Irrigators Energy Savers Program

targets significant energy savings for a

Queensland cotton farm

PROPOSed SOlutiOn

Potential energy savings 8%

Key facts

Farm / Industry

Cotton

Location

Cecil Plains

Irrigation

Flood

Pumps

Centrifugal

Solution

Proposed:
Consider pump replacement on failure

Farm profile

The farm produces cotton on 1,860 hectares in the Cecil Plains area and uses flood irrigation to inundate crops approximately every 10 days. Dams are located on-site for the storage of rain runoff and the farm has a licence to access a defined volume of water each year by flood harvesting overland flow.

The available water supply for irrigation changes each year depending on rainfall and the volume of water in the dams. The irrigation system uses several bore pumps that transfer water to open channels around the fields, which is then transferred to the cotton using siphons. The majority of the electricity consumption on-site is for the pumping.

Current irrigation

The irrigation system comprises:

- Several bore pumps that transfer water to the open drains. Two of these were assessed: one 45kW and one 75kW.
- Surface pumps that transfer water between dams, open drains and fields, depending on the configuration. One 37kW surface pump was assessed.
- Siphons that transfer the water from the drains to the fields to inundate the crops.

Action

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

- installation of variable speed controls
- replacement with newer, more efficient pumps.

Results

Of the above energy-saving opportunities, one initiative was identified for pump replacement of the 45kW bore pump with a more efficient 37kW pump, with savings of 8% and a payback period of 14.3 years (approx).

The bore pumps are used in such a way that a variable speed drive is not suggested as the flow rate required by the irrigation system is constant and does not vary during the time of use of the pump.

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

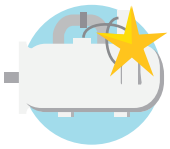
QFF

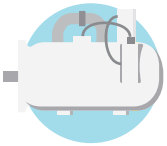
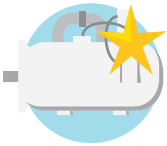
ERGON ENERGY NETWORK

Queensland Government

Recommendations

The energy audit recommendations are summarised below:

Solution	 Replace pump
Est. energy savings (kWh/annum)	6,133
Est. operating cost saving	$1,991
Est. cost to implement	$28,500
Payback period (years)	14.3
Est. demand reduction (kW)	8
Est. energy savings	8%

Forecast savings in pump operating costs	 Existing system	 Upgraded system	 Reduction in operating costs
Annual operating cost	$53,373	$51,382	-
Cost to implement	-	$28,500	-
Operating costs for first 15 years	$800,595	$799,230	$1,365
Annual pump operating cost for years 16 to 20	$53,373	$51,382	$1,991
Total pumping costs for 20 years	$1,067,460	$1,056,140	$11,320

Farmer feedback

The farm owner is not proceeding with the recommendations in the energy audit in the short term, as the payback period is not financially viable. The operation of the pump
is still sound and the recommendations in the audit would be considered further if the pump performance degraded significantly or failure occurred.

The owner indicated the audit was still beneficial as it assisted with developing further knowledge on strategies available to reduce energy consumption in irrigation.

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.