For almost 15 years (next month), I have had the privilege of working for Bob Rose at the Breakthrough Technologies Institute (www.btionline.org) and its Fuel Cells 2000 program. I hit the ground running and took over the Fuel Cell Technology Update as one of my first duties and eventually earned the reins to run Fuel Cells 2000, overseeing the website, writing and editing reports, case studies and articles, giving presentations, conducting outreach to various groups, editing the Fuel Cell Directory and Fuel Cell Quarterly newsletter (both retired several years ago) and so on. Sadly, the program and my time here are coming to a close and this will be the very last Fuel Cell Technology Update. Fuel Cells 2000 will end, although the site and some materials will live on archive form (details still being sorted out). We even found a home at the Smithsonian for most of our historical archives of conference proceedings, slides and pictures, reports and company information – some of which goes back to the very beginning of our industry!

On October 1, my colleague Sandra Curtin and I are headed to the Fuel Cell and Hydrogen Energy Association (FCHEA – www.fchea.org – new website launching this month!), where we will continue to produce our report series, “State of the States: Fuel Cells in America” and “The Business Case for Fuel Cells” (the 2014 editions of both should be coming out soon), the Fuel Cell and Hydrogen Policy Roundup and DOE’s Fuel Cell Technologies Market Report as well as working on marketing/communications for FCHEA and its members and the fuel cell industry. I will also be working on membership development, my new email next month will be jgangi@fchea.org if you are interested in learning more about FCHEA and the benefits of membership or just want to touch base with updates on your company or questions about the industry. jennifer@fuelcells.org will be active for a while (if you want to say goodbye) but will eventually be phased out after we move over.

There are still several outlets to receive fuel cell news, including the Fuel Cell Connection from FCHEA (http://visitor.r20.constantcontact.com/manage/optin/ea?v=001q5gl0NDN5qMRm3Hi4xH1-w%3D%3D) and the Department of Energy EERE Fuel Cell Newsletter (https://public.govdelivery.com/accounts/USEERE/subscriber/new?preferences=true#tab1). If you aren’t a member of the Fuel Cells group on LinkedIn that I manage, you should be – there are lots of good discussions, news items and job postings happening there. On Twitter, follow FCHEA at @FCHEA_News to keep up-to-date on the latest fuel cell news. Fuel Cells 2000’s database and a few other charts and items will make the transition over to FCHEA with us as well.

It has really been an amazing experience and truly a pleasure working here and I hope this newsletter, as well as the website, charts, case studies and reports were all a useful resource for you over the years. For those of you I know personally, I hope to see you soon, and for those I don’t, I hope to meet you, either at the Fuel Cell Seminar in Los Angeles this coming November, an upcoming event in the future, or an FCHEA member meeting.

Just for kicks, I have included some choice items from each month’s Fuel Cell Technology Update from the year 2000 at the end of this issue, just to see how far the industry has come, what has stayed the same, where things were way off, and to reminisce about companies long gone. 😊

Also, we are finishing up the Business Case for Fuel Cells report draft- if you have any company or customer news you can share to include related to sales, installations, results, savings, etc., please send to me! Any images would be great, too.

TRANSPORTATION APPLICATIONS
Ohio’s SARTA to Receive Two Fuel Cell Buses Next Year.
The Stark Area Regional Transit Authority (SARTA) in Ohio is partnering with CALSTART to deploy two fuel cell buses through its No Emissions Bus Program, tentatively scheduled for production in February 2015 for the first bus and July 2015 for the second. Delivery will be August 2015 and December 2015. The Ohio Department of Transportation (ODOT) granted SARTA $500,000 to construct a hydrogen station to fuel the bus.

Proton Power Finalizes 25 kW System, Joins Austrian Bus Project.
Proton Power has finalized the development of its new 25-kilowatt (kW) HyRange fuel cell system for bus, light and heavy duty vehicle applications, primarily as a range extender for battery vehicles. The modular design allows generating 50k W or 75 kW and the system has been continuously tested and run over the last nine months. Proton was also selected to integrate the HyRange 25 system into a 3-ton battery passenger transport vehicle manufactured by a major automotive OEM to increase the vehicle’s range. The project is being funded by the Austrian government.

Cool Infographic from Hyundai.
Hyundai has posted a great infographic explaining how a fuel cell vehicle works.

STATIONARY APPLICATIONS

Doosan Hitting Ground Running, Holding Online Auction on Sept. 9th.
Following its acquisition of ClearEdge Power and Fuel Cell Power last month, Doosan Corporation formed the Doosan Fuel Cell Group, and from that, Doosan Fuel Cell America, Inc. According to Doosan Fuel Cell Group CEO Jeff Chung, the company plans to add hundreds of employees to its South Windsor, Connecticut, facility and will focus primarily on the 400-kW stationary fuel cell system. Doosan has hired an auction team to dispose of its laboratory, testing, machine shop and other equipment such as office furnishings, networking, computer, and audio/visual equipment from ClearEdge Power's Hillsboro, Oregon, location. You can look at the items online or in person on September 8th (7205 N.W. Evergreen Parkway, Suite 100) and the live auction will be held Tuesday, September 9th at 10:30 am PT.
http://auctions.tigergroup.com/cgi-bin/mndetails.cgi?tigergrp127

Ballard and Anglo American Conducting Off-Grid Residential Field Trial.
Ballard Power Systems and Anglo American Platinum have partnered with Eskom, South Africa's power utility, and the Department of Energy of South Africa to conduct a 12-month field trial of a methanol-fuelled fuel cell system in an off-grid residential application. The trial is being conducted in the rural community of Naledi Trust and will use a Ballard 5 kW ElectraGen™-ME fuel cell system, integrated by Anglo American Platinum into a complete prototype off-grid solution, including a battery bank and inverter operating within a micro-grid. This will power 34 rural homes in the Naledi Trust community, with monthly delivery of liquid methanol fuel to an external storage tank.

PORTABLE/BACKUP POWER

Heliocentris Acquires FutureE, Enters Agreement with IT Provider for 300 Systems.
In June, Heliocentris Energy Solutions AG has acquired FutureE Fuel Cell Solutions GmbH, a company focused on the telecommunications industry. The combination of FutureE and Heliocentris will provide fuel cell systems from 1 kW to 20 kW. Since the acquisition, FutureE entered into a master distribution agreement with a Beijing IT banking solutions provider to market its Jupiter fuel cell systems to Chinese
banking customers. The systems will have output powers ranging from 5 kW to 18 kW, and the contract aims for delivery of at least 300 in 2015 with a potential sales value of €12 million (US$15.8 million). 

Ballard Deploys 20 Fuel Cells in Philippines.
Ballard Power Systems has deployed 20 methanol-fuelled ElectraGen™-ME backup power systems in the Philippines with its channel partner AECi. The systems were installed on rooftop locations in Manila for Globe Telecom.

BOC Portable Fuel Cell Generator Powering Tree-House Radio Station.
Remote Performances, a week-long radio broadcast of visiting and local artists, was broadcast live from a remote tree-house studio in Glen Nevis, Scotland, powered by two portable hydrogen-fueled Hymera fuel cells from BOC.

SFC to Launch EFOY GO!
SFC Energy AG announced plans to launch a completely new, innovative mobile socket for leisure and outdoor activities, the EFOY GO! in early 2015. The lightweight EFOY GO! (< 6 kg) was developed to deliver power away from the grid for a variety of recreational applications.

ReliOn Project Named E-Tech Award Finalist.
ReliOn, a Plug Power company, and the Communication Infrastructure Corporation (CIC USA) have been named a finalist in the Green Telecom & Networks division of CTIA’s annual Emerging Technology (E-Tech) Awards competition for their joint project, “Providing a Reliable, Cost-Effective and Green Remote Off-Grid Power Solution.” The 400-watt fuel cell is part of a 39-site microwave network on top of a mountain in Pennsylvania, providing primary power to the customer’s equipment since April 2014. The E-Tech Awards ceremony will take place September 10. Good luck to our friends at ReliOn!

MICRO FUEL CELLS

MILITARY APPLICATIONS

FUELING/STORAGE

Air Products Adds Tube Trailer to Service UK Station.
Air Products introduced an additional SmartFuel® hydrogen high pressure tube trailer to its fleet to deliver large volumes of hydrogen at high pressure to Air Products’ new, publicly accessible refuelling station located in Heathrow, United Kingdom.

SAE Publishes Tandem Fueling Standards, DOE Webinar on Sept. 11.
Last month, we told you about the Society of Automotive Engineers (SAE) J2601 standard, “Fueling Protocols for Light Duty Gaseous Hydrogen Surface Vehicles” but that was only part of the story. SAE also published J2799, “Hydrogen Surface Vehicle to Station Hardware and Software” that specifies the communications hardware and software requirements for fueling Hydrogen Surface Vehicles and is intended to be used in conjunction with J2601 and J2600, Compressed Hydrogen Surface Vehicle Fueling Connection Devices. These standards are 13 years in the making and the effort of a group of
dedicated companies and individuals, including BMW, Daimler, Hyundai and Toyota. They provide the basis for hydrogen fueling in the first generation of infrastructure worldwide.

http://www.prweb.com/releases/2014/07/prweb12042788.htm
http://standards.sae.org/j2601_201407/
http://standards.sae.org/j2799_201404/

To help explain the new standards, the U.S. Department of Energy (DOE) Fuel Cell Technologies Office (FCTO) is hosting a webinar, "Introduction to SAE Hydrogen Fueling Standardization" on Thursday, September 11, from 12:00 to 1:00 p.m. Eastern Daylight Time (EDT).

http://www1.gotomeeting.com/register/936526249

Toyota Receives METI Approval to Self-Inspect Hydrogen Tanks.
Toyota Motor Corporation has received approval from Japan's Ministry of Economy, Trade and Industry (METI) to self-inspect and manufacture high-pressure hydrogen tanks for fuel cell vehicles. This makes Toyota the first company to become a registered manufacturer of 70 MPa (700 bar) hydrogen tanks under Japan's High Pressure Gas Safety Act, revised in 1997 by METI.

http://newsroom.toyota.co.jp/en/detail/3906446

**MATERIALS/COMPONENTS/TESTING**

**REPORTS/MARKET STUDIES**

**The Hydrogen Transition.**
The NextSTEPS (Sustainable Transportation Energy Pathways) Program at the UC Davis Institute of Transportation Studies (ITS-Davis) has published a new white paper, The Hydrogen Transition, which details the convergence of new factors propelling an international market rollout of hydrogen fuel cell vehicles.


**CaFCP Publishes Air, Climate, Energy, Water & Security Well-to-Wheels Report.**
The California Fuel Cell Partnership has published a new well-to-wheels report which summarizes the most common vehicle/fuel pathways in California using Argonne National Laboratory’s newest GREET model, developed with support from U.S. Department of Energy’s EERE program.


**DOE Renewable Energy Storage Webinar Slides.**
Presentation slides from the recent DOE FCTO webinar “Increasing Renewable Energy with Hydrogen Storage and Fuel Cell Technologies” has been posted on DOE’s website. A recording of the webinar is also available.

http://energy.gov/eere/fuelcells/2014-webinar-archives

**REQUESTS FOR PROPOSALS/FUNDING OPPORTUNITES**

**DOE SBIR/STTR.**
DOE’s 2015 Small Business Innovation Research and Small Business Technology Transfer (SBIR/STTR) Phase I Release 1 funding opportunity announcement has been released and includes two hydrogen and fuel cell topics: non-platinum catalysts for fuel cells and detection of contaminants in hydrogen.

http://science.energy.gov/sbir/funding-opportunities

**NYSERDA PON Advanced Transportation Technologies.**
The New York State Energy Research and Development Authority (NYSERDA) has released a Program Opportunity Notice (PON 2957) to support the development, demonstration, and commercialization of innovative transportation products, systems and services. Proposals will be evaluated on the basis of their energy, environmental and economic development benefits. Up to $3,500,000 of NYSERDA funding is available. All, some, or none, of the available funds may be awarded.
Denmark Transportation Funding.
The Danish Energy Authority (DEA) has initiated a new round of applications for funding for the establishment of partnerships to promote the use of electricity, gas and hydrogen in transport. For 2014 to 2015, a total of DKK33 million (US$5.8 million) has been allocated to support partnerships working to promote green transport. The goal is to create a lasting increase in the prevalence of energy-efficient vehicles.

http://www.internationallawoffice.com/newsletters/detail.aspx?g=3a2bb8ad-3b8b-40c8-bdb8-731b60a5aa04

MISCELLANEOUS

Binghamton University Breaks Ground on Smart Energy Facility.
Binghamton University (my alma mater!) broke ground on a $70 million, 114,000-square-foot Smart Energy Research and Development Facility at the campus’ Innovative Technologies Complex. The facility, scheduled for completion in 2017, will house the physics and chemistry departments and plans include installing a fuel cell to produce electricity at a reduced cost to heat and cool the building. Fuel cells will also part of the research conducted at the facility.


Intelligent Energy Holdings plc was named as the top British patent applicant for energy and storage technologies for 2013, according to a UK Intellectual Property Office report.


CONFERENCES

World of Energy Solutions 2014.
World of Energy Solutions 2014, which includes the f-cell forum, will be held October 6-8, 2014, at the Messe Stuttgart, ICS, in Stuttgart, Germany. To register, please go to https://world-of-energy-solutions.com/en/conference-wes/registration.html.

California Hydrogen & Fuel Cell Summit.
The California Hydrogen & Fuel Cell Summit will be held October 15-16, 2014, at Cal/EPA in Sacramento, California. For details, please go to http://californiahydrogensummit.com/indexFall.asp.

Fuel Cell Seminar.
The Fuel Cell Seminar & Energy Exposition, “Fuel Cells: The Power to Drive Change TODAY,” will be held November 10-13, 2014, at the Westin Bonaventure in Los Angeles, California. For more information, please visit http://www.fuelcellseminar.com/. Hope to see you there!

A look back to the fuel cell news 14 years ago…

January 2000

California Fuel Cell Partnership to Build Vehicle and Fueling Facility. The California Fuel Cell Partnership announced plans to construct a headquarters office in West Sacramento to house fuel cell electric vehicles and a hydrogen refueling station. The 55,000 square-feet facility is expected to open in
the fall of 2000. Up to 16 test cars will be provided by partnership members DaimlerChrysler, Ford, Honda and Volkswagen.

**DaimlerChrysler Plans Fuel Cell Car Price Near $18,100.** DaimlerChrysler has set a target price for its first fuel-cell-powered car—around $18,054 at current exchange rates. The car will be a version of the Mercedes-Benz A class, with a few thousand expected to be introduced in 2004. At a Tokyo symposium, DaimlerChrysler stated that fuel cell cars would account for up to 25 percent of the global market by 2020.

**DCH Technology Expands Fuel Cell Operations.** DCH Technology has added a second production and test facility to its Wisconsin fuel cell operations. This expansion will include the addition of on-site hydrogen production.

**GE MicroGen Signs Fuel Cell Contracts with New Jersey Resources and Flint Energies for Distribution.** New Jersey Resources (NJR), through its unregulated affiliate NJR Energy Holdings, and Flint Energies (GA) have entered into a contract with GE MicroGen, to be their exclusive energy partner for distributing residential and small commercial fuel cell systems in New Jersey and Georgia. Early next year, GE will begin delivering pre-commercial systems to NJR and Flint for testing and demonstration within their territories.

**February 2000**

**Ford, GM Unveil FCVs at NAIAS.** At the 2000 North American International Auto Show, Ford Motor Company unveiled the TH!NK FC5, a family size sedan powered by Ballard’s latest methanol reformer fuel cell electric powertrain, the Mark 900 series. Based on the 2000 Ford Focus, the TH!NK FC5 does not compromise passenger or cargo space because the fuel cell powertrain is located beneath the vehicle floor. Also, at the Auto Show, General Motors unveiled the Precept advanced class vehicle, in both hybrid and fuel cell powered forms.

**Motorola Develops Miniature Fuel Cell.** Scientists at Motorola Labs and Los Alamos National Laboratory have developed a new, miniature fuel cell that may one day replace traditional batteries in laptop computers, cellular phones and other consumer electronic devices. The fuel cells are powered by liquid methanol and last up to 10 times longer than existing rechargeable batteries, powering a cellular phone for more than a month. They will also be significantly lighter in weight and less expensive.

**March 2000**

**GM Introduces Advanced Fuel Cell; Vehicle to Pace Marathon at Olympics.** At the Geneva Motor Show, General Motors introduced a fuel cell stack that achieves full power nearly 12 times faster in freezing conditions than the fuel cell stack it unveiled six months ago. The stack was shown in Opel’s Zafira fuel cell vehicle, which will pace the marathon at the Summer Olympics in Sydney, Australia.

**Times Square Lights Up With Fuel Cells.** The two fuel cells at 4 Times Square in New York City are now up-and-running. The fuel cells, manufactured by ONSI Corp., generate 400 kW of electricity and will provide a portion of the building’s general power requirements. If there is a utility blackout, the systems are capable of operating independent of the utility grid to maintain power to critical mechanical components and the landmark signs on the facade of the building.

**Northwest Power Systems Receives Order from Tokyo Boeki.** Northwest Power Systems (NPS), a subsidiary of IDACORP, has received an order from Tokyo Boeki, Ltd., for two fully integrated, prototype residential fuel cell systems to be field-tested in Japan this year. The test units will each generate approximately 2.5 kW of electricity. Through the units’ heat exchangers, each unit will also produce the heating equivalent of another 2.5 kW of energy suitable for water and space heating purposes.

**Plug Power Opens New Manufacturing Facility.** Plug Power opened its new 50,000 square-foot manufacturing facility in Latham, New York. The new manufacturing facility, which is double the size of
the previous facilities, will enable Plug Power to begin beta-unit production of PEM fuel cell systems for field testing later this year.

April 2000

**Ballard, XCELLSIS, and CTA Conclude Successful Fuel Cell Bus Program.** Ballard Power Systems, XCELLSIS Fuel Cell Engines Inc., and the Chicago Transit Authority (CTA) have successfully concluded the world’s first fuel cell bus demonstration and testing program after two years of operation. The three buses have clocked more than 5,000 hours in revenue service, covered over 30,000 miles, carried more than 100,000 passengers, and emitted nothing more than water vapor.

**Hybrid Fuel Cell Battery Tested for Undersea Vehicles.** The Office of Naval Research (ONR) has funded research at the Naval Undersea Warfare Center to test a new, high energy electric power source to propel unmanned undersea vehicles. Researcher have just conducted a continuous 37-hour demonstration of a semi-fuel cell, which combines features of a fuel cell and a standard battery, carrying a permanent internal power generator that runs on external liquid hydrogen peroxide tanks.

May 2000

**DaimlerChrysler Plans to Build Fuel Cell Buses.** DaimlerChrysler plans to build 20 to 30 fuel cell city buses within the next three years and sell them to transport operating companies in Europe and abroad. The fuel cell “Citaros” are expected to be delivered by the end of 2002, at a price of US$1.2 million each. The buses will run on compressed gaseous hydrogen, with a top speed of 50 mph (80 kmph) and a range of 186 miles (300 km).

**Siemens Westinghouse and Southern California Edison Successfully Test World’s First “Hybrid” Fuel Cell-Turbine.** Siemens Westinghouse and Southern California Edison successfully completed factory testing of the world’s first fuel cell/gas turbine hybrid power system. The 220-kW system is being readied for shipment, installation and operation at the National Fuel Cell Research Center at the University of California, Irvine. The hybrid power system combines a pressurized solid oxide fuel cell and a microturbine generator. In factory testing, it produced enough energy to power a hotel or strip mall – 164 kW from the SOFC and an additional 21 kW from the microturbine.

**South County Hospital Installs Fuel Cell.** South County Hospital in Wakefield, Rhode Island, is the first hospital in New England to generate its own electricity with a fuel cell. The 200-kilowatt unit began operation in December 1999, producing one-third of the hospital’s electricity during peak hours. Hospital officials estimate that the fuel cell will reduce power bills by $60,000 to $90,000 per year and prevent more than 40,000 pounds of air pollution and 2,000,000 pounds of carbon monoxide from being emitted to the atmosphere.

**Epyx Merges with De Nora Fuel Cells to Form Nuvera.** Epyx, a subsidiary of Arthur D. Little, has merged with De Nora Fuel Cells to form Nuvera Fuel Cells, which will produce fuel cell systems for applications in the stationary power and transportation markets.

June 2000

**Hyundai Signs Agreement with IFC for SUV Demonstrator Program.** Hyundai signed an agreement with International Fuel Cells (IFC) to incorporate IFC’s fuel cell power plant in a Sport Utility Vehicle demonstrator program. Plans are to remove the internal combustion engine from two new Santa Fe SUVs and replace them with fuel cell systems running on hydrogen. The agreement may be extended to produce two additional vehicles.

**Global Thermoelectric Successfully Tests Modular Residential Fuel Cell Unit, Achieves Significant Improvements in Output.** Global Thermoelectric has successfully tested its next generation residential fuel cell system. The output of the new scalable system is 1.35kW. The company achieved significant
improvements in power output from its solid oxide fuel cells, increasing power output by 60% at an operating temperature of 800°C.

**IdaTech Demonstrates Latest Fuel Cell System.** IdaTech demonstrated its newest, fully integrated prototype to Methanex Corporation shareholders at their annual meeting. The three-kilowatt system, powered by methanol, ran the sound system, buffet heat lamps, IdaTech booth lights, and the TV/VCR used for the meeting.

**July 2000**

**Manhattan Scientifics Completes Testing of Fuel Cell Bicycle.** Manhattan Scientifics has completed testing of its Hydrocycle, a bicycle that operates on a fuel cell. The hydrogen fuel is stored in a two-liter carbon fiber pressure vessel located behind the seat. The bicycle, developed to compete with today’s battery-powered bicycles, has a range of 70 to 100 kilometers and a top speed of 30 kilometers per hour.

**Second European Power Plant with Direct FuelCell Technology to Start Up in October.** FuelCell Energy is supplying the fuel cells for a power plant to be built at a hospital in Germany. The Rhone Klinilum, in Bad Neustadt will be the first hospital in the world to use FuelCell Energy’s Direct FuelCell™ technology. The power plant will start up in October.

**NYPA Fuel Cell in Yonkers Earn Environmental Award.** The New York Power Authority’s (NYPA) fuel cell power plant at the Westchester County Wastewater Treatment Plant in Yonkers has been selected by the New York Chapter of the Association of Energy Engineers (AEE) as its Environmental Project of the Year.

**Acumentrics Forms SOFC Team, Begins Manufacturing Fuel Cell Systems.** Acumentrics Corporation announced that Nigel Sammes, Ph.D., and seven Solid Oxide Fuel Cell (SOFC) scientists and engineers from the University of Waikato in New Zealand have joined the company. Acumentrics intends to begin production of complete power systems that operate from propane or natural gas and output AC electricity, without the need of an external reformer, air blower, or fuel pump.

**“Automotive Fuel Cells – The Future is Here.”** Allied Business Intelligence (ABI) recently released a new report entitled “Automotive Fuel Cells – The Future is Here”, which predicts that millions of fuel cell powered vehicles will be on the road by 2010. The report also claims that by the second decade of this century, the mass production of automotive fuel cells will ultimately result in a total rejection of oil as a vehicle fuel.

**“Fuel Cells” Reports Rise In Fuel Cell Demand.** “Fuel Cells”, a new study from the Freedonia Group, reports that the demand for fuel cells in the U.S. market will rise fourfold through the year 2004 to $2.4 billion. Explosive growth will continue thereafter, with the market reaching $7 billion by 2009. Activity within the fuel cell industry is expected to increasingly shift from product development, test marketing, demonstration and prototyping to the actual sale of finished products to real world customers.

**August 2000**

**GM Unveils HydroGen1.** General Motors unveiled its prototype, the HydroGen1 fuel cell, its smallest, most powerful fuel cell yet. The HydroGen1 is two-thirds smaller than previous GM models, yet provides 80 kW of power, and has a thermal efficiency of 53 to 67 percent. In addition, the HydroGen1 can start a car in temperatures as low as -40º C.

**Ceramic Fuel Cells Builds 25 kW System.** Australian fuel cell company Ceramic Fuel Cells Limited (CFCL) has completed its first large-scale experiment in the development of its flat-plate Solid Oxide Fuel Cell (SOFC) technology. A complete 25 kW system was built, including a large fuel cell stack, balance-of-plant and control system. The experiment supplied important data on the operation of larger stacks and
system-stack integration, which will be invaluable for the next phase: a major product development program.

**Food Powers Fuel Cell.** Stuart Wilkinson of the University of South Florida in Tampa has built a microbial fuel cell (MFC) that can be powered by food, and runs a small robot – a gastrobot – named Chew Chew. Within the fuel cell lives a population of bacteria, which speed the breakdown of its food-fuel, releasing electrons that charge a battery. The MFC prefers meat because of its high energy density.

**September 2000**

**Ballard Ships First Fuel Cell Bus.** Ballard Power Systems and XCELLsis Fuel Cell Engines shipped the first bus powered by the pre-commercial fuel cell engine to the SunLine Transit Agency in Palm Springs, CA. The bus will be the first of 25 expected to operate under the auspices of the California Fuel Cell Project.

**Largest Fuel Cell System Dedicated in Alaska.** The largest commercial fuel cell system in the nation, at the Anchorage Mail Processing Center in Alaska, is now the primary source of power for the facility. Five fuel cells, connected in parallel to produce one megawatt of electricity, were developed by International Fuel Cells and have digital power modules by MagneTek.

**Manhattan Scientifics Supplies Army with Fuel Cell System.** Manhattan Scientifics has successfully tested and delivered a fuel cell power supply to the U.S. Army. The power system will be tested by the Army as part of its program to evaluate the feasibility of supplementing batteries in portable communication equipment. The system is capable of delivering 60 to 70 watts of continuous power, and has four times the power performance and half the weight required in the Army specification.

**October 2000**

**Honda Develops New Fuel Cell Car.** Honda has developed a four-seater fuel cell car, the FCX-V3, which has a motor 25 percent lighter than the two-seater fuel cell car unveiled last year. The car also has a faster start-up time - brought down to 10 seconds from 10 minutes - and uses a newly developed ultracapacitor instead of a battery, resulting in improved acceleration. The FCX-V3 will be road-tested in the California Fuel Cell Partnership program.

**H Power Introduces Advanced Fuel Cell System, Signs MOU with Ball Aerospace.** H Power has introduced the Power Pem® PS250, a new advanced PEM fuel cell system, rated at 250 watts. The product is designed for the small electric vehicle market as either a primary or fuel cell-battery hybrid power source, or a backup power supply for solar photovoltaic installations. It can also be used for military and industrial portable battery chargers. H Power has signed a "Memorandum of Understanding" with Ball Aerospace & Technologies to supply PEM fuel cell stacks for use in Ball Aerospace's portable hydrogen fuel cell power systems that are sold to U.S. military and other users.

**FuelCell Energy Selected by DOE for Ohio Coal Mine Project.** FuelCell Energy has been selected to design, construct and operate a 250 kW Direct FuelCell (DFC) at the Harrison Mining Corporation coal mine in Cadiz, Ohio, to reduce methane emissions associated with underground coal mining operations. The Department of Energy (DOE) and FuelCell Energy will equally split the costs for the $5.4 million, three-year program. Site design is expected to begin this fall.

**November 2000**

**President Approves $100 Million Fuel Cell Appropriation.** The Department of Energy will have more than $100 million for fuel cell related programs in the new fiscal year, $10 million above the President's request. The money is contained in the Interior Appropriation bill signed by President Clinton and gives $52.7 million for stationary fuel cells, $10 million more than requested, and approved the full request of $41.5 million for transportation fuel cell research and $5.5 million for buildings. Fuel cell projects will
receive $8.85 million from the FY2001 Transportation Appropriation, which was signed into law by the President on October 23, 2000. Georgetown University’s fuel cell bus program will receive $4.85 million, $2.0 million is for University of Alabama’s (Birmingham) fuel cell buses, $1.0 million will go to West Virginia University for its fuel cell technology institute’s propulsion and Intelligent Transportation System testing, and $1.0 million is for AC Transit’s zero-emission fuel cell bus deployment demonstration project in California.

**DaimlerChrysler Unveils NECAR 5, Jeep Commander 2, Initiates Fuel Cell Tests.** DaimlerChrysler presented the NECAR 5, the latest version of the New Electric Car, in Berlin. The NECAR 5 runs on methanol, unlike its predecessor, the NECAR 4, which ran on hydrogen. DaimlerChrysler also unveiled the Jeep Commander 2 fuel cell concept vehicle, running on hydrogen reformed on-board from methanol. The vehicle is actually a fuel cell/battery hybrid concept, with a nickel-metal-hydride battery to provide supplemental energy during acceleration, and for cold starts. The battery also captures energy from regenerative breaking. The hybrid powertrain gives the Commander 2 near-zero tailpipe emissions, while achieving double the fuel efficiency of a conventional SUV. DaimlerChrysler plans to initiate a series of tests on a new fuel cell vehicle specifically built for the California Fuel Cell Partnership.

**December 2000**

**FCT and Siemens Join on Fuel Cell Project.** Fuel Cell Technologies Corporation (FCT) and Siemens Westinghouse Power Corporation will jointly develop and demonstrate a 5 kilowatt SOFC combined heat and power generator for remote and residential applications. Siemens will develop and test the SOFC stacks. FCT will build, test, and demonstrate the remainder of the generator including the heat recovery system. The project should be ready for demonstration by 2002.

**Four Companies Join California Fuel Cell Partnership to Help Build Hydrogen Fueling Stations.** Four companies—Hydrogen Burner Technologies, Pacific Gas and Electric, Proton Energy Systems, and Stuart Energy Systems—have been invited to join the California Fuel Cell Partnership as Associate Partners. They will assist in exploring the development of a hydrogen-fueling infrastructure in California, and will each provide at least one hydrogen fueling station for the Partnership’s demonstration program.

**Ballard Power Systems Delivers Fourth Stationary System.** Ballard Power Systems has delivered its fourth 250 kW stationary fuel cell power generator for field-testing to Nippon Telegraph and Telephone (NTT) in Japan. A cogeneration system using an absorption chiller developed by EBARA Corporation will be tested in conjunction with the fuel cell generator.