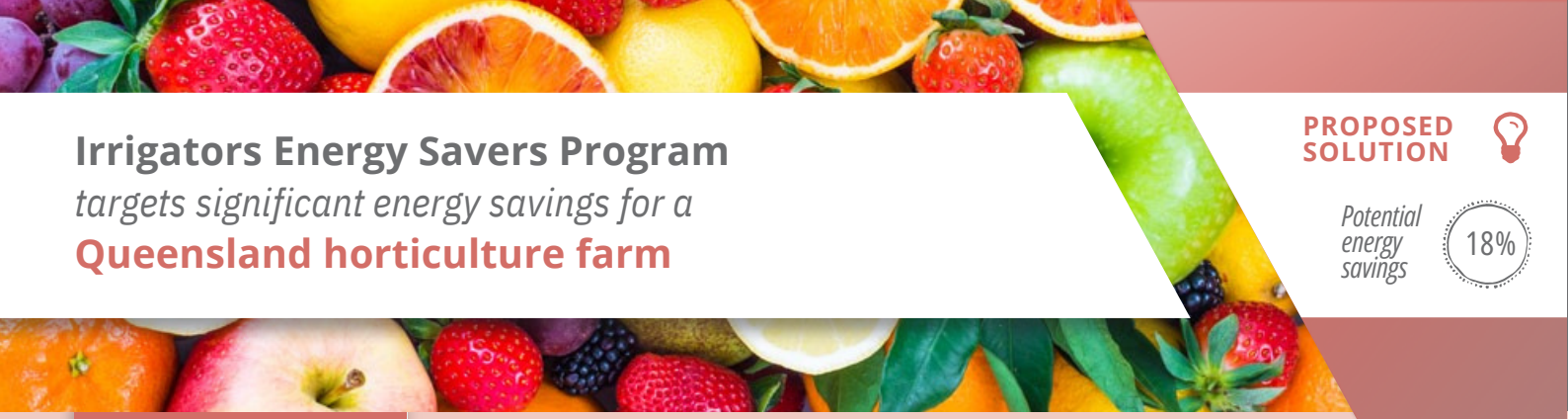


Irrigators Energy Savers Program

targets significant energy savings for a

Queensland horticulture farm

PROPOSED SOLUTION

Potential energy savings 18%

Key facts

Farm / Industry

Horticulture

Product

Apples

Location

Stanthorpe

Irrigation

Drip and micro irrigation

Pumps

Centrifugal

Solution

Proposed:
Variable speed drive

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

Farm profile

The farm, located in Stanthorpe, irrigates approximately 160 hectares of apple trees using a dripper system located adjacent to each tree.

Irrigation varies throughout the year depending on the season and weather conditions. The farm is divided into several zones, each with its own irrigation system consisting of a dedicated pump and water storage dam.

Electricity consumption is mainly for irrigation and refrigeration requirements.

Current irrigation

The irrigation system comprises:

- Six water storage dams that each provide the supply for one irrigation zone.
- Five zones are fed by centrifugal electric pumps of varying sizes between 15kW and 20kW that supply water to the dripper systems at 3 litres per hour per tree at 550kPa at the discharge end.
- The sixth zone is supplied by a diesel pump and was not assessed.

Action

An energy audit for each pump installation evaluated:

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

Results

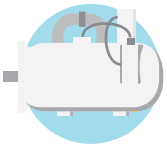
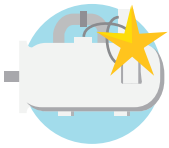
Of the energy-saving opportunities evaluated, one initiative was identified for the dripper irrigation pump system with savings of 18% and a payback period of 4.2 years (approx).

Installation of variable speed drives on each of the pumps is recommended as pressure reduction can be achieved while still delivering the required flow rate. For example, the pumps currently operate at 550kPa, whereas testing confirmed that a reduction to 450kPa still delivers the required flow rate. This pressure reduction can be achieved by using variable speed drives.

Recommendations

The energy audit recommendations are summarised below:

Solution	 Install variable speed drive on selected pumps
Est. energy savings (kWh/annum)	20,367
Est. operating cost saving	$5,706
Est. cost to implement	$24,000
Payback period (years)	4.2
Est. demand reduction (kW)	20
Est. energy savings	18%

Forecast savings in pump operating costs	 Existing system	 Upgraded system	 Reduction in operating costs
Annual pump operating cost	$32,099	$26,394	-
Cost to implement	-	$24,000	-
Operating costs for first 5 years	$160,495	$155,970	$4,525
Annual pump operating cost for years 6 to 10	$32,099	$26,394	$5,705
Total pumping costs for 10 years	$320,990	$287,940	$33,050

Farmer feedback

The farm owner indicated support for the audit report findings and planned to source quotes for the installation of variable speed drives.

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