

Imlay and Moerewa halve lighting energy in LED room trials

Affco Imlay and Moerewa replaced a sample of metal halide and fluorescent lights with a more energy efficient LED option; this halves electricity used for lighting in these rooms.

The Opportunity

Affco sites use mostly fluorescent and metal halide lamps in their light fittings. Often, these are left switched on 24/7 and need replacing regularly (every 1 – 3 years).

Although fluorescent and metal halide technologies are more energy efficient than most other lamp types, LED lighting technology development in 2013/2014 is overtaking them.

Affco sites use 5% of electricity for lighting. Replacing existing lights with LEDs would save 1.5% to 2.5% of Affco's electricity costs plus reduce maintenance costs.

Many LED replacements, as recent as 2012, have resulted in inadequate light quality and false energy saving claims.

The Solution

Brent Dowman (Imlay) and Trevor Ward (Moerewa) tried different LED technologies. Both used 200 W LED inserts to replace 400 W metal halide lamps in processing areas. Suppliers designed LED inserts to fit into the existing light housing.

These LED lights will also be switched off more often than the high intensity discharge (HID) metal halide lights. HID lamps have a 5-10 minute re-strike period, which results in people not switching them off when vacating a room.

Suppliers included Business Lighting Solutions (BLS) LEDs and Trevor Strong Electrical's Evolve LEDs. Both are included on EECA's list of approved lighting programme partners.

Freddy Woodman (Moerewa) also arranged trials to replace fluorescent tubes with BLS's LED tube equivalent. The existing fluorescent fitting required a quick wiring modification to accommodate the LED tube.



- *Three rooms fitted with LED*
- *64,600kWh saved each year*
- *\$8,600 annual energy savings*
- *Capex \$17,600 incl 20% grant*
- *Light quality improved*
- *Maintenance reduced significantly*

The Savings

The trials demonstrated electricity use halved while light lux levels were at least maintained and increased up to 40% in places. In addition,

light uniformity improved from 0.5 to 0.79 and anecdotal comments by Moerewa engineers and production supervisors are positive in that light quality is a whiter and brighter colour with LEDs than with metal halide-lamps.

Electricity use was measured. As an example, energy demand reduced from 8.4kW to 3.8 kW in the mutton slaughter room at Moerewa. Refer to table for all results.

Conclusion

A trial of LED demonstrated lighting electricity costs halve as well as maintenance costs are reduced. The cost of LED results in pay back periods between 1.2 and 2.2 years. Note however, some rooms can achieve quicker payback periods depending on operating hours and potential for increased switch off. Also, LED technology and manufacturing continue to develop rapidly, which is resulting in purchase costs being less than at the time of this trial.

The quality of light has improved. Where shadowing effects from hanging carcasses may occur then care is required with the lighting design. From these trials site engineers have learnt practical lessons when replacing existing lights with LED technologies, which has been reported separately by Trevor Ward.

Photos: Metal Halide (above) and LED replacement



LED Lighting Results

	Moerewa HID	Moerewa Fluorescent	Imlay HID
Room	Mutton Slaughter	Supervisor Office	Small Goods
Number of lights	18	14	9
Original Demand (kW/room)	8.42 – 8.61	1.96	4.05
LED Demand (kW/room)	3.74 – 3.85	0.84	0.22
Energy Saved (kWh/yr)	38,750	4,800	21,000
Energy saved (\$/year)	\$4,260	\$530	\$2,530
Maintenance saved (\$/yr)	\$730	\$220	\$335
Net CAPEX installed (\$)	\$10,287	\$895	\$6,390
Lux before	210 – 1,000	440 - 1,240	290 - 750
Lux after	400 – 1,730	460 – 1,400	560 - 1120
Payback period (Years)	2.0	1.2	2.2