

Farm Profile

The farm, near Mundubbera, produces a variety of citrus and mangoes and is irrigated year-round depending on rainfall. Water is supplied from an on-site irrigation dam and replenished from the river. The site has a number of large pumps that serve different areas of the farm. Some pump direct from the river and some from the irrigation dam.

Current Energy Demand

It is a large site consuming 1,800 MWh per year and harvests 17,000 bins per year of fruit over 170ha with current energy benchmarking of approximately 240kWh/tonne of fruit produced.

The site energy consumption consists of:

- A packing shed
- A large pump that pumps from the river to an irrigation dam which also irrigates some plots, responsible for approximately 30% of site energy use and is the highest user of energy
- A booster pump that pumped from the irrigation dam to the plots that could not be reached by the other pump, so double pumping occurred. This pump is approximately 3% of the site use and was chosen to be analysed to try and reduce the double pumping and some demand charges.

Action

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

- Tariff analysis
- Installation of a solar PV system
- Upgrading the booster pump
- Installing smart water metering for irrigation scheduling

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Results

Of the energy saving opportunities evaluated, 3 initiatives were identified with potential energy savings of 7% of the site total of approximately \$26,000 p.a. with an average payback period of 5.5 years.

A tariff analysis was completed on the sites tariffs and it was found that there were savings of approximately \$11,000 per year by changing the tariff on the largest pump. The pump was on Tariff 66, which is an irrigation tariff begin phased out in July 2021. It was recommended to change to Tariff 50 which is a large user Time Of Use tariff.

The audit recommended installing a new booster pump. A new booster pump would partially remove the need for the double pumping from the dam. A variety of duty points were tested and it was determined that a new, smaller pump (160kW to 75kW) would have returned a payback period of just over 4 years. A Variable Speed Drive (VSD) was also recommended to better control the pump flow rates and pump performance.

Other recommendations included installing a ground mounted solar system at the site of the large pump of 39kW, which resulted in a payback period of approximately 6 years. Changing the irrigation scheduling to match the solar output allowed for higher utilisation of the energy generated. Smart water meters were also recommended to better monitor volumes of water being double pumped and irrigation amounts.

Outcomes/Recommendations

The energy audit recommendations and potential benefits are summarised below:

Solution	Upgrade 75kW pump	Install 20kW solar at packing shed
Est. Cost to implement	\$66,000	\$64,000
Est. Energy Savings	28,700 kWh/ p.a.	64,000 kWh/p.a.
Est. Operating cost saving	\$16,000	\$10,000
Payback Period	4 years	6.4 years

Following the audit report recommendations, the grower proceeded with installation of the new booster pump, will change tariffs and will install the solar in the future. Energy savings of 1.3% has meant post implementation benchmarking is now 223kWh/tonne of fruit produced.

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.

The audit also suggested to install smart water metering so the site is able to track monthly water transfers to the dam alongside application of each irrigation schedule Like real time energy meters, this is expected to assist in achieving management changes through increased visibility of irrigation and water consumption patterns.

Due to the large energy conusmption for this site even small application efficiencies can lead to large energy cost savings. Water meters are roughly \$3000-\$ 6000. 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