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### 1. Welcome New Members

CHBC extends a warm welcome to our newest Silver member, AC Transit and our newest Individual members, Richard Pilatos, Intelligent Hydrogen, and John Cornish, EPC. We appreciate your support!

[AC Transit](http://www.actransit.org): <http://www.actransit.org>

### 2. Pre-Reg Ends Dec 3 for CHBC Dec 11 Meeting on Infrastructure

California Hydrogen Business Council's December 11 General Meeting will offer insights into existing and planned infrastructure projects, present problems and spotlight solutions, and help prepare stakeholders for ARB's upcoming RFP. Outstanding presentations include AQMD's 2009 Clean Fuels Program and Aerovironment's Unmanned Aircraft System plus Jumpstarting the Hydrogen Refueling Infrastructure in California; Camp Pendleton Hydrogen Station: Site Permitting and Integration; SCE Rosemead Station; Digester Gas to Hydrogen; Orange County Sanitation District Station; GM Hydrogen Infrastructure Study and Stations; Clean Energy's Hydrogen Infrastructure Projects; an Overview of Quantum Refueling Products and Projects and more. Pre-reg ends December 3. Register now!

[Register](http://www.californiahydrogen.org/page.cfm?content=45&event_ID=77): [http://www.californiahydrogen.org/page.cfm?content=45&event\\_ID=77](http://www.californiahydrogen.org/page.cfm?content=45&event_ID=77)

### **3. Let President-Elect Obama Hear Your Views on Hydrogen**

The Office of the President-Elect is inviting comments regarding energy policy. This is the perfect chance to let President-Elect Obama and Vice President-Elect Biden know that sustained support of hydrogen is essential to our national security and our economy. Write him today! It's critical that our voices be heard!

[Support Hydrogen!](http://www.change.gov/page/s/energyenviro): <http://www.change.gov/page/s/energyenviro>

### **4. California Economy Loses \$28 Billion Yearly to Health Effects of Pollution**

The California economy loses about \$28 billion annually due to premature deaths and illnesses linked to ozone and particulates spewed from hundreds of locations in the South Coast and San Joaquin air basins, according to findings released Wednesday by a Cal State Fullerton research team. Most of those costs, about \$25 billion, are connected to roughly 3,000 smog-related deaths each year, but additional factors include work and school absences, emergency room visits, and asthma attacks and other respiratory illnesses, said team leader Jane Hall, a professor of economics and co-director of the university's Institute for Economics and Environment Studies.

[Pollution](http://www.latimes.com/features/health/la-me-pollute13-2008nov13,0,5432723.story): <http://www.latimes.com/features/health/la-me-pollute13-2008nov13,0,5432723.story>

### **5. CARB, H2 Experts Gather at UCLA**

At a recent event at the University of California, LA, hosted by the California Air Resources Board, fuel cell automakers gathered to update the media on Hydrogen Highway progress. American Honda Motor Co.'s Stephen Ellis announced that the company's 2008 FCX Clarity had achieved a 70% improvement on range versus the FCX of five years prior with only a 10% increase in fuel. GM's Dave Barthmus said Project Driveway reached 500,000 miles in November. He reiterated the company's plan of reaching fuel cell commercialization by 2015 with 10,000 vehicles manufactured per year by each of the OEMs. Daimler's Rosario Berretta said Mercedes is on its second generation hydrogen fuel cell vehicle, the Class B, and reiterated plans to deploy hundreds of vehicles in the coming years wherever hydrogen stations are located.

[Hydrogen Highway](http://www.calstart.org/dailynewsnotes/daily_nns_detail.php?id=9638): [http://www.calstart.org/dailynewsnotes/daily\\_nns\\_detail.php?id=9638](http://www.calstart.org/dailynewsnotes/daily_nns_detail.php?id=9638)

### **6. Swank Gets Behind the Wheel of BMW's Hydrogen-Powered Luxury Sedan**

Hilary Swank, two times Academy Award-winning Best Actress, received the keys to a BMW Hydrogen 7, the world's first hydrogen-powered luxury sedan. With the first kilometres covered by Hilary Swank, 3.5 million kilometres have been driven with the BMW Hydrogen 7. Mileage has been generated by numerous worldwide renowned personalities. Hilary Swank joins Brad Pitt, Angelina Jolie, Will Ferrell, Jay Leno, Edward Norton, Cameron Diaz, Melissa Etheridge and others who have opted for a BMW Hydrogen 7 as their energy-efficient ride of choice. The vehicle has also made an impact overseas, with luminaries such as Michael Glos, German Federal Minister for Economy and Technology, and Hans-Gert Pottering, President of the European Parliament, and many others.

[BMW](http://www.theautochannel.com/news/2008/10/31/209756.html): <http://www.theautochannel.com/news/2008/10/31/209756.html>

### **7. Honda FC Sport Design Study Suggests Hydrogen Sports Car Future**

Honda revealed the Honda FC Sport design study model, a hydrogen-powered, three-seat sports car concept, at the 2008 Los Angeles Auto Show. The FC Sport emphasizes the design flexibility and potential of Honda's V Flow fuel cell technology - already deployed in the Honda FCX Clarity sedan - and reconfigures it into a lightweight sports car design with an ultra-low center of gravity, powerful electric motor performance and zero-emissions. The design study concept is inspired by supercar levels of performance through low weight and a high-performance, electrically driven fuel cell powertrain. In addition, the 2008 Honda FCX

Clarity is the first hydrogen car to be eligible for a rebate under California's Alternative Fuel Vehicle Incentive Program (also known as Fueling Alternatives).

[Honda](http://www.hondanews.com/categories/1097/releases/4879): <http://www.hondanews.com/categories/1097/releases/4879>

[Rebate](http://www.fuelingalts.energycenter.org): <http://www.fuelingalts.energycenter.org>

### **8. KIA Unveils Borrego FCEV at LA Auto Show**

Kia Motors Corp.'s Fuel Cell Electric Vehicle program (FCEV) took a major technological step forward with the global unveiling of the all-new Kia Borrego (known as "Mohave" in some markets) FCEV at the Los Angeles International Auto Show. Numerous innovations including a higher output 154 horsepower fuel cell and a new 450-volt Supercapacitor give the Borrego FCEV higher performance, a greatly extended driving range and cold-weather starting capability to operate in sub-zero temperatures. Available with two and three tank systems with 70MPa pressure, the Borrego FCEV's power plant is located under the center floor. The vehicle has a top speed of 161 kph and boasts a best-in-class system efficiency of 62 percent.

[Kia](http://www.newswire.co.kr/?job=news&no=372274): <http://www.newswire.co.kr/?job=news&no=372274>

### **9. Shanghai VW Debuts Hydrogen Fuel Cell Passat Lingyu at LA Auto Show**

Volkswagen's partnership with Shanghai Auto to build cars and develop new technology together unveiled the hydrogen fuel cell powered Passat Lingyu sedan at the Los Angeles Auto Show. The Passat Lingyu has been built by the joint-venture in China since last year. The new fuel cell model will be used to promote alternative energy mobility, with a view to mass production sometime in 2010. The Passat Lingyu's fuel cell was developed jointly by Shanghai-VW, Tongji University, and Chinese technology firm Shanghai Shen-Li High Tech. The clean powertrain features a 120hp (88kW) electric drive motor running on lithium-ion batteries that are charged by a 75hp (55kW) fuel cell in the base of the car. This is capable of taking the Passat to a top speed of 93mph and a range of 190 miles on a single tank of hydrogen.

[VW](http://www.motorauthority.com/shanghai-volkswagen-to-showcase-hydrogen-fuel-cell-passat-lingyu-at-la-auto-show.html): <http://www.motorauthority.com/shanghai-volkswagen-to-showcase-hydrogen-fuel-cell-passat-lingyu-at-la-auto-show.html>

### **10. GM Unveils A Hydrogen-Electric Fuel-Cell Luxury Hybrid Concept SUV At Las Vegas**

General Motors unveiled the Cadillac Provoq, its plug-in hydrogen-electric fuel-cell luxury hybrid concept SUV, at the 2008 Consumer Electronic Show in Las Vegas. The Cadillac Provoq uses the same eFlex architecture that was rolled out in early 2007 with the Chevy Volt. GM uses this iteration as a platform for its fifth-generation fuel cell stacks, which the company says are half the size of its predecessor, but more powerful. The vehicle stores its hydrogen in two 10,000-psi composite fuel tanks mounted under the cargo floor and its electricity in a lithium ion battery pack mounted under the rear seat. The two hydrogen tanks provide 280 miles of mobility, with the batteries providing 20 more miles of driving.

[Provoq](http://www.hybridcars.com/vehicle/cadillac-provoq.html): <http://www.hybridcars.com/vehicle/cadillac-provoq.html>

### **11. US Dept of Agriculture to Partner With Chevy**

The U.S. Dept. of Agriculture (USDA) has become the newest partner in Chevrolet's Project Driveway, the first and largest market test designed to speed hydrogen powered fuel cell electric vehicles (FCEV) to the consumer marketplace. Over the next six months, the USDA will be using a Chevrolet Equinox FCEV to transport top leadership and Congressional Relations Staff on official business on Capitol Hill -- petroleum free -- while providing valuable real-world performance feedback. The partnership with the USDA is part of the Dept. of Energy's hydrogen and fuel cell research, development, and demonstration efforts. GM will provide the maintenance, fuel and service of the vehicle. Fueling for the USDA is

being provided at the Shell Benning Rd. station in the Northeast community of Washington, D.C.

[Chevy:](#)

<http://www.paddocktalk.com/news/html/modules.php?op=modload&name=News&file=article&sid=98427>

### **12. Eco-Car Team Receives Challenge: Make it Run on Hydrogen**

Missouri S&T is one of 17 universities selected by the U.S. Dept. of Energy to compete in a three-year competition called EcoCar: The Next Challenge. The teams will incorporate lightweight materials into the vehicles, improve aerodynamics and utilize alternative fuels like ethanol and hydrogen. Strategies for each team will depend upon the specific tasks they are assigned. S&T team members just got word they have been selected to receive a hydrogen fuel cell powertrain. A team from the University of Waterloo in Canada will be working with a hydrogen fuel cell solution. Earlier this year, Missouri S&T dedicated the first hydrogen fueling station in Missouri. The station is used by hydrogen-powered buses running along Interstate-44, primarily between Rolla and Fort Leonard Wood, Mo.

[Challenge:](http://www.ecocarchallenge.org/)

[Missouri S&T:](http://visions.mst.edu/chemistry/2008/11/)

### **13. Honda Begins Leasing FCX Clarity Fuel Cell Vehicle in Japan**

Honda Motor Co., Ltd. began leasing the FCX Clarity fuel cell vehicle in Japan, recently delivering the first vehicle to the Ministry of the Environment. This transaction follows directly upon a completed lease to the Ministry of the FCX fuel cell vehicle, predecessor to the FCX Clarity. Initially, Honda plans to lease the FCX Clarity in Japan only to governmental agencies and certain corporate entities. Honda has leased the vehicle in the US since July 2008. Designed as a dedicated fuel cell vehicle, the FCX Clarity is powered by the Honda V Flow fuel cell stack. Thanks to the innovative layout of the fuel cell power plant, the FCX Clarity offers superior design, packaging and driving performance. The combined sales plan for Japan and U.S. calls for about 200 units within three years.

[Japan:](http://www.marketwatch.com/news/story/Honda-Begins-Leasing-FCX-Clarity/story.aspx?guid=%7B14B150F5-5A2B-4E02-9AA8-777762AB244C%7D)

### **14. Opel Presents Fuel Cell Vehicle Fleet with Business Partners in Berlin**

The goal of achieving sustainable mobility with zero emissions came a step closer when Opel announced the European part of GM's biggest-ever test program for fuel cell vehicles during a visit by Germany's Federal Minister of Transport, Building and Urban Affairs Wolfgang Tiefensee. Nine companies will be the first to operate the GM/Opel HydroGen4 zero emission vehicles in the Berlin area as they go about their regular business: ADAC, Allianz, Coca-Cola, Hilton, Linde, Schindler, Axel Springer, Total and Veolia. This real-world road test will run under the umbrella of the Clean Energy Partnership (CEP), a German Federal Department for Transport, Building and Urban Development funded project focused on proving the day-to-day suitability of hydrogen as a fuel for road transport.

[Opel:](http://www.theautochannel.com/news/2008/11/27/265281.html)

### **15. RMIT Unveils Australia's First Hydrogen Race Car**

Working in collaboration with Germany's Fachhochschule Ingolstadt University of Applied Sciences, RMIT University researchers have unveiled Australia's first hydrogen-powered race car. The car will bid for the title of world's fastest hydrogen-powered racer when it attempts to break the Guinness World Records mark for speed by a vehicle of its class in early 2009. Powered by an internal combustion motorcycle engine modified to run on hydrogen, the hydrogen race car is expected to reach speeds of up to 170 kmh in its world record bid, to be held in Germany next year. Professor Aleksandar Subic, RMIT head of the School of

Aerospace, Mechanical and Manufacturing Engineering, said the hydrogen car project could radically change the world's approach to automotive technologies.

[Race Car](http://www.themotorreport.com.au/11674/rmit-unveils-australias-first-hydrogen-race-car/): <http://www.themotorreport.com.au/11674/rmit-unveils-australias-first-hydrogen-race-car/>

### **16. Indian Scientists Develop Hydrogen Fuel Cells to Power Bus**

India's space scientists have developed hydrogen fuel cells to power a bus by leveraging their know-how of the homegrown cryogenic technology for rockets. The two-year effort yielded positive results and the scientists are now readying the fuel cells to be fitted into a bus. The hydrogen cells are a spin-off of the cryogenic technology that ISRO has been developing for the last few years. "That's not exactly the cryogenic technology... (It's) liquid hydrogen handling and that's where we have some expertise. So, we have finalized the design," said G Madhavan Nair, chair of Indian Space Research Organization (ISRO). "Tatas are responsible for the locomotive part of it, and hydrogen handling system also. First protomodel has been assembled. Results are good. Maybe next year, it should be on the road."

[Bus](http://in.news.yahoo.com/48/20081117/1243/ttc-isro-scientists-develop-hydrogen-fue.html): <http://in.news.yahoo.com/48/20081117/1243/ttc-isro-scientists-develop-hydrogen-fue.html>

### **17. Engineer Granted \$1.75 Million to Produce Hydrogen from Cellulosic Biomass**

University of Rochester Professor David Wu has received a \$1.75 million grant to investigate a way to turn waste biomass, such as grass clippings, cornstalks, and wood chips, into usable hydrogen or ethanol. The U.S. Dept. of Energy (DOE) issued the grant to Wu, a professor of chemical engineering, because he is one of the foremost scientists working to derive ethanol from biological waste products. Generating hydrogen gas, Wu explains, is very similar to generating ethanol, and he is employing state-of-the-art genomic approaches to study and enhance the abilities of a microorganism that has the capability to produce both fuels from farm and forest residues. The bacterium Wu studies, called *C. thermocellum*, has the very rare ability to break down tough plant cellulose and convert it to hydrogen and ethanol.

[Cellulosic](http://media-newswire.com/release_1079110.html): [http://media-newswire.com/release\\_1079110.html](http://media-newswire.com/release_1079110.html)

### **18. H2scan Presents at 2nd China Intl H2 & FC Expo**

Prabhu Soundarrajan, H2scan's chief scientist and director of strategic applications development, recently presented a paper on "Hydrogen Specific Sensing Systems for Industrial Applications" at the 2nd China International Hydrogen & Fuel Cell Expo in Shanghai, China. The paper focused on the relevance of the company's sensors in hydrogen, fuel cell and industrial manufacturing. Soundarrajan noted most hydrogen detection technologies including LEL sensors require the presence of oxygen. H2scan's hydrogen specific sensors can operate efficiently in a wide variety of gas backgrounds without cross-contamination or false alarms to trace the source of a percent level hydrogen leak and for hydrogen process control applications including hydrogen fuelling stations, fuel cells and hydrogen production.

[H2scan](http://www.h2scan.com/news_16.aspx): [http://www.h2scan.com/news\\_16.aspx](http://www.h2scan.com/news_16.aspx)

### **19. Hy9 Sparks Exxon Deal, Names Bradshaw CEO**

Hy9 Corp., a maker of hydrogen purifiers for use with fuel cells, has struck a new deal with ExxonMobil Corp. to provide its products to ExxonMobil's on-board fuel cell reformer project. The project, announced last year, aims to develop fuel-cell-powered forklifts to run on a variety of hydrocarbon-based fuels, such as diesel fuel. While the hands-on research will be done on forklifts, officials at Hopkinton-based Hy9 and at ExxonMobil said the project is a precursor to bringing such technology to passenger vehicles. The deal comes on the heels of

a change in management at Hy9. The company appointed Brad Bradshaw, the president of the Massachusetts Hydrogen Coalition, as interim CEO.

[Hy9](http://www.masshightech.com/stories/2008/11/24/weekly5-Hy9-sparks-Exxon-deal-names-Bradshaw-CEO.html): <http://www.masshightech.com/stories/2008/11/24/weekly5-Hy9-sparks-Exxon-deal-names-Bradshaw-CEO.html>

## **20. Michigan Students Establish New Fuel-Cell UAV Record**

University of Michigan undergrads flew Endurance, their 12-pound radio-controlled fuel cell-powered unmanned aerial vehicle (UAV) with its 8-foot wingspan, for 10-hours and 16 minutes, at an average speed of about 99 miles per hour. The flight was conducted in a field in Milan, MI, about 20 miles south of Ann Arbor. The project, called SolarBubbles, was chaired by engineering senior Nick Rooney, who says the flight could have gone another five hours before the craft's fuel was exhausted, but the flight was cut short due to lack of lighting and navigation equipment required for night operation. His group hopes to try for a 24-hour flight later. The Michigan Daily reports the students were attracted by the chance to play a role in the development of alternative energy sources.

[Endurance](http://www.aero-news.net/index.cfm?ContentBlockID=b9dd4d1f-debd-4e0a-a11a-6918bd9f903b): <http://www.aero-news.net/index.cfm?ContentBlockID=b9dd4d1f-debd-4e0a-a11a-6918bd9f903b>

[Flight](http://solarbubbles.engin.umich.edu/~solarbubbles/): <http://solarbubbles.engin.umich.edu/~solarbubbles/>

## **21. Air Products and AERI Study Focused on Advanced CO2 Capture Technology**

Air Products is collaborating with the Alberta Energy Research Institute (AERI) on a study focused on an advanced carbon dioxide capture technology for use with gasification. The advanced carbon capture technology, developed by Air Products, could reduce the cost of carbon dioxide (CO2) capture by up to 25 percent versus current technologies. The study, "Advanced Hydrogen and CO2 Capture Technology for Sour Syngas," is expected to be completed by October 2010. Air Products is also planning to construct a new production facility in St. Charles, MO to increase manufacturing capacity of its PRISM(TM) membrane products. The new plant is to be on-stream in early 2010. Membranes are often used for hydrogen recovery and purification.

[CO2 Capture](http://www.edubourse.com/finance/actualites.php?actu=47974): <http://www.edubourse.com/finance/actualites.php?actu=47974>

[Membranes](http://www.airproducts.com/PressRoom/CompanyNews/Archived/2008/29Oct2008.htm):

<http://www.airproducts.com/PressRoom/CompanyNews/Archived/2008/29Oct2008.htm>

## **22. Hydrogen Storage Potentially Lighter than Batteries**

A Dutch-sponsored researcher who developed a new way to determine which alloys are best at absorbing hydrogen has come up with a material that has the potential to provide hydrogen storage that is 60 percent lighter than an equivalent battery. Dr. Robin Gremaud used a technique discovered at the VU University, Amsterdam, where he is based, called, "switchable mirrors." Ten years ago, researchers there discovered that certain materials lose their reflection by absorbing hydrogen. Using this technique, he simultaneously analyzed the efficacy of thousands of different combinations of the metals magnesium, titanium and nickel. Gremaud is the first to use this method for measuring hydrogen absorption. The British company Ilika in Southampton wants to build a hydrogen analyzer using this technique.

[Research](http://www.chemistrytimes.com/Research/Hydrogen_tank_lighter_than_battery.asp):

[http://www.chemistrytimes.com/Research/Hydrogen\\_tank\\_lighter\\_than\\_battery.asp](http://www.chemistrytimes.com/Research/Hydrogen_tank_lighter_than_battery.asp)

## **23. Hydrogen Safety Course Developed by UM**

With the number of hydrogen-fuelled vehicles travelling America's highways expected to increase, the University of Montana has developed an eight-hour awareness training program aimed at emergency response teams and funded by the U.S. Depts. of Transportation and Energy. The course is tailored to those who are coming into contact with

hydrogen in emergency situations, such as firefighters, emergency medical technicians, law enforcement professionals and emergency administrators. In addition, the course will also include training on hydrogen storage, personnel equipment and emergency responses.

[Training](http://www.gasworld.com/news.php?a=3292;la=1): <http://www.gasworld.com/news.php?a=3292;la=1>

#### **24. Target 2030: Energy and Climate Future Conference Jan 14-15, Sacramento**

Organized by CALSTART, this timely symposium of policymakers and industry leaders will identify, outline and discuss innovative new solutions to address California's transportation-related energy, climate and air quality challenges. Target 2030 will present an unparalleled opportunity to meet with state leaders and explore new policies, technologies and partnerships that can address California's transportation energy and climate needs. Experts from automotive, transit, land-use planning, fuel providers, and environmental leaders will take part in outlining the issues and seeking new collaborative and long-term approaches to change. For sponsorships, technology exhibits and ride and drive information, contact Debby DuBose, Event Manager at 626/744-5653 or [ddubose@calstart.org](mailto:ddubose@calstart.org), [Target 2030](http://www.calstart.org): <http://www.calstart.org>

#### **25. Send Us Your News; Board of Directors**

We welcome important news from our members for inclusion on our website and in next month's report. Thank you for helping build a great organization. Our board: President - Henry Wedaa; Vice President - Paul Scott, ScD; Secretary - Josh Mauzey; Treasurer - John Williams; Managing Director - Catherine Rips; Membership Chairman - Mark Abramowitz; Program Chairman - Henry Wedaa; Director at Large - Allan Bedwell; Director at Large - Fred Silver; Director at Large - Larry Watkins; Ex-officio Government Liaison - Analisa Bevan. To send news or contact the board, please email: [info@californiahydrogen.org](mailto:info@californiahydrogen.org).

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Catherine Rips, Editor/Publisher

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