

The Fuel of the Future?

Divided opinions mark battle over ethanol usage

by Dennis A. Shook

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Wisconsin should turn its cornfields into ethanol, the proposed energy source of the 21st century, says Gov. Jim Doyle.

But is that a realistic goal or just wishful thinking? Is ethanol the clean, renewable energy source touted by its supporters? Or is it simply a ploy that appeals to some politically powerful constituencies?

The governor has frequently said he wants to replace the "oil fields of the Middle East with the cornfields of the Midwest." Detractors say that makes for a better political slogan than a viable energy solution. But Doyle has committed to aiding the ethanol industry, which would develop corn into ethanol, a fuel source proponents say helps gasoline run cleaner.

"Ethanol is clean, it's renewable, it's less expensive, it helps Wisconsin farmers and it reduces the demand for foreign oil," Doyle said, explaining his support for the alternative fuel.

In his 2006 State of the State speech, Gov. Doyle said he would push for "the recommendations of my Task Force on Renewable Energy—including getting 10% of our energy from renewable sources by 2015." That goal includes utilizing a variety of energy sources, including solar and wind power.

The task force also recommended developing a plan to get 25% of the state's electricity and transportation fuels from renewable sources by 2025.

Doyle called for passage of a bill that would require that 10% of all gasoline immediately be made up of ethanol. The bill failed by a narrow vote in the state Senate last year and it has not been reintroduced in the current session.

Last week, Doyle joined with 16 other governors in the Democratic Governors Association in calling for President Bush to work with Congress on ways to reduce gasoline prices, which have hit record highs.

Doyle isn't the only promoter of ethanol. Support for the fuel has come from both sides of the political spectrum, including President George W. Bush, who has called for a fivefold increase in developing such biomass fuels in the near future to reduce dependence on foreign oil.

The federal government is investing in the industry with taxpayer money. In March, the U.S. Department of Energy announced it would provide more than \$23 million for five projects focused on converting biomass material to ethanol. The department said the research would support President Bush's goals of making ethanol cost-competitive by 2012 and also reduce the nation's gasoline consumption by 20% in the next 10 years.

This sort of environmentally aware, farmer-friendly talk has encouraged many who are hoping to find a safe, sound alternative to fossil fuels.

But is developing ethanol really a viable answer to the rising cost of gasoline? Is it better for the environment? Or is it simply a way for Wisconsin farmers to make a healthy profit by selling their corn crops to local ethanol plants, with Wisconsin consumers and taxpayers underwriting the costs?

An article in last week's *New York Times* reported that oil executives said that Bush's recent call for a sharp increase in biofuel use has led to many oil companies holding off on plans to construct new gasoline refineries. The lack of new refineries is often cited as a cause for the recent skyrocketing gas prices.

It also quoted Lawrence Goldstein, an analyst at the Energy Policy Research Foundation—funded by the oil industry—as saying that ethanol can lead to increased volatility in fuel prices.

"If we get a bad corn crop, we will end up paying for it at the pump and on the food shelves," he said in the *Times*. "We are not buying security. We are increasing volatility."

A Step Into the Future

Both supporters and opponents of ethanol can cite stacks of scientific papers to bolster their ethanol stands. But even Josh Morby, executive director of the Wisconsin Bio Industry Alliance—an advocate funded by ethanol producers such as Ace Ethanol and Badger State Ethanol, as well as agricultural industries—acknowledged that corn-based ethanol is not the ultimate solution for those seeking a safe, alternative fuel source. Instead, Morby said ethanol is simply the first step toward developing an even more viable homegrown energy source.

"Generally speaking, we're not saying that corn-based ethanol is the only solution," Morby said. "It's a start and has us heading in the right direction."

Morby said the ultimate goal is converting all sorts of biomass materials that are now largely unused into fuel, such as corncobs and cornstalks, switch grass and even waste from paper mills. That process is called cellulolysis.

But finding the enzyme needed to make that magic come true has proven to be almost as elusive as an alchemist's search for a process to change lead into gold.

Until that discovery is made, ethanol will come largely from corn, with all of the problems that dependence brings. For instance, most cars cannot use ethanol in its pure form because special, flex-fuel engines are required to burn that level of alcohol.

What's more, ethanol is not readily available in southeastern Wisconsin in its most common blend, known as E-85. The E-85 blend uses 85% ethanol and only 15% gasoline.

But Morby said that these two problems are being solved. First, Morby noted, the number of registered vehicles that can use ethanol has increased by 17% in the past year, to 128,563. And ethanol is easier to find.

"Most gas pumps in this area already advertise that their gasoline might contain up to 10% ethanol," Morby said. Most cars on the road today can handle that much ethanol blended with regular gasoline, he said.

"And there are 70 stations throughout the state that now carry E-85," he added, which could only be used in cars with flex-fuel engines.

Wisconsin currently has seven ethanol plants, which Morby said could soon increase to 10 because of demand. Morby added that 400 million gallons of ethanol will be produced in Wisconsin by the end of 2007, almost twice the amount produced in the state in 2006.

In an April 12 article, the Environment News Service said that there are 118 ethanol production facilities in the United States and 76 more under construction, which led to 5.5 billion gallons of ethanol production capacity by the end of 2006.

Evaluating Ethanol's Promise

While Morby makes it seem as if ethanol is a positive step toward finding a cleaner renewable fuel source, ethanol has also raised questions about its energy efficiency and environmental gains. Ethanol detractors insist that efforts to use corn to produce ethanol can cause other dire consequences and that it is not an efficient use of corn or the land it is grown on.

Critics contend that relying on just corn to produce fuel will produce even more problems than the industry aims to solve.

Some of the criticism of ethanol includes:

- *Energy issues:* While there is much debate regarding the costs of producing ethanol, it is generally estimated that producing ethanol from corn costs about twice what it costs to produce a gallon of gasoline. As an indicator of those higher ethanol costs, most plants that produce ethanol use fossil fuels, such as coal or natural gas, rather than using ethanol to help produce more ethanol.

Ronnie Cummins, executive director of the Organic Consumers Association (OCA), which is critical of ethanol as a cost-effective alternative to gasoline, said, "We emphasize that it takes as much energy, or more, to produce corn-based ethanol and that using corn for ethanol is not a good idea. Cellulosic ethanol has promise but needs research. What is far more important is conservation and conversion to renewable energy sources, such as solar and wind. With minor adjustments, such as corn-based ethanol, all you create is an illusion that you are dealing with the problem."

Three scientists in a recent article for the *National Academy of Sciences* magazine wrote that when production costs are taken into consideration, "ethanol would sell for \$1.80 per gallon at the pump. However, this is equivalent to \$2.70 per gallon in order to get as much energy as in a gallon of gasoline."

They said that technology improvements promise to reduce ethanol costs, but it is unlikely to fall below the cost of producing gasoline even then.

There are also other environmental concerns.

“Abusing our precious croplands to grow corn for an energy-inefficient process that yields low-grade automobile fuel amounts to unsustainable, subsidized food burning,” says Cornell University professor David Pimentel, who chaired a U.S. Department of Energy panel in 2001 that investigated the energy, economic and environmental aspects of ethanol production.

University of Minnesota professors David Tilman and Jason Hill have argued that ethanol can never meet America’s demand for gas in any event. In an article for the March 25 *Washington Post*, Tilman and Hill wrote, “If every one of the 70 million acres on which corn was grown in 2006 was used for ethanol, the amount produced would displace only 12% of the U.S. gasoline market. Moreover, the ‘new’ [non-fossil] energy gained would be very small—just 2.4% of the market.”

Most damning, perhaps, was their observation, “Car tune-ups and proper tire air pressure would save more energy.”

But ethanol advocates such as Morby deny that the fuel is a “net energy loser.” Morby said studies performed by the University of California-Berkeley for the U.S. Department of Energy in 2006 “show that ethanol yields more energy than is used to grow and harvest the grain.”

Morby said the study claims that “a gallon of ethanol contains more energy than required to produce and transport that gallon.” Morby also said ethanol has an advantage because it’s home grown and not extracted in the Middle East.

“Gas is better than ethanol because it has more power,” Morby acknowledged. “But we have to look at alternative sources of energy in order to reduce our dependence on foreign oil and to decentralize production of oil, in case of hurricanes or wars.”

- *Expense*: Opponents say that using ethanol is more expensive than gasoline because it does not provide the same mile-per-gallon rate. Even the governor’s newly created Office of Energy Independence acknowledged that ethanol has lower energy content than regular gasoline, so it would take more E-85 to equal the energy derived from regular gas. But Maria Redmond, the office’s biofuels sector specialist, said that E-85 is considered a high-octane fuel, or premium grade. She noted that if it is priced at about 50 cents below the cost of normal gasoline, consumers would just about break even. But she also acknowledged that many gas stations do not sell ethanol for that much less.

Redmond said while the state offers no subsidy for ethanol development, the federal government subsidy amounts to about 51 cents for every gallon of ethanol produced.

Morby contends the use of 10% ethanol at the pumps has proven that ethanol is cheaper than gasoline. And he said that once cellulolysis comes into common use, ethanol will be significantly less expensive than gasoline, particularly as oil prices continue to rise.

- *Pollution:* Ethanol is commonly thought to be a cleaner fuel source, and Morby contends that ethanol helps reduce tailpipe emissions.

But Stanford University atmospheric scientist Mark Jacobson said that E-85 would produce even more ground-level ozone than gasoline. Complicating matters is that when ethanol is produced, pollution-causing chemicals are released into the air, as well as an odor that smells either like popcorn or manure, depending on who you talk to.

- *Food chain:* The demand for corn for fuel could lead to problems in developing countries that rely on corn produced by the United States. Pimentel's studies showed that the average American automobile, traveling 10,000 miles a year on pure ethanol (not a gasoline-ethanol mix) would need about 852 gallons of the corn-based fuel. That would require 11 acres to grow, or the same amount of cropland needed to feed about seven Americans. Most ethanol opponents claim that there will be a resultant disruption to supply and cost along the food chain, particularly impacting developing nations that rely on U.S. corn for food.

But Morby said ethanol is made from field corn that is fed to cattle, not sweet corn, and that the process still leaves a feed for animals to consume, known as "distillers dry grain."

- *Plant locations:* There is invariably a fight by local citizens when an ethanol plant is seeking a location. One of the recent fights was in the town of Dover, in Racine County, where a citizens' group was able to deny needed permits for an ethanol plant. That opposition came despite the promise of growing the tax base and providing new jobs. (See "Not in Their Back Yard.")

Ethanol Future

One possibility for more efficient and cost-effective use of ethanol is to follow the path taken in Brazil, where sugar cane has been used to produce ethanol.

In Wisconsin, some have pointed to sources other than corn for ethanol, such as switch grass. The U.S. Department of Energy has promoted research into that area and investments have been headed toward biotechnology companies that are capable of genetically engineering microbes that can break down all kinds of crops into alcohol to make fuel.

But will it ever be enough to help make a dent in the nation's reliance on foreign and fossil fuels?

"We're headed in the right direction with ethanol," Morby said.

Doyle is also pleased with the progress. In an appearance at the GM plant in Janesville in March 2006, Doyle praised the plant for having built more than 1.5 million flex-fuel vehicles capable of handling more ethanol.

"Ethanol has strong support in Wisconsin, and for good reason," Doyle said. "For every dollar we spend at the gas pump, 70 cents leaves the Wisconsin economy. But for every dollar we spend on ethanol, 70 cents stays right here in Wisconsin, which is great news for our economy, and the hardworking farmers all across this state."

When the governor created his new Office of Energy Independence in April, he said, "The Midwest, together, is uniquely situated to become the Saudi Arabia for renewable energy, with Wisconsin at the forefront. The fact is, if an oil field in Iran has to compete with a farm field in Wisconsin, that's a very good thing for the environment, it's a very good thing for the Wisconsin economy and it's a very good thing for the world."

Whether it also turns out to be good news for consumers remains to be seen.