



EFLM TASK FORCE-GREEN LABS STRATEGIES FOR ENERGY CONSERVATION AND SUSTAINABILITY



Prepared by

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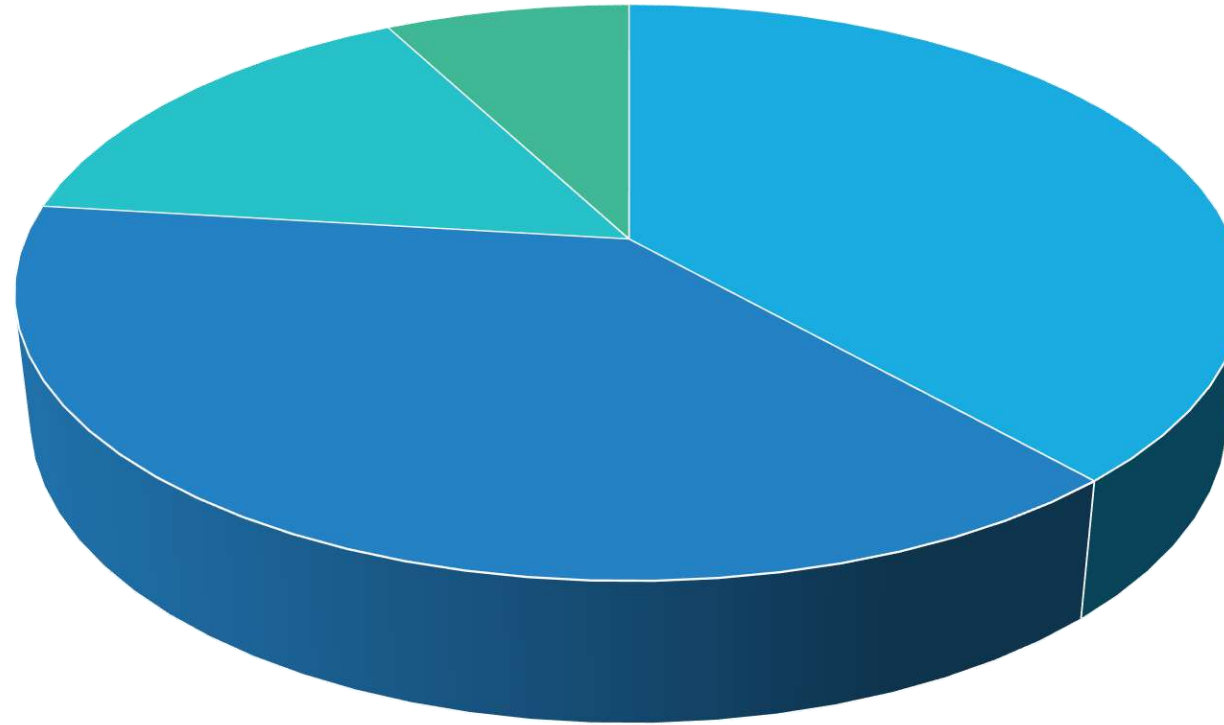




3–6 x more E



Energy consumption

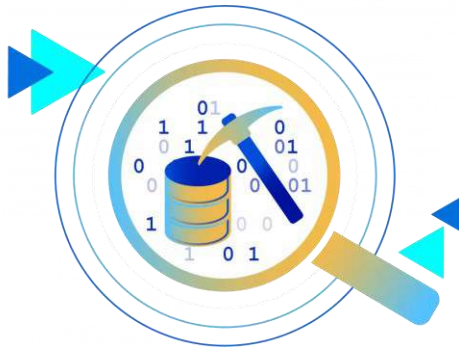


- Ventilation system
- Laboratory equipment
- Temperature control
- Humidity control





- ✓ Maximizing energy efficiency and measuring and controlling carbon footprint



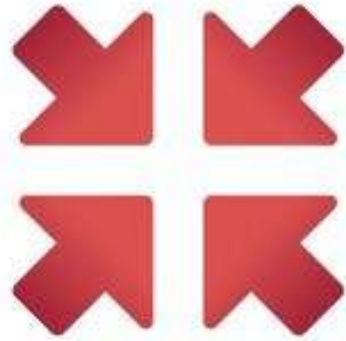
Sustainable solutions

Reducing costs



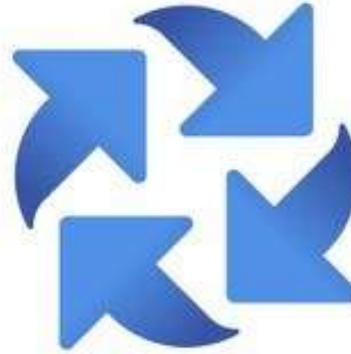
- ✓ Easy-to-implement reductions made by laboratory staff.
- ✓ Senior management should have the leading role and set the example.





REDUCE

- the consumption of energy
- natural resources
- unsafe products



REUSE

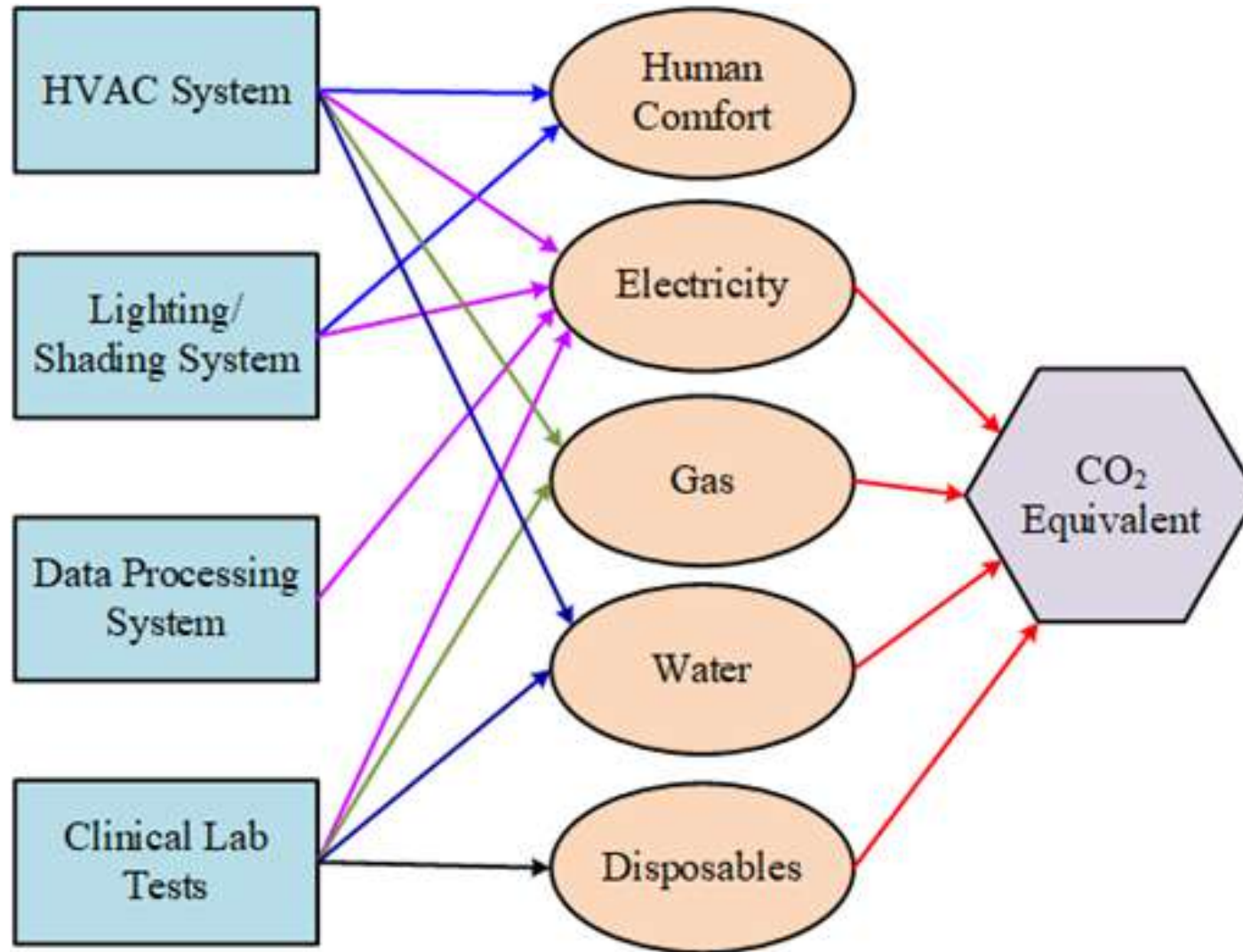
- as much as possible before replacing



RECYCLE

- preventing waste
- reduce the consumption of fresh raw materials, energy usage, air and water pollution





Ni K, et al. *Energies* 2018;11:3105.





- Reduction of energy consumption in the laboratory's workflow,
- Reduction of gasoline consumption by laboratory logistics and staff,
- Energy-efficient and environmentally friendly design of laboratory/hospital buildings,
- Use of renewable energy sources when and where possible,
- Collaboration between hospital buildings and laboratory networks for resource sharing.



How can laboratories reduce energy consumption?



1. Switch off



- Lights, computers, instrumentation and equipment at the end of the day or when not in use.
- Heating or cooling element (high energy consumers).
- Traffic light sticker system:



– switch off equipment when you are finished using it;



– check with senior staff on whether it can be turned off after use/end of day;



– must remain on.



2. Smart technology



- Sensor lights
- Replacing light fittings with more efficient ones; switching from fluorescent bulbs to LED.
- Use natural light as much as possible; task lighting.
- Solar power, sustainable biofuel, combined heat and power systems.
- Ensuring energy saving or sleep mode is active on computers, printers and scanners; do not use screensavers.



3. Think twice



- Reducing and discouraging printing, only where necessary.
- Reducing the number of emails being sent, especially those with attachments; unsubscribe to emailing lists of no value or interest.



4. Timers



- Installing timers on equipment that may delay work practices or take time to initialise when switched on.



5. Fume hoods and Biological Safety Cabinets (BSC)



- Shutting the sash on fume hoods when not in use.
- BSC can be switched off when not required or at the end of day.
- Any small appliances used inside fume hoods or BSC are also powered off when not in use.
- If using UV light as a method of decontamination, install a timer and only run when laboratory is empty.



6. Refrigerators and freezers



- Keep refrigerators and freezers organized.
- Audit regularly what is stored.
- Defrost routinely freezers and clear out regularly items stored; fill empty spaces with empty storage boxes or ice packs.
- Change regularly filters that need changing, clean exposed refrigeration coils of refrigerators and freezers and clean the door sealing.
- Where possible $-80\text{ }^{\circ}\text{C}$ can be increased to $-70\text{ }^{\circ}\text{C}$ without adverse viability or compromise of stored items.



7. Waste



- Autoclaves should be run as efficiently as possible (e.g. a two-streamed route where items are sent for autoclave or dishwashing as appropriate).
- Should only be run when full – sharing loads within departments; setting up a schedule to coordinate runs.



8. Air conditioning



- Ensure windows are not open or space heaters are not used while AC units are in operation.
- Temperature and humidity controls should be adjusted relative to seasonal demands.
- Close doors in rooms where AC is being used.



9. Equipment and instrumentation

- Choose equipment and instrumentation that carry an energy star rating and insignificant air-conditioning or heating requirements.
- Suppliers should take back packaging materials for reuse or recycling after supply of instruments and equipment; also obliged to take old appliances for recycling (EU WEEE regulations).
- All equipment made safe and decontaminated.
- Where possible, new equipment should be locally purchased.
- If possible, include a green element to procurement.



10. Reagents and consumables



- Reagents and consumables should be sourced and manufactured as locally as possible to reduce carbon footprint associated with transport.
- Products should be bulk bought, especially commonly used items across department.
- Discussions with suppliers to reduce packaging, especially difficult to recycle or non-recyclable.



11. “Sharing is caring”



- Smaller departments or laboratories might consider equipment sharing instead of purchasing their own (e.g. autoclaves, freezers, printers, fume hoods, thermal cyclers, water filters/deionisers).



12. Sample transportation, pre-pre-analytical and pre-analytical phases



- Alternatives (cycling or small cars) for transport of sample and laboratory materials over short distances.
- Hybrid or electric vehicles.
- Explore future alternatives such as drones' transportation.





EFLM CHECKLIST FOR GOOD ENVIRONMENTAL PRACTICES IN CLINICAL LABS

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