

Hydrogen, Fuel Cells & Alternatives

Monthly Monitor on the latest technology developments,
policy issues and capacity building opportunities
in the energy and transport sectors

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RESEARCH UPDATES

Harnessing hydrogen from the sun

Platinum, a rare and expensive metal, is the most commonly used catalyst for generating hydrogen through electrolysis. Researchers at Oxford University in the UK, however, have successfully made hydrogen from sunlight and water, using titanium dioxide as the catalyst. The team used a hydrogenase enzyme containing selenium, which binds strongly to titanium dioxide, and is tolerant to oxygen and hydrogen. Previous experiments have used hydrogenase enzymes containing nickel and iron, but these are inhibited by the oxygen and hydrogen that they produce.

<http://www.h2journal.com/displaynews.php?NewsID=82?>

[PHPSESSID=ba9106734303b5fdfee869702a5e07fc?PHPSESSID=d30f5e5ba131535e0c2409ef4701426c](http://www.h2journal.com/displaynews.php?NewsID=82?PHPSESSID=ba9106734303b5fdfee869702a5e07fc?PHPSESSID=d30f5e5ba131535e0c2409ef4701426c)

Meanwhile in the US, researchers at MIT have created a compound based on the metal rhodium, a photo catalyst, to produce hydrogen gas with a zap of light. According to the research team the technique is essentially, "photosynthesis in a beaker," and could provide a cheap, clean energy source in the future.

<http://web.mit.edu/newsoffice/2001/nocera.html>

Hydrogen from waste

Researchers in Japan have succeeded in producing hydrogen from animal waste for use in fuel cells. Cattle dung and urine are fermented under oxygen-free conditions to extract ammonia, which is then electrolysed into hydrogen and nitrogen. This technique allows the production of hydrogen without producing unwanted carbon dioxide and can also be applied to human waste.
<http://www.fuelcelltoday.com/online/news/articles/2009-01/obihiro-hydrogen>

World's smallest fuel cell

New Scientist has reported that the world's smallest working fuel cell, at just 3 millimetres across, has been created by US chemical engineers. Future versions of the tiny hydrogen-fuelled power pack could replace batteries in portable gadgets.
<http://www.newscientist.com/article/dn16370-worlds-smallest-fuel-cell-promises-greener-gadgets.html>

New soybean process could simplify biodiesel production

According to recent research published in the journal *Aquaculture*, a new method of soybean meal processing known as 'in situ transesterification' has been developed. The process simplifies the biodiesel synthesis process by combining the extraction and transesterification steps, enabling the production of biodiesel in a single treatment conducted directly on a lipid-bearing solid material
http://www.soyatech.com/news_story.php?id=11780

Towards greener biogas

Plant scientists at Cornell University in the US have invented a new method that uses manure and other farm byproducts to remove toxic hydrogen sulfide from biogas. Hydrogen sulfide can combine with water to cause acid rain and to corrode engines and its removal makes biogas a more viable alternative fuel source.
<http://www.enn.com/sci-tech/article/39043>

INDUSTRY NEWS

Toyota to commercialize fuel cell cars by 2015

In June 2008, Toyota introduced an advanced version of its Highlander-based fuel cell hybrid vehicle (FCHV) equipped with a newly designed higher-performance fuel cell stack. The company recently announced plans to start commercialization of its fuel cell vehicles by 2015, although the exact timing, sales volume and price were not divulged.
<http://www.greencarcongress.com/2009/01/toyota-plans-li.html>

Mercedes unveils Fuel Cell BlueZERO

Mercedes has unveiled its BlueZERO fuel cell car at the Detroit motor show in January. Using a flexible modular architecture concept, the vehicle can be built in a range of powertrains to suit customer demand. A pure battery version of the car, the BlueZERO E-Cell, and an electric-petrol hybrid, the BlueZERO E-Cell Plus, have also been unveiled. The BlueZERO F-Cell gives a range of over 240 miles (384km).
<http://www.fuelcelltoday.com/online/news/articles/2009-01/Mercedes-unveils-Fuel-Cell-BlueZ>

GM and Iberdrola to partner on recharging networks

Spanish energy utility Iberdrola has teamed up with General Motors, UK, to undertake a feasibility study on charging networks for plug in electric vehicles. The goal is to reach agreement with the local and national governments in both countries to set up the recharging stations.

<http://www.pressportal.com.au/news/120/ARTICLE/3974/2008-12-12.html>

Israel scales up electric recharging infrastructure

Better Place, a company promoting electric vehicles has unveiled 17 charge spots at a parking area in Tel Aviv and announced plans to install another 10,000 spots in 2009, aiming to expand to 100,000 recharging stations by 2010. The recharging infrastructure will include charge spots at parking lots, residential areas and office buildings, with a number of battery swap facilities.

<http://www.just-auto.com/article.aspx?id=97132>

Commercially viable nickel-zinc battery close to completion

It has been nearly two decades since the last major advance in battery technology -- the commercialization of the lithium ion cell. This battery type remains the industry's standard for pure electric vehicles because it can deliver more power over a longer period of time and at a lower cost than any competitive technology. Recently, the California-based PowerGenix company developed a viable alternative, an improved nickel-zinc battery, and plans to install it in hybrid vehicles by 2011.

<http://www.theautochannel.com/news/2009/01/15/365188.html>

Nissan begins production of flex-fuel car in Brazil

Production of the first Nissan E100 flex-fuel vehicle that can run on both petrol and ethanol has begun at the new Renault-Nissan Alliance Plant in São José dos Pinhais, Brazil. The two-row, five-seat MPV Livina will be available with a manual transmission 1.6-liter K4M engine or an automatic 1.8-liter MR engine.

http://www.nissan-global.com/EN/NEWS/2009/_STORY/090113-01-e.html?rss

India a step closer to commercializing hydrogen-fuelled cars

The Indian Oil Corporation has launched its first hydrogen fuel-dispenser, which will make it easier for the country to manufacture and run hydrogen fuelled cars. Located at Dwarka, New Delhi, the new facility is part of a long term plan to diversify the country's energy mix.

<http://www.gasworld.com/news.php?a=3447;r=5;>

DEMONSTRATIONS AND TESTING

Japan airlines in biofuel flight demo

Japan Airlines (JAL) became the first airline to conduct a demonstration flight using a sustainable biofuel primarily refined from the energy crop, camelina, mixed with two other second-generation biofuel feedstocks: jatropha and algae. Second-generation feedstocks do not compete with natural food or water resources and do not contribute to deforestation practices. The technology could have an impact on the aviation fuel supply in as little as three years.

<http://www.enviro.aero/Aviationindustryenvironmentalnews.aspx?NID=316>

Kia develops high-performing fuel cell vehicle

Kia's Research and development centre in South Korea has produced a SUV that can travel more than 700km on one hydrogen tank. During testing the hydrogen Mohave achieved 633km without

refueling, indicating that a single charge of hydrogen can power the vehicle over 754km. The vehicle has an under floor fuel cell stack system that can generate 115kw.

<http://www.just-auto.com/article.aspx?id=97154&lk=dm>

POLICY DEVELOPMENTS

Australia takes first steps towards low-carbon future

The Australian Government has released a 'White Paper' on its Carbon Pollution Reduction Scheme, which aims to achieve a 15% reduction in Australia's emissions by 2020. By introducing a cap and emissions trading system, Australia joins a growing group of countries introducing carbon targets, the most established of which is the European Union policy introduced in 2005.

<http://www.neurope.eu/articles/91219.php>

Japan to bring back solar power subsidy for homes

The government of Japan has set aside 9 billion yen (\$99.6 million) in the first quarter of 2009 and possibly more in the next fiscal year to encourage households to install solar panel equipment. Japan aims to have more than 70 percent of newly built houses equipped with solar panels by 2020 as part of its long term goal of cutting greenhouse gas emissions by 60-80 percent in 2050.

<http://www.enn.com/energy/article/38928>

China to subsidize fuel cell and electric vehicle purchases

China has announced plans to subsidize purchases of energy-efficient vehicles in 13 cities to speed up upgrades in technology and structural optimization of the automobile industry. The size of the one-off subsidy will be pegged to the price premium of an energy efficient vehicle over that of conventional vehicles.

<http://www.fuelcelltoday.com/online/news/articles/2009-01/china-subsidy>

Pakistan aims for fuel self-reliance

President Asif Ali Zardari of Pakistan has urged measures on "war-footing" to achieve self-reliance in indigenous fuel, as oil imports impact on the country's economic stability. President Zardari said the recent volatility in oil prices, as well as environmental concerns, point to the need for developing alternative fuels such as ethanol and biodiesel.

<http://www.brecorder.com/./index.php?id=862982&currPageNo=1&query=&search=&term=&supDate=>

US paves the way for fuel-celled equipment on aircraft

The US Department of Transport has published a rule allowing fuel cells on board US passenger aircraft as carry-on baggage. This will enable the transport of fuel-celled laptops, cell phones, video players and other electronic equipment. Fuel cell system fuels allowed on board as carry-on baggage had previously been limited to only liquid and liquefied gases.

<http://www.fuelcelltoday.com/online/news/articles/2009-01/dot-transport-rule>

FUNDING AND PARTNERSHIP OPPORTUNITIES

US boosts funding for fuel cell vehicles and alternatives

The US Department of Energy has issued a modified \$300million Funding Opportunity Announcement for cost-shared projects that aim to expand the use of alternative vehicles. The funding covers: refueling infrastructure for alternative vehicles; incremental cost of dedicated alternative fuel vehicles; education and outreach workshops for petroleum reduction fuels and technologies; and an alternative fuel and advanced technology vehicles pilot programme. Eligible vehicles include light-, medium- and heavy-duty vehicles that use EPA alternative fuels; fuel cell electric vehicles; electric hybrid vehicles; plug-in hybrid electric vehicles; and a range of off-road/non-road commercial work or advanced technology vehicles.

<http://www.thegreencarwebsite.co.uk/blog/index.php/2009/02/26/funding-for-alternative-fuel-vehicles/>

UPCOMING EVENTS

19-20 March 2009, Brussels, Belgium. **2nd International Conference on Biofuels Standards.** This conference is organized by the European Commission's Directorate General of Energy and Transport in close collaboration with the US National Institute of Standards and Technology (NIST) and the Brazilian Instituto Nacional de Metrologia, Normalização e Qualidade Industrial (INMETRO). The conference aims to facilitate the continuation of the Tripartite work on technical specifications, test methods and reference materials and to provide an opportunity for all stakeholders to discuss sustainability criteria issues in an informal way.

http://www.biofuelstp.eu/events/200309_Biofuels_standards_brussels_prog.pdf

25 March 2009, Birmingham, UK. **Building the Hydrogen & Fuel Cells Future.** This is the 5th annual hydrogen and fuel cells conference and exhibition at the National Exhibition Centre in Birmingham. It will focus on the application of the Low-Carbon Built Environment European Union and UK programme. <http://www.climate-change-solutions.co.uk/>

29 March – 3 April 2009, Columbia, South Carolina, USA. **National Hydrogen Association (NHA) Annual Hydrogen Conference 2009.** South Carolina is establishing itself as a hydrogen hub, with the Savannah River National Laboratory and the Center for Hydrogen Research collaborating to address production and storage issues while South Carolina's research universities are tackling automotive integration, fuel cell research and future transportation needs. This year's conference will address the theme: "Celebrating 20 years of growing the hydrogen industry."

<http://www.hydrogenconference.org/>

30 March – 2 April, Midrand, South Africa. **4th Annual African Biofuels.** African Biofuels is Africa's largest and most established gathering of professionals in the biofuels industry. This year's event will address: biodiesel, ethanol and alternative biofuels production; overcoming the current industry challenges and creating new opportunities; and emerging technologies and the movement towards second generation biofuels.

<http://www.africanbiofuels.co.za/>