# 2018 SUSTAINABILITY REPORT Harvard Medical School













GREEN.HARVARD.EDU



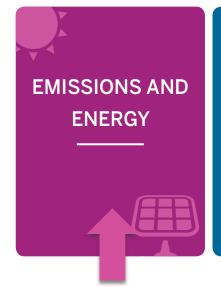




# HARVARD UNIVERSITY SUSTAINABILITY PLAN

- Water Conservation Measures
- Longwood Reuse Room reopened!
- Freecycle and E-waste collection
- Waste diversion efforts
- Healthier Building Materials Academy

- Sustainable Meeting and Event Guide
- Bike Fair
- Take the Stairs Campaign





NATURE AND ECOSYSTEMS

HEALTH AND WELL-BEING



- ..
- HMS Facilities Energy Manager Green Hero recognition
- ULT Freezer preventative maintenance
- HMS Facilities external presentations

- Countway Community Garden
- Arnold Arboretum Tour

- SEAM student org.
- Green Lab Certification
- Sustainable Student Event Fund
- Earth Month Sustainability Fair
- Commencement & White Coat Waste Diversion
- Lighting Fairs

# Harvard University Announced Science-based climate goal

### HARVARD'S CLIMATE ACTION PLAN:

**FOSSIL FUEL-FREE BY 2050** 

**FOSSIL FUEL-NEUTRAL BY 2026** 

green.harvard.edu/climate

# Harvard Medical School and HMS Affiliates Announced Decarbonization Commitment

The Boston Globe

OPINION | GEORGE Q. DALEY, ASHISH JHA, AND AARON BERNSTEIN

Climate change threatens public health and doctors' ability to provide care

# Decarbonizing Health Care



Harvard Medical School, teaching hospitals, clinical institutes sign joint commitment to reduce greenhouse gas emissions

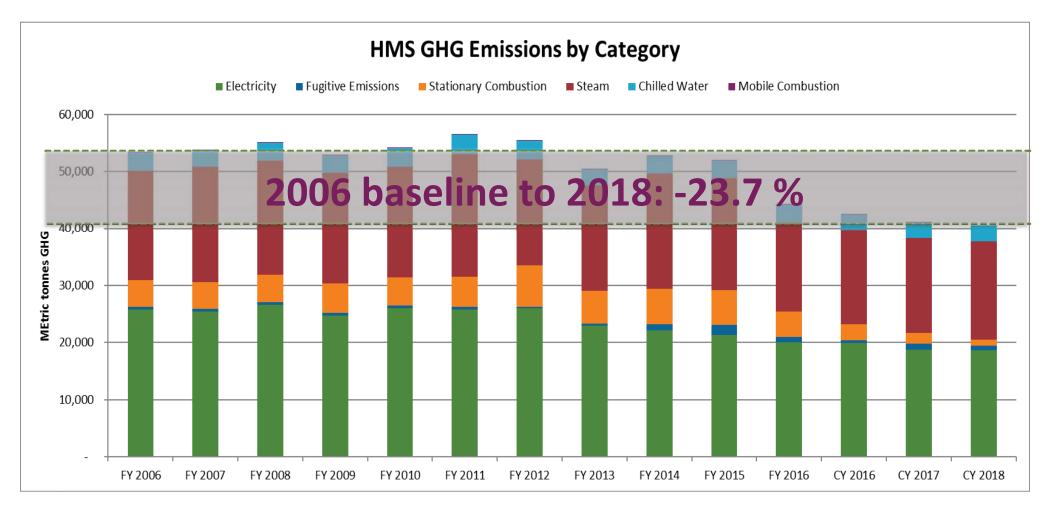
# Harvard Medical School and HMS Affiliates Announced Decarbonization Commitment

Participating hospitals, groups and clinical institutes:

- Beth Israel Deaconess Medical Center (Signatory: Kevin Tabb, CEO, and Pete Healy)
- Partners Healthcare (Signatory: David Torchiana, CEO)
- Boston Children's Hospital (Signatory: Sandra Fenwick, CEO)
- Cambridge Health Alliance (Signatory: Patrick Wardell, CEO)
- **Dana-Farber Cancer Institute** (Signatory: Laurie Glimcher, CEO)
- Joslin Diabetes Center (Signatory: Peter Amenta, CEO)
- Harvard Medical School (Signatory: George Q. Daley, Dean)

### **Emissions and Energy**

#### HMS GREENHOUSE GAS EMISSIONS REDUCTION PROGRESS



<sup>\*</sup>Metric Tonnes GHG = Metric Tons of Carbon Dioxide Equivalents
Fugitive Emissions - Pollutant released into air from leaks in equipment, pipe-lines, seals, valves, etc.
Stationary Combustion -A fixed-site producer of GHG, mainly power plants and other facilities using

# **Emissions and Energy**

### HMS ENERGY USAGE KBTU/FT<sup>2</sup> BY BUILDINGS

Buildings	KBTU/ft <sup>2</sup>	
Gordon Hall	146.57	
Goldenson	247.47	
C Building	212.23	
Armenise	208.05	
Modell	260.17	
TMEC	208.49	
180 Longwood	118.82	

Buildings	KBTU/ft <sup>2</sup>
LHRRB	317.03
Mudd	452.15
Warren Alpert	327.72
Vanderbilt	102.63
Countway	178.67
Dental total	303.56
NRB	253.87

Total	243.17
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# HMS energy savings 5 common/central strategies

1	Energy Audits	Determine and evaluate opportunities	
2	Preventative Maintenance	Regular upkeep and performance enhancement of existing equipment	
3	Corrective Maintenance	Remediation of faults or performance deficiencies that were identified	
4	Energy Efficiency Upgrades	Larger-scale project with energy/resource savings – typically equipment upgrades or replacements	
5	Data Management and Analytics	Improve troubleshooting and predictions of campus energy use	



### **ENERGY AUDITS**

4 HMS buildings

COUNTWAY LIBRARY GOLDENSON

GORDON HALL NEW RESEARCH BUILDING

40 energy conservation measures (ECM) identified

**\$19k** average utility cost savings per ECM

**\$775k** total estimated utility cost savings

**4.4yrs** average simple payback



### **ENERGY AUDITS**

4 HMS buildings

COUNTWAY LIBRARY GOLDENSON

GORDON HALL NEW RESEARCH BUILDING

Potential savings

**3,255,000** electricity (kWh)

**3,325** steam (mmBTU)

**175,000** chilled water (ton-hours)

**393,000** water and sewer saved (cubic feet)

\*Estimated savings if all ECMs fully implemented as proposed.

\*Estimates based on EPA GHG equivalencies calculator



# ENERGY CONSERVATION PREVENTATIVE MAINTENANCE PROGRAMS STEAM TRAP TESTING

**1,288** steam traps surveyed

**82.4%** steam traps in good working order

<4% leaking, blowing, or plugged traps

Ideal trap station

Bypass

Check Valve

BlowDown

Test
Valve

Condensate
Return

**3,970,000** estimated pounds of steam lost annually

153 days return on investment (ROI) if all are repaired



# ENERGY CONSERVATION PREVENTATIVE MAINTENANCE PROGRAMS

#### **ULTRA-LOW-TEMP FREEZERS**

HMS Facilities continued a preventative maintenance (PM) program on Harvard-owned Ultra-Low-Temperature (ULT) freezers operating below **-65**.

In 2018 the program included **268** freezers. PM included replacement of air filters and conditional assessment of the gaskets, condenser coils, evaporators, and temperature alarm points and backup batteries, which are replaced on a 2-3 year timeframe.

Energy savings are associated with keeping freezer coils and filters free of dust, allowing for proper heat exchange. The PM program saves energy while providing a more secure environment for research samples.





### **CORRECTIVE MAINTENANCE**

#### **COMPRESSED GAS LEAK TESTING**

### Identified opportunities

- **66** Compressed air leaks
- **5** Steam leaks
- **1** Helium leak
- **1** Nitrogen leak
- **1.3** ROI (years)

### Issues remaining

0

Leaks in a compressed air system can waste **20-30%** of the compressor's output and lead to unnecessary cycling and increased run time.

Addressing leaks can increase service life and decrease necessary maintenance of equipment.



### **ENERGY EFFICIENCY UPGRADES**

#### SEELEY MUDD VENTILATION OPTIMIZATION

**160,000** Total space impacted (sqft)

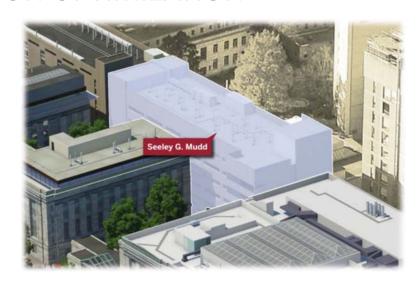
### **Annual Savings**

**10,000** Ventilation (CFM)

**42,800** Electricity (kWh)

66,900 Chilled Water (ton-hr)

**1,200** Steam (kLB)



The volume of outdoor air being conditioned for the building was optimized.

Flow stations on constant volume air handlers were recalibrated

VFD sequence of operations was modified to maintain ventilation targets.



### **ENERGY EFFICIENCY UPGRADES**

#### COUNTWAY LIBRARY VENTILATION OPTIMIZATION

**160,000** Total space impacted (sqft)

### **Annual Savings**

**30,000** Ventilation (CFM)

**41,000** Electricity (kWh)

22,800 Chilled Water (ton-hr)

Steam (mmBTU)



The volume of outdoor air being conditioned for the building was optimized.

New minimum CFM settings established for ~210 VAV terminals between floors L1 - 5

"Occupied/Unoccupied" airflow rates were recalibrated and are determined by occupancy sensors or schedule, depending on location.



### **ENERGY EFFICIENCY UPGRADES**

#### WARREN ALPERT VENTILATION OPTIMIZATION

**286,000** Total space impacted (sqft)

### **Annual Savings**

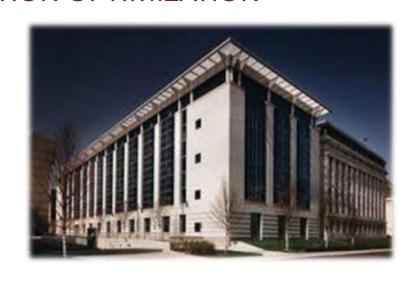
**13,000** Avg. ventilation redux (CFM)

**41,000** Electricity (kWh)

94,000 Chilled Water (ton-hr)

**1,400** Steam (mmBTU)

**48,900** Humidification water (Gals)



The volume of outdoor air being conditioned for the building was optimized.

New minimum CFM settings established for ~120 VAV terminals between floors 1 - 5

"Occupied/Unoccupied" airflow rates were recalibrated and are determined by occupancy sensors or schedule, depending on location.

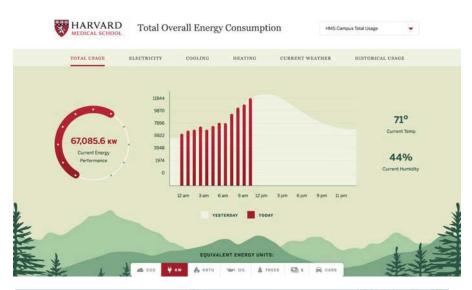


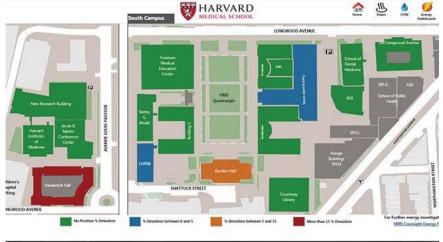
### **ENERGY DATA MANAGEMENT AND ANALYTICS**

HMS rolled out new energy dashboards to facilitate operational improvements and transparency to the HMS community.

The current Campus Energy Consumption dashboard depicts actual and historical energy consumption that can be displayed in a variety of equivalent energy units (i.e. oil, trees, cars).

The new Campus Energy Heat Map is used to efficiently convey energy performance to building operators, letting them know if buildings are within-expected range or trending higher, thereby instigating investigation.







### **HMS FACILITIES PRESENTS:**

# LABORATORY BUILDING ENERGY AND RESOURCE MANAGEMENT STRATEGY

HMS Facilities presented to an array of audiences at several venues:

- International Institute for Sustainable Laboratories (I2SL)
- Nanyang Technical University,
   Singapore
- Cambridge Compact
- Harvard's Energy and Sustainability Professionals Network (ESPN)
- Harvard's Sustainability and Energy Management Council







# HMS FACILITIES ENERGY MANAGER RECEIVED HARVARD HERO FOR COMMITMENT TO SUSTAINABILITY





Don has since taken on a role as the Facilities Operations Leader at the new Bill and Melinda Gates Medical Research Institute based in Cambridge.

We wish him and the organization the best in achieving their mission!

### HEALTHIER BUILDING MATERIALS STRATEGY

- Teams from HMS and HSPH joined presentations by faculty researchers and campus sustainability leaders regarding strategies to eliminate potentially hazardous chemicals from building materials and finishes.
- Capital projects and construction teams begin implementing healthier building materials strategies by purchasing Healthier Hospital Initiative compliant furniture and evaluating existing product lines to evaluate compliance and identify potential alternatives where products were non-compliant.

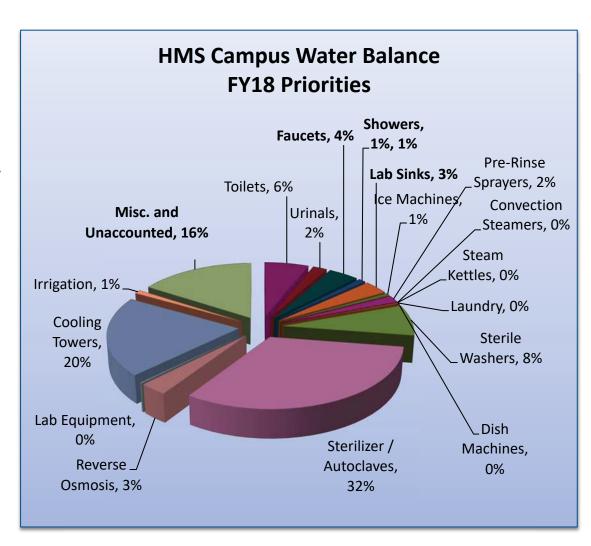


### WATER CONSERVATION

HMS presented to the Cambridge Compact for a Sustainable Future on, "Incorporating Water Efficiency into Energy Management Planning."

HMS Labs began piloting lowflow lab-faucet aerators

HMS is investigating sterilizer and glass washing efficiency measures.



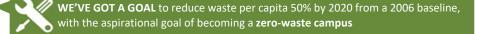
### **WASTE REDUCTION & DIVERSION**

- HMS continues to implement waste bin standardization across the campus.
- Compost was expanded to bathrooms across campus, allowing paper towels to be diverted from the waste stream.
- Global markets impacted recycling guidelines, restricting laboratory plastics to trash. Facilities and Custodial teams continue to engage labs and the HMS community to minimize contamination.











#### HARVARD GREEN IT STANDARDS RELEASED



#### For more information:

https://green.harvard.edu/sites/green.harvard.edu/files/SustainableITStandards.pdf

# FREECYCLE AND E-WASTE COLLECTION CAMPAIGN

HMS hosted bi-annual freecycles, organized by EcoOpportunity, where lab, office, and personal items are made available for reuse to all members of the community.

The Longwood Campus also participated in a University-wide effort in collaboration with IT Security to collect personal and University electronic waste for free.

Over 9,000lbs of e-waste was collected across Harvard – a substantial amount of which came from the Longwood campus.

# Secure + Sustainable Free Electronics Recycling



Safely and securely recycle **personal and University electronics** for free. No limits. Any location. Certificate of Secure Destruction available.

April 25 11:00 - 1:30 Chan SPH Kresge Building Atrium
April 26 8:30 - 3:00 HMS Courtyard Café

Computer equipment | routers | keyboards | mouse | printers | scanners | fax machines | credit card machines | telephones | mobile phones | answering systems | cameras | surveillance equipment | stereos | video equipment | gaming equipment | cables | power cords | wiring capacitors | diodes | resistors | transistors and more

Not accepted: refrigerators, washing machines, dryers, AC units, CRT monitors, televisions, loose batteries







# REOPENED LONGWOOD CAMPUS REUSE ROOM!



LEARN IT. LIVE IT.

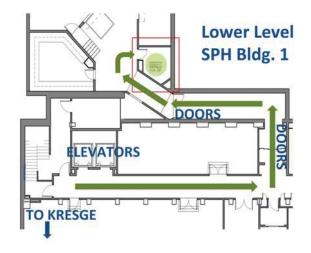
WE'VE GOT A GOAL to reduce waste per capita 50% by 2020 from a 2006 baseline, with the aspirational goal of becoming a zero-waste campus

# LONGWOOD CAMPUS REUSE ROOM

REOPENING NOVEMBER, 2018!
OPEN TO HARVARD'S LONGWOOD COMMUNITY

Help green your lab, office, and life by **REUSING AND SHARING** equipment!

SPH Bldg.1 Loading Dock – Room SB-01 Open Wednesdays from 12:30-2pm



#### **ACCEPTED ITEMS**

- **LAB EQUIPMENT**
- **ELECTRONICS**
- OFFICE SUPPLIES
- HOME ITEMS

# NATURE AND ECOSYSTEMS



### **COUNTWAY COMMUNITY GARDEN**



Increased programming and budgetary support from HMS.

Purchased new garden beds.

- Annual Fall Harvest festival
- Annual Summer Garden Gathering



For more information:

https://www.hsph.harvard.edu/news
/features/countway-harvest/

# **NATURE AND ECOSYSTEMS**



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# BI-ANNUAL TOUR OF HARVARD'S ARNOLD ARBORETUM







greenharvard • Following
Arnold Arboretum of Harvard University

greenharvard Signs of spring at the @arnold\_arboretum!

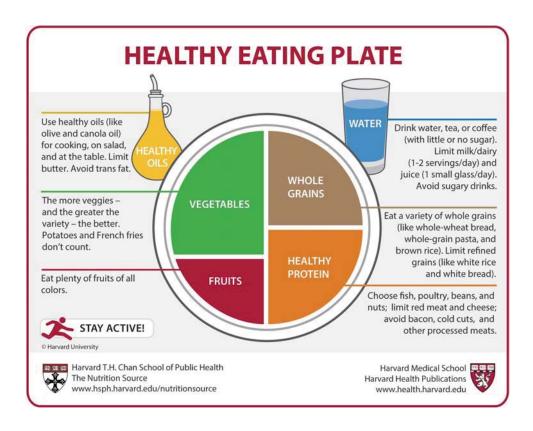
Students from the @harvardchansph Sustainability + Health Student Forum and the Hiking Club recently joined together for an #EarthDay inspired tour of the Arboretum.

#greenharvard #harvard #sustainability #getoutside #spring #arnoldarboretum #boston #outdoors #health #wellbeing



Add a comment...

# Healthy Eating: Nutrition and Sustainability



- Sustainable and Healthful Food Standards Working Group
- Participation in MASCO's Farm to LMA
- Sustainable food sourcing through Restaurant Associates
- Harvard #FoodBetter Conference



**Healthy Eating: Nutrition** and Sustainability

### **Sustainable Meeting and Event Guide Launched**

HMS Dining Services' catering menu includes a variety of compliant menu options for any meeting or event.

#### For more information:

https://green.harvard.edu/campaign/s ustainable-meeting-and-event-guide

### **TOP 10 TIPS FOR BETTER MEETINGS**

FROM THE HARVARD SUSTAINABLE MEETING AND EVENT GUIDE

The Harvard Sustainable Meeting and Event Guide was created to support a culture of health and wellness in meetings and conferences across the University. Start with these 10 tips to help employees, students, and visitors eat well and be active while reducing their environmental impact.





- Make pitchers of tap water the featured beverage. Add fruit to some pitchers for a flavor-infused option.
- Opt for plant-based proteins for the main dish, like beans, lentils, or tofu.
- Offer fruits and/or vegetables every time food is served.
- Always serve whole grains instead of refined grains (like brown rice in place of white rice).
- When offering snacks, serve whole or cut fruit, vegetables and hummus, or unsalted nuts.
- Coffee and tea make for a satisfying end to a meal. If dessert is necessary, opt for a combination of dark chocolate, fresh fruit, and unsalted nuts

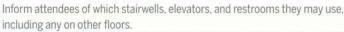
#### WASTE REDUCTION

Ask your caterer to use reusable, recyclable, or compostable serving items.



Make sure your meeting room has a "waste station" with clearly-marked recycling, compost, and trash bins

Periodically break up sitting time with standing, walking, or light stretching.





CHECK OUT THE FULL GUIDE AT GREEN.HARVARD.EDU/EVENTGUIDE







#### **Take the Stairs**

TAKE THE STAIRS CONTINUED ACROSS HARVARD UNIVERSITY
INCLUDED CLIMBERS FROM ALL 13 SCHOOLS AND INSTITUTIONS AT HARVARD

2016: 577 Participants | 58 teams reached Meru's summit!

2017: 1,128 Participants | 229 teams reached Pierce Peak 4x

2018: 617 Participants | 114 teams traversed NH's Presidential Range

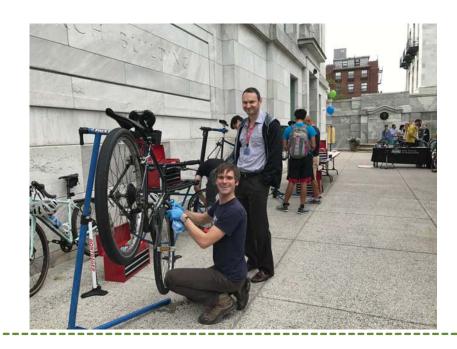


Refreshed the TtS website

Participants engaged on social media from across the world!

1.37 flights or20 million feet "climbed"





The Longwood Campus has over 900 bike racks!

The Harvard Longwood Bicyclists engages stakeholders across the Longwood Campus with over 1,500 members. The group advocates for advancement in bike-friendly infrastructure and parking, provides safety and learn-to-bike lessons for the Harvard community,





New bike racks in bike cages



AREA CYCLISTS

IKE FAIR UPDATES:
/WW.HSPH.HARVARD.EDU/BIKES

Annual Bike Fair



# LAUNCHED: Harvard Green Lab Certification

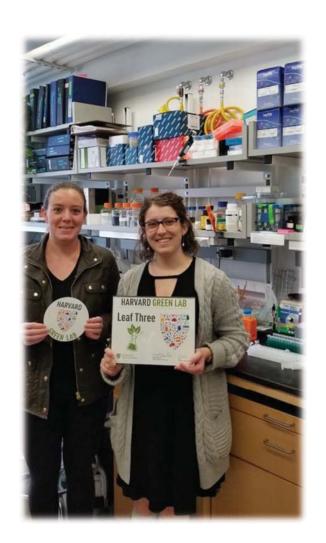


# CULTURE AND LEARNING

### Green Lab Certification

- Systematic, self-directed assessment
- Designed for all lab-types
- Engages all lab members
- Tiered Certification (Leaf 1-4)





https://green.harvard.edu/news/green-lab-certification-program-launches-longwood-medical-campus

# CULTURE AND LEARNING



### Green Lab Certification

3 HMS labs certified as of 12/18

- ICCB-L Leaf 4
- Genetics Media Prep and Glass Washing – Leaf 4
- Harper Lab, Cell-Bio Leaf 3





https://green.harvard.edu/news/green-lab-certification-program-launches-longwood-medical-campus



HMS Students for Environmental Awareness in Medicine (SEAM)



"We have a moral obligation to mobilize and address climate change, as we treat and will continue to treat patients impacted by it." – Shadaab Kazi, HMS '21

#### **HEALTH & MEDICINE**

# Environmental medicine brings climate change to forefront

https://news.harvard.edu/gazette/story/2018/05/medical-school-students-address-environmental-issues-from-physicians-perspective/



### HMS Students for Environmental Awareness in Medicine (SEAM)





At a panel discussion at the Medical School, members of Students for Environmental Awareness in Medicine, including event planner Shadaab Kazi, gave the physicians' perspective on how environmental issues will impact human health. Photos by Kris Snibbe/Harvard Staff Photographer

https://green.harvard.edu/news/green-lab-certification-program-launches-longwood-medical-campus



### EcoOpportunity, Harvard's Longwood Campus Green Team

# EcoOp's Sustainable Student Event Fund Launched Fall '18

The fund provides supplemental funding to student organizations towards meetings or events that wish to comply with the Sustainable Meeting and Event Guide and/or are focused on topics pertaining to climate, sustainability, and health.

For more information:

https://green.harvard.edu/longwoodeventfund



# CULTURE AND LEARNING

EcoOpportunity, Longwood's green team, led efforts throughout the year that engaged the entire Longwood campus community

HMS Commencement & White Coat Ceremony Waste Ambassadors







### **Longwood Lighting Fairs**

HMS: 50 attendees participated, that purchased 708 products. In addition, we also raised \$215 for the Mass Fallen Hero Campaign.

HSPH: 42 attendees participated, that purchased 646 products. In addition, we also raised \$215 for the Mass Fallen Hero Campaign.



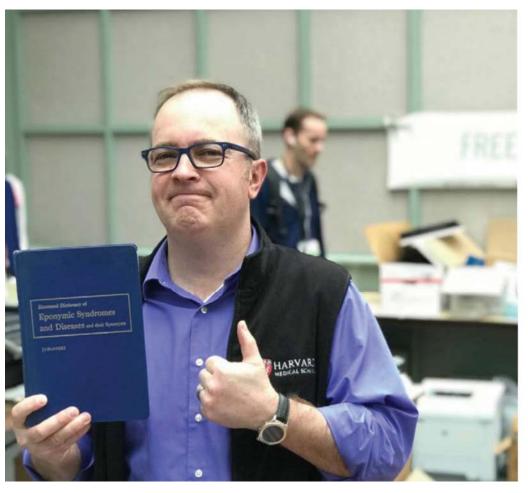
# LONGWOOD CAMPUS SUSTAINABILITY EVENTS



<b>Event Description</b>	Plan Focus Area	Date	# of attendees
Summer Garden Gathering	Nature & Eco., Culture & Learning	June 2018	200 Community Members
Commencement 2018, White Coat Ceremony	Campus Operations	May 2018	20 Waste Diversion Ambassadors
Arnold Arboretum Student Trips	Nature & Ecosystems	Oct. 2017, May 2018, August 2018	25 Harvard Longwood community members
Lab & Office Supply Freecycles, HMS and Harvard Chan School	Campus Operations	Oct. 2017, May 2018	+200 people at each
Take the Stairs	Health & Wellbeing	April 2018	+600 Community members, + 1.4 million flights of stairs
Earth Day Sustainability Fairs	Culture & Learning	April 2018	+250 Community members
Longwood Bicyclist Events: Bike Breakfast, Maintenance Classes	Health & Wellbeing	Sept. 2017, Sept. 2018	+300 Community members
Annual Campus Bike Fair	Campus Operations	September 2017, 2018	+300 Community members
Countway Garden Harvest Festival	Nature & Ecosystems	September 2017, 2018	150 Community members
EcoOpportunity Monthly Meetings	Culture & Learning	Monthly	5-10 participants monthly



### Spring 2018 Freecycles at HMS and HSPH





greenharvard You never know what you'll find at a Harvard Freecycle!
At today's @harvardmed event, Willy Lensch, Dean Daley's Chief of Staff, who has his PhD in Molecular and Medical Genetics, found this book on Eponymic Syndromes and Diseases.

#GreenHarvard #Harvard #harvardmedicalschool #sustainability #freecycle #reuse #reducewaste #anothermanstrashisanothermanstreasure

willy.lensch I was THRILLED to find this book!





### Fall 2018 Freecycles at HMS and HSPH





greenharvard There were lots of great finds and smiling faces at today's @harvardchansph #freecycle! #Reuse events like this are held across Harvard and throughout the year in offices, dorms and labs to encourage people to donate items to be rediscovered by others rather than ending up in the trash.

wellwithmike Love it! How often do you all hold events like these and where do you advertise them?

adamimeier @wellwithmike generally they're held twice/year - once during fall and once during spring semesters. HMS and HSPH hold them on back-toback days.

adamjmeier @wellwithmike we also reopened the Longwood Reuse Room in HSPH Bldg. 1 loading dock. open Wed.









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OCTOBER 24, 2018



### HMS Facilities, Green Office Re-Certification, May 2018





greenharvard Shout out to our friends in the @HarvardMed Facilities Department on their re-certification of Leaf 4 Green Office, the highest level of achievement!

Thank you for all you do to encourage sustainability on the HMS campus, and for "practicing what you preach" in your own offices.

#GreenHarvard #Harvard #HarvardMed #GreenOffice #Sustainability #LearnItLiveIt #SaveEnergy #ReduceWaste #ActOnClimate



Add a comment...



### HMS External Education, October 2018





Congratulations to @harvardmed Office for External Education for achieving Green Office Leaf Level Two recognition! They are now working on a green team video to educate their colleagues about waste reduction.







### Connect

green.harvard.edu

@GreenHarvard

EcoOpportunity: goo.gl/ke8u1m

### Learn more

Sustainability Plan

www.green.harvard.edu/plan

Sustainability Report

www.green.harvard.edu/report

Living lab

www.green.harvard.edu/livinglab