uk green ict programme
- the virtuous triangle

Bob Crooks
Green ICT Lead, Dept Env Food & Rural Affairs
Chair BCS Green IT Specialist Group
Not only Climate Change but also...

- Energy is in short supply
- Materials are in short supply
- Manufacture of ICT and development of ICT services consume both &
- ICT is growing 2% +, typically 10-15% of a business CO2 footprint &
- Moving to an economy based on services and information...accelerating growth!
  - Data centre services now make up some 12% of UK GDP
  - UK industrial strategy, with its emphasis on energy-efficient computing as one of the 8 areas for UK technical leadership

ICT is part of the solution (Mitigation and Adaptation)

Brundtland: “A development is sustainable if it meets the needs of the present without compromising ability of future generations to meet their own needs”
The Virtuous triangle for Green ICT...

- Reduce the Environmental Impact of ICT Systems
- Use ICT to Facilitate More Sustainable Processes
- Use ICT to Measure & Control Sustainability
UK Government ICT...

Some figures...

- UK Public Sector ICT spend
  - £16b per annum, central government spend £7b
  - 9% of total Public Sector spend
  - 1% of entire UK economy
- 90% of ICT technology spend with supply chain, including some £1.2b on hosting

=> A great opportunity for ICT efficiency

=> Essential to engage with suppliers
UK Government response...

A **Government ICT strategy**

= workstreams driving efficiency and sustainability gains..

- End user device
  - Build & procure single devices fitted to job roles/use profiles
  - Reduce device proliferation – Laptop, Tablet, Blackberry, etc

- Public Sector Networks
  - Sharing network enables sharing buildings

- Hosting
  - Virtualising servers and consolidating Data Centres

- Capability
  - Professional development, build in Green ICT skills

- G-Cloud services bring in from large and small enterprises

- Digital by Default
  - Saving paper, call centres

- &….
An HMG Greening government ICT Strategy

• Vision: A cost effective and energy efficient ICT estate, which is fully exploited with reduced environmental impacts to enable new and sustainable ways of working for staff, organisation & customers
Reduce the Environmental Impact of ICT Systems

Use ICT to Facilitate More Sustainable Processes

Use ICT to Measure & Control Sustainability
And what are we doing centrally...

- Set up Cross-Public Sector Green Delivery Unit (GDU)
- Compiled work book of best practices
- Identified 14 key target outcomes across the lifecycle
  - Depts to choose and achieve 10 by April 2015
- Compiled Maturity Model for embedding Green ICT, in processes
  - Depts to achieve level 3 by April 2015, and provide plans to get there by April 2013
Sourcing ICT... Buy less, share more

- Extend life and maximise use of existing systems
- Go for single richer devices
  - Printers
  - End user devices (PC, laptop, iPADs, Blackberries...)
- Go for Services not Assets
  - Cloud-store of services
  - Virtualise and consolidate
- Align assets used with environmental standards
  - Government Buying Standards
  - EU Codes of Conduct for
    - Energy efficient data centres
    - Broadband
  - International Standards for network and server kit
- Close the Loop
  - Buy stuff that is constructed from recycled materials
  - Buy stuff that can be recycled

Targets
⇒ GBS/International standards in all new contracts from July 2013
⇒ DC CoC Endorser status by April 2013
⇒ DC Participant status for all DCs used to host new services from April 2014
Operating ICT... Lean and Mean

• Minimise power consumption
• Reduce paper consumption
• Follow standards for efficient operations
  – EU Code of conduct
• Change behaviours
• Embed in operational practices and services

Targets:
=> Measure and set trajectory for reducing footprint from April 2013
=> Equipment and applications rationalisation by April 2014
Getting rid of ICT
– follow the Waste hierarchy

• If broke fix it!
• Re-use, Re-furbish for other purposes
• Recycle elsewhere
  – Clean and re-sell
  – Charities/Schools
• Reclaim components, consumables and materials
• Dispose in line with regulations
  – WEEE, licensed sites etc

Targets:

=> Zero landfill from government ICT by April 2015, with full tracking of all disposals from April 2013
### Key target outcome

<table>
<thead>
<tr>
<th>Description</th>
<th><strong>1. ICT equipment and services procured using</strong> Government Buying or International Standards where appropriate.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2. Decisions to replace equipment</strong> based on business utility rather than set refresh points.</td>
<td>At initial procurement or next refresh point for purchase/lease GBS applied where available. Where not available international standards for greener electronics applied, with use of accreditation schemes such as (eg EPEAT, or ECMA) to confirm compliance.</td>
</tr>
<tr>
<td><strong>3. Power consumption</strong> minimised for end user access devices.</td>
<td>At refresh points, process in place to review whether to refresh equipment, balancing the footprint from continuing to use and support, against the footprint from procuring, installing and running more efficient kit and disposing of the existing devices.</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Description</th>
<th><strong>4. Number of end user access devices</strong> reduced to minimum necessary for business needs.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>5. Number of printers and volume of print reduced</strong> to minimum necessary for business needs.</td>
<td>Device intensity reduced through sharing and device reduction initiatives, adopting for example:</td>
</tr>
</tbody>
</table>

---

<table>
<thead>
<tr>
<th>Description</th>
<th><strong>4. Number of end user access devices</strong> reduced to minimum necessary for business needs.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>5. Number of printers and volume of print reduced</strong> to minimum necessary for business needs.</td>
<td>Print reduction strategy developed and adopted incorporating:</td>
</tr>
</tbody>
</table>

---
## Roadmap – 14 key areas for improving practice

| 6. **Networks audited**, reduced and shared with due regard to resilience needs. | Network infrastructure rationalised and shared  
- Audit existing provisions and resilience arrangements  
- Align networks and remove duplication  
- Match provisions to requirement  
- Power management efficiencies  
- Use shared/cloud based services and migrate to PSN provisions where appropriate |
|---|---|
| 7. Suppliers engaged in monitoring and improving environmental performance of the **ICT supply chain**. | Improved environmental performance of the ICT supply chain through  
- incentivised contracts to deliver greener products, services and innovative behaviours  
- adoption of GBS for product types covered  
- reporting of energy/carbon footprints for products and services |
| 8. Business needs met through **shared applications** hosted in-house, or as services on the web | Existing applications and services and business reqs, are audited and rationalised, those apps and services not required being decommissioning, and new development avoided by sharing those available within organisation and beyond |
| 9. **Applications are virtualised and consolidated** onto fewer servers. | Applications virtualised where appropriate, removing/reducing hardware dependencies, and consolidated onto fewer servers that are loaded to maximum levels of utilisation with due regard to resilience needs |
| 10. **EU Data Centre Code of Conduct** endorser status adopted. | Programme of energy efficiency improvements drawn up and implemented and Endorser status gained under EU CoC for energy efficient data centres and server rooms |
| 11. **Server rooms** are run energy efficiently | The impact of data centres and server rooms on the environment is understood and managed with active supplier engagement continuously seeking efficiencies and reduced impacts. |
Roadmap – 14 areas for improving practice (3)

12. **Storage capacity** minimised with due regard to resilience and availability needs. With:
   - Policies and guidance in place for managing emails and documents,
   - Use of tiering and compression technologies
   - Availability of collaboration spaces

13. Minimal levels of land-fill from disposal of ICT kit at end of life. Disposals reduced through policies and practices for re-using and recycling ICT kit at end of useful life.
<table>
<thead>
<tr>
<th>Key Target Outcome (KTO)</th>
<th>CPS</th>
<th>DCLG</th>
<th>DECC</th>
<th>Defra</th>
<th>DfID</th>
<th>DoH</th>
<th>DWP</th>
<th>FCO</th>
<th>HMRC</th>
<th>HO</th>
<th>MOD</th>
<th>MoJ</th>
</tr>
</thead>
<tbody>
<tr>
<td>KTO1. Use of Green ICT standards in procurement</td>
<td>4</td>
<td>4</td>
<td>6</td>
<td>5</td>
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<td>KTO2. Replace for business utility not refresh</td>
<td>3</td>
<td>6</td>
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<td>5</td>
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<td>5</td>
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<tr>
<td>KTO3. Power consumption minimised for end user access devices.</td>
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<td>5</td>
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<td>4</td>
<td>5</td>
<td>3</td>
<td>5</td>
<td>4</td>
<td>4</td>
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</tr>
<tr>
<td>KTO4. Minimise end user access devices</td>
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<td>4</td>
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<td>KTO5. Minimise and consolidate print</td>
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<td>6</td>
<td>4</td>
<td>5</td>
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<td>Key Target Outcome (KTO)</td>
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</tr>
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<td><strong>KTO8. Share services and systems</strong></td>
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<td>4</td>
<td>4</td>
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<td>5</td>
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</tr>
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<td><strong>KTO9. Virtualise and consolidate hosting arrangements</strong></td>
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<td>5</td>
<td>4</td>
<td>3</td>
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</tr>
<tr>
<td><strong>KTO10. EU Data Centre Code of Conduct endorser status</strong></td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>4</td>
<td>3</td>
<td>N/A</td>
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<td>4</td>
<td>3</td>
<td>1</td>
<td></td>
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<tr>
<td><strong>KTO11. Server rooms are run energy efficiently</strong></td>
<td>4</td>
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<td>4</td>
<td>2</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td><strong>KTO12. Storage capacity minimised</strong></td>
<td>4</td>
<td>6</td>
<td>4</td>
<td>2</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>4</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td><strong>KTO13. Minimise need for disposal and land-fill</strong></td>
<td>5</td>
<td>6</td>
<td>2</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>5</td>
<td>3</td>
<td>5</td>
<td>5</td>
<td>5</td>
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</tr>
<tr>
<td><strong>KTO14. Reduce business travel</strong></td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>4</td>
<td>6</td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>5</td>
<td>4</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>
And achieved by April 12..

- Average PUE for 10 depts of 1.87
- At least 232ktCO2 savings from individual dept initiatives, saving £1.3m pa
- GDU Cross dept working groups for
  - Metrics
  - Procurement
  - Share/re-use
Not forgetting the Service wrap

- Service management
  - Help desk
  - Break/fix
- Change
  - Upgrades
- New builds
  - Development
  - Testing
  - Delivery
Maturity model* levels...

1. Foundation  
   - evidence and intelligence gathering to inform actions, agreed plans
2. Embedded  
   - show commitment and basic initial development, basic processes in place
3. Practised  
   - moving forward taking actions to improve, repeatable actions
4. Enhancing  
   - pushing for new opportunities, adoption of best practice, improving capability
5. Leadership  
   - taking control, having own vision, optimising performance

Summary of Depts Baseline position and aspirations @ April 2012...
And now for the 2\textsuperscript{nd} vertex
Reduce the Environmental Impact of ICT Systems

Use ICT to Facilitate More Sustainable Processes

Use ICT to Measure & Control Sustainability
Greening ICT Strategy targets ...

• To report ‘bottom-up’ on operational energy consumption from April 2013
• To adopt standards for consistent measurement and reporting from April 2015 (building on Carbon Trust led GHG Protocol sector guidelines)
JISC’s tool for Higher Education Sector
INTRODUCTION and INSTRUCTIONS
This tool is designed to help Further and Higher Education (FHE) Institutions estimate the in-house energy use and costs and carbon footprint of their non-residential ICT usage.

The tool can be used in two ways:
1. The ‘quick and simple’ method (blue area of the worksheet). This only requires a number (which can be estimated) for each of the different types of ICT device.
2. The ‘thorough’ (and more accurate) method (yellow area of the worksheet). In addition to numbers of devices, this enables users to enter institution-specific data on the power rating/typical usage hours or energy consumption of equipment.

For each item on the right, click on the link to go to the appropriate sheet and fill in the details for your institution. Measure your progress by indicating when you have completed a section.

Each section allows you to return to this menu, or from each page you can a) click a link to take you to another section or b) click the Tab for the section you want to go to.

When you have completed all sections you can see your totals and an analysis of your results by clicking on the ‘Totals and Analysis’ button.
## SusteIT ICT Energy and Carbon Footprinting Tool © SusteIT 2012

### PCs & Monitors

<table>
<thead>
<tr>
<th>Type</th>
<th>Number</th>
<th>Watts (Active, idle) (f)</th>
<th>Watts (Standby) (f)</th>
<th>Hours/y (Active, idle) (g)</th>
<th>Hours/y (Standby) (g)</th>
<th>Total Energy Consumption kWh/y per PC (h)</th>
<th>Total Energy kWh/y</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PCs</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High performance PCs &amp; workstations</td>
<td>1</td>
<td></td>
<td></td>
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<td>400</td>
<td>400</td>
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<tr>
<td>Medium performance, standard PCs</td>
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<td>Low power, green PCs</td>
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<tr>
<td>Managed standard PCs</td>
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<td></td>
<td></td>
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<td>120</td>
<td>120</td>
</tr>
<tr>
<td>Student green PCs</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>65</td>
<td>65</td>
</tr>
<tr>
<td>Student standard PCs</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>117</td>
<td>117</td>
</tr>
<tr>
<td><strong>Other Devices</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Portable PCs (laptops)</td>
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<td></td>
<td></td>
<td></td>
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<td>Thin clients</td>
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<td>0</td>
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</tr>
<tr>
<td><strong>Monitors</strong></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>CRT Monitors</td>
<td>1</td>
<td>70</td>
<td>5</td>
<td>2,080</td>
<td>6,680</td>
<td>179</td>
<td>179</td>
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<tr>
<td>Flat (LCD or TFT) Monitors</td>
<td>1</td>
<td>25</td>
<td>1</td>
<td>2,080</td>
<td>6,680</td>
<td>59</td>
<td>59</td>
</tr>
<tr>
<td><strong>Adjustments</strong></td>
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<td></td>
<td></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Aircon overhead for computer suites</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.00</td>
<td>0</td>
</tr>
<tr>
<td><strong>PCs &amp; monitors energy sub-total</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1,350</td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
- Areas in yellow are default figures which can be altered if data specific to the institution is available.
- The letters in brackets correspond to explanations in the User Guide and the worksheet “Assumptions” on how the default assumptions were derived.

**Instructions:**
Type in the blue areas - nominal figures only have been entered.
<table>
<thead>
<tr>
<th>Category</th>
<th>Energy Use (kWh/y)</th>
<th>%</th>
<th>Energy Cost (£/y)</th>
<th>CO₂ emissions (kg/y)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HPC</td>
<td>1,208,617</td>
<td>14%</td>
<td>157.120</td>
<td>649.052</td>
</tr>
<tr>
<td>Servers</td>
<td>1,520,736</td>
<td>18%</td>
<td>197,696</td>
<td>816.666</td>
</tr>
<tr>
<td>PCs</td>
<td>4,164,477</td>
<td>48%</td>
<td>541,382</td>
<td>2,236,408</td>
</tr>
<tr>
<td>Networks</td>
<td>687,362</td>
<td>8%</td>
<td>89,357</td>
<td>369,127</td>
</tr>
<tr>
<td>Telephony</td>
<td>202,356</td>
<td>2%</td>
<td>26,306</td>
<td>108,669</td>
</tr>
<tr>
<td>Imaging</td>
<td>835,659</td>
<td>10%</td>
<td>108,636</td>
<td>448,765</td>
</tr>
<tr>
<td>AV</td>
<td>61,598</td>
<td>1%</td>
<td>8,008</td>
<td>33,080</td>
</tr>
<tr>
<td>TOTAL</td>
<td>8,680,806</td>
<td>100%</td>
<td>1,128,505</td>
<td>4,561,766</td>
</tr>
</tbody>
</table>
Using ICT to measure and control sustainability at work

• Server rooms and Data centres energy management systems and practices
• Asset lists and footprint calculations
  – Identify hot-spots
• Building management and sensing systems
• Scrunching office space
• PC energy monitors
Use data from control and management systems

• Positive feedback
  => your sacrifices and behaviour changes are making a difference!

• PR for having a green business organisation

• Competitive advantage
  – Reduced overheads
  – Become a virtual business for customers
    • Eg BA, HMG Digital by Default
And the 3rd ...
Reduce the Environmental Impact of ICT Systems

Use ICT to Facilitate More Sustainable Processes

Use ICT to Measure & Control Sustainability
For government processes

**HMG 14th Best practice**

Achieve Business travel reductions through adoption of audio, web and video conference facilities, social media and collaboration tools
UK Greening Government commitments

Long term policy goals

- Climate change: cutting UK greenhouse gas emissions by 80% by 2050
- Waste: Planning for a zero waste economy
- Water: using water resources sustainably and efficiently
- Green economy

- 2011: Cut carbon emissions by 10% in central government
- 2012: Cut paper use by 10%
- 2013: Closed loop paper waste collection and recycling
- 2014: Ensure that redundant ICT equipment is reused or recycled
- 2015: Cut greenhouse gas emissions by 25%
  - 2015: Cut domestic flights by 20%
  - 2015: Cut waste by 25%
  - 2015: Cut water consumption
  - Get Supply chain data
  - Embed Government Buying Standards
  - Cut water consumption
  - Closed loop paper waste collection and recycling
  - Ensure that redundant ICT equipment is reused or recycled
  - 2012: Cut paper use by 10%
And so far...

2010/11: achieved 10% reduction in estate footprint

<table>
<thead>
<tr>
<th></th>
<th>Baseline 19 depts</th>
<th>Achieved Apr 11</th>
<th>Reduction %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emissions 2009/10 tCO2 (May Baseline)</td>
<td>764,141</td>
<td>659,609</td>
<td>104,532</td>
</tr>
<tr>
<td>Weather Corrected Emissions 2009/10 tCO2 (May Baseline)</td>
<td>749,547</td>
<td>646,231</td>
<td>103,316</td>
</tr>
<tr>
<td>Reduction %</td>
<td>13.6796743</td>
<td>13.78379208</td>
<td></td>
</tr>
</tbody>
</table>
And so far...

April 11– March 12 : reduced paper consumption by 10%

2012 Olympics – aimed for a 50% reduction in Public Sector travel (commuting and business) figures being audited but looking good!
Digital by default

- 1 billion government transactions per annum, across 650 different types
- In 2011 82% of population are on line
  - 86% of them carry out purchases on the net
  - 60% banking
  - 57% pay bills
- But only 46% carried out a government transaction online
- Predominant success with
  - Company House: 89% for search and file of returns
  - HMRC: 80% for self assessments
- On-line is cheaper (SOCITM)
  - F2F - £8.62
  - Phone - £2.83
  - Online – 15p
- HMRC estimate of £14.70 per hour of interaction with government
Digital by default – key targets

By April 2013:
   All 24 central depts publishing on Gov.UK
   Cab Office to publish standards for Digital

From April 2014:
   All arms length bodies and agencies publishing on Gov.UK
   All new customer services to be Digital

By April 2015:
   3 key exemplar legacy services transitioned to digital
   Service managers appointed and digitally trained for all transactional services
   All transaction types > 100k pa to be re-designed
Behaviour change?

• Need behaviour changes throughout
  – How we get hold of things
    • Quickly and off the shelf => Apps, Cloud services
    • Fit process to solution
  – How we use ICT more efficiently
    • Less power
    • Less support overheads
    • Less consumables
  – How ICT is used to do things more efficiently
    • Less travel
    • Less paper
    • Less space
    • Quicker, more embracing, better quality decision making
    • Set Digital as default
But we’re all too human!
Shock!

Sustainability just another movie show until it suddenly becomes real for an individual?
Thank you