



Truckin' on Down the Road to Mainstream

Breakthroughs like cellulosic ethanol and biobutanol could continue to turn field corn into fuel corn and switchgrass into greenbacks as America tries to plug the OPEC pipeline in favor of growing our own.

By Dan Stephens

Ethanol: More than a Flash in the Pan

Once relegated to the outskirts of legitimacy, ethanol is becoming mainstream, thanks to government backing and a meteoric rise in popularity. Not bad for basically 200-proof corn liquor you can re-grow in three months.

In a scant few years, ethanol has morphed from quirky corn fuel to benign behemoth – dare say, media darling. It has momentum in the legislatures in the form of favorable taxes; momentum in the Heartland in the form of subsidies; and momentum in headlines in the form of the renewable resource that will save the world.

But is ethanol hype or hope? Will it burn itself out?

“Ethanol will never go away,” says Sean O’Hanlon, founder and Executive Director of American Biofuels Council. “The marketplace will ultimately decide the dominant fuel, probably a mix – a blend of biofuels. But it’s not going anywhere.”

Ethanol’s more side dish than main course when it comes to our fuel consumption. The roughly 5 billion gallons of ethanol produced in 2006 consumed nearly one-fifth of the corn crop and about 3% of our gas consumption. In 2007, the roughly 10 billion gallons of ethanol produced consumed about 25% of the corn crop. This year, when more factories come on line, ethanol will gobble up anywhere from 30 and some say as much as 50% of the corn harvest, which represents about 7% of gas usage. Today’s total 430-million acres of cropland would only offset about 14% of gas usage.

President Bush’s improved Energy Bill – signed at the end of 2007 – increased ethanol mandates to 13.2 billion gallons by 2012 and 15 billion gallons by 2022, which is a mere drop in the bucket compared to 140 billion gallons of gas burned annually.

Still it’s a start, say ethanol advocates.

Dan Basse, President of AgResource Company, a global research company that forecasts agricultural price trends, predicts a briefer shelf-life for ethanol – three to five years.

“Short-term we are lacking alternatives, so ethanol and biodiesel are part of the solution, but it’s not something I believe has any kind of longevity. As we look forward, the world has to bring more land into production to feed itself, much less fuel itself.” Our main fuel source will not be vegetarian, according to Basse. Hybrids and hydrogen will fill the horizon as the next energy category, not plants. “That is where everyone is headed. Using crops and switchgrass – it’s just an interim step.”

Not a Panacea

Bioenergy has a big appetite. It takes a lot to make a little. Critics contend higher corn prices, spurred by ethanol demand, lead to higher retail food prices for consumers. They say the U.S. will be unable to produce enough corn to satisfy all markets, creating shortages and intensifying competition that will drive the price of corn higher.

But advancements in seed, farming and ethanol technologies will allow American farmers to continue feeding the world while helping fuel the country’s energy needs. “There is no conflict between food and fuel – we can produce both,” says Ken McCauley, President of the National Corn Growers Association, adding we can “readily satisfy demand for livestock feed, human food processing, exports and fuel ethanol.”

U.S. corn growers produced the three largest corn crops in history in as many years. In 2005, after all corn demands were

met from the 11.1 billion bushel harvest, two billion bushels remained in surplus.

Jim Murphy, senior consultant with the Context Network, looks beyond food versus fuel, saying "everyone can argue about that." He's focused on the bigger picture, oil versus ethanol, and says the country should focus on finding less expensive, more carbon neutral alternatives to oil.

"Corn is the most economical ethanol feedstock in North America," he says. "We get back 34% more energy than we put into it. So it's worthwhile. Compared to crude oil – carbon wise – it's a much smarter thing to do." According to Murphy, we haven't tapped corn's full potential. "You have to look at corn holistically," he says. "It's not just the starch in the kernel, it's also the rest of the plant including the fiber in the kernel, the cobs and the corn stover. The beauty of corn as an ethanol feedstock is the relative ease of collecting and transporting the rest of the plant to produce cellulosic ethanol."

New Crop of Biofuels

Ethanol today just uses the kernel. Other areas of the plant have yet to be exploited. First is the fiber content of the kernel, the pericarp, says Murphy. That's another 8 or 9% weight of the kernel that can be used and it's already being harvested. The second is the stover, or the stalk. This, along with the fiber, is composed of cellulose which can be converted into ethanol. Cellulose is the main component in plant cell walls and is the most common organic material on earth. It's more difficult to break down and convert into usable sugars than corn starch.

Honing cellulosic technology would dramatically increase available material, making today's waste tomorrow's fuel. Refuse requiring disposal such as corn stalks, rice straw and wood chips or "energy crops" of fast growing trees and grasses would be used for cellulosic ethanol. Some say the best hopes lay in switchgrass and mixed prairie grasses, which can grow on marginal land and require little in the way of inputs.

The Department of Energy has estimated land resources in the U.S. are capable of producing a sustainable supply of 1.3 billion tons per year of biomass, sufficient to displace 30% of the country's oil consumption, according to a recent study.

Seed companies, like Pioneer Hi-Bred International, are investing in this fledgling technology. Pioneer and its parent company DuPont are working on an Integrated Corn-Based Biorefinery project that will use the entire corn plant, thereby doubling the amount of ethanol obtained per acre. "We see this technology as part of the entire mix," says Jerry Harrington of Pioneer. "Obviously the industry is maturing. We expect this maturation to continue."

Meanwhile, biodiesel, made from soybean oil and animal fat, may play a niche role where a cleaner-burning biodegradable fuel is required. The marine industry, for example, could benefit.

But even if the entire soybean crop – usurped recently by mammoth corn plantings – was converted to biodiesel, it would replace only 6% of diesel usage, which amounts to an iota of total gas pumped.

The answer may lie offshore – biodiesel from marine algae. Royal Dutch Shell recently announced plans to build a pilot plant in Hawaii to grow marine algae. Vegetable oil would be extracted and converted to diesel for trucks and cars.

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Technology that Fuels: Biobutanol

A turbo-charged cousin of ethanol could help the bioenergy cause. Pioneer and BP will roll out the first advanced biofuel in the U.S. after 2010. Called biobutanol, it is produced from the same ag feedstocks as ethanol but has the same “kick” as gasoline.

“It has the same energy content as gas,” says O’Hanlon. “So you don’t lose power like you do with ethanol.” Additionally, it’s less hygroscopic – it doesn’t absorb as much water. “It can be transferred through existing oil pipelines. Ethanol can’t. It must be transported by truck, rail or barge.”

O’Hanlon says biobutanol, already available in the U.K., will debut in one of three U.S. cities: Atlanta, Houston or Miami.



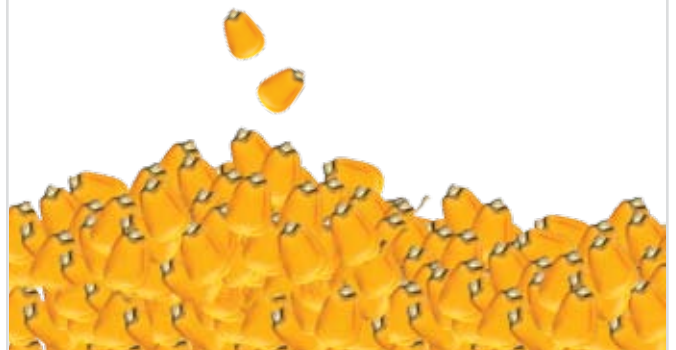
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President Bush proposed pumping \$1.2 billion into this revolutionary fuel. He predicted in 20 years, hydrogen-powered cars would be making our air cleaner and less dependent on foreign sources of oil.

But until then, it’s mostly corn. “In Brazil, it’s sugarcane,” says Murphy. “It’s likely to be sugar beets in Europe. But in the U.S. for now it’s corn.” “Biofuels are here to stay,” predicts O’Hanlon. “Multiple fuels from multiple feedstocks.” **SW**