

Caernarvon Orchard

LED lighting

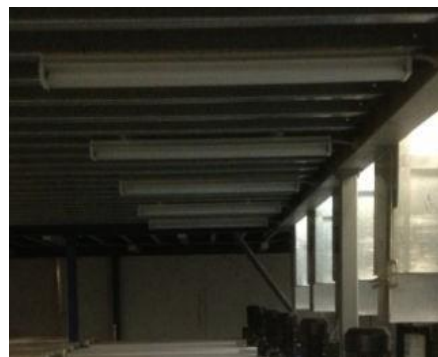
The 'Watts in Your Business' project has completed energy audits of 30 packhouses and orchards Australia-wide. This case story of Caernarvon Orchard's packing shed shows where energy use and costs could be reduced.

Caernarvon Orchard in Orange, NSW, produces and packs approximately 4500 tonnes of apples and 800 tonnes of cherries per annum and is regarded as a medium sized orchard. Lighting accounts for approximately 5% of their annual electricity use and costs about \$3400.

Throughout the packhouse, lighting requirements and configurations differ according to the activities of each area, height of the ceilings and the availability of natural sunlight. All of the lighting is manually controlled, requiring the staff to turn lights on and off as they enter or exit a work area. In total, the packhouse uses 28 T8 fluorescent tubes and 16 High Bay (Metal Halide) lighting fixtures, all with magnetic ballasts. The lights operate for 45 hours per week for 46 weeks of the year, resulting in about 15,500kWh of electricity consumption per year.



Non illuminated High Bay lighting fixture.



Non illuminated T8 fluorescent tube fixtures.

Site savings opportunities:

- Replace High Bay fixtures with LED fixtures to save \$2120 a year for a one-off investment of \$5600.
- Replace T8 fluorescent tubes with T5 fluorescent tubes using a Retrofit Kit to save \$223 a year for a one-off investment of \$616.
- Payback period of 2.6-2.8 years.

The importance of lighting ballasts

Lighting ballasts are used as the 'control gear' for each fixture. There are two types of lighting ballast, magnetic and electronic. Electronic ballasts are more energy efficient and use 17% to 25% less energy than the magnetic type and do not tend to flicker or make a humming sound when the light is on.

Best option to save energy

Electricity and cost savings can be made at Caernarvon Orchards by replacing both the existing T8 fluorescent tubes and the High Bay (Metal Halide) lighting fixtures with more efficient bulbs.

The 28 T8 fluorescent tubes can be replaced with T5 fluorescent tubes which use approximately 30% less electricity or reduce consumption by approximately 700kWh annually.

The High Bay (Metal Halide) fixtures can be replaced with 200 Watt LED alternatives. These replacement fixtures use about 50% less electricity.

Benefits of upgrading lighting

By implementing lighting efficiency opportunities, Caernarvon could reduce the electricity it consumes for lighting by about 68% and save over \$2300 (excluding GST) annually. The orchard's total electricity consumption could reduce by 4% annually.

Installing the new bulbs would also:

Reduce maintenance costs: LEDs have a longer life than metal halides. This reduces the frequency of lighting replacements and maintenance costs.

Upgrading lighting fixtures in the Caernarvon packing shed will help save energy.



Improve power factor: LED lighting improves power factor because it reduces the amount of inductive loads at the site.

Minimise hazardous material: Metal halide bulbs contain mercury, LED bulbs do not. Installing LED bulbs will reduce the hazardous materials on site and will enable easier disposal of perished bulbs.

Provide instant light: High Bay LEDs have an instantaneous strike, eliminating the need for lights to 'warm up' before they are fully illuminated.

Implementation requirements

- Prior to installing the new lighting Caernarvon should:
- Obtain quotes and appoint a qualified contractor.
- Confirm that the existing electrical circuitry supply is compatible with the desired lighting upgrades.
- Agree when lights will be installed, noting installation must be when lights are not in use.
- Perform pre-analysis of energy consumption according to International Performance Measurement and Verification Protocol method.
- Install in accordance with Australian Standards and the manufacture's guidelines.
- After installation, measure circuit power and luminance and monitor fixtures to ensure appropriate operation.