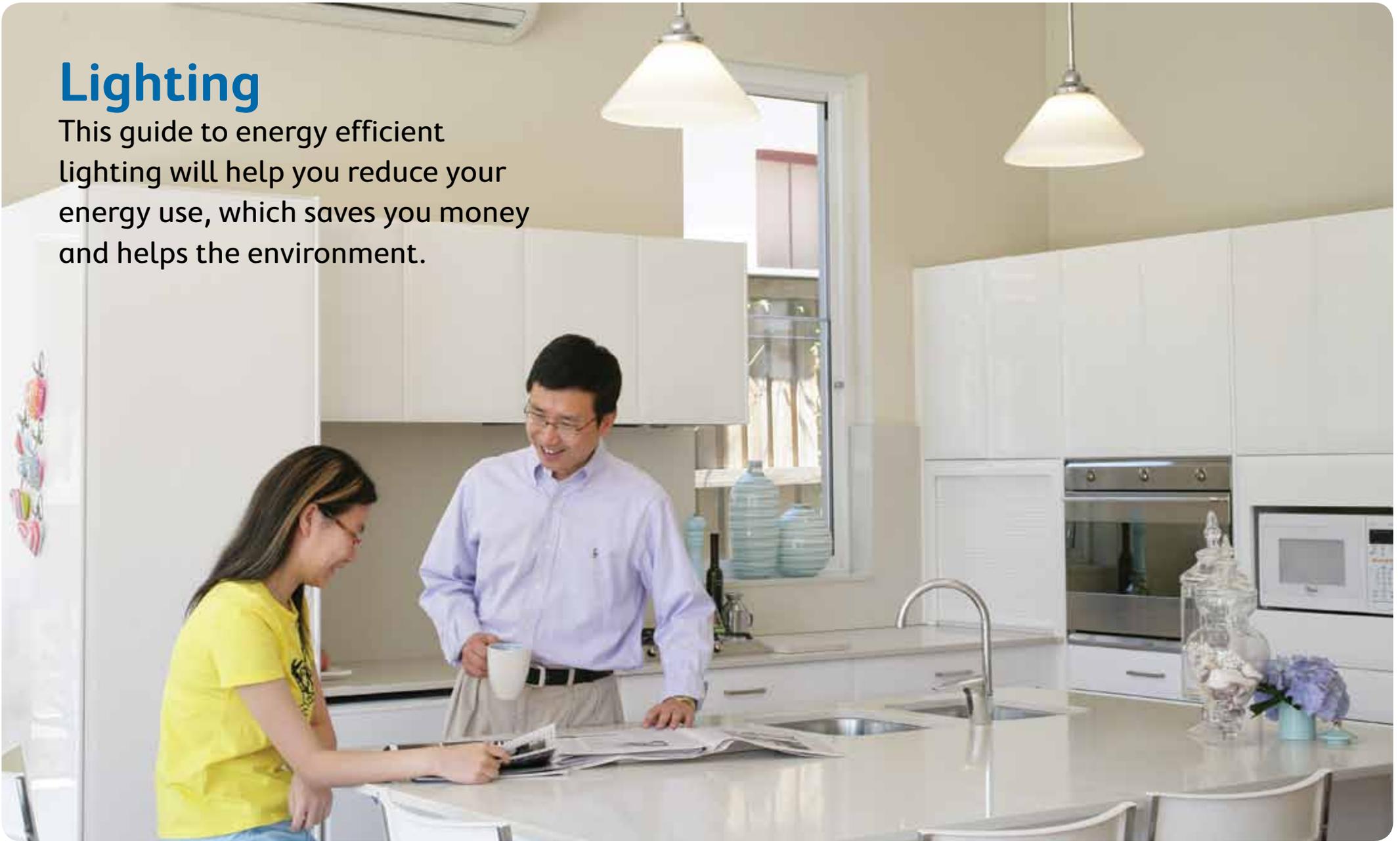


Lighting

This guide to energy efficient lighting will help you reduce your energy use, which saves you money and helps the environment.



Make the most of natural light

Choosing the best forms of lighting, light fittings and globes can be tricky. The most efficient lighting technology can save energy, money and greenhouse gas emissions. Here are some facts to consider when selecting the best lighting options for your home.

Homes that make the best use of natural lighting require less artificial lighting during the

day. When buying, building or renovating your home or business, think about ways to bring more natural light into your home. Well-designed windows, skylights and louvers let the sun shine in, which is the best lighting of all.

Some ways to bring more natural light into your home include:

- opening curtains or blinds

- creating larger windows
- installing panes of glass into solid doors
- using light-coloured paint or mirrors to reflect light and brighten the room
- installing thermally efficient skylights or solar tubes.



Did you know?

In the past, it was thought that turning the light on and off demanded more energy than leaving it on all the time, but that's not the case. Turn the light off when you leave a room for more than a few minutes.

Fluorescent lights

Fluorescent lamps use less energy than other types of lamps and last longer. Fluorescent tubes are available in a straight or circular style and are ideal for offices, kitchens, garages and workshops because they provide excellent general lighting for large spaces. Modern fluorescent lighting creates good quality light that can be used in many types of homes and settings.

Compact fluorescent lamps (CFLs) are up to three and a half times more efficient and can last up to seven times longer than halogen bulbs. Replacing a typical 52W halogen globe with a 15W CFL, will save 37W of power. This will save \$15 per year for a globe used for four hours per day.



Disposing of a broken CFL

Although the mercury content of CFLs is small, if you break one, you should dispose of it carefully by:

- Opening nearby windows and doors to ventilate the room.
- Wearing disposable gloves and using a brush to carefully sweep up the pieces.
- Using a moist paper towel to wipe away any fragments.
- Placing all the pieces of the light bulb and cleaning materials into a sealed plastic bag for disposal in the outside bin – do not place in the recycling bin.

Modern CFLs are available in warm or cool colours and in a variety of shapes and sizes. You can also buy dimmable CFL lamps.

Dusting and cleaning CFLs and light fittings will maintain optimum light output over their extended lifespan.

Lighting options

Incandescent lighting

Incandescent globes create light by passing electricity through a wire filament. Incandescent bulbs are the least efficient globe available – 95 per cent of the energy used to generate light is lost as heat. They are cheap to buy, but cost more to run than CFLs and need to be replaced more often, making them more expensive and greenhouse gas intensive.

There are many kinds of common filament globes available:



Standard incandescent globes are pear shaped and have a bayonet or screw type fitting. They are

used as decorative bulbs, pilot or as oven and fridge lights. Although these were the most widely used type of bulb in homes, their availability is limited with most common types of incandescents now banned from sale in Australia.



Standard halogen globes are a variation on the standard incandescent globe. The wire filament is replaced with a

halogen bulb. This new globe looks the same as the standard light globe, is fully dimmable but uses 30 per cent less energy and lasts twice as long. These lamps offer the closest 'like for like' replacement for the old style globes. While they are more efficient than the standard incandescent, they remain over three times more expensive to run than CFLs. Where CFLs are not suitable, such as certain dimming situations, these globes are an alternative.



Halogen downlights are used extensively in modern household

lighting and many retail stores. There are two main types of halogen downlights – mains or high voltage (240 volt) and the more common low voltage downlights. Downlights are useful when you wish to highlight an area or object, as they create a direct beam of light. However, halogens are an inefficient form of general room lighting because up to six downlights may be needed to light the same area as one CFL.

If you have halogen downlights, there are several simple steps you can take to reduce your energy bills. These include:

- Replacing older iron-core low voltage transformers, which are usually recessed in the ceiling above each downlight, with more efficient electronic transformers. This will save about 15 per cent on running costs.
- Replacing halogen lamps with new, more efficient infrared coated lamps (IRC). These lamps use 30 per cent less electricity than standard halogen globes.
- Swapping low voltage halogen downlights with CFL or LED downlights, saving up to 75 per cent on running costs. Seek advice from a lighting specialist before attempting to make these changes as some available options do not provide equivalent light.



Reflector lights are commonly used for outdoor lighting. A typical example of this globe is the PAR

38 lamp used in exterior security lighting which uses 150 watts or more. Other types of reflector lamps include infrared heat lamps in bathrooms, which typically use between 250 and 375 watts.

If you have reflector lights you can save money by:

- Replacing high wattage incandescent outdoor lamps with CFL alternatives.
- Considering 2-in-1 heating/lighting systems for the bathroom. Most of these have dual controls which allow the infrared heat lamps to be operated separately and used only when required in winter. Use a CFL for the lamp lighting to save more.

LEDs



Light emitting diodes, also known as LEDs, are expected to be the future of efficient lighting technology due to their long lifespan and potential for high efficiency. LEDs have been commonly used for indicator lights, traffic lights or display lighting, but are increasingly being used for more general lighting in homes and businesses.

Although LED lamps currently have a higher purchase price, they can be more energy and cost efficient over the long term. But, it's important to make informed choices when buying LEDs, as the LED lamps commonly available vary widely in lighting quality and efficiency. Currently, the better LED lamps are about as efficient as CFLs.

The right choice

Where natural lighting is not an option, it is important to make the right choices when choosing lamps, light fittings or even when designing the spaces that you need to light.

Make it efficient

- Use the lowest wattage, highest efficiency lamp to light the area. At present, fluorescent lighting offers the most cost and energy efficient way to light your home or business.
- Choose light fittings with reflectors and diffusers to direct light effectively.
- Replace worn out globes with newer technology to reduce running costs.
- Consider solar powered lights for outdoor lighting and use timers and sensors to limit the hours they are on.

Select the right light for the space

How you use a space determines how it can best be lit. Hallways and bedrooms, for example, may not need to be as bright as a kitchen or stairwell. Here are some questions to consider when selecting light fittings for a space:

- What happens in the space and how bright does the light need to be?
- Can task lighting meet the lighting needs rather than lighting the whole room?
- Does the lighting need to be dimmable?
- For lighting interiors what lighting colour temperature would you prefer?
- Is it important to have feature lighting such as wall wash or spotlighting?
- Are there any safety issues to consider, such as lighting a staircase?



Comparison of colour temperatures. From left: cool white, neutral white, warm white

Image courtesy of Digilin Australia

Standard incandescent globes		Standard halogen globes		Compact Fluorescent Lamp (CFL)		CFL savings per year	
Watts	Yearly running costs \$	Watts	Yearly running costs \$	Watts	Yearly running costs \$	Replace an incandescent globe	Replace a halogen globe
25	\$9.90	18	\$7.10	5	\$2.00	\$7.90	\$5.10
40	\$15.80	28	\$11.00	8	\$3.20	\$12.60	\$7.80
60	\$23.70	42	\$16.60	12	\$4.70	\$19.00	\$11.90
75	\$29.60	52	\$20.50	15	\$5.90	\$23.70	\$14.60
100	\$39.40	70	\$27.60	20	\$7.90	\$31.50	\$19.70

Note: Running costs are based on an average use of four hours per day per year and calculated using the regulated retail electricity tariff for the Ausgrid network area from 1 July 2012 (inc GST).

Ways to save

Efficient use

Even the most energy efficient lighting can be costly to run if it is not used efficiently. Here are some efficiency tips to help further reduce your lighting energy use:

Turn it off or control it

- Light only the spaces you use.
- Turn the light off when you leave a room.
- Use dimmers to set preferred light levels. A dimmed light uses less energy.
- Use sensors to control security lights.

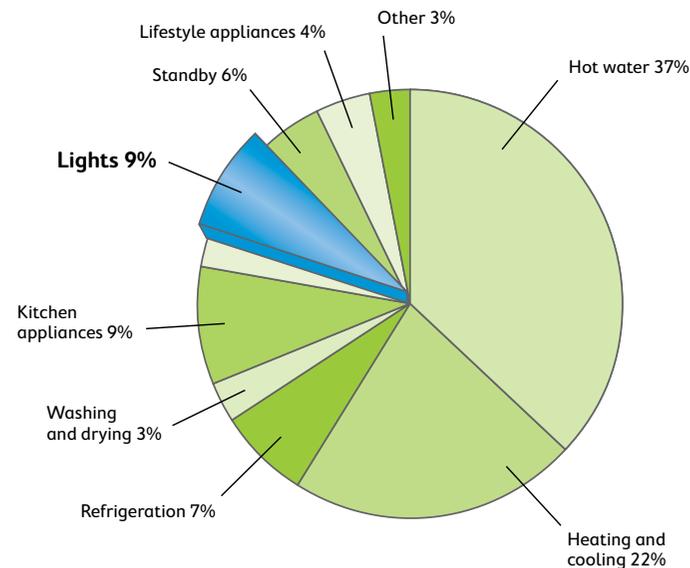
Use it and maintain it efficiently

- Use task or purpose lighting in work spaces, such as fluorescent tube or LED strip lights over a kitchen counter. These light a work space more effectively than a large, multi-globe fitting in the centre of the room or a series of recessed downlights.
- Install and use switches for individual lights to improve control and efficiency or install a dimmer to create atmospheric lighting.
- Clean light fitting regularly. Dust and dirt on light fittings can reduce light output by up to 50 per cent.



Average household energy use*

The average household spends around 9% of their annual energy bills on lighting.



*Average household energy usage is based on a typical 3-person household in Sydney with all electric appliances, 500 litre fridge, reverse cycle air conditioning, clothes dryer, dishwasher and halogen lamps. Hot water usage is based on a 7 minute shower per person per day with a standard showerhead on an off peak tariff. Actual energy consumption will vary depending on appliance usage, model and type.

The phase out of inefficient incandescent light bulbs

The Australian Government is working with the states and territories to phase out inefficient incandescent light bulbs. The first stage started in 2009 with the phase out of inefficient standard incandescent globes from sale in Australia. Other types of inefficient incandescent lamps will be restricted from sale in the future, by applying minimum energy performance standards. For further information visit <http://www.climatechange.gov.au/what-you-need-to-know/lighting.aspx>

Sensors and timers

Even a few external lights left on all night or during the day may nearly double a home's lighting costs. Lighting controls, such as motion sensors and timers, improve efficiency and save the cost of running external security and outdoor lights throughout the night.

Use this table to compare lighting options and choose the right lights for your home and lifestyle.

Lamp types	Incandescent		
	Standard incandescent 	Standard halogen 	Reflector lamps 
Considerations	This technology is more than 125 years old and less than 10 per cent efficient. Incandescent globes are currently being phased out and many models are no longer available in Australia.	More efficient than incandescent but running costs over three times more than an equivalent CFL. Fully dimmable and closest 'like for like' replacement for the old style standard globes.	Often used for outdoor lighting and as heat lamps for bathrooms. Inefficient for general lighting with CFL a better option in most instances.
Efficiency compared to incandescent lighting	Not applicable	About 30 per cent more efficient	Similar to standard globe
Average lamp life (hours)	1,000	2,000	2,000
Typical wattage	25 to 100 watts	18 to 75 watts	25 to 150 watts (standard) 150 to 375 watts (heat lamps)
Running costs	Very high	High	Very high
Purchase cost	Low	Low to medium	Low to medium
Colour appearance	Warm	Warm	Warm
Best used	Specialty applications or where no other options available.	Best used where dimming is preferred or where CFLs are not an option.	Bathroom heat lamps or spot lighting applications where CFLs or halogen globes are not an option.
More efficient alternatives	CFL, LED or standard halogen globes.	CFL or LED	CFL or standard halogen globes.

Comparison of lighting options

	Fluorescent		LEDs
Halogen downlights 	Linear fluorescent 	CFLs (Compact Fluorescent Lamps) 	LEDs (Light Emitting Diodes) 
Inefficient for general lighting as several low voltage halogen lamps may be needed to light the same area as one overhead globe. Infrared coated lamps (IRC) are the best choice saving 30 per cent compared with a 50 watt lamp.	Popular in offices, they are an efficient light source especially as newer technologies such as T5 and tri-phosphor lamps further reduce power usage and improve lighting quality. Lamps come in a range of colour temperatures, shapes and light output levels.	An efficient replacement for traditional incandescent lamps. Dimmable versions are now available, along with warmer colours for improved colour quality.	LEDs have a long life, can be highly efficient and are becoming more widely available.
Typically 20 to 50 per cent more efficient	Up to 90 per cent more efficient	Up to 80 per cent more efficient	Typically 50 to 85 per cent more efficient
1,000 to 5,000	6,000 to 25,000	6,000 to 15,000	10,000 to 50,000
20 to 75 watts	14 to 60 watts per lamp	4 to 25 watts	1 to 20 watts
High to very high	Low	Low	Low to medium
Low to medium	Medium	Low to medium	High to very high
Warm	Cool to warm	Cool to warm	Cool to warm
Best for spot or task lighting.	Wide application in homes and businesses.	CFLs can be used in standard light fittings.	Specialty applications where long operation hours are required or maintenance may be difficult.
35W IRC lamps. CFL and LED downlights are a possible option but seek specialist advice.	T5 lamps and electronic ballasts.	Linear fluorescents offer higher efficiencies for general lighting. Some premium LEDs are more efficient, but can be costly to buy.	Fluorescent lighting remains the most efficient lighting option for most household and business lighting.



Lighting 2012/2013

For more information on how to save on your energy bills, visit our website at www.ausgrid.com.au/save or call 13 15 25.



Globe images courtesy of OSRAM Australia

