Irrigators Energy Savers Program

targets significant energy savings for a

Central Queensland horticulture farm

PROPOSED SOLUTION

Potential energy savings 39%

Key facts

Farm / Industry

Horticulture (greenhouse)

Product

Cucumbers

Location

Bundaberg

Irrigation

Drip and micro irrigation

Pumps

Centrifugal

Solution

Proposed:
Variable speed drive and solar photovoltaic installation

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 in Bundaberg grows continental cucumbers in three greenhouses covering 1.3 hectares. The site is divided into a number of zones with the operation of the irrigation system dependent on the age of the plants, the season and weather conditions.

Cucumbers are packed and stored in cold rooms at the farm before distribution. The packaging and cold room are within the existing farm shed along with a small workshop.

Current irrigation

The irrigation system comprises:

- Drippers that use pressure compensators to maintain drip rate at 3 litres/hr and timers to control flow using solenoid valves from a central irrigation management system. The required flow rate for each zone varies from 8,000 litres/hr to 12,000 litres/hr.
- Two 27kL water tanks that are filled by a 1.5kW bore pump. From the water storage tanks, two irrigation pumps (2.4kW and 3.8kW) installed in series, pump the water to the drippers via a disc filtration system. Flow rates to the various zones are manually controlled by throttling.
- An injector pump connected to a venturi system that injects fertiliser into the system as required.

Action

An energy audit for each pump installation evaluated:

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

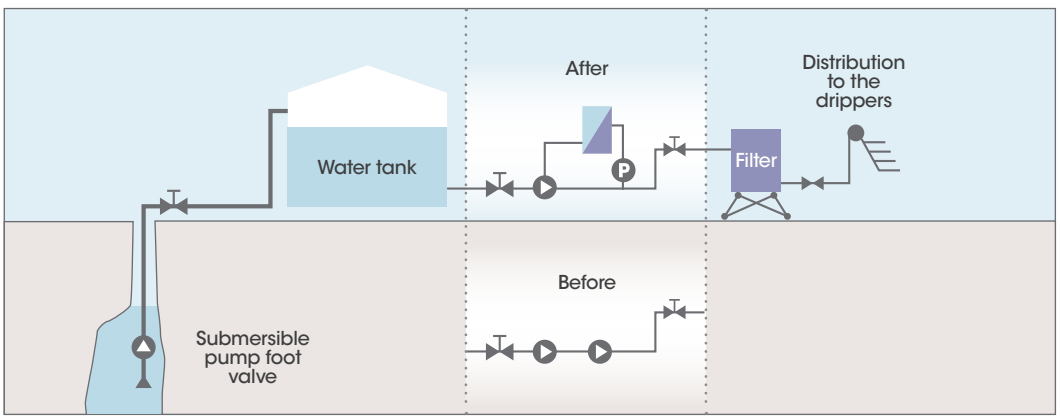
Results

Of the energy-saving opportunities evaluated, one initiative was identified for the trickle irrigation pump system with savings of at least 34% and a payback period of 6 years (approx).

The other pump systems were considered to be operating efficiently, and viable upgrade options would depend on future maintenance or replacement. Increases in running hours and total consumption from crop diversification and expansion also may improve the calculated return on investment to the target range of 4 years.

Implementation of a 5kW solar photovoltaic system to offset some power consumption and costs could result in potential savings of 39% over a payback period of 7.1 years.

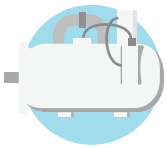
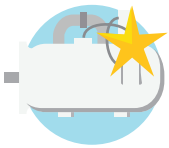
Irrigation pump system before and after



Recommendations

The energy audit recommendations are summarised below:

Solution	 Replace the existing two pumps in series with one pump connected to a variable speed drive (VSD)	 Connect the VSD to pressure transmitters	 Install 5kW photovoltaic (PV) system to non irrigation account
Est. energy savings (kWh/annum)	4,435		5,671
Est. operating cost saving	$1,446		$1,636
Est. cost to implement	$10,000		$10,500
Payback period (years)	6.3		7.1
Est. demand reduction (kW)	1.8		5
Est. energy savings	38%		39%
Other benefits	✔ Reduced irrigation time ✔ Time saving through automatic operation		✔ Offset farm electricity costs

Forecast savings in pump operating costs (excludes PV system)	 Existing system	 Upgraded system	 Reduction in operating costs
Annual pump operating cost	$4,195	$2,749	-
Cost to implement	-	$10,000	-
Operating cost for first 7 years	$29,365	$29,243	$122
Annual pump operating cost for years 8-10	$4,195	$2,749	$1446
Total pumping costs for 10 years	$41,950	$34,741	$7,209

Farmer feedback

Recent feedback from the farm owner indicates that, following planned farm crop diversification, the payback periods will be recalculated to reflect updated running hours with a view to implementing the energy conservation measures.

Case studies

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