

Ten Greening Opportunities Within the Mathematics Department – a SMART plan

Opportunity	Description	Why	How	When
Travel for Research (item 1 of Negative Environmental Factors document)	All research-active academic staff are required by the School to undertake such work, and this leads to regular overseas flights. Meaningful reduction on this will be difficult because it is essential for research work. As yet, there is no viable alternative to travel to attend/speak at a research conference.	Travel for research, and particularly flying overseas, almost certainly constitutes the department's greatest negative environmental impact.	Creation of a meaningful Travel policy, leading to restrictions on domestic flights. Explore opportunities for offsetting for overseas flights. Promote technological alternatives to travel, such as telephone conferencing and Skype for research collaboration, in place of meeting in person. Consider monitoring air miles travelled on LSE business to better understand scale of problem.	Consider travel policy again at March 2015 Departmental Meeting, and publicise if approved (first considered in 2012). Liaise with School regarding offsetting scheme during next academic year. Periodically remind colleagues about using technology to facilitate research collaboration. Establish monitoring system for next academic year (from August 2015).
Heating (item 2 of Negative Environmental Factors document)	Heating the department (mainly in winter) is undoubtedly a significant negative environmental factor for the department.	LSE's heating relies primarily on gas and is therefore a source of significant carbon emissions. There are few green alternatives to gas available currently.	Secondary glazing recently installed on 3 rd floor of Columbia House (already in place on 4 th floor) – at our request - and thermostatic control valves fitted on all Columbia House radiators – the School did this as standard. This gives us the means to keep energy wastage/heat loss to a minimum in future. The key action is therefore instruction and guidance on how to best use these tools, awareness raising of the implications of not doing so. Ensure staff know how to use TCVs. Campaign to remind colleagues to 'wear a jumper' rather than turn radiator up. Ask Estates for information on heating energy usage of department.	Awareness raising campaign at key times of year: primarily start of Michaelmas Term, midway through term, shutdown to frost setting for vacations, start of Lent Term reminder, end of Lent term shutdown to frost setting. Provide training on using TCVs to coincide with LSE switching heating on – check with Estates for timing.
Procurement (item 3 of Negative Environmental Factors document)	We spend a considerable amount of money per year on procuring goods and services, and any purchase and delivery of made goods has potential environmental impact. This therefore needs to be considered	Purchasing involves many greenable aspects. Where possible, items bought should have minimal environmental impact, such as being recycled,	Monitor purchasing to ensure that greenest items are bought where possible. Monitor effectiveness of 'green' items – not all offer clear benefits, for instance refilled printer cartridges that run out twice as quickly as new ones, and recycled highlighters that last only a third as long as new ones. There	Monitor effectiveness of green products over the next 12 months. Look for alternatives where necessary. Engage with Office Depot on green product information over

	when purchasing.	refilled, re-used, or reusable. Transportation and delivery of items also involves carbon emissions.	is a suspicion that Office Depot green options are sometimes not as green as they seem. We aim to engage with them as a supplier to validate some of their information about products, and to ask for the return of the 'Green Book' that used to gather the greenest items together in one place making them easier to find. Attempt bulk ordering to minimise transport miles where possible	summer – contact previously made with the School's purchasing manager to facilitate this. Where possible only order goods/items that will travel a short distance.
Paper/printing/copying – course materials. (item 4 of Negative Environmental Factors document)	Though we are not excessive users of printing and photocopying, as a department there is a requirement to provide students with a great deal of paper-based course material.	Although we have significantly reduced our impact here in the last 5 years we continue to use lots of paper as a department. This means trees being cut down, and energy and water usage in the production of the paper - even for recycled paper. Energy usage when printing/photocopying. Use of chemical inks in printers and photocopier. Travel to deliver paper/ink to LSE.	Use online resources such as Moodle and the web instead of printing. (One issue here is the extent to which students then print the papers off anyway, simply passing the buck and not being able to ensure that the student uses recycled paper. So gather information about this). When printing is necessary, use recycled paper for all printing. Print double-sided, two pages to the page. Use smaller font sizes, narrower margins to reduce number of pages produced. Explore new technologies (kindles/iPads): these may better facilitate use of 'online' materials and discourage printing. Note, such devices also have their own significant environmental impact (metals/minerals, mining, energy and water used in manufacture, energy to power the devices) Monitoring copies made/paper usage to ensure this isn't rising or understanding why if it does.	Almost all these activities are underway, with an emphasis on reviewing regularly, monitoring usage and gathering additional information so that the best ways forward for reducing reliance on paper and printing can be identified.
Paper/printing/copying – departmental meeting papers. (also item 4 of Negative Environmental Factors document)	It has become increasingly apparent that in an attempt to maintain audit trails, ensure communication and to close administrative loops, the department is using a large amount of paper and printing for its own meetings.	As above	Wherever practically possible to make all departmental meetings and internal committee meetings as paperless as possible. Circulating all papers ahead of time via email. Ensuring room has projection facilities so that the majority of papers can be projected on screen and read that way during the meeting. Potential difficulties are longer papers which are not easy to read on-screen (but then use	Many of our key meetings have been paperless for a number of years, and seems to have been a success. We now need to encourage and promote this approach to all of our meetings rather than just some.

			paper-saving ideas mentioned in item above). Sharing papers at meetings rather than a copy for all is another possibility.	
Coffee Machines/Kettles (item 5 of Negative Environmental Factors document)	The department has two coffee machines and two kettles. The coffee machines are switched on for most of each working day. The kettles are used frequently.	Heating elements found in these items use a significant amount of electricity every time they are used.	Encourage good practices in terms of switching appliances off at the end of each day. Ensure they are already switched off for holiday periods. Give advice on not overfilling kettles and therefore only using as much water and energy as needed. We were advised 3 years ago to consider replace kettles with 'instant boiling water' taps on water 'coolers'. This failed spectacularly.	Water coolers with hot water taps were installed 3 years ago to replace kettles. The hot water was not hot enough to make tea and too hot for coffee. We replaced this with a small boiler tank providing instant hot water, and monitored energy usage compared to a single kettle. The kettle used far less energy. Therefore kettles remain our most energy efficient option. Energy awareness posters/stickers/emails to promote switching off of coffee machines, and not overfilling kettles.
Education and Students	It is very difficult to incorporate environmental education/awareness into the curriculum on mathematics degrees.	Educating future leaders of business, industry and government on the importance and value of the environment and sustainability is a key opportunity available to a World-leading university.	We are in the process of introducing a 'sustainability in the curriculum' fund, for green course development in the department, after a successful pilot funded by the School's Sustainable Project Fund. We include environmental statements/information/guidance in student handbooks and at Orientation. Engage students with Green Impact project.	Successful work on MA100 and MA107 funded by LSE's Sustainable Project Fund. New departmental 'sustainability in the curriculum' fund agreed and being developed, due to launch imminently. Information for student handbooks and Orientation for new students taking place. Information on Green Impact to first SSLC meetings of Michaelmas Term.
Linux PCs	Relatively unique to the Mathematics Department: a number of academic staff use Linux as their operating system instead of Windows. The	Linux users usually leave their PCs switched on when not at LSE and as a consequence they use more electricity than	Assess the extent of the problem – several Linux users have now started using Macs, which do get switched off. Remaining Linux users have new setups that allow them to access files without leaving PC on. Linux is	Currently underway. Departmental IT Officer is in discussions with Linux users about their usage, and has arranged with IT Services

	computer often works as a server, and can be 'contacted' and accessed by that academic wherever in the world they are, giving them full access to their files and software as though they were sat in front of their computer.	Windows users who switch off.	a less system-intensive operating system than Windows in normal use, so the energy-usage of these machines may be lower when they are on – gather evidence of this.	the provision of access to networked hard-drive space for Linux users.
Lighting	Many areas of the department used to be significantly overlit, and difficult to control manually. Much of the lighting was not low energy.	Poor lighting can waste a considerable amount of electricity.	A big project has been undertaken in conjunction with LSE Estates to replace virtually all lighting in the department with modern low-energy lighting, and movement sensors for all communal areas.	This has now been completed.
Photocopier	The photocopier on the 4 th floor of Columbia House spends a large portion of the day on standby when not in use. It should be noted that this is a communal copier used by the whole of the building, and therefore is not simply 'ours'.	Given the amount of heat generated by the machine even when in 'standby' it is clear that it uses a significant amount of electricity even when not in use.	We will encourage better practices through a combination of information, posters and reminders. Consider use of a timer on the plug to ensure that the copier is switched off out of hours. Attempt to minimise copying.	Copying reduction plans already underway. Timer was fitted to plug in June 2012 but may recently have developed a fault. Energy awareness posters present – reminders to be sent regularly.

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