

Irrigators Energy Savers Program

targets significant energy savings for a
North Queensland sugar cane farm

PROPOSED SOLUTION 

Potential energy savings 

Key facts

Farm / Industry

Sugar cane

Location

Ingham

Irrigation

Travelling gun

Pumps

Submersible

Solution

Proposed:

Variable speed control

Farm profile

The farm, south of Ingham, cultivates sugar cane and irrigates with travelling irrigator guns. The site receives a high annual rainfall that offsets some of the need for irrigation.

Submersible bore pumps provide irrigation water at significant pressure which have been throttled at the discharge to provide the correct flow and pressure to the irrigation system.

Current irrigation

The irrigation system comprises:

- Two submersible bore pumps (48kW pump A and 37kW pump B). Both bores are relatively deep and the pumps move water against significant head because of the water height.
- Gate valves are used to throttle the flow at the bore discharges to provide the correct operational flow and pressure for the overhead travelling gun irrigation system.

Action

An energy audit of the pumping systems evaluated:

- installation of variable speed controls
- pump replacements
- irrigation system replacement with ultra-low pressure boom.

Results

Of the energy-saving opportunities evaluated, one initiative was identified with potential savings of 45% and a payback period of 0.7 years (approx).

The energy audit report identified the potential for installing a variable speed drive on pump A to modulate the pump speed to maintain approximately 65 psi at the irrigation guns. The variable speed drive panel could monitor energy, pressure and flow to enable tuning under diverse field conditions, and would remove the requirement for throttling of valves.

The financial feasibility assessment in the audit report was based on client feedback for the potential upper limit hours of operation in a dry, low rainfall year. While the audit recommendations provided a viable solution with a short payback period, this can vary significantly depending on the level of annual rainfall.


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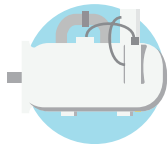
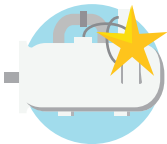



Recommendations

Note: the following is based on nominated client run hours of 2080 hr/yr rather than historical data.

The energy audit recommendations are summarised below:

| Solution |  Install variable speed drive on one pump |
|---------------------------------|--|
| Est. energy savings (kWh/annum) | 47,840 |
| Est. operating cost saving | \$10,690 |
| Est. cost to implement | \$7,500 |
| Payback period (years) | 0.7 |
| Est. demand reduction (kW) | 23 |
| Est. energy savings | 45% |

| Forecast savings in pump operating costs (at nominated run hours) |  Existing system |  Upgraded system |  Reduction in operating costs |
|---|--|---|---|
| Annual pump operating cost | \$29,771 | \$19,081 | - |
| Cost to implement | - | \$7,500 | - |
| Operating costs for first 2 years | \$59,542 | \$45,662 | \$13,880 |
| Annual pump operating cost for years 3 to 10 | \$29,771 | \$19,081 | \$10,690 |
| Total pumping costs for 10 years | \$297,712 | \$198,312 | \$99,400 |

Farmer feedback

At this time the owner has decided not to proceed with implementing the recommendation. This decision was based on evaluating the return on investment from completing the irrigation upgrades to increase crop production versus relying on rainfall with a lower yield outcome. This may change depending on sugar pricing.