

Irrigators Energy Savers Program

targets significant energy savings for a Queensland sugar cane farm

PROPOSED SOLUTION



Potential energy savings

20%

Key facts

Farm / Industry

Sugar cane

Location

Ingham

Irrigation

Travelling gun

Pumps

Submersible

Solution

Proposed:

Install variable speed drive with pressure reduction

Farm profile

The farm, south of Ingham, cultivates sugar cane with travelling overhead boom irrigator guns that are used to provide water to the crops. Water for irrigation is supplied using submersible bore pumps.

Current irrigation

The irrigation system comprises:

- Two 30kW submersible bore pumps that supply water from deep bores, 55 metres underground. Both pumping systems were considered identical and in consultation with the farmer only one was tested for the energy audit report.
- Either or both of the pumps can supply a series of travelling overhead irrigator guns to disperse water over the cane.

Action

An energy audit of the pumping systems evaluated:

- installation of variable speed control
- replacing the irrigator guns with a low pressure boom irrigator.

Results

On the basis the farmer adopted a low pressure boom irrigator, an energy saving opportunity was identified with potential savings of 20% and a payback period of 3 years (approx). If the current high pressure guns remain in use, the payback period increases to more than 5 years.


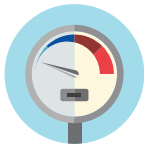
The energy audit report identified the potential for installing variable speed drives on both existing pumps to modulate the pump speed to maintain approximately 65 psi at the proposed irrigation booms. The variable speed drive panels could also be used to monitor energy, pressure and flow to enable tuning under diverse field conditions.

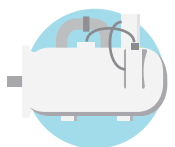
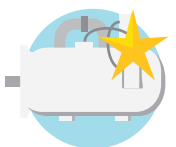

The Irrigators Energy Savers Program was funded by the Queensland Department of Agriculture and Fisheries



Recommendations

The energy audit recommendations are summarised below:

Solution	  Install variable speed drives on two pumps and use low pressure irrigator
Est. energy savings (kWh/annum)	12,000
Est. operating cost saving	\$2,470
Est. cost to implement	\$7,500
Payback period (years)	3
Est. demand reduction (kW)	6
Est. energy savings	20%

Forecast savings in pump operating costs	 Existing system	 Upgraded system	 Reduction in operating costs
Annual pump operating cost	\$6,900	\$4,430	-
Cost to implement	-	\$7,500	-
Operating costs for first 4 years	\$27,600	\$25,220	\$2,380
Annual pump operating cost for years 5 to 10	\$6,900	\$4,430	\$2,47
Total pumping costs for 10 years	\$69,000	\$51,800	0 \$17,200

Farmer feedback

The farmer is evaluating costs to complete the replacement of the high pressure irrigator guns with low pressure units and advised that the energy savings applicable would improve viability of farm operations. The farmer is evaluating costs to complete the replacement of the high pressure irrigator guns with low pressure units and advised that the energy savings applicable would improve viability of farm operations.

This case study was originally developed during 2017-18 as part of the Queensland Government funded Irrigators Energy Savers Program, delivered by the Queensland Farmers' Federation.