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Sweetening the pot

Despite the challenges currently facing the global sugar industry, a sugar manufacturer has improved its mill efficiency by 30% following the replacement of its steam turbine with an integrated drive system.

In 2012, the global sugar market faced a second year of surplus – reaching a record 10.3 million-ton surplus following a 9.2 million-ton surplus the pre-vious year. Since then, the global sugar industry has grappled with price declines, and sugar prices are expected to continue to fall until 2025. Nevertheless, industry experts do not expect sugar production to decrease because it takes time for cane farmers to switch to other crops, and the prices of other crops are falling as well. To address this challenge, forward-looking sugar manufacturers are seeking to improve asset use, reduce operating costs, enhance sustainability, and increase turnover.

Tackling the challenge

Kaset Thai International Sugar -Corporation Public Co. Ltd. (KTIS), owner of three sugar mills, including the largest in the world, invested THB 200 million to THB 300 million (US \$6 million to US \$9 million) in an integrated drive solution developed by OEM Allied-Tek using Integrated Drive Systems (IDS) from Siemens. “Our engineering team is very confident in the IDS solution from Allied-Tek and Siemens because of the trustworthiness of the brand and the quality of the machines and services,” says KhunParphanSiriviriyakul, KTIS CEO. Allied-Tek installed a six-roller mill at KTIS Mill No. 6, with two sets of drives at the mill and pressure feeder. Each drive has an H-compact AC induction motor, a Sinamics variable-speed drive, and a Flender planetary gear unit, all provided by Siemens. Direct coupling and the planetary gear unit reduce energy loss at each stage of power transmission, and the induction motor, with its variable-speed drive, provides operational flexi-bility. All the components are controlled by and integrated into a Simatic PCS 7 process control system. “With this configuration, the cane mill can crush at optimum efficiency through the milling season, regardless of cane quality and quantity as well as the mill rollers’ condition,” says SomkiatWongkittikul, managing director of Allied-Tek.

Efficiency is key

According to Wongkittikul, the electric drivetrain provides flexible mill operation. “Once the mill is set up at the beginning of the season, it can be run without stopping for readjustments, thus reducing downtime,” he says. With IDS from Siemens, KTIS improved mill energy efficiency by 30% compared with that of a steam turbine setup. Siemens’ motors and inverters perform at 98% efficiency when combined with a high-torque planetary gear unit from Siemens. “When we eliminated the steam turbine drive system – that is, the high-speed gear unit, the intermediate-speed gear unit, and the

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final-stage gear unit – we also removed any remaining inefficiencies. So we estimate total system efficiency to be over 94% for the drivetrain and at least 80% if you compute the box coupling and the mill pinions. Efficiency has increased from 47%,” says Christian Darmali, mechanical drives general manager, Siemens Pte Ltd.

Low-maintenance technology

IDS are designed to require little maintenance and provide a safer working environment. High-temperature, high-pressure steam pipes in the mill house are gone, along with the high-pitched hissing noise from the turbines. The new system is designed for easy upkeep. “We developed many wear parts for the mill to last for the whole crushing period. Maintenance can then be done during the off-season,” says Wongkittikul. “We also added instruments to monitor the mill condition during operation, so operators can plan downtime if they suspect something is wrong.” On the drivetrain side, even less maintenance is required. The planetary gear unit needs only lubrication, and the motor simply requires general cleaning with compressed air. All the electrical cabinets are installed in air-conditioned rooms, so operators just need to clean the air filters and monitor the humidity.

A close partnership

Wongkittikul chose Siemens as a technology supplier because it provides a robust, compact, and easy-to-operate drive system that can be used in harsh environments with minimal maintenance. “IDS suit our criteria very well,” he says. Siemens’ technical support and after-sales service were also key. Allied-Tek always looks for a partner, not merely a supplier, when it develops a solution for a client. “Siemens is one of our long-term partners that we feel confident working with – from our first project in 2000 until now,” says Wongkittikul.

Future expansion

Siriviriyakul believes IDS are worth the investment. “We plan to install the IDS solution in our Ruampol sugar mill to achieve the same benefits as at our Kaset Thai mill.”