How to Create a Culture of Sustainability in Science: From the Benchtop to the Boardroom

Best Practices for Sustainable Laboratories – 20 October 2022

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European Stakeholder Engagement

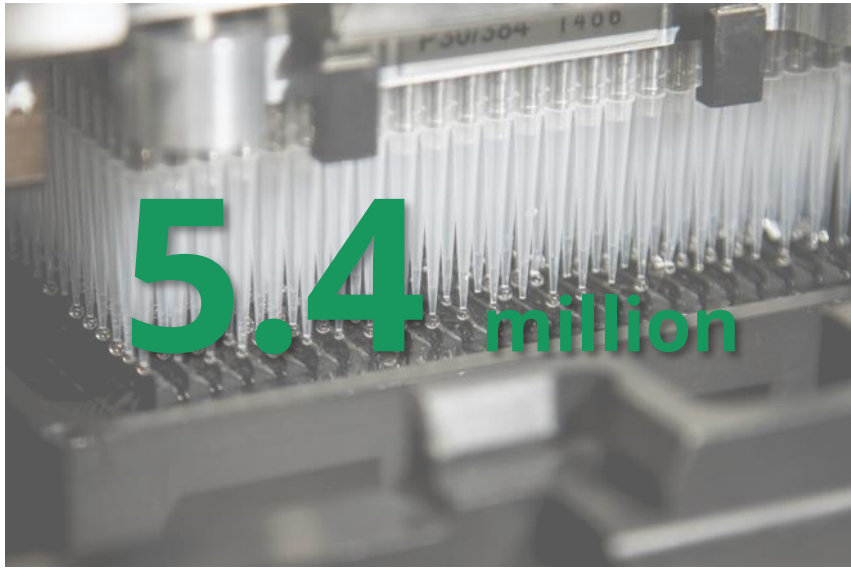
My Green Lab Vision

We will ensure a world where all science is conducted in a way that benefits the health and well-being of people and our planet.

Laboratories Are Resource Intensive Spaces

More energy than office spaces

More water than office spaces



Tons of plastic waste each year
(12 billion pounds)

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Building a global culture of sustainability in science.

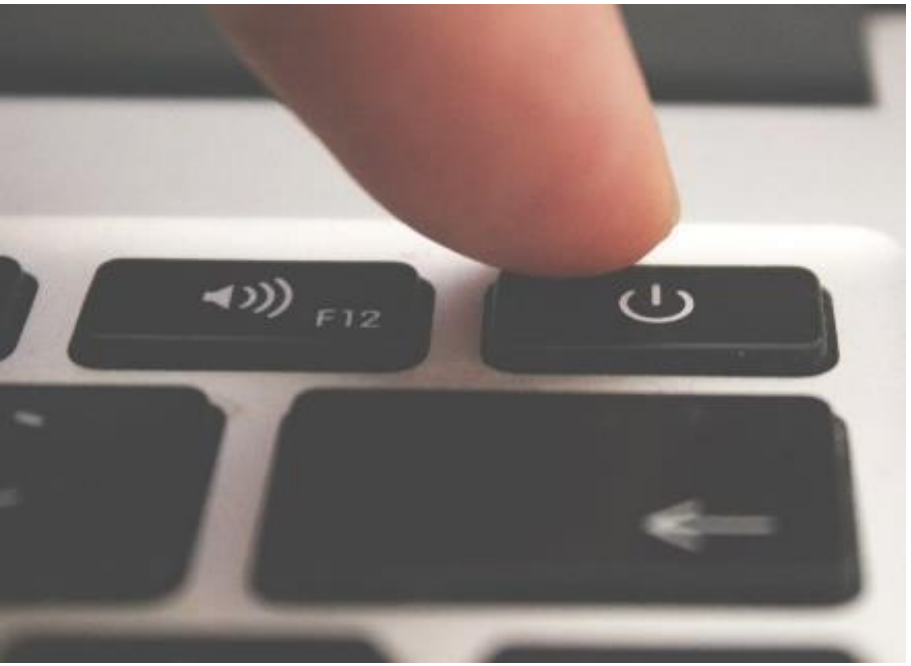
At My Green Lab We

Bring **awareness** to the environmental impacts in a laboratory

Share best practices, case studies, and more to **support** green lab projects

Help scientists explore ways to **reduce** the **impact** of their work

Operate as a **Not-for-Profit** Organization



Rethinking Energy

- Make sure **lights get turned off** in the lab and support rooms
- Identify **equipment to turn off** when it is not in use
- Use **outlet timers** to make it easy

Reducing Energy in a Research Building

- **24 outlet timers were installed** on 23 water baths and one heat block
- It was found that the outlet timers resulted in a **total savings of 4,800 kWh**
- The energy savings is equivalent to the greenhouse gas emissions from driving **nearly 14,500 km per year**

Be Good in the Hood

- Fume hoods can consume as much as **3.5 homes worth of energy**!

- **Shutting the sash** on your fume hood could **save 2 homes worth of energy**
- Make sure **excess equipment and supplies** are not stored in hoods, blocking air flow
- **Turn off the lights** when not in use

Harvard's **Shut the Sash** program
saves $240,000 / year
and 300 tons CO_2-e

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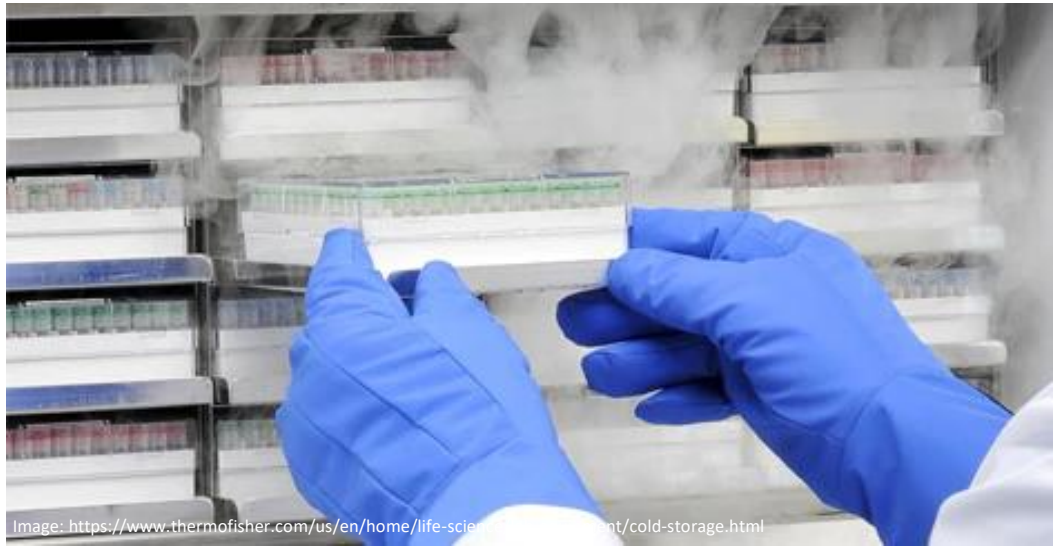
Cold Storage Best Practices

- **-80°C freezers** can consume **as much energy as a house**
- **Chilling up -80s to -70°C** can save around 30% of the energy consumed

- Keep cold storage operating at **maximum efficiency**:
  - Maintain door seals
  - Defrost and remove ice
  - Clean filters and vacuum coils – this can save 10%


Image: https://www.dpr.com/projects/biogen-building-8-floors-4-5-lab-renovation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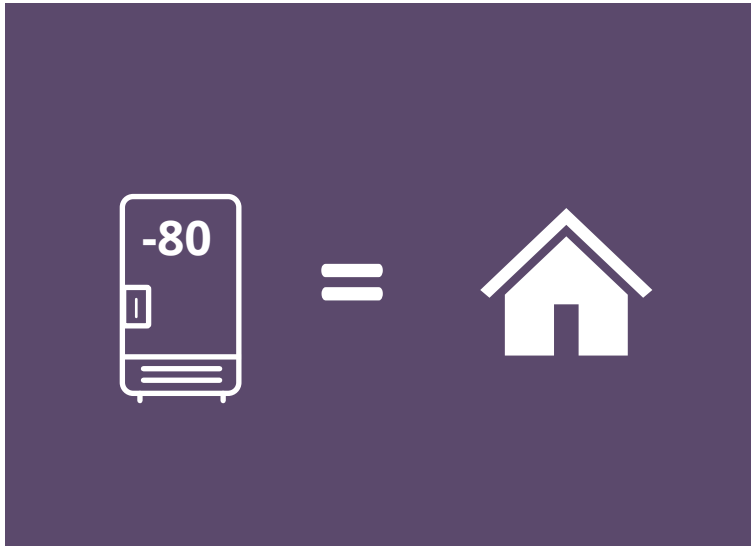

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Water Wisdom

- Check faucets for **low-flow aerators** – they can reduce water usage at the tap by 50% - 70%
- Use **alternatives to single-pass cooling** like recirculated water
- Run **autoclaves and dishwashers** when full as much as possible
- Use the **right quality water** for the task – it takes 11 liters of water to make 4 liters of DI water

Reduce, Reuse, Recycle

- Get to know your waste and **identify your largest waste streams**
  - know what you can recycle
  - Identify what you can reduce
- Work with suppliers to **explore product alternatives** that can help you minimize waste, reduce hazards and/or decrease energy and water usage
- Use a **shared supply of common reagents** and materials to prevent over-purchasing
- **Choose** more sustainable products – look for environmental labels like Energy Star or ACT

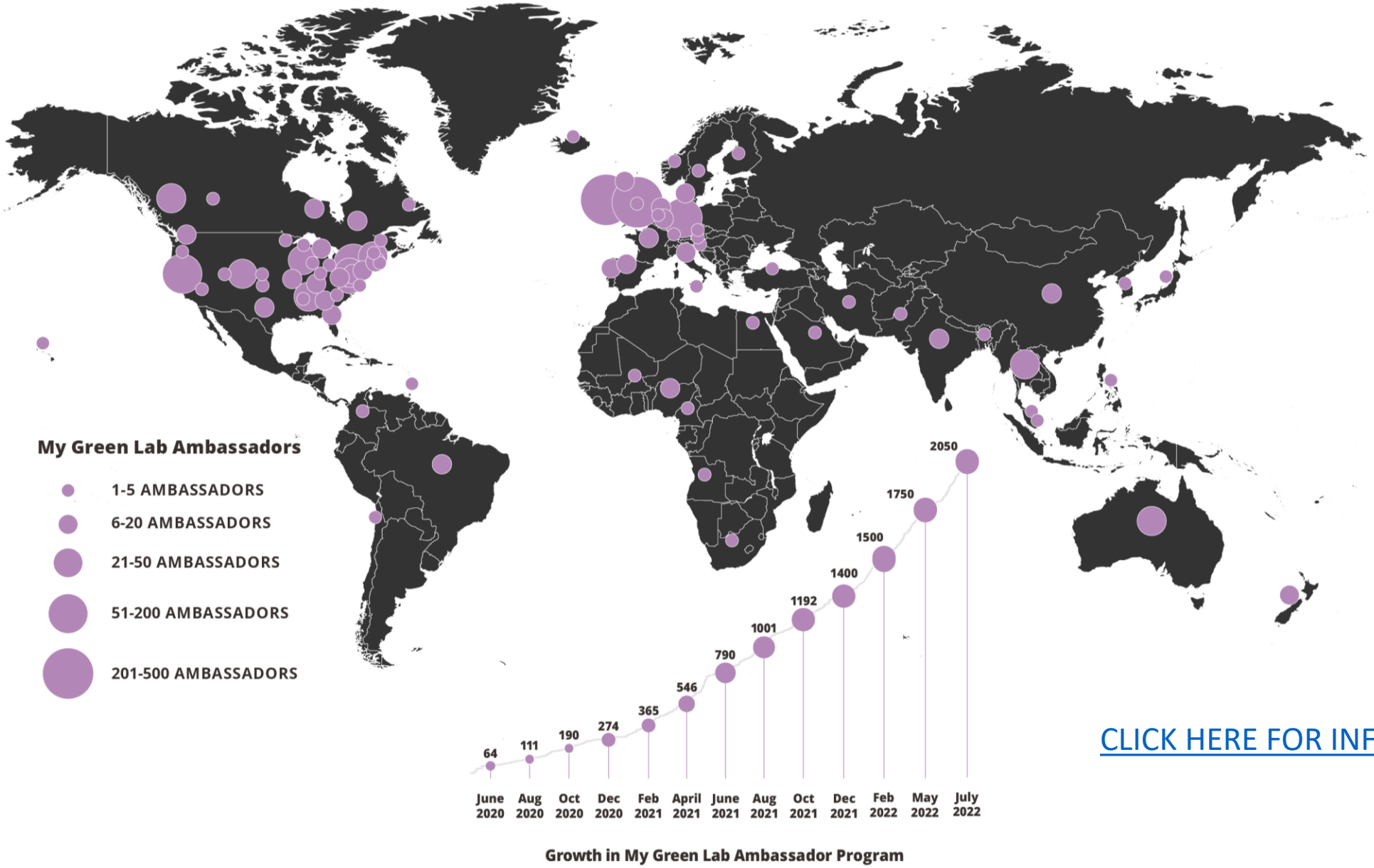
Program Ecosystem

My Green Lab offers a suite of leading-edge programs to engage everyone from students and researchers, to laboratories, major institutions, and corporations in an effort to fundamentally and permanently improve the environmental performance of scientific research.

My Green Lab Ambassador Program

- **Free**, online learning program
- A quick introduction to lab sustainability
- Smart Science videos with interactive quiz questions
- Access to 2,000+ Ambassadors across 40 countries!

My Green Lab Ambassador Program Growth



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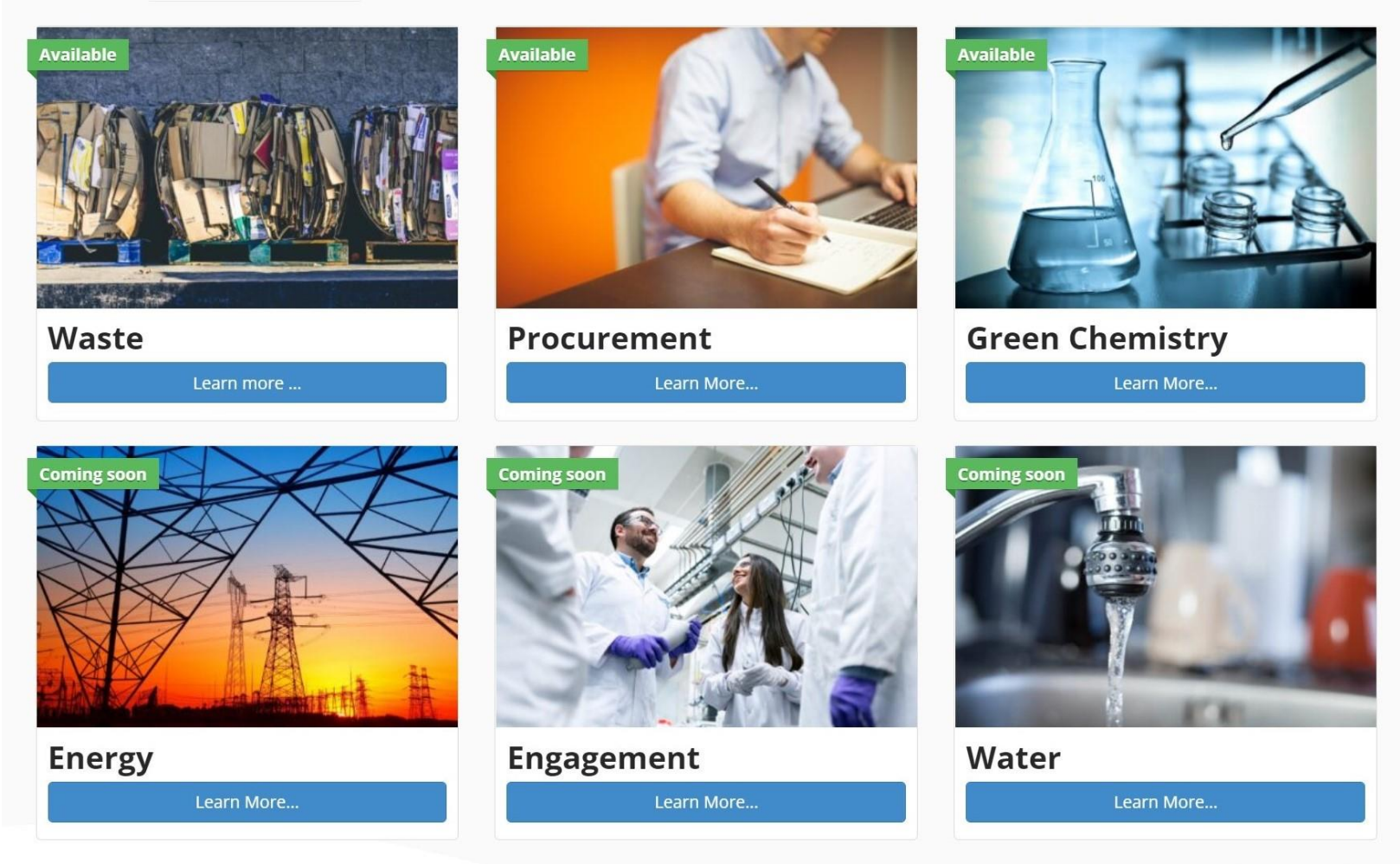
My Green Lab Accredited Professional (AP) Program



freezer challenge

2022 International Laboratory Freezer Challenge

Engagement & Impact

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I²SL
International Institute for Sustainable Laboratories®

International Laboratory Freezer Challenge

Energy Saved Through Participation (in kWh)

Equivalent to the electricity used by

1,300 homes

for a year

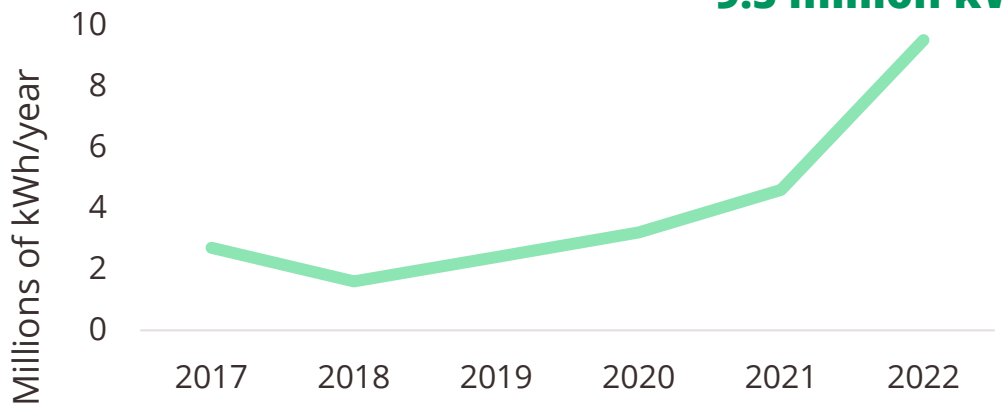
Equivalent to

6,732 Metric Tons

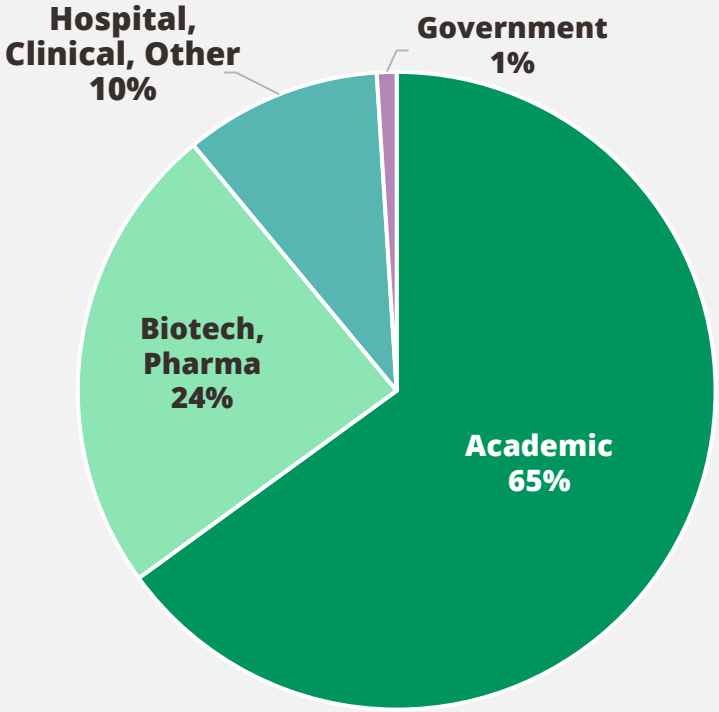
of CO_2 avoided

Since 2017, the total amount of energy saved is **24 million kWh**

9.5 million kWh



Engagement By Sector



Participating Labs

1239

Countries Engaged

27

Participating Research Institutions

120

Participating Cold Storage Units

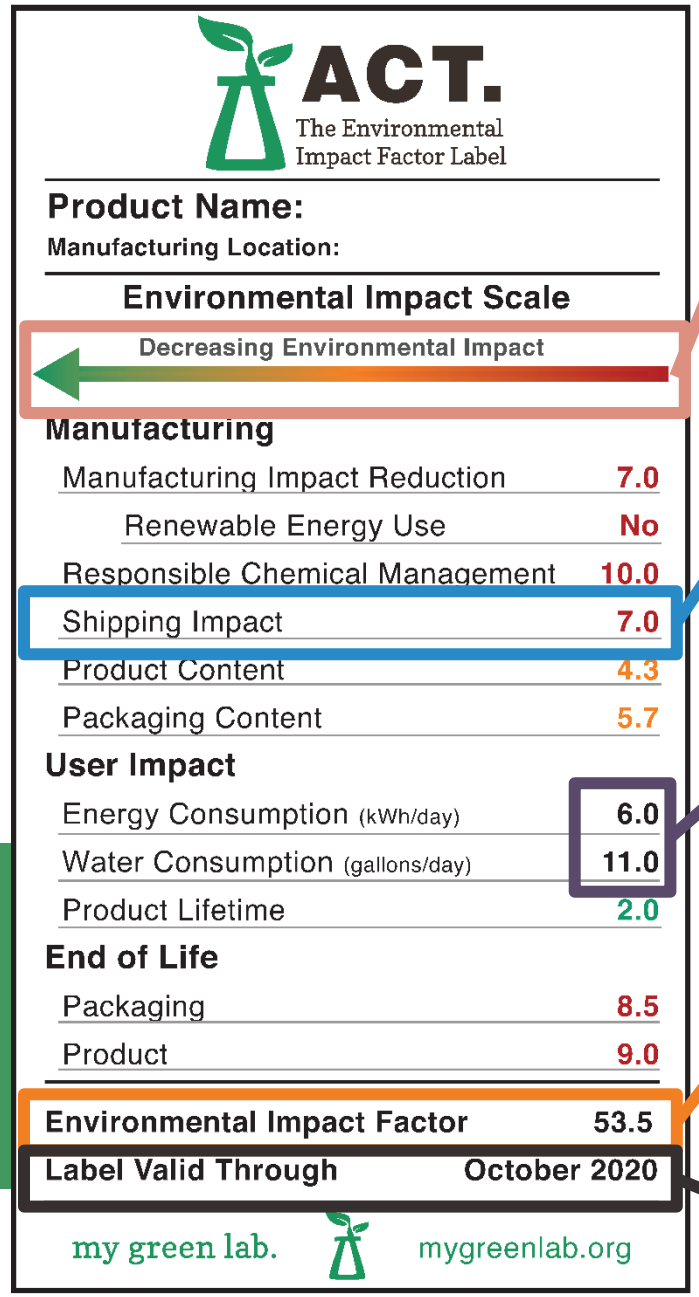
12,000+

ACT.

Accountability Consistency
Transparency

an eco-nutrition label for laboratory products

www.act.mygreenlab.org/



Simple color scale indicates environmental impact, with values on a scale of 1 to 10

Additional information about categories available online

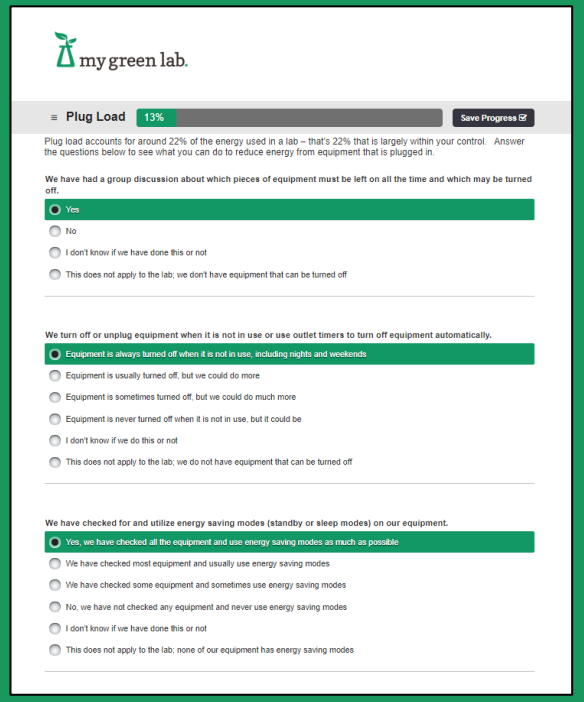
Energy and water consumption data help drive sustainable lab practices

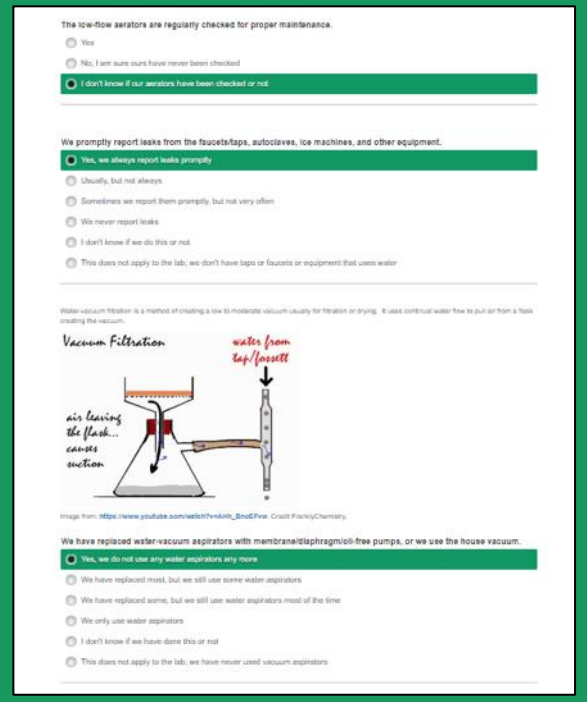
Total Impact Factor enables quick comparisons

Expiration date keeps data current and drives continuous improvement

My Green Lab Certification

- Online assessment
- 14 topics covered
- 175 questions, 30-45 minutes to complete
- Focus is on lab behaviors and actions lab members can take to be greener
- 8-10 months certification journey





Infrastructure Energy
Plug Load
Fume Hoods
Large Equipment
Cold Storage
Water
Purchasing
Resource Management
Green Chemistry
Recycling & Waste Reduction
Vivaria
Field Work
Travel
Community

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Certification Process

1. Assess Baseline

- Survey lab members to understand current practices
- 3 – 5 weeks
- 50% participation required
- Make recommendations for improvement

2. Implement Changes

- Labs discuss solutions and implement behavior change practices
- Labs and Green Teams coordinate additional work
- 6 – 8 months on average

3. Get Certification

- Re-assess lab practices
- 3 – 5 weeks
- 50% participation required
- Certification level given
- Make recommendations for further improvements

4. Make More Changes

- Labs adopt additional policies and best practices
- Green Teams support further improvement projects

5. Do Re-Certification

- After 2 years, re-assess lab practices and provide new certification level
- Further recommendations made

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Recognizing Success

Green

80% score on Certification Assessment

Platinum

70% score on Certification Assessment

Gold

60% score on Certification Assessment

Silver

50% score on Certification Assessment

Bronze

40% score on Certification Assessment

Case Study – Colorado Dept. of Agriculture

- Focused on fume hood best practices, autoclave best practices, waste reduction and energy management
- "**It was fun**, and we learned a lot"
- "[The environmental impact of labs] can be alarming--but it can also be **motivating and empowering to know that we can make these changes**"

Reduced energy usage by 187,000 kWh/year

Saved 1,700 cubic meters of water/year

Reduced waste by 180 kg/year

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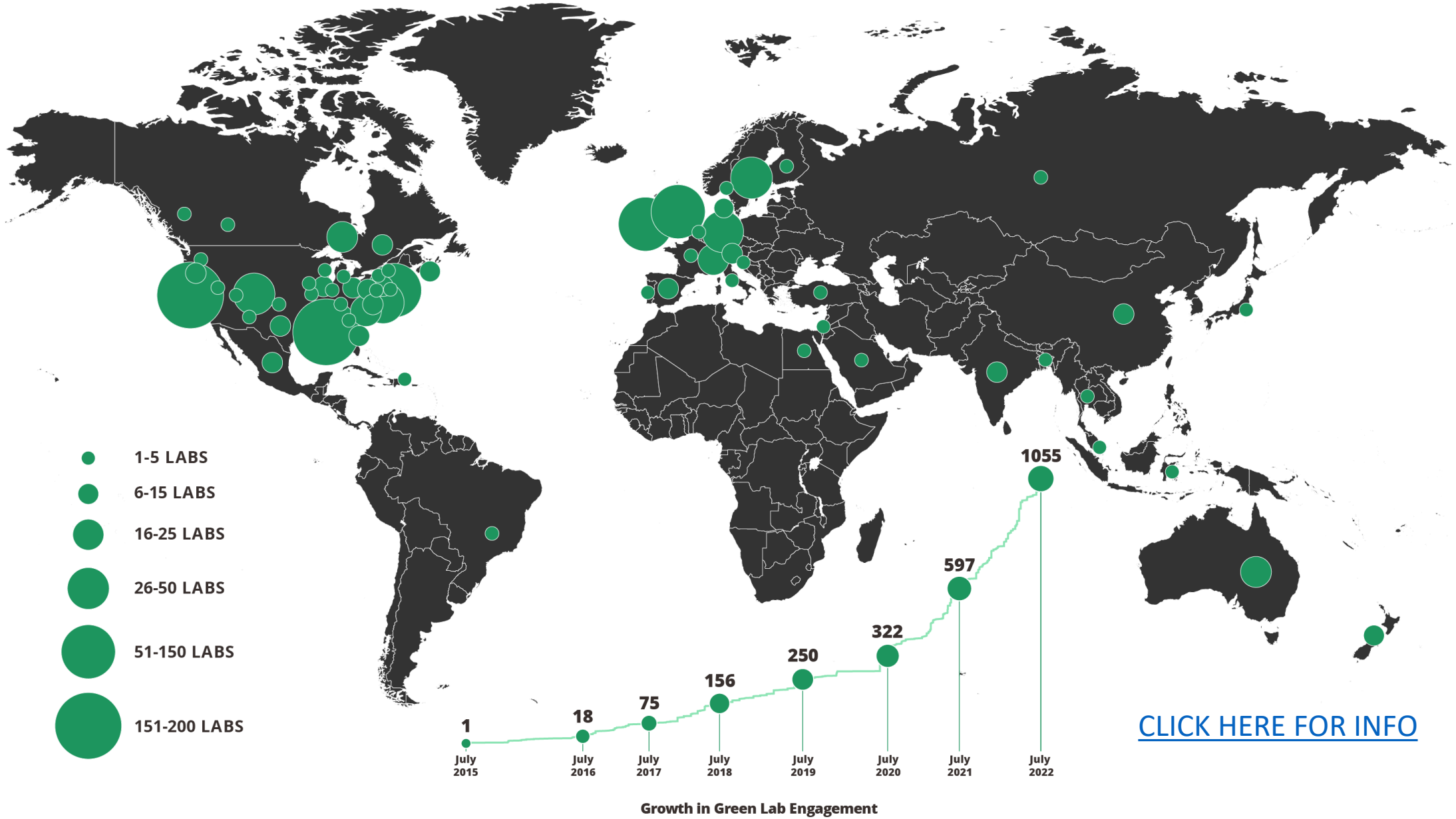
Sample Green Lab Certifications

Amgen
AstraZeneca
Biogen
Boston Children's Hospital
Capitol Regional District, Canada
Colorado Department of Agriculture
Danone Nutricia
Delta Leaf Labs
Department of Energy
Environmental Innovations
Environmental Protection Agency
Gilead
GlaxoSmithKline (GSK)
Howard Hughes Medical Institute
Johns Hopkins University
Johnson and Johnson
La Trobe University
Medtronic
National University of Ireland
Novartis
Novo Nordisk
Pepsi Co
Queen's University
Royal College of Surgeons Ireland
Sanofi
Stanford University
Takeda
Trinity College Dublin
United Kingdom Research and Innovation
University of Nantes, France
University College Cork
University College Dublin
University of Alabama, Birmingham
University of California, Irvine
University of California, Merced
University North Carolina
University of Melbourne, Australia
University of Southern Denmark
University of Florida
University of New South Wales

My Green Lab Certification Program Growth



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Green Lab Certification Selected as Key Player in the United Nation's Race to Zero

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The 2030 Breakthrough Outcome for Pharma states, **"95% of labs across major pharma and med-tech companies are My Green Lab certified at the green-level by 2030."**

million advocates for sustainable science

My Green Lab and the International Institute for Sustainable Laboratories issue a challenge to science funders around the world to encourage sustainability in research.

We invite scientists and sustainability advocates around the world to join the **Million Advocates for Sustainable Science.**

sustainablescienceadvocates.org

Join the Movement

- Sign up for our Newsletter
- Become a Green Lab Ambassador
- Start a My Green Lab Certification
- Support the ACT Label in Procurement
- Sign the Million Advocates for Sustainable Science

“Never doubt that a small group of thoughtful, committed citizens can change the world; indeed, it's the only thing that ever has.”
–Margaret Meade

Transformative

Agilent
ELEMENTAL MACHINES

Breakthrough

ThermoFisher SCIENTIFIC
The world leader in serving science
eppendorf
Nucleus Biologics
BULLITT FOUNDATION
Roche
RAININ
envetec

Discovery

illumina
avantor
WATT IQ
B medical systems
Stirling ULTRACOLD
MilliporeSigma
QIAGEN
PHCbi
Promega
STERILIS SOLUTIONS
USA SCIENTIFIC
cytiva

Experimental

Haier Biomedical
Intelligent Protection of Life Science
POLYCARBIN
BECKMAN COULTER
GILEAD
Miele
AstraZeneca
GRENOVA

Investigation

eurofins | BioPharma Product Testing
JACOBS WYPER ARCHITECTS
labcon
Flad
REUZEit Surplus Asset Management
BIO ECHO Life Sciences

Community

QUIGLEY COMPLIANCE ASSOCIATES

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