energy saving trust

Lighting

Most buildings require artificial lighting to some extent, and it's crucial to ensure that the lighting provided is of good quality and tailored to the specific tasks and occupancy of the building.

When assessing the lighting needs of your building, first consider who is using the space and what activities are being carried out within it. Our requirement for lighting varies depending on the tasks being performed. For instance, if your space accommodates customers or visitors, it's likely you'll want to create a well-lit, inviting atmosphere. Whereas walking down a corridor is a relatively simple visual task and doesn't require as much light. In an office environment, the amount of light needed to view a computer screen differs from that needed to read a printed report.

It's also important to understand the occupancy patterns of the space and when lighting is required. Is the building only occupied during typical office hours? Is a particular room only in use for a few hours each day? Are people constantly entering and leaving the room within a short period? Both the bulbs themselves, and their control, play significant roles in the building's lighting energy use.

Designing an efficient lighting system

Once you know how the building is used, you can then review whether there are any improvements that could be made to reduce your lighting bill. Reviewing your bulb choices can be a useful first step. LEDs are the most common energy efficient bulb on offer.

What is an LED?

Light emitting diodes, or LEDs, are efficient, turn on instantly at full brightness, and are available to fit almost every light fitting in a building. An LED works by producing light from the electricity flowing through the bulb.

Select the right lumen value

With traditional bulbs, we used watts to determine the brightness of a bulb, but watts measure power consumption rather than brightness. Energy-efficient bulbs use fewer watts, so it is best to look at lumen output to determine how bright it's going to be.

This table compares the wattage of traditional bulbs and approximate equivalent lumen values of LEDs.

Traditional bulb	LED bulb
15 watt	140 lumen
25 watt	250 lumen
40 watt	470 lumen
60 watt	800 lumen
75 watt	1,050 lumen
100 watt	1,520 lumen

Select the right colour

Low energy light bulbs imitate traditional light bulbs, so if you prefer a particular colour, there should be a close match with the new energy-efficient lighting.

'Soft white' or 'warm white' bulbs provide a cosy glow that is best for general lighting, while 'cool white' or 'pure white' are ideal for focussing on tasks, or any area that requires clear vision.

The colour rendering index (CRI) of a bulb shows you how well a bulb will illuminate a chosen colour. Two bulbs can have the same colour, but the bulb with a higher CRI will show colours more accurately than the other.

The bulb's packaging will indicate the CRI alongside the lumen value. A CRI of 80 or more is appropriate for many tasks.

What are the benefits of upgrading to LED?

If there are any incandescent or halogen bulbs in your building, upgrading them to LED can reduce your electricity consumption and your electricity bill. In addition:

- They last longer than conventional light bulbs reducing replacement costs.
- LEDs produce very little waste heat compared to conventional sources, reducing the need for additional cooling on warm days.

Indicative costs and savings

Potential savings switching traditional or halogen bulbs for LEDs

Switching incandescent bulbs to LEDs	
100 watt incandescent bulb	Save up to £14 per bulb per year

		(Based on 1,100-lumen bulb running for 562 hours per year.)
	75 watt incandescent bulb	Save up to £9 per bulb per year (Based on an 825-lumen bulb running for 503.5 hours per year.)
	60 watt incandescent bulb	Save up to £7 per bulb per year (Based on an 660-lumen bulb running for 445 hours per year.)
	40 watt incandescent bulb	Save up to £4 per bulb per year (Based on an 440-lumen bulb running for 394 hours per year.)

	Switching halogen bulbs to LEDs	
	50 watt halogen bulb	Save up to £5 per bulb per year (Based on 750-lumen bulb running for 521 hours per year.)
	35 watt halogen bulb	Save up to £4 per bulb per year (Based on an 525-lumen bulb running for 521 hours per year.)

Fluorescent lighting

Many office and work environments are lit by fluorescent tubes. These vary in efficiency, with modern thin tubes (T5s) being the most efficient and the older, thicker tubes being the least efficient. All fluorescent tubes are more efficient than traditional incandescent bulbs, but even the most efficient tubes are not as efficient LEDs. Compact fluorescent

bulbs – designed to fit into domestic style fittings – are not quite as efficient as the best straight tubes.

Modern fluorescent tubes are often fitted in mounts with a reflector to direct more light in the desired direction, and this will improve overall system efficiency. Some also have diffusers over the bulbs, which can improve the look and feel but will tend to reduce efficiency, especially if the diffuser isn't kept clean.

Replacing a fluorescent lighting system with an LED lighting arrangement can be relatively expensive as you will often need to change the fittings, not just the tubes. You are more likely to consider this level of upgrade as part of a wider refurbishment, but savings could be considerable, particularly if you are replacing an older fluorescent system, and if you are able to introduce other optimisation, such as avoiding unnecessarily bright lighting or arranging switching so that levels can be adjusted more appropriately.

Controlling lighting

Understanding when and how each area of the building is used will help determine the type of controls needed. For instance, spaces with varying occupancy throughout the day may benefit from occupancy sensors that automatically adjust lighting levels based on movement detection, reducing energy waste during periods of low activity.

You should also consider the flexibility and ease of use of the lighting controls, especially if you need other people to interact with them. Intuitive controls allow occupants to adjust lighting according to their preferences and tasks.

Advanced controls like daylight sensors can optimise energy savings by automatically dimming or switching off artificial lights in response to available natural light, further reducing energy consumption while maintaining comfortable lighting levels.

If advanced lighting controls don't seem appropriate for your building, don't overlook the potential for small, practical improvements to reduce lighting use. Simple solutions tailored to specific challenges can still yield significant savings and promote sustainable practices. For example, lights left on in areas like staff kitchens or break rooms, even when unoccupied, can be a common problem. Staff may have their hands full with hot drinks for themselves and colleagues as they leave the room and forget to return to switch the light off. Simple interventions like installing reminder signs and providing convenient solutions such as a table near the light switch to temporarily hold items, could encourage occupants to switch off lights when leaving the room. By identifying and addressing low-cost, high-impact opportunities for improvement, you can reduce the overall energy use of the lighting system and contribute to a more sustainable building operation.

What else can I do to reduce my lighting bill?

- Use natural daylight as much as possible.
- Always turn lights off when leaving a room. The quickest way to start saving is just remembering to turn lights off when you don't need them.
- Arrange light switches so it is easy to turn them off, for example, place switches for rooms at the door.

- Label light switches that can be turned off by all staff, especially in infrequently occupied areas such as meeting rooms, storerooms and bathrooms, and in rooms with multiple switches in one place.
- Use sensors or timers on external lights, so they are only on when they need to be.
- Consider using transparent shades or fittings, as a dark lampshade can absorb some of the light a bulb emits.
- Ensure that you regularly clean any lamp shades or fittings to increase the impact of the light.
- Make sure furniture is not blocking light sources.
- Consider installing lighting controls such as movement sensors or time clocks to ensure that the right light is provided in the right place and at the right time and that you reduce electricity use. According to the Carbon Trust, lighting controls can make huge reductions in energy use, usually between 30% and 50% in a typical office environment.

Can I do this by myself?

Yes! Switching out existing halogen or incandescent bulbs to LEDs is something that you can do by yourself, unless there are difficulties in access or fittings need changing as well.

For bigger jobs though, such as switching from tube lighting to LEDs or installing lighting controls, you will need to talk to an electrician who will assess your needs and evaluate your building before proposing which system could be right for you. Click here to learn more about this.