

# Energy Savers Plus Program

*targets significant energy savings for*

## Queensland Horticulture Farms

POTENTIAL  
SOLUTION



POTENTIAL  
ENERGY  
SAVINGS

25%

### Key facts

#### Farm / Industry

Horticulture

#### Product

Tomatoes and Capsicums

#### Location

Stanthorpe

#### Case study focus

Pumping and irrigation

#### Solution

Replace irrigation lines, install variable speed drives and solar PV.

### Summary

A drought affected horticulture farm located in Stanthorpe could still benefit saving both time and money from recommendations in a recent energy savers audit. The audit recommended to install Variable Speed Drives (VSDs) on the irrigation pumps and a solar PV system to offset the energy consumption.

### Farm Profile

The farm, near Stanthorpe, produces tomatoes and capsicums and is irrigated year round depending on rainfall. Water is supplied from an on-site irrigation dam and is replenished from rainfall and the nearby creek. The site is undulating and has different sized blocks and so has complex irrigation needs. The irrigation system consists of three (3) centrifugal pumps that pump the water around the fields to T-Tape drippers. The site had been severely affected by the recent drought during the audit process.

### Current Energy Demand

It is a small site consuming approximately 23,000 kWh per year at a cost of \$7,800. The current production is approximately 1,250 tonnes per year and the current energy benchmark is about 18.4 kWh/tonne of produce. The infrastructure contributing to the energy consumption onsite consists of:

- Three 15kW centrifugal pumps.
- And a shed with some lighting and electrical equipment.

### Action

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

- Installation of three 15kW Variable Speed Drives to compensate for paddock top
- Replacing irrigation suction pipes moving from 75mm to 150mm PVC
- Installation of a 10kW solar system
- Tariff Change- moving from obsolete T65 to T20 Time of Use (TOU)



The Energy Savers Plus Program Extension is funded by the Queensland Department of Energy and Public Works.



## Results

Three initiatives were identified with potential energy savings of 50% of the site total, 9.4 tCO<sub>2</sub>-e of estimated emission reductions and a combined payback period of approximately 15 years.

A tariff analysis was completed on the sites and found that there were small cost savings achievable. All three NMIs were on Tariff 65, which is an irrigation Time of Use Tariff (TOU), due to expire in July 2021. It was suggested to move two of the NMIs to Tariff 20, which is a small business flat rate tariff to optimise any savings possible.

The audit recommendations included installing VSDs on the three 15kW irrigation pumps. The VSD would allow the grower to better manage the differing sizes and elevations of the paddocks. It was also recommended to install a soil moisture monitoring system with the VSD to have more control over the moisture levels required, which may reduce pumping costs and energy consumption over time. These recommendations had a payback period of 29 years. The exact payback period is difficult to calculate due to the variants present on different farms when installing soil moisture monitoring.

A solar system was recommended to be added to one of the pump NMIs. A 10kW system was suggested for the 15kW pump which had a payback period of 7 years. It was also suggested to increase the diameter of the pipe from the creek to the irrigation dam to reduce friction losses. By increasing the size from 75mm to 150mm PVC, the payback period was 13.5 years and is likely to reduce wear on the pumps.

## Outcomes/Recommendations

Following the audit recommendations, the grower proceeded with installation of the VSDs, soil moisture monitoring system and upgrading of the pipework, while solar will be considered in future upgrades. The VSDs and soil moisture monitoring were chosen to more efficiently manage the limited water at the site. Energy savings from the implemented solutions are estimated in 25%, with emission reductions of 5.5 t CO<sub>2</sub>-e per year. Post implementation benchmarking of the implemented recommendations is expected to be 13.8 kWh/ tonne, which is a reduction of 25%.

The energy audit recommendations are summarised below:

Solution	3x15kW VSDs and soil moisture monitoring	10kW Solar System	Pipe replacement
Estimated Cost to implement (\$)	38,400	15,000	5,000
Annual Energy Savings (kWh)	4,600 (19%)	4,200 (18%)	1,300 (6%)
Annual operating cost savings (\$)	1,300	2,200	370
Payback Period (years)	29	7	13.5
Annual Emission Savings (t/CO <sub>2</sub> -e)	4.31	3.89	1.2

## 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.

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



PROPOSED 56% energy savings 27.3<sup>t</sup> CO<sub>2</sub> savings 20,884<sup>\$</sup> cost savings



PROPOSED 24% energy savings 100<sup>t</sup> CO<sub>2</sub> savings 19,681<sup>\$</sup> cost savings



Case studies

To see how other agriculture businesses are saving energy and costs, go to [www.qff.org.au/energysavers](http://www.qff.org.au/energysavers)