

How to Implement Lighting Refurbishments

Above all other building services, lighting offers the greatest energy reduction opportunity.



Image courtesy of Thorn Lighting

Impact of Lighting

Lighting can account for up to 40% of electricity use in buildings and technological advances in recent years make lighting refurbishment more viable than ever.

It is estimated that up to 75% of buildings have outdated lighting which is not only inefficient in its energy consumption but is also not delivering the optimum visual environment for its occupants.

Many existing buildings have been inherited by their current occupants and often without any consideration given to improving the lighting to adapt to the new tasks being performed.

Some 80% of our sensory input at work comes through our eyes so it is vital to provide good quality lighting that is designed to match the tasks being undertaken.

Different task activities have different visual demands; this may be the actual task, the length of time it's being carried out or the age of the people; all of these factors influence the lighting design process.

By delivering a visual environment which meets the needs of its occupants, staff will feel more comfortable in their workplace, be more content and may even become more productive.

Why embark on a refurbishment?

The greatest opportunity for reducing energy and cutting costs in many buildings is through a lighting refurbishment.

With so many buildings using outdated, ineffective lighting, the overall scale of the potential electricity savings is huge. A 10% reduction in lighting use in the non-domestic sector would reduce carbon emissions by 2.4 mTCO₂ equivalent.

For example, a building using outdated T12 fluorescent lighting might use luminaires with four 20w lamps. Replacing the old fittings with new luminaires using three 14w T5 lamps is likely to give a better lighting quality in the space and – even before the introduction of lighting controls – deliver a 50% energy reduction.

Lighting controls can deliver even greater savings (see the [How to Implement Lighting Controls Guide \(CTL161\)](#)) and these may be retrofitted into existing installations, often without the need for any significant re-wiring. They can also be integrated into new lighting systems.

When considering a lighting refurbishment project take the opportunity to review existing lighting and establish whether it meets the needs of the users of the space.

Whilst simple upgrades of lamps and gear can deliver energy savings, if the appropriateness of existing lighting for current tasks hasn't been reviewed then any issues or problems will remain.



Image courtesy of Zumtobel

Therefore before embarking upon any refurbishment programme, you should carry out an assessment – not just of the existing lighting, but of the requirements of the space, with particular attention to the light levels.

Put simply, a lighting scheme is only truly effective if it is delivering light in the right place, at the right time to create the right visual environment.

Appropriate visual environment



Image courtesy of Thorn Lighting

The [Lighting Technology Overview \(CTV049\)](#) provides information on design considerations in reaching decisions about the lighting levels, whilst the SLL Code for Lighting provides more detailed information and guidance.

When considering a lighting refurbishment, it is also prudent to consider a regular maintenance schedule as the effectiveness of any lighting installation can be compromised without regular maintenance.

This includes cleaning of luminaires, especially reflectors and panel diffusers but extends to wall surfaces and glazing which should be cleaned regularly to optimise lighting performance and daylight availability.

How to get started

Identify the existing lighting

The first step is to identify the existing lighting. Our [Lighting Technology Overview \(CTV049\)](#) will enable you to identify the types of lamp and luminaires you have simply and easily.

If you have tubular fluorescent lamps, they may be running on magnetic control gear which is much less efficient than High Frequency control gear. It is actually possible to determine if this is the case, just by using a mobile phone camera.

With the camera function turned on, point your phone towards fluorescent lamps, as if you were going to take a picture of them. If they are being run using magnetic control gear, you will see them flickering on your mobile phone screen; if they are not flickering then they are being run by much more efficient HF gear.

Luminaires which contain magnetic control gear should be considered for an upgrade, especially as they are operating the larger, less efficient T8 or T12 lamps. Upgrading these luminaires to ones with dimmable HF gear and the smaller diameter T5 lamps will produce significant energy reductions.

Secure staff buy-in

Employee engagement is crucial to the on-going success of any project and this can start even before any refurbishment programme is implemented. Involving staff by seeking their views on the lighting and including them in the decision making process will share ownership with them and they will respond more positively. To help you get started, why not take a look at our [Creating an awareness campaign \(CTG056\)](#) guide?

Encouraging staff to get involved with stickers encouraging them to switch off lights or making them aware that they can enhance a room by adjusting window blinds to maximise daylight can stimulate an interest which will go beyond the actual refurbishment. View the animation on [adjusting window blinds to maximise daylight in a room](#).

Assess all factors when considering return on investment

When examining the potential for any improvement, it is important to consider the return on investment in both tangible and less tangible terms.

Whilst calculating a payback on the capital cost can be an influence over the decision making process, the less tangible benefits should also be considered.

Good lighting has been shown to have a positive effect on staff morale, performance and even productivity so the long term benefits to a deeper refurbishment may outweigh any fiscal ones.

It is important to consult an expert regarding any refurbishment, to ensure not that the lighting will meet with the visual requirements of the occupants, but who can advise on a suitable lighting controls approach.

Whilst lighting controls offer tremendous opportunities for energy management, it is vital that the occupants fully understand how they work and this will be crucial to the on-going success of the refurbishment.

What are the options?

We tend to think of refurbishment in two distinct ways: as a stand-alone upgrade or as part of a wider project. The latter often provides even greater opportunity for energy reductions.

A simple upgrade of outdated lighting would be to replace the lamps and control gear in existing luminaires to modern, more efficient versions.

If the existing lighting uses T8 or T12 fluorescent lamps, especially on magnetic gear, then they should be considered for replacement. It is important to check that new T5 lamps will perform well in the existing luminaires as they are a smaller diameter tube so advice should be sought on the optical performance with an upgrade.

If suitable though, this can offer a simple solution and up to 50% energy savings.

Case study

JM Henderson

JM Henderson took a two-pronged approach to their lighting, refurbishing the office lighting and upgrading the factory lighting.

In the office areas, they retrofitted new high frequency control gear and modern efficient fluorescent tubes into the existing light fittings.

In addition to lower energy costs and longer lamp life, the environment was improved for the staff as HF lamps do not flicker like the older ones.

In the factory they replaced the old sodium lighting with new luminaires containing fluorescent lamps. The old luminaires were mounted at high level and both the quality and level of lighting on the workshop floor was poor.

The new lighting produces crisp white light and is suspended at a lower height so in addition to increased light levels and lower energy use, they create a more productive and safer working environment.

Project cost:	£26,000
Energy reduction:	53 MWh
Financial saving:	£4,600
CO ₂ saving:	29 tonnes

The next step up would be to replace luminaires with a one-for-one replacement. Luminaires which are older than ten years old should be considered for this type of upgrade. In addition to their improved efficiency, new luminaires can also improve the visual environment of the space and enhance user comfort, especially if computers & display screens are being used.

It may be possible to incorporate some automatic lighting controls with this approach, either as part of the luminaire or room-based. Lighting controls can automatically switch off lighting when rooms are unoccupied or adjust the lighting level if there is enough light through windows or roof lights.

Occupancy and daylight sensors can save more than 25% of electricity use and lighting controls can also be retrofitted to existing lighting, often without the need for any significant rewiring.

Read the [How to Implement Lighting Controls Guide \(CTL161\)](#) to find out more.

Daylight control

Implementing a much wider refurbishment, looking



Image courtesy of Thorn Lighting

to redesign the lighting – and maybe other building services – can be even more rewarding, not just in energy efficiency but in creating a more stimulating and pleasant working environment.

A professional lighting designer can advise on a solution which goes much further than achieving appropriate lighting levels for the tasks, but which achieves the design objectives of delivering appropriate lighting where and when it is needed for the use of the space: the right light, in the right place at the right time.

Common problems & finding suppliers

Common problems

Some members of staff are complaining that they are suffering headaches at work.

Older lighting installations often use magnetic control gear which causes lamps to flicker. Replace luminaires with high frequency T5 versions to improve user comfort and save energy.

Lighting is being left on after people leave work in the evening.

Install occupancy controls to switch off lighting in unoccupied spaces. Read the [How to Implement Lighting Controls guide \(CTL161\)](#) or [view our video](#) to find out more.

The lighting has been inherited from a previous occupier of the building.

It may not be appropriate for the current activities so get advice from a specialist. They will advise whether you should be considering alterations to the lighting to best suit your business.

Questions to ask

Have work tasks been properly analysed and appropriate lighting provided?

Does the lighting scheme provide the right amount/direction of light for the task?

Have potential hazards been identified and properly lit?

Is the lighting appropriate for the use and architecture of the building?

Is the use of daylight maximised?

Have appropriate lighting controls been used/specified?

Have the lighting controls been commissioned properly?

Finding a supplier

Lighting designers

There are directories of practices available through the [Society of Light & Lighting](#) and the [Institution of Lighting Professionals](#).

Manufacturers

[The Lighting Industry Federation](#) has a comprehensive list of member organisations who supply lighting equipment.

Electrical contractors

[The Electrical Contractors Association](#) can put you in touch with electrical contractors who operate nationally or local to your area.

Carbon Trust Implementation Solutions

[The Carbon Trust Implementation Solutions](#) puts you in contact with accredited suppliers across all sections of lighting.