

Case study 8: timing peak energy use

Stanthorpe, QLD

The 'Watts in Your Business' project has completed energy audits of 30 packhouses and orchards Australia-wide. This case story of P. Savio & Co. Pack House and Cold Storage shows where energy use and costs could be reduced.

The P. Savio & Co. Pack House and Cold Storage (Savio's) facility in Pozieres, Queensland, produces and packs approximately 4,000 tonnes of apples per annum. It is a large facility with 14 cold storage rooms controlled by a refrigeration system that utilises 3 large ammonia compressors ranging from 22kW to 37kW in size.

From May 2013 to February 2014 the pack house consumed just over 435,000 kWh of electricity at a cost of almost \$95,000 (excluding GST). There were significant opportunities to reduce electricity costs at Savio's facilities through demand management.

Avoiding demand charges

Demand is the rate at which electricity is consumed from the supply grid. When the demand for electricity approaches network capacity, network operators must act to maintain a reliable supply of electricity to customers. To discourage customers from drawing large demands of electricity from the grid and potentially impacting network supply, a demand charge may be implemented. Customers can minimise their demand charges by:

- Shifting electricity demand to a time when the overall site demand is low.
- Installing energy efficient equipment.
- Using alternative energy sources (eg. solar).
- Installing Power Factor Correction.

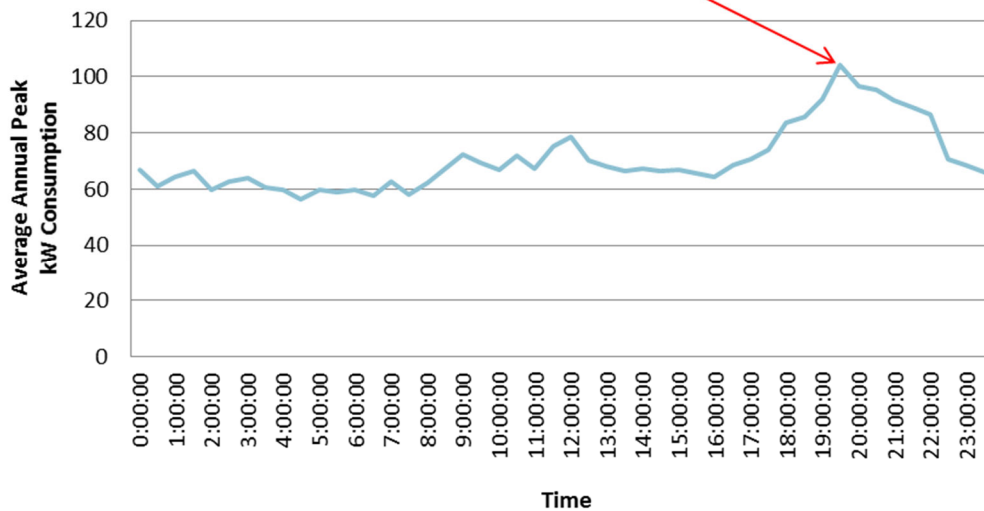
The demand charge for the Savio's main pack house and cold storage facility accounts for 40% of their total electricity costs. This is exceptionally high when compared to other similar businesses.

Site savings opportunities:

- Save \$5,500 every year including \$2,500 in electricity costs plus \$3,000 in demand charges.
- Achieved by daily shut-down of refrigeration equipment between 6.00pm and 11.00pm to coincide with grader use.

Because the Savio packhouse is used at night significant energy savings could be made through changing the business's energy demand.





Electricity demand at Savio's showing the peak time when refrigeration equipment could be shut down.

Best option to save energy

The Savio packhouse operates primarily in the evening. From May to October 2013, all peak demand events at the orchard were between 6pm and 11pm, which corresponds with the operations of the grading equipment. The Savio business could install timers on their refrigeration equipment to shut it down during this high demand period. The refrigeration system could then be restarted at 11pm after grading has been completed for the day. This would reduce the site's demand charges and provide additional electricity and cost savings as a result of the reduced use of the refrigeration system.

The peak picking (and therefore refrigeration) season is February to April each year. This period was excluded from the demand reduction opportunity because maximum capacity of refrigeration is essential to remove 'field heat' from the fruit. This opportunity works well for sites whose demand charge is per kW (not kVA). If a site's demand charge is per kVA then Power Factor Correction is a good option in addition to demand reduction strategies.

Implementation requirements

Prior to fully implementing this opportunity the orchard managers should ensure that the fruit quality will not be compromised by the timed shut-down of the refrigeration system. This could be implemented after the 'field heat' has been extracted from the fruit and the fruit's core temperature has stabilised at the desired temperature.

Results from temperature loggers should be recorded in each of the cold storage rooms to ensure the core fruit temperature does not fluctuate outside desired levels. In addition, product evaluation should occur after a trial period to ensure that quality is not affected.

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