



Department of Transformation

Information & Communication Technology

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Green ICT Strategy 2010 - 2014

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1. Summary

The focus of Green ICT is to reduce CO₂ emissions associated with the use of ICT and to use ICT to reduce emissions elsewhere within the city and the Council. Other outcomes that will be achieved by focusing on Green ICT will be:

- cost savings associated with reduced power consumption
- more effective handling of redundant and waste ICT equipment
- more environmentally sustainable behaviour
- meeting an increased level of corporate social responsibility
- enhancing the city's reputation as a leading green and digital city

There are ten Green ICT initiative areas:

- 1) ICT Energy Measurement and Reporting - the measuring of ICT energy consumption is an essential prerequisite to inform power saving priorities and to demonstrate improvements
- 2) Printing - reducing the number of printers and increase the use of multifunctional devices which will reduce the amount of power and consumables used
- 3) Workstation Power Management - reducing the power consumed by desktop PCs and peripherals through use of power management software and more efficient devices
- 4) Telecommunications - using ICT to reduce the need for Council officers to travel and to facilitate a reduction in corporate accommodation
- 5) Server Virtualisation - increasing the use of virtual servers will dramatically reduce the number of physical servers required for an associated reduction in power consumption
- 6) Data Centres - data centre refurbishment and effective use will realise energy savings through more efficient cooling and power distribution. Future data centre collaboration may also realise more efficient data centre services for Bristol and other organisations
- 7) Sustainable Procurement - sharing knowledge on emerging technologies, business requirements for ICT and procurement practices will realise a higher degree of environmental and social sustainability
- 8) Waste ICT Reuse and Recycling - using an external organisation that specialises in ICT equipment reuse and recycling will ensure compliance with waste disposal legislation and Bristol's corporate social responsibility that includes community reuse
- 9) Internal Engagement - raise awareness of Green ICT issues with staff and implement measures which will lead to behavioural change
- 10) City Leadership - contribute to the 20:20 City Strategy of sustainable prosperity

2. Introduction

Climate change is the greatest environmental challenge facing the world today. Rising global temperatures will bring changes in weather patterns, rising sea levels and increased frequency and intensity of extreme weather. To avoid the most dangerous impacts of climate change, the average global temperature must not rise more than 2°C.

The CRC Energy Efficiency Scheme (formerly known as the Carbon Reduction Commitment) is the UK's mandatory climate change and energy saving scheme. It is central to the UK's strategy for improving energy efficiency and reducing CO₂ emissions, as set out in the Climate Change Act 2008. The Climate Change Act makes the UK the first country in the world to have a legally binding long-term framework to cut CO₂ emissions.

Bristol City Council is in the top 5000 energy consumers in the UK and is required to participate in the CRC from April 2010. The CRC is designed to improve energy efficiency in large organisations by operating a CO₂ 'cap and trade' mechanism, providing a financial incentive to reduce CO₂ emissions from energy use. Above the legally set targets, Bristol City Council has committed to a citywide reduction of Bristol's CO₂ by 40% by 2020 as well as a reduction in the Council's own emissions by 3% year-on-year.

ICT is a significant contributor to CO₂ emissions for both the city and the Council. With funding from the Carbon Trust, the Council has calculated the carbon footprint of ICT in Bristol. Business use of ICT in 2006 accounted for 3% of the city's emissions which equates to 67,258 tonnes of CO₂. The Council has signed the Eurocities Green Digital Charter, which commits the Council to decrease the city's ICT carbon footprint by 30% by 2020. Within the Council, ICT is responsible for up to 20% of building energy use emissions, which were 49,519 tonnes of CO₂ in 2008/09.

There are a number of key initiative areas laid out in this strategy document, that will address the requirement to reduce the energy use and CO₂ emissions associated with the use of ICT. Additionally, there are initiative areas that address the fact that ICT is a key enabler for reductions in CO₂ emissions elsewhere within the organisation and the city.

3. Document Purpose and Structure

This document is to be presented to the Council Senior Leadership Team for approval and will then be included in the ICT Strategic Development Plan, for ongoing review.

The format for this document is to list the initiative areas, with each initiative then being presented in terms of their vision (outcomes) and of what we can do now, what is required to position ourselves in the medium term and where we want to be in the longer term. There will be cross over between some initiative areas and some areas may include multiple but related projects or work packages.

4. Initiative Areas

ICT Energy Measurement and Reporting

The Vision

Benchmark current ICT consumption of power to inform ICT energy management priorities and demonstrate improvements made over time by:

- Measuring the power usage effectiveness (PUE) and power consumption of the Council's Data Centres
- Measuring the power consumed by workstations
- Reporting Green KPIs to the ICT Management Team
- Including Green KPIs in service specific SLAs

Initiative Stakeholders

Green ICT Lead - Quentin McPhee

Energy Manager - Paul Isbel

Energy Management Officer - James King

Climate Change & Built Environment Co-ordinator - Lorraine Hudson

Connecting Bristol - Stephen Hilton

Current Situation

A project exists to install sub metering for the data centres. Further granularity of power usage in data centres can be gained by the use of intelligent Power Distribution Units (PDUs). A business case for the wide implementation of intelligent PDUs is being considered.

Workstation power consumption is currently being benchmarked by an in-house developed network scanning tool, which will demonstrate improvements when a workstation power profile solution is implemented.

Areas for Improvement

Power consumption statistics and other Green KPIs are to be included in the ICTMT dashboard and reported on quarterly directly to the ICTMT.

As service specific Service Level Agreements mature, the inclusion of Green KPIs will draw attention to the least power efficient IT services, prompting remedial action.

Where we want to be

Power consumption for all major IT services will be understood and published and CO₂ reduction targets established.

Printing

The Vision

Reduce the amount of power, paper and other resources consumed resulting from printing

from PCs, including within Bristol schools, by:

- Replacing inefficient printers currently deployed throughout the Council and Bristol schools with multifunction printers
- Raising awareness of green printing practices
- Reduce the need for printing by the using alternative technologies for storing and presenting information

Initiative Stakeholders

Green ICT Lead - Quentin McPhee
Printer Strategy Project Manager - Nick Norris
Infrastructure Development Manager - Mike Bailey
Infrastructure Architect - Trevor Welsman
Schools' Liaison - Steve Ralph & Tahir Khan
Schools Sustainable Procurement Officer - Elaine Ashley

Current Situation

The Printing Strategy project (PROJ/09/110) is a part of the Tactical Efficiencies programme (PROG/09/008) and is scheduled to complete at the end of March 2010. Once completed 50 core Council locations will have had their non-multifunction printers removed (with a few exceptions) and users at these sites will have access to the more efficient multifunction printers.

The printing solution deployed in Bristol schools varies from school to school. A project is to be initiated to investigate and identify an appropriate solution for both curricular and school administration printing.

Areas of Improvement

As a result of the News Ways of Working programme the number of Council buildings will be reduced to 17 by 2013/14 and consequently there will be a natural migration of users from sites without multifunction printers to ones that do have them. Given this embedded continuous improvement an assessment of staff use of non-multifunction printers need only be conducted at the conclusion of the New Ways of Working programme.

In the medium term a more efficient printing solution will be rolled out across Bristol schools.

Where we want to be

All Council locations will have the ICT endorsed printing solution with the solution being periodically reviewed.

Wide adoption of ICT endorsed printing solution across Bristol schools with the solution being periodically reviewed.

Technologies that reduce the need for printing will be reviewed and considered as a part of the sustainable procurement initiative area.

Workstation Power Management

The Vision

Reduce the power consumed per workstation within the Council through:

- the use of a power profile management solution
- improved user behaviour
- considering and employing alternative workstation devices, including thin clients

Reduce the power consumed per workstation within the Bristol schools through:

- advising schools on power profile management solutions
- advising schools on alternative workstation devices, including thin clients

Initiative Stakeholders

Green ICT Lead - Quentin McPhee

Infrastructure Development Manager - Mike Bailey

Infrastructure Architect - Trevor Welsman

Schools' Liaison - Steve Ralph & Tahir Khan

Current Situation

An internally developed power profile solution has recently been explored. A project is to be initiated to identify, procure and implement a power profile solution in conjunction with an awareness campaign to improve user behaviour. This project may interface with or be a part of the programme to re-engineer the ICT infrastructure.

Areas of Improvement

An evaluation is to be performed as to where within the Council a thin client architecture would be a more power efficient and effective method of delivering a managed desktop environment. A project is to implement a thin client solution to appropriate areas of the business. This project may interface with or be a part of the programme to re-engineer the ICT infrastructure.

Where we want to be

Users will be informed, empowered and rewarded in relation to workstation power savings. Where possible a power profile solution will be employed to automate more efficient workstation power states. Where appropriate a thin client solutions or a programme of PC replacement with thin client workstations is in place.

Telecommunications

The Vision

Reduce travel related energy use and CO₂ by:

- implementing and improving telecommunication solutions
- implementing and improving flexible working solutions
- raising staff awareness of ICT enabled alternatives to travel and encouraging behaviour change

Reducing the power consumed per network device by:

- using more power efficient network equipment

Initiative Stakeholders

Green ICT Lead - Quentin McPhee

New Ways of Working (NWOW), Project Manager - Lucille Hoskins

Domain Expert, Telecommunications - Alex Simpson

Smarter Travel Choices Team - Matt Barrett

Current Situation

The NWOW programme is to evaluate and implement new technology that will reduce the need for face to face meetings. This could include desktop to desktop and group video conferencing and voice over internet protocol (VOIP). The NWOW is also to evaluate and implement new technology that will support flexible and home working. This could include virtual desktop infrastructure (VDI), presence management and task management solutions.

Areas of Improvement

In the context of ongoing network and telephony equipment refresh, more efficient network devices will be evaluated and implemented.

As a part of the NWOW programme an assessment is to be made of Council officer's work related travelling practices to identify priority areas and to benchmark travel related CO₂ emissions so that improvement can be demonstrated.

An awareness campaign is to be launched to ensure staff are aware of existing telecommunication and flexible working facilities and to encourage a culture of reduced travel.

Where we want to be

Throughout Bristol City Council and home working locations there will exist a power efficient telecommunication infrastructure that reduces the need for staff to physically move between locations. There will also exist a culture of using appropriate telecommunication technology and travelling only when necessary.

Server Virtualisation

The Vision

Reduce the size of the server estate in both Bristol City Council and Bristol schools which will lead to reduced power consumption, by:

- Virtualising 70% of the Council's server estate
- Centralising school's administration servers
- Virtualising a portion of the school administration servers

Initiative Stakeholders

Green ICT Lead - Quentin McPhee

Enterprise Architect - Trevor Welsman
MIS Manager (schools) - Steve Ralph

Current Situation

A project to virtualise Council servers is currently being considered and when implemented will realise significant power consumption reductions by reducing the number of physical servers.

A project to centralise and virtualise school administration servers is in its early stages.

Where we want to be

ICT will ensure that as much of the server processing power is virtualised as is feasible.

Data Centres

The Vision

Improve the power efficiency of the Romney House Data Centre and use the Council House Data Centre (DC2) more effectively by:

- Including hot aisle containment and free air cooling at the Romney House data centre
- New UPS at the Romney House data centre
- More fully populating DC2 with servers
- Being innovative with emerging Data Centre technologies and methods

Initiative Stakeholders

Green ICT Lead - Quentin McPhee
Energy Manager - Paul Isbel
Energy Management Officer - James King
Infrastructure Architect - Trevor Welsman
Senior Data Centre Officer - Mike Isaacs
Domain Expert, Data Centres - Alex Simpson

Current Situation

The award winning data centre (DC2) is under utilised. A programme is to be created to manage the various projects required to populate the empty racks within DC2.

DC2 Populating Projects:

- CRITA to DC2 - installing shelves in to DC2 racks and moving towers down from CRITA as well as some rack mounted CYPs server and Genesys servers
- Other to DC2 - consideration should be given to other CYPs servers that were not in CRITA and other "odd" servers such as those in the Colston Hall
- School PFI - Romney House Data Centre hosts servers belonging to Northgate, which for continuity purposes requires 18 to be moved to DC2
- Existing Business Continuity moved to DC2 - Romney House data centre to DC2 server
- VDI server to be added to DC2 - increase in flexible working capacity
- Balancing Moves - to balance the data centre capacity

- New Business Continuity - new hardware to introduce continuity

The fitting of a hot aisle and evaporative cooling in the Romney House data centre will be completed soon and is anticipated to make sizable reductions in air conditioning power consumption.

A project to replace the existing Romney House data centre UPS is considering alternative uninterrupted power supply technologies.

Areas for Improvement

An environment of innovation is to be fostered that considers new technologies and practices, such as flywheel, fuel cell or other efficient UPS design, reuse of heat generated in Data Centres and localised power generation.

Engaging with the British Computer Society's Data Centre Specialist Group or other similar organisation will ensure all appropriate data centre power efficiency solutions are employed.

Where we want to be

In the longer term the use of the Council's current data centres will be affected by either a move toward hosting data centre services externally or hosting data centre services for partner organisations, or a combination of the two strategies.

Employing a Building Management System (BMS) or Data Centre Management System is to be considered to see if it would be cost effective to have a highly managed environment depending on the level of need for internal hosting of servers.

Sustainable Procurement

The Vision

That environmentally sustainable procurement practices be used in the procurement of ICT equipment, whereby the following is considered:

- The power efficiency of any procured device
- The life expectancy of procured devices
- A device's embedded carbon
- The use of toxic compounds within devices
- The use of packaging
- The supplier's green credentials
- The working conditions for workers in the supply chain

Initiative Stakeholders

Green ICT Lead - Quentin McPhee
Infrastructure Development Manager - Mike Bailey
Sustainable Procurement Officer - Elaine Ashley
Environmental Performance Officer - Giles Liddell

Areas for Improvement

A formalised and systematic process of communicating and setting of ICT procurement

standards is to be established between the Council's Sustainable Procurement team and ICT. This working partnership will ensure that the most appropriate sustainability criteria are applied to the procurement of ICT equipment and software.

Where we want to be

ICT procurement standards and practices will be continuously reviewed, as new technologies and suppliers emerge, and identified key performance indicators are to be reported on to ICT senior leadership. Through market engagement the Council will drive innovation and developments in sustainable technology.

ICT Reuse and Recycling

The Vision

Redundant ICT equipment generated by the Council will be handled so that:

- equipment that can be reused to support digital inclusion is distributed to Bristol community groups and disadvantaged households
- unusable waste is recycled within the UK
- no untreated waste is sent abroad

Initiative Stakeholders

Green ICT Lead - Quentin McPhee
Principal IT Officer - Roger Searle
Senior IT Officer - Mike Isaacs
Connecting Bristol - Stephen Hilton
Sustainable Procurement Officer - Elaine Ashley
Environmental Performance Officer - Giles Liddell

Current Situation

A waste disposal provider is employed to remove, refurbish or arrange treatment.

There are a variety of ad-hoc arrangements in place for the supply of redundant ICT equipment to Bristol communities.

Areas for Improvement

The effectiveness of the waste provider will be reviewed in February 2011.

A coordinated and strategic arrangement is to be put in place for the supply and support of refurbished ICT equipment to disadvantaged Bristol families, and voluntary and community groups.

Internal Engagement

The Vision

All Council staff that use ICT will be empowered to be able to reduce their energy consumption, CO₂ emissions and waste associated with their working and domestic ICT practices through:

- education on Green ICT issues, addressing why changes in practice are needed
- raising awareness of Green ICT tools and methods, addressing how behavioural changes can be made
- the rewarding of good practice, which requires the measuring of Green impact

Initiative Stakeholders

Green ICT Lead - Quentin McPhee
 Corporate Development - Denise Brock
 Energy Management Officer - James King
 Climate Change & Built Environment Co-ordinator - Lorraine Hudson
 Environmental Performance Co-ordinator – Steve Ransom

Current Situation

A Green ICT agenda is to be included in the re-branding of the Council's ICT function and within the drive for “Smarter Ways of Working”. Collaborating with the Energy Management Unit and the Sustainable City Group to put a Green ICT presence on the Source, possibly in conjunction with the “Green Finger”. Simple tools or add-ons such as standardised email footer, questioning the need to print to be made available and advertised. Corporate staff induction is to include specific references to Green ICT practices.

Areas for Improvement

A significant area of potential CO₂ emission savings that would benefit from improved Green ICT practices relates to power consumption of work stations and the use of paper for printing. These initiative areas are to be monitored in such a way that individuals, teams or departments can be rewarded in an appropriate manner.

Where we want to be

All Council officers will be aware of the ICT issues related to energy consumption, CO₂ emission and waste and what can be done to reduce the impact of ICT, through an ongoing Green ICT programme of internal communication.

City Leadership

The Vision

To support the implementation of the 20:20 City Strategy of sustainable prosperity by sharing best practice with local and national organisations, lowering the city's carbon footprint, improving Bristol's “Green credentials” and encouraging Green ICT innovation.

Initiative Stakeholders

Green ICT Lead - Quentin McPhee
 Connecting Bristol - Stephen Hilton
 Climate Change & Built Environment Co-ordinator - Lorraine Hudson
 University of Bristol - Simon MacIntosh Smith

Current Situation

Bristol City Council has been working with the Carbon Trust to develop and implement an innovative, forward looking approach to Green ICT. This has involved developing a

methodology for understanding how ICT currently contributes to a city's emissions from the different business sectors. Connecting Bristol is leading work in this area and has established a Green ICT solutions database and a Bristol Green ICT Champion group. Additionally, as a part of this work a website has been developed that has been short listed by the European Commission in the Best Green ICT project awards: www.greenaddict.eu.

The Council is supporting the University of Bristol's £10 million bid to establish an Innovation and Knowledge Centre for Energy Efficient Computing and Communications in Bristol.

Through BETS (Bristol Environmental Technologies Sector) and other initiatives, the Council is encouraging new investment in green technologies, skills and jobs.

Council House Data Centre (DC2) is a focus for media attention and industry awards. A submission to the Council worker of the year is being made based on the DC2 success.

Where we want to be

Bristol wants to be recognised as one of Europe's leading sustainable cities. A strong Green ICT strategy with clear evidence of success will help Bristol to achieve this.