Case Study

LED LIGHTING UPGRADE

Background

Cardiff Metropolitan University has developed a Carbon Management Strategy with year on year 3% carbon reduction targets in-line with the Welsh Government's Climate Change Strategy for Wales and HEFCW's carbon management plan recommendations. The University are now three years into this strategy and as part of forward planning have continued to identify a series of projects to help deliver these targeted reductions for the remainder of the period.

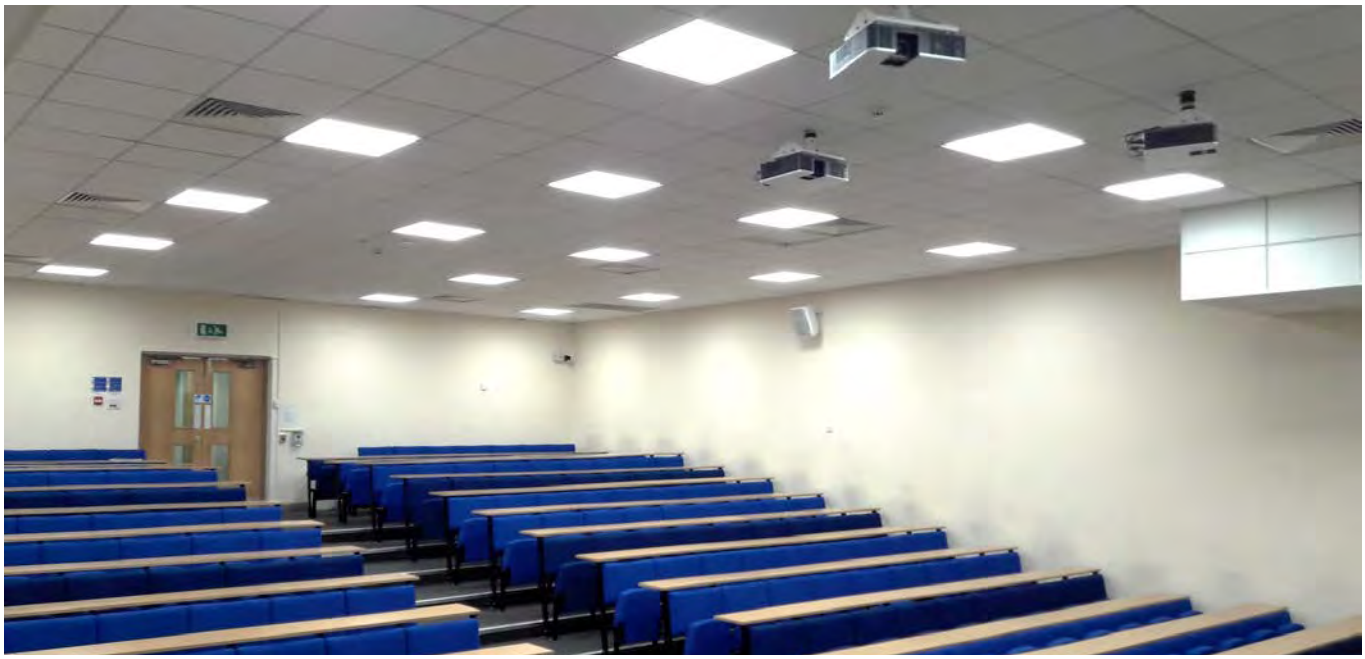
Cardiff Met spends about £850k per year on electricity across the estate. Of this total, approximately 40% is attributable to lighting costs. Lighting technologies have significantly advanced in recent years to provide efficient, safe and improved lighting yet besides these tangible benefits, there are now solid financial advantages to be gained from replacing older lights with newer technologies. In particular, LED lighting replacement programmes can be funded partly if not entirely by the cost savings achieved.

The project

In 2015, the Welsh Government initiated 'The Invest to Save (I2S) fund' which provided a short-term pool of resources aimed at helping public organisations transform and improve the efficiency of their services. The University applied for and were successful in securing an interest free loan of £150,000 for the implementation of LED lighting across the estate. The project centred on improving the student experience through the replacement of inefficient, outdated lighting with low energy, high output LED fittings. This would not only generate energy, cost and carbon savings but also provide high quality learning and teaching environments that facilitate improved outputs and productivity. To ensure the available funds were appropriately allocated to those areas with the most inefficient lighting, a comprehensive survey was carried out across the academic estate to identify and prioritise existing light fittings that would ultimately inform the programme of upgrades.

The programme was planned to ensure minimum disruption to teaching and learning spaces with the vast majority of works carried out over the academic holiday periods, in particular the Easter and summer breaks. The whole project was coordinated and delivered by the Estates team over a period of 1 year working closely with onsite electricians, schools and departments to ensure installations were carried out in a timely manner in accordance with the expectations of occupants.

Lecture Theatre 1 – Cyncoed Campus



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Key facts

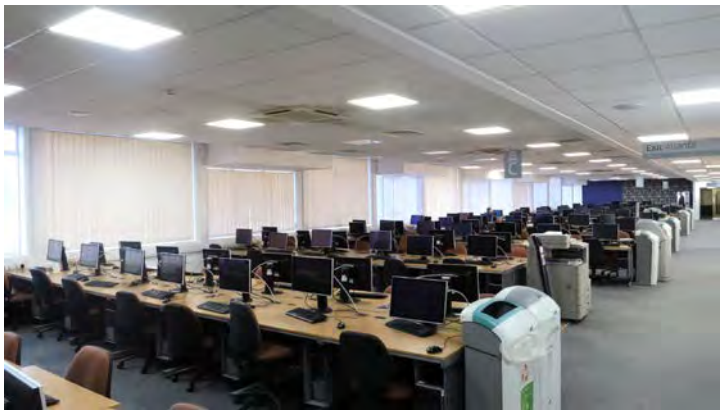
The project delivered the following benefits over the completed programme of upgrades:

69%	Overall electricity reduction
£77k	Annual savings in electricity costs
80t	Reduction in tonnes of CO2 per year
1,725	Total number of fittings removed
1,355	Total number of LED fittings installed
21.5%	Reduction in number of LED fittings installed
4yrs	Payback period

Save as you go

Across the completed portfolio of 85 separate upgrades, the retrofit LED luminaires installed demonstrated energy savings as high as 85% in some areas with an average of almost 70% across the entire programme. In addition, as the lamps have an operating life of up to 50,000 hours, maintenance savings of up to 100% can be realised. The return on investment shows full payback within 4 years on average however some upgrades will be paid off in less than a year through the savings in energy costs from the reduced energy demand. These reductions have been realised by the preparation of individual lighting designs for each space with a specific focus on ensuring adequate lighting levels, whilst maximising savings through a reduced number of fittings, lighting controls and in teaching spaces simpler, local controls for switching banks of lights pursuant to the requirements of teaching. Where applicable and achievable, verification of savings were enhanced through direct current measurements pre and post installation to ensure calculated savings were being delivered. The long lifespan of LEDs will in turn reduce the volume of waste produced not only from a reduction in replacement fittings but also on future waste streams. With LED lighting, ongoing waste streams are typically reduced by at least 50% compared to fluorescent lamps and they also eliminate the requirement to separate constituent parts due to the absence of mercury.

The qualitative benefits associated with LED lighting include increased productivity and alertness, more even lighting across spaces, improved mood, standardised colour rendition and colour temperature (daylight).



Cyncoed Campus – B Block IT Suite

Cyncoed Campus - C Block Teaching Space

Case Study

Simple control

Throughout this programme, a strong emphasis has been placed on occupant behaviour when considering the use of lighting in learning spaces and designing lighting strategies that complement the main function. This has been borne out in the simplification of controls strategies and a move away from purely automated systems to simple, user controlled switchable banks of lights suitable for meeting the flexible requirements of a teaching environment. Most learning spaces are transient areas which staff and students occupy for short periods of time. As such these spaces lack ownership and to counteract this, absence sensors have been integrated which switch off the lights after a predetermined time if they are left on after use. These additional controls have a direct impact on energy use and contribute further cost savings over and above the savings delivered by the light fittings themselves.

Llandaff Campus – L2.01

Llandaff Campus – T2.19

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