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200 Proof Fuel?

by Gary Witzenburg

Most of us realize by now that we have an energy problem. And a lot of the resulting attention, as always, has been focused on the automobile—in spite of the fact that private autos consume only about 13 percent of the energy used in this country.

Yet few can agree on just how to tackle the problem, especially when it comes down to squeezing the last ounce of waste out of our old friend, the car. There's no question that cars will get smaller, lighter, and more efficient.

Then there's talk of additional hefty taxes on fuel, dollar penalties tacked onto big-car prices and rebates for small cars; while at the same time, massive amounts of both federal and private money are being spent trying to develop alternative engines and drivetrains for the cars of tomorrow. But these alternatives—turbines, Stirling Cycle engines, electrics, and gas/electric hybrids, to name a few of the best known—are at least ten years away from any practical application in automobiles. And even if they do come to pass, they may *never* put a really serious dent in the fuel problem or threaten the faithful gas-powered piston engine's supremacy.

But there are those who maintain that there's nothing wrong with the cars and engines we already have—it's what we're putting into them that causes the problems. In other words, why spend billions on new-engine tooling and technology, which may or may not pay off someday, without spending a little bit of money investigating alternate fuels?

The predicament we find ourselves in at the moment is not so much that we can't get the fuel we need, but from whom we have to get it. It has been said that more oil is discovered every year than the world uses. But, for reasons of both domestic supply and economics, we are currently importing close to half of it from outside our borders—and mostly from the politically flammable and potentially hostile countries of the Middle East.

So it makes good sense to concentrate on producing as much of our own fuel as is technologically possible—and from *renewable* resources. It's arguable whether we *could* supply our own growing need for petroleum fuels from within, but as long as it's cheaper to buy much of it elsewhere the oil companies will continue to do so—for the same reason you and I will drive across town to buy something for less than we could get it down the street. However much oil we do have under our political control, though, the fact remains that it's not renewable. Once it's gone, it's gone. The same is true for natural gas.

Hydrogen has been proposed and tried in motor vehicles with some success, but hydrogen is not cheap to produce, and it's difficult and costly to distribute. Those who recall the Hindenburg know why you can't carry it around in gaseous form in your car's tank; and in a safe, solid chemical "fuel cell," it becomes too heavy and cumbersome for small, personal vehicles—at least at today's level of technology.

There are other alternative fuels as well, the most intriguing and promising of which is alcohol. Alcohol comes in two basic forms, methanol ("methyl" or "wood" alcohol) and ethanol ("ethyl" or "grain" alcohol). The former can be produced from wood, coal, oil, natural gas, and even garbage and sewage, and is presently used to power Indianapolis-type and other high-powered racing cars. The latter is distilled from sugarcane and almost any kind of grain—corn, wheat, milo, rice—and is the stuff that puts the kick into our favorite intoxicating beverages.

Because methanol is currently cheaper, and available in larger quantities than ethanol, most alcohol-fuel research by the auto companies, oil companies, and other groups has concentrated on it. But methanol is not readily mixable with gasoline in blends, and separates in the presence of water; it causes some cold starting, vapor lock, and other problems, and has only about half of the "heat content" (energy per pound) of gasoline.

Ethanol, on the other hand, while more expensive and in shorter supply, has a much more favorable heat quantity; it blends easily and seems to have none of the other problems of methanol. It's biggest drawback, however, is that vast quantities of land and farm labor would be needed to grow enough "fuel grain" to make any serious impact on our total fuel problem.

Still, grain alcohol advocates say that just the 60 million acres of arable land held in the government "soil bank" in 1974 could have produced thirty billion gallons of ethyl alcohol—an amount equal to one-third of the total gasoline consumed by U.S. motor vehicles that year. Used in blends of 30 percent ethanol to 70 percent gasoline, that production alone could have replaced all the gasoline produced from imported oil at that time.

With a strong interest in promoting new markets for its own grain crops, the state of Nebraska has been experimenting for several years with a 10 percent blend called "Gasohol." So far, Gasohol's future looks bright, with slightly better fuel economy and performance than straight gasoline, no increase in emissions and no engine modifications necessary for using it. Nebraska estimates that just 15 percent of its current grain crop could supply the one hundred million gallons of ethanol needed to convert all its annual gasoline usage to Gasohol, and much of that would come from "distressed" (wet and rotting) grain that would otherwise be wasted.

Think of the possibilities. If the problems of methanol can be effectively solved, we can power our cars with fuel made from waste and sewage instead of dumping such troublesome debris in the ocean or having to bury it. And if large amounts of land not needed for food production can be used to "grow" ethanol, we can pay our fuel money to farmers and distillery operators at home instead of to sheiks abroad.

No solution is ever a total solution to such a large-scale, long-term problem; but further development of alcohol and other alternative fuels could certainly help ease the crisis. ■