



UNSW Science Sustainable Research and Laboratories Guidelines

SCIENCE SUSTAINABILITY WORKING GROUP

Overview

Environmental sustainability is a key component of the [UNSW 2025 Strategy](#), and an important strategic priority for the Faculty of Science. Through the [Environmental Sustainability Plan \(2019-21\)](#), UNSW is focused on having a lower environmental footprint.

The Faculty of Science is committed to being a leader in sustainable research practices. The UNSW Science Sustainable Research and Laboratories Guidelines seek to provide practical sustainability guidance for Science managers, researchers, technical staff, and students. A lab is broadly defined as anywhere that research takes place, including offices, field-work sites, and clinical sites.

Almost every research project and lab activity will have an environmental impact. These Guidelines identify opportunities to reduce and mitigate these impacts with an appreciation that not every Guideline will be possible or applicable in each context. Staff and students are encouraged to make use of whichever Guidelines are suitable for their situation and to celebrate each improvement made.

UNSW Science Sustainable Research and Laboratories Guidelines

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This document provides a high-level overview of each Guideline. Further information on sustainable research and laboratory practices can be found in the [UNSW Science Sustainable Research Library](#).

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Embed Sustainability into Research Design

The best way to incorporate sustainability into your research is to carefully plan projects before starting work. For example, a thorough literature review can help to reduce the need to expend energy and resources on new experiments. Where possible, try to incorporate regular environmental check-ins into project plans. Project reviews are a great time to identify more environmentally efficient ways of working, such as opportunities to trial greener reagents or reactions.

If feasible, include the environmental costs and benefits of your project in proposals and planning documents, and consider sustainability outcomes when evaluating the impact and success of your research. When writing grant applications check if the required equipment is available in other faculties (this might be included as an in-kind contribution in your application). Major equipment is generally catalogued by [PVCRI](#). You can also use [Safesys](#) and the [UNSW Research Infrastructure Scheme](#) to search for equipment already on campus.

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Use Energy and Water Efficiently

The Faculty of Science is one of the largest users of energy and potable water at UNSW. In 2019, the University consumed 88.7 GWh of electricity, approximately 40% of which was used by Science (UNSW Sustainability Energy Data). Small changes by researchers can significantly reduce energy use such as shutting down equipment overnight. For experimental scientists, closing fume cupboards when not in use presents a fantastic opportunity to cut energy consumption, as an open fume cupboard can use the same amount of energy as 3.5 homes (Stanford 2016).

UNSW's Kensington campus consumed approximately 321,000 KL of water in 2019 which is the equivalent of 128 Olympic-sized swimming pools (UNSW Sustainability Energy & Water Efficiency). There are many opportunities for researchers to recycle water and reduce water use in experimental research. Outside of laboratories, water leaks in kitchens and bathrooms can create significant water waste. If you see water leaks, report them to Estate Management.

[Click here](#) for more tips on conserving water.

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Minimise Waste

UNSW generates close to 190 tonnes of chemical waste and 60 tonnes of biological waste annually. Less than 6% of the University's chemical waste is recycled, with most ending up in landfill (UNSW Estate Management 2020). Simple ways to minimise chemical and biological waste in the lab include sharing laboratory consumables and resources, maintaining up-to-date inventory records, and developing a depository system to reduce the amount of material which enters PC2 laboratory environments. Single-use plastics are another common waste stream in research. Single-use plastics can be significantly reduced in the lab by using washable or reusable labware in place of disposable items.

[Click here](#) for more information on recycling in labs and find further information on UNSW waste and recycling programs [here](#).

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Make Sustainable Procurement Choices

The purchase and disposal of consumables in a laboratory often creates a large amount of waste. To support sustainable procurement first consider if a purchase is necessary. A good auditing system will reduce unnecessary lab purchases, as will repairing items and checking if products are available on reuse portals or for rent. Where possible, reach out to other research groups and labs to see if you can share equipment or consolidate orders. It is important to think about the environmental impact of a product across its whole lifecycle.

Consider buying items that are:

- Water and energy efficient
- Comprised of recycled materials
- Designed for extensive reuse
- Included in end-of-life take-back programs
- Void of excessive packaging.

Think about having a conversation with preferred suppliers if they do not have these options available. Consider locating new items in shared facilities such as the Mark Wainwright Analytical Centre, Australian National Fabrication Facility (ANFF), and UNSW MakerSpace Network.

[Click here](#) for more information on shared research equipment and facilities. Further tips on sustainable research procurement can be found [here](#).

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Use Green Chemistry

Green Chemistry is the practice of reducing the environmental impact of the chemical realm through biologically non-toxic products and processes. **Green Chemistry** is of increasing importance across all experimental science, including in energy conservation, waste reduction, resource management and life cycle considerations. The experimental procedures used by wet-lab scientists are often backed by a large body of precedent, even when safer or greener alternatives exist. Consider regularly setting aside time to explore ways to improve your experimental methods. For example, you may be able to replace toxic ethidium bromide with new stains or replace environmentally damaging chlorinated solvents with ether-based green solvents. Always be mindful of the new hazards or incompatibilities that may be introduced by a substitution.

For useful resources on chemical substitution, explore the links collected on the [MyGreenLab](#) website.

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Collaborate in Research

Collaborative research is a significant way to conserve resources. Collaborations reduce the need to repeat work and procure materials. Collaborations can also create environmental efficiencies by leading to more targeted experiments.



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Manage Data Securely and Accurately

Data management is one of the most important aspects of science and a key feature of sustainable research because it creates environmental efficiencies. Accurate record keeping helps to enhance reproducibility and reduce errors. The careful cataloguing and backing up of research data (including computational outputs, spectra, device performance measurements, survey data) protects against the environmental costs which would arise if data were lost. Consider using electronic lab notebook platforms such as [LabArchives](#) or [OneNote](#) over paper-based record-keeping.

[Click here](#) for more information on secure record keeping and data management at UNSW.

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Make Sustainable Travel Decisions

Travel for field work, research conferences and collaborations can have a significant carbon footprint. Science staff and students should avoid travel if they can achieve their goals without travelling by using virtual conferencing.

[Click here](#) for ideas and information on running digital meetings and events.

Where travel is required, consider sending a subset of members in your research group, prioritising early career researchers and other equity objectives. Sustainable travel choices such as refraining from air travel for short trips and selecting CO₂e efficient rental car options can have a large environmental impact. Science staff and students should also consider offsetting carbon dioxide emissions related to essential travel by purchasing carbon units that are accredited under a recognised standard such as [Gold Standard](#), [Verified Carbon Standard](#), [SocialCarbon](#), and [Climate, Community & Biodiversity Standards](#). The [UNSW Science Sustainable Travel Policy](#) endorses the reimbursement of carbon offsets for essential travel that is paid for by the University.