



Energy efficient lighting

Every business uses lights, and for some businesses, lighting can account for up to 50% of energy use. There is a strong case to look at how your business can use lighting more efficiently, including upgrading to more energy efficient lighting. You could potentially reduce your lighting energy usage by up to 80%.

What does 'using lighting more efficiently' mean?

It means being smarter with your lighting – making better use of natural lighting, turning off lights when not in use, dimming lights, using sensors and controls or upgrading to lights that are more energy efficient. Energy efficient lighting uses less energy without compromising on brightness and quality.

The **Energy efficient lighting technology report** provides information on different upgrade options, including technical specifications, cost estimates and potential savings to help you determine the best option for your particular needs.

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How can energy efficient lighting benefit your business?

Every modern business should have the most efficient lighting installed and with today's technology there is no longer an excuse. As well as saving you money through reduced electricity usage, energy efficient lighting:

- will require far less maintenance as the operating life is longer
- may improve the quality of lighting, which can in turn improve productivity and worker safety
- may boost efficiency and throughput by increasing worker satisfaction and comfort levels.

Where do you start and what steps are involved?

1. Assess your needs against the current situation. This analysis should include:
 - your current lighting energy consumption and cost
 - your operating hours
 - how and where lighting is used
 - levels and quality of lighting
 - what controls and sensors exist to regulate lighting
 - levels of available natural lighting
 - staff behavioural practices.
2. Use the above information to identify where you can remove lighting altogether, replace lights, install sensors and controls, or change behaviours.
3. Determine the implementation requirements and costs.
4. Identify if staff can be involved or if specialists are required.
5. Go to market to get quotations, and carefully evaluate supplier proposals.
6. Install the new lighting system. It is useful to trial this in a small area first if you're upgrading a significant number of lights.



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What is best practice energy efficient lighting?

It is important to review the lighting operations of your facility in a holistic manner. Some steps are to:

- assess the natural light available and the potential to make more use of it in open spaces such as warehouses through devices such as skylights
- link artificial light use to natural light levels (daylight linking), using sensors and smart control systems to minimise energy use
- assess options for zoning, de-lamping, dimming or multilevel switching to reduce energy consumption
- identify low activity areas and assess the use of occupancy sensors
- review the areas (i.e. the zones) in your business with discrete lighting controls, and increase the number of zones (if appropriate) to allow lights to be turned off when areas are not used
- identify lights that could be upgraded to more energy efficient options
- assess energy efficient lighting options available to you and the potential savings for your business
- The table below provides a summary of recommended upgrade options that provide good energy savings with relatively short payback periods. Note there are other options available, some of which cost less, but have minimal savings or come with some risks, and others that have good savings but are more expensive. For details on all options, including potential savings and cost estimates, see the **Energy efficient lighting technology report**.



Lighting controls

When planning a lighting upgrade you should also consider installing an automatic control system or upgrading your existing one. Automatic controls that incorporate timers, dimmers and occupancy sensors can dramatically increase your energy savings.

The NSW Office of Environment and Heritage (OEH) has a detailed technical guide to energy efficient lighting which will help you identify appropriate and reliable energy efficient lighting for your site. The report is available at: www.environment.nsw.gov.au/resources/business/140017-energy-efficient-lighting-tech-rpt.pdf.

OEH's Calculight tool can help you identify appropriate upgrade options and compare them by cost, energy savings and payback period, see www.environment.nsw.gov.au/lightingToolApp/default.aspx.

OEH also runs training courses on energy efficient lighting. When you attend a course you will receive post-training support to help you upgrade to energy efficient lighting at your site, see www.environment.nsw.gov.au/business/lighting-training.htm.

OEH has a panel of pre-approved specialists who can assist you with a lighting upgrade project, see www.environment.nsw.gov.au/business/energy-efficiency-expert.htm.

Lighting application	Option	Energy savings	Key benefits	Issues
Office lighting – the most common lighting used in Australian offices is twin recessed 36W T8 fluorescent lamps.	Install new twin 28W T5 lamp light fittings	33%	<ul style="list-style-type: none"> • Relatively low cost • Easy installation 	
	Install new highly efficient T5 light fittings using one 28W T5 lamp	67%	<ul style="list-style-type: none"> • Long lamp life • Low maintenance 	<ul style="list-style-type: none"> • Some reduction in brightness
	Install new 30W integrated LED fittings	67%	<ul style="list-style-type: none"> • Low pay back period • Long maintenance free life • Dimmable versions available 	<ul style="list-style-type: none"> • One-for-one replacement may not be possible in some circumstances
Commercial and residential interior lighting – Low voltage dichroic halogen lamps (50W MR16), which are being phased out as a result of a government import ban in 2012, are still in use in many commercial business spaces as well as residential situations. They should be replaced as they are highly inefficient, with each light costing up to \$50 per annum to operate.	Replace light fitting with new 16W LED fittings	75%	<ul style="list-style-type: none"> • Good lighting levels • Generate less heat, so reduced load on HVAC 	<ul style="list-style-type: none"> • Fairly expensive • May not be compatible with dimming and transformer equipment
	Replace halogen lamps with 7W LED lamps	Up to 83%	<ul style="list-style-type: none"> • Low cost • Short pay back • Long lamp life • Generate less heat, so reduced load on HVAC 	<ul style="list-style-type: none"> • Beam control may differ • May not be compatible with dimming and transformer equipment • May require extra light fittings to comply with lighting standards
Large, open spaces such as warehouses – high and low bay lighting (400W mercury vapour lamps or 400W metal halide lamps). Cost to operate one high or low bay light is about \$230 per annum	Replace 400W mercury vapour lamps with new 110W LED light fittings	75%	<ul style="list-style-type: none"> • Long maintenance free life • Reaches full brightness quickly • Dimmable 	<ul style="list-style-type: none"> • High initial cost • Light distribution and beam may differ • One-for-one swap not always possible
	Replace 400W metal halide lights with new 320W pulse-start metal halide light fittings	23%	<ul style="list-style-type: none"> • Relatively low cost • Maintains light level and quality • Long maintenance-free life 	<ul style="list-style-type: none"> • Lamps degrade in output • Reduced light quality when dimming
Fire stairs, plant rooms and car parks – most commonly used is surface fitted twin 36W T8 fluorescent lamp lights	Install new 43W LED fittings with integrated power and diffuser	52%	<ul style="list-style-type: none"> • Maintains brightness • Low maintenance costs 	<ul style="list-style-type: none"> • May cause glare • Single lamp may cause 'dark' areas
	Install new 43W LED fittings with integrated power and diffuser	52%	<ul style="list-style-type: none"> • Maintains brightness • Low maintenance costs 	<ul style="list-style-type: none"> • May cause glare • Single lamp may cause 'dark' areas
Exterior lighting – most commonly used external lighting in commercial and residential applications are inexpensive 500W halogen floodlights	Install new 110W LED floodlights	82%	<ul style="list-style-type: none"> • Low pay back period • Long operating time • Dimmable 	<ul style="list-style-type: none"> • High initial cost