Energy Savers Plus Program

targets significant energy savings for a
Queensland horticulture farm

PROPOSED SOLUTION

Potential energy savings 10%

Key facts

Farm / Industry

Horticulture

Product

Chillies

Location

Bundaberg

Solution

Proposed:
Fan variable speed control and lighting upgrade

Farm profile

The facility is located in Bundaberg and supplies fresh chillies as well as puree products that are manufactured in the on-site processing plant. The facility includes a warehouse, dispatch centre, refrigerated cold rooms and the processing plant area.

An energy audit report focused on the refrigeration and air conditioning facilities as the major users of energy. Refrigeration to the cold rooms is provided by a number of condensing units placed outside the main facility. The facility is also serviced by two air conditioners as well as three fluid chillers.

Current energy demand

The site energy consumption consists of:

- Four cold rooms with condensing units that use different refrigerants including R22, R134a and R407C.
- Two air conditioning units each with 23kW electrical load.
- Three fluid chillers that range between 18kW and 32kW electrical load.
- A 100kW solar photovoltaic system that offsets energy consumption during the day.

Action

An audit of site energy consumption evaluated:

- evaporator fan speed control
- lighting upgrades
- refrigeration upgrades.

Results

Of the energy-saving opportunities evaluated, two initiatives were identified with potential energy savings of 10% and a payback period of 3.9 years (approx).

The audit report recommendations included an initiative to implement variable speed control on the evaporator fans which will involve installation of seven variable speed drives for motors between 1.5kW and 3kW.

Another recommendation was the replacement of the current T8 lighting in the cool rooms with LED fittings. This will avoid unnecessary heat load, reduce energy consumption of the lighting and reduce maintenance costs resulting from increased LED longevity.

The energy audit also investigated a number of opportunities for conversion to a different refrigeration system including thermal storage installation, R22 refrigerant replacement, ammonia chiller installation or Freon chiller installation. The preferred option is the implementation of a glycol and chilled water ammonia plant to replace the existing refrigeration and HVAC units as a long-term recommendation (14 years payback period).

The Energy Savers Plus Program was funded by the Queensland Department of Energy and Water Supply

QFF

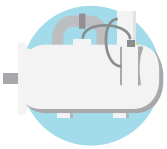
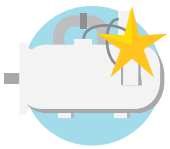
ERGON ENERGY NETWORK

Queensland Government

Recommendations

The energy audit recommendations are summarised below:

Solution	  **Fan variable speed control and lighting upgrades**
Est. energy savings (kWh/annum)	80,800
Est. operating cost saving	$7,251
Est. cost to implement	$28,500
Payback period (years)	3.9
Est. demand reduction (kW)	0.8
Est. energy savings	10%

Forecast savings in operating costs	 **Existing system**	 **Upgraded system**	 **Reduction in operating costs**
Annual operating cost	$154,000	$146,749	-
Cost to implement	-	$28,500	-
Operating costs for first 4 years	$616,000	$615,496	$504
Annual operating cost for years 5 to 10	$154,000	$146,749	$7,251
Total electricity costs for 10 years	$1,540,000	$1,495,990	$44,010

Farmer feedback

The audit project was a real eye opener, we have implemented the lighting upgrade and are reviewing our HVAC systems as we plan expansion of our facilities.

This case study was originally developed during 2018-19 as part of the Queensland Government funded Energy Savers Plus Program, delivered by the Queensland Farmers' Federation.