

The Gasohol Rebellion

Can Big Oil Hold Its Ground?

By Samuel Blumenfeld

Illustration by Anthony Schultz

Gasohol, a blend of 10 percent alcohol (ethanol) and 90 percent unleaded gasoline, may not seem to many like much of an energy alternative at the moment, but it's just the beginning of what may become an American revolution in automotive fuels. And it is a revolution that the big oil companies don't particularly want to see happen.

The company that is introducing gasohol to New England is Johnson Products of Boston, a small independent gasoline distributor that owns Top Gas, a string of seventy stations in the six states, with ten of them in Massachusetts. Jerry Portanti, vice-president of Johnson Products, decided to try selling gasohol in New England because he had read about its success in the Midwest and thought it made a lot of sense. "It's a way of stretching our gasoline supply and giving us, at the same time, a higher octane unleaded premium. If the public goes for it, we'll probably put it in all our New England stations."

Ethanol is 200 proof alcohol. When it is blended with gasoline in a 10:90 mix it provides up to 5 percent better mileage, increases the octane rating, and cuts down on noxious emissions by as much as 30 percent. A higher ratio of ethanol cuts down the pollutants even more, but it may also require some carburetor adjustments. That's why the 10:90 blend has been designated, because it can be used now in any car without any adjustments at all.

Alcohol, which can be made from grain, corn, sugar cane, potatoes, sorghum, cheese whey, and all sorts of cellulosic waste, has long been known to be a motor fuel superior to gasoline. The drivers at Indy use it. Even Henry Ford was aware of alcohol's superior qualities and tried to build a fuel alcohol industry in the 1920s. But the oil companies were able to produce gasoline so cheaply that alcohol could not possibly compete with it. Originally, gasoline was a minor product of oil refining. But the invention of the automobile created a potentially large market for it, and the oil companies went after that market aggressively. Gasoline was a dirtier and less efficient fuel than alcohol, but it was also much cheaper. The consumer bought it and the pollution problems that came with it. Today, however, gasoline is no longer cheap or plentiful and its polluting characteristics have become unacceptable to the consumer. So alcohol is being reconsidered. But the oil companies have always regarded alcohol as a potentially dangerous competitor.

The promoters of gasohol contend that they do not want to entirely replace gasoline, but merely extend it by using alcohol. But the oil companies don't want to open the door to alcohol at all because they're afraid that what's happening in Brazil might happen here. The Brazilians, who must import 80 percent of their oil, decided not to mortgage their future development to OPEC. So they made a national commitment to go all the way with alcohol as a motor fuel by the year 2000. Brazil is using sugar cane as its source of alcohol. "We are convinced that solar energy is the answer for us," a Brazilian official recently told a group of visiting Americans. "but instead of obtaining solar energy through solar panels we are going to obtain it through plants."



America's potential in that area is as good as Brazil's, but the Department of Energy doesn't see it that way. The DOE, under the strong influence of the oil companies, has been pushing for the coal-into-methanol-into-gasoline solution to the fuel shortage. Most of our enormous supply of coal in America is owned by the oil companies, and coal conversion is the direction the oil companies want us to go in. But converting coal or even oil shale into gasoline is very expensive, very dirty, and full of difficult technical problems, and in the end will give us the same old dirty gasoline plus a few carcinogens to boot. So who needs it? The oil companies need it to save their huge investments in coal and to keep the supply of gasoline tight.

So Big Oil has been saying a lot of nasty things about gasohol: that it's a solution to an agricultural problem not an energy one; that it takes more energy to produce alcohol than you get back from it; that you get less mileage from alcohol, not more; that alcohol does horrible things to the insides of

your engine; that it's too expensive. That sort of criticism creates a lot of confusion in the public mind, but the promoters of gasohol have been answering these criticisms all along with the facts.

First, while it is true that gasohol will provide additional markets for agricultural products, it is also true that alcohol can be produced from cellulosic waste materials, which can also help solve some of America's waste disposal problems. Also, this is a nation plagued — or blessed, however you want to look at it — with huge agricultural surpluses. Recently, a million tons of potatoes were dumped in Idaho because there was no market for them. They could have been used in the production of fuel alcohol.

As for the argument that it takes more energy to make alcohol than you get back from it, this same argument can be applied to the oil industry itself. It takes energy to find oil, get it out of the ground, transport it, refine it, and distribute it. It takes far more energy to convert coal into gasoline than it does to convert corn into alcohol. Energy loss occurs in all conversion processes. For example, before coal becomes actual electricity, two-thirds of its potential energy is lost. In the transmission of electricity from

its source to one's wall socket, a lot of it is simply lost on its way through high-tension wires. That's part of the price we pay to convert energy into the form we want to use it.

Actually, the negative-energy-balance argument is something of a shell game. They use the Btu (British thermal unit) as the unit of measurement. (A Btu represents the amount of heat needed to raise the temperature of one pound of water one degree Fahrenheit.) Getting a precise measurement of the Btu potential of ethanol has not been easy. Experts' estimates have ranged from 72,190 to 90,000 Btus per gallon. A gallon of gasoline has about 115,000 Btus. This means that you can heat more water with gasoline than with the same amount of ethanol. But the purpose of a motor fuel is not to heat water but to produce a properly controlled explosion in a combustion chamber. It's the explosive character of the fuel that counts, not how much heat it produces. In the case of ethanol you get a more controllable explosion, which accounts for the higher octane rating, and that's very important when it comes to the internal combustion engine.

The octane rating of a fuel is a measure of its tendency not to preignite in the combustion chamber before the spark plug fires. Low octane fuel causes more preignition, more knocking, more possible damage to the engine. Ethanol has a lower tendency to preignite, and therefore it has a higher octane rating. In fact, the only positive thing the oil companies will acknowledge about ethanol is its higher octane rating. At this moment they are frantic about finding some additive to improve the performance of unleaded gasoline. But rather than add ethanol to unleaded, which would increase the octane rating but also encourage alcohol production, they want to go back to leaded. But that will require a change in the Environmental Protection Agency's lead phase-down requirement. The oil companies predict an even more severe shortage of gasoline unless the nation sacrifices its environmental goals on an altar of lead.

But we can have both a cleaner environment and higher octane without lead if we use ethanol. The facts are quite dramatic. When you mix ethanol with unleaded gasoline, you get a considerable reduction in gasoline pollutants. A test to confirm this phenomenon was conducted in New York City in the spring of 1978 by the *New York Daily News*. Using a 1977 Chevy Impala, the *News* used gasohol mixtures with 10, 15, and 25 percent ethanol. At 10 percent ethanol, carbon monoxide emissions were cut 38 percent; at 15 percent ethanol, the carbon monoxide was cut a dramatic 68 percent! The other exhaust pollutants — hydrocarbons and nitrogen oxides — were also reduced.

The *News* test prompted the Department of Energy to study the impact that gasohol would have on New York's air if 10 percent ethanol were used only by late-model cars and taxis. The results estimated that carbon monoxide in the city air could be cut by 17 percent, hydrocarbons would drop 4.5 percent, and nitrogen oxides 0.5 percent. In

(Continued on page 28)