UTILITY FLEET
MANAGEMENT

ECOLOGY WATCH

By Rick Geise

California's electricity and natural-gas crises probably cost manufacturers and owners of electric- and natural-gas-powered vehicles some sleep. For everyone else, it's biodiesel to the rescue.

Appeasing Energy Appetites With Biodiesel

Like it or not, our little world is growing up. And like a hungry teenager with an inclination to supersize every meal, industrial progress has an undeniable appetite for energy. With demand continuing unchecked, what is being done — or can be done — to increase energy supplies?

USA Today reported in September that petroleum refineries have not significantly increased capacity or improved infrastructure in 30 years. Natural gas prices have doubled in the past year, with capacity limitations coming into question.

Calls for alternative energy solutions have created an interesting riddle reminiscent of the "chicken-or-egg" puzzle. What comes first — customer demand for alternative fuels, or dedicated alternative fuel vehicles (AFVs) and refueling infrastructure?

Dedicated AFVs — vehicles built from the ground up to run on a specific alternative fuel — can cost thousands of dollars more per vehicle than conventionally fueled counterparts. Refueling infrastructure can easily run $250,000 or more per location.

The bottom line

With increased competitive pressures, utilities must think about the bottom line. In order to justify capital investment in refueling infrastructure, there must be significant numbers of "key carrying" consumers who own or lease AFVs.

Making matters even more challenging are mandates to energy providers to incorporate alternatively fueled vehicles into their own fleets.

Government intervention has, in fact, skewed the fleet industry's view of what might otherwise be a simple matter of supply and demand. Because of this intervention — particularly the energy provider and state fleet mandates of the Energy Policy Act of 1992 (EPAct) — most utility fleet managers have come to categorize AFVs as just another example of big government flexing its muscle without considering the hardships this causes.

EPAct was intended to achieve three basic goals:

1. To provide energy security by lessening dependence on foreign oil. In 1992, when EPAct became law, the memory of the Gulf War was still fresh. Current turmoil in the Middle East has brought this issue to the forefront once again.
2. To address growing environmental concerns.
3. To promote domestic economic development.

No initiative

What we've been missing is initiative. Not only did EPAct's mandates for utility providers have minimal checks and balances from an enforcement standpoint, but the price of conventional fuel was simply too low for alternative fuels to compete.

However, with this winter's tight energy supplies and high prices, plus political unrest in the Middle East, we now have the catalyst for positive change in the alternative fuels arena. But which alternative fuels are best?

Currently, the Department of Energy (DOE)

Biodiesel works in any vehicle that runs on diesel fuel.

recognizes natural gas (compressed and liquid), propane, electric, ethanol and biodiesel as approved alternative fuels.

The challenge with alternative fuels has centered around the inconvenience of refueling and the expense associated with purchasing AFVs or retrofitting existing vehicles.

In addition, most alternative fuels significantly limit range, power and payload capability.

Biodiesel, the newest entrant into the changing world of alternative fuels, doesn't require users to purchase new vehicles or retrofit existing ones. There is no significant impact on a vehicle's operating characteristics. Biodiesel can power any compression-ignition engine. In fact, many fleet managers using biodiesel report that they do not tell their drivers anything initially about the alternative fuel, minimizing the "resistance-to-change" effect.

But what is biodiesel?

In the early 1990s, U.S. agriculture became interested in developing non-food uses for its abundant soybean and oilseed harvests. At the same time, the rendering industry began evaluating the potential of value-added processing for its raw materials. Taking the lead from the emerging biofuels industry in Europe, farmers and renderers joined forces to develop a new and promising domestic biofuel, known as biodiesel.

Today, this fledgling industry has an approved ASTM "PS 121" specification for biodiesel.

In simplest terms, biodiesel is a methyl ester produced by combining methanol with the oil or feedstock, then adding a catalyst. Glycerine is spun off during the refining process, with the remaining product being termed a mono-alkyl ester, known as "biodiesel."

Biodiesel is virtually non-toxic, being 10 times less toxic than table salt and more biodegradable than sugar. In its pure form, it can be handled, stored and transported with the same guidelines as vegetable oil.

Biodiesel can be made from a variety of feedstocks, including soybeans, rapeseed, canola and palm oil, as well as from recycled vegetable oils. This represents a renewable, and therefore inexhaustible, supply of energy.

Currently, there are 10 producers of biodiesel in the United States. The most cost-competitive producers use recycled vegetable oil as a feedstock.

Studies conducted by the National Renewable Energy Lab (NREL), a division of the U.S. Department of Energy, have found that these inexpensive recycled feedstocks are of comparable quality to other, more expensive oils.

As a fully compatible liquid fuel, biodiesel can be used as an additive at low inclusion rates, as a blending component or as a complete replacement to diesel fuel.

In order to be classified as an alternative fuel, the fuel mixture must include at least 20 percent biodiesel (B20) in the blend. One AFV EPAct credit can be earned for every 450 gallons of biodiesel purchased, which equates to 2,250 gallons of B20.

Commitment needed

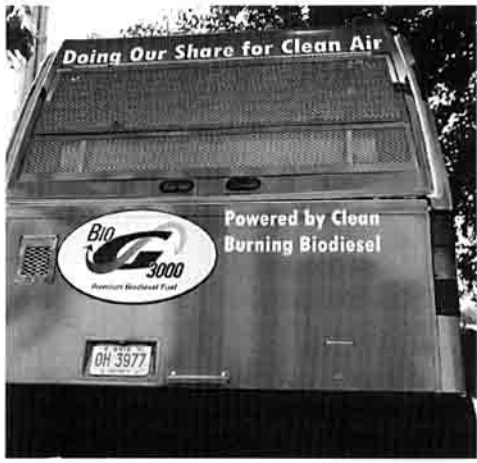
If we're really going to reduce our dependency on foreign oil, we need to gain commitment to products like ethanol and biodiesel as blending components in the overall fuel supply.

Currently, more than 50 percent of our energy needs are met by imported fuels. Only 0.3 percent of the vehicles on the road operate on alternative fuels. While this number is increasing, at the current pace it will take more than a decade to displace 1 percent of our fuel consumption with alternative sources of energy.

Just as ethanol has been blended with gasoline at the pump, products like biodiesel can be incorporated into the diesel fuel supply. That would, in relative terms, have a dramatic impact in displacing our dependence on foreign oil and improve operating characteristics of the blended fuel.

Biodiesel at a 2 percent blend can improve lubricity by 60 percent. This is a significant benefit that can be derived from a nominal investment.

The most obvious benefit from a low blend commitment would be that biodiesel would become instantly more available and, therefore, more economical. With the price of petroleum energy expected to keep rising, increased biodiesel supplies will encourage fleet managers to evaluate the attractiveness of increasing their blend rates of biodiesel to the 20 percent level or higher, depending on the economics.



The price of Biodiesel is dropping steadily.

Prices drop, benefits rise

Meanwhile, the price of biodiesel has fallen dramatically over the past six months alone. Biodiesel can be routinely purchased today for less than $2 per gallon, with additional price reductions for large-volume orders. These costs are still higher than conventional fuel, but they are dropping and may, one day, be on a par with conventional fuel.

When evaluating the total cost-per-EPAct-credit, biodiesel can offer a clear advantage when compared with other alternative fuels. In particular, since biodiesel does not require capital outlays for new vehicles or refueling infrastructure, biodiesel is often the most cost-effective alternative fuel available to earn EPAct credits.

Environmentally speaking, B20, along with the use of a catalytic converter, can reduce particulate matter emissions by 30 percent, carbon monoxide by 21 percent, and total hydrocarbons by 47 percent. Biodiesel is also completely free of sulfur, and the lubricity benefits mentioned previously are particularly important given low-sulfur diesel's detrimental impact on lubrication. Biodiesel also serves as a mild solvent, and actually cleans the fuel system.

The only standard maintenance suggestion when converting an existing diesel engine to biodiesel is that,

after the first 30 days, a fuel-filter change is recommended.

Biodiesel can be made from many feedstocks, including soybeans and cooking oil.

Selecting a supplier

When selecting a supplier, be sure that the company supplying your biodiesel is reputable and has the ability to meet ASTM PS 121 specifications. It's also important from a quality and control standpoint to know if you are dealing with an actual biodiesel manufacturer or simply a marketer or reseller of alternative fuels. For questions regarding biodiesel quality, contact the National Renewable Energy Laboratory at (303) 275-4616.

Alternative fuels will continue to be key factors for fleet managers, especially for utilities and others challenged with EPAct mandates. The Department of Energy is still studying the possibility of extending the EPAct rules, or some version of them, to cover private and municipal fleets as well. If that happens, the use of alternative fuels will come dramatically to the forefront of the public's consciousness, and biodiesel may well turn out to be the answer for many of these fleets.

As volumes increase, production efficiencies will be realized by manufacturers, resulting in continued downward pressure on pricing. In addition, tax incentives are a very real possibility in the not-so-distant future. Across the United States, biodiesel is available and readily implemented. For medium to heavy-duty vehicles, biodiesel offers a clear option that maximizes the utility of an existing fleet. A conventionally fueled truck today can be an alternatively fueled vehicle tomorrow. Delivery options vary. Biodiesel can be received in 55 gallon drums, by tanker or truck, or by railcar. From maximizing engine life and performance to complying with stricter EPA air quality regulations, find out why more fleet managers are changing their fuel, not their fleets, with biodiesel. ■

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