

# 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).

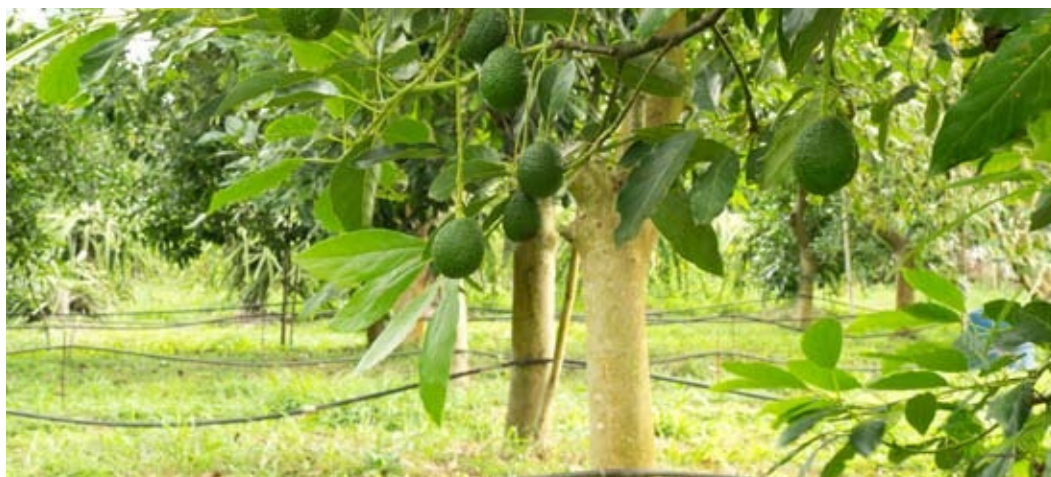
The energy audit report included a recommendation to upgrade the existing irrigation pump to a smaller high efficiency 18kW pump with a variable speed drive controlled by pressure sensors. The existing pump operates at 44 L/sec on average but, on long distance duties, a significant portion of pumping 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 was funded by the Queensland Department of Energy and Water Supply

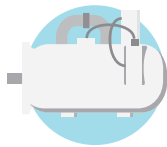
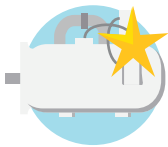



# Recommendations

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
<b>Total energy costs for 10 years</b>	\$253,600	\$198,747	\$54,853

## Farmer feedback

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

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