

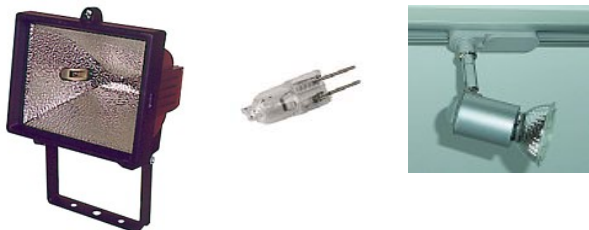
Lighting

Why is my choice of lighting important?

In homes and commercial buildings that are not heated electrically, lighting typically accounts for around 15%, but can often account for over 50%, of electricity consumption. This is much higher than it needs to be because most lighting is provided by highly *inefficient* 'filament' lamps i.e. light fittings that use lamps (bulbs), which have a 'glowing wire' inside them, such as those below:



The above are typical of the type of lamp fitted in most domestic table-, standard-, wall-, ceiling- and spot- light-fittings. A type of filament lighting that is becoming increasingly popular employs halogen-filled filament lamps. These are usually miniature decorative spotlights or external floodlights (often used for security lighting) e.g.



Many of these small lamps are lit via a low voltage transformer. Contrary to what you may think, they do not use significantly less electricity than ordinary filament lights. All filament lighting is not only up to five-times more expensive to run than modern alternatives, it also results in up to five-times more electricity being consumed. As most electricity generation produces large amounts of carbon dioxide, inefficient electric lighting is therefore up to five times more environmentally damaging than modern high-efficiency lighting.

Why are filament lamps inefficient?

When the light is switched on, electricity flows through a thin metal wire usually made of tungsten. The wire gets very hot and glows so brightly that it lights up the room. But 90% of the electricity passing through the wire is wasted because it generates unwanted heat and so leaves only 10% to generate light (this is why a lit bulb will burn you if you touch it). Because of the heat that these lamps produce, it is common for a light fitting to have a maximum lamp size recommendation e.g. table lights with shades often recommend a maximum 60watt lamp to be used.

What 'efficient' alternatives are there?

Fluorescent lighting is currently the most easily available form of high-efficiency lighting. In addition to long tubes,

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fluorescent lamps come in all shapes and sizes. They can be adapted to fit most light fittings that accept bayonet or screw caps and can be used for most purposes. Some examples are shown below:



The above are often called 'Energy-Saving Lamps' or 'Compact Fluorescent Lamps' (CFLs). The different 'bulb-type' shapes are just glass covers over a miniature folded fluorescent lamp. The above all have electronic controls built into the white

cap but you can buy special light fittings that have built-in lamp controls instead. This means that lamps without control caps can be used. These lamps are cheaper, smaller and generally last longer than those lamps with built-in controls. In addition, they can also be used with dimmer switches whereas the lamps with built-in controls cannot be.

Halogen lighting

CFLs are available as a direct replacement for halogen-type, dichroic, mini spot lamps - but only the mains voltage GU10-type (use 7w or 9w to replace 35w/50w).



9w GU10 CFL

In addition, a new form of **light emitting diode (LED)** lamp has been developed which may be used to dichroic MR12 (low voltage) as well as GU10 spot-lamps. LED lamps typically use around one twentieth of the electricity and last up to 50 times longer than their halogen counterparts. Currently LED replacement lamps cost around £12



38LED MR16

each but over their lifetime would only use around £20 of electricity. Over the same period, replacement halogen lamps would have cost around £70 and they would have

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used around £200 of electricity. The light output from LED lamps varies according to the type and number of individual LEDs fitted in the lamp. Replacement lamps for MR12 and GU10 halogens are available in a variety of outputs but in general none are quite bright enough as direct replacements for the 50w lamps. However, some of the better LED lamps are equivalent to around a 30w halogen. It should be noted that if you use MR16 LEDs it is advisable to use a transformer recommended by the lamp supplier rather than the halogen lamp transformer (cost c. £10).

Strip Fluorescent lamps

All fluorescent lighting is more efficient than filament lighting but some fluorescents are more efficient than others. Older fluorescent light fittings have start-up controls that are driven by a fairly inefficient transformer and capacitor system and the tubes themselves do not emit as much light as newer tubes. If you have old 35mm (1½ inch) diameter T12 fluorescent tubes, replacing them with 26mm (1 inch) T8 tubes will reduce electricity use by 10%. Replacing the light fitting with new mains-frequency controlled fittings will save a further 10%.

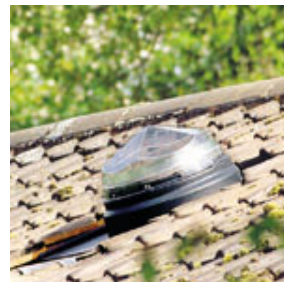
The ideal replacement would be T8 or T5 triphosphor tubes with high-frequency controlled light-fittings. This form of lighting is around 50% more efficient than the old T12 tubes and fittings. It also has the added advantage of allowing dimmer controls to be fitted. This is particularly useful in commercial buildings that have lights near windows as the lights can be linked to sensors that automatically dim the

lighting when daylight is bright. High-frequency lighting also has the advantage of having no visible lamp flicker and smoother, faster start-up times.

Utilising Daylight

Natural light is obviously the most energy-efficient form of lighting. Consider placing windows wherever possible. If some areas cannot be lit by daylight, it may be worth considering installing 'Sun Pipes'. These are highly polished tubes, which are used to direct and concentrate daylight from a small roof window down into the area to be lit. These are particularly useful for areas in a building that would otherwise need continuous artificial light.

Costs start from around £200 for a complete kit (excludes installation).



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Best Tips for Energy Efficient Lighting

1) Replace all standard filament spotlights, candle-shaped and rounded bulbs with energy-saving miniature fluorescent lamps – there should be one that will fit in your light fitting.



2) If you have dimmer switches and you don't want to do without them, consider installing light fittings/adaptors that have built-in electronic controls to accommodate dimmable fluorescent lamps such as:



Ceiling fitted down lights

Wall Lights

3) Don't fit internal halogen lighting! – If you want spotlights consider energy-saving spotlights in standard spotlight fittings.



4) If you have many mini halogen spotlights consider replacing the lamps with LEDs

5) Do not use external halogen lighting for anything other than sensor-controlled lighting – if you want outside lighting consider installing separate fluorescent floodlights.



6)

Replace old large diameter (35mm/1½ inch) T12 fluorescent tubes

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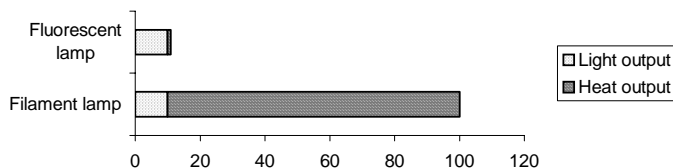
with T12 (26mm/1 inch) tubes for a 10% electricity saving – better still replace the lamp and fitting with high-frequency fittings and T8 triphosphor tubes for a 50% saving.

7) Always buy the most efficient equipment – it will be stamped with this logo



Comparing filament lamps to fluorescent lamps

Typically a fluorescent lamp uses up to 5 times less electricity than a filament lamp when providing a similar light output. This is because fluorescent lamps do not produce heat and so do not 'lose' valuable electricity the way filament lamps do.



This means that if you are replacing a filament lamp with a fluorescent lamp, a much lower wattage lamp is needed to provide the same light e.g.

25watt filament bulb is equivalent to 3-7watt CFL

40watt filament bulb is equivalent to 7-10watt CFL

60watt filament bulb is equivalent to 12-18watt CFL

100watt filament bulb is equivalent to 20-25watt CFL

This also means that you can put a much brighter fluorescent lamp in light fittings without the risk of the heat damage that would occur if you fitted a brighter filament lamp.

EXAMPLE: over its 12-year lifetime a 20w CFL used 3hrs per day will use around 260kwh of electricity. That means electricity costs of at around £26 and CO₂ emissions of 110Kg. Over the same period you would need fifteen 100w filament lamps which will use around 1300kwh. That means electricity costs of at around £130 and CO₂ emissions of 550Kg. Also a CFL costs about £3 and fifteen 100w ordinary bulbs about £10.

DON'T FORGET – IF YOU WANT TO REALLY HELP THE ENVIRONMENT, TELL YOUR ELECTRICITY SUPPLIER THAT YOU WANT TO SWITCH TO A 'GREEN TARIFF' OR CONTACT US ON 0800 512012 FOR A LIST OF 'GREEN ELECTRCITY' SUPPLIERS SO THAT YOU CAN COMPARE THEIR TARIFFS.

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More Information

Company	Website/ email address	Telephone Number	Address
Screwfix (Mail Order)	http://www.screwfix.com	0500 41 41 41	Freepost: Screwfix Direct, FREEPOST, Yeovil, BA22 8BF.
Low Energy World (Mail Order)	http://www.lowenergyworld.com	0845 0600 222	Low Energy World, 38 Carter Street, Uttoxeter, Staffordshire, ST14 8EU
Lighting Direct	http://www.lighting-direct.co.uk/enquiries@lighting-direct.co.uk	01923 333000	Unit 39, The Wenta Business Park, Colne Way, Watford, Hertfordshire, WD24 7ND, U K
Eurobatteries (Mail Order)	http://www.eurobatteries.com	01454 416005	Unit 5 Shortway. Thornbury. Industrial Estate. Bristol. BS35 3UT
EXCLED Ltd.	sales@led-lightbulbs.co.uk	01453 756361	The Old Cottage, Piccadilly Mill, Lower Street, Stroud. GL5 2HT
The Lightbulb Company	http://www.thelightbulb.co.uk/enquiries@thelightbulb.co.uk	01865 205500.	Thomas Edison House, 74 - 77 Magdalen Road, Oxford OX4 IRE.
Hendra Renewable Energy Solutions	www.solarcornwall.co.uk Sun pipes etc	01566 779542	SJ Yeo Electrical Launceston
Light Bulbs Direct Ltd	info@lightbulbs-direct.com http://www.lightbulbs-direct.com/articles.asp	01494-723286.	40a Highland Road, Amersham, Bucks. HP7 9AY
Efficient Lighting	www.efficientlight.co.uk info@efficientlight.co.uk	08702 425384	Radford, Woodside, Greenbank, Plymouth PL14 8QE
www.megamanuk.com		0845 408 4625	

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http://www.lyco.co.uk/products/23W-SCREW-DIMMABLE-LOW-ENERGY-BULB.htm?prodID=3163			
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