



# Energy Efficiency

## #4 FRUIT AND VEGETABLES - COLD ROOMS

**This farm produces about 780 tonnes of zucchini and strawberries per year on 40 acres of sandy/clay loam soils in the sub tropical climate of the Sunshine Coast. The business includes growing, packing and cold storage operations. This case study focuses on the on-farm cold storage.**

The operation includes three cold rooms varying in size from 16m<sup>3</sup> to 25m<sup>3</sup>, using either R12 or R404A refrigerants. The two main cold rooms consume 11 440 kWh per year.

The farm owners are minimising the energy consumption by managing the runtime of the three cold rooms, only using each one as additional chilled space is required. For example, the cold rooms vary in their operating hours depending on the season and crop (between eight and 24 hrs per day, and for as little as 3.5 days per week in the low season). Total annual run times for the three units vary between 680 and 1383 hours.

This is a strategy that can be applied very easily in other similar operations with a little planning and without any financial outlay.

There are a number of additional measures that can increase the energy efficiency of cold rooms.

### System maintenance

Regular maintenance will ensure that a unit runs more efficiently, is more reliable and will have a longer service life. Regular maintenance can save about 5 per cent of the energy costs and can ensure longer service life of the equipment, reduce ongoing service costs and lower the risks of breakdowns.

Regular maintenance should include:

- following recommended defrost procedures
- checking door seals and insulation
- ensuring temperature thermostats are operating correctly by doing regular calibration
- checking insulation on pipes and repair damages
- cleaning the condenser and check the fan, fan guard and pump
- cleaning the evaporator
- checking the operation of the defrost system, condition of fans and safety equipment

- checking for undue noise and vibrations
- checking the operation of all safety controls.

### Cool room design

A number of simple design elements can greatly reduce energy use. For example, it is important to have a well-insulated cool room without air-leaks. Automatic doors may be an option for larger enterprises, but plastic strip curtains are a cheap and efficient method to keep the cool air inside when shifting produce to and from the cool room. Up to 30 per cent of heat load in cool rooms can come from air exchanges when cold air escapes through poorly sealed doors. It is also important to minimise the temperature of produce before it goes into cool storage.

The orientation of packing sheds, cool rooms, docking facilities, standing tarmac, pre-coolers, offices and the surrounding area can have a large impact on efficiency. Cool rooms are best placed in the southern end of the shed, while shed doors and openings should preferably face south. If your packing shed doesn't meet these requirements, it will be worth considering additional shade provided by structures or vegetation.

### Equipment upgrades

Modern refrigeration plant can employ newer technologies such as energy efficient motors and variable speed compressor drives, and be much more energy efficient than older designs as a result. However, these kinds of upgrades require significant investment and are probably best considered for new facilities or when existing equipment has reached the end of its serviceable life.

*Disclaimer: The examples in this fact sheet are provided for general information and do not constitute financial advice. We encourage growers to seek specialist financial advice before making significant investments.*

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## Management

Greatest efficiency is attained when the cool room is full but not overloaded

- keep heat sources away from the cool room
- ensure that doors are kept shut
- install strip curtains and/or rapid doors.

## Action

The farm owners are very sensibly managing the runtimes of the three cold rooms to minimise the chilled volume depending on need. This is a very simple option that involves no financial outlay and can be employed in other businesses with the flexibility provided by multiple cold rooms. The farm has yet to take action on energy efficiency measures in the cold rooms themselves.

## More information

Further details are contained in Growcom Energy Efficiency factsheets, available from the Growcom website.

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