

Sustainable Information Technology Group (SITG)

Thursday 19 May 2016, 09.30am

Cheviot Room, Charles Stewart House

AGENDA

1	Minute To <u>approve</u> the minute of the previous meeting on 18 February 2016 and <u>raise</u> any matters arising	Α
2	ICT in the Context of Reuse To <u>receive</u> a mid-term project report from the SRS Engagement Manager	В
3	Climate Strategy Review & ICT Contribution To <u>receive</u> an update from the Convener	С
4	Sustainable IT Implementation Plan To <u>discuss</u> an update from the SRS Engagement Manager	D
5	IT Energy Footprint & Prioritised Projects for Energy Savings To <u>receive</u> an update from the Director of ITI	E
6	Utilities Programme Brief – Pathways to 10% & Sustainable Campus Fund To <u>receive</u> an update from the Convener	Verbal
7	Sustainable ICT Procurement & Supply Chains To <u>receive</u> an update from the Procurement Manager on the SPPT tool and ICT workshop	Verbal
8	Any Other Business To <u>consider</u> any other matters from Group members	Verbal

UNIVERSITY OF EDINBURGH



MINUTE OF A MEETING of the Sustainable Information Technology Group held in the Cuillin Room, Charles Stewart House on Thursday 18 February 2016.

Present:	Dave Gorman (in chair), Director of Social Responsibility and Sustainability Fiona Carmichael, Computing Support Officer, Literatures, Languages & Cultures Paul Clark, Head of IT for CMVM Simon Marsden, Director IS Applications Division Fraser Muir, CHSS Chief Information Officer Euan Murray, Development Team Manager, Learning Spaces Technology Bruce Nelson, College Registrar, College of Science & Engineering
	Caro Overy, SRS Engagement Manager George Reid, Procurement Manager Tony Weir, Director IT Infrastructure
In attendance:	Myles Ewen, Senior Computing Officer, standing in for Bryan MacGregor
Apologies:	David Brook, Acting Head of Estates Operations Michelle Brown, Head of SRS Programmes Bryan MacGregor, Director of User Services Division Fleur Ruckley, Waste & Environment Manager

1 Minute

The Convener welcomed attendees to the second meeting of the Group. The minute of the previous meeting on 2 October 2015 was agreed as a correct record.

Action – JR to invite the EUSA VPS to join the Group as student representative.

Post-meeting note: EUSA VPS will join SITG from its May meeting.

2 Climate Strategy Review & ICT Contribution

The Convener updated the Group on the progress of the Climate Strategy review so far. Despite considerable effort and investment, UoE was not on track to achieve the targets set in 2010. The new strategy, which would be presented to the Principal's Strategy Group (PSG) in April, advocated a whole institution approach and ambitious but achievable targets that took into account future growth of the estate, staff and student numbers. Decarbonisation of the grid with wind and solar coming on stream was expected to have a major impact on emissions figures. The new strategy proposed returning absolute carbon emissions to baseline year 2007/8 levels, as well as halving relative emissions per £1M turnover against 2007/8 figures by 2025. The new strategy did not assume any additional savings from SITG activities or IT generally, but the Convener hoped the Group's work could assist over time in identifying reductions in expected IT related emissions growth.

3 Energy & Utilities Programme Brief

The Utilities Programme Brief outlined in Paper C included a notional energy saving from IT of £100K from business as usual. The overall target of a 10% saving could not be achieved without the establishment of a Sustainable Campus Fund as a mechanism to support various parts of the University in taking action to deliver energy savings. The SCF proposal would be submitted as a business case to the Capital Projects Group and subsequently Estates Committee in March. It called for funding of £750K in the first year, rising to £1M in the second and third. There may be opportunities for SITG to identify projects that would benefit from SCF funding that would not normally receive funding from the Colleges or ISG. IT had been identified as a growth area and associated electricity use

Α

В

was expected to increase. Initial work would focus on better understanding the baseline, including possible consultancy work and investment in infrastructure and metering.

SITG was in favour of setting a stretch target, but had some concerns as to whether £100K was achievable. With the growth of renewables, energy storage was becoming more important at national level, and members recommended liaising with experts in the School of Engineering to better understand the significance of energy storage to the University in terms of future investment and business continuity. Energy saving plans would need to take account of the distributed nature of IT across the University, with responsibilities lying with IS and the Colleges. SITG would reflect further on the target figure and timeline.

4 Sustainable IT Implementation Plan

Outputs from the workshop and discussion at October's meeting had been captured in the draft Implementation Plan circulated as Paper D. The Plan was split into four main themes: data and evidence building, energy efficiency improvements, resource efficiency improvements, and contribution to wider SRS themes (beyond energy and waste).

<u>Action – TW</u> to feed in on points A2 and A3 on establishing baseline metrics, with SRS providing overall ownership and coordination.

Section B focusing on energy efficiency improvements aligned with SRS planned deliverables.

<u>Action – All</u> members to feed in B2, aiming to compile a body of evidence and case studies relating to utilities efficiency IT actions undertaken at other institutions.

The Senior Vice Principal had directed the SRS Department to assist in capturing and telling the story of existing SRS activity across the University. Once momentum around green IT had built up, successes in this area would also be celebrated. Members supported the proposal to host an event to share best practice, as the necessary networks were in place and this could raise the institution's profile in the sector.

<u>Action – CO & JR</u> to come back to the Group with thoughts for the event, tying in with FM as Convener of an EAUC-Scotland sustainable IT community of practice.

Members raised security concerns associated with investigating intelligent power consumption agent software to switch off machines out of office hours, as these machines could not be patched, becoming more vulnerable, and drew very little power in standby mode.

Members advised revising timelines in the draft Plan to reflect the lack of visibility of data beyond direct IS control. It was unlikely that SITG would have a full understanding of the baseline by April.

Action – TW to reflect on the data and report back.

Action – JR to update Implementation Plan timelines accordingly.

Post-meeting note: Timelines amended from April to September 2016.

SRS were working with Procurement on resource efficiency and opportunities around circular economy. Members preferred 'PC reuse' to 'cascading', as better reflecting the nature of the project. Work around printing and imaging would be hampered by the absence of baselines in this area. There was potential for action mapping out energy efficiency from centralised versus distributed printing. This was already in place for multifunction devices and, if consumables for desktop printing were being charged to the correct codes, the reduction in moving to MFDs could be demonstrated. There were already good news stories in this area, including double sided printing by default.

D

<u>Action – JR</u> to add a further action for initial investigation of a model to use around printing, including routes through Finance or Procurement to establishing metrics.

Post-meeting note: Added as Task C9.

Members recommended commissioning a student visual survey – walk round audits had been successful in the past in securing management information. Members proposed requesting a licence for Xerox software capable of producing a MI report detailing savings from migrating to cloud printing. This tied in to discussion at SOAG in January about reframing environmental language to focus more on resource efficiency and cost (e.g. giving the financial savings rather than number of tonnes diverted from landfill).

CHSS had accounted for all fixed IT, with work in progress inventorying mobile devices. The discovery phase was key, with the aim to develop a model that could be reused elsewhere. A sustainable IT project carried out in 2008/9 did develop an Excel model that could provide a starting point. Network discovery tools could also be used, though it would be harder for desktop printers. Members agreed on the general approach to getting a baseline and how to maintain it, though the evidence was lacking.

<u>Action – CO</u> to liaise with FM and others to follow up on establishing a baseline that could be used to project figures.

5 EAUC: Green ICT Update

SITG noted the update.

6 ICT in the Context of Reuse

The Chief Information Officer CHSS updated members on progress of the PC reuse project since the paper presented at October's meeting. The paper had highlighted three barriers to uptake in CHSS: space to store equipment prior to reuse; data security and secure wiping; and minimising the overall burden on Schools and Colleges in order to make it happen. Inroads had been made to tackling all three. Space in High School Yards had been allocated for the life of the project. A tool to wipe devices had been identified and approved by Records Management and could help with projects elsewhere. A £2.5K site licence for the software had been secured for a year initially and a decision would then be made whether to continue.

Zero Waste Scotland funding had been secured for the project for six months and an intern was due to start in late February, in post until July, focusing on enhancing the capacity for reuse in the institution. The intention was to develop a case study as well as additional documentation. ECCI were on board to look into the carbon side and implications for energy usage. The target was to reuse at least 100 PCs. Within the University, central support groups were the most likely recipients, having an older fleet of machines than the Colleges which were on a four-year replacement cycle. While the WARPit reuse portal could provide indicative figures, this project should provide more robust evidence. The group favoured a tighter, local reuse loop where practical. The ability to improve machines, for example by adding memory cheaply, meant that a decent level of usability could be assured.

Action – JR to invite the project intern to report at the next meeting.

Post-meeting note: Bradley Richards will be in attendance at May meeting for item 2.

7 IT Energy Footprint

The Director of ITI presented collated data on power usage for IS hosted or managed infrastructure, including total draw for the data centres.

<u>Action – TW</u> to circulate the data to members following the meeting.

Certain areas of the data centres had no metering (e.g. water supply), making up part of the draw of a combined feed. Based on what IS is charged, a yearly cost had been calculated, including managed Windows desktops. The calculated power draw for desktops was based on an assumption of how long they were left in stand by and how long in use. The estimated total draw was 9Mkwh per year, or £800K. This did not include laptops or mobile devices and an assumption would need to be made about how often these were charged onsite.

The previous Climate Strategy lacked rigour on the boundary, not including gas or electricity offsite, ARCHER or the UK Research Data Facility. While UoE had operational control, it was not responsible for making the strategic decisions that would impact on energy use. There was also significant other research computing not IS-run that IS managed on behalf of, or in partnership with, various research groups. ARCHER was the only facility within UoE that was directly charged. There were lines of enquiry into how to reduce the other two. 1.7 was the global average for data centres. ARCHER accounted for 7% of overall electricity consumption.

Members requested a table of all exclusions to be taken out of the University's footprint. such as national infrastructure, taking a consistent view of the University's tendency to colocate kit (e.g. SRUC). Next steps were to sharpen estimates or replace them with meter readings, include laptops and macs, and take a view on co-located and national service power usage. The Group acknowledged a wide expanse of activity that IT Infrastructure did not see or manage. Desktop was easier to establish, network and storage harder. It should be possible to find big pockets to consolidate. As there was direct charging and metering for national services these figures were readily available. The question was whether the current membership was able to fill in the blanks for those areas that sat with the Colleges and Support Groups. Figures for AV were also missing, as traditionally IT did not include AV. Telephones drew very little power. Mac addresses from Eduroam could give the number of unique devices, including student laptops, and modelling could be carried out based on an assumption of how often these would be plugged in. Overall, members felt there were opportunities for savings, but stressed the need to only gather data for those areas where action could be taken and to bear in mind business needs before energy savings, particularly around business aviation and the University's internationalisation strategy.

<u>Action – All</u> members, once TW had finalised his initial draft and circulated, to assist in collating a fuller footprint in time for the next meeting.

8 Sustainable ICT Procurement & Supply Chains

Following a paper to SOAG in January, the Procurement Manager updated members on the Sustainable Procurement Prioritisation Tool (SPPT) and risks and opportunities in supply chains for ICT.

SRS and Procurement were working together on testing the new tool which would go out for wider consultation in May or June. UoE was a member of <u>Electronics Watch</u>, an independent monitoring organisation working to achieve respect for labour rights in the global electronics industry (e.g. on child labour, maternity rights, and collective bargaining) through socially responsible public purchasing in Europe. SITG would receive regular updates as the network developed.

Members had received the draft Conflict Minerals Policy for comment, and were broadly content. The Policy would be submitted to CMG for formal endorsement on 1 March. Once the new fair phone agreement with the Scottish Government and Vodaphone was in place the Group could work on a strategy to promote it.



THE UNIVERSITY of EDINBURGH

Sustainable Information Technology Group (SITG)

Thursday 19th May 2016

PC Reuse Project Mid-term Report

Description of paper

This paper gives an overview of progress on the project funded by Zero Waste Scotland to increase capacity for reuse of IT equipment within the University of Edinburgh.

Action requested

SITG is asked to note and comment on the paper, providing feedback on suggestions for a follow-up phase of this project.

Resource implications

The paper has no additional resource implications, although the group may wish to consider future implications dependent upon project outcomes.

Risk Management

The updated Project Risk Register is included in the paper below

Equality & Diversity

Although due consideration has been given to equality and diversity as a key element of the SRS agenda and we do not currently think that an Equality Impact Assessment is required, we will continue to monitor issues within our work.

Next steps/implications

Work on this project so far indicates the following issues may be of relevance for a subsequent phase of this project

Consultation

This paper has been developed by the SRS Engagement Manager and circulated to the Project Board in advance of submission.

Further information

<u>Author</u> Caro Overy, SRS Engagement Manager

Presenters Caro Overy, SRS Engagement Manager Bradley Richards, PC Reuse Intern

Freedom of Information This paper may be included in open business.

Mid-term project report on ZWS funded Project 3RR001-318

Background

In November 2015, the Department for Social Responsibility & Sustainability bid for funding from Zero Waste Scotland to increase capacity within the University of Edinburgh to reuse and repair IT equipment, specifically focusing on PC desktops. Funding was approved, providing £25,000 to work towards the following aims:

- Develop a process and business case for the reuse of PC desktops within the University of Edinburgh, consulting with all relevant stakeholders to ensure this can be implemented institution wide
- Carry out a carbon study of PC desktop reuse to provide the sustainability case for reuse of machines based on specific data
- Develop an understanding of the potential for repair and refurbishment of PC desktops within the University
- Work with selected partners to provide resources and training on IT reuse

Project Progress

Identified and appropriately fitted out secure storage for PC	
desktops	
Space identified, appropriately serviced and in use for refurbishment	
and storage with the Turing Trust.	
Carbon study of IT reuse	
Scope of study defined and data gathering has commenced. On	
schedule.	
Workshops on IT repair and refurbishment	
One workshop of three has taken place as part of the Reuse Hoose	
event with low attendance. Two further workshops to take place in	
June 2016 targeted to University staff initially, potentially open to	
University students for the second.	
Internship to support project	
Bradley Richards employed since 7/3/16 through Bright Green	
Business.	
Training for intern	
Training underway through Remade in Edinburgh. Bradley is	
spending 1 day per week at the Remakery, Remade in Edinburgh's	
new reuse and repair hub	
PC desktop reuse	
The project has reused 20 PC desktops internally to the University.	
Our target is 100 by the end of July 2016, so current progress is	
viewed as a little slow. However, following liaison with Computing	
Officers, we are confident this progress will speed up in time to meet	
the target.	
Internal reuse process development	
Blancco data wiping software has been purchased and is being	
tested. Early tests indicate it is fit for use providing high level	
assurance and certification of machines wiped.	

Next Steps

Within the project, the following opportunities have been noted so far:

Sourcing PCs: We note that sourcing of PCs appropriate for reuse is entirely dependent on the academic year timetable and have identified an opportunity to establish an effective flow of PC desktop machines.

Policy Integration: We will work closely with Kate Fitzpatrick (Waste & Recycling Manager) to incorporate learnings from this project into future policy development on reuse in the wider context of waste.

Data wiping: Blancco data wiping software, as noted, has proved very effective for the purposes of internal reuse. We have further engagement to do with Records Management within the University to explore viability of external reuse of equipment that has been wiped using this software. It is recommended that funding is sourced to purchase this at the end of the existing licence to enable continued internal reuse of PC desktop machines.

Other technology: We note that PC desktops are only one strand of IT equipment, with multiple project stakeholders recommending we look at laptops, tablets and other mobile devices in the context of reuse in the future.

Potential Risk	Mitigation
Number of computers going to project for reuse lower than expected	Project is linked with Sustainable IT Group at the University for promotion and engagement. Staff time has been dedicated to promotion of the project and, following liaison with Computing Officers, we are building an understanding of the flow of PC desktops across the University and are confident the target will be met.
Staff time stretched if shared with other projects	SRS staff time for this project is funded through the Zero Waste Scotland grant. So far, this has proved sufficient mitigation.
Space constraints	Location identified and secured for the duration of the project. Following further development of model and business case, we hope to secure space for future phases. Current mitigation is sufficient for the duration of the existing project.
Quality of computers and data protection	PC Reuse intern is receiving training in compliance, and regular communication with Records Management ensures the project fulfils data protection needs. A viable and tested external reuse route exists for machines that are inappropriate for internal reuse. Risk sufficiently mitigated for the duration of the project, although continued engagement with Records Management essential.

Risk Management

SITG 19/05/16	Sustainable IT Im	plementation Pla	n 2015-16		D		
A. Evidence Building	Dbjective: To gather data to reach a broad inderstanding of the scale of the University's ootprint associated with IT, including agreeing a ooundary in line with the remit of the Group.				KPI: Number of areas/domains for which robust data has been produced and made available to SITG.		
Tasks	Colleagues Responsible	Colleagues to Consult	Dates		Outputs / Outcomes		
A1. Agree SITG membership, remit and boundaries and define operational contr in terms of IT (personal computing, distributed network & data centres).	Jane Rooney ol	SITG	February 2016		Streamlined membership including student representation. Achievable, fully developed, agreed remit.		
A2. Establish a baseline of sustainability metrics in relation to IT infrastructure (to understand how significant in carbon terms the various issues are) and feed in to development of an energy consumpti tracking tool.	Dave Gorman & SRS on on	SITG	September 2016		Robust data on relative energy and carbon contribution including overall power consumption of equipment and whole life costing.		
A3. Set realistic and measurable baseline ar targets for carbon emissions associated with IT (taking account of anticipated growth) & agree reporting mechanism.	d Dave Gorman & SRS team with College reps?	SITG	September 2016		Agreed targets (relative or absolute?) and outline reporting structures through SITG to ITC & SRSC.		
A4. Review the criteria (GHG Protocol or other) on carbon generated through shared services (e.g. ARCHER) and ensure noted in Carbon Scope documer circulated to members	SRS Dept Matthew Lawson	SITG	September 2	016	Agreed strategic approach & make recommendation to SRSC / ITC.		

B. Pathways to energy efficiency improvements	Objective: To iden improvement proje assessing the effe various opportunit savings.	tify and enable IT effi ects throughout the L ctiveness and conse ies to make energy, o	ciency Jniversity, quences of carbon and cost	K re al t a	KPI: Number of projects identified and num recommendations made for implementation and carbon savings quantified where data available).		
Tasks		Colleagues Responsible	Colleagues to Consult	D	Dates	Outputs / Outcomes	
B1. Develop and distribute resources/materials to increase awareness of sustainability actions and promote best practice, including integration of Conflict Minerals Policy.		SRS Dept. Joe Farthing	SITG	July 2016		New electronic materials to promote energy efficiency in IT, including information on the relative impacts of different pieces of equipment to drive positive behaviours.	
B2. Compile a body of evidence and case studies relating to utilities efficiency IT actions undertaken at other institutions.		SRS Dept.– Chris Litwiniuk	SITG Energy Office	Summer 2016		Summary report showing actions, payback periods and links to any publications.	
B3. Develop networks and p an event to share best p	ootentially host practice.	Jane Rooney & Caro Overy, Fraser Muir (convenor of EAUC Green IT Community of Practice)	SITG Energy Office	By Oc 2016	ctober	Event delivered to UoE staff and staff from other universities / partner organisations.	
B4. Publish case studies on website and distribute to key stakeholders		SRS Dept. – Joe Farthing	SITG	Throughout 2016, as they become available		Case studies of University of Edinburgh sustainable IT achievements published on website alongside messaging on positive impacts including investment work with corporate partners and effects the University has globally.	
B5. Identify any funding op support sustainable IT p	portunities to projects	Michelle Brown & Claire Martin	SITG	Ongo	ving	An understanding of the funding landscape and communicating this to	

				stakeholders. (e.g. ZWS PC reuse project currently underway)
B6. Investigate potential use of wireless to map use of devices and monitor usage levels as staff and student numbers increase.	IS representatives (Bryan MacGregor?)	SITG Tony Weir	October 2016	Scoping potential to report on use of devices and provide report then establish timelines for future reports
B7. Investigate intelligent power consumption agent software, e.g. to switch off machines out of office hours, which could generate significant savings.	IS representatives	SITG Tony Weir	October 2016	Recommendations on feasibility / pathways to implementation.
B8.Develop and promote an energy standby policy which could be implemented for supported desktops.	IS representatives with SRS Dept. promoting	SITG Energy Office Tony Weir	October 2016	Recommendations on feasibility / pathways to implementation.

C. Pathways to resource efficiency improvements	Objective: To identify and enable IT efficiency improvement projects throughout the University, assessing the effectiveness and consequences of various opportunities to make resource savings.			KPI: Number of projects identified and number of recommendations made for implementation (cost and carbon savings quantified where data is available).		
Tasks	Colleagues Responsible	Colleagues to Consult	Dates	Outputs / Outcomes		
C1a Develop and distribute resources/materials to increase awareness of sustainability actions and promote best practice (including paperless working via One Drive).	SRS Dept. – Joe Farthing	SITG	Ongoing	New electronic materials to promote best practice in resource efficiency in IT to drive positive behaviours.		
C1b Map printing behaviours and impact across the University to identify opportunities for more efficient printing and imaging use	SRS Dept. – Caro Overy and CHSS – Fraser Muir	SITG	By October 2016	Representative survey of printing behaviours across the University providing data for recommendations on changes.		
C2. Develop and disseminate sustainable procurement guidelines / minimum standards for IT and support SPPT prioritisation exercise.	George Reid / Procurement SRS Dept. – Chris Litwiniuk, Liz Cooper IS representatives	SITG	April 2016	All staff with IT procurement responsibilities have a list of sustainability criteria, which are then embedded into procurement process.		
C3. Compile a body of evidence and case studies relating to resource efficiency IT actions undertaken at other institutions.	SRS Dept. – Caro Overy	SITG	Summer 2016	Summary report showing actions, savings, and links to any publications. (Work together with energy related case studies for efficiency).		
C4. Develop networks and potentially host a circular economy event to share best practice and link with academics.	Michelle Brown, Liz Cooper & Caro Overy	SITG	By October 2016	Event delivered to UoE staff and staff from other universities / partner organisations.		

C5. Publish case studies on website and distribute to key stakeholders	SRS – Joe Farthing	SITG	End July 2016	Case studies of University of Edinburgh sustainable IT achievements published on website alongside messaging on positive impacts including investment work with corporate partners and effects the University has globally.
C6. Conduct a pilot project monitoring PC cascading within CHSS.	SRS Dept. – Alan Peddie	SITG	August 2016	Summary report showing methodology and impacts.
C7. Investigate potential savings and risks associated with circular economy / resource efficiency / internal and external reuse; advise on and facilitate schemes (including packaging take-back schemes)	Fraser Muir & Alan Peddie	SITG	July 2016	Develop and deliver solutions to issues around secure data erasure, storage and time constraints to drive greater reuse. Make recommendations regarding the acquisition of a commercial product to cleanse PCs to a set standard.
C8. Map risks and opportunities through ICT value chains via the SPPT prioritisation exercise engaging with academics and researchers at UoE.	SRS Dept. – Liz Cooper Procurement – George Reid & Stuart McLean	SITG	April 2016	Risks and opportunities prioritized. Academics and student researchers engaged in process. Living Lab project linking academics and practitioners.
C9. Initial investigation of a model to use around printing, including routes through Finance or Procurement to establishing metrics.	George Reid / Procurement SRS Dept. – Chris Litwiniuk IS representatives	SITG	September 2016	Agreed printing model including roll-out plan

D. Contribution to wider SRS themes	Objective: Investigate SRS opportunities in IT beyond energy & waste			KPI: Number of papers endorsed / recommendations put forward	
		1	1		
D1a Scanning and research risks and opportunities within UoE supply chains and link with wider partnerships (e.g. conflict minerals, Electronics Watch)	SRS Dept Liz Cooper & Chris Litwiniuk	SITG	October 2016	Papers / briefings endorsed by SITG and escalated via SRSC & ITC.	
D1b Ensure awareness of conflict minerals and the University's Conflict Minerals Policy is cascaded through all IS staff and those with procurement responsibilities for IT equipment.	IS Representatives	SITG	July 2016	Plan in place for communication, observing evidence of questions about conflict minerals being asked in procurement processes.	
D2. Develop and promote the introduction of pilot schemes / opportunities around personal devices for staff to test internally.	SRS Dept.	SITG	July 2016	Schemes such as the addition of fair phones as an option for University telephony. Testing and promoting other Circular Economy related products and materials.	

IT Energy Footprint

Initial Footprint

To provide an initial benchmark on IT energy consumption, Information Services has gathered data related to power usage for equipment which is hosted or managed by Information Services. The table below provides the initial data on power usage from this review for data currently available:

		Av IT		Total	Estimated total power		
		power draw per		power	draw (kw		
Item	Number	unit (kw)	PUE	(kw)	year	Cost	per year
KB data centre	1	178.61	1.7	304	2,659,786	£	239,381
Central data centre	1	101.40	1.56	158	1,386,054	£	124,745
ACF data centre (IS managed usage)	1	190.00	1.2	228	1,997,280	£	179,755
Managed Windows Desktops	13,200	0.05	1	197	1,723,467	£	155,112
Network switches	2,300	0.04	1	92	805,920	£	72,533
Wireless access points	2,350	0.01	1	19	164,688	£	14,822
Routers (distributed)	15	2.34	1	35	307,345	£	27,661
Total					9,044,540	£	814,009

The data centre usage includes national shared services such as the IT used by EDINA, and of colocated infrastructure for SRUC.

These figures include a number of estimates, in particular:

- The PUE for all data centres is estimated:
 - There is no metering of chilled water supply for KB data centre, an estimate has been used in calculating the presented PUE.
 - The AT data centre uses a common district cooling system, so includes estimate for chilled water.
 - The ACF is well metered, but the PUE varies over time depending on room utilisation.
- The Managed Windows Desktops reflects all Windows desktops, open access labs and lecture theatre systems managed by IS. The power-saving from operation in standby mode has been modelled rather than calculated on actual machine configuration

There are also a number of missing items from this review, and further work is required to complete the baseline power use, such as mac and linux desktops, all laptops, mobile devices and telephony.

Next Steps

As noted, in calculating the initial footprint there are a number of estimated figures. Where possible these estimates should be replaced by monitored power use, or by further refining the estimation.

Those items not captured in the initial review should be included in the footprint calculation.

The Sustainable IT Group should agree an approach on how co-located or national service's power usage should be considered in calculation of the University's IT footprint.

This initial review was bounded to IS managed or managed equipment. Thought should be given to how a full data capture of University IT can be achieved.