

# FY17 SUSTAINABILITY REPORT

## Harvard Medical School



**HARVARD**  
UNIVERSITY

Sustainability



**HARVARD**  
MEDICAL SCHOOL



EDUCATE AND  
EMPOWER



LEARN IT.  
LIVE IT.

TRANSLATE  
RESEARCH



INSTITUTIONALIZE

AMPLIFY  
IMPACT



**HARVARD**  
Office for Sustainability



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[GREEN.HARVARD.EDU](https://green.harvard.edu)

 [#GREENHARVARD](https://twitter.com/GREENHARVARD)  [@GREENHARVARD](https://www.instagram.com/GREENHARVARD)



# HARVARD UNIVERSITY SUSTAINABILITY PLAN

- Waste Bin Standardization
- Waste Audit and Reuse Platform
- Water Conservation Measures
- Green Lab Efforts



- Bike Fair and Safety Summit
- Healthy and Sustainable Food Standards
- Take the Stairs Campaign



## EMISSIONS AND ENERGY



- Mudd Heat Recovery Optimization
- NRB Ventilation Redux
- C Building Fan Coil Reprogramming
- TMEC Ventilation Redux



- Countway Community Garden
- Bi-Annual Arnold Arboretum Tour



- Re(Design) Innovation Challenge
- Earth Month Sustainability Fair
- EcoMosquito Newsletter
- Commencement & White Coat Waste Diversion



# Harvard University's Science-based climate goal

*Reduce emissions 30% from 2006–2016  
(established in 2008)*

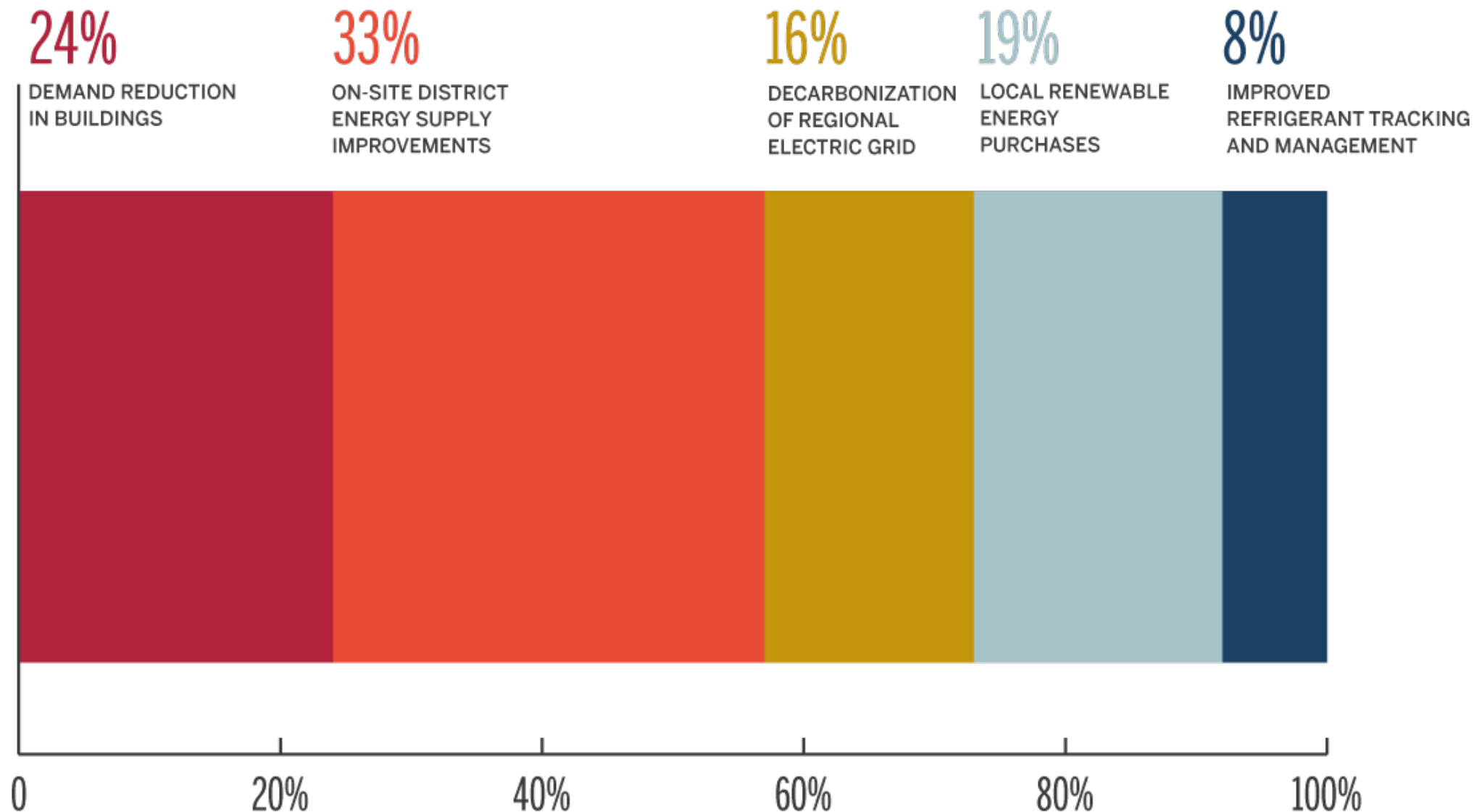


## What Made The Goal Unique:

- ▶ Based on established climate science
- ▶ Imposed a short-term target in order to spur immediate action
- ▶ Reflected absolute emissions, inclusive of campus growth
- ▶ Included all properties within operational control throughout North America

## HOW HARVARD MET ITS GREENHOUSE GAS REDUCTION GOAL

30% reduction by 2016 from a 2006 baseline, including growth

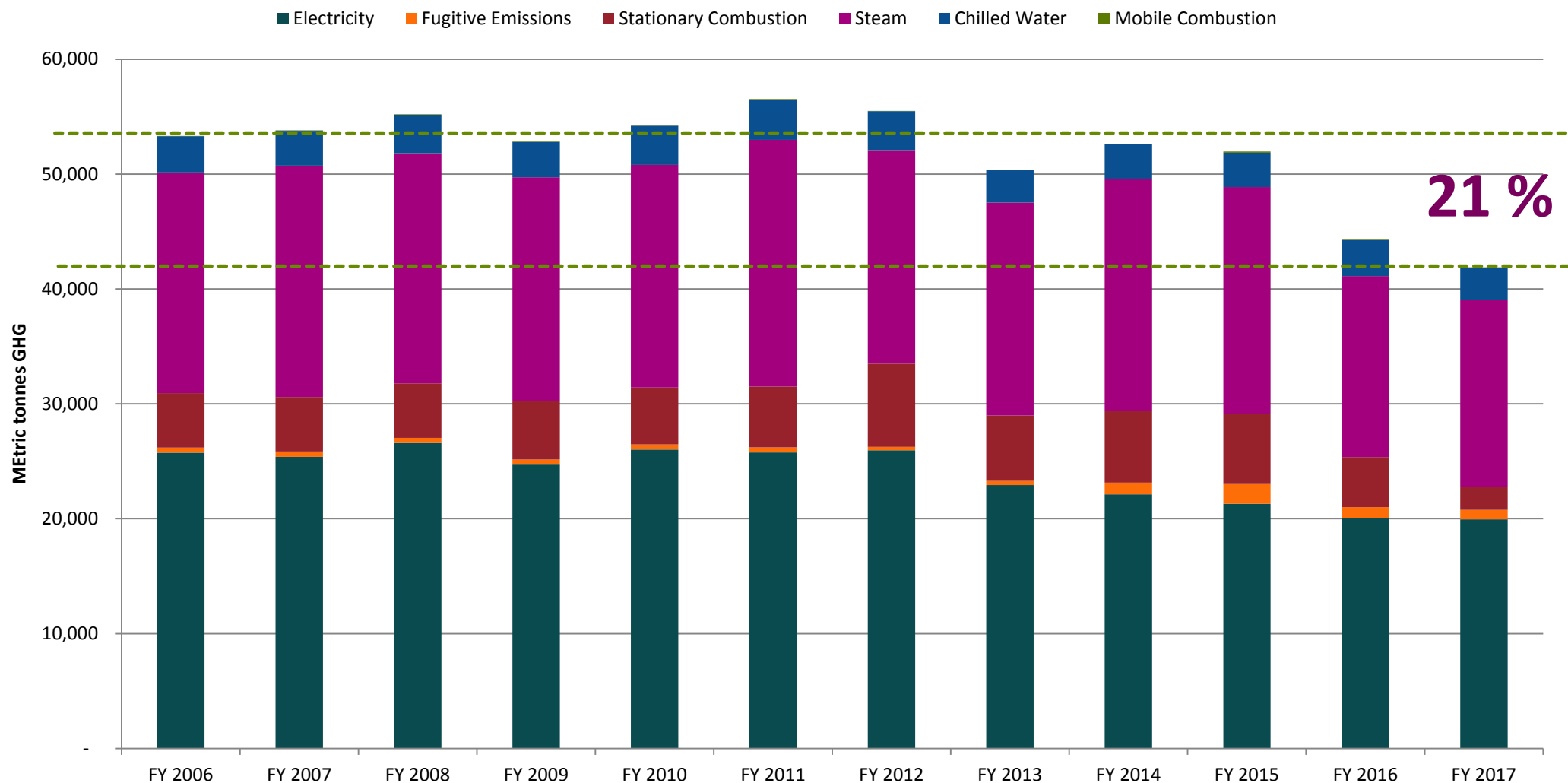


# EMISSIONS AND ENERGY



## HMS GHG EMISSIONS REDUCTION PROGRESS

HMS GHG emissions by category







# FRESH AIR, WITH SAVINGS

*Reducing air change rates throughout Harvard Medical School's campus lowered energy use while maintaining required minimum indoor ventilation rates.*



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**ONE HARVARD:** Thanks to the help of our entire community, the University reduced its greenhouse gas emissions 30%, from 2006 levels, despite growing 12%.

# EMISSIONS AND ENERGY

## ENERGY CONSERVATION MEASURES AND STRATEGIC ENERGY PROJECTS



### Harvard-wide Lab Impact:

Laboratories consume **46%** of energy on campus but represent only **22%** of the square footage, illustrating the unique challenge that research-focused organizations face as they seek to reduce their emissions footprint.

SEELEY MUDD – HEAT  
RECOVERY OPTIMIZATION

NRB – VENTILATION  
REDUCTION

C BUILDING – NEW FAN COIL  
REPROGRAMMING

TMEC – VENTILATION  
REDUCTION



# EMISSIONS AND ENERGY

## HMS ECMS AND STRATEGIC ENERGY PROJECTS

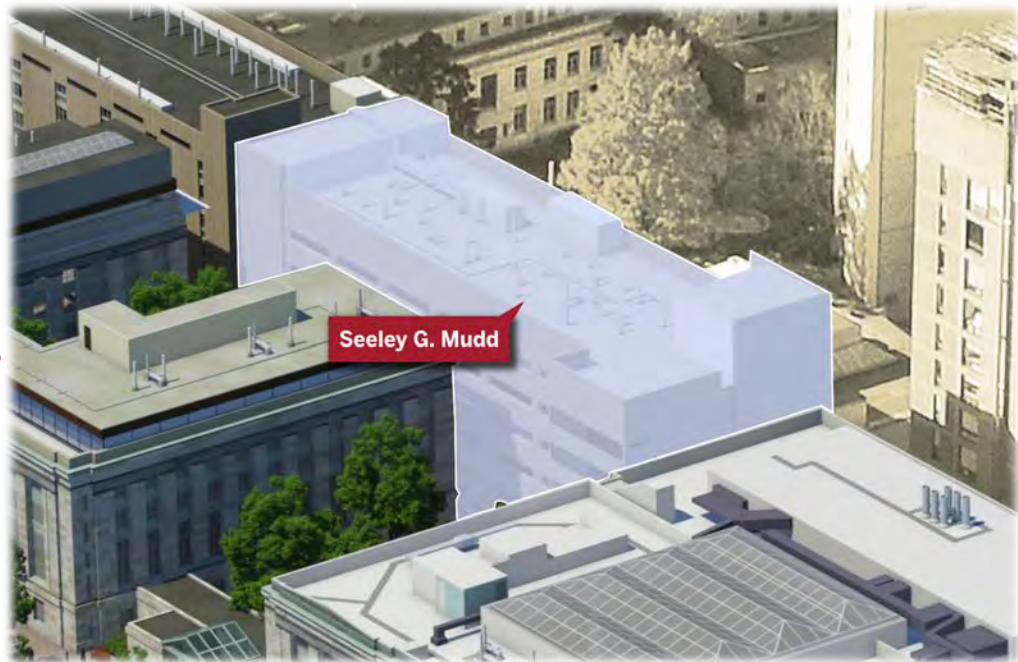
### SEELEY MUDD – HEAT RECOVERY OPTIMIZATION

Total space impacted: 91,600sqft

Building Use: Research Lab

#### ANNUAL SAVINGS

- Reduction in Electricity (kWh): 11,175
- Reduction in CHW (Ton-hr): 1,840
- Reduction in Steam (kLb): 1,067



To improve system performance, a dedicated exhaust pump was installed to provide constant flow through the exhaust coil, maximizing heat recovery at all times.

Heat recovery system was reprogrammed and graphics updated for optimization. Further trending and testing will be done to tune programming and for system verification during Fall 2017

# EMISSIONS AND ENERGY

## HMS ECMS AND STRATEGIC ENERGY PROJECTS

### C BUILDING – NEW FAN COIL REPROGRAMMING

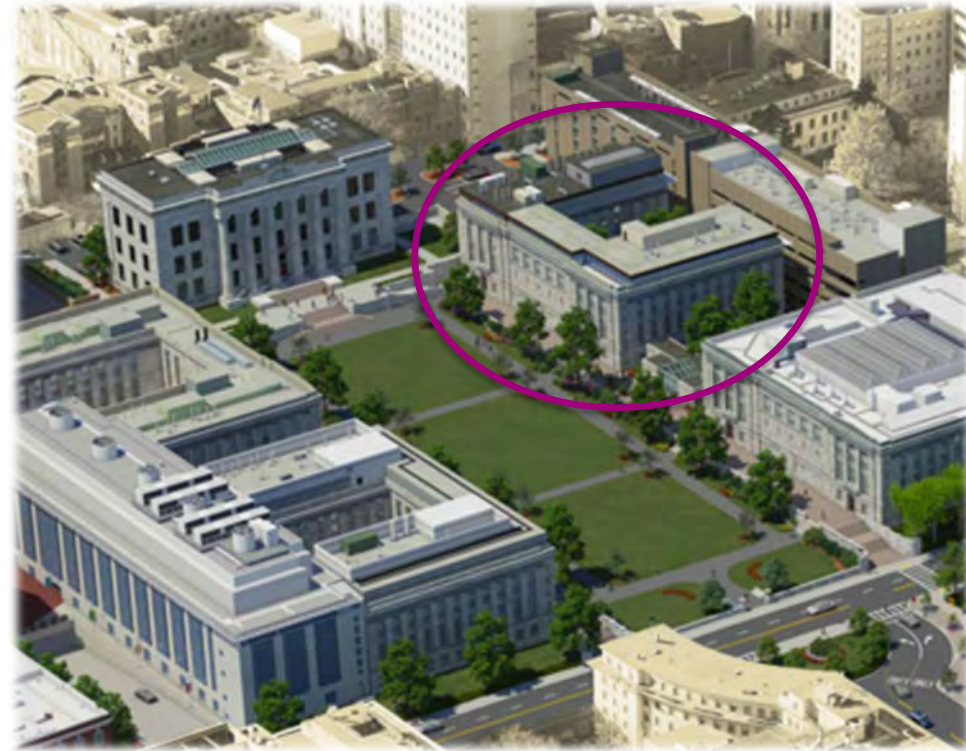
Total space impacted: 136,360sqft

Building Use: Research Lab

#### ANNUAL SAVINGS

- Reduction in Electricity (kWh): 67,626
- Reduction in CHW (Ton-hr): 36,653
- Reduction in Steam (kLb): 937

206 new control sensors were added to 222 new direct digital control (DDC) fan coil units to allow for set-back programming implementation.





# EMISSIONS AND ENERGY

## HMS ECMS AND STRATEGIC ENERGY PROJECTS

### TMEC VENTILATION REDUCTION

Total space impacted: 180,027sqft

Building Use: Office/Classroom/Lab

#### ANNUAL SAVINGS

- Reduction in Electricity (kWh): 125,395
- Reduction in CHW (Ton-Day): 3,945
- Reduction in Steam (mmBTU): 1,728
- Reduction in Water (Gallons): 34,242



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

Rooftop exhaust systems were consolidated

Exhaust systems had VFD's installed to allow for manual balancing of supply and exhaust simultaneously.

Energy consumption was further reduced through supply air temperature reset control and occupancy scheduling of air-handlers and exhaust fans



# EMISSIONS AND ENERGY

## ULT FREEZER PREVENTATIVE MAINTENANCE PROGRAM



HMS Facilities continued a preventative maintenance program on Harvard Owned Ultra Low Temperature freezers, which includes freezers operating below -65

This year's program included 258 freezers, covering 312 issues such as connecting to Central Alarm, repairing gaskets/seals, defrosting, and more.

25% more freezers were added to the program this year, while there were 6% fewer issues identified



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—a win-win situation for research labs and facilities teams alike.



# CAMPUS OPERATIONS



## WASTE REDUCTION & DIVERSION: WASTE BIN-STANDARDS

- ✓ Completed a waste assessment and review of current waste procedures.
- ✓ Rolled out new waste bins in 3 HMS buildings and high-profile bins across HMS's campus.
- ✓ Completed waste audit for HMS non-lab spaces



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LIVE IT.



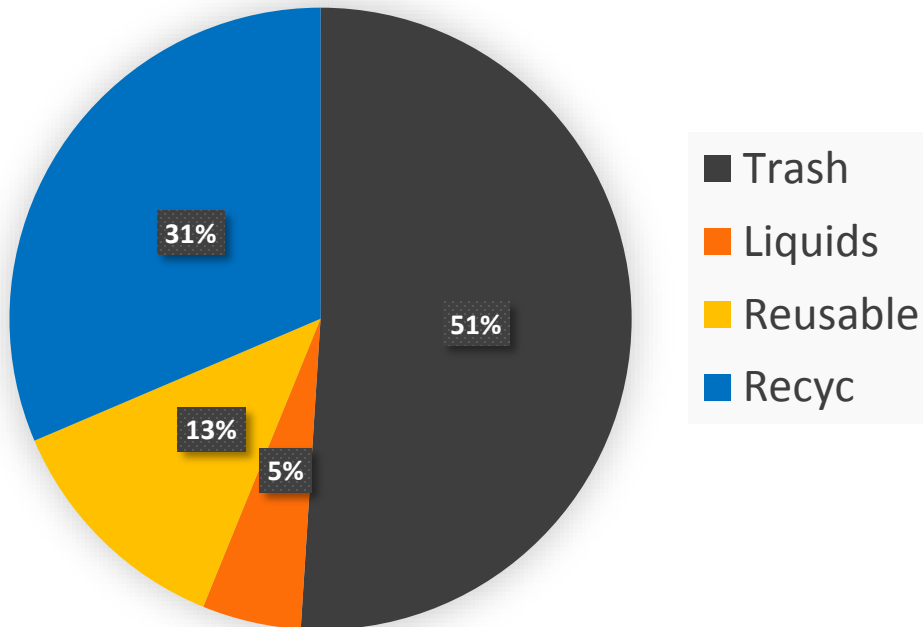
WE'VE GOT A GOAL to reduce waste per capita 50% by 2020 from a 2006 baseline, with the aspirational goal of becoming a **zero-waste campus**

# CAMPUS OPERATIONS



## WASTE AUDIT ANALYSIS

HMS Waste Audit, 12/2016  
(Excluding Compostable Material)



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**



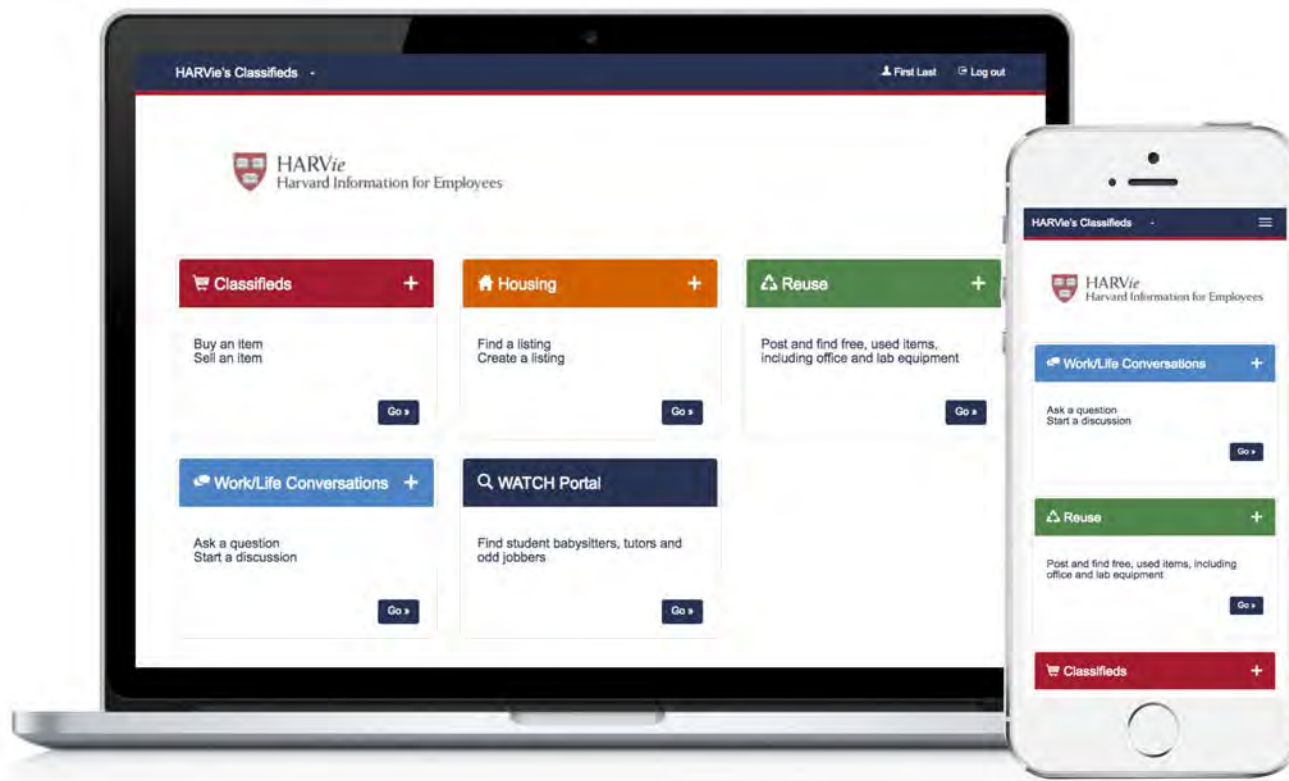
# CAMPUS OPERATIONS

## WASTE DIVERSION: REUSE

Collaboration with Harvard HR, EH&S, OFS

HARVie's Classifieds: New Website, New Reuse Platform

[harviesclassifieds.harvard.edu](http://harviesclassifieds.harvard.edu)



# CAMPUS OPERATIONS



## WATER CONSERVATION

## CAMPUS-WIDE WATER AUDIT COMPLETED

### Usage:

FY06: 16,854 CCF

FY17 14,012 CCF

17% reduction

### Water Conservation Measures Completed

644 non-lab faucet aerators

144 shower heads

Faucet retrofits

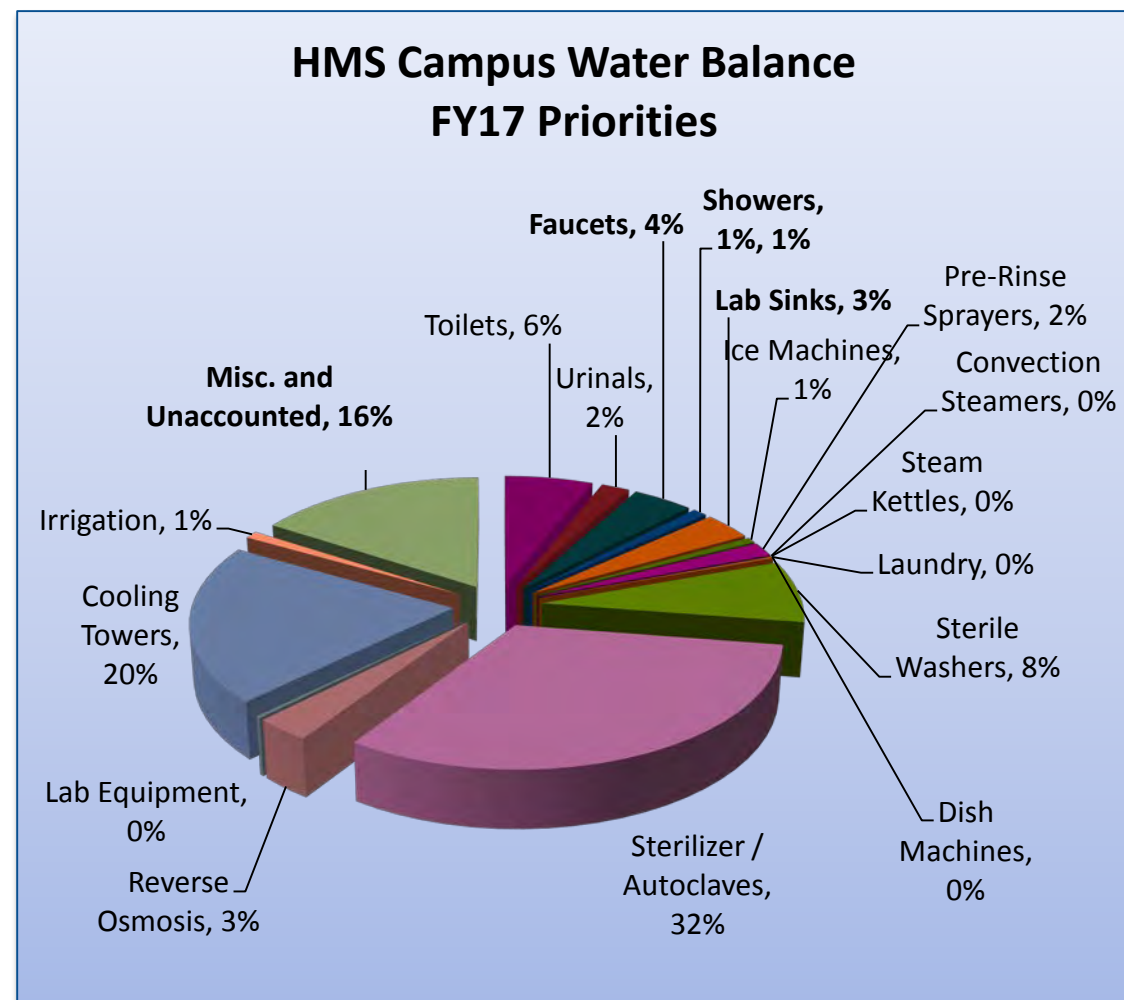
½ year payback

Estimated Savings: 3 million gallons

### Next Steps:

Water consumption reduction from HMS's 3,100 lab sinks

Tracking Water Use Intensity (WUI)



# CAMPUS OPERATIONS



## LONGWOOD GREEN LABS EFFORTS

Harvard University was honored by Seeding Labs, a nonprofit that began at HMS, at their annual *Instrumental Access* event



- The **Sustainer Award** was given to **Harvard University** for supporting global science through Seeding Labs since the organization's inception. This award also recognizes Harvard's innovative approach to increasing the environmental sustainability of science.

- By partnering with Seeding Labs, Harvard University is utilizing its resources for the greatest scientific impact, both at home and across the globe.



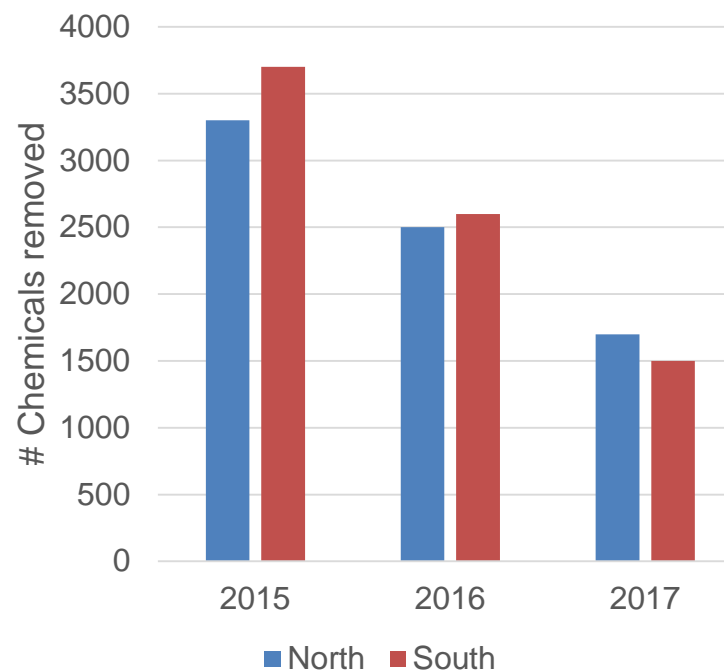


# CAMPUS OPERATIONS



## LONGWOOD GREEN LABS EFFORTS: CHEMICAL AMNESTY AND SWAP

Location	Chemicals Collected			Chemicals Swapped		
	2017	2016	2015	2017	2016	2015
HMS						
South/HSDM	1500	2600	3700	2	--	6
HMS North	1700	2500	3300	56	37	4
Total	<b>3200</b>	5100	7000	<b>58</b>	37	10



# NATURE AND ECOSYSTEMS



## COUNTWAY COMMUNITY GARDEN

5th Annual  
**Countway Community  
Garden  
Harvest Festival**

Now a  
two day event!

**September 14th**  
Lunchtime Lecture:  
**The Secret Garden of Your Microbiome**  
12:00-1:00PM  
Waterhouse Room, Gordon Hall

Heather Jackson-Wise, MPH and  
certified health and nutrition coach,  
will be bringing together the latest  
science on the gut microbiome and  
nutrition therapy to get rid of sugar  
cravings, bloat, lose weight, im-  
prove mood and increase energy.

**September 15th**  
**Harvest Festival Potluck**  
4:00-6:00PM  
Countway Community Garden

Come celebrate a successful 2016  
growing season! Enjoy home-made  
treats and tea from our herb gar-  
den. Featuring live music from the  
Countway Band!

**Rain Date:** September 16th 4:00-6:00pm

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COUNTWAY LIBRARY OF MEDICINE  
HARVARD MEDICAL SCHOOL

Reorganization of Community Garden  
Management team – transitioned from  
co-founder(s) to two new managers



Annual Fall Harvest festival



Annual Summer Garden Gathering



Increased student engagement through  
Re(Design) Innovation Challenge





# NATURE AND ECOSYSTEMS



## BI-ANNUAL TOUR OF HARVARD'S ARNOLD ARBORETUM

Autumn Foliage '16



**greenharvard • Following**  
Arnold Arboretum of Harvard University

**greenharvard** The EcoOpportunity team at @harvardchansph worked with the Office for Student Affairs to lead a tour of @arnold\_arboretum this past weekend. #Longwood students, staff, and even visiting parents explored the #Arboretum, taking in the vibrant fall colors and the current woodworking exhibit. #Sustainability #Nature #HarvardinAutumn #GreenHarvard 🍁🍂

**fairharbor** Very cool!



96 likes

OCTOBER 25, 2016

Add a comment...





# HEALTH AND WELL-BEING

## Take the Stairs

TAKE THE STAIRS EXPANDED ACROSS HARVARD UNIVERSITY  
INCLUDED CLIMBERS FROM ALL 13 SCHOOLS AND INSTITUTIONS AT HARVARD  
LARGEST NUMBER OF PARTICIPANTS YET!

**2016:** 577 Participants | 121 teams | 58 teams reached Meru!  
**2017:** 1,128 Participants | 289 teams | 229 teams reached Pierce Peak 4x!



**Pierce Peak** was named after the late Dr. Chester Pierce, faculty of Harvard Medical School and Graduate School of Education.

**2,701,301 flights or  
40,519,515 feet “climbed”**

# HEALTH AND WELL-BEING



Sustainable Harvard  
@GreenHarvard

Following

Thx to the hundreds of @Harvard Longwood #bike commuters who attended the @harvardmed @HarvardChanSPH Bike Fair!



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,

## HARVARD LONGWOOD BIKE FAIR

WEDNESDAY SEPTEMBER 21, 2016

11:30AM-1:30PM ON THE QUAD PROMENADE AT HMS

(RAINDATE - SEPTEMBER 22, 11:30AM-1:30PM)

-FREE BASIC BIKE TUNEUPS  
AND GIVEAWAYS

-MINI CLASSES ON  
MAINTENANCE & SAFETY

-BIKE VENDORS & INFO FOR  
AREA CYCLISTS

BIKE FAIR UPDATES:  
[WWW.HSPH.HARVARD.EDU/BIKES](http://WWW.HSPH.HARVARD.EDU/BIKES)



Safety, maintenance, and  
learn to bicycle classes



New bike racks in bike cages



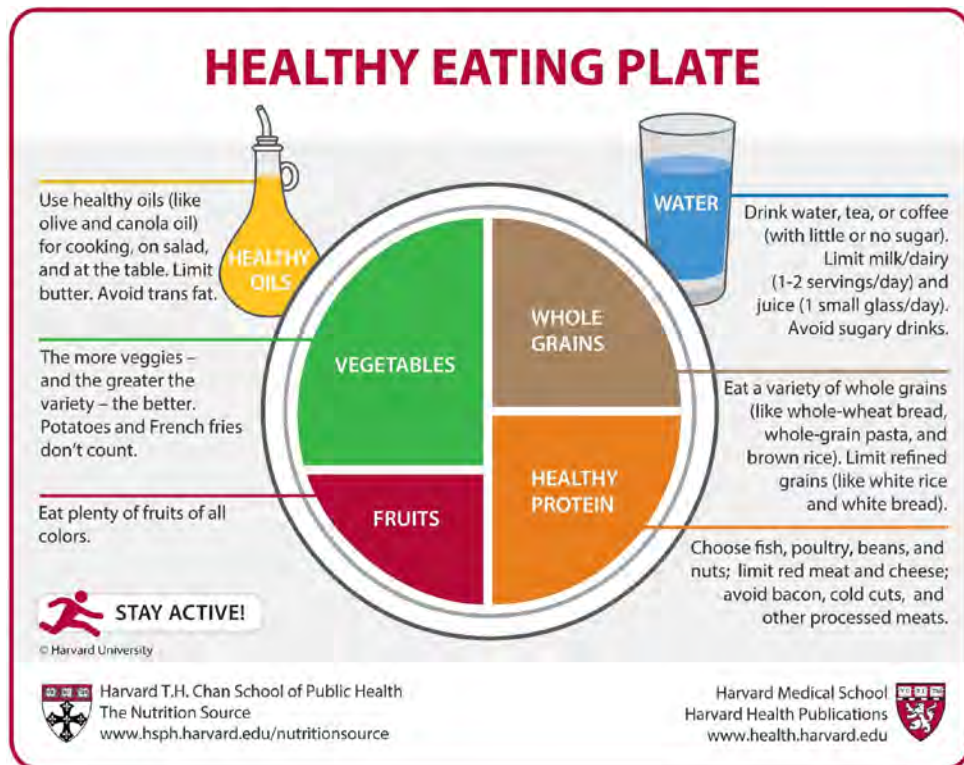
Events:

- Bicycle fair
- Bicycle breakfast



# HEALTH AND WELL-BEING

## 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**

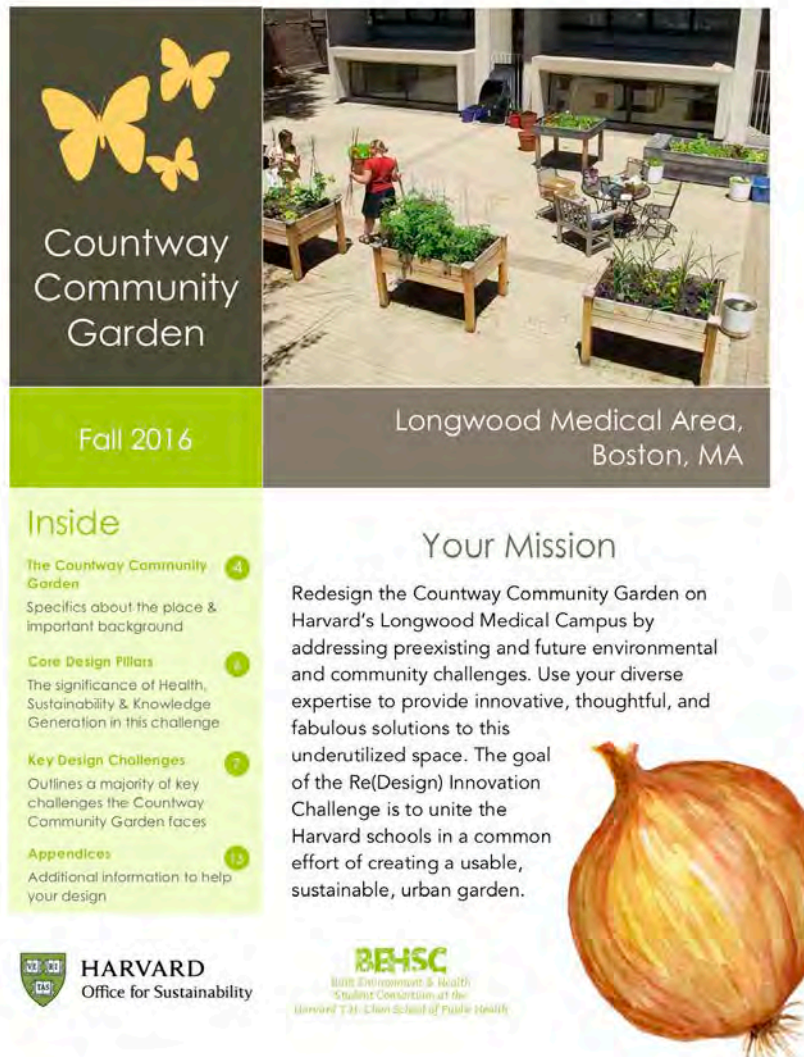




# CULTURE AND LEARNING



## Re(Design) Innovation Challenge: case-based design competition



The brochure for the Countway Community Garden redesign challenge. It features a header with three yellow butterflies and the text 'Countway Community Garden' and 'Fall 2016'. A central photograph shows a garden with wooden planters and people. The 'Inside' section lists: 'The Countway Community Garden' (page 4), 'Core Design Pillars' (page 6), 'Key Design Challenges' (page 7), and 'Appendices' (page 13). The 'Your Mission' section describes the goal of redesigning the garden on Harvard's Longwood Medical Campus. Logos for Harvard Office for Sustainability and BEHSC (Biology, Environment & Health Student Consortium at the Harvard T.H. Chan School of Public Health) are at the bottom. A large onion is illustrated on the right side of the brochure.

**Countway Community Garden**

Fall 2016

**Inside**

- The Countway Community Garden** (4)  
Specifics about the place & important background
- Core Design Pillars** (6)  
The significance of Health, Sustainability & Knowledge Generation in this challenge
- Key Design Challenges** (7)  
Outlines a majority of key challenges the Countway Community Garden faces
- Appendices** (13)  
Additional information to help your design

**Your Mission**

Redesign the Countway Community Garden on Harvard's Longwood Medical Campus by addressing preexisting and future environmental and community challenges. Use your diverse expertise to provide innovative, thoughtful, and fabulous solutions to this underutilized space. The goal of the Re(Design) Innovation Challenge is to unite the Harvard schools in a common effort of creating a usable, sustainable, urban garden.

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**BEHSC**  
Biology, Environment & Health  
Student Consortium at the  
Harvard T.H. Chan School of Public Health

- ✓ **50 students** from across **10 Harvard Schools**
- ✓ **5 teams** submitted redesign proposals
- ✓ Project continues with members from the winning team, Green Dream Team, as a collaboration with Countway Garden managers, Countway Library, HMS, and OFS

**For more information:**

**<https://green.harvard.edu/reinnovate>**

# 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





# CULTURE AND LEARNING



## RESEARCHER ENGAGEMENT

- ✓ 2 annual Longwood Campus Freecycles for exchanging lab, office, and personal equipment
- ✓ >150 HMS community members engaged in each Freecycle
- ✓ Began creation of University-wide Green Lab Certification, piloting with labs at HMS





# CULTURE AND LEARNING



## STAFF AND COMMUNITY ENGAGEMENT



A fresh look for  
EcoMosquito!



EcoOpportunity's monthly EcoMosquito newsletter provides accessible and fresh sustainability content to the Longwood community

# LONGWOOD CAMPUS SUSTAINABILITY EVENTS



Event Description	Plan Focus Area	Date	# of attendees
EcoMosquito Newsletter	Culture & Learning	Monthly Distribution	+350 person email list, Posted in +40 locations throughout campus
Summer Garden Gathering	Nature & Eco., Culture & Learning	June 2017	50 Community Members
Commencement 2017 – Waste Diversion	Campus Operations	May 2017	20 Waste Diversion Ambassadors
Arnold Arboretum Student Trips	Nature & Ecosystems	Oct. 2016	25 Harvard Longwood community members
Lab & Office Supply Freecycles, HMS and Harvard Chan School	Campus Operations	Oct. 2016, May 2017	+200 people at each
Chemical Amnesty & Swap	Campus Operations	May 2017	3,200 collected, 58 swapped
Take the Stairs	Health & Wellbeing	April 2017	+1,100 Community members, + 2.7 million flights of stairs
Earth Day Sustainability Fairs	Culture & Learning	April 2017	+250 Community members
Longwood Bicyclist Events: Bike Breakfast, Maintenance Classes	Health & Wellbeing	Sept. 2016	+300 Community members
Annual Campus Bike Fair	Campus Operations	September 2016	+200 community members
Countway Garden Harvest Festival	Nature & Ecosystems	September 2016	30 Garden members
Sustainability Signage on M2	Culture & Learning	Ongoing since July, 2015	Visible to 500 researchers/day
Sustainability Trivia	Culture & Learning	June & Oct. 2015, January 2016	~25 Staff

# ORIGINAL CONTENT and SOCIAL ENGAGEMENT

## HCSPH/HMS sustainability stories specific to our work:

- The Garden Cure (HCSPH Magazine)
- A garden grows at Longwood (Harvard Gazette)
- Reflection on the (Re)Design Innovation Challenge (green.harvard.edu)
- HMS completes most comprehensive waste audit (green.harvard.edu)
- Study opens door to better sleep, work, health (Living Lab story/CHGE - green.harvard.edu)
- Harvard receives Sustainer Award for partnership with Seeding Labs(external story)

## Top 10 pages on green.harvard.edu:

1. (Re)Design Innovation Challenge (2,924 unique pageviews; **14<sup>th</sup> most visited page of all on green.harvard.edu**)
2. Impact of Green Buildings on Cognitive Function (HCSPH research highlight)
3. De-ice your freezer in 4 steps (HMS lab featured)
4. Healthy Eating Plate (HCSPH resource)
5. Encourage mindful eating with a mindful eating corner (HCSPH green tip)
6. Empirical Case for a Plant-based Diet (HCSPH research highlight)
7. Targeting environmental neuro developmental risks (HCSPH research highlight)
8. 17 Healthy Gift Ideas (HCSPH green tip)
9. 6 strategies to create more sustainable meals (HCSPH green tip)
10. 5 tips for sustainable eating (HCSPH green tip)

OFS sends a **monthly newsletter** to a list of **more than 10,200** students, staff, faculty, and members of the outside community.

HCSPH/HMS is represented in each newsletter through **research**, shout outs, stories, tools or resources, or links to social media posts.

HCSPH/CHGE content was the lead story of the February and March email newsletters; the **(Re)design innovation challenge** was featured heavily throughout the year



HCSPH/HMS provided **6 photos** of the **83** photos posted by OFS to Instagram. OFS featured Peter Stroup as part of the **#HarvardClimateStories** Instagram campaign



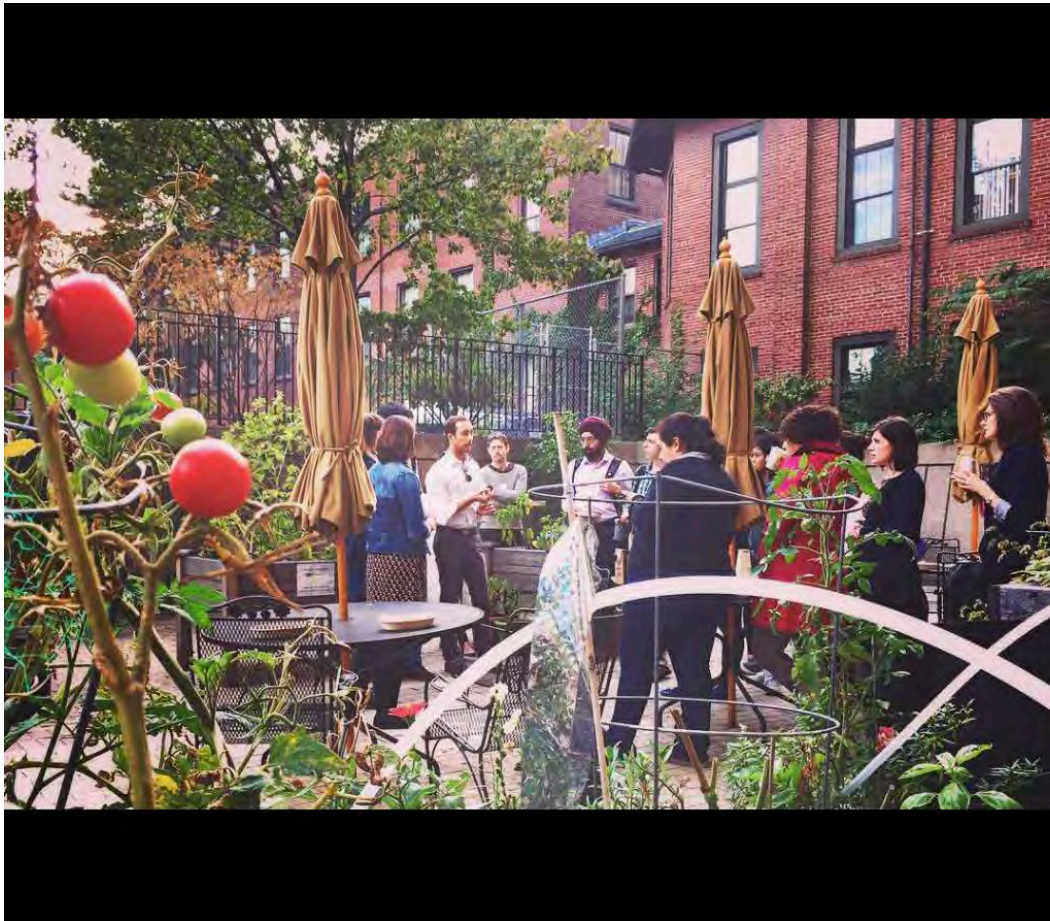
OFS tweets 6-8 times per day. On average, HCSPH/HMS are every day (heavily research-related content). OFS also retweets Harvard EnvHealth, HSPH Nutrition, and CHGE frequently.



OFS posts once daily to Facebook. Generally, HCSPH/HMS (mostly research) are represented 3-4 times per month.



# ORIGINAL CONTENT and SOCIAL ENGAGEMENT



**greenharvard • Following**  
Countway Community Garden

**greenharvard** Student teams gather in the Countway Community [#Garden](#) [@harvardmed](#) & [@harvardchansph](#) to learn more about their case challenge to [#redesign](#) this underutilized [#urbanspace](#) into one that promotes [#innovation](#), [#sustainability](#), [#health](#), and knowledge generation. 48 students from 10 [#Harvard](#) Schools will form into interdisciplinary teams to reimagine the garden and present their visions, incorporating and designing for issues of accessibility, transportation,



**94 likes**

SEPTEMBER 28, 2016

Add a comment...



# ORIGINAL CONTENT and SOCIAL ENGAGEMENT



•[Greenharvard](#) Q. How did you keep your team motivated about working toward Harvard's ambitious climate goal and what type of culture have you tried to create?

A. From the start, it was all about engagement on our team. In our Facilities Department we have half a dozen core values and one of those is [#environmental](#) stewardship. We hold each other accountable to those values and we all believe in them. Working toward the goal, it was understood that everyone participates in the process together and we know what the targets are and what the limitations are — that buy-in was crucial. Despite the challenge, we viewed the goal as a win-win because any reduction in greenhouse gas emissions is directly related to reductions in energy usage, which is directly related to reductions in costs. So whether you were supportive of the sustainability aspect or not, certainly the fiscal implications were an opportunity. We also included the [#climate](#) target in our business goals and in our individual goals, so that everyone on the team was working toward the same end and felt personal accountability. Our objective is to continue to reduce as much as we can through continuous commissioning and by experimenting with new technologies in our buildings and [#laboratories](#). It's certainly in our best interest and we're looking forward to the challenge.

**Peter Stroup**

**Director of Facilities**

**Harvard Medical School**



Acting on [#climatechange](#) has united our students, faculty, and staff around a common purpose. Through [#HarvardClimateStories](#), meet the people working to help pilot promising new solutions on campus. [#GreenHarvard#Harvard](#) [#sustainability](#)





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**Connect**

[green.harvard.edu](http://green.harvard.edu)

@GreenHarvard

EcoOpportunity: [goo.gl/ke8u1m](http://goo.gl/ke8u1m)

**Learn more**

Sustainability Plan

[www.green.harvard.edu/plan](http://www.green.harvard.edu/plan)

Sustainability Report

[www.green.harvard.edu/report](http://www.green.harvard.edu/report)

Living lab

[www.green.harvard.edu/livinglab](http://www.green.harvard.edu/livinglab)