

# JISC and Green ICT

**Rob Bristow** - Joint Information Systems  
Committee

# Why Green ICT – Why JISC?

- Picked up by JOS Committee 2007
- Carbon Reduction
- CSR
- Links to other aspects of JOS work
  - Business Efficiency
  - Toolkits and self-assessment approaches
  - Sustainable futures

- ICT Energy and carbon emissions
- CRC
- Funding council drivers
- Reduce costs
- Improve efficiency
- Enhance reputation
- New ways of working and new paradigms for teaching, learning, research and administration

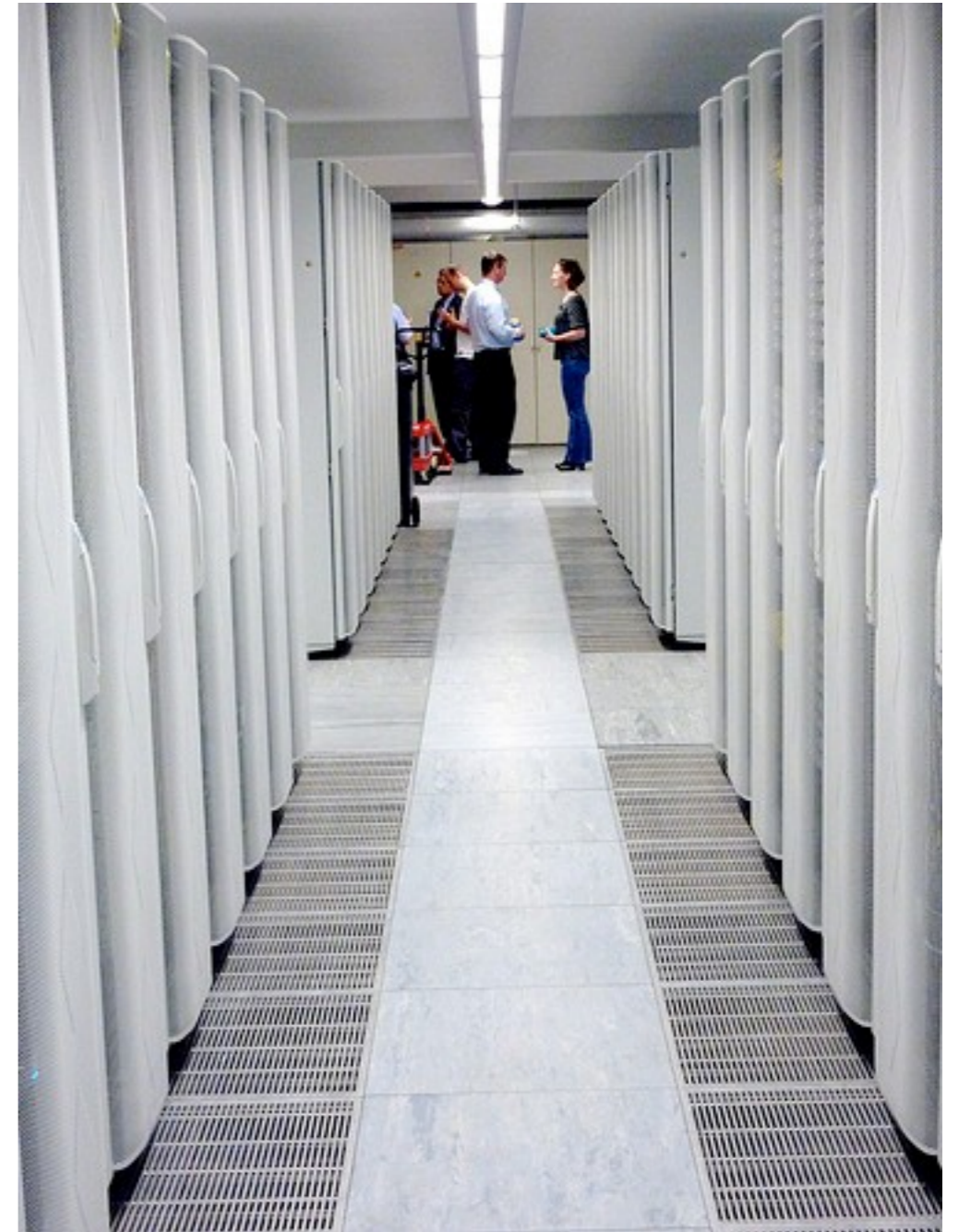
# The Problem

- Many devices
  - 760,000 PCs
  - 215,000 servers
  - 147,000 networked printers
  - 512,000 Mwh of electricity
  - 275,000 tonnes of CO2
- High costs
  - £116 million + in 2009 (HE & FE in UK)

Source: Suste-IT Report

# The Problem

- Data centres
- The desktop
- Printing
- Embedded carbon
- Disposal
- Demand!



Picture: Josie Fraser  
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# The opportunity

- Smarter systems, buildings and processes
- De-materialisation, dis-aggregation and dis-intermediation
- HE as exemplar for low-carbon IT
- Green as driver for other efficiency gains

# The Desktop

- Powerdown - This should have been done by now
- Extend it out to staff PCs
- Wake-on-LAN solutions available
- Extend life
- Procure to Energy Star 5 and EPEAT Gold if possible
- Examine case for Thin-Client

# Thin Client

- **Plus**

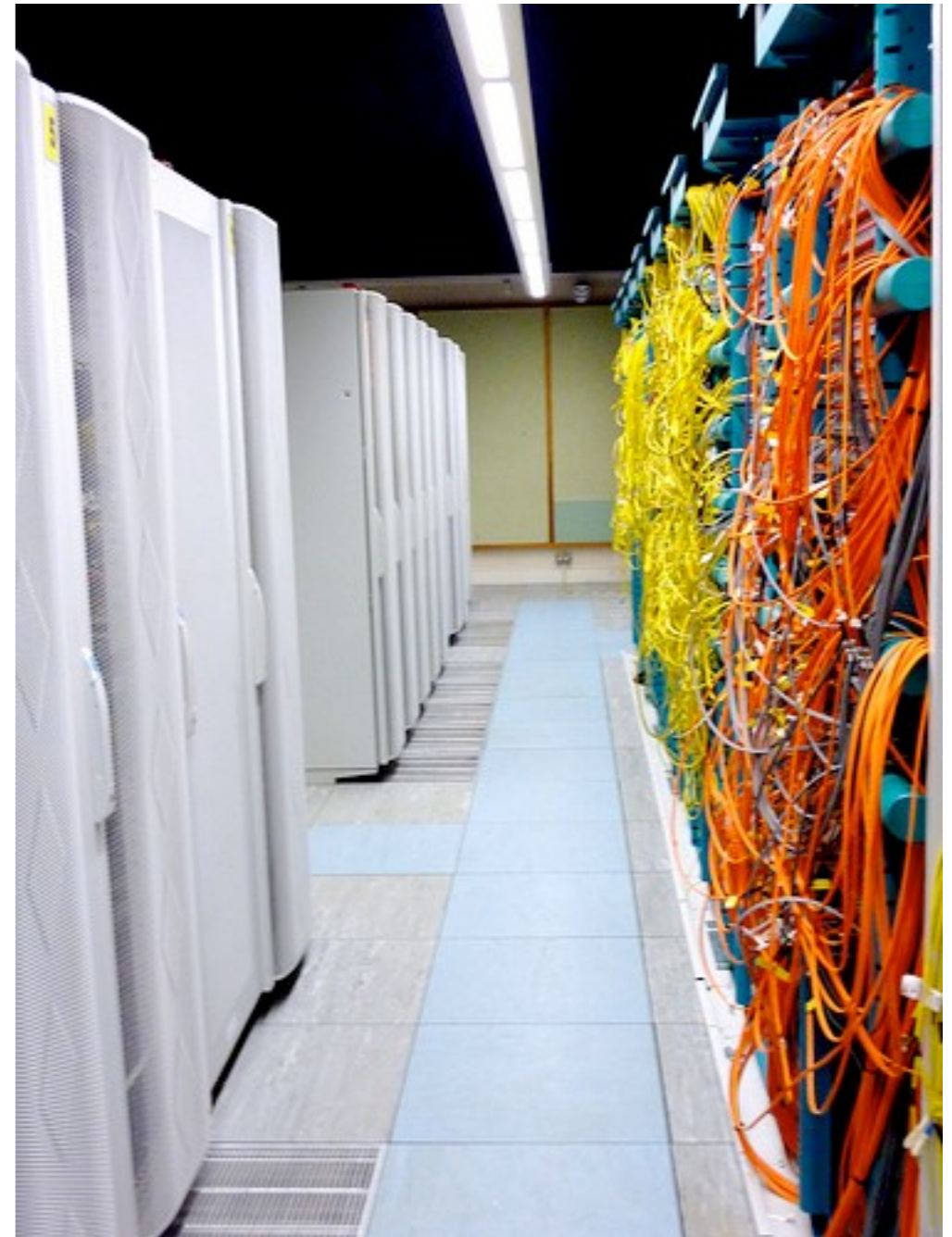
- Kit lasts longer
- Easy to consolidate and virtualise
- Lower Energy consumption in use and reduced need for cooling
- Less weight and bulk to transport - less waste
- Reduced support costs

- **Minus**

- Load at server
- Many devices on 24/7
- Video/3-D Graphics not handled well
- New thick-client solutions can match the thin-client claims
- Important to match to users' needs

# Data Centres

- “the physical reality of modern campus CyberInfrastructure (CI) is a complex network of ad hoc and sub-optimal energy environments in departmental facilities”
  - Green Light project - UC - San Diego  
<http://greenlight.calit2.net/>
- But demand is growing
  - Processing
  - Storage



Picture: Josie Fraser  
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# Printing

- (Staff) printing is out of control
- HE Sector consumes over 21,000 tonnes of paper per year
- Accounts for 10-16% of ICT-related electricity use
- Most of the energy associated with printing comes from making the paper
- Form a cross functional team and get buy-in from users
- Consolidate printing to MFDs
- Enable “Pull” printing
- Enable duplex and monochrome printing by default
- Enable quick switch to low power mode

- UK Government's Quick Wins
- Centre of Excellence
- Standards
  - Energy Star
  - ECMA Eco-Declaration
  - EPEAT
- Sustainability not yet embedded in procurement practices
- Need for strategic view of procurement and estates involvement

# The Green ICT Programme - Overview

## Key objectives for the programme

- Greening the sector - attitudinal and behaviour change embedded across the sector
- New sustainable procurement paradigms
- Sustainability seen as key driver and yardstick for sector activities
- Harnessing of sector research activities

## Intended outputs from this programme

- Substantive body of knowledge illuminating areas of uncertainty in respect to Green ICT
- Exemplar projects providing leadership and best practice example

## Outcomes

- Reduction of sector carbon footprint and associated energy costs
- Increased capacity and expertise across the sector in sustainable ICT
- Improved reputation of sector and UK as leaders in this area
- Reduction in waste generated by ICT use

# The story so far

- Suste-IT Project
  - Year long look at Green ICT in HE and FE
  - Report, briefing papers, case studies
  - Carbon Footprinting Tool
  - Thin/Thick Client tool
  - <http://www.susteit.org.uk/>

# Green Projects

- Low Carbon ICT – Oxford
  - Wake-on-LAN and Powerdown solutions
- Location Independent Working – Coventry
  - Flexible working process and practices
- RARE-IDC – Hertfordshire
  - Re-engineering real-life server rooms
- ECCICLES – Bolton
  - Step by step change to reduce energy use

# JISC Tech Watch – Low Carbon ICT

- Best practice measures and standards for metrics
- Short term 'quick fixes'
- Longer term solutions
- Factors that are likely to affect how these technologies develop in the future
- Low Carbon ICT Roadmap linking to targets associated with the Climate Change Act
- Strategic guidance for senior managers
- <http://bit.ly/1GjvIZ>

## Current Projects

- Deliberative User Approach in a Living Lab: connecting users to energy use through ICT [DUALL] (De Montfort)
  - “a socio-technical, deliberative approach enabling users of a large-scale, public-sector building to understand the potential for ICT to reduce energy consumption
- How Green Was my video-conference (Swansea)
  - Real life understanding of how people use V-C and the environmental impacts of using it
- Green in Silico (Bradford – HEEPI)
  - Focus on STEM (Science, Technology, Engineering and Mathematics) related ICT activities
- Greening Events (Bristol)
  - An exploratory investigation into how to minimise the sustainability impacts of academic events while gaining the maximum benefit from them

# Projects (cont)

- Energy Recovery for Server Rooms (ER4SeR) (UHI Millennium Inst)
  - Outline Project Description: Development of a Management Decision Support toolkit for the potential for use of Energy Recovery from computer server rooms, based on complete walk-through of at least three real-life scenarios
- E-Reader Demonstrator Project (Edgehill)
  - Investigating and trialing the potential for print substitution by using e-Readers in institutional committee meetings
- Planet Filestore (Cardiff)
  - Investigating the environmental savings from dynamically moving data between fast, resilient tier 1 storage and reduced energy lower tier storage

# Projects (cont)

- Energy Reporting with Green Outcomes - ERGO Project (Pembroke College)
  - To reduce the environmental impact of institutional ICT through raising awareness of the effects that small behavioural change can make to reduce energy usage
- PEG – Printing Efficiently and Greener (UEL)
  - Printing rationalisation without tears
- ThinC Efficiency: Does “Thin Client” Mean “Energy Efficiency”? (Leeds Met)
  - An experimental analysis providing real data relating to the comparative costs of running thin and thick client systems in a typical university environment.

# Projects (cont)

- Virtually Sustainable (Bradford – HEEPI)
  - Further work on Video-conferencing and remote collaboration tools
- Responsibility for Energy Costs (Gloucestershire and Forum for the Future)
  - Exploring the relationship between the users of energy and those who pay for it
- Cloud Study (Strathclyde)
  - Review of environmental and institutional implications of Cloud Computing
- ICT Energy and Carbon Management (EAUC) & London Higher project

# The Cloud

- “Not everything will move into the cloud, but the cloud will move into everything” - Nicholas Carr
- JISC - three studies – technical, research, and enterprise (inc environmental implications)
- Cloud and Grid – Convergence?
- Hybrid clouds and Shared Services
- Questions about “Greenness” of the Cloud

# Queen Margaret University

- Thin clients everywhere
- New build
- Key driver was avoiding AC
- Good IT/Estates cooperation
- Reduced support overhead by 2 FTEs



# Cardiff University

- Low power servers
- Chilled water cooling
- Efficient layout
- Efficient UPS
- 30% support overload

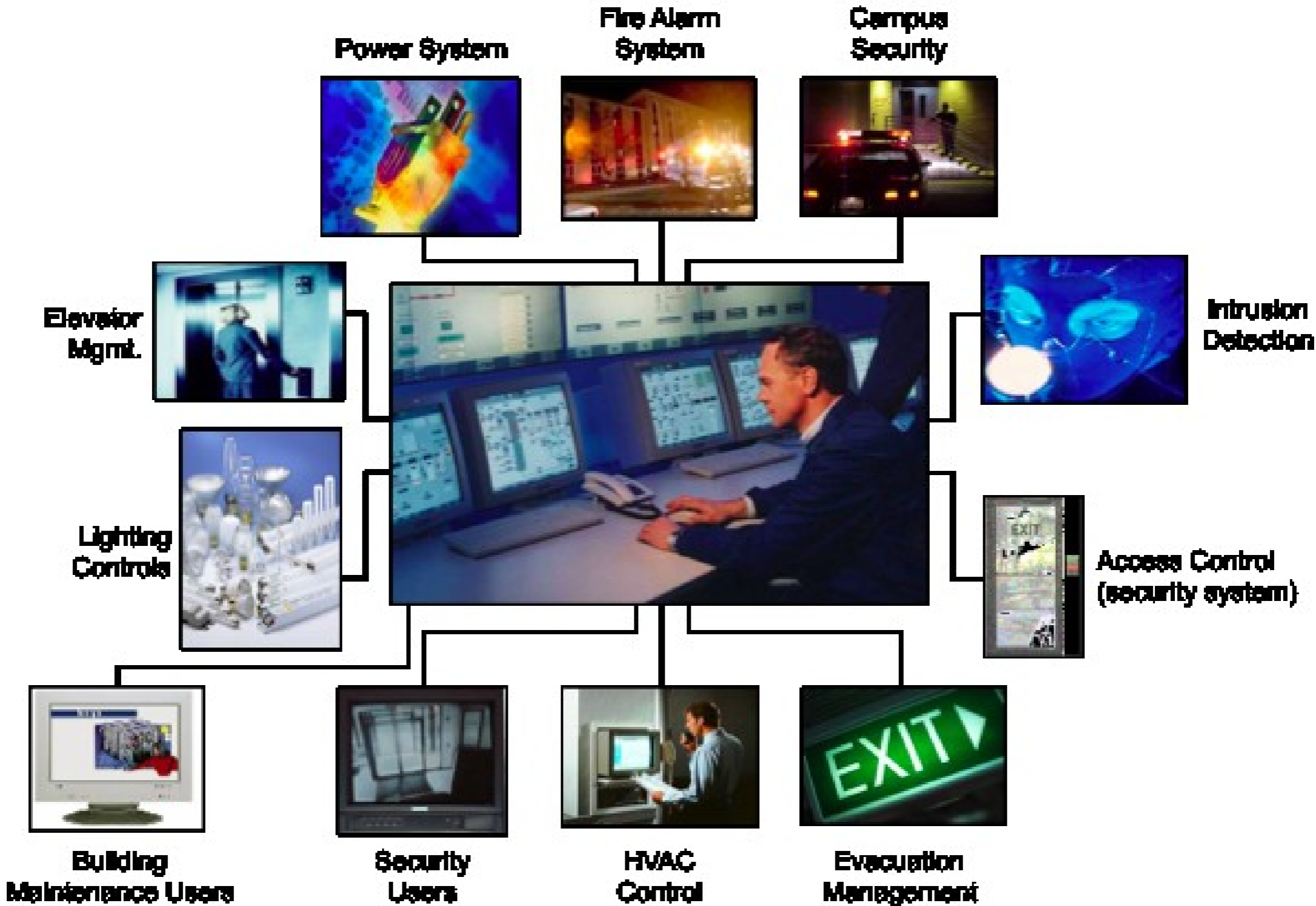


# Imperial College



- IT as opportunity
- Move to e-Procurement
- Saved 240,000 pieces of paper a year
- £40,000 in postal costs
- Less paper to store
- Leveraged existing e-Business Suite (Oracle)

# Ave Maria University



# Top Tips to reduce your carbon footprint

1. Assess your carbon footprint
2. Enable PC Powerdown for devices not in use. Move to Thin-Client Devices or more efficient thick-client devices as appropriate
3. Extend life of equipment and procure to Energy Star 5
4. Consolidate and virtualise servers. Get servers out of departments and offices into properly designed data centres. Run them warmer
5. Implement Hot/Cold aisle separation and containment in your data centre. Look at the possibility of direct cooling of racks
6. Install more efficient power supply units (PSU) and uninterruptible power supply systems (UPS)
7. Consolidate printers and enable duplex and monochrome printing by default
8. Reduce travel by maximising the opportunities for remote conferencing and flexible and home working
9. De-duplicate and rationalise data storage
10. Rationalise and simplify IT systems and architecture

# Carbon Reduction Commitment

- Starts April 2010
- 6,000 MWh
- Get an accurate record of your emissions in 2010/11
- Buy allowances if needed
- League tables and reputation
- DECC's CRC website  
(<http://www.decc.gov.uk/crc>)

- <http://www.jisc.ac.uk/whatwedo/programmes/greeningict.aspx> - JISC's Greening ICT Programme
- [http://re.jrc.ec.europa.eu/energyefficiency/html/standby\\_initiative\\_data\\_centers.htm](http://re.jrc.ec.europa.eu/energyefficiency/html/standby_initiative_data_centers.htm) - EU C of C
- <http://www.susteit.org.uk/publications/index.php> - for:
  - Suste-IT main report and summaries
  - Best practice reviews for Data Centres, Personal Computing, Printing, Procurement
  - A number of papers written by Grid Computing Now! for the Suste-IT project. Subjects covered include the EU Code of Conduct for Data Centres, Data Centre Cooling and Virtualisation
- <http://www.susteit.org.uk/cases/index.php> - for 20 case studies drawn from UK HE and FE highlighting good practice and innovative solutions
- <http://greenict.jiscinvolve.org/> - JISC's Green ICT Blog
- #greenict - Tag in use on Twitter et al
- <http://www.eauc.org.uk/home> - The Environmental Association of Universities and Colleges (EAUC)
- <http://www.defra.gov.uk/sustainable/government/what/priority/consumption-production/quickWins/index.htm> - Buy Sustainable - Quick Wins

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