Energy Savers Plus Program

targets significant energy savings for a

Laidley Horticulture Farm

IMPLEMENTED SOLUTION

POTENTIAL ENERGY SAVINGS 12%

Key facts

Farm / Industry

Horticulture

Product

Vegetables: Roots and brassicas

Location

Lockyer Valley

Case study focus

Pumps and VSDs

Solution

Install new pump with VSD, two VSDs on existing pumps, and a 12kW solar system.

Summary

A mixed vegetable farm located near Laidley in the Lockyer Valley could benefit from recommendations in a recent energy audit. The audit recommended to replace an irrigation pump, install Variable Speed Drives on existing irrigation pumps and install a solar PV system to offset the energy consumption.

Farm Profile

The farm, near Laidley, is a large producer of vegetables with a large packing shed. The farm is irrigated year-round depending on rainfall. Water is supplied from on-site irrigation dams and are replenished from bores and rainfall. The irrigation systems are gradually being changed from high pressure systems to drip tape to be more water efficient and as a result there is a variety of pressures required. Due to the current drought conditions, the level of the aquifer is low and the amount of water in the bore is lower than usual. For this reason, all the submersible pumps are oversized and to reduce the flow rate and to avoid pumping air the discharge valves are heavily throttled.

Current Energy Demand

It is a large site consuming approximately 234,000 kWh per year at a cost of $53,000. The farm offsets its current consumption using an installed 100kW solar system. Irrigating over 70 hectares and harvesting roughly 4200T of vegetables sets a current energy benchmark of approximately 119kWh/tonne of produce.

The infrastructure contributing to the energy consumption onsite consists of:

- A 30kW centrifugal pump
- A 11kW submersible pump
- A 22kW centrifugal pump
- Two large cold rooms totalling 53kW of cooling capacity

Action

The energy audit recommended the following changes to improve efficiency and reduce costs:

- Installation of a VSD on the 22kW pump,
- Installation of a VSD on the 11kW submersible pump,
- Replacing the 30kW pump with new efficient pump with a Variable Speed Drive, and
- Installing a 12kW solar system.

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Results

Of the energy saving opportunities evaluated, four initiatives were identified with potential energy savings of 18% of the site total, approximately 42,000kWh per year, a combined payback period of approximately 5.09 years and emission savings of 34 tCO2-e per year.

The audit recommended installing a new pump on one of the dams. The existing 30kW pump was inefficient and was throttled with a valve to compensate for the different pressured systems. The replacement pump suggested is the same size and includes a VSD will allow for accurate adjustments of irrigation pressure and reduce electricity consumption. The new pump with the VSD has an estimated payback period of 6.3 years. It was also recommended to install VSDs on the 11kW and 22kW pumps because of varying pressures in the irrigation system. These resulted in an estimated payback period of 2.7 and 8 years respectively.

Other recommendations included installing a 12kW ground mounted solar system at the site of the 11kW submersible pump, which resulted in an estimated payback period of 3.4 years.

Outcomes/Recommendations

The energy audit recommendations and potential benefits are summarised below:

Solution	New 30kW pump and VSD	VSD on 11kW submersible pump	VSD on 22kW pump	12kW solar system
Estimated Cost to implement ($)	19,000	8,800	8,000	21,600
Annual Energy Savings (kWh)	11,000 (5%)	12,400 (5%)	4,750 (2%)	13,900 (6%)
Annual emissions savings (tCO_2-e)	8.9	10	3.8	11.3
Annual operating cost savings ($)	3,000	3,300	1,000	4,100
Payback Period (years)	6.3	2.7	8	3.4

Following the audit report recommendations, the grower proceeded with installation of the new pump and 3 VSDs, with actual energy savings of 12% over total farm consumption and emission reductions around 23 tCO2-e per year.

Energy Audits for your Business

An energy audit is a great way for a business to identify the most effective way to cut costs, reduce emissions and boost productivity. By implementing the suggested recommendations, the farm could expect a new benchmark of 94kWh/tonne, a 21% reduction.

See other case studies including sector case studies and technology case studies at the website: www.qff.org.au/newsroom/case-studies/

Case studies

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