

2013 PROGRESS REPORT



Duke's  
Sustainability  
Strategic Plan

# Introduction



Waste audits of several Duke buildings in FY13 revealed that 88% of the material disposed of could be recycled or composted if comprehensive, robust programs existed. A pilot program is underway to expand access to composting and recycling. Data is currently being collected and is expected to show potential for significant waste reduction.

As Duke strives to be a truly sustainable institution, fiscal year 2013 (FY13) has been an exemplary year. The focus of the Campus Sustainability Committee (CSC), made up of students, faculty and staff, has been to assess the campus waste stream, test new programs and develop targets around overall waste reduction at Duke. Campus waste audits have shown that only 12% of the material in Duke's trash should have gone to the landfill. Pilot projects in the summer of 2013 have expanded waste reduction opportunities to capture this reusable material by moving to mixed recycling and post-consumer composting in several campus buildings.

Duke continues to implement the campus Climate Action Plan to reach carbon neutrality by 2024. The FY13 greenhouse gas inventory shows progress towards this goal with a 28% reduction of emissions compared to a 2007 baseline. Overall energy emissions have dropped 30%, while transportation emissions have proven harder to impact, increasing by 15% compared to the 2007 baseline. The Duke Carbon Offsets Initiative (DCOI) completed a 12-household energy efficiency pilot project whereby Duke employees received free energy-efficiency upgrades. Results indicate that low-cost, non-invasive energy efficiency measures have the potential to reduce home energy bills by an average 10-15%, the equivalent of about 1 metric ton carbon dioxide equivalent (MTCO<sub>2</sub>e) per year per household. Thanks to funding from The Duke Endowment, the DCOI will implement a 30-employee pilot in spring 2014 to test creative financing approaches for implementing energy-efficiency measures and capturing the offsets created to help meet Duke's internal goals.

To continue to meet institutional greenhouse gas reduction goals, Duke will be increasingly reliant on the campus community to make individual changes that will add up to larger campus reductions. This makes Duke's sustainability communication efforts even more vital. This spring Duke celebrated the first annual Sustainability Awards where staff, faculty and students were honored for personally contributing to campus sustainability efforts. Providing opportunities for individuals to increase their understanding of sustainability, change their behavior, measure their impact, and be recognized for this commitment can help the University meet its carbon neutrality goal and create a culture of conservation and responsibility.

## Duke Sustainability Ratings and Awards

- Princeton Review Green Rating 98/100
- Sustainability Tracking, Assessment and Rating System (STARS) Gold Rating
- Association of Physical Plant Administrators 2013 Sustainability Award
- Carolina Recycling Association's 2013 Outstanding College or University Program Award
- 2013 Tree Campus USA (5th consecutive year)
- 2012 NC Sustainable Energy Association's Award for Business Innovation (shared with Loyd Ray Farms project partners)
- 2013 American Council of Engineering Companies (ACEC)/NC Henry A. Stikes Grand Conceptor Award for Engineering Excellence (awarded to Cavanaugh & Associates for the Loyd Ray Farms system design)
- 2013 National ACEC Honor Award (awarded to Cavanaugh & Associates for the Loyd Ray Farms system design)

### Reporting Our Progress



**GREEN CFL**  
Met goals or on track  
to meet goals.



**YELLOW CFL**  
Making progress but  
could do better.



**RED CFL**  
Re-evaluating goals.

# Emissions & Carbon Offsets



Duke University has made significant progress towards its goal of carbon neutrality by 2024. Future emissions reductions will be increasingly dependent on individual behavior in areas of energy conservation, commuting and air travel.

\* Metric Tons Carbon Dioxide Equivalent

In 2007, Duke established a baseline of carbon emissions of 338,828 MTCO<sub>2</sub>e as part of the Climate Action Plan. If Duke continued business as usual from that time, the University's emissions were projected to more than double by 2050.

To achieve carbon neutrality by 2024, Duke is focusing on a combination of emission reduction efforts on campus and the development of local carbon offsets through the Duke Carbon Offsets Initiative (DCOI) to address its remaining emissions.

## Goals

- Aggressively pursue on-campus efforts to reach established milestones for emission reductions for carbon neutrality by 2024. Duke expects to be at 45% reduction on campus by 2024 and will fulfill the remainder of the emissions reduction with local offsets.
- Identify high-integrity local carbon offsets through partnerships, purchases, and the development of innovative projects in fulfillment of Duke's 2024 carbon neutrality commitment and current demand from the internal Duke community.

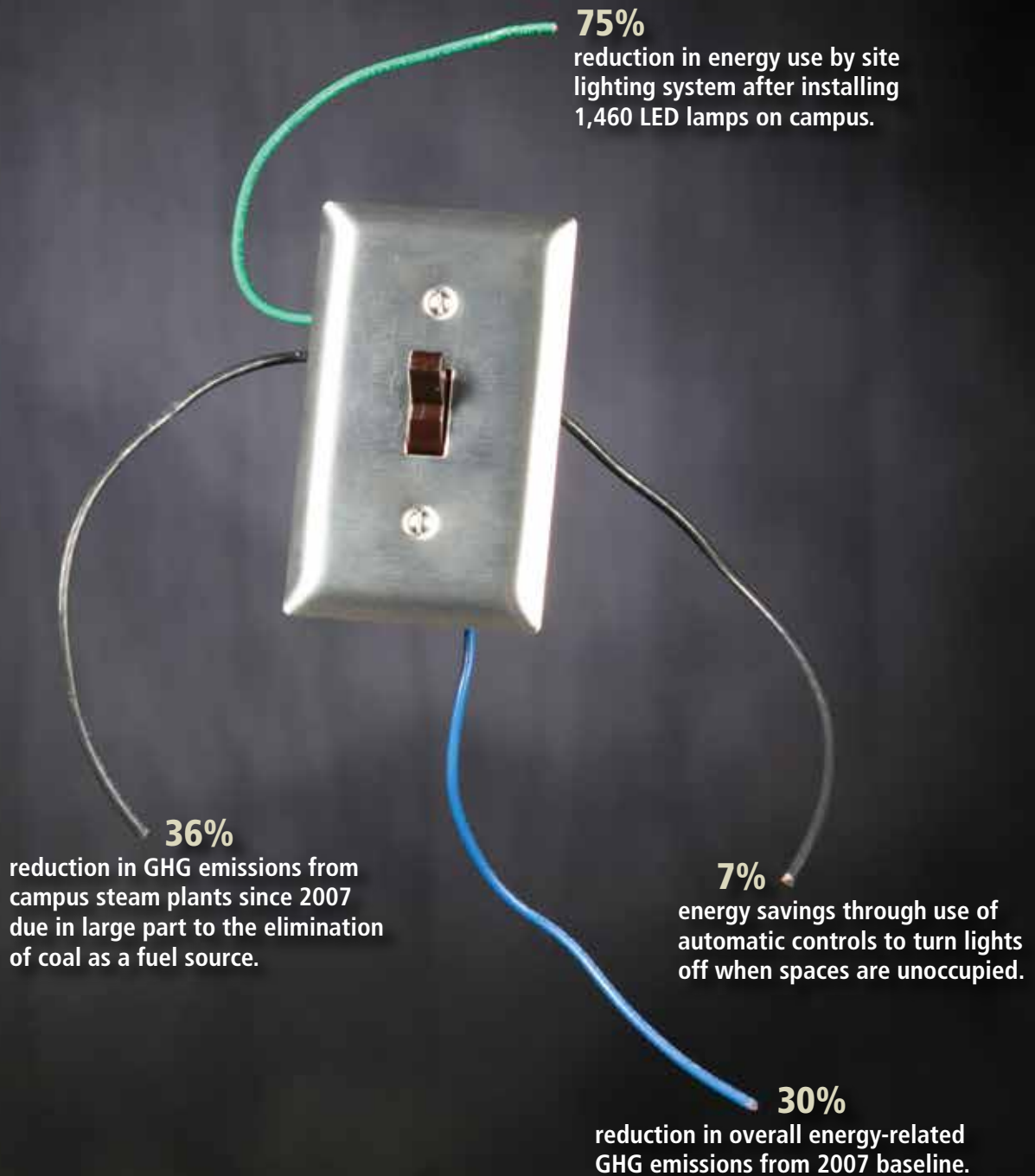
## Progress

- Duke has reduced overall GHG emissions 28% from a 2007 baseline. A change in methodology for tracking air travel led to a portion of the reductions reflected for 2013. However, even without this adjustment, emissions would have been reduced 18% from 2007.
- Along with the Nicholas Institute for Environmental Policy, DCOI modeled least-cost scenarios for generating electricity from swine waste, which will also yield significant greenhouse gas emission reductions. The analysis has been embraced as a blueprint for the deployment of the swine-to-energy resource.
- The Loyd Ray Farms swine waste-to-energy project generated its first verified carbon offsets in 2013. In its third year of operation, the project underwent repairs that will increase the system's reliability.
- DCOI has partnered with the South Carolina Help My House energy efficiency program to purchase carbon offsets that it achieves by improving the energy efficiency of its customers' homes. The data acquired from the partnership will inform DCOI's Employee Residential Energy Efficiency (REE) carbon offsets pilot, due to start in the Spring of 2014.

## Looking Forward

- Continue implementation of on-campus carbon reduction strategies set forth in the Climate Action Plan, with a focus on educating the Duke community about their personal impact on the campus climate goals.
- Test the efficacy of pursuing energy efficiency-based carbon offsets and consider implementing more renewable energy-based projects as a cost-effective greenhouse gas mitigation strategy.

# Infrastructure



Duke University's significantly lower energy-related GHG emissions include reductions in the carbon content of Duke Energy's electrical production, energy efficiency upgrades in campus buildings, increased efficiency in the campus steam plants and switching from coal to natural gas in the steam plants.

Duke's infrastructure – including energy, buildings, land use and water – represents some of the greatest opportunities to decrease carbon emissions and enhance sustainability on campus.

While Duke has made a significant impact on energy use on campus, a large segment of this important area is outside of the University's control because all electricity is purchased from Duke Energy.

# Goals

- Achieve a 15% reduction in energy in existing buildings by 2030.
- Certify all new construction and major renovation at a minimum of LEED™ Silver.
- Focus water-reduction strategies on the top 20 buildings that account for 70% of water use at Duke, use residence halls to educate students, and explore opportunities to educate the campus community regarding water conservation.

# Progress

## Energy:

- Existing building energy use is down 8% from 2007 baseline.
- Electricity usage on campus is down 8% from 2007. Duke has begun implementation of new electric smart meters across campus.
- Development of a strategic plan to convert campus steam distribution to more efficient hot water distribution in selected areas. Installation of a condensing economizer at the West Campus steam plant will increase steam-generating efficiency between 5%-7%.

## Land Use:

- Adoption of a campus wood policy to preserve Duke's "University in the forest" identity. All tree removal plans, including removals, plantings, and wood re-use, must be approved.

## Buildings:

- Duke currently has 27 LEED™ certified buildings and 8 buildings registered with LEED™ for future certification, representing 29% of the University's total square footage.
- Finalizing a minimum building energy-efficiency requirement that designers must follow for new construction and major renovation projects.

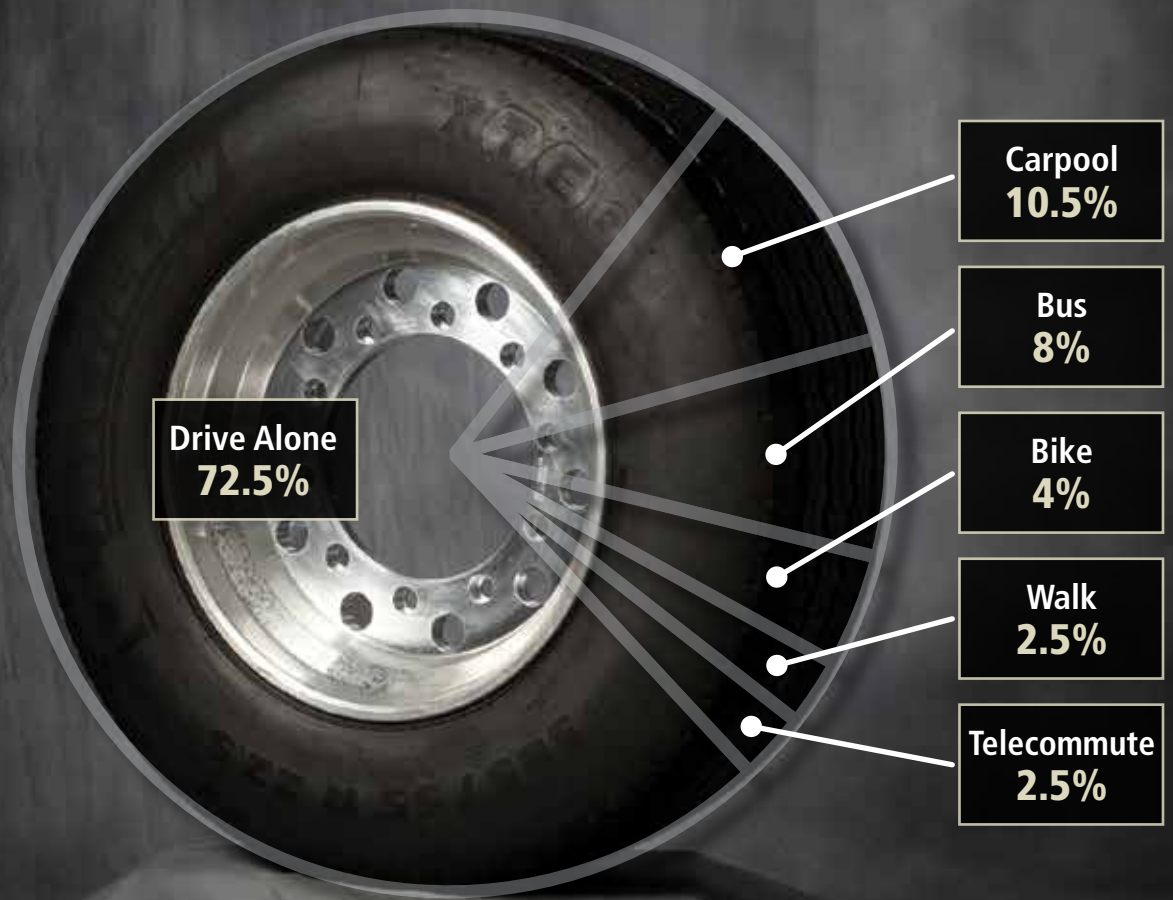
## Water:

- Sustained reduction of 30% in potable water use on campus since 2006 despite growth.
- Implemented water-reduction measures for the top 6 highest water-consuming University buildings that is expected to save about 10 million gallons per year.
- Construction has started on the campus water reclamation pond, which will provide about 100 million gallons of non-potable water to Duke's Chilled Water Plant.

# Looking Forward

- Finalize energy and water efficiency requirements for all new construction and major renovations at Duke.
- Continue implementing energy-efficiency projects identified through audits including lab ventilation-reduction measures, metering upgrades, site lighting improvements and building retro-commissioning.
- Implement water-reduction strategies as identified in audited University buildings. Select and audit additional University buildings to identify further water savings.

# Campus Operations



While the number of commuters driving alone decreased from 74% to 72.5% in the last year, overall employee commuting greenhouse gas emissions have increased 15% from a 2007 baseline, despite investments in transportation demand management strategies. This increase is due in part to employees living further away from campus and workforce growth.



Duke's campus operations – including transportation, dining, waste/recycling, and procurement – help support more than 35,000 employees, 15,000 students and thousands of patients and visitors coming to campus each day. Through concerted efforts, Duke has made great strides to make these operations more sustainable.

## Goals

- Achieve a 5% reduction in single occupancy vehicle (SOV) trips by 2018. The University remains committed to the long-term mode share goal set in the CAP to decrease the campus drive alone rate to 45% by 2050.
- Assess Duke's baseline recycling and waste reduction efforts and create meaningful targets to increase diversion and reduce the total campus waste stream.
- Define sustainable food at Duke, assess baseline efforts and develop targets for sustainable food procurement in campus dining facilities.
- Revise Duke's current environmentally preferable purchasing policy to make it more accessible and useful for campus purchasers while exploring opportunities to further green Duke's supply chain.

## Progress

### **Transportation:**

- Duke has reassessed short-term mode share milestones and has developed a new 5-year Transportation Demand Management plan to realign efforts with long-term CAP goals.
- Duke has reduced SOV trips by employees in the University and Schools of Medicine/Nursing by 2% from 2012 to 2013.
- The University has hired a transportation demand management program manager to reduce campus transportation impacts.

### **Food & Dining:**

- Duke Campus Farm had 1,321 volunteer hours by staff, faculty, students and community members in FY12 and 1,300 in FY13. Farm production increased by 40% in 2013, and revenue was about \$17,000.

### **Waste & Recycling:**

- Conducted recycling survey with peer institution to inform Duke's standards for recycling and diversion.
- Completed campus waste audits to assess Duke's waste streams. Conducted pilots for mixed recycling, post-consumer composting and office waste-reduction efforts to inform overall waste reduction targets.
- Recycling rate for the University, Schools of Medicine/ Nursing and Health System was 29% in FY12 and 30% in FY13.

### **Procurement:**

- Reviewing several aspects of Procurement such as recycled-content paper and disposables to consider options to reduce life-cycle impacts of materials at Duke (e.g. requiring purchasing of at least 30% recycled-content paper).

## Looking Forward

- Improve occasional parking options with implementation of new parking access revenue control system (PARCS) and establish park and ride options at Duke Regional Hospital, South Point Mall and South Square. Develop a campus mobility plan to improve infrastructure and safety.
- Determine waste diversion rates for University and Health System, establish outdoor waste and recycling plan, and develop university-wide standards for recycling, composting and waste based on results of pilots. Develop future rollout options.

# Education & Engagement



**Green Workplace:**  
**47 certified workspaces**  
(representing 1,100 staff)

**Green Classroom:**  
**15 certified classrooms**

**Green Labs:**  
**10 certified labs**

**Green Event Certification:**  
**20 certified events**  
(1,700 attendees)



Sustainable Duke staff have created various certifications based on standards that provide guidelines to promote sustainable behaviors. The certifications provide a template for individuals, departments and schools to reduce GHG emissions through their work, study, research and events.

Becoming a sustainable institution requires the campus community's cooperation, and because of this, Duke strives to expand understanding and foster behavior change by creating a culture where sustainability is a common component of the collective conscience.

## Goals

- Incorporate sustainability into the depth and breadth of every student's experience by including core concepts of sustainability in every applicable field and research opportunity and by using the campus as a living laboratory for sustainability.
- Enhance understanding and foster changes in behavior among members of the Duke community that reduce greenhouse gas emissions at Duke.

## Progress

### Education:

- Development of new course, "ENV245: Theory and Practice of Sustainability," co-taught by Duke's Environmental Sustainability Director and Academic Sustainability Director. Students study the local-to-global reach of sustainability challenges while using the Duke campus as a primary case study. This course has become a permanent fall course starting in the 2013-14 academic year. To date, students have addressed 9 campus topics ranging from water use to assessment of environmental literacy.
- 35% of Duke graduates earned degrees in programs with sustainability learning outcomes during the 2012-13 academic year.
- 9 Master's projects from the Nicholas School of the Environment were focused on campus sustainability issues, representing about 8% of all projects.

- As of FY13, faculty have mentored 52 Trillium Fellows. Fellows are faculty and staff that have gone through intense training on integrating sustainability into their courses.

### Communication:

- Increased sustainability certifications to transform campus spaces and events (see graphic).
- Continued successful Green Devil Smackdown competition with 1,327 participants in 43 teams taking on 3,064 challenges.
- Sustainability Workshop through Learning and Organizational Development has educated 263 staff attendees to date.
- Increased engagement with graduate schools through sustainability information included in student orientations and Campus Sustainability Fellows paired with schools to provide additional support for projects.

## Looking Forward

- Finalize new undergraduate certificate 2.0 in sustainability that includes 450 hours of experiential learning outside the classroom.
- Develop an assessment tool to measure sustainability literacy of the Duke student body.
- Green Devil Smackdown sustainability competition returns spring 2014 with increased in-person engagement, Bass Connections collaboration on effective messaging and data analysis of actions taken.
- 41 courses have already earned Green Classroom Certification for FY14.



Presented by Sustainable Duke,  
Office of the Executive Vice President

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