

➤ Most people think of ethanol as an alternative fuel designed only for specialized flexible fuel vehicles (FFV). While this is partly true, almost 70% of the gasoline sold in the United States contains some amount of ethanol. In addition to cars, industrial ethanol is used in everything from mouthwash to hand sanitizers to perfume and shampoo. Pure beverage ethanol, manufactured in the form of grain neutral spirits (GNS), is used in many premium alcohols, such as vodka and hard lemonades.

Most ethanol production facilities, such as Golden Triangle Energy Cooperative (GTEC) in Craig, Mo., generate little to no waste throughout the manufacturing process. "Everything we consume at the plant is either sold or reused," says Roger Hill, general manager, Golden Triangle Energy Cooperative.

With \$50 million in gross annual revenue, GTEC manufactures about 20 million gallons of ethanol and more than 160,000 tons of wet livestock feed every year. The production process is run by just three operators, and until a few years ago, controlled using a distributed control system (DCS) installed when the plant was built in 2001.

However, just a few years after the plant opened, Hill and his colleagues were informed by the DCS manufacturer that their system was obsolete, and the supplier would no longer be manufacturing replacement parts.

"The company would still repair some of the rundown parts, but the refurbishment process could take up to three weeks," explains Hill. "One day of downtime at our facility can cost us \$35,000 in lost profit, and unexpected shutdowns can cause unsafe conditions for our employees."

Hill and his colleagues started shopping for a new control system. "We needed a reliable system with readily accessible spare parts, and extensive support and training capabilities," Hill says.

GTEC contracted with systems integrator Bachelor Controls Inc. (BCI) of Sabetha, Kan., a Rockwell Automation Solution Provider, to help with the search.

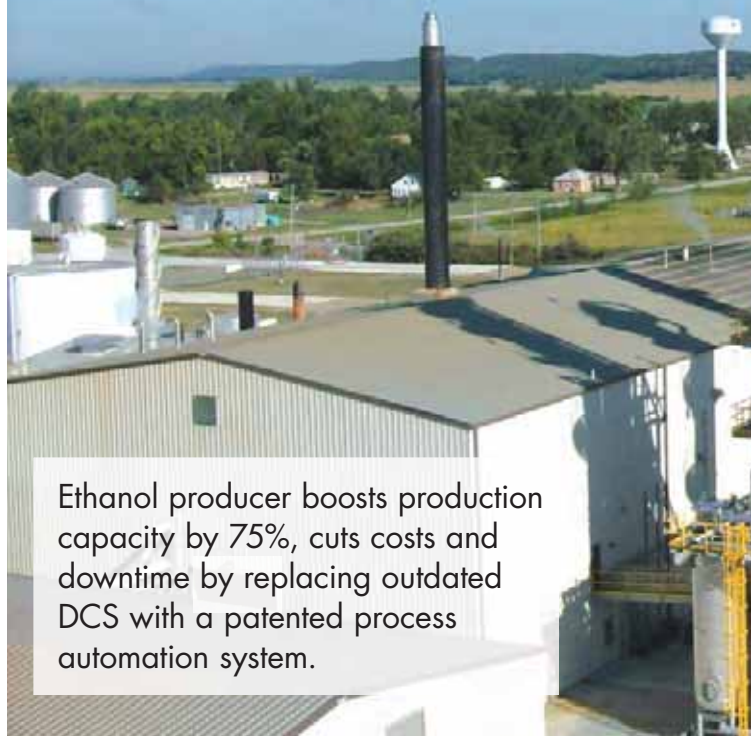
"Rockwell Automation provided the highly flexible system, service, training and locally available parts that GTEC needed. Other systems we looked at just didn't have the level of hardware and software support that we wanted," explains Marvin Coker, senior project engineer at BCI.

## New Process Automation System

Coker and the BCI engineering staff selected the Rockwell Automation PlantPAX™ process automation system to replace the existing DCS. The system is based on the Rockwell Automation Integrated Architecture™ platform, which delivers a unified process, discrete and information solution.

The new system also leverages the Allen-Bradley® Control-

# RELIABILITY MAKES ALL THE DIFFERENCE



Ethanol producer boosts production capacity by 75%, cuts costs and downtime by replacing outdated DCS with a patented process automation system.

With the scalable PlantPax process automation system, GTEC was able to install a new Controls, Inc. engineers customized the FactoryTalk View SE software to ease operator

Logix® programmable automation controllers (PAC) from Rockwell Automation, which provides common development tools, network protocol and a service-oriented architecture.

Prior to installation, engineers from BCI and GTEC met several times to compare piping and instrumentation diagrams to the facility's actual layout, check each I/O point, and discuss overall control strategy. To keep costs down and minimize complications, all existing field wiring and devices were retained during the upgrade. Also, the logic for the new system was reverse engineered from text pulled out of the outdated DCS, retaining the same control strategies.

## Two-Phased Implementation

Phased migration from the DCS to the PlantPax system was completed in two stages during consecutive scheduled shutdowns, which would usually last four days.

During the pilot phase, BCI focused on the grains receiving area. This included installing one ControlLogix



production system that expands production capacity by 75%. (Inset:) Bachelor transition.

controller, EtherNet™ and ControlNet™ communications infrastructure, and FactoryTalk® View Supervisory Edition (SE) human-machine interface (HMI) software.

“We were able to customize the FactoryTalk View SE software to mimic the look and feel of the old interfaces, which made it much easier for the operators to adjust to the new system,” Coker explains.

The second phase, which involved the complete plant switchover to the new system, took about four days. BCI replaced the outdated I/O racks with I/O from Rockwell Automation for the more than 800 I/O points spread throughout the plant.

The team installed the remaining ControlLogix PACs, and checked that each I/O point correctly responded to commands from the controller. Restart procedures began on the morning of the fifth day, and with a nearly flawless installation process, the plant was running at full production capacity by the end of the day.

## Remarkable Results

Hill and his colleagues at GTEC are thrilled with the new process automation system. “Downtime has been dramatically reduced — there are some months that we operate with zero downtime,” Hill says.

“Maintenance time also has been significantly reduced — mostly because we don’t have to do much maintenance!”

For service needs, BCI engineers can use the remote connectivity allowed by the Rockwell Automation

open architecture, which provides remote access to the GTEC system over a simple Ethernet connection.

The scalable nature of the PlantPax system allowed GTEC recently to install a new production system to produce the grain neutral spirits used in alcoholic beverages. “We just tied in the new I/O, downloaded the necessary programming to the FactoryTalk View SE software and ControlLogix controllers, and double-checked the I/O points for each valve and input. The operators were already comfortable with the

system, and the software made it easy to get production started right away,” Coker explains.

GTEC has expanded production capacity by 75%. It’s now able to manufacture 35 million gallons of industrial and beverage-quality ethanol each year, which helps position the company to capitalize on increased interest in alternative fuels worldwide. In addition, GTEC can operate the entire plant — including the new high-quality process — without hiring any new staff.

“Our return on investment on the new system has been tremendous,” Hill says. “When you operate 24 hours per day, there is no opportunity to make up for profits lost as a result of downtime. Thanks to the new PlantPax system and the support of BCI, we don’t have to play catch-up anymore.” □

[Rockwell Automation PlantPax Process Automation System](#)

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