

Irrigators Energy Savers Program

targets significant energy savings for a south-east Queensland dairy farm

PROPOSED SOLUTION 

Potential energy savings

20-30%

Key facts

Farm / Industry

Dairy

Location

Carneys Creek

Irrigation

Travelling gun

Pumps

Centrifugal and submersible

Solution

Proposed:

Rectify water leakage and install variable speed control

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



Farm profile

The dairy farm, located near Carneys Creek in south-east Queensland, uses electric pumping for irrigation of cattle pastures and drinking water for the herd. Several pumps transfer bore water to holding tanks where it is gravity fed to the pasture as needed throughout the year as well as pumped to a travelling gun irrigator.

Current irrigation

The irrigation system comprises:

- One submersible bore pump that is used to supply water to a holding tank at the farm house.
- One 1.5kW centrifugal pump that transfers water from the farm house to another tank on the hill.
- One 36kW submersible bore pump supplies water to the travelling irrigator.
- One soft hose travelling irrigator delivers water to three different areas of the farm at varying elevations.

Action

An energy audit for energy use on-site evaluated:

- installation of variable speed control on the 36kW submersible pump
- rectifying water leaks.

Results

Of the energy saving opportunities evaluated, one initiative was identified to install variable speed control on the irrigation bore pump with potential savings of 20% and a payback period of 5.4 years (approx) as well as immediate opportunities through leak rectification.



Sonic flow measurements and pressure readings were taken at various points through the irrigation system during the energy audit, which identified that approximately 50% of the water being pumped was lost due to leakage. This represents not only a waste of water but also increased energy use as the pump was being pushed beyond its normal operating parameters to deliver the same volume of water at the irrigation outlet.

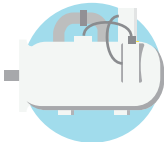


While reducing the leaks will provide a significant reduction in energy consumption, the installation of variable speed control will maximise savings from the reduction in flow and finer delivery pressure control on the outlet of the irrigation system.



Recommendations

The energy audit recommendations are summarised below:

Solution	 Variable speed drive	 Rectify underground reticulation leaks
Est. energy savings (kWh/annum)	6,859	13,718
Est. operating cost saving	\$1,768	\$3,745
Est. cost to implement	\$8,000	\$1,500
Payback period (years)	4.5	0.4 (estimated)
Est. demand reduction (kW)	0	0
Est. energy savings	20%	>30%

Forecast savings in pump operating costs	 Existing system	 Upgraded system (both recommendations)	 Reduction in operating costs
Annual operating cost	\$9,363	\$3,850	-
Cost to implement	-	\$9,500	-
Operating costs for first 2 years	\$18,726	\$17,200	\$1,526
Annual pump operating cost for years 3 to 10	\$9,363	\$3,850	\$5,513
Total pumping costs for 10 years	\$93,630	\$48,000	\$45,630

Farmer feedback

The owner has found significant opportunity for energy savings through identifying water leaks with rectification achieving possible savings of over 30%. Planning is underway for site irrigation upgrades to improve productivity, which may supercede the recommendation about the variable speed drive.