



## LED (Light-Emitting-Diode) Lighting

LED technology is currently driving one of the most efficient, and fastest growing types of lighting products on the market. LEDs work by using the direct flow of electrons through the semiconductor material within the lamp (globe) to emit light. The nature of the technology is ‘solid state lighting’ which dramatically reduces energy lost as heat, instead directing a larger portion of the input energy to light emission, thus making LEDs more efficient than other common lamps on the market. Older lamps such as incandescent lamps/bulbs lose over 95% of their energy in the form of dissipated heat; this is the direct result of how they work, heating a wire filament to white heat (very hot) with only a very small percentage of the energy being radiated as visible light, the rest being waste heat. By comparison, LED lamps use a more direct conversion of energy through the semiconductor, realising visible light rather than heat. This is a much more efficient way of converting electrical power to visible light energy.

When purchasing an LED lamp it is important to check the Colour Rendering Index (CRI) on the label, verifying the lamp's capacity to illuminate an object's colour accurately compared to natural light.



The CRI scale ranges from 0 to 100, with 100 being equivalent to natural light. However the CRI is not the only item on the label to consider; luminous efficacy, input power and correlated colour temperature are all efficiency indicators of the lamp. See figure 1 for further information.

Figure 1. LED label  
source: <http://www.lightingcouncil.com.au/site/ssl/label.php>

The significantly lower heat output of an LED lamp is a big *safety* bonus, and in the case of downlights, drastically reduces the area of ceiling that has to be clear of insulation for fire hazard reasons. This translates into higher building insulation efficiency and consequential heating cost savings to the household.

The efficiency of LED lights, and their longevity are a direct \$\$ saving. LED lamps are estimated to last up to 25,000 hrs compared to 2,000 hrs for incandescent lamps and 6,000 hrs for compact fluorescents. See tables below for globe/lamp life and associated costs.

## STANDARD LAMP TYPE

	TRADITIONAL (OLD STYLE) INCANDESCENT (60W)	HALOGEN INCANDESCENT (42W)	GOOD QUALITY CFL (10W)	GOOD QUALITY LED (8W)
Lamp price	(phased out 2009)	\$3.50	\$7.00	\$12
Annual lamp operating hours	1460			
Estimated lamp life: Years @ 1460 hrs/yr (hours)	60W incandescent lamps are no longer available	1.37 (2000hrs)	4.1 (6000hrs)	17.12 (25000hrs)
Annual lamp cost		\$2.55	\$1.70	\$0.70
Annual kWh of electricity	87.6kWh	61.32kWh	14.6kWh	11.68kWh
Annual cost of electricity (25c per kWh)	\$21.90	\$15.33	\$3.65	\$2.92
Total annual cost (electricity + lamp)	\$21.90**	\$17.88	\$5.35	\$3.62

\*\* Incandescent lamps (40W - 100W) are no longer available for purchase but may still be in use.

Source: [http://www.lightingcouncil.com.au/files/LED%20Buyers%20Guide\\_2015.pdf](http://www.lightingcouncil.com.au/files/LED%20Buyers%20Guide_2015.pdf)

## COMMONLY INSTALLED DOWNLIGHT LAMPS

	50W DOWNLIGHT LAMP	35W DOWNLIGHT LAMP	7W LED DOWNLIGHT LAMP
Lamp cost	(Phased out 2009)	\$5.50	\$15
Annual lamp operating hours	1460 hours		
Estimated lamp life in years @ 1460 hrs/yr	50W downlight lamps are no longer available	1.37 (2000hrs)	17.1 (25000hrs)
Annual lamp cost		\$4.01	\$0.88
Annual kWh of electricity	73kWh	51.1kWh	10.2kWh
Annual cost of electricity (25c per kWh)	\$18.25	\$12.78	\$2.55
Total cost (electricity + lamp)	\$18.25##	\$16.79	\$3.43

## 50W downlight lamps are no longer available for purchase but may still be in use.

Source: [http://www.lightingcouncil.com.au/files/LED%20Buyers%20Guide\\_2015.pdf](http://www.lightingcouncil.com.au/files/LED%20Buyers%20Guide_2015.pdf)

- Be aware that all 12V downlights have transformers, and if replacing halogen globes from downlights with LED globes you must know whether your downlights are running off 12V (with a transformer) or 240V (without a transformer) to replace safely. If 12V halogen downlight globes are replaced with LED globes without also replacing the transformer with an LED driver the life expectancy of the LED globe will be compromised and the lamp efficiency seriously compromised. **(Note that a qualified electrician must replace the transformers).**

Contact the Energy Innovation Co-operative via email at [info@eico-op.com.au](mailto:info@eico-op.com.au) or phone at T: 03 5657 3108 / M: 0468 423 246

or visit us on

