



### SHEDDING LIGHT ON LEDs

For over 100 years, our homes have been lit largely by ‘incandescent’ light bulbs, in which a tungsten filament is enclosed in a glass bulb filled with argon gas. Light comes from it because electric current makes the filament white hot. A fairly recent improvement on this system still uses a tungsten filament, but also contains a chemical called a ‘halogen’ (usually iodine) and the container is quartz, rather than glass. These bulbs go by a variety of names, but usually include some of the words tungsten, halogen, iodine and quartz. Because they run hotter than a conventional bulb, they are more efficient (ie more of the electricity is turned into light, and less into heat). An alternative to these is the fluorescent bulb—originally in the form of a ‘strip light’, but more recently as a thin convoluted tube. These are much more efficient than incandescent bulbs. However, we are now in the middle of a (somewhat undramatic) revolution, with a move from ‘incandescent’ and fluorescent light bulbs to LEDs (light emitting diodes).

It is not easy to describe how an LED works, since it owes more to quantum physics than to everyday experience! Suffice it to say that the LED converts electrical energy directly into light. The process is not totally efficient, and some heat is produced, but much less than in a normal bulb or even a fluorescent tube. Typically, to get the same light output as from a conventional bulb, you only need to use about a seventh of the power.

LEDs have been around since the 1960s, for specialised applications, but it is only recently that they have become a practical proposition for lighting the home. There are several reasons for this. Firstly, because of the physics of how they work, they only produce light of a single colour. In order to get white light (which is a mixture of colours) the original answer was to use a cluster of several LEDs of different colours, but modern designs use a blue-light LED, coated with a phosphorescent material (like that used in fluorescent strip lights), which then glows with a bright white light. The light from the first ‘domestic’ LEDs was very blue, but nowadays they produce a very acceptable white light.

The move to LEDs is going on all around us. Most bicycle lights, most torches, and many car lights are now LEDs, rather than incandescent bulbs, and many public buildings are now lit by LEDs. They are now available as exact replacements for nearly every type of light bulb used in the home. The question thus arises, should we be replacing all our light bulbs by their LED equivalents? The answer (as always) is yes...and no! A few years ago, the light they produced was very blue, and they wouldn’t work on dimmer switches, so for these reasons they were not very appealing. Both those objections have now gone, and it makes sense to consider them much more seriously. Let’s look at the pros and cons.

In favour of LEDs:

- a) Increased efficiency, which means lower electric bills. An LED bulb only uses about one seventh of the power of a conventional bulb. However, lighting is only a small part of many people’s electricity usage, so you might not notice the difference, and it would take a long time to get your money back.
- b) Much longer bulb life. ‘Old fashioned’ light bulbs typically last 1,000 hours, and quartz-halogen bulbs around 2,500 hours. LED bulbs last about 25,000 hours, or ten times as long. Not having to replace light bulbs so frequently can be a considerable advantage, especially when the light fitting is difficult to reach.
- c) The bulb runs much cooler. This wouldn’t normally be noticed, but may be an

**OSRAM** OSRAM

**Energy Saving LED Bulbs**

- ✓ Each bulb lasts up to 15 years
- ✓ Save up to 80% energy
- ✓ Save up to £103 per bulb per year\*

1 2 3 4 5

**2 FOR £15 MIX & MATCH**

*Robert Dyas Advertisement for LED bulbs*

advantage. In Holy Trinity Church, the heating and cooling of the conventional screw-in light bulbs sometimes causes them to come loose in their sockets, and to stop working. This should not happen with LED bulbs.

There is really only one thing against LEDs: their much higher cost. Prices are coming down, but at the time of writing (July 2014) LED replacements for typical domestic light bulbs start at about £7, so it would cost a substantial sum of money to replace all the bulbs in your house in one go!

So, the best strategy is to have one or two ‘spare’ LED bulbs in stock, but not to buy large numbers at one time, as they will probably get cheaper. When a bulb fails, it may be replaced by its LED equivalent.

One or two things to watch out for:

Make sure the bulb you buy is ‘warm white’.

Divide the wattage of the bulb you are replacing by seven to choose an equivalent LED bulb. For example, a 35w conventional bulb would be replaced by a 5w LED. Be warned, however—this is very inexact, and you may need to be guided by the manufacturer, or by what they tell you in the shop.

If the bulb is to be used with a dimmer switch, make sure it is compatible. Most are not, so if it doesn’t say, it probably isn’t!

I hope you find these comments ‘illuminating’!

*Mike Whittle*