Ethanol to n-Butanol in the Land of 10,000 Lakes

Construction retrofitting a Minnesota ethanol plant to produce renewable chemicals is well-underway.

By Katie Fletcher | February 16, 2016

Key to Success: The distillation and fire pump building are part of Green Biologics Ltd.'s campus where it will deploy its advanced fermentation process. The green chemicals the company will produce possess a competitive advantage to petroleum-deri
PHOTO: CENTRAL MN RENEWABLES

Bushels of corn have served as feedstock for Central MN Ethanol Co-op LLC's dry mill plant since 2002, but those days are soon coming to an end. Toward the end of March, ethanol production will cease at the 21-MMgy plant. Corn will still find its way to the Little Falls, Minnesota, site, but rather than ethanol and dried distillers grains production, the corn's sugar will make biobased solvents n-butanol and acetone. U.K.-based Green Biologics Ltd., an industrial biotechnology and renewable chemicals company, acquired the ethanol plant in December 2014, renaming it Central MN Renewables LLC. "The Little Falls location was selected for its ideal location relative to our feedstock, which is corn," says David Anderson, global vice president of marketing with GBL. "This will be the first renewable n-butanol plant in the U.S., and we do have plans to build at future locations."

Although this will be the company's first commercial plant in the U.S., GBL has a one-thirtieth-scale demonstration plant in Emmetsburg, Iowa, and a pilot plant in Gahanna, Ohio, near Columbus. "When proving out technology, you start with bench lab, then you step it up multiple sizes to a pilot plant, then to a demonstration plant and then you reach commercial capability," says Dana Persson, GBL president of North America, during an interview from the construction site. "I am sure the next plant will be even larger than this one."

Anderson says GBL is already in the process of identifying a second plant in the U.S., but the current focus is on starting up this first plant. Following the site acquisition, the company completed permitting in late August and groundbreaking shortly thereafter, enabling the project to remain on track to become operational during the third quarter this year. Despite conditions that often accompany a Minnesota winter, construction crew members are busy on-site, evidenced by the all-too familiar sound of construction vehicles using their back-up beepers, audible even beyond Persson's office window.

As part of the retrofit, he says, the plant requires some additional equipment and building infrastructure, including slightly different distillation equipment than what is currently installed at the facility. Even so, the key components of the equipment and existing infrastructure fit in "pretty well," Persson explains, with the new manufacturing process being readied for deployment. "This plant made sense for Green Biologics because you have existing grain handling and storage facilities, fermentation assets, water treatment capabilities, and the supply chain is already in place," he says. "If they were going to start from a Greenfield operation, they'd have a much larger investment than what they will have with this plant."

Persson adds that the feedstock supply will be "no different than what we do today" and come from area corn suppliers. "Prior to being purchased by GBL, the ethanol plant was a cooperative, so many of those corn suppliers were shareholders who have a long history with the plant," he says. "Some of those same farmer shareholders and others invested in the new plant as well." Area growers and the state have demonstrated support of the CMR project, Persson says, including the Minnesota Department of Employment and Economic Development and the Minnesota Department of Agriculture, which awarded

the project $500,000 in state Next-Gen funding last year.

Besides utilizing the current feedstock supply chain, all of the ethanol plant's existing infrastructure will be leveraged, Anderson says, with the addition of the company's advanced fermentation process (AFP) that can convert a wide range of feedstocks into green chemicals such as n-butanol, acetone and, through chemical synthesis, derivatives of butanol and acetone. The platform combines the AFP with proprietary Clostridium microbial biocatalysts and synthetic chemistry. Anderson says the company's key markets for its products include paints and coatings, adhesives, inks, personal care, cosmetics and fragrances. GBL is currently seeking customers for its commercial facility. "We are actively negotiating supply agreements with numerous partners," Anderson says.

In November, shortly after breaking ground on the ethanol plant retrofit, GBL received approval for membership to the American Chemistry Council. "This raises our credibility as a true specialty chemicals company," Anderson says.

The facility currently endures its growing pains as it's readied for retrofit. "The focus of my office right now is making sure this plant is ready on time and on budget, and people are brought on and trained properly so that we are ready to produce renewable chemicals," Persson says.

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