Greening Government ICT

2015 Annual Report

Reducing carbon. Reducing cost.

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Final Version

Contents

Foreword

The government launched its Greening Government IT Strategy in 2011 with a commitment to report transparently. This is the fourth and final year of the strategy and we can report that a number of significant commitments and targets have been achieved with good progress towards achieving the others.

Since the strategy was published there have been major changes in the government's approach to technology and digital services. These are entirely consistent with driving improved sustainability for government technology. The move to cloud based, commodity, re-useable and digital by default services, provides opportunities to have greener IT and to use technology to help departments' operations be more sustainable overall.

There is a strong central commitment through the Way We Work (TW3) programme to ensure that civil servants have the modern tools they need to enable them to work effectively together and with customers. New greener digital technologies and working practices will help do just that as well as improve the quality of deliverables by providing more timely and inclusive development

This report shows the progress we are making and provides case studies of how departments are using a wide range of digital services from modern communication and collaboration tools to cloud-sourced data storage.

All new significant technology proposals now have to be assessed against the GDS Technology Code of Practice. One criteria used in that assessment is to "ensure best sustainability practices, whether in-house or via external suppliers, including compliance with Greening Technology" (Technology Code of Practice item 13).

Departments' response to implementing the challenges in the Greening Government ICT Strategy and delivering greener services is a good example of cross-government collaboration. The Green ICT Delivery Unit (GDU) is a light touch virtual organisation which identifies and shares best practice. It is focused on developing supporting tools and guidance and then transparently reporting on progress. The GDU also reaches out to the UK ICT industry, through organisations such as TechUK, JISC (Joint Information Services

Committee for Higher Education) and the BCS(British Computer Society), working together to identify opportunities and pushing for continuous improvement.

Improvements in the sustainability of technology and adoption of technologies for mobile and collaborative working have contributed towards the progress made with the Greening Government Commitments programme which set targets for central government departments and their agencies to significantly reduce waste, water usage and carbon emissions from the government estate by 2015, together with making their ICT procurements more sustainable. The Greening Government Commitments 2014/15 Annual report can be found at https://www.gov.uk/government/publications . The two strategies were formed at different times but are now more closely aligned, with technology providing essential services for helping departments meet their Greening Government Commitments (GGC), including those for waste and travel. However readers will need to be bear in mind that the GGC programme uses a different reporting methodology and does not cover the same departments in all its assessments.

Whilst we have now reached the end of this Strategy there remain opportunities and areas of challenge where we can reap further benefits from using ICT. Central programmes for TW3 and Estates rationalisation continue with an increasing reliance on ICT services to achieve efficient and sustainable outcomes. The Greening Government Commitments programme is being refreshed for a further 5 years and will increasingly rely on ICT services to deliver the savings sought in Waste, travel, estate footprints and paper. There is an increasing commitment across the Public Sector to use of CCS frameworks where there is more work to be done at refresh points to improve the sustainability of the services they offer, the Print frameworks will be the first to be addressed.

Consequently with the change of administration in 2015/16 we have sought and agreed with Cabinet Office Tech Leaders group to have departments conduct a 5th assessment for 2015/16 focusing on assessing progress in those areas where departments did not hit the targets and in the use of ICT to meet the challenges of implementing central programmes . This will provide time for taking stock and deciding how we then best move forward

Chris Howes
Chair of the Green ICT Delivery Unit (GDU)
Chief Technology Officer
Defra

Introduction

During 2014/15 good progress has continued to be made on implementing the Greening Government ICT strategy. All sixteen large central Departments and an increasing number of their arms-length bodies have again provided assessments of progress towards achieving a Level 3 for the Green ICT Maturity of our Technology Services and adoption of 10 out of the 14 key target outcomes on the Roadmap. 10 departments have continued to provide an annual energy consumption footprint assessment for their ICT services.

In line with the Strategy Implementation Plan we have also collected data on availability of collaboration tools and services, use of government buying standards and on recycling and disposals. It is clear from the data returned that a significant number of departments are adopting a range of digital tools and services to improve the way they work, the access, processing and storage of their data and information, and taking initiatives to reduce sustainability impacts across the ICT lifecycle of the assets deployed .

More widely

- The Cabinet Office/Government Digital Service (GDS) Digital by Default and Ways of Working programmes bring with them the implementation of new digital tools and services that inherently have positive sustainability impacts.

- The implementation of the Public Services Network (PSN) is driving sustainable savings and efficiencies by removing duplicate network connections. It also allows public sector employees to work in more flexible, collaborative ways by creating a common network of networks and by enabling access to their ICT services from any government office.

- The Government Service Design Manual includes a Technology Code of Practice that requires compliance with the Greening Government ICT Strategy (Practice 17) as well as driving departments towards using common platforms and services (Practice 13) and sharing services (Practices 17 & 18), which in turn will reduce sustainability impacts.

This report:

- conveys the highlights from those assessments.

- the work done by the GDU throughout 2014-15.

- identifies areas where departments remained challenged by the Green Technology agenda and commitments not met .

- sets out broadly the proposed direction of travel for 2016 and towards 2020.

Key highlights

These include:

- the average level of Maturity, being an assessment of the degree to which departments are embedding sustainability in their day to day IS services, rising from **2.9** to **3.4**, with **fourteen** departments now achieving the **Level 3**[1] target an increase of 5 on last year.

- **80% or above** of departments have attained a **Level 3** maturity in (those in bold achieved this year) **governance & promotion**, **architecture**, greening their end user support arrangements, consolidation and **utilisation** of devices, **procurement**, travel reduction, **resource**, space and energy optimisation, and corporate reporting, with significant improvements shown for Information and Data management, investment decisions, **running projects, solution design** and electronically enabling customer services.

- **Six** (double the number from last year) departments achieved **ten** or more Key Target Outcomes from the Roadmap, whilst this is good progress we are still well short of the commitment for all departments to reach this target

- As last year **ten** departments submitted energy footprint assessments and carrying forward assessments for another 7 departments the average energy consumption per member of staff has continued to fall with a reduction of 84 kWh/year on last year and 584 kWh/year on 2012/13. .

- there are over 600 video conference installations reported across 11 departments' estates .

- staff are being provided with access to a wide range of collaborative working tools from shared working spaces to video and audio conferencing facilities and social media, allowing them to work together and with customers, at a wider range of locations. This has facilitated not only more efficient working practises and more

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[1] Level 1 – Foundation, Level 2 – Embedded, Level 3 – Practiced, Level 4 – Enhanced, Level 5 - Leadership

timely outcomes, but also helped to reduce travel costs by allowing staff not to have to travel to meetings.

- **nine** departments have provided statistics on their reuse, recycling and disposal of redundant IT assets, covering some **156,860 items** (91,700 last year)items weighing **1,528 tonnes** (945 tonnes last year)and achieving nearly **96% (**94% last year) level of landfill/incineration avoidance .

The GDU continues to support departments in improving the sustainability of their technology. As well as sharing assessments and case studies, the group has continued to meet monthly throughout the year and has had two active working groups, for Print Management and Reuse and Disposal.

The government and its partner organisations spend substantial amounts of money each year on printing, including the support and maintenance of some 75,000 printers across 12 central departments. The Print Management Working Group adopted two objectives, seeking to reduce the amount of printing going on, in line with the government's Digital by Default agenda for customer transactions and where printing is necessary to ensure this is done as efficiently as possible. The experience of DWP's success (see inset) is being shared with other departments as they reach refresh points in their printer and print services. The group also links up with the Greening Government Commitments work around paper reduction

DWP won the Green IT awards public sector project of the year for its sustainable print project with Xerox. Replaced 30,000 legacy printers with 8,200 multi function devices (energy star rated) - 63% cut in energy, help desk calls halved and 90% reduction in site visits by engineers

The Reuse and Disposal Working Group aims to ensure that wherever possible our ICT and other assets are reused and disposed of responsibly. The Group has assisted MoD in re-using some 2,000 no-longer wanted IT laptops from DECC, tackling a number of issues on the way in ways that other departments can now use to help other departments with their re-use work (see Case Study below). Defra was also able to pass on some 3,700 ICT devices to schools to use. The Group is now looking to support an extension of

an HMRC initiative to set up a clearing house for unwanted consumables and office furniture, to cover ICT assets with the aim of eventually establishing a cross-government

and potentially wider public sector reuse and disposal network covering a comprehensive range of assets surplus to public sector requirements .

Key challenges

Greening the project lifecycle

It is clear that we must continue to improve our performance in the areas of incorporating green information and metrics into running projects and making investment decisions. Incorporating sustainability impact assessments into the design of projects is still proving hard, and adding such impacts to investment decisions can impact value for money calculations if whole lifecycle costs are not included. This has been particularly difficult at a time when departments are under significant financial pressure and government is changing its project delivery methodology and becoming more agile and customer-focused. Inclusion of compliance with our Strategy in the government's Technology Code of Practice is an important step. Going forward, we now need to highlight the key items for such compliance to be most beneficial.

Defra has completed a virtualisation & consolidation programme for Windows servers and storage decommissioning 109 servers with a 70% reduction in rack space , removal of 44 SAN switches and a reduction of storage devices from 22 to 4

Is the Cloud green?

Whilst clearly offering significant gains in terms of enabling the sharing of services and capacity, the energy efficiency and location of the underlying hosting infrastructure for Cloud services is not readily visible, and assumptions about its efficiency could be misplaced. With more services being delivered from the Cloud

and the amount and source of any emissions being less obvious it will become both more complex and challenging to meet our obligations to report on supply chain emissions. Difficulties include estimating the proportion of a Cloud service that is used, assessing emissions from intervening network components when services are shared with other customers, and direct measurements

> HMRC has enabled software updates during the day removing the requirement for PC's to be left powered on at night and enabling standard Windows 7 power management settings making a significant reduction in energy consumption.

are not readily available.. We must find ways to address these if we are not to lose track of the footprints of our Technology services as we move these to Cloud solutions.

Green Skills

We are clearly making progress in the areas of procurement, architecture and project management but there is still room for improvement in these fields and we need to investigate whether individuals with skills in these areas are lacking specific green awareness as part of their skill set. We will seek to address this shortfall by further raising awareness and promoting appropriate training for Green ICT as well as links both with the GDS Technology function skills and capability review and with the current revision of the SFIA (Skills Framework for the Information Age)[2].
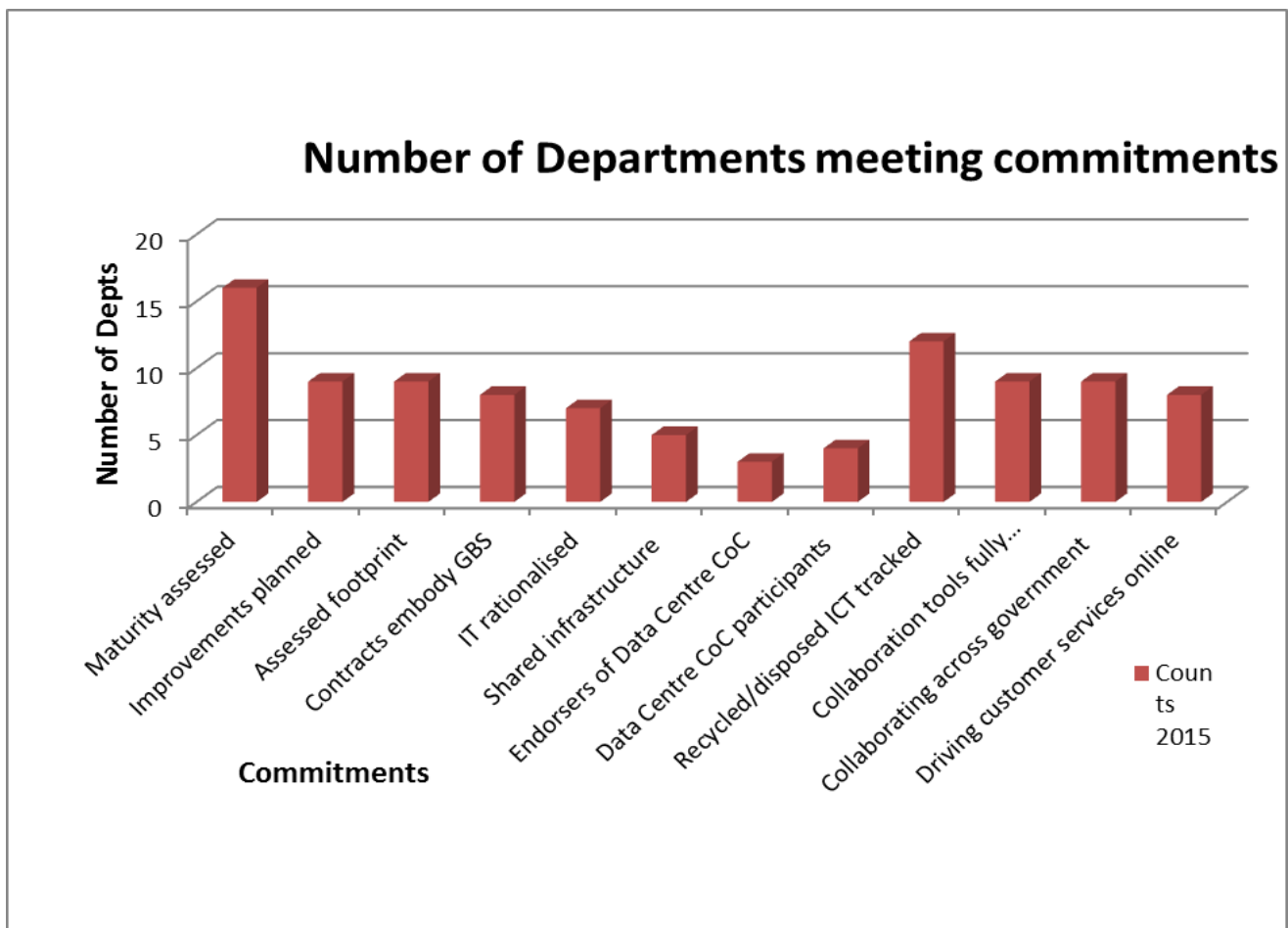
Reporting

It has continued to be a challenge to gather and report good quality green data and statistics in order to measure our progress. This can often be because we are asking for data that departments and/or suppliers do not collect or which suppliers charge to gather and process.

> Defra disposed of 11,179 ICT assets of which 3,720 were supplied to schools and charities and 2,871 were sold for commercial re-use: overall achieving 97.8% diversion from landfill by weight of disposed items

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[2] SFIA is a model to help match the IT skills of a workforce to an organisation's needs. It is managed by the SFIA Foundation a not-for-profit organization with 4 corporate members - the Institution of Engineering and Technology (IET), e-skills UK, the British Computer Society (BCS), and the IT Service Management Forum (itSMF)

With the end of some major System Integrator contracts across government, and adoption of a larger number of smaller contractors predominantly using commodity Cloud services we hope that this can be improved by using consumption-based charging regimes to provide estimates of footprints based on the proportion of the whole service each customer uses

Achievement of Commitments

The Chart below shows that of the 12 substantive commitments in the original plan only the Maturity Model assessment has been provided by all departments responding this year, with over half meeting commitments for providing footprint assessments, fully exploiting collaboration tools and undertaking collaboration work with other departments.

As last year **sixteen** departments completed the maturity assessment,

Fourteen out of the **sixteen** (16) departments have now achieved or exceeded the target **Level 3** Maturity:

An average score for all departments calculated from staff weighted averages shows that HMG as a whole has met the Level 3 (practised) target:

- Last year, departments achieved an average score of **2.9**, this year it is **3.4**

- Last year, the average level of departmental ambition was to achieve a level of **3.6**, this year it is **3.84**

The following charts illustrate our progress.

Chart 1

The first portrays the percentage of departments reaching **Level 3** or above this year against the levels achieved last year (**green**) and similarly compares the desired levels across both years (**red**).
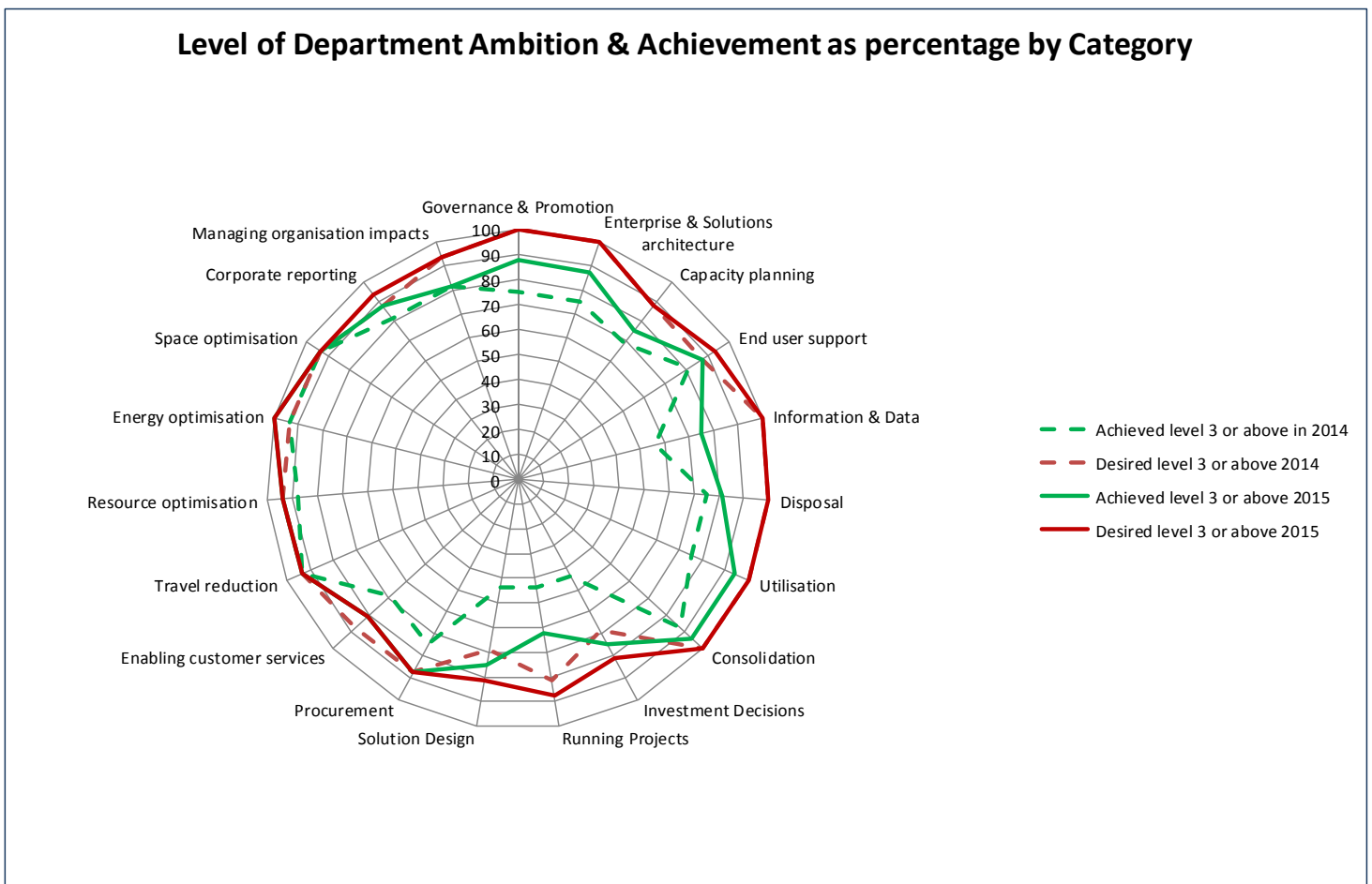

Level of Department Ambition & Achievement as percentage by Category

Chart 2

Chart 2 below shows the proportion of departments achieving **Level 3** or higher for each category in 2014 (**blue)** and in 2015 (**red**). This is useful for illustrating which categories of IT services are most mature and the areas in which departments face more challenge as well as highlighting the areas where the greatest amount of progress has been made.
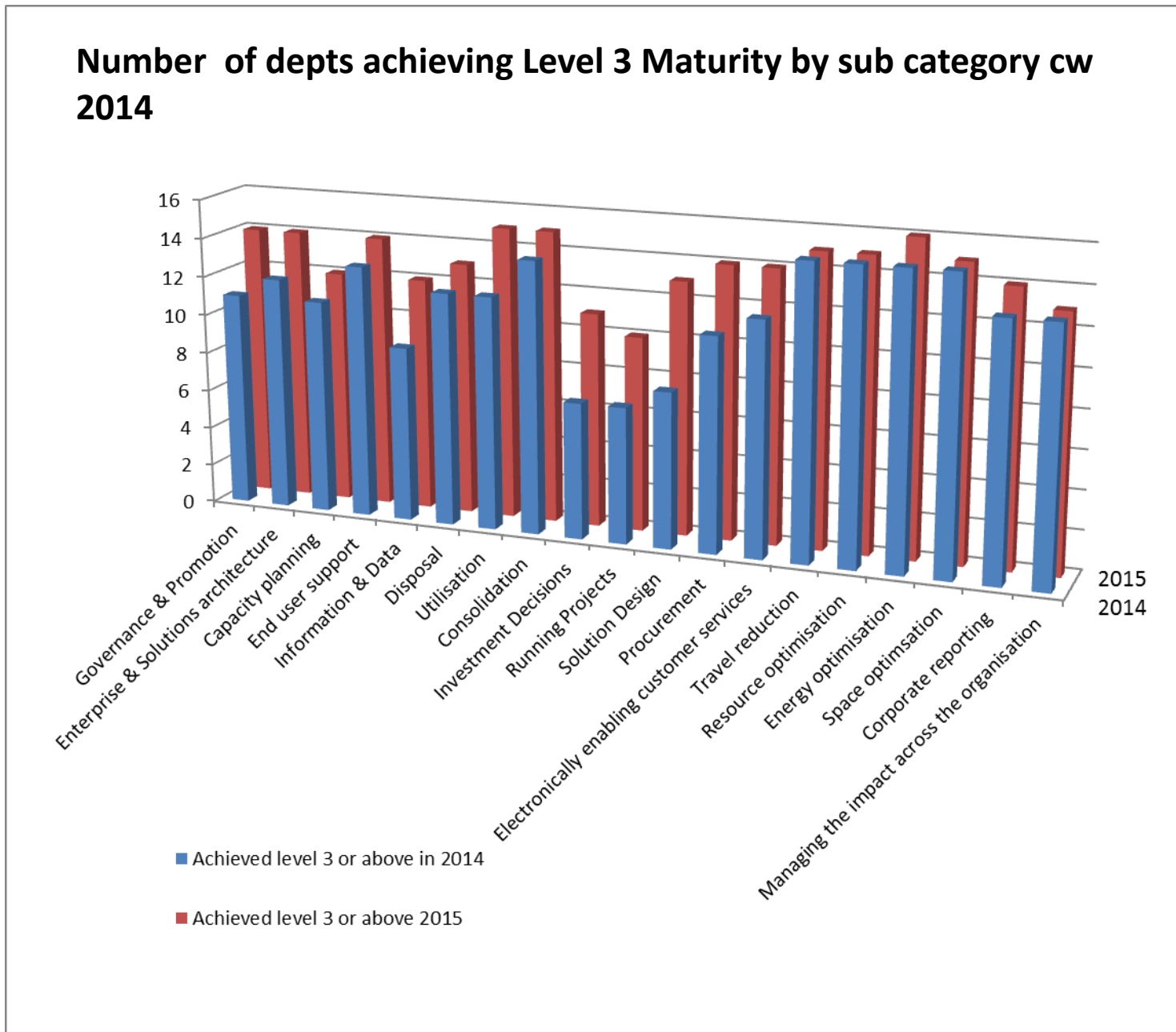

Number of depts achieving Level 3 Maturity by sub category cw 2014

Chart 3

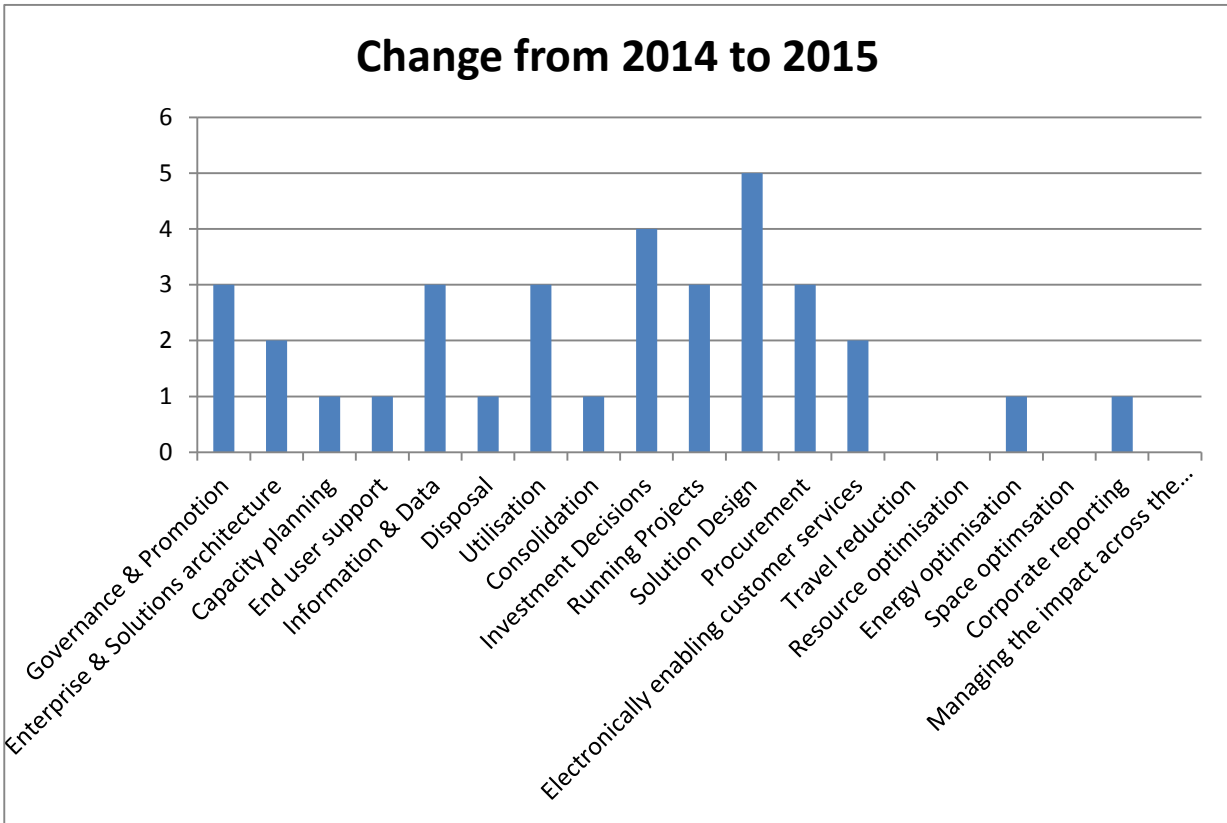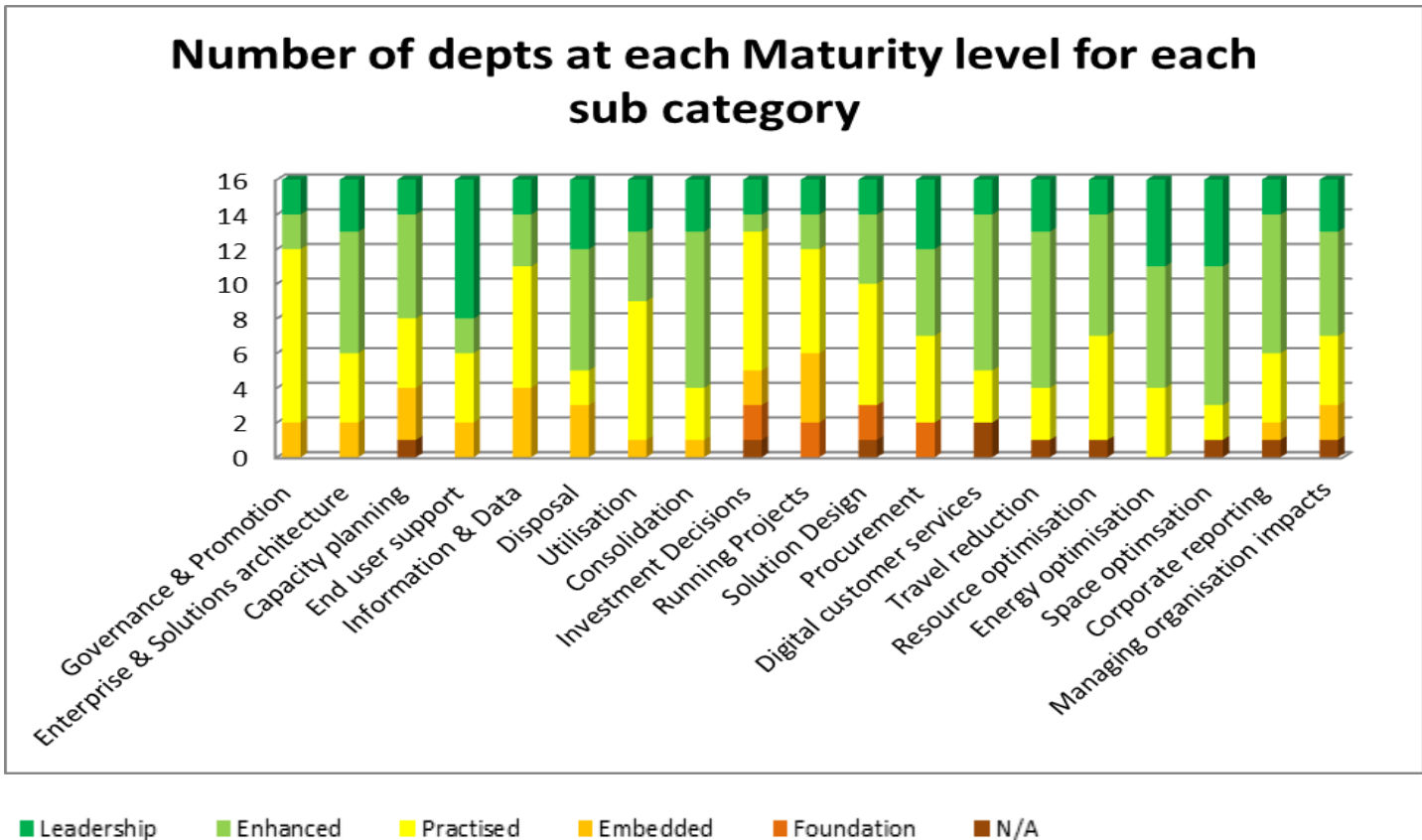Chart 3 shows the change on last year's results

Change from 2014 to 2015

Chart 4

This chart provides an indication of how close departments are to gaining **Level 3** maturity for each category.

Number of depts at each Maturity level for each sub category

Legend: ■ Leadership ■ Enhanced ■ Practised ■ Embedded ■ Foundation ■ N/A

In conclusion…

Looking at themes from the analysis, we have achieved significant improvements in

- governance
- Information and Data Management
- Utilisation
- Investment Decisions
- Solution design

With much lower levels of improvement in

- Capacity
- end user support
- disposal
- consolidation
- Energy Optimisation
- Corporate reporting

Our weakest areas remain

- Information and data management
- investment decisions
- running projects

Roadmap Assessment[4]

Fourteen Government Departments provided assessments – **three** fewer than last year - demonstrating their achievement of Key Target Outcomes (KTO) through the utilisation of best practices from the Green Technology Workbook.

Three departments (HMT, Defra and DH) have already met the target of achieving **ten** or more KTOs while **eight** departments have sufficient KTOs in progress to achieve **ten** next year.

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[4] https://www.gov.uk/government/publications/greening-government-ict-strategy

Chart 5

This shows the number of Key Target Outcomes achieved or in progress for each department
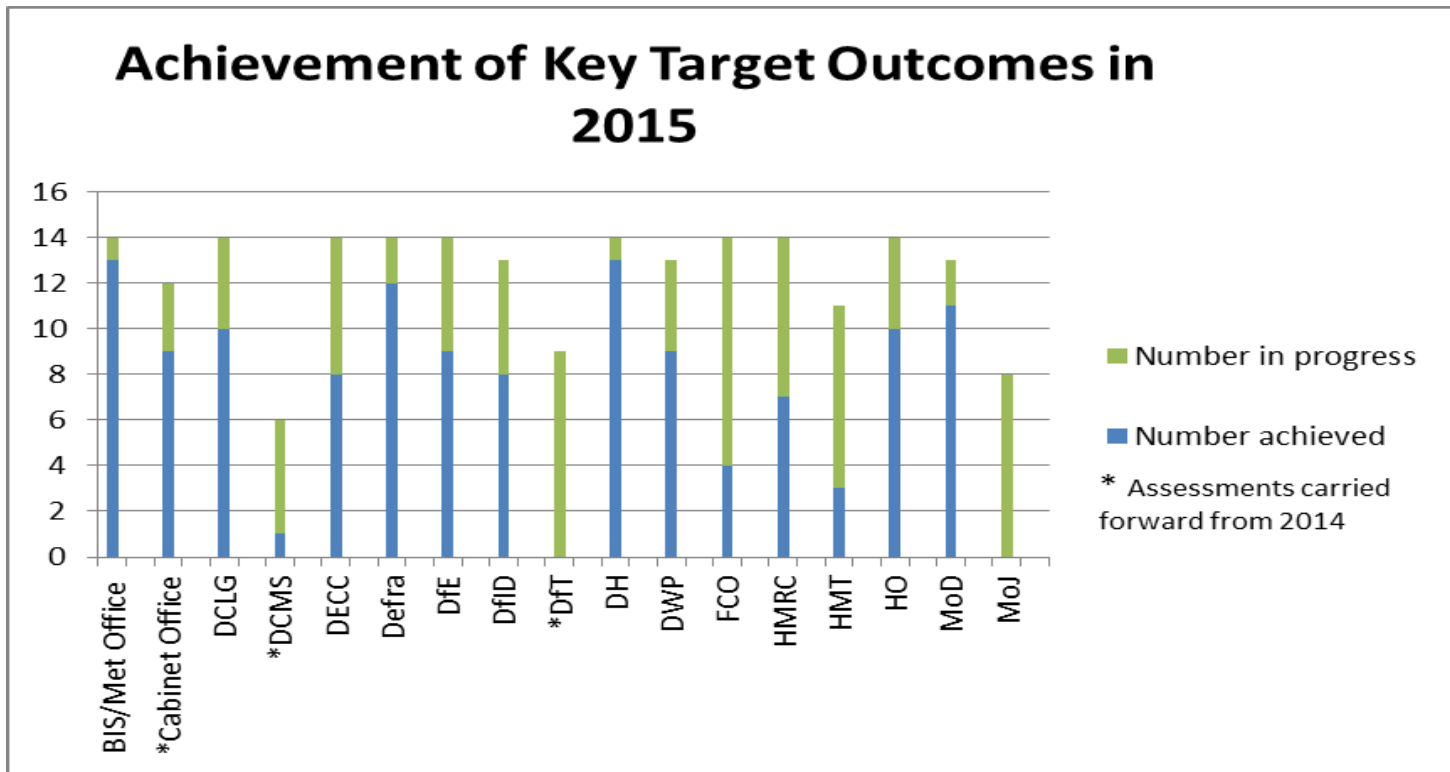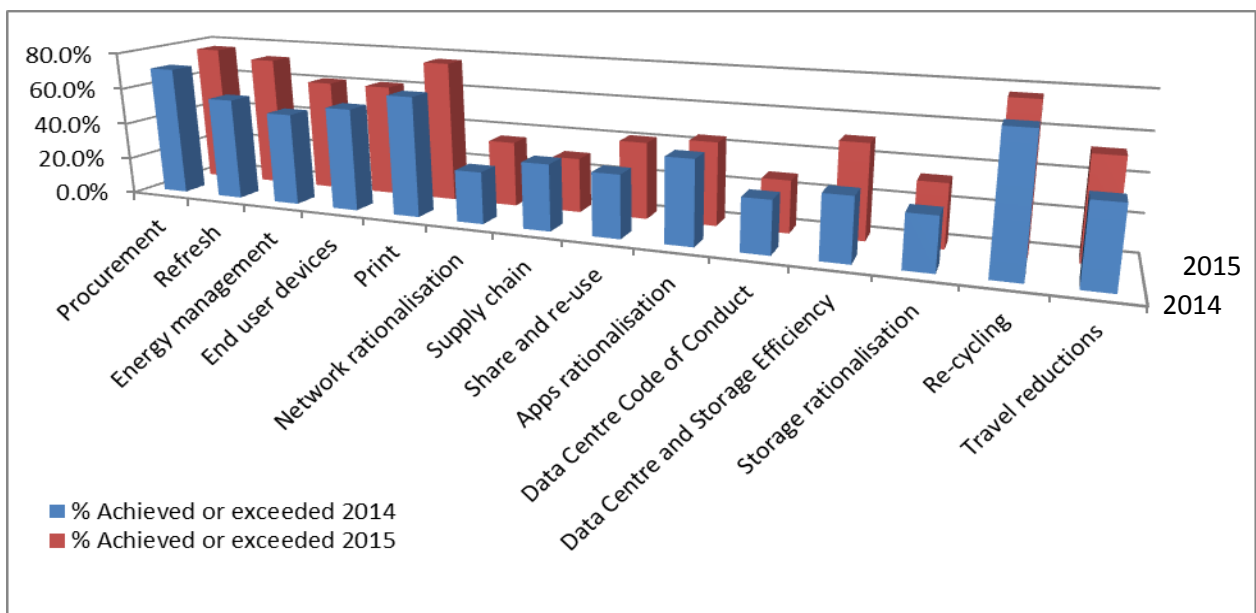

Chart 6

This shows the percentage of departments achieving each Key Target Outcome

In conclusion …

KTOs for Recycling, Print and Procurement are **major successes** with significant improvements being made in Refresh, Energy Management, Data Centre and Storage efficiency and Travel reductions.

Less improvement has been shown in the KTO for Network Rationalisation where some departments have returned to 'planning' and 'in progress' as they plan their move to PSN. Departments are making improvements with the KTOs for Supply Chain, Share/re-use and Data Centre Code of Conduct but more slowly than in other areas.

Assessment of the ICT operational energy footprint

This is the third year that the GDU has gathered figures for the IT operational energy footprint. This is the assessment, if not measurement, of the energy taken to run our IT. The GDU again used the tool developed with the Joint Information Systems Committee for Higher Education (JISC) last year.

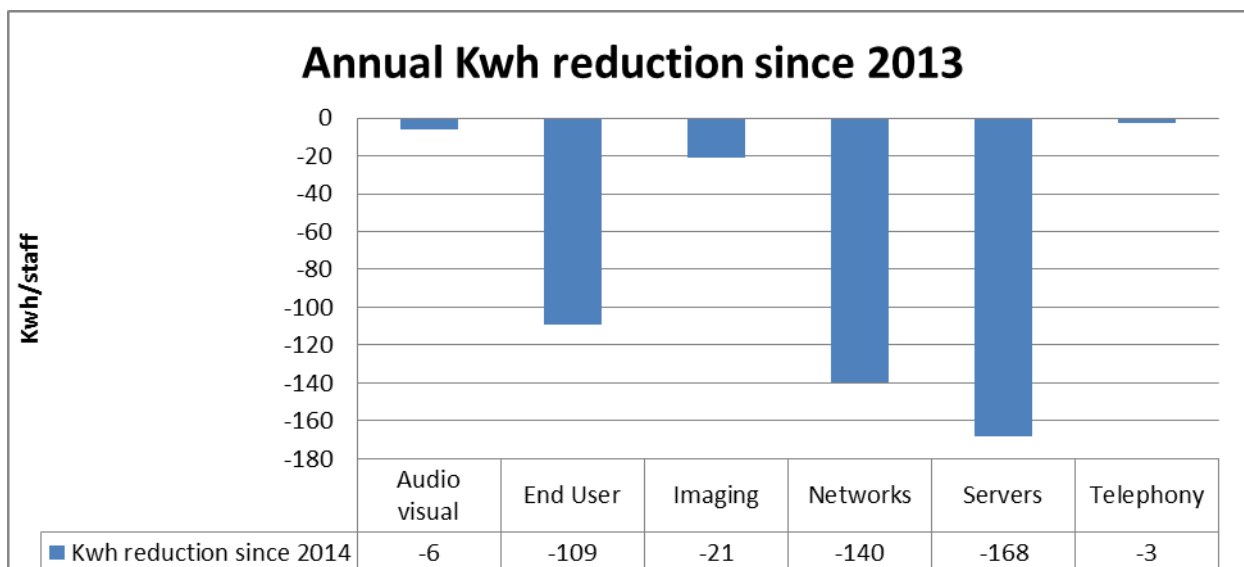Disappointingly only nine departments were able to provide assessments of their ICT operational energy consumption this year; footprints for a further six departments have been carried forward. Last year we had fourteen returns and in 2013 ten departments provided full returns. However the average number of staff across all asset types, now covered by the footprint assessments has grown from 400k in 2013 to 438k this year (Chart 8)

Chart 7 – 2015 footprint

Category	Energy Use (kWh/y)	%	Energy Cost (£/y)	CO$_2$ emissions (kg/y)	Num of staff covered	Average kWh/y/ staff	Average £/y/staff	Average kg CO$_2$/ staff
Audio Visual	6,461,504	1.5%	657,794	2,941,063	331,364	19	2	9
End User	110,199,948	24.8%	11,513,645	52,900,967	539,364	204	21	98
Imaging	39,569,088	8.9%	4,126,703	18,689,455	544,200	73	8	34
Networks	25,100,804	5.6%	2,569,841	11,816,061	335,567	75	8	35
Servers	239,200,158	53.8%	22,845,066	104,237,452	544,200	440	42	192
Telephony	24,326,899	5.5%	2,565,975	11,505,512	336,200	72	8	34
TOTAL 14/15	444,858,400	100%	44,279,024	202,090,511	438,483	1015	101	461
TOTAL 12/13	585,842,365	100%	44,954,786	253,046,367	399,420	1467	113	634
Diff	-140,983,965		-675,762	-50,955,855	39,062	-452	-12	-173

Chart 8

The following chart shows the change in the footprint for each component.

	Audio visual	End User	Imaging	Networks	Servers	Telephony
■ Kwh reduction since 2014	-6	-109	-21	-140	-168	-3

NB Number of staff covered varied for each category so total less than overall average of 584KwH/Staff
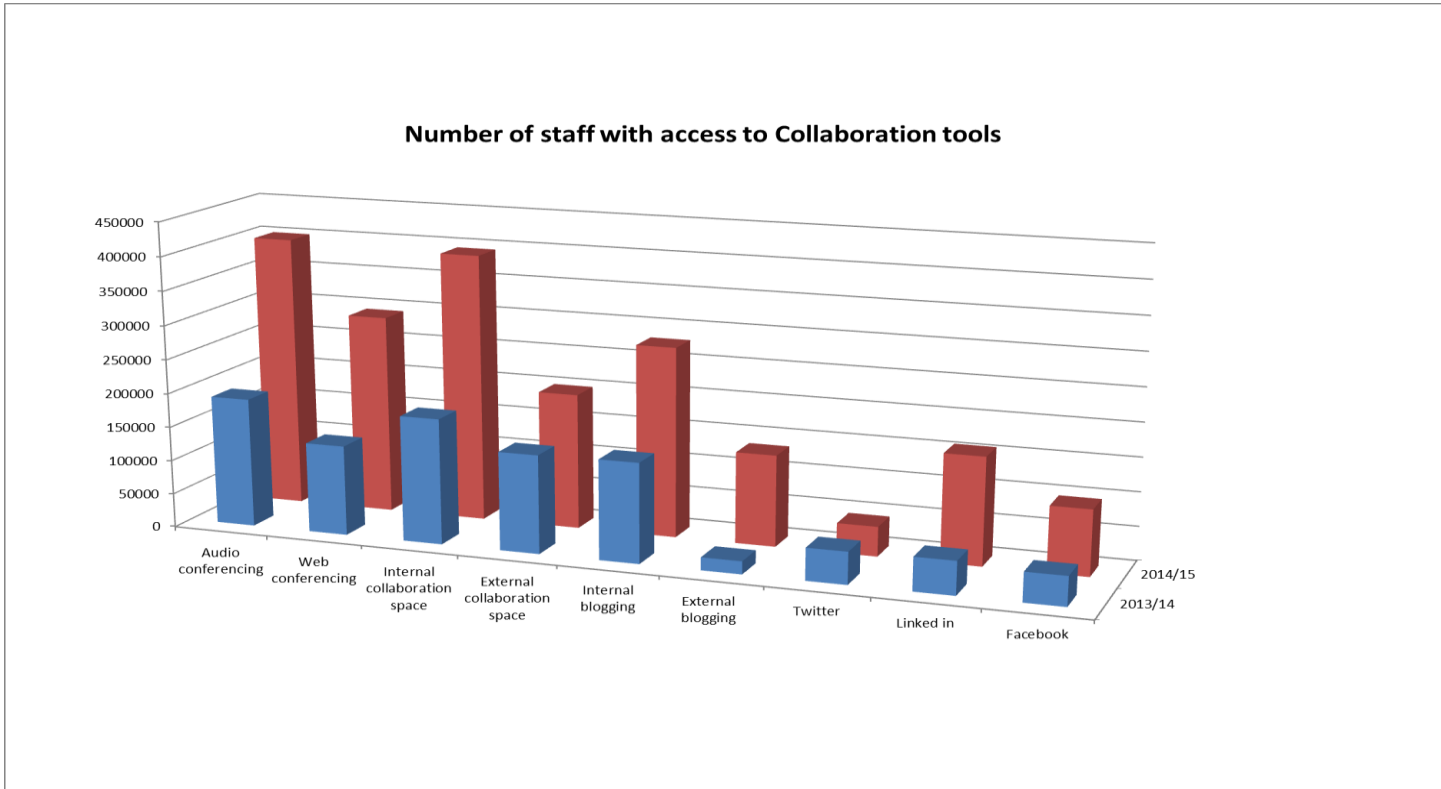
Chart 9 – staff covered by footprint measurement

In conclusion …

The results show that although there has been a rise in the number of staff covered by the survey since 2013 there has been a reduction in the average amount of energy used per annum per member of staff of **452kWh/y** or **173kgCO2**. The cost of the energy consumed has gone up but this is due to increases in energy prices rather than any significant changes in supply arrangements. Although the amounts of energy used have reduced over the past year, the percentages for each type of asset have remained roughly the same. The largest elements are still end user devices and servers.

Access to Collaboration Tools

Some 400k staff now have access to Audio Conferencing services and 300k to internal webinar services across 9 departments. The numbers across all types of collaboration tools have increased significantly from last year even though the number of returns is down from the 11 we had last year -

Chart 10

Number of staff with access to Collaboration tools

Case studies

Department of Health

: Collaboration tools used to reduce travel and office space

DH is using technology to reduce the need to travel. The Windows 8 tablet pilot allows mobile workers to use public Wi-Fi where there is a landing page. The use of smart devices both phone and tablet is being piloted, e.g. iPads, iPhones and BlackBerry as a precursor to BYOD implementation. All Arm's Length Bodies which use the 'Open Service' contract (DH, NHSE, CQC, HEE, HRA and NTDA) can hot desk in each other's buildings because they share a network. There are hot desking areas in all DH buildings allowing users to use thin client devices or plug in their laptop. Video and audio conferencing services are used extensively in the DH, with travel budgets restricted to encourage greater use. MS Lync is now deployed providing webinar services and with new Z90 thin clients desk-to-desk video calls are now possible. MS Lync also provides desktop, document and electronic whiteboard sharing making collaboration part of daily office routine within DH. Use of MS Lync VoIP allows users to continue to use the same number irrespective of geographical location. A

WAN upgrade now underway will result in improved connectivity to the internet, Wi-Fi (both corporate and guest). Use of Yammer encouraged throughout the Department.

Department for Communities and Local Government

: Helping staff to work smartly

DCLG's Connect ICT services contract supports flexible and collaborative working reducing the need to travel. DCLG has adopted a single device per user policy supplemented by the use of BYOD for tablets and smartphones, and the provision of home-worker tokens to enable staff to access DCLG network via home PCs. With all buildings now connected to a common WAN, all DCLG staff can hot desk in any DCLG location, using desktop thin client devices or their own laptops. DCLG's corporate VoIP based Telephony system enables Video and audio conferencing to be used extensively across DCLG (fixed and mobile VC units are available across the DCLG estate; teleworker phones are available for home-workers). MS Lync is deployed across the DCLG estate which allows webinars and desktop, document and electronic whiteboard sharing improving collaboration across DCLG teams and locations.

The Department for Energy and Climate Change

: Generating value from disposals

As part of the IT disposal pilot organised by the GDU Re-use and Disposal Working Group, DECC agreed to allow their redundant Green Deal IT assets to be securely and sustainably recycled or disposed of through the pilot arrangements, in order to demonstrate both the ability to re-use and return revenue and to showcase the social value and corporate social responsibility benefits that can be created by recycling/re-using rather than disposing of unwanted IT assets. Seven DECC servers, six networking devices and the associated forty five storage devices were taken by a contractor who had guaranteed cost neutrality for all services as a worse case, with any revenue to be shared on a 75/25 split, after costs. Items that could not be re-used or re-marketed would not incur any costs to DECC, as they would be broken down into constituent parts and re-used via prison workshops. Whilst cost neutrality and a powerful CSR story were important, the key requirement demanded by DECC was the absolute guarantee of data security. A process was put in place at HMG 'List X' premises allowing data classified as up to and including 'Secret' to be handled. Furthermore, CESG-approved Blanco software was used by SC cleared engineers to overwrite data and the end-to-end process achieved the ADISA (Asset Disposal & Information Security Alliance) standard's highest pass rate, 'Distinction with Honours'.

After the data erasure, testing, refurbishment and reporting process was complete, assets that had successfully passed functionality test were placed on sale. With a business model that shared revenue on a 75/25 split in DECC's favour, the supplier attempted to maximise the sale price focusing on direct sales to end users and SMEs, as opposed to relying on bulk, trade brokers. After all costs of service and revenue share, £2,290.00 was generated for DECC.

Ministry of Defence

: Virtualisation of DBS Finance Oracle R12 estate:

Ministry of Defence has successfully completed the pilot for upgrading its Finance Oracle R12, using virtualisation, including partition mobility. The footprint for the new machines sees a huge reduction in the number of racks required with additional space to add another server into the same cabinets to meet future needs. Once the new servers are installed, the power saving and the reduction in heat displacement surveys will be completed. MOD believes that the power reductions once quantified will be substantial. As an added benefit, because of the additional processing power of the modern servers, MOD expects to make a saving on the Oracle licensing due to the decrease in cores required.

Department of Business Innovation and Skills – National Oceanography Centre

: Data Centre energy efficiencies

The National Oceanography Centre is wholly owned by the Natural Environmental Research Council, part of the Department of Business Innovation and Skills. The Southampton site has a legacy data centre which over the last 6 years has substantially increased its IT performance and capacity (from **220** TB to over **1** PB of disk storage) whist reducing its energy usage by about **50%**.

The approach taken is the same as that by the cycling coach Dave Brailsford - "The Aggregation of Marginal Gains", mainly due to the high cost of developing a new facility. A working group was set up including users, Estates and IT representatives. The group looked at all possibilities, conventional and otherwise for improvement; these were assessed for impact, return on investment, prioritised and where possible implemented. This group has continued to review changes, and to discover and develop new ways for

further improvements with a longer term aspiration to register the data centre as Participant in the EU Code of Conduct for energy efficient data centres.

The changes made so far include automatic metering, increased air inlet temperatures, increased humidity range, free air cooling air conditioning supplemented with sea water cooling, server virtualisation, thermal containment curtains, air flow balancing, under floor baffles to improve airflow, and environmental considerations for all purchases and changes.

This resulted in the facility being voted runner up in the 2012 Minister of Energy awards but the team has continued to make improvements as ideas, resource and funding become available. Future plans include the reuse of heat waste energy from the room and extension to the existing **117**kWp solar array at the Centre to boost renewable energy generation.

The facility now has an average Power Usage effectiveness (PUE)[5] of **1.5** which is comparable with most new build data centres and is exceptional for a legacy data centre.

Department of Business Innovation and Skills - National Environment Research Council

: Integrating Room Based and Desktop Video Conferencing

The Natural Environmental Research Council (NERC), one of the BIS Partner Organisations, has a requirement to interact with many internal and external organisations and people. There was a challenging requirement for video conferencing that would integrate and work with existing room based systems and Windows, Mac, iOS, Linux and Android operating systems.

Following trials and product evaluation, a pilot was implemented using VisiMeet for Janet[6]. The pilot has proved to be hugely successful with benefits of increased productivity, improved quality and a reduction in travel. Such were the benefits that the pilot was expanded and became operational almost immediately as it became an indispensable way of working.

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[5] PUE is commonly used across the data centre industry being the ratio of the total amount of energy consumed by a data centre to the energy taken by the ICT equipment in that data centre

[6] JANET is a UK government-funded organisation providing networking and collaboration services for research and education establishments in the UK. All Research Councils and Universities are connected.

Looking forward

The GDU will continue to promote and help departments with the implementation and use of technologies that enable reductions in the sustainability impacts of organisational activity, such as those achieved though adoption of collaboration and conferencing tools. These tools are essential if HMG Digital and Efficiency programmes including those for The Way We Work (TW3), Digital by Default and Greening Government Commitments (GGC) are to succeed in improving the efficiency and sustainability of government operations, and reducing its costs.

With some strategy targets and commitments not yet met, the GDU will continue its work to share best practice and lessons learnt across departments to enable further progress.

Facing the opportunities presented by the expanding range of technology solutions and innovations now available in the IT marketplace, typically delivered as Cloud-based commodity services, and made available through Gcloud and the HMG Digital Marketplace frameworks, large, long-term Systems Integrator contracts are not so attractive to departments. This change in approach to contracting ICT services requires the GDU to shift its focus from aiding departmental procurements to working with Crown Commercial Service (CCS) to deliver more sustainable ICT services through engagement in its framework and Gcloud refresh activities.

With the efficiency agenda impacting the whole public sector, the GDU needs to reach out to engage with the wider Public Sector to enable other public sector organisations to reduce their sustainability impacts and achieve improved efficiency through use of ICT and digital services. It will look to pass on its skills and experience to help other public sector staff improve their awareness of the sustainability and efficiency opportunities from using Technology and Digital services – exploiting further their legacy estate as well as moving to use new digital, more sustainable services.

In reaching the end of the original Strategy Implementation Plan, and noting the national and international recognition for the Strategy as well as its place in many government ICT contracts, the GDU proposes to reformulate the Strategy with a simpler implementation plan to cover the next 4 years (April 2016 to March 2020), to set out targets and reporting for the ambitions above.

To do this we will need to maintain and to continue to harvest the positive commitment and enthusiasm of departmental GDU representatives without which we would not have achieved the successes over the last 4 years and reported in this report.