

Energy Savers Plus Program

targets significant energy savings for a
Queensland horticulture farm

PROPOSED SOLUTION 

Potential energy savings  61%

Key facts

Farm / Industry

Horticulture

Product

Citrus and avocados

Location

Mareeba

Irrigation

Drip and micro irrigation

Pumps

Centrifugal

Solution

Proposed:

Pump upgrade, lower flow rate and solar photovoltaic installation

Farm profile

The farm, near Mareeba, produces citrus and avocados, irrigated for approximately 10 months a year depending on rainfall. Water is supplied from an on-site irrigation dam and replenished from the Tinaroo scheme.

Current energy demand

The site energy consumption consists of:

- One 45kW centrifugal belt-driven pump that draws water from the on-site dam to supply various farm blocks up to 1,000m away from pump location.
- A packing shed with various items of machinery that processes the fruit.

Action

An audit of site energy consumption evaluated:

- variable speed control
- off-peak pumping
- pump and motor replacement
- lighting upgrade
- air conditioning upgrade
- solar photovoltaic (PV) installation.

Results

Of the energy-saving opportunities evaluated, two initiatives were identified with potential energy savings of 44% and a combined payback period of 3.6 years (approx).

The energy audit report included a recommendation to upgrade the existing irrigation pump to a smaller high efficiency 18kW pump with a variable speed drive controlled by pressure sensors. The existing pump operates at 44 L/sec on average but, on long distance duties, a significant portion of pumping energy is wasted due to friction head losses from the reticulation system.

The more efficient 18kW pump would operate at 24 L/sec with friction losses virtually eliminated due to the lower flow rate. Run hours would be increased accordingly to deliver the required water volume. Overall, the upgrades would improve efficiency of the pump system from 283 kWh/ML to 193 kWh/ML due to the reduction in friction head losses.

In future, the variable speed pump system may be further upgraded to allow remote control of hydrants and enable the farmer to manage watering remotely.

The audit report also included an initiative to install a 15kW solar PV system to the packing shed to offset a significant portion of site energy use.

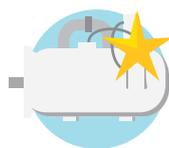
The Energy Savers Plus Program is funded by the Queensland Department of Energy and Water Supply



Recommendations

The energy audit recommendations are summarised below:

Solution



Pump upgrade, variable speed control and lower flow rate

	Existing 45kw pump	New 18kw pump	Est. savings
Operating flow rate	44	24	-
Run hours per annum	615	1,139	-
Total energy usage (kWh/annum)	27,839	18,931	8,908
Energy consumption (kWh/ML/m head)	4.2	3.3	0.9
Operating cost (\$/annum)	\$5,826	\$3,168	\$2,658
Operating cost (\$/ML/m head)	\$0.87	\$0.56	\$0.31
Est. cost to implement	-	\$11,487	-
Payback period (years)	-	4.3	-

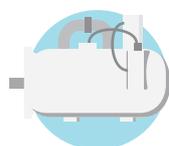
Solution



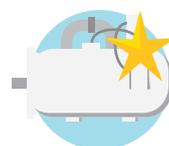
Install solar PV system

	Est. energy savings (kWh/annum)	Est. operating cost saving	Est. cost to implement	Payback period (years)	Est. demand reduction (kW)	Est. energy savings
	22,995	\$5,966	\$19,900	3.3	15	61%

Forecast savings in operating costs



Existing system



Upgraded system



Reduction in operating costs

Annual operating cost	\$25,360	\$16,736	-
Cost to implement	-	\$31,387	-
Operating costs for first 4 years	\$101,440	\$98,331	\$3,109
Annual operating cost for years 5 to 10	\$25,360	\$16,736	\$8,624
Total energy costs for 10 years	\$253,600	\$198,747	\$54,853

Farmer feedback

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



Case studies

To see how other agriculture businesses are saving energy and costs, go to www.qff.org.au/energysavers