

NC STATE
UNIVERSITY

ANNUAL SUSTAINABILITY REPORT

2014-2015



ENGAGING CAMPUS AND COMMUNITY IN PREPARING FOR A MORE SUSTAINABLE FUTURE



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“AT NC STATE, WE SOLVE GLOBAL CHALLENGES AND CREATE ECONOMIC, SOCIETAL AND INTELLECTUAL PROSPERITY. THESE ADVANCES RESULT IN A BETTER, MORE SUSTAINABLE FUTURE FOR OUR CAMPUS, STATE, NATION AND WORLD.”



Randy Woodson
Chancellor



NC STATE SUSTAINABILITY HIGHLIGHTS

JULY 1, 2014 — JUNE 30, 2015



ACADEMICS & RESEARCH

- Courses integrated real-world learning opportunities such as improving the sustainability of a building, sustainability auditing and reporting, and change management, *pages 7-9*
- Students solved sustainability challenges, *pages 7-9*
- Researchers discovered breakthroughs in global ecosystems, renewable energy, coastal design and smart grid, *pages 7-9*



PURCHASING & WASTE REDUCTION

- Nearly 50 percent of campus waste was diverted from the landfill, *page 12*
- Compost collection expands to Talley Student Union and Carter-Finley Stadium as campus pizza box composting soars to 10,760 boxes, *pages 12-13*
- Local food purchases topped 27 percent of food purchased by University Dining, *page 13*



COMMUNITY & CULTURE

- Sustainability Fund awards \$117,000 in grants for sustainability projects, *page 18*
- 15 campus departments and 33 campus events achieve certification for sustainability, *page 18-19*
- 63 percent of all incoming students said NC State's sustainability commitments influenced their decision to attend the university, *page 19*

FROM THE CAMPUS ENVIRONMENTAL SUSTAINABILITY TEAM

Advancing sustainability is an embedded core value at NC State University that continues to grow in importance. As this 2014-2015 Annual Sustainability Report highlights, sustainability at NC State has never been more innovative or far-reaching.

growing campus-wide collaboration around sustainability.

The university's sustainability progress and momentum continue to earn local and national recognition, including the 2015 national APPA Sustainability Award and designation by the Princeton Review as one of the nation's greenest colleges.

As you will see in this report, sustainability engages the entire campus community, making this year's accomplishments something the entire Wolfpack can celebrate.

Produced on behalf of the Campus Environmental Sustainability Team by the University Sustainability Office, this year's report reflects progress in year four (July 1, 2014 to June 30, 2015) of the university's five-year Sustainability Strategic Plan. This year's accomplishments in academics and research, community and culture, energy and water, green development, purchasing and waste reduction, and transportation are the result of

Jack K. Colby

Co-Chair, Campus Environmental Sustainability Team
Assistant Vice Chancellor for Facilities Operations
Chief Sustainability Officer

William E. Winner

Co-Chair, Campus Environmental Sustainability Team
Professor, Dept. of Forestry and Environmental Resources
Director, Environmental Sciences Academic Program
Chair, University Energy Council

Tracy Dixon

Director, University Sustainability Office



TRANSPORTATION

- Wofline breaks ridership record with more than 3 million riders, *page 21*
- First campus bike lanes installed, *page 22*
- Number of campus ZipCars and alternative vehicles expands, *page 22*



ENERGY & WATER

- 28 percent campus energy reduction (since 2002) and 50 percent campus water reduction (since 2001), *page 26*
- Recommissioning efforts, University Housing renovations and student residence hall energy competitions net energy savings, *page 24-25*
- Winter Holiday energy savings top \$2.7 million, and summer classroom energy savings program launches, *page 24-25*



GREEN DEVELOPMENT

- Wolf Ridge Apartments and Cates Utility Plant earn LEED certification, *page 30*
- Students add garden, apiary to College of Veterinary Medicine, *page 29*
- 650+ campus construction and renovation projects integrate sustainability standards, *page 30*

ACADEMICS AND RESEARCH

PREPARING STUDENTS AND INNOVATIONS THAT CREATE A MORE SUSTAINABLE WORLD

As a preeminent research university preparing tomorrow's workforce, NC State is committed to academic excellence and research that improves the world. By educating about sustainability, students are better prepared for the complex social, environmental and economic challenges that the future holds.



Students Improve Nelson Hall

In fall 2014, NC State offered an interdisciplinary course called "LEED Lab" in which 25 undergraduate and graduate students gained real-world experience in upgrading campus facilities for utility savings and long-term sustainability. The students evaluated Nelson Hall's operations, maintenance and potential to earn LEED (Leadership in Energy and Environmental Design) Certification from the U.S. Green Building Council.



Grant Funds Study of Environment, Health

In April 2015, the National Institute of Environmental Health Sciences awarded NC State's Center for Human Health and the Environment a \$6.5 million grant to study the effects of environmental factors on human health.



Twenty Years of Sustainable Agriculture

In fall 2014, the Center for Environmental Farming Systems at NC State celebrated 20 years and \$2.5 million in new research grants to further its work to promote sustainable agriculture in North Carolina.



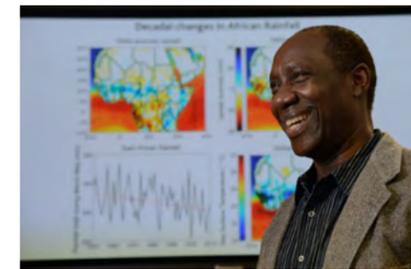
Students Solve Rice Bag Challenge

As a senior design project, 16 teams of textile engineering and technology students developed prototypes that could be made from Stop Hunger Now rice bags, which the nonprofit wants to repurpose into useful products.



Researchers Study Future of Forests

NC State researchers join several initiatives that use eddy flux towers and warming chambers to study the response of trees and insects to rising temperatures and future forest ecosystems.



Professor Leads Climate and Policy Initiative

NC State's Dr. Fred Semazzi leads an international initiative in East Africa that pairs climate science with economic development planning as the region grows.



Connecting Immigrants With Local Food

A seed grant from NC State Outreach and Engagement launched a faculty-led pilot project to create or expand community gardens among three immigrant communities in the Raleigh area.

2014-2015 HIGHLIGHTS



FACULTY SEEK CONNECTION BETWEEN ANIMAL, HUMAN DISEASES

College of Veterinary Medicine faculty launched three pilot projects studying the genetic basis of diseases that afflict both animals and humans: Addison's disease in Standard Poodles, corneal dystrophy in Boston Terriers and the ability of newborn calves to absorb antibodies from their mothers' milk.

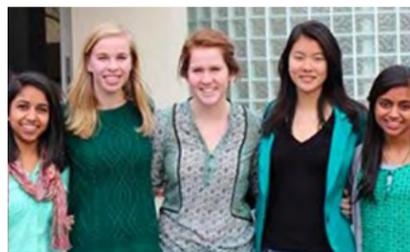


STUDENTS RE-IMAGINE LAKE RALEIGH WOODS

Using high-tech, 3D technology in the James B. Hunt Jr. Library on campus, College of Design students in a fall 2014 course designed a new trail system for NC State's Lake Raleigh Woods.

CHANGE MANAGEMENT COURSE EVALUATES CAMPUS SUSTAINABILITY

As NC State prepares for the development of its next Sustainability Strategic Plan, students in a Change Management class interviewed stakeholders to help leadership better understand the current landscape of campus sustainability.



SHOWCASE, GRANTS BOOST BUSINESS SUSTAINABILITY

At Poole College of Management's 2015 Leadership and Innovation Showcase, a student who developed FreshSpire, an app to reduce food waste, won the undergraduate award. The college also awarded grants to faculty developing sustainability-related research and curriculum in consumer behavior, innovation management, accounting, human resources, employee engagement and other fields.



SCHEDULES INCREASE SMART GRID VIABILITY

NC State engineering researchers developed a new technique for scheduling energy in electric grids that moves away from centralized management by tapping into the distributed computing power of energy devices.

SUSTAINABILITY EDUCATION EXTENDED TO FACULTY

The Office of Faculty Development and the University Sustainability Office partnered to offer two Sustainability in Teaching workshops in 2014.



SUSTAINABLE IDEAS RECEIVE GRANTS FROM 2014 CHANCELLOR'S INNOVATION FUND

Among the NC State research that the Fund is helping move from lab to marketplace:

- **Affordable biofuel made from saltwater algae.** Researchers discovered how to inject extremophiles in algae, resulting in two products: oil for biofuels and extremozymes, which are part of numerous consumer products. The cost of biofuel production is offset by the sale of the extremozymes and enables production of a renewable liquid transportation fuel.
- **Energized fabric.** With half of the energy generated in the U.S. lost as waste heat, researchers created thermoelectric textiles that harvest power from temperature differentials, such as when wrapped around a pipe or stretched over walls, and generate DC voltage that could supplement power sources.
- **Variable fuel injectors for cleaner driving.** Researchers are developing a new injector that optimally adapts both the direction and rate of fuel flow in an internal combustion engine and automatically changes the timing of when fuel is sprayed in the up-and-down cycle of a cylinder. They hope to increase engine efficiency by as much as 10 percent, while also reducing emissions in a cleaner-burning engine.

STUDENTS USE CAMPUS FOR SUSTAINABILITY LEARNING

Between PackLink, an online listing of campus sustainability projects for students, and courses that integrate experiential learning, NC State's Facilities division participated in more than 20 projects that connected student learning with sustainability improvements to campus.



PROFESSORS LAUNCH COASTAL DESIGN LAB

Two College of Design professors started the Coastal Dynamics Design Lab, which focuses on recovery planning, design and natural hazard response in North Carolina coastal areas. Students in two courses, held summer and fall 2014, assessed various aspects of coastal resiliency and developed proposals for disaster response and recovery structures in numerous Outer Banks communities.

BREAKTHROUGHS IN ALTERNATIVE ENERGY



NC State researchers studying alternative energy sources published key findings including methods to improve catalytic performance in the production of hydrogen gas, record-breaking solar efficiency improvements in new semi-conducting polymers, breakthroughs in biofuel possibilities among woody plants and grasses, and development of a new technique for determining the role that a material's

structure has on the efficiency of organic solar cells.

BUSINESS COURSES INTEGRATE REAL-WORLD SUSTAINABILITY CHALLENGES



Several teams of NC State graduate-level business students conducted sustainability research in 2014-2015. One group studied how grocery store merchandising and local meat availability influences consumer shopping behavior and perceptions. Another group developed a draft business plan for sustainable tourism in Micronesia. Advanced Accounting students audited metrics published in NC

State's 2013-2014 Annual Sustainability Report. NC State's Poole College of Management also hosted 19 students from Shanghai University for a three-week international summer program focused on sustainability.



Shrinking Habitats Harm World Ecosystems

A five-continent NC State study shows that 70 percent of forests are within a half-mile of the forest edge, where encroaching development or agriculture can cause plant and animal losses.



Big-Data Approach Estimates EV Range

NC State researchers developed software that estimates how far electric vehicles can drive before needing to recharge. The new technique uses data on a host of variables to predict the vehicle's energy use.



Low-Tech Solution to High-Cost Pests

With a \$1 million grant from the Bill & Melinda Gates Foundation, this NC State project studies how wrapping seeds in treated, biodegradable paper can reduce crop damage from parasitic worms in sub-Saharan Africa.



Researchers Seek Solution to Toxic Wells

Two NC State soil science professors are studying natural arsenic contamination in the groundwater and soils in Cambodia so that the problem can be better managed or eliminated.



Rural School Program Wins National Award

NC State's Northeast Leadership Academy for rural school leaders earned an Exemplary Educational Leadership Program Award from the University Council for Educational Administration.



Students Ditch Dependency on Gas

College of Engineering seniors converted an old model Porsche into an electric vehicle as part of a senior design project at FREEDM Systems Center on campus.



PROGRESS TOWARD STRATEGIC GOALS

STRATEGY 1: Develop the scholarship, including the courses, curricula and research needed for students to become literate about energy, environment and sustainability.

TACTIC: Establish an Environmental Sciences First Year Program Committee to review possible paths for first year students to explore a variety of environmental science-related majors.

PROGRESS: Dr. Michael Mullen, Vice Chancellor and Dean for Academic and Student Affairs, and Dr. Mary Watzin, Dean of the College of Natural Resources, are co-chairing the committee, which consists of representatives from each academic college. The committee continues to review the Life Sciences First Year program to assess what parts of that program model are applicable. Conversations about what majors might participate and what the first year curriculum map might look like will continue into next year.

TACTIC: Create the Semester @ CMAST program to promote exposure to marine sciences.

PROGRESS: A semester-long program called Semester @ CMAST was approved in spring 2015. Beginning in spring 2016, up to 25 NC State undergraduate students will be resident students at CMAST, NC State's Center for Marine Sciences and Technology. This maiden voyage of the program is the first of a standing series of full semesters allowing exposure to all facets of marine science.

TACTIC: Develop new courses that feature content related to sustainability issues.

PROGRESS: A new Environmental Sciences course (ES 150) called Water and the Environment received initial approval and could be offered to students as early as the spring 2016 semester.

STRATEGY 2: Explore the concepts underlying sustainability in courses and curricula to build the case for sustainable practices.

TACTIC: Create an inventory of sustainability and sustainability-related courses based on the Sustainability Tracking, Reporting, Assessment and Rating System (STARS) definitions to understand what courses are already offered. Submit the course list with NC State's STARS submission in fall 2015.

PROGRESS: Students from the EcoVillage completed the course inventory as a capstone project in collaboration with the directors of the University Sustainability Office and the EcoVillage. After receiving training on STARS definitions and the inventory template, students searched the university course catalog using more than 160 keywords. Staff reviewed and edited the list for quality control.

STRATEGY 3: Engage in discussions for advancing sustainability to optimize the use of energy, water, buildings, land, transportation and existing space through participation in the Campus Environmental Sustainability Team (CEST) working groups.

TACTIC: Pilot an energy saving program during the summer when classrooms are not in heavy use.

PROGRESS: The pilot of the Summer Energy Savings Initiative in summer 2014 involved the Registrar's Office, Building Maintenance and Operations, Energy Management and the University Sustainability Office. The team identified when strategic classrooms and event spaces were unoccupied and building temperatures were adjusted to optimize energy

savings. Planning for summer 2015 included consolidating events and classes into designated buildings for additional savings.

STRATEGY 4: Use the physical campus as a classroom and research facility to demonstrate and explore sustainability principles and practices.

TACTIC: Continue to position PackLink as the resource for students to connect with sustainability-related projects on campus and gain real-world experience through experiential education.

PROGRESS: PackLink upgraded to a better online platform allowing easier viewing of project opportunities. Encouraging campus departments to include projects is an ongoing effort.

STRATEGY 5: Promote research to advance sustainability, including discovery of new technologies that advance sustainability, securing patents and employing new workers that align with a new energy economy.

TACTIC: Create a sustainability research inventory based on the Sustainability Tracking, Reporting, Assessment and Rating System (STARS) guidance to identify faculty involved in sustainability research. Submit the course list with NC State's STARS submission in fall 2015.

PROGRESS: The full research inventory will be completed during summer 2015. To aid that process a few new resources are available online at sustainability.ncsu.edu including a list of faculty in the Sustainability Cities Consortium as well as faculty looking for student help in their sustainability research. These resources will be added to the full research inventory and submitted with NC State's full STARS report.

STRATEGY 6: Engage faculty researchers in sustainable practices to increase the resource use efficiency of research equipment and spaces needed to conduct state-of-the-art research.

TACTIC: See strategy 5 tactic

PROGRESS: See strategy 5 update

STRATEGY 7: Provide opportunities for service learning that bridge education, research and the practical application of sustainability.

TACTIC: Create a mechanism for faculty to learn about how to include sustainability in their teaching, research and/or practice.

PROGRESS: The Office of Faculty Development and the University Sustainability Office partnered to offer two short Sustainability in Teaching workshops during the year. Expanding on those workshops, there will be an all-day workshop over fall break 2015 about "Where Interaction Meets Impact: Integrating Sustainability Into Teaching, Research and Practice," to replicate a model that has been successful on other campuses. The long-term goal is to provide a community for faculty to share best practices on including sustainability in their work.



PURCHASING AND WASTE REDUCTION

STRIVING FOR SUSTAINABLE MATERIALS AND ZERO WASTE ON CAMPUS

A university needs resources. At NC State, sustainability starts at the source as more economically, environmentally and socially beneficial products make their way on campus. When these resources reach the end of their useful life, the university's robust waste diversion program reduces campus waste through recycling, reuse and composting programs.

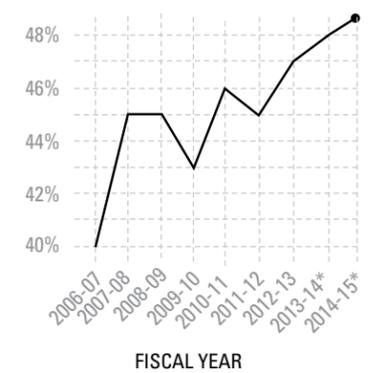


Solar-Powered Compactor Eases Recycling, Waste Collection

Funded by the Sustainability Fund, the first solar-powered compactor was installed on campus. It removes air volume to create five times the capacity of traditional bins. The compactor is also equipped with technology that notifies maintenance staff when the unit needs to be emptied.

2014-2015 HIGHLIGHTS

PERCENTAGE OF CAMPUS WASTE DIVERTED FROM LANDFILL

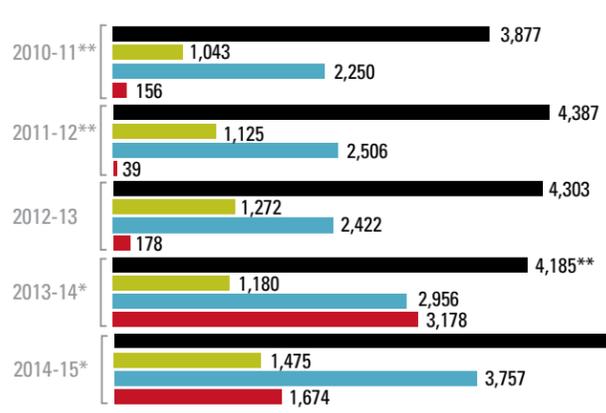


*Indicates that recycling and diversion rates from small construction projects were tracked and reported. With that addition, the campus diversion percentage is 57%. This year's diversion rate of 49.9%, which excludes construction recycling and diversion, is reported for consistency in comparison to prior years when construction waste was not tracked.



PIZZA BOX COMPOSTING SOARS IN ITS SECOND YEAR
 NC State's popular pizza box composting program, launched in March 2014, resulted in the composting of 10,760 pizza boxes in fiscal year 2014-2015. The program, a partnership of University Housing and Waste Reduction and Recycling, continues to expand.

TONS OF CAMPUS MATERIAL RECYCLED, COMPOSTED, REUSED AND LANDFILLED



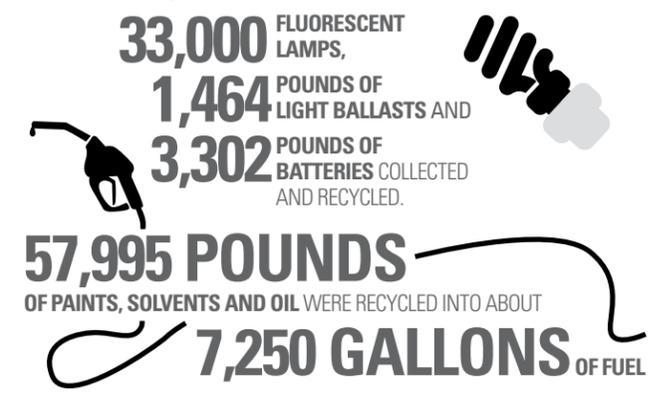
LANDFILLED
COMPOSTED
RECYCLED
REUSED

* Includes landfill, recycling and diversion amounts from small campus construction projects.
 **Reflects change in previously-reported numbers, which have been audited internally for accuracy



CAMPUS WASTE STUDIED IN DEPTH
 To better understand the most wasted items on campus, NC State commissioned a Waste Characterization Study on 32 dumpsters, which were sampled twice over a two-week period in spring 2015. The findings of this audit revealed areas for improvement and will drive the development of new outreach efforts designed to minimize the amount of campus waste sent to local landfills.

CAMPUS WASTE RESPONSIBLY RECYCLED
 NC State Environmental Health and Safety diverted many items from landfills this fiscal year, including:



STUDENTS 'PACK N GIVE' AT MOVE OUT
 During residence hall move out in May, students donated 16,781 pounds of reusable items and 604 pounds of food, which was donated to charity organizations. Also, the amount of material recycled increased by 114 percent over last year.

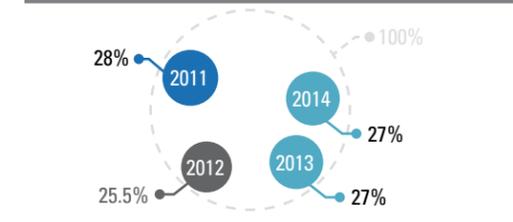


PLASTIC BAGS RECYCLED, REDUCED ON CAMPUS
 The NC State Stewards student group recycled nearly 4,500 plastic bags through a plastic bag recycling program that included a "No Plastic Bag Day" in campus convenience stores, educational materials and a personal pledge to make the case for removing single-use plastics from campus.



STUDENTS AID IN RECREATION FIELD COMPOST
 In fall 2014, University Recreation and Grounds Management partnered to study the viability of using compost instead of traditional fertilizer to maintain the health of grass on the university's recreation fields. With the help of two students, two recreational fields on Centennial Campus were included in a study that showed better soil health in a field receiving compost versus a field receiving fertilizer.

LOCAL FOOD SERVED IN CAMPUS DINING HALLS



Poole College 'Kicks the Can'
 To provide more recycling opportunities, Poole College of Management classroom trash cans were removed so that building users will use hallway stations that offer waste and recycling options.



Talley Student Union Adds Composting
 Even before the building was completely opened, building occupants were already composting. An estimated 26 tons of food waste and related packaging were composted in fiscal year 2014-2015.



Students Test Compost Tea on Campus
 Three students living in the EcoVillage researched the viability of using compost tea instead of traditional fertilizers on the lawn in front of Bragaw Residence Hall. Initial results proved promising.



WE Recycle Diverts 42.5 Tons From Landfill
 NC State's football tailgating recycling program recycled 42.5 tons of material during the seven-game 2014 football season. NC State was also a participant in the national Game Day Recycling Challenge.



Carter-Finley Stadium Composts
 In preparation for composting inside the stadium during home football games in fall 2015, NC State Athletics and NC State Waste Reduction and Recycling offered composting at the Kay Yow Spring Football Game.



Campus, Community Recycle Together
 A March 2015 community recycling drive at NC State resulted in 12,600 pounds of paper shredded and recycled, 2,282 plastic bags recycled and 446 pounds of textiles donated to a local nonprofit.



2014-2015 TACTICS

PROGRESS TOWARD STRATEGIC GOALS

STRATEGY 1: Instill the values of total cost of ownership and total life cycle costing into purchasing and project decision making.

TACTIC: Include language covering total life cycle cost into contracts and bid for items more than \$5,000.

PROGRESS: Work with strategic sourcing analysis to formalize marketing program with MarketPlace paper suppliers.

STRATEGY 2: Achieve a 60 percent landfill diversion rate by 2015 with a stretch goal of achieving a 65 percent diversion rate by 2015.

TACTIC: Through a Waste Characterization Study, determine the composition of NC State's solid waste to effectively develop additional programs and policies aimed at achieving waste reduction goals through an established baseline.

PROGRESS: Complete. The study was conducted in Spring 2015.

TACTIC: Examine construction and demolition debris weight reporting process and incorporate to overall waste diversion.

PROGRESS: Ongoing. Forward tactic to fiscal year 2015-2016.

TACTIC: Develop a zero waste program within the Poole College of Management.

PROGRESS: The Poole College of Management's Sustainability Initiative created a waste diversion plan that will begin implementation in fall 2015. The plan includes mini waste bins coupled with larger recycling bins, relabeling of current recycling bins and removal of classroom waste bins.

TACTIC: Work toward zero waste goals for Carter-Finley Stadium by identifying start-up funding for a zero waste initiative.

PROGRESS: University Athletics will strive toward a "Zero Waste Stadium" in fall 2015. This is a partnership between Athletics, Waste Reduction and Recycling, University Sustainability Office and University Dining.

TACTIC: Pilot trash chute closure at residential building, and evaluate and develop a more accessible Greek Court recycling program.

PROGRESS: A recycling chute was added at Alexander Residence Hall and that project helped spur planning for a "Mixed Recycling Dumpsters" pilot program at residential buildings and Greek Court.

TACTIC: Perform benchmarking study of peer institutions and selected university programs.

PROGRESS: Complete.

STRATEGY 3: Implement source reduction and environmentally preferable purchasing initiatives to decrease waste before it occurs.

TACTIC: Continue development of SOP for sustainable procurement.

PROGRESS: The draft of a Green Procurement Standard Operating Procedure to accompany the university's Sustainability Policy is in progress.

STRATEGY 4: Increase the amount of environmentally and socially responsible materials purchased.

TACTIC: Have MarketPlace vendors provide normalized reports on

sustainable purchases in yearly status reports.

PROGRESS: Working with MarketPlace vendors to include data on sustainable purchases during the last fiscal year.

STRATEGY 5: Implement sustainable purchasing standards.

TACTIC: Revise bid document to include language that encourages vendors to provide sustainable options for the items that are listed in bid documents.

PROGRESS: Research commodity categories for potential sustainability options such as energy savings, toxic waste removal, etc.

STRATEGY 6: Develop a comprehensive closed loop program to capture organic waste (food waste, animal bedding, yard waste, etc.) for composting that can be used on campus.

TACTIC: Continue to identify and evaluate on campus food waste producers for compost collection opportunities, including pizza box expansion and post-consumer pilots.

PROGRESS: Fully executed and completed a Waste Characterization Study that provides data on composting opportunities for campus.

TACTIC: Continue to formally evaluate possible cost and personnel needs to further expand composting opportunities with a focus of Lake Wheeler Yard Waste Facility as a viable pilot location.

PROGRESS: Completed a Compost Feasibility Study.

TACTIC: Support a digester study that will evaluate the possibility of using dairy farm waste as well as organic pre- and post-consumer food waste.

PROGRESS: The digester feasibility study is complete but would need funding and further collaboration.

TACTIC: Work with Grounds Management to develop a program for utilizing organic materials produced on campus as soil amendment: This tactic has been re-invigorated and will identify locations for a compost pilot on campus.

PROGRESS: Grounds has continued to expand utilization of organic material as soil amendment through application at Hunt Library, The Oval and Avent Ferry Courtyard. These areas have proven successful and will be closely monitored. Grounds will use compost leaf mulch, which uses some campus yard waste, in March 2016. Compost soil amendments are now regularly being used on new installations by the Horticulture Maintenance group (amounts and types dictated by plant species requirements and soil tests).

STRATEGY 7: Develop a more extensive outdoor walkway recycling program to capture additional recyclable materials and remove them from the waste stream.

TACTIC: Pilot a solar-powered waste and recycling compactor unit.

PROGRESS: The first waste/recycling solar compactor was installed at Carmichael Gym. As a result of the success of this project, additional funds have been allocated for future purchases of units from Grounds Management, Talley Student Union and additional grants from the student Sustainability Fund.

TACTIC: Place paired waste and recycling outdoor receptacles on Centennial Campus.

PROGRESS: Placements are 80 percent complete. Continue to pair sites next fiscal year. Next goal is possible replacement of recycling lids and relabeling containers with increased font size wording.

STRATEGY 8: Utilize modern waste collection concepts and practices to streamline services, improve programs, and increase operational efficiencies and customer service.

TACTIC: Utilize new measuring tools to determine the nature of material streams from campus customers and the campus community.

PROGRESS: This year Fleetmind software was fully incorporated in collection of waste, cardboard and mixed recycling. Data has been used to identify efficiencies and to create waste reports for Talley Student Union. The reports and data should continue to be utilized to create education and information that will improve understanding of waste quantities on campus.

TACTIC: Develop a comprehensive grease recycling program for campus apartments, Greek Village and all campus dining facilities.

PROGRESS: Complete. Oil from campus is picked up by a local vendor and converted into biofuel.

TACTIC: Continue to provide updated educational information to campus on recyclable materials through newly developed website as well as updated labels.

PROGRESS: New website recycling.ncsu.edu provides comprehensive information on campus recycling and waste management. This website will be continually updated. Labels have been updated at Nelson Hall and continued updates are being planned.

TACTIC: Request funding and plan for expansion of current bulk debris (e.g. construction, renovation, etc.) site and Centennial Campus site location.

PROGRESS: Planning for Centennial Campus site is in process. Request for Centennial Site Bulk Debris site has been submitted.

TACTIC: Provide operational and educational support to Talley Student Union, which provides many waste diversion opportunities in a consolidated building.

PROGRESS: Talley Student Union continued to implement new initiatives related to waste reduction and recycling. One such initiative was the campus' first post-consumer composting locations. Combined with pre-consumer composting, 26 tons of compost was collected during the first 10 months of the program. These efforts to refine operations such as increasing on-site sorting and involving campus partners resulted in a 31 percent diversion rate.

STRATEGY 9: Increase the partnerships among NC State, local farmers, producers and manufacturers in North Carolina, resulting in more sustainable food purchases by University Dining.

TACTIC: Increase amount of local and sustainable food

purchased by University Dining.

PROGRESS: Local purchasing continues to build as University Dining's primary food vendor, US Foods, has increased its inventory of local products. Purchasing local is still the primary goal, along with supporting increased production at NC State's Agroecology Education Farm. University Dining's award-winning "My Roots Are At NC State" local food campaign has been expanded to focus on NC State research that impacts the local food system in North Carolina.

TACTIC: Expand partnership between University Dining and NC State's Agroecology Education Farm.

PROGRESS: The partnership with the NC State Agroecology Education Farm continues to grow. With the purchase of two season-extending hoop houses for the farm, Dining has demonstrated its commitment to the farm and the value of serving campus-grown food in on-campus dining locations.



COMMUNITY AND CULTURE

CREATING A CULTURE OF SUSTAINABILITY ON CAMPUS

Sustainable universities thrive. When faculty, staff and students embrace sustainable actions, the entire university benefits. During this fiscal year numerous NC State events, partnerships, programs and student-led initiatives embedded sustainability in campus life while also having a positive impact in the community.



Students Empower Ecotourism in Costa Rica
More than a dozen NC State students traveled to Costa Rica over spring break as part of an Alternative Service Break trip that linked micro-entrepreneurs to the growing network of People First Tourism, an NC State global initiative that connects people seeking genuine travel experiences with local micro-entrepreneurs.



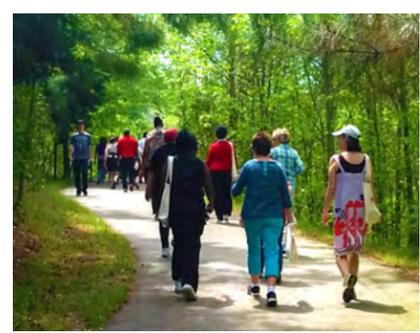
Civic Engagement Initiative Tests Reuse
A team of Park Scholars researched the possibility of a campus (re)Purpose store that would reduce landfill waste while also connecting low-income students with resources.



Student Thinks Outside the Hive
NC State student Leigh-Kathryn Bonner's solution to the worldwide bee shortage: rooftop bee hives. Through her nonprofit, Bee Downtown, she's added 120,000 new honey bees atop roofs in nearby downtown Durham.



Presentation Focuses on Gender, Planet
A sustainability-themed presentation focusing on "Gender and the Environment" was developed for the Don't Cancel That Class initiative offered by the NC State Women's Center.



Earth Month Features Nearly 40 Campus Sustainability Events
NC State celebrated the planet in April 2015 with nearly 40 events focusing on some aspect of sustainability, ranging from the annual Earth Fair celebration on the Brickyard to the annual Green Brick Awards.



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2014-2015 HIGHLIGHTS

SUSTAINABILITY FUND AWARDS CAMPUS GRANTS

In May 2015, the student-led board of the NC State Sustainability Fund awarded \$117,000 of grant funding to 10 project proposals that further sustainability. The grant funding is generated by a \$1.50 per semester student fee that students voted to create in 2012. This year's funded projects include:

- Two projects to install additional compactors that use solar energy to compress waste/recycling and reduce the frequency at which a receptacle must be emptied.
- Performance of the Great Animal Orchestra Symphony during NC State's Earth Month 2016.
- Reconstruction of a garden bed and installation of signage at the student-led SOUL Garden on Centennial Campus.
- Implementation of a "BioBlitz" project that will survey the diversity of campus wildlife.
- Installation of an aquaponics system that will provide food for University Dining and local food banks.
- Marketing materials and advertisements for the Campus Farmers Market, including funds for events and speakers.
- Installation of a covered solar charging station near Tucker Hall.
- Student internship at NC State's Compost Training Facility and supplies for composting workshops.
- Student internship at NC State's Agroecology Education Farm.

15 CAMPUS WORKPLACES ACHIEVE SUSTAINABILITY CERTIFICATION

In 2014, a Wolfpack Certified Sustainable Workplace program was created to offer campus departments the opportunity to be more sustainable and earn recognition for these efforts. These departments include:



Liaison for Early College High School
Facilities Operations Business Services
Environmental Health and Public Safety
Capital Project Management
Eastern 4-H Center
OnBoarding Center
EcoVillage
Utilities and Engineering Services

University Sustainability Office
Office of Assessment
Repair and Renovation
Study Abroad Office
Environmental Sciences Academic Program
University Recreation
Center for Environmental Farming Systems



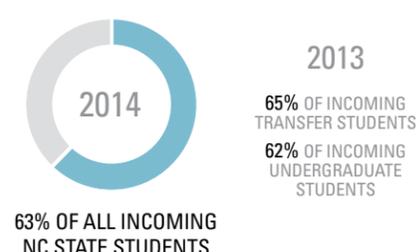
NC State Stewards leading a plant walk during Earth Month.

NC STATE STEWARDS 'THINK AND DO'

Launched in 2013 as a student sustainability leadership program supported by the University Sustainability Office, the 26 NC State Stewards in 2014-2015 promoted sustainability on campus through projects and peer-to-peer education, including:

- Developing and installing a campus outdoor solar charging station with a nearly \$30,000 Sustainability Fund grant.
- Facilitating residence hall energy competitions that saved nearly \$9,000 in avoided energy costs.
- Continuing efforts to reduce use of single-use plastic bags on campus through a plastic bag recycling program.
- Creating a series of virtual tours of unique campus plants.
- Conducting a series of workshops developing crafts from discarded material.
- Educating about sustainability through presentations and events.
- Placing 4th in NC State's Shack-A-Thon with a shack that was co-sponsored by the Stewards, WISE and the Goodnight Scholars and built from repurposed pallets, plywood, carpet tiles and scrap pieces of wood.

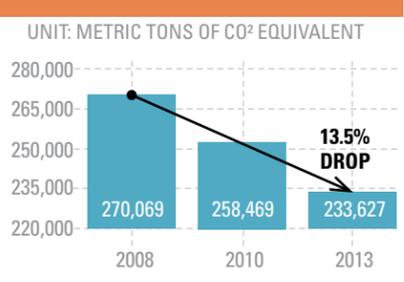
SURVEY: PERCENT OF INCOMING STUDENTS FOR WHOM NC STATE'S SUSTAINABILITY COMMITMENTS INFLUENCED DECISION TO ATTEND



WOLFPACK CERTIFIED SUSTAINABLE



NC STATE GREENHOUSE GAS EMISSIONS



PARENTS AND FAMILIES COMBAT CAMPUS CANKERWORMS

The 2014 Parents and Families Weekend service project involved up to 75 people attaching specially-designed bands to about 80 campus trees that are most vulnerable to cankerworms, a small but mighty pest that wreaks havoc on North Carolina trees.



ALUMNI ASSOCIATION SWEETENS PAPERLESS RENEWAL

To encourage paperless auto-renewal for members, NC State's Alumni Association offered \$5 savings plus a reusable bag made from 100 percent recycled plastic bottles in an online 2014 membership promotion.

NC STATE JOINS HEALTHY CAMPUS MOVEMENT

NC State joined the Partnership for a Healthier America's Healthier Campus Initiative, committing to strengthen 23 wellness-related guidelines over the next three years.

SOLAR CENTER CHANGES NAME

To reflect progress of the expanded clean energy industry, the NC Solar Center at NC State was renamed the NC Clean Energy Technology Center in July 2014.



Rubbage Ride Volunteers Beautify Campus
110 participants collected 555 pounds of litter on campus during Service Raleigh's Rubbage Ride event on March 28, 2015. More than half of the litter was diverted from landfills through composting or recycling.



Maps Showcase Campus Sustainability
Online and printed maps educate about NC State's sustainability features. The Office of New Student Programs used the maps in Welcome Week activities for incoming students.



Students Battle for Bragging Rights
NC State students competed against students from area universities to log the most alternative transportation trips in winter 2015 as part of the Student Commute Challenge.



NC State Social Entrepreneurship Surges
Launched in 2013, the Social Entrepreneurship Initiative offered speaker series, hands-on workshops, internships and mentoring for students who desire careers that can make a difference in the lives of people worldwide.



Connecting Diversity, Sustainability
In 2015, Americorps member Cynelsa Broderick began a 10-month term with the University Sustainability Office, exploring the intersection between diversity and sustainability on campus.



EcoVillage Expands Residents' Understanding of Sustainability
Residents participated in sustainability community service activities, education seminars, socials and a spring break urban development field trip to San Francisco.

PROGRESS TOWARD STRATEGIC GOALS

STRATEGY 1: Adopt, promote and adhere to a sustainability policy.

TACTIC: Provide education to key units on how to implement the university's sustainability policy and standard operating procedures (SOP).

PROGRESS: The SOP was presented to some units and will continue.

STRATEGY 2: Report sustainability information on a national scale toward becoming a national leader in sustainability.

TACTIC: Revise NC State's STARS (Sustainability Tracking, Assessment & Rating System™) submission and pursue a rating.

PROGRESS: The University Sustainability Office is facilitating the data collection process for STARS with a goal of submitting information by December 2015. An EcoVillage capstone project utilized students in the creation of a list of sustainability-related courses and degree programs that align with STARS requirements.

STRATEGY 3: Support opportunities to obtain funding for sustainability including grants, university campaigns, a student fee and seed money.

TACTIC: Create a fundraising plan for campus sustainability activities. Identify funding priorities at low, medium and high levels as well as campus resources for each level.

PROGRESS: The University Sustainability Office secured sponsorships for two Change Your State theme months, Earth Month and the Green Brick Awards. The sustainability donation webpage was revised to more clearly display opportunities and to more easily accept donations and sponsorships. Conversations about fundraising and development resources are ongoing.

STRATEGY 4: Implement a comprehensive sustainability education and awareness program that utilizes peer-to-peer networks.

TACTIC: Manage the expansion of the NC State Steward program's reach into student peer-to-peer networks.

PROGRESS: Now involving 35 students, the NC State Stewards capped a successful second year of outreach and campus projects, including receiving a Sustainability Fund grant for the installation of outdoor solar charging stations, facilitating residence hall energy competitions, continuing efforts to reduce use of single-use plastic bags on campus, creating a series of themed virtual tours of unique plants located on campus, conducting a series of DIY workshops and educating about sustainability through presentations.

TACTIC: Utilize Change Your State framework for sustainability communications.

PROGRESS: In addition to guiding the communications focus for the University Sustainability Office, Change Your State themes are also being embedded in other parts of campus such as the syllabus framework for an STS course, the university's sustainable workplace certification, NC State Athletics campaigns and as an example used by other campuses.

TACTIC: Work with the NC State Alumni Association to understand how to engage alumni in sustainability efforts.

PROGRESS: The Alumni Association created sustainability messaging and offered a reusable bag in their membership renewal drive. Some young alumni groups are planning to certify their events as sustainable. The University Sustainability Office and Alumni Association are creating a

short and mid-term plan for engaging young alumni with a sustainability interest.

STRATEGY 5: Create a network among the local sustainability community that includes universities, governments, corporations and nonprofits.

TACTIC: Have an active presence at major sustainability conferences and gatherings such as AASHE, Smart and Sustainable, Net Impact, Green Build, student EcoReps conference, Southeastern Sustainability network (SESN), UNC System Sustainability Alliance and the Appalachian State Energy Summit).

PROGRESS: NC State hosted the annual meeting and conference of the Southeast Sustainability Network, comprised of regional sustainability directors in higher education. The University Sustainability Office hosted a facilitation and sustainability strategic planning workshop that was attended by other campus sustainability managers in North Carolina. NC State also had a presence at major sustainability conferences and workshops.

STRATEGY 6: Grow the Campus Environmental Sustainability Team (CEST) as a cross-campus team of faculty, staff, students and community members engaged in campus sustainability.

TACTIC: Begin planning effort to identify the CEST membership for revision of the university-wide Sustainability Strategic Plan (SSP) and Climate Action Plan.

PROGRESS: CEST used questions and recommendations proposed from a Change Management/Learning History graduate project to guide thinking about successes of the current SSP and what areas should be adjusted for future plans. Full planning will happen throughout fiscal year 2015-2016.

STRATEGY 7: Establish annual campus events to embed sustainability as a part of campus culture.

TACTIC: Focus on boosting participation in Certified Wolfpack Sustainable program from high-profile NC State traditions and events.

PROGRESS: Certified Wolfpack Sustainable is becoming a well-known and utilized program among NC State events and workplaces. 33 campus events received sustainability certification this year, and the university event and catering service, RAVE, is working to incorporate sustainability into its offerings. All Wolfpack Certified Sustainable events and workplaces -- 15 were certified in the first year -- were recognized at the 2015 NC State Green Brick Awards.

STRATEGY 8: Create incentives and provide recognition and rewards to promote sustainability across campus.

TACTIC: Expand the recognition of the Green Brick by acknowledging Certified Wolfpack Sustainable events and workplaces.

PROGRESS: The 2015 Green Brick Awards became a standalone event for sustainability recognition and networking. Around 75 participants were present to acknowledge the achievements of Green Brick Award winners, nominees, and certified sustainable events and workplaces.

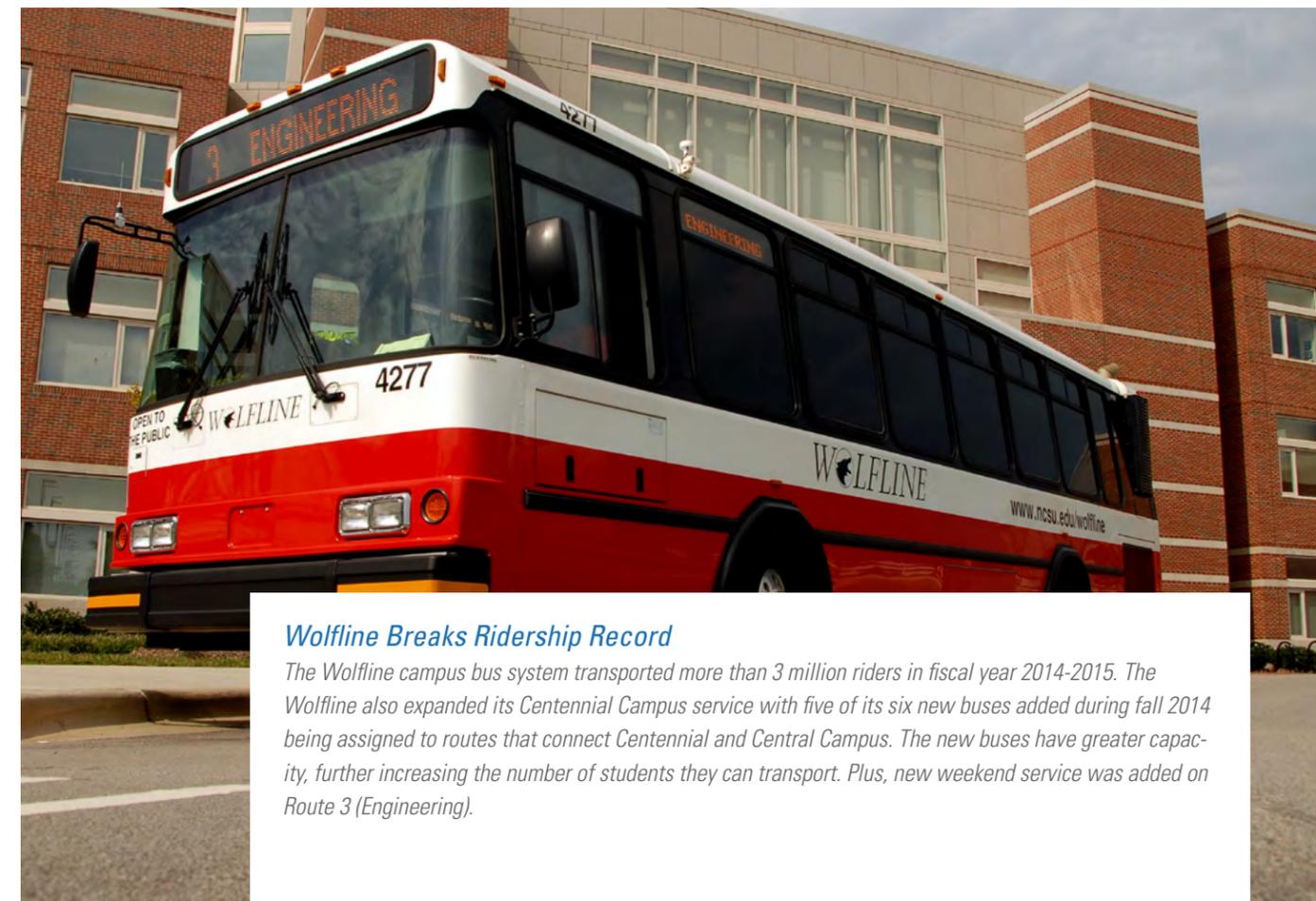
COMMUNITY AND CULTURE



TRANSPORTATION

PROPELLING SUSTAINABLE TRANSPORTATION

On a thriving campus, people are on the move. From work to class and everywhere in between, students, faculty and staff travel to, from and around campus. Every year, campus sustainable transportation options grow, reducing energy use and greenhouse gas emissions while creating a more pedestrian-friendly and less congested campus.



Wolfline Breaks Ridership Record

The Wolfline campus bus system transported more than 3 million riders in fiscal year 2014-2015. The Wolfline also expanded its Centennial Campus service with five of its six new buses added during fall 2014 being assigned to routes that connect Centennial and Central Campus. The new buses have greater capacity, further increasing the number of students they can transport. Plus, new weekend service was added on Route 3 (Engineering).



2014-2015 HIGHLIGHTS

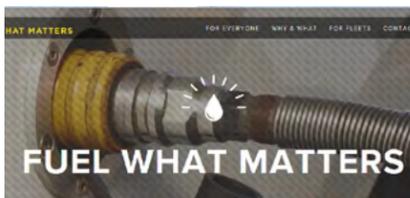


PACK CELEBRATES BIKE TO WORK DAY

NC State Transportation, Institute of Transportation Research and Education, and University Recreation hosted a May 15 breakfast event to celebrate National Bike to Work Day.

CAMPUS ZIPCAR FLEET EXPANDS

The more than 1,000 registered ZipCar users on campus gained access to two new ZipCars in 2015, bringing the total number of NC State ZipCars to seven vehicles in four campus locations.



NC STATE-BASED CENTER LAUNCHES STATEWIDE CLEAN TRANSPORTATION CAMPAIGN

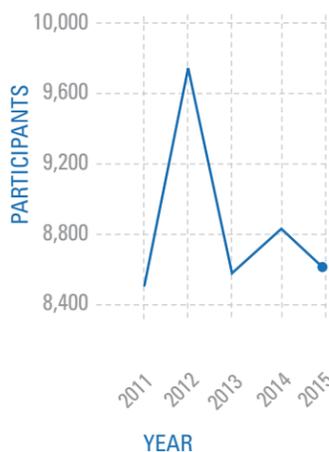
The NC Clean Energy Technology Center at NC State launched Fuel What Matters, a statewide educational campaign, in 2015 to reduce harmful vehicle emissions by encouraging the use of cleaner fuels.



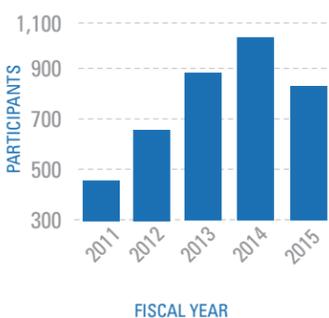
Alternative Vehicles Headline 2014 Campus Sustainability Day

The event, which aimed to accelerate awareness of energy and energy-saving practices, featured more than a dozen alternative vehicles displayed on the Brickyard.

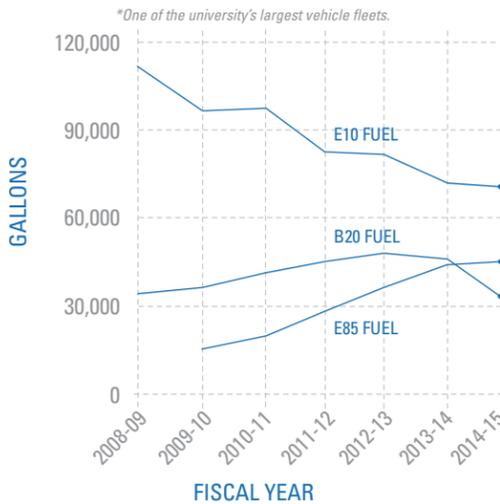
STUDENTS, FACULTY AND STAFF USING GOPASS REGIONAL TRANSIT CARDS



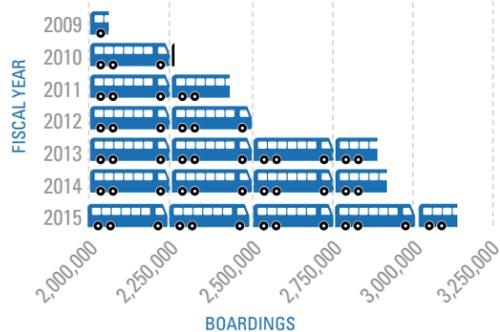
WOLFTRAILS ALTERNATIVE COMMUTING PARTICIPANTS



FUEL TYPE USED IN FACILITIES OPERATIONS FLEET*



WOLFLINE BUS SYSTEM PASSENGER BOARDINGS



Alternative Vehicles Join University Fleet

In 2015, NC State Transportation added a hybrid car to its fleet and NC State Repair and Renovation added a power-assisted bike, creating more sustainable methods of employee travel around campus.



First Campus Bike Lanes Installed

Along Varsity Drive on Centennial Campus, about 2,000 feet of bike lanes were added to promote safer cycling. Shared lane markings (sharrows) were also added on Varsity Drive and near Greek Village student housing.

2014-2015 TACTICS

PROGRESS TOWARD STRATEGIC GOALS

STRATEGY 1: Develop a long-term campus vision addressing alternative transportation, parking, campus connectivity and congestion in coordination with the comprehensive Campus Master Plan.

TACTIC: Execute sequencing plan for phasing of projects for both the 2012 Campus Mobility Plan and 2011 Campus Bicycle and Pedestrian Plan to ensure continued implementation of campus projects.

PROGRESS: Complete and now part of standard operating procedures.

STRATEGY 2: Reduce the consumption of petroleum products throughout the university fleet and procure more alternative fuel and low-emitting vehicles.

TACTIC: Pursue grant opportunities for the procurement of electric vehicle charging infrastructure targeted for North Campus and Central Campus.

PROGRESS: A grant was submitted to the NC Clean Energy Technology Center in fall 2014 seeking funding to purchase two electric vehicle charging stations. This tactic will be pursued further in fiscal year 2015-2016.

TACTIC: Prepare for a new request for proposal (RFP) process on the Wolfline (campus bus system) operations contract.

PROGRESS: The development of the RFP is underway and anticipated to be released in fall 2015 with vendor selection targeted for spring 2016.

STRATEGY 3: Increase Wolfline ridership and ensure that this campus bus system continues to provide a high level of service that meets user needs.

TACTIC: Begin Sunday daytime service for the Route 8 (Southeast Loop).

PROGRESS: Complete.

TACTIC: Reconfigure Route 10 (Southside Circulator), per the Campus Mobility Plan, to serve the Gorman Street area.

PROGRESS: Complete.

STRATEGY 4: Improve bicycle and pedestrian access on campus.

TACTIC: Implement phasing/sequencing of projects from the 2011 Campus Bicycle and Pedestrian Plan on an annual basis.

PROGRESS: Complete. This is now standard operating procedure in close collaboration with the Office of University Architect and Design and Construction Services.

TACTIC: Expand bicycle racks on buses to Route 3 (Engineering).

PROGRESS: Complete. Bike racks on buses is now standard for all new buses in the Wolfline's fleet.

TACTIC: Track campus bicycle locker and clothing locker rentals.

PROGRESS: Complete. Usage is now tracked and ensures timely processing of new memberships/renewals.

TACTIC: Partner with City of Raleigh on the "Watch For Me NC" pedestrian and bicyclist safety campaign.

PROGRESS: Complete. Program efforts occurred in fall 2014 in close collaboration with Campus Police, Union Activities Board, University Housing, University Sustainability Office and University Recreation.

STRATEGY 6: Maximize the use of the alternative fuel offered at NC State's fueling facility.

TACTIC: Ensure all new light-duty vehicle acquisitions processed through University Purchasing comply with the U.S. Department of Energy's Energy Policy Act (EPAAct), which requires 75 percent of all light-duty vehicle purchases to be alternative-fuel capable.

PROGRESS: Recommendations have been submitted to university administration but review has been delayed due to leadership transitions. Forward tactic to next fiscal year.

TACTIC: Create a university policy requiring the use of alternative fuel in all flex-fuel vehicles.

PROGRESS: This guideline is in the university's sustainability standard operating procedures (SOP). Recommendations have been submitted to university administration but review has been delayed due to leadership transitions. Forward tactic to next fiscal year.

TACTIC: Research the university's current vehicle fleet to determine which vehicles are capable of using alternative fuel and reprogram their fuel key accordingly.

PROGRESS: Recommendations have been submitted to university administration but review has been delayed due to leadership transitions. Forward tactic to next fiscal year.

STRATEGY 7: Reduce air pollution, greenhouse gas emissions and excess fuel consumption by vehicles.

TACTIC: Create a "Best Operating Practices" procedure for state-owned vehicle operations.

PROGRESS: Recommendations have been submitted to university administration but review has been delayed due to leadership transitions. Forward tactic to next fiscal year.

STRATEGY 8: Analyze university-owned vehicles and processes for key efficiencies that can be implemented to achieve a more sustainable fleet size, content and operating practices.

TACTIC: Review recommendations of third party consultant regarding universal fleet policies.

PROGRESS: Recommendations have been submitted to university administration but review has been delayed due to leadership transitions. Forward tactic to next fiscal year.

ENERGY AND WATER

ACCELERATING CAMPUS UTILITY EFFICIENCY AND COST-SAVINGS

Energy and water are among a university's most necessary and costly expenses. NC State's aggressive energy management strategies are designed to minimize costs, save natural resources and reduce greenhouse gas emissions. These conservation strategies are successfully reducing campus energy and water use while enabling the university to progress toward surpassing state-mandated utility reduction goals.



Recommissioning Team Spurs Savings
The campus recommissioning team performed comprehensive HVAC audits and repairs on Partners II and Engineering Building I, generating nearly \$200,000 in cost savings during fiscal year 2015. Carmichael Recreation Center was also recommissioned and will begin accruing savings in fiscal year 2015-2016.



Winter Break Energy Savings Top \$2.7 million
NC State saved \$274,987 in avoided energy costs during winter break. Since the Winter Holiday Energy Savings Initiative began in 2004, more than \$2.76 million in utility costs have been avoided.



Residence Halls Receive Energy Retrofits
Among University Housing's energy efficient renovations are installation of LED lighting, wireless thermostat systems, replacement windows and other mechanical equipment designed to generate energy savings and enhance indoor air quality for student residents in the Tri-Towers, North Hall, Watauga Hall, select Greek Housing, Lee Hall, Sullivan Hall and Bragaw Hall.



Students Compete to Conserve Energy
Facilitated by University Housing and the NC State Stewards student group, two October 2014 residence hall competitions, Wolf Ridge Energy Challenge and Tri-Towers Energy Challenge, saved nearly \$9,000 in utility costs.



Real-Time Energy Use Tracked
A new campus dashboard was installed that allows the campus community to view and track building energy reduction online and on digital displays.



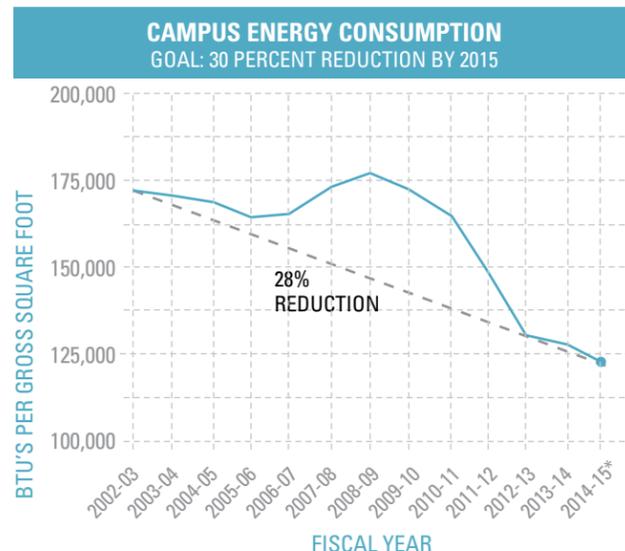
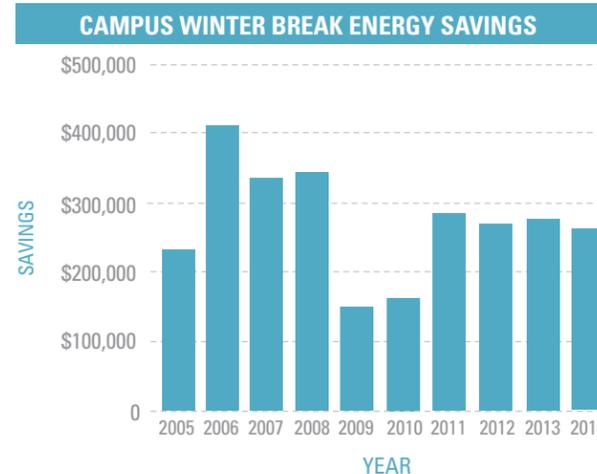
Summer Schedules Net Energy Savings
In July 2014, cooling was reduced in campus buildings when classrooms were not in use in order to save energy. The initiative expanded in 2015 to include Maymester, Summer I and Summer II sessions.

2014-2015 HIGHLIGHTS

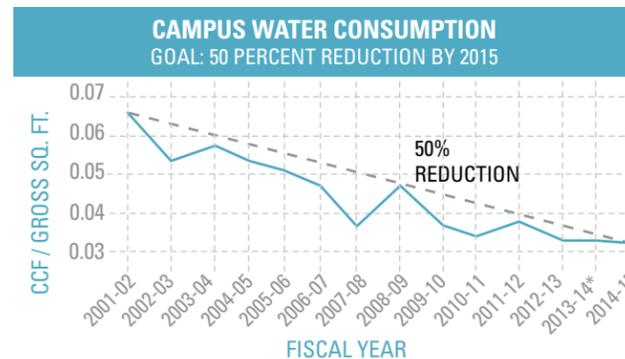


SOLAR SOAKS UP SAVINGS ON PARTNERS I

Nearly 100 solar panels generating approximately 29,000 kwh of electricity annually were installed in April 2015 and are expected to produce energy for at least 25 years. Strata Solar donated the panels to NC State to support the university's renewable energy and smart grid research.



*Building on the previous methodology for calculation, this year the metric was aligned with the U.S. Department of Energy measurement protocol, which more accurately accounts for energy efficiency gains from the university's cogeneration utility plant that opened in 2012. The numbers reported above for fiscal year 2012-2013, 2013-2014 and 2014-2015 reflect application of the new methodology. Browse NC State's Annual Energy and Water Report for additional information: go.ncsu.edu/energywaterreport



*This number was audited and updated to reflect a 49% reduction.



LEDs Boost Lab Lighting Quality

In January 2015 more than 100 outdated lighting fixtures at the Asheville-based NC State Minerals Research Lab were replaced with LEDs that improved lighting quality and energy efficiency.



Park Scholars Leave Solar Legacy

NC State's Park Scholars led the installation of an outdoor solar sculpture on Centennial Campus. The sculpture, which allows users to charge electronic devices with solar energy, will be completed in fall 2015.



Chancellor Signs Energy Commitment

In February 2015, NC State's Chancellor Randy Woodson endorsed Accelerate Energy Productivity 2030, which commits NC State to improving its energy productivity.

2014-2015 TACTICS

PROGRESS TOWARD STRATEGIC GOALS

STRATEGY 1: Achieve a 30 percent reduction in building energy consumption by 2015 against the 2003 baseline.

TACTIC: Continue developing more accurate semester building schedules to operate building mechanical systems that are aligned with actual building use. Install zone override buttons to accommodate building occupants. Cultivate a working relationship with the Registration and Records Office to develop energy conscientious classroom schedules.

PROGRESS: A summer setback scheduling program was launched during the Summer II session in 2014. This ongoing effort between Registration and Records, Building Maintenance and Operations, University Sustainability Office, and Energy Management consolidates classroom usage over the summer in an effort to reduce utility and maintenance costs and improve safety.

TACTIC: Implement the fourth energy performance contract as funding is available.

PROGRESS: Design is in progress. Forward to next fiscal year.

TACTIC: Complete the next phase of SCADA (supervisory control and data acquisition) implementation, including automated switch upgrades at Centennial Campus and installing SCADA at the Centennial Biomedical Campus substation.

PROGRESS: Complete.

TACTIC: Implement the next phase of the D.H. Hill Library BAS (building automation system) upgrade.

PROGRESS: Incomplete due to lack of funding. Final completion of the 2nd - 9th floors of the South Tower is anticipated in fiscal year 2016.

TACTIC: Continue recommissioning activities at selected energy-intensive campus buildings as funding is available.

PROGRESS: Buildings recommissioned this year are First Year College, Carmichael Recreation Center, and 50 percent of Engineering Building I, which was not completed because of the discovery of substantial repairs requiring major funding.

TACTIC: Continue steam trap survey and replacement program as funding is available.

PROGRESS: Complete.

TACTIC: Work with Environmental Health and Safety to upgrade or remove/replace older, inefficient campus fume hoods. Provide shared funding to facilitate energy conservation while still maintaining rigorous health/safety standards.

PROGRESS: No progress. Forward to next fiscal year.

TACTIC: Continue campus energy awareness campaign to encourage building occupants to implement energy conservation measures.

PROGRESS: Energy conservation emphasis through Change Your State, the campus sustainability awareness campaign, continues.

STRATEGY 2: Achieve a 50 percent reduction in building water consumption by 2015 against the 2002 baseline.

TACTIC: Continue implementation of wi-fi water meter reading technology to obtain real-time water consumption data. Integrate leak detection

reporting to flag wasteful conditions.

PROGRESS: No progress. Forward to next fiscal year.

TACTIC: Install autoclave water miser devices in lab buildings.

PROGRESS: 12 water miser units were installed to reduce water consumption in labs.

TACTIC: Utilize students to audit water-intensive buildings and identify water conservation opportunities.

PROGRESS: The NC State Stewards student group performed water and energy assessments at Carmichael Gym and Honors Village Commons. They also managed energy and water competitions in October at the Tri-Towers and Wolf Ridge residence halls.

TACTIC: Upon completion of the new re-use water line on Centennial Campus, quantify potable water consumption and cost avoidance.

PROGRESS: New water meters were installed at all five utility plants, and the City of Raleigh re-use water supply line will be installed in 2015.

STRATEGY 3: Improve energy data management capabilities and make data-driven decisions utilizing enhanced energy data.

TACTIC: Complete the second year of measurement and verification reporting for both major energy performance contracts on campus.

PROGRESS: Complete.

TACTIC: Quantify key performance metrics (inputs and outputs) for campus district energy plants (both individually and aggregated).

PROGRESS: Progress made and efforts will continue during fiscal year 2015-16.

TACTIC: Complete state-required measurement and verification reporting for selected buildings.

PROGRESS: Complete. Building performance data was provided to the state in fall 2014.

STRATEGY 4: Train and educate staff and building end-users to properly operate and maintain building systems in an energy efficient manner.

TACTIC: Continue College of Textiles building occupant energy reduction pilot program started in May 2014.

PROGRESS: Complete.

TACTIC: Complete the integration of energy dashboards on campus and promote availability of this new real-time reporting technology.

PROGRESS: Complete. The energy dashboard is fully integrated. More meters and buildings can be added to the dashboard at any time. Dashboards are being displayed at some campus buildings and are also available on the NC State Sustainability website.

TACTIC: Publish the twelfth edition of the NC State Strategic Energy and

Water Report for fiscal year 2014-2015.

PROGRESS: Complete and available online at go.ncsu.edu/energywaterreport.

TACTIC: Continue to utilize students to identify campus energy and water conservation opportunities.

PROGRESS: The NC State Stewards student group performed water and energy assessments at Carmichael Gym and Honors Village Commons. They also managed energy and water competitions in October at the Tri-Towers and Wolf Ridge residence halls.

STRATEGY 5: Ensure a cost-effective and reliable energy supply by developing business scenarios and strategies for diversifying fuel sources.

TACTIC: Issue a request for proposal to qualified transport marketers for the period 2016 through 2021. Upon award, lock in natural gas strips that meet the procurement program.

PROGRESS: Complete. A one-year contract was awarded and natural gas strips are placed through 2016.

STRATEGY 6: Evaluate utility financial structures that create incentives for saving energy.

TACTIC: Refresh the ultra-low temperature freezer rebate program in campus labs as funding is available.

PROGRESS: No progress. Forward to next fiscal year.

STRATEGY 7: Implement green standards and practices for information technology and computing.

TACTIC: Continue collaborating with the Office of Information Technology's Green IT Committee to identify and implement energy conservation best practices.

PROGRESS: Progress toward computer power management on campus continues. A new how-to beta website was developed and is expected to go live in 2016.



GREEN DEVELOPMENT

BUILDING AN EFFICIENT, SUSTAINABLE CAMPUS

NC State's campus serves as a living laboratory for students, providing hands-on learning opportunities in smart resource management and environmental sustainability. By applying innovations that increase human health and well-being while reducing the environmental footprint of campus, NC State models environmental, social and economic sustainability in the local and global community.



Students Add Garden, Apiary
With a grant from the student Sustainability Fund, a group of College of Veterinary Medicine students established a habitat for bees and an educational community garden just outside the college's main building.

2014-2015 HIGHLIGHTS



TALLEY STUDENT UNION OPENS

Concluding a multi-year renovation, Talley Student Union opened in summer 2015. The 283,000-square-foot building is expected to earn LEED certification.

STUDENTS CREATE CAMPUS PLANT MAP

The NC State Stewards student group created GIS-mapped campus plant walks that highlight native plants and trees. They also hosted a series of educational plant walks during Earth Month (April 2015).

NUMBER OF CAMPUS CONSTRUCTION, RENOVATION PROJECTS INTEGRATING SUSTAINABILITY TOPS 650

Since LEED certification is only pursued for the construction of major campus buildings, an NC State-specific sustainability standards checklist was developed to ensure that sustainability principles are incorporated into smaller campus projects, including more than 650 in fiscal year 2014-2015.



Campus Apartments Earn LEED Certification

Wolf Ridge Apartments, which opened in August 2014, received LEED Silver certification for sustainable features, including a green roof, rainwater cistern and 4,182 energy-efficient LED lights.



Cates Utility Plant Earns LEED Certification

Cates Steam Plant earned LEED Silver certification for its 2012 renovation that included energy efficiency improvements and cogeneration technology.

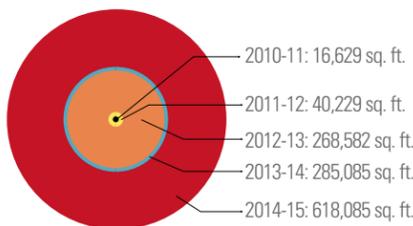


Reynolds Seating Sold to Wolfpack Fans

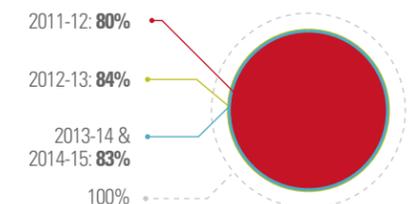
As the renovation of Reynolds Coliseum began, 3,000 of its 1949-era seats were removed and sold instead of being sent to local landfills. The building's renovation is designed for LEED certification.



LEED CERTIFIED SPACE ON CAMPUS



PERCENTAGE OF CAMPUS BUILDINGS WITHIN A 600-FOOT WALK OF A COURTYARD, PLAZA OR NEIGHBORHOOD STREET



2014-2015 TACTICS

PROGRESS TOWARD STRATEGIC GOALS

STRATEGY 1: Update the campus Physical Master Plan to integrate and coordinate transportation, land use, utilities, buildings and stormwater planning.

TACTIC: Publish 2014 Master Plan poster and provide a user-friendly website version.

PROGRESS: Complete. Posters were printed and are being shared with the campus community. The online version of the document was posted in January 2014 using software that eases navigation and printing individual page spreads.

STRATEGY 2: Adopt a sustainability vision statement and include it as part of the scope statement for all projects more than \$500,000.

TACTIC: Post departmental project lists on the Facilities and Sustainability website and indicate sustainable features on selected projects.

PROGRESS: This tactic was modified to develop tiered sustainable standards that apply to all non-LEED projects. Tiered sustainable standards, which will be posted on the Sustainability website, have been developed to apply to all design and construction on campus.

TACTIC: Inform academic and self-liquidating groups on campus that renovations need to consider sustainable features in design.

PROGRESS: The Green Building Checklist was introduced at the College Facility Coordinator meeting on March 17, 2015.

TACTIC: Complete requirement for contractor qualifications to include sustainability for formal projects.

PROGRESS: A review determined that although sustainability experience is not currently a factor in selection of contractors for small projects, NC State does often utilize contractors with previous campus experience, which offers continuity and exposure to campus sustainability programs. Appropriate ways to integrate sustainability experience into the pre-qualification process will continue to be considered.

STRATEGY 3: Integrate sustainable strategies for all new construction and renovation projects including publicly owned, privately owned, and leased or partnership properties.

TACTIC: Arrange for design projects managers to visit other North Carolina college campuses to research projects that have integrated interesting or new sustainable approaches.

PROGRESS: With a microgrant from NCAPPA, staff will travel to the NC Zoo and Elon University in fall 2015 to review facility best practices related to sustainability.

TACTIC: Complete sustainability guidelines for use on all campus projects.

PROGRESS: Tiered sustainability design and construction standards have been approved, and Capital Project Management is inserting standards into existing documents to make the guidelines actionable.

TACTIC: Develop and implement small project specifications and standard details that will be located on standard drawing sheets.

PROGRESS: Carry forward this tactic to fiscal year 2015-2016. Cover sheets will utilize targeted "Tier" descriptions from the sustainability project requirements that are appropriate given the project budget/size.

TACTIC: Integrate sustainability into standard Ground Lease for Centennial Campus.

PROGRESS: Carry forward to fiscal year 2015-2016. Sustainability is being integrated into Centennial Campus ground lease projects on a project-by-project basis. Future projects include the StateView Hotel and Textiles Innovation Center, which are seeking LEED Silver certification.

STRATEGY 4: Exceed NC State's established minimum commitment to achieve LEED Silver certification.

TACTIC: Use site project notification signage or maps to communicate projects with sustainability features.

PROGRESS: The Campus Sustainability Map is a new tool that can communicate project information on the Sustainability website. There are many departments running different online maps. Integration of GIS mapping across campus will be a tactic in fiscal year 2015-2016.

STRATEGY 5: Give priority to holistic building and property modifications that maximize efficient and effective resource use.

TACTIC: Focus on space utilization planning to enforce NC State's Sustainability SOP, which shifts emphasis from new construction to improving existing campus assets/buildings.

PROGRESS: A memo was sent to all colleges in September 2014. Initial reports were run and deemed unsatisfactory due to limited participation. Met with 10 colleges and the Graduate School to follow up. Office space efforts will be finalized in fall 2015.

STRATEGY 6: Design new buildings and utilize existing facilities as long-term, flexible resources.

TACTIC: Implement post-occupancy survey program to determine how select projects are performing after one year. Include energy use, comfort and value questions about project implementation to learn if the project was a long-term success, and if not, what the issues were.

PROGRESS: Occupants have been surveyed to ensure expectations have been met with regard to comfort and indoor air quality. Tier I-III of the sustainability project requirements will include team evaluation of project success. A survey has not been systematically deployed to all building projects.

STRATEGY 7: Enhance utilization and management of campus and building space to increase efficiency and reduce the need for new construction.

TACTIC: Continue project that tags people to office space and begin running reports to identify under-utilized space.

PROGRESS: Ongoing with particular emphasis on personnel within academic colleges. Office space efforts will be finalized in fall 2015.

TACTIC: Tag researchers with research space on campus to identify under-utilized space.

EVENTS, AWARDS AND HONORS

PROGRESS: Research space reports will be run in winter 2015 and follow up will be scheduled as necessary.

STRATEGY 8: Create pedestrian-friendly, mixed-use neighborhoods to reduce the distance between necessary services and to avoid single occupant vehicle use.

TACTIC: Complete Morrill Drive gateway and pedestrian safety project.

PROGRESS: Complete. Project added new walkway on the east side of Morrill Drive to Wood Hall driveway. Light levels in the area now meet campus standards.

TACTIC: Update Recreation Sports Master Plan.

PROGRESS: Complete. The plan updated the cost estimates for key projects including new play fields at Varsity Drive.

TACTIC: Complete Varsity Drive bicycle safety project.

PROGRESS: Complete. New sharrows and bike lanes are installed.

TACTIC: Update the Landscape Implementation Plan.

PROGRESS: The Landscape Implementation Plan will be updated in the 2015-2016 fiscal year.

STRATEGY 9: Improve the acreage of campus open spaces.

Strategy update: Change the strategy title to "improve" instead of "increase" so that it also focuses on enhancing existing open space in addition to increasing acreage of open space.

STRATEGY 10: Increase the percentage of undergraduate students living on campus to reduce transportation needs and to enhance retention.

TACTIC: Evaluate an alternative strategy/metric for tracking this strategy's progress (e.g. close "off campus housing" is walkable, too).

PROGRESS: Ongoing. List is being created of off-campus housing addresses and distances from campus.

STRATEGY 11: Create and administer a Stormwater Master Plan for campus in conjunction with the NC State Stormwater Programs and the comprehensive Campus Master Plan.

TACTIC: Develop a regional priority projects list for creating regional stormwater plan, including budgets for plans.

PROGRESS: An inventory project for parts of North and Central Campus precincts and planning to improve storm water management for the Dan Allen Drive corridor have been completed.

TACTIC: Create a Stormwater Working Group.

PROGRESS: Ongoing. Leadership for this potential collaborative will be identified.

STRATEGY 12: Improve and enhance campus natural areas and habitats.

Strategy update: Remove "open spaces" from the strategy name since Strategy 9 includes open spaces.

STRATEGY 13: Strengthen the campus Tree Reforestation Plan.

TACTIC: Create Street Tree Master Plan for Dunn Avenue.

PROGRESS: Complete.

TACTIC: Create Street Tree Master Plan for Dan Allen Drive.

PROGRESS: Complete.

TACTIC: Submit Greek Village Conservation Plan to City of Raleigh.

PROGRESS: On hold due to staffing shortages.

STRATEGY 14: Develop a land management plan for Lake Raleigh Woods.

TACTIC: Draft recommendations for the Lake Raleigh Woods Management Plan.

PROGRESS: Data collection and analysis is complete. Initial recommendations regarding trail locations and permitted uses have been drafted. College of Natural Resources graduate students will finalize draft plan in fall 2015 to manage research, teaching and recreation uses.

TACTIC: Involve classes in invasive species eradication.

PROGRESS: There was not an opportunity for this type of class project during the 2014-2015 fiscal year. The opportunity will be discussed as a possibility for future semesters as a partnership between Grounds Management and faculty from College of Natural Resources and College of Agriculture and Life Sciences.

STRATEGY 15: Employ best practices for sustainable operation of campus buildings and grounds such as integrated pest management, biodiversity, green cleaning, composting, recycling and water reuse.

TACTIC: Pilot the LEED Operations and Maintenance rating system through the LEED Laboratory course.

PROGRESS: A LEED Lab course was held in fall 2014 and the rating system was evaluated using Nelson Hall as the subject building. Changes to the course and building were implemented based on feedback.

GREEN DEVELOPMENT



NC State's Campus Environmental Sustainability Team recognized outstanding campus sustainability contributions with **2015 Green Brick Awards** to student Hannah Frank, staff member David Johnson, faculty member Danesha Seth-Carley and University Student Centers.



NC State received **Carolina Recycling Association's Outstanding College or University Program Award** for its pizza box composting program.

Winds of Change, the journal of the American Indian Society for Engineering and Science, named NC State as a leader in academic programs focused on sustainable energy.

Alpha Kappa Alpha Sorority, Delta Zeta Sorority and Sigma Chi Fraternity received the **Most Sustainable Chapter Awards** at the annual NC State Greek Life Awards.



2015 City of Raleigh Environmental Awards received by the NC State community:

- Institutional Innovation Award for the university's interdisciplinary LEED Lab course
- Green Building Residential Design Award for the NC Cooperative Extension Residential Energy Efficiency Program
- Environmental Awareness Award for the Sustainable Planning and Urban Sightseers (SPUDS) trip offered by NC State's EcoVillage Living and Learning Village
- Youth Award to NC State student Eric Rizzo for his leadership of the NC State Stewards
- Second place in the public service announcement competition to NC State student Carson Nguyen



The Princeton Review named NC State in its annual **Guide to 322 Green Colleges**, which identifies the nation's most environmentally friendly universities.

NC State's Jenkins MBA program was featured as a leading program making a social and environmental impact and the NC State graduate Net Impact chapter was highlighted as a Gold chapter in **Net Impact's 2014 Business as UNusual Guide**.



NC State University received the **2014 APPA Sustainability Award** in recognition of sustainability excellence in campus educational facilities. NC State is the first public university in North Carolina to receive the award from APPA, a professional association of more than 10,000 education facilities professionals from 1,300 educational institutions.

2014 Sir Walter Raleigh Awards recognized NC State's student-designed and built Artist's Backyard for excellence in resource conservation, preservation of Raleigh's natural features and exemplary design.



SUSTAINABILITY-RELATED CAMPUS EVENTS DURING FISCAL YEAR 2014-2015:

2014

Poole College Green Event Planning Workshop, July 11
Home Energy Conservation Workshop, Aug. 12
Genetics, Food and Society, Aug. 19
Packapalooza, Aug. 23
WE Recycle in Football Tailgating Lots, Home Game Saturdays in the Fall
SOUL Garden Workdays, Saturdays in the Fall
Local. Sustainable. NC State Soccer Game, Sept. 4-5
AgDay at NC State's Football Game, Sept. 6
Net Impact Welcome Meeting/Ice Cream Social, Sept. 11
The Cookstove Initiative, Sept. 12
Intersections of Genetics and Society, Sept. 19
Global Climate Change Lecture, Sept. 29

Bountiful Harvest Food Drive, Oct. 8-Nov. 7
Alternative Vehicle Showcase, Oct. 15
More Than Money (MTM) Careers Workshops, Oct. 22
WESA Food Waste Awareness, Oct. 22
Innovative Women's Conference, Oct. 24
SOUL Garden Workday, Oct. 25
Dinners with Purpose featuring John Replogle, Oct. 29
Slow Food Potluck, Oct. 30
Poole College of Management Industry Speaker and Net Impact Lunch 'N' Learn Series with Shawn Heath from Duke Energy, Nov. 4
Net Impact Lunch 'N' Learn Series Featuring Mark Schmidt of John Deere, Nov. 5
Faculty Workshop: Building Sustainability Into Your

Courses, Nov. 10
A Conversation With Amory Lovins, Nov. 10
Recycling Tour at the Sonoco recycling facility, Nov. 12
Discussion with Author Paul Roberts, Nov. 13
NC State Celebrates America Recycles Day, Nov. 13
Zero Waste Events Workshop, Nov. 13
Speed Networking for Social Entrepreneurs, Nov. 18
Poole College of Management Industry Speaker and Net Impact Lunch 'N' Learn with Bruno Sarda of Dell, Nov. 20
Water Walk, Nov. 22
Sustainability in Research Seminar with Guler Aras, Dec. 1
Human Rights Day Observance, Dec. 12

2015

Roots & Shoots Speaker Series: Diversity in Conservation, Jan. 15
NC State Pop Up: Sustainability, Entrepreneurship and Innovation, Jan. 22
Free Film Screening: *Fed Up*, Jan. 27
Genetic Engineering Documentary Series, Jan. 29
Net Impact Lunch 'N' Learn with Anne Kilgore of Eastman Chemical Company, Feb. 4
Science Unscripted: Alex Manda, Feb. 9
Smart Grid (R)evolution, Feb. 11
Net Impact Lunch 'N' Learn with Louis Ferretti of IBM, Feb. 25
The EcoTalk: How to Live Sustainably at NC State, Feb. 25
Slow Food Potluck, Feb. 26
North Carolina Student Energy Network Spring Retreat, Feb. 27-March 1
Poole College Sustainability Initiative Curriculum Development Seminar and Research Seminar, March 4
Environmental, Water Resources, and Coastal Engineering Research Symposium, March 6
The Shale Gas Revolution: Green Energy or a Bridge to Nowhere?, March 6
Paper Shredding & Recycling Drive, March 11
Water Resources Research Institute Annual Conference, March 18-19
Who Cares? Documentary Screening Event, March 18

Coffee & Viz - Gary Lackmann, March 20
Change Your State's Water Month Fair, March 23
Author Event and Book Release: *Lentil Underground* by Liz Carlisle, March 24
Sustainability Initiative Industry Speaker Series and Net Impact Lunch 'N' Learn with Laurie Zelnio of John Deere, March 25
Rubbage Ride, March 28
College of Vet Medicine Open House, March 28
Environmental Exploration Day, March 28
Plant Walk Fridays, Fridays in April
Tai Chi at Lunchtime, Tuesdays in April
Harrelson Lecture with Fabien Cousteau, April 6
Lunge and Learn, April 7
Norman Borlaug Lecture Series, April 8
Poole College Wells Fargo Lecture, April 8
Rethinking Food Systems, April 9
Wastelands and Wilderness: Nuclear Lands, April 10
Earth Day Planter, April 11
Kay Yow Spring Football Game, April 11
Global Engagement Exposition, April 14
Water Resource Impacts During Unconventional Shale Gas Development with Hydrofracking: The Pennsylvania Experience, April 15
Drilling to Explore the Transformation of Bedrock into Soil in the Deep Critical Zone, April 16

Movie Screening: *Disruption*, April 16
Green Brick Awards, April 17
Climate Change: Whom Do We Trust?, April 18
WESA Cat, April 18
Day Hike and Yoga at Eno River State Park, April 19
Agroecology Farm Spring Fling, April 19
Earth Month Walk, April 20
The Game of Life, April 20
The Genius of Earth Day: How a 1970 Teach-In Created the First Green Generation, April 20
Faith and Sustainability, April 20
Net Impact and Supply Chain Club Lunch 'N' Learn with Matthew Drown of Caterpillar, April 21
State of the Sciences with Madeline Jacobs, April 21
State Energy Conference, April 21-22
Sustainable Cinema Free Film Series: Plastic Paradise, April 21
Earth Fair, April 22
What Everyone Should Know about Going Public: The Broader Impacts of Citizen Science, April 22
Farm Feast, April 22
Pack N Give, April 20 - May 11
Sustainable Cinema Film Series: *Shored Up*, April 28
Bike to Work Day Pit Stop, May 15
Founding of the Farm at Black Mountain College, June 30

EVENTS, AWARDS AND HONORS



ACKNOWLEDGEMENTS AND CONTACT INFORMATION

NC State's Annual Sustainability Report is produced on behalf of the Campus Environmental Sustainability Team by the University Sustainability Office.

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CERTIFIED WOLFPACK SUSTAINABLE EVENTS (CAMPUS EVENTS THAT ACHIEVED CERTIFICATION AT THE FOLLOWING LEVELS)

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NC State More Than Money Careers Workshops, Oct. 22, 2014
Poole College of Management Sustainability in Research Seminar, Dec. 1, 2014
Facilities Division Recognition Luncheon, Dec. 12, 2014



STEWARD

Poole College of Management Green Event Planning Workshop, July 24, 2014
Tri-Towers Energy Challenge Kickoff, Sept. 30, 2014
Repair and Renovation Chili Cook Off, Oct. 10, 2014
NC State Alumni Association Brewery Tour, Oct. 23, 2014
Poole College of Management Industry Speaker: Shawn Heath from Duke Energy, Nov. 4, 2014
Net Impact Lunch 'N' Learn Series Featuring Mark Schmidt, Nov. 5, 2014
Poole College of Management Faculty Workshop: Building



Sustainability into Your Courses, Nov. 10, 2014
Poole College of Management Zero Waste Event Planning Workshop, Nov. 13, 2014
Poole College of Management Industry Speaker: Bruno Sarda from Dell, Nov. 20, 2014

CHAMPION

New Employee Orientation, monthly
Center for Geospatial Analytics Forum, weekly fall semester event
Environmental Sciences Program Fall Student Social, Aug. 26, 2014
Alternative Vehicle Showcase, Oct. 15, 2014
Center for Environmental Farming Systems Board Meeting, Oct. 16 and 18, 2014
Center for Environmental Farming Systems Soilbration, Oct. 17, 2014
Center for Environmental Farming Systems Lecture and Reception, Oct. 18, 2014



SOUL Garden, WESA and Slow Foods Halloween Potluck, Oct. 30, 2014
Homecoming, Nov. 2-8, 2014
STS 323Q Hunger Banquet, Dec. 2, 2014
Krispy Kreme Challenge, Feb. 14, 2015
WESA Cat, April 4, 2015
Green Brick Awards, April 17, 2015
Earth Fair, April 22, 2015
Farm Feast, April 22, 2015
State Energy Conference, April 21-22, 2015
End of Year West Campus Party, April 24, 2015
12th Annual On the Dock of the Bay, May 2, 2015
Facilities Business Services Employee Appreciation Cookout, May 19, 2015
East Coast Grounds Managers and Landscape Architect's Conference, June 2-4, 2015
Southeastern Sustainability Network, June 15-17, 2015



View the Annual Sustainability Report online
go.ncsu.edu/SustainabilityReport



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