



THE ROYAL BOROUGH OF
**KENSINGTON
AND CHELSEA**

Green ICT Strategy
Efficient, Sustainable, Responsible

December 2008

Version	Produced by	Comments
0.1	Barry Goodall	First complete draft
0.2	Barry Goodall	Corrected typographical errors. Added Staff Communications as a separate task. Followed comments by ISD Management Team.
1.0	Barry Goodall	Incorporated comments by Information Technology Planning Group (ITPG).

Contents

1. Executive summary	4
2. Green Vision	5
3. The ICT Contribution	5
4. Green ICT Strategic Objectives	6
5. Progress to date	7
6. Risks and mitigations	8
Appendix A - Areas for ICT Carbon Reduction	9

1. Executive summary

Why are we 'greening' our ICT?

Our computer systems are an essential element in the delivery of services to our residents, be it taking online payments of Council Tax, providing parking permits, or processing planning applications. Thousands of us use our computers to work far more efficiently than we could have dreamed possible as recently as 10 years ago.

But this progress comes with a price. Information and Communication Technology (ICT) is a major user of energy and natural resources. The use and disposal of computers, servers and printers has to happen in a sustainable way and we must set an example for our residents and local businesses. We have to do our best to ensure that the very systems that improve the lives of our residents do not also have a negative impact on the environment.

The Green ICT strategy sets out the first steps we can take to reduce our carbon footprint. There are many simple steps that can be taken right now to improve the situation. We need to make sure these things happen and happen quickly. By turning off just one computer overnight we can save 185kg of CO₂ in a year. Over the whole estate the potential is enormous – turning off every one of 3,500 computers at night would have the same effect as taking 250 cars off the road.

We want our technology to be efficient, we want it to be more sustainable and above all we want to be responsible in the way we use it. This strategy sets out the first steps we are taking to achieve these goals.

2. Green Vision

- 2.1. The Council has set a target to reduce carbon dioxide emissions from its estate by 40% by 31st March 2014. It aims to achieve carbon neutrality by 2020. This applies to the whole of the its operations, not just ICT.
- 2.2. To help achieve these targets the Council has joined Phase 6 of the Carbon Trust's Local Authority Carbon Management Programme.
- 2.3. Central Government has set a target for its office estate to achieve carbon neutrality by 2012. The UK has an overarching target to reduce greenhouse gases by 26% or more by 2020 and by at least 60% by 2050.

3. The ICT Contribution

- 3.1. Office equipment is the fastest growing energy user in the business world. The Carbon Trust estimates that it consumes 15% of the total electricity used in offices, expected to rise to 30% by 2020, with around two-thirds of the energy consumed by office equipment being attributed to computers¹.
- 3.2. However the Green ICT agenda is not just about energy efficient ICT. ICT can also be used to generate environmental benefits elsewhere in council operations and the wider commercial world. It is a key enabler for most Transformational Government programmes, providing better and more efficient services and bringing those services to the public rather than making the public come to us. It should also play a major part in reducing carbon emissions from other areas of activity, for example through enabling tele and video conferencing, remote and home working.
- 3.3. Coupled with the cultural change and more energy efficient working practices, the use of ICT can reduce both building occupancy and travel. This has knock-on benefits as staff take these new behaviours and best practices home to their local communities. Council ICT can act as a powerful enabler for our residents and businesses to reduce their carbon emissions. But these changes are likely to require an increase in ICT investments, making it all the more important to ensure that the inherent carbon footprint of new investments is significantly reduced.

¹ Carbon Trust, Technology Overview, Office Equipment – Introducing energy saving opportunities for business

4. Green ICT Strategic Objectives

4.1. Strategic Objectives

- Reduce the amount of energy consumed by our ICT equipment;
- Ensure equipment is turned off when not in use;
- Reduce paper consumption;
- Work with the Change Programmes to identify the impact of the changes they propose.

4.2. This will be delivered by:

- implementing as many actions from 'Areas for ICT Carbon Reduction' (Appendix A) as are practicable and necessary to deliver the strategic objectives above and specifically:
 - o extend the lifecycle of all ICT purchases to their natural demise either caused by failure, inability to support the business objectives of the organisation, excessive maintenance costs or excessive carbon footprint and energy consumption, as opposed to frequent automatic refresh and replacement programmes. This should occur where such extension will have environmental benefits across the product lifecycle and re-deployment of the equipments is not envisaged;
 - o reduce the overall number of PCs used by the organisation to reach as close to a 1:1 ratio as possible unless there are exceptional circumstances²;
 - o improve the energy efficiency of PCs;
 - o implement a range of active device power management actions as detailed in Appendix A to significantly reduce power consumption;
 - o reduce the overall number of printers used by the organisation and replace with multi-function devices where practicable and use green printing defaults wherever possible (such as double-sided and multiple pages printing);
 - o increase average server capacity utilisation to achieve a minimum of 50% where possible;
- all procurements should adhere to the OGC "Quick Wins" criteria. In addition, by June 2009 all procurement documentation must specify environmental criteria for ICT in line with advice being developed by the OGC Centre of Expertise in Sustainable Procurement.

4.3. The approach is to:

- increase staff awareness of the impact ICT can have and encourage them to think of different ways of working;
- understand the resources required, costs of implementation and the issues which need to be addressed if more radical proposals are to be introduced;
- task managers to assure the environmental consequences of procurements are fully evaluated;
- provide managers with information about the energy and paper consumption of their service so they can compare the performance of their service with others and assess the impact of any changes they instigate.

² Exceptional circumstances to include Health and Safety concerns, formal on-call arrangements, business continuity arrangements, security requirements and accessibility or special needs circumstances.

5. Progress to date

- 5.1. In June 2007 the Sleepless in Kensington campaign was initiated to raise awareness and encourage staff to turn off PCs and other ICT equipment overnight. This led to a saving of 30 tonnes of CO₂ over the following year.
- 5.2. The number of physical servers owned by the Council peaked in June 2006 at 253. Since then we have been using virtualisation and Networked Attached Storage (NAS) to reduce this number and to accommodate growth without expanding our physical infrastructure. We now run 200 physical servers, 100 virtual servers and host 40 NAS shares. As a result the Council's server estate now produces 40 tonnes less CO₂ per year than before. Furthermore, without the use of this technology our energy consumption would have grown and our CO₂ emissions would have been 80 tonnes higher.
- 5.3. We have carried out an extensive and detailed analysis of our existing PC estate and thin clients. We concluded that a switch to thin client technology would lead to an increase in electricity consumption and so higher CO₂ emissions. We will stay with our current environment and aim to improve it further.
- 5.4. A list of immediate steps has been developed to encourage the early implementation of some simple but high impact actions (Appendix A). Examples of areas where immediate savings can be made include:
 - running a long life asset campaign to increase lifespan where appropriate;
 - turning off PCs overnight, at weekends and during holiday periods;
 - ensuring that all printers are either purchased with automatic duplexing functionality or default to duplex and grey scale to reduce the amount of maintenance and transport required and electricity, paper and toner used;
 - removing active screen savers and utilising power management functionality to put monitors in low power modes after specified periods of inactivity to reduce energy consumption of the equipment;
 - ensuring peripheral equipment is switched off overnight;
 - putting PCs into low power modes after specified periods of inactivity;
 - re-using or re-distributing legacy ICT and related goods to ensure assets are fully utilised for their whole life via a credible, traceable provider.
- 5.5. Departments should consider opportunities for sharing ICT services with other departments which may have the potential to increase energy savings.
- 5.6. This is a continuous programme of activity. Further work will:
 - keep abreast of new technological developments and research, identifying the pros and cons of different approaches;
 - embed Green best practices and environmental impact assessments into departmental supply chains and reflect these in procurement standards;
 - encourage the use of ICT to help reduce energy consumption in other parts of the organisation e.g. reducing occupancy, minimising travel and ending the need to print documents;

- assess the environmental impact of delivery, support and project development of ICT services.

6. Risks and mitigations

- 6.1. There are a number of risks which need to be considered to ensure the vision is met:
- managers not taking the targets seriously – granular energy monitoring will be implemented enabling accurate reporting to show progress against targets;
 - the cultural change required not happening – staff need to embrace the challenge, opportunities to raise awareness must be identified and taken;
 - sustainability requirements not being given enough consideration prior to procurement leading to unnecessary additional environmental impact – ISD and TELS will work with the Strategic Procurement Team to produce criteria to help assess the environmental impact of bids;
 - new technologies and innovation making current best practice redundant – the list of actions will remain under review;
 - operational requirements taking precedence over environmental concerns – sustainable ICT must become “business as usual”;
 - sustainability requirements not being given enough consideration in change programmes leading to adverse environmental impact – the ISD Business Improvement Team will work with the Change Managers and business teams to ensure that sustainability is a requirement of all such programmes and projects.

Appendix A - Areas for ICT Carbon Reduction

This list will be adapted as further input is received, and as further innovation, products and research become available.

Actions	Rationale
Staff Communications	
1. Promote energy awareness to staff	The biggest contributors to climate change are us and the way we conduct our everyday lives. People need advice and feedback to encourage appropriate changes to their behaviour.
2. Provide managers with information about their service	Provide energy and paper consumption information so managers can compare their service with others and assess the impact of any changes they make.
PCs - Desktops and Laptops	
3. Shut down PCs after office hours	For the default working day of 8 hours the overnight period lasts 16 hours. When weekends and holidays are taken into account we could be wasting up to four times as much energy as consumed during the working day.
4. Remove active screensavers	A monitor left running with an active screen saver uses the same amount of energy as when the screen is in full use. The PC also consumes needless power in sustaining the screensaver.
5. Switch monitors to standby after 5 minutes of inactivity (no active screensaver)	If nothing on the screen has changed for a long time it is likely that it is no longer being used. Standby mode prevents a longer period of wasted power. The display can quickly be resumed if it is indeed in use.
6. Enable active power management on desktops (standby / hibernate after a defined period of inactivity)	Having active power management enabled will more closely match the consumption of energy with use, reducing wasted energy. PCs can be put into a low energy mode when the user is away from the desk, e.g during lunch or at a meeting.
7. Ensure re-use of equipment that is no longer required but is still serviceable. If re-use is not possible recycle or ensure green disposal.	The majority of energy in the life of a PC or laptop is consumed in its manufacture, delivery and disposal. Extending its use or seeking its re-use elsewhere will save energy and materials (manufacturing stage) as well as purchase and disposal costs.
8. Specify computers with high-efficiency Power Supply Units (80% conversion or better)	Power supply units convert mains AC power to the DC power needed by computers. More efficient units minimise the loss of energy from this conversion in the form of heat.
9. PC consolidation	Reducing the number of electronic devices an individual has will reduce indirect energy requirements e.g. less support and maintenance.

	Instead of having separate PCs in the office and at home use a single laptop and carry it between the two. And a laptop PC uses far less energy than a desktop.
Other office ICT Equipment	
10. Apply timer switches to non-networked technology and printers	Not all ICT equipment can be networked and/or automatically shut down or put into standby mode – typically printers, photocopiers and scanners. Neither do all such devices have automatic facilities to switch to a standby mode after a pre-set time. Timer switches can be used to turn off such equipment automatically outside office hours saving up to 67% of its daily energy consumption if currently left on 24hours a day.
11. Set default green printing including duplex and grey scale	By reducing the amount you print you will save paper and energy. Further savings can be made by presetting duplex, booklet and greyscale defaults and using a “Print on collect” facility where provided.
12. Optimise power-saving sleep mode on printers	Printers are typically only active for 263 hours per year or 12 calendar days; so if on permanently they waste energy 97% of the time. If power saving is already in place, reduce the amount of time before sleep is activated.
13. Printer consolidation	Reducing the number of printers and replacing those left with networked multi-function devices (MFDs) e.g. combined printers/copiers, can significantly reduce energy consumption. Fewer printers should also lower maintenance and management costs.
14. Device consolidation	Reducing the number of electronic devices an individual has will reduce indirect energy requirements e.g. less support and maintenance. Instead of having separate PCs in the office and at home use a single laptop and carry it between the two. Rather than a mobile phone and a PDA (e.g. Blackberry), use a single integrated device and “follow-me” services. Rather than having separate video conferencing equipment consolidating it into desktop devices may reduce energy consumption
Data Centres	
15. Server Optimisation a. Implement storage virtualisation and capacity management b. Convert existing physical servers to “virtual servers” – partition servers that run in parallel on the same hardware without any interference c. Turn off servers outside their	Assists in identifying unused servers and disks. Air-conditioning/cooling equipment typically requires at least the same power as the servers they cool, so reducing servers may save twice the power required to run them. • Industry practice has been to run a server using only 20% of its capacity. • A server which is switched on but idle still requires 50-70% of the power it uses when it is running under maximum load, therefore a single server running at 80% load uses considerably less energy

service level agreement, subject to a phase loading and chiller unit risk assessment d. When designing and provisioning new services, avoid procuring new physical servers. Use:- - existing servers - NAS shares - virtual servers. e. Implement a multi tiered storage solution, much of the data spinning on disks today is seldom accessed	than 4 servers each running at 20% load. • Configure several 'virtual' servers onto a single server to increase capacity used. Using a single device in this way not only reduces the hardware and support costs but also decreases the energy requirement.
16. Reduce cooling in the data centre to appropriate levels and increase the ambient room temperature	• Research has shown that increasing temperatures in data centres does not lead to a higher failure rate as was previously thought. • Over 50% of the power associated with the data centre is used for cooling the ICT equipment.
17. Identify servers and data disks in the data centre that are running but not providing any services and decommission	• A server which is switched on but idle still uses 50-70% of the power used when running at maximum load.
18. Specify low-power consumption, low voltage servers with high-efficiency Power Supply Units (80% conversion or better)	• Do not over specify system requirements. The higher the specification the more mains power is drawn. • Power Supply Units convert mains AC power to the DC power needed by computers. More efficient units minimise the loss of energy from this conversion in the form of heat.
19. Ensure re-use of equipment that is no longer required but is still serviceable	• Energy is required to manufacture, distribute and recycle equipment as well as to use it • Extending its use or seeking its re-use elsewhere will save energy as well as purchase and disposal costs.
20. Data centre audit	• Identifies mismatches between the current physical layout and the layout that would maximise the effectiveness of cooling from air conditioning units • Up to a 20% reduction in cooling could be achieved³.

³ <http://thehotaisle.com/?p=10>