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# McCain's cuts refrigeration costs with low harmonic ABB drives

One of the UK's leading manufacturers of frozen foods is using ABB low harmonic variable speed drives to cut its site load from 7 MW to 6 MW.

The McCain Food's plant at Whittlesey, Peterborough, is the UK's largest chip factory, producing 30 tonnes of frozen chips an hour.

The company was looking for further ways to reduce its energy consumption and costs at the factory and wanted to replace its old refrigeration facility with modern equipment. The on-site cold store, which operates 24/7, accounted for 60 percent of the site electrical loading. The company also wanted to get better control of the refrigeration plant and reduce the potential impact of harmonics.

Paul Derbyshire, McCain's Electrical, Control and Automation engineer for McCain Central Engineering GB, informs us that the project team looked into using variable-speed drives to control the new plant. "We were looking for the best drive for this application and investigated several solutions from a number of manufacturers," he says. "We found that nothing gave the same performance as ABB active front-end variable-speed drives. With ABB drives, there is no interference on the line and they do not need filters to cut harmonics, as other drives do.

"Although we had no known issue with harmonics on site before the project, one of our main motivators was not to generate any harmonics from the installation of such large drives. The competitors' drives at the time all used large filters to deal with the harmonics generated by their drives."

In a conventional frequency converter, with a six-pulse diode bridge as a rectifier, the network side current is not sinusoidal and has significant harmonic content, especially fifth and seventh harmonics. Typical current distortion can range from 30 to 50 percent in total. In an ABB low harmonic drive, the use of the motor control platform, direct torque control (DTC), together with a low pass filter, suppresses the current harmonic content, giving a distortion of less than 5 percent. The resulting clean sinusoidal current will therefore cause little or no distortion on the network voltage waveform.

Benefits include direct connection to the network, with no complex multi-winding transformer required and no need for external filter equipment. The drives exceed the requirements of EN 61000-3-12 and IEE519 and offer genuine unity power factor with no compensation needed.

The new refrigeration plant cut the number of compressors from 20 to seven. To run the compressors, ABB installed seven variable-speed drives, with ratings ranging from 350 to 650 kW.

Overall, the new refrigeration plant using ABB drives cut the site loading by around 1 MW. "They also give us the ability to over speed the motor to get more refrigeration capacity, which we cannot do with traditionally controlled refrigeration plant," says Derbyshire. "ABB drives are also very reliable compared to others – they are good workhorses. We considered them the best large drives on the market at the time," he adds.

Since the drives were installed at the plant, ABB drives have also been installed at many other McCain Food's plants globally and the company is looking for other applications where ABB drives could bring benefits. "We keep in close contact with ABB and have frequent product awareness sessions with them, bringing benefits to both companies," adds Derbyshire.

ABB (ABBN: SIX Swiss Ex) is a pioneering technology leader in power grids, electrification products, industrial automation and robotics and motion, serving customers in utilities, industry and transport & infrastructure globally. Continuing a history of innovation spanning more than 130 years, ABB today is writing the future of industrial digitalization with two clear value propositions: bringing electricity from any power plant to any plug and automating industries from natural resources to finished products. As title partner in ABB Formula E, the fully electric international FIA motorsport class, ABB is pushing the boundaries of e-mobility to contribute to a sustainable future. ABB operates in more than 100 countries with about 147,000 employees. [www.abb.com](http://www.abb.com)



**Caption:** McCain is using ABB low harmonic variable speed drives to cut its refrigeration costs.

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