



The new LED lighting is shown (on the left hand side) alongside the old T5 fluorescent fittings in the photo above taken during the course of the retrofit.

Since the creation of DECC on 3 October 2008, we have been engaged in an ambitious and wide-reaching programme to reduce our energy consumption and improve our overall sustainability. By 2013/14 we had cut our energy use by 42% and carbon emissions from our estate by 38% since DECC was established in 2008. Carbon emissions per full time employee have also been slashed from 1.93 t/CO₂ to 0.6 t/CO₂. Information on how we achieved this can be found here

THE CHALLENGES

Although we are very proud of our achievements, this success has presented its own challenges. As our HQ building has become more and more energy efficient, it has become increasingly difficult to identify cost effective and technically feasible energy and carbon saving measures that can be retro-fitted into the building. In addition, DECC's estate has expanded with the occupation of additional space in Kings Building, central London, from November 2013. In this environment it is very hard to continue to achieve absolute energy and carbon reductions

PARTNERSHIPS

In order to bring fresh insight to our challenges and reap the benefits of energy and carbon savings as soon as possible, we used the Mayor of London's RE:FIT programme. This provides a framework for

the public sector to retrofit existing buildings with energy saving measures and has been designed especially for the public sector providing several advantages:

- a faster, streamlined procurement process and support in managing this; and
- a savings guarantee from contractors.

We used the partnership approach to run a mini competition amongst the Energy Services Companies (ESCOs) on the framework and, based on our selection criteria, chose Skanska Rashleigh Weatherfoil Limited to implement a range of energy saving measures at our main London buildings, 3 Whitehall Place and 55 Whitehall. The proposed measures are guaranteed to save 303,596 kWh per annum, which is around 14% of the energy use of these buildings. They should also save around 159 tonnes of carbon per annum. More information can be found on the RE:FIT website.

A good deal of the success of this project was the ability to forge close working partnerships with a several organisations to deliver the project on time and to the agreed budget. DECC's sustainability Team worked closely with the RE:FIT's Programme Delivery Unit at the Greater London Authority, Philips, who designed and manufactured the LED light fittings and control system, Skanska our chosen ESCO and Interserve, DECC's FM provider.

INNOVATION AND PRODUCT SELECTION

The measures agreed fall into two categories:

1. LED lighting

We already have LED lighting in many of the non-office spaces in 3 Whitehall Place, such as staircases, lifts and toilets which we estimate reduced our emissions by an impressive 76 tonnes a year. We realised that we could achieve far higher energy and carbon saving by rolling out LED lighting more widely in the building. However, the quality of light in office areas is very important and it was always going to be crucial to find high quality, office compliant LED light fittings that would meet the needs of our staff. The existing office lighting already employed a fairly efficient technology, using newer fluorescent tubes (known as T5). Compared to retrofits in most comparable buildings, which tend to use relatively inefficient T8 tubes, the energy savings are slightly lower. However they are very significant. Moreover there are additional savings to be had from the switch to LED lighting in the form of lower maintenance costs – it is claimed that LED luminaires typically last 5 times as long as the fluorescent equivalent.

A like for like replacement of the T5s with the new LED lighting was carried out over eight floors in March 2014. This amounts to approximately 1300 light fittings – quite an undertaking. The luminaires chosen fitted the existing metal grid ceiling, and incorporated our air-handling but had a two month lead time. To maximise energy savings we also chose a new localised control system which not only automatically turns lights off in an unoccupied room but also dims them on in response to the levels of daylight and is operated by a hand held remote control set. The new controls can dim the new fittings down to just 5% and operate in addition to our existing centralised control system. This combination of LED lighting, a centralised lighting control system and a layer of local control is especially innovative and designed to optimise lighting efficiency in more challenging buildings where a high degree of efficiency has already been achieved. The installation started on 5 March 2014 and was completed by 31 March

2. Building Management System modifications and upgrade

These include reducing the minimum speed settings for supply and extract fans and installing a variable speed drive for boiler house ventilation fan.

COMMUNICATION

Although LED technology is well established and the potential energy savings fairly easy to estimate, we still wanted to be sure that this type of lighting would also make a ~difference to working conditions and be acceptable to staff before spending a lot of money. Consultation with relevant staff groups, including our Disability Network and Unions, Health and Safety colleagues, as well as with staff more generally would be critical to the success of the project. We also decided to carry out a limited trial of an office compliant (i.e. a low Universal Glare Rating) fitting in a pleasing warm white colour temperature (3,000 Kelvin). They were tested in the 'Touchdown', an overflow office area designed to accommodate staff for short periods of time. Although a comparatively small space, its function ensures a high turnover of staff so maximising the number of people experiencing the proposed new lighting. The pilot took place in October and November 2013. Staff were encouraged to provide feedback via either on-line or paper based questionnaires. We also measured lux levels before and after the installation. The results of the questionnaire were largely positive with over two thirds of respondents noting an improvement in the lighting. Light levels at desk level increased by around 100 lux.

RESULTS

So far so good! Although it is early days, initial results are encouraging. The graph below shows overall electricity use at 3 Whitehall Place in the weeks leading up to, during, and after the installation, showing a fall of almost 30%. We are working with our contractor to establish robust measurement and verification data to provide proof of actual energy savings. DECC staff are also benefiting from a lighter, brighter work place, with increases of up to 200 lux measured in parts of the building.

COST EFFECTIVENESS AND CARBON COMMITMENT

Cost*	£428,436
Annual energy savings (kWh)	303,596
Annual carbon saving (t/CO2)	159
Annual energy savings**	£30,409
Total annual savings (inc. maintenance)	£36,833

* Cost of fittings and installation excluding VAT, measurement & verification and Investment Grade Proposal

**Including energy price inflation of 5%

Because 3 Whitehall Place is now so energy efficient we are looking at much longer payback periods than when we first began in 2008. The measures provided under the RE:FIT programme give a payback of about 12 years. This project demonstrates that even the most energy efficient organisations can still be ambitious in their carbon commitment and that we should strive for continuous improvement. DECC aims to maintain these savings through its robust Energy Management System which achieved ISO 50001 certification in December 2013.

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