CHBC News: April 2007

1. CHBC's April 27 Meeting Features Excellent Lineup

By registering now, you can still lock in pre-event pricing for CHBC's April 27 General Meeting in Sacramento, hosted by CalEPA. Speakers will include Dr. Alan Lloyd, ICCT; Analisa Bevan, CalEPA; Kevin Harris, Hydrogenics; Catherine Dunwoody, California Fuel Cell Partnership; Mickey Oros, Altergy Systems; Jeff Grant, Ballard Power Systems; Woody Clark, Los Angeles Community College District; Dr. J.P. Hsu, Smart Chemistry; Bud Beebee, SMUD; Dr. James Zoellick, Schatz Energy Research Center; and Jaimie Levin, AC Transit. Legislators and staffers are welcome to attend and may register at a special discounted price.
April 27 Meeting:
http://www.californiahydrogen.org/page.cfm?content=45&event_ID=66

2. 17-Year Old Actress Becomes Youngest to Lease Honda FCX

American Honda Motor Co., Inc. is furthering its real world fuel cell vehicle program by handing the keys to its next retail customer, 17-year-old Q'orianka Kilcher, who earned praise as the young star of the 2005 film "The New World." "The best way to demonstrate the importance of next generation vehicles like the Honda FCX is to put the next generation of drivers behind the wheel," said John Mendel, senior vice president of American Honda. "Q'orianka Kilcher will be driving around Hollywood in the ultimate environmental status symbol, literally and figuratively driving the change toward a hydrogen future." The FCX is powered by Honda's originally developed fuel cell stack (Honda FC Stack) with the breakthrough capability to start and operate in freezing

temperatures as low as -4 degrees Fahrenheit, along with increased performance, range and fuel efficiency compared with earlier models.
Honda: http://www.hondanews.com/categories/1097/releases/3904

3. Mazda Delivers Hydrogen Rotary Engine Vehicle to Japan Automobile Research Institute
Mazda Motor Corp. has delivered one dual-fueled RX-8 Hydrogen RE vehicle, which runs on either gasoline or hydrogen, to the Japan Automobile Research Institute (JARI). The Mazda RX-8 Hydrogen RE has a rotary engine with a dual-fuel system that allows the driver to select either gasoline or hydrogen fuel with the flick of a switch. JARI is working with the New Energy and Industrial Technology Development Organization on the Establishment of Codes & Standards for a Hydrogen Economy Society project. The RX-8 Hydrogen RE will be used as part of its R&D activities to review the regulations regarding the safety of hydrogen vehicles, establish examination and evaluation techniques and create proposals for international standards.
Mazda: http://www.mazda.com/publicity/release/2007/200703/070312.html

4. Morgan to Produce Fuel Cell Car
Traditional, hand-built car specialist Morgan has announced its plan to be one of the first car makers to produce a hydrogen fuel-cell car. Morgan "Life Car" - a hydrogen-fueled, zero-emissions car will be built using Morgan's existing wooden-framed body. The car, announced at the Geneva Motor Show, is intended to demonstrate that a zero emission vehicle can also be fun to drive. Artist's impressions of the car show a vehicle shaped like the Aero 8, but with aerodynamic fairings covering the wheel arches. It will be a very lightweight car with a fuel cell hybrid powerplant, which will give it a 200-mile range. It's being developed in partnership with hi-tech specialists including Cranfield University, QinetiQ, Oxford University and Linde AG. Morgan also announced it would run a full three-car works team in the FIA GT series this year, and fittingly for a maker of "living classics." It has hired two classic racing drivers to head the team: 1970s F1 Grand Prix winners Jacques Lafitte and Jean-Pierre Jabouille.
Morgan: http://www.pocket-lint.co.uk/news/news.phtml/6948/7972/Morgan-hydrogen-fuel-cell-Geneva-motorshow.phtml

5. Award for High Temperature Fuel Cell From Volkwagon
The high temperature fuel cell from Volkswagen has been awarded a prize in the special category "Innovation of Reason" by the largest German consumer magazine "Guter Rat." In the last eight years, research experts from Volkswagen have developed a new type of membrane as the core element of the fuel cell. This makes it possible to construct a smaller, more efficient and better value for money system overall. The main modifications are: new high temperature membrane on phosophorous basis and likewise newly designed eletrodes. This enables fuel cells to be operated over a long period of time at temperatures of 120 degrees Celcius - without any power loss, without humidification and with no irreparable damage to the cells. The special feature is that the high temperature membrane uses phosphorus acid instead of water for energy generation. The first vehicle prototypes that use this high temperature technology could be around by about 2010. Series production of this future technology is not expected before 2020.
VW:
http://www.duemotori.com/news/auto_news/11712_Award_for_high_temperature_fuel_cell_from_Volkswagen.php

6. EU Develops Gas Technology to Make Efficient Hydrogen ICE Engines
The EU-funded Hydrogen Internal Combustion Engine (HyICE) project tested ways to

build hydrogen-fuelled engines that are as efficient as current diesel engines, without the same pollution, and with as little as possible trade-off in terms of engine size and power. In taking the internal combustion engine as their starting point, the members of the three-year project led by the inventor of the automobile, BMW, focused on developing new components such as injectors and an ignition system. The final result of this collaboration is an environmentally friendly engine with a distinct performance of 100 kW per litre cubic capacity (displacement), bringing the possibility of hydrogen-only cars a step closer.
HyICE Project: http://www.gasworld.com/news.php?a=1382

7. Toro Co. Partners with New York State Parks on Hydrogen Fuel Cell Project
The Toro Co. announced a partnership with the State of New York to provide the next generation of turf maintenance equipment powered by hydrogen fuel cells. The project supports New York's Executive Order 111 to adopt "Green and Clean" State buildings and vehicles. The New York State Energy Research and Development Authority (NYSERDA) is contributing $380,025 toward the project. Selected as a partner, Toro will provide Niagara Falls State Park (NFSP) with three hydrogen-powered utility vehicles based on the Toro(R) Workman(R) chassis by mid-2007. The NYSERDA-funded project included hydrogen fuel cell vehicles because they generate minimal emissions. Other benefits include: reduced noise pollution; increased machine efficiency over gasoline- or diesel-powered equipment; rapid refueling versus slow recharging of battery-operated equipment; and low emissions.
Toro: http://www.fuelcellsworks.com/Supppage7007.html

8. Fuel Cell Toy One of 11 Coolest Products on Planet
The first example of a fuel cell-powered consumer product has been named one of the "11 coolest new products on the planet." Miniature hydrogen fuel cell car H-racer, designed by clean power solutions company Horizon, was voted first in the marketing category by event organizers Business 2.0 and Frog Design in the Bottom Line Design awards. The prize honours firms for ingenuity in business success. "Horizon is a start-up that builds industrial-grade fuel cells. [This is] a clever way to show how they work," confirmed the judges, adding that "brisk sales of this tiny toy contribute cash to the company's bigger R&D goals." Taras Wankewycz, co-founder and lead designer of the H-racer, said he hoped the H-racer would help Horizon "lead the world into a clean and energy independent hydrogen age."
H-Racer:
http://www.fuelcelltoday.com/FuelCellToday/IndustryInformation/IndustryInformationExternal/NewsDisplayArticle/0,1602,8949,00.html

9. Hydrogen Fueling Stations to Debut in Several States
Gas Technology Institute's (GTI) has announced the achievement of major milestones for three hydrogen fueling station projects: 1) Construction of a hydrogen fueling station in San Carlos, CA is scheduled to begin this summer. Pacific Gas and Electric Company (PG&E) was recently awarded a California Air Resources Board (CARB) grant for the project. GTI will serve as a partner on the project, providing a mobile hydrogen unit (MHU) that uses GTI's patented reformer technology. The hydrogen fueling station will be co-located with a publicly accessible compressed natural gas station to allow for 24/7 availability. 2) The University of Texas at Austin, Center for Electromechanics (UT-CEM) and GTI plan to install the first permanent hydrogen fueling station packaged by GreenField Compression Inc. of Richardson, TX and deploy the first zero-emission fuel cell hybrid bus in the State of Texas this summer. The Federal government, including the U.S. Department of Energy (DOE), and private industry have funded over $20 million to develop these advanced fueling and vehicle technologies. 3) GTI will also be opening a

publicly-accessible hydrogen fueling station with credit card access at its headquarters in Des Plaines, IL in early April this year.
GTI:
http://www.gastechnology.org/webroot/app/xn/xd.aspx?it=enweb&xd=6newsroom\2007\hydrogenfuelingstationstodebutin20073_15_07.xml

10. Air Products and FuelCell Energy Begin Construction of High Efficiency Hydrogen Energy Station
Air Products and FuelCell Energy, Inc. announced construction has commenced on an advanced hydrogen energy demonstration station. The station, funded in part by the United States Department of Energy (DOE), is to demonstrate a tri-generating green energy system capable of providing low-cost hydrogen, electric power and heat from one integrated unit. The new system will combine FuelCell Energy's Direct FuelCell(R)(DFC) power plants with Air Products' advanced gas separation technologies. The DFC system produces reliable ultra-clean electric power and heat for cogeneration, as well as hydrogen for industrial applications and fuel cell vehicles. The system is designed to produce more than 250 kilowatts (kW) of green power and over 135 kilograms (about 300 pounds) of hydrogen per day. The system could provide hydrogen for smaller industrial users who routinely purchase liquid or gaseous hydrogen that currently must be delivered by truck. The DFC system could also be equipped to provide daily hydrogen fueling for approximately 35 fuel cell vehicles.
Energy Station:
http://www.airproducts.com/PressRoom/CompanyNews/Archived/2007/20Mar2007.htm

11. Plans on Table for Richmond CA Hydrogen Plant
On March 22, plans were presented to build a hydrogen plant at the Richmond Chevron refinery that would deliver gas to refineries in Rodeo and Martinez. The plant would carry gas from Richmond to the ConocoPhillips refinery in Rodeo and the Shell refinery in Martinez via underground pipelines. The pipelines would be laid through the cities of Richmond, Pinole, Hercules and Martinez and through East Bay Regional parklands in the Carquinez hills. Praxair gave an overview of the project to the Contra Costa County Hazardous Materials Commission in Concord. The project is in the early stages and not expected to reach the permitting stage until sometime next year.
H2 Plant:
http://www.contracostatimes.com/mld/cctimes/news/local/states/california/16951874.htm

12. Roskam Announces Alternative Energy Award
Congressman Peter J. Roskam (R-IL) announced a four-year U.S. Department of Energy (DOE) cooperative agreement for $3,396,186 to the Des Plaines-based Gas Technology Institute (GTI) for development of a gasification membrane reactor system for production of hydrogen from biomass. This project will evaluate new processes to produce hydrogen from renewable biomass with high efficiency and low cost using a hydrogen-selective membrane. The proposed membrane gasifier can potentially reduce the hydrogen product cost by more than 40% over the conventional biomass gasification technology.
GTI Award: http://roskam.house.gov/News/DocumentSingle.aspx?DocumentID=59335

13. New BioFuels Process Promises to Meet US Transportation Needs
Purdue University chemical engineers have proposed a new environmentally friendly process for producing liquid fuels from plant matter - or biomass - potentially available from agricultural and forest waste, providing all of the fuel needed for "the entire U.S. transportation sector." The new approach modifies conventional methods for producing liquid fuels from biomass by adding hydrogen from a "carbon-free" energy source, such

as solar or nuclear power, during a step called gasification. Adding hydrogen during this step suppresses the formation of carbon dioxide and increases the efficiency of the process, making it possible to produce three times the volume of biofuels from the same quantity of biomass, said Rakesh Agrawal, Purdue's Winthrop E. Stone Distinguished Professor of Chemical Engineering. The researchers are calling their approach a "hybrid hydrogen-carbon process," or H2CAR.
Biofuels: http://news.uns.purdue.edu/x/2007a/070314AgrawalBiomass.html

14. TWI Develops New Hydrogen Solution
One of the principal obstacles preventing the mass adoption of hydrogen as the clean energy source of the future may be felled in Cambridge, England following major investment in a state-of-the-art materials testing facility by The Welding Institute (TWI). The current hydrogen vessel and testing machine has paved the way for TWI's new world leading version. The testing system will be the only one of its kind in the world, providing the oil and gas and automotive industries with a unique opportunity to develop appropriate alloys for the safe storage of high-pressure hydrogen and is already attracting the interest of car manufacturers. With the ability to expose metals to a pressure of 1,000bar -- over seven tons per square inch -- and temperatures between -150ºC and 85ºC, the facility is being housed at TWI's headquarters in Granta Park in a specially reinforced, blast-proof building, capable of absorbing an accidental explosion.
TWI: http://www.businessweekly.co.uk/news/view_article.asp?article_id=11649

15. Alternate Energy Corp. Produces Hydrogen Without CO2 Emissions
Alternate Energy Corp., the developer of an innovative technology for the production of hydrogen and certain commodity chemical products, recently announced that its breakthrough process technology will produce bulk quantities of pure hydrogen without any emission of greenhouse gases (carbon dioxide) into the environment. AEC's process produces valuable commodity chemicals, while producing the hydrogen, but no toxic by products -- it is a totally green process. AEC believes that its green technology for the production of hydrogen is the right technology at the right time. The primary methods of producing hydrogen gas today are electrolysis and steam reformation of natural gas.
AEC: http://www.cleanwatts.com/news/news.asp?id=98

16. Priming the Pump for Hydrogen Fuel
Ecotality plans to produce a prototype of an apparatus called the Hydratus that generates hydrogen fuel, from a reaction between magnesium and water, as it's needed by a vehicle's fuel cell. The Jet Propulsion Laboratory, run for NASA by the California Institute of Technology, has developed a new version of the Hydratus that offers double the mileage of the old version, but at the same weight and volume. Ecotality, based in Scottsdale, Ariz., plans to unveil its prototype by the end of 2007, which will give the company time to put refinements into the newer version of Hydratus, according to Ecotality's CEO, Jonathan Read. "Hydrogen on-demand is going to be what catapults hydrogen from being a great concept to a great reality," said Read.
Hydratus: http://news.com.com/2102-11392_3-6170740.html?tag=st.util.print

17. Plug Power Announces Agreement to Acquire Cellex Power
Plug Power Inc. recently announced execution of a definitive agreement to acquire Cellex Power Products Inc., a leader in fuel cell power solutions for industrial vehicles, for $45 million. Since its inception in 1998, Cellex Power has been developing proton exchange membrane (PEM) fuel cell power units for electric lift trucks and is targeting the estimated $1.5 billion industrial motive battery market. In November 2006, Cellex successfully completed beta testing of its zero-emission, hydrogen fuel cell power units in pallet trucks at two Ohio-based Wal-Mart distribution centers. Cellex Power's strategy is

to develop a full product portfolio addressing all three classes of electric lift trucks, enabling complete conversion of distribution centers and maximizing customer benefit.
Plug Power: http://www.plugpower.com/news/press.cfm

18. Riverside Wastewater Plant to Run on Hydrogen Fuel Cell
A wastewater treatment plant serving Riverside, CA, will install a hydrogen fuel cell to generate electric power for the plant, announced FuelCell Energy, Inc. The company expects the Riverside hydrogen fuel cell to serve as a model for other installations in California that will transition from fossil-fuel generating power plants to cleaner alternatives. The plant treats 30 million gallons of wastewater daily, and is now powered by three reciprocating engines fueled by anerobic digester gas from the plant. However, the fuel cell, which will also consume the digester gas, will produce power for the plant with no combustion. The $4.5 million installation is being funded by California's Self-Generation Incentive Program, through the Southern California Gas Co.
Waste Water Plant: http://www.watertechonline.com/news.asp?mode=4&N_ID=66691

19. New Zealand on Pathway to Hydrogen
CRL Energy's will spend $533,334 to show how New Zealand could switch to hydrogen-based energy and hopes to have a discussion paper by the end of the year. The paper would not only canvass the potential to use hydrogen to run vehicles and generate electricity, but how "surplus" electricity - from sources such as windpower, wavepower or ocean currents - could be used to split hydrogen out of water and store it until needed. The paper would look at other ways to produce hydrogen, ranging from the concept of extracting it from big coal deposits - and re-burying the unwanted carbon - to producing it in methane from digester systems. CRL Energy is half-owned by the coal industry and half by a state science company, the National Institute of Water and Atmospheric Research.
New Zealand:
http://www.nzherald.co.nz/section/1/story.cfm?c_id=1&objectid=10426413

20. South Carolina Positioning Itself to Win in Hydrogen World
In trying to build the best hydrogen fuel-cell research team in America, South Carolina has taken a page from George Steinbrenner's playbook for building a great baseball team: Hire your competitors' best players. And, like the flamboyant New York Yankees owner, South Carolina has gotten good at it. The S.C. Hydrogen Coalition, which promotes the hydrogen economy in the state, hired as its new director Shannon Baxter-Clemmons, hydrogen fuel-cell adviser to California Gov. Arnold Schwarzenegger. (Editor's Note: Shannon is California Hydrogen Business Council's former government liaison. We wish her all the best in SC!)
SC: http://www.thestate.com/mld/thestate/16973485.htm

21. Biofuel Cell Produces Electricity from Hydrogen in Plain Air
A pioneering "biofuel cell" that produces electricity from ordinary air spiked with small amounts of hydrogen offers significant potential as an inexpensive and renewable alternative to the costly platinum-based fuel cells, British scientists recently reported. The research was presented at the 233rd national meeting of the American Chemical Society, the world's largest scientific society. Fraser Armstrong, Ph.D., described how his research group at Oxford University built the biofuel cell with hydrogenases -- enzymes from naturally occurring bacteria that use or oxidize hydrogen in their metabolism. The cell consists of two electrodes coated with the enzymes placed inside a container of ordinary air with 3 percent added hydrogen.
Biofuel Cell: http://news.mongabay.com/2007/0327-fuel_cell.html

22. Save the Dates!
Mark your calendars now for CHBC's summer and fall General Meetings. One-day conferences will be held on Friday, July 27 (location to be announced) and Thursday, October 25 (location to be announced). More details will be released soon.
Meetings: http://www.californiahydrogen.org/page.cfm?content=16

23. Member Benefits
Platinum membership is $5,000 per year and includes your logo on each page of the CHBC website for one year, your firm credited as sponsor of two General Meetings during the year, and two free registrations at each CHBC meeting for 12 months. Gold membership is $2,500 and includes your firm credited as a sponsor of one General Meeting during the year and one free registration to each CHBC General meeting for one year. Silver membership is the buy of the century at $1,000; Individual membership is $200. Please see http://www.californiahydrogen.org/page.cfm?content=12 for full details. To inquire about membership, contact Managing Director Catherine Rips, info@californiahydrogen.org.
Gold Members: http://www.californiahydrogen.org/page.cfm?content=61
Silver Members: http://www.californiahydrogen.org/page.cfm?content=33

24. Board of Directors
President - Henry Wedaa; Vice President - Paul Scott, ScD; Managing Director - Catherine Rips; Secretary - Josh Mauzey; Treasurer: Jerald Cole; Membership Chairman - Mark Abramowitz; Fleets Chair - John Addison; Program Chairman - Henry Wedaa; Director at Large - Gary Dixon; Director at Large - John Williams, PE; Director at Large - Allan Bedwell; Director at Large - Fred Silver; Ex-officio Government Liaision - Analisa Bevan. To contact the board, please email: info@californiahydrogen.org.

25. Send Us Your News!
We welcome important news from our members for inclusion on our website and in next month's report. In addition to being distributed to CHBC's list of over 2200 industry members, our newsletters are forwarded to thousands more through the Canadian Hydrogen Association and FuelCellMarkets.com. Please send to: info@californiahydrogen.org. Thank you for helping build a great organization.
CHA: http://www.h2.ca/
Fuel Cell Markets: http://www.fuelcellmarkets.com/

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