

Irrigators Energy Savers Program

targets significant energy savings for a Queensland sugar cane farm

PROPOSED SOLUTION 

Potential energy savings

15%

Key facts

Farm / Industry

Sugar cane

Location

Childers

Irrigation

Travelling gun

Pumps

Centrifugal

Solution

Proposed:

Replace selected motors and install variable speed drives

Farm profile

The farm, located in the Childers area, cultivates sugar cane and uses broadacre irrigation. The site is divided into a number of zones, each with its own irrigation system which consists of soft hose, high-pressure travellers connected to a dedicated pump. Water is delivered to the farm by a water distribution system.

The operation of the irrigation systems varies according to the season, the weather conditions and the age of the plants in the different zones. As the systems deliver a constant flow of water, the volume of water delivered is modified by changing the irrigation time.

Current irrigation

The irrigation system comprises:

- Soft hose, high-pressure travelling gun irrigators that deliver a constant flow of water to each zone with each fed by a centrifugal pump ranging from 37kW to 45kW.
- One of the 37kW pumps has already been upgraded to variable speed drive control with a radio frequency pressure transmitter at the water gun discharge.
- A central distribution pipe that feeds each of the irrigation pumps from the incoming supply to the farm.
- One 11kW booster pump that lifts water from one site on the farm to a zone at a higher elevation. This is only required when the pipeline pressure is low from other downstream usage.

Action

An energy audit for five typical examples of the pumping systems evaluated:

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

Results

Of the above energy saving opportunities, two initiatives were identified with savings of 15% and a payback period of 3.2 years (approx).

The energy audit report recommended replacement of three pump motors that were ageing and no longer efficient with new high-efficiency motors as well as installation of variable speed drives on two pumps.



The other pump systems were considered to be operating efficiently and viable upgrade options would depend on future maintenance or replacement. Plans to upgrade irrigation equipment to suit crop growth as well as irrigation cycles may influence future investment decisions.

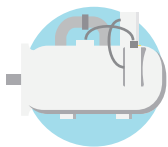
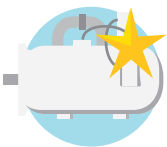

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Recommendations

The energy audit recommendations are summarised below:

Solution	  Replace motors and install variable speed drives on selected pumps
Est. energy savings (kWh/annum)	35,612
Est. operating cost saving	\$9,983
Est. cost to implement	\$32,039
Payback period (years)	3.2
Est. demand reduction (kW)	20
Est. energy savings	15%

Forecast savings in pump operating costs	 Existing system	 Upgraded system	 Reduction in operating costs
Annual pump operating cost	\$60,822	\$50,839	-
Cost to implement	-	\$32,039	-
Operating costs for first 4 years	\$243,288	\$235,395	\$7,893
Annual pump operating cost	\$60,822	\$50,839	\$9,983
Total pumping costs for 10 years	\$608,220	\$540,429	\$67,791

Farmer feedback

Recent feedback from the farm owner indicates willingness to progress with implementation of the audit recommendations. Completion is forecast by August 2016.

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.