THE UNIVERSITY of EDINBURGH

Sustainable Laboratories Steering Group (SLSG)

"Supporting World Class Laboratories"

Tuesday 2 June 2015, 11.30am

Room 1.09, Main Library, George Square

AGENDA

Members: Andrew Arnott; Michelle Brown; Martin Crawford; Valerie Gordon; Dave Gorman; David Gray; David Jack; Andy Kordiak; Julia Laidlaw; Sandra Lawrie; Stewart McKay; Brian McTeir; Fleur Ruckley; Candice Schmid; Graham Thomas; Geoff Turnbull

1 Introduction, Purpose and Aims of Meeting

Aims: To confirm the implementation work plan, describe progress against the implementation work plan, identify where support from across UoE is required for completion of the implementation work plan, share identified opportunities for improvement (especially utilities) and identify a route to implementation of these improvements.

2 Minute **A**

To *approve* the minute of the previous meeting on 27 January 2015

3 Matters Arising

To *raise* any matters arising not covered on the agenda or in post-meeting notes

SUBSTANTIVE ITEMS

4 Utilities Spend/Efficiencies & Role of Lab Managers/Centre Managers/Relevant Heads of School **Verbal**

To *receive* a presentation from the Assistant Director, Estates Operations

5 SLSG Implementation Work Plan **B**

To *discuss* and *endorse* a proposed Plan from the Programmes Facilitator – Laboratories

a) Update on progress against the Plan from the Programmes Facilitator – Laboratories **C**

b) Breakout session on how SLSG members can support completion of the Implementation Work Plan.

6 Findings From Building a Body of Evidence and Case Studies, Including Findings from 2015 Lab Sustainability Awards **D**

To *note* a paper from the Programmes Facilitator – Laboratories

ROUTINE ITEMS

7 Thematic Workshops **E**

To *receive* an update on the first Labs Workshop from the Programme Manager

8 Any Other Business **Verbal**

To *consider* any other matters from Group members

If you require this agenda or any of the papers in an alternative format e.g. large print please contact Jane Rooney on 0131 650 4375 or email jane.rooney@ed.ac.uk

UNIVERSITY OF EDINBURGH **A**

MINUTE OF A MEETING *of the Sustainable Laboratories Steering Group held in the Balcony Room, Old Moray House on Tuesday 27 January 2015*

1 Welcome and Introductions

The Convener welcomed attendees to the first meeting of the Group, noting how positive it was to see a high turnout and so much interest in laboratories, and outlined the programme for the session.

2 Review of Lessons Learned from Previous Sustainable Labs Work

Engagement Facilitator Chris Litwiniuk gave an overview of engagement and facilitation work carried out by the SRS Department to date including:

- delivering training, setting up induction and exit policies
- running the Lab Awards scheme and peer audits
- submitting funding applications for water chillers & LED microscope systems
- building evidence as part of a long-term cold storage study
- investigating helium recovery and alternative lab ventilation strategies
- Facilitating networking to share best practice.

In their research, policies, equipment and structure of management every lab is different. However technical staff often face similar challenges and can learn from the approaches of others. Collaboration, given a solid research and evidence base, can also drive new solutions. There was at present no University-wide forum to debate and resolve these issues. With an emphasis on not constraining the core business of the University in terms of science, research and teaching, this Group would bring together multiple perspectives. The Programme Facilitator – Laboratories outlined potential areas for the Group to discuss.

Lab. Ventilation Strategy

The main issue was the energy cost (c. £1,650 annually) involved in the loss of treated (heated or cooled) air expelled. Controls designed by suppliers were often based on standards that were years out of date. Research still needed to be done, reflecting the wide variety of uses fume cupboards were put to – e.g. Biology had different air extraction requirement to Chemistry. However there was potential for significant savings through altering operational hours or air flow. Fume extraction was typically interlinked with whole air handling systems and could not be addressed in isolation.

Procurement

Members could collaborate to support ongoing work by the Procurement team and SRS Department on whole life costing, end-of-life buy-back, reducing packaging and centralised consumables purchasing, thereby reducing costs and waste. The UoE equipment sharing website WARPit was highlighted, having in its first year of operation saved over £20K, 8,000kg CO_{2e} and 1,000kg of waste. The scheme would be promoted more widely following completion of the start-up phase. It had taken some time to get the terms and conditions in place to be able to include laboratory and IT equipment and a further set would need to be in place before the scheme could be expanded beyond UoE.

Action – JR to circulate SOAG WARPit paper to the Group.

***Post-meeting note**: this item was a verbal update, extract from the minute below:*

Waste Update – WARP-IT

The Director of SRS outlined the context to the scheme which the result of collaborative work with the Waste and Environment Manager. It was felt to be useful for SOAG to see the tool and make suggestions on how to build on and develop it.

The SRS Engagement Facilitator (Waste) briefed the Group on the WARP-IT reuse and exchange web portal which allowed users to share excess resources. A UoE email address was the sole requirement to register. A pilot begun in December 2013 with 20-25 users had worked well and WARP-IT was opened to all staff in March 2014, accompanied by some limited advertising. As most items fell in the stationery category, administrative staff had been targeted initially. Discussions were ongoing regarding adding laboratory and IT equipment. Terms and conditions for laboratory items had been finalised in November 2014. Links to charities including the British Heart Foundation had been established which would allow other institutions to benefit from unclaimed resource.

UoE WARP-IT currently had 200 members, with a target of 250 by the end of the year. Three thousand kilograms of CO_2e had been saved. At an initial cost of £2½K, estimated savings from the scheme were £11/12K. The scheme was also saving space and influencing users to reflect on their purchasing in ways that were not immediately measurable. In the future, purchasers could be asked to look on WARP-IT before buying, as part of overall resourcing strategy.

Given legal and safety implications, at present membership was restricted to UoE staff and claimed items had to remain on UoE property. The terms and conditions have been reviewed by the Director of Legal Services. There remained some outstanding issues around storage space.

The Convener welcomed the scheme, highlighting the importance of ensuring a system of checks and balances was in place.

Action – AP to return at the May meeting to update the Group on progress.

Waste

SLSG noted that the School of Chemistry had won an S-Lab award for its chemical management system and a GreenOvation award for its glove recycling scheme - initiatives that could be picked up by other schools.

Lighting

During refurbishments efforts could be made to move away from bench level lighting across the board, control lighting to reduce energy consumption and make better use of natural daylight, lighting technology and low energy alternatives.

Freezers

A number of areas for improvement had been identified. Installations of alarms to alert to temperature drops could help persuade researchers to reduce buffer zones and move from -80°C to -75°C. Streamlining of contents, exit procedures to avoid abandoned samples and replacing older units could all lead to savings. Evidence on minus 80 freezer savings and sample safety available from the Secretary on request.

Water

A move from open to closed loop chilling and behavioural changes were discussed.

Sub-metering

Members noted work undertaken by Energy Office to get an ever-improving picture of energy consumption in labs, monitoring labs within mixed use buildings, and monitoring

individual or groups of items to build up evidence of the impact of any pilot projects or identify the impact of increased activity/changes to equipment.

The SRS Department offered its services working with areas to improve operations and work towards University targets, and urged colleagues to get in touch if they had any ideas relating to sustainability that they would like support with.

General Discussion and Q & A

Members discussed outcomes of former learn energy initiatives and acknowledged the need for widespread cultural change. The Universities Scotland Efficiencies Taskforce was noted as a driver for change and a point of contact for garnering greater cross-sector support. SLSG recognised the need to address large scale large impact strategic issues, such as potential expansion of laboratory facilities, rather than individual pieces of activity.

Members discussed framing a set of recommendations for new laboratory buildings and refurbishments, recognising that while guidelines did exist, they needed to be constantly updated and required flexibility built in to facilitate improvement and ensure that solutions were a good fit for intended tenants. Understanding the science and what the growth would be was essential in future-proofing. SLSG recognised the need to challenge potential projects before adding to the estate to ensure that new laboratory facilities would be heavily used. The Group recognised the work being done in the Technical Engineering Manager's team to review design guidelines and look at designs more critically. A small task group within SLSG could be set up to feed in views.

S-Lab was noted as a valuable resource in terms of expertise and a gathering place for case studies and examples, bringing in operational issues and efficiencies to balance the focus on aesthetics, and allowing for awareness raising on what was happening within the market.

Action – JR to add all members to the circulation list for the S-Lab newsletter, unless they indicated a wish to opt out.

SLSG discussed the expectations of funders in terms of restrictions, incentives and guidelines, noting a variety of approaches (the Wellcome Trust did have space guidelines and expect a BREEAM excellent rating, the SFC did not).

3 Membership and Remit **A**

A draft remit and membership for SLSG had been approved by the Sustainability Operations Advisory Group on 5 November 2014.

It was proposed that a core steering group be established with additional representatives joining for themed meetings which would help develop strategy and advise on activities for the Labs Facilitator. A wider mailing list of interested supporters would be maintained.

It was felt that technical support and functional expertise were well represented. Members acknowledged that energy champions within a building could bring about transformational change. SLSG highlighted the need to engage with PhD students and also with technical staff, as those providing the core training that stayed with lab users throughout their careers.

Action – JR to invite a research student to join the Group.

Post-meeting note: *student representative still to be identified – suggestions welcomed.*

As the highest HVAC users, representation should be sought from the animal facilities.

Action – JR to invite Graham Thomas to join the Group.

***Post-meeting note**: Graham Thomas accepted the invitation to join SLSG.*

Action – DG and SRS Department to reflect on the membership and circulate a proposal.

Action – All to send in their thoughts.

***Post-meeting note**: membership proposal circulated on 11 March.*

4 Priorities for 2015 and Beyond

Attendees discussed in groups both immediate and longer-term priorities including:

Evidence, Research and Data

- Getting a clearer understanding of utilisation and the research to back up any proposed changes (including accurate metering)
- Case studies on existing exemplar locations.

Engagement/Behaviour Change / Training

- Widening engagement and securing buy-in from staff, PIs and PhD students, getting those who run, maintain and use laboratories to advocate on the Group's behalf
- Empowering and investing in technical staff through training schemes and personal development opportunities
- Working with strong academic champions to bring about culture and behaviour change
- Widening participation in the Labs Awards (the audit group was noted a valuable tool to share best practice and the element of competition was a strong motivator).

Standards, Guidelines and Procedures

- Producing guidelines delineating departmental and operational responsibilities
- Standardising operating procedures (e.g. induction and exit policies, procurement)
- Producing guidelines on good practice when designing and refurbishing laboratory facilities, framing common standards as a starting point for discussions with budget holders, and ensuring that guidelines are monitored and kept up to date. SLSG recognised a need to challenge and gather supporting evidence before adding to the estate. Input from the Estates Department would be needed, working with laboratory users and their representatives. The Technical Engineering Manager's Team were currently engaged in a review of design guidelines and a small task group of SLSG could be set up to feed in to that process.

Procurement/Waste

- Standardisation of suppliers and consumables, beginning with audits and investigation of potential savings / efficiencies
- Asking suppliers for data on the cost and carbon footprint of deliveries in order to move away from piecemeal approaches, consolidate orders and develop improved processes
- Engaging with suppliers to minimise packaging
- Raising awareness of WARPit and addressing the legal and H&S issues involved in expanding the scheme beyond UoE.

Funding

- Researching opportunities for specific funding for sustainability in labs and identifying how wider funding opportunities integrate sustainability criteria
- Securing a guaranteed fund to cover any ideas arising in this space

- Providing incentives for schemes that would make a difference in terms of health and safety, efficiency, cost or performance
- Providing funds to help push research forward.

5 Funding Opportunities and External Collaboration **B**

The Head of SRS Futures gave an update on SFC funding and outlined other funding and collaboration opportunities.

Peter James of S-Lab was noted as a contact to discuss appetite for collaboration and support. A number of institutions including Napier, Strathclyde, Glasgow and Aberdeen had expressed interest in using the scheme to foster good practice and identify opportunities.

A number of themes had been identified to improve laboratory operations, use space more effectively and develop technical staff. The University of Strathclyde were covering the fees for their technical staff to achieve chartered status – UoE could establish a similar scheme. Building multi-purpose science labs would increase utilisation and improve space management. SLSG noted a number of HEFCE initiatives around shared teaching space. However, concerns were raised regarding the impact of expansion and ensuring that provision kept up with projected levels of undergraduate recruitment.

The original S-Lab bid to SFC (available from the Secretary on request) had been referred on to the Universities Efficiencies Task Force. In collaboration with other institutions, a proposal could be made for £180K over two years to cover the Programme Facilitator – Laboratories' time and support the development of a piece of work.

6 Agree Dates of Meetings in 2015

Members agreed to meet again in the spring, after the summer, and towards the end of the year.

Action – DG & SRS Department to start to put ideas into strategic categories and blocks of work and circulate for views.

***Post-meeting note**: draft work plan circulated to the Group on 17 March.*

THE UNIVERSITY of EDINBURGH

B

Sustainable Laboratories Steering Group (SLSG)

"Supporting World Class Laboratories"

Tuesday 2 June 2015, 11.30am

Sustainable Laboratories Implementation Plan 2015

Description of paper

The paper presents SLSG with a proposed implementation plan with the aim to develop a more strategic and holistic approach to embedding social responsibility and sustainability (SRS) within laboratories at the University of Edinburgh.

The paper also describes a timeline for meetings, and proposes that the future meetings be split into "Labs Workshops" to discuss operational matters, and SLSG "core group" meetings to discuss strategic matters. The paper has been circulated to all attendees of the first core group meeting (27th January 2015) for comments, and the version attached for discussion incorporates all comments received.

Action requested

SLSG is invited to *discuss* and *endorse* the work plan, the division of the group into operational and strategic groupings, and the members of each of these groupings.

Background and context

The University of Edinburgh has pressing targets in relation to reducing carbon emissions and estates costs. Laboratories are highly energy and resource intensive environments, and many studies have shown that lab space can consume 4 or 5 times as much energy as office space per m^2. Thus opportunities to improve sustainability and make savings in terms of energy consumption and utilities spend in laboratories must be a key part of any strategy to meet these targets.

The Labs Implementation Plan was drafted in collaboration with key stakeholders in order to identify, specify, agree and record the actions required in order to improve laboratory sustainability across University of Edinburgh. The majority of tasks fall to Andrew Arnott, Programmes Facilitator – Laboratories, Department for Social Responsibility and Sustainability, however there are also implications for other individuals/departments, most notably the Energy Office.

Sustainable Laboratories Implementation Plan 2015

Discussion

Laboratories are critical sites for the University mission of creating knowledge and enhancing our position as one of the world's leading research universities, making a sustainable contribution to Scotland, the UK and the world. Laboratories have a large carbon and environmental footprint, with especially high energy consumption as well as use of finite materials and production of hazardous waste. To improve sustainability there is a need for working across departments in order to have the greatest impact. Some impacts on the sustainability performance of a laboratory can be made at the design stage while other impacts can be ameliorated through actions by laboratory managers, technicians and users. Laboratories are important sites for influencing the attitudes and behaviour of the staff and students who work and study in them, as behaviour changes can have substantial impacts in the short term and may be adopted as standard practice in future years. A number of opportunities exist for laboratories to undertake actions commensurate with the circular economy where by-products are diverted from expensive and unsustainable waste streams and instead recognised as useful raw materials.

The purpose of this implementation plan is to develop a more strategic and holistic approach to embedding social responsibility and sustainability (SRS) within laboratories at the University of Edinburgh. The University has a duty and commitment to reduce emissions and spending on utilities which will soon exceed a cost of £20 million per year. Investing in sustainability within labs will help:

- Reduce energy usage and carbon footprint
- Reduce other environmental impacts including water, waste and depletion of finite resources
- Reduce costs
- Reputational improvement
- Contribute to other priorities such as Health and Safety, staff well-being and student experience.

The implementation plan responds to the University's Strategic Plan 2012–2016 and records actions delivering both existing policies and new commitments.

5 key themes have been prioritised for 2015 based on discussion with key stakeholders, the Sustainable Labs Steering Group (SLSG), the Core Audit Group and the Department for SRS's understanding of key work areas and support requested by colleagues: 1) evidence building; 2) engagement and training; 3) utilities efficiencies; 4) outreach and funding; 5) integration in estates design and construction.

It is important to note that progress is reliant on successful partnerships with post-doctoral students, operational, technical, academic and senior management staff. Progress will be monitored regularly by the SLSG which will meet three times per year. A timeline is also included within the implementation plan outlining key milestones and dates of meetings.

A. Evidence Building	Objective: To gather, collate and develop evidence and data on the effectiveness and consequences of various opportunities for efficiency improvements.			KPI: Number of topics for which a body of evidence has been produced and made available to SLSG.
Tasks	**Colleagues Responsible**	**Colleagues to Consult**	**Dates**	**Outputs / Outcomes**
A1. Assess fume cupboards for suitability for Variable Air Volume (VAV) conversion	Andrew Arnott Estates (Premises Managers and Design Office)	Energy Office Representatives of relevant laboratories	June 2015	Develop/obtain an inventory of fume cupboards and whether they are fixed or VAV Identify fixed volume fume cupboards and investigate their suitability for converting to VAV Calculate savings, obtain quotes/indicative costs for conversion and identify suitable conversions with short payback periods
A2. Investigate potential energy savings and risks to samples associated with raising the temperature of minus 80°C freezers.	Andrew Arnott Brian McTeir Lorna Bathgate Irene McGuinness	Martin Farley Lee Murphy (other contributors of samples)	First 6 monthly analysis due October 2015	5 year project with 6 monthly assessments of energy savings and sample quality from the investigation operating at Roslin Institute. 6 monthly reports will be presented to the SLSG as a standing item on the agenda.

A3. Investigate potential energy savings and risks to samples associated with changing DNA/RNA storage methods to room temperature.	Andrew Arnott Peter James (S-Labs)	SLSG	By 30th May 2015	Report on the current state of knowledge (literature review) relating to alternative storage methods of DNA/RNA
A4. Compile a body of evidence and case studies relating to sustainable laboratories actions undertaken at other institutions.	Andrew Arnott Peter James (S-Labs)	SLSG	By end of May 2015	Summary report showing actions, payback periods and links to any publications
A5. Conduct a trial/pilot project monitoring the impact of distributing 'switch off' stickers and other communications materials.	Andrew Arnott Joe Farthing (A building containing laboratories which has reliable energy data)	SLSG	June 2015	Summary report showing methodology and impacts.

B. Training and Engagement	Objective: To increase knowledge and awareness of sustainability actions among laboratory users.	KPI: Number of communications (events /presentations /talks /meetings /distribution of materials) between Programmes Facilitator Laboratories and key laboratories personnel.

Tasks	Colleagues Responsible	Colleagues to Consult	Dates	Outputs / Outcomes
B1. Develop a core list of sustainability criteria to be covered in induction and exit processes and disseminate this to laboratories.	Andrew Arnott Core Audit Group	Val Gordon SLSG	End of May 2015	All relevant staff responsible for lab inductions have list of sustainability criteria
B2. Host an event with HEaTED and S-Lab to focus on professional development of laboratory technical staff, and sharing best practice	Andrew Arnott Val Gordon	SLSG	Before end Dec 2015	Event delivered to UoE staff and staff from other universities
B3. Engage with more laboratories to encourage and enable sustainability actions and participation in Sustainability Awards. (Where ESA is not suitable for the lab, opportunities for improvement should still be identified and enabled).	Andrew Arnott	SLSG	Ongoing until at least Jan 2016	Additional laboratories engaging with SRS on sustainability improvement projects. 2 Additional laboratory teams taking part in ESA 2015-16 in comparison to 2014-15 (12 expected in 2014-15).
B4. Publish case studies on website and distribute to key stakeholders.	Andrew Arnott SRS communications team	SLSG	End May 2015	Case studies of University of Edinburgh sustainable laboratories achievements published on website.
B5. Develop and distribute resources/materials promoting best practice in laboratories.	Andrew Arnott SRS communications team	SLSG	July 2015	New printed and electronic materials to promote best practice in laboratories.

C. Utilities and waste efficiencies	Objective: Identify and enable utilities efficiency improvement projects throughout the university			KPI: Number of utilities efficiency improvement projects implemented. (Cost and carbon savings quantified where data is available)
Tasks	**Colleagues Responsible**	**Colleagues to Consult**	**Dates**	**Outputs / Outcomes**
C1. Identify the air handling system settings for rooms containing -80°C freezers and assess for suitability (size of "dead band" and set point temperatures)	Andrew Arnott Martin Crawford Premises managers	Energy Office Relevant laboratories	July 2015	Appropriate set points and dead bands identified and programmed for all -80 freezer rooms, and communicated to relevant staff.
C2. Identify funding to support replacing mercury lamps in microscopes with LED lamps.	Andrew Arnott	Relevant laboratories Colin Miller – Procurement Energy Office Registrars of Schools (likely represented by middle management – TBC)	September 2015	An understanding of the funding landscape and communicating this to laboratories.

C3. Identify areas for motion sensor/daylight sensor controls for lighting.	Andrew Arnott Premises managers	Energy Office	July 2015	Areas suitable for motion sensor/daylight sensor lighting controls identified. Business cases drawn up for the work and where suitable, applications for funding made.
C4. Identify funding to support replacing older -80°C freezers with new models.	Andrew Arnott	Relevant laboratories Colin Miller – Procurement Energy Office	September 2015	An understanding of the funding landscape and communicating this to laboratories.
C5. Identify opportunities to divert non-hazardous laboratory consumables from landfill (e.g. gloves, plastics)	Andrew Arnott Laboratory Managers	Waste and Environment Manager (Fleur Ruckley)	October 2015	Waste streams analysed at a number of laboratories and arrangements made with waste providers to collect non-hazardous laboratory consumables. Awareness raised among users of these labs.
C6. Identify opportunities to raise the temperatures of back-up -80 freezers.	Andrew Arnott Roslin Institute Martin Farley	Laboratories who have contributed samples. SLSG	Ongoing First 6 monthly analysis in October 2015	An understanding of the time taken for internal freezer temperature to change. An understanding of the different energy consumptions from operating ULT freezers at different temperatures.
C7. Identify opportunities to change fluorescent area lighting to LED lighting.	Andrew Arnott	Energy Office	July 2015	Areas suitable for LED lighting identified.

	Premises managers Laboratory Managers			Business cases drawn up for the work and where suitable, applications for funding made.
C8. Identify opportunities to establish packaging take-back schemes.	Andrew Arnott Laboratory Managers	Waste and Environment Manager (Fleur Ruckley) Colin Miller - Procurement	October 2015	Waste streams analysed at a number of laboratories and arrangements made with suppliers to collect packaging. Awareness raised among users of these labs.
C9. Engage with academic colleges and corporate services to discuss improving accessibility to existing funding streams.	Andrew Arnott Dave Gorman Liz Vander Meer	Dougie Williams/David Jack from Energy Office	First engagement by July 2015	Streamlining of the application processes which must be followed by applicants for various existing funding streams available within the University. Increased frequency of review of applications. Reduced time between applications being submitted and a decision being made. Increased number of applications from laboratories for funding for sustainability actions.

D. Outreach and Securing Funding	Objective: To secure funding to support the continuation of sustainable laboratory work within the University of Edinburgh			KPI: Amount of time the sustainable laboratories work is supported for after January 2016.
Tasks	**Colleagues Responsible**	**Colleagues to Consult**	**Dates**	**Outputs / Outcomes**
D1. Engage with SFC to secure funding for further sustainable laboratories positions/resources.	Dave Gorman Andrew Arnott David Somervell	SLSG	By Dec 2015	Funding secured to extend UoE's work with laboratories
D2. Engage with Universities Scotland Efficiencies Taskforce	Dave Gorman Andrew Arnott	SLSG	By September 2015	'buy-in' secured with other universities to strengthen bid for SFC funding
D3. Engage with other institutions	Andrew Arnott Dave Gorman Core Audit Group (SLSG members?)	SLSG Peter James (S-Labs)	By November 2015	Relationships formed and developed with those responsible for sustainable laboratories in other institutions. Best practice shared. Improvements encouraged.

E. Estates Design and Construction	Objective: To ensure sustainability concerns are embedded within the processes of estates design and construction			KPI: Level and frequency of input from SRS into estates design and construction
Tasks	**Colleagues Responsible**	**Colleagues to Consult**	**Dates**	**Outputs / Outcomes**
E1. Review and develop design and construction guidelines for new laboratories.	Graham Bell Andrew Arnott Laboratory representatives	SLSG Energy Office	By Jan 2016	Guidance on: Lab ventilation Cooling/heating set points and dead bands Lighting technologies and controls Cold rooms vs fridges & freezers Space for storing recycling/packaging
E2. Establish a mechanism by which SLSG/SRS can be informed of and influence new estates developments for laboratories.	Graham Bell Andrew Arnott	SLSG Laura Skinner – Procurement Energy Office	By Jan 2016	SLSG/SRS can have input to new estates developments for laboratories, specifically including Darwin Project.

Timeline			
Meeting	**Dates**	**Topic/Theme**	**Invitees**
Labs Workshop 1	Late May 2015	Waste and Procurement	Full SLSG invited to attend depending on their interest in this topic. Focus on operational, technical and procurement staff. Presentations on waste, WARPit and procurement/engaging suppliers. Fleur Ruckley invited to speak on lab waste streams. SRS representative to speak on WARPit. Procurement representative to speak on efficient lab procurement.
Sustainability Awards Application Deadline	*20th March 2015*		*Award Participants*
Sustainability Awards Lab Audits	*March/April 2015*		*Awards Core Audit Group*
Sustainability Awards Ceremony	*22nd April 2015*		*Award Participants*
Labs Workshop 2	Early June 2015	Design of new laboratories / developing guidelines for design and operation.	Full SLSG invited to attend depending on their interest in this topic. Focus on operational staff, estates development, lab managers, energy managers and controls managers.
SOAG	*End of May 2015*	*Progress update*	

SLSG Strategic Meeting 1	June 2015	Review implementation plan progress and discuss the minutes of Themed Meetings 1 & 2.	Limited invite list focusing on strategic/managerial level staff along with representation from operational staff.
SOAG	*Mid-September 2015*	*Progress update*	
2015/16 Academic Year – Inductions	*September – October 2015*	*Inductions*	*New students*
Labs Workshop 3	Late August 2015	Implementation of utilities efficiency improvement projects, including best practice technologies, where central funding can be utilised, and where departmental or external funding should be sought.	Full SLSG invited to attend depending on their interest in this topic. Focus on operational staff, premises managers and lab managers. Energy Office representatives invited to speak.
SOAG	*Early November 2015*	*Progress update*	
Labs Workshop 4	November 2015	Training/CPD for lab staff and post-doctoral students.	Full SLSG invited to attend depending on their interest in this topic. Focus on technical staff and post-doctoral students. HEaTED network would be invited to speak.
SLSG Strategic Meeting 2	Late November 2015	Review implementation plan progress and discuss the minutes of Themed Meetings 3 & 4.	Limited invite list focusing on strategic/managerial level staff along with representation from operational staff.

Sustainable Laboratories Implementation Plan 2015

Annex 1

Sustainable Laboratories Steering Group – remit and membership

A draft remit and membership for SLSG had been approved by the Sustainability Operations Advisory Group on 5 November 2014.

“The main purpose of the Steering Group would be to provide expert guidance and direct the expanding remit of work associated with sustainable laboratories. It would ensure that work on sustainable laboratories is continued through a coordinated approach. The proposed Steering Group would:

- Provide expert guidance to the Programme Facilitator – Laboratories
- Contribute towards setting future objectives and monitoring progress
- Identify funding opportunities to support sustainable laboratories work
- Achieve buy in from academic schools, support groups and research centres
- Link sustainable laboratories agenda with University-wide strategic plans and objectives.

The Steering Group would aim to bring together colleagues from across university academic schools and support groups with expertise in laboratory practices and systems.”

At the inaugural meeting it was proposed that a core steering group be established with additional representatives joining for themed meetings which would help develop strategy and advise on activities for the Programme Facilitator – Laboratories. A wider mailing list of interested supporters would be maintained.

CORE GROUP MEMBERSHIP	
Andrew Arnott	Programme Facilitator Labs
Dave Gorman	Director of Social Responsibility & Sustainability
Geoff Turnbull	Assistant Director of Estates
David Gray	Professor of Immunology, Institute of Infection & Immunology Research
David Jack	Energy Manager
Julia Laidlaw	Project Manager (Estates and Buildings)
Martin Crawford	Controls Manager
Andy Kordiak	Equipment Procurement Manager, MVM
Sandra Lawrie	Technical Services & Estates Manager, School of Biological Sciences
Brian McTeir	Easter Bush Campus Facilities and Services Manager
Stewart McKay	Technical Services Manager, IGMM
Heather Anderson	Senior Technical Officer, CMVM
Candice Schmid	Health & Safety Adviser
Valerie Gordon	Technical Officer, Institute for Education, Teaching & Leadership
TBC	Student Researcher

THEMATIC/OPERATIONAL GROUP MEMBERSHIP	
Heather Anderson	Senior Technical Officer, CMVM
Andrew Arnott	Programme Facilitator Labs
Graham Bell	Estates Depute Director
Jim Brown	Zone Manager, KB
Michelle Brown	Head of SRS Programmes
Ronald Brown	Deputy Technical Services Manager, School of Chemistry
Rab Calder	Zone Manager, CMVM
Martin Crawford	Controls Manager
Valerie Gordon	Technical Officer, Institute for Education, Teaching & Leadership
Dave Gorman	Director of Social Responsibility & Sustainability
David Gray	Professor of Immunology, Institute of Infection & Immunology Research
David Jack	Energy Manager
Andy Kordiak	Equipment Procurement Manager, MVM
Sandra Lawrie	Technical Services & Estates Manager, School of Biological Sciences
Matthew Lawson	Programme Manager
Chris Litwiniuk	Engagement Facilitator
Stewart McKay	Technical Services Manager, IGMM
Brian McTeir	Easter Bush Campus Facilities and Services Manager
Lindsay Murray	Health and Safety Manager – Chancellors - CMVM
Janet Philp	School Administrator, School of Biomedical Sciences
Fleur Ruckley	Waste & Environment Manager
Candice Schmid	Health & Safety Adviser
Laura Skinner	College Procurement Manager, Science & Engineering
Anna Stamp	Estate Development Manager, CMVM
David Somervell	Head of SRS Futures
Dawn Windsor	Easter Bush Deputy Campus Facilities and Technical Manager
Margarida Teixeira-Dias	Physical Resources and Scientific/Technical Services Manager (Geosciences)

Annex 2

Core Audit Group – remit and membership
The Core Audit Group exists as an operational level group to steer and plan the activities relating to the laboratories section of the Edinburgh Sustainability Awards. The Group's activities includes timings and logistics of awards audits, as well as providing a forum for communication between participants of the awards scheme and the organisers of the awards scheme (Social Responsibility and Sustainability department).

The CAG consists of the Programme Facilitator – Laboratories and representatives of laboratories who have taken part in the awards scheme for a number of years. This comprises:

AWARDS CORE AUDIT GROUP MEMBERSHIP	
Heather Anderson	Chancellors Senior Technical Officer, College of Medicine and Veterinary Medicine
Andrew Arnott	Programme Facilitator – Laboratories, Department of Social Responsibility and Sustainability
Ronald Brown	Deputy Technical Services Manager, School of Chemistry
Brian McTeir	Easter Bush Campus Facilities and Services Manager, College of Medicine and Veterinary Medicine
Dawn Windsor	Easter Bush Deputy Campus Facilities and Technical Manager, College of Medicine and Veterinary Medicine
Stewart Franklin	Technical Officer, School of Chemistry
Eliane Salvo-Chirnside	Senior Research Technician, SynthSys, School of Biological Sciences
Carol Wollaston	Centre Manager, Centre for Integrative Physiology, College of Medicine and Veterinary Medicine

Resource implications
As noted above there is a time resource implication for a number of different members of staff, notably the Energy Office.

The above plan should lead to the identification of lab sustainability improvement projects for implementation. Many of the improvements and savings possible in laboratories will require some degree of investment in order to unlock the savings – the current internal funding environment is unclear for a number of lab improvement actions (i.e. should an action be supported by central or departmental funding) and this is hampering progress. Greater clarity around funding is necessary in order to be able to properly identify suitable projects for development.

Risk Management
Some of the improvements to laboratory sustainability are well established and low risk. Other potential improvements, however, are less well established and as such the exact extent of savings is harder to quantify. In all scenarios, minimising or eradicating any negative impact on science or health & safety would be a key requirement of any project.

Equality & Diversity
Due consideration has been given to equality and diversity as a key element of the SRS agenda. An Equality Impact Assessment is not required.

Next steps/implications
The agreed plan will be actioned by those named in the document, and progress shall be reported to the SLSG core group (next meetings June and November 2015). This shall form the majority of the body of work of Andrew Arnott, Programmes Facilitator – Laboratories, Department for Social Responsibility and Sustainability for 2015.

Consultation
This paper has been circulated to all attendees of the first SLSG meeting (January 2015) for comment and submitted to the May meeting of the Sustainability Operations Advisory Group (SOAG).

Further information
Author and presenter, Andrew Arnott, Programmes Facilitator – Laboratories 27th May 2015.

Freedom of Information
This is an open paper.

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C

Sustainable Laboratories Steering Group (SLSG)

"Supporting World Class Laboratories"

Tuesday 2 June 2015, 11.30am

Sustainable Laboratories Implementation Plan Progress Update

Description of paper
The paper presents SLSG with an update on progress against the proposed implementation plan.

Action requested
SLSG is invited to *note* and *discuss* the report.

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Social Responsibility and Sustainability

Sustainable Labs Implementation Plan progress update

01/06/2015
Prepared by **Andrew Arnott** for
Sustainable Labs Steering Group core meeting

This document is intended to give an update on progress against the objectives of the Sustainable Laboratories Implementation Plan, which was drawn up to provide a structured approach to improving sustainability within laboratories at the University of Edinburgh in 2015. A traffic-light system (RAG) has been used to communicate quickly and clearly the progress which has been or is being made. In general this is taken to mean: green = on track, amber = delayed or problematic, red = objective is in danger of not being met. Further details on the progress against each individual action is included within the comments column. This document will be updated on a quarterly basis and shared with the Sustainable Laboratories Steering Group at Core meetings.

Objective	Tasks	Progress (RAG)	Comments
To gather, collate and develop evidence and data on the effectiveness and consequences of various opportunities for efficiency improvements.	Assess fume cupboards for suitability for Variable Air Volume (VAV) conversion Investigate potential energy savings and risks to samples associated with raising the temperature of minus 80°C freezers. Investigate potential energy savings and risks to samples associated with changing DNA/RNA storage methods to room temperature.		Two contractors have visited Joseph Black labs to quote for conversion to VAV (first quote received indicated payback period of less than 3 years, still awaiting second quote). The freezer study at Roslin continues to make progress and will soon be ready for legal sign-off. Energy savings have been identified and included in the Evidence Base document.

Objective	Tasks	Progress (RAG)	Comments
	Compile a body of evidence and case studies relating to sustainable laboratories actions undertaken at other institutions. Conduct a trial/pilot project monitoring the impact of distributing 'switch off' stickers and other communications materials.		As a result of the reduced resources available in the communications team at SRS the trial/pilot project to attempt to monitor the impact of 'switch off' stickers has not yet happened and will be substantially delayed.
To increase knowledge and awareness of sustainability actions among laboratory users.	Develop a core list of sustainability criteria to be covered in induction and exit processes and disseminate this to laboratories. Host an event with HEaTED and S-Lab to focus on professional development of laboratory technical staff, and sharing best practice Engage with more laboratories to encourage and enable sustainability actions and participation in Sustainability Awards. (Where ESA is not suitable for the lab, opportunities for improvement should still be identified and enabled). Publish case studies on website and distribute to key stakeholders Develop and distribute resources/materials promoting best practice in laboratories.		Exit process document is now almost complete. Inductions process is under discussion as to the best way forward in terms of fitting in with other SRS activities. The support for HEaTED may now be developed into a Labs Workshop session instead. In addition the Programmes Facilitator – Laboratories is assisting in the production of a conference poster on the connection between sustainability and CPD of lab technical staff. Additional laboratories have been engaged within the Geosciences department at King's Buildings and further requests for assistance have been received from SRUC labs (one of whom participated in the Lab Awards) Case study production is behind schedule but shouldn't be too delayed as it will lead on directly from the soon-to-be-completed evidence base document. Resources are distributed to labs to promote best practice on an ongoing basis. A review of the materials highlighted some changes which could be made but will have to be delayed due

Objective	Tasks	Progress (RAG)	Comments
			to the reduction in communications resource within SRS.
Identify and enable utilities efficiency improvement projects throughout the university	Identify the air handling system settings for rooms containing -80°C freezers and assess for suitability (size of "dead band" and set point temperatures) Identify funding to support replacing mercury lamps in microscopes with LED lamps. Identify areas for motion sensor/daylight sensor controls for lighting. Identify funding to support replacing older -80°C freezers with new models. Identify opportunities to divert non-hazardous laboratory consumables from landfill (e.g. gloves, plastics) Identify opportunities to raise the temperatures of back-up -80 freezers. Identify opportunities to change fluorescent area lighting to LED lighting. Identify opportunities to establish packaging take-back schemes. Engage with academic colleges and corporate services to discuss improving accessibility to existing funding streams.		Best practice settings for air handling systems were discussed and promoted during the Lab Awards. The evidence base will be used to create a business case for future presentation. This will be influenced by the internal funding scenario. Some areas were identified during Lab Awards audits but a more thorough energy audit is proposed. The evidence base will be used to create a business case for future presentation. This will be influenced by the internal funding scenario. Glove recycling and diversion of non-hazardous lab plastics was discussed during the Lab Awards audits and also at the first Labs Workshop. Opportunities were discussed during Lab Awards audits. Some areas were identified during Lab Awards audits but a more thorough energy audit is proposed. This was discussed at the first Labs Workshop. This is underway in discussions between SRS and Estates.

Objective	Tasks	Progress (RAG)	Comments
To secure funding to support the continuation of sustainable laboratory work within the University of Edinburgh	Engage with SFC to secure funding for further sustainable laboratories positions/resources. Engage with Universities Scotland Efficiencies Taskforce Engage with other institutions		SFC are not currently looking like a likely source of funding for this work in 2016. However, Zero Waste Scotland may be in a position to fund this role, potentially with more of a focus on waste. No further engagement has been made with USET. Connections have been made with labs sustainability staff at other universities via S-Labs workshops and also through independent proactive engagement with St Andrews and Strathclyde including previous and upcoming visits.
To ensure sustainability concerns are embedded within the processes of estates design and construction	Review and develop design and construction guidelines for new laboratories. Establish a mechanism by which SLSG/SRS can be informed of and influence new estates developments for laboratories.		Design guidelines are being produced by S-Labs as a result of a meeting attended by AA. These should be published around September 2015. SRS have replied to requests for consultation on the design of the Darwin Tower development.

Resource implications
The current internal funding environment is unclear for a number of lab improvement actions, hampering progress.

Risk Management
In all scenarios, minimising or eradicating any negative impact on science or health & safety would be a key requirement of any project.

Equality & Diversity
Due consideration has been given to equality and diversity as a key element of the SRS agenda. An Equality Impact Assessment is not required.

Next steps/implications
A further progress update will be submitted to the next meeting of SLSG in November.

Consultation
This paper has been reviewed by the Director of Social Responsibility & Sustainability.

Further information
Author and presenter, Andrew Arnott, Programmes Facilitator Laboratories 1st June 2015.

Freedom of Information Open paper.

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D

Sustainable Laboratories Steering Group (SLSG)

"Supporting World Class Laboratories"

Tuesday 2 June 2015, 11.30am

Findings from Building a Body of Evidence & Case Studies

Description of paper

The paper presents SLSG with the evidence base summary so far, with a more comprehensive version included as Annex 1. The evidence base to date focuses only on energy, with further content to be added on waste, water and other factors as these become available.

Action requested

SLSG is invited to *note* and *discuss* the findings.

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Social Responsibility and Sustainability

Sustainable Labs Evidence Base

June 2015

Prepared by **Andrew Arnott** for

Sustainable Labs Steering Group core meeting

This document is intended to provide a summary of the evidence gathered to date relating to the savings available from improving sustainability within labs at University of Edinburgh. The evidence has been arranged into topic/technology areas. This is a working document and shall be expanded over time as and when further evidence is made available. The initial focus of this document has been on energy saving, due to the substantial impact of laboratory energy consumption on the University of Edinburgh's utilities costs and environmental performance. Where possible references have been provided for figures included within this document.

Cold Storage

1. Average plug load cost is typically £700 per ULT freezer[1]
2. Air con energy consumption can be almost as much as plug load for ULT freezers, effectively doubling the **total energy consumption to c. £1,400 on average**.[2]
3. Old ULT freezers can use around £1000 energy annually (plug load) compared to **new freezers** at under £600 (plug load). Energy consumption increases c. 3% per year of age.[3]
4. **Natural ventilation** could substantially reduce air con costs of £700/year/freezer (average) [4]
5. **Good sample management** leading to reduced numbers of ULT freezers required by could reduce total energy costs by £1,400/year/freezer removed[5]. Plus additional space savings.
6. **Room temperature storage of DNA[6]** would substantially reduce requirement for ULT freezers. If could remove 60 freezers across UoE would result in savings of £60-120k/yr.
7. **Defrosting** can save £160/year/freezer[7]
8. **Preventative maintenance** can save £230/year/freezer[8]
9. **Separate heat sources (i.e. incubators) from ULT freezers** can save £60/year/freezer[9]
10. **Raise temperature of freezers to -70°C** could save c.£350/year/freezer[10]
11. **Save-a-watt voltage optimisation plugs** can save over £70/year/freezer[11]

Ventilation

1. Fume cupboard energy consumption can cost **£2,000**/year/FC.[12]
2. **Replace constant volume fume cupboards with variable air volume** to save c.£1,000/year/FC (payback under 3 years) [13]
3. **Replace fume cupboards (0.5m/s) with low air volume (0.3m/s) fume cupboards.** 40% energy savings measured at University of Nottingham (up to £800/year/FC)[14]
4. **Replace old electric humidifiers in animal labs.** Gurdon Institute Cambridge saw a £345,000 saving from 6 months by replacing 3x 75kW electric humidifiers with 3x 100kW gas[15]
5. **Demand based room ventilation** can drop the safe level of air changes to 3/hour, then ramp up to a much higher peak rate when sensors are triggered. **Energy savings in published case studies can range from 15% to 58%** depending on initial conditions**.** [16]
6. **Ensure adequate ventilated storage cupboard capacity** so fume cupboards don't need to be used as storage (and thus operate 24/7).[17]

Microscopy

1. **Replace mercury light-source microscopes with LED**. Relatively small plug load energy saving (c. £300 over 10-15 years) but **reduced air con costs**. Major savings in researcher time from bulb replacement (much longer lamp life). Safety benefits (mercury vapour and fire risks). Short warm-up time. Reduced risk of bulb exploding and damaging mirrors (£4,000). More consistent of light quality – improves quality of research. Bulk purchase discount 15-20%.[18]
2. **Locate microscopy on solid ground-/basement floors** to reduce need for air compressors using c. £600/year to operate air tables. [19]
3. **Shareable/bookable large microscopy equipment** reduces purchase costs and running costs by up to £600/item/year.[20]

Lighting

1. **Replace lamps and fittings with LED.** Savings of up to £65/fitting/year and payback periods 1-3 years depending on fitting/lamp type and operational hours. [21]
2. **Install daylight sensor controls** in suitable areas. Savings of £16/fitting/year and payback periods 3.5-5 years depending on fitting/lamp type and operational hours.[22]
3. **Install motion sensor controls** in suitable areas. Savings of £41/fitting/year and payback periods 1-2 years depending on fitting/lamp type and operational hours.[23]

Benchtop equipment

1. **Fitting simple timer plugs** to ensure switch off when not required (e.g. overnight/weekends) can annually save: £500-£1000 per drying oven[24], £250-£300 per temperature controlled centrifuge[25], £1,500 per temperature controlled shaker[26], £200 per gas chromatograph[27], £100 - £400 per mass spectrometer[28].

Equality & Diversity

Due consideration has been given to equality and diversity as a key element of the SRS agenda. An Equality Impact Assessment is not required.

Consultation

This paper has been reviewed by the Director of Social Responsibility & Sustainability.

Further information

Author and presenter, Andrew Arnott, Programmes Facilitator Laboratories 1st June 2015.

Freedom of Information Open paper.

Financial modelling of 1, 2 and 5 year programmes of energy savings in University of Edinburgh laboratories

Year 1								
Action	**Annual cost saving per unit**	**Savings comments**	**No. Units**	**Total annual cost saving**	**Unit cost (no VAT)**	**Total cost (no VAT)**	**Cost comments**	**Payback period**
Replace old -80 freezers with new on a rolling replacement basis	£800	£400 plug load + £400 air conditioning load reduction	10	£8,000	£9,000	£90,000		11.3
Improved sample management/introduction of room temperature DNA storage	£1,400	£700 plug load + £700 air con load reduction	2	£2,800		£500	Passive storage cabinets are also needed to keep samples below 30% relative humidity, and may cost $500-1000 per lab.	0.2
Fit Save-A-Watt voltage optimisation plugs to ULT freezers where V.O. has not already been implemented	£70		6	£420	35	£210		0.5
Replace CV fume cupboards with VAV	£1,000	Savings almost entirely from make-up air	46	£46,000	2000	£92,000	Costs likely to be between £1k and £3k per FC (quotes are being gathered for 2 labs in Joseph Black)	2.0
Replace standard air flow fume cupboards with low flow fume cupboards	£800		10	£8,000		£20,000	ESTIMATE: costs currently unknown	2.5

Year 1								
Action	**Annual cost saving per unit**	**Savings comments**	**No. Units**	**Total annual cost saving**	**Unit cost (no VAT)**	**Total cost (no VAT)**	**Cost comments**	**Payback period**
Replace overhead fluorescent lighting with LED	£31	Average of a variety of operational hours and fitting types (ranging from £11 to £65)	100	£3,100	83	£8,300	Average of a variety of fitting types (ranging from £72 to £120)	2.7
Install motion sensor controls on lighting	£34	Average of a variety of fitting types (ranging from £27 to £41)	25	£850	50	£1,250	Includes installation cost. Assumes one control for one fitting.	1.5
Fit timer plugs to drying ovens	£400		10	£4,000	30	£300		0.1
Fit timer plugs to temperature controlled centrifuge	£275		10	£2,750	30	£300		0.1
Fit timer plugs to temperature controlled shaker	£900		25	£22,500	30	£750		0.0
Fit timer plugs to gas chromatographs/mass spectrometers	£200		5	£1,000	30	£150		0.2
Replace drying ovens with poor thermal properties with new well insulated and sealed ones	£630		5	£3,150	1800	£9,000		2.9
YEAR 1 TOTAL				£102,570		£222,760		**2.2**

Year 2								
Action	**Annual cost saving per unit**	**Savings comments**	**No. Units**	**Total annual cost saving**	**Unit cost (no VAT)**	**Total cost (no VAT)**	**Cost comments**	**Payback period**
Replace old -80 freezers with new on a rolling replacement basis	£800	£400 plug load + £400 air conditioning load reduction	10	£8,000	£9,000	£90,000		11.3
Improved sample management/introduction of room temperature DNA storage	£1,400	£700 plug load + £700 air con load reduction	5	£7,000		£500	Passive storage cabinets are also needed to keep samples below 30% relative humidity, and may cost $500-1000 per lab.	0.1
Replace CV fume cupboards with VAV	£1,000	Savings almost entirely from make-up air	10	£10,000	2000	£20,000	Costs likely to be between £1k and £3k per FC (quotes are being gathered)	2.0
Replace standard air flow fume cupboards with low flow fume cupboards	£800		15	£12,000		£30,000	1ESTIMATE: costs currently unknown	2.5
Replace overhead fluorescent lighting with LED	£31	Average of a variety of operational hours and fitting types (ranging from £11 to £65)	200	£6,200	83	£16,600	Average of a variety of fitting types (ranging from £72 to £120)	2.7
Install motion sensor controls on lighting	£34	Average of a variety of fitting types (ranging from £27 to £41)	50	£1,700	50	£2,500	Includes installation cost. Assumes one control for one fitting.	1.5
Fit timer plugs to drying ovens	£400		25	£10,000	30	£750		0.1

Year 2								
Action	**Annual cost saving per unit**	**Savings comments**	**No. Units**	**Total annual cost saving**	**Unit cost (no VAT)**	**Total cost (no VAT)**	**Cost comments**	**Payback period**
Fit timer plugs to temperature controlled centrifuge	£275		25	£6,875	30	£750		0.1
Fit timer plugs to temperature controlled shaker	£900		50	£45,000	30	£1,500		0.0
Fit timer plugs to gas chromatographs/mass spectrometers	£200		5	£1,000	30	£150		0.2
Replace drying ovens with poor thermal properties with new well insulated and sealed ones	£630		10	£6,300	1800	£18,000		2.9
YEAR 2 TOTAL				**£114,075**		**£180,750**		**1.6**

Year 5								
Action	**Annual cost saving per unit**	**Savings comments**	**No. Units**	**Total annual cost saving**	**Unit cost (no VAT)**	**Total cost (no VAT)**	**Cost comments**	**Payback period**
Incorporate natural ventilation into design of new freezer rooms/"farms"	£700	£700 air con load	100	£70,000		£100,000	ESTIMATED additional design and build costs	1.4
Raise ULT freezer temperatures to -70C	£350		250	£87,500		£5,000	Staff time and test costs for the freezer trial at Roslin	0.1
Replace old electric humidifiers in animal labs	£300,000	Based on experience from Gurdon Institute in Cambridge	1	£300,000		£750,000	1ESTIMATE: costs currently unknown	2.5
Install demand based ventilation controls (e.g. Darwin)	£56,000	Based on experience from MRC building at Cambridge (incorporates a reduction in savings equivalent to the £11k cost of maintenance)	1	£56,000	£97,000.00	£97,000	Based on experience from MRC building at Cambridge	1.7
Replace old -80 freezers with new on a rolling replacement basis	£800	£400 plug load + £400 air conditioning load reduction	10	£8,000	£9,000	£90,000		11.3
Improved sample management/introduction of room temperature DNA storage	£1,400	£700 plug load + £700 air con load reduction	20	£28,000		£1,500	Passive storage cabinets are also needed to keep samples below 30% relative humidity, and may cost $500-1000 per lab.	0.1
Replace CV fume cupboards with VAV	£1,000	Savings almost entirely from make-up air	10	£10,000	2000	£20,000	Costs likely to be between £1k and £3k per FC (quotes are being gathered)	2.0

Year 5								
Action	**Annual cost saving per unit**	**Savings comments**	**No. Units**	**Total annual cost saving**	**Unit cost (no VAT)**	**Total cost (no VAT)**	**Cost comments**	**Payback period**
Replace standard air flow fume cupboards with low flow fume cupboards	£800		15	£12,000		£30,000	1ESTIMATE: costs currently unknown	2.5
Replace overhead fluorescent lighting with LED	£31	Average of a variety of operational hours and fitting types (ranging from £11 to £65)	200	£6,200	83	£16,600	Average of a variety of fitting types (ranging from £72 to £120)	2.7
Install motion sensor controls on lighting	£34	Average of a variety of fitting types (ranging from £27 to £41)	50	£1,700	50	£2,500	Includes installation cost. Assumes one control for one fitting.	1.5
Fit timer plugs to drying ovens	£400		25	£10,000	30	£750		0.1
Fit timer plugs to temperature controlled centrifuge	£275		25	£6,875	30	£750		0.1
Fit timer plugs to temperature controlled shaker	£900		50	£45,000	30	£1,500		0.0
Fit timer plugs to gas chromatographs/mass spectrometers	£200		5	£1,000	30	£150		0.2
Replace drying ovens with poor thermal properties with new well insulated and sealed ones	£630		10	£6,300	1800	£18,000		2.9
YEAR 3 TOTAL				**£648,575**		**£1,133,750**		**1.7**

References

[1] Gumapas & Simons, *World Review of Science, Technology and Sustainable Development, Vol 10, No.s 1/2/3, 2013*
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[4] http://www.triplered.com/downloads/pdf/Sterling%20Freezer%20Efficiency%20paper.pdf
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[6] http://www.goodcampus.org/uploads/DOCS/106-case_10_-_uni_california_final_25_2_11.pdf and http://sustainable.stanford.edu/sites/default/files/documents/Stanford_Room_Temp_Pilot_May09.pdf
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[8] Gumapas & Simons, *World Review of Science, Technology and Sustainable Development, Vol 10, No.s 1/2/3, 2013*
[9] www.eventlink.org.uk/.../103-Arthur_Nicholas_-_Cold_Storage_at_the_University_of_Manchester
[10] Gumapas & Simons, *World Review of Science, Technology and Sustainable Development, Vol 10, No.s 1/2/3, 2013*
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[11] http://www.savawatt.co.uk/images/db/dt_casestudies/4/casestudy.pdf
[12] Based on figures given in two separate independent reports for labs in Joseph Black Building
[13] Based on figures given in two separate independent reports for labs in Joseph Black Building
[14] http://www.eventlink.org.uk/uploads/DOCS2/90-S-Labs_Workshop_-_Chemistry_Labs_refurbishment_-_David_Josey.pdf
[15] Based on evidence provided by Kathy Hilton of the Gurdon Institute
[16] MRC Building, Cambridge. And also http://www1.eere.energy.gov/buildings/commercial/pdfs/bba_air_change_rates_highlights.pdf
[17] Some fume cupboards around UoE operate 24/7 as there is no/insufficient other ventilation for the room. E.g. Waddington Building.
[18] Based on experience at Roslin Institute
[19] Based on 1.1kW compressor
[20] A benchtop scanning electron microscope is rated at c.1kW[20], while a larger multiphoton confocal at c.7kW.[20] Larger end of the scale could cost around £600 annually to run (plug load alone – not including HVAC. Based on 35% capacity factor, 10h/day, 5 day/wk.).
[21]

	£ reduction	Payback
T12 5' to LED short hours	£18	3.9
T12 5' to LED long hours	£46	1.5
T12 5' to LED 24/7	£65	1.1
T8 5' to LED short hours	£10	7.1
T8 5' to LED long hours	£26	2.8
T8 5' to LED 24/7	£35	2.0
T8 600x600 to LED short hours	£11	10.7
T8 600x600 to LED long hours	£28	4.2
T8 600x600 to LED 24/7	£39	1.8

[22]

	£ reduction	Payback
T12 5' photocell controls	£16	3.4
T8 5' photocell controls	£11	5.1

T8 600x600 photocell control	£14	4.0

[23]

	£ reduction	Payback
T12 5' PIR controls (18hx7 - 8hx5)	£41	1.2
T8 5' PIR controls (18hx7 - 8hx5)	£27	1.8
T8 600x600 PIR controls (18hx7 - 8hx5)	£35	1.4

[24] http://www.sciquip.co.uk/store/products/ecocell-with-natural-air-convection/
http://www.leec.co.uk/products/laboratory/drying-cabinets/drying-cabinets
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MINUTE OF *the Labs Workshop on Waste and Procurement held in Main Library Meeting Room 1.11 on Tuesday 26 May 2015.*

In attendance: Andrew Arnott, SRS Programme Facilitator - Laboratories
Ron Brown, Deputy Technical Services Manager, School of Chemistry
Val Gordon, Technical Officer, IETL
Andy Kordiak, Equipment Procurement Manager, MVM
Matthew Lawson, SRS Programme Manager
Chris Litwiniuk, SRS Projects Co-ordinator - Engagement
Stewart McKay, Technical Services Manager, IGMM
Brian McTeir, Easter Bush Facilities and Services Manager
Colin Miller, Purchasing Manager, Roslin Institute
Alan Peddie, SRS Projects Co-ordinator - Engagement
Fleur Ruckley, Waste & Environment Manager
Candice Schmid, Health & Safety Adviser
Dawn Windsor, Easter Bush Deputy Campus Facilities Manager

Apologies: Heather Anderson; Graham Bell; Jim Brown; Michelle Brown; Rab Calder; Martin Crawford; Karen Darling; Dave Gorman; David Gray; David Jack; Julia Laidlaw; Sandra Lawrie; Lindsay Murray; Janet Philp; Laura Skinner; David Somervell; Anna Stamp; Margarida Teixeira-Dias; Geoff Turnbull; Graham Walker

1 Introduction

The SRS Programme Facilitator - Laboratories welcomed attendees to this workshop on the linked issues of procurement and waste; the first in a series addressing the major areas of sustainability in labs (waste, lab design guidelines, energy efficiency/ utilities, and CPD).

The workshops were an offshoot of the Sustainable Laboratories Steering Group (SLSG) which first met in January. Given its diverse remit, it had been decided that the core group would handle strategic considerations and the workshops would cover operational matters.

The aims of the session were: to share best practice; identify barriers and how they could be overcome; and develop approaches that could, where necessary, be taken on to other groups for progression and support.

2 Labs Procurement Process Update

The Purchasing Manager, Roslin Institute presented an update on progress with the labs consumables contract, and how this related to waste minimisation.

The recent tendering programme, which offered an opportunity to gather information and engage with suppliers, weighted 20% on sustainability to balance the usual focus on cost and systems and try to improve supplier behaviour. The expectation of continuous improvement was factored in. 15 suppliers were currently offering waste reduction programmes and a further 10 were willing to work with the University to address the issue. Fisher Scientific in particular could

offer a number of schemes that were not currently being taken up at a campus level. The total value of the lab framework was in the region of £16million.

Action – AA & SRS Department to provide support in engaging with these suppliers. CM would pass on the list once the contracts had been set up.

Polystyrene packaging was identified as a major source of waste for the University, the cost of disposal relating to the volume taken up (though polystyrene boxes could be removed in stores, and could be packed with other waste to mitigate this). There was as yet no route for recycling polystyrene. The best option currently was to compact it to reduce volume and cost.

Roslin Institute was committed to eProcurement and was working with the SciQuest system. 90% of its labs consumables were sourced from contracted suppliers. Bulk buying and the consolidation process in SciQuest was being used to cut packaging and transportation costs. Even with these waste reduction measures in place, polystyrene disposal at Roslin still represented expenditure of £15K per annum.

Discussion / Q&A

The Group noted a trend away from reusable to disposable single use items, generally made from non-recyclable materials, with washers and sterilisers seeing less use. This was a demand coming from the lab bench rather than procurement channels, with users trusting the sterility of single-use items and attracted by the convenience. It may not be practical to provide and store sufficient quantities of reusable items, for example glass pipettes, for a campus the size of Roslin. The practice of single use items being used for non-hazardous materials was compounding the problem.

Packaging take-back schemes, scheduled to coincide with deliveries, were identified as the most viable way of reducing waste arisings and a number of these were currently operating successfully at UoE, including the current light fitting contract. Suppliers had a responsibility to take back / recycle a certain percentage of waste and investigation should be carried out to follow up on how they were meeting these requirements. Attendees noted some inconsistency in how suppliers were operating across campuses, taking back packing materials in some areas, and not in others. This may depend on the volumes involved.

The lifespan of lab equipment made take-back at end of life more complicated than WEEE for domestic appliances. However it was happening, if not routinely, particularly in the case of larger items, trading in old equipment for credit against new. Circular economy principles could be particularly applicable in this case and suppliers could be sought out who already design for reuse. BD Biosciences, for example, would take back any manufacture’s flow cytometers, given the opportunity to take competitors’ machines out of the market. The ability to dispose of old equipment and receive credit for it made these schemes particularly attractive for labs. Other suppliers were willing to put pipette tip packaging recycling schemes in place to persuade consumers to use their products. However, having too many waste streams from a lab would quickly become complicated to manage and could require a lot of space for the various bins. Starlab could be asked to provide a report on the quantities collected from UoE and recycled.

The Sustainability Awards were noted as a useful vehicle for creating and expanding areas of order consolidation as well as a route to developing local

solutions. Even when labs were consolidating ordering, the supplier's own supply chains could duplicate packaging anyway. The Labs User Group, which had representation from every campus, reported significant interest in and engagement with sustainability on the ground.

3 Lab Waste Minimisation

The Waste and Environment Manager presented on the challenges, successes and future strategy for lab waste minimisation.

- Challenges
  - Legal
  - Health & Safety
  - Space
    - particularly the space required to segregate waste to ensure it is treated in the right way, or to keep electrical equipment clean and dry
  - Conflicting priorities

Labs Waste:

>292 tonnes - 10% of waste (hazardous stream only – not including the element that goes into the general stream, which cannot be quantified)

>£120,000 - 25% of spend

>28 tonnes CO_2eq - 20% of total emissions

- Achievements (across the board)
  - Stock management (in pockets where this was being used it was proving very effective)
  - Reuse & repair (a number of schools had their own workshops which could handle some repairs, though they required storage space for tools and spare parts)
  - Training & guidance (guidance was available in various forms including: courses; the Be Sustainable laboratories guide; and the How To guide for labs waste)
  - Recycling initiatives (engagement with contractors on recycling single use consumables, chemistry gloves scheme, WARPit, bottle return etc. every lab should now have a box for glass recycling)
  - S-Lab – sharing good practice

- Opportunities
  - Hazard Management
    - Choice of materials
    - Stock Management
    - Segregating and describing waste
    - Storage
  - Prevention
    - Bulk packaging (better address at sector level)
    - Use of different materials / chemicals
  - Recycling
    - Recycling of plastics, metals, paper, card & glass

- Auditing
- Benchmarking
  - Metrics/KPIs
- More training / guidance
  - Videos (snapshot, bite size training when needed)
- Design (to reduce hazards and improve circularity)
  - Packaging (take-back schemes / purchasing a service more than a product)
  - Equipment (may be better to lease than buy)

Action – FR to look into recycling opportunities for Pyrex.

Discussion / Q&A

A significant challenge was the variation in procurement systems from campus to campus. The Procurement Office were rolling out a series of workshops to address the issue, demonstrating the benefits of systems such as eStores. It was highlighted that the SRS Department could support this action if required. The cost, in terms of staff time, of an electronic order was estimated at £5, compared to £60 for a paper order. Attendees agreed on the need to get communications out based on schemes that were known to work well in other areas.

Action – AA to investigate if S-Lab or EAUC can influence packaging materials from suppliers on a national HE scale.

Action – SRS Department to undertake waste auditing to clarify which waste streams are diverted from landfill in different areas.

Action – SRS Department to design and deliver more training and guidance (perhaps in video format) which could be completed online. It was recommended that Derek Mills in procurement at IGMM could talk about how much has been saved by using e-stores for stock management.

Action – SRS Department to investigate whether any academic departments are developing alternatives to polystyrene for temperature controlled transport packaging.

4 WARPit

The SRS Projects Co-ordinator presented on the WARPit reuse portal which had consolidated pre-existing pockets of reuse and integrated them into a system that was more visible and measureable. Roll out had begun with targeted engagement on easy to swop items such as stationery, crockery and PAT tested electronics without data. Free promotional giveaways had encouraged people to use the site. The website cost £2,500 per year and had saved over £26K in 18 months of operation.

The next focus had been PC cascading. A lot of this activity was going on within the University already, and the aim was to shift some of this on to WARPit. A pilot run in the central area would soon be expanded, once the IS wipe and reformat trial was complete.

The challenge of rolling WARPit out to labs was recognised and the intention would be to start small. Items would have to have a decontamination certificate, be in the original packaging, and the agreement of all grant holders etc. involved would have to be secured. Microscopes would be a good starting point. The more services an

item required (power, steam, water etc.) the more difficult it would be to cascade. As more people came to use WARPit the range of items offered would improve. The scheme would be open to third parties for certain items only. A process map for resale was currently being drawn up by the Director of Legal Services.

Action – AP to circulate updated guidance.

Action – AP to check that automated emails from WARPit were functioning as intended, and investigate the possibility of users selecting categories of items they wish to be notified about.

Discussion / Q&A

Attendees noted inconsistency in the repair of items, estates handling those they had responsibility for and some schools having workshops. Noted that HEaTED offered courses in repair. As PAT testers tended to be external contractors, attendees were encouraged to report minor repairs through the EBIS system. Lab users were asked whether there are any items of equipment they foresaw as unsuitable for WARPit – none were identified as all items of equipment must go through a certified decontamination process at the end-of-life anyway so would be safe to pass on if there were a recipient. Microscopes were identified as being particularly suitable for WARPit.

5 Summary

The strategic approaches and practical actions that UoE labs could adopt going forward included:

- Once the tender process was locked down, negotiating with suppliers, especially on the issue of packaging
- Providing additional training and guidance, particularly online videos for staff on waste
- Expanding WARPit at a slow and steady pace
- Expanding eStores to other areas
- Carrying out audits of provision and recycling and reuse schemes to expand the most progressive contracts across the estate
- Discussing packaging with suppliers at the national level through EAUC and S-Lab
- Looking to UoE Design & Engineering schools for alternatives to polystyrene for temperature controlled transport
- Leasing versus purchasing
- Repair, including HEaTED workshops and CPD for technical staff.

Date of next meeting: 14.00-16.00, Tue 16 June 2015, Cuillin Rm, Charles Stewart House