

Reducing ICT Related Energy Use in UK FHE Institutions Through the Use of More Sustainable Technology.

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SUSTE-TECH

Sustainable Technology in
UK Universities and Colleges

Principle Aims of the SUSTE-TECH Project

To help Universities and Colleges across the UK become more sustainable in their choice and use and disposal of ICT equipment

- To reduce ICT related energy use, CO₂ emissions, running costs
- Improving their “green credentials” : increase in college applications, help with funding avoid penalties etc.



Background Information on the Project....

- **Government Legislation** : The 2008 Climate Change Act set a target to reduce Carbon emissions by 26% by 2020 and 80% by 2050 (1990 levels).
- ICT use accounts for 2% of CO₂ emissions worldwide.
- The UK FHE sector uses almost 1.5 million PC's, 246,000 printers and 238,000 servers.
- Emits > 500,000 tonnes of CO₂.
- Annual ICT related energy bill for the UK FHE sector : £116 million.

Background Information on the Project....

The extraction and processing of materials that go into the manufacture of ICT equipment has a very heavy environmental footprint

- A study (IVF, 2007) a European PC and 17" monitor = 20kgs of materials.
- A PC and Monitor's life cycle will include the disposal of 37kgs of non hazardous waste and 0.7kgs of hazardous waste.

Background Information on the Project....

The production of a PC & monitor will consume..

- 3,244 mega joules of energy, 920 litres of process water

Create..

- 193 kgs of greenhouse gasses
- also release heavy metals, contribute to acid rain and other air, soil and water pollutants.

We still need to work educate and research via the use of technology, just more sustainably.

The Projects Methodology..

1. Create awareness of the project through e- mails, flyers, workshops, attendance at conferences etc.
2. Recruit 16 Universities and Colleges across the UK (8 in Y & H region and 8 in the S.W. and S.Wa. region).
3. Establish an ICT systems baseline-dataset for each of their institutions through the use of the SusteIT Tool.
4. Set a time-frame for improvement (15-18 months) with progress updates at the half-way stage.

The Projects Methodology...cont.

5. Identify where and how their ICT systems can be improved
6. Offer guidance and support throughout the course of the time-frame by offering consultancy support and sector support etc.
7. Re-calculate their ICT systems baseline-dataset (using the SusteIT tool) thus demonstrating improvement.

“Before and After” of energy use and CO₂ emissions

Sustainable ICT Options

- **Printing Centers** : Having a centralized printing center is more efficient in terms of paper and energy use.
- **PC Power-down**: Computers that automatically shut off when not in use.
- **Virtualization : Applies to Data Centers and Servers** : now it serves 2 or 3 functions, is smaller in size, is typically no longer on site, not paying for its associated running costs i.e. energy, space, staff and air conditioning systems.

Sustainable ICT Improvements cont.

- **Data Centers** : Made more efficient through correct placement of equipment to optimize flow of cold air/natural cooling
- **Thin Client Technology** : Using smaller more streamline, more compact equipment : e.g. going from a 20kg desktop to a laptop or notebook.

Sustainable Improvements in Technology cont.

- **Cloud Computing** : Computer resources are delivered over the Internet by external service providers. Where before you may have had a university e-mail address, university linked schedules, timesheets etc., the responsibility for delivering the service will be given to a service provider such as Google or Amazon.

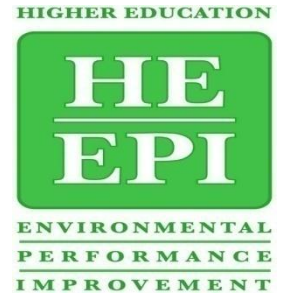
Mix & Match of sustainable ICT, implement more than one sustainable option and all have proven successful in CO₂ emission reduction.

Using the SusteIT Tool



Very straight forward :

- Gather your institution's ICT system baseline-dataset.
- facts and figures on :
- number of ICT equipment pieces,
- energy usage (kWh's) and
- running times (hrs) on..



HPC's, Servers, PC's & Monitors,
Networks, Phones, Imaging, and AV
equipment.

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Using the SusteIT Tool



The SusteIT Tool is very user friendly :
with

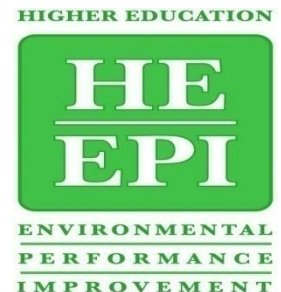
- 1.sections of information for guidance
2. all ICT equipment listed
3. easy to flip between data sheets
4. Colour co-ordinated for ease of use

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Yellow : Energy Use;

Blue: Number of pieces of equipment,

Green: Categories of equipment.



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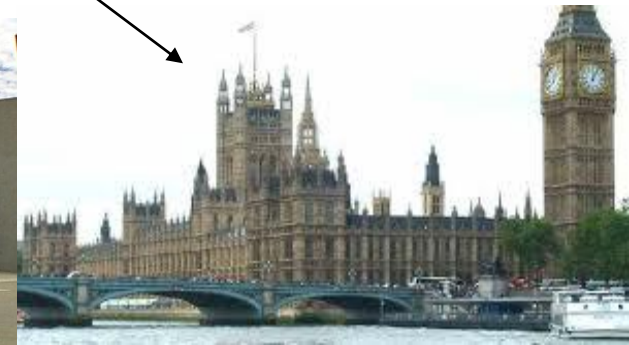


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Schools and Libraries

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The

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Participants

Received 15 applications to participate

- 10 completed Suste IT tools
- 14 Action Plans

from..

- 7 Y&H , 3 Welsh, 5 South West Institutions..

good mix of FE & HE inst.

- 10 HE , 4 FE, 1 mix...all with similar ICT problems.

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Results of Suste-IT Tool



- Suste IT Tool Results indicated that ..
- **Servers , PC's and Networks** are the main consumers of ICT related energy followed by **Imaging**.

lesser extent : **HPC's, Telephones, VC equipment.**

No surprise results,similar results regardless of size of institution

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Participants Action Plans

Servers : 11 inst : decommissioning, virtualising, consolidating servers or moving servers off site.

PC's & Monitors : 14 inst tackling their PC & monitor energy consumption by replacing with Thin Client, PC power down, VDI desktop, procuring for greener computers.

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Participants Action Plans

- **Networks** : only 2 institution tackling their networks,
- **Printing** :7 inst. are consolidating to MFD's, introducing charged or code printing, printing double sided by default
- **VC** : only 1 inst. will increase the use of VC
- **Telephones:** 1 inst. is addressing IP phone use



Participants Action Plans

Overall Energy and EF Reduction Policy :

Many are implementing a “general” energy management system,

- Automatic or timed powerdown of ICT equipment,
- creating awareness of campus wide energy use,
- recycling ICT equipment,
- green procurement,
- auditing and consolidating all ICT equipment
- lowering running costs & reducing waste



What do the Results Indicate?

In a nutshell :

- significant improvement in the past 5 years
however ..
- huge scope for improvement..
- Many of the changes are simple,
...just not being carried out!

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Barriers to Implementing Action Plan

1. **Cuts in Funding:** leads to staff shortages, freeze on green initiatives,

Solution : focus on quick wins

- PC powerdown, printing double sided by default, awareness campaigns, procuring for greener equipment, tweaking temp of data centre rooms **...are all free.**

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Barriers to Implementing Action Plans

2. Poor Communication!!

- Between ICT, Energy & Environmental Managers, and Facilities, Buildings & Estates and senior management....no follow through on initiatives.

Solution

- Explain what it is your trying to achieve, why its necessary, how your going to implement it
- ask for their co-operation and help
- make them feel involved
- report successes



Barriers to Implementing Action Plans

3. Institutional Restructure !!

- won't be able to stick to an Action Plan
- too much going on, hands are tied, not allowed to make plans

Solution

Solution : 4M's

- Do the **math**,
- **meet** with all stakeholders,
- **merge** ideas with technology and
- **make** IT happen.



Success Stories



- WLC, 20% red. in data centre running costs (vented door).
- Stevenson College: Anticipating a cost savings of £70,000, in reduced energy costs since using server virtualization.
- QMU : Anticipating energy savings of 70,000 kWh via replacement of older PC's with thin client ones and automatic shutdown of non 24/7 PC hardware.
- University of Liverpool: Saved £50,000 by using PC power-down



Don't give up ! Energy Reduction is Important

- Save money
- reach carbon targets,
- improve institutions green credentials,
- green ICT makes life easier for everyone





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What is the EAUC ? : Environmental Association for Universities and Colleges, ..“the EAUC is the environmental and sustainability champion within Further and Higher Education in the UK”

EAUC’s aim : To assist institutions in becoming more sustainable in their operations by providing data & information on Environmental Legislation, Green ICT, Waste Management, Energy Management etc.,
...Sustainability has expanded to Procurement Research, Business, Law etc etc,....



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How do you become a member ? : By paying an annual subscription. (fee dependant on size of inst.)

Associate Members : businesses, government organisations, local council, charities etc.

Benefits of Membership: Access to a wide range of sustainable information, case studies, toolkits, training programmes, government organisation, sector contacts, publications etc.,

Over 300 U&C are members.....and growing



Green Impact & UTC : Both benchmarking
GI: is an Environmental accreditation scheme for university departments run by the NUS : Staff & Students complete a workbook, then audited, then awarded Gold, Silver or Bronze.



UtC : Env. Mgrs complete a detailed questionnaire, then graded, improve year on year.

UCCCF : Scottish Institutions have committed to reducing their carbon emissions

www.eauc.org.uk/projects



The EAUC run or support a number of projects

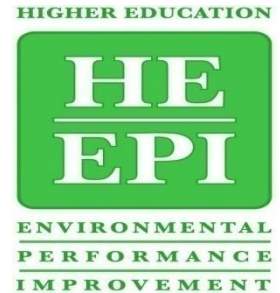
- **Continuing Professional Development (CPD) Programme :** Training for staff that are working towards sustainability in their institution.
- **Get Sorted & Exchange :** Both online repositories providing information & data (toolkits and case studies) from institutions that have improved their sustainable performance.
- **PPAPC : Promoting Poverty Aware Procurement on Campus:** encouraging U&C to tackle poverty when procuring goods and services



- **Annual Conference:** Fantastic opportunity to come together with peers and associate members, will be able to network and see vendors showcase their wares etc... running workshops, lectures etc.
- **The Green Gown Awards Ceremony** U&C are awarded for their environmental performance. **Award Categories include** : Carbon Reduction, Green ICT, Research, Sustainable Construction & Refurbishment, Student Initiatives and Campaigns etc. www.eauc.org.uk



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41 greening of ICT projects