

The Vice-Chancellor's foreword

As one of the world's great universities, Oxford has a significant positive impact at a global, national and local level. We are known for the high quality of our environmental teaching and research and in parallel with this, the University is working internally to reduce its impact on the environment through its environmental sustainability policy and we are determined to play our part in cutting carbon emissions through our carbon management strategy.

It is now even more important that the University acts to reduce its energy consumption, due to:

- ▶ The rising cost of electricity, gas and oil
- ▶ Increasing legislative pressure for the University to reduce emissions – from 2012 we will pay £12 for every tonne of carbon dioxide we emit under the Government's Carbon Reduction Commitment (CRC) Energy Efficiency Scheme
- ▶ The need to meet energy targets set by HEFCE, as well as our own longer-term targets:
 - ▶ to reduce carbon emissions by 11% compared to 2005/06 levels by 2015/16
 - ▶ to reduce carbon emissions by 33% compared to 2005/06 levels by 2020/21

Whilst University buildings are built to high environmental specifications, new low carbon buildings will not shrink our carbon footprint sufficiently.

In 2009/10 the University's total carbon footprint derived from grid electricity and on-site fossil fuel use was 80,615 tonnes CO₂.

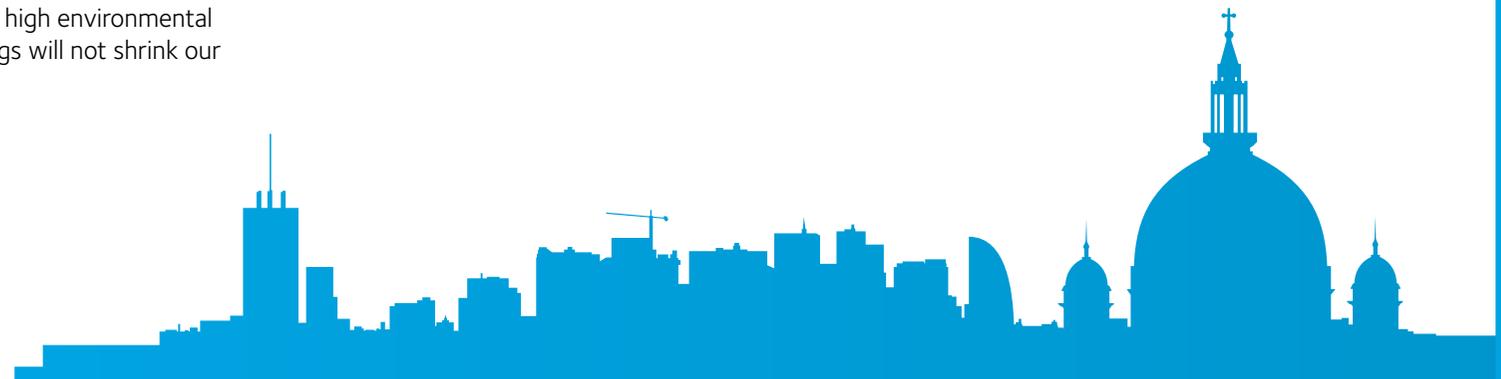
We must find new and creative ways to reduce demand for energy in our existing buildings – and to achieve these challenging targets, all staff and students will need to play a role.

This Energy Toolkit is designed to help the University achieve its energy reduction targets – I hope it will prove essential reading for your department.

Professor Andrew Hamilton FR



Professor Andrew Hamilton FRS



Welcome to the Energy Toolkit

We're glad you're reading this toolkit, because it was a labour of love to develop it! We conducted energy audits, asked energy managers lots of questions and looked at pages and pages of energy data. But it was all worth it, because this is one of the main tools for helping the University meet its long term energy targets.

University of Oxford Energy Targets

- ▶ to reduce carbon emissions by 11% compared to 2005/06 levels by 2015/16
- ▶ to reduce carbon emissions by 33% compared to 2005/06 levels by 2020/21

Developed by the University Sustainability Team, we hope you find the toolkit easy to use and that it helps you to reduce energy consumption and cut your energy bills.

The toolkit will help you to

- ▶ reduce electricity, gas and oil consumption in your departmental building
- ▶ cut your energy bills
- ▶ problem-solve specific areas of energy consumption
- ▶ access practical guidance, energy efficiency top tips, fact sheets and case studies

This toolkit is for

- ▶ Decision-makers with a say on how buildings are managed
- ▶ Heads of Department
- ▶ Administrators
- ▶ Building Managers
- ▶ Facilities Managers
- ▶ Laboratory Technicians
- ▶ IT Managers
- ▶ Staff and Students
- ▶ University Eco Reps
- ▶ Anyone else responsible or interested in reducing energy in departmental buildings

To see the University's Carbon Management Strategy go to:

www.admin.ox.ac.uk/estates/environment/energy/carbonmanagementstrategy



What is the University doing to save energy?

Many energy saving projects are embedded in the Estates Directorate's operations and these include:

- ▶ Replacing old gas-fired boilers with high efficiency boilers as part of an on-going plant room refurbishment programme
- ▶ Replacing heating and ventilation stand-alone controls with Trend Building Management System networked controls
- ▶ Rewiring electrical services including replacing old lighting with high efficiency luminaires and automatic controls where appropriate
- ▶ Designing energy efficient buildings to meet BREEAM 'Excellent' rating or equivalent with efficient heating, lighting and controls. Air conditioning is avoided where possible with an emphasis on natural ventilation with night cooling
- ▶ Monitoring gas, electricity, oil and water consumption in all University buildings

Whilst the Estates Directorate is mainly responsible for mechanical aspects of energy management in the University, all staff and students play a key role in helping the University reduce its CO₂ emissions, and developing new and creative ways to reduce energy consumption in University buildings.

University Estates Directorate energy saving projects

- ▶ The Estates Directorate negotiated best prices for gas and electricity contracts (the contract period Aug 2007-Jul 2012 is for electricity generated by large scale hydro-electric power from Scottish and Southern Energy)
- ▶ The Estates Directorate launched the Energy Conservation Fund and a HEFCE-Salix revolving green loan fund to finance departmental energy saving projects
- ▶ A carbon management strategy has been developed to outline the way the University intends to reach its carbon dioxide emissions reduction targets

The Estates Regulations

Departments wishing to install heating, cooling or lighting systems that are not part of the rolling condition survey should contact the Estates Directorate first, for guidance on installation and efficiency standards. The Estates Regulations outline areas of responsibility for departments and are issued in hard copy to all building administrators. The Estates Regulations are also available on the University website:

www.admin.ox.ac.uk/estates/regspols

Eco Reps

The University has Eco Reps in many of its departments. Eco Reps are a network of staff volunteers who want to help their department reduce its environmental impacts¹.



¹ www.admin.ox.ac.uk/estates/environment/ecoreps

Monitoring & Reporting

What is SMEasure?

SMEasure is a monitoring tool developed by the University's Environmental Change Institute. Using building energy analysis and carbon monitoring SMEasure can help your department/college save money and reduce carbon emissions.

What does it do?

SMEasure building energy analysis could help you save between 10–40% on your energy bills. SMEasure allows you to monitor your energy consumption compared to 'typical' energy consumption.

Through the input of meter readings and the automatic weekly update of regional temperature data (degree-day data) SMEasure displays information on how energy efficient your building is.

The typical and best practice building energy performance benchmarks used in SMEasure come from the Chartered Institution of Building Services Engineers (CIBSE). These same benchmarks are used for the indicative Display Energy Certificate (DEC), provided by SMEasure for each building monitored in the system.

How can I find out more about SMEasure?

SMEasure is free. Just visit the website:

www.smeasure.org.uk to create an account and start recording your energy meter readings.



Lighting

Lighting is one of the year round energy uses and it is very easy to waste energy.

Quick wins

Inform your cleaning / security staff that they are expected to turn lights off after they have finished cleaning a room or area / or when they are doing their security checks (it's easiest to formalise this in cleaning contracts or at least speak to the cleaning manager to ensure it's part of the cleaners' job specification).

Develop a communication system (eg: regular emails/posters/stickers) to remind people to remember to switch off lights when they leave the room/building.

Maximise natural daylight by keeping windows clean and ensuring curtains and blinds are in working order.

Long term

Install automatic lighting control sensors (Passive Infra-Red: PIR) in common spaces. Contact the Energy Manager for advice – see **Contacts**

Request an energy audit for your building or buildings by contacting the Energy Manager.

Keep in mind

PIR - (Passive Infra-Red) lighting sensors pick up movement, heat, sound or light. PIR lighting is good for low use areas (libraries, corridors, WC, security lighting, store rooms and bike sheds). Lighting sensors that detect acoustics are good for corridors (they pick up sound around corners). Daylight sensors are good for controlling lighting around windows (and certain lights can be dimmed to maintain the correct level of lighting).

Timer switches - reduce the time lighting is on by enabling lighting to turn on and off at pre-set times. Run-down timers work by only letting lighting stay on for a set time.

Compact Fluorescents (CFL) - CFLs are good for task lighting, corridor lighting, small room lighting (eg: toilets or store rooms) and are cheap and widely available.

Fluorescent tubes - T5 is the most energy efficient lighting for large open plan spaces such as offices. It's possible to convert from T8s to T5s and save energy without changing fittings (by using adaptors).

LED - LEDs are increasingly popular, they're very energy efficient and last up to 50,000 hrs. The range of LEDs is small, but it is increasing.



Green IT

Turning PCs off is one of the easiest ways to save a lot of energy, yet not everyone does.

Quick wins

- ▶ Power down desktop computers and laptops when not in use
- ▶ The University Computing Services (OUCS) has developed a system for reducing IT-related energy in departments and colleges – and will be happy to discuss the scheme with you: www.oucs.ox.ac.uk/greenit/desktop.xml
- ▶ Reduce paper and ink consumption by only printing when necessary, printing double-sided by default and using recycled paper
- ▶ Switch off printers, photocopiers and faxes, etc, at the end of each day
- ▶ Make more use of electronic communications instead of paper-based communications
- ▶ Work with your IT staff to implement energy-saving IT projects
www.oucs.ox.ac.uk/greenit
- ▶ Set up automatic power management (sleep/standby mode), eg: monitors, printers, scanners, photocopiers, laptops and desktop computers
- ▶ Consolidate servers using virtualisation software or pay for server space with other service providers rather than operating your own server room. If you manage your own server room/data centre, set the cooling set-point to about 22 °C:
www.oucs.ox.ac.uk/greenit/oxford-central-machine-room-design.xml
- ▶ Reduce the number of printers, scanners, photocopiers and other office equipment to reduce capital costs, electricity bills, maintenance and IT support time



Labs

Laboratories are the University's most energy intensive buildings

Quick wins

- ▶ Review energy use from lab equipment (fume cupboards, drying cabinets and fridges)
- ▶ Identify whether research equipment can be turned off at night, weekends and holidays
- ▶ Keep fume cupboard sashes down and closed when not in use
- ▶ Defrost fridges and freezers regularly to maintain efficiency
- ▶ Allocate 'defrosting' responsibility to a staff member, or have a timetable so you know when defrosting is due
- ▶ Clean the fridge condenser as dirt impedes efficiency
- ▶ Check and clean the rear of fridges annually
- ▶ Trim back operating hours if the equipment is programmable



Raising awareness

Communication is key – energy saving initiatives are more successful if staff and students know what the department is trying to achieve. Most importantly, reward people when they’ve made an effort – an email or recognition at a staff meeting will make people feel that their efforts have been noticed.

Publicity

If you don't have time to develop your own awareness raising campaign, the University Sustainability Team can help you with free publicity for your department (available electronically)

Energy saving fact sheets

The University website has lots of energy saving fact sheets available for download:

www.admin.ox.ac.uk/esates/environment/energy/atoz.shtml

Energy saving presentations

The University website has lots of presentations (PowerPoint) available for download:

www.admin.ox.ac.uk/estates/environment/energy/energytoolkit/casestudies

Energy saving posters

You can order free energy saving posters via the Sustainability Team by going to the following website:

www.admin.ox.ac.uk/estates/environment/energy/resources



³ Eco Reps are University staff and students who volunteer to help their departments become more environmentally-responsible (contact: kate.aydin@oued.ox.ac.uk) for more details.

Raising awareness

Top Tips for raising energy awareness

- ▶ Email your department monthly to remind them how they can reduce energy
 - ▶ Ask senior management to inform staff/students that the department is committed to saving energy
 - ▶ Show staff and students how to save energy (eg: by email, your website or posters around the building)
 - ▶ Review energy management on a regular basis at staff management meetings
 - ▶ Constantly challenge standard procedures – ask ‘Why do we do it this way? Is there a better way?’
 - ▶ Find out if your department has an Eco Rep³ as they may be able to assist you in energy saving projects if you need extra help
 - ▶ Give responsibility for energy saving to willing staff members, eg: Eco Reps – many staff and students like to get involved in environmental initiatives
 - ▶ Tell staff and students about any progress – monthly updates are useful
 - ▶ Include energy management responsibility in new staff members’ job descriptions (and as part of your induction process)
- ▶ Brief all lecturers on the need to save energy in labs, lecture theatres and libraries. Ask them to brief students (close fume cupboard sashes, turn lights and computers off)
 - ▶ Allocate responsibility to staff responsible for shared equipment (eg: printers, lab equipment)
 - ▶ Provide in-house energy reduction training for staff (don’t forget temporary/ancillary staff, cleaners, caterers, consultants, etc)
 - ▶ Ask your staff and students for energy saving ideas – offer incentives for good ideas
 - ▶ If external people are using your building, give them instructions on how to use energy efficiently in the building (eg: turning lights and computers off and ensuring they know how to adjust the air conditioning or heating if necessary)



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Funding

Two types of energy saving funds available to departments:

1) Energy Conservation Fund

The Energy Conservation Fund is collected through Energy Conservation Levy – this is a levy of 0.1p/kWh on University buildings' energy consumption. The levy is applied to electricity, gas, heat and oil use. The levy is 'recycled' back to departments in the form of funding, which pays for departmental energy saving projects. Note: Projects must meet the Energy Conservation Fund criteria (see below).

Criteria

The levy from which the fund is financed excludes embedded spaces where energy costs are incorporated in the space charge and where the Estates Directorate is not responsible for building and plant maintenance.

The levy is applied to actual energy bills and is collected quarterly in arrears. The levy charges are collected by the Estates Directorate Accounts, using internal journal transfer where possible.

Minimum grant of £1,000; maximum grant of £50,000 to any one project, except in exceptional circumstances.

Maximum grant to any one department in one year with a rolling maximum of £100,000 in any 3 year period.

Calculated simple payback period to be no longer than 5 years. Projects can be of a larger value if the department contributes the extra but payback rules still apply.

2) Salix Revolving Loan

The Salix Revolving Loan is financed by a loan from HEFCE/Salix and matched funding from the University. The money is loaned to departments to finance energy saving projects and the resulting cost savings from reduced energy bills are used to repay the loan, which is then recycled to finance other projects. Note: Projects must meet the Salix criteria (see below).

The University has funding available for energy saving projects. Your department may be eligible for funding from the University's Energy Conservation Fund. Why not contact the University's Energy Manager for more info?

Criteria

The Salix funding is made up of £200,000 Carbon Trust funding; £200,000 from HEFCE and £100,000 matched funding from the University's Energy Conservation Fund. The University retains the ring-fenced interest-free loan and recycles it as many times as possible. The Salix loan is used to pay for energy reduction schemes in buildings. The costs are repaid by the departments out of the energy savings they make over the loan period.

Projects must deliver both CO₂ and revenue benefits and must also offer long term CO₂ savings.

There is no minimum size for a project but the recommended minimum is £1,000. The maximum loan depends on the amount of funding available in the 'pot' but it's likely to be about £150,000.

Either a maximum 5 year payback period and £100/t CO₂ lifetime basis for technologies covered in the Salix Technology Support Notes.

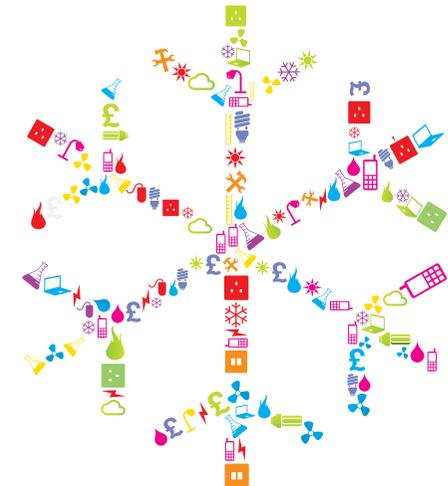
Or a maximum 7.5 year payback period and £50/t CO₂ lifetime basis for technologies covered in the Salix Technology.

Support Notes

To enable projects to meet the selection criteria departments can contribute an extra 20% of the cost.

Once a project meets the Salix criteria it is selected by the Estates Directorate and approved by the Building and Estates Sub-Committee (BESC).

You can also download a **funding application form** from the website.



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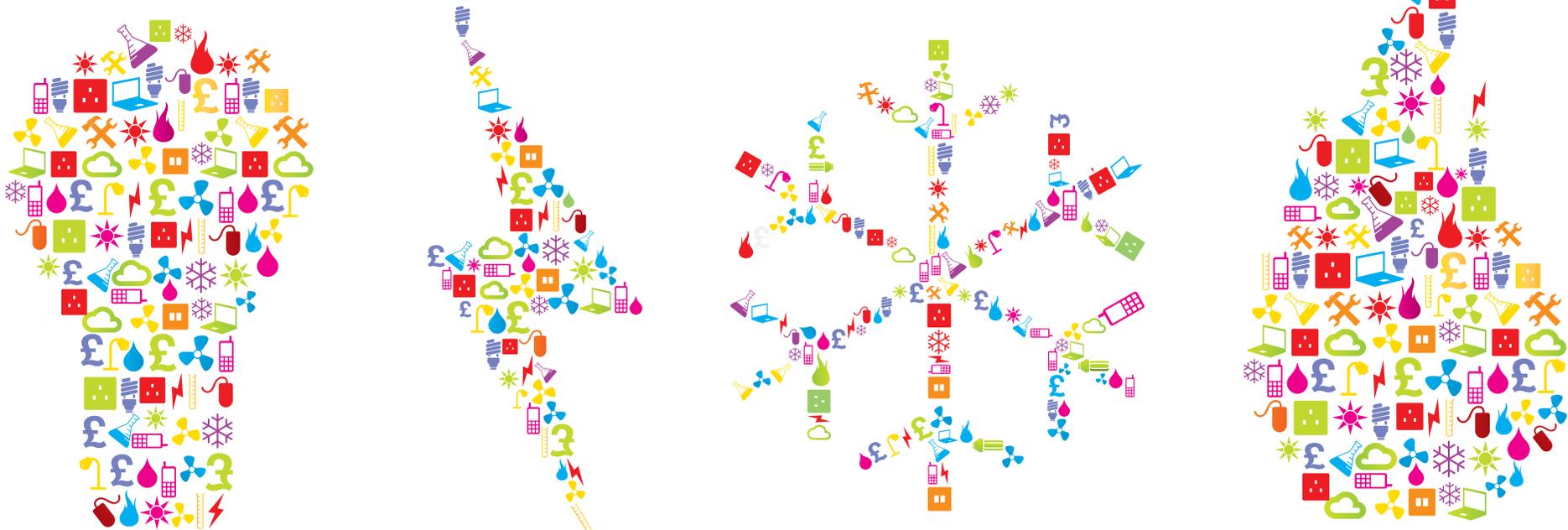
Opportunities for cost-savings

There are many opportunities for cost savings through energy efficiency.

For example, if equipment is turned off outside normal working hours, the annual costs would be reduced by 67% (from 8,760 to 2,920 hours):

Electrical equipment (if left on all year)	Electrical Load	Hourly cost	Annual cost (8,760 hrs)	Annual cost (2,920 hrs)	Cost saving
Single PC & LCD screen	100W	1.1p	£95	£32	£63
Lighting (small office)	220W	2.4p	£210	£70	£140
Lighting (100 seat lecture theatre)	1,320W	14.5p	£1,270	£423	£847

Remember – longer term action will make significant energy savings. It might take a bit more effort, but the energy and cost savings can be significant. Changes to mechanical services and any electrical issues should be directed through the Estates Directorate Helpdesk via your departmental administrator. The Estates Directorate can provide you with advice on the best lighting and lighting controls for your building (eg: installing automatic lighting and energy efficient lighting).



Contacts

For information on energy saving, funding, case studies and monitoring:

Philip Pike
Energy Manager
Sustainability Team
✉ philip.pike@oued.ox.ac.uk
☎ 01865 278780

Jonathan Walford
Assistant Energy Conservation Engineer
Sustainability Team
✉ jonathan.walford@oued.ox.ac.uk
☎ 01865 278779

To report energy-related faults:

The Estates Directorate Helpdesk (please contact Estates via your administrator):

✉ helpdesk@oued.ox.ac.uk
☎ 01865 270877

For buildings at Old Road Campus, Churchill or JR, please report faults to Norland Managed Services:

✉ oxfordcustomerservice@norlandmanagementservices.co.uk
☎ 01865 289777

For information on lighting and lighting controls:

David Baker
Electrical Engineer
The Estates Directorate
✉ david.baker@oued.ox.ac.uk
☎ 01865 278772

For advice on F-Gas regulations:

Kay Belcher
Assistant Mechanical Services Engineer
The Estates Directorate
✉ kay.belcher@oued.ox.ac.uk
☎ 01865 278784

To set up green IT in your department:

Oxford University Computing Services
✉ greenit@oucs.ox.ac.uk
☎ www.oucs.ox.ac.uk/greenit/desktop.xml

For advice on sustainability-related issues and publicity:

Kate Aydin
Sustainable Development & Waste Management Officer
Sustainability Team
✉ kate.aydin@oued.ox.ac.uk
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