LED Lighting and controls upgrade

Cost: £62,000 to replace over 1000 fittings

Return on Deployment

It is impossible to calculate exactly how much this upgrade saved us as unfortunately the lighting circuits within the buildings aren't individually metered. Lighting is also very seasonal and a building's occupancy also impacts usage. We calculated that the new LED lights would reduce the amount of electricity we use for lighting by 80% on a high occupancy winter day. For us, on a dark winter day this is a cost reduction from approximately £165 to £31.50 approximately or 1,520kWh to 268kWh on lighting, and a saving of 290kg CO2.

We expect the investment to have re-paid itself just in the cost of electricity saved within 6 years. This investment would pay back more quickly for buildings with a twenty-four-hour occupancy pattern, or ones requiring the lights to be on all the time during daylight hours, regardless of the season (maybe because desks are in large open plan offices, away from natural light from windows). If we also considered the maintenance costs associated with replacing the fluorescent tubes, which have a much shorter lifespan than LEDs, this payback period would reduce further.

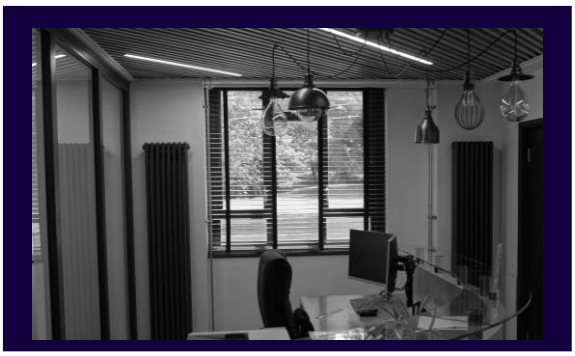
Why?

This was a relatively quick and easy project to start our journey to Net Zero! The task required a comparatively small capital outlay but was expected to have a relatively quick return on deployment. There were very few complexities that needed resolving before the work could begin. Upgrading to LED's would save us money and carbon by reducing our electricity consumption. It would also decrease building maintenance requirements, reducing the frequency of requests to our Facilities Team to replace expired fluorescent tubes

Legislation introduced in June 2021, after we completed this work, has now banned the sale of fluorescent strip lights by September 2023

If you are planning an upgrade like this, use it as an opportunity to consider adding more automated lighting switches like motion detectors or Lux level sensors. These can help you achieve greater savings, both of carbon and financial. They need careful thought about placement before installation to ensure colleagues aren't stranded on a dark stairwell or kitchen which could be dangerous to their health and safety.

Figure title



The new LED light fitting in our reception helped modernise the area

Background

As with many commercial premises, prior to the upgrade work, lighting for offices, corridors, bathrooms and kitchens in our headquarters building was provided by fluorescent strip lights fitted within the ceiling tile arrangements. Lighting was mostly controlled by standard on/off switches although in a small number of areas (mainly bathrooms) they were controlled by motion sensors. The fluorescent tubes looked dated and required changing frequently – this update would quickly save money and carbon while improving the aesthetics of the building.

What we did

We decided to replace all the lighting across our site with LED's. This involved replacing approximately 1,500 lamps. In some cases, if the old fittings were not suitable, it was necessary to replace or modify the fittings. It was necessary to hire a cherry picker to change the light fittings and bulbs in some locations we use as warehouse areas due to the ceiling height.

The work was carried out by our Facilities Team, supplemented by two electricians. The high number of lamps and fittings that needed replacing meant that the whole exercise took about 6 weeks to complete.

The change to LED's altered the Lux levels and glare in some offices led to requests from colleagues to make

Savings:

Approximate monthly saving kWh:

(based on half utilisation of lighting) 9,000kWh

Monthly financial saving:

(based on half utilisation) £1,000

Monthly carbon saving:

(based on half utilisation) 2,200 kg CO^2

Payback period:

(based on electricity use reduction only): 5-6 years

minor changes to the lighting configuration. This meant that the task took longer than initially planned.

Motion sensors were fitted in a few more locations to turn lights on and off automatically.

Since we undertook this work a small proportion of the LED bulbs expired however the supplier replaced these under warranty. The Facilities Team have however noticed that they are called to replace far fewer bulbs than they were before the exercise, and it is a far quicker task to replace them than it used to be with the fluorescent tubes

Results

Feedback from staff has been very positive. They report that the illumination from the new lights is not as bright and so makes a nicer environment. The new fittings look more modern and so also improve the ambiance. Staff also like that the new lights last longer so they are disturbed less, and when the lights do fail, they don't develop an annoying flicker first.

It is worth noting that although a fluorescent tube is cheaper than an LED bulb, a fluorescent tube will only last 2-3 years. LEDs are expected to last about 10 years (ours are covered by a warranty up to 5 years). As mentioned above, changing an LED is a much quicker and easier task that replacing a fluorescent tube. This change saves our Facilities Team valuable time changing bulbs both in frequency and duration.

Things we would have done differently

We made these alterations prior to the COVID19 pandemic. When the changes to the lighting were made the building was bustling with about 150 people in per day. Since the start of the pandemic, the building is now used far more sporadically, with a regular occupancy nearer 30 per day. Although occupancy is expected to rise again it is not expected to be anywhere near the pre-pandemic levels. With hindsight it would have been beneficial to put in far more motion sensor switches, especially in public areas where lights get left on for convenience like kitchens and corridors. The low level of occupancy makes this efficiency far more cost effective.

Lux level sensors alter the level of artificial luminescence when the amount of natural daylight changes. Adding more of these sensors when the work was done would save more carbon and make the lighting more cost effective without impacting colleagues' comfort.

While there is a desire to install more of both type of technology, now attention has moved on to other things it is difficult to find the resources to go back and install more of both

Next Steps

We will be converting more of the lighting in common areas and corridors to motion sensors however we are still considering the practicalities of this – how do you ensure that long corridors are covered without having to purchase too many expensive sensors?

Useful Tip! Remember to factor in the disposal of old fluorescent tubes and fittings - for us this took several skips.

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