Irrigators Energy Savers Program

targets significant energy savings for a

Queensland horticulture farm

IMPLEMENTED SOLUTION

Actual energy savings 54%

Key facts

Farm / Industry

Horticulture

Product

Citrus

Location

Mundubbera

Irrigation

Drip and micro irrigation

Pumps

Submersible

Solution

Implemented:
Installed variable speed controls and a solar photovoltaic system, and upgraded lighting

The Irrigators Energy Savers Program is funded by the Queensland Department of Agriculture and Fisheries

QFF

ERGON ENERGY NETWORK

Queensland Government

Farm profile

The farm is a 100 hectare citrus producer located in the Mundubbera area with water sourced for irrigation from the underground aquifer.

Citrus trees are irrigated using sprinklers beside each tree and the areas are divided into zones with water supply controlled by an irrigation management system which can be adjusted according to the season and weather conditions.

Electricity consumption on-site is driven mainly by the irrigation pumping, packaging operations as well as refrigeration cold rooms, which are used during April to October.

Current irrigation

The irrigation system comprises:

- Two 45kW bore pumps that supply water to the irrigation system and are located 66 metres below ground level.
- A third smaller bore pump of 5.5kW is used to supply water to the packing shed and is controlled by a variable speed drive (VSD).

Action

An energy audit of the site evaluated:

- installation of variable speed controls
- installation of a solar photovoltaic (PV) system.

Results

Of the energy-saving opportunities evaluated, two initiatives were identified that the owner has since implemented, along with other measures to realise energy savings of greater than 50% and a payback period of 4.8 years (approx.).

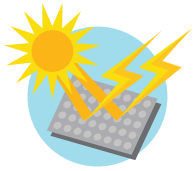
The energy audit included recommendations to install VSDs on the two 45kW irrigation pumps, which were run with the discharge throttled to provide the correct pressure to the irrigation sprinklers. Therefore, there was an opportunity to reduce energy use by slowing down the pumps using VSDs as an alternative to throttling. The farm in fact replaced the two 45kW pumps to 37kW pumps further adding to savings when combined with the VSDs.

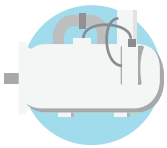
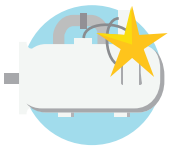
Another initiative recommended was to install a 30kW solar PV system on the packing shed to offset a large amount of the site's energy usage during the day and to review the tariff pricing structure for the pump electricity accounts to realise savings of over $1,900 per annum.

The owner subsequently implemented the VSDs on the two bore pumps and replaced high bay lighting and fluorescent tubes in the packing shed with new energy efficient LEDs. The owner also installed an 82.8kW solar PV system on the packing shed reducing the number of points of supply to maximise the benefit received from electricity generated.

Energy savings

A summary of the energy savings achieved is as follows:

Solution	 Install variable speed drives	 Lighting upgrade	 Solar PV system
Est. energy savings (kWh/annum)	170,528		
Est. operating cost saving	$41,503		
Est. cost to implement	$200,000		
Payback period (years)	4.8		
Est. demand reduction (kW)	90		
Est. energy savings	54%		

Forecast savings in site operating costs	 Existing system	 Upgraded system	 Reduction in operating costs
Annual operating cost	$69,016	$27,513	-
Cost to implement	-	$200,000	-
Operating costs for first 3 years	$345,080	$337,565	$7,515
Annual pump operating cost for years 4 to 10	$69,016	$27,513	$41,503
Total pumping costs for 10 years	$690,160	$475,130	$215,030

Farmer feedback

Implementation of energy-saving initiatives has resulted in energy consumption avoidance of over 170MWh between the baseline season of October 2013-June 2014 and the reporting season of October 2014-June 2015. This equates to energy savings of 82kWh per tonne of fruit production.

The farmer indicated it was helpful to have the information needed to make informed decisions. *"Once I had all the information we went ahead with implementing the recommendations. Before installing our variable speed drives, we had to irrigate all three blocks to get rid of the pressure. Now we can just do one or two as required."*

Case studies

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