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Gas-Fueled Biodiesel

*Biodiesel Industries Plant in Texas Powered
By Natural Gas Pumped from a City Landfill*

A new Biodiesel Industries plant in Denton, Texas is being billed as the world's first fully renewable biodiesel facility, as it will use farm- and restaurant waste-derived feedstocks, with process power coming from landfill natural gas.

The City of Denton helped fund the project and has committed to taking 300,000 gallons of pure diesel per year, to be used to blend B20 for a fleet of some 386 refuse and other trucks, and buses. Plant capacity is 3 million gallons of B100 per year.



Biodiesel Industries' plant in Denton, Texas

"This project is the first of its kind," Biodiesel Industries president Russ Teall says in a release.

"All of the energy needs of the facility, including all process heat and power, will be provided by renewable landfill gas from the City of Denton."

Teall's Denton plant comes on line as biodiesel is becoming a scarce commodity: "Manufacturers are

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TOSHIBA

Japanese firm claims new lithium ion battery that can be charged to 80% in one minute. [Page 3](#)

Traction

*DoE, OEMs Ink Many Many Millions in H2, Fuel Cell Vehicle Deals
At the National Hydrogen Association's Annual Gala in Washington*

An \$88 million development pact between General Motors and the Department of Energy was just one of the major OEM contracts signed at the National Hydrogen Association's annual meeting in Washington.

NHA claimed the biggest-ever assemblage of hydrogen vehicles in one place, with more than a dozen ride-and-drive cars, and buses, fueling at a local Shell — the nation's first public pump at a retail station.

Natural gas vehicle experts made the point that they should be helping drive the H2 bandwagon, as most hydrogen today is made from natural gas; likewise most hydrogen for the near tomorrow.

NGV firms claim hardware and expertise to safely handle gaseous fuel — and bring it to the road.



[More on Pages 6-7](#) DoE's Sam Bodman commits the agency to hydrogen.

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Update on Sweden

It's not just biogas. Sweden boasts big incentives for natural gas vehicle operators, and is increasing its supply base via LNG imports to three cities and a possible pipeline from Germany.



All this as Volvo is reducing the price premiums on its NGVs.

[See Page 8](#)

Renewables

Denton Biodiesel *(continued)*

having to ration their fuel," says National Biodiesel Board president Joe Jobe.

"They're producing as much as they can."

Denton will get its B100 for a net price of \$2.30 per gallon, Teall told *F&F*, about 30¢ below the national norm for B100.

The figure takes into account last year's new tax credits for biodiesel, which amounts to a penny per percentage point for farm-derived product, with a credit of half a cent per point for biodiesel derived from such sources as restaurant waste.

Eventual Price Parity Expected

"As the price of petroleum diesel rises," Teall says, "the difference between the price of petroleum diesel and biodiesel will decrease. The perceived additional value of biodiesel, and limited supply, has resulted in the increasing biodiesel prices that you see today.

"My prediction is that additional biodiesel production capacity will be built over the next couple of years, and, along with the increasing price of petroleum diesel, there will very soon be a time when biodiesel and petroleum diesel are the same price."

The Denton biodiesel plant is Santa Barbara, Calif.-based Biodiesel Industries' fifth. Others are located in Rutherford, Australia; in Colorado; and at the Port Hueneme Naval Base in California.

Technology Available for Partners

The company employs a modular, expandable design and claims a proprietary, "feedstock neutral" process that can produce quality biodiesel "from many different resources such as soybean oil and used french fry oil."

"Quality control systems are built into the process control automation for the facilities, ensuring that the biodiesel produced meets stringent U.S. and European standards," the company says.

The technology is available to joint venture partners, who generally are granted exclusive rights to their respective territories, explains Jake Stewart, who is Biodiesel Industries' man in Denton.

The Denton plant was opened March 29 in a ceremony attended by actress Darryl Hannah. Biodiesel Industries, president Russ Teall, 805-683-8103; rteall@aol.com or Jake Stewart, 940-390-8284; stewart@USA.net; www.pipeline.to

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Electric Vehicles

100 More

New York City Transit Says It Will Buy 100 Additional BAE HybriDrive Orions

New York City Transit is close to ordering 100 additional 40-foot hybrid electric buses — diesel-fueled Orion VIIIs with "HybriDrive" drivetrains from BAE Systems, an agency spokesman told *F&F* last week.

Contrary to published reports, NYCT has by no means decided against compressed natural gas vehicles as a matter of future policy, he says — the 4,600-bus agency's no-CNG decision applies to this order only.

And, despite its general satisfaction with lead acid batteries (*F&F*, March 14), NYCT is looking to evaluate ultracapacitors in lieu of batteries in one of its existing vehicles, says R&D director Gary LaBouff. LaBouff said too that he's looking to test Optima lead acids in addition to batteries from EnerSys (Hawker).

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60-Foot Gasoline Hybrid?

Los Angeles MTA wants to test a 60-foot gasoline-fueled hybrid bus, and is looking at a base vehicle from New Flyer with a drivetrain by ISE Corp.

At issue is whether the gasoline-fueled Ford Triton V-10 that powers ISE's 60-foot New Flyer hybrids will be powerful enough for the bigger vehicle, MTA's Richard Hunt told *F&F* last week.

A total of 76 of the 40-foot hybrid transit buses, with the blessing of the California Air Resources Board for gasoline as an alternative fuel in transit operations, are being deployed in half a dozen California cities (*F&F*, March 14).

L.A. MTA, Richard Hunt, 818-701-2801;

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A Hybrid Spec from APTA

A new specification for hybrid buses from the American Public Transportation Association is expected to be finalized at APTA's **Bus & Paratransit conference next month** in Columbus, Ohio, reports Joshua Goldman of ISE, who helped draft the version now being circulated.

Los Angeles MTA's Richard Hunt (above) is vice chairman of the APTA Clean Propulsion committee.

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ISE, Joshua Goldman, 619-287-8785, ext 133;

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www.FleetsandFuels.com

Electric Vehicles

Fast-Charge

Toshiba Claims Lithium Ion Battery That Can Be Charged in One Minute

Japan's Toshiba late last month claimed a lithium ion battery breakthrough it says allows for batteries that can be taken to 80 percent of charge in one minute.

"The new battery fuses Toshiba's latest advances in nanomaterial technology for the electric devices sector with cumulative knowhow in manufacturing lithium-ion battery cells," says a release. "A breakthrough technology applied to the negative electrode uses new nanoparticles to prevent organic liquid electrolytes from reducing during battery recharging.

"The nanoparticles quickly absorb and store vast amount of lithium ions, without causing any deterioration in the electrode."

Toshiba further reports that the new Li-ion battery boasts improved cycle life, "losing only 1 percent of capacity after 1,000 cycles of discharging and recharging," and can operate at very low temperatures. Energy density has been improved too, Toshiba says.

The battery is to hit the market next year.

www.toshiba.co.jp

AccelRate for Hawker

Vancouver-based AccelRate Power Systems is trumpeting a deal whereby Tennessee-based Hawker Powersource will manufacture and market battery chargers using AccelRate's fast-charge algorithms in North America.

"Hawker will manufacture a private label line of chargers for AccelRate, to be sold through aftermarket distributors to the vast motorized materials handling industry," AccelRate says.

The firms are initially targeting users of lead acid batteries, such as electric lift truck operators, although the AccelRate technology, says a spokeswoman, works "with all

Hino Hybrids in Boston

If you want a look at the new Hino 165 hybrid-electric trucks, they'll be at the North American Truck Show in Boston late this month, advises sales VP Derek Kaufman.

The 16,000-pound GVW truck has a drivetrain and battery similar to the Toyota Prius (*F&F*, January 17).

Hino began building conventional diesel trucks, including the Class 4 Hino 165, at a Toyota plant in Long Beach, Calif. last year.

Hino, VP Derek Kaufman, 248-648-6411;
kaufman@hino.com; www.hino.com

April 28-30, 33rd Annual North American Truck Show at the Boston Convention and Exposition Center. *North American Expositions*, Greg Coughlin, 617-242-6092, toll-free 800-225-1577; fax 617-242-1817; gcoughlin@naexpo.com; www.naexpo.com

More Meetings on FleetsandFuels.com

battery chemistries and sizes and can dramatically decrease charging time while maximizing battery life." Batteries can be charged up to five times faster, she told *F&F*.

The AccelRate technology was developed by Vladimir Petrovic, a former director of Belgrade's Institute Mihailo Pupin, the company says.

AccelRate, VP Pierre Gadbois, 604-688-8656;

pierre@accelrate.com; www.accelrate.com

Denso for Toyota & Lexus

Denso International America is offering "smaller, lighter" components for hybrid electric vehicles, including a control computer, a battery-monitoring unit, a DC-DC converter, and an electric air conditioning compressor.

"All are smaller and lighter than conventional components, but still able to meet the needs of today's larger hybrid vehicles," the company says. Denso componentry is used on Toyota's new Highlander hybrid SUV and Lexus RX-400h, and on Toyota's new Harrier and Kluger hybrid vehicles in Japan.

Denso info, Marlene Goldsmith or Kevin Wilson,

248-372-8222; marlene_goldsmith@denso-diam.com;

www.densocorp-na.com

Valence Lithium Ion

Austin, Texas-based Valence Technology is promoting plug-in hybrid electric vehicles and battery electric Sacramento taxis using its U-Charge and Saphion lithium ion battery technologies.

Valence, Judy Racino, 512-527-2921;

judy.racino@valence.com; www.valence.com

WaveCrest Thailand

Virginia's WaveCrest Laboratories will locate its WaveCrest Center of Excellence Asia in Thailand, pledging to "partner with businesses, government ministries, and academic and research institutions in Thailand to develop, manufacture and market advanced electric propulsion and drive systems." "It will not simply be 'outsourcing' what exists now, but rather a collaboration of many enterprises to continue developing new and better technology solutions," WaveCrest president and CEO Roy Barbee said in a release.

WaveCrest, president Roy Barbee, 703-435-7102;

info@wavecrestlabs.com; www.wavecrestlabs.com

Free Motors

Chicago's Bodine Electric is offering free sample units of its AC, DC, or brushless DC motors to qualified OEMs through **June 30**. The family-owned company, which is celebrating its 100th year of manufacturing fractional-horsepower motors, offers more than 850 stock models, each complemented by system-matched motion controls. Bodine says it's making the free motor offer because collaborative engineering early in the design phase of a project can prevent costly last minute modifications.

Bodine, 773-478-3515 or toll-free 800-726-3463;

fax 773-478-3232; avis.weisman@bodine-electric.com;

www.bodine-electric.com



Gaseous Fuels

Corn Cob Enabler

Agricultural Waste Products Could Be Basis For ANG: Low-Pressure Natural Gas Storage
 Researchers at the University of Missouri (MU) are looking for partners for low pressure storage technologies for natural gas wherein one of the storage media is derived from corn cob agricultural waste.

They hope that ANG – adsorbed natural gas – will challenge CNG in the marketplace. It's seen as a market enabler, eliminating the clumsy voluminous tanks that have reduced trunk space and otherwise made NGVs unattractive. Energy required for compression would be dramatically reduced too.

Vehicle Tests Later This Year

The target is for 150 grams of natural gas to be stored per liter of corn cob-derived medium at just 500 psi, say MU's Peter Pfeifer and colleagues. So-called Van der Waals attraction in the nanoporous materials "forces natural gas into liquid-like dense fluid." Only 20 grams of CNG can be stored at 500 psi, Pfeifer says.

Calixarenes, an even cheaper medium than cob waste, could store up to 100 grams of methane per liter at 500 psi.

"The calixarene," Pfeifer says, "may go into tanks for methane recovery from landfills, where a small tank volume is less critical, and the high premium will be on loading the tank at low pressure (e.g. 50 psi instead of 500 psi) and on low manufacturing costs."

The ANG project is known as ALL-CRAFT, for

Closing the Gaps

The Interstate Clean Transportation Corridor is working to close what it calls "critical infrastructure gaps" for natural gas fueling. ICTC gave word last week of new stations in Barstow and Temecula, Calif., for both liquefied and compressed natural gas vehicle fuel.

Ground was broken on the Barstow station bridging Los Angeles and Las Vegas last week (it's to open in July) and Downs Energy has issued a purchase order for construction of a station at its cardlock in Temecula — marking "the first time that natural gas fueling has been added to this type of automated cardlock facility," says ICTC administrator Gladstein, Neandross & Associates.

Watch for news of "a critical gap closure project in Santa Clarita" too. Gladstein-Neandross also advises that nearly \$3 million is being made available in California to offset the cost of natural gas-fueled truck engines.

ICTC, Erik Neandross, 310-314-1934, ext 2;

fax -314-9196; erik@gladstein.org; www.gladstein.org

Downs Energy, president Mike Downs, 951-256-8282

Alliance for Collaborative Research in Alternative Fuel Technology. It's an outgrowth of work pioneered at Atlanta Gas Light and by the University of Alicante, in Spain. Doug Horne of AGL, who now heads the Clean Vehicle Education Foundation (CVEF), consults, as does Francisco Rodríguez-Reinoso of the University of Alicante, an editor of the journal *Carbon* and a long-standing collaborator of MU's Pfeifer. Olive pits have been used to make the ANG adsorbent too.

Missouri Corn Cobs Could Carry the Country

ALL-CRAFT partners further include the Midwest Research Institute and the Kansas City Clean Cities chapter, through which a dedicated-CNG Honda Civic GX operated by Kansas City is to be fitted with an ANG fuel system for tests to commence late this year.

There is enough corn waste in Missouri alone, the MU researchers say, to provide raw material for fuel storage for all of the cars in the United States.

"Yes, you read this right," Pfeifer told *F&F* last week. "Although Missouri is behind Nebraska, Iowa, and Illinois in terms of corn production, the Missouri corn by itself will be enough.

"I was amazed myself when I did the calculation."

The MU team is also looking to apply adsorbed fuel technology to hydrogen.

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MRI, Phil Buckley, 816-753-7600, ext 1573; fax 816-531-0315; pbuckley@mriresearch.org; www.mriresearch.org

Kansas City Clean Cities, Benjamin Watson, 816-531-7624; coordinator@kc-cleancities.org; www.kc-cleancities.org

Air Buses to Accommodate Airbus

North American Bus Industries is close to a final contract, to be worth \$4.2 million, to supply six Model 60-BRT low floor buses for the Los Angeles International Airport.

"The new higher-capacity airfield buses are needed to accommodate new aircraft that will begin service at LAX next fall," airport authorities say in reference to the new Airbus A380, the biggest airliner ever, that's entering service late in the year.

The buses will be able to accommodate as many as 140 passengers and their carry-on baggage, up from 60 to 80 passengers in today's airfield vehicles.

The new NABIs will have CNG fuel systems installed by Alabama's Fab Industries.

An option could double the number of 60-foot buses to 12 and the value of the business to NABI to \$8.4 million.

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Gaseous Fuels

Learning from Gas

Pair with NGVs Standards Experience Are Now Helping with Hydrogen Too

Experts from the natural gas vehicles industry are working toward a workable system of world standards for hydrogen. "It's a huge imperative," says Jeff Seisler, who heads the Amsterdam-based European Natural Gas Vehicle Association. "It's the heart and soul of getting this stuff into the market."

"We believe that standards facilitate technology," says Randy Dey, president of CCS Global, of Toronto. "Everyone gains."

"Manufacturers economize when they no longer have to adapt their products to a multitude of different national rules," Dey says. "Consumers get products with improved safety, quality and at lower cost."

"International trade is facilitated when sellers and buyers can base their contracts on clearly defined common references that are recognized from one country to the next. International cooperation between governments on legislative and regulatory work is simplified and accelerated when reference can be made to international standards."

Learning from NGV Industry's Mistakes

Dey's firm can provide companies with guidance through the sometimes daunting world of international accords. Hydrogen standards are now being developed through the TC 197 committee of ISO, for example, with various sub-designations for things like electrolysis, reformers, and storage devices.

In natural gas, Dey says, international standardization work was undertaken after various countries had already adopted their own national standards and regulations, making it "much more difficult to achieve the necessary harmonization. The hydrogen industry is trying to avoid repeating the mistakes that were made by the natural gas industry," he told *F&F*.

Standards are just a start, Seisler says, noting that just as much effort is necessary to make sure they are the basis of real-world regulations that work.

Groups like ISO develop standards, which are codified into regulations by governments and the UN. "We are working with industry to provide consensus and then bring it to the United Nations," says Dey.

His next ISO TC 197 meeting will be at the Fuel Cell Seminar in Palm Springs, Calif. November 14-18. ENGVA, Jeff Seisler, +31-23-554-3050;

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CCS Global, president Randy Dey, 905-847-7811;

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Love Clean Energy

First NGV Fueling Station Opened At Love Field
Clean Energy is talking up its new CNG fueling station at Dallas Love Field, augmenting existing stations downtown and at the Dallas Fort Worth International Airport. Dallas has the largest light-duty CNG municipal fleet in the nation with more than 1,200 vehicles. Love Field is located seven miles northwest of the downtown central business district.

It's served by Southwest Airlines and Continental Express and handles 7 million passengers per year.

Clean Energy, David Haradon, 214-572-6580;

dharadon@cleanenergyfuels.com;

www.cleanenergyfuels.com

City of Dallas, Sam Peacock, 214-670-6654;

steven.peacock@dallascityhall.com

ENGVA Seminar

The European Natural Gas Vehicle Association will hold its European Gaseous Fuel Training Institute Seminar at its offices in Hoofddorp, the Netherlands, near Amsterdam's Schiphol Airport, on April 27. The course is designed to provide an overview of the European and world NGV industry, and markets. ENGVA, +31-23-554-3050; fax +31-23-557-9065; info@engva.nl; www.engva.org

Companies

Hedging Bets

Or, Diversify and Conquer, as Hybrid Fuel Systems Is Looking to Branch Beyond Natural Gas Vehicles
Watch for Florida- and Atlanta-based Hybrid Fuel Systems, flush with \$1.2 million in new funding, to branch beyond natural gas vehicles by acquisition: both buying another company or two, and by making use of test equipment, including sophisticated dynamometers, acquired from Georgia Power & Light.

The goal? To "diversify the revenue model," says CEO Mark Clancy.

"If you're more diversified, there's a greater chance of acquiring sales," he told *F&F*.

In addition to converting diesel engines to run mostly on natural gas while keeping the diesel cycle, he wants to take Hybrid into biodiesel and propane, and to offer testing services.

"I'll be able to offer emissions outsourcing for OEMs," Clancy says.

"You don't try to swallow the whale but you try to swallow a handful of mackerels."

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NHA 2005

Target 2020

In Ten Years, Says Bodman at NHA 2005, We Will Know if Hydrogen Cars Are a Go
“The progress that DoE and the automotive and energy industries have made so far has us on the path to an industry commercialization decision in 2015.

“If our research program is successful, it is not unreasonable to think we could see the beginning of mass market penetration by 2020.”



That was the word from Samuel Bodman, the new Secretary of the U.S. Department of Energy, at the National Hydrogen Association's meeting in Washington late last month.

“Today, at a time when the price of gas runs north of \$2 per gallon and oil is trading at over \$50 per barrel,” said Bodman, “the idea of motor vehicles powered by hydrogen makes more sense than ever.”

(Regular unleaded gasoline was offered for \$2.79 within sight of *F&F's* offices in San Francisco at presstime.)

Bodman signed contracts at NHA 2005 committing DoE to four different hydrogen learning and demonstration efforts with automakers and energy companies.

The agency is providing approximately half of an estimated \$380 million over five years.

It's Pdc for Plug

Honda Shows Plug Power Home Energy Station: It Can Power a House, Fuel an FCV in Minutes
American Honda displayed an FCX fuel cell vehicle (and brought another for the NHA 2005 ride-and-drive), and showed the latest Home Energy Station developed with Plug Power (NASDAQ:PLUG).

The Plug HES makes hydrogen from natural gas using a compact proprietary reformer. Also in the self-contained unit are cylinders into which hydrogen is compressed to 6,000 psi, enabling vehicle fueling at 5,000 psi. An FCX can be fueled in just six minutes.

The HES tanks take about 14 hours to refill — more than adequate to support one hydrogen vehicle, Plug engineering VP Bob Sinuc told *F&F*.

The tanks are supplied by Structural Composites Industries, Sinuc says. They are a variant of SCI vessels used on both the FCX and Honda's Civic GX

natural gas vehicle. The diaphragm compressor for the HES is supplied by Pennsylvania's Pdc Machines (which also displayed at NHA 2005).

The Plug HES contains a fuel cell for making household electricity, and heat from the reforming process is used to heat both the premises and water for bathing.

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Modine for ChevronTexaco

Thermal Management Prowess Applied to Reactor To Help Make Local Hydrogen Production Possible
Wisconsin's Modine Manufacturing (NYSE:MOD), a \$1.2 billion company, is helping ChevronTexaco adapt its large-scale natural gas reforming technology for local installations.

The key to the design, Modine says, is the component in which methane and steam combine to begin the steam methane reforming process. An advanced SMR reactor “integrates multiple reactions and heat transfer functions to increase efficiency while minimizing controls and balance of plant components,” Modine says.

Ballard's a Customer Too

“We have deployed all of what we know about thermal management and SMR and processed it into a single device,” says Mark Baffa, who directs Modine's fuel cell group. “It's a novel and unique approach, taking a very complex system and scaling it down to a viable commercial appliance, all self-contained.”

“No one has been able to do that before,” Baffa says. “We hope that our collective work will demonstrate that it is possible to support a fuel cell and hydrogen vehicle industry.”

Modine says it began working with fuel cell technology in the spring of 1997 and launched its fuel cell products group in 2000, drawing on “more than 88 years of global experience in thermal management to design cutting edge fuel cell thermal solutions.”

Modine says it supplies water management components for the fuel cell systems Ballard supplies to DaimlerChrysler and Ford, as well as stack cooling modules for Mercedes and Gillig buses with Ballard fuel cells.

Modine, Mark Baffa, 262-636-1695;

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Hydrogen Meetings and More...

We count upwards of a dozen industry meetings addressing hydrogen and fuel cells through the end of 2005. Next year's NHA gathering has been scheduled too (March 11-16, 2006 in Long Beach, Calif.). [Click here for instant access to information on all of them, i.e. a complete clean fuels and advanced technology vehicles events calendar, on the Fleets & Fuels website.](#)

NHA 2005

DaimlerChrysler

Watch for fleet deployments of the F-Cell fuel cell car by DaimlerChrysler soon, says Wolfgang Weiss, who heads the DaimlerChrysler operation at the California Fuel Cell Partnership headquarters in West Sacramento.

DaimlerChrysler brought one (A-Class) F-Cell car for display at NHA 2005 and another for the ride-and-drive.

The F-Cell cars have fuel cell stacks from Ballard.

Daimler is also promoting larger new F-Cell vehicles with more powerful (100-kilowatt or 134 horsepower) motors, based on B-Class Mercedes sedans.

DaimlerChrysler, Wolfgang Weiss, 916-375-0377;
ww101@dcx.com; www.daimlerchrysler.com

Japan Steel Works

JSW displayed small low pressure hydrogen tanks, suitable for driving small fuel cell devices, based on a range of metal hydride storage materials, some of which enable hydrogen to be dispensed at room temperature.

"These materials turn hydrogen, which typically damages steel, to their advantage," JSW says. It takes a company the size of JSW to bring such a technology to such a potentially huge market, says David Haberman, who represents JSW in the U.S. and did so at NHA 2005.

for JSW, David Haberman,

561-989-9494; ifdhllc@aol.com; www.jsw.co.jp

Ballard

Ballard Power Systems (NASDAQ:BLDP) coordinated release of its **technology Road Map** with NHA 2005, and stated that its fuel cells would be ready for commercialization by 2010.

Fiedler Group

Fiedler Group president Patrick Fiedler was on hand at NHA 2005 to promote the Los Angeles-based firm's architectural and engineering services. "Understanding that time is money, we continually apply our combined expertise in entitlement, design and program management," the company says. Fiedler claims expertise in natural gas as well as hydrogen facilities, and clients including the City and County of Los Angeles, and BP.

Fiedler Group, president Patrick Fiedler, 213-381-7891;
fgla@fiedlergroup.com; www.fiedlergroup.com

Heatric

The unit of British aerospace concern Meggitt said its heat exchange technology makes its reformers an attractive option for producing hydrogen onsite from natural gas.

Heatric makes chemically etched and diffusion bonded printed circuit heat exchanger and printed circuit reactor components.

The compact PCHE/PCR technology "incorporates extremely high efficiency heat exchange with high pressure and extreme temperature capabilities," the company says. Heatric, Caroline Evans, +44-1202-627000; fax +44-1202-632299; caroline.evans@heatric.com; www.heatric.com

WEH

Germany's WEH promoted its TK17 H pistol-grip fueling nozzle for hydrogen, a device that allows one-hand fueling very similar to the use of a conventional gasoline fueling nozzle today.

The firm makes a TK17 CNG variant for fueling natural gas vehicles — which it offers outside the U.S.

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Publications

Diesel Growth in Europe

"Diesel engines are gaining in popularity in Europe, penetrating even vehicle segments that have traditionally been considered gasoline engine strongholds," Frost & Sullivan research analyst Kaushik Madhavan says in promoting the firm's new study on the European diesel market. "The penetration of diesel engines is expected to increase from the current 45 percent to about 53 percent by 2012." Put another way, the next-generation diesel engine technologies market in Europe, worth some \$6.34 billion in 2004, will grow at a compound rate of 3.6 percent per year and be worth some \$8.26 billion in 2012, the consultancy predicts.

European Market for Next Generation Diesel Engine Technologies, F&S number B389, is priced at \$12,500 U.S. F&S, Magdalena Oberland, +44-20-7915-7876;
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Strategies

Sweden

Country Bereft of Indigenous Natural Gas Has Flourishing Natural Gas Vehicle Sector

The Swedes brought Electrolux and Ikea to the world, Saab and Volvo too of course, and are showing how natural gas vehicles can be successfully embraced even in a country with no natural gas in the ground.

Sweden leads the world in biogas, made from wastes including municipal sewage, is going ahead with at least three liquefied natural gas import projects and is considering a pipeline from Germany.

'Tidbits' from Peter Boisen

The aforementioned Volvo is even lowering its NGV prices.

That's the word from Peter Boisen, a former Volvo planner now vice chairman of the European Natural Gas Vehicle Association.

Boisen cites the new Swedish-language journal *Energigas*, which is published four times per year by the Swedish Gas Association for the following "interesting tidbits:"

- The three cities Stockholm, Nynäshamn and Oxelösund are to build liquefied natural gas terminals. Investment in Stockholm alone amounts to some \$71 million U.S., with start-up slated for 2007. The fuel will be moved in tankers with a capacity of about 10,000 cubic meters.
- Sweden now has a record of ten years without a single accident involving natural gas (or biogas).
- The "Baltic Gas Interconnector," a pipeline linking Rostock in Germany with Trelleborg in the south of Sweden, has been approved by the so-called "Environmental Court." A go-ahead decision may be made later this year. The time from decision until the new natural gas pipeline is ready for use is estimated to be three years.
- The Swedish Energy Authority (STEM) early this year allocated \$10.3 million to the University of Växjö for trials with large scale gasification of biomass. Earlier a pilot plant for cellulose-based ethanol in Örnsköldsvik received a grant of \$15.4 million.
- Volvo has cut the Swedish price surcharge for CNG models to approximately \$4,200 compared to comparable gasoline powered cars.
- NGV drivers in Stockholm enjoy benefits including free

overnight parking and exemption from city access fees slated to begin this autumn, benefits that can amount to as much as \$2,800 per year.

- Other Swedish cities offering free parking benefits for NGVs and some other environmental vehicles now include Borås, Göteborg, Falun, Halmstad, Jönköping, Karlskrona, Kristianstad, Kungsbacka, Linköping, Mölndal, Norrköping, Skövde, Stockholm, Sundsvall, Trollhättan, Västerås,



Växjö, Örnsköldsvik, Östersund, and Örebro; while cities including Falkenberg, Halmstad, Jönköping, Kristianstad, Lahom, Linköping, Stockholm,

Trollhättan and Växjö offer subsidies covering part of the additional cost for environmental vehicles; and a few Swedish towns – Halmstad, Kristianstad, Laholm and Trollhättan – subsidize natural gas costs to the tune of \$1,050.

Boisen also direct his correspondents to a new report by Owe Jönsson of SGC, the Swedish Gas Center, finding that the Swedish use of methane gas for the automotive sector could reach 5 percent via biogas and another 10 percent via natural gas by 2020.

Such fuels could account for 40 percent of Swedish automotive needs by 2050.

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Calstart Knows Sweden Too

WestStart-Calstart earlier this year issued a 52-page report on biogas in Sweden (*F&F*, January 17), and said that that some 45 percent of the fuel for approximately 4,500 Swedish NGVs comes from the renewable source.

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Swedish Gas Centre