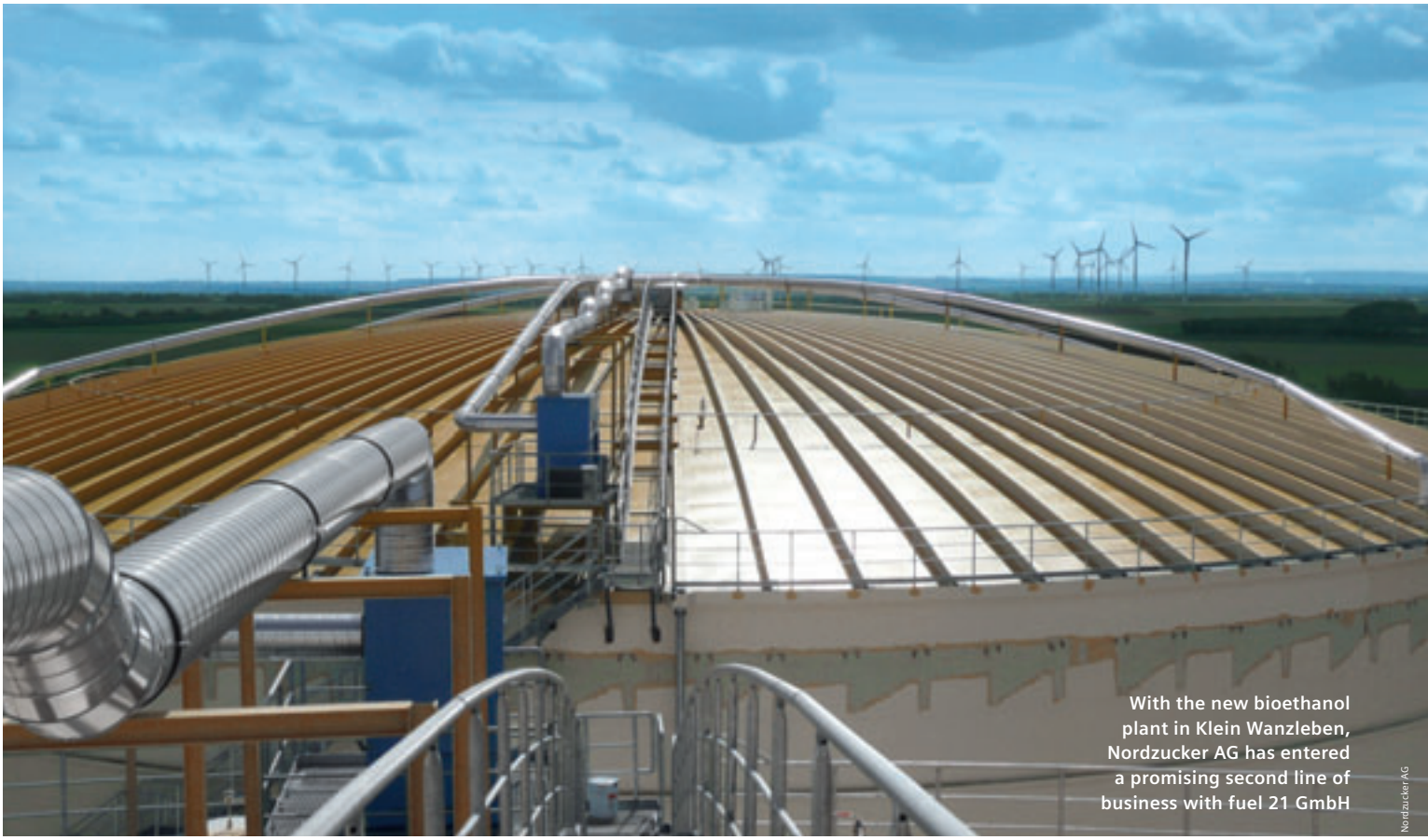
■ fuel 21 GmbH – Nordzucker AG, Germany

From Beet to Fuel

Nordzucker AG benefits from Totally Integrated Automation in its first bioethanol plant in Germany. The plant, operated by the Nordzucker subsidiary fuel 21 GmbH, also exploits synergies with the neighboring sugar factory.



With the new bioethanol plant in Klein Wanzleben, Nordzucker AG has entered a promising second line of business with fuel 21 GmbH

Nordzucker AG

Nordzucker AG is one of Europe's leading sugar producers. In early 2008, the company's first bioethanol plant went into operation at the sugar factory site in Klein Wanzleben near Magdeburg, Germany. The entry into the sustainable energy resources market has created a promising second line of business for the company.

After the recent liberalization of the sugar markets, bioethanol production has provided new perspectives and will help secure sugar beet farming in northern Germany. The bioethanol plant is located next to a Nordzucker AG sugar factory to which 3,600 farmers in four German states supply approximately 1.3 million tons of sugar beet annually.

Year-round production

The new plant, with a production capacity of 400 cubic meters of bioethanol per day, is operated by the wholly owned Nordzucker subsidiary fuel 21 GmbH

& Co. KG. In addition to various qualities of bioethanol, the company also produces fusel oils, higher alcohols, and vinasses. With equipment for fermentation, distillation, and vinasse concentration, the new plant uses the production and services of the neighboring sugar factory in several ways. It supplies the raw juice as a process feed during the three-month sugar beet campaign as well as thick juice and molasses for the rest of the year. This allows year-round operation. The new plant is connected to the sugar factory's power supply, process water systems and wastewater treatment, which creates additional synergies.

To create further capacity, the sugar factory is being equipped with additional thick juice tanks as well as plants for wastewater collection and cleaning. The boiler and turbine station has been extended with a waste heat boiler system with additional firing and a gas turbine for power generation.

Electrical engineering from one source

Special challenges faced in the completion of this project included the short construction time of approximately 12 months as well as the introduction of new technology. Nordzucker required economically and ecologically state-of-the-art process and plant technology for the production process to enable cost-effective and sustained operation of the plant right from the beginning.

Siemens received the general contract to supply and install the energy supply, the drive and automation technology, and the field instrumentation, including the engineering, assembly, commissioning, and project management. The Siemens Solution Partner on/off engineering gmbh took on the engineering services.

The contract also included six transformers with a busbar trunking system, a Sivacon low-voltage system with more than 70 fields and intelligent Simocode load feeders as well as the drive technology for 250 drives, of which 70 are controlled by Sinamics G120 and G150 frequency converters.

The heart of the automation system is the Simatic PCS 7 process control system with redundant servers and integrated F-technology for the Ex area, eight automation systems from the Simatic S7-416/417 series, six clients, a link to the sugar factory's existing Teleperm M control system, and Profibus links (Profibus and Profibus PA) to the field devices. The fermentation, the rectification and dehydration, the ethanol store, and the bioethanol production subplants are each controlled by an automation system. Another four automation systems control the new sugar factory plants: the thick juice tanks, wastewater system, new boiler, and boiler burner and gas turbine. The process instrumentation for measuring temperature, pressure, flow, and filling level at approximately 1,500 process points includes instruments from the Sitrans and Sipart series. Such a comprehensive automation solution was only possible with the Totally Integrated Automation (TIA) concept from Siemens, with the unique uniformity of its system base – from the energy supply and PCS 7 process control technology to the drive technology and field instrumentation.

The entire bioethanol plant is controlled and monitored by one control room. It was completed in March of last year and has been operating to the customer's full satisfaction since then. The construction of the new bioethanol factory has enabled sugar beet processing in Klein Wanzleben to increase from 13,000 to 16,000 tons per day. ■

Nordzucker AG

Additional thick juice tanks increased production capacity for Nordzucker

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