



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

Best Practices for Sustainable Laboratories – 20 October 2022

**eurolab**

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European Stakeholder Engagement

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Building a Global Culture of Sustainability in Science

 **my green lab.**

# 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.

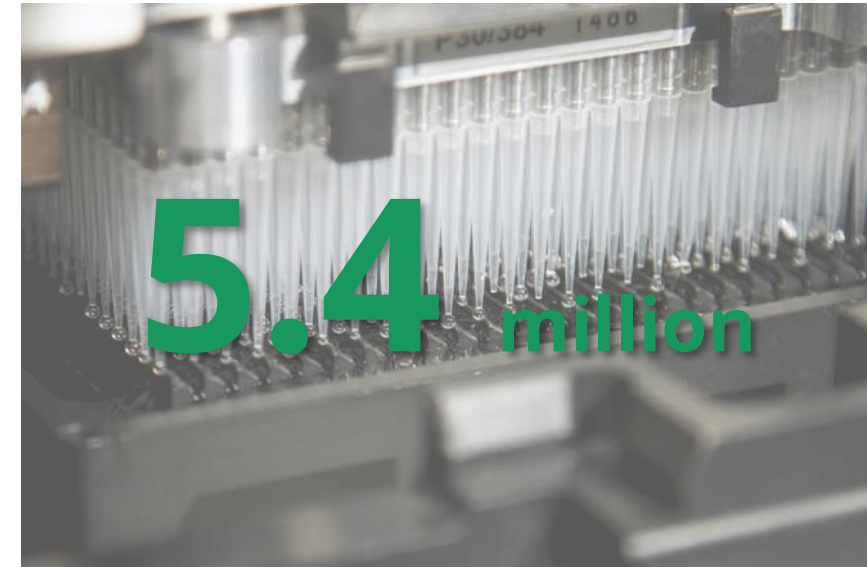
# Laboratories Are Resource Intensive Spaces



**More energy than  
office spaces**



**More water than  
office spaces**



**Tons of plastic  
waste each year  
(12 billion pounds)**



# 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<sub>2</sub>-e

# 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%





# 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.

### Certification



**my green lab  
certification.**

#### **My Green Lab Certification**

International 'gold standard' for laboratory sustainability best practices.

## **ACT.**

#### **The ACT Label**

The world's premier eco-label for laboratory products that ensures Accountability, Consistency and Transparency in order to enable sustainable laboratory procurement.

### Advocacy & Education



**freezer  
challenge**

#### **Freezer Challenge**

International competition to encourage cold storage best practices.



#### **My Green Lab Ambassadors**

Global community of green lab enthusiasts that have been educated and empowered to bring green lab principles into their work and research.



#### **My Green Lab Accredited Professionals**

The first credential of its kind developed to offer scientists an opportunity to grow their knowledge and demonstrate their expertise in lab sustainability.

### Campaigns



#### **UN Race To Zero**

MGL is a delivery partner for the UN RtZ, working to enable the systemic transformation of the Biotech and Pharmaceutical sector. MGL Certification has been selected as a key indicator in the 2030 Breakthrough Outcomes campaign.



**million advocates for  
sustainable science**

#### **Million Advocates**

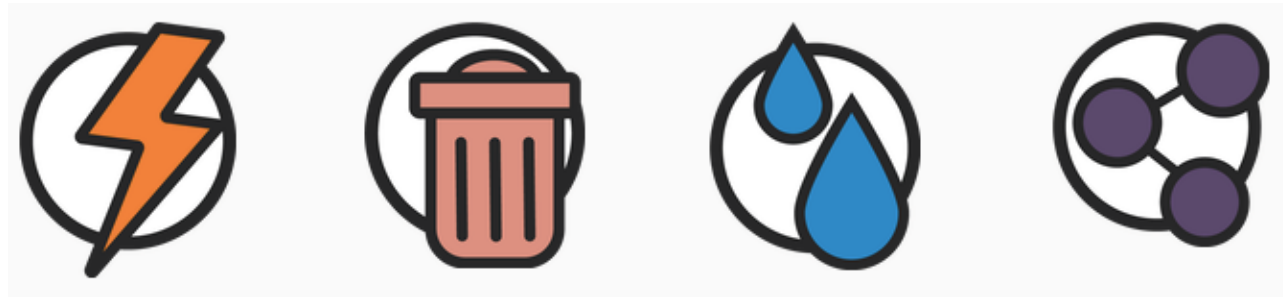
Global advocacy campaign requesting action from funding bodies to prioritize sustainability in the way research is conducted.



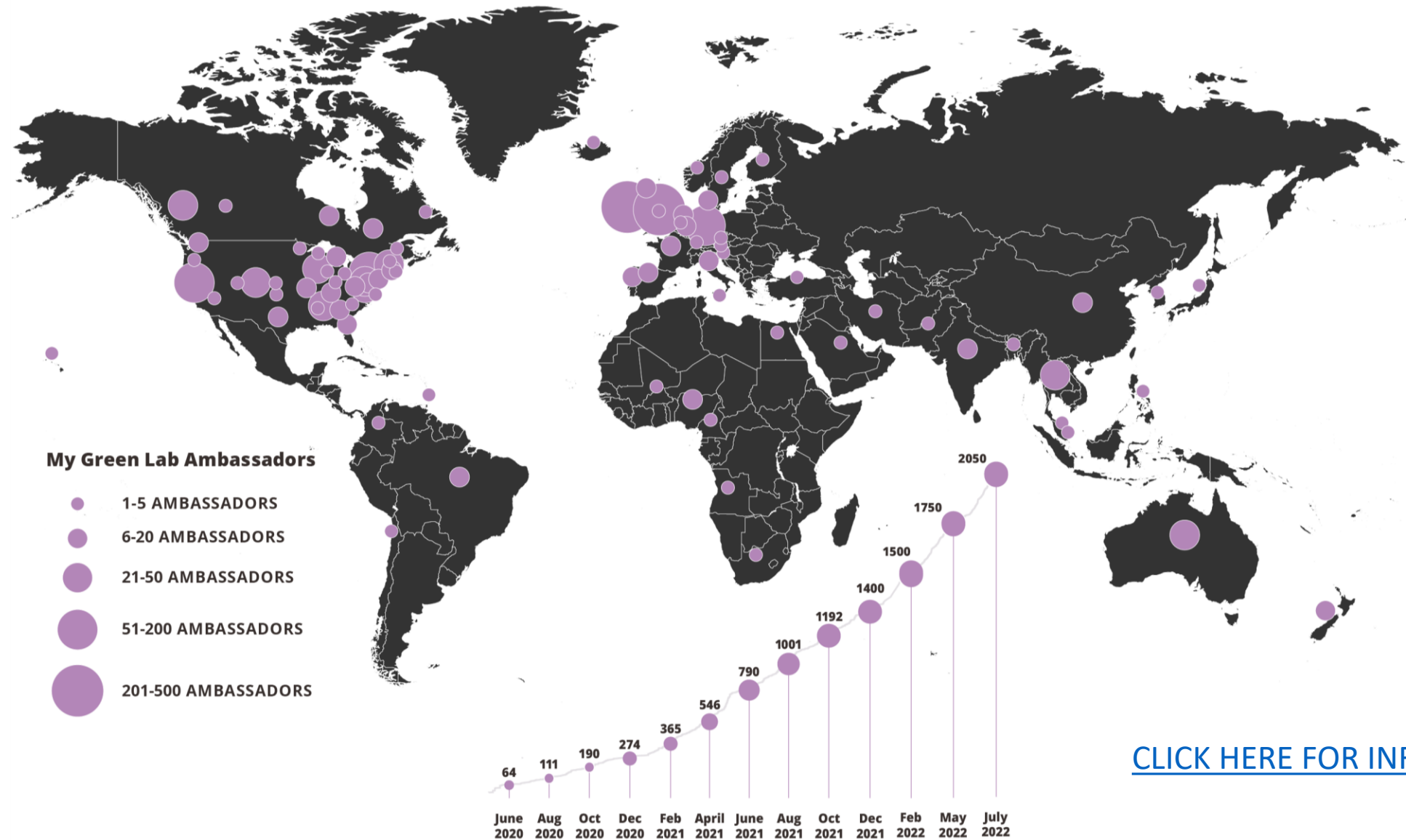
# My Green Lab Ambassador Program



- **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



[CLICK HERE FOR INFO](#)







# My Green Lab Accredited Professional (AP) Program

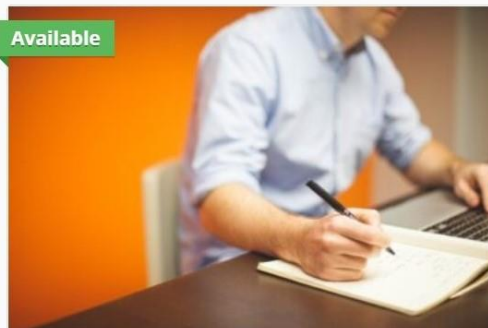
Available



**Waste**

[Learn more ...](#)

Available



**Procurement**

[Learn More...](#)

Available



**Green Chemistry**

[Learn More...](#)

Coming soon



**Energy**

[Learn More...](#)

Coming soon



**Engagement**

[Learn More...](#)

Coming soon



**Water**

[Learn More...](#)



freezer  
challenge

# 2022 International Laboratory Freezer Challenge

Engagement & Impact



my green lab.



# International Laboratory Freezer Challenge

## Energy Saved Through Participation (in kWh)



Equivalent to the electricity used by

**1,300 homes**

for a year

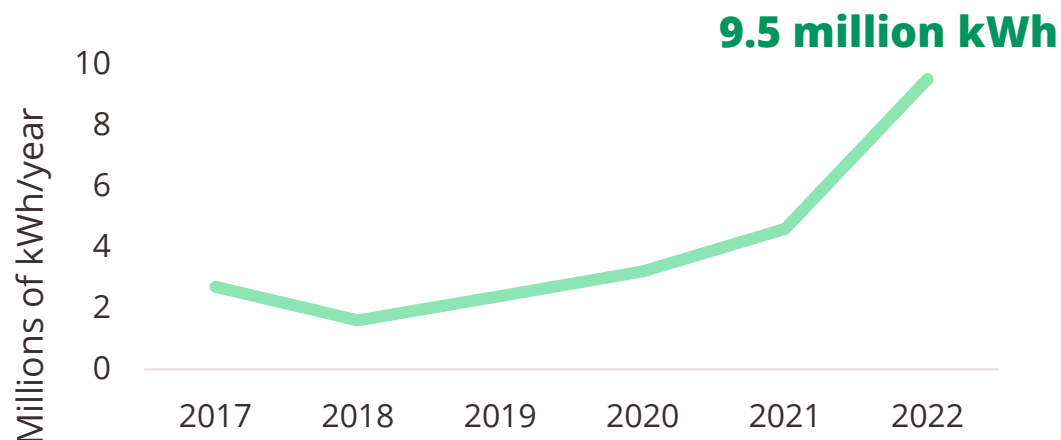


Equivalent to

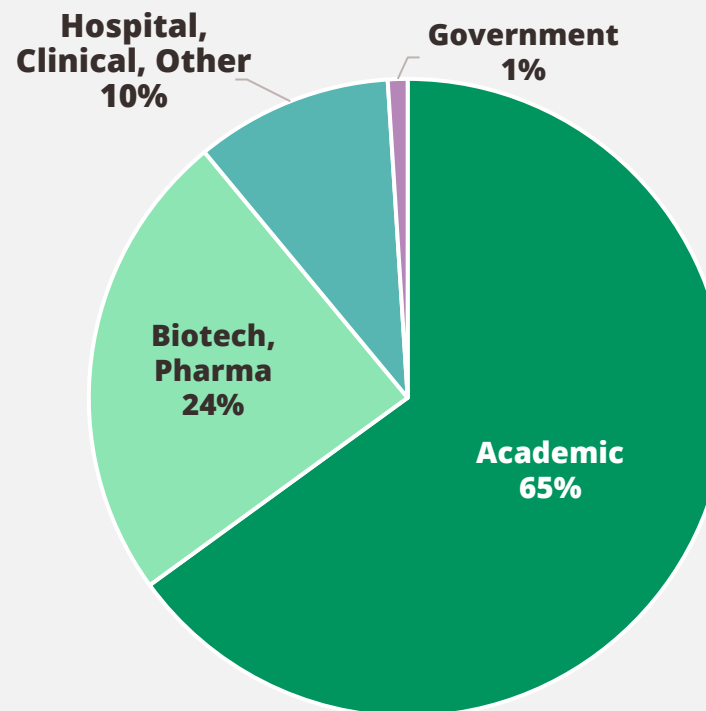
**6,732 Metric Tons**

of CO<sub>2</sub> avoided

Since 2017, the total amount of energy saved is **24 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/](http://www.act.mygreenlab.org/)


**ACT.**  
The Environmental  
Impact Factor Label

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**Product Name:**  
**Manufacturing Location:**

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**Environmental Impact Scale**



Decreasing Environmental Impact

**Manufacturing**

Manufacturing Impact Reduction	7.0
Renewable Energy Use	No
Responsible Chemical Management	10.0
Shipping Impact	7.0
Product Content	4.3
Packaging Content	5.7

**User Impact**


Energy Consumption (kWh/day)	6.0
Water Consumption (gallons/day)	11.0
Product Lifetime	2.0

**End of Life**

Packaging	8.5
Product	9.0

**Environmental Impact Factor** 53.5

**Label Valid Through** October 2020

[my green lab.](#)  [mygreenlab.org](http://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



- 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

The 10<sup>th</sup> law of safety is regularly checked for proper maintenance.

☐ Yes

☐ No, I am sure ours have never been checked

☒ I don't know if our aspirators have been checked or not

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We promptly report leaks from the faucets/taps, autoclaves, ice machines, and other equipment.

☒ Yes, we always report leaks promptly

☐ Usually, but not always

☐ Sometimes we report them promptly, but not very often

☐ We never report leaks

☐ I don't know if we do this or not

☐ This does not apply to the lab, we don't have taps or faucets or equipment that uses water

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Water vacuum filtration is a method of creating a low to moderate vacuum usually for filtration or drying. It uses continuous water flow to pull air from a flask creating the vacuum.

*Vacuum Filtration*

The diagram illustrates a vacuum filtration setup. On the left, a flask is shown with a side arm connected to a vertical tube. A handwritten note next to the flask says "air leaving the flask... creates suction" with an arrow pointing to the side arm. The vertical tube has a stopper at the top and a side arm that connects to the flask. A handwritten note above the tube says "water from tap/faucet" with an arrow pointing down into the tube. The tube is partially filled with water, and the water level is higher in the tube than in the flask, creating a vacuum.

Image from: [https://www.youtube.com/watch?v=uk6w\\_Bn0dFw](https://www.youtube.com/watch?v=uk6w_Bn0dFw) Credit: FrankyChamary

We have replaced water-vacuum aspirators with membrane/diaphragm/ oil-free pumps, or we use the house vacuum.

☒ Yes, we do not use any water aspirators any more

☐ We have replaced most, but we still use some water aspirators

☐ We have replaced some, but we still use water aspirators most of the time

☐ We only use water aspirators

☐ I don't know if we have done this or not

☐ This does not apply to the lab, we have never used vacuum aspirators

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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



# 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



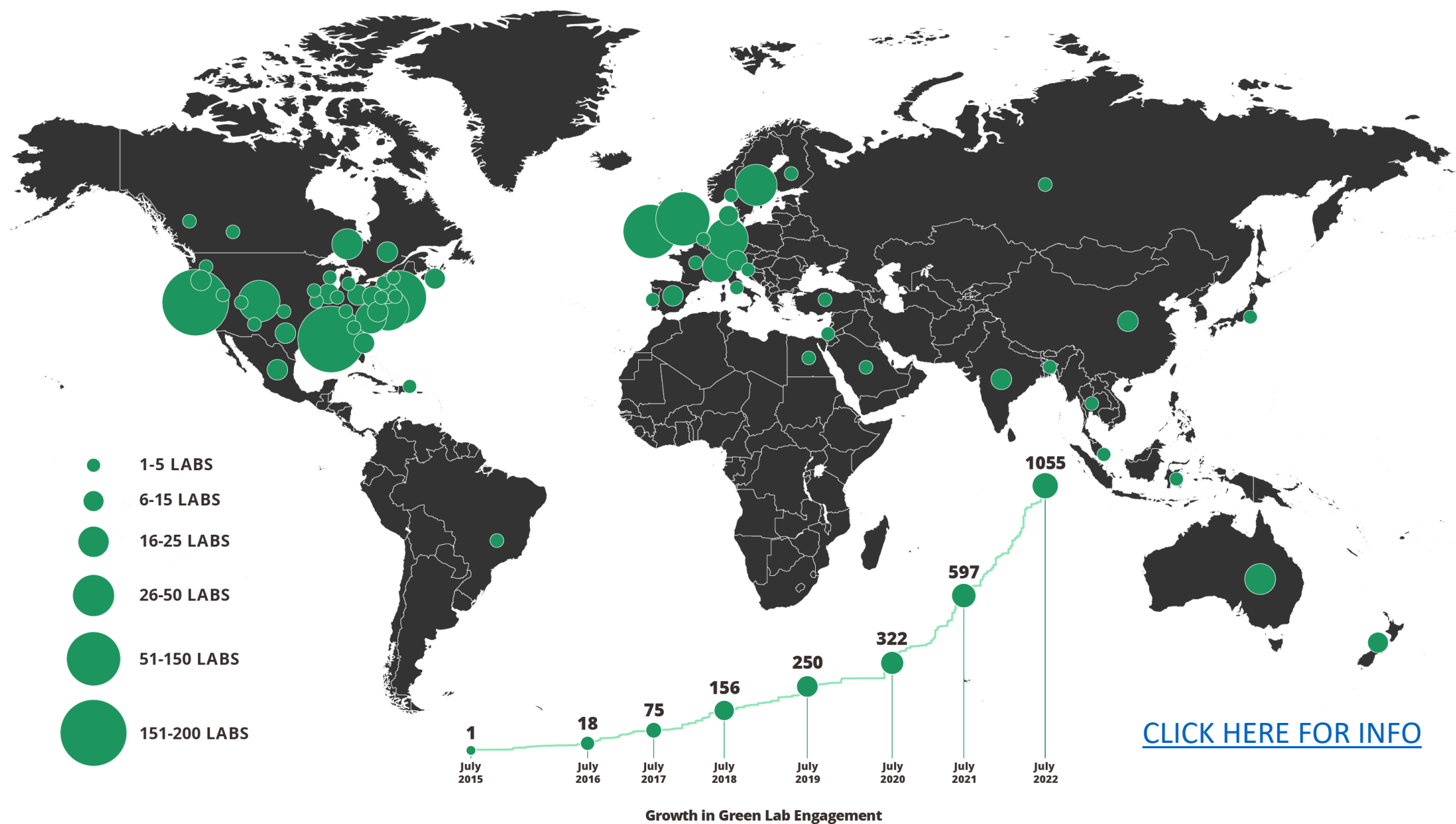
# Sample Green Lab Certifications



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



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



my green lab  
certification.



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](https://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**



**Breakthrough**



**Discovery**



**Experimental**



**Investigation**



**Community**



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