

The Revolving Green Fund (RGF)

The RGF provides interest-free support for capital investment in energy efficient and low carbon technologies in English Higher Education Institutions, with funds supplied by a partnership established between HEFCE and Salix Finance Ltd. Similar Salix-managed recycling funds also operate in Scotland and in Northern Ireland.

A Note of Caution

Balance upstream environmental impacts – related to production – against the purchase of potentially more efficient new equipment.

Do not underestimate the potential of ‘rebound effects’ to cancel out savings. If an organisation can cut energy usage and run equipment more cheaply, it may be tempted to run more of it.

Sustainable procurement

De Montfort University are working on re-engineering procurement to reduce CO₂ and enable sustainability. This work involves the Estates department, Information Technology, Procurement and the Institute of Energy and Sustainable Development. They are reviewing current activity across the University to establish how the institution’s carbon footprint is affected by what and how things are procured. They aim to develop an ICT tool to enable improved decision making around the environmental impact of suppliers, goods and services, and to understand what that change means for the organisation’s management.

<http://bit.ly/uXsPaD>

Getting Started

Use our ICT energy and carbon footprinting tool. Knowing your current footprint will enable you to set achievable targets and monitor progress.

JISC Read ‘Low Carbon Computing: a view to 2050 and beyond’ to help you plan. Also contains a draft model of a ‘low carbon ICT roadmap’.

Consider where you can change things/make savings, and at what scale you want or need to make changes. The scale of what you can achieve may depend on the buy-in of other SMT members and relevant stakeholders – present a case to stakeholders and decision-makers.

Review procurement. Look at the whole ICT lifecycle to see where you can change the type of equipment you use: materials and energy used in making ICT and its components; transport of hardware; energy consumption of equipment when in use; financial and environmental costs of disposal, versus costs of recycling.

Review business, academic and day-to-day processes and procedures: can you make any of them ‘remote’ or electronic?

Streamline the services you provide: can any be shared or outsourced?

Sign up to the EU Code of Conduct for Datacentres. The Code is a voluntary initiative which promotes best practice. It aims to reduce the environmental impact and energy use of data centres. The Code is a useful framework which focuses on two key areas: the IT load (IT capacity available for the power used) and facilities load (equipment and systems that support the IT load, such as cooling systems).

Good practice in financing green IT investment

- » Devolved energy budgeting at the University of Oxford Chemistry Laboratory
- » Shared savings/costs scheme at the University of Cambridge

Further information and resources

Anderson, P et al. (2009) ‘Low Carbon Computing: a view to 2050 and beyond’

<http://bit.ly/t6dVQH>

EU Code of Conduct for Data Centres

<http://bit.ly/h4FA7>

Goodcampus.org. Up to date guidance in the form of cases, guides, white papers, plus networking and tools on sustainability (especially energy and resource efficiency) -in knowledge-intensive organisations. Many of the projects showcased here were backed by JISC.

<http://www.goodcampus.org>

Hopkinsin, L and James, P (2009) Sustainable ICT Procurement in higher education. JISC.

<http://bit.ly/tCMmts>

ICT energy and carbon footprinting tool. A free download from the SustelT website:

<http://www.susteit.org.uk/files>

James, P and Hopkinson, L (2009) ‘Sustainable ICT in Further and Higher Education: SustelT final report. JISC.

<http://bit.ly/rSm9VU>

Thomas, K (2009) Managing sustainable ICT in FE and HE: Strategic overview. JISC

<http://bit.ly/vvkWMO>

This briefing paper has been produced for JISC.

Alternative formats of this paper can be found at: www.jisc.ac.uk/publications

Using IT to Go Green

Pathway to best practice November 2011

This briefing is for **senior management team: heads of IT, estates, strategy and procurement.**

The University of St Andrews has financed almost £2 million of energy efficiency expenditure through Salix. Its Energy Officer, David Stutchfield, says that “Salix funding was instrumental in helping our new data centre achieve a 1.2 PUE (Power Utilisation Effectiveness) – probably the best in the sector”.

The Context

Under the UK Climate Change Act 2008, the higher and further education sectors must meet carbon reduction targets of 34% by 2020 and 80% by 2050, compared with 1990 levels.

Most green initiatives in FE/HE involve ICT. They range from relatively simple ways to save power, to those needing high-level change, such as rethinking your institution’s IT strategy.

The Rewards

- » Meet and improve on required legal targets
- » Improve your reputation
- » Save money
- » Increase efficiency
- » Reduce your carbon footprint

What We Know Already

What can be done?

There are four main ways to use ICT to go green:

- 1 Change the way you use ICT, (eg power saving methods)
- 2 Change the type of IT you use (eg to more efficient or sustainable technology/hardware; virtualisation)
- 3 Manage things better with IT, eg energy use displays in buildings and working practices such as video conferencing.
- 4 reduce the amount of IT equipment on site by sharing or outsourcing.

How easy is it?

Everyone wants to be green – you start with a lot of goodwill. But there can be barriers to change. Lack of staff time, lack of budget, lack of guidance and awareness, especially outside ICT departments, can mean that ideas do not get off the starting block. Green issues are not always a procurement priority, and procurement as a whole may not be that strategically embedded. However, many colleges and universities are trialling and implementing new ways to go green with help from JISC.

Personal computing and powerdown

Better management of **PCs and printers** can save power and reduce the use of other resources without serious re-investment. Examples include changing the approach to printing, and implementing automatic power up/power down procedures for desktop computers.

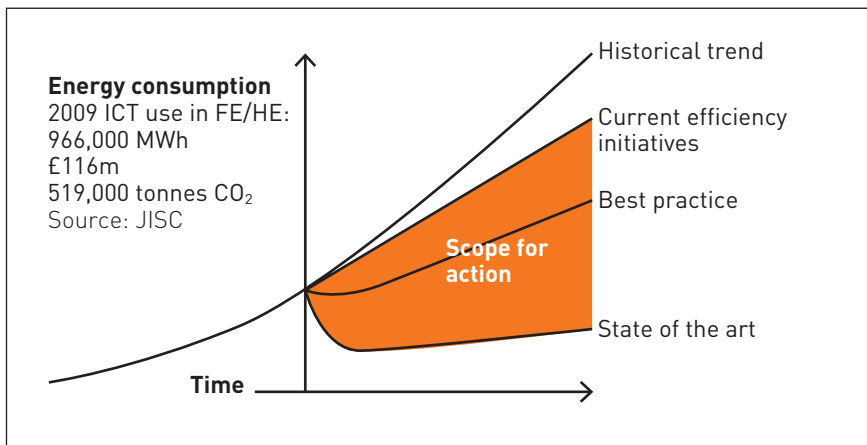
Data centres

Most colleges and universities have constantly-expanding data centres to run. They use a lot of energy and generate a lot of heat, which must be dispersed using more energy. Some

Cutting PC power use

PAWS is a ‘power down and wake’ system being developed at Aberystwyth University to cut the power usage of student workstations, so that computers are not running when not in use. The system will eventually be available for other institutions to install and implement.

<http://bit.ly/rOUM8R>



Scope for energy-saving in IT

institutions have found innovative ways to reduce cooling costs or are researching ways to capture and reuse heat energy. For example, Worcester College of Technology are looking at greener ways to dispose of heat output, and also installing photovoltaic cells to create enough energy to run evaporative cooling units.

How to 'green' legacy systems is a big issue for data centres and computer rooms; for example, retrofitting systems to make cooling more efficient presents complex engineering problems. JISC projects, for example at Hertfordshire and Imperial College (see box) are pioneering techniques for improving energy use in existing data centres.

$$PUE = \frac{\text{Total facility power}}{\text{IT equipment power}}$$

Power Usage Effectiveness (PUE) is a way to measure the energy efficiency of a data centre. It is the total energy consumption of a data centre, divided by that of the IT equipment itself. A low PUE reflects a limited 'overhead' of cooling load, power supply and other energy uses which are not contributing to computing

activities. In many older data centres, this extra load can be around twice the amount used by computing (ie a PUE of 3.0), but state of the art facilities now have this figure down to 1.2 or less.

Increased awareness of this issue, partly through projects driven by JISC, means more colleges and universities are starting to achieve this figure. Investing in data centres is expensive, but it can immediately bring huge savings in energy use, which no amount of 'simple quick fix' measures elsewhere in your institution could equal.

Managing things using IT

Buildings. Innovations in IT are making it possible to present data about energy consumption in university and college buildings, allowing wider dissemination through web databases and display panels in buildings, so raising awareness of energy usage.

Changing working practices. Facilities like videoconferencing are a potential way to save energy and reduce your institution's carbon footprint, particularly where colleges or universities are relatively remote.

The Welsh Video Network (WVN) and JISC are running a research project to look at how much energy is consumed by video conferencing equipment and studios, and how much energy is saved by replacing actual meetings with video-conferenced ones, in order to better assess the 'green credentials' of video conferencing. www.wvn.ac.uk/en/projects/greenict/

A greener data centre

Cardiff University's High Performance Computing cluster achieved a PUE of 1.3 by combining quad-core servers, highly efficient UPS and HV transformers, rack-level chilled water circuits, hot aisle containment and free cooling.

Cardiff are also creating a web-based modeling tool, the STorC Storage Calculator, to allow IT managers, engineers and decision makers to calculate the energy and financial savings they could make from introducing tiered storage technology. The tool will allow users to save their

work and return to it at a later date. The new tool will work on a number of platforms, including smartphones and other mobile devices. <http://bit.ly/v97p2A>

At the University of Hertfordshire, a project to reduce and re-use energy in data centres included capturing the hot air and, via a heat-exchanger, feeding it back into the hot water system for the building the data centre is contained in. As a result, the University of Hertfordshire is the first university in Europe to conform to the EU code of

conduct for data centres, introduced in 2010.

<http://bit.ly/sfcSxw>

Imperial College are considering different methods – 'cold aisles', energy recovery systems, temperature adjustment and control – to reduce the power use of existing computer rooms. They are modelling the different scenarios and effects of each in order help management decision-making. They anticipate a 5% reduction in power consumption.

<http://bit.ly/tv3EN1>

Procurement

You can review procurement to take into account environmental impacts of all equipment you buy right across its lifecycle, from production, distribution and use through to disposal. Production and use are the stages which it is generally agreed have the most impact, so ensuring that you only buy equipment that is manufactured in a more sustainable way and is rated as more energy efficient will help.

Changing service models

Outsourcing or **sharing** some of your ICT-related services will allow you to use the equipment, data storage and associated processes within your institution more efficiently – or to remove some of it entirely.

Processes that can be shared or outsourced, by way of ICT systems, include services such as student records, timetabling, finance, estates, human resources, library management, virtual learning environments (VLEs) and customer relations management.

A particular form of outsourcing, **cloud computing**, is still relatively new for universities and colleges. It is basically 'computing capability that is delivered as a service over the internet', and can include email, data storage, and software services for things like remote collaboration and virtual learning environments. Still in its early days, the cloud's green credentials are yet to be established, but the potential benefits are large.

Using the cloud you can move computing effort out of what are, in many cases, inefficient local data centres in universities to facilities where you can take advantage of economies of scale. The ability to shift computing load dynamically to take advantage of free cooling, means the institution doesn't have to use mechanical chilling.

JISC For more examples of pioneering JISC projects, visit JISC's Greening ICT programme: <http://bit.ly/rri7SM>

Financing Green IT Investment

The Responsible Energy Costs in Higher Education and Further Education – Stage One (RECSO) study led by Forum for the Future has found that the financial/accounting incentives to 'go green' in the education sector are generally weakly developed. The study identified five techniques which could help:

- 1 Devolved budgeting: an individual becomes the responsible budget-holder for their area
- 2 Shared savings: a department keeps a portion of any savings it makes
- 3 Grants and soft loans: from either an institution's internal resources or external funds such as the Salix Trust
- 4 Awareness and competition: no direct incentives, but provides relevant information to encourage behavioural change
- 5 Whole life costing: techniques to identify and take into account the full costs of assets over their entire lifecycle

The next stage of the RECSO project will be to develop guidance, strategic advice and support pilot projects in interested institutions in order to introduce the use of these mechanisms.

At Cardiff University, the Planet Filestore project has demonstrated energy saving of over 80% by managing file storage

The road less travelled

Aberystwyth University has a centrally bookable video conferencing (VC) studio at each of its four main campuses.

These have been equipped, and are supported, by the WVN, funded by the Welsh Assembly Government. Four departments – Biological Sciences, Computer Science, Information Services and Language and Learning – also have their own departmental equipment. 585 conferences were booked at these facilities in 2009-10. Virtual meetings at the University have an average of eight participants at three locations, and avoid an average of 320 miles travel at a cost of £200. This translates to travel savings of over £120,000 per year for the VC participants from Aberystwyth.

Seeing the savings

The University of Manchester has an annual utility bill of £15 million and a £850,000 CRC charge. To reduce these – and to exceed the average 43% reduction of CO2 emissions between 2005 and 2020 required by HEFCE/UUK – it has set up a Carbon Credit Scheme. It was launched in August 2011 with the publication of electricity use and related carbon emissions data for each major academic building. Each has been given a 3% annual reduction target and their performance against this is monitored (on a 24 hour lagged basis). Summary data will be displayed in building entrances and can be accessed over the web by users for more detail.