

Ban The Bulb:

Within two years of writing this article, the familiar shape of the light bulb as we know it will cease to be commercially available.

Designed by Thomas Edison (or Joseph Swann, depending on who you listen to), the incandescent light bulb works by running an electric current through a piece of resistive wire encapsulated within the familiar glass bulb to create light. It has become an iconic symbol to innovation and, literally, brilliant ideas. It is much more than that though, it is arguably the nicest source of electric light available to us, and soon it may be gone.

2009 saw the introduction of EU legislation stating that all frosted lamps must be of class A energy standard and hence sounding the death knell for all frosted incandescent lamp sources. The EU reasons that compact fluorescent lamps offer the same quality of light as frosted incandescent sources! This year has seen the phasing out of the 60W version.

According to the EU ruling, there are no replacements for clear incandescent lamps so these can remain in circulation. However, the UK seems to be ahead of itself in this instance as the voluntary phasing out of all incandescent lamps is happening. At the end of this year we will also lose the 40W GLS lamp.

The banning of the bulb does seem a symbolic gesture and a relatively token gesture:

- In a typical British household, replacing standard bulbs with CFLs would save not much more than 2% of the total household direct CO2 emissions from electricity, gas and car use (1)
- Daily, this amount of CO2 is roughly equivalent to that emitted by:
 - Driving a car 1 or 2 miles
 - Half a drying programme in a tumble dryer
 - Refining primary aluminium to manufacture two aluminium drinks cans
 - A typical TV/satellite box/DVD player installation being left in standby rather than switched off at the wall when not in use
- Based on typical UK mileage it would be possible to save ten times more CO2 by swapping a gas-guzzling 4x4 for a smaller family car.
- Many households could probably also save ten times as much CO2, relatively painlessly, by being more frugal with their heating, reducing the thermostat temperature, and using the time switch to turn off (or manually turn right down) the heating during the hours when the house is unoccupied, or overnight.

Whether we like it or not, these events mark a paradigm shift in the way we light some of our buildings and spaces. This will particularly affect environments that traditionally require mood, contrast, drama and good colour rendering, which almost automatically evokes the hospitality, leisure and residential sectors.

With social and climatic responsibility in mind there is no doubt we, as diligent designers and specifiers should be creating energy efficient, low carbon schemes. But should we do this to the detriment of quality of space and atmosphere where, in such a competitive sector, mood is everything?



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Incandescent lamp sources have served us well over the years and nowhere more importantly than in the residential and hospitality sector fitted within table lights, floor lights, bedside lights, bulkheads and downlights they are inexpensive and easy to control.

Beyond physical properties, incandescent lamps provide wonderful mood and atmosphere; they provide that warm cosy feeling we love so well. This is created because the lamps have a full spectral output. That is to say they are similar to candlelight, in that they include all colours of the light spectrum, from blue to red in a nice smooth curve, which in turn combine to form 'white light'. If you dim an incandescent lamp the curve slips gently towards the warmer end of the spectrum following a natural progression we expect from a bright white sun to a warmer image at sunset.

Utilizing these lamps in floor and table lights they subconsciously remind us of camp fires and sunsets where the light sources are low down in our vision; the light is directional and the colour temperatures are warm.

Compare this to the spectral output of a fluorescent or LED light source and you see that both low energy sources have a very 'blocky' output, missing some parts of the colour spectrum altogether. This creates the very flat quality of light and relatively poor colour rendering associated with these lamps; have you ever purchased an item of clothing only to find it's a totally different colour when you get it home?

Only the very latest cutting-edge LEDs can get anywhere near the spectral output of an incandescent source.

Consider a typical, traditional guest room for example – some downlights, a couple of bedside table lights and a floor standing luminaire. Do we really want retro-fit compact fluorescent lamps with their slow warm up and murky quality of light?

Current research even suggests that fluorescent lighting is not relaxing because it is bland, non-directional and the blue spikes in the spectral output produce stress hormones cortisol and reduce melatonin production. Melatonin is vital for relaxation in order to get a good night's sleep – important for hotels! (2)

Notwithstanding the comparatively poor quality of light these lamps are also difficult to control. No longer can we utilize a simple rotary dimmer switch. Don't believe the hype lamp manufacturers tell you – whilst some mains dimmable fluorescent lamps are coming onto the market they still do not have a smooth dimming curve down to 0% and they often have a considerable shift of colour temperature as they dim. So your warm white light may start looking a little pink or green!

Hold on, I hear you say, the bulb is disappearing but other incandescent sources are still available, like MR16 spotlights and new tungsten halogen 'bulbs'. Well yes they are – for now. But the EU are reviewing implementation measures for banning of these sources too. I suspect the inevitable will happen, and then what are we left with?

LEDs? Are they not here to save the lighting industry? Well no and yes... they are certainly not yet the panacea lighting manufacturers would have you believe. LEDs are great for providing saturated, coloured light and have developed immeasurably in the last few years, continuing to improve all the time. However at this time they are still relatively poor at providing anything near full spectral white light.

Anyone who has specified LEDs will have experienced problems with LEDs being installed on site and, despite the manufacturer claiming they are all the same colour temperature, many appears lightly cooler or warmer than adjacent fittings. This is because there are so many variables to consider in manufacturing an LED that a minuscule variation in one of many components can have a major impact upon light output.



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If you take a proper look at LED manufacturers' data you'll find that most good quality white LEDs significantly reduce in output over their life. If you agree with CIBSE / SLL guidelines you'll be maintaining lamps at around 80% the initial lumen output and, in the case of white LEDs, that means around 25,000 hours – not the 50-100,000 hours many manufacturers claim.

Whilst technology is moving apace we will be stuck with these limitations for some time yet. So, if we are to embrace fluorescent and LED sources within the hospitality, leisure and residential sectors, we must re-consider how we utilize these sources and stop trying to use them as a retro-fit solution.

It is this change in mindset – not trying to use new sources in the same way as traditional ones that takes us to a watershed moment in terms of lighting design.

One could be forgiven for thinking that it's quite literally all doom and gloom for lighting, but perhaps there really is a little light at the end of the tunnel. As a practicing lighting consultant I am not viewing legislation and technology as a constraint but as a means of blurring the boundary between architecture, interior design and lighting.

Working closely with designers, engineers and quantity surveyors we are launching a two-pronged attack to ensure the same quality of lighting, contrast, drama and 'atmosphere' are retained.

Firstly, we are getting into the realm of intelligent lighting control systems – even for 2 and 3 and 4 star hotel offerings. A good lighting control system has many advantages beyond government tax breaks. A well specified system can reduce energy bills and provide a great deal of flexibility, and easy dimming of low energy sources, it will also enable scene selection to create said mood and drama for the guest.

The disadvantage of course is that it can cost around £300-£500 per key depending upon quantity of circuits.

Secondly, by integrating light sources into architectural details we are able to use the texture and colour of a surface finish to overcome poor colour rendering while creating interesting mood and drama.

For example, on a recent hotel we have located LEDs within coves where the light can disperse before any inherent inconsistencies are visibly noticeable. Where high levels of illumination are required, integrating what are essentially ugly and bulky fluorescent sources within desk joinery or behind bathroom mirrors provides high levels of functional lighting.

This approach must of course be considered and appropriate – and we still require the odd downlight for modelling or table light to provide a warm and convivial atmosphere. Coves, coffers and integrated details enable us to control the illumination on a given surface and thus contrast ratios.

Buzzwords for this lighting approach would be integrated and layered. Where we once had 2 or 3 circuits we now have 4 or 5, and occasionally even 6, within a guest room – the sum of many small integrated sources making up the overall illuminance level.

So the future isn't all bad and technology is slowly catching up, eventually we may have long life, low energy sources with good colour rendering and dimming characteristics. But, for now at least we as designers, and our clients alike, need to revise our approach towards lighting within these areas and embrace the new technologies by turning each lamps disadvantages into a positive. Yes it will require a higher degree of thought, creativity and detailing and undoubtedly a higher capital outlay on lighting but lower electricity bills and maintenance costs are making design integration a viable solution in the long run.

1. <http://www.techmind.org/energy/dontbanthebulb.html>, <http://savethebulb.org/> & <http://greenpages.pld-a.org/leds-groundbreaking-research-results-on-health-issues>



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2. http://www.ninds.nih.gov/disorders/brain_basics/understanding_sleep.htm

Further reading:

<http://savethebulb.org/> <http://www.pld-a.org/>



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