

Energy Savers Plus Program

targets significant energy savings for a

Caboolture Horticulture Farm

POTENTIAL
SOLUTION



POTENTIAL
ENERGY
SAVINGS

39%

Key facts

Farm / Industry

Horticulture

Product

Strawberries

Location

Caboolture

Case study focus

Refrigeration/Cool Rooms

Solution

Installation of three solar systems, replace cold room condenser, and upgrade air conditioning

Summary

A strawberry farm located near Caboolture could benefit from recommendations in a recent energy audit. The audit recommended to install solar PV systems to offset the energy consumption, upgrade cold room condensers, and upgrade workers accommodation air conditioning.

Farm Profile

The farm, near Caboolture, produces strawberries and is irrigated for 9 months of the year depending on rainfall. Water is supplied from an on-site irrigation dam which is replenished from rainfall. The farm has two main pump houses which irrigate two farming areas, and a large packing shed with cold rooms. The irrigation system is a mix of solid set sprinklers and T-tape drippers with water supplied through centrifugal pumps.

Current Energy Demand

It is a large site consuming 310,000kWh of electricity per year at a cost of \$95,000, and harvests 1200 tonnes of strawberries over 30 hectares. Their current energy benchmarking is approximately 260kWh/T of strawberries. The pumps were recently installed and were in good condition and were not the focus of the audit.

The infrastructure contributing to the energy consumption onsite consists of:

- Large packing shed with sorting equipment
- Workers accommodation with air conditioning, lighting and a kitchen
- Four large cold rooms with separate condensers, around 20 years old
- A pump shed containing 3 x 55kW pumps in series that serves a different area
- A pump shed containing 3 x 37kW pumps in series that serves one area of the farm

Action

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

- Replace cold room condensers,
- Upgrade workers accommodation air conditioning, and
- Installation of three solar PV systems, 2x30kW systems and 1x20kW system.

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



Results

Of the energy saving opportunities evaluated, 4 initiatives were identified with potential energy savings of 39% of the site, cost savings of \$26,000, 27% of total, with an approximate combined payback period of 9 years and emission reductions estimated as 97.1 tCO₂-e per year.

The audit report recommendations included installing 3 solar systems around the farm: a 30kW system was recommended for the packing shed; a 20kW ground mounted solar system for the smaller pump shed; and a 30kW ground mounted solar system for the large pump shed.

Other recommendations included replacing the existing, 20-year-old condensing units attached to each of the cold rooms with 4 new condensing units with Variable Speed Drives (VSD) on the compressor and the condenser fan. By replacing these units, the farmer could achieve an energy saving of 9% with a payback of 14 years

An option that was presented in the report was to change the current air-conditioning systems in the workers accommodation. Currently there is a small cassette unit for each room. It was suggested to replace the units with a single VRF (variable refrigerant flow) unit with multiple heads. They are found to be approximately 25% more efficient than current split systems.

Post implementation benchmarking is predicted to be 158kWh/T of strawberries which is a 40% reduction.

Outcomes/Recommendations

The energy audit recommendations and potential benefits are summarised below:

Solution	30kW Solar on packing shed	20kW solar on pump shed	30kW solar on pump shed	Replace condensing units on cold rooms
Estimated Cost to implement (\$)	45,000	34,000	51,000	80,000
Annual Energy Savings (kWh)	40,000 (13%)	17,300 (6%)	35,000 (11%)	27,500 (9%)
Annual operating cost savings (\$)	6,310	3,435	10,500	5,750
Payback Period (years)	7.13	9.9	4.86	14
Annual Emission Savings (tCO ₂ -e)	32.4	14	28.4	22.3

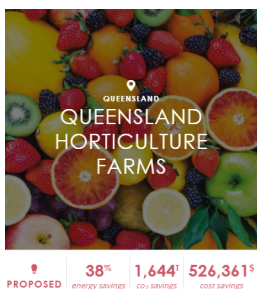
Following the audit report recommendations, the grower will assess their options and may implement in the future.

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.

Should the site adopt all recommendations listed in the audit a new benchmark of 159kWh/t of produce could be achieved a 39% 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