



**Sustainable Laboratories Steering Group (SLSG)**

**Monday 23<sup>rd</sup> September 2019, 2pm**

**Raeburn Room, Old College**

**AGENDA**

- 1 Minute** **A**  
To approve the minute of the previous meeting on 27 May 2019 and raise any matters arising
  
- 2 Sustainable Labs Programme Plan RAG Update** **B**  
To note and discuss a report from the SRS Projects Coordinator including Ashworth Energy Monitoring Project, Lab Awards & LEAF pilot updates
  
- 3 Hugh Robson Energy Monitoring Project Report** **C**  
To note and discuss a report from the SRS Projects Coordinator
  
- 4 LILEE Distribution Project** **Verbal**  
To receive an update from the Design Informatics Research Software Engineer
  
- 5 Lab Procurement - Equipment Re-use/Re-sale Process** **Verbal**  
To receive an update from the Laboratory & Medical Equipment & Consumables Team Manager
  
- 6 Technician Commitment update** **Verbal**  
To receive an update from Laboratory Technician Val Gordon
  
- 7 Sustainability Champions Network** **Verbal**  
To receive an update from the SRS Projects Coordinator
  
- 8 SLSG Programme Plan 2020-2025 – Workshop session** **Verbal**  
To discuss ideas for the next iteration
  
- 9 Any Other Business** **Verbal**  
To consider any other matters from Group members.

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**MINUTE OF A MEETING** of the Sustainable Laboratories Steering Group held in Room 2.01 Geography (Old Infirmary) on Monday 27 May 2019.

- Members:** Dave Gorman, (Convener), Director of Social Responsibility and Sustainability  
Andrew Arnott, Engagement Manager  
Rachael Barton, SRS Projects Coordinator  
David Brown, Technical Services Manager, School of Chemistry  
Michelle Brown, Head of SRS Programmes  
Dean Drobot, Head of Energy and Utilities Management  
Joanne Dunne, Early Stage Researcher  
Grant Ferguson, Director of Estates Operations  
Kate Fitzpatrick, Waste & Recycling Manager  
Simon Santamaria Garcia, Student Representative, School of Engineering  
Val Gordon Technical Officer, Institute for Education, Teaching & Leadership  
David Gray, Head of the School of Biological Sciences  
Sharon Hannah, Bioquarter Campus Operations Manager  
Yuner Huang, Early Stage Researcher  
Angela Ingram, Service Manager, IGMM  
David Jack, Energy & Utilities Operations Manager  
Andy Kordiak, Laboratory & Medical Equipment & Consumables Team Manager  
Julia Laidlaw, Estate Development Manager  
Sandra Lawrie, Technical Services & Estates Manager, School of Biological Sciences  
Guy Lloyd-Jones, Forbes Chair of Organic Chemistry  
Robert MacGregor, Energy Engineer, Utilities Management  
Stewart McKay, Technical Services Manager, IGMM  
Brian McTier, Easter Bush Campus Facilities and Services Manager  
Lee Murphy, Genetics Core Manager  
Janet Philp, Joint Unions Liaison Committee  
Thomas Reynolds, Chancellors Fellow in Civil Engineering  
Candice Schmid, Occupational Hygiene and Projects Manager  
Matthew Sharp, BVS Deputy Director - Business
- In attendance:** Evan Morgan, Design Informatics Research Software Engineer, for item 7
- Apologies:** Dave Gorman; Rachael Barton; Dean Drobot; Joanne Dunne; Grant Ferguson; Kate Fitzpatrick; Simon Santamaria Garcia; David Gray; Yuner Huang; Angela Ingram; Julia Laidlaw; Guy Lloyd-Jones; Robert MacGregor; Lee Murphy; Janet Philp; Matthew Sharp

**1 Minute**

A

In the absence of the Convener, the Head of SRS Programmes welcomed attendees to the fourteenth meeting of the Group.

The minute of the meeting held on 28 January 2019 was approved as a correct record, subject to one amendment.

Action – JR to amend previous minute to include apologies from MB.

**Post-meeting note: amended 28/05/19.**

## 2 Sustainable Campus Fund Projects

B

SLSG noted this paper, which covered the overall financial performance of the Campus Fund, set up three years ago with the agreement of Estates Committee as an energy and carbon efficiency vehicle for the University. Sections 9 and 10 of the paper focused specifically on lab projects. Overall, labs were continuing to contribute a significant pipeline of projects to the fund, second only to lighting. The SCF included a specific sub-fund for freezer upgrades, which had now been fully subscribed and top-up funding agreed.

Since January's meeting the Joseph Black fume cupboard upgrade had gotten underway and was progressing well. Premier had been contracted to carry out this work, moving 28 cabinets to variable flow, and replacing fluorescent lights with LEDs. Some of the cabinets were double width, making it more challenging to fit controls. This project could serve as a pilot for similar projects to be rolled out as far as possible across the University. User, electrical and thermal monitoring would be used to assess the success of the pilot, in addition to monitoring through the BMS.

Action – AA to share early findings from the Joseph Black project at the next meeting.

## 3 Sustainable Labs Programme Plan with RAG Status Update

C

All activities were at green status, with the exception of BMS control sense checks which had been missed in summer 2018. This would be picked up in summer 2019. There were currently two buildings under consideration.

As the Plan was now entering its final year, members agreed the Engagement Manager's proposal to hold a workshop at the next meeting to share ideas and agree basic principles for the ensuing plan, submit a first draft to the 25<sup>th</sup> November meeting and a final version for adoption early in 2020.

## 4 Summer Internship Proposals

D

The SRS Department had agreed to host two internships over summer 2019. One, co-sponsored with the College of Science and Engineering, would focus on mapping sustainability activities within the College. This would be a 12 week internship, starting in early July. The CSE contact would be Duncan Herd. Initial contact with schools would be through Directors of Professional Services.

*Post-meeting note: SRS Coordinator Rachael Barton confirmed that the CSE contact would be Bruce Nelson rather than Duncan Herd.*

Action – All members in or working with CSE who can summarise sustainability activity within a particular area to pass this on to AA.

The second would be a repeat of the freezer internship, hosted in labs and running for a total of 8 weeks. The intern would undertake practical tasks including defrosts and restocking, cleaning filters and heat exchanger fins, inventorying contents and identifying old samples for disposal. SRS were looking for volunteers to host the intern in their lab for a period of time dependant on the size of their fleet of freezers.

Action – All members willing to host the intern to get in touch with AA.

Action – All members aware of any technicians involved in hosting interns to pass details on to VG.

## 5 Lab Procurement - Equipment Re-use/Re-sale Process

The Laboratory & Medical Equipment & Consumables Category Team Manager updated SLSG on progress developing the reuse/resale process. In the past Procurement had

investigated a number of ways of disposing of unwanted assets, including trading them in against new procurement, donating internally and externally, using Warp-it, and Waste Electrical and Electronic Equipment recycling. Recently there had been a particular focus on selling outwith the University. One significant hindrance had been the absence of a process approved at senior level to point to. Two years ago multi-department discussions began to develop a flowchart and FAQs to support and advise colleagues through this process. Engagement with the Colleges had been helpful, with College Registrars particularly supportive.

Issues raised 18 months ago around disposal of items funded from exchequer funds had now been resolved, with assurances received that this would not be relevant to lab procurement (it focused mainly on land, with values from around £3M). In a few cases Procurement had gone to some lengths to secure permission to sell from donation sources.

Regarding ERDF-funded items of equipment, the general advice was to be proportionate (no Scotland-specific advice was available). Procurement had a good awareness of larger European Regional Development Fund projects and would be able to continue to keep an eye on these as they progressed.

Legal Services had provided advice around balancing value and the risk associated with selling goods, and had revamped the terms and conditions for University selling. The process had been a good example of inter-departmental cooperation, and a shared file location would be set up to store contract documents, accessible by Estates, SRS, Procurement and Legal Services.

Initially it was felt that for items below a threshold of £10K the effort involved in selling outweighed resale value, however some cases had been raised where resale would be very straightforward, and so this threshold had been scrapped and each individual case would be assessed on its own merits. Procurement and Legal Services would review cases in the first instance, looking to donate or reallocate where sale was not justifiable. One of the first recommendations would be to reuse internally.

At this time the process would not address the area of useful equipment of very low resale value. Advertising equipment was also not currently being covered – the onus was on users wanting to sell to find a buyer. UoE would also not be using companies to sell on its behalf.

In terms of next steps, the flowchart and FAQs needed minor amendments before finalisation. The Head of Court Services had recommended going down the process route rather than policy. A committee paper was currently being drafted which the Director of SRS would be asked to present to the University Executive.

SLSG thanked the Category Team Manager for providing useful clarity on this topic.

Action – AK to circulate the paper to this group for consultation before it goes forward to University Executive.

## **6 Technician Commitment update**

SLSG was updated on progress across various activities to fulfil UoE's obligations under the Technician Commitment, including enhancing the visibility of technicians and their contribution, supporting them to gain recognition through professional registration, enabling career development opportunities, and ensuring the future sustainability of technical skills across the organisation.

Events had been held at QMRI, Informatics, and KB, with another one scheduled for 4<sup>th</sup> June at ECA. Local groups had been active, and a Technical Staff Professional Registration Workshop planned for 30<sup>th</sup> May already had over 20 participants. A budget had been secured for technical staff to access professional registration. UoE was on track to secure employer champion status. A number of technical staff had signed up to participate in the Foundation Apprenticeship scheme for school pupils in Fifth and Sixth Year. Talks were ongoing to secure a senior sponsor, though details could not yet be confirmed. A paper would be prepared to update People Committee on progress and outline a framework for future activities.

Action – All members wanting to feed in to the paper to contact VG.

## 7 **LILEE Distribution Project – Next Phase**

The Design Informatics Research Software Engineer outlined the background to this behaviour-based living lab project. The interface was an Internet of things (IoT) device for the management of lab equipment. Six units were currently installed at Roslin Institute. Using their ID card to access the interface, staff could use the device to book equipment. It also suggested options for equipment sharing.

The project had received additional funding from SRS and the University's newly formed IoT Research and Innovation Service to roll out the devices more widely and was looking for labs willing to participate in trials. Project staff would provide support to customise the device to the needs to each lab's users. The interface could be attached to any piece of equipment and its features customised appropriately.

The devices allowed for greater transparency, allowing visibility of who was using equipment and when, and whether they were willing to share capacity. Allowing users to share capacity on an existing booking made for much more efficient use of lab equipment. The project had seen a 20-25% reduction in equipment use, generating annual savings of £60 - £120 per device. There had been a 93% acceptance rate when users were offered the opportunity to share equipment.

In future, the project team would like to look into adding the ability for LILEE to connect to Bluetooth, allowing it to get equipment to operating temperature in time for bookings, or turn it off when not required. It could also tie in to cold storage management. The devices could also be used to restrict access to users who had attended relevant training. While the scope for adding additional features was vast, the focus currently was on rolling LILEE out further to get more interaction in its current capacity as a booking device. Devices would go into labs over the next few months, and be trialled for around a year.

Action – All members to spread the word and encourage more labs to participate in trials, particularly areas with high energy use equipment, where there were opportunities for sharing. Interested parties to contact [e.morgan@ed.ac.uk](mailto:e.morgan@ed.ac.uk).

Action – JR to invite the Design Informatics Research Software Engineer to report back on progress at September's meeting.

***Post-meeting note: invitation accepted on 6<sup>th</sup> June.***

## 8 **Lab Plastics Overview**

A member of staff had been secured to work on lab plastics one day a week for six months. A [survey](#) was currently running on the SRS website aimed at developing a baseline on what was currently being done on lab plastics and identifying pockets of good practice. In addition to the survey, desk-based research was being conducted on

best practice internally and externally which would then form the basis of a communications campaign. One area targeted for improvement was re-education around when lab plastics were not contaminated and could go into the usual recycling streams. An action plan for future work on lab plastics would be drawn up, including promoting glass alternatives where practical and where these offered a good sustainability saving over their life cycle as compared to plastics. Ideally SRS would like all members of staff working with lab plastics to complete the survey.

The Group recognised this as an important area of work, with the overall aim of phasing out non-recyclable plastics where possible by 2030.

Action – All members to help spread the word about the survey, particularly to colleagues in Science & Engineering.

Action – All members aware of examples of good practice to pass these on to [Kerry.Cheek@ed.ac.uk](mailto:Kerry.Cheek@ed.ac.uk).

## **9 Ashworth Energy Monitoring Project Proposal**

SRS were working with Building Manager Claudia Schaffner on a new energy engagement monitoring project. Firstly monitoring would be set up on certain electrical circuits and a baseline measured. Claudia was working with Robert MacGregor in Estates to identify areas that were electrically isolated and had discrete user populations. The fourth floor of Ashworth 3 was a suitable prospect, as well as the third floor if there was enough monitoring equipment.

Once monitoring was in place engagement activities would be carried out including posters, Be Sustainable online training, walkarounds, CPD courses on sustainable labs, and workshops on specific lab themes, including a session on the Sustainable Campus Fund. Then data on energy consumption per person would be assessed to see if this had led to a reduction. The proposed project still needed to be presented to lab users to get their consent. This would be a 12 month project, the longest undertaken so far, starting in June or July. This should help rule out any fluctuations due to seasonality.

Action – AA to circulate the project plan for Ashworth.

## **10 HRB Update On Longer Term Impact**

SLSG noted a rise in energy use at Hugh Robson over the monitoring period, potentially due to an increase in MSc and undergraduate students and an upturn in the intensity of research. Alternatively, as the per capita figure was based on data from swipe card access, this may have been inaccurate. The Engagement Team would build lessons learned from the HRB project into plans for Ashworth.

Action – AA to circulate the HRB report once finalised.

## **11 Lab Awards Update**

The Lab Awards had taken place at the end of March. Turnout had been good, and the Engagement Manager thanked all involved. Accredited teams included: the Roslin Institute Laboratories; Edinburgh Clinical Research Facility (WTCRF); Biology Teaching Organisation; SRUC Biomarkers Lab; School of Chemistry; IGMM; Chemical Engineering Teaching Lab: Denbigh Lab and the SCRUM Tissue Culture Team. As Awards remain valid for two years, several other teams kept their accreditation from 2017, including: the MRC Centre for Reproductive Health, QMRI; the Horsfall Lab; Chemical and Environmental Engineering; and Bioresearch & Veterinary Services. New teams for 2019/20 included the QMRI flow cytometry facility and the Regan and Wallace

groups in biology. Bioresearch & Veterinary Services intended to resubmit this year. More teams were expected to sign up, with the deadline at the end of October.

University-wide, 21 buildings now had Labs Awards teams, some covering the whole building, some just a small segment, with 45% of all lab buildings participating at least partially in the scheme.

## **12 Any Other Business**

Duncan Peter, who had some connections to the School of Engineering, had approached SLSG members in Biology and Chemistry regarding his Scottish Enterprise-funded start-up company focused on producing small, easily installed reverse osmosis units with a wide range of applications, providing point of use purified water. The Convener recommended linking him in through ECCI to the EIT Climate-KIC partnership.



**Sustainable Labs Steering Group**

**23<sup>rd</sup> September 2019**

**SLSG Programme Plan update (June 2019 – September 2019)**

**Description of paper**

This document is intended to give an update on progress against the objectives of the 2017-20 Sustainable Laboratories Steering Group Programme, which was drawn up to provide a structured approach to improving sustainability within laboratories at the University of Edinburgh over that time period, with a view to achieving wider University goals such as the Zero by 2040 target within the Climate Strategy. A Gantt Chart using a traffic-light colouring system (Red/Amber/Green) 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, and grey = action scheduled for future work. Further details on the progress against each individual action is included within a table. This document will be updated prior to each meeting of the Sustainable Laboratories Steering Group.

The purpose of this report is to report against progress in relation to activities with further thought on monitoring of outputs and outcomes to be considered. The outcome objectives of the 3 year plan are noted below:

**Action requested**

SLSG is asked to note the progress described in this paper and provide any advice or guidance for further improvement.

**Background and context**

At the October 2017 meeting of the SLSG this 2017-2020 programme plan was presented and approved. This report notes the progress against this 3-year plan.


**Outcome objectives:**


1. 10% reduction in energy consumption.
2. Lab equipment reuse and sharing increased
3. Reduced consumption of materials, especially hazardous materials.
4. Enable culture of sustainable working through provision of support and training for lab technicians.
5. Adoption and use of sustainable building design guidelines (incorporating labs) and Soft Landings or similar approach.
6. 100% of labs covered by Edinburgh Sustainability Awards teams
7. By 2020 every building with labs will have an energy coordinator who is lab-based.





## Communications and Engagement

Activity	Associated Outcome	Colleagues supporting	Comments	RAG
<b>Promote use of the Sustainable Campus Fund</b>	<ol style="list-style-type: none"> <li>10% reduction in energy consumption</li> <li>3. Reduced consumption of materials, especially hazardous materials</li> </ol>	<ul style="list-style-type: none"> <li>Robert MacGregor</li> <li>Energy Office</li> <li>Estates Small Works Team</li> </ul>	<ul style="list-style-type: none"> <li>Emails sent promoting the fund</li> <li>Verbal communications with colleagues, including via Sustainability Awards teams</li> <li>45% of funded SCF projects are lab projects</li> </ul>	
<b>Develop further sustainability communications materials for use by non-SRS staff including persuasive body of evidence to influence academics and lab users, as well as lists of recommended items of lab equipment (based on verified sustainability credentials)</b>	<ol style="list-style-type: none"> <li>10% reduction in energy consumption.</li> <li>Lab equipment reuse and sharing increased</li> <li>Reduced consumption of materials, especially hazardous materials.</li> <li>6. 100% of labs covered by Edinburgh Sustainability Awards teams</li> <li>7. By 2020 every building with labs will have an energy coordinator who is lab-based.</li> </ol>	<ul style="list-style-type: none"> <li>Lab Users</li> </ul>	<ul style="list-style-type: none"> <li>Research (living labs) into effective communication methods (e.g. energy monitoring) will feed into this</li> <li>Work to develop processes for equipment re-sale/re-use will also feed into this</li> <li>A project investigating lab plastic use commenced in April. The key activities are to research best practice for reducing single-use lab plastics and create an action plan, guidance, and improved communications on this subject</li> <li>Best practice research and guidance for reducing lab plastics continues to be developed</li> <li>A survey was conducted to better understand purchasing, use, and disposal of plastic items in University laboratories. The survey received 225 responses and initial analysis of results is underway</li> <li>Post installation communications materials have been developed to provide guidance on correct fume hood use following the fume hood retrofit in the Joseph Black Building</li> </ul>	
<b>Work with lab users/building</b>	<ol style="list-style-type: none"> <li>10% reduction in energy consumption</li> </ol>	<ul style="list-style-type: none"> <li>Energy Office</li> <li>Lab Users</li> </ul>	<ul style="list-style-type: none"> <li>Improved data has not yet been made available, but this is not yet considered to be delayed</li> </ul>	

Activity	Associated Outcome	Colleagues supporting	Comments	RAG
managers to make use of improved energy data (when available) – e.g. communicating the data, setting targets			<ul style="list-style-type: none"> <li>Where short term localised energy monitoring projects have been undertaken (e.g. HRB, IGMM and Roger Land) the energy data has been a useful communication and engagement tool</li> <li>The energy monitoring project based in Ashworth is due to commence at the end of September and will support this outcome. Meters have been ordered by Estates and an engagement activity schedule agreed with the lab manager</li> </ul>	
Recognition of good practice via awards and/or other communications.	<ol style="list-style-type: none"> <li>10% reduction in energy consumption.</li> <li>Lab equipment reuse and sharing increased</li> <li>Reduced consumption of materials, especially hazardous materials.</li> <li>100% of labs covered by Edinburgh Sustainability Awards teams</li> </ol>	<ul style="list-style-type: none"> <li>Lab Users</li> </ul>	<ul style="list-style-type: none"> <li>Recruitment of teams for the 2019-2020 Awards are underway. Nine teams have signed up to actively participate this year, with eight teams from 2018 remaining accredited</li> <li>This includes six taking part in the Awards for the first time</li> <li>25 Buildings have lab awards teams (although not all teams cover a whole building) equating to around 50% of lab buildings participating or partially participating in the lab awards</li> <li>Pilot of LEAF tool in the School of Chemistry was successfully completed, with next steps to be discussed. Data collected was submitted to the pilot coordinators for analysis. Feedback on participation was provided by the School and SRS back to the pilot coordinators. It is hoped that this participation will be included in the School's REF2021 submission</li> </ul>	

Activity	Associated Outcome	Colleagues supporting	Comments	RAG
<b>Regular communications between SRS and SLSG/lab users (e.g. newsletter or emails)</b>			<ul style="list-style-type: none"> <li>Established communications via Technicians' Group</li> <li>Regular communications via contacts lists, e.g. lab and/or building managers</li> <li>All SLSG are encouraged to sign up to SRS newsletter for departmental news and events</li> </ul>	
<b>SLSG meetings (strategic direction, project support and progress reporting)</b>		<ul style="list-style-type: none"> <li>SLSG members</li> </ul>	<ul style="list-style-type: none"> <li>Suitable scheduling of meetings is taking place</li> <li>Attendance is good</li> </ul>	
<b>Share good management processes – e.g. equipment sharing</b>	<ol style="list-style-type: none"> <li>Lab equipment reuse and sharing increased</li> </ol>	<ul style="list-style-type: none"> <li>Lab Users</li> <li>SRS Comms</li> <li>Waste Dept</li> <li>Procurement Dept.</li> </ul>	<ul style="list-style-type: none"> <li>No specific promotion of this has taken place yet</li> <li>Guidance on ventilation and cold storage good practice has been disseminated</li> <li>Lab waste clarification and equipment re-sale/re-use guidance is ongoing - Advice from Legal is to ask for approval from the Policy and Resources Committee for this "Procedure" (i.e. not a "Policy")</li> <li>Promotion of this is included within communications to Awards teams</li> </ul>	
<b>Peer learning of sustainable labs best practices (via awards, workshops, campus meetings) – including recruitment of</b>	<ol style="list-style-type: none"> <li>10% reduction in energy consumption.</li> <li>Lab equipment reuse and sharing increased</li> <li>Reduced consumption of materials, especially hazardous materials.</li> </ol>	<ul style="list-style-type: none"> <li>Lab Users</li> </ul>	<ul style="list-style-type: none"> <li>The 2019-2020 Award were launched in April, with team recruitment in progress</li> <li>Three workshops were held between May – July for Awards teams to facilitate sharing of best practice</li> <li>A dedicated Yammer group has been created to encourage communication between teams</li> </ul>	

Activity	Associated Outcome	Colleagues supporting	Comments	RAG
<b>awards teams and energy coordinators.</b>	6. 100% of labs covered by Edinburgh Sustainability Awards teams 7. By 2020 every building with labs will have an energy coordinator who is lab-based.		<ul style="list-style-type: none"> <li>Ongoing support and encouragement to confirmed and prospective teams is taking place</li> <li>Some awards teams are recruiting additional teams</li> <li>C.67% of lab buildings have an energy coordinator based on recent analysis, however it is currently unknown if these energy coordinators are lab based</li> </ul>	
<b>Encourage and support organisation of a prestigious conference over video conferencing, potentially with support from The Wellcome Trust</b>		<ul style="list-style-type: none"> <li>Lab Users</li> <li>Academics</li> <li>Funders</li> </ul>	<ul style="list-style-type: none"> <li>No specific action has been taken on this yet</li> <li>Potential to harmonise/merge with work on Business Travel pilots being conducted by SRS</li> <li>Proposed for 2019-20 academic year</li> </ul>	

## Utilities, Waste and Carbon

Activity	Associated Outcome	Colleagues supporting	Comments	RAG
<b>Support implementation of ventilation improvements in labs</b>	1. 10% reduction in energy consumption.	<ul style="list-style-type: none"> <li>Health and Safety</li> <li>Energy Office</li> <li>Estates small works team</li> </ul>	<ul style="list-style-type: none"> <li>Feasibility work assessed Wind Responsive Ventilation – reported in March 2018. Proposal is £1m cost and 8 year payback. Current proposal is to split into phases to reduce disruption and incorporate into the above noted major refurb at Chemistry</li> </ul>	

Activity	Associated Outcome	Colleagues supporting	Comments	RAG
			<ul style="list-style-type: none"> <li>Fume cupboards in 2 labs in Joseph Black Building have been converted to VAV with motion sensor controls for the sash, in the first phase of improvements</li> <li>Post installation communications materials have been developed to provide guidance on correct fume hood use following the fume hood retrofit in the Joseph Black Building</li> <li>Many practical projects are in development/implementation phases (e.g. Demand Based Ventilation, fume cupboard upgrades, ensuring efficient new fume cupboards in new labs, chemical store upgrades)</li> </ul>	Green
<b>Develop targets of kWh/m2 for various space use categories</b>	5. Adoption and use of sustainable building design guidelines (incorporating labs) and Soft Landings or similar approach.	<ul style="list-style-type: none"> <li>Estates Development</li> <li>Estates Operations</li> <li>Contractors (Cundalls and Henry Gun-Why)</li> </ul>	<ul style="list-style-type: none"> <li>Due for action 2019-20</li> </ul>	Grey
<b>BMS/HVAC control sense checks programme extended to further lab spaces (incorporating checks of biohazard</b>	1. 10% reduction in energy consumption.	<ul style="list-style-type: none"> <li>Energy Office (controls)</li> <li>Lab Users</li> </ul>	<ul style="list-style-type: none"> <li>Scheduled for action each summer 2018, 2019 and 2020</li> <li>Two buildings, Ashworth and Michael Swann, have been reviewed, as one was unable to be completed in 2018. VT circuit checks show appropriate settings</li> </ul>	Green

Activity	Associated Outcome	Colleagues supporting	Comments	RAG
<b>category activities)</b>				
<b>Engage with lab users on development and publication of labs design guidelines</b>	5. Adoption and use of sustainable building design guidelines (incorporating labs) and Soft Landings or similar approach.	<ul style="list-style-type: none"> <li>Lab Users</li> </ul>	<ul style="list-style-type: none"> <li>The new design standard, ESME, is being phased into building projects, including those which are currently in early RIBA stages</li> <li>SRS has involvement in the design meetings for four lab-containing building projects. The aim in these meetings is to ensure that sustainability is embedded within the design and planning process</li> </ul>	

### Living Labs projects

Activity	Associated Outcome	Colleagues supporting	Comments	RAG
<b>Recruitment and implementation of student (paid) interns for freezer inventories and/or other laborious semi-skilled work.</b>	<ol style="list-style-type: none"> <li>10% reduction in energy consumption.</li> <li>Lab equipment reuse and sharing increased</li> <li>Reduced consumption of materials, especially hazardous materials.</li> </ol>	<ul style="list-style-type: none"> <li>Lab Users</li> </ul>	<ul style="list-style-type: none"> <li>Internship commenced on schedule on the 3<sup>rd</sup> July, and concluded on the 28<sup>th</sup> August</li> <li>By the internship's conclusion, there had been little agreement to dispose of any samples. However there was interest in long term storage options, such as the Roslin freezer farm project</li> <li>There were significant issues affecting the progress of the project, including little interest in freezer defrosting from labs, and labs were difficult to get in touch with. Ice scraping and filter/fin cleaning made up the majority of the practical work</li> </ul>	

Activity	Associated Outcome	Colleagues supporting	Comments	RAG
			<ul style="list-style-type: none"> <li>A final report was produced outlining the intern's recommendations and will be circulated</li> </ul>	Green
<b>Support lab-based 'living lab' sustainability projects (DNA, lighting, freezers)</b>	1. 10% reduction in energy consumption. 2. Lab equipment reuse and sharing increased 3. Reduced consumption of materials, especially hazardous materials.	<ul style="list-style-type: none"> <li>Lab Users</li> <li>Estates</li> </ul>	<ul style="list-style-type: none"> <li>Scheduled for action each summer 2018, 2019 and 2020</li> <li>Discussions have started around DNA storage</li> <li>Long-term cold storage project (-60, -70 and -80) is ongoing (expected publication 2020)</li> <li>Energy efficient equipment replacements (SCF) are being monitored for actual energy performance</li> <li>An intern was recruited over summer 2019 to support improvements in freezer and sample management</li> </ul>	
<b>Hazardous chemical substitution opportunities identification.</b>	3. Reduced consumption of materials, especially hazardous materials.	<ul style="list-style-type: none"> <li>Lab Users</li> </ul>	<ul style="list-style-type: none"> <li>Preliminary meetings and conversations have been held with key individuals in Chemistry teaching, Chemistry research, and Chemistry health and safety. Materials and web links regarding possible avenues for investigation have been shared. While Andrew is acting Engagement Manager, SRS work on this project will be paused temporarily, to be picked up again in October 2019.</li> </ul>	

### Technical Staff

Activity	Associated Outcome	Colleagues supporting	Comments	RAG
<b>Work with Technicians'</b>	4. Enable culture of sustainable working through provision of	<ul style="list-style-type: none"> <li>Technical Staff</li> </ul>	<ul style="list-style-type: none"> <li>University of Edinburgh has signed up to the Technician Commitment</li> </ul>	Green



Activity	Associated Outcome	Colleagues supporting	Comments	RAG
<b>Support Steering Group to improve CPD, career development and community cohesion of technical staff.</b>	support and training for lab technicians.	<ul style="list-style-type: none"> <li>• Technical Managers</li> <li>• IAD</li> <li>• HR</li> <li>• Academics</li> </ul>	<ul style="list-style-type: none"> <li>• The TSSG is working with Val Gordon (seconded to work on Technician Commitment for 10h/wk) to develop and implement an Action Plan incorporating a website, events, CPD, Professional Registration, newsletters, emails</li> <li>• An update report on progress against the Implementation Plan is being produced for People Committee</li> <li>• A Technician Commitment Action Plan update and RAG report have been developed to report on the previous year's commitments</li> <li>• Professional Registration Workshops were held at the BioQuarter campus and KB on the 5th September</li> </ul>	

## Funders

Activity	Associated Outcome	Colleagues supporting	Comments	RAG
<b>Work with funding bodies to influence their approach to sustainability.</b>	<ol style="list-style-type: none"> <li>1. 10% reduction in energy consumption.</li> <li>2. Lab equipment reuse and sharing increased</li> <li>3. Reduced consumption of materials, especially hazardous materials.</li> </ol>	<ul style="list-style-type: none"> <li>• Lab Users</li> </ul>	<ul style="list-style-type: none"> <li>• SRS department personnel are involved in discussions with Wellcome Trust on a bilateral and multilateral (via the UK-wide Lab Efficiency Action Network) basis</li> </ul>	

Activity	Associated Outcome	Colleagues supporting	Comments	RAG
	<ul style="list-style-type: none"> <li>4. Enable culture of sustainable working through provision of support and training for lab technicians.</li> <li>5. Adoption and use of sustainable building design guidelines (incorporating labs) and Soft Landings or similar approach.</li> </ul>			



### **Resource implications**

No resource implications are related to reporting on progress against this plan. Implementation of the plan will have wider resource implications, which have been detailed elsewhere.

### **Risk Management**

No risks associated with reporting on progress against this plan. No items on the plan are currently at risk of failure (red graded).

### **Equality & Diversity**

No foreseen impacts.

### **Next steps/implications**

A further progress report will be provided at the next SLSG meeting by the SRS Project Coordinator – Labs (or appropriate substitute). During that time further actions will be taken towards the outcome objectives of the plan.

### **Consultation**

This document has been reviewed by:

Director – SRS

Head of Programmes – SRS

Engagement Manager – SRS

### **Further information**

#### Author and Presenter

Rachael Barton      SRS Projects Coordinator

Department for Social Responsibility and Sustainability

September 2019

### **Freedom of Information**

This is an open paper.



**Sustainable Labs Steering Group**

**23<sup>rd</sup> September 2019**

**HRB Energy Monitoring Project Report with Phase 4 data**

**Description of paper**

This paper provides the results of an energy monitoring project in the Hugh Robson Building (HRB) at the University of Edinburgh. This paper was previously submitted to the January 2019 SLSSG meeting and is being resubmitted with the inclusion of additional Phase 4 follow up data.

**Action requested**

SLSSG is asked to note the findings of the additional data provided within the Appendix section, and consider implications for future lab energy engagement methods.

**Recommendation**

It is recommended that a further energy monitoring project be carried out in labs which have yet to have received in depth engagement activities and advice, with the aim of achieving energy savings in labs. This project should have a revised methodology to take account of the Impacts and Recommendations set out in this paper.

**Executive Summary**

The SRS department delivers a range of energy projects which help increase energy efficiency through behaviour change and infrastructure improvements. As lab areas are typically more energy intensive than office spaces, engaging labs in energy efficiency is particularly important and significant energy savings can be achieved.

An energy monitoring project was previously carried out in the IGMM Centre Building from July to September 2017, reporting a drop in energy consumption (daily energy cost per person) of 12-24% over the monitoring period. It was determined that further energy engagement projects should be carried out with the aim of achieving long term energy reduction in labs. The first floor of the Hugh Robson Building (HRB) was selected for 2018 with a three phase project being undertaken, including a period of baseline data collection, a phase of poster engagement and a final phase involving face to face engagement. A fourth phase was subsequently carried out in March 2019 to follow up and identify if any long term impacts on energy consumption had taken place (see Appendix).

The monitoring carried out from the 17<sup>th</sup> September to 21<sup>st</sup> November did not see a drop in total energy consumption, but rather an increase of 11.3%. There are a

number of factors which may have influenced this increase, including increased use of electric heaters as the temperatures decreased, increased use of lighting with decreasing daylight and increased work intensity (unable to be measured). The energy consumption per person however decreased by 8.5% over the duration of the monitoring period. This would imply that equipment may have been used more efficiently following engagement periods.

Although the total energy consumption did not decrease, the project attracted 17 attendees to the face to face workshop demonstrating the interest of lab staff in the topic of lab sustainability. The audience was engaged and follow up enquiries have been made indicating that the project had other qualitative impacts. Not all workshop attendees worked on the first floor and some high energy consuming pieces of equipment were located elsewhere. This could mean that the energy savings may not have been as high as if more first floor staff attended and that energy savings may still have occurred but not have been within the monitoring.

It is recommended that future projects have a more tightly controlled monitoring scopes, to ensure that only lab energy usage is being monitored. Carrying out the project during a time of year that does not feature major fluctuations in work intensity is also important to accurately measure the engagement impact in isolation.

### **Background and context**

The SRS department delivers a range of energy projects which help increase energy efficiency through behaviour change and infrastructure improvements. Projects include the Big Summer Chillout and Winter Shutdown campaigns, the Energy Coordinator Network, the Lab Awards and the Sustainable Labs programme. As lab areas are typically more energy intensive than office spaces, engaging labs in energy efficiency is particularly important and significant energy savings can be achieved.

The aim of the project was to deliver a staff engagement activity focused on reducing energy use in the lab. This involved energy monitoring to measure and verify any potential energy savings. The project also aimed to help ascertain whether the existing SRS energy behaviour-change practices of 1) distribution of posters and stickers, and 2) face to face induction presentations have a measurable impact on the energy consumption of a facility.

A similar energy monitoring project was previously carried out in the IGMM Centre Building from July to September 2017. This project reported a drop in energy consumption (daily energy cost per person) of 12-24% over the monitoring period. In summer of 2016, energy monitoring was carried out at the Horsfall Lab (Roger Land Building, KB), however, this project was incomplete due to faulty monitoring equipment. Better monitoring equipment was purchased by estates and installed for the 2017 project at IGMM.

At the Sustainable Laboratories Steering Group meeting on 21<sup>st</sup> May 2018, it was recommended that further energy engagement projects should be undertaken at new volunteer labs, to determine if the successes can be replicated.

It was anticipated that two over-riding variables would affect the energy consumption of the facility:

1. Number of people in the space each day
2. Type of research activity each person is doing during the measurement period

## **Discussion**

### Approach and Methodology

Monitoring was planned for 11 weeks from 17th September 2018, to be carried out on the 1st floor of the Hugh Robson Building. However, due to scheduling and the capacity of monitoring equipment, monitoring was carried out from Friday 14th September to Wednesday 21st November 2018 (10 weeks). Data was initially collected at the end of each phase, but the monitoring equipment had reached capacity before the end of the final phase, cutting the recording period short.

Two 3-phase electricity monitors were installed in the HRB first floor distribution boards to monitor two electrical distribution boards (DBs) which (roughly) cover the first floor offices and labs. The circuits being monitored cover the plug-load 'small power' energy consumption and our energy data does not include the energy consumed by the AHU/chillers. As the meters covered two separate distribution boards, the energy usage recorded by each was combined to reflect the total energy use by the first floor.

A follow up period of monitoring was carried out in March 2019 to assess whether there were any longer term changes to energy consumption (see Appendix).

Entry into the main laboratory space is via swipe card access, and the number of lab users accessing the labs each day was requested and provided by Axxess (ITI Communications Infrastructure Section). This quantitative data shall be used to identify whether a major change in the population of the space is influencing the energy data, and to correct for any such influence.

The project was carried out in four phases:

Phase 1 – Baseline data collection: Energy monitoring was carried out to measure the baseline energy consumption prior to any engagement. Length, 3 weeks.

Phase 2 – Poster engagement: Posters with energy saving messages were put along the corridors of the first floor and in the labs on Mon 8th Oct, with continued energy monitoring. Length, 3 weeks.

Phase 3 – Workshop engagement: A face to face workshop with presentation was held on Fri 2nd Nov highlighting ways to save energy in the lab, with continued energy monitoring. Length 4 weeks.

Phase 4 – Follow up monitoring: Energy monitoring was carried out to measure any long term changes in energy consumption. Length, 4 weeks (see Appendix).

The workshop was open to all staff working in the HRB, and was not limited to those working on the first floor. 17 members of staff attended the workshop and a lunch was provided to encourage attendance. This included staff who work during the week and at weekends.

### *Data collection and Manipulation*

The energy meters were installed on Thursday 13th September and removed on Monday 3rd December. However as only part of the first day was recorded that has been excluded from analysis. When the meters were removed, it was found that data collection capacity had been reached on the 22nd November and so the last full day included in the results is the 21st November.

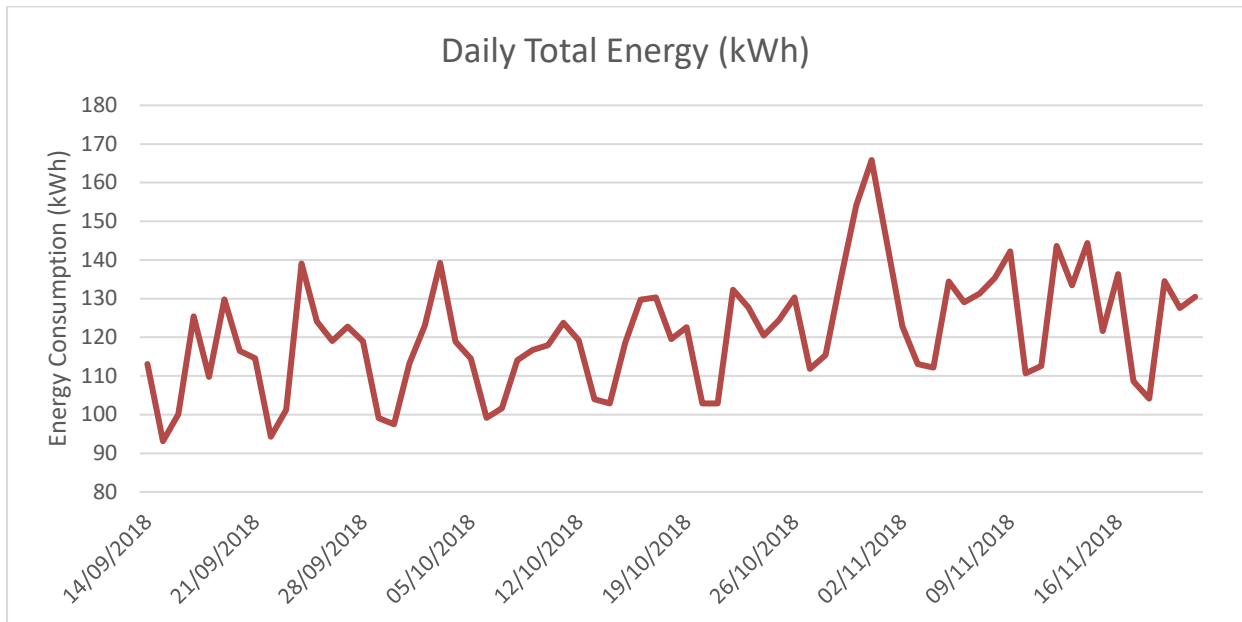
As the project took place from September to December as the day length was shortening and temperatures were dropping, these factors have been included with the analysis. Historical temperature and day length records were used for the monitoring period (1, 2). Anecdotal reports of excessively low room temperatures were sought, with staff members confirming that electric oil-filled space heaters were used in offices on cold days. The energy data does not include the energy consumed by the AHU/chillers however, and so temperature variations would not impact energy use by normal heating systems, only additional plug in devices.

Swipe card data provided by Axxess was provided for the four cad access points into the lab areas on the first floor. The unique number of swipes at each was provided, omitting any duplicated swipes from the same staff member. To determine the number of personnel present each day, the highest number recorded at any of the access points for each was used. This may be a conservative number as it is possible that multiple people could enter during one swipe.

## Energy Consumption Results

### *Daily Energy Consumption*

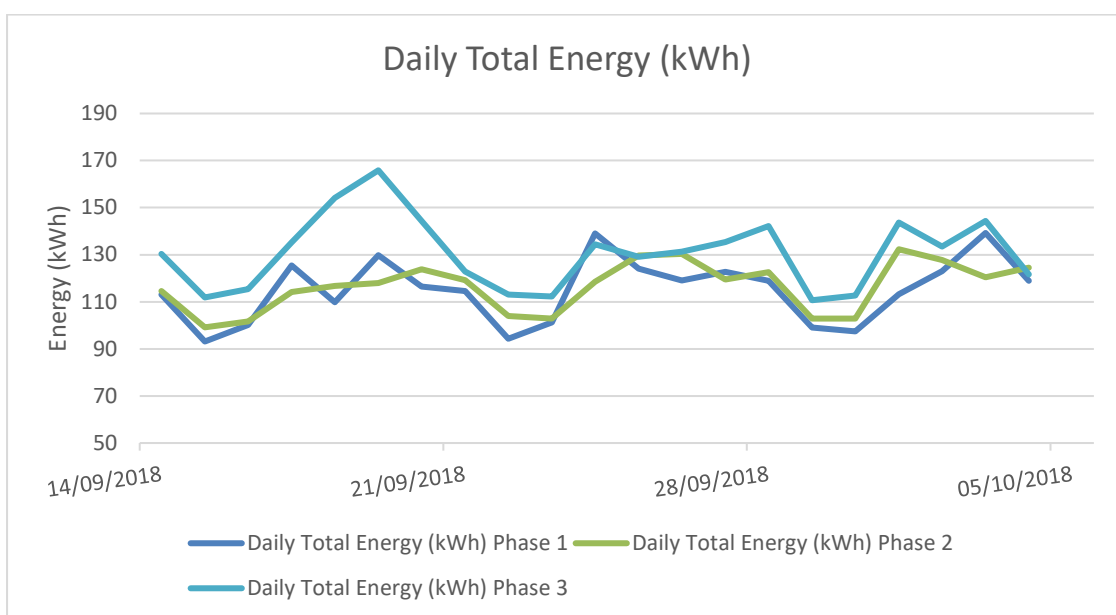
The graph below shows how the daily energy consumption for the first floor offices and labs, with weekends included.



The energy usage over the project did not decrease in terms of total consumption, but rather the trend was increasing consumption. The total daily energy consumption of the first 15 days was 1722kWh (average of 115kWh), the total for the last 15 days was 1917kWh (average of 128kWh), an increase of 11.3%.

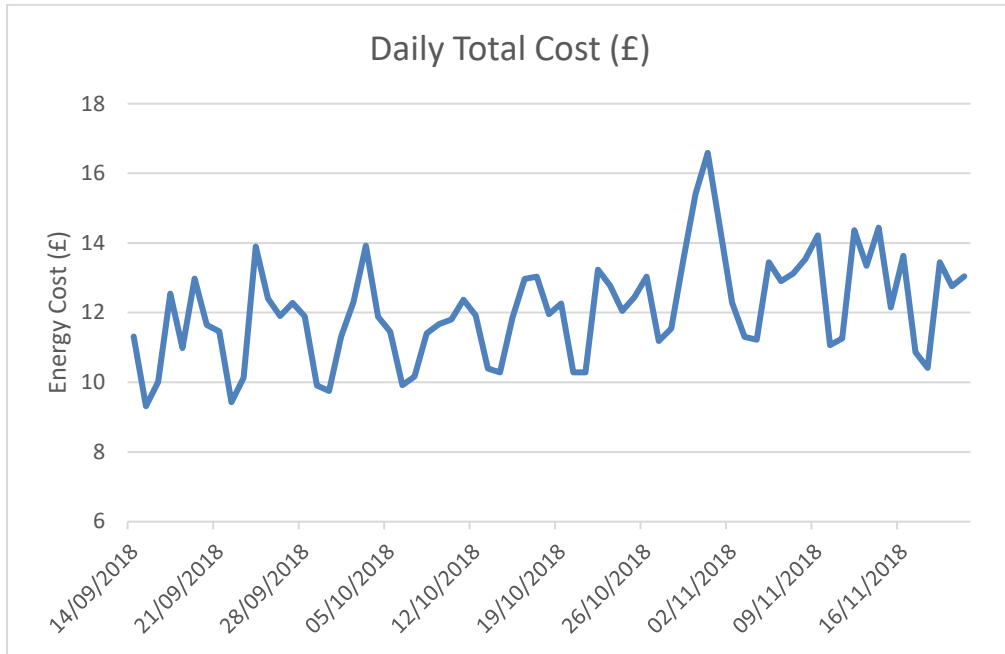
There is a clear spike in energy usage in the week between the 27th Oct and the 4th Nov, peaking on the 31st Oct.

In addition to increased energy usage during the weeks as the monitoring continues, there is also an increasing trend towards higher energy use at the weekends.



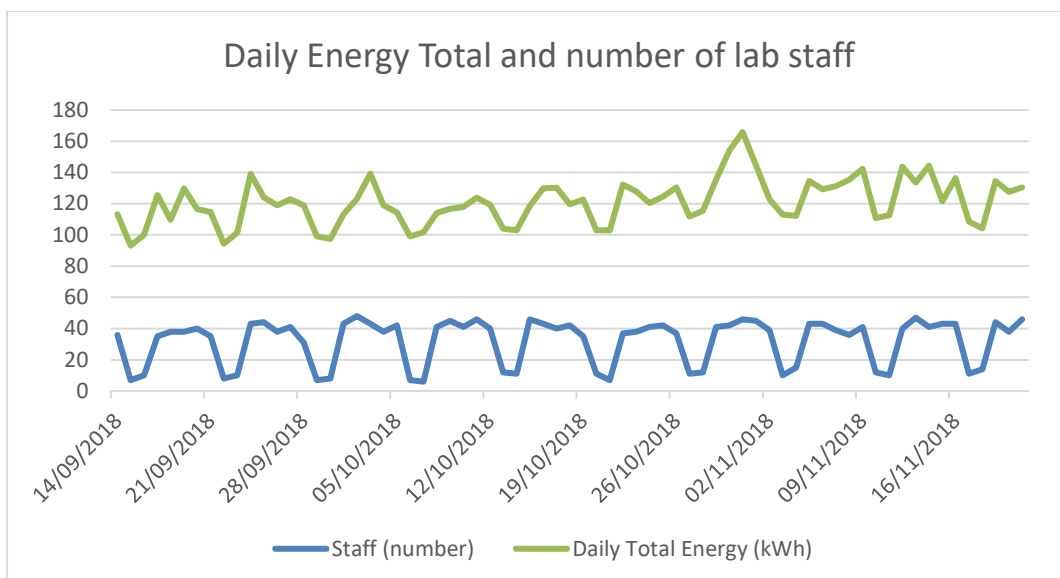


In terms of energy cost, the total daily energy cost for the first 15 days was £172.20 (average of £11.48), the total for the last 15 days was £191.68 (average of £12.79), an increase of 11.3%.



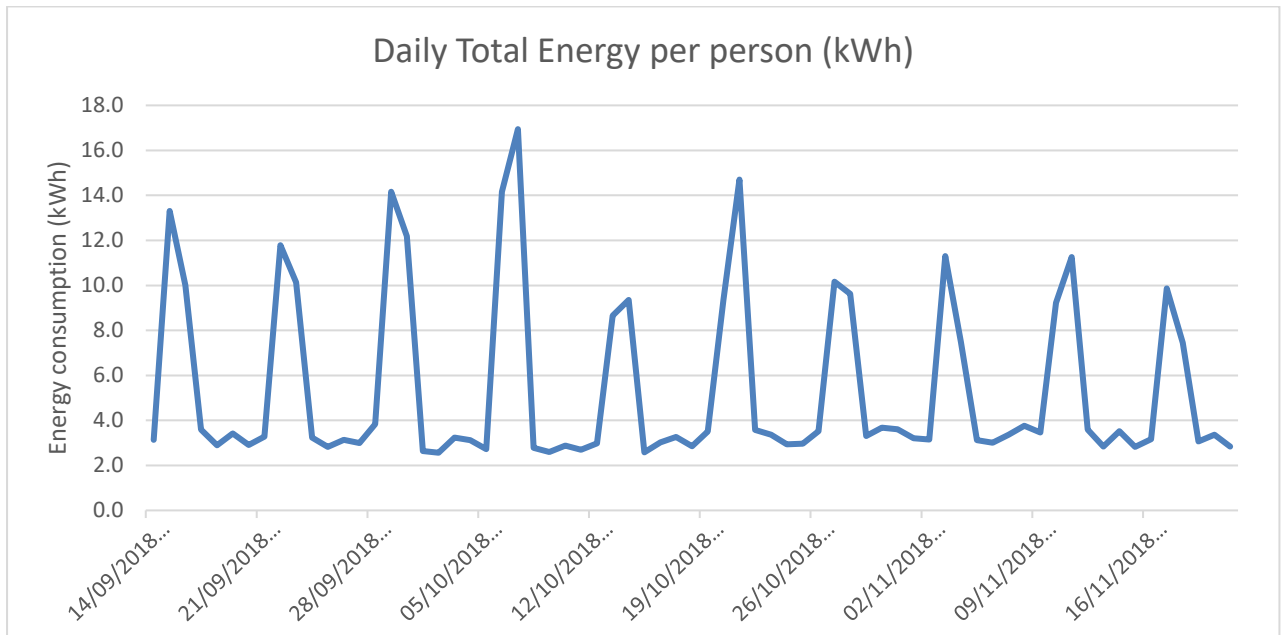
**Energy consumption per person results**

Total energy consumed can be related to the number of people using the area. To determine if increasing numbers of staff using the labs and offices was responsible for the increased energy usage, the number of staff present each day was compared to total daily energy used:



As a general trend, energy usage is higher during the week when there are more staff present, than at the weekend, when both reduce. The peak in energy consumption on the 31st Oct does not appear to be explained by an increase in staff numbers.

When taking into account the variation in staff numbers per day, the energy usage per person is higher for weekend days than week days.



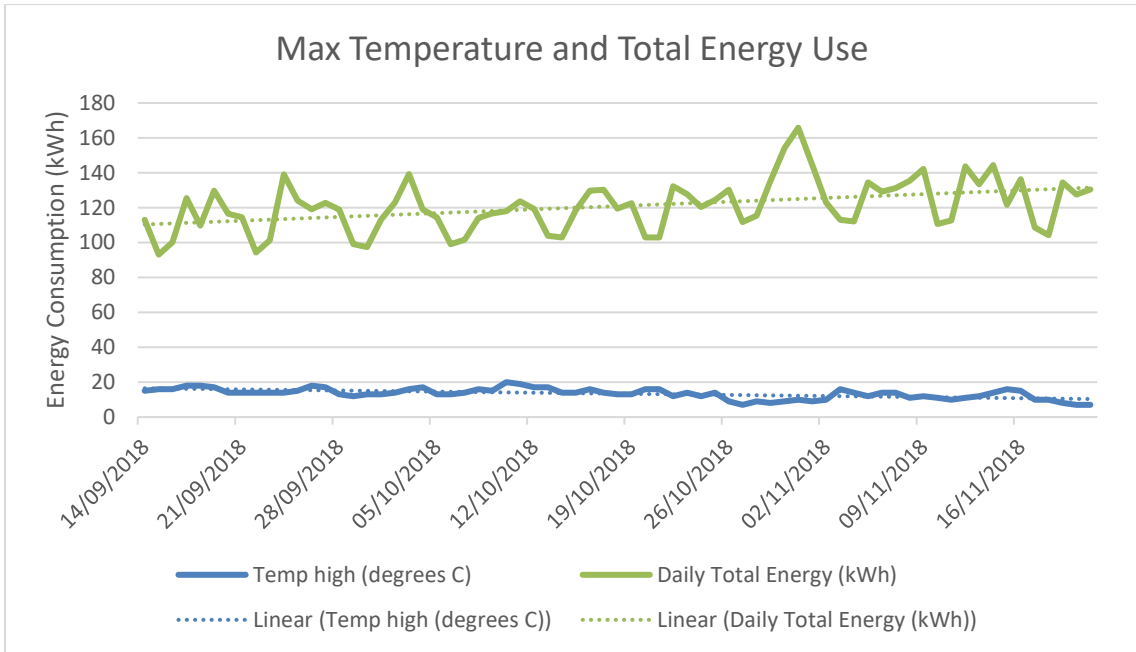
In contrast to the absolute total energy consumption over the project, the energy usage per person showed a gradual decrease. The total daily energy consumption per person from the first 15 days was 80kWh (average of 5.3kWh), the total for the last 15 days was 73kWh (average of 4.9kWh), a decrease of 8.5%.

In terms of energy cost per person, the total for the first 15 days was £8.05 (average of £0.54) and for the final 15 days was £7.36 (average of £0.49), a decrease of 8.5%.

### *Temperature and Energy Consumption Results*

Although the energy meters did not record energy used by AHUs or chillers, anecdotal reports were received indicating that on cold days, electric plug in heaters were used in the offices.

The recorded daily high temperature was compared to daily energy use, to determine if changes in temperature had an effect on energy consumption.

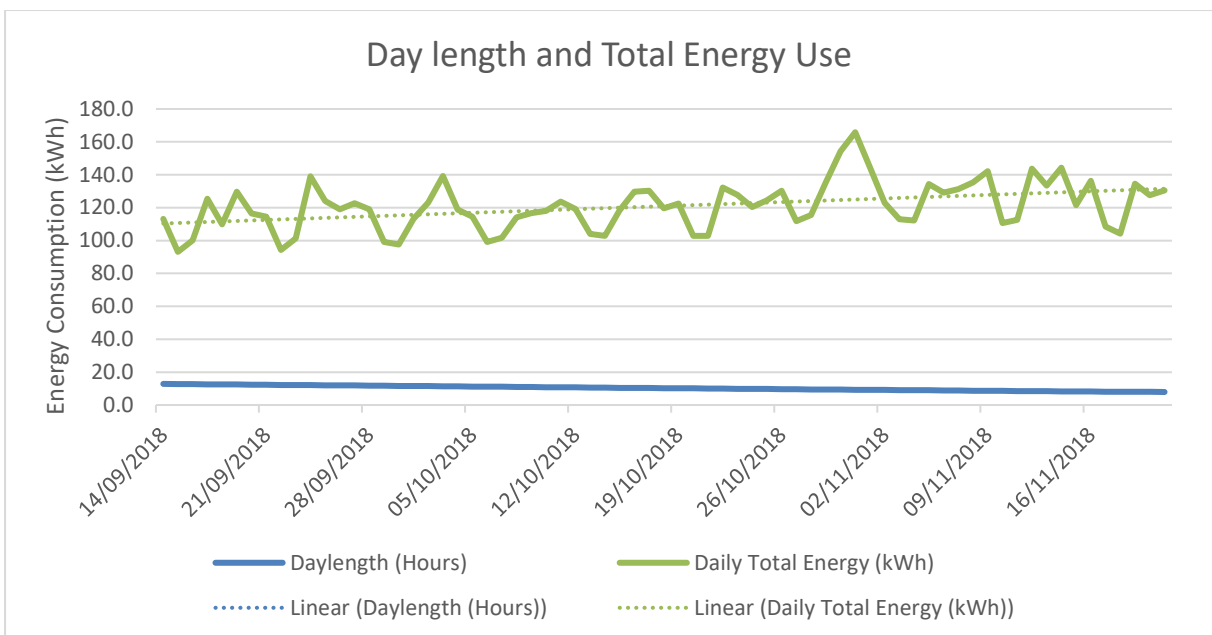


There is a general trend that as the temperature decreased, the energy consumption increased.

#### Day length and Energy Consumption Results

It was also noted, that with decreasing day light hours and the October clock change (Sunday 28<sup>th</sup> October), staff may be using lights in labs and offices for longer or using additional lighting sources.

To determine any likely impact of day length on the energy usage, the recorded hours of daylight were compared to total daily energy usage.



As with the relationship to temperature, there is a general trend that as the number of daylight hours decreases, the energy consumption increases.

## Discussion

### *Daily Energy Consumption*

Over the course of the project, the energy usage increased rather than decreased, with an 11.3% rise from 1722kWh for the first 15 days compared to 1917kWh for the final 15 days.

As the project was run over the first semester, from September to December, it is likely that factors which could not be accounted for have impacted the data. These could include change in research/work intensity, changing work patterns or purchases of new equipment.

No building works were carried out during this time which would have explained the sudden peak on the 31st Oct. It was reported that no significant changes in work patterns occurred during the monitoring period (e.g. no increased intake of staff/student after the start of the project).

### *Energy consumption per person*

When looking at the energy usage on a per person basis however, there is a clear 8.5% reduction in consumption over the project (total of 80kWh for the first 15 days to 73kWh for the final 15 days).

By accounting for variations in the number of staff present, this would indicate that the engagement activities made an impact. Unfortunately, as the energy meters covered distribution boards recording energy usage in both office and lab spaces, it is unclear where the energy savings have occurred.

The cause of such a reduction in energy consumption per person may be associated with improved efficiency of practices – for example switching off more items of equipment when not in use, especially over nights (weekend consumption seems to have varied less). Of course, on weekends when there are fewer people working, the energy usage per person is high than during the week. This increased weekday population will mean that the energy consumed by communal equipment which must remain 'on' permanently or for long periods of time will be shared among more individuals, and thus the energy intensity of any one individual is reduced. It is promising that the energy per person decreased over the project while the weekday/weekend population remained consistent, indicating energy efficiency changes.

For future monitoring projects, it will be vital to ensure that only lab spaces are being recorded to ensure that lab impacts are being identified.

### *Temperature and Energy Consumption*

There is a general trend that as temperatures dropped during the project, the energy consumption increased. As staff reported during the engagement workshop that when it is cold many people use electric plug in heaters in their offices, this use of heaters could explain some of the increase in total energy. It was estimated that there are 12 office heaters, although the exact energy consumption of these was not recorded separately.

### *Day length and Energy Consumption*

There is a general trend that as hours of daylight decreased during the project, the energy consumption increased. Some of the increase in energy consumption could therefore be explained by increased use of lighting or use of additional lighting sources. Lighting is not on an automated schedule – users will turn on lights when they arrive for work and turn them off when leaving, meaning the use of lighting varies.

## Impacts and Recommendations

### *Equipment and Monitoring area*

Due to the issue with data not being recorded until the end of the planned monitoring period (3rd Dec), it is recommended that data is collected every month to avoid researching storage capacity. A check on the battery/charge of the device should also be carried out.

Due to the nature of the distribution boards, both office and lab areas were monitored for the project. This has meant that any increase in energy consumption or decrease in per person usage cannot be attributed to changes within the lab with accuracy. It is vital that future host labs are able to be monitored more precisely with only lab areas being metered.

### *Other considerations*

The number of people using the first floor spaces was typically 30-35 people during the week, and 6-10 people on weekend days. As the engagement workshop was attended by staff from across the HRB (not just the first floor) and there were in total 17 attendees, not every staff member working the first floor labs will have received in depth advice. It is recommended that for future project, higher attendance is sought from those working in the target area.

Much of the advice in the engagement workshop focused on saving energy from highly energy consuming equipment such as Ultra Low Temperature Freezers, fume hood and autoclaves. It should be noted that the first floor labs did not contain many of these pieces of equipment, and wash up facilities were on another floor. If high energy equipment was not present in the monitoring area and many workshop attendees did not work on the first floor, this could partly explain why there was not a decrease in total energy use.

## References

1. <https://www.accuweather.com/en/gb/edinburgh/eh1-3/november-weather/327336?monyr=11/1/2018>
2. <https://www.timeanddate.com/sun/uk/edinburgh?month=11&year=2018>

## Appendix – Follow up data from March 2019

### *Background*

To determine if there was any longer term impact of the engagement activities, follow up monitoring took place in March 2019 (the fourth and final phase). The monitors were installed as before, but no engagement activities were undertaken.

### *Energy Consumption Results*

Using similar data analysis, the final 15 days of monitoring in March were used to determine total and averaged kWh values and costs, and also per person values. The differences between the September and March, and the November and March values were compared.

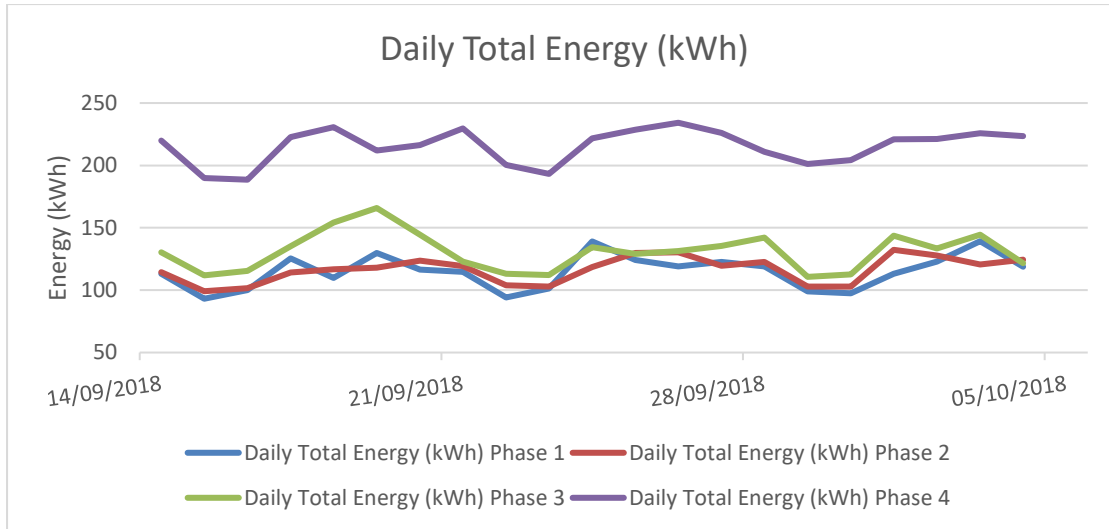
### Total Energy use and energy use per person comparisons

The total daily energy consumption for final 15 days in March was compared to the values for the first 15 days in September and the last 15 in November.

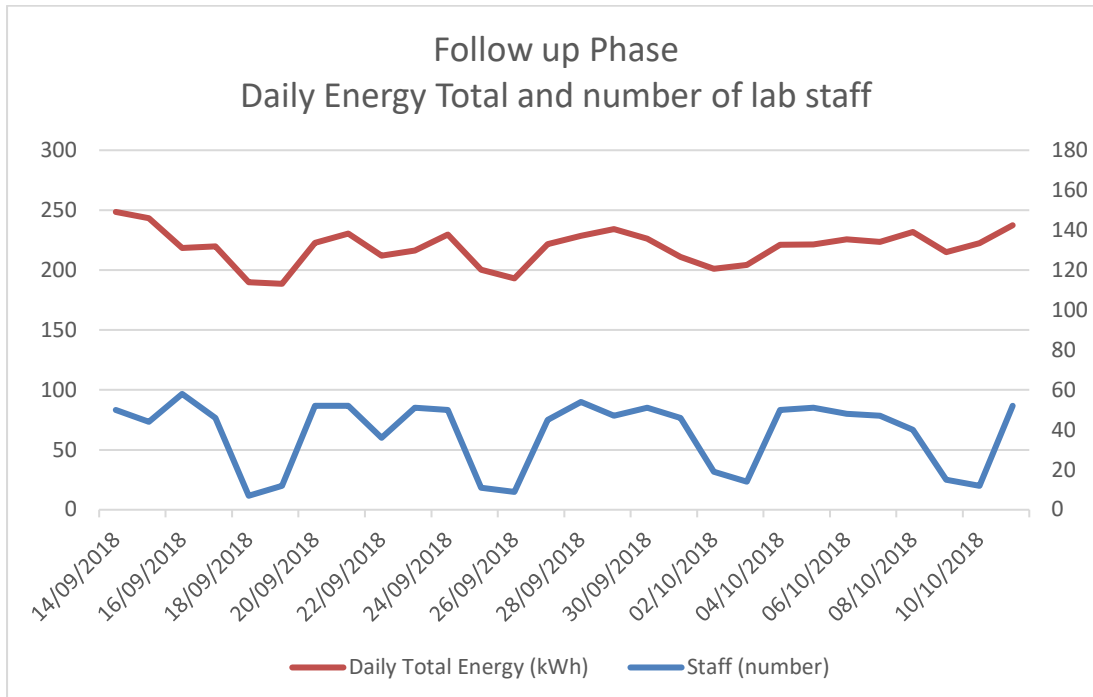
Metric	First 15 days in Sept	Last 15 days in Nov	Last 15 days in March	% change Sept to Nov	% change Nov to March	% change Sept to March
<b>Total energy consumption (kWh)</b>	1722	1917	3325	+11.3	+73.5	+93.1
<b>Daily average energy consumption (kWh)</b>	115	128	222	+11.3	+73.5	+93.1
<b>Total energy consumption per person (kWh)</b>	80	73	110	+8.5	+49.2	+36.4

<b>Daily average energy consumption per person (kWh)</b>	5.3	4.9	7.3	+8.5	+49.2	+36.4
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In addition to increased energy usage during the weeks as the monitoring continues, there is also an increasing trend towards higher energy use at the weekends.

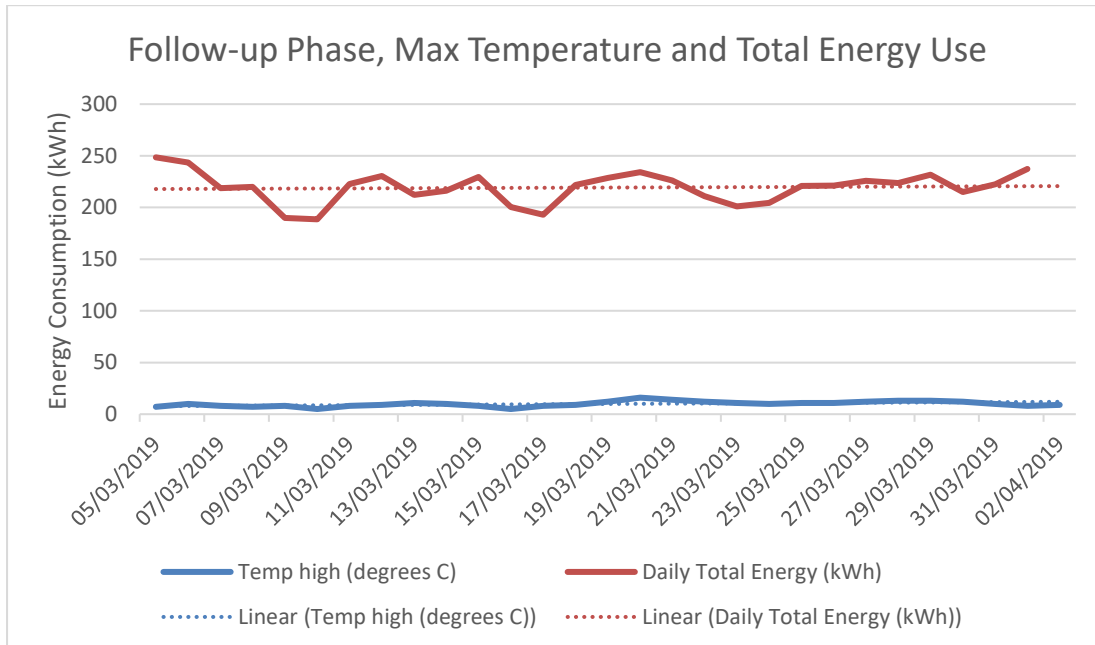


When taking into account the variation in staff numbers per day, the energy usage per person is higher for weekend days than week days.

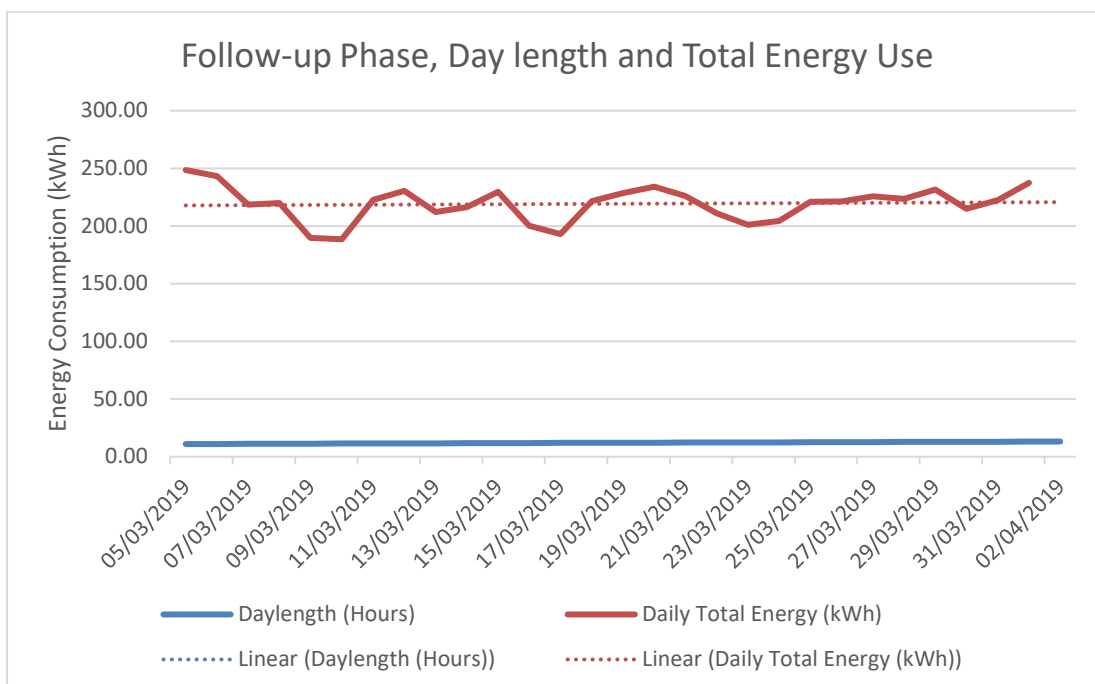


## Temperature and Energy Consumption Results

The recorded daily high temperature was compared to daily energy use, to determine if changes in temperature had an effect on energy consumption. However, no clear increasing or decreasing trend in energy consumption was observed.



To determine any likely impact of day length on the energy usage, the recorded hours of daylight were compared to total daily energy usage. However, no clear increasing or decreasing trend in energy consumption was observed.





## *Discussion*

There is a clear increase in energy consumption from the engagement period to the follow up period, considering both the change from the start of September to the end of March, and from the end of November to the end of March.

There are a number of possible factors which could contribute to this increase:

- Possibly due to MSc/Undergrad students joining the lab for their dissertation projects (which could be more energy intensive research) and such students may be less conscious of energy saving habits in the lab. It was estimated that approximately 70 project students in the building were in the building during the monitoring period. It is unclear how many students were based in these specific labs, but an estimate of 20 was suggested.
- The number of people recorded via swipe card access may not reflect the true number of people in the lab, as some MSc students may not have been granted card access and therefore would not be counted.
- There could be an increase in research intensity from staff.
- It may be that any change in behaviour from Sept to Nov was short lived and was not maintained to March.

**Resource implications**

There are no further resource implications for this project. Should similar projects be undertaken, it would be reasonable to expect them to have similar resource requirements.

**Risk Management**

Future monitoring projects should take into account the recommendations highlighted in the Impacts and Recommendations section to ensure quality data is collected, and accurate impacts measured.

**Equality & Diversity**

No foreseen impacts.

**Next steps/implications**

SRS Projects Coordinator to implement a further energy monitoring project in a new lab in Ashworth, with a revised engagement and monitoring strategy to take account of the recommendations set out in this paper.

Regular update on the project's outcomes will be shared with the SLSG.

**Consultation**

This document has been reviewed by:

Director – SRS

Head of Programmes – SRS

Engagement Manager – SRS

**Further information**Author and Presenter

Rachael Barton SRS Projects Coordinator

Department for Social Responsibility and Sustainability

September 2019

**Freedom of Information**

This is an open paper.