

DON'T LET A FOCUS ON CAPITAL EXPENDITURE COST YOU IN THE LONG TERM

Regina Leite, Head of Product Marketing, IEC Low Voltage Motors at ABB Motion, explains how making the right investment in motor-driven systems can offer significant lifetime savings.

Faced with volatile energy prices and increasing pressure to cut emissions, decision-makers across every industry must contend with the same challenge: energy costs represent a major element of their operating expenses (OpEx). So how can they reduce it while maintaining high product or service quality and throughput?

Focusing on the energy efficiency of motor-driven applications is a natural place to start. This is because electric motors are an essential component of processes in almost every industry. Estimates suggest that industrial motors use approximately 45% of the world's power, much of it from non-renewable sources and much of it lost to waste. Many older motors are extremely inefficient. And even motors installed in the past five years may not offer the highest levels of energy efficiency.

However, the energy efficiency of low voltage motors has increased dramatically in recent years due to technological advances and pressure from regulators.

The exact savings depend on the specific application, but as an example, ABB's IE5 Synchronous reluctance motors (SynRM) offer up to 40% lower energy losses compared to IE3 motors. Furthermore, they significantly reduce energy consumption and CO₂ emissions compared to commonly used IE3 induction motors.

The technology used in SynRM motors delivers up to 30°C lower winding temperatures and up to 15°C lower bearing temperatures which contribute to the lower energy losses. But this also increases reliability and extends the motor's lifetime while reducing the need for maintenance,

which has the added benefit of reducing the total cost of ownership (TCO) of a system.

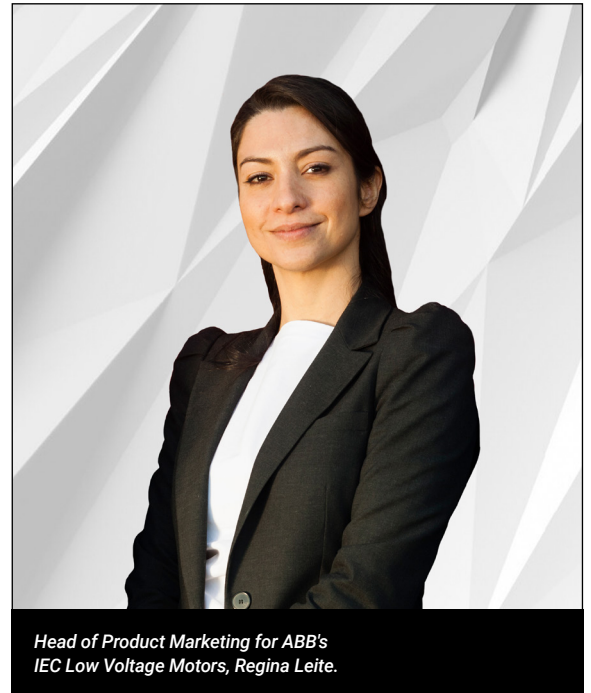
TAKING A SYSTEMS APPROACH

Whereas industrial motors traditionally operate at full speed even when the load requirements are minimal – wastefully using a throttle valve to control the flow of water, for example – a variable speed drive (VSD) adjusts the speed and torque of the motor to match the precise requirements of the process. Because the relationship between motor speed and energy consumption is non-linear, even a 20% reduction in speed can result in energy savings of up to 25% or more.

With a moderate investment to update electric motor technology to a VSD and IE5 motor package, the return on investment (ROI) can be achieved within as little as one year. Further, due to its reliability, the system will continue generating savings for a decade or more, and reduced downtime and ease of maintenance also contribute to significant savings.

For most facilities, energy is by far the greatest OpEx, and the majority of it is used by motors to drive fans, pumps, compressors, conveyors, and other machinery. Cutting energy use, therefore, is a direct route to reducing OpEx. With VSDs reducing energy consumption, a facility would see corresponding cuts to its energy bill and a significantly lower TCO.

This was the case for the Bocholt sewage treatment plant in North Rhine-Westphalia, Germany. The facility invested in four SynRM motor



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and VSD packages for its second sludge pumping station. Combined with modifications to the impeller geometry, and the use of the VSDs to adjust the power applied in response

to hydraulic load, the plant has cut energy consumption – a significant ongoing expense – by 40%.

Ultimately, stakeholders face a classic CapEx-OpEx trade-off: a short-term increase in CapEx to

invest in higher-quality, more efficient solutions that yield significant long-term OpEx savings and a far lower TCO.

In addition, by failing to take advantage of more efficient technologies, facilities that do not upgrade are not only wasting money, but they are also failing in their obligation to tackle climate change. ✖

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