Irrigators Energy Savers Program

targets significant energy savings for a

Queensland nursery

PROPOSed SOLutIOn

Potential energy savings 15%

Key facts

Farm / Industry

Nursery

Product

Nursery plants

Location

Gatton

Irrigation

Drip and micro irrigation

Pumps

Centrifugal

Solution

Proposed:
Variable speed drives

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

Farm profile

The nursery, near Gatton, has 17 hectares dedicated to intensive plant production and specialises in seedlings, natives and shrubs, providing plants in pots, hanging baskets and punnets.

Irrigation is automatically controlled accordingly to the various stages of growth in different areas of the site. In addition to the irrigation system, the nursery also uses compressors, robotic transplanters, denesting lines, tray fillers, a potting machine and a soil blender in its operations.

Current irrigation

The irrigation system comprises:

- Five bore pumps that feed large storage tanks to supply water to site.
- Several pumping stations that deliver water from the tanks to the irrigation system. One of these stations was assessed. The pumping station consists of two 7kW fixed speed pumps, used in a duty/standby arrangement, that deliver base-load water supply. In this study, these pumps were fixed speed but other pumping stations have already been upgraded to variable speed control.
- Each pumping station also includes a third pump of 5.5kW that tops up the pressure in the system and this pump is controlled by a variable speed drive with a pressure transmitter on the pump discharge.
- Overhead sprinklers and misting sprays that are automatically controlled by solenoid valves and maintained at a constant pressure of 310kPa.

Action

An energy audit for each pump installation evaluated:

- installation of variable speed controls
- replacement with more energy efficient drive units.

Results

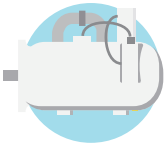
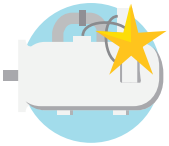
Of the energy-saving opportunities evaluated, one initiative was identified for implementation of variable speed drives on the two fixed speed pumps with energy savings of 15% and a payback period of 11 years (approx).

The other pump systems were considered to be operating efficiently and did not require upgrades.

Recommendations

the energy audit recommendations are summarised below:

Solution	 Install variable speed drives on selected pumps
Est. energy savings (kWh/annum)	1,515
Est. operating cost saving	$364
Est. cost to implement	$4,000
Payback period (years)	11
Est. demand reduction (kW)	2.2
Est. energy savings	15%

Forecast savings in pump operating costs	 existing system*	 upgraded system**	 Reduction in operating costs
Annual pump operating cost	$53,455	$53,091	–
Cost to implement	–	$4,000	–
Operating costs for first 12 years	$641,460	$641,092	$36
Annual pump operating cost for years 13 to 20	$53,455	$53,091	8
total pumping costs for 20 years	$1,069,100	$1,065,820	$36 $3,280 4

* Denotes whole farm
** Whole farm operating costs after adopting audit recommendations

Farmer feedback

The nursery is trialling new water-efficient sprinklers which will significantly reduce water consumption. A decision to upgrade the fixed speed pumps with possibly smaller motors will depend on the outcome of the trial. The owner may find that pumping requirements can be managed by the remaining pumps as a result of water savings achieved.

This case study was originally developed during 2016-17 as part of the Queensland Government funded Irrigators Energy Savers Program, delivered by the Queensland Farmers' Federation.