Energy Savers Plus Program

targets significant energy savings for a
Queensland sugar cane farm

PROPOSED SOLUTION

Potential energy savings 19%

Key facts

Farm / Industry

Sugar cane

Location

Mareeba

Irrigation

Centre pivot

Pumps

Centrifugal

Solution

Proposed:
Variable speed control and pump upgrade

The Energy Savers Plus Program was funded by the Queensland Department of Energy and Water Supply

Farm profile

The farm, near Mareeba, produces sugar cane and is in the process of transitioning to coffee production. A combination of pivot boom travelling irrigators and trickle tape, with a small area using fixed sprinklers, irrigates the 92 hectare farm.

The irrigation water supply is pumped from a 10 Ml dam on the property that relies on a combination of natural water ingress as well as the Tinaroo water scheme.

Current energy demand

The site energy consumption consists of:

- Pump 1 – a 90kW centrifugal pump that supplies irrigation to two paddocks.
- Pump 2 – a 55kW centrifugal pump that supplies two centre pivots as well as smaller trickle and sprinkler systems.

Pump 2 represents the largest energy use.

Action

An audit of site energy consumption evaluated:

- irrigation strategy changes
- pump upgrade
- variable speed control
- increased dam size
- solar bore pump
- transition to trickle irrigation.

Results

Of the energy-saving opportunities evaluated, two initiatives were identified with potential energy savings of 24% and a payback period of 2.8 years (approx).

The energy audit recommended upgrade of Pump 2 to a high efficiency model with installation of a variable speed drive (VSD) to ensure the pump operates closer to the best efficiency point under its various duty loads.

Other initiatives identified in the audit included splitting the irrigation area for Pump 1 to irrigate one paddock at a time, providing increased dam water storage and installing a solar bore pump to avoid re-lift pumping costs. However, these initiatives had long payback periods.

The audit also identified the opportunity to transition to trickle irrigation for coffee plants which should be assessed as part of future site planning.

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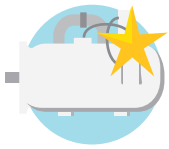
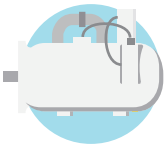
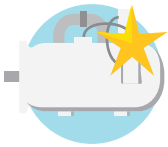
ERGON ENERGY NETWORK

Queensland Government

Recommendations

The energy audit recommendations are summarised below:

Solution	  **Variable speed control and pump upgrade**
Est. energy savings (kWh/annum)	22,740
Est. operating cost saving	$4,156
Est. cost to implement	$11,700
Payback period (years)	2.8
Est. demand reduction (kW)	-
Est. energy savings	24%

Forecast savings in operating costs	 **Existing system**	 **Upgraded system**	 **Reduction in operating costs**
Annual operating cost	$30,500	$26,344	-
Cost to implement	-	$11,700	-
Operating costs for first 3 years	$91,500	$90,732	$768
Annual operating cost for years 4 to 10	$30,500	$26,344	$4,156
Total energy costs for 10 years	$305,000	$275,140	$29,860

Farmer feedback

The owner has expressed interest in implementing the audit report recommendations, with timing to be confirmed.

This case study was originally developed during 2018-19 as part of the Queensland Government funded Energy Savers Plus Program, delivered by the Queensland Farmers' Federation.