

Energy Savers Plus Program

targets significant energy savings for a

North Queensland fresh food distribution business

IMPLEMENTED SOLUTION 

Actual energy savings

30%*

Key facts

Industry

Produce wholesaler

Product

Fresh produce, meat, small and dry goods

Location

Cairns

Chiller system

High efficiency chillers with variable capacity screw compressors

Solution

Implemented:

Efficient chillers, variable speed drives, efficient pumps, smart controls

The Energy Savers Plus Program is funded by the Queensland Department of Energy and Water Supply



Business profile

Total Food Network (TFN) supplies a wide range of fresh produce, meat, small and dry goods to the retail and resource sectors via distribution centres in Cairns, Brisbane, Port Moresby and Lae. Temperature controlled warehousing plays a major role in the TFN supply chain and ensures that produce is stored in optimal condition.

The Cairns TFN distribution centre is located in a temperature controlled warehouse that is currently owned by Metcash Limited. In 2010, a new water cooled refrigeration plant was installed, although over the past five years the system had begun to struggle to maintain the ideal temperature and operate to the expected standards of reliability and energy efficiency.

In 2014, TFN in association with Metcash Limited began investigating an upgrade of the site-wide refrigeration system. Jackson & Jackson Refrigeration Pty Ltd (J&J) was engaged to design and construct a new primary cooling system to meet the key criteria detailed below. McClintock Engineer Group (MEG) was sub-contracted by J&J to provide technical support and design assistance throughout the process.

Scope of design

The following design criteria were agreed for the new primary cooling system:

- **Energy efficiency:** aimed at reducing TFN's electricity expenditure, allowing them to remain competitive in the market place.
- **Performance:** to stabilise temperature control to ensure produce remained fresh.
- **Reliability and redundancy:** to ensure TFN was confident using the entire facility with no concerns about system failure, therefore ensuring a reliable operation.

Solutions

The following design solutions were identified:

Energy efficiency

- Installation of high efficiency water cooled chillers that incorporated variable capacity screw compressors (existing cooling tower retained). The previous system included fixed speed scroll compressors with larger capacity steps at 25%.
- Installation of single, high efficiency primary and condenser water pumps. The previous system utilised a total of 16 small pool style water pumps.



Photo courtesy TFN

- Inclusion of variable speed drives (VSDs) on the primary/condenser water pumps and cooling tower fan to stop motors unnecessarily operating at high speed resulting in unnecessary energy consumption.
- New controls with after-hours setback to provide flexibility in regards to temperature set points throughout the warehouse. Ante and processing rooms could be maintained at warmer temperatures outside of operating hours resulting in reduced energy consumption.

Performance

- The use of variable capacity compressors would allow the chillers to gradually increase and decrease their capacity to maintain close temperature controls within the warehouse.
- The new chilled water design was selected to ensure adequate water flow was supplied to each chilled water coil in the field.

Reliability and redundancy

- Two chillers were selected, each with the capacity to maintain the entire

site's cooling requirements for 95% of the year.

- The system was designed to incorporate the medium and high temperature racks as a single system. The two new chillers and existing racks were connected in series with the chilled water initially supplied to the medium temperature rack before transferring to the high temperature rack and finally back to the chillers. Having the system connected in series delivered a cost effective approach while maintaining redundancy to each rack with only two chillers.



Energy savings

Clever planning provides an optimal solution



Efficient chillers

Installed high efficiency chillers with variable capacity screw compressors



Variable speed drives

Installed VSDs on all pumps and cooling tower fan motor



Efficient pumps

Installed premium efficiency pumps on condenser and chilled water circuits



Smart controls

Installed new controls enabling temperature set back to different zones after hours



Creative thinking

Developed creative systems to integrate 'the old, with the new'

By making the decision to implement new energy efficient systems and upgrade outdated equipment TFN will see the financial benefits for years to come!

TFN cut their electricity usage by approximately

30%*

*Energy savings shown are from an independent auditor's measurement and verification report conducted in 2015.

Business feedback

Management feedback is that the initiatives have significantly added to more efficient warehouse operations.



Case studies

To see how other businesses are saving energy and costs, go to www.qff.org.au/energysavers