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Power protection sewn up for Vietnam's leading polyester fiber manufacturer



Vietnam is regularly cited as the fastest-growing of the world's emerging economies, growing at over 6 percent since January this year and expected to reach its impressive GDP growth target of 6.2 percent by the end of 2015. Fueled by foreign domestic investment and an easing of corporate regulations, Vietnam positions its manufacturing sector as a low-cost alternative to China [1].

Clothing is big business

Apparel production and its associated industries are a key contributor to Vietnam's success and will account for 60 percent of the country's export market by 2030, according to Nguyen Van Tuan, Chairman of the Vietnam Cotton and Spinning Association. Since January this year, garment exports have earned the country 12.2 billion USD, up 10.3 percent year-on-year [2].

Petrovietnam Petrochemical and Textile Fiber Joint Stock Company (PVTEX) was the first polyester fiber manufacturing plant to be built in Vietnam. The plant in Hai Phong City in Northern Vietnam produces polyester staple fiber (PSF) from raw materials at the rate of 500 tons each day, meeting 40 percent of the local demand. The plant employs around 1000 people and represents a 324 million USD investment for the company.

The cost of poor power quality

Vietnam's electricity supply is generally stable, but rising demand and recurrent drops in voltage

in the form of short-term sags and longer-term brownouts put strain on industry[3] which can result in the loss of products and damage to manufacturing equipment. PVTEX experiences up to 35 power quality events each year. Each sag causes the booster and spinning pump lines to stop suddenly resulting in a loss of production worth up to \$8,000. In one year alone, the factory lost more than \$200,000 due to power quality events.

Mr. Pham Khac Toan, Manager of PVTEX's Production department, says these power quality events cause major disruption to the plant, "With 30 – 35 events each year, the PVTEX factory needed a solution to protect the critical loads in the PSF production workshop. If these critical load fail in operation due to sag events, the whole of PVTEX's production will shut down."

An unconventional approach PVTEX approached ABB through its local partner, and two competitors to tender proposals to protect the power supply to the booster and spinning pump lines. They were presented with two options based on different technologies to resolve the sag issue: conventional UPS (uninterruptible power supply) technology that relies on energy storage systems such as batteries or capacitors, and voltage conditioning systems which use power from the utility to supply continuous and steady voltage to the load.

The UPS system was discounted due to the high operational expense of battery replacement and maintenance, despite the lower initial capital expense. ABB's PCS100 AVC-40 Active Voltage Conditioner was chosen over the competitor model due to the over 30 percent lower total cost of ownership and an expected return on investment in the shortest possible time.

Khac Toan continues, "We chose ABB's active voltage conditioner solution as it suits the technical requirements of our factory and our need for a continuous, clean voltage supply. It's

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01 The spinning lines at the PVTEX factory are a critical load. If this line fails due to voltage sags, the whole production facility shuts down.

also a very sound investment, commercially. The initial investment cost and total cost of ownership are much more reasonable than those associated with a UPS solution.”

Benefits of the system

The PCS100 AVC-40, designed for sag correction in large commercial and industrial applications, is the first of its kind to be installed in a manufacturing facility in Vietnam. Voltage sags are the most common cause of equipment malfunction in automated industry the world over, and the PCS100 AVC-40, built on a proven and dependable converter platform, provides instant voltage sag and surge correction ensuring maximum productivity. As the system has a small footprint and a modular design, it can be easily fitted into equipment rooms or confined spaces, eliminating the need to design and build added floor space.

The PCS100 AVC-40 has a faster return on investment due to low operation costs thanks to its leading efficiency of over 98 percent, and minimal heat rejection ensures minimal costs for electricity and cooling. The PCS100 AVC-40 requires no batteries, as it draws the additional energy required to make up the correction voltage from the utility supply. With no ongoing maintenance costs typically associated with batteries, the cost of ownership for a PCS100 AVC-40 system is very low.

The acid test

PVTEX’s new power protection equipment was able to prove its worth just one week after installation. Khac Toan explains, “In late July, a deep voltage sag occurred on our PSF production lines. Our critical loads were all protected and production continued as normal. The utility voltage sagged to 61 percent of the nominal supply. The PCS100 AVC-40 was able to inject voltage to bring the input back up to 99 percent of the nominal supply, which is well within our equipment’s operational range. Without the PCS100 AVC-40’s protection, production would have shut down and we would have experienced significant losses.”

ABB supplied two 300 kVA and two 150 kVA PCS100 AVC-40 units, operating on a 50 Hz grid at a voltage of 400 VAC, to stabilize the input voltage on two booster pumps and a spinning pump filament. ABB’s partner in Vietnam supported the installation and commissioning of



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the units in a low voltage room at the PVTEX factory and ABB provided in-depth training for factory staff in the effective use of the equipment.

PVTEX expects the PCS100 AVC-40 to feed a stable power source to the critical load that could help them recoup their investment within the first year of ownership. Khac Toan agrees, “PVTEX expects to see an increase in production by improving the yield rate by 0.15 percent per year. Based on the performance of the equipment, we shall certainly consider investing in further PCS100 AVC-40 systems for other critical loads in the PVTEX factory in future.”

References

- [1] **Yahoo News** (2015, 26 June) Vietnam economy grows by 6.28% in first half of 2015 [online]. Available from <http://news.yahoo.com/vietnam-economy-grows-6-28-first-half-2015-114610880-finance.html> [accessed 29.06.15]
- [2] **Vietnam News** (2015, 27 June) Asia to produce over 60% of world’s apparel [online] available from <http://vietnamnews.vn/economy/272286/asia-to-produce-over-60-of-worlds-apparel.html> [accessed 29.06.15]
- [3] **The Economist** (2013, 31 August) A Heavy Load [online]. Available from <http://www.economist.com/news/asia/21584374-vietnams-power-grid-under-strain-all-kinds-fuses-may-blow-heavy-load> [accessed 29.06.15]

To find out more about ABB’s power protection solutions:

Web: www.abb.com/ups

Email: powerconditioning@abb.com

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ABB LTD.
Power Protection NZ
111 Main North Road
4110 Napier,
New Zealand

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