

2025 Annual Sustainability Report



Harvard Medical School

Campus Planning & Facilities



October
2026

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Statement on Sustainability: 2025

Campus Planning & Facilities leads campus sustainability efforts through how we plan, operate, and maintain our facilities. As stewards of the campus, we are responsible for its care and operations and for advancing environmental sustainability as a core part of that work.

Over the past year, Campus Planning & Facilities implemented new energy efficiency and building performance measures, expanded our waste reduction and zero-waste initiatives, and supported projects to reduce the environmental impact of research and clinical operations. We continued to use data to guide these efforts, contributing to the University's Annual Sustainability Report and helping to identify opportunities for continual improvement across campus.

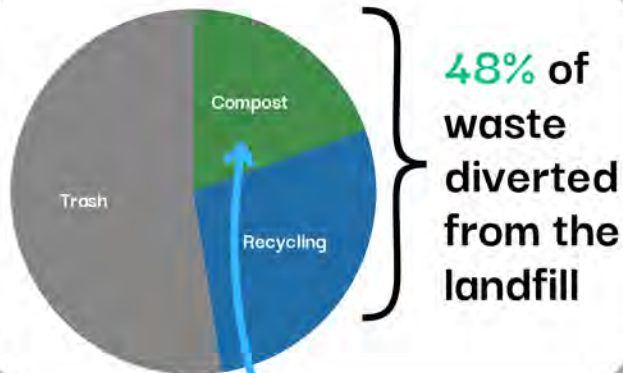
Aligned with Harvard's Sustainability Action Plan, we remain focused on emissions reduction, resource conservation, and healthier campus environments in support of the University's fossil fuel-free goals. The success of this work depends on close collaboration and community engagement, and we are grateful to the many staff, faculty, and students whose daily actions help move it forward.

We invite you to explore this year's report and continue working with us to build a more sustainable, resilient campus.

Stephen Maiorisi
Chief Campus Planning and Facilities Officer
Harvard Medical School

2025 Sustainability Impact at a Glance

HMS & HSDM % Reduction in Emissions and Energy since 2006



9% increase in volume of organics composted



9% city water reduction from 2024 to 2025



100% sustainably sourced pork, milk and yogurt procured by Restaurant Associates



133 MWh produced with solar on campus

7 energy conservation measures

118 corrected mechanical faults

2,044 Metric tons CO₂e saved annually

These annual savings are equivalent to:

229,999 gallons of gasoline not consumed

275 homes' energy use for one year

93,899 propane cylinders for grilling

722 tons of waste recycled instead of landfilled

33,798 tree seedlings grown for 10 years

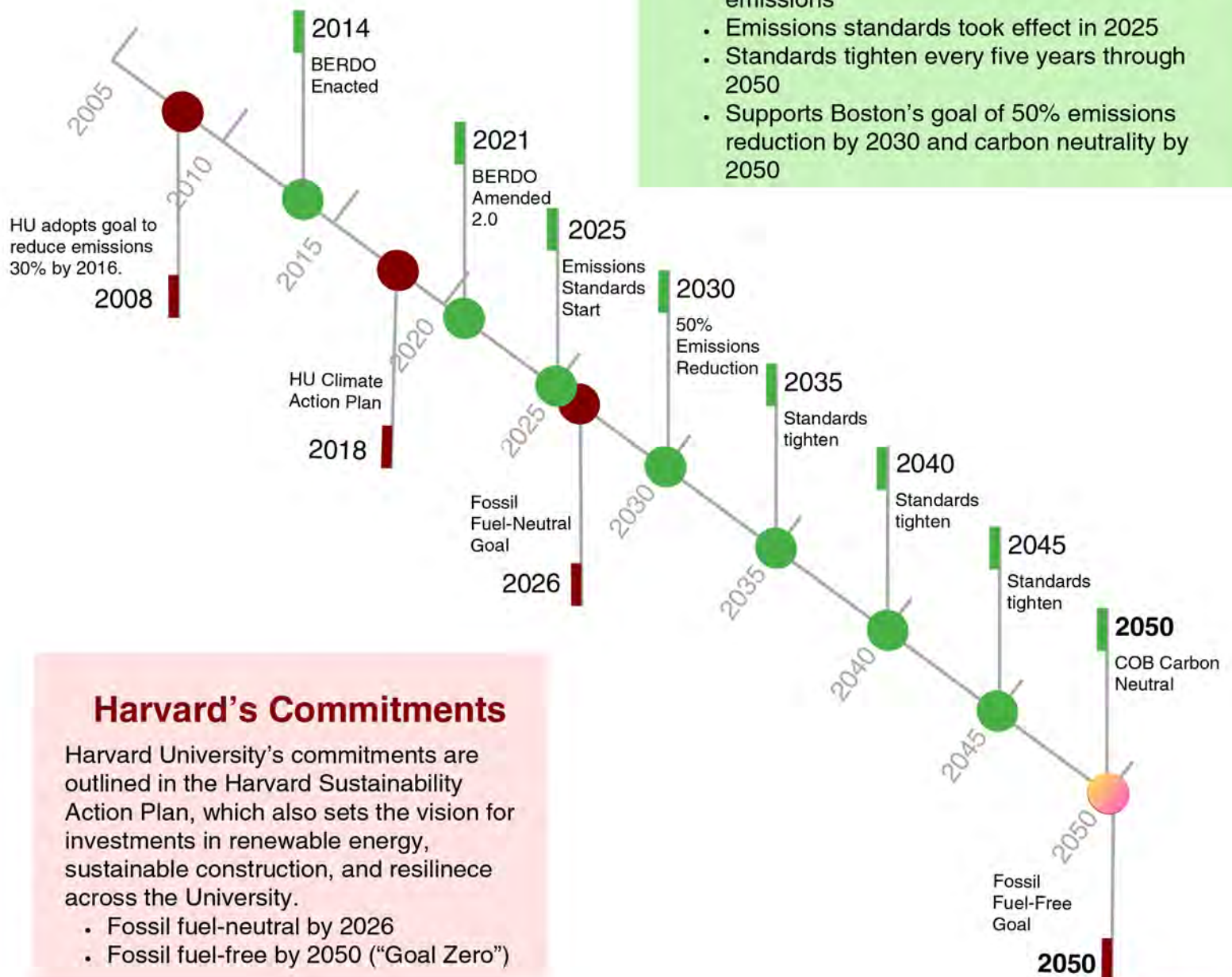
Emissions & Climate Commitments

Harvard Medical School (HMS) and Harvard School of Dental Medicine (HSDM) are working to reduce greenhouse gas emissions in line with both University commitments and City of Boston requirements. Our approach combines long-term decarbonization of campus energy systems, operational improvements, and transparent reporting to track progress.

Building Emissions Reduction and Disclosure Ordinance (BERDO)

The City of Boston's BERDO applies to large buildings across the city, including those at HMS and HSDM.

- Annual reporting of building energy use and emissions
- Emissions standards took effect in 2025
- Standards tighten every five years through 2050
- Supports Boston's goal of 50% emissions reduction by 2030 and carbon neutrality by 2050

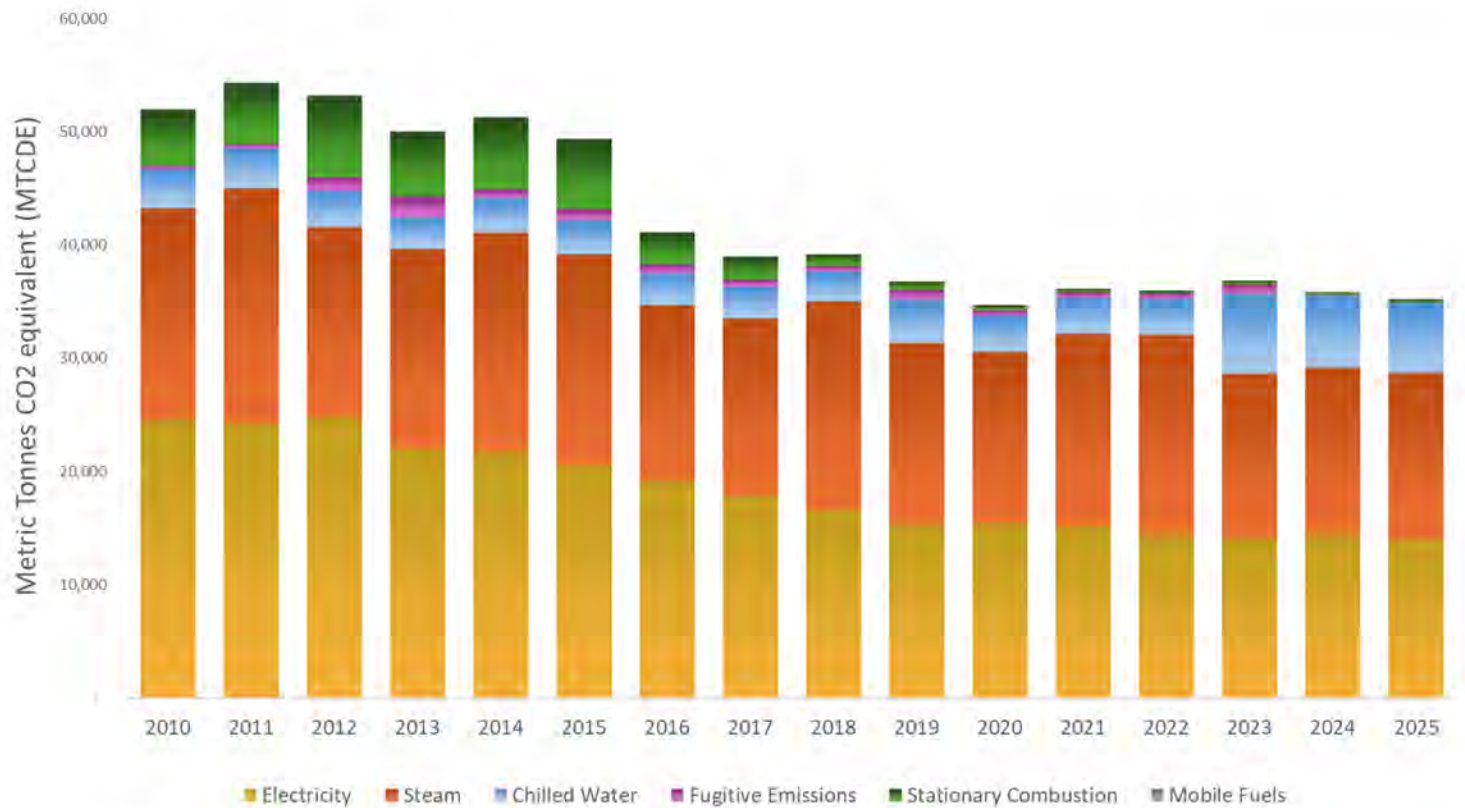


Harvard's Commitments

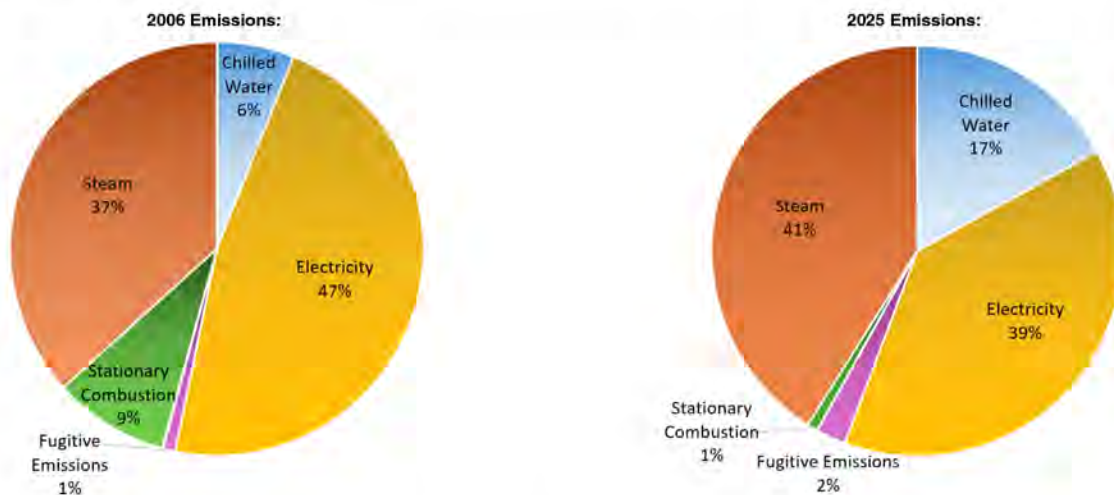
Harvard University's commitments are outlined in the Harvard Sustainability Action Plan, which also sets the vision for investments in renewable energy, sustainable construction, and resilience across the University.

- Fossil fuel-neutral by 2026
- Fossil fuel-free by 2050 ("Goal Zero")

Annual HMS/HSDM Emissions by Source



**Note: 2025 greenhouse gas emissions data is preliminary and may undergo revisions as finalized figures become available.*



Helpful definitions:

- MTCO₂e: metric tons of carbon dioxide equivalent. Equivalent carbon dioxide is a metric that accounts for various greenhouse gases' respective capacities to heat the Earth's atmosphere.
- Fugitive Emissions: Pollutant released into air from leaks in equipment, pipe lines, seals, valves, etc.
- Stationary Combustion: A fixed-site producer of GHG, at HMS, these are mainly facilities using natural gas boilers.

HMS/HSDM Decarbonization Roadmap

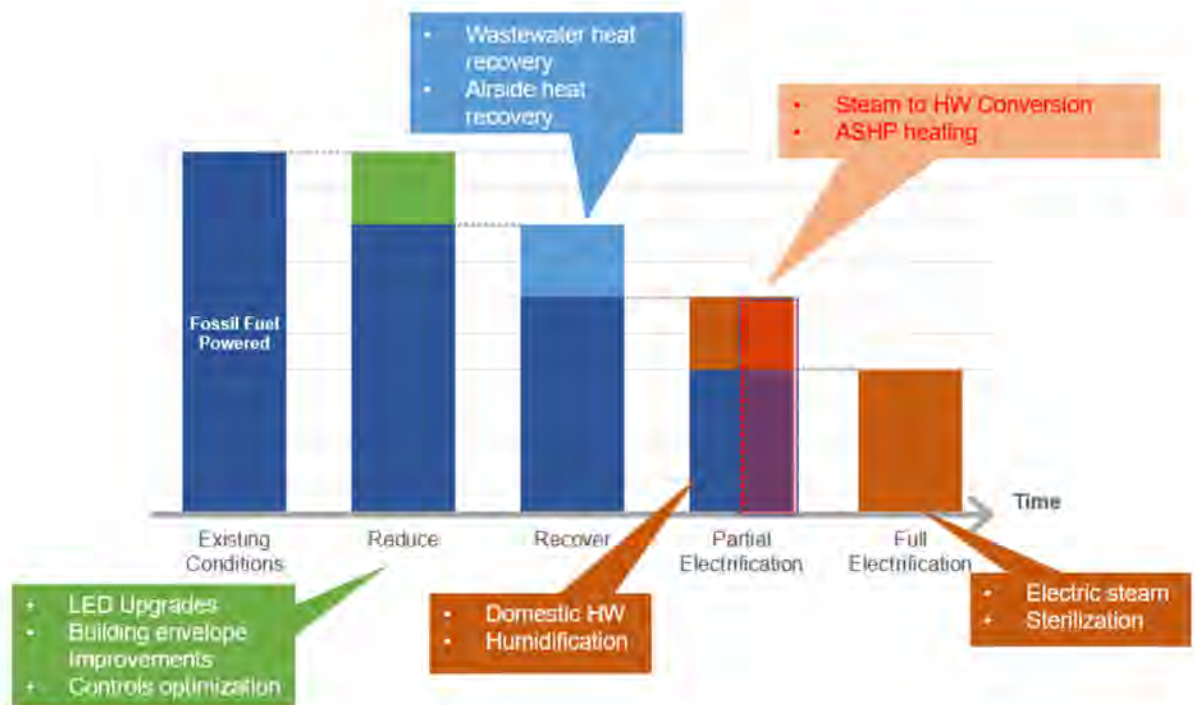
Building on the Utility master Plan study and its results completed in 2024, HMS is now developing its long-term Campus Decarbonization roadmap to evaluate feasible emissions-reduction pathways and establish a long-term program for reducing fossil-fuel use and greenhouse gas emissions across the HMS/HSDM campus. The plan is intended to support Harvard University's climate and sustainability goals while maintaining the reliability, resiliency, and specialized operating requirements of a complex academic and research environment.

Since 2025, HMS has been working with Harvard University's Office for Sustainability and BR+A Consulting Engineers to review, refine, and finalize the draft plan. This collaboration is focused on strengthening the technical analysis, validating the implementation sequence, improving the financial and operational justification for proposed projects, and developing a clear decision-support dashboard for future capital planning.

The Decarbonization Plan combines campus-wide infrastructure improvements with building-specific strategies designed to reduce energy consumption, improve system efficiency, and enable the eventual conversion to lower-temperature heating systems and reduce reliance on steam utility which is the most difficult to decarbonize.

Key strategies include:

- Conversion of buildings from steam-based heating to low-temperature hot water systems
- Expansion of building-level and advanced laboratory heat recovery
- Gut renovations in selected buildings where comprehensive system replacement is warranted
- Potential heat recovery from wastewater streams
- Electrification of selected building systems and central infrastructure
- Use of adiabatic humidification to reduce steam demand
- Electric boiler systems for specialized sterilization requirements
- Battery storage and other measures to improve operational resilience
- Coordinated upgrades to the central hot-water plant and distribution piping in the buildings



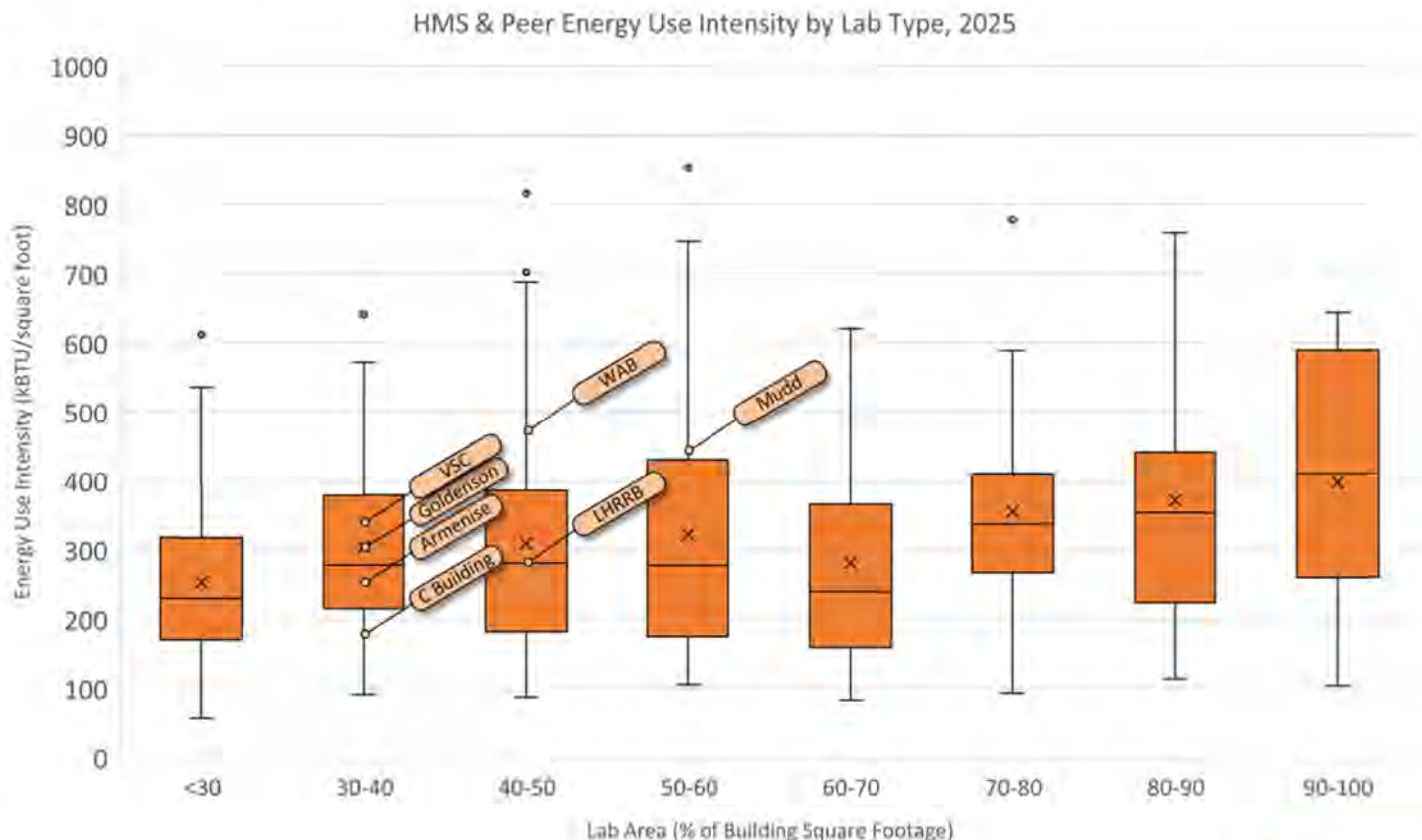
The roadmap prioritizes projects that are within HMS's direct control during the early implementation phases, while establishing the technical and infrastructure foundation for more complex, MATEP-dependent transformations in later years. Through its ongoing collaboration with Harvard's Office for Sustainability's team as well as University's planning and financial leadership, HMS is striving to develop a technically viable, financially supported, and actionable plan. Once finalized, the Plan will serve as a foundation for future capital planning and a guide for advancing HMS and HSDM toward Harvard University's long-term climate and decarbonization objectives.

High-Impact Research Spaces

Labs and research buildings are the most energy-intensive spaces on campus. They often operate 24/7, require high ventilation rates, and host critical equipment with stringent temperature and humidity requirements. While under half of HMS/HSDM's gross square footage is made up by wet labs, it accounts for the majority of our energy use, and therefore the largest share of our carbon footprint.

Since labs are complex, expensive to modify, and central to the success of research, they represent both difficult challenges and exciting opportunities for emissions reductions. In 2025, the Facilities group focused their efforts on several energy conservation strategies to reduce the energy consumption of lab buildings, ranging from heat recovery to ventilation optimization. The later sections on energy conservation measures will expand on how these improvements help to conserve energy across campus. These projects are important in laying the groundwork for long-standing carbon reduction by permanently improving the efficiency of building operations. Improving the efficiency in buildings creates a path forward for taking larger leaps in energy reduction in future years, such as integrating new technologies or electrifying HVAC systems.

Below is a boxplot showing the relationship between lab space (as % of total building area) and Energy Use Intensity (EUI) in lab buildings. Each bin represents a range for the proportion of square footage in each building dedicated to lab research, with labels denoting the placement of HMS 2025 EUIs. The comparative data is sourced from the International Institute for Sustainable Laboratories' (I2SL) Lab Benchmarking Tool (LBT) - a database containing energy, emissions, and operational metrics from 1000+ peer facilities.



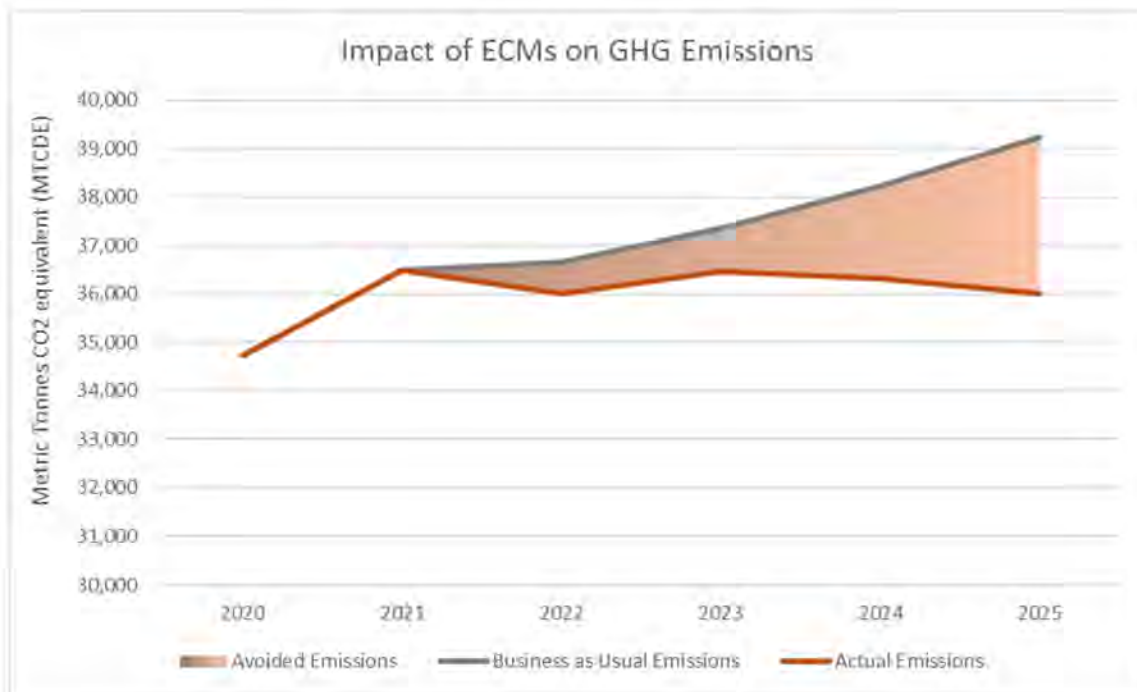
Energy Conservation Measures (ECMs)

Between 2024 and 2025, HMS has completed three major energy conservation programs designed to reduce energy consumption and campus GHG emissions, improve building-system performance, and support long-term operational efficiency. Collectively, the projects addressed heat recovery, mechanical/HVAC system optimization, retro-commissioning, controls modernization, and equipment efficiency improvements across key campus facilities.

The projects provide benefits in four primary areas:

- 1) Reduced utility consumption and operating costs
- 2) Lower greenhouse-gas emissions and compliance cost
- 3) Improved HVAC control, reliability, and maintainability
- 4) Better alignment of building-system operation with occupancy, laboratory requirements, and actual loads

ECMs in 2025 alone account for 1,531 MTCDE avoided. Projects completed in 2025 are explained in more detail on the following pages.



The graph above illustrates the impact that ECM projects have on our campus. The shaded area between actual emissions and business-as-usual emissions (i.e., what we would have emitted if energy conservation measures weren't implemented) represents avoided greenhouse gas emissions.

VSC Heat Recovery Chiller

In 2024, HMS installed a new Heat Recovery Chiller (HRC) online at the Veritas Science Center, the School's largest and one of its most research-intensive facilities. The heat recovery chiller project captures heat that would otherwise be rejected from the chilled-water system and transfers it to the heating hot-water system serving laboratory and related reheat loads. This allows the same equipment to produce useful cooling and heating simultaneously.

This system was not fully operational in 2024 and most of 2025. HMS continued to work with its vendors and consultants to completed multiple improvements and adjustments to the control sequences of the chiller. After these additional changes were implemented, the Heat Recovery chiller went into baseload operation in late 2025 and has been providing significant steam cost savings for the school.

The operation of Heat Recovery Chiller helps to reduce steam consumption by approximately 19,500 klbs annually and **avoids ~1,200 metric tons of carbon dioxide equivalent emissions per year**. The project is estimated to produce approximately **\$300K in annual total cost savings**, with an estimated simple payback of about ~5 years.

Additional operational benefits include:

- Improved integration of the chilled water and heating hot water systems
- Reduced dependence on steam for laboratory reheat
- Greater flexibility in meeting year-round heating and cooling loads
- Improved utilization of rejected heat that would otherwise be wasted



VSC viewed from Longwood Avenue

Mechanical, Retro-Commissioning (RCx) and Controls Upgrades (1 of 2)

A broad package of HVAC optimization projects has been implemented across campus in 2025 including the Modell Center, Countway Library, Gordon Hall, Veritas Science Center as well as VSC/WAB kitchen and cafeteria areas. The work combines retro-commissioning, equipment repairs, controls improvements, operating schedule changes, VAV conversions, kitchen hood controls, and laboratory ventilation optimization.

The central benefit of this program is that it improves the performance of existing systems without relying on major equipment replacement. The projects correct deficiencies such as excessive air exchange rates, failed or overridden controls, unnecessary equipment idling, ineffective static-pressure control, nonfunctional VFDs, and poor coordination between laboratory and building automation systems

This package of ECM projects is estimated to reduce school's carbon footprint by **~400 metric tons of carbon dioxide equivalent per year**. The project is estimated to generate approximately **~\$210K in annual total cost savings**, with an estimated simple payback of about ~6.5 years.



Countway Library viewed from courtyard

Mechanical, Retro-Commissioning and Controls Upgrades (2 of 2)

Key benefits of this project package included:

- **Improved HVAC efficiency:** Air handlers, fans, VAV boxes, and pumps will operate closer to actual building requirements. Static-pressure resets, supply-air temperature resets, fan-speed modulation, and occupancy-based control reduce unnecessary fan operation and avoid over-conditioning.
- **Reduced unoccupied energy use:** Several systems were operating continuously or for longer periods than required. Scheduling air handlers during occupied periods and allowing controlled unoccupied setbacks will reduce unnecessary heating, cooling, ventilation, and fan energy while maintaining temperature limits in sensitive areas such as IT closets and electrical rooms.
- **Optimized laboratory ventilation control:** The VSC ventilation optimization measure coordinates Siemens/Distech building controls with Phoenix laboratory controls. This allows supply and exhaust airflow to be adjusted based on occupancy, hood operation, and room-specific air-change requirements. The result is reduced excess ventilation while maintaining required airflow, room pressure relationships, and laboratory safety conditions.
- **Improved reliability and system visibility:** Retro-commissioning includes functional testing, sensor calibration, repair of failed components, replacement of malfunctioning VFDs and CO₂ sensors, testing of alarms and interlocks, and improvements to BMS graphics and dashboards. These measures should make the systems easier to operate, troubleshoot, and maintain.
- **Improved occupant comfort and indoor environmental quality:** More accurate sensors and properly functioning control sequences should improve temperature control, humidity management, ventilation delivery, and room pressurization. The measures are also expected to reduce simultaneous heating and cooling and minimize temperature problems caused by faulty or overridden controls.
- **Reduced kitchen exhaust energy:** The installed Melink kitchen hood controls modulate exhaust fan speed in response to actual heat and smoke generated by cooking activity. This reduces fan energy and the associated heating and cooling required to condition replacement air, while maintaining minimum airflow and gas-safety interlocks.

Mechanical/HVAC Energy Conservation Measures in REB

A group of impactful Energy Conservation Projects has been implemented in 2025 in Research and Education Building (REB) at the School of Dental Medicine. The program includes three related HVAC measures addressing air-handler scheduling, laboratory ventilation controls, and heat recovery system improvements. Together, these measures target the building's largest energy-consuming systems and reduce unnecessary operation of fans, pumps, heating and cooling equipment. The primary benefits are as follows:

- **Air-handler scheduling and resets:** AHU scheduling reduces operation during unoccupied periods, particularly in non-laboratory areas. Supply-air temperature and static-pressure resets allow the systems to operate at the lowest practical fan speed and cooling output while still satisfying zone requirements.
- **Laboratory ventilation controls and retro-commissioning:** Recommissioning laboratory occupancy sensors and restoring communication between the Phoenix and Siemens control systems allows laboratory air changes to be reduced during unoccupied periods. This reduces fan energy, cooling energy, and heating/reheat energy without changing occupied laboratory requirements.
- **Heat recovery improvements:** The REB heat recovery improvements optimize the glycol heat recovery loop by adding two-way valves, variable-speed pump drives, improved controls, monitoring, and coil cleaning. These changes improve heat recovery effectiveness during heating mode, enable cooling-mode heat recovery, and reduce pump energy through variable-speed operation.

The completed ECM projects in REB help to reduce school's carbon footprint by about **~200 metric tons of carbon dioxide equivalent per year**. The projects are estimated to generate approximately **~\$120K in annual energy and maintenance cost savings**, which equates to about 4 years of simple payback.



Air Handlers in REB penthouse

Ultra-Low Temperature Freezer Preventative Maintenance Program

Harvard Medical School (HMS) supports 300+ Ultra-Low Temperature (ULT) freezers across campus, providing critical -80°C -class storage for tissue samples and other valuable research materials. Recognizing the importance of these units to uninterrupted research operations, HMS Facilities has established and oversees a biannual preventive maintenance program performed by a qualified third-party service provider.

The program includes systematic inspection, performance testing, cleaning, and basic preventive maintenance to identify potential issues before they develop into equipment failures. In addition to helping protect valuable research samples and improve freezer reliability, proactive maintenance can help optimize equipment performance, extend useful equipment life, and reduce energy consumption and operating costs.

ULT freezers are among the most energy-intensive pieces of laboratory equipment, making effective maintenance an important component of both research continuity and HMS's broader energy-management and sustainability objectives.



Coming in 2026

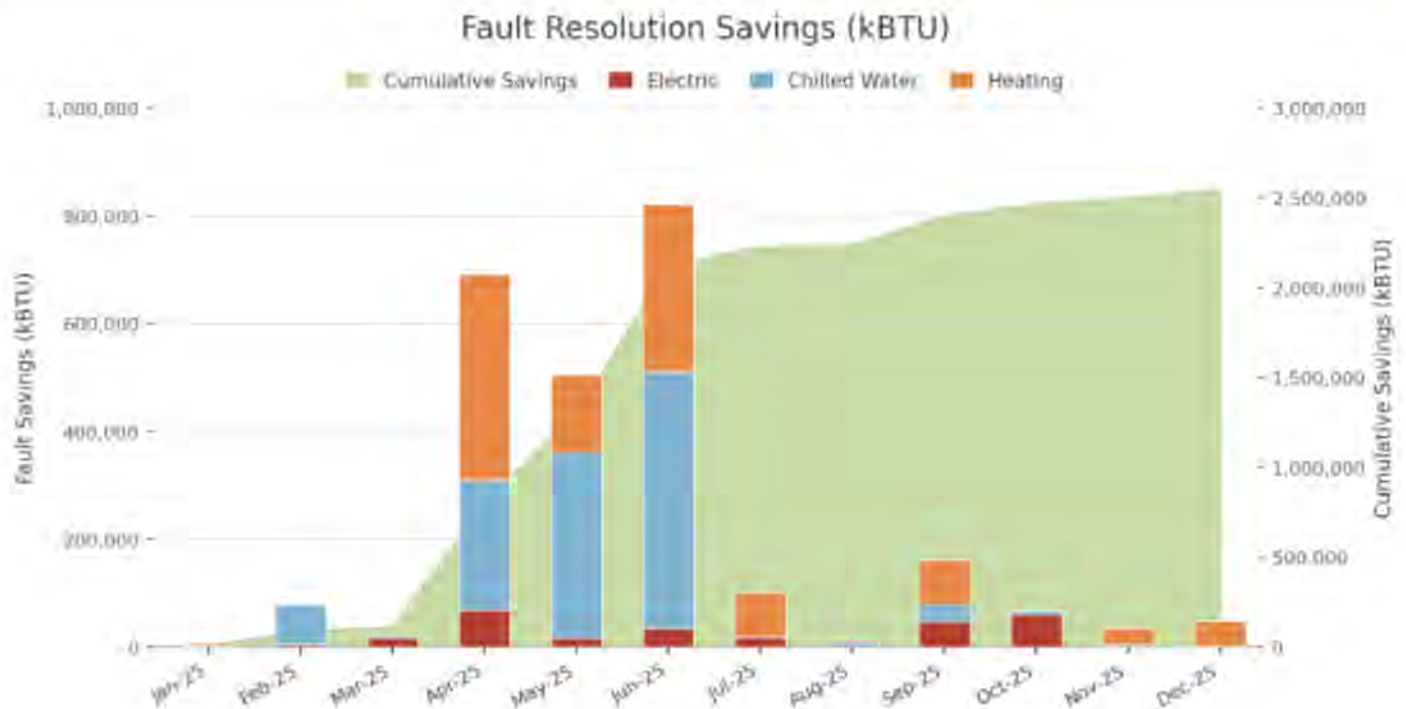
A new package of energy conservation projects (Phase 5) will be carried out in several buildings across campus, focusing on enhanced controls, ventilation optimization, CO2 based Demand-Control ventilation, as well as Retro-Commissioning (RCx).

Design and planning will begin for the next phase of energy conservation program (Phase 6) which will include additional heat recovery opportunities, optimization of chiller plant operation in VSC, technical feasibility analysis of using electric sterilization and glass wash equipment instead of traditional steam-based machines, and others.

The school will continue pursuing reductions that are technically and economically practical, but the next stage of decarbonization will require larger-scale transformations and significantly greater capital investment. Working together with OFS, university planning and financial leaders, CP&F will continue to develop school's decarbonization plan in 2026 and beyond which will be a multi-year, multi-technology plan implemented over the next few decades.

Fault Detection Software

HMS operates an ongoing fault detection and analytics program that monitors the campus building control system and flags issues early. The system reviews temperatures, airflows, and schedules to identify hidden inefficiencies such as simultaneous heating and cooling, sensor drift, or control errors. In 2025, alerts prompted the correction of 118 issues, resulting in an estimated ~2.5 million kBTU in realized energy savings and ~513 MTCDE of emissions savings. The graph below shows the basic statistics of the fault detection and resolution for calendar year 2025.



Green Lab Certification

Engaging and working directly with researchers is an essential part of reducing HMS's carbon footprint. The Green Lab Certification program encourages labs to adopt best practices that reduce energy consumption, limit waste and promote more sustainable research spaces.

Over the past few years, HMS Labs have participated in certification on multiple levels, demonstrating how sustainable practices can effectively be integrated into high-intensity research environments.

Ultra-Low Temperature Freezer Rebate Program

One way that labs can demonstrate sustainable practices while maintaining a high standard for lab infrastructure is by participating in the Facilities Ultra-Low Temperature Freezer Rebate Program. Freezers are among the most energy-intensive pieces of equipment in research settings, often running 24/7 at temperatures as low as -80°C . By upgrading to more energy-efficient models, substantial energy/emissions reductions can be achieved. 2 rebate applications were processed in 2025, resulting in a reduction of about 24,000 kWh annually. The rebate program has continued into 2026, with 8 additional freezers being replaced through September.



VSC Solar Array

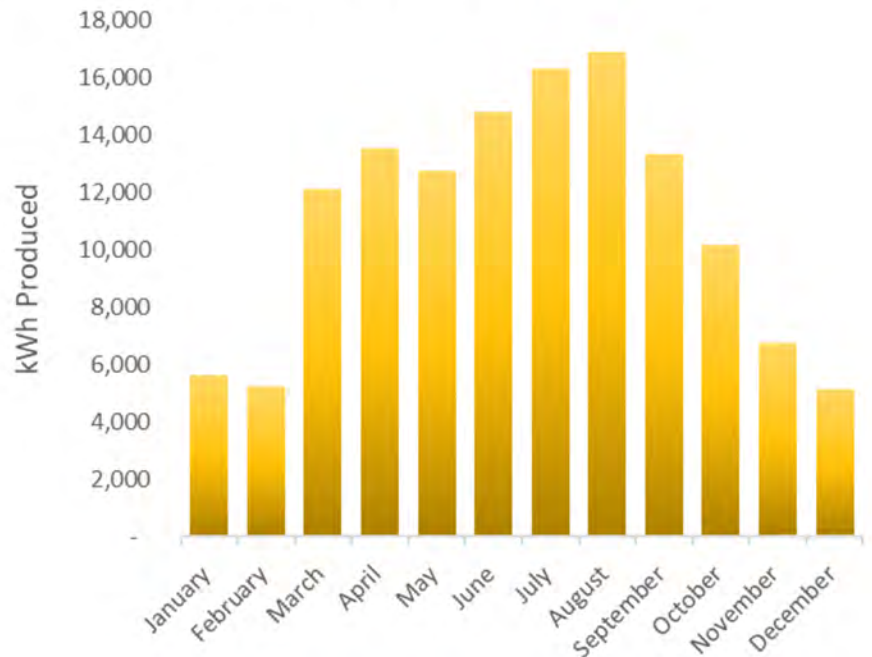
Below is the monthly production of electricity from the 380 solar panels on the roof of NRB in 2024. This electricity supplements power provided by Eversource. Every kWh generated by the solar panels contributes to the relative reduction of GHG emissions that would otherwise be generated by Eversource.

Production Stats 2025:

~133 MWh generated

~33 MT CO₂e emissions avoided

VSC Solar Production - 2025



Electric Vehicle Charging

The recent decline in overall charging activity on campus is due to two factors. First, construction work in the VSC garage required several chargers to be taken offline in April 2025; this work concluded in late May.

Second, on May 13, Facilities was notified that Shell Recharge, the service provider operating the majority of campus chargers (8 out of 10 units), had terminated its contract with HMS effective April 30. In November, we established a new contractor for these 8 units, and we are working with the vendor to obtain kWh data for these chargers



ChargePoint EV Charger in VSC Parking Garage

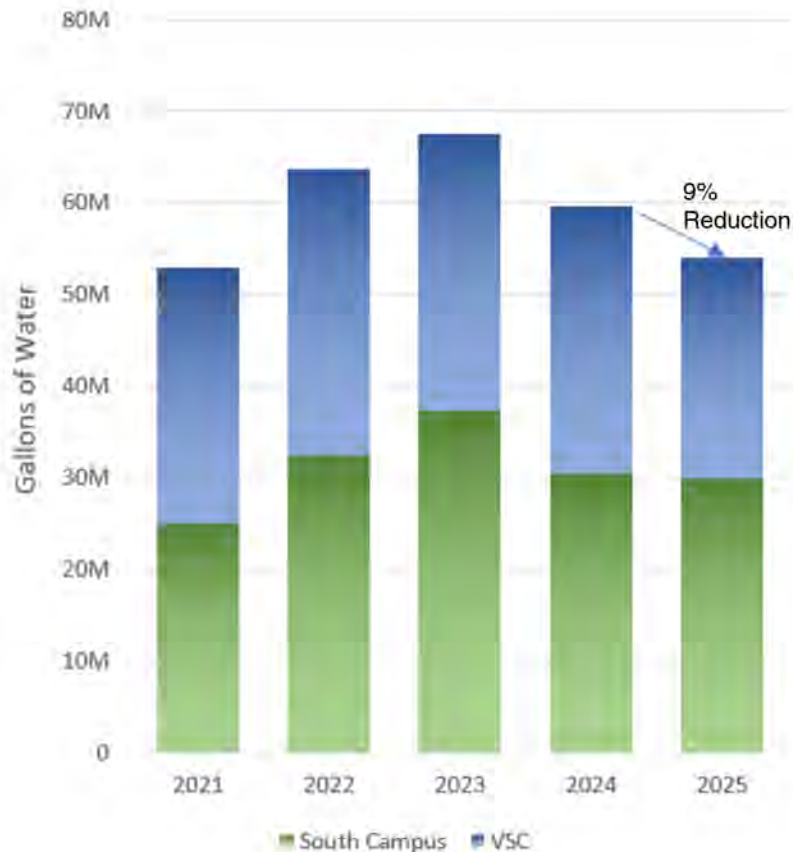
kWh Used by Electric Vehicles			
Year End	VSC	WAB	Sum
2023	45,644	33,094	78,738
2024	48,395	34,413	82,809
2025	22,176	38,353	60,529

Water Consumption

Water use on campus supports regular building uses (sinks, toilets, water fountains), lab processes (sterilization and cagewash), cooling tower operations in select buildings, and irrigation on the quad lawn and green spaces across campus. When comparing water usage data to 2024, we used **9% less water in 2025**.

The decrease is mostly attributable to VSC, the largest building on our campus. In fiscal year 2025, upgrades were made to the cagewash and sterilization equipment serving the animal spaces, which helped to reduce a significant amount of city water.

HMS City Water Consumption

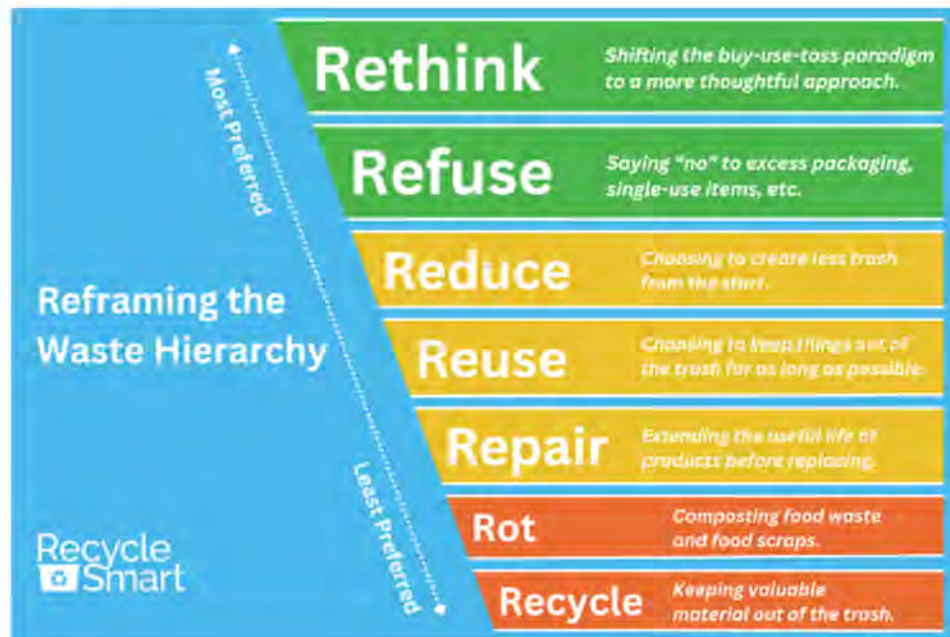


HMS Irrigation Water Consumption & Precipitation



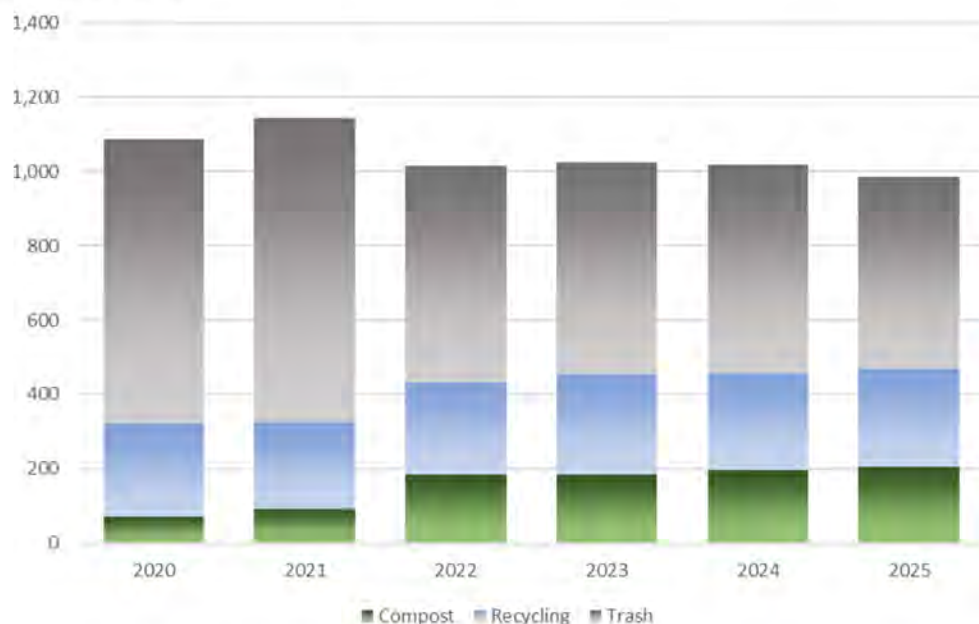
Another reason VSC experienced lower water consumption was a lower amount of irrigation water used. The chart on the right shows irrigation water on campus compared to the amount of precipitation during the watering season (April through October). We experienced significantly more rainfall in 2025 during this time frame than in 2024, leading to an overall reduction in the need for irrigation water on campus.

Waste Disposal



In 2025, HMS maintained a similar profile of waste generation compared to the past 3 years, with a 3% decrease in total reported tonnage. Compost volumes reached a record high, with a 5% increase in 2025 compared to 2024. This reflects the continued growth and participation in organics diversion programs across campus. Municipal solid waste (i.e., trash) decreased in 2025 by 8% for the third consecutive year, continuing a long-term downward trend. Finally, recycling increased slightly by 1%.

All 4 of these trends reflect positive changes in building use patterns along with improvements in waste diversion infrastructure and practices. This is partly due to signage and bins being updated across campus in 2024 to improve clarity on where to dispose of each kind of waste (trash, recycling, compost).



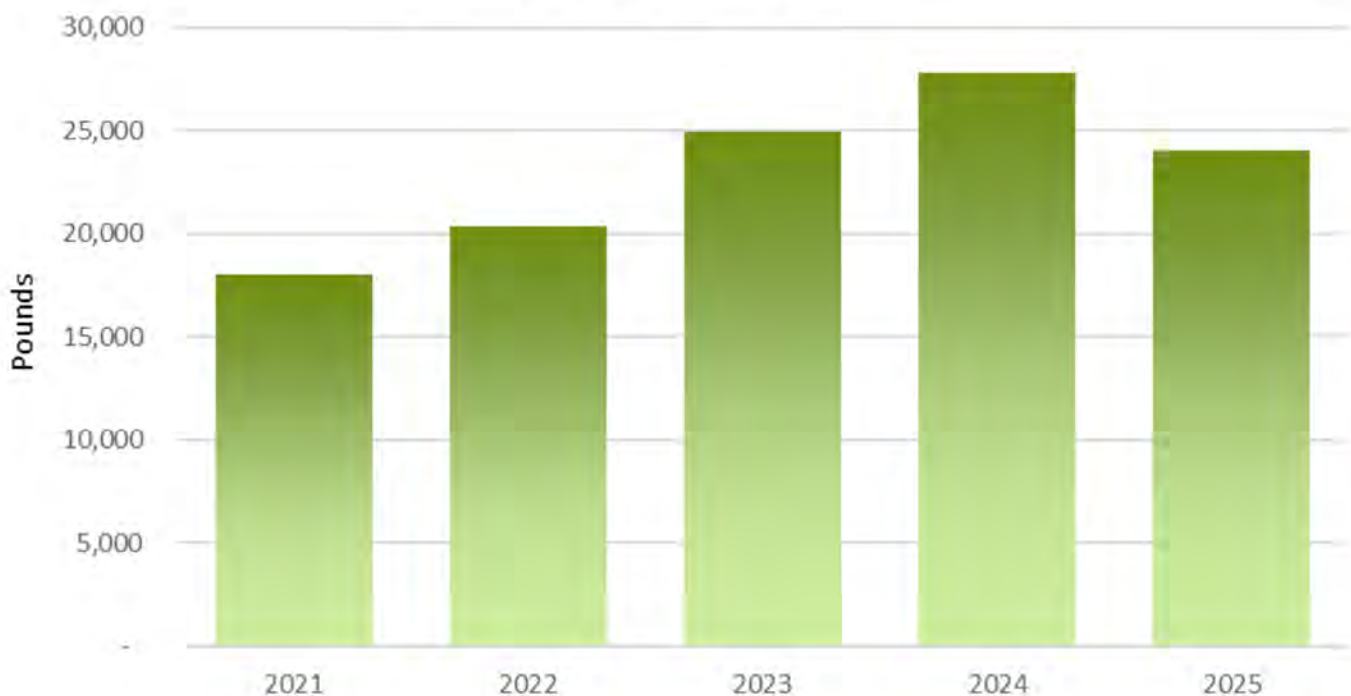
Pipette Tip Box Recycling

Pipette tip box recycling has continued to expand on HMS's campus since its expansion from a pilot in 2019 to full campus availability in August 2020. Pipette tip box recycling volumes reduced slightly from 2024 to 2025. However, the recycling of the ~24,000 lbs of pipette tip boxes avoided ~118,000 lbs of carbon* from entering the atmosphere.

The tip boxes, polypropylene plastic, are granulated and re-used by local manufacturers to make more laboratory supplies.



Annual Recycling Volumes



*as reported by PolyCarbin

Grounds

HMS and HSDM's outdoor spaces are maintained all year with an emphasis on safety, appearance, and environmental stewardship. Crews care for plantings, trees and site infrastructure each season, while the winter brings the added challenge of maintaining walkways that are clear of snow and ice.

Shifting Practices

Traditional methods for snow removal rely heavily on the application of chloride and other snow-melting machines. While these methods are effective at keeping surfaces clear of snow, they can also cause long-term damage to pavement and landscaping, consume significant amounts of fuel, and contaminate waterways via storm drain networks.

Back in 2023, Facilities introduced a strategy to prevent these negative outcomes, while also keeping walkways clear. Brine pretreatment - a liquid mix of water and salt sometimes blended with vegetable byproducts - is applied *before* storms so ice cannot bond to the pavement. Brush-equipped plows clear the snow mechanically rather than chemically. Magnesium chloride is reserved for designated "non-chloride" zones where rock salt would be too harsh, and spreaders are calibrated to prevent overapplication. This approach prioritizes safety while applying chemicals more responsibly.

The Results

- Historical baseline: ~9,000 lbs of salt per inch of snow
- 2025: ~3,570 lbs of salt per inch of snow (95,300 lbs of salt, 26.71 inches of snow)



Ventrac with brine sprayer



Dining

HMS partners with Restaurant Associates (RA) as its on-site dining management company. RA implements sustainable practices and promotes healthful food choices through various initiatives, including:

- Sourcing sustainable seafood according to Monterey Bay Aquarium Seafood Watch standards
- Maintaining a sustainability scorecard to track and monitor purchases
- Using compostable serviceware, including clamshells for main courses and hot items, trays used in the cafés, and coffee cups
- Offering Virtual Teaching Kitchen classes that focus on sustainable, plant-forward meals to promote food literacy and education
- Hood monitoring system to lower air flow, and therefore energy consumption, during downtime or when heat production is low

Sustainable Sourcing

With a target of 100% sustainable purchasing across all categories of food, in 2025 RA achieved:



When falling short of the 100% goal, it is often due to supplier substitutions. RA continues to work closely with suppliers to minimize these occurrences and maintain high standards.

Countway Community Garden

Countway Library and the Countway Community Garden provide students, staff, faculty, and members of the Longwood community with a welcoming outdoor space for gardening, events, learning, and community connection. Managed in partnership with campus volunteers, the garden includes dozens of raised beds that are planted each spring and maintained throughout the growing season. The garden also serves as a venue for workshops, social gatherings, and wellness programming for at least seven months of the year.

2025 Growing Season Highlights:

- 183 registered gardeners planted and maintained 71 raised beds during the April-October growing season.
- Organized the second annual Longwood Earth Day Festival, which welcomed more than 200 attendees and featured 7 sustainability-focused campus groups.
- Hosted over 30 events organized by departments and groups from across campus.
- Gardeners are encouraged to use organic soil and seeds, while rain collection barrels support water conservation in the garden.
- Several garden beds are dedicated to pollinator-friendly plants, providing habitat and food sources for pollinators.
- Food scraps and compostable materials are collected in a compost roller in the garden, which produces compost to nourish the garden's plants throughout the growing season.



Additional Garden Features:

Organic Seed Library: Community members are encouraged to save seeds from their harvests and return them to the seed library, creating a cycle of reuse that helps make gardening more accessible while supporting seed stewardship and biodiversity.

Sustainability Bookshelf: Browsable collection of 40 titles covering sustainability, gardening, food systems, and related topics; created in collaboration with Harvard's Council of Student Sustainability Leaders and Countway Library's Sustainability Working Group.



Get in Touch

For more information about sustainability initiatives and how you can get involved, please visit our website or email us directly.

<https://campusplanning.hms.harvard.edu/energy-sustainability>

With all questions related to energy efficiency programs please contact:

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