PRINCETON’S SIXTH ANNUAL REPORT ON SUSTAINABILITY DEMONSTRATES CONTINUED PROGRESS TOWARD AMBITIOUS GOALS through the University’s strengths in teaching, collaborative research and operational innovation. The University continues to expand the demonstration of principled pathways to sustainability leadership through rigorous inquiry and endeavors that use the campus as a living laboratory.
PATHWAYS TO LEADERSHIP
Princeton strives to ensure that students are equipped to meaningfully employ sustainability principles in their future endeavors, academically, professionally or personally.

JOIN A STUDENT GROUP
ENGAGE IN SERVICE
STUDY AND RESEARCH
TAKE ACTION EVERY DAY
EXPLORE CAMPUS AS A LAB

Photo credits clockwise starting with top left: Brian Wilson, Office of Communications; Dallas Nan ’16; Office of Communications; Office of Sustainability; Brian Wilson, Office of Communications.
RESEARCH & EDUCATION

GOAL
Cultivate leaders among students and engage researchers from multiple disciplines to advance global sustainability, using the campus as a living laboratory.

PROGRESS
• In 2014, 20 percent of graduating seniors representing at least 28 disciplines engaged academically in environmental studies and sustainability during their four years at Princeton.
• During the 2013-14 academic year, 99 undergraduates from 22 majors held environmentally-focused internships with Princeton faculty and external organizations, including assignments in 22 countries around the globe.
• New sustainability-related courses offered in 2013-14 included “Agriculture and Food Security,” “Climate Change and Extreme Weather in the Garden State,” and “Designing Sustainable Systems: Applying the Science of Sustainability to Address Global Change.”
• In summer 2014, the Office of the Dean of Research launched a “Campus as a Lab” innovation fund for faculty research in sustainability, energy and the environment.

WHAT’S NEXT
• Advance support for sustainability-related research fellowships, course-related fieldwork, internships and undergraduate research through various departments.
• Continue to define the role of sustainability in the existing University curriculum, both graduate and undergraduate, and explore how to develop a more cohesive curriculum around the environment and sustainability.
• Continue to develop support for faculty interested in using the campus as a laboratory and assure a venue for faculty and students to present their research and initiatives.
CAMPUS & CIVIC ENGAGEMENT

GOAL
Advance sustainability on campus and in the local and global communities through education and outreach, service and partnerships.

PROGRESS
• More than a dozen student groups are affiliated with GreenLeaders, a student council coordinated by the Office of Sustainability. Highlights include:
  - More than 500 people attended the seventh annual Earth Day Festival.
  - Greening Princeton and Building Services collaborated to launch a single-stream recycling pilot, which resulted in the decision to roll the program out across campus in 2014-15.
  - Students United for a Responsible Global Environment (SURGE) spearheaded the University’s first campus-wide residential college energy savings competition using a new app featuring live data. The winning residential college saved nearly 7,000 kWh and $1,617.
  - More than 30 EcoReps teamed up to enhance recycling at Housing move-out and at Reunions 2014 for the fifth consecutive year.
  - The Princeton Garden Project at Forbes College hosted gatherings throughout the year. One highlight was the annual autumn celebration featuring locally made pizza and ice cream made with the garden’s herbs and vegetables.
  - The Sustainable Fashion Initiative held its second annual Clothing Swap, during which nearly 100 Princeton students exchanged over 700 items.

High Meadows Fellow, Dana Miller ‘13 (left), worked with the Environmental Defense Fund to conduct training workshops with Indonesia’s National Council on Climate Change to help bolster the country’s capability to create for the United Nations an inventory of the country’s greenhouse gas emissions and the mitigation activities undertaken. (Photo courtesy of the Pace Center for Civic Engagement)
The Pace Center for Civic Engagement continued to engage students in social and environmental activism this past year. Highlights include:

- Engaging more than 200 students in public service through Community Action, a freshman orientation program.
- Advising weekly Student Volunteers Council service projects and Breakout Princeton alternative break trips, including an international “Solar Sustainable Service” trip to a remote village in Peru.
- Supporting a variety of independent student organizations dedicated to promoting environmental awareness on campus and beyond.
- More than 30 Princeton-area middle school students learned about renewable energy as part of the Community House STEM Summer Camp.
- Six Princeton Internships in Civic Service (PICS) interns worked with nonprofits and alumni this past summer in the areas of energy and the environment.
- 12 High Meadows fellows are currently working for environmental nonprofit organizations across the nation.

Princeton’s director of sustainability serves on the Board of Sustainable Princeton, which works collaboratively to reduce environmental impact in the community.

Fifteen additional staff members joined the Sustainability Ambassador educational program, which now has representatives from more than 35 campus offices or departments.

The Office of Sustainability collaborates extensively with the New Jersey Higher Education Partnership for Sustainability to offer state-wide programming.

Princeton participated actively in the first Ivy+ Sustainability Consortium strategic planning process.

WHAT’S NEXT

- Increase student involvement in shifting toward a more sustainability-infused campus culture.
- Identify new opportunities to employ meaningful service and civic engagement to advance the University’s commitment to sustainability.
- Investigate a range of employee incentive programs to encourage adoption of sustainable practices at work and at home.

Student EcoReps pose after the P-Rade, where they encouraged alumni to recycle. The students collected more than 60 large bags of recyclables during the P-Rade alone. (Photo courtesy of the Office of Sustainability)
ENERGY

GOAL
Reduce absolute campus greenhouse gas emissions to 1990 levels by 2020.

PROGRESS
• The University is on track to reduce CO₂ emissions to 1990 levels (95,000 metric tons) by 2020 by employing a variety of strategies identified. The extremely cold winter this past year contributed to a 9 percent increase in campus CO₂ emissions above the previous year.
• Princeton’s new 5.3-megawatt solar array went online in fall 2012. The system provided approximately 8 percent of campus electricity last year. Notably, a third party will claim the CO₂ reductions until the array is paid for, near 2020. At that time, Princeton will begin claiming reductions.
• Since the University’s Energy Master Plan was established in 2008, annual energy savings of approximately $5.7 million and annual CO₂ reductions of more than 25,000 metric tons have been realized or identified for implementation.

WHAT’S NEXT
• Re-evaluate long-term greenhouse gas reduction goals and assure alignment with leading research recommendations.
• Identify the remaining 5 percent of operational strategies needed to achieve the 2020 greenhouse gas reduction goal, and begin planning for post 2020 reductions.
• Assess how to track the impact of Princeton energy initiatives on and off campus.
• Re-evaluate Princeton’s internal CO₂ tax to maximize impact.
For Earth Day 2014, Energy Plant Facilities staff hosted tours of Princeton’s 5.3-megawatt solar field. The tours were attended by students, faculty and staff. (Photo courtesy of the Office of Sustainability)
BUILDINGS

GOAL
Maximize the potential of the built environment to stimulate transformational thinking and exceptional performance in sustainability.

PROGRESS
• Since 2008, 1.24 million square feet of new construction and major renovation projects have been built according to Princeton’s aggressive sustainability and energy conservation guidelines.
• Since 2010, more than 90 hours of sustainability-related continuing education courses were offered to more than 50 Facilities employees, 30 of whom are LEED® Accredited Professionals.
• The University continues to track toward its commitment to recycle 95 percent of construction and demolition debris for new and renovated buildings, including construction of the Arts and Transit Project (including the Lewis Center for the Arts), and 20 Washington Road.
• A geothermal heating and cooling system is being installed at the new Lakeside graduate housing community. Notably, the University selected the technology after applying its internal “carbon tax,” which is used when comparing major building systems that cost more upfront but result in economic and environmental benefits over time.

WHAT’S NEXT
• Continue to apply Life Cycle Cost Analysis and an internal “carbon tax” to justify efficient technologies that may have higher upfront costs but lower system lifetime costs and other environmental benefits.
• Evaluate educational and research potential of major and minor projects, where appropriate, such as the School of Architecture’s new sustainable design laboratory renovation project.
• The new Lewis Center for the Arts, due to be completed in 2017 as part of the Arts and Transit Project, will feature energy-efficient buildings, green roofs, geothermal heat pumps, daylighting controls and more.
• Begin to pursue third-party certification for new major construction and renovation projects, starting with the Lewis Center for the Arts and 20 Washington Road.
TRANSPORTATION

GOAL
Increase efficiency and reduce emissions associated with transportation, including reducing commuter car numbers by 750 (15 percent) between 2008 and 2020.

PROGRESS
- There are 520 fewer commuter cars on campus today compared to 2008 (an 11 percent reduction).
- 772 campus community members now participate in the Transportation Demand Management (TDM) program.
- The number of members participating in the campus Enterprise CarShare program increased by 12 percent to 758 in the last year.

WHAT’S NEXT
- Further develop TDM incentive programs, including proposing a subsidy for train station parking; increasing the number of preferred parking spaces for car and vanpool participants; and increasing carpool incentives.
- Evaluate infrastructure improvements to incentivize use of alternative fuel vehicles for commuters and alternative fuel options for the campus fleet.

The Transportation Demand Management Program provides a 50 percent subsidy toward monthly transit passes for commuters. Last year, over 200 faculty and staff members took advantage of this opportunity. (Photo by Denise Applewhite, Office of Communications)
FOOD

GOAL
Increase sustainable food purchases to 75 percent by 2015 and raise awareness about green dining.

PROGRESS
• The portion of sustainable food purchased was 60 percent last year, up from 36 percent in 2007 with 44 percent being produced within 250 miles of campus. This year is the first to include contracted campus dining operations in the inventory, which explains a modest decline in the share of sustainable food purchased overall compared to last year.
• Campus Dining has now identified the relative carbon footprint of 1,024 food items, an increase from 170 in 2012. Of the items, 785 are categorized as low-carbon, 112 are medium-carbon, and 127 are high-carbon. The data are available on the Campus Dining website and the Princeton Mobile app.
• Together with local schools and restaurants, Campus Dining celebrated national Food Day in October 2013 by serving nearly 100 gallons of locally grown butternut squash soup throughout campus.

WHAT’S NEXT
• Investigate the connection between food-related goals and regional sustainability drivers, such as water, soil and air quality.
• Research supplier sustainable practices to determine benefits associated with their social responsibility and environmental stewardship.
• Evaluate on-site or local food scraps conversion options.
The Whitman Courtyard was the site for Diner Inn Blanc on Wednesday, Oct. 9, 2013. About 700 members of the Community and University came together to dine on dishes prepared from local ingredients. (Photo by Michael Yoon, University Services)
PURCHASING

GOAL
Encourage sustainability in the supply chain and procurement of purchased goods and services.

PROGRESS
• In 2014, 92 percent of general-use office paper purchased was 100 percent post-consumer recycled, chlorine-free paper, up from 67 percent in 2008.
• About 55 percent by volume of chemical cleaners and soaps purchased were Green Seal™ certified, an increase from last year’s 52 percent.
• Since 2010, the use of “blue cleaning” equipment has expanded to include nine floor machines and 11 spray bottles. The devices clean with water instead of chemicals.
• Last year, the portion of remanufactured printer cartridges purchased increased to 51 percent from just 1 percent in 2009.

WHAT’S NEXT
• Expand default “green” purchasing processes for standard office supplies.
• Develop campus procurement standards for various classes of electric and low-emission vehicles.
• Host a Sustainable Purchasing Fair for the University community.
• Evaluate potential shifts in metrics that include human and environmental health impacts.

AMOUNT AND TYPE OF PAPER PURCHASES 2011-14

<table>
<thead>
<tr>
<th>Year</th>
<th>Paper type (% post-consumer recycled, chlorine-free paper)</th>
<th>Virgin (0%)</th>
<th>30%</th>
<th>50%</th>
<th>100%</th>
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<tbody>
<tr>
<td>2011</td>
<td>83% (162 tons)</td>
<td>3% (6 tons)</td>
<td>7%</td>
<td>2%</td>
<td>7%</td>
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<tr>
<td>2012</td>
<td>85% (155 tons)</td>
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<td>2%</td>
<td>7%</td>
<td>6%</td>
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<tr>
<td>2013</td>
<td>98% (169 tons)</td>
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<td>0.4%</td>
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<tr>
<td>2014</td>
<td>92% (167 tons)</td>
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<td></td>
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<td>0.6%</td>
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Paper type (% post-consumer recycled, chlorine-free paper)  ■ Virgin (0%)  ■ 30%  ■ 50%  ■ 100%
WASTE REDUCTION

GOAL
Reduce overall campus waste by 40 percent between 2006 and 2020.

PROGRESS
• Campus waste decreased by 4 percent per capita in the past year and 28 percent per capita since 2006. The recycling rate has increased to 43 percent from 38 percent in 2006.
• The University purchased about the same amount of paper per capita in 2014 as last year, and 82 fewer tons than 2008. Since 2009, when a student print quota was instituted, sheets printed in computer clusters and public libraries have declined by 31 percent, 7 percent of which occurred in the past year.
• Paper towel purchases have decreased 29 percent per capita since 2008 when hand towel dispensers were converted to non-electric proportioning versions.
• The total volume of cleaning chemicals purchased has decreased by 27 percent since 2010. However, this past year, the volume increased by 28 percent.
• Since 2006, nearly 6,127 campus researchers have been trained by Environmental Health and Safety staff to prevent laboratory pollution, significantly reducing the amount of chemical waste generated.

WHAT’S NEXT
• Roll out a mixed recycling program across campus in parallel with an educational campaign and new campus labeling system to increase recycling rates.
• Increase move-out donation options for items including clothing, food, toiletries, school supplies and books, and increase donation opportunities through the University’s Surplus Program.
• Determine long-term objectives for overall waste reduction on campus.

TOTAL WASTE INCLUDING RECYCLING PER CAPITA

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Waste (pounds per capita)</th>
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<tbody>
<tr>
<td>2006</td>
<td>842</td>
</tr>
<tr>
<td>2007</td>
<td>826</td>
</tr>
<tr>
<td>2008</td>
<td>820</td>
</tr>
<tr>
<td>2009</td>
<td>751</td>
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<td>2011</td>
<td>697</td>
</tr>
<tr>
<td>2012</td>
<td>628</td>
</tr>
<tr>
<td>2013</td>
<td>606</td>
</tr>
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</table>
In 2012, the turf on Bedford Field was replaced with a turf designed to hold water, resulting in a savings of 10,000 gallons per watering. (Photo by Christopher Lilija, Facilities Organization)

**WATER**

**GOAL**
Reduce overall campus water usage by 25 percent between 2006 and 2020.

**PROGRESS**
- Annual campus water usage remained about the same as last year and has declined by 21 percent — or 50 million gallons — since 2006.
- Residential hall water usage has dropped 25 percent, or nearly 14 million gallons, since 2006.
- Measures to reduce irrigation on athletic fields continue. Advancements include new turf installed in 2012 on Bedford Field with a backing designed to hold water, resulting in a water usage reduction from approximately 12,000 gallons to 2,000 gallons per watering (an 83 percent decrease).

**WHAT’S NEXT**
- Continue to evaluate the major water-using activities on campus and devise strategies for reduction.
- Encourage behavior-changing water conservation initiatives through student organizations.
- Track irrigation water usage on athletics fields.
- Align water conservation and management goals to address regional water concerns.
LANDSCAPE & STORMWATER MANAGEMENT

GOAL
Create a vibrant, sustainable landscape and manage stormwater events with a campus-wide ecosystem approach.

PROGRESS
• Since 2007, the campus had a net increase of approximately 2,370 trees. In total, nearly 12 acres of woodlands and five acres of open green space have been established over that same time period.
• Following the installation of the Butler College green roof in 2009, stormwater data indicates that the roofs demonstrate delayed runoff and an approximate 60 percent reduction in peak runoff for moderate rain events.
• Fertilizer use on campus, not including athletic fields, increased to 6 tons in 2013 from 4.5 tons in 2012 and 2.5 tons in 2008. The increase is largely due to weather, a greater number of outdoor events and campus expansion.
• Non-athletic pesticide use decreased to about 3,100 gallons from 2012 to 2013, and represents a nearly 40 percent decrease from 2007 levels.

WHAT’S NEXT
• Explore the development of a monitoring program in partnership with academic programs to test aspects of a variety of campus stormwater strategies.
• Study woodland planning and maintenance practices on campus and carry out an ecological assessment to inform future goal setting.
• Employ the Sustainable Sites initiative (SITES™) certification program, beginning with the Arts and Transit Project.
• Evaluate alternatives to synthetic fertilizers and track the use of fertilizers and pesticides on athletics fields.
• Assess the amount of pervious surfaces on campus to establish a baseline for future goal planning.

PESTICIDE USAGE YEARLY TOTAL

<table>
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<th>Gallons</th>
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</tr>
<tr>
<td>2008</td>
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<tr>
<td>2009</td>
<td>4,200</td>
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<tr>
<td>2010</td>
<td>1,600</td>
</tr>
<tr>
<td>2011</td>
<td>3,200</td>
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<tr>
<td>2012</td>
<td>3,600</td>
</tr>
<tr>
<td>2013</td>
<td>3,200</td>
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</table>
GREENLEADERS HOST EARTH DAY CELEBRATION

In April 2014, hundreds of students and other members of the Princeton community gathered to celebrate Earth Day at a picnic lunch hosted by the student GreenLeaders on Frist South Lawn. The picnic featured local and sustainable fare, and cupcakes made with naturally pigmented frosting in the shape of the new Office of Sustainability logo. Several student groups and performers entertained the crowd throughout the afternoon.

In summer 2014, the Office of the Dean for Research launched a “Campus as a Lab” innovation fund for faculty research. The initiative will support bold new ideas that involve the use of the campus as a laboratory for scientific, engineering, humanistic, artistic or social science research on sustainability, energy and the environment. The initiative is made possible through support from the Office of the Dean for Research, the Andlinger Center for Energy and the Environment, the High Meadows Foundation Sustainability Fund, the Princeton Environmental Institute, and the Office of the Dean of the College.

The Washington Road Stream, part of the campus watershed, will be studied with support from the new “Campus as a Lab” innovation fund established by the Office of the Dean for Research. (Photo by Christopher Lillja, Facilities Organization)