ABB’s ACQ580 drive helps one of Australia’s largest almond growers reduce electricity demands in processing operations by 15%

ABB’s ACQ580 drive has helped Select Harvests to lower energy usage, reduce harmonics in the power network, and support their sustainability goals in operations.

Select Harvests is one of Australia’s largest almond growers and the country’s leading manufacturer, processor and marketer of nut products, health snacks and muesli to the Australian retail and industrial markets, in addition to exporting almonds globally.

The Select Harvests Carina West Processing Facility produces between 30 and 35,000 tons of almonds per year. A by-product of this is almond hull and shell waste. Select Harvests’ baghouse filtration equipment is used to remove the almond hull and shell and therefore must always be operating throughout the production process.

As part of Select Harvests’ sustainability goals, they’ve commissioned a biomass power station that consumes approximately 30,000 ton a year of this biomass waste. The waste is burned to produce high pressure steam to run a steam turbine and produce power onsite, and the waste ash is directed to a compost facility, which is returned to their orchards.

A progressive circular approach, the combination of the almond production, biomass power station functionality, and steam turbine system, requires a stable electrical network. Due to a weak power grid in the area, harmonic distortion was introduced into the power network creating unwanted electrical disturbances.

It was these harmonics that were causing the unexpected failure of motors for Select Harvests. The non-linear load in the power system was impacting power distribution creating a voltage distortion that was leading to increased operational downtime. Following an instance of a motor breakdown, Select Harvests called upon ABB Authorised Value Providers A1 Electric Motors and Remtron, to help find a solution.

Anthony Merrett, Automation Support Engineer for Drives and Power Quality at Remtron said, “the electrical stress caused by harmonics and high starting currents
pollute electrical networks with dirty power that can make connected equipment behave erratically. In severe cases they can cause damage to sensitive electronic equipment, overheating in electrical distribution equipment, interference in communication equipment, and give false readings on measurement devices.”

**Issues discovered during assessment**

A1 Electric Motors and Remtron performed a full power quality analysis onsite which included an investigation of the plant switchroom and current power factor.

It was discovered that Select Harvests were experiencing 6% of harmonic voltage distortion (THDv) in stationary mode, even without any equipment in operation at the point of supply. “The largest producers of harmonics within their system were four large drives running the baghouse motors,” said Chris Cheong, Managing Director at A1 Electric Motors.

Mark Davis, Process Improvement Engineer at Select Harvests expressed his objective to implement total power factor correction. “Ordinarily, we’d have gone for the typical option which is a capacitor-based system with harmonic filters. But after talking to A1 Electric Motors and Remtron, they advised that the higher harmonics in the area would still lead to damage to that equipment over time and wouldn’t have the lifespan that we’d expect out of our equipment.”

Mark adds, “in seeking a solution from alternate providers, the equipment they specified would have been detrimental to capacitors because they didn’t consider power quality and a fully integrated solution.”

The goal became to help Select Harvests increase power efficiency and reduce energy demands overall.

**Implementing a sustainable solution**

ABB’s ACQ580 ultra-low harmonic (ULH) variable speed drive (VSD) was identified to be the best solution for Select Harvests, as part of an overall drive and motor equipment upgrade for the plant. Installed within 48 hours of the existing equipment failure, the instrumental advantage of the ABB value provider network was fully realised. Without the fast turnaround, Select Harvests would have experienced tens of thousands of dollars’ worth of downtime for their processing facility.

ACQ580 ULH drives are engineered to reduce harmonics in the power network. They integrate easily with existing infrastructure, so there was no need for Select Harvests to oversize their electrical system or increase budget for broader investment in additional infrastructure. Also, by using this clean technology, the need for any additional filters or power quality equipment is eliminated. By reducing the non-linear load on the power distribution system, all machines are able to operate efficiently and reliably.

The combination of the ultra-low harmonic technology found in ABB’s ACQ580 drive, along with a motor upgrade performed by A1 Electric Motors, has resulted in a reduction in harmonic distortion and energy demand of 15%* Total harmonic distortion (THDi) is now less than 3%.

Further analysis on the drive revealed that the harmonic distortion of the supply to the baghouse had decreased from 40% THDi to 2% THDi, with a power factor increase from 0.9 to 1.0. This Power Factor of 1 (Unity Power Factor) out of the drive in operation means no extra reactive current is needed to attain the required power output for the baghouse operations.
Mark says, “another additional benefit of the ABB solution was that it didn’t require any infrastructure upgrades or system upgrades to implement. The integration was easy, the footprint was the same, and the cable sizing didn’t need to change.”

Mike Briggs, Head of Motion for ABB Australia, says, “our sustainability focus is at the heart of ABB’s commitment to responsible business practices. ABB’s ability to align with our customer’s aspirations with regards to sustainability goals has assisted Select Harvests in managing and ultimately achieving their lowered emissions targets.”

Select Harvests is now installing additional ABB drives as part of their entire site power quality management upgrade.

*Based on 4320 hours per annum running at 40kVA difference this represents a saving of 172,800 kVAhr per annum.

Learn more about ABB’s ACQ580 ultra-low harmonic variable speed drives.