

Progressive Farmer
Todd Neeley
March 19, 2015

OMAHA (DTN) -- Jim Knopik loves ethanol as much as any red-blooded farmer.



The former Central Minnesota Ethanol Co-op in Little Falls, Minnesota, is venturing into production of normal butanol starting sometime in 2016. The 20-million-gallon ethanol plant was built in the 1990s. (Photo courtesy of Green Biologics)

After all, Knopik was among some 750 investors in the Central Minnesota Ethanol Co-op in Little Falls, Minnesota, who in the 1990s saw the need to create market stability for corn after years of prices barely high enough to break even.

Area farmers pooled their money to build a 20-million-gallon ethanol plant. When the ethanol boom took off in the mid-2000s, however, the plant began to fall behind the technology curve.

Knopik and his neighbors could see the writing on the wall.

It was time to go shopping for a brighter future, and they hope they found it in producing normal butanol, or n-butanol, starting sometime in 2016.

England-based company Green Biologics bought the plant in recent years and is in the process of converting it to normal butanol production, all while continuing to produce ethanol for the time being. Once normal butanol production is in full gear, the plant not only will maintain jobs for 30-some long-time employees, but likely will be adding jobs. The company has been renamed Central Minnesota Renewables.

Knopik is investing back into the new project.

"(Butanol) is priced quite a bit higher," he said. "It is a nice alternative for us ... It will be the only plant around producing normal butanol. Sometimes it makes you

nervous until it gets going. I just feel it is going to be a good fit for us. We have been studying this for a while."

Knopik farms about 1,500 acres, with about 1,200 irrigated acres of primarily kidney beans. His farm uses corn in the rotation and has for many years on his farm about 5 miles from the plant.

"It just kind of saves a lot of trucking for us," he said. "For us, we usually deliver 140,000 bushels of corn a year to the ethanol plant. We kind of delivered more and more to the plant since it opened in 1995. For a while it didn't bring in acres. But it just took off from there."

Butanol's market has remained relatively stable, while the ethanol market has been driven by volatile corn prices from \$2 to \$8, rising and falling oil prices and politically driven debate on the future of the Renewable Fuel Standard.

Normal butanol has a variety of uses in cosmetics, paints, solvents and adhesives, to name a few.

GREEN BIOLOGICS

Dana Persson, vice president of commercial development for Green Biologics, said the co-op began considering the long-term outlook sometime in 2011.

"We talked about our size as a handicap, so we went on a strategic search," said Persson, who was already a consultant for the plant. In 2013, 99% of shareholders supported the butanol idea.

"We're going to put significant dollars -- about \$40 million -- into the plant," he said. "That's a significant investment in the community. Community leaders have been very supportive. It is a different paradigm than it was 15 years ago. We thought about what can we do to maintain the market for corn? We gave farmers a choice. They voted to sell the plant to Green Biologics. Many investors then put proceeds from the sale back into the plant. It is still farmer ownership."

Farmers not only can expect to see a seamless transition to butanol, Persson said, but may in the end see an improvement in the local corn market.

"From the corn farmers' perspective, the plant may use slightly more corn than it does for ethanol," he said. "... It is good for the community, corn farmers and employees, and it has a higher-value chain."

BUTANOL EMBRACED

Although corn ethanol is deeply entrenched in the Little Falls community, as is the case with many small towns across the Corn Belt, farmers in central Minnesota have embraced the butanol concept, Persson said.

"Farmers adapt to technology as fast as anybody," he said. "It is a higher value... We're getting great acceptance in the marketplace."

Joel Stone, global vice president of engineering and president of Green Biologics, said because ethanol production and chemical production such as butanol share many similar processes, there could come a time when more ethanol plants will be expanding into chemicals.

"If you look at history, the very first plants producing fuel gravitated to the chemical industry," he said. "What's the next step for ethanol facilities? Chemicals and fuels. The state of Minnesota has embraced us in this being a success story."

Stone said that several years ago his company began looking at ethanol plants in central Minnesota and other regions, to either repurpose older plants with the butanol technology or install as a bolt-on.

"It just so happened that Central Minnesota Cooperative was looking for an alternative approach," he said. "Central Minnesota is oriented ideally to repurpose while operating it as an ethanol plant."

It's not out of the question that Green Biologics' technology could find its way into larger, 100-million-gallon ethanol plants at some point, Stone said. For example, some plants could produce normal butanol as a niche product with say 20% of the corn bought by a plant. Because butanol is a higher-value product, he said, that scale of butanol production at a large ethanol plant could improve such a facility's profitability.

"We will be looking at other plants," Stone said. "We're intensely focused on making plant No. 1 successful."

THE FUTURE

Generally speaking, Persson said, the market for normal butanol is more stable than ethanol. Even as the price of corn ranged from \$2 to \$8 a barrel, butanol "didn't go off the rails," he said.

Though normal butanol does have value as a fuel, Green Biologics says butanol is worth three times more as a chemical. As a chemical, normal butanol has a market valued at more than \$6 billion. Downstream chemical intermediate markets are valued at more than \$40 billion, the company said.

The repurposing of the plant involves converting from ethanol fermentation to the fermentation of acetone, normal butanol and ethanol. Existing fermenters will use the bacteria clostridia to replace yeast as the biocatalyst agent that digests sugar and converts to alcohols and solvents.

The company is installing new distillation equipment, but mostly all the existing equipment will be used.

Considering corn prices have fallen in recent years and ethanol production has become more cost-effective, Persson said it is yet to be seen how quickly other ethanol companies will take a hard look at butanol.

"In 2014 we had a record corn year," he said. "In 2015 it will be more open. Everyone wants to see the plant work. If Little Falls is successful, then maybe there will be other opportunities."

Todd Neeley can be reached at todd.neeley@dtm.com

Follow Todd on Twitter @toddneeleyDTN

(SK/AG)

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