Irrigators Energy Savers Program

targets significant energy savings for a

Central Queensland sugar cane farm

PROPOSED SOLUTION

Potential energy savings 16%

Key facts

Farm / Industry

Broadacre crops

Product

Sugar cane and macadamias

Location

Bundaberg

Irrigation

Travelling gun

Pumps

Centrifugal

Solution

Proposed:
Resolve pressure loss and install variable speed drive

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

Farm profile

The farm, near Bundaberg, produces sugar cane and macadamias, and draws water from the Burnett River to irrigate the crops.

Irrigation is via travelling gun irrigators with five discrete pumping stations to distribute and disperse water across the farm. The main irrigation period is from September to April when irrigation is mainly undertaken overnight and runs an average of 16 hours per day.

Current irrigation

The irrigation system comprises:

- Two submersible turbine pumps that draw water from the river to supply the high-pressure travelling gun irrigators. They are both powered by 93kW electric motors and one is fitted with a variable speed controller.
- A pump station that consists of two centrifugal pumps in series (a 15kW lift pump and a 55kW booster pump) that supply river water to the irrigation system.

Action

An energy audit of the pumping systems evaluated:

- installing variable speed controls
- replacement with more energy efficient drive units
- resolving pressure losses
- resizing pumps.

Results

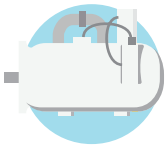
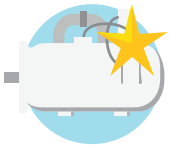
Of the energy-saving opportunities evaluated, several initiatives were identified with savings up to 16% and a payback period of 1.3 years (approx). These initiatives include modifying existing pump pipework at one pump to reduce pressure losses, installing a variable speed drive to another and undertaking impellor modifications to a booster pump to better match duty requirements.

There are significant savings available (approx. $11,000 per annum) by reviewing the tariff pricing structure for each pump installation.

Recommendations

The energy audit recommendations are summarised below:

Solution	 Replace motors and install variable speed drives on selected pumps
Est. energy savings (kWh/annum)	63,678
Est. operating cost saving	$17,075
Est. cost to implement	$22,148
Payback period (years)	1.3
Est. demand reduction (kW)	39
Est. energy savings	16%

Forecast savings in pump operating costs	 Existing system	 Upgraded system	 Reduction in operating costs
Annual pump operating cost	$106,719	$89,644	-
Cost to implement	-	$22,148	-
Operating costs for first 2 years	$213,438	$201,436	$12,002
Annual pump operating cost for years 3 to 10	$106,719	$89,644	$17,075
Total pumping costs for 10 years	$1,067,190	$918,588	$148,602

Farmer feedback

The total estimated capital cost to implement the recommendations has been an impediment to proceeding. The farm owner is sourcing quotes to assess the cost of staging the upgrade works. While the overall capital outlay was a barrier, the farmer acknowledged the business case was sound and that improvements needed to be implemented.

Case studies

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