



# Review of Green IT Developments

Summary Report  
January 2010

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## Terms of Reference

This report has been undertaken under the remit of Digital 20/20, Yorkshire and Humber's strategy to build a strong digital economy. Funded by Yorkshire Forward, Digital 20/20 consists of a partnership between industry, employers and public sector bodies responsible for education, skills and economic development, and is driven by an Action Plan. ([www.digital2020.org.uk](http://www.digital2020.org.uk))

The research on which this report is based was commissioned as part of Digital 20/20's remit to monitor key technology trends and to advise on the opportunities they present for the region.

'Green IT' was identified as an issue rising up the political agenda towards the end of 2008, within the broader debate about measures to address climate change and opportunities for achieving economies in the recession. It was noted that Green IT activities were often subsumed and lost in the broader environmental debate and that there was no regional focus on the technology aspect in particular. A light-touch, pragmatic research exercise was therefore initiated to review Green IT activities in the Yorkshire and Humber region against the national/international backdrop with the aim of:

- Identifying areas of regional strength that could be shared and built upon
- Helping those in the region who needed more information and support to develop and implement Green IT policies

Specific objectives of the research were to:

- Identify what we mean by 'Green IT'
- Identify relevant initiatives at both regional and national level, and beyond
- Identify where Green IT issues can be addressed through existing Digital 20/20 activities
- Identify some practical next steps that Digital 20/20 can endorse
- Make recommendations for how Digital 20/20 can add value to partner activities

The research was compiled through a mixture of:

- Desk research of policy documents, news articles and event reports
- Consultations with regional contacts (see Appendix A)
- Use of social media to gain broader based input

Initial outputs of the research are summarised briefly here but the full results have been used to create a Digital 20/20 'Green Zone' blog which will be launched in January 2010, following on from the Digital 20/20 Green IT mini-conference in Leeds on 18<sup>th</sup> January 2010.

## What is Green IT?

The terms 'Green Computing' and 'Green IT' are not used consistently in the marketplace but, in general, cover three key areas:

1. Being greener in how we use Information and Communications Technology (ICT)
2. Using technology to be greener
3. Recycling and disposal of ICT equipment

## Being Greener with IT

This is relevant to those who direct and manage IT and facilities departments, who need to understand the actions they can take to promote sustainable ICT within their organisations, including:

- Purchasing environmentally friendly devices and equipment with ultra low power consumption
- Hardware consolidation and balanced deployment
- Virtualisation, of both servers and desktops
- Using alternative computing provision models such as thin client
- Printer consolidation, and reducing consumption of paper and ink
- Improving power management including networked power-down policies
- Creating more energy-efficient data centres and how to share these among institutions

There will be other aspects, but these are some headline issues to set out the types of areas where action can be taken.

## Using IT to be Greener

Technology can provide solutions, not just for improving energy efficiency in computing devices and networks, but also in developing low carbon technologies to decrease carbon emissions of other sectors. Examples of technologies that fall into this category include:

- Video-conferencing and telepresence to avoid unnecessary travel
- New communications technology to enable remote and flexible working
- Software as a service
- Building and power management systems
- Mapping and routing systems and telematics (to reduce vehicle fuel bills)

A recent study by IDC presented at the UN Climate Change Conference in Copenhagen (reported on Silicon.com) indicated that the UK is one of the best prepared countries in the world to use IT to cut its CO2 emissions:

*The ICT Sustainability Index, launched last Thursday, modelled and predicted the size of the reductions in CO2 emissions that each country in the G20 group of nations could achieve by using new technologies.*

*Countries were then ranked in order of those whose economy, infrastructure and laws put them in the best place to realise the biggest cuts, with the UK placed joint third with Brazil, France and Germany.*

*Ranked ahead of the UK was Japan, which topped the index, and the US, which followed in second place.*

*Nearly six billion tonnes of CO2 emissions could be saved by 2020 through the use of IT, according to the study by analyst house IDC.*

*The index looked at how 17 technologies - including teleconferencing, digital media and smart grids - could cut emissions in the energy, transport, industrial and building sectors.*

*The report also stressed the importance of businesses using server and storage virtualisation and thin client technology to cut the carbon footprint of corporate datacentres.*

*Roberta Bigliani, research director at IDC Energy Insights, said "the use of software solutions offering energy management systems should be a key focus" for all of the G20 nations.*

## **Recycling and Disposal**

A recent study by Dell reported that people in the UK are the least likely to recycle old technology <http://tinyurl.com/p89en9>. The report highlights a lack of awareness as one of the key issues.

Recycling computing equipment is important to keep harmful materials out of landfills. Outdated computer systems can be repurposed, or donated to various charities and not-for-profit organisations. Computer parts and supplies, such as printer cartridges and batteries, can also be recycled.

In the UK there are now European legislative standards, in the form of the Waste Electrical and Electronic Equipment Directive (WEEE Directive), to regulate how recycling and disposal is done. The WEE Directive aims to reduce the amount of electrical and electronic equipment being produced and to encourage everyone to reuse, recycle and recover it. It also aims to improve the environmental performance of businesses that manufacture, supply, use, recycle and recover electrical and electronic equipment.

## Drivers for Green IT

There is a large amount of contradiction in research findings at present. Reports issued within days of each other are saying completely opposite things about companies' adoption of green IT approaches. However, certain factors remain consistent:

### Cost Reduction

Cost reduction, especially through reducing energy consumption, is by far the most significant driver in the market place at present – unsurprisingly given the economic climate.

For example, recent research by the Sector Skills Council for Business and IT, e-Skills UK, found that cost cutting was the number one priority for IT leaders in 2009. This is backed up by an IBM/Info-Tech report tracking the adoption rates of green IT strategies in medium-sized companies. This found that, of the top five practices, four of them are driven largely by cost savings.

However, the e-Skills survey also found that most firms (presumably because most firms in the UK are SMEs) are shunning new technologies such as cloud computing, software as a service and virtualisation – all of which have potential green benefits. Whilst cost saving is a key driver, SMEs may be missing out on the cost reductions that could be obtained through green IT strategies because they are typically aimed at larger operations with more management bandwidth.

### Legislation

The Climate Change Act 2008 mandates carbon reduction commitments from 2009 covering all corporations and public sector bodies spending more than £500,000 per annum on electricity.

In March 2009, Viviane Reding, Information Society and Media Commissioner for the European Union, said that upcoming European Union telecoms legislation would also make Europe greener:

*New telecommunications rules will guarantee the seamless market we need, and contribute ICT in the fight against climate change.*

However, while the carbon footprint of the technology sector itself is growing, the Commissioner said that she believed the industry would be capable of addressing that without the need for legislation (see below).

### Growing Political Pressure

In 2008, the UK became the first country in the Western world to publish a strategy for green ICT in the public sector. Targets mentioned include:

- By 2012, public sector IT energy consumption will be carbon neutral
- By 2020, Government ICT will be carbon neutral across its lifecycle

To add incentive, the Government is proposing, for example, to link institutional capital funding in the education sector to achievements against new carbon reduction targets.

The European Commission has called on member states to use information and communication technologies to improve energy efficiency, in an ongoing regional push to combat climate change and aid economic recovery.

In March 2009, the Information Society and Media Commissioner Vivian Reding said:

*We think ICT is the instrument we need to get the energy crisis solved....This is how you get high growth out of the connected economy.*

*Targeting energy-efficient and low-carbon growth will help Europe face its biggest challenges: climate change, energy security and the economic crisis.*

*...ICT has an enormous untapped potential for saving energy right across the economy.*

Since then the Commission has introduced Recommendation C(2009) 7604, adopted on 9<sup>th</sup> October 2009, which calls on the ICT sector to agree on common methodologies for measuring energy consumption and carbon emissions by 2010.

In addition, addressing EU Member States and the ICT sector, it advocates more public-private partnership initiatives and partnerships between the ICT industry and defined strategic sectors in order to reach energy efficiency targets.

The European Commission Information Society and Media Directorate has a Unit on ICT for Sustainable Growth and is driving development through its Seventh Research Framework Programme (FP7) and the Competitiveness and Innovation Framework Programme (CIP).

## UK Activities

### Industry Bodies

Green IT was identified as an 'emerging trend' in e-Skills UK's 'Technology Counts: IT and Telecoms Insights 2008'.

[http://www.e-skills.com/cgi-bin/orad.pl/474/eskillsUK\\_TechnologyCounts\\_final.pdf](http://www.e-skills.com/cgi-bin/orad.pl/474/eskillsUK_TechnologyCounts_final.pdf)

*Environmental considerations are now at the core of many customer, brand and operations decisions. IT & Telecoms is both part of an environmental problem and central to environmental solutions. Addressing environmental concerns in a commercially sustainable way is demanding new skills, from technical design of power management through to the development of new services to assess environmental metrics.*

Intellect has an Energy and Environment Leadership Group and Working Group, established summer 2007, whose members are Directors of large IT companies. The group produced an initial report: 'High Tech: Low Carbon - the role of the technology sector in tackling climate change' which was launched in February 2008. The Group now states that it is developing and implementing a programme to deliver those commitments and has published a useful case study digest on 'ICT: Greening the Public Sector': <http://www.intellectuk.org/content/view/3785/84/>.

BCS launched a Green IT Specialist Group in 2009. Its aim is to promote green computing and address green issues and the adoption of green practices for Information and Communication technologies and services across their lifecycle, particularly for end users and home users. BCS claim that 'Green IT will soon be the business norm':

<http://www.bcs.org/server.php?show=ConWebDoc.28267>

The Society of Information Technology Management (SOCITM) – the professional association for IT managers working in and for the public and third sectors – is also showing an increasing focus on green issues.

Global Action Plan, an independent non-governmental environmental charity that works with businesses, schools and communities to bring about environmental savings, has formed the Environmental IT Leadership Team (EILT), a panel of major ICT users from a range of different sectors who are committed to taking practical action to cut carbon dioxide emissions from the ICT sector. The aim is to create an independent expert user group focused on identifying and publishing best practice sustainable IT strategies.

Many of the IT and Telecoms industry majors have started to position around Green IT issues and barely an industry news bulletin comes out without a reference to Green IT somewhere. Obvious examples include IBM's Smarter Planet initiative. CompTIA recently published a report on Green IT entitled 'Green IT: Insights & Opportunities'. It is interesting to read the quotes from industry majors on this International Telecommunication Union news page about the Copenhagen Summit:

[http://www.itu.int/newsroom/press\\_releases/2009/NP09.html](http://www.itu.int/newsroom/press_releases/2009/NP09.html)



Geneva, 29 October 2009 — In the lead up to the Barcelona Climate Change Talks (2-6 November), which will produce the draft text to be considered at the UN's COP15 Copenhagen Climate Change Conference in December, ITU is stressing the critical importance of including information and communication technologies (ICTs) as part of the solution.

Specific mention of the critical role of ICTs in the Copenhagen draft Agreement will help commit policy makers around the world to seek technical solutions to reducing GHG emissions.

A recent study [1](#) estimated that more effective use of ICTs could help reduce total global emissions by 15% by 2020, representing carbon savings five times higher than the estimated emissions for the whole ICT sector in 2020. The Global e-Sustainability Initiative (GeSI), of which ITU is a part, estimates that these reductions could deliver energy efficiency savings to global businesses of over EUR 500 billion.

Since the adoption of the Kyoto Protocol in December 1997, the number of ICT users has tripled worldwide, yet ICTs find no mention in the current draft COP15 text.

## Industry Events

The prestigious Guardian/Government Computing Awards now include a category for Green IT and there is also a specialised conference: 'Government ICT Goes Green' run by GovNet Communications (publishers of Government IT magazine).

Recent and upcoming UK/European events include:

Government ICT goes green	September 2009	<a href="http://www.govnet.co.uk/greenict">www.govnet.co.uk/greenict</a>
Green IT Expo	November 2009 November 2010	<a href="http://www.greenitexpo.com">www.greenitexpo.com</a>
ICT for Energy Efficiency	February 2010	<a href="http://ec.europa.eu/information_society/events/ict4ee/2010/index_en.htm">http://ec.europa.eu/information_society/events/ict4ee/2010/index_en.htm</a>
Green IT UK conference	May 2011?	<a href="http://www.greenituk.com">www.greenituk.com</a>
BSI IT Governance	May 2010?	<a href="http://www.bsigroup.com/it-governance">www.bsigroup.com/it-governance</a>
Green Enterprise World Forum: Shaping the Future of Green IT	June 2010	<a href="http://www.destinationgreenit.com/green-enterprise-world-forum-shaping-the-future-of-green-it">http://www.destinationgreenit.com/green-enterprise-world-forum-shaping-the-future-of-green-it</a>

## Education Sector

The Green Gown Awards ([http://www.eauc.org.uk/green\\_gown\\_awards](http://www.eauc.org.uk/green_gown_awards)) have introduced a 'Green ICT' category. (Note: Colleges and universities within Yorkshire & Humber have consistently been recognised in these awards.)

In the Further/Higher Education space, the JISC (Joint Information Systems Committee) commissioned a year-long study on Sustainable ICT (<http://www.susteit.org.uk/>) which was based at the University of Bradford. A major output of the project was an ICT energy and carbon footprinting tool. The JISC has also just commissioned a range of Green IT research projects as part of its 3-year Green ICT programme. JISC are keen to explore how these education sector-based projects can be disseminated to a broader context and we are currently discussing this with them.

- Study of Ownership and Responsibility for Energy Costs
- Small Scale Exploration Studies of Aspects of Green ICT

JISC has uncovered a number of examples of Green ICT best practice detailed in three case studies at the University of Edinburgh, Cardiff University and Queen Margaret University and are actively involved in reporting on likely impacts of 'low carbon computing' for the tertiary sector.

<http://www.jisc.ac.uk/publications/documents/greenictedinburgh.asp>

<http://www.jisc.ac.uk/publications/documents/greenictcardiff.aspx>

<http://www.jisc.ac.uk/publications/documents/greenictqueenmargaret.aspx>

<http://www.jisc.ac.uk/whatwedo/services/techwatch/reports/horizonscanning/hs0902.aspx>

In the schools area, Becta has an ICT Carbon Footprint Comparison Tool: <http://tinyurl.com/dgztfb>. Green IT is an important part of 'Building Schools for the Future' with suppliers such as RM being very visible about their green credentials:

<http://www.rm.com/generic.asp?cref=GP842689&srcurl=/rmcomhome&linktype=brandf>

## Green IT Skills

There are a number of short foundation courses now on the market:

- BCS recently launched its ISEB Foundation Certificate in Green IT. This is a 3 day course, costing £1400, which is evaluated through a one hour multiple choice examination. The course is still being piloted and covers a basic introduction to the principles of Green IT.
- IT Governance Ltd, a company which provides IT governance products and services, offers five different courses that it describes as being about Green IT. They appear to be about general green issues that touch on or can be applied to IT. The courses are in one or two day formats and range in price from £399 to £716.
- SOCITM offers a short course on Managing the Environmental Aspects of ICT, which costs £495.

- CompTIA launched a Green IT starter course in its Strata portfolio in December 2009 aimed at IT managers and supervisors.
- Learning Light collaborated with Active Recycling to develop an e-Learning course which leads to an NVQ in Recycling Operations (WEEE). The course has been successfully piloted with prisoners at HMP Wealstun who are involved in the disassembly of electric equipment. Digital 20/20 case study on the initiative (published last year): <http://www.digital2020.org.uk/skills/casestudies/10>

In terms of more extensive study integrated into degree courses or at post graduate level, Leeds Metropolitan University offers a MSc in Green Computing, which is running its first cohort. A number of other UK universities are involved in research projects to address the different aspects of Green IT identified above, but it is not clear that they have as yet developed study courses. The University of Leeds offers staff development courses which touch on Green IT as part of their wider approach to sustainable procurement: <http://www.leeds.ac.uk/sddu/top/a-z.html#g> .

## Regional Initiatives

Yorkshire & Humber has a strong focus on reducing carbon emissions, driven by Yorkshire Forward:

<http://www.yorkshire-forward.com/about/our-policies/lower-carbon-economy>

The region has already beaten off competition to secure European funding for the UK's first Carbon Capture and Storage Project, led by Powerfuel.

Our research found a number of regional networks concerned with environmental issues in general and greening business activity in particular, but no regional network for Green IT and no specific focus on Green IT in any existing networks.

The research did not cover whether regional groups of the national organisations identified above such as BCS have any specific Green IT mandates or concerns.

The following list of organisations and companies in Yorkshire & Humber concerned with a low carbon economy, either as a network, or a company providing solutions, or a research body, is by no means exhaustive but gives a clear indication that there is some breadth and depth of expertise in the region.

Interviews (see Appendix for list of consultees) indicated an interest in creating more dialogue in the region, starting with a conference. This feedback has been incorporated into the proposed set of actions for Digital 20/20 to initiate (see Recommendations).

### Regional Networks (note none are specific to Green IT)

Bradford Business Environment Forum <http://www.bbef.org.uk>

Business Environmental Forum <http://www.here4greenbusiness.co.uk/>

Carbon Action Yorkshire <http://www.carbonaction-yorkshire.org.uk/>

CO2sense <http://www.resourceefficiency-yorkshire.org.uk/>

Future Energy Yorkshire	<a href="http://www.fey.org.uk/site/">http://www.fey.org.uk/site/</a>
Green Business Network	<a href="http://www.greenbusinessnetwork.org.uk/">http://www.greenbusinessnetwork.org.uk/</a>
Green Business Club	<a href="http://www.sygbc.co.uk/">http://www.sygbc.co.uk/</a>
Humber Environmental Network	<a href="http://www.humberenvironmentalnetwork.co.uk/">http://www.humberenvironmentalnetwork.co.uk/</a>
Y&H Environmental Hub	<a href="http://microsite.yhub.org.uk/">http://microsite.yhub.org.uk/</a>

### **Companies**

Codefounders	<a href="http://www.codefounders.com">http://www.codefounders.com</a>
EnviroFutures	<a href="http://www.envirofutures.com/">http://www.envirofutures.com/</a>
Harding Auyong	<a href="http://www.hardingauyong.com/greenit.html">http://www.hardingauyong.com/greenit.html</a>
NewTech	<a href="http://www.newtech.co.uk/">http://www.newtech.co.uk/</a>
Scientia Group	<a href="http://www.scientia-group.co.uk/pages/home">http://www.scientia-group.co.uk/pages/home</a>
Very PC	<a href="http://www.very-pc.co.uk/">http://www.very-pc.co.uk/</a>

### **Education**

SusteIT	<a href="http://www.susteit.org.uk/overview/index.php">http://www.susteit.org.uk/overview/index.php</a>
(reviews the environmental and social impacts of IT in FE&HE)	
JISC RSC e-learning forum green theme	<a href="http://www.rsc-yh.ac.uk/">http://www.rsc-yh.ac.uk/</a>
Learning Light	<a href="http://www.learninglight.com/">http://www.learninglight.com/</a>
(developed an e-learning programme for NVQ Level 1 and Level 2 Recycling Operations (WEEE))	

### **Recycling/Renewables/Sustainables**

Yorwaste Ltd	<a href="http://www.yorwaste.co.uk/">http://www.yorwaste.co.uk/</a>
Live-Tech	<a href="http://www.live-tech.co.uk/">http://www.live-tech.co.uk/</a>
DOT-COMmunICaTions	<a href="http://www.dot-communications.co.uk">http://www.dot-communications.co.uk</a>
Active Recycling	<a href="http://www.activerecycling.co.uk/">http://www.activerecycling.co.uk/</a>

No doubt there are other networks, companies and education sector activities that could be added. To facilitate this process, it is proposed that a Digital 20/20 'Green Zone' blog space be established to act as a focal point for making contacts visible, facilitating conversation and interaction, and flagging up important news (see Recommendations below).

## Key Issues Identified from the Research

- Green IT is gaining momentum particularly over the past 18 months
- It is an area that is complicated by misinformation, tokenism (or 'greenwashing') from manufacturers/service providers and misperceptions among consumers
- Responses to Green IT issues are largely patchy and un-connected
- It often lacks visibility within broader sustainability/environmental bodies
- At the moment the key driver for organisations is cost saving, particularly where there is no legislation
- There are already skills gaps around implementation of virtualisation and the building of a green IT infrastructure
- There are interesting pockets of innovation within the Yorkshire and Humber region including in the Skills area
- Major players within the region are in fact operating at a national/global level but their activities and expertise lack visibility in the rest of the region
- There is currently a lack of regional touch points for events and news and there are few opportunities for people either regionally or nationally to build their professional networks within the area of Green IT

## Digital 20/20 Recommended Actions

The intention of this report was to assess what Digital 20/20 could do to add value to what is already happening in the region in terms of Green IT. The following set of actions therefore focuses on the role of Digital 20/20 as a catalyst working with regional partners:

1. Set up a regional blog
  - Make public the outputs from the current research
  - Feature people interviewed
  - Use comments from interviews to trigger feedback
  - Get feedback from those in the region that attend national events
  - Include a section on Skills to profile new Y&H course offerings
  - Profile the new Digital 20/20 'Remote & Flexible Working' short course that is available under Creative Commons Licence
2. Run an event to showcase regional activity and draw together academic and company contributions:
  - Link to BCS, Intellect (possibly) and e-Skills
  - Speakers – regional experts from university & company projects
  - Audience – public sector & corporate IT managers
3. Case studies – draw out Green aspects in the existing Digital 20/20 e-business improvement case study series
4. Add in a Green IT section to the regional ICT benchmarking survey to gauge what people are doing
5. Review the option for adding an acknowledgement of Green IT achievement in the ICT Active scheme
6. Add a Green IT Award Category in the Yorkshire Digital Awards
7. Create a Green IT Special Interest Group in the new IT Yorkshire network (<http://www.techmesh.org/>)
8. Contact the regional Universities and Technology Parks and also the JISC Regional Centre to see what they can contribute
9. Connect to national activities in BCS, Intellect, e-Skills, EILT, Becta etc
10. Check what global vendors are doing that we can leverage in the region, e.g. Cisco, Google, IBM, Microsoft

## Appendix A: Consultations

Consultations were used to validate the evidence emerging from the desk research and to provide a more qualitative dimension to the mapping.

We have consulted the following people within the region as part of this research and we acknowledge their assistance in helping to define the issues:

**Name:** Dr Martin Beer (Principal Lecturer)

**Organisation:** Communication and Computing Research Centre (CCRC)

**URLs:** <http://www3.shu.ac.uk/c3ri/Details.cfm?Action=DetailsOfStaff&StaffID=107&SDisplay=Full>

**Name:** Colin Coghill

**Organisation:** Formerly Director of Information Systems Services at Leeds University

**URLs:**

Was Chair of the University's Sustainable IT Group

**Name:** Dr David Grey (Director of Undergraduate Studies)

**Organisation:** Hull University (Dept. Of Computer Sciences)

**URLs:** <http://www.codefounders.com/products/Powerdown/Default.aspx>

Involved in development of the Powerdown software (a power management tool that shuts down machines when they are not in use).

**Name:** Peter Hopton (Managing Director)

**Company:** Very PC

**URLs:** <http://very-pc.co.uk/>

<http://www.very-pc.co.uk/?page=news&article=1>

Specialise in the manufacturing of green computers

**Name:** Peter James

**Organisation:** University of Bradford

**URLs:** <http://www.susteit.org.uk>

Project Director of Suste-IT (Managing Environmentally Sustainable ICT in FE and HE)

**Name:** Paul Miller

**Organisation:** Cloud of Data (Semantic Web/ Cloud Computing Consultancy and Analysis)

**URLs:** <http://cloudofdata.com/>

**Name:** Paul O'Donnell (Managing Director)

**Company:** Scientia Group

**URLs:** <http://www.scientia-group.co.uk/>

Specialise in advising companies on the purchase of green IT/tech solutions.

**Name:** Colin Pattinson

**Organisation:** Head of Faculty at Leeds Metropolitan University

**URLs:** [http://www.leedsmet.ac.uk/inn/courses\\_postgraduate\\_studies\\_msc\\_green\\_computing.htm](http://www.leedsmet.ac.uk/inn/courses_postgraduate_studies_msc_green_computing.htm)

Leads the University's MSC in Green Computing