



my green lab
certification.

Your Lab – Green Lab Certification Results



my green lab.



Laboratories Are Resource Intensive Spaces



More energy than
office spaces



More water than
office spaces



Pounds of plastic
waste each year



Your Participation Matters



Green Lab Certification Helps Us:

- Involve our scientists in minimizing our environmental impacts
- Build a culture of sustainability in the lab
- Advance our global sustainability goals
- Identify waste-reduction opportunities so more can be invested in science

Thank you for helping make labs more sustainable!



Green Lab Certification Topics



Infrastructure
Energy



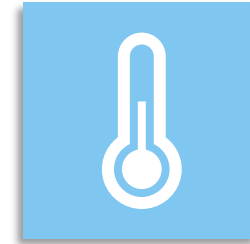
Plug Load



Fume
Hoods



Large
Equipment



Cold
Storage



Water



Purchasing



Resource
Management



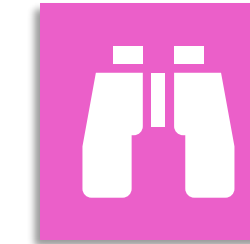
Green
Chemistry and
Green Biologics



Recycling &
Waste
Reduction



Vivaria



Field Work



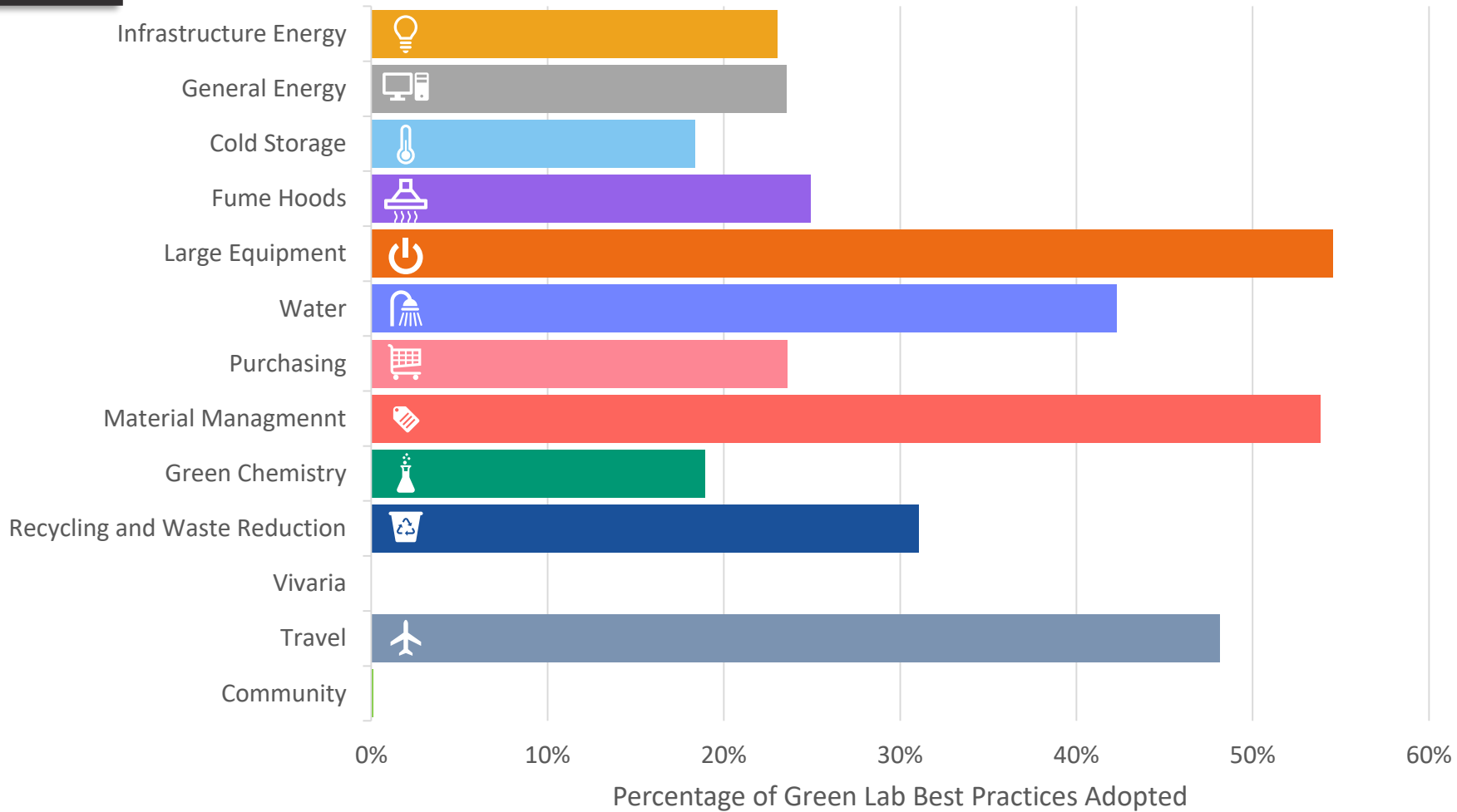
Travel



Community



Your Lab Scoring



Each topic was assessed based on 14 responses

Overall Score

29%



A Closer Look: Plug Load



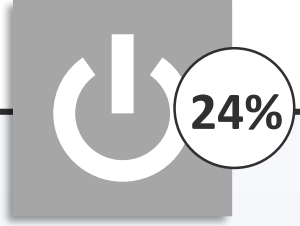
What's Already Being Done

- 61% - We have optimized the number of pieces of equipment and share them
- 43% - We turn off or unplug equipment when it is not in use
- 25% - We have completely turned off any cold or warm rooms, clean rooms or other environmental spaces that are not in use





A Closer Look: General Equipment



Simple Ways to Improve

- Have a group discussion about what equipment can be turned off and what needs to be left on
- Utilize outlet timers to make it easy to turn off equipment after hours
- Walk through the lab to check equipment for standby and sleep modes that could help reduce energy usage – you can ask the vendors too!
- Post signs or protocols to help people remember to turn off equipment when finished



A Closer Look: Green Chemistry



The 12 Principles of

GREEN CHEMISTRY

Green chemistry is an approach to chemistry that aims to maximize efficiency and minimize hazardous effects on human health and the environment. While no reaction can be perfectly 'green', the overall negative impact of chemistry research and the chemical industry can be reduced by implementing the 12 Principles of Green Chemistry wherever possible.

1. WASTE PREVENTION



Prioritize the prevention of waste, rather than cleaning up and treating waste after it has been created. Plan ahead to minimize waste at every step.

2. ATOM ECONOMY



Reduce waste at the molecular level by maximizing the number of atoms from all reagents that are incorporated into the final product. Use atom economy to evaluate reaction efficiency.

3. LESS HAZARDOUS CHEMICAL SYNTHESIS



Design chemical reactions and synthetic routes to be as safe as possible. Consider the hazards of all substances handled during the reaction, including waste.

4. DESIGNING SAFER CHEMICALS



Minimize toxicity directly by molecular design. Predict and evaluate aspects such as physical properties, toxicity, and environmental fate throughout the design process.

5. SAFER SOLVENTS & AUXILIARIES



Choose the safest solvent available for any given step. Minimize the total amount of solvents and auxiliary substances used, as these make up a large percentage of the total waste created.

6. DESIGN FOR ENERGY EFFICIENCY



Choose the least energy-intensive chemical route. Avoid heating and cooling, as well as pressurized and vacuum conditions (i.e. ambient temperature & pressure are optimal).

7. USE OF RENEWABLE FEEDSTOCKS



Use chemically renewable feedstocks rather than petrochemical sources.

8. REDUCE DERIVATIVES



Minimize the use of temporary derivatives such as protecting groups. Avoid derivatives to reduce reaction steps, resource use, and waste.

9. CATALYSIS



Use catalytic instead of stoichiometric reagents. Choose catalysts for high selectivity, minimize reaction times and energy demands.

10. DESIGN FOR DEGRADATION



Design chemicals that degrade and can be discarded easily. Ensure that both chemicals and their degradation products are not bioaccumulative, persistent, or toxic.

11. REAL-TIME POLLUTION PREVENTION



Monitor chemical reactions in real-time as they occur to prevent the formation and release of any potentially hazardous and polluting substances.

12. SAFER CHEMISTRY FOR ACCIDENT PREVENTION



Choose and develop chemical procedures that are safer and inherently minimize the risk of accidents. Know the possible risks and assess them beforehand.

What's Already Being Done

• 83% - We avoid acutely hazardous materials

• 72% - We have identified and use greener alternatives

• 61% - We use a greener alternative tool or selection guide to identify greener chemicals

• 54% - We utilize solvent-free chemistries or separations





A Closer Look: Green Chemistry



44%

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Choose the least energy-intensive chemical route. Avoid heating and cooling, as well as pressurized and vacuum conditions (i.e. ambient temperature & pressure are optimal).

7. USE OF RENEWABLE FEEDSTOCKS



Use chemicals which are made from renewable (i.e. plant-based) sources, rather than other, essentially non-renewable chemicals originating from petrochemical sources.

8. REDUCE DERIVATIVES



Minimize the use of protecting groups. Avoid derivatives to reduce reaction steps, resources required, and waste created.

9. CATALYSIS



Use catalytic instead of stoichiometric reagents. Choose catalysts to improve selectivity, minimize waste, and reduce reaction times and energy demands.

10. DESIGN FOR DEGRADATION



Design chemicals that are safer and can be discarded easily. Ensure that both chemicals and their degradation products are not bioaccumulative, or otherwise persistent.

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Monitor chemical reactions in real-time as they occur to prevent the formation and release of any potentially hazardous and polluting substances.

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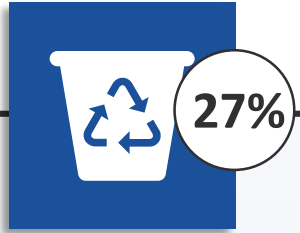


Choose and develop chemical procedures that are safer and inherently minimize the risk of accidents. Know the possible risks and assess them beforehand.

- Have a group discussion about the 12 Principles of Green Chemistry and how they apply to your work – are there best practices you can share?
- Evaluate options to use an alternative to ethidium bromide in the lab
- Look at your methods that require heating/cooling or non-atmospheric temperatures – are there alternative methods available at ambient temps and pressures?

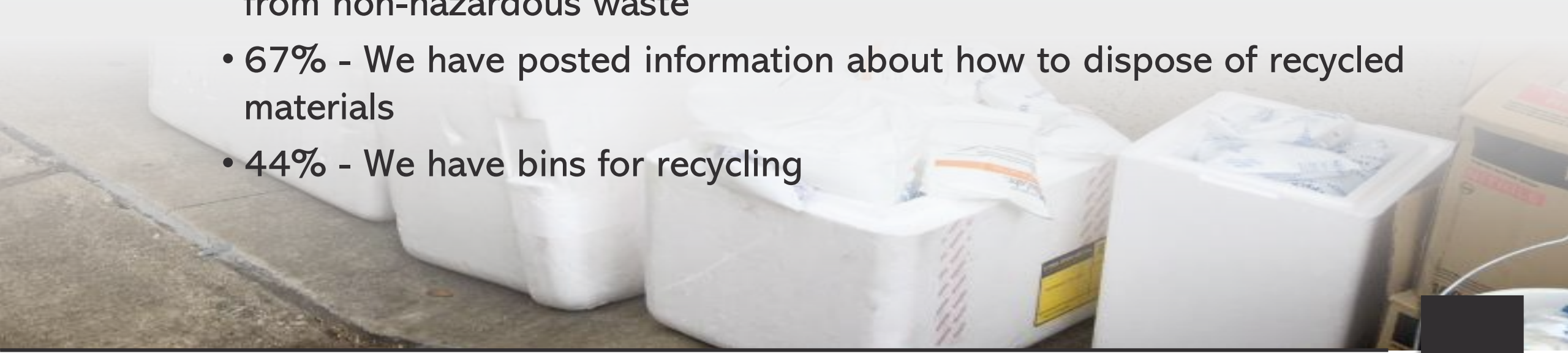


A Closer Look: Waste Reduction & Recycling



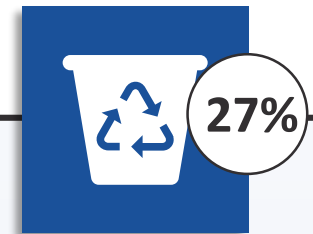
What's Already Being Done

- 89% - We understand the labeling requirements for hazardous and non-hazardous wastes
- 78% - We recycle batteries and other universal wastes
- 67% - We have established guidelines for separating hazardous waste from non-hazardous waste
- 67% - We have posted information about how to dispose of recycled materials
- 44% - We have bins for recycling



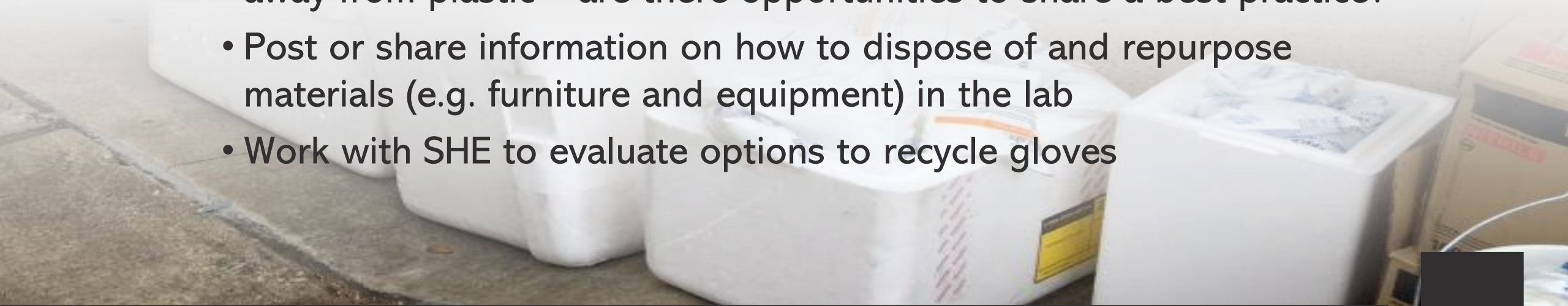


A Closer Look: Waste Reduction & Recycling



Simple Ways to Improve

- Set up bins for recycling in the lab and work with the site to understand what you can recycle – create signage that is clear and easy to understand
- Have a group discussion about where you have been able to transition away from plastic – are there opportunities to share a best practice?
- Post or share information on how to dispose of and repurpose materials (e.g. furniture and equipment) in the lab
- Work with SHE to evaluate options to recycle gloves





Thank You



Questions?

www.mygreenlab.org