Aim of this briefing note

This briefing note has been written for Laboratory professionals and procurement teams supporting the purchase of Laboratory equipment within the Further and Higher Education Sectors (FHE). Its purpose is to assist colleagues develop meaningful institutional policies that contribute to the delivery of organisational carbon objectives. It describes key environmental principles and how these can be applied in practice to reduce the negative environmental impact of laboratory equipment.

Institutions are encouraged not to develop a separate or stand-alone 'sustainable equipment policy', instead they are encouraged to embed the principles and activities described in this note into existing organisational policies and processes. This will ensure that sustainability becomes mainstreamed into business activities rather than an 'add on' that can be overlooked and sidelined.

Scope

The scope of this briefing note extends to: Laboratory and research equipment (henceforth lab equipment) and consumables used in the operation of this equipment.

These may be used in a variety of lab "architypes" within an institution, including: biological labs; chemical labs; engineering labs, mechanical labs etc. But is applicable to all equipment regardless of size or cost.

Out of Scope of this briefing note are:

- General lab consumables
- Fixed infrastructure / equipment
- Facilities managed outside of a lab (e.g. by estates)
- Ancillary devices such as workstations required to use the equipment*

Examples of those in scope could include flow cytometry, scanning electron microscopes and mass spectrometers.

*While these ancillary devices are not considered specifically within the scope of this document, it is noted that many pieces of equipment rely on these to function and so, when these are considered at end-of-life and there are no alternatives or replacement units available, it is very likely that the equipment itself will also need to be retired.

Drivers

Climate breakdown and the ecological crisis are two defining issues of our time, and we are at a crucial moment. The impacts of climate change are both global and unprecedented in scale, as confirmed by research such as that behind the Climate Stripes (#ShowYourStripes). The knock-on effects on our societies are already palpable, with communities suffering as a result. Without drastic action today, adapting to these impacts in the future will be more difficult and costly.

The environmental impacts of research and innovation are significant and while research helps us to understand how the world works and how to solve the challenges we face, it must not be done wastefully, no matter how important the results might be. Many materials used in manufacturing lab equipment are in danger of extinction, which means we may face difficult decisions as we are unable to produce equipment due to shortages or unavailability of key materials. European Chemical Society has warned of "Serious problems" if we don't do anything to restrict our use of the most endangered elements – or find effective ways to recycle them, (What are endangered elements and why do they matter? | World Economic Forum (weforum.org))

One example of this is Helium which, according to the American Chemical Society, is used to reach ultra-cold temperatures makes it "indispensable" to scientific research and to medical diagnostic equipment (e.g. in magnetic resonance imaging (MRI) scanners).

The UKRI Concordat for the Environment Sustainability of Research and Innovation Practice provides a framework for change within the Research and Innovation Sector, and outlines how organisations can work together and share best practice and the actions they can take to reach net zero. Infrastructure and equipment are identified as a key priority within the concordat. Additionally various organisations in the sector are exploring the creation of a national database listing lab equipment to promote efficiencies and shared use.

Sustainability principles for Lab Equipment in the FHE sector

Introduction

The manufacture, use and disposal of lab equipment and associated technology like computing, employed in education and research laboratories, have a significant environmental impact. They require large amounts of natural resources in their manufacture and production, and they can often have notable energy use and thus contribute to carbon emissions. Lab equipment, due to its specialist application, costly repair and longer lifespan, can be challenging to redeploy and reuse, often leading to it being treated as e-waste.

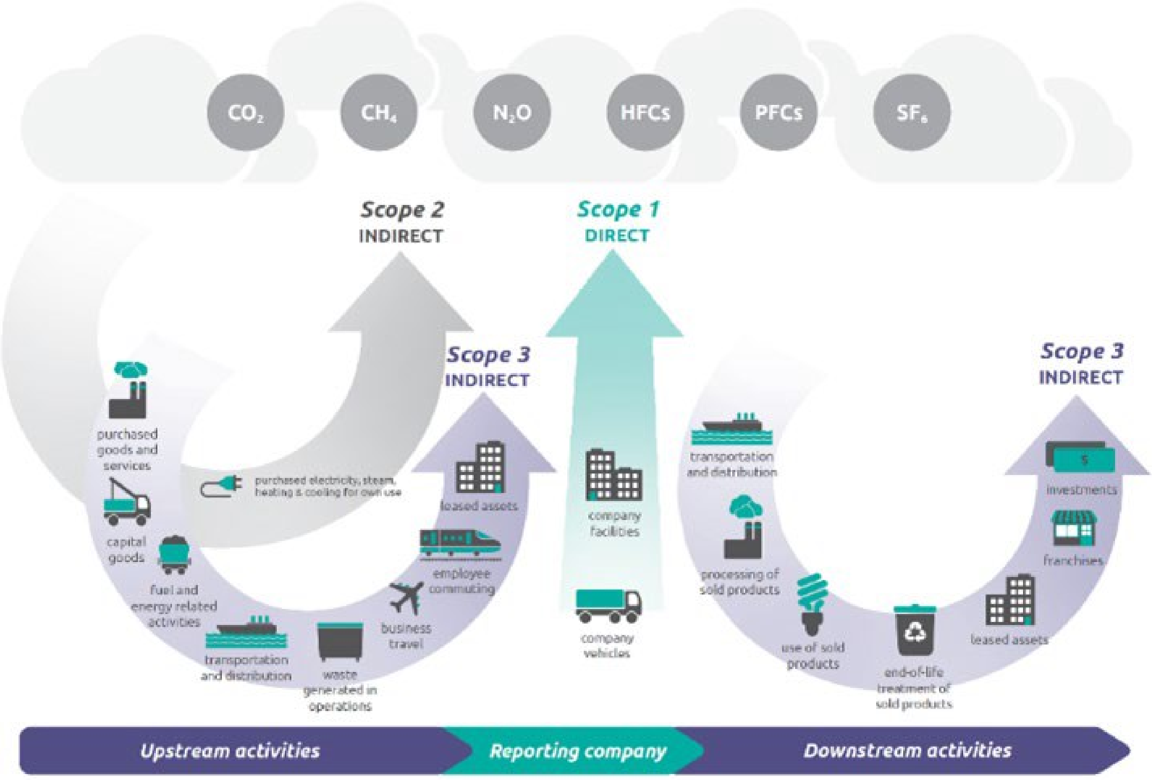
E-waste is the fastest growing waste stream according to the World Health Organization (WHO). E-waste includes digital and electronic waste like scanners, freezers and associated computing. Unitar (Global e-Waste Monitor 2024: Electronic Waste Rising Five Times Faster than Documented E-waste Recycling | UNITAR) report a record 62 million tons of e-waste produced in 2022, up 82% since 2010. Even more worrying is that e-waste documented as being recycled only accounts for 22% of the total, showing the staggering growth of E-waste and the lack of facilities or processes in place to deal with this.

The critical nature of lab equipment to research in our institutions, coupled with the sizeable investment in their purchase and maintenance, means that we have a responsibility to understand and address the sustainability effects of the lifecycle of the equipment.

The environmental impact of lab equipment

The environmental impact of goods and services is often quantified using carbon emissions and these have been split into three scopes by the Greenhouse Gas Protocol:

- **Scope 1 emissions** are direct emissions from owned or controlled sources, for example gas fired boilers and fuel used in fleet vehicles.
- **Scope 2 emissions** are indirect emissions from the generation of purchased energy, for example purchased electricity.
- **Scope 3 emissions** are the remaining indirect emissions that occur as a consequence of the activities of an organisation (e.g., the emissions from the manufacture & supply of goods and services purchased, or from staff travel and commuting).



While not all FHE institutions may have a significant presence of labs, where these are present, it is estimated they consume up to 10 times the amount of energy (per m2) compared to the equivalent office space. In addition, research-intensive organisations that have started to evaluate the impact of their lab equipment on embodied carbon emissions is significant – equating to somewhere in the region of a third of their carbon emissions from procurement.

It is expected that lab equipment defined in this document will account for a smaller proportion of these emissions compared to infrastructure related equipment (e.g., fume cupboards or HVAC systems). However, there is greater ability to influence the use of these individual items both in terms of:

- Increasing the efficiency of this equipment when in use, which may reduce the equipment's energy consumption, as well as reducing the replacement frequency of items due to lack of appropriate maintenance.
- Increasing the sharing of these items within groups, schools or institutions as well as with external partners – which will lead to fewer new items being purchased, whilst also increasing the opportunity to collaboratively purchase more efficient equipment.
- Consideration for reducing the use of consumables required in relation to the equipment in question.

Indirectly, an increasing number of lab equipment either includes ICT related hardware (e.g., microchips or sensors) within their products, or require a stand-alone processing unit or workstation, some of which may require high processing capacity to run dedicated software. While these are not considered specifically within the scope of this document, it is noted that many pieces of equipment rely on these workstations to function and so, when these are considered at end-of-life and there are no alternatives or replacement units available, it is very likely that the equipment itself will also need to be retired.

Previous work examining opportunities to reduce the impact in this area was undertaken by the EAUC & HEPA Responsible Procurement Group, available through the "Sustainability principles for ICT and digital technology in the FHE sector" guidance document.

Although carbon emissions have become the standard measure of environmental impact - other environmental problems, chemical pollution, loss of biodiversity or depletion of natural resources are not captured in this metric nor are societal impacts.

To deliver any meaningful change and genuine reductions in an organisation's environmental footprint, institutions should focus efforts on better management and sharing of lab equipment, whilst also considering the impact of ancillary consumables across their life cycle – i.e., manufacture, transportation, use and disposal.

Workers and Human Rights & Safety in lab equipment Supply Chains

While the focus of this document is the environmental (particularly climate and waste) impacts of lab equipment, it should be noted that the social impacts also have a high relevance from a sustainability perspective if not addressed. This document does not focus on this area as the UK FHE sector (or almost all of it) has parallel activity well under way on workers and human rights in our supply chains.

When considering lab equipment with ICT components, this is through a partnership with Electronics Watch, an organisation that actively monitors workers' rights conditions in our electronic supply chains.

Electronics Watch was set up by a European wide group of publicly funded bodies including several from the UK FHE sector and has grown to a membership of over 1000 organisations (universities, purchasing consortia, local authorities, national governments etc). All UKUPC member universities in Scotland, England and Northern Ireland are now members of Electronics Watch as well as a small number in Wales. Electronics Watch have been successful in freeing over 11,000 people from modern slavery in recent years as well as improving the working conditions of thousands more. Engagement with Electronics Watch is encouraged for Procurement, Sustainability & ITC stakeholders within institutions, as maximising engagement maximises the leverage and positive outcomes that their work can achieve.

Where lab equipment does not have ICT components, the **Sustain Supply Chain Code of Conduct (V2021b)** - which may be used by any member of all UKUPC consortia and/or EAUC, and by the members of the Sustain Project - does include reference to ensuring social compliance, with specific reference to: avoidance of forced, involuntary or underage labour; improving Working Environment and Terms; and Ethical Compliance & Economic Development.

This code of conduct was collaboratively developed and reviewed by the Sustain Project, members including APUC, LUPC, HEPA, EAUC, various HE/FE institutional Procurement and Sustainability leaders, NUS (and other student associations) and People & Planet.

Key environmental principles

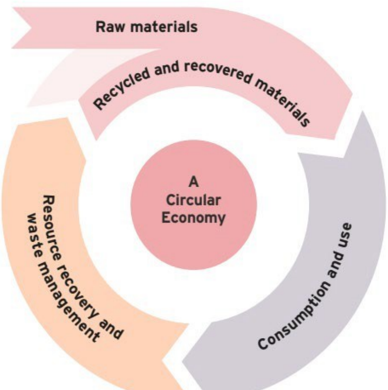


Figure 1. Source: DEFRA 2018 (Our waste, our resources: a strategy for England)

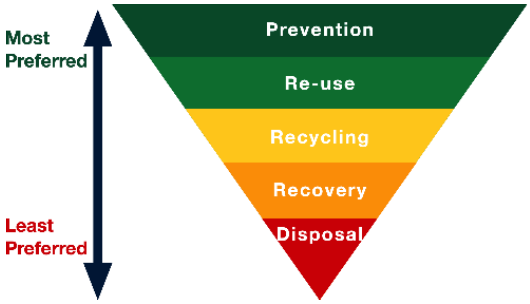
The current 'take-make-consume and dispose' pattern of growth is not a sustainable model of growth and has significant social and environmental consequences. A zero-waste, or circular economy is an economic model that moves away from a throwaway society to one where, resources are fully valued both financially and environmentally for the full extent of their life cycle.

In a Zero Waste economy the emphasis is not placed on recycling. Instead, emphasis is placed on keeping resources in circulation at their highest material value, for as long as possible - this concept is known as the circular economy.

The diagram illustrates how a circular economy ensures that resources are kept in use as long as possible, thus extracting maximum value from them. Circulating products and materials retains embodied energy and reduces greenhouse gas emissions.

The waste hierarchy is an important concept and the cornerstone of sustainable waste management. The waste hierarchy ranks options for waste management according to environmental (and, typically, financial) preferability, as the diagram on the right illustrates.

It is important that materials are managed as high up the waste hierarchy as possible, this not only reduces the carbon impact of processing the waste but also means that the material has a higher value.



Priority goes to preventing the creation of waste in the first place, followed by preparing waste for reuse; to recycling, and then recovery. Disposal – in landfill for example – is regarded as the worst option.

Managing lab equipment in line with circular economy principles and robustly applying the principles of the waste hierarchy will result in a reduction of organisational carbon emissions across all scopes of carbon and, in many cases, substantial cost savings. In practice this means:

- **Purchasing environmentally preferable products and equipment** – these products have less of an impact on society or the environment compared to competing products and can be demonstrated through transparent sustainability credentials. In terms of lab equipment that are products that are:

    - Designed to minimise energy consumption in use
    - Designed to minimise water consumption in use
    - Made from sustainable materials or contains recycled content,
    - Designed for end-of-life recyclability or life extension through 'upgradability'
    - Reduces the use of single use consumables and hazardous chemicals

    Considering the environmental impact of most products is predominantly due to the sourcing of raw materials and manufacturing, it is expected that the decision to purchase new equipment should only be made where the product has reached end-of-life. However, a full life-cycle analysis (cost and carbon) should be undertaken prior to purchasing new equipment where an existing item has not reached end-of-life. It may be possible to request this information from suppliers when enquiring about replacement equipment.

- **Sharing equipment** - Sharing equipment, including the technical expertise required to maximise outputs, is the best way to reduce the impact of research equipment. Reducing the unnecessary duplication of equipment that an organisation owns and ensuring that it is fully utilised. In doing so, this minimises the need for additional purchases of the same equipment and will reduce the scope three carbon emissions. Establishing an Equipment Database aids sharing and allows equipment repairs, replacement and refurbishment to be well managed.

- **Avoid purchasing new** – through alternative purchasing mechanisms such as leasing (servitisation model) or purchasing ex-demo or refurbished models. Ensuring that any purchase enables take-back from the supplier or allows reselling of equipment to other organisations at the “end-of-useful life” for the institution.

- **Maximising the longevity of equipment (Circulate products and materials at their highest value)** – Keeping equipment in use for as long as possible is an essential part of the circular economy. Equipment that is durable with replaceable parts that can be repaired should be chosen in preference to alternatives that cannot be repaired. Maintenance and service schedules should also be adopted as these actions will prolong the equipment's life. When it is not possible to extend the lifespan of equipment any longer, then it is essential to ensure that the equipment is effectively recycled at the end of its useful life. In this instance recycling may mean returning to the manufacturer or a third party to refurbish or to consolidate useful parts for use in other units, retaining value in this material and reducing the volume of material that is discarded. Training technical staff in repairs and maintenance can extend the longevity of equipment and speed up simpler repairs while also improving the financial balance between ‘repair or replace’ decisions.

Mechanisms for sharing

The sharing economy is where assets and services are shared between peers rather than individual ownership. This approach not only has a positive environmental impact, but it can also save money (for example on capital expenditure and servicing and maintenance costs). This section provides practical advice around the practicalities of facilitating sharing schemes in organisations, all of which require the following tenets to be successful.

Key tenets:

Institutional commitment	Include a commitment to share rather than purchase equipment in organisations policies, for example Sustainability Policies and Procurement Policies.
Institutional governance	Develop process so that procurement colleagues can review orders before they are placed and confirm that purchases of equipment are necessary.

	Include a mechanism in internal reviews of grant applications to ensure that applicants check equipment databases before completing application forms and thus only purchase of equipment when necessary.
Develop organisational processes and resources	Develop institutional equipment registers and ensure that they are maintained by developing and articulating roles and responsibilities around updating these regularly. Participate in sector initiatives to promote research equipment sharing. E.g., JISC.
Investment in staff & recognition of existing experience	Many of the pieces of equipment that can be shared require technical expertise to use the equipment, or to train others to use the equipment in the most effective manner. As such, it should be recognised that this expertise must be suitably resourced (e.g. through inclusion in job descriptions and annual objectives) and should be considered essential to facilitating effective asset management and sharing.
Awareness raising	Ensure that colleagues are aware of institutional policies and catalogues through: • Relevant procedures and guidance documents • Lab inductions • Sustainable Labs/ LEAF webpages etc. This awareness should allow for colleagues to take planned into experimental design. In doing so, it is likely to increase efficiency of this research (e.g. no delay in procuring specific equipment).
Education	Education of academic staff around the environmental and financial benefits of sharing equipment to encourage alternative thinking around this opportunity.
Uniformity of equipment	Where feasible, equipment models should be streamlined across institutions. This allows for reduction in training requirements across equipment, as well as increased opportunities to repurpose parts from end-of-life units into existing stock and to collate servicing needs.
Institutional ownership and maintenance of	While equipment may be purchased through internal or external funding, all equipment should be considered as owned by the institution. In doing so, this allows for centralised servicing and asset management, which in turn reduces

equipment	staff time and increases cost efficiency (e.g. through setting out a tender for servicing of equipment types at an institutional level). In addition, institutional ownership allows for equipment to be repurposed (or sold on should it be deemed appropriate) should a researcher leave the institution.

Methods for sharing

1. Local / specialised equipment sharing

Overview: This method outlines where there is an individual lab which hosts specific equipment. In this instance, the lab could set up a local "booking system" to facilitate the sharing of this equipment, with this "booking system" managed by the lab.

In this instance, it would be possible for a "booking system" to be developed through existing platforms such as a shared Excel spreadsheet, a calendar, or a website with requesting form. Alternatively, more advanced tools could be used where the lab have knowledge or skills to utilise these.

Opportunities:

- Locally managed, so staff managing the system should have a good understanding of the items within the system, including any training or maintenance needs
- Key staff at host location likely to know how to use the chosen "booking system" well, and be able to provide support to new users
- Low-cost / no-cost options for managing equipment available with right expertise, though some resource is required to implement a system & maintain data within a system.

Challenges:

- Scaling this method to encompass equipment from other parts of institution / other users may not be possible and requires staff time locally to undertake this work.
- Communicating the scheme to potential customers is challenging outside of personal networks of the lab staff managing the "booking system", leading to an under-utilised service.
- May not fully utilise the technical expertise to effectively run equipment or experiments, leading to increased failures and repeats.
- May increase purchase of consumables, and therefore continue to generate unnecessary waste, if these are not centrally purchased by the equipment hosting laboratory.

Examples

- University of Edinburgh – Institute of Genetics & Cancer (IGC)

2. Core Facilities

Overview: This method utilises specialist teams whose role includes outsourcing of their expertise to researchers within the institution as well as externally.

Opportunities

- Utilises expertise of the equipment and techniques to undertake research in a service model
- In addition to reduced need to purchase equipment, this method reduces the need for end-users to purchase consumables to undertake the procedures, which may be bought in bulk to reduce costs, but leads to wastage. Bulk buying by the core facilities team leads to greater efficiency of the service.
- Quicker to deliver results as doesn't require time to train up staff before undertaking the work, or time to order consumables or equipment if new equipment (if required)
- Higher potential quality of data and machine uptime, maximising the outputs obtainable from a technology

Challenges

- Movement of samples between sites may not be possible to easily arrange
- Cost associated to these core facilities may appear higher than undertaking the work locally, even if the efficiencies of scale make this cheaper / more sustainable in reality.
- Barriers presented through charging a cost upfront for access
- Perceived lack of transparency of these services may lead to suspicions in relation to research integrity
- Lack of understanding of the benefits to the services offered leading to lack of uptake.

Examples

- University of Exeter – Research Facilities
- University of Sheffield – School of Medicine and Population Health
- University of Edinburgh – Shared Research Facilities

3. Institution-Wide Equipment Databases (software based):

Overview: This method utilises dedicated asset management software locally. This could be at a lab or school level, but there are opportunities to utilise a whole-institution approach to facilitate equipment sharing across facilities as well as externally.

While the authors of this paper do not endorse one particular system, examples of software which offers this functionality include: ChemInventory, ChemTracker, Clustermarket, LabCup, LabRegister, PPMS, Q-Pulse.

Opportunities

- Additional "bolt on" functionality of these programmes which can be of use (e.g. storing of COSSH forms, equipment maintenance logs)
- Dedicated platforms are geared towards enhancing user experience, and maintenance / upgrades of these systems are managed by the system provider
- Platform providers often offer training and support for users and institutions, ensuring that onboarding a system at an institutional level is streamlined.
- Equipment databases also allow equipment repairs and replacement cycles to be managed proactively to prevent/reduce equipment downtime while also informing the potential extension of equipment life cycles.

Challenges

- Resource required within the institution to initiate and maintain a system (e.g. data cleansing). This is predominantly required when initiating, but resource is required on a repeating basis (e.g. annually) to ensure that the data remains up-to-date.
- Financial outlay for the system itself – this could be several £10,000s for whole institutional access
- Management structures within decentralised institutions may not lend to good practice in sharing of equipment, regardless of systems to support this.
- Requires culture change to see equipment as belonging to the institution rather than the individual / group
- There is a risk that equipment is stored long-term for "potential" future projects, rather than selling on to recoup maximum value
- Movement of staff (either internally or to other organisations) makes tracking equipment challenging. Ensuring that there is suitable responsibility to hand over ownership of equipment in these instances before a system is implemented may make it possible to embed within a system.

Examples

- University of Cambridge– Equipment Sharing Database

4. Dedicated regional sharing with other institutions / National Equipment Databases

Overview: These are databases which are developed in collaboration between more than one institution or organisation. Each institution shares details of equipment they are able to share, and it allows users at other institutions within the partnership to access these. In some instances there may be a cost associated with use of the equipment, or to transport equipment between institutions for use.

Opportunities

- Ability to access more specialised equipment which would otherwise not be available or may need dedicated funding to attain. Alongside cost savings, there is a potential time saving in not needing to wait for any funding applications to be successful

Challenges

- Transportation of equipment between institutions or sharing across geographical regions may not be possible or viable (e.g. for a small piece of equipment to be shared for a day)
- Setting up another institution as a supplier within internal systems may be prohibitive to using the service (e.g. if a "one-off" purchase)

Examples

- JISC national database
- Science & Engineering South Equipment Sharing portal
- Konifer Equipment Database (3rd Party supplier)

If you can't share, then what…?

The only way to reduce the environmental and societal impacts of lab equipment is to manage it in the most sustainable way possible across its full lifecycle – from extraction of raw materials, processing and manufacturing, transportation, in use and disposal. The previous section looked to increase the use of lab equipment as a way of avoiding purchasing new items.

The next section provides practical advice around the proactive procurement of lab equipment when a new item must be purchased, including what to consider and how to embed good practice in institutional policies and procedures, across four areas where institutions have opportunities to have impact: During the research planning stage; During Procurement; When a product is in use; and at the end of life / disposal stage.

Experiment / project planning stage		
Consideration	**Questions to ask**	**Example of where to embed**
Asset requirements	What outputs will be required for the proposed project? What expertise are you seeking? Is your team capable or are you seeking local technical expertise? Are there local FHE institutions with the capabilities or are you seeking international capabilities? What commitment is there from funders to fund shared equipment? Will there be any follow-up with institutions post grant award to ensure spare capacity is being offered to other users? Will funders allow for equipment to be sold at end of the project to ensure embodied impact of equipment is maximised?	Project proposal and funding application form
Asset leasing	Do suppliers offer leasing options? What are the environmental and financial benefits of leasing compared to purchasing?	Financial directives. Check the supplier has mechanisms to refurbish the equipment
Existing assets that meet the needs	Do existing assets meet the research needs? Is there actually a need to purchase something new? Do other colleagues have the asset (s) already, how can we facilitate the sharing of these within and between institutions?	Commit to buying only what's needed in organisational policies. Develop, maintain and share institutional asset registers.

	What expertise is required to utilise this existing equipment, and is it possible to access this for the purposes of this research?	Create equipment or lab management policies with emphasis on sustainable asset management. Educate stakeholders (including research grant bodies and recipients) on the environmental costs/benefits of adopting a more sustainable procurement policy for equipment. Develop/enhance organisational leavers processes to ensure asset recovery for reuse or continued sharing through a new owner, in particular around known funding cycles.
Procurement Stage		
Consideration	**Questions to ask**	**Example of where to embed**
Asset sharing	Has someone else bought this equipment since the funding application was made? If so, could this item be shared? Is there the expertise to do the kind of work you are seeking already available within your institution?	
Technical specifications for devices, equipment etc.	Could a reused / remanufactured / ex demo item be purchased instead of new, especially for equipment that will only be used for basic functions?	Commit to purchasing repairable and/or refurbished equipment in organisational policies. Clarify institutional expectations around equipment

	How long is the item expected to last and can the lifespan be extended? Can you receive commitment from manufacturers to continue instrument support for duration of project (or extension to existing support structure)? How will the piece of equipment be used in the long term – can it go to other departments once the original owner no longer needs it? What expertise, maintenance or support will be required if the equipment is passed on to another location? Would it be preferable to undertake this through a remanufacturing service to ensure equipment is in good condition?	lifespans in organisational policies. Ask existing supplier if they sell refurbished units / buy back surplus equipment.
Environmental data for products	What data is available on the products you're purchasing? This could be carbon emissions, biodiversity impact or any other relevant metric provided by the supplier. What data would be beneficial for your organisation to collect to support climate strategies or other institutional commitments? How is this data calculated by suppliers? Is the methodology transparent and sufficiently detailed to be applicable to the product being purchased? What steps is the supplier taking to improve the accuracy of this data? Is it possible to display this data to buyers alongside cost or product	Ask questions of the suppliers during the pre-tender engagement to establish what they can provide. Include as a weighted question in tender documents and include as a contract clause / schedule to ensure reporting of this data against institutional purchases is provided regularly (e.g. quarterly) by the supplier. Include product specific data within supplier catalogues to highlight more sustainable options.

	specifications?	
Warranty period	What is the appropriate length of time for a warranty, given the use of the equipment? What are the implications of future repairs on the warranty?	Include warranty requirements in tender specifications, if necessary, caveating repairs. Ensure that end users are aware of use warranty conditions and ensure that information is readily available to them.
Standardising equipment	Can the organisation adopt standard models for frequently bought items and facilitate internally managed swapping schemes e.g. consumables and spare parts? How can research colleagues support the institution more effectively through the increased use of the same lab equipment?	Set out approved devices for the institution in the Procurement policy and / or research policy. Inform users about the sustainability of their equipment choices including carbon cost to encourage a sustainable mindset. Set up a central scheme to collect and redistribute surplus consumables and equipment.
Managing the development of equipment policies, assets and budgets centrally	What delivers best value for the organisation? For example, can the institutions obtain more price leverage in the market when buying in bulk? How can assets be managed so they remain in use for as long as possible?	Organisational financial directives. Procurement policy. ICT device policy. Sustainability / CSR policy. Organisational report on environmental and financial

	Can the organisation take a consistent approach to refresh cycles? How can data on spend and carbon be collected and analysed to improve performance?	costs of lab equipment.
Purchasing from environmentally preferable suppliers / purchasing the most environmentally product	Does the supplier have any environmental credentials? Be aware of greenwash e.g. “carbon neutral” or “carbon positive” claims where off setting is used, see info here the green claims code checklist - gov.uk (www.gov.uk) Can you compare carbon impact of different devices alongside cost comparisons?	Apply Sustain Supply Chain Code of Conduct. Ask questions around the environmental preferability of their products and the supply chain, both in tender specifications and during new supplier interviews. Ask vendors to qualify their credentials in the areas listed earlier in this document: Key Environmental Principles. Ask for carbon data at the tender stage and set out expectations for accuracy and sharing frequency.
Maximising the lifespan of assets	Could life of lab equipment be extended through refurbishment? Where applicable, can the supplier provide clarity on future support for hardware and software issues from supplier? Is the device repairable?	Embed requirements and related KPI’s in tender documents. Commit to purchasing refurbished equipment in relevant organisational policies. Commit to reusing lab equipment wherever possible.

	How long will equipment be supported? Will new assets be compatible with existing devices/ systems / requirements?	
Asset use		
Consideration	**Questions to ask**	**Example of where to embed**
Asset longevity	How can staff be trained to ensure that assets are used properly, for example understanding best practice, maintenance needs, powering down fully?	Include in equipment training in lab inductions with a training refresher every 2/3 years. Develop training/best practice/SOPs for lab equipment.
Plan for long term use and to keep assets in use for as long as feasible.	Can equipment be used by others in the organisation when the original user no longer needs it? What action needs to be taken to facilitate this? Do staff have the technical expertise to repair (or refurbish) equipment?	Sustainability / CSR policy. Equipment policy. Offer to other researchers via equipment database. Recycling, UniGreenScheme, Charities?
End of use		
Consideration	**Questions to ask**	**Example of where to embed**

Waste hierarchy	First ask can the equipment be reused (either in current institution or by an external partner)? If equipment has to be recycled, what process will be used? What is the location of the mechanical process of recycling, where will the shredded materials go? If disposal (i.e., not recycling) is being considered, ask why? This is the least preferable option.	Include end of life reuse/ recycling into waste management policy. Resources: [Waste hierarchy guidance (publishing.service.gov.uk)]
Component parts	Can component parts be taken out of devices which are no longer working? Either for internal reuse or donated externally? Do staff have the technical expertise to undertake this?	Equipment policy, specifically what happens to devices at end of life. Resources: [Project launched to optimise WEEE raw material reuse and recovery (circularonline.co.uk)]
Reuse	Can users be supported with reused equipment e.g., long-term loan? Are there external organisations that purchase / re-sell redundant equipment? Can external organisations or charities have devices donated to them? If possible, keep local – the less distance items are	Ask suppliers if they offer buy-back service during tender process. Resources: [ISO 27001 Disposal and Destruction Policy Template Download – ISO Templates and Documents Download]

	transported, the better for carbon.	(iso-docs.com)
Institutional responsibility	Is onward processing legal, accredited, auditable? Ask contractors what the onward destination and processing will be when equipment is collected for reuse or recycling. When a device goes onto third party for reuse/ recycling/disposal, institutions are still liable for what happens to the devices as the originator.	Institutional Risk Register Waste & Resources policy.

Conclusion

The use of lab equipment enables great research to take place in our FHE institutions. However, this comes at a cost to the environment. The impact of lab equipment is significant and needs to be addressed urgently. By being proactive and embedding the principles described in this briefing note into organisational policies, procedures and practices, institutions will be able to take positive steps in reducing the negative impacts whilst maximising the benefits of their use.

Further Details

This document was released in December 2024 by members of the Circular Economy & Waste Subgroup as part of the EAUC & HEPA Responsible Procurement Group.

Further details of the Responsible Procurement Group, including additional resources, can be found on the EAUC website: https://www.eauc.org.uk/responsible_procurement_group