

Energy Savers Plus Program

targets significant energy savings for

Queensland Horticulture Farms

POTENTIAL SOLUTION



POTENTIAL ENERGY SAVINGS

16%

Key facts

Farm / Industry

Horticulture

Product

Tomatoes

Location

Lockyer Valley

Case study focus

Cold Rooms and LED lighting

Solution

Replace refrigeration components and install LEDs

Summary

A drought affected tomato farm in the Lockyer Valley could benefit from recommendations in a recent energy savers audit. The audit recommended to install new cold room units on the existing cold rooms and LED lighting.

Farm Profile

The farm, in the Lockyer Valley, produces tomatoes and is irrigated year-round depending on rainfall. Water is supplied from on-site irrigation dams which are replenished from bores and rainfall.

Current Energy Demand

It is a large site consuming 123,000kWh per year at a cost of \$26,000, and harvests 2,400T of tomatoes. Their current energy benchmarking is approximately 50kWh/T of tomatoes. A key target of the farm is to reduce their consumption below 100,000 kWh per year.

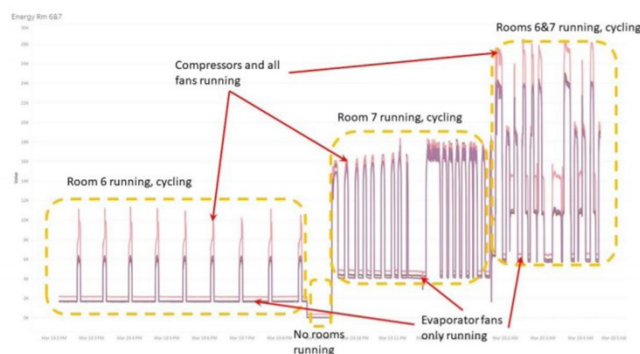
The site energy consumption consists of:

- Four large cold rooms, two with rapid cool assistance
- Packing shed area

The auditor noted that the cold rooms themselves were generally older and in good condition, though the refrigeration equipment was studied closely. The existing units were bought second hand and were of an unknown age, so they had reached end of life. Two were operating with refrigerant R22 which has been phased out in 2016 and is already costly, and two operating on R404A which is in the process of phase down. The auditor also noted that the location of the condenser units close together in an area with low air flow means that they would be operating less efficiently.



A detailed analysis of power consumption of the cold rooms was undertaken using real-time metering to identify opportunities.



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



Action

An audit of site energy consumption evaluated:

- LED Lighting upgrade,
- Replacement of the refrigeration units, and
- Replace evaporator fans and upgrade controller.

Results

Of the energy saving opportunities evaluated, 3 initiatives were identified with potential energy savings of 17% of the site total and a combined payback period of approximately 19 years.

The audit report recommended replacing the evaporator fans in the cold rooms with new, energy efficient direct drive fans which can operate at different speeds. To do this a controller upgrade is recommended to allow for the more complex fans. This would have a payback period of just under 3 years. An upgrade to LED lighting in the shed will result in a payback period of 5.16 years.

The report also recommended replacing all refrigeration units with a single refrigeration rack containing at least 3 compressors with the lead compressor on speed control. By replacing the units the farm would achieve a payback period of 37 years as they are only used for a few months each year. Although this payback period is significant, it will allow for the farm to better control temperature requirements, potentially improving quality and reliability.

Measurement and verification will be completed on the new refrigeration system in the coming months.

Outcomes/Recommendations

The energy audit recommendations and potential benefits are summarised below:

Solution	LED Lighting Upgrade	Replace Evaporator Fans	Replace refrigeration units
Estimated Cost to implement (\$)	1,450	16,000	200,000
Annual Energy Savings (kWh)	773 (0.6%)	10,000 (8%)	10,000 (8%)
Annual operating Cost Savings (\$)	281	5,700	5,400
Annual Emission Savings (tCO ₂ -e)	0.6	8.1	8.1
Payback Period (years)	5.16	2.85	37

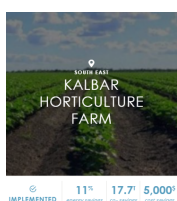
Following the audit report recommendations, the grower proceeded with installation of the new refrigeration units, fans, and control system. They will be installing 4 separate refrigeration units to better manage redundancies in their system. Post implementation benchmarking is predicted at 43kWh/T with total energy savings of 16% and removal of 16.2 t/CO₂-e per annum

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.

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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