



UNIVERSITY OF PENNSYLVANIA

CLIMATE AND SUSTAINABILITY ACTION PLAN 3.0

SUMMARY REPORT FY20-FY24



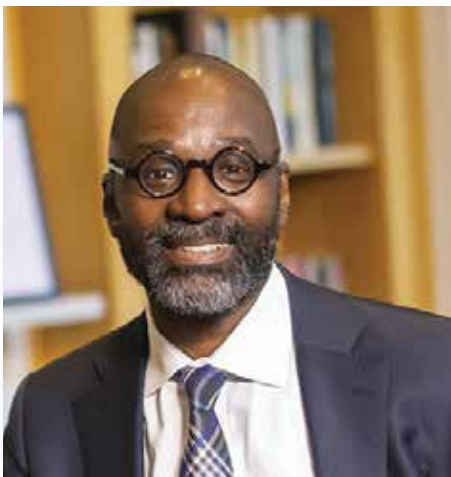
CONTENTS

- 3 > Introduction
 - Leadership Quotes
 - Timeline
- 5 > Progress Summary
- 7 > Academics
- 11 > Utilities and Operations
- 14 > Physical Environment
- 19 > Strategic Waste
- 24 > Procurement
- 29 > Transportation
- 33 > Outreach and Engagement
- 37 > Looking Forward
- 38 > Acknowledgments



From a new 1,600-acre solar farm expected to produce the equivalent of approximately 70% of our campus and Greater Philadelphia area’s health system’s electricity demand, to pioneering research and teaching, Penn is leading the science and practice of sustainability on every front. As our strategic framework, In Principle and Practice, makes clear, Penn has the ingenuity and the responsibility to continue this important work and serve as an exemplar to higher education and the world.

–J. LARRY JAMESON, MD, PHD, INTERIM PRESIDENT



Sustainability is among Penn’s highest priorities – and central to the mission of our new strategic framework, In Principle and Practice, which calls us to lead on the most urgent challenges of our time. Across our campus and our community, we are forging engaged, inventive research to discover new ideas, accelerate interdisciplinary connections, and provide innovative solutions for the world’s climate crisis.

–JOHN L. JACKSON JR., PROVOST AND
RICHARD PERRY UNIVERSITY PROFESSOR



In my Penn career, I’ve witnessed Penn’s tremendous progress in sustainability – from investments in Penn’s infrastructure to groundbreaking climate research. Yet, our journey is far from over. As we continue to innovate, our charge as an institution of higher learning is to both educate and adjust our operations for the benefit of our community and society at large.”

–CRAIG R. CARNAROLI, SENIOR EXECUTIVE VICE PRESIDENT

2007

JUNE

President Gutmann signs the *American College and University Presidents Climate Commitment (ACUPCC)*.

2009

SEPTEMBER

Penn launches its first *Climate Action Plan* defining its University-wide sustainability goals through 2014.

2010

MARCH

Penn issues *Century Bonds*, with \$200 million earmarked for projects that combine deep energy retrofits, deferred maintenance, and sustainability.

2014

OCTOBER

Penn launches its *Climate Action Plan 2.0*, reporting on five years of accomplishments and establishing goals through 2019.

2017

JUNE

Penn joins eleven Ivy Plus universities in reaffirming commitment to climate change mitigation after U.S. withdrawal from the Paris Agreement.

2019

OCTOBER

Penn launches its *Climate and Sustainability Action Plan 3.0 (CSAP 3.0)*, reporting on ten years of accomplishments and establishing goals through 2024.

2020

APRIL

Penn announces the signing of a Power Purchase Agreement (PPA) designed to offset approximately 70% of electricity use for the University and Health System in the Greater Philadelphia area.

2021

JUNE

The Environmental Innovations Initiative launches its strategic plan to catalyze Penn's role in creating solutions to real-world environmental challenges.

2022

APRIL

Construction began on the solar energy project that is part of Penn's Power Purchase Agreement (PPA). Two new solar energy facilities will be built in central Pennsylvania, from which Penn will purchase all of the electricity produced - an amount equal to approximately 70% of the total electricity demand of the academic campus and the University of Pennsylvania Health System in the Greater Philadelphia area.

2023

Solar facilities under Penn's Power Purchase Agreement begin operation.

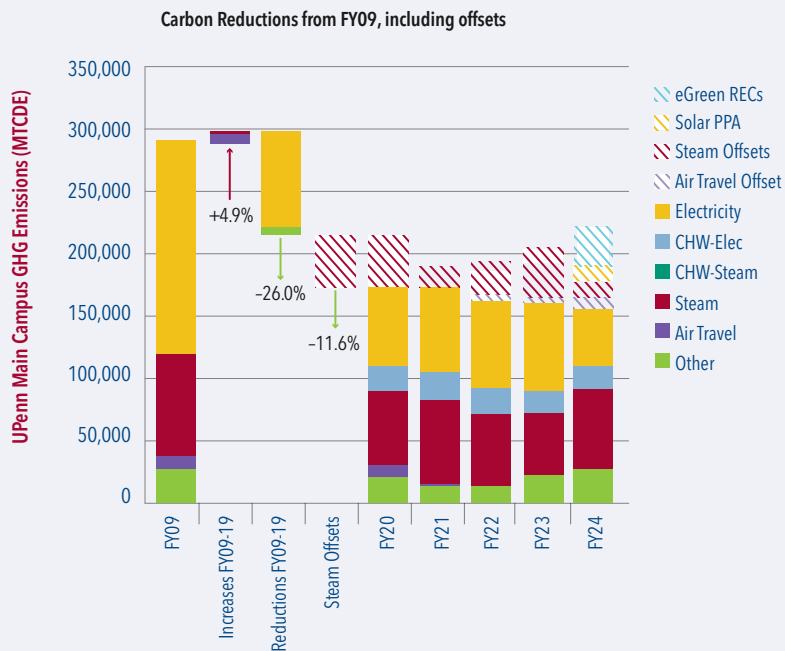
2024

Publication of CSAP 4.0

PROGRESS SUMMARY

This report highlights fiscal years 2020 - 2024 (July 1, 2019 - June 30, 2024) progress toward achieving the goals of the *Climate and Sustainability Action Plan 3.0 (CSAP 3.0)*, Penn’s guiding document for campus sustainability. The goals were developed and executed by Penn’s Environmental Sustainability Advisory Committee (ESAC), comprised of over 100 members. Included are key updates on progress made in each of the seven initiatives of the CSAP 3.0 - initiatives designed to advance Penn toward its goals to:

- Expand the scope of sustainability research in Penn’s academic Centers, and provide students with a rigorous education and experiential learning opportunities in climate and sustainability;
- Continue to reduce carbon emissions and explore expanded use of renewable energy to mitigate the impacts of climate change;
- Incorporate sustainable practices into campus design and management;
- Embrace circular economy principles to reduce waste and single-use products;
- Make sustainable choices in purchasing and business operations;
- Create an accessible, integrated, and multimodal transportation system for Penn students, staff, and faculty; and;
- Inform, educate, and empower the Penn community to participate in Penn’s climate change and sustainability goals



The chart shows Penn’s progress in reducing the main campus carbon footprint over the past three years as compared to the Fiscal Year 2009 baseline year.

Reduction from FY09

NET
 FY19: 33%
 FY20: 37%
 FY21: 44%
 FY22: 45%
 FY23: 46%
 FY24: 47%

Source: Center for Environmental Building & Design

As the University concludes the CSAP 3.0 term, this report provides an opportunity for Penn to reflect on what has been achieved over the past five years and prepare for the next era of sustainability planning.

If you have questions, comments, or want to get involved, please contact the Penn Sustainability Office (PSO) at sustainability@upenn.edu. For more information, please visit sustainability.upenn.edu.

HIGHLIGHTS | Seven Initiatives

Initiative	3.0 GOALS PROGRESS	KEY HIGHLIGHTS
Academics	100%	<ul style="list-style-type: none"> • 5,112 students enrolled in environment-related courses in the 2023-2024 academic year • All 12 schools published Academic Climate Commitments.
Utilities & Operations	100%	<ul style="list-style-type: none"> • Reduced GHG emissions by 47% from 2009 baseline. • Two solar energy facilities constructed in Central PA. - equal to approximately 70% of the electricity demand of the University of Pennsylvania and the University of Pennsylvania Health System in Greater Philadelphia.
Physical Environment	100%	<ul style="list-style-type: none"> • To date, there are 51 LEED projects certified by US Green Building Council (USGBC), with an additional 7 under construction and 4 in design. • Completed first carbon footprint for real estate portfolio, and Morris Arboretum & New Bolton Center.
Strategic Waste	100%	<ul style="list-style-type: none"> • Signed on to City of Philadelphia's Zero Waste Partnership program. • Initiated waste audit contract to help optimize waste operations; 29% diversion rate achieved in FY24, up from 24% in FY20.
Procurement	100%	<ul style="list-style-type: none"> • Enacted a Travel Sustainability Policy and process to track, fund, and offset the carbon emissions from all Penn-related air travel. • #2 in the Food & Dining category in the 2022 & 2023 AASHE Sustainable Campus Index.
Transportation	100%	<ul style="list-style-type: none"> • Published a Low-Emission Vehicle Guide to support vehicle purchasers in transition to electric vehicles. • Penn transit added 6 electric passenger vans to fleet.
Outreach & Engagement	100%	<ul style="list-style-type: none"> • Climate Week and Earth Week established themselves as major annual event series' on Penn's campus. From FY20-FY24, there were 118 Climate Week events and 132 Earth Week events. • The Green Labs program was formally established and conducted its first ULT Freezer Inventory to assess energy saving opportunities in labs.



ACADEMICS

MISSION

- Make climate change and sustainability part of the curriculum and the educational experience available to all students, including classroom instruction, extracurricular experiences, and research and internship opportunities
- Support teaching, learning, research, and scholarship on sustainability
- Inform the entire University community of the principles of sustainability and its three key constituent pillars: environmental protection, economic prosperity, and equitable distribution of resources



TOWARD AN EQUITABLE FUTURE

In fall 2023, the Penn Sustainability Office (PSO) and the Environmental Innovations Initiative (EII) collaborated to develop and distribute a first-of-its kind Climate Change Survey to the Penn community. The survey had specialized tracks for undergraduates, graduate students, faculty, and staff. The results provided invaluable information on campus attitudes, beliefs, knowledge, and behaviors about the University's operations and academic offerings related to the environment. An analysis of the nearly 1,500 responses was shared with University leadership, including all 12 School deans, and will inform how PSO and EII will develop future programming and resources. The two offices plan to issue the survey every two years to track trends and progress.

Among the notable findings, 26% of undergraduate respondents and 36% of graduate student respondents reported being extremely interested in environment-related courses. Of faculty survey respondents, 88% were interested in advancing experiential learning at Penn, while 81% of students said they were open to exploring professional development opportunities related to climate or sustainability.

These and other responses demonstrate an appetite throughout the Penn community for enhancing both institutional- and individual-level responses to climate and sustainability challenges. The survey's trove of data has already proven valuable as Penn determines how to commit its resources to be a climate leader.



As part of the Power Purchase Agreement, Penn graduate researchers have analyzed the biological, chemical, and physical properties of the soil on the solar fields to help students and other scientists understand how solar field construction and operation impact soil health.



GOALS	STRATEGIES	FY20 - FY24 PROGRESS
Support cross-disciplinary research and coordination of work between Schools and academic Centers	Work with the Office of the Provost to promote curricular opportunities, coordination of scholarship in Schools and Centers and promotion of majors, minors, and concentrations in sustainability.	<p>The President and Provost announced the establishment of the Environmental Innovations Initiative in 2020. EII facilitates innovative research, helps to recruit and retain outstanding faculty members, and develops formal and informal educational programs.</p> <p>Three rounds of EII's funded research communities catalyzed interdisciplinary collaborations at Penn. 14 research communities have received more than \$460,000 in funding. All address issues related to the Initiative's pillars of climate action, stewardship of nature, and societal resilience.</p>
Campus-as-Lab: Support the use of campus-as-lab to promote applied learning	Develop a formal Campus-as-Lab initiative to merge Penn's operational sustainability goals with applied learning and research for faculty and students.	Penn has an ecosystem of applied research and learning that provides students with opportunities for engaged environmental scholarship on both global and local scales. More than 10 centers, offices, and institutes offer engagement. Across nine Schools there are immersive courses offering opportunities to apply and accrue environmental knowledge. The Environmental Innovations Initiative provides a round-up of these opportunities on a webpage on their website.
Help advance the City's regional sustainability objectives and provide professional development and real-world learning opportunities to Penn students	Formalize a Civic Sustainability Fellowship program to place Penn students in internships with City agencies.	Civic Sustainability Fellows were hired and placed with the Philadelphia Water Department, the School District of Philadelphia, the Philadelphia Energy Authority, UC Green, and more in the summer semesters. Twelve Civic Sustainability Fellows have been hired since FY20.
Improve the Climate Literacy of Penn Students	Develop a climate literacy assessment of Penn's undergraduate student body and recommendations to strengthen climate change education across the curriculum.	A Climate Change Survey was issued to the Penn community in fall 2023, garnering nearly 1,500 responses. 86% of respondents somewhat or strongly agreed that they feel a personal sense of responsibility to help mitigate climate change, and 92% of respondents indicated that it was important to them that Penn prioritizes sustainability and climate action in its day-to-day operations.
Expand tracking and reporting of student enrollment in sustainability-related majors, minors, and concentrations	Document students in sustainability-related majors, minors, and concentrations.	<p>Penn offers over 37 degrees, concentrations, and certificates related to the environment across several Schools.</p> <p>5,112 students enrolled in environment-related courses in the 2023-2024 academic year. Of these courses, 1,796 students participated in sustainability-focused courses, and 3,316 students participated in sustainability-inclusive courses, as determined by the Association for the Advancement of Sustainability in Higher Education (AASHE).</p>



GOALS	STRATEGIES	FY20 - FY24 PROGRESS
<p>Improve opportunities for a cohesive sustainability education at Penn</p>	<p>Improve opportunities for a cohesive sustainability undergraduate education by identifying course sequencing and essential early-curricular courses.</p>	<p>The Environmental Innovations Initiative led efforts to enhance and expand education connected to sustainability, climate change, energy, and the environment across Penn, including at the undergraduate level. The Initiative expanded a publicly available, searchable inventory of environment-related courses. Updated each semester to reflect current course offerings, the online tool enables users to sort courses by keywords, topics, academic units, and priority areas.</p> <p>The Initiative worked with faculty and staff across schools to establish the Climate and Health Education Working Group, with a mission to advance opportunities for integrated undergraduate education related to climate and sustainability, among other goals. An associated Canvas site offers educators at Penn trusted resources to support their teaching related to climate; more teaching resources are in the works.</p> <p>The Initiative's leadership developed a new introductory-level course, <i>Humans and the Earth System</i>, available to all undergraduates, which provides a grounding in the science, impacts, and solutions of climate change and other environmental challenges.</p>



Penn's Freezer Challenge 2021 participants working at their bench.



UTILITIES AND OPERATIONS

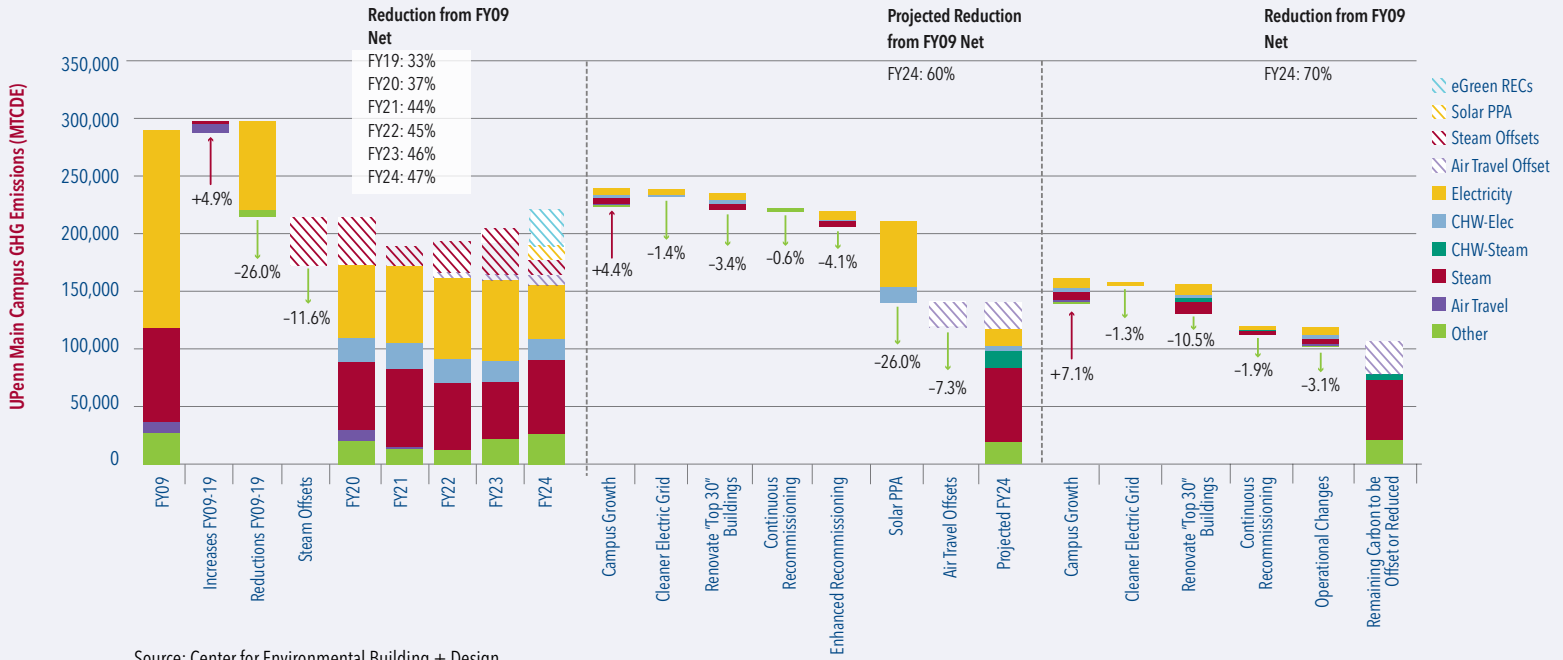
MISSION

To reduce campus carbon emissions and the costs associated with maintaining campus operations by:

- Adopting best practices in energy conservation through design, operation, and maintenance of both building infrastructure and district energy systems
- Exploring and adopting best practices for campus energy procurement



CARBON REDUCTIONS & NEUTRALITY PROJECTIONS 2009-2042



Source: Center for Environmental Building + Design



TOWARD AN EQUITABLE FUTURE

Establishing and implementing a shadow price for carbon can encourage more responsible and climate-conscious procurement and decision-making in construction, renovation, and Energy Conservation Measures (ECM) projects. In 2024, the ESAC Utilities & Operations Subcommittee, with assistance from FRES Design & Construction, completed a carbon shadow pricing pilot study, intended to inform a process that will eventually be more widely applied to Penn projects. This pilot is a first step to further prioritizing the carbon emissions profiles of different project options, allowing Penn to more accurately consider social and environmental costs in its decision-making.

A carbon shadow price is not ultimately charged, but can be an effective tool in making life-cycle cost projections and better reflect the social and environmental benefits of building projects that reduce carbon. With this in mind, the Subcommittee selected a renovation project at Claire M. Fagin Hall to complete the pilot study. The group focused its attention on a planned replacement of incandescent bulbs with LED bulbs that is forecasted to lessen carbon emissions. The social cost of carbon close to the \$190/MTCDE recently recommended by the EPA was used to estimate costs and emissions over a 20-year period. Utilizing a life-cycle costing calculator initially developed at Harvard and modified for Penn projects demonstrated modest cost and carbon savings should the LED option be pursued.

The results proved that applying a carbon shadow price can reasonably aid project management decision-making in at least some cases. In the CSAP 4.0 term, the Utilities & Operations Subcommittee will apply what was learned during the pilot study to officially establish an internal shadow price for carbon and determine how to widely implement standardized life-cycle cost projections.



GOALS	STRATEGIES	FY20 - FY24 PROGRESS
<p>Reduce Penn's overall carbon footprint toward 2042 carbon neutrality goal</p>	<p>Investigate a renewable Power Purchase Agreement to reduce Penn's emissions from electricity.</p>	<p>Penn has moved one step closer toward its goal of 100% carbon neutrality on campus by 2042 with the operation of Great Cove I and II – two solar facilities constructed in central Pennsylvania as a result of Penn's power purchase agreement (PPA). As both facilities now begin to produce power, the project will produce the equivalent of approximately 70% of the total electricity demand of Penn and the University of Pennsylvania Health System in the Greater Philadelphia area from renewable sources.</p>
	<p>Study options to mitigate emission from campus steam consumption, including low-carbon steam, alternative heating solutions, and viable offsets.</p>	<p>Penn purchased carbon offsets accounting for 156,869 MTCDE of steam emissions in FY20 – FY24.</p> <p>Penn developed carbon offset guidelines to ensure that investments in carbon offsets result in real GHG reductions and that carbon offset projects add value to their education, research, and service missions while helping to create a healthy, just, and sustainable society.</p>
	<p>Expand School and Center awareness and training sessions through energy data awareness programs and the expansion Energy Dashboards for Facilities and Real Estate Services (FRES) Operations & Maintenance and School and Centers.</p>	<p>School and Center Sustainability Coordinators have been trained in how to utilize Qlikview to better understand energy consumption patterns. Usage data is updated monthly and is delivered in a platform providing powerful data visualization and benchmarking opportunities.</p>
	<p>Identify and implement approved energy and carbon reducing measures as part of the Enhanced Recommissioning Program.</p>	<p>Issues that were identified during 45 recommissioning investigations saved an estimated 79,153 MMBtu.</p> <p>In total, there have been 11 enhanced recommissioning investigations and reports.</p>
	<p>Leverage SCADA capabilities to transition toward a continuous recommissioning Operations & Maintenance process.</p>	<p>Controls engineers updated building controls, one building at a time, with the goal of standardizing the nomenclature and graphics for building equipment. By standardizing these elements, it will open the opportunity to employing standardized algorithms in the future, which are the basis for continuous commissioning and improve efficiency and building function.</p>
	<p>Optimize maintenance activities to improve energy efficiency through proactive maintenance.</p>	<p>Operations & Maintenance developed a three-pronged approach of identifying and addressing deferred maintenance, reducing backlogged maintenance service calls, and optimizing practice of proactive maintenance. This strategy was implemented successfully at the Perelman School of Medicine and is being expanded to additional campus research buildings.</p>
	<p>Work with academic Centers to determine an internal cost of carbon and incorporate into capital planning.</p>	<p>The ESAC Utilities and Operations Subcommittee studied the feasibility of implementing carbon pricing at Penn. The group executed a pilot exercise using a planned renovation in Claire M. Fagin Hall to determine whether the University should adopt a shadow price and apply a cost per carbon emission to investment or purchasing decisions. The group studied similar initiatives at other institutions to determine a best course for adoption at Penn.</p>



PHYSICAL ENVIRONMENT

MISSION

- Create, maintain, and continuously improve a sustainable campus by increasing ecologically managed green space, reducing building energy consumption, and expanding awareness of sustainable design



TOWARD AN EQUITABLE FUTURE

Pick the right spring afternoon to walk through Penn Park and you'll quickly notice a transformation of the parking lot at the north end. An entire row of cars is temporarily cleared out and, in their place, stand over 100 young trees and a dozen Penn staff members, ready to find those trees their new homes.

The cause for such a scene is Creating Canopy, the annual distribution of free yard trees to staff and faculty of the University of Pennsylvania and the University of Pennsylvania Hospital System who are residents of the Greater Philadelphia area. Members of the Penn community arrive by car (a few by scooter or bike) and are aided by staff from the Office of the University Architect and Morris Arboretum & Gardens, among others, to load their new trees into their vehicle and secure them for the ride home.

Despite not holding the giveaway in FY20 due to the COVID-19 pandemic, 500 trees were given away in the CSAP 3.0 term, including 150 in 2024. Fifteen unique species were offered at the 2024 event, with young trees ranging from two to nine feet tall.

Trees provide many critical benefits in urban areas including stormwater management, wildlife habitat, carbon sequestration, and temperature regulation. By providing Penn and UPHS staff and faculty with trees, Penn not only helps employees improve their own yards, but offers an opportunity to improve conditions for those employees' fellow community members. TreePhilly, a program of Philadelphia Parks & Recreation, serves as a partner of Creating Canopy as they continue their pursuit of 30% tree canopy coverage in every Philadelphia neighborhood. Their staff, along with staff from the Morris Arboretum & Gardens, provide guidance to those picking up trees about how to plant and care for the new additions to their yards.



Penn staff member picking up a cucumber magnolia tree at Creating Canopy 2024.



GOALS	STRATEGIES	FY20 - FY24 PROGRESS
Update Campus Design Standards	Review and revise as needed Penn’s engineering and design guidelines.	<p>The Office of the University Architect, with assistance from Design and Construction, revised Penn’s Green Guidelines, now titled the Sustainable Guidelines for Renovation.</p> <p>To date, there are 51 LEED projects certified by US Green Building Council (USGBC), with an additional 7 under construction and 4 in design. Of the 51, 39 are Penn campus School/Center projects; 9 are Real Estate managed and/or off-campus projects; 3 are Penn Health System projects.</p>
	Review and revise Penn’s non-LEED project Sustainable Building and Renovation Guidelines.	<p>Rewritten renovation guidelines for non-LEED projects, the <i>Sustainable Guidelines for Renovation</i>, were reviewed and revised with plans to integrate into instructions for issue to design professionals.</p>
Improve Penn’s Landscape Ecology Practices	Identify priority areas within the Ecological Landscape Stewardship Plan (ELSP).	<p>Penn’s Ecological Landscape Stewardship Plan (ELSP) recommendations were implemented throughout the CSAP 3.0 term. Out of 29 recommendations, 11 are complete, 2 are incomplete, and 16 are ongoing.</p> <p>Penn’s campus in West Philadelphia was given renewed accreditation as a Level II arboretum by the ArbNet Arboretum Accreditation Program.</p>
	Reduce the number of bird strikes on campus.	<p>Penn’s Bird-Friendly Guidelines were published in spring of 2021, which seek to incorporate design strategies that reduce bird collisions with new buildings and where large areas of exterior glazing are replaced in renovated buildings.</p> <p>A Student Eco-Rep group working with Facilities & Real Estate Services and Penn Medicine designed outreach programs to promote bird-friendly practices on Penn’s campus. The group recruited 22 Real Estate buildings, 14 College Houses and one Penn building to participate in the Lights Out program, encouraging lights to be turned off at night. When we followed up in spring 2024, all 37 partners verified commitment to the program and are actively participating.</p> <p>Penn launched an interactive map of bird-friendly buildings (sustainability.upenn.edu/bird-friendly-buildings) and now features 10 buildings with bird-friendly glass.</p>



Ringe Squash Center features bird-friendly glass to reduce bird strikes as part of Penn’s bird-friendly efforts.



GOALS	STRATEGIES	FY20 - FY24 PROGRESS
<p>Continue to improve the sustainability of Penn's Real Estate holdings</p>	<p>Emphasize Penn's commitment to sustainability and work with landlords to integrate sustainability-related policies.</p>	<p>Following a survey of over forty property managers of buildings in the real estate portfolio, Penn Sustainability authored the University's first Real Estate Building Sustainability Report. Included are an assessment of current sustainability practices and recommendations to lower the carbon footprint of off-campus apartment buildings, fraternity and sorority housing, office and retail spaces, and Pennovation Works.</p>
	<p>Integrate green leasing policies for Penn-owned retail and commercial tenants and encourage sustainability-related policies.</p>	<p>Penn's Real Estate team now sends its revised Tenant Handbook, which includes sustainability practices that promote sustainability in leases, to all new tenants.</p>
	<p>Continue to track energy use and develop metrics to quantify the impact across the Penn Real Estate portfolio.</p>	<p>Penn Sustainability worked with the Center for Environmental Building + Design (CEBD) and Real Estate to complete the first Real Estate carbon footprint. Emissions figures are now updated annually.</p>
<p>Expand Penn's carbon footprint geography to include Morris Arboretum & Gardens and New Bolton Center (NBC)</p>	<p>Expand Penn's carbon footprint to include Morris Arboretum & Gardens and New Bolton Center.</p>	<p>CEBD and Penn Sustainability completed the first carbon footprints for the New Bolton Center and Morris Arboretum & Gardens, satellite properties within 40 miles of Penn's West Philadelphia campus. Emissions figures are now updated annually.</p>
<p>Integrate best practices in occupant health and wellness to Penn's building standards</p>	<p>Assess opportunities for implementation of wellness criteria in new construction and major renovations.</p>	<p>Using suggestions from a working group of building experts, the Physical Environment Subcommittee explored how to embed WELL building standard practices in Penn's building design guidelines.</p>



Touring Morris Arboretum & Gardens in Northwest Philadelphia



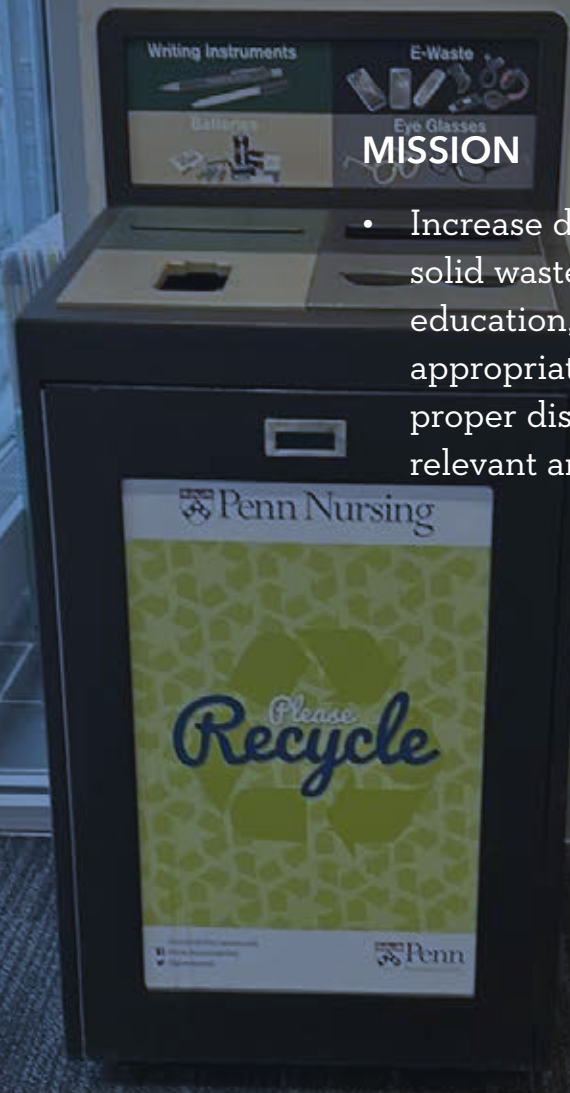
GOALS	STRATEGIES	FY20 - FY24 PROGRESS
<p>Improve water use and management on campus</p>	<p>Minimize potable water use through irrigation and fixture efficiency.</p>	<p>Penn's campus water footprint was calculated by Student Eco-Reps, in collaboration with The Water Center at Penn.</p> <p>Penn continues to add native and drought tolerant plants to its landscapes, helping reduce irrigation volumes after plant establishment.</p>
	<p>Improve stormwater management.</p>	<p>A stormwater working group was formed to assess Penn's stormwater management and develop recommendations for improving stormwater management at Penn. Completed recommendations include a comprehensive maintenance and tracking process for stormwater assets and developing a publicly available map of campus stormwater projects.</p>
<p>Improve Penn's Preparedness, Resiliency, and Adaptation to Climate Change</p>	<p>Aggregate information to combine resiliency, adaptation, and mission continuity.</p>	<p>Penn Sustainability assessed current data resources and gaps, researched related efforts and best practices, and identified stakeholders to engage as an initial step toward climate resiliency planning and shared this climate resiliency report with Penn leadership.</p> <p>The FY23 Mission Continuity exercise was with a hurricane table-top exercise for all of Penn.</p> <p>A Mission Continuity resiliency group was formed with representation across Penn to explore resiliency topics and preparedness at Penn.</p>



Amy Gutmann Hall, completed in 2024, is Philadelphia's tallest new mass timber building, with a cutting-edge system that significantly reduces the building's carbon footprint – by 52% relative to concrete, and 41% relative to steel.

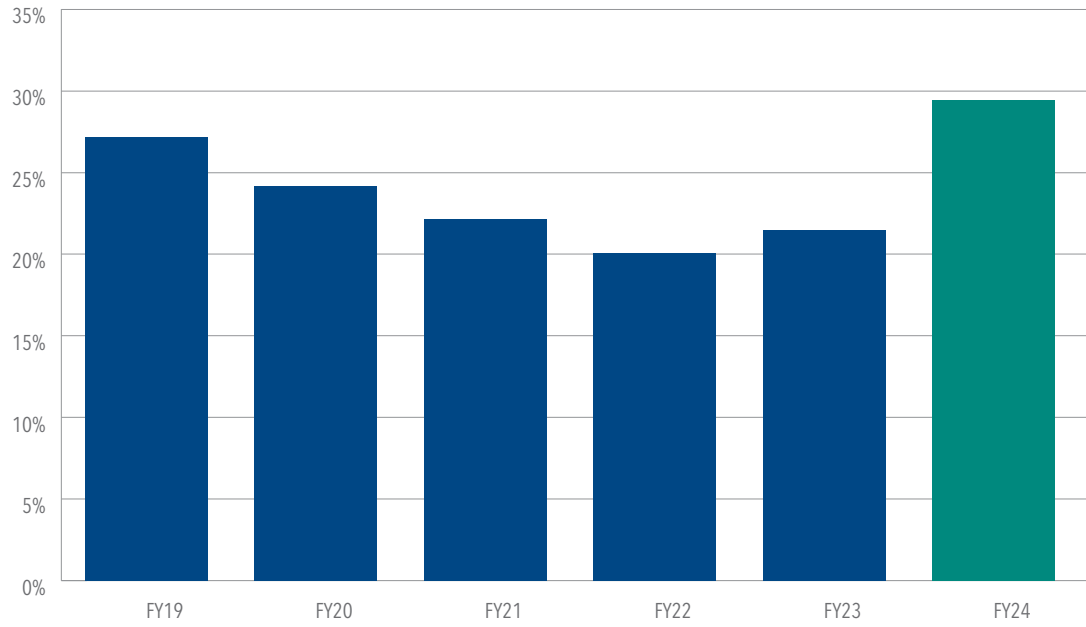
STRATEGIC WASTE

- Increase diversion and minimize solid waste through community education, strategic purchasing, appropriate infrastructure, and proper disposal, strengthened by relevant and accurate metrics

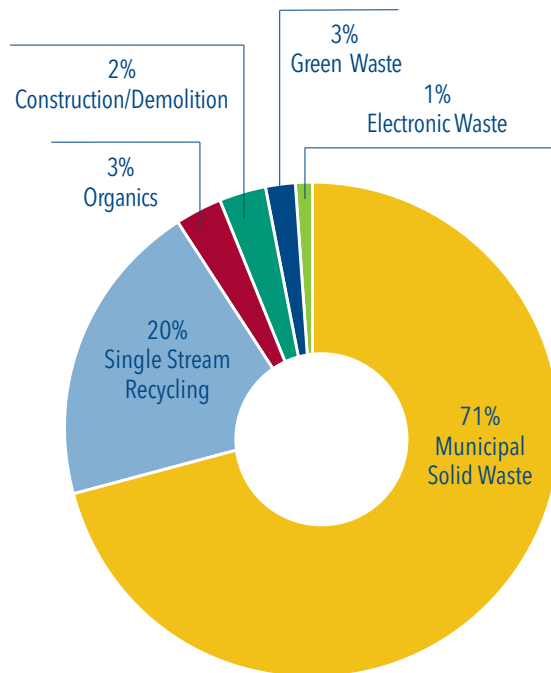




FY24 | Annual Percentage of Waste Diverted from Landfills or Waste-to-Energy Incineration



FY24 | Waste Breakdown





TOWARD AN EQUITABLE FUTURE

As Penn strives to be an excellent Philadelphia neighbor in accordance with the In Principle & Practice strategic framework, a heightened awareness arose in the CSAP 3.0 term about providing outlets for off-campus students to donate and dispose of unwanted belongings when they depart for the summer. In response, Penn Sustainability partnered with Penn's Office of Social Equity & Community and the Office of Government & Community Affairs to expand these opportunities. Following a pilot effort in 2023, the groups collaborated in 2024 on three strategic initiatives:

- Curbside Bulk Trash Removal - Coordination with the Philadelphia Streets Department and University City District allowed for three weekly bulk trash collections in the neighborhoods surrounding Penn during May. University City District reported a more than tenfold decrease in emails to their office about neighborhood waste.
- Donation Center at Resurrection Church - For three weekends during May, students brought kitchen items, small furniture, household items, bikes, clothing, and non-perishable food. Much of the clothing donated was given to a drop-in center for women in Kensington, while household items were set aside for Penn international students to use the following autumn.
- Curbside Furniture Drive - Penn for Refugee Empowerment aided in dispatching two trucks to collect furniture for the Philadelphia Furniture Bank. The effort yielded one full truck and another half-full truck with items from thirteen participating student houses.

Expanding off-campus move-out programming proved to benefit a wide array of stakeholders. Participating groups were delighted that good materials remained in the community and items were collected quickly, minimizing litter and sidewalk issues. The University plans to continue its efforts around surplus property in the coming years, as well as making West Philadelphians' streets cleaner and greener.



Student volunteers help recycle materials during Penn's Move-In each fall.



GOALS	STRATEGIES	FY20 - FY24 PROGRESS
<p>Increase Penn's Overall Waste Diversion and Minimize Waste Sent to Landfill</p>	<p>Improve waste data tracking and reporting.</p>	<p>Penn Sustainability, in partnership with Urban Park and Penn Housekeeping, created a waste precinct map to identify buildings that dispose of their waste in the same location. The waste precinct map is used to provide waste disposal data at the building or multi-building scale so that Building Administrators can better understand their waste footprint.</p>
	<p>Evaluate and improve campus waste practices, recycling, and all diversion streams.</p>	<p>A truck with a scale was purchased and Urban Park staff were trained on data collection. This allows Penn to have more granular data from open-top trash and recycling dumpsters that had previously only been measured as a whole.</p>
		<p>Penn Sustainability published an updated map of water bottle refill stations, illustrating the 324 campus locations where water bottles can be filled for free.</p>
		<p>For the first time in its century-long history, Hey Day 2023 was a zero-waste event. Penn Sustainability, Penn Dining, Urban Park, and Student Eco-Reps collaborated to source compostable food packaging and provide onsite waste diversion direction to participating students.</p>
		<p>The University diversion rate was 29% in FY24, up from 24% in FY20.</p>
	<p>A total of 318 tons were composted from FY20 - FY24.</p>	
<p>Strengthen education, training, and transparency.</p>	<p>The Green Living Survey was utilized to assess interest and capacity for adopting waste minimization behaviors on campus. Results were used to create Compost 101 trainings.</p> <p>Move-in Green volunteers provided education and training for students arriving to Penn on how to properly recycle at Penn, and tabled at the New Student Orientation Expo to further educate Penn students on how to recycle. All students residing on campus received a magnet with instructions on how to recycle at Penn.</p>	



<p>Increase Penn's Overall Waste Diversion and Minimize Waste Sent to Landfill</p>	<p>Expand the University's Surplus Property Program.</p>	<p>Recognizing the responsibility of Penn to be a good neighbor in our West Philadelphia community, a partnership was formed in 2024 among Penn Sustainability, Penn's Office of Social Equity and Community, the Office of Government and Community Affairs, and several student groups to provide off-campus students with means and opportunity to dispose of their unwanted belongings. The coalition created a three-pronged process for off-campus moveout including a multi-day collection site at nearby Resurrection Church, increased trash pickups (3x/week), and rounds made from Philadelphia Furniture Bank collection trucks.</p>
<p>Support Regional Waste Goals</p>	<p>Support the City's 2035 Zero Waste Goal.</p>	<p>Penn continues to serve as a member of the City of Philadelphia's Zero Waste Partnership Program, committing to work closely with the City to reach its goal of zero waste and litter by 2035. Involvement in the program includes providing monthly waste data to the City.</p>



Off Campus Move-Out: Penn Sustainability and the Office of Social Equity & Community collaborated with the Philadelphia Furniture Bank in May 2024 to repurpose one and half trucks worth of unwanted furniture from Penn students moving out for the summer.

PROCUREMENT

MISSION

- Increase awareness and enable the procurement of environmentally responsible products and options
- Engage with suppliers and campus partners to reduce waste; and to identify and promote sustainable supply chains

Office DEPOT®

envirocopy® 30 paper

30% recycled white

500
sheets

20
pound

92
brightness*

8.5" x 14"

(21.6cm x 35.6cm • 75g/m²)

standard



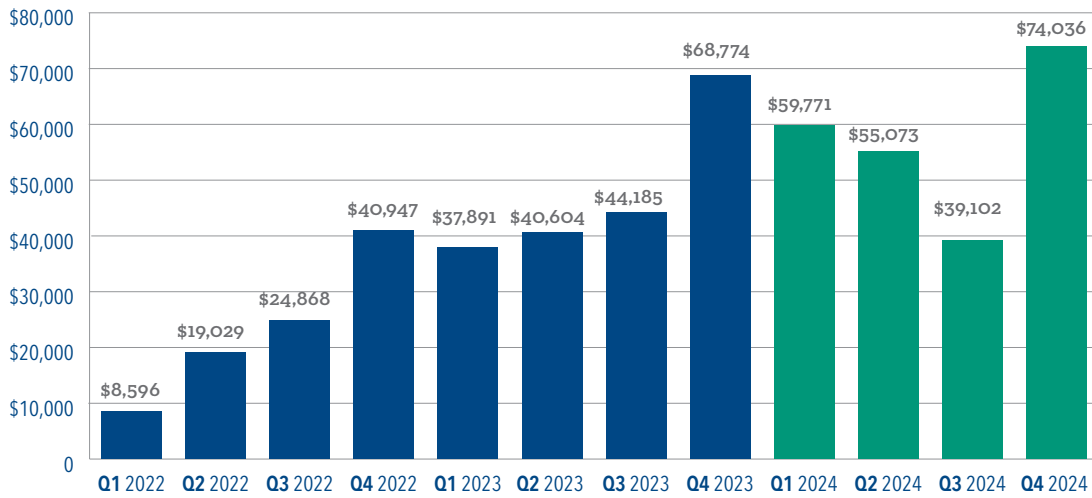
A product with a green story to tell

Go greener and get organized. For keeping files and drawers organized, there is nothing better than a quality hanging folder. And these folders are not just green in color, they're made with 100% recycled paper. By using recycled materials in manufacturing, less energy and water are used. And they are recyclable too, so they can be recycled again and again to come back once more as another green product.

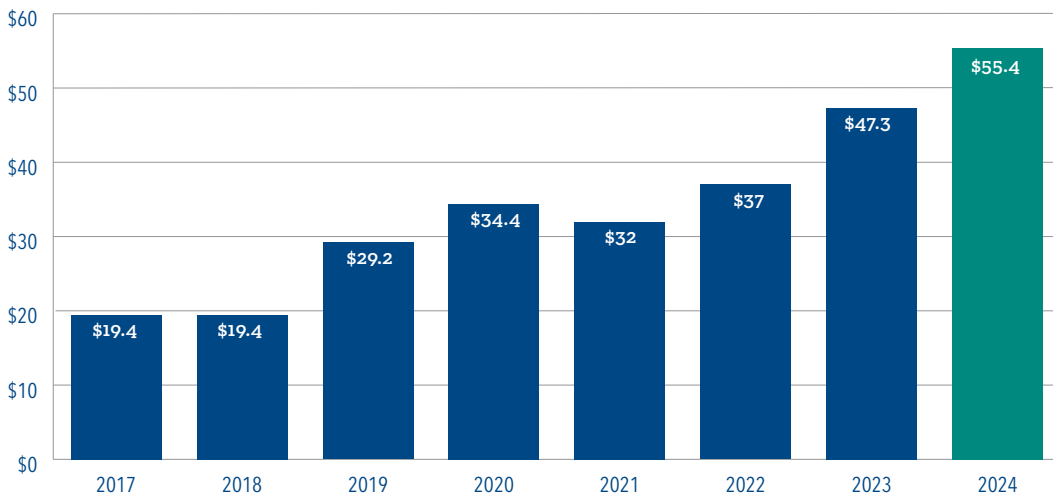
eco-co
paper made
recycled



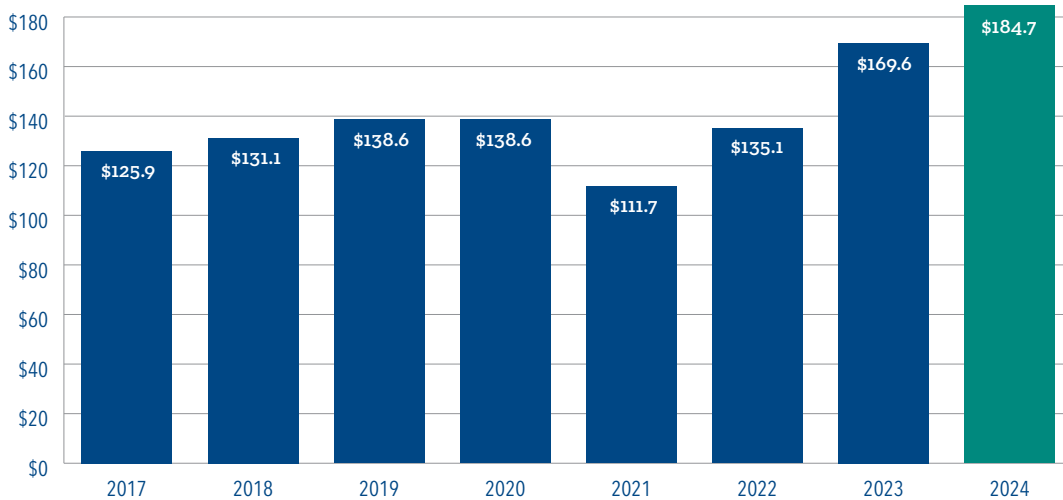
FY24 | Collected CLIO Amounts by Fiscal Quarter



FY24 | Black-Owned Business Spend (millions)



FY24 | Diversity Spend (millions)



Source: Penn Procurement Services



TOWARD AN EQUITABLE FUTURE

In 2023, ESAC Procurement Subcommittee Co-chairs Mark Mills and Colleen Reardon helped establish a new Electric Vehicle Procurement Working Group to facilitate Penn's acquisition of zero-emission vehicles and charging infrastructure. Replacing the campus's internal combustion engine vehicles with zero-emission alternatives is not only essential to achieving Penn's goal of carbon neutrality by 2042, but will have a positive impact on local air quality. Yale Climate Connections estimates that driving an EV in Pennsylvania reduces CO₂ pollution by 67% compared to gasoline, while the national average is 66%.¹

In less than eighteen months since the group first convened, the team has made progress on several fleet electrification initiatives. A meeting of fleet managers on Earth Day 2024 provided a forum for vehicle procurement decision-makers to exchange ideas about future EV purchases. The working group has also engaged with the central group leading Penn's activity related to the Inflation Reduction Act (IRA), determining which recent vehicle acquisitions are available for EV credits and developing strategy for securing future IRA funding. Recent inventories of campus vehicles and their parking locations, as well as updates of Low Emissions Vehicle Purchasing Guidance and a Vehicle Replacement Guide, have also been completed with assistance from the EV Procurement Working Group.

The group will continue its work in the CSAP 4.0 term, developing central sourcing expertise, providing outlets for stakeholders to share ideas, and providing further guidance to fleet managers and University leadership. The team has laid a foundation not only to support University initiatives such as a lowering Penn's carbon footprint and reducing fuel costs, but also to support the surrounding community with cleaner air and potentially expanded access to EV charging.

¹ <https://yaleclimateconnections.org/2023/09/electric-vehicles-reduce-carbon-pollution-in-all-u-s-states/>



GOALS	STRATEGIES	FY20 - FY24 PROGRESS
Increase Procurement of Sustainable Food Products	Increase procurement of sustainable food in Penn Dining Cafes.	Bon Appetit's Farm to Fork spending at Penn increased by 57% from FY22 to FY23. Farm to Fork is Bon Appetit Management Company's purchasing program that tasks chefs to spend at least 20% of their annual food budgets purchases from enrolled vendors.
	Improve catering practices on campus.	Penn Procurement Services' new catering website "Catering@Penn," includes details about sustainable services and products offered by vendors , as well as business ownership information and whether the supplier is local.
Encourage purchasing of low- or zero-emissions vehicles	Encourage purchasing of low- or zero-emissions vehicles.	<p>A Low Emissions Vehicle Purchasing Guide was created and published on Penn Sustainability's website. The guide provides recommended vehicles, resources on funding, and information on charging infrastructure.</p> <p>An Electric Vehicle Procurement Working Group was established, focusing on University goalsetting, EV sourcing guidance.</p>
	Expand campus fleet tracking.	PSO has been able to expand fleet tracking through strategic outreach to asset managers and information provided by the Office of Risk Management. Penn currently has 40 electric vehicles, three gasoline-electric hybrid vehicles, and nine vehicles fueled by a biodiesel blend fuel.
	Establish a plan to reduce Penn's carbon emissions from air travel.	<p>The Climate Impact Offset (Clio) fee charged to support offsetting air travel emissions was established in FY22 and has been deployed for three full years. \$227,982 was collected in FY24 to be invested in verified carbon offsets.</p> <p>Carbon Offset Purchasing Guidelines were created to steer the project selection process.</p>



Penn Dining launched a carbon footprint food campaign to promote their sustainable food options.



GOALS	STRATEGIES	FY20 - FY24 PROGRESS
Expand Sustainable Office Equipment Purchases, Options, Standards, and Technology	Expand use of auto-replacements.	Auto-replacements were identified and put into production where possible with Penn's office supplies provider. Where auto-replacement technology was not available, Penn Procurement worked with companies such as Fisher Scientific and CDW-G to place sustainability markers on their catalog offerings and use other methods such as pop ups to prioritize sustainable products in Penn's online marketplace.
	Expand use of Managed Print Services to all Schools.	All schools and 30 centers are currently using some form of Managed Print Services. New schools adopting Managed Print Services from FY20 – FY24 include Navy ROTC, Institute of Contemporary Art, Government & Community Affairs, University Museum, Penn Innovation Center, Penn Biden Center, Wharton San Francisco, Greenfield Inter-cultural Center, Office of the Chaplain, Penn First Plus, Center for Advanced Judaic Studies, Social Policy and Practice, Gene Therapy, and Annenberg Public Policy.
	Establish Sustainable Furniture Standards for Healthy Interiors.	The Furniture Working Group developed the Sustainable Furniture Purchasing Guide , which was published in 2024. The guide provides an overview of sustainability attributes of furniture products and how they relate to health and environmental impacts. A Manufacturer Overview provides a general overview of adherence to certain sustainability characteristics by furniture manufacturers from whom Penn commonly purchases.
	Quantify and Communicate Penn's Supply Chain Impact.	Penn Sustainability & Penn Procurement completed Penn's initial Scope 3 analysis . The study uncovered the top five categories of Penn's Scope 3 emissions and is published on Penn Sustainability's website.



Penn Dining provides reusable Green2Go boxes to reduce food container waste.

A photograph of a campus street scene. In the foreground, three cyclists are riding on a green-painted bike lane. A white SARTA bus with the number 8468 is driving in the adjacent lane. The bus destination sign reads "40 CONSHOHOCKEN-CONVENT". In the background, a large "Penn" sign with the University of Pennsylvania crest is visible. The scene is set during the day with some shadows on the ground.

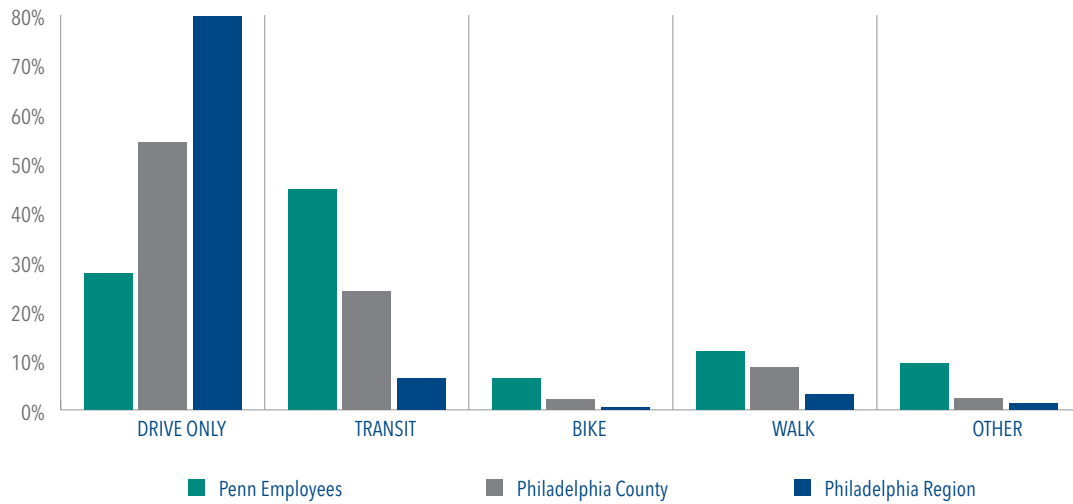
TRANSPORTATION

MISSION

- Continue to prioritize a pedestrian and bike-friendly campus
- Encourage the use of local, alternative, and low-carbon transportation options
- Promote pedestrian and cyclist safety on campus

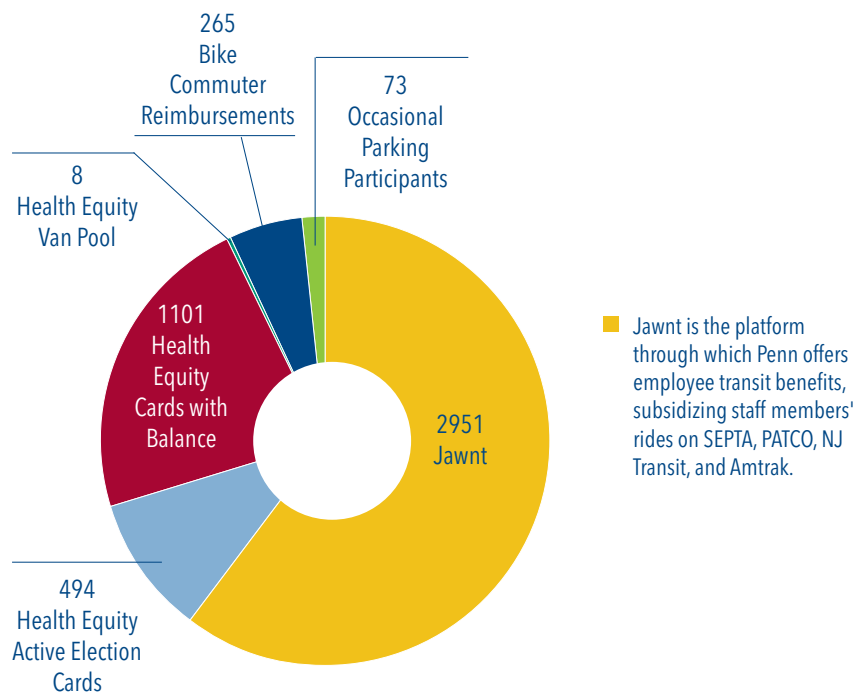


Penn Employees' Commute Mode Share Compared with Philadelphia County and Region



Source: PennPraxis Commuter Survey

FY24 | Commuter Benefit Program Participation



Source: Division of Business Services



TOWARD AN EQUITABLE FUTURE

Throughout the CSAP 3.0 term, the University demonstrated a commitment to improving its bicycle programs and supporting regional bicycle infrastructure. Several groups actively addressed bike-specific issues over the last five years, including the ESAC Transportation Subcommittee, Penn Bike Committee, and Penn Cycling. Penn's fostering of a bicycle-friendly environment provides numerous health and social benefits to Quakers and other Philadelphians.

Perhaps no other event celebrated the University's commitment to bicycling than the Bicycle Coalition of Greater Philadelphia's annual Bike to Work Day. Penn served as the West Philadelphia host site, helping organize a lively fair for riders to visit on their morning commutes. Every May, two-wheeled crowds gathered in front of the Penn Museum, chatting with representatives from Penn offices, City agencies, and local nonprofits, before riding together to City Hall. In 2023 and 2024, the group ride was led by City Council Member Jamie Gauthier. These events served as a reminder that Penn plays an important role in helping Philadelphians get around the city safely, affordably, and with a reduced environmental impact.

The University continued to incentivize staff, faculty, and postdoctoral researchers to cycle to work with the Bike Commuter Reimbursement Program, with active participants growing to 265 in FY24. The program provides up to \$240 per participant annually for bike purchases, maintenance, improvements, accessories, parking costs, and safety gear. The increase in reimbursement filings, as well as results from the 2023 Commuter Survey showing the prevalence of bike commuting, illustrate the Penn community's preference for utilizing sustainable transportation modes.

Penn strengthened its partnership with Indego, Philadelphia's bike-share program, over the last five years, increasing the number of on-campus stations from four to six. This coincided with an impressive growth in the number of trips that start or end at one of the six stations on Penn's campus, peaking at 112,148 in FY24. Indego values accessibility in its system operations, providing discount passes to Pennsylvania ACCESS cardholders, and offering free Learn-to-Ride and Riding Basics classes for less experienced bikers.



GOALS	STRATEGIES	FY20 - FY24 PROGRESS
<p>A campus supported by an accessible, integrated multi-modal transportation system</p>	<p>Promote incentive programs for alternative transportation, integrate services with other transit providers, and influence local transportation systems.</p>	<p>72% of commuting trips made by Penn employees, on average, are by an alternative to single-occupancy vehicles, according to the 2023 Penn Commuter Survey.</p> <p>In 2023, Penn's Divisions of Business Services and Human Resources increased the discount provided to public transit commuters in order to provide more affordable commuting options and to encourage sustainable transit to and from campus. The new commuter discount is 50% off monthly SEPTA transit passes, Amtrak monthly passes, and PATCO. The maximum discount is \$105/month.</p> <p>Penn supports 12 EV charging stations at three campus locations.</p>
<p>Have an accessible and safe campus for bicyclists and pedestrians</p>	<p>Promote a pedestrian-friendly and safe campus in support of the City's Vision Zero efforts.</p>	<p>PennPraxis, Penn Sustainability, Business Services, and HR created and released a faculty and staff Commuter Survey. A summary report included recommendations for Penn to enable safe, affordable, and accessible transportation options.</p>
	<p>Enhance the University's bicycle policies and coordinate initiatives with the greater Philadelphia bike community.</p>	<p>During FY24, 112,148 Indego trips started and ended at six locations on or around campus, more than doubling the 53,662 trips in FY20. Stations at 34th & Chesnut and 34th & Spruce St were installed in FY20.</p> <p>Penn's Bike Commuter Reimbursement Program completed its sixth year of subsidizing Penn faculty and staff who commute by bike. This program grew in popularity in FY24, with 265 riders utilizing the benefits.</p> <p>Penn has supported and communicated about Bike to Work Day annually, including serving as an activity hub for West Philadelphia bike commuters.</p> <p>354 bike parking spots were installed from FY20-FY24.</p>
<p>Improved energy efficiency of parking and transportation facilities and fleet composition</p>	<p>Improve energy efficiency in parking facilities operations.</p>	<p>50% of Penn's parking garages have transitioned to LED lighting with the goal of fully transitioning to LED lighting by FY28. LED lighting upgrades have been completed for two parking garages, while remaining LED upgrades are planned for FY26-28 as current bulb use is exhausted.</p>
	<p>Transition Penn vehicles from high carbon to low carbon or renewable fuels.</p>	<p>Penn Transit purchased six Ford Transit EV Cargo vans retrofitted for passenger service, which are now operational on several campus routes. The vans reduce Penn's carbon footprint by 13.26 MTCDE annually per vehicle.</p> <p>A Low Emissions Vehicle Purchasing Guide was created and published on Penn Sustainability's website. The guide provides recommended vehicles, resources on funding, and information on charging infrastructure.</p>



OUTREACH AND ENGAGEMENT

MISSION

- Continue to highlight the urgency of global environmental concerns, while building a holistic on-campus culture of sustainability



TOWARD AN EQUITABLE FUTURE

Throughout the past five years, Earth Week and Climate Week have both provided vital opportunities for Penn students, staff, and faculty to engage their peers and the greater community around a wide array of sustainability-related subjects. Both event series served as outlets to educate, debate, celebrate, and raise awareness about environmental topics at global, national, regional, and local scales. While there are distinctions in how the spring Earth Week celebrations and fall Climate Week programming are organized, both were successful in engaging the campus, with plans to continue both into the CSAP 4.0 term.

From 2020 - 2024, Penn Schools, Centers, green teams, and student groups organized over 130 Earth Week events centered on themes such as environmental justice, climate action, and nature-based solutions. Notable programming included a concert and conversation with alums Talon Bazille and Angelo Matos, a Penn Engineering Green Team clean-up of Venice Island in Manayunk that removed over 10,000 pounds of trash, several e-waste and specialty recycling drives, and the annual GreenFest, featuring sustainability-minded groups from campus and greater Philadelphia. Starting in 2021, Penn Sustainability organized its first pan-University Earth Week series, overseeing the Earth Week Organizing Committee that determines each year’s theme, providing marketing support, and maintaining a central online event listing.

Number of Climate Week events and estimates on participants by year between FY20-FY24:

- 2020: 3,000 participants**
- 2021: 45 events and 2,400 participants**
- 2022: 33 events and 3,000 participants**
- 2023: 40 events and 2,200 participants**

Overall count of participants for Climate Week between FY2020-2024: 10,600 participants.



GOALS	STRATEGIES	FY20 - FY24 PROGRESS
Expand and Strengthen Existing Outreach Programs	Incorporate sustainability as a formal component of the Wellness at Penn Initiative.	Environmental wellness has been incorporated as a formal component of the Wellness at Penn Initiative. 2,166 members of the campus community participated in the 30x30 Challenge , which incentivizes time spent in nature throughout the month of April. Programming included Campus Recreation's Outdoor Bootcamp and Penn HR's Outdoor Wellness Walks.
	Strengthen the Green Labs Working Group, Green Living, and Green Office programs.	<p>Penn Sustainability and Environmental Health & Radiation Safety partnered to launch a formalized Green Labs program and full-time position to advance safe and sustainable lab practices at Penn. Key achievements include increased participation in the Penn Labs Freezer Challenge, Fume Hood sensor study, and Penn's first Ultra-low Temperature Freezer Inventory.</p> <p>1,081 students completed the Green Living program survey. All participants committed to practicing responsible recycling habits, turning off unused lights, turning off faucets and reporting leaks, and minimizing energy use.</p> <p>The Green Office+ pilot was launched in SEAS and FRES buildings to do in-depth monitoring of energy practices for improved understanding of efficiency opportunities. The Hybrid Green Office program was also created to support sustainable behavior in hybrid work environments.</p> <p>163 first-year students and 61 upper division undergraduates participated in the PennGreen pre-orientation program, receiving an engaging and fun introduction to Penn's and Philadelphia's sustainability programs.</p>
	Develop a comprehensive strategic communication plan for sustainability.	The Sustainability Marketing and Communications Plan that encompasses media relations, social media, partner promotions and events, website, advertising and collateral materials, photography, and videos continues to be implemented and updated as necessary.
	Launch a new sustainability website.	In FY24, Penn Sustainability launched a rebranded and reorganized Penn Sustainability website . The site features more resources, guides, videos, and a robust events calendar.
	Create a Green IT Working Group.	The ESAC Green IT Working Group was established in the fall of 2023. Members represent ten Penn Schools and Centers, and have identified goals to work on during the CSAP 4.0 term. The Working Group led a discussion at the 2024 Penn IT Staff Convention.



GOALS	STRATEGIES	FY20 - FY24 PROGRESS
	<p>Elevate visibility of sustainability as core priority for employee onboarding and new student orientation.</p>	<p>A Sustainability 101 Workday training was developed and published in FY24, with FRES and Residential Services staff incorporating this training into new employee onboarding.</p> <p>Sustainability info sheets and magnets with recycling information were created and included in welcome materials for all incoming first- and second-year students during New Student Orientations.</p> <p>Penn Sustainability trained Move-In Green ambassadors to educate first-year students about the University's recycling programs and sustainability initiatives during New Student Orientation.</p> <p>Student Eco-Reps developed sustainability trainings for dining staff on how to support sustainable waste practices. The trainings were given by Penn Dining and Penn Sustainability Office staff to all dining employees in 2022 and 2023.</p>
<p>Engage Penn's Leadership to Serve as Sustainability Change Agents</p>	<p>Partner with the Environmental Innovations Initiative to advocate climate action to Deans/Schools; support the creation of School-level climate statements for all Schools at Penn.</p>	<p>Launched during Climate Week at Penn 2022, each School at the University has now issued an Academic Climate Commitment, reflecting the role that all disciplines and professions play in advancing climate solutions.</p>



LOOKING FORWARD

The preceding reports demonstrate the remarkable progress made by Penn Sustainability and its many collaborators from FY20 - FY24. Throughout the *CSAP 3.0* term, the University reaffirmed its commitments to sustainability and climate action by establishing and expanding upon dozens of vital programs and projects in seven initiative areas.

Published simultaneously with this summary report is Penn's Climate & Sustainability Action Plan 4.0, which establishes goals for the next five years. Much of the work to be carried out over the next half decade is directly linked to the *CSAP 3.0* progress detailed here, and with ESAC subcommittees having developed new goals for each initiative area. Penn Sustainability continue to apprise of progress through regular reports, its website, and social media accounts.

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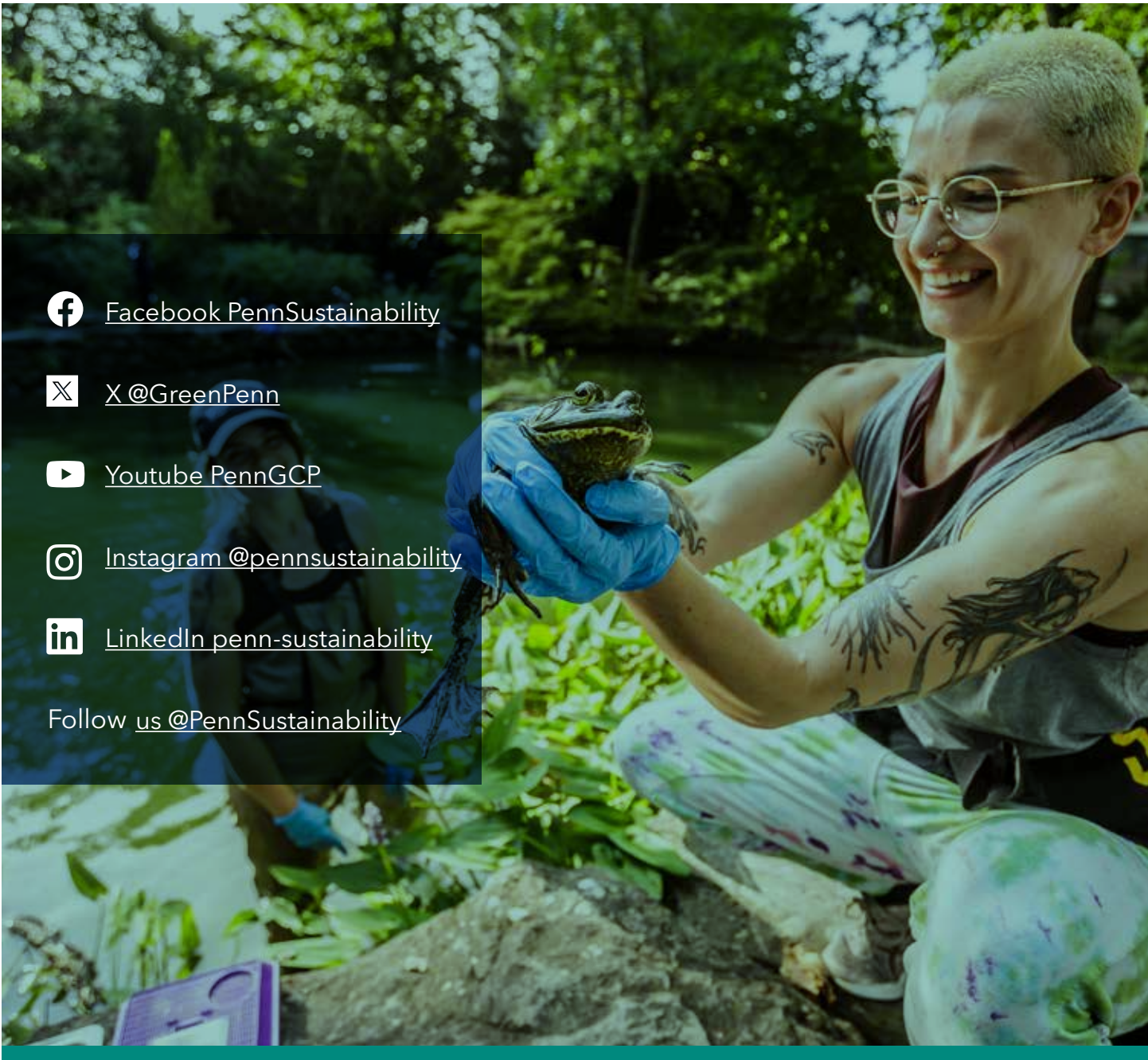
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