

August 6, 2007

Volume XIV, Number 16

## Toyota PHEVs

*The OEM Is to Supply Plug-In Prius Cars with NiMH Batteries For Evaluation by Two California Universities, Japan Trials Too*  
Defining the product and “preparing society” are the two reasons for Toyota’s decision to supply two plug-in versions of its popular Toyota Prius for two California universities to evaluate, says Bill Reinert of the Advanced Technology Vehicles unit of Toyota Motor Sales USA (TMS).



the Toyota plug-in's plug

the automaker knows what the market wants.

Part of preparing society is developing emissions test certification procedures for plug-in hybrid electrics, and deciding how best calculate the sum of the vehicles’ tailpipe emissions and the grid powerplant emissions they cause, says Prof. Scott Samuelson, director of the Advanced Power and

### \$5 Million for UC Davis Too

“We can do the technical stuff behind closed doors,” he told *F&F* last week — such as design of motors and batteries and controls — once the

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## Ballard, ISE for Commercial Fleet of H2 New Flyers for BC Transit

BC Transit said Friday it’s awarded C\$46.4 million for 20 hydrogen fuel cell buses said the first ever for regular service deployment. **Page 6**

## Sonex Aircraft E-Plane at Oshkosh

A battery electric airplane by Sonex Aircraft was unveiled at AirVenture Oshkosh 2007, the Experimental Aircraft Association’s annual summer gala in Wisconsin.

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## ENGVA Takes Its Message to the Poles



The European Natural Gas Vehicle Association for the second year in a row took its annual meeting to the politicians, working to make sure that NGVs touted as a clean transportation solution on one hand are remembered as policy and regulations are set on the other. This year’s ENGVA annual meeting was held in Strasbourg, France, with key sessions held at the European Parliament itself.

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## The Port of Oakland

Electricity from LNG and a new CNG fueling station to support all manner of vehicles as California’s Port of Oakland takes steps to reduce its air pollution impact.

The Pacific Gas & Electric utility and Clean Energy are players at the Port, where clean air opportunities have prompted at least one new alignment of provider companies.

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## Plug-In Hybrid Vehicles

### Toyota to Supply PHEVs *(continued)*

Energy Program at UC Irvine. Samuelsen points out that the Toyota plug-in work is supported by the California Air Resources Board, and by the South Coast Air Quality Management District, and is tied to work by SAE's longstanding J-1711 PHEV panel.

All agree that challenges remain, but Toyota gave seeming vindication to the growing world of plug-in hybrid electric vehicle advocacy on July 25, stating that a PHEV Prius would be supplied to Samuelsen's group at APEP in Irvine, and another to the Institute of Transportation Studies at the University of California, Berkeley. UC Berkeley also hosts CCIT, the California Center for Innovative Transportation.

#### 'Much Work to Be Done'

Road-testing has been approved for Toyota in Japan, too. Eight PHEV vehicles will take part there.

"The cost-benefit of hybrids is becoming more apparent with climbing gas prices," TMS executive VP Jim Lentz said in a release. "We anticipate combined sales of Toyota and Lexus hybrids in the United States to reach a quarter million units this year."

"Our goal with this program is to evaluate various advanced vehicle technologies, as well as key factors such as infrastructure, intelligent transportation systems, and urban design," TMS senior VP and chief planning officer Dave Illingworth said in the Toyota release. "The Toyota Prius convinced mainstream



a plug-in Prius, from Toyota itself

consumers on the merits of hybrids... although there is much work to be done with plug-ins, we see this pilot program as a significant step in the advancement of the technology."

#### Toyota Is Researching Lithium Batteries

The Toyota PHEVs will have nickel metal hydride batteries from Panasonic EV, which supplies the batteries in production Prius cars as well (and which is more than half owned by Toyota). The NiMH chemistry for the PHEVs is slightly different to favor charge depletion performance rather than charge sustain, Reinert says.

The vehicles' drivetrains have been modified to allow all-electric operation at speeds up to 60 mph. All-electric range is about 7 miles. The PHEV Prius battery packs will be rated at 2.7 kilowatt-hours, about double that of a standard Prius.

Toyota is looking ahead to lithium batteries too, Reinert says, indicating that the automaker is doing its

*more on page 3*

### Context of an 'Overnight Sensation'

Word of Toyota's PHEV work comes hard on the heels of a Ford-Southern California Edison program on plug-ins, and a major study by the Electric Power Research Institute and the Natural Resources Defense Council (*F&F*, July 23).

The Ford-SCE initiative encompasses not only the vehicles, but "the future of PHEVs as part of a complete vehicle, home and grid energy system," i.e. vehicle-to-grid. To the north, Pacific Gas & Electric is researching V2G as well. To the south, San Diego Gas & Electric has converted a pair of Prius cars to plug-in operation to gather data.

The EPRI-NRDC study found broad societal benefits from grid-connected electric transportation. "We now see that widespread use of PHEVs could expand the fuel options in our transportation sector and at the same time yield net benefits to our environment," EPRI president and CEO Steve



*'It's an overnight sensation (after six years for me, ten-plus for Andy Frank),' says Felix Kramer of the PHEV advocacy group CalCars.*

*Prof. Frank (of ITS Davis) is at left with ex-CIA director & energy security advocate James Woolsey – and Kramer's car.*

Specker said in announcing it.

To reiterate the benefits summed up two weeks ago, a 60% U.S. market share for PHEVs would take up just 7% to 8% of grid-supplied electricity in 2050, while improving air quality and reducing petroleum consumption by 3 million to 4 million barrels per day.

PHEVs hold the further potential to reduce greenhouse gas emissions from vehicles by more than 450 million metric tons per year in 2050 — equivalent to removing a staggering 82.5 million passenger cars from the road.

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## Plug-In Hybrid Vehicles

**Toyota to Supply PHEVs** *(continued)*  
own lithium battery R&D.

Vehicle-to-grid capable? Not yet. To make a favorable impact on utility management, V2G will require so many vehicles, and so many advances in controls and metering, in hardware and software, most of it not existing yet, that there's no point in cluttering up the current program, Reinert says.

Elsewhere, the Institute of Transportation Studies at UC Davis has \$1.5 million from the California Air Resources Board to gauge consumer reaction to PHEVs, with additional money for battery work. Late last year ITS-Davis got \$3 million from the California Energy Commission to establish a PHEV test center.

Early last month, Ford pledged to supply a lithium ion-powered, plug-in version of its Escape Hybrid, as many as 20, for Southern California Edison trials, and an electric utility association and an environmental group released a major study extolling plug-in technology (*see page 2*).

### Coordination's Another Challenge

Protocols and software for data collection have yet to be developed, nor has the extent of cooperation between the two California universities and Toyota in Japan been defined — let alone cooperation with the Ford-SCE program, Google's data-disseminating PHEV project (*F&F*, June 25), work at Argonne, and other efforts around the country. "Details on the vehicles, methodologies, [and] modeling... are not yet ready for prime time," says Toyota. "We have yet to determine even what Toyota will let us do, so that's premature at this point," says one university participant.

"We have a goal," says Ed Kjaer of SCE, "to make all the data compatible."

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## Government

### Targeting Oil

*Low Carbon Rules Would Target Fuel Sellers As Alt Fuel Providers Would Sell Vital Credits*  
California should come down hard on the providers of conventional fuels in order to reduce greenhouse emissions in the state, while allowing providers of alternatives, including electricity, the gaseous fuels, and biofuels to sell credits, an expert panel from the University of California said last week.

The Low Carbon Fuel Standard was commissioned early this year by California Gov. Arnold Schwarzenegger and written by Alex Farrell, director of the Transportation Sustainability Research Center at UC Berkeley, and Dan Sperling, director of the Institute of Transportation Studies at UC Davis.

### The LCFS Said 'Hugely Important'

"The point of regulation should be the refiners, blenders and importers of petroleum fuels," says a summary, noting that such businesses should be required to track the greenhouse impact of their products, and reduce it — by at least 10% by 2020.

"This new policy is hugely important, and has never been done before," author Sperling said. "It will likely transform the energy industries.

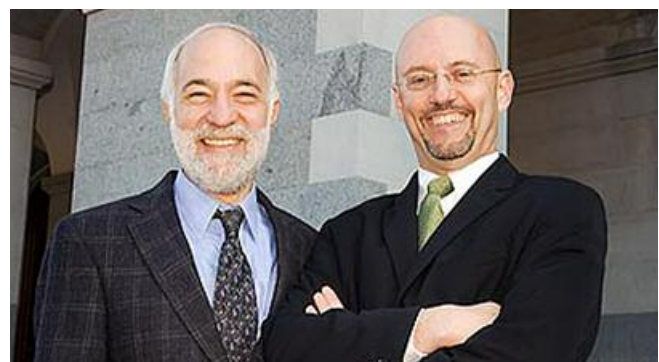
"And the 10% reduction is just the beginning. We anticipate much greater reductions after 2020."

The report suggests that petrofuel providers would reduce their greenhouse-gas emissions in a variety of ways, including blending more biofuels with gasoline and diesel, *buying low-carbon fuels and emissions credits from other producers* (emphasis added), and making their refineries more efficient and using lower-carbon sources of energy to run them.

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Dan Sperling of ITS Davis at left, with Alex Farrell of Berkeley

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## Hybrid Vehicles

### OCTA Eyes Plug-Ins

California Transit Agency Is Seeking Information, Considers CNG-Fueled Plug-In Hybrid Transit Bus  
Southern California's Orange County Transportation Authority is looking ahead to an electric vehicle future, and may have one or more of its hundreds of on-order compressed natural gas-fueled New Flyer buses outfitted for plug-in hybrid operation.

Two years ago OCTA hired expertise to help make its natural gas fuel choice, and picked compressed natural gas over liquefied. Now the agency wants to figure out the best way to move rationally toward an electric, and ultimately to a hydrogen future.



one of OCTA's new CNG-fueled New Flyer buses

"The last thing that we're going to do is crystal clear," says technical services support manager Dennis Elefante. "The last thing is no doubt hydrogen. It's nature's perfect fuel."

How to get there is another matter. Gaseous CNG is one part of the equation, as are electrified drivetrains. The rub is deciding how far to go with either at this time.

OCTA wants help with its EV decision-making, already starting to evaluate bids under its Electric Vehicle Technology Advancement solicitation 71063, which was released July 24 and closed last week.

A CNG-fueled plug-in hybrid is one possibility. OCTA has 377 CNG buses on order with New Flyer (about two dozen have been delivered), Elefante says, and could order 300 more in 2012 or so. The agency currently operates four hybrid New Flyer buses, two diesel-fueled with GM Allison parallel drivetrains and two gasoline-fueled, with series electric drives by ISE.

#### PHEV Prius-Powered CNG?

OCTA is also nearing the end of a four-year lease of no fewer than 99 Toyota Prius hybrids. Elefante is interested in a grid-connected variant to succeed them. His thinking? Beyond fuel savings, hybrid EVs could serve as a source of emergency power for OCTA's electrically driven CNG compressors — for which its second and third installations have just been contracted with Trillium USA (*F&E*, June 25).

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### Electric vs. Hydraulic

Two Teams Said to Have Proposed Trucks

For the HTUF Hybrid Refuse Truck Program

WestStart-Calstart, which administers the Hybrid Truck User Forum program, is evaluating proposals to its Hybrid Refuse Truck Working Group in hopes of naming winners at the HTUF national meeting slated for September 19-21 at the Qwest Field Event Center in Seattle.



Crane LET 2

The goal is to build a small fleet of prototype hybrid refuse trucks to be tested in cities including Chicago and New York, helping speed commercialization of the fuel saving designs.

The Hybrid Refuse Truck Working Group includes half a dozen active user fleets, including municipal and private operators, representing more than 20% of the North American refuse industry, Calstart says.

Matt Stewart of the City of Chicago is the user lead for the program.

The two HTUF refuse contenders, sources say, are an American LaFrance truck with a hydraulic hybrid drivetrain by Bosch Rexroth, and a Crane Carrier vehicle with a series hybrid electric drive by ISE Corp.

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#### Azure and Utilimaster

Azure Dynamics (Toronto:AZD) last week disclosed an MoU for Utilimaster to integrate Azure's P1 parallel hybrid electric powertrains into Ford E-Series commercial chassis at Utilimaster's facilities in Wakarusa, Ind. The deal "represents a vital link in our supply chain for the production of our P1 hybrid electric commercial delivery vans," Azure CEO Scott Harrison said in a release.

"We have the breadth, capability and experience to accommodate the anticipated growth in demand for the Ford E-Series hybrid commercial vans and shuttle buses," said Utilimaster president and CEO Larry Doyle.

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## Electric Vehicles

### A Battery Bus for LA Metro?

*Agency Is Talking with ISE and with Funders, Would Provide the Base Vehicle and Operate It*

There's no contract yet and funding hasn't been arranged, but Los Angeles County Metropolitan Transportation Authority is talking with ISE in San Diego about converting an existing LA Metro bus for zero-emission battery electric operation.

ISE would determine the optimum drivetrain.

"We're willing to give them the vehicle to convert, and we'll operate it and gather data under real service



conditions," says Richard Hunt, general manager of LA Metro's San Fernando Valley unit. The favored platform is the lightweight,

composite-bodied CompoBus by North American Bus Industries, Hunt told *F&F*. LA Metro has 100 45-foot NABI CompoBus vehicles, and 20 40-footers.

Funding would likely come from the South Coast Air Quality Management District with the participation of Calstart, Hunt says.

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## The E-Flight Initiative

*Sonex Unveils a New Electric Sportplane*

Wisconsin's Sonex Aircraft and its AeroConversions affiliate unveiled a prototype battery electric airplane at the Experimental Aircraft Association's EAA **AirVenture** meeting in Oshkosh last month.

In the face of soaring fuel costs, "E-Flight is a push to explore viable alternative energies for powering sport aircraft and improve the efficiency and performance of current products and technologies to *keep aviation affordable for the average pilot, and to keep recreational aviation available* to future generations of pilots" (emphases added). Sonex wants to help draw attention the "green" issues confronting all of aviation, founder and owner John Monnett told *F&F* special correspondent John Morris at Oshkosh.



under the cowl of the Sonex e-plane - note battery boxes

Sonex says it developed the aircraft's drivetrain in-house, including a 3-phase, 270-volt, 200-amp DC cobalt motor (said "the most powerful, lightest-weight, and efficient unit of this type ever produced," and *scalable*) and controller.

The aircraft has lithium polymer batteries in special protective cases. The batteries will be charged individually prior to first flight as an onboard battery management system is designed for the market.

Sonex is also developing an ethanol-capable aircraft based on the AeroConversions AeroVee.

Pete Buck is chief engineer.

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## Biodiesel

### Next Week for NextDiesel Biodiesel

Michigan's NextDiesel Biodiesel is holding a grand opening for its new facility in Adrian, Mich. (southwest of Detroit near Toledo, Ohio) next Tuesday, August 14.

Michigan Gov. Jennifer Granholm is expected to attend, as are several members of the U.S. Senate and House of Representatives, joining officials of NextDiesel parent Biofuel Industries Group, LLC.

The Adrian facility was made possible through a grant approved by Gov. Granholm for the City of Adrian in September 2006, the company says. It is the state's first to be built in a designated Renewable Energy Renaissance Zone. The new biodiesel plant will be capable of handling multiple feedstocks, starting with soy, business development manager Jason Eisenberg told *F&F*.

Initial capacity of 20 million gallons per year will be expandable to 100 million gallons per year.

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*Fleets & Fuels* is published electronically 24 times per year by August Pacific Press. \$397.00 per year world rate. Quantity discounts available.

Publisher and Editor-in-Chief Richard Piellisch.

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ISSN 1075-0134

## Gaseous Fuels

### H2 Buses for BC Transit Mark Major First

Canada's BC Transit said late last week that it's awarded \$46.4 million (Canadian, approximately \$44.1 million U.S. at current rates) "to deploy the world's first fleet of 20 fuel cell buses and hydrogen infrastructure to be integrated into the regular operational service of an urban transit system."

The vehicles, one to be delivered next year and the rest in 2009, will showcase Canadian technology at the 2010 Winter Olympics at Whistler, north of Vancouver. They will then continue in regular revenue service for the duration of their useful lives.

They will be low-floor, 41-foot New Flyer buses with 130-kilowatt HD6 fuel cell modules from Ballard Power Systems powering ISE drivetrains with Siemens motors.

The drives will have Cobasys nickel metal hydride batteries for regenerative braking. Hydrogen will be stored in three 5,000-psi carbon fiber-on-aluminum fuel cylinders from Calgary-based Dynetek.

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### Baytech Gets Key IRS Approvals

California's Baytech has gotten notice from the U.S. Internal Revenue Service that a wide range of its natural gas- and propane/LPG-fueled conversions for GM engines have been formally approved for new federal Qualified Alternative Fuel Motor Vehicle Credits. A letter from John Risacher, the agency's acting industry director for heavy manufacturing and transportation, specifically lists 114 vehicle and engine combinations from model year 2005 through 2007, with GVWs up to 42,000 pounds. Heavier vehicles are eligible for tax credits as high as \$32,000.

"We have determined that a purchaser... may rely on the certification," Risacher said.

"The tax credits offer our customers the opportunity to recoup a substantial portion of their investment in CNG- and propane-fueled vehicles," Baytech VP Richard Turner told *F&F*. He cautions, however, that every case is different, and that the tax credits don't apply to every buyer.

"It is the purchaser's responsibility to determine how they can take advantage of the credits based on their own tax situation," Turner says.

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ENGVA took its message right to the decision-makers in Strasbourg.

### ENGVA 2007 in Strasbourg...

The European Natural Gas Vehicle Association took its argument to policy-makers again this year, following up its 2006 meeting in Brussels with 2007 in Strasbourg, and holding one day of conference sessions right on the European Parliament premises.

The key argument? That Europe should emphasize compressed natural gas and liquefied natural gas as it seeks to lower greenhouse emissions and curb imports, at the same time preparing for a hydrogen future.

European Commission studies have supported the gaseous fuels strategy. The threat is a policy favoring blends of liquid biofuels with today's conventional mix.

### 'Cleaner and More Efficient Options than Liquid Fuels'

"We took the meeting to the legislators in Strasbourg to make sure that the goals for gaseous fuels are translated into hard policy," says ENGVA chief Jeff Seisler.

"We went to Strasbourg to the legislative branch of the European Union to let them know that there are cleaner and more efficient options than liquid fuels, and that our products are ready today."

"This is not the type of event that is attempted often by non-government organizations," Seisler told *F&F*.

Besides holding sessions inside — highly unusual — ENGVA mounted an exhibition of vehicles in front of the Parliament building. The growing availability of OEM NGVs, in fact, was the non-political news of the show.

ENGVA's Marlinda van den Burg is asking conference participants to rate the gathering via an [online survey](#). Answers will be used to help organize ENGVA 2008 — and for van den Burg's academic thesis.



### ...and ENGVA Next Month in Norway

September 17-19, ENGVA Marketing & Communications and Technology committee meetings. Sponsored by [Raufoss Fuel Systems](#) (Hexagon, Lincoln Composites). Radisson SAS Hotel in Lillehammer, Norway.

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## Events

### 10th NEDRA Nationals

*There Are Real Motorheads in EVs, Too:*

*Electric Drag Racing This Month in Oregon*

The Santa Rosa, Calif.-based National Electric Drag Racing Association is holding the 10th Anniversary NEDRA Nationals August 17-18 at Oregon's Portland International Raceway.

Organizers promise "the largest group of battery-powered drag racing vehicles ever in one place competing against each other and gasoline-powered cars, trucks, and bikes."

"Media attention and public interest in NEDRA has been growing substantially," says regional director Roy LeMeur. NEDRA's purpose is to foster public awareness of EV performance and to encourage

technological advances through competition, and to do so "by organizing and sanctioning safe, silent and exciting electric vehicle drag racing events." Vehicles like the White Zombie and Killacycle are sponsored by the battery-makers EnerSys and A123, LeMeur told *F&F. Car and Driver* ran an [article on NEDRA](#) in May, he notes, as did *The Wall Street Journal* just last week.

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### 'Lean and Green Into Gold'

*Learn How to 'Turn Lean and Green into Gold'*

*At Supply Chain Conference Late Next Month*

The UK's eyefortransport is stepping up promotion of its Green Transportation & Logistics Summit, billed as "the only gathering of supply chain executives focused on sharing the industry secrets for how to save money, increase visibility and reduce risk

through green transportation and logistics initiatives... the only event where you will learn how to turn lean and green into gold."



Fleet and logistics managers from companies including Coca-Cola, General Mills, IBM, Nike, Procter & Gamble, Staples, Unilever, the U.S. Postal Service, Volvo Logistics North America and Wal-Mart are on the Summit agenda.

The Green Transportation & Logistics Summit is being held September 25-26 at the Golden Gateway Holiday Inn in San Francisco.

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### This Month: Asilomar 2007

August 21-24, Asilomar 2007 Transportation and Climate Policy, Eleventh Biennial Conference on Transportation and Energy Policy under the auspices of the Energy and Alternative Fuels Committees of the U.S. Transportation Research Board. Asilomar Conference Grounds in Pacific Grove, Calif. Organized by the Institute of Transportation Studies at the University of California, Davis.

UC Davis-ITS, Stacy Mello, 530-752-6548;

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### EVS-23 Online Registration Open

Online registration has opened for EVS-23, the 23rd International Battery, Hybrid and Fuel Cell Electric Vehicle Symposium & Exposition — the world electric vehicles meeting December 2-5 in Anaheim, Calif.

EVS-23 will encompass 2007's annual U.S. Electric Drive Transportation Association meeting.

A pre-conference workshop on plug-in hybrid electric vehicles has been added for Sunday, December 2.

Conference registration fees are discounted by \$100 through October 19.

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### Dallas for FedFleet in June 2008

June 24-26, FedFleet 2008, the 8th National Motor Vehicle and Aviation Exposition and Workshops. Hilton Anatole Hotel in Dallas, Texas. Sponsored by the Federal Fleet Policy Council, the Interagency Committee for Aviation Policy, the U.S. General Services Administration's Office of Governmentwide Policy, and GSA Fleet.

Organized by Lawrence, Kans.-based A-S-K Associates.

FedFleet 2008, Leslie McKeenan, 785-841-8194

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or [help@fedfleet.org](mailto:help@fedfleet.org); [www.fedfleet.org](http://www.fedfleet.org)

### Faster Freight-Cleaner Air East Coast

July 8-10, 2008, Faster Freight-Cleaner Air East Coast. Javits Center in New York City. Organized by Southern California's Gladstein, Neandross & Associates.

GNA, Jaime Nack, 310-314-1934

or U.S. toll-free 800-993-0302; fax 310-314-9196;

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### Fuelling Pakistan 2008

Fuelling Pakistan 2008, the second annual exhibition on compressed natural gas/CNG, LPG-propane and alternative sources of energy, March 14-16 at the Lahore Fortress Stadium in Lahore, Pakistan.

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### Meetings!!

Click here for instant access to a complete listing of upcoming meetings and conferences courtesy *Fleets & Fuels*.

## Strategies

### The Port of Oakland

#### *Emissions Reduction Efforts at Marine Facility Create Significant Alternative Fuels Opportunity*

Northern California's Port of Oakland (the nation's fourth busiest after Los Angeles, Long Beach, and New York-New Jersey) is taking steps to reduce its environmental impact, and its air pollution remediation efforts are creating numerous opportunities for alternative fuels.

Grants from federal, state and local government and strong support from Pacific Gas & Electric are enabling replacement of a wide range of conventional vehicles with both compressed natural gas and liquefied natural gas, and LNG is even providing an answer to the challenging problem of eliminating container ship idling.

It all fits neatly with Oakland's own avowed plan to be "petroleum-free" by 2020.

#### Public Access CNG

Clean Energy (NASDAQ:CLNE) has just opened a new CNG station at the Port, and a new company has formed to provide both natural gas-fueled trucking services and natural gas-based electricity for ships — LNG-fueled cold-ironing.

The new CNG station is 24/7 public access, and will be used for Oakland city vehicles as well as the Port. It's Clean Energy's third in the area (one serves the Oakland Airport, which is also run by the Port) and was built with \$225,000 in support from the Bay Area Air Quality Management District. The station has electric Ariel compressors and GreenField dispenser, and its site, between the Port itself and waterfront Jack London Square, with vacant property on either side, lends itself to easy expansion for LNG dispensing.

Clean Energy is already trucking in LNG for the new cold-ironing service provided by the CleanAir Marine Power



PG&E-CleanAir Transport 'Clean Air Machine,' a Kenworth tractor fitted for CNG or LNG operation, shown at Clean Energy's new Oakland fueling station

unit of CleanAir Logix. The CAMP service, promoted as DFMV Cold Ironing (for dual frequency, multi voltage) involves an LNG-fueled generator that can provide about a megawatt of power at either 50Hz or 60Hz and 380 volts to 480 volts — flexible enough for ships from anywhere, says CAMP's Scott Johns.

Emissions are cut by some 95% compared to those from an idling

ship, and the CAMP service, which is billed by the hour, saves the Port an estimated \$90 million in dockside electrification expenses. And dockside electrification, says Johns, wouldn't have the ship-accommodating flexibility of DFMV.

"It makes us the chameleon of shore power," says CleanAir Logix co-founder Roger Lowther. "We can synchronize and provide power to any ship," he says, reducing carbon dioxide emissions by about half a ton per hour.



**PORT OF OAKLAND** played an active role, providing an LNG fuel trailer and other equipment, and technical support.

The system consumes about 100 gallons of LNG per hour.

"It's a beachhead," says Gregg Roche, Clean Energy's business development director for ports. Demand for cold-ironing makes it more likely that LNG will be accepted by truck operators — they know it will be available.

CAMP parent CleanAir Logix is a new company, result of a merger with Wittmar Engineering & Construction, developer of the CAMP service. CleanAir Logix also provides logistical services and under the **CleanAir TransPort** banner operates a fleet of trucks serving the Port. A federal CMAQ and Port grant of \$2.2 million is facilitating the purchase of nine new Kenworth trucks with the new ISX diesel cycle engine from Westport Innovations, LNG-fueled.

#### Testing Emerging Technologies

"We must move cargo more efficiently in order to reduce impacts on air quality now and in the future," Port environmental health and safety manager Roberta Reinstein said in a recent Port publication. "We are using pilot and demonstration projects to test emerging technologies such as alternative fuels... The Port is positioning itself," Reinstein said, "to invest in state-of-the-art technology now to accommodate the cargo growth in the future."

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#### Port of Oakland at a glance

**Headquarters:** Oakland, California

**Port Employees:** 600 (but affects 28,500 in region)

**Annual Movements:** Approximately \$33 billion per year

**Fleet:** Approximately 250 Port vehicles being transitioned to clean fuels or hybrids.

*The Port of Oakland was established in 1927. Since 1962, the Port has spent more than \$1.4 billion to construct 1,210 acres of marine terminals, an intermodal rail facility, and maritime support area.*