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The University of Oxford Carbon Reduction Carbon Reduction Programme

About the project

Summary

The Carbon Reduction Programme seeks to provide an all-encompassing approach to realise significant carbon reductions at the University of Oxford whilst providing staff and students with a sense of satisfaction from being involved in the process. The degree of engagement from all stakeholders makes this programme distinctive, and the projects within it are designed to provide skills, knowledge transfer and empowerment to all users.

Project partners

The University of Oxford

The results

The problem

HEFCE has set a sector target of 43% reduction in carbon emissions by 2020 on a baseline of 2005 and has asked for a commitment from all institutions to generate a Carbon Management Plan and reduction target to support this. On a more local level, Low Carbon Oxford brings together organisations from across Oxford to sign the Low Carbon Oxford Charter to achieve the city's target of 40% carbon reduction by 2020. The University of Oxford has signed this Charter, committing to collaborating with more than 40 companies in order to reduce carbon by 3% year-on-year.

The approach

The University has a carbon management fund to support the implementation of technologies or actions that will assist the University in reducing its carbon emissions. A carbon reduction programme manager was also appointed.

Our goals

In 2011, the University of Oxford set an ambitious target, as part of our Carbon Management Strategy, to reduce Scope 1 and 2 carbon emissions by 33% by the end of 2020/21 against a 2005/6 baseline. This target applies only to the University's functional estate.

Scope 1 and 2 emissions include direct emissions from fuel combustion, and indirect emissions from purchased electricity, heat or steam.



Profile

- Higher Education
- 22,602 students (includes full- and part-time students)
- 12,510 staff
- Urban

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Obstacles and solutions

Obstacles	Solutions
Funding to allow projects to progress.	The University is committed to achieving its carbon reduction target and allocated a carbon management fund.
Resource to allow projects to progress.	A carbon reduction projects manager was appointed, projects are outsourced and further project management is being sought.

Performance and results

Since starting the project in 2011, 4,767 tonnes of carbon and £1.1m of energy costs have been saved. Over 180 projects have been completed ranging from solar PV to lighting upgrades and roof insulation.

The journey has inspired several new initiatives such as the Low Carbon Oxford Week Treasure Hunt, the ISCN award-winning Carbon Innovation Programme and a range of training courses for staff and students. In the coming years the University is looking to explore the concept of a living laboratory and trialing new battery storage technologies in collaboration with academic departments.

The Carbon Reduction Programme is run by a Projects Manager in the Environmental Sustainability team in Estates Services. However the programme could not run without the immense and dedicated support of the University's staff and students.

The work is split into 5 categories. Each is described below, with a brief summary of some of the projects being carried out:

1. Renewable energy

Solar PV offers the University an exciting opportunity to deliver energy directly to its facilities, significantly reducing carbon emissions whilst also reducing electricity bills and increasing security of supply. To date over 1000 panels have been installed and a total of £489k has been spent on solar PV from the Carbon Management Fund. These projects have a payback of between 6-10 years, including the Feed-In Tariff (FIT) income, and it is estimated that the projects will avoid costs of £31k – a saving from which departments will benefit directly – and a reduction of 150 tonnes of carbon per annum. The combined FIT income from the current installations will be in the region of £50k/annum. This income will be reinvested into more carbon-saving projects, and work continues to identify additional opportunities on the estate.

2. Building fabric

The University owns an ageing estate, and this has given rise to a number of opportunities to install insulation and reduce heating costs. By working with the three-year repairs and maintenance plan, costs of installation can be reduced and the recent completion of the Physics building has generated annual savings of 49 tonnes of carbon.

3. Building systems

Building Management Systems (BMS) manage how and when building services, such as heating and ventilation, operate. They are often controlled by temperature and CO₂ set points and timers. Typically a building will run



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from 8am to 6pm, but the University runs a range of facilities that require specialised operation. For example, the libraries and museums may require specialised humidity controls, and laboratories will require specific air pressures for safety. Optimising the way in which these systems are controlled offers the University an opportunity to reduce its carbon emissions and operating costs with a relatively low investment outlay.

The BMS optimisation programme was launched in 2015 and focuses on the buildings with the largest emissions. Each building will go through a 12-month process involving a phase of increased metering of its activity, a phase of analysis, implementation of changes and then a phase of monitoring and validation to assess the impact and success of the changes made. Optimisation of over 20 buildings is planned, and the programme will run from 2015 to 2020. To date, savings of 1,052 tonnes of carbon per annum have been identified from 11 buildings in just under 12 months. This pioneering work has been featured in the Chartered Institute of Building Services Engineers (CIBSE) magazine.

A number of maintenance and mechanical upgrade opportunities were identified during the BMS optimisation process, and this will form phase two of the works.

A carbon reduction plan is not complete without a project on lighting. Over £2m has been spent on upgrading lighting at the University between 2014 and 2016, and these upgrades have resulted in removal of over 3,000 tonnes of carbon from the University's annual emissions. Particular projects have also been relatively high-profile in their contribution to user experience and conservation – the Natural History Museum, the Pitt Rivers Museum and the Ashmolean Museum to name a few. LED installations reduce cooling requirements and the removal of UV from the light source protects the artefacts.

4. Engagement and behavioural change

Three different and recurring training courses have been launched to acknowledge the start of the change journey for staff and students. Due to the transient nature of the University population this comes with its challenges, and taking a group through the change curve and competence levels to unconscious competence will be long and repetitive. Feedback from the training has been positive and encouraging. To accompany this, the University has invested in new user-friendly monitoring and targeting software that will give building users access to their energy performance data. This will support continued effort to engage with users and building managers, and provide more useable data to Green Impact teams.

In October 2015 the Carbon Innovation Programme was launched. This was to establish multidisciplinary teams of staff and students to work collaboratively and identify innovative ideas to help reduce carbon emissions across the University. The teams each developed an initial concept into a detailed project and then, following a number of supporting events, ten teams presented their ideas to a panel of experts (titled the Carbon Den) during December 2015. DPhil student Peter Armstrong commented: 'The launch event offered a great opportunity to mix with people working in different disciplines. It was great to see so many multidisciplinary teams presenting at the Carbon Den.'

The quality of the projects put forward was exceptional. The diverse ideas ranged from an engagement project using sculptures to investigating heat recovery from data centers. Funding was made available to two of the projects and five more are now being further developed to be assessed for funding suitability later this year.

Professor Malcolm McCulloch, Associate Professor in Engineering Science and a member of the panel commented: 'This exciting programme has stimulated many great projects, most of which will lead to further efforts to reduce the University's carbon production. The outcomes exceeded our expectations; especially as it is



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the first year the programme has been run.' The Carbon Innovation Programme was recognised this year by an ISCN award.

5. Plugged load

Mathematical, Physical and Life Sciences and Medical Sciences Divisions are responsible for 76% of the University's carbon emissions. A key source of these emissions is the energy-hungry equipment contained within the laboratories. As a result, a new procurement user group was set up and new service contracts agreed. A subsidy scheme has been put in place to upgrade Ultra Low Temperature (ULT) freezers, of which the University has over 500. Full funding has been provided for over 130 glass dryers that will save 370 tonnes of carbon per annum. The laboratory tab within the Green Impact scheme has also been developed to encourage better practice within the labs. Future plans include training undergraduates, providing guidance on equipment use, and maintenance and inductions.

The future

Lessons learned

The Carbon Reduction Programme is a constantly evolving group of projects with learnings taken from each project onto the next. Most learnings tend to focus around operational issues or stakeholder engagement. It is important to communicate progress and requirements as soon as possible in the process and to set clear guidelines for project generation and authorisation to allow progress to be swift.

Sharing your project

A number of guidance documents and case studies have been added to the updated website and publically available. Aspects of the project, such as the Carbon Innovation Programme and the Living Laboratory have been discussed with Belfast, Cambridge and Yale universities amongst others and also with EAUC. The BMS work was published in a sector magazine and will be highlighted at a national conference.

What has it meant to your institution to be a Green Gown Award finalist?

The Carbon Reduction Programme is a vital part of our work towards making the University a more sustainable place to work and study and we are delighted to have this programme recognised as a Green Gown Finalist.

Further information

[Energy and Carbon Website](#)

[Carbon Innovation Programme Website](#)

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