US Fuel Cell Council

The Voice of the Fuel Cell Industry

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US Fuel Cell Council: The Voice of the Fuel Cell Industry

Mission

The US Fuel Cell Council (USFCC) is a trade association dedicated to commercialization of fuel cells in the United States.

About the USFCC

The US Fuel Cell Council is the trade association of the industry. Our membership includes producers of all types of fuel cells, major suppliers, automakers and their suppliers, universities, fuel cell customers, hydrogen and other energy providers, government agencies, nonprofit organizations, allied trade associations and many others.

Formed in 1998, the US Fuel Cell Council provides its members an opportunity to help shape the programs, policies, and practices needed to commercialize this important energy technology. Members have access to exclusive reports and analyses, technical collaboration, and many other activities, including the annual USFCC Congressional Fuel Cell Expo on Capitol Hill in Washington, DC.

2007 Officers

President: Jerry Hallmark, Motorola Labs
Vice President: Frank R. Preli, UTC Power
Treasurer: Chris Forbes, Siemens Power Generation
Secretary: Erin Lane, Plug Power

Executive Committee

Chair: *Jerry Hallmark, Motorola Labs*

Everett Anderson, Distributed Energy Systems
Ethan Brown, Ballard Power Systems
Keith Cole, General Motors
Greg Dolan, Methanol Institute
Chris Forbes, Siemens Power Generation
Eric Funkenbusch, 3M
Jay Hoffman, Johnson Matthey Fuel Cells
Owen Hopkins, Entegris
Dennis Kountz, DuPont Fuel Cells
Erin Lane, Plug Power
Stewart McKenzie, Columbian Chemicals Company
William Mitchell, Nuvera Fuel Cells
Greg Moreland, MTI Micro Fuel Cells
Frank Preli, UTC Power
Eric Simpkins, IdaTech
Rex Luzader, Millennium Cell*
*Associate Member Representative

Strategy Committee

Chair: *Mike Hicks, IdaTech*

Ethan Brown, Ballard Power Systems
Stewart McKenzie, Columbian Chemicals Company
Chris Forbes, Siemens Power Generation
Ella Kisilis, United Technologies Research Center
Malcolm Man, Tekion
Jesse Schneider, Chrysler
Sondra Ullman, Plug Power
Robert Wichert, US Fuel Cell Council

Staff

USFCC Staff

Tony Androsky, Deputy Executive Director
Beth Ayres, Executive Assistant
Bud DeFlaviis, Director of Government Affairs
Sarah Olexsak, Member Services Specialist
Robert Rose, Executive Director
Robert Wichert, Technical Director

Support

Breakthrough Technologies Institute, Inc. provides contract office services and staff support.

To the Members of the US Fuel Cell Council:

At the US Fuel Cell Council, we pride ourselves on being member-led. In 2007, our collective vision and hard work have materially advanced development and commercialization of fuel cells.

- In Congress, we won House and Senate approval of a long term 30% installation tax credit extension, partly as the result of our first formal grass roots lobbying effort.
- We also won House and Senate approval of nearly \$420 million for R&D in FY 2008.
- We convinced the US Department of Energy – after a two year struggle – to launch a substantial effort to support federal agency fuel cell purchases. We jointly held workshops with purchasing agents from federal agencies and National Laboratories. We are working with the Department of Defense on its fork lift deployment program.
- We are pursuing a multi-year effort to obtain approval to ship fuel cartridges for fuel cell devices on board aircraft and to carry portable fuel cells and their fuels on passenger aircraft. Almost every country worldwide has already approved methanol, formic acid and butane powered fuel cell devices; hydrogen and borohydride fueled systems are under active review.
- To facilitate technical communication, the United Nations Sub-Committee of Experts on the Transport of Dangerous Goods has granted the USFCC Consultative Status as the voice of the fuel cell industry.
- We published the first comprehensive list of fuel cell products, based on a commercial definition developed by our members; we are seeking international recognition of the list.
- We publish the best data on the commercial status of our industry and were invited to present a “State of the Fuel Cell Industry” address at the recent Fuel Cell Seminar and Expo.
- We now have three USFCC members on the Fuel Cell Seminar and Expo Board, spearheading an effort to expand the commercial focus of the Seminar.
- We are leading collaborations on a wide range of forward-looking issues, from hydrogen infrastructure to fuel quality to manufacturing, from safety to education and training.
- We have added to our growing list of technical papers and recommended practices on issues such as testing, materials, seals and gaskets.
- We conducted a rigorous budget process that assures executive member priority setting input and more than doubled contract income for 2008, fulfilling a promise to our members.

For 2008, we will:

- publish and promote a comprehensive revision of the *Path Forward*, our vision of a public-private partnership supporting R&D, purchases and market entry support;
- seek full funding for R&D and full implementation of the Energy Policy Act of 2005;
- increase our marketing and education efforts;
- hold additional workshops for federal purchasing agents; and
- continue to invest in codes and standards activity to assure an industry voice, and to save you money in this complex and demanding area.

The year ahead poses fresh challenges for our industry and our industry association. But working collectively, we can and will overcome them to build a successful fuel cell industry.

Sincerely,

Jerry Hallmark
President

USFCC Executive Members

3M
Angstrom Power
Ballard Power Systems
BASF
Bloom Energy
Cabot Fuel Cells
Chevron Technology Ventures
Chrysler
Columbian Chemicals Company
Dana Corporation
Delphi Corporation
Distributed Energy Systems
DuPont Fuel Cells
Entegris, Inc.
FuelCell Energy, Inc.
General Motors
Gore Fuel Cell Technologies
Hydrogenics Corporation

IdaTech
Johnson Matthey Fuel Cells
Methanol Institute
Motorola Labs
MTI Micro Fuel Cells
National Joint Apprenticeship and Training Committee
Nissan Technical Center North America
Nuvera Fuel Cells, Inc.
Ohio Department of Development
Plug Power, Inc.
Polyfuel, Inc.
Siemens Power Generation
Tekion
Toyota Motor North America
Trulite Industries Ltd.
University of South Carolina NSF-I/UCRC
UTC Power

USFCC Associate Members

Acta S.p.A.
Air Products and Chemicals, Inc.
Arkema
BIC Corporation
Breakthrough Technologies Institute
Bulk Molding Compounds, Inc.
Casio Computer Co. Ltd.
Caterpillar Electric Power Group
Cerium Laboratories
Concurrent Technologies Corporation
ConocoPhillips
Direct Methanol Fuel Cell Corporation
Donaldson Company, Inc.
Energizer Battery Manufacturing, Inc.
Energy Conversion Devices, Inc.
Franklin Fuel Cells
Gas Technology Institute
Graftech, Inc.
Hawaii Natural Energy Institute
HydroGen Corporation
Intelligent Energy
Ion Power, Inc.
ITM Power PLC
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Neah Power Systems, Inc.
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Panasonic Energy Solutions Laboratory
Parker Hannifin Corporation
Power Air Corporation
Procter & Gamble
Protonex Technology Corp.
ReliOn, Inc.
Renewable Fuels Association
Rohm and Haas
SENTECH, Inc.
SGL Carbon Group
SolviCore
South Coast Air Quality Management
Sud-Chemie, Inc.
Tata Power Company, Ltd.
Teledyne Energy Systems, Inc.
Toshiba Corporation
Toyo Seikan Kaisha, Ltd.
UltraCell Corporation
Underwriters Laboratories, Inc.
Versa Power Systems
ZTEK Corporation

USFCC Government/Non-Profit

Argonne National Laboratory
California Environmental Protection Agency
Connecticut Hydrogen-Fuel Cell Coalition
(Connecticut Center for Advanced Technology)
CSA International
Kettering University
Office of Naval Research
National Association of State Fire Marshalls/HELP

National Fuel Cell Research Center
National Institute of Standards and Technology
National Renewable Energy Laboratory
Rensselaer Polytechnic Institute
South Carolina Research Authority
Taiwan Fuel Cell Partnership
U.S. Department of Energy

Finance

The USFCC has annual income in excess of \$1 million.

Dues: Dues revenue represents about 75% percent of the total. The Council's policy is to finance core operations from dues income, and finance expanded services whenever possible via growth in membership and non-dues income.

Contracts: The Council conducts an education program under a contract (FY 2008) from the US Department of Energy (DOE), which includes publication of the monthly Fuel Cell Connection and technical activity in solid oxide fuel cells. The Connection is distributed to the public free of charge. DOE also supports some of the Council's Codes & Standards activities.

Other Revenue: The Council raises revenue from the sale of certain publications, from sponsorships and from other activities.

Pre-competitive Collaborations: Members occasionally collaborate on an activity and share its cost. Typically, collaborations involve obtaining outside expertise on an urgent technical or regulatory matter. Participation is voluntary and member-led.

Value: Dues paying members get access to all eight Working Groups and all Focus Groups, the Members Only web site and Members Only materials. No special assessments or additional fees are required or expected to cover core program activities.

The US Fuel Cell Council is the voice of the fuel cell industry, with a presence and visibility on Capitol Hill, in the halls of government, in the media and among technical bodies worldwide. Eight "high-octane" Working Groups lead the staff efforts and generate products and services that address all fuel cell technologies and all fuel cell applications.

Dues: Dues for 2007 are:

- \$12,000 for Executive Members;
- \$7,000 for Associate Members;
- \$7,000 for Government/Nonprofit members.

Organization and Structure

- The US Fuel Cell Council is a business association organized under Section 501-c-6 of the Internal Revenue Code. Dues generally are deductible as a business expense, except for the portion that finances lobbying.
- Governing authority is vested in a *Board of Directors*. Every Executive Member has a seat on the Board. Associate Members collectively nominate one person to serve as their Board representative. The Board meets at least bi-annually, usually in conjunction with USFCC general membership meetings.
- Officers include a President, Vice President, Secretary and Treasurer, elected annually by the Board.
- There are two Standing Committees and eight Working Groups.
- The *Strategy Committee* coordinates Working Group activity. The *Executive Committee* is responsible for financial management and the Board agenda. The Executive Committee develops the annual budget.
- The Committees meet regularly via conference call.
- The *Working Groups* are responsible for the activities of the Council. The Working Groups have substantial independence and their own budgets. In addition, several task forces and focus groups provide a specific concentrated product or service. Working Groups meet at least monthly via conference call.
- Nonmember participation in Working Group activities is permitted at the discretion of the Working Group Chair where there is value added for the Working Group; such participation is limited to a 90-day period.
- Close to 500 individuals are now on the Council's email distribution list.

Major Initiatives

Advocacy

- Advocate full implementation of the Energy Policy Act of 2005 including fuel cell Market Transformation program.
- Advocate eight-year reauthorization for fuel cell installation tax credit.
- Advocate robust funding for fuel cell research and development.
- Work collaboratively with bipartisan Hydrogen and Fuel Cell Caucuses in both House and Senate.

Marketing

- Working with US DOE on Fuel Cell Early Market Activity, a program to educate potential customers at federal agencies and National Laboratories.
- Maintain comprehensive Commercially Available Products list.
- Trade show participation and presentations bring the fuel cell message to potential collaborators and customers.
- High quality brochures and fact sheets address power generation, vehicles and micro fuel cell applications.

Industry Data

- Annual industry survey of sales, employment, and research and development (R&D) spending now covers companies worldwide in collaboration with counterpart organizations in Japan, Canada and Europe.

Transportation Regulations

- USFCC has consultative status at the United Nations UNSCETDG and participatory status at ICAO for fuel cell issues.
- ICAO Technical Instructions as of January 1, 2007, provide for methanol, formic acid and butane fuel cells to be allowed as carry-on baggage.
- UN Number designators with appropriate conditions for shipment expected to be obtained shortly.
- International Electrotechnical Commission (IEC) published IEC PAS 62282-6-1 Ed. 1 in February, 2006.
- USFCC provides guidance to security personnel, screeners, and airline professionals regarding fuel cell products approved for airline carry-on use by passengers.

Other Standards and Regulations

- USFCC Joint Hydrogen Quality Task Force (JH2QTF) is a recognized leader on issues regarding hydrogen contaminants, stack poisoning, and testing/protocol development.
- USFCC members and staff are involved in every significant code activity including leadership of standards writing working groups and chairmanship of technical committees for national and international efforts.

Specifications

- Under leadership of the Materials and Components Working Group, a second series of blind round robin MEA tests were conducted and new protocols and technical papers have been published.
- Work is underway in Single Cell Testing, Durability Issues, Gas Diffusion Layer Testing, Conductivity Testing, Contaminants, Gaskets, Solid Oxide Fuel Cells.

Solid Oxide

- The Solid Oxide Fuel Cell (SOFC) Focus Group fosters a unified SOFC message within the Council and the industry.
- Workshop in November helped define a consistent message and strategy among the SOFC community.
- Released button cell testing protocol.

Publications and Outreach

- The *Fuel Cell Connection*, monthly survey of fuel cell and hydrogen R&D and sales opportunities.
- *Weekly Currents* and *Legislative Update* (Members only) provide up-to-the-minute information.
- *Media Guide* reaches hundreds of media outlets with member information and contacts.
- Application specific brochures and fact sheets showcase the technology and provide member visibility.

Publications – The Voice of the Fuel Cell Industry

US Fuel Cell Council Publications

- **Weekly Currents** - policy news, advance RFP notices, speaking opportunities, member news, Council calendar. This publication is for members only.
- **Fuel Cell Connection** - funding and partnership opportunities, industry news. The *Connection* is available to the public without charge and now has more than 4,000 subscribers.
- **Media Guide** - distributed to more than 500 reporters, industry analysts, political and business leaders annually.
- **Legislative Update** - distributed with the *Weekly Currents*; reports on events in Washington, D.C. and in state capitols. This publication is for members only.

US Fuel Cell Council Resource Materials

- **US Fuel Cell Council Worldwide Industry Survey**
An annual survey examining worldwide fuel cell sales, research and development (R&D) expenditures and employment. This valuable information can be used to assess the development of the industry.
- **US Fuel Cell Council Media Guide**
Provides contact information for member companies – including press contacts – and a description of each member's fuel cell activities. It is distributed free to media and opinion leaders.
- **Commercially Available Fuel Cell Product List**
A comprehensive list of micro, portable, stationary and transportation fuel cell products available for purchase. Available in a brief EZ-Read and comprehensive Full-Detail version.
- **An Agenda for Action**
An easy-to-follow, application-neutral document that provides policymakers with a balanced outline of the industry's policy needs.
- **Fuel Cell Power for Mobility**
An extensive review of fuel cell vehicles and their use. Member company work is highlighted.
- **Fuel Cells for Power Generation**
Extensively revised in 2007, this brochure reviews fuel cells for stationary applications, including commercial/industrial and residential/backup size applications. Member company work is highlighted.
- **Fuel Cell Energy Cost Model**
An Excel spreadsheet (with embedded macros) available to the general public for calculations of estimated fuel cell energy costs given fuel, load, and other user input.
- **Codes and Standards Priority Matrix**
This matrix summarizes the codes and standards priorities of the fuel cell industry and gives direction on where additional priority and resources are required. The document is reviewed monthly by the USFCC Strategy Committee.
- **Fact Sheets**
Topics include: Fuel Cells - The Basics; Fuel Cell Types; Residential Applications for Fuel Cells; Portable Fuel Cell Applications; Fuel Cells for Transportation; Fuel Cells for Wastewater Treatment Plants; Fuel Cells for Military Applications; Fuel Cells: Stationary Power - Industrial Applications; Hydrogen – Basics; Hydrogen: Fossil Fuel; Hydrogen: Non-Fossil Fuel; Alternative Fuel Vehicle Comparison.
- **Technical Papers**
Topics include: Introduction to Solid Oxide Fuel Cell Button Cell Testing; Electrical Conductivity Test Protocol; Fuel Cell Leak Testing Requirements and Procedure; Fuel Cell Test Station Requirements and Verification Procedure; Presentation on Longevity; Proposed Hydrogen Fuel Standard Road Map; Protocol on Fuel Cell Component Testing; List of Potential Hydrogen Contaminant Compounds and References to Published Results on These Compounds; Protocol on Fuel Cell Component Testing: Primer for Generating Test Plans; Protocol on Fuel Cell Component Testing: Suggested Dynamic Testing Profile (DTP); Protocol on Fuel Cell Component Testing: Suggested Test Plan Template; Protocol on Fuel Cell Component Testing: Types of Measurements Necessary for Industry to Understand and Apply the Test Data Generated; Recommended Standard Test Methods for Fuel Cell Gasket Materials; Single Cell Test Protocol.

These resources can be downloaded from the USFCC Brochures & Reports Page: www.usfcc.com/resources/brochrep.html.

Website

The US Fuel Cell Council web site, www.usfcc.com, provides information about the Council, links to member sites, a virtual library, conference and meeting listings, informative downloads and links to employment and related sites. Web statistics show more than two million hits over the past year.

Regular additions to the public face of the web site include:

- Technical documents and protocols
- "Capitol Hill Events" page
- Presentations from recent meetings
- A listing of publications and media outlets quoting USFCC staff or referencing USFCC informational materials
- Press releases
- Newsletter issues in English, Spanish and Portuguese

The "Members Only" section of the web site includes minutes of all Working Group conference calls, task items and work product results, back issues of publications, and data archives, as well as reports and presentations. Recent "Members Only" additions include:

- Materials for USFCC/DOE Early Market Activity workshops
- Materials for UN, ICAO, and DOT for Portable Power issues
- Working Group reports

Events

USFCC Congressional Fuel Cell Expo

More than 20 leading fuel cell industry companies participated in the seventh annual US Fuel Cell Council Congressional Fuel Cell Expo on May 15, 2007, in the Caucus Room of the Cannon House Office Building on Capitol Hill in Washington, D.C. The event featured a number of fuel cell vehicles available for a ride-and-drive and several working fuel cell systems. The event drew hundreds of members of Congress, congressional staff, federal officials, business executives and news media representatives. The Expo is an annual event, sponsored by the US Fuel Cell Council.

2007 Capitol Hill Expo Exhibitors:

Ballard Power Systems	IdaTech, LLC
Chevron	MTI Micro Fuel Cells Inc.
Columbian Chemicals	National Energy Technology Laboratory (NETL)
Delphi	Nuvera
Distributed Energy Systems	Plug Power
Dupont Fuel Cells	Siemens Power Generation
Entegris	Trulite, Inc.
FuelCell Energy, Inc.	U.S. Department of Energy (DOE)
Fuel Cells 2000	University of South Carolina
Gore Fuel Cell Technologies	UTC Power
GrafTech International Ltd.	Versa Power
Hydrogenics Corporation	

Fuel Cell Seminar & Exposition

US Fuel Cell Council retains an active role on the Board of the Fuel Cell Seminar & Exposition. The US Fuel Cell Council is a major supporter of the event, sponsoring the lanyards and hosting the Welcome Reception via support from our Sustaining Sponsors. Throughout the week the Council distributes "The Show Daily" newsletter detailing conference activities and announcements. At the 2007 Fuel Cell Seminar & Exposition in San Antonio, Texas, special focus was placed on new member recruitment. The staff and members did this by distributing recruitment packages, inviting non-members to working group meetings and meeting with potential members in the exhibit hall.

Conferences

Council staff, with priority guidance from the Education and Marketing Working Group, conducted booth exhibits at several conferences in 2007:

- International Hydrogen & Fuel Cell Expo (FC EXPO 2007), Tokyo, Japan
- GovEnergy, New Orleans, LA
- 2007 Fuel Cell Seminar & Exposition, San Antonio, TX

Policy Actions

Definition of Commercial System

The Executive Committee affirmed the definition of a commercial fuel cell system. The USFCC considers a fuel cell power system commercial if it meets the following three criteria:

- Offered for sale at an established price (a price quoted consistently in proposals and bids for projects of comparable scope);
- Offered with a written warranty; and
- Meets approved industry standards or is certified by an established industry body.

Fuel Cell Pathfinder Award

The US Fuel Cell Council's Pathfinder Award recognizes the contribution of individuals outside the industry to the commercialization of fuel cells in the United States. Awards are given annually at the USFCC's Capitol Hill Reception and may also be awarded at other events during the year.

Researchers, planners, political leaders, employees of federal and state governments, and fuel cell users and buyers will be among the recipients. In extraordinary circumstances, a company or institution might also be an appropriate recipient.

The symbol of the Pathfinder Award is the compass. A compass helps guide the user in the right direction. Pathfinders are leaders, helping guide our industry.

Recipients are selected by an awards committee from nominations made by members.

US Fuel Cell Council Pathfinder Award Recipients:

2003

Mr. Steve Chalk, U.S. Department of Energy
Dr. Alan Lloyd, California Air Resources Board
Dr. JoAnn Milliken, U.S. Department of Energy
Dr. Mark Williams, U.S. Department of Energy

2004

Dr. Charles Ke, U.S. Department of Transportation

2005

Governor Bob Taft (R-OH)
Senator Byron Dorgan (D-ND)
Senator Lindsey Graham (R-SC)
Congressman John Larson (D-CT)
Congresswoman Nancy Johnson (R-CT)

2006

Senator Gordon Smith (R-OR)
Congressman Mike McNulty (D-NY)

2007

Shalom Zelingher, NYPA (posthumous)

Staff Presentations

Over the years Council staff members have made hundreds of presentations at workshops, seminars and meetings in the US and in a number of other nations. Highlights of 2007 include:

Congressional Hearings and meetings

- US House Ways and Means Committee Testimony – Fuel Cell Tax Credits, Washington, DC
- US House and Senate Hydrogen and Fuel Cell Caucus, public meeting, Washington, DC
- US House Science and Technology Committee, Committee staff briefing, Washington, DC
- US Senate Committee on Finance, Senate staff briefing, Washington, DC

Conferences

- Fuel Cell Early Markets: Policy, Finance & Applications 2007, Brussels, Belgium
- Fuel Cell Seminar & Exposition, San Antonio, TX
- Hydrogen & Fuel Cells 2007 Conference, Vancouver, BC
- Industrial and Commercial Overview of Hydrogen and Fuel Cells Conference and Exhibition, Mexico City
- International Microelectronics And Packaging Society, Albuquerque, New Mexico
- 3rd International Hydrail Conference, Salisbury, NC

Meetings and Workshops

- Center for American Progress – Discussion on Alternative Energy Funding, Washington, DC
- Department of Transportation (DOT), Washington, DC; Atlantic City, NJ
- Federal Aviation Administration (FAA), Atlantic City, NJ
- Hydrogen Executive Leadership Panel, National Association of State Fire Marshals, Atlanta, GA
- Hydrogen Infrastructure Forum between National & Local Governments and Industry: "Addressing Potential Near Term Demand Gaps," Washington, DC
- International Civil Aviation Organization (ICAO), Montreal, Canada
- International Electrotechnical Commission (IEC), Paris, France
- International Organization for Standardization (ISO) TC22 SC21, Naples, Italy; Berlin, Germany
- JARI/FCCJ/USFCC Joint Meeting, Washington, DC; Troy, MI
- Kettering University, Flint, MI
- National Academy of Sciences Committee on Resource Needs for Fuel Cell and Hydrogen Technologies, Washington, DC
- National Fire Protection Association, NFPA 853 and NFPA 850, Boston, MA
- National Training Institute for the Electrical Industry, NJATC, Knoxville, TN
- Natural Resources Canada/MOD/US Department of Defense (DOD), Vancouver, British Columbia, Canada
- Society of Automotive Engineers (SAE) Fuel Cell Standards Committee, Troy, MI
- Transportation Securities Administration (TSA), Washington, DC
- United Nations (UN) Subcommittee on the Transport of Dangerous Goods, Geneva, Switzerland
- USFCC/Department of Energy Early Market Activity, Washington, D.C; ANL-Chicago, IL

Codes and Standards Working Group: Chair - Sondra Ullman, Plug Power

The Codes & Standards Working Group provides leadership and guidance to the National Hydrogen and Fuel Cell Codes & Standards Coordinating Committee in monthly meetings and through policy direction. The monthly meetings provide members an opportunity to assess the current regulatory and standards landscape as well as formulate responses to circumstances as they develop. The opportunity to influence non-members, as well as the US Government, makes this an especially effective forum. Our members work hard to identify critical gaps and costly overlaps of standardization and regulatory activities. The Council provides timely updates to the US Fuel Cell Council Codes & Standards Priority Matrix for the information and use of everyone in the fuel cell and hydrogen industries. Council members serve on all the expert panels and forums that affect our potential markets.

Our Technical Director and Deputy Executive Director serve on numerous technical committees and expert panels along with serving on the US Technical Advisory Group to IEC Technical Committee 105 on fuel cells and the ISO Technical Committee 197 on Hydrogen.

Our Deputy Executive Director also serves on both the NFPA and SAE fuel cell standards panels, serves as the Chair of the CSA Fuel Cell Technical Committee, as well as providing a valuable interface with the National Association of State Fire Marshals.

Our Technical Director is the Chairman of ASME PTC-50 on fuel cell performance, the Chairman of the NFPA Fuel Cell Installation Standard Working Group (NFPA 853), the convenor of IEC TC 105 Working Group #7 responsible for the IEC Portable Fuel Cell Safety Standard, the Chairman of the CSA Portable Safety Standard Working Group and the Secretary of IEC TC 105 Working Group #8 responsible for the IEC Micro Fuel Cell Safety Standard as well as serving as the fuel cell industry representative to the United Nations Sub-Committee of Experts on the Transport of Dangerous Goods and the International Civil Aviation Organization (ICAO) Dangerous Goods Panel. Our Technical Director is also a member of the National Fire Protection Association Working Group responsible for NFPA 2 on Hydrogen as well as providing a valuable continuing interface with the International Air Transport Association and the International Airline Pilots Association.

The Executive Codes & Standards Task Force, comprised of the Chairs of the Transportation, Portable Power, Materials & Components, Codes & Standards, and Power Generation Working Groups provides oversight and direction needed at an executive level. This Task Force produces an updated Codes & Standards priority matrix every month as a function of their membership in the Strategy Committee and provides valuable budget input regarding Codes & Standards expenditures by the Council.

Areas of Concentration

- Portable / Micro Fuel Cell Safety Standards
- Portable / Micro Fuel Cell Transportation Regulations
- SAE Fuel Cell Standards Committee
- Global Technical Regulations for Fuel Cell Vehicles
- CSA Standards
- IEC TC 105 on Fuel Cells
- ISO TC 197 on Hydrogen
- NFPA Standards
- NEC/NFPA 70 - National Electric Code
- ASME Standards
- UL Standards
- CGA Standards
- ICC Model Building, Mechanical, and Fire Codes
- Hydrogen Quality
- Single Cell Testing

Coordination of Member Comments

As a valuable service to members, the USFCC alerts members when codes and standards are open for comment, consolidates member comments, and forwards them to the appropriate authorities. This industry feedback to the standards developing organization has been done for the following issues:

- NFPA Refueling Equipment
- ISO Hydrogen Quality
- IEC Micro Fuel Cells Safety Standards
- California Hydrogen Purity Regulations
- CSA Stationary Fuel Cell Safety Standards
- CSA Portable Fuel Cell Safety Standards
- IEC Stationary Fuel Cell Safety Standards

Materials and Components Working Group: Chair - Mike Hicks, IdaTech, LLC

The Stack Materials and Components Working Group fosters collaboration in Single Cell Testing, Durability Issues, Gas Diffusion Layer Testing, Gaskets, Solid Oxide Fuel Cells, and – in cooperation with the Transportation Working Group – Hydrogen Quality.

The following products are available at no cost from the US Fuel Cell Council web site at www.usfcc.com/resources/brochrep.html. Feedback and suggestions are encouraged.

Single Cell Test Protocol

This procedure was developed by consensus of the members of the US Fuel Cell Council Materials & Components Working Group, Single Cell Testing Task Force. The intention of this procedure is to provide the PEM Fuel Cell industry with a standard test protocol which outlines a consistent, repeatable method for conducting a single cell test and generating a polarization curve. The protocol specifies a cell configuration consisting of commercially available cell hardware and materials as well as cell operating and test conditions. The protocol establishes a common basis for data exchange between material suppliers, fuel cell developers and other test labs by ensuring test results are generated in a consistent, verifiable manner. The US Fuel Cell Council is an acknowledged leader in this regard.

Conductivity Testing Protocol

The Conductivity Testing Protocol was developed by consensus of the members of the US Fuel Cell Council Materials & Components Working Group under the leadership of Eve Steigerwalt. The Objective is to present a general test procedure for measuring through-plane electrical conductivity for material and bipolar plate development. The testing protocol covers the electrical through-plane measurement of non-metallic bipolar or separator plate materials. It is not intended to predict the performance of the material under stack conditions, but rather to gather intrinsic material property data.

Durability Testing Protocols

Testing protocols to evaluate MEA durability are being proposed by the Durability Task Force. These protocols were selected by consensus after reviewing different protocols available in the literature. The primary objective is to assemble a test package to measure the relative durability of membrane and electrodes under accelerated tests that trigger specific failure modes. The Durability Task Force has developed a Durability Round Robin program using these testing protocols to be implemented in 2008.

A valuable cooperative relationship was established with the Japanese Automotive Research Institute, JARI, in 2007 that will permit JARI to participate in the Durability Round Robin as well as allow other participants to utilize the JARI testing fixture for part of this work.

GDL Testing Protocols

GDL Testing Protocols have been developed and used as a basis for GDL Round-Robin testing by member companies. Following the initial Round-Robin effort, feedback will be incorporated into final draft documents leading to publication.

Round-Robin Testing

Round-Robin Testing has continued using the Single Cell Testing Protocol and the GDL Testing Protocol. Members are encouraged to share their learnings during testing, and revisions to the testing protocols have resulted from valuable member feedback. Results are published in peer-reviewed formats and public comment is encouraged.

Gasket Performance

A Recommended Standard Test Methods document for Fuel Cell Gasket Materials has been prepared by the Stack Materials and Components Gasket Focus Group. The purpose of this document is to supply guidance to academia and the fuel cell industry on the testing of and reporting on fuel cells. These test methods describe the procedures for determining properties of PEM fuel cell gasket materials and changes in their properties due to aging. A gasket testing Round Robin has been developed using this testing guidance for implementation in 2008.

Hydrogen Quality

See Transportation Working Group

Education and Marketing Working Group: Chair – Stewart McKenzie, Columbian Chemicals Company

The Education and Marketing Working Group supports the mission of the USFCC by increasing understanding of fuel cells and candidate fuels. We do this by:

- developing and disseminating materials on all fuel cell applications
- identifying and educating target audiences
- supporting USFCC members and other working groups
- collaborating with USFCC members and other organizations
- marketing fuel cell technologies and products
- marketing the USFCC as the “voice of the industry”

Areas of Concentration

As part of its Marketing Plan, the Working Group has gone through an extensive reorganization and has developed a new effort focused on Public Relations, Events and General Marketing in a strategic effort to promote the Council, its members and fuel cell technology.

The Working Group and Council staff has:

- Revised the USFCC key benefits matrix to reflect the interests of a variety of audiences
- provided interviews with and quotes for a variety of national and international publications and broadcast programs
- developed Literature Development guidelines to ensure a consistent, focused Council message is conveyed
- developed a Collateral Matrix to foster continual updating of USFCC outreach material

Power Generation Working Group: Chair - Chris Forbes, Siemens Power Generation

Annual Industry Survey

The Power Generation Working Group oversees publication of the Annual World Wide Industry Survey Report, the industry's most comprehensive compilation of sales, employment and R&D spending data.

Stationary Power Brochure

The Working Group's Stationary Power Brochure showcases the variety and benefits of stationary fuel cell power systems. The brochure was revised and published anew in October 2007.

Hydrogen Siting Issues

Modeling of hydrogen fuel cell systems, especially those for Uninterruptible Power Supplies, has been accomplished as a Cooperative Research Project, in cooperation with the National Fire Protection Association Foundation and USFCC member companies. The effort includes characterization of the system, characterization of the hazards, and quantification of setbacks and other parameters. Members contributed financially to this work, along with the USFCC. A final report is now available from the NFPA Foundation.

Market Development and Customer Outreach

The Power Generation Working Group has initiated discussions of possible market development and customer outreach efforts to encourage participants in the US Environmental Protection Agency Supplemental Environmental Projects Program to install fuel cells. Initial discussions with US EPA have revealed that some participants have taken advantage of this opportunity.

The Power Generation Working Group has also evaluated the possibility of a dialogue with utility companies aimed at better understanding barriers to utilization of fuel cells by utility companies and is also investigating the availability of credit for fuel cells under new or existing Renewable Power Generation Mandates in the various states.

Defining "Commercial"

The Power Generation Working Group has developed, proposed, refined and published an industry definition of "Commercial" as applied to fuel cells.

Portable Power Working Group: Chair - Malcolm Man, Tekion

Transportation Regulations

The Portable Power Working Group is leading industry efforts to obtain regulatory permission to transport fuel cell cartridges and fuel cells as separate and distinct articles under transportation regulations associated with the International Civil Aviation Organization (ICAO), the International Airline Transport Association (IATA), the US Department of Transportation (US DOT) and other worldwide country regulators including the United Nations Sub-Committee of Experts on the Transportation of Dangerous Goods (UNSCETDG). In a show of value and expertise, the USFCC has received consultative status at the United Nations UNSCETDG. The US Fuel Cell Council has also been granted participatory observer status at ICAO for fuel cell issues.

One goal of this work is to obtain a passenger exception to allow passengers to bring micro fuel cell systems on board passenger airliners. Initial approvals by ICAO took effect on January 1, 2007, and provide for methanol, formic acid and butane fuel cells to be allowed as carry-on baggage. The US DOT has proposed allowing some borohydride compounds to be carried on board in the US as well. Permission for hydrogen in metal hydrides and borohydride compounds awaits consideration at ICAO of the new unique UN entries for fuel cell cartridges adopted at the UNSCETDG meetings in December of 2006 with the help and participation of the USFCC as the fuel cell industry representative. These entries will be considered at the ICAO Dangerous Goods Panel meetings in November of 2007 with implementation scheduled to take effect in January of 2009.

Efforts by USFCC staff have taken the form of work with the International Electrotechnical Commission (IEC) and responsibilities as the Secretary of the IEC Technical Committee 105 Working Group on Micro Fuel Cell Safety in preparing IEC 62282-6-1, Micro Fuel Cell Safety. Work by USFCC staff and members resulted in the successful publication of IEC PAS 62282-6-1 Ed. 1 in February, 2006, as well as a Corrigendum to this specification required to correct issues related to editorial changes and for the clarification of leak testing requirements identified by ICAO. The USFCC was intimately involved in these efforts at the IEC Central Office and has established a valuable link with ICAO through this work.

The US Fuel Cell Council and its members also participate in ISO TC 197 Standards for safety of cartridges containing hydrogen in metal hydrides – ISO 16111 and related work. This work has resulted in publication of ISO TS 16111 in, 2006 by the international community.

The Portable Power Working Group funds an expert consultant for this effort in 2007 out of the general US Fuel Cell Council budget. Additional work, funded by a consortium of members, has not been required for the first time this year due to the commitment of the Technical Director's staff time to this high priority issue.

The Working Group has also consulted with the US DOT and the US Federal Aviation Administration (FAA) and has worked with DOT and FAA officials on regulations governing fuel cell and fuel cell cartridge transportation. Work to codify the ICAO Technical Instructions within US 49 CFR has been especially challenging in 2007. Efforts to expedite this process continue.

As the Voice of the Fuel Cell Industry, the US Fuel Cell Council has provided to IATA guidance to security personnel, screeners, and airline professionals regarding fuel cell products approved for airline carry-on use.

Brochure

An informative brochure documenting the advantages of portable fuel cell systems will be published in 2008.

Transportation Working Group: Chair – Jesse Schneider, Chrysler LLC

During 2007, the Council's Transportation Working Group (TWG) initiated several new projects in addition to its already busy workload.

On October 11, 2007, the Transportation WG hosted a meeting that brought together industry with federal and state government interests. The focus of the meeting was the developing hydrogen infrastructure in key states and the potential near term demand gaps. USFCC members participating included vehicle OEMs, energy suppliers and other stakeholders. It was proposed that the forum be continued, formalized and led by the US Fuel Cell Council.

The TWG is developing a new brochure that will be used for marketing and outreach. This new product is called: *Fuel Cell Vehicle Commercialization: Taking the Automobile out of the Carbon Equation*. The brochure will be an educational tool for policy makers and the general public, and highlight the major advances that have been made on the road to commercialization.

Through the continuing relationship formalized by the 2003 MOU between the USFCC and the Fuel Cell Commercialization Conference of Japan (FCCJ), signed during the inaugural meeting of the International Partnership for a Hydrogen Economy, the Transportation Working Group works with the Japanese Automotive Research Institute (JARI) on cooperative efforts concerning hydrogen fuel specifications and contaminants. Two formal meetings were held with the FCCJ and JARI. These meetings were hosted by the USFCC in Washington, DC and Detroit, MI. Elements of cooperation regarding durability and single cell and short stack testing were coordinated.

This reporting period the staff and Transportation Working Group has concentrated on:

- Leadership of the U.S. Technical Advisory Group (ISO TC22SC21). Staff as well as several working group members serve on the USTAG. The USFCC Transportation Working Group's former Chair is also the Chair of this USTAG
- Leadership of the SAE Fuel Cell Standards Committee Safety Working Group and Interface Working Group, as well as hydrogen quality work items
- Vice-Chairmanship of the SAE Fuel Cell Standards Committee
- UN/ECE World Forum For Harmonization Of Vehicle Regulations, Working Party-29 (WP-29)

Joint Hydrogen Quality Task Force: Chair – Bill Collins, UTC Power

In its fourth year of operation, the USFCC's Joint Hydrogen Quality Task Force (JH2QTF) is recognized as the global leader on issues regarding hydrogen contaminants, poisoning and testing/protocol development and is considered the starting point for all "hydrogen as a fuel" discussions. Membership is composed of a wide range of expert interests including vehicle OEMs and suppliers, fuel cell OEMs and suppliers, fuel providers, national and university research/validation laboratories, government organizations and related industry trade groups. The Council's JH2QTF has been collaborating closely with the Society of Automotive Engineers International (SAE), CSA International, Japanese Automotive Research Institute (JARI), Fuel Cell Commercialization Conference of Japan (FCCCJ), International Organization of Standardization (ISO), International Electrotechnical Commission (IEC), and others. The Task Force's publications, the credible foundational source for industry code, standards and recommended practices development, are available for free on the USFCC website.

Active cooperative channels exist with the Hawaii Natural Energy Institute, the Japanese Automotive Research Institute, Los Alamos National Lab, Kettering University's Fuel Cell Research Center and the University of South Carolina. Additionally, the task force has developed close coordination relationships with ASTM, the State Government of California, US Department of Commerce, National Institute of Standards and Testing, the US Department of Energy and others.

The European FCTESTQA organization recognizes USFCC as a member.

Government Affairs Working Group: Chair – Ethan Brown, Ballard Power Systems

The Government Affairs Working Group (GAWG) is an effective and visible advocate for fuel cells and related fuels and infrastructure. Staff, working together with active members, continue to advocate a long-term federal commitment to fuel cell research, validation, purchases and early market support.

In late 2006 and early 2007, the GAWG decided to focus our efforts on three key priorities for the first session of the 110th Congress. These priorities included: appropriations in support of commercialization; extension of investment tax credits; and increased interface with government officials.

Thanks in part to USFCC efforts, the Energy Policy Act of 2005 featured new programs designed to speed the adoption of fuel cell technology. Central to this plan was a Market Transformation program. In essence, it helps willing government agencies purchase fuel cells at costs comparable to incumbent technologies.

Working with key Senate supporters, the appropriations subcommittee included funding for Market Transformation activities in their FY 2008 appropriations report. The subcommittee also added funding for Manufacturing Research and Development in support of the fossil energy fuel cell component.

The Energy Policy Act also created an Investment Tax Credit that incentivized purchases of fuel cell units. While the credit has proven to be beneficial, its full impact will not be realized until it enjoys a long-term extension. The fuel cell industry is advocating an extension until 2016.

Currently, legislation that is still pending provides the long-term extensions industry sought. In addition, both the House and Senate versions maintain the 30% incentive, while the House version lifts the cap to \$3,000 a kW. The proposal floated by the Senate eliminates the cap all together. Finally, the GAWG pledged to increase interaction with government officials. The USFCC staff held at least 50% more individual meetings year with Congressional staff. The USFCC held a continued presence at hearings, briefings, and meetings with Administration officials. The group continued fundraising outreach; worked with the DOE on implementing the Market Transformation program; and hosted another successful Capitol Hill Expo and legislative information session.

SOFC Focus Group: Chair – Ella Kisilis, UTCRC

The Solid Oxide Fuel Cell Focus Group (SOFCFG) was created in 2004 as the result of member interest in unified SOFC representation within the USFCC and fuel cell industry. This focus group serves to collate SOFC interests from USFCC members and to coordinate the execution of SOFC initiatives within established Council working groups in order to meet SOFC needs.

Areas of Concentration:

- The focus group continued to strengthen its representation within the Government Affairs, Power Generation, Transportation, Sustainability and Education & Marketing working groups.
- The focus group met during the 2007 DOE SECA Program Review, inviting non-members as well as all Council members to participate in a “technology wide” workshop. The workshop focused on issues related to solid oxide protocols, testing methodology, state of the technology, government advocacy, education, marketing & outreach, organization within the Council, and SECA and focus group leadership.
- Solid Oxide Fuel Cell Focus Group members have developed working relationships, critical to commercialization, with the National Energy Technology Laboratory (NETL) and Argonne National Laboratory (ANL). Using the ANL and NETL SOFC testing protocols as a common ground, industry partners have taken the first step in identifying a common standardized approach to “button-cell testing.”
- US Fuel Cell Council’s “Button Cell Testing Protocol” document. It has been published as the “Introduction to Solid Oxide Fuel Cell Button Cell Testing” and is being used as a primer to new ventures. Additionally, it is the foundation to an industry effort focused on the next iteration of a consensus testing/measurement tool.