



Lighting Your Home

Fluorescent Lighting, save energy and money



Now that incandescent lights are no longer sold most people are buying Compact Fluorescent Lights (CFL's) for lamp replacements.

So why did the Federal Government phase out incandescent lights?

Because CFL's:-

- 1) last up to 8 times longer than incandescent lights and
- 2) produce the same amount of light for 25% of the energy consumption

This translates to a saving of between \$30 and \$70 over the lifetime of the bulb, pretty good for an investment of \$6 (and less in bulk)! And you don't have to change light bulbs nearly so often.

CFL's contain an electronic ballast and fit normal bayonet or screw fittings. No problem, just replace your existing lamps when they burn out or, if you have done the calculations, you may wish to change-over immediately to begin saving energy and money now. The new generation of CFL's are much smaller and lighter than the first generation and are flicker free. They provide good brightness on start up and maximum brightness after one minute.

But what about the quality of light???

The quality of light in CFL's is now excellent and can be used in virtually any light fitting and any location around the house.

They are available in a range of colour temperatures, using different phosphors to achieve the perceived colour. "Warm White" runs at a colour temperature of 3000⁰K which is similar to incandescent (yellow tinge), "Cool White" runs at 4000⁰K (white) and "Daylight" has a colour temperature of 6500⁰K (blue tinge).

Generally Warm White is used in living rooms and bedrooms and Cool White is used in service areas. Try out the tube colour types in your local lighting shop to see which you prefer.

Lamp Shape

Compact fluorescents now come in a variety of shapes, linear, corkscrew, and enclosed. Talk to your lighting shop to choose the correct shape to match your fixture and application. Generally anything which emulates the traditional lamp will work well in a light fitting but some fittings allow for elongated lamps giving better light output. There are now even candlelight CFL's.



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In General

Whatever type of lighting you use in your home, the less they are on, the less electricity you will use: saving you money and reducing your environmental impact:

Quick Tips:

- Turn off lights when not in use
- Rather than lighting a whole room, use 'task' lighting
- Use motion sensors for outdoor lights
- Clean light bulbs and fixtures regularly
- Use timers if motion sensors are too expensive

Other Types of Lighting

Mains Voltage Halogen (MVH) bulbs

Slightly more efficient than the traditional incandescent lamp a typical incandescent of 60W is rated at 42W for an MVH. Whilst considerably less efficient than a CFL (12 W) they are useful where dimming, touch lamp control or accurate colour is needed.

Low Voltage Halogens

Halogen lamps are considerably less efficient than compact fluorescent lights and when used in downlights, the large number of halogens used vastly increases the energy consumed to light the room. Lamp life on average is about 2-5 times shorter than fluorescent. Use halogen lighting sparingly where bright task-lighting or accenting is required but better still consider CFL's or Light Emitting Diode (LED) lighting.

CFL Downlights

Why Recessed Halogen Downlights are bad news

Because halogens run so hot, they require a 90mm radius circle clear of the insulation around them. If you think of the ceiling insulation as the doona of your house, these gaps around the downlights are the same as cutting holes in your doona! In a 20m² room with 8 downlights you will have an uninsulated area of only 1% by area, but will increase heat loss by 15%, not including heat losses due to infiltration (warm air venting out through the downlights themselves). In addition, the 8 downlights draw 500W of power when the same light levels in the room could be achieved with two 25W surface mounted CFL fixtures.

These have been on the market since about 2005 and are a big improvement over the halogen downlights. Coming currently in 7, 9, 11 and 18 W sizes, the 18W bulb is roughly equivalent to a 100W light. Running on 240V they don't have a transformer but you can use the same hole in your ceiling if you decide to replace your halogen downlights. You'll need an electrician to do the wiring. You can also now buy dimmable versions of the CFL's.

Pros:

- Much lower energy consumption while still acceptable levels of light.
- Downlight covers can be fitted with close tolerances so insulation can be packed closer to the sides than with halogens.
- Lamps last much longer so lower maintenance.
- Lower whole of life cost than halogens due to low energy costs and lower replacement.
- More expensive versions are dimmable.

Cons:

- Central beam intensity is still less than halogen but the light spread is broader
- Downlights are still a very inefficient way to light a room as many fixtures are required due to recessing and narrow beam angle.

LED Lights

These are predicted to be the lights of the future.

They have three main benefits:

1. Experimental LEDs have attained very high efficiencies
2. They last a very long time- 50 000 hours, the equivalent of nearly 6 years continuous running. You'll never have to change a light bulb again.
3. Because of their high efficiency they run much cooler than halogens allowing you to insulate closer to the recessed downlights removing a big energy loss from your home. But you still need to maintain a small gap around the fitting so that the heat sink can work well which maintains the life of the light



LED's are still expensive, \$150 for a quality version, but are being applied now in commercial signs, decorative lighting, car and traffic lights and outdoor low voltage garden lighting.

Residential lighting will see lights similar to the one above later this year but will probably cost \$70 - \$100 initially.

Windows:

To many, the best light is natural light so maximising windows would seem a logical way to reduce the need for artificial light. Unfortunately, even the best windows allow a much greater heat flow than does a similar area of insulated wall. In general, windows on the northern face of a house in Canberra are beneficial to a house's comfort and energy performance while windows on the East, West, and South can cause discomfort and are potentially great energy loss makers. Remember, it's always cheaper to turn on a light than to use active heating or cooling. For more information, see the HEAT Windows Factsheet.

Skylights

Skylights provide natural daylight to rooms that would otherwise require lighting. Unfortunately, they also allow large quantities of heat to enter in summer and heat to be lost from your house in winter.

How do you get light without heat in a dark room?

1. The simplest and cheapest solution is to install an energy efficient light fixture (you can even pay a bit extra and get a daylight spectrum fluorescent). OR
2. Use a daylighting device. Choose one with a highly reflective internal surface and made of a material which gives good colour transfer.
3. Using a clerestory window (high level vertical window) instead will reduce summer heat gain and reduce winter heat loss if it is facing north but be sure to include an eave above your windows.
4. If you insist on a skylight, buy the best you can afford. Features such as double glazing, block out blinds, and low emissivity glass all help to reduce the inherent problems in our climate caused by skylights.

Lighting Myths

Myth 1: Low voltage means low energy use

Voltage refers to the "strength" of the electricity flowing, not the amount of energy consumed. The energy that a lamp draws is the measure of the power of the lamp and the time the lamp is on. Low voltage lights typically use high energy 50W lamps and an additional 5-15W used in their

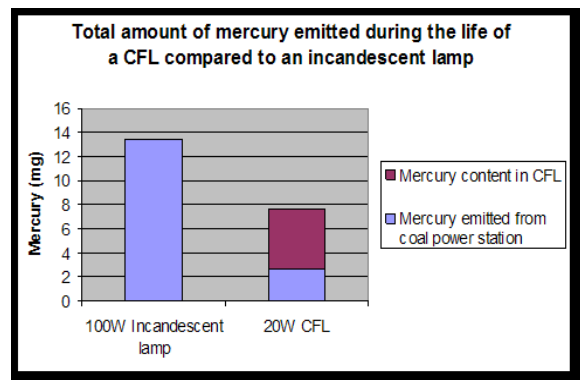
transformers. CFLs by comparison use between 12 and 21W and don't require transformers.

Myth 2: Turning fluorescents on and off uses all my savings in power

The idea that you are better off leaving a fluorescent on for hours rather than turning it off came about because old magnetic ballasts had a high inrush current on start up which consumed energy for a short while, so excessive switching was not recommended. Not so with modern electronic ballasts. If you're going to leave the room for more than 10 minutes, turn off the light.

Myth 3: Fluorescent lamps are bad for the environment because they contain mercury

All fluorescent lamps contain some mercury but this is being reduced with each new generation of lamp. About 5 times more mercury (and other pollutants) is being released into the atmosphere from burning coal to provide the power for inefficient incandescent lamps AND now Canberra Waste Transfer Station recycle CFL's.



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Miscellaneous Tips:

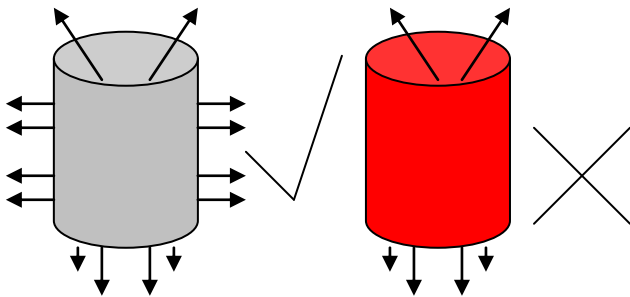
- Use light-coloured paints inside your house. Dark wall and ceiling colours absorb light, increasing the amount of lighting needed.
- Modern dimmer controls reduce greenhouse gas emissions as they reduce light output and extend lamp life. If you are buying new dimmable fixtures, ensure that dimming the light fixture does reduce power use.
- Automatic timers turn off after a set intervals or you can use sensor lights; great for service area.

Get the most out of your fluorescent lamps and fittings.

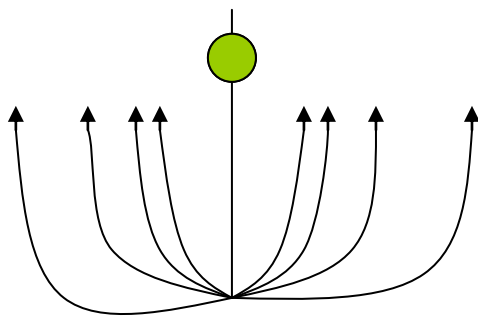
Good lighting mixes direct and indirect light. Direct is ideal for detailed work such as over kitchen benches or lighting an art-work. Indirect is excellent for providing general lighting for movement around a room or accessing items in cupboards. It provides a safer, more even light source. Dark walls or ceilings make the lighting requirements more difficult as much higher powered lighting is needed.

1. Pendants

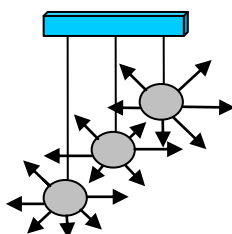
Use translucent diffusers with folded or spiral CFL's for best distribution of light. Opaque materials impede the light output creating a dark space with shadows.



If you must have a candelabra use mini fluorescent candle lamps

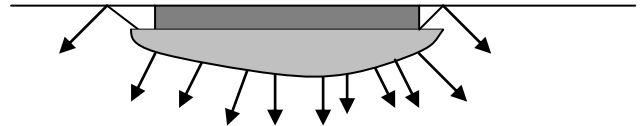


Decorative pendants can use round CFL's without diffusers.



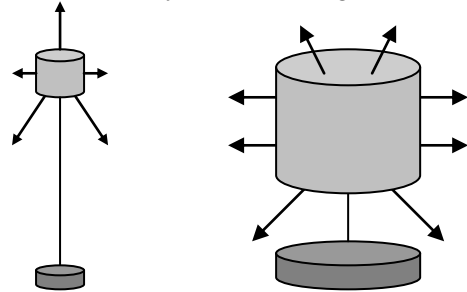
2. Surface mounted fittings

These allow even distribution of light to all surfaces and thereby avoid dark spots.



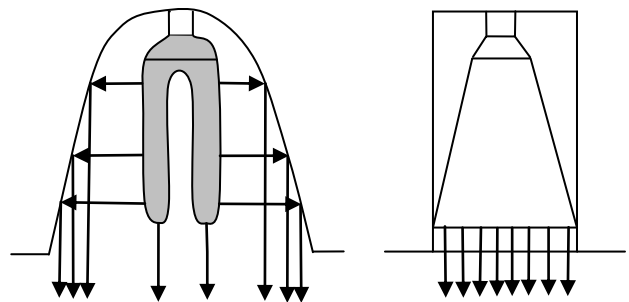
3. Lamps – standing or desk

Often used instead of existing downlights in a room, gentler more evenly distributed light and cheaper to run.



4. Metal Canister downlights

Choose the fluorescent lamp type for shape of canister



A range of other fact sheets on saving energy and money in your home are available from HEAT

