

Fertilizer industry finds its alternative energy: corncobs

June 18 2009, By Renee Schoof, McClatchy Newspapers

American agriculture has become increasingly dependent on foreign sources of natural gas, a key ingredient in the nitrogen fertilizer that farmers use to get high yields of crops such as corn and wheat.

Now, a California start-up company is preparing to open a plant that will make fertilizer in the U.S. and reduce fossil fuel emissions from agriculture.

Nothing exotic is needed, said the company, SynGest of San Francisco. The raw ingredient for the same ammonia-based fertilizer farmers have used for decades is something many already have and don't really need — corncobs.

This kind of innovation is the upside of energy price increases, said Jack Oswald, the chief executive of SynGest.

"When energy prices were very, very low, you couldn't compete," he said. But natural gas prices have increased over recent years, driving many U.S. fertilizer companies to close their doors because natural gas prices overseas were lower. Today more than half the country's nitrogen fertilizer is imported, and about 20 percent of the imports are from Russia.

Natural gas is used to make ammonia, the basic component for nitrogen fertilizer. Prices for natural gas rose dramatically in the U.S. over the past 10 years, according to the U.S. Department of Agriculture. Because

natural gas is cheaper in other countries, the U.S. has increasingly turned to foreign supplies for ammonia since 1990.

"We don't relish being in Ukraine's shoes," Oswald said, referring to Russia's embargo on natural gas supplies to its neighbor during the winter.

The cost of natural gas now accounts for up to 90 percent of the cost of making nitrogen fertilizer, according to the U.S. Government Accountability Office. Last year, when natural gas prices rose, so did the cost of fertilizer, one of farmers' biggest expenses.

SynGest says its plan to build small plants in the Midwest to make fertilizer from corncobs would eliminate the price volatility farmers have had to put up with and help ensure that U.S. farmers won't face a shortage.

"If energy supplies in general become tight we can always turn down the thermostat and we can always car pool," Oswald said. "But when nitrogen fertilizer is missing or reduced in farming, crop production drops by a measurable amount. That directly affects the amount of food available, which is not replaceable. You can't just hitch a meal the way you can hitch a ride."

Dennis Harding, a former farmer who directs new business development for the Iowa Farm Bureau, said one of the most attractive parts of the SynGest plan is that it would set a more stable price for fertilizer.

"Over the last couple years grain prices went up but inputs went up as well because of changes in energy costs, and we had a lot of volatility," Harding said. "Sometimes volatility is the hardest thing to manage."

SynGest says its system for making fertilizer also reduces the heat-

trapping gases stored in the atmosphere. Corncoobs are from plants that consumed carbon dioxide as they grew, and the gasification process needed to make the ammonia leaves behind a black residue, called biochar, that can be added back to the fields to improve the soil. Biochar also stores carbon dioxide.

SynGest's plan is to collect cobs from an area about 30 miles around its first plant in Menlo, Iowa, and make fertilizer for a local market starting in 2011. Eventually, it sees plants scattered throughout corn country.

Oswald said that the price of natural gas now is at the lower end of his company's break-even point. However, the Energy Information Agency forecasts that natural gas prices will rise. "As it goes up, the production cost of [ammonia](#) goes up using natural gas, but in our case it doesn't," because the price of corncoobs would remain stable, Oswald said.

"The good news for us is that because natural gas power plants are much easier to build and cleaner in general than anything else, they're going to drive demand and keep prices up," he said.

Oswald said he had the financing almost worked out, helped in part by the company's ability to lock in low costs for its feedstock. Farmers would also benefit, he said.

"These guys are going to pay more for my product than they did five or 10 years ago for natural-gas-based product, but it's not likely they'll ever get that price again," Oswald said. "But locking in a price guarantees they'll never pay the extraordinarily high prices they've been paying and could pay again."

SynGest estimates each plant will cost \$80 million to build, creating 500 construction jobs and then 200 permanent jobs, and that \$7 million in revenue will flow back into the local economy from the purchase of the

cobs.

High natural gas prices, like last year's, would make the SynGest process profitable, but currently natural gas is relatively low and likely to be the cheapest raw material to produce nitrogen, said Wen-yuan Huang of the U.S. Department of Agriculture's Economic Research Service

However, Huang also has written in a recent report for USDA that the long run supply outlook is that population increases and a return of growth will drive up demand for fertilizer, and an expected rise in fossil fuel prices will increase the cost for nitrogen fertilizer from [natural gas](#).

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<https://phys.org/news/2009-06-fertilizer-industry-alternative-energy-corncoobs.html>

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