



Swire Cold Storage

There is a growing demand in Australia for a 'greener' approach towards energy consumption to meet concerns about the impact on the environment and from businesses looking to find ways of reducing their costs through a more efficient use of the power they buy.

THE SITE

Over the last fifty years Swire Cold Storage (SCS) has been involved in every aspect of the Cold Chain. The Victorian facility located in the Laverton industrial district, a variety of frozen foods including vegetables and seafood.

THE CHALLENGE

Swire is committed to the improvement of energy efficiency across all sites in all states and is addressing the business challenge of the rising cost of electricity to its operating costs. Swire continue to invest in sensible solutions that benefit both environment and financially. The issue facing Swire was how to squeeze more efficiency and cost savings from this already very high energy efficient site at Laverton. When the site was built, Swire invested in many high efficiency products at the site and it is recognised as one of the most energy efficient facilities owned by Swire. The energy efficiency initiatives already installed at the site included SCADA - Energy Management System with maximum demand control on the refrigeration plant, Variable Speed Drives (VSD's) on Condenser & Evaporator fan motors, Air Defrost Systems on Evaporator Penthouse units and also in technology to minimise air/heat infiltration to refrigerated areas with air locks and rapid rolldoors.





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The Solution

In Australia, where there is a particular problem with over-voltage, Voltage Optimisation as an energy efficiency measure is emerging as a popular solution. The statutory electricity supply range for Australia is 230V +10% to -6% which means that electricity suppliers are required to provide a voltage level that is between 253V and 216V. Therefore, the supplier will distribute electricity at 253V and the voltage will decrease over distance. Given that most electrical equipment manufactured for Australia is designed to work most efficiently at 220V to 230V energy consumption will increase if the voltage is supplied at a higher level.

One of the reasons why voltage optimisation is so effective is that the Australian average voltage supplied from the Grid is approximately 242V. Voltage optimisation works best on inductive loads– motors and lighting for example – and significant savings can be achieved on motors in particular, especially if these are not loaded at 100% of their capacity for 100% of the time.

The Powerstar voltage optimisation unit is a highly efficient triple wound transformer that is designed to correct the over-voltage by bringing it in line with the actual needs of the equipment on site. The system effectively reduces the voltage to an optimum level whereby all the equipment operates correctly but consumes less power in the process. In addition the Powerstar unit also offers improvement in power quality by cancelling damaging harmonics and reducing the reactive power, hence improving power factor.

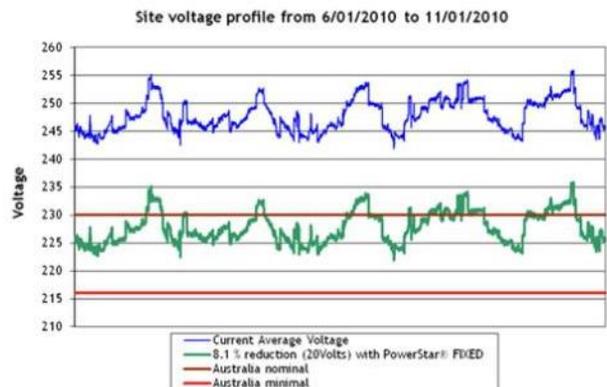
A full site survey was first performed to determine the exact electrical loading characteristics of the site equipment. Voltage measurements were taken capturing maximum, minimum and average values every 2 minutes for a period of one week. Voltages recorded were Maximum: 257V Minimum: 242V Average 248V

As a result of the findings Powerstar proposed the installation of a 1000kVA Powerstar unit matching the site demand with a significant expansion capability. The proposal was to install the Powerstar unit with a typical 20V reduction (8.1%), maintaining constant average voltage at 223 volts and included a guaranteed savings of 8.5% of the total site kWh.

The installation

Powerstar installed the voltage optimisation unit at the incoming supply to the site and was able to optimise the existing main circuit breaker for protection of the unit.

All the preparation work was performed with no interruption to the site with the final connections made during shutdown of the plant over a period of a few hours on a Sunday whilst the plant was not operating.





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The Results and Business Benefits

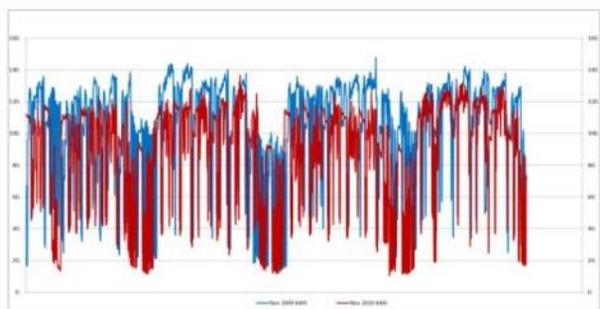
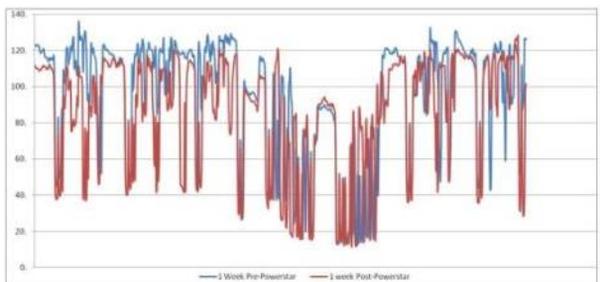
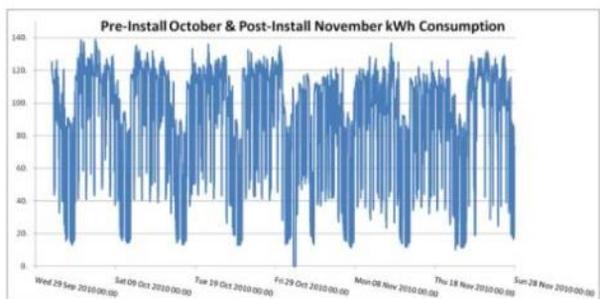
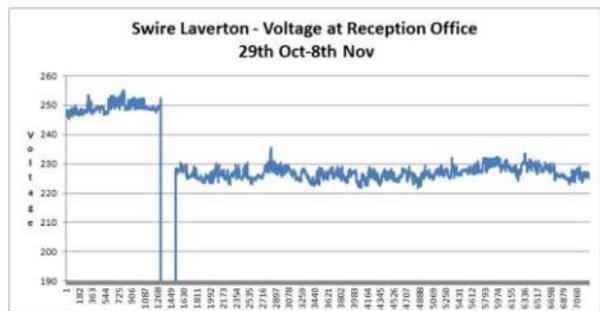
Installation of the Powerstar system has led to a reduction in voltage level to the site, from an average of 248V down to 223V.

Verification of data is critical in the quality of results and this is verified by Swire's Half Hour Data from the existing metering.

It is normal to adjust the data with daily temperature to get a true comparison.

The weather at Laverton warmed up during the week after installation however the data shown is pure data and not normalised in this case.

This graph shows a 13% saving of electricity consumption over the month pre and post install and an average saving of 30,000 kWh electricity per month,



One week pre & post install

The savings made by comparison of 1 week pre and post Powerstar install exclusive of temperature normalisation are 13.2%.

Pre- Nov 2009 & Post Nov 2010

The savings made by comparison of Nov 2009 & Nov 2010 consumption exclusive of temperature normalisation are 13.8%.



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Conclusion

No changes were needed on any site equipment before or after the Powerstar installation.

After over one month of operation the savings are higher than expected from pre-project analysis. Swire are now investigating further 'roll out' of Powerstar power conditioners at other Swire facilities where further benefits can be achieved in energy, CO₂-e reductions and environmental sustainability

Based on like-for-like usage, results show that monetary savings for Swire is in the region 13% to 14% per annum and a reduction in CO₂-e of 490 tonnes.



CUSTOMER QUOTATION

“Now that the voltage level has been specifically adapted to accommodate the exact needs of the Swire Laverton site, the potential for the electrical equipment to fail has also been drastically reduced, thus reducing maintenance costs on major electrical components.”



Sam Czyczelis
General Manager, Engineering
Services