



HOW TO SAVE ENERGY IN LABORATORIES

Laboratories use a lot of energy.... By reducing your energy wastage, you can decrease unnecessary University spending on fuel bills and prevent the release of avoidable greenhouse gases, shrinking the University's environmental impact. This guidance document will provide you with the knowledge you need to reduce your energy wastage in laboratories.

General advice

- Turn off any electrical items whenever not required, such as radios and lights, as well as computer equipment and analytical equipment.
- Remember to switch off electrical items when you leave the laboratory, even if you only intend to be gone for 15 minutes.
- Make sure all items that can be switched off are turned off at the end of the day.
- If you see an empty laboratory, with the lights and radio on, please turn them off.
- Whenever not in use, switch off ancillary services to reduce energy use and maintenance requirements. E.g.
 - Air compressors
 - Vacuum pumps
 - Demin water pumps
 - Local extract fans
 - Task lighting
 - PC terminals & monitors.
- Optimise the use of sterilisers/dishwashers by only using when on full loads.
- Assign responsibility for switching off (staff, or students in teaching laboratories).
- Include any linked office accommodation in your switch off efforts.

Checking Energy Consumption

- Refer to the manufacturer's data;
 - Handbook
 - Nameplate on equipment
 - Assume 50% of max load = working load



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- Assume 25% of max load = idle load.
- Direct measurement (please ask the Energy Managers in ESS for more details).

Heating

- When building is occupied:
 - Are windows and doors left open when the heating/air conditioning is on?
 - Areas suffering from overheating?
 - Are there obstructions in front of radiators or heaters?
 - Are portable electric heaters in use?
- Outside normal occupancy
 - Are doors and windows closed?

Ventilation

- Natural – open windows? Do NOT open if heating is on.
- Mechanical – programmed into the building
- Air Handling Units – programmed into the building
- Outside normal occupancy
 - Are all fans switched off?
 - Are all windows closed?

Air conditioning/cooling units

- Are there any areas suffering from excessive cooling?
- Are windows and doors left open when the heating / air conditioning is on?
- Is it absolutely necessary?
- What are the guidelines for temperature settings for the laboratory function?
- Do the time control settings reflect laboratory use? Match occupancy patterns and seasons (e.g. could 'free-cooling' from outside be used?)
- Are there conflicting heaters and air conditioning units. Ensure minimum 3°C dead band between heating and cooling set points.



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- Is the cooling temperature be set to no more than 3°C less than the ambient temperature?

Lighting

- When building is occupied:
 - Lights off in unoccupied areas?
 - Lights off when sufficient daylight?
 - Clean light fittings?
 - Are blinds being used to minimise solar gain in air conditioned areas?
 - Is external or security lighting on during daylight hours?
- Outside normal occupancy;
 - Are all the lights switched off?
 - Is the lighting zoned? Light switches labelled?
 - Switched off when enough natural daylight?
- Are lights on while blinds are closed during the day?
- Are there any automatic controls?

Laboratory Equipment

Outside normal occupancy, are laboratory equipment, fume cupboards and ancillary services turned off? Remember to turn off;

- Fume cupboards
 - Use the right sash height
 - Avoid using the fume cupboard as bench space (use it just for stages of the experiment that present a hazard).
 - Avoid using fume cupboards to store chemicals (use dedicated storage cupboard instead).
 - Try to store as many chemicals together (within safety constraints) to reduce the number of fume cupboards that need to be left on continuously.
 - Make adequate preparations to equipment before the experiment has started so that the fume cupboard does not need to be switched on for as long.
 - Lower the sash to the recommended height to maintain a purge volume.



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- Use time switches to control cupboards?
- Manually switching off fume cupboards where appropriate.
- Kilns/ovens
 - Ensure fully loaded (run multiple batches together)
 - Could they be used at night/ weekends? (reduce university max demand and use of comfort cooling/ fans while occupied)
- Incubators
 - If you have multiple incubators, can your work be organised so that one can be turned off?
- Centrifuges
 - Switch off when not in use – especially refrigerated models
- Microscopes
 - Switch off when not in use
- Refrigerated storage
 - Placed away from heat sources?
 - Correct temperature setting?
 - Seals ok?
 - Only open when necessary
 - Defrosted regularly?
 - Do all contents need to be kept?
- Sterilisers/dishwashers
 - When building is occupied, are sterilisers/dishwashers being used effectively?
 - Water heating/pumping activities
 - Analytical equipment
- Computer equipment
 - Turn off the screen when leaving the computer for more than 5 minutes.
 - Turn off the computer and all its accessory parts at the end of the day.
 - Your computer will only receive Windows and Security updates during its shut down process; without this, the machine will become slower over time.
 - Turn off printers and scanners when not in use.



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Fume Cupboard Management Questions

- What is the fume cupboard used for?
 - Use of fume cupboards for storage should be avoided
 - Use of cupboard space below the fume cupboard for storage should also be avoided, but where this is necessary the cupboard should be directly vented to outside rather than through the fume extraction system, in order to avoid having to leave the fume cupboard running for the purpose.
- When the fume cupboard is in use
 - Lowering the sash on dual fan speed and variable air volume (VAV) fume cupboards saves energy and reduces noise.
- Are fume cupboards being left on unnecessarily?
 - Switch off fume cupboards overnight wherever possible.
 - Laboratory technicians/cleaners/security could be asked to check that such equipment has been turned off.
 - Time switches could be used to switch off cupboards when the length of the experiment is known and when the laboratory is closed (with appropriate signage).
- Are face velocities excessive?
 - Can fume cupboards be designated by purpose so that selected fume cupboards (where weighing or handling of low volatility / toxicity substances occurs) can operate at low face velocities?
 - Are face velocities set according to the operations that are likely to be performed in the cupboard?
- What is the working sash height?
 - When working at the fume cupboard, sash height should be low enough to ensure that face velocities can be maintained.
 - When users move away from the fume cupboard they should ensure that they pull down the sash.