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## Can Ethanol from Corn Be Made Sustainable?

The first biofuel plants are ready to make ethanol from the nonfood part of corn, but such cellulosic ethanol may falter if subsidies end

By David Biello | Wednesday, February 20, 2013 | 3 comments

A new plant is rising from the fields around Emmetsburg, Iowa—one that will ferment into ethanol the cobs, stems and husks of corn from nearly 50,000 hectares of farmland. Such cellulosic ethanol offers a way to get the energy and environmental security benefits of biofuels without disrupting the food supply when the edible corn itself is used.

"The facility will be operational in 2014," says Jeff Lutt, chief executive of Poet, LLC, one of the largest brewers of ethanol in the U.S. "We are on the doorstep of cellulosic ethanol, but don't pull the rug out from under us after we invest billions."

That rug, Lutt and others in the biofuel business worry, is the U.S. government removal of price support for cellulosic ethanol, among other alternative fuels. Already, this year many of the subsidies and supports enjoyed by the biofuel industry will expire—and critics have argued that all such supports under the 2005 Renewable Fuel Standard (amended in 2007) should be ended, especially for the bulk of ethanol produced today, which is brewed from the noncellulosic starch in corn kernels.

In the past few years the increasing use of corn for fuel, along with drought, has helped triple the price of corn globally. (The U.S. supplies 60 percent of the world's exported corn.) Poet's own corn ethanol brewing facility in Macon, Mo., has had to shut down because of tight supplies. "It's not that we can't get corn," Lutt explains. "It's that we can't get corn priced in a way that it is economically viable to continue."

The corn shortage exists despite the fact that between 2006 and 2011 U.S. farmers converted more than 530,000 hectares of land to growing the grain, according to a study published in *Proceedings of the National Academy of Sciences* on February 18. Those lands were not fertile soils but instead the kind of marginal lands that are prone to erosion—and the kind of runoff from cornfields that causes environmental problems like the oxygen-depleted waters, or "dead zone," in the Gulf of Mexico. Overall the U.S. now transforms roughly 40 percent of its national corn crop into the alcohol fuel.

In the last decade ethanol brewed from corn has come to supply 10 percent of the U.S. automotive fuel supply, some 50 billion liters per year. Critics argue that corn ethanol is now an established fuel and should no longer receive government support, which comes to roughly \$7 billion annually, once tax credits, tariffs and other incentives are totaled. But Lutt points to ethanol forestalling the use of foreign oil as well as providing new revenues for North American farmers that make it possible to grow corn at a profit without direct subsidies. "We have an option [for fuel] for the first time in 100 years," he adds.



**CELLULOSIC ETHANOL:** Poet has begun harvesting cellulose--the stem, leaves and cob of corn plants--for use in a new facility the biofuel brewer is building in Emmetsburg, Ia.  
Image: © Poet

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Although Lutt argues that ethanol from corn should continue indefinitely as part of the U.S. fuel mix, the U.S. Congress hoped to gradually replace it with the kind of cellulosic ethanol to be brewed at Poet's Liberty facility in Emmetsburg over the course of the next decade. But quantities of cellulosic ethanol have consistently failed to meet expectations, perhaps because those expectations were set based on amounts of cellulosic material available on fields rather than the ability of technology at the time to turn biomass into fuel. "It's hard to predict technology development," Lutt admits.

There have been some pleasant surprises, such as Poet's ability to use more than just corn cobs. That, in turn, enables farmers to collect the stalks and other detritus from the fields with a simple baler for delivery to the Liberty facility. "You can take more trash off the field and get more density [in the bale of biomass] as well," Lutt says. At the same time, enough of the carbon-rich material is left behind to ensure continued soil fertility—the farmers produce nine metric tons of biomass per hectare but only harvest a ton for the cellulosic facility, according to Poet.

Although efforts to develop cellulosic ethanol in a big way continue to struggle, Lutt and his allies in the biofuel business would like to see more effort put into reconfiguring automobile engines to run on ethanol. If that happens, he argues: "I think we'll blow away the concept of electric vehicles."

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