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The Great Corn Con

The Senate's preposterous new ethanol bill

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The ethanol madness continues! Last week, the Senate passed an energy bill mandating the production of 36 billion gallons of ethanol per year by 2022—a sevenfold increase over current levels. Senators congratulated themselves for their environmental foresight. The president, a biofuels advocate, has enthusiastically endorsed the ethanol surge. But it's almost certainly a fantasy, since no one in Washington seems to have thought for five minutes about where or how that much ethanol could be produced.

There are two domestic sources for that ethanol in such quantities: corn or cellulose. (Sugar cane is an excellent feedstock for ethanol, but the United States grows relatively small amounts of cane, particularly when compared with Brazil, the world's largest producer.)

Let's look at corn first. The Senate's ethanol mandate will increase the consumption of corn, the single most subsidized crop in America. In 2005 alone, according to the Environmental Working Group, corn subsidies totaled $9.4 billion. By increasing ethanol production—and thus corn production and consumption—the mandate will likely cost taxpayers extra billions both in the form of higher subsidy payments and higher food costs. But set aside the budget concerns for a practical one. How much ethanol can be produced from corn?

According to the U.S. Department of Agriculture, distillers can produce about 2.7 gallons of ethanol per bushel of corn. In 2006, U.S. farmers produced about 10.5 billion bushels of the grain. So, even if Congress mandated that *all* of America's corn be turned into ethanol, it would yield only about 28.3 billion gallons, far *less* than the mandated volume. And, clearly, most of America's corn is still going to be used for animal feed, family barbecues, and high-fructose corn syrup.

So, let's assume that only half of U.S. corn gets used for ethanol production. That would provide about 14 billion gallons of the 36 billion gallons demanded by the Senate. The other 22 billion gallons of alcohol will have to come from cellulosic ethanol—a fuel that can be made from cornstalks, wood chips, or grass (that legendary "switch grass" that President Bush likes to talk about). But cellulosic ethanol is like the tooth fairy: Many people believe in it, but no one ever actually sees it.

Last year, former Vice President Al Gore claimed that cellulosic ethanol will "be a huge new source of energy, particularly for the transportation sector. You're going to see it all over the place." In his 2006 State of the Union speech, President Bush announced increased federal funding for cellulosic ethanol research with the goal of making "this new kind of ethanol practical and competitive within six years." Former CIA Director James Woolsey is among the most vociferous boosters of the fuel. Back in 1999, in an article published in *Foreign Affairs*, he and Sen. Richard Lugar, an Indiana Republican, declared that cellulosic ethanol

would “democratize the world’s fuel market.”

Maybe. But there’s no reason to expect that the cellulosic ethanol industry will be able to grow fast enough to supply the 22 billion gallons in question.

Developing an ethanol production system based on biomass will likely take decades. It took more than 25 years of federal subsidies before corn ethanol production reached 5 billion gallons per year. In fact, it took 13 years just to get to 1 billion gallons. Given the massive investments required for new distilleries, storage tanks, and transportation networks, it’s reasonable to assume that it will take at least that long for cellulosic ethanol to reach similar production levels. And yet, the Senate expects the cellulosic ethanol business will grow to be four times as large as the corn ethanol sector is today, and do so in just 15 years.

Perhaps the most important constraint on cellulosic ethanol is geographic. Like corn ethanol, cellulosic ethanol production is limited by the amount of arable land. In May 2006, former CIA Director John Deutch, who’s now a chemistry professor at Massachusetts Institute of Technology, wrote a piece for the *Wall Street Journal* in which he claimed that producing enough ethanol from switch grass (a fast-growing plant that’s native to North America) would require vast amounts of acreage. Deutch estimated that producing enough cellulosic ethanol to replace 1 million barrels of oil per day—roughly equivalent to 22 billion gallons of ethanol per year—would require planting 25 million acres of land in switch grass. That’s an area about the size of Kentucky, or about 5 percent of the 440 million acres of cropland in the United States.

And all of this assumes that making cellulosic ethanol is even worth doing from an energy standpoint. A peer-reviewed study of alternative automotive fuels to be published this week by Jan Kreider, an engineering professor at the University of Colorado in Boulder, found that like corn ethanol, cellulosic ethanol produces minuscule gains in net new energy. (Other studies have shown both types of ethanol to be net energy losers. Still others claim significant energy gains.) Kreider’s paper will be published by the American Society of Mechanical Engineers as part of its 2007 conference on energy sustainability.

Energy requirements aside, “Cellulosic ethanol doesn’t have a proven production technology that’s economic,” Kreider told me Monday. “But even if there were such a technology, there’s not enough land, not enough water, and not enough transportation infrastructure to provide the quantity of fuel the Senate is mandating.”

So, what about using more ethanol from sugar cane? Well, the United States could, at least in theory, grow more cane. But that wouldn’t make much sense, given that Brazil can produce it at far lower cost. And, thanks to pressure from farm-state senators, Congress has effectively limited the use of Brazilian ethanol with its $0.54 per-gallon tariff on foreign ethanol.

The final issue is quantity. Thirty-six billion gallons of ethanol a year sounds like a lot, but it’s only 2.34 million barrels per day. And given ethanol’s lower heat content—about two-thirds that of gasoline—the effective production would be equivalent to 1.54 million barrels of oil per day. The United States uses nearly 21 million barrels of oil per day, of which 12.54 million barrels are imported. Thus, even if American ethanol producers can miraculously achieve the Senate’s goal of 36 billion gallons per year by 2022, they will be producing the equivalent of just 7.4 percent of America’s total current oil needs and just 12.2 percent of its

imports. That quantity of ethanol will not take America very far toward the oft-repeated goal of energy independence.

Alas, the ethanol craze isn't limited to Congress. Presidential candidate and former Sen. John Edwards, a Democrat, has declared that the United States should be producing 65 billion gallons of ethanol and other biofuels per year by 2025. And every major presidential candidate—including former ethanol heretic John McCain, a Republican—are genuflecting in front of the ethanol altar.

So, don't expect the ethanol binge to stop any time soon. An ethanol-induced hangover is sure to follow.

Robert Bryce is the managing editor of Energy Tribune. His book on the mirage of energy independence will be published in February.
