UNIVERSITY OF ABERDEEN

Sustainability Case Studies

ENERGY MANAGEMENT: JAMES MACKAY HALL LIGHTING

The Challenge: Inefficient Light Bulbs

As with the large majority of the University's portrait lighting, halogen reflector lamps were used to illuminate the gallery area of James MacKay Hall.

As these lamps had a life span of 2,000 hours and were in operation for 12 hours a day throughout the year, a handful were replaced weekly as a result of failure. At a cost of £8 per lamp and with associated running and maintenance costs, these lamps were identified as a potential energy saving project by the Energy Management team in Estates.

The Solution: Replacement with LEDs

The University's Carbon Management Plan commits the institution to reduce emissions linked to energy use and to improve energy efficiency. These commitments, coupled with an active Energy Monitoring and Targeting regime, drive the implementation of sustainable and energy saving technologies across campus. Replacement 7 Watt LED bulbs were selected as ideal alternatives for the old halogen bulbs. They have many benefits over traditional halogen bulbs that more than outweigh the increase in price:

- LEDs are the most energy efficient bulbs, using at least 80% less energy than halogens;
- LEDs have a significantly longer lifespan;
- LEDs don't produce heat in the form of infrared radiation, which makes incandescent bulbs hot to the touch. The absence of heat allows LED fixtures to be positioned in locations where over-heating from conventional lighting could cause problems.

The Results: Significant Savings

Changing the 79 existing halogen lamps with LED replacements cost £1,264 and took 2 days to complete in January 2015.

Once installed, the LED replacement lamps resulted in a decrease of 86% in the lighting energy consumption of the hall. The reduced electricity demand from the new fittings generated energy savings of £1,100 per year and the project was fully paid back within 14 months. The increased lifespan of LED bulbs also resulted in the number of lamps replaced (normally up to 300 bulbs per year) reducing to zero in the first 24 months of operation. This has a beneficial impact on maintenance cost as one £17 LED bulb has the same lifespan as 25 halogen bulbs (saving £383) as well as lamp disposal and associated waste costs.

Additionally this project has reduced carbon dioxide emissions by approximately 5 tonnes per year.

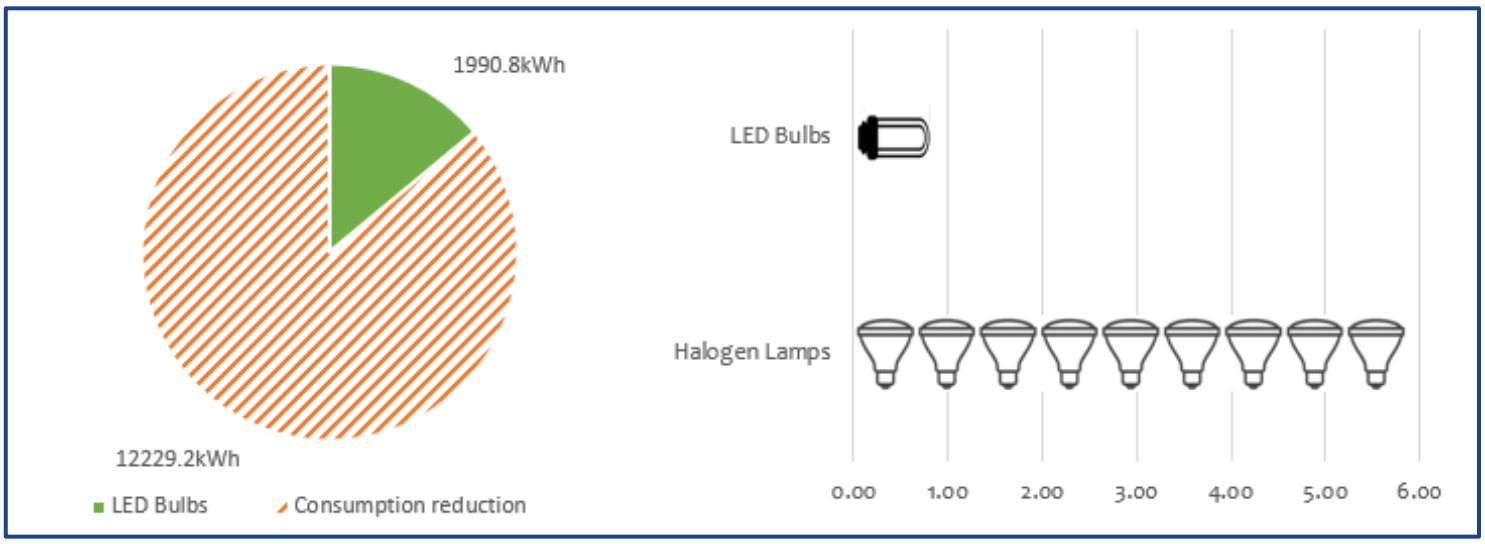
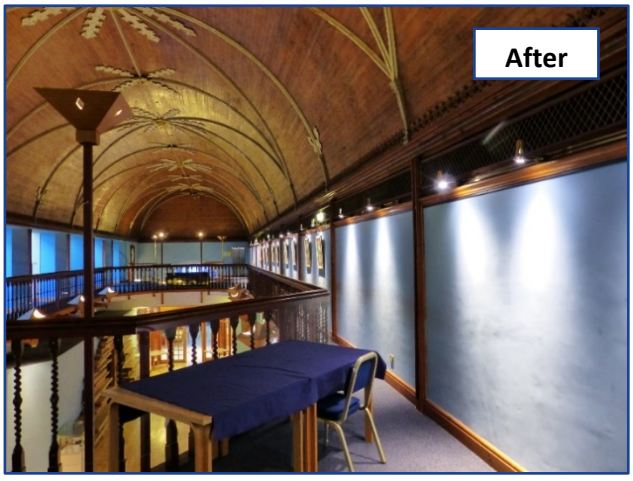


Figure 1: Yearly Electricity Consumption

Figure 2: Carbon Dioxide Emissions (CO_2tonnes)



Lessons Learned

- This project highlights that investing in more expensive technologies can yield significant savings where those technologies are much more efficient.
- Replacing existing lighting with LEDs reduces electricity consumption and has a significant impact on the required maintenance and yearly replacement numbers.
- Careful planning regarding colour rendering is vital when considering replacement LED lighting for old tungsten, halogen and CFL lamps.