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*Utility & Telecom Fleets* feature articles

Facing fuel choices: clean & green

*Fleet managers are faced with a variety of alternative fuel choices as the industry strives to stay clean and go green.*

by Paula Trapalis

According to the [Clean Fleet Report](#), “Many fleets have specific goals to reduce petroleum dependency, meet cleaner emission mandates, reduce greenhouse gas emissions, and begin pilot fleets that model their future goals. Fleets are expanding their use of hydrogen, natural gas and biofuels. Sometimes, they even save money in the process. Fleets emit far less greenhouse gases with natural gas, a fossil fuel, compared with diesel which is processed from oil. The picture is even brighter when hydrogen is reformed on-site from natural gas and put in hybrid-electric fuel cell drive systems that are over double the efficiency of diesel engines. Biofuels reduce the dependency on oil. Biodiesel is far more fuel-efficient than corn ethanol, with more promising greenhouse gas reductions.”

**Many choices**

**Biodiesel**

Diesel engines are the standard for heavy vehicles, such as trucks and buses. Biodiesel is a blend of diesel, which is processed from oil, and fuel from biological sources such as soy or food waste. Blends of 5, 10, and 20% biofuel are popular because they run in most current diesel engines. Look for wide use of B20 in heavy vehicles.

**Butanol**

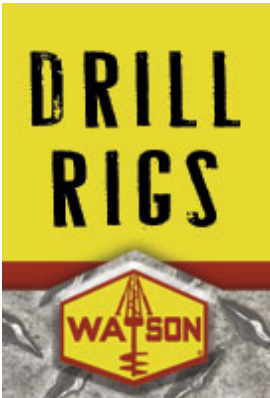
Butanol has a much higher energy content than ethanol. Butanol can most likely be blended with gasoline in higher percentages than ethanol and run in non-flexfuel engines. Butanol may get transported in the same pipelines as gasoline.

**Ethanol**

When you drive a car, there is most likely an ethanol blend in your fuel tank. Ethanol is a fuel from a plant source that is normally mixed with gasoline. U.S. vehicles can run on a blend of up to 10% ethanol (E10). Some states require ethanol as an oxygenating agent in gasoline, replacing MTBE and tetraethyl lead. Ethanol has the potential to reduce U.S. dependency on foreign oil. We are growing our own fuel. Ethanol—a form of



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alcohol—is the predominant biofuel in use today. The United States and Brazil together produce about 90 percent of global fuel ethanol. In 2006, the United States passed Brazil to become the world’s largest producer. Brazil has used ethanol to reduce its dependency on gasoline by 40%. In the U.S., 2%. In the U.S., the vast majority of ethanol is processed from corn.

### Hydrogen

California currently has 2,500 daily riders on hydrogen vehicles including cars, light trucks, delivery vans and buses. According to the Clean Fleet Report, its Optimistic Scenario is that California will have over 1,000,000 daily riders by 2022, saving over 300 millions of gasoline annually by that target date. New California regulation will require major public transit operators to have over 1,000 hydrogen fuel cell buses in service before 2022. Early fleet adopters of hydrogen are often major users of solar power. About half the stations in California put renewable power on the grid during daylight hours, then buy less expensive electricity at night to electrolyze hydrogen from water. The least expensive stations get their hydrogen from pipelines or onsite reformation of natural gas. About 70% of the California hydrogen vehicles use fuel cells. The balance run pure hydrogen or hydrogen blended with CNG in engines.

### Natural Gas

There are about five million natural gas vehicles in operation globally. There are about 150,000 natural gas vehicles in the USA. These vehicles consume 238 million gasoline gallon equivalents. That amount has doubled in only five years. CNG vehicles are popular in fleets that carry lots of people: buses, shuttles and taxis. CNG is also replacing coal as the number one source of electricity.

### *What about propane?*

According to CleanFUEL USA, propane fuel for fleet vehicles typically costs less than conventional or reformulated gasoline and is highly competitive with diesel. Propane has long been recognized as “green” energy. Fleets can cut emission and help protect the environment by using it. Propane fueled vehicles produce significantly lower particulates, carbon monoxide, nitrogen oxide, hydrocarbon, and greenhouse gas emissions than gasoline or diesel engines.

Propane is also safe too, with the most narrow flammability range of any fossil fuel. Because it is released from a pressurized container as a vapor, liquid propane cannot be swallowed like gasoline or alcohol fuels. Propane is a nontoxic, nonpoisonous fuel that does not contaminate aquifers or soil. Propane vehicle tanks are constructed from carbon steel, in compliance with a code developed by the American Society of

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Mechanical Engineers.

### **LPI Solution In Action**

CleanFUEL USA recently announced the official launch of a \$2.1 million dollar research and development project to bring the Liquid Propane Injection (LPI) system to three platforms of the GMC/Chevrolet 6.0L engine. CleanFUEL USA says the LPI system is the leading advancement in propane engine technology because of its simple design, low emissions and economics.

The Propane Education and Research Council (PERC) recently awarded the Georgetown, Texas-based company with a grant to cover the expenses for half of the project. Founded in 1993 by Curtis Donaldson, CleanFUEL USA provides a total alternative fuel solution for fleets and consumers by providing infrastructure, engine technology and fuel.

The LPI system is available currently on the GM 8.1L engine in both Chevrolet and GMC platforms. It is also available in the Roush Ford F150 and the Blue Bird Vision school bus.

### ***A Closer Look at Biodiesel***

According to the National Biodiesel Board, biodiesel is the first and only alternative fuel to have a complete evaluation of emission results and potential health effects submitted to the U.S. Environmental Protection Agency (EPA) under the Clean Air Act Section 211 (b). These programs include the most stringent emissions testing protocols ever required by EPA for certification of fuels or fuel additives. The data gathered complete the most thorough inventory of the environmental and human health effects attributes that current technology will allow.

Jeff Stephens, PhD, Director of Science and Technology at Propel Biofuels, Inc., commenting on the engine benefits of biodiesel, says, “Due to less soot production, biodiesel can increase the time needed between oil changes, resulting in fewer oil changes for the life of the vehicle. Biodiesel’s higher cetane provides better combustion and higher its lubricity can result in longer engine life.”

Propel Biofuels also offers CleanDrive. CleanDrive is the industry’s first integrated carbon emission tracking platform. With a Propel CleanDrive Fleet Card, or by creating a CleanDrive account with Propel, fleets receive real time reporting of the volume of carbon emissions reduced by using biodiesel instead of petroleum. Clean Drive graphically displays the positive impacts of biodiesel use across three areas:

- Reductions in CO<sub>2</sub>
- Barrels of oil displaced
- Equivalent annual impact of mature trees

***Kenworth Clean Technology Tour debuts this spring, to showcase “green” products***

Kenworth Truck Company will launch the Kenworth Clean Technology Tour this spring to showcase its range of new products for heavy and medium duty truck purchasers.

The extensive Kenworth Clean Technology Tour is expected to appear at 70 events, including several in Environmental Protection Agency (EPA) non-attainment areas. Kenworth’s environmental vehicles on the tour will be a Kenworth T800 liquefied natural gas (LNG) vehicle, a Kenworth T270 medium duty diesel-electric hybrid truck, and an aerodynamic, EPA SmartWay™ program eligible Kenworth T660 equipped with the CARB-compliant Kenworth Clean Power® no-idle system. Tour stops will be made in conjunction with Kenworth dealerships. The tour is expected to run into the fall.

“The Kenworth Clean Technology Tour is a great opportunity for customers to see environmentally friendly products from Kenworth that can help lower operating costs and reduce emissions,” said Gary Moore, Kenworth assistant general manager for marketing and sales.

***PG&E’s clean fleet and visionary future***

*by John Addison*

Years ago, you only had one choice for your telephone service – AT&T. Now you have a variety of choices from landline, wireless, cable, and Internet providers. Years ago, gasoline was your only fuel choice. Now you have a number of fuel and electric choices. In the future, your favorite provider may be your electric and gas utility.

PG&E – Pacific Gas and Electric - (NYSE: PCG) provides electricity and natural gas to over 5 million customers in California. With revenues exceeding \$12 billion, PG&E has an opportunity to increase its services as we continue the shift from vehicles with gasoline engines to vehicles using electric propulsion and alternate fuels.

When I met with a number of PG&E managers, one traveled from his Alameda home via bicycle and ferry. Others used low-emission CNG and hybrid vehicles. The people managing PG&E’s clean transportation programs practice what they preach.

***Largest CNG Fleet in USA***

As part of its larger environmental leadership strategy, PG&E owns and operates a clean fuel

fleet of hybrid-electric and fuel cell vehicles, and more than 1,300 natural gas vehicles — the largest of its kind in the United States. PG&E's clean fuel fleet consists of service and crew trucks, meter reader vehicles and pool cars that run either entirely on compressed natural gas or have bi-fuel capabilities. PG&E also has the largest fleet of Honda (HMC) Civic GX CNG cars.

Over the last 15 years, PG&E's clean fuel fleet has displaced more than 3.4 million gallons of gasoline and diesel, and helped to avoid 6,000 tons of carbon dioxide from entering the atmosphere. Most of PG&E's fleet runs on diesel or gasoline. CNG vehicles are simply not available for all of the fleet's diverse applications. Heavy vehicles require either liquid natural gas (LNG) or diesel to meet extended power and range demands. Most heavy vehicles, including PG&E's, run on diesel.

For any utility, Class 6/7 service trucks often need to idle their large diesel engines for hours in order to run heavy lifts and other equipment. As new lines are installed, customers complain of the vehicle noise keeping them awake at night. The maintenance crew is often forced to stop and start the engine so that they can shout between the ground person and the one in the air. The hybrid truck is especially valuable in neighborhoods with noise restriction laws.

I reviewed PG&E's new hybrid service truck which already had over 6,000 miles of operation. Efrain Ornelas demonstrated the heavy lift and other accessories operating electrically with the engine off. In service, the vehicle is reducing diesel fuel use 55% because of regenerative braking on road and engine-off electric operation during stationary work. The vehicle even included both 110 and 208V outlets for power tools.

At \$3.00 per gallon for fuel, the potential savings ranges from \$4,500 to \$5,500 a year per vehicle. Each hybrid truck reduces greenhouse gas emissions an estimated two tons per year.

In addition to the dramatic diesel fuel savings, PG&E further reduces petroleum use and emissions by using B20 biodiesel. PG&E is increasing using B20 biodiesel with its entire diesel fleet.

"Hybrid-electric trucks are promising because of their potential to significantly reduce the use of petroleum-based fuel and help keep California's air clean," said Jill Egbert, manager, clean air transportation, PG&E. "We hope our involvement will lead to the accelerated development and mainstream acceptance of hybrids in our industry."

PG&E is one of 14 utilities in the nation participating in the pilot truck program, sponsored by WestStart's Hybrid Truck Users Forum (HTUF), a hybrid commercialization project bringing together truck fleet users, truck makers, technology companies, and the U.S. military, to field-test utility trucks with an integrated hybrid power-train solution.

This new Class 6/7 hybrid truck is built by International incorporating the Eaton (ETN) hybrid drive system with a 44kW electric motor. Eaton has produced more than 220 drive systems for medium and heavy hybrid-powered vehicles. Vehicle configurations include package delivery vans, medium-duty delivery trucks, beverage haulers, city buses and utility repair trucks – each of which has generated significant fuel economy gains and emission reductions.

Fleet customers for Eaton hybrid power have included FedEx Express, UPS, Coca-Cola Enterprises, The Pepsi Bottling Group, and the 14 public utility fleets into which were placed 24 hybrid-powered repair trucks.

Eaton employs a parallel hybrid diesel-electric with Eaton's Fuller® UltraShift® automated transmission. It incorporates an electric motor/generator between the output of an automated clutch and input of the transmission. The system recovers energy normally lost during braking and stores the energy in batteries. When electric torque is blended with engine torque, the stored energy is used to improve fuel economy and vehicle performance for a given speed or used to operate the vehicle with electric power only.

“The early results are very promising,” said Bill Van Amburg, senior vice president, WestStart. “While testing these trucks on a larger scale and over a longer period of time in this pilot program is a critical next step, we're confident these vehicles are commercially viable and will deliver real value to customers.”

PG&E sees a similar opportunity to save with its Class 5 trouble trucks. For this truck, PG&E partnered with the Electric Power Research Institute and other utilities to conduct a plug-in hybrid pilot project for a Ford F550 Super Duty Field Response Truck. PG&E currently has 350 Field Response Trucks on the road.

### **Compressed Natural Gas Stations**

PG&E owns and operates 34 compressed natural gas (CNG) fueling stations, for its own fleet and more than 200 commercial and private fleets. This

includes transit districts, private refuse haulers, school districts, municipalities, air/seaports, and other miscellaneous operators including taxi, package delivery, military, and private fleets.

Leading the way to clean electricity and cleaner transportation are corporations like PG&E. In their own fleet they are proving that alt-fuels and electric drive systems can save money and emissions. As the technologies are proven, PG&E gives customers new ways to secure clean fuels and electric power.

*\*Editor's note: OPTIMARK Inc. publishes the Clean Fleet Report. John Addison is the Publisher of the Clean Fleet Report and President of OPTIMARK Inc. He is the author of Revenue Rocket and the upcoming book Save Gas, Save the Planet. He has taught courses at U.C. Davis and U.C. Santa Cruz Extension. John Addison given over 1,000 speeches, workshops, and moderated conference panels in over 20 countries. He is a popular speaker in the Americas, Europe and Asia. Email John Addison at [johnaddison1@gmail.com](mailto:johnaddison1@gmail.com).*

***“Green” Roush® Propane F-150 leaves minimal carbon dioxide footprint***

With so much talk these days about reducing emissions, lowering one's carbon footprint, and going “green,” ROUSH® has created an excellent fleet option by developing a Ford F-150 pickup powered by propane.

According to research commissioned by the Propane Education & Research Council (PERC) and conducted by Energetics, Inc., propane's emissions have lower carbon content than gasoline, diesel, heavy fuel oil, and ethanol. Even when upstream emissions - those released as a result of extracting and processing energy - are factored into the equation, propane is still one of the best fuel options from a greenhouse gas (GHG) perspective.

When fuel is burned at a 99 percent combustion rate, on-site emissions estimates of the amount of carbon dioxide released per Btu heavily favors liquid propane gas which releases only 62.7 kg CO<sub>2</sub>/million Btu. Ethanol, commonly known as E85, releases 66.6 kg, and gasoline falls in at 70.5 kg. Diesel fuel is the worst of the group at 72.5 kg.

The exhaust emitted from a properly maintained propane-fueled engine contains virtually no toxic compounds. And because the boiling point is 44 degrees below zero Fahrenheit, propane vaporizes instantly when released into the atmosphere. It degrades rapidly when exposed to the light, and no contamination will result from spills or leaks.

Additionally, propane does not have the contaminants of some other fuels like diesel, and has less criteria pollutants across many applications. Propane's portability, storability, and environmental benefits also qualify it to serve the unique needs of several applications, such as fueling a fleet of pickup trucks.

The ROUSH F-150 Liquid Propane Injection truck is designed and manufactured to operate solely on propane while providing the same horsepower, torque and drivability of an F-150 equipped with a gasoline-powered 5.4-liter, 3-valve Triton™ V-8 engine.

ROUSH has begun taking orders for the propane-powered F-150. The 2008 model year truck can be ordered, delivered and serviced through a nationwide network of select Ford dealers.

The ROUSH F-150 is available in Regular Cab, SuperCab and SuperCrew cab styles with XL, XLT, STX, & FX4 trim and all three different bed lengths. The liquid propane injection system option includes dedicated propane fuel lines, fuel rail assembly and fuel tank. Additionally, the vehicle's computer has been re-calibrated to provide optimum performance and fuel economy.

Based in Livonia, Mich., "The Art of Performance Engineering" takes place at ROUSH Performance. To get a look behind the scenes at what goes on at ROUSH and how the vehicles and parts are designed, manufactured, tested and produced log on to [www.roushperformance.com](http://www.roushperformance.com).

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