Actio$_2$n Surrey
SURREY'S LOW CARBON COMMUNITY

Energy Efficient Lighting

Compact Fluorescent lights

On average, 13% of the energy in the home comes from lighting and appliances[1]. Energy efficiency allows us to maintain our standard of living whilst consuming less and minimising waste - maximising utility with the minimum cost. It is important to maximise energy efficiency as the majority of the homes in the UK are supplied with energy from the burning of fossil fuels. Fossil fuels are not only non-renewable; they are responsible for a large majority of the Nation's green house gas emissions. Even if a household's energy is provided from 100% renewable energy sources, which does reduce CO_2 emissions, renewable energy technologies still require suitable areas or space to be built or installed and this is often in short supply. Renewable energy is also, at present, more difficult to harness.

Images courtesy of Megaman UK

Old bulbs are extremely inefficient, they turn just 5% of the electricity they consume into light, and the other 95% is lost as heat. Energy efficient bulbs are 80% more efficient than old bulbs but still give out the same amount of light. Replacing the lighting throughout your home with energy efficient bulbs will help to reduce your household's energy demand and could save you a significant amount on your annual energy bills – with the average price of energy efficient lights around £2; households could save up to £45 a year (£675 over the average lifetime of a bulb)[2] if all the bulbs in the house were switched to energy saving bulbs. On average only half of British households use energy-saving light bulbs and of those who do, they only fit efficient bulbs in 5 places out of a potential 24[3].

[1] DEFRA
[2] Energy Saving Trust
[3] Energy Saving Trust

Energy-saving bulbs have developed rapidly since they first came to market, and although the technology is still undergoing improvements there are now a wide variety of energy efficient bulbs suitable for almost any light fitting.

FAQs on Artificial Lighting

What is wrong with the old incandescent light bulbs?
Incandescent light bulbs are enormously inefficient. Only 5% of the energy consumed by incandescent light bulbs is transformed into useful light energy. The other 95% is wasted as heat energy. In today's society, such inefficiencies and waste should be a thing of the past. Although Energy efficient light bulbs or CFLs are far from perfect, they are 80% more efficient than incandescent light bulbs.

Don't the energy efficient Compact Florescent Light bulbs (CFL) take a long time to light up?
For most energy efficient bulbs this is no longer the case. Although some bulbs do take a minute or two to warm up to full brightness.

Are energy efficient bulbs are more energy intensive to manufacture therefore less efficient?
Energy efficient bulbs may require more energy during their production, however because of their higher operating efficiency when in use they recoup this extra energy many times over compared to a traditional bulb.

What about Halogen bulbs?
Halogen bulbs do use less energy than traditional light bulbs (typically 20W-50W for halogen bulbs compared with 40W-100W for traditional bulbs), however rooms that have halogen bulbs tend to have a greater numbers of fittings thus consume more energy. There are energy efficient halogen bulbs that are available such as Philips Masterline and Osram Decostar, these use around 30% less electricity than traditional halogen bulbs. Another alternative is simply to not fit bulbs in every spot!

Do energy efficient bulbs work on dimmers?

Until recently this was the case and most existing energy efficient bulbs won't work on dimmers. However, there are now several dimmable bulbs that are available; Megaman and Philips are two manufacturers.

Do energy efficient bulbs / CFLs contain mercury?

Energy efficient bulbs contain 4 mg of mercury, the equivalent size to that of the tip of a ball point pen. Although this is undesirable, traditional incandescent bulbs are responsible for several times as much mercury released into the atmosphere - because of their higher energy consumption more energy is required to run them which is predominately provided by coal fired power stations burning fossil fuels. So over the lifetime of each bulb the energy efficient bulb is responsible for less mercury emissions*. There are also much larger sources of mercury pollution created as a result of manufacturing polyvinyl chloride, electrical goods and many other products that we demand in our daily lives.

But if CFL bulbs contain mercury do they present a health risk should one break?

DEFRA states that the mercury inside of energy efficient bulbs is unlikely to be a hazard to health even if it is broken. Energy saving bulbs are coated in a hard plastic and are more durable than traditional bulbs and trade figures suggest breakage rates are less than 1%. However DEFRA provides these guidelines should a breakage occur:

> *Vacate the room and ventilate it for at least 15 minutes. Do not use a vacuum cleaner, but clean up using rubber gloves and aim to avoid creating and inhaling airborne dust. Sweep up all particles and glass fragments and place in a plastic bag. Wipe the area with a damp cloth, then add that to the bag and seal it. Mercury is hazardous and the bag should not be disposed of in the bin. All local councils have an obligation to make arrangements for the disposal of household hazardous waste at a civic amenity site or household waste recycling centre (DEFRA)*

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Do CFLs emit unsafe levels of ultraviolet light at close range?

An 'open' CFL

The Health Protection Agency (HPA) has stated that under certain circumstances of use, CFLs can result in exposure to ultraviolet light that exceeds guideline levels. 'Open' CFLs (figure 1) should not be used where a person is less than 30cm or 1ft away from the bulb over one hour a day. It is recommended that in such conditions an 'open' bulb should be replaced with a double glazed 'closed' bulb (figure 2), or move the light away further than 30cm. The HPA has said that for all other purposes, where the bulbs are a sufficient distance away from inhabitants (greater than 30cm/1ft) CFLs are safe to use. **An alternative for close reading or working are LED lamps.**

A 'closed' CFL

Should I leave energy saving bulbs on when I leave a room to avoid switching them on and off?

This is what the National Energy Foundation has said on the matter:

> "There used to be a general belief that because fluorescent lights used more power in their warm-up phase, it was better to leave them on all the time. This was never true - an old style strip light (or non-electronic CFL) only uses as much energy in the warm-up phase as it does whilst operating for a minute or so, and modern electronic ballast CFLs use even less energy at the start. Although CFLs do not use much electricity it is still best to keep them switched off when not wanted - why throw money away on anything that not needed?" (NEF website)

Where can energy efficient bulbs be recycled in Woking?

Martyrs Lane and Slyfield both have facilities to recycle fluorescent bulbs.

Attention

CFLs must not go into your household bin, broken or not. They must be recycled. Woking BC is also making arrangements to provide collection facilities in the town centre. As with traditional bulbs, these should be kept well out of reach of children.

For alternatives to artificial lighting, please see our factsheet on Solar Tubes.

Light Emitting Diodes (LEDs)

Whilst LEDs have been around for a while used as indicators in appliances or products, they are now available in bulbs for domestic lighting. LEDs consume a fraction of the energy required by other traditional bulbs and some energy efficient bulbs, even as little as one watt! Other advantages of LEDs include:

- A life span of 20,000+ hours compared with 600-1000 hours with an incandescent bulb and approximately 6000-8000 hours with energy efficient bulbs
- Durable – LEDs are very durable and withstand bumps and knocks
- They don't heat up very much (compared with halogens) or give off unwanted emissions
- They are very bright and respond immediately when switched on
- No issue with mercury or other disadvantages associated with energy efficient bulbs

They come in a variety of colours and are available in reading lights and some lamps, however as they are still very new to the domestic market their range is limited at present. LED spotlights and other bulbs are currently more expensive than energy efficient or traditional bulbs but they are becoming increasingly cheaper, and because of their very low energy consumption the cost could potentially be recouped through lower energy bills within a matter of months.

LEDs range from 1.8 Watts right up to 25+ Watts. They come in all shapes (strip lights, golf ball, spot lights etc)

Luminosity

Energy efficiency of different lamps is often measured by the number of lumens produced per Watt. The table below provides a brief guide that compares different bulbs. LEDs offer the most lumens per electricity consumed.

Lamp Technology	Energy Efficiency (lumens per Watt)	Typical Lifetime (hours)
Incandescent	8-14	400-2,000
Halogen	15-25	1,500-5,000
Fluorescent (tube)	45-100	6,000-70,000
Fluorescent (CFL)	50-70	3,000-15,000
LED	50-100	20,000-50,000

Lighting Industry Federation

Transformers & 12v fittings

If you are a homeowner looking to fit LED spotlights/bulbs and you have 12v fittings you may need to change the transformer from an electronic transformer to a small wire-wound transformer. Electronic transformers normally allow for a minimum and maximum wattage, in some cases a circuit with LED bulbs may not meet the minimum load required by the transformer (often 20 Watts). Any good electrician merchants should be able to provide more information on this.

What else should I consider when looking for LED bulbs?

1) Beam angle

If you are looking for a spotlight to go into the ceiling of a kitchen to light the walls or floors of a room you will want a bulb that has a wide angle spread. Look for 120°, if you wish to have a more directional light, choose a narrow beam angle such as 60°. A narrow beam angle would be more suited to close working.

2) Strength of the bulb

Again, this will depend on what you want the light for. A 1-5 Watt LED will probably only be suitable for close working or reading whereas you will probaly want around a 7-15 Watt bulb for a pendent fitting or for ceiling spotlights.

7 Watt LED = 40 Watt (traditional bulb)(approximately)
5 Watt LED = 35 Watt Halogen (approximately)

Where can I get LEDs?

B&Q and John Lewis now stock a range of LED bulbs, however the best place is possibly the internet. Below are some websites to try:

http://www.litebulbs.co.uk

www.lampspecs.co.uk

http://www.greenled.co.uk/

Ebay is also a good place for LED bulbs.

For more information on energy efficient lighting or other energy related issues, please call the Actio2n Woking advice line on 0800 783 2503.