



## Lighting

Low Energy Light bulbs can use 80% less electricity than old bulbs. Or to put it another way, lighting accounts for 8% or more of a typical household's energy bills: cutting your lighting bill is one of the easiest ways to save energy and money in the home.

If you already have compact fluorescent (CFL) light bulbs around your home then, consider replacing the CFLs with LED light bulbs in the hall, landing and anywhere else that always seem to be on in your home whether for security reasons and/or forgetful family members.

### Replacing bulbs

Whether you rent or own your property, you can save money today by changing the way you use your lights by fitting new energy-saving lights.

- if you replace a traditional light bulb with a compact fluorescent bulb of the same brightness you will typically save around £3 per year, or £50 over the life of the bulb
- if you replace a halogen down-lighter (spotlight) with an equivalent LED you will typically save around £4 per year, or about £140 by the time you have to replace the bulb.
- If you replace, x1 compact fluorescent bulb with an LED (of the same brightness) you will typically save approx. £8 per year.
- If you replace, x1 traditional light bulb with an LED (of the same brightness) you will typically save approx. £11 per year.

Many homes today use a mixture of standard light fittings and halogen down-lighters or spotlights (mainly in kitchens and bathrooms). There are low-energy alternatives for both these types of light:

- Compact fluorescents (CFLs) – these are what most people think of as an energy-efficient light bulb. A cost-effective option for most general lighting purposes, and now widely available in a huge range of sizes, fittings and styles.
- LEDs – even more efficient, and the ideal replacement for halogen downlighters. More expensive than CFLs but save even more money in the long term.

### Types of LED light bulbs

- GLS = traditional-looking bulbs,
- GU10 = spotlight (halogen replacement)
- Candle = small light bulb (with small fitting generally for bedside lamps etc.)
- E27 = Standard Screw fix / E14 = Small Screw fix
- B22 = Standard Bayonet / B15 = Small Bayonet





Ofcourse, the easiest way to save on your lighting bill is simply to turn off the light when you're not using it. You will ALWAYS save energy if you turn the light out when you leave the room, even if it's only for a minute or two.

### Using less lighting

We all need light to do the things we want to do, but sometimes we leave lights switched on when we don't need to, or we use more lights than we need. The basic message is simple – turn it off if you don't need it. But here are a few tips to help...

- ALWAYS turn the lights off when you leave the room. Whatever type of lights you have, you will save energy by turning them off even for a few seconds
- Most types of light bulb will last longer if you don't switch them on and off repeatedly throughout the day. But you won't save money by leaving any type of light on for a few minutes just to try and make it last longer. Just turn it off when you don't need it and turn it back on again when you do. Simple.
- Try and arrange light switches so that it's easy to turn them off. Most houses are wired so you can switch the landing light on at the top or the bottom of the stairs. Make sure you can do this wherever it will help, usually at every door to a room or corridor. Otherwise you may be tempted to leave the light on for later
- If you have external lights, then a sensor that turns them on when you approach will make them much cheaper to run. If you fit a time switch too, they won't keep coming on all night whenever a cat walks past.
- Use the right light for the job in hand. If you're watching television you probably only want low level background lighting, but if you're reading a book you will want something bright but local.
- Having a range of lights in a room, all with separate switches, will make it easier to achieve the lighting you want and need, whenever and wherever you want it. And you'll save more energy than you would by using a single dimmer switch for the whole lot.

### How the lighting looks



#### Light output

We've probably all bought a low-energy light bulb at some point and been disappointed with the result. It said "60 watt equivalent" on the packet, but when you switch it on in your home it just wasn't that bright.

The problem is that "60 watt equivalent" doesn't actually mean anything precise. The 60W figure is a measure of the electricity consumption of an old inefficient bulb, and is not a

measure of brightness.

Lighting manufacturers are now required (by European law) to describe the brightness of the bulb on the label in terms of Lumens. For example, an energy efficient bulb that claims to be the equivalent of 60 watts traditional bulb, must have a minimum brightness of 700-750 Lumens.

If you want to know how bright a light bulb really is you need a figure that measures its actual light output. Fortunately, bulb manufacturers now have to quote the light output on all new bulbs. Once all the old stock has been cleared from the shelves, every new bulb you



see in the shops will have its light output in Lumens clearly printed on the packet.

What does this mean?

### Matching lumens to Watts for GLS bulbs

Lumens	GLS equivalent	Where to use it
1700+	125-150 W	Extremely bright bulb for areas where a lot of light is required; senior citizens, care centres require a lot of light.
1,200 to 1,300	100 W	Usually the brightest bulbs in the house, single light fittings for lighting the whole room.
700 to 750	60 W	Wherever a less bright bulb will do, e.g. smaller rooms, rooms with more than one fitting.
350 to 400	40 W	Individual reading lamps, fittings that take more than one bulb.
200 to 225	25 W	Usually used to give ambient effect only, or to light cupboards etc.

### Matching Lumens to Watts for halogen down-lighters

When it comes to replacing halogen down-lighters with LEDs, the numbers are slightly different. LEDs are naturally directional and don't need reflectors to make them into spotlights.

Also, halogens are often fitted in large numbers and may be giving off far more light than is actually needed. This means that an LED may be able to replace a halogen even if its output in Lumens is significantly lower.

Lumens	Halogen equivalent	Where to use it
300+	50 W	If you currently have a few 50W halogens and you want to keep the same brightness.
200+	35 W	If you currently have 35W halogens, or lots of 50W and you could manage with less light output
100+	20 W	Usually for local lighting such as display cabinets, rather than general lighting.
less than 100	-	Not usually useful.

Be aware that the stick-shaped CFLs emit light from the side of the bulb. A spiral CFL emits light through 360 degrees. So, a stick-shaped CFL (most common and cheapest) may not be suitable if you have dark lampshades that enclose the bulb blocking a lot of the light. You can tackle this by replacing it with a spiral type CFL.

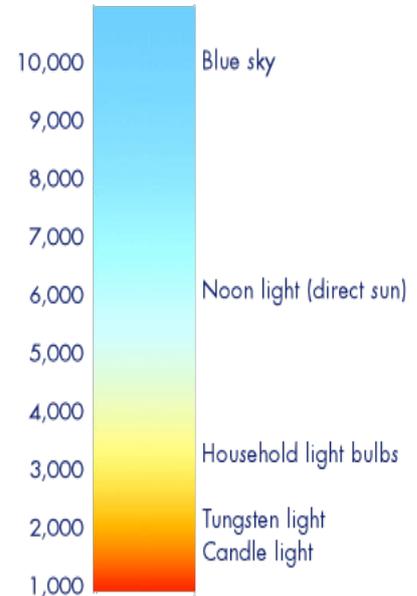


## Colour

If you want to emulate the colour of your old bulbs, you need to go for warm or very warm lights with a temperature of around 3,000k or less.

The sun gives out white light, and that is the sort of light we're used to living in much of the time. But old fashioned light bulbs give out a much yellower light. When we're indoors our eyes adapt to this and we think of this as "white". If we then see a light source that is genuinely white, it actually looks blue by comparison. We call this a cold light, because we associate blue with cold and red or yellow with warm.

Most low energy bulbs - CFL or LED - are designed to mimic old fashioned bulbs to some extent, and are usually described as "warm white" or "soft white". This will usually be the preferred option for general household use. Bulbs that are sold as "cool white" or "pure white" are likely to look less attractive in the home, but may be appropriate for workplace lamps and anywhere where clear vision rather than ambience is the priority. "Daylight" bulbs are the whitest of all, and are usually only used by artists and others who need to match colours correctly.



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### Colour rendering

This is slightly different from colour. Two light bulbs can both give out white light, but certain colours will not show up well when illuminated by the first bulb, while they look fine under the second bulb. This means the first bulb has a lower colour rendering index (CRI).

Traditional bulbs have a CRI of 100. A good CFL will have a CRI of 80 or more, which is good enough for normal domestic use. Most LEDs have a CRI of 90 or more, so are usually fine. However, if you buy bulbs with a CRI of less than 80 there is a risk that the quality of light in your home will look a bit odd.

The CRI should be quoted on all bulb packaging somewhere. If you choose an Energy Saving Trust Recommended bulb you are guaranteed a CRI of at least 80.

## Things to think about...

Average usage of a domestic light bulb is up for argument, but its generally taken at 4 hours per day. 4 hours x 365 days gives us approx. 1460 hours per year

The life of the LED performance lamp is about 30,000 hours.  $(30,000/1460) = 20.55$  years

- Say, x11 lamps (bulbs) @ £15.00 each (inc VAT) = £165 total cost
- 11 x 60W GLS traditional bulbs @ 0.30 pence each (inc VAT) = £3.30 but only last approx. 1000 hrs. So need to replace/buy them on average 30x over an equivalent lifetime of LED bulbs (30,000 hrs).
- 30 x £3.30 = £99

So, investment difference is: £165 - £99 = £66



So, for replacing 11x traditional bulbs with LEDs, the payback period (assuming fixed energy tariff) is approx.  $165/114 = 1.5$  years payback time.....approx.

**NB:** 114 = £140 (GLS) - £26 (LED)

## Conclusion

If you already have compact fluorescent (CFL) light bulbs around your home then, consider replacing the CFLs with LED light bulbs in the hall, landing and anywhere else that always seem to be on in your home whether for security reasons and/or forgetful family members.

And if any of those CFLs are already on their way out or have blown completely, be sure to dispose of them responsibly as they are known to contain mercury, which is harmful to human health.

## Appendices

### KEY FACTS

1x 60 watts Traditional incandescent bulb gives approx. 700 - 800 lumens.

1x 15 watts Compact fluorescent (CFL) = 1x 60w traditional incandescent bulb

1x 6 - 7 watts LED (approx 800 Lumens) = 1x 15w CFL

1x 35 watts traditional spotlight gives of approx. 500 - 750 Lumens.

1x 3 - 5 watts LED spotlight = 1x 35 - 50w traditional halogen spotlight

1x 25w traditional candle bulb (bedside lamps etc.) = approx. 200- 500 lumens

1x 1.5 watts LED = 1x traditional candle bulb

## CALCULATING AVERAGE PAYBACK PERIOD

Average usage of a domestic light bulb is up for argument, but its generally taken at 4 hours per day. 4 hours x 365 days gives us approx. 1460 hours per year

Replacing TRADITIONAL 60W LIGHT BULB with same.

Traditional 60W GLS bulbs = approx 0.06KW (60/1000)

0.06KW x 1460 hrs = 87.6 KWh

Electricity unit cost = 15 pence per KWh (x 87.6) = (1314/100) = £13.14 (approx.) per light bulb per year.

Say x11 traditional light bulbs in home = 11 x 13.14 = approx. £140 per year.

Replacing traditional light bulb with new 11 Watt LED (top range/expensive sort)

LED light bulb = 0.011KW (11/1000)

0.011KW x 1460 hours = 16.06 KWh

Electricity unit cost = 15 pence per KWh (x 16.06) = (240.9/100) = £2.40 (approx.) per light bulb per year.

Say, x11 traditional light bulbs to be replaced in home = 11 x 2.40 = approx. £26 per year.

That's an approx. saving of £114 per year!

Replacing traditional light bulbs with new Compact fluorescent (CFL) bulb

CFL bulb 15W = approx. 0.015KW (15/1000)

0.015 x 1460 hrs = 21.9 KWh

Electricity unit cost = 15 pence per KWh (x 21.9) = (328.5/100) = £3.29 (approx.) per CFL per year.

Say, x11 traditional light bulbs in home = 11 x 3.29 = approx. £36 per year.

That's an approx. saving of £104 per year!