

The background of the entire page is a photograph of a university campus in autumn. Large trees with vibrant orange and yellow leaves frame the scene. A bright sunburst effect is visible on the right side, where the sun is partially obscured by a tree trunk. In the background, a green lawn is visible with a few people sitting on the grass. A dirt path leads from the foreground into the distance.

NC STATE
UNIVERSITY

ANNUAL SUSTAINABILITY REPORT

FISCAL YEAR 2021



From the Chancellor

As the ongoing pandemic has highlighted, the grand challenges we face as a community, state, nation and world are complex and interconnected. A healthy environment, economy and society are built with collaborative and sustainable solutions, and there's no better place for those bold ideas to become reality than NC State.

Our 2021 Sustainability Report highlights the latest progress in our university commitment to wise stewardship of resources, prudent financial planning and environmentally responsible operations. Incorporating sustainability into our teaching, research and operations creates a more efficient and resilient campus, fosters important research breakthroughs and equips students to lead.

In this report, you will learn about sustainability programs and projects that build awareness, partnerships and solutions. I am proud of our NC State community for addressing important social, economic and environmental challenges and helping create a brighter future for all.



Dr. Randy Woodson, NC State Chancellor



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This report highlights sustainability impact from July 1, 2020 through June 30, 2021.

From the Sustainability Council

In the 2021 NC State Sustainability Report, you will find a year's worth of sustainability impact.

From sustainability-related academics and events to research discoveries and student programs, NC State has continued making progress toward its sustainability goals amid a year of pandemic-related challenges. This report highlights the university's sustainability data, program results, cost savings and more from July 1, 2020 through June 30, 2021. You will find updates on new and existing sustainability programs, projects and practices that positively impact our campus community and beyond.

On behalf of the NC State Sustainability Council, thank you for your interest in the university's sustainability efforts. Together, we are creating environmental, social and economic solutions that improve our campus, community and world.

Dr. Stephen Kelley
Co-Chair, Sustainability Council
Professor, Department of
Forest Biomaterials

Allen Boyette
Co-Chair, Sustainability Council
Senior Director, Energy Systems

Carla Davis
Director
Sustainability Office

Academics

Goal: Integrate sustainability into education, experiences and research.

Pivot To Online Learning

Amid COVID-19, many faculty developed creative online tools for virtual learning, including:

- **FOR 339** (Dendrology) undergraduate teaching assistants mapped 100+ campus trees so students could use a Google map to study specimens. These trees now have arboretum tags that allow anyone to learn more about campus trees.
- In **ENV 101** (Exploring the Environment), campus sustainability field trips were transitioned to virtual tours.
- **MBA 582** (Sustainability and Business) worked in small virtual teams on projects with six purpose-driven companies to improve social and environmental impact as part of the B Corp Clinic.
- In **ARC 525** (Sustainability Over The Life Of A Building), students worked in interdisciplinary groups to evaluate the operations and maintenance of a campus facility, doing self-guided tours and then working in virtual groups.



Coastal Resilience and Sustainability Initiative

NC State launched a new Coastal Resilience and Sustainability Initiative to create a more resilient and sustainable future for coastal communities across North Carolina – and around the world. Through an interdisciplinary team of experts, the initiative will work toward actionable solutions that address issues such as climate change and focus on natural ecosystems, coastal plain communities, and rural and agricultural economies for a more sustainable future.

Research Highlights

Sustainability-related research is throughout the university's academic colleges. Here are a few research highlights:

- **Poole College of Management:** Researchers launched an effort to improve working conditions in clothing factories on a global scale by developing and marketing a tool that lets shoppers know how items were made.
- **College of Engineering:** Researchers found that when a power system combines energy storage and solar power generation, the end result is an unexpected reliability boost, which is encouraging news for renewable energy.
- **Wilson College of Textiles:** A successful study coating cotton yarns with enzymes could lead to a new generation of chemical filters, including one that can turn carbon dioxide, a greenhouse gas, into water-soluble baking soda.
- **College of Veterinary Medicine:** Research is ongoing in Malawi to establish effective antimicrobial resistance identification protocols, train researchers and institute effective surveillance systems in southeast Africa.
- **College of Sciences:** A study demonstrated the feasibility of using see-through solar panels in greenhouses to generate electricity.
- **College of Design:** Coastal Dynamics Design Lab continues its N.C. community flood work with grants in Lumberton and Princeville for resiliency planning and investments in greener infrastructure.
- **College of Agriculture and Life Sciences:** Studies are underway on greenhouse gas mitigation through agriculture, carbon sequestration and soil salinity.
- **College of Humanities and Social Sciences:** A study found that more students struggled with basic needs of food security and housing during the pandemic.
- **College of Education:** Researchers identified a teaching strategy that could help students understand climate change and the role that humans play.
- **The Graduate School:** Geospatial Analytics research uses modeling and data visualization to help ensure that decision-making about prescribed burns considers the vulnerability of communities to smoke downwind.
- **College of Natural Resources:** A research analysis found counties with more socially vulnerable populations had a higher density of natural gas pipelines overall, suggesting these counties are also at greater risk of facing water and air pollution, public health and safety issues, and other negative impacts associated with the pipelines.

Undergraduate Course Inventory

NC State offers more than 400 undergraduate courses focused on at least one of the U.N. Sustainable Development Goals (SDGs). Students Vanessa Merritt, Brianna Johns, Elisabeth Ramsey and Marica Thomas created the course inventory with faculty member Seth Murray.

New Graduate Certificate in Disaster Resilient Policy, Engineering and Design

The certificate in the College of Design will educate the next generation of practitioners and scholars to reduce disaster losses and assist communities adapting to a changing climate.

STIR Impact Scholars

The Strengthening The Impact of Research (STIR) program launched to enhance NC State's capacity to design and conduct research with broad impacts on society. The inaugural Spring 2021 class included 12 university researchers studying topics including education, environment and sustainable cities.

Artful Arbor Installed

Fourteen students in Horticultural Science 272: Design Build Studio worked with the Facilities Division's Grounds and Building Services unit to install a new arbor near Kilgore Hall. To boost sustainability, students used organic and native plant species, low impact design, durable and re-purposed building materials and the most easily maintainable plants.



Student Leadership

Goal: Engage students in initiatives that promote leadership and service in sustainability.

Race and Place Seminar Series

The Geospatial Graduate Student Organization hosted a Race & Place seminar series to highlight research that contextualizes race by speaking to environmental justice, equity, diversity and inclusion in the geographical and geospatial sciences.



Students Expand Composting Efforts

With a Sustainability Fund grant, the Zero Waste Wolves student organization worked with University Housekeeping and Waste Reduction and Recycling to add paper towel composting bins into the public restrooms of Bragaw, Lee, Sullivan, Wood, Bowen, Carrol, Metcalf, Bagwell, Becton and Berry Residence Halls; Avent Ferry Complex; and Wolf Village and Wolf Ridge Apartments during fall 2020.



Social Innovation Fellows

NC State's Social Innovation Fellows worked on several sustainability-related projects, including: reducing contamination at the NC State Compost Facility and Research Cooperative, creating an impact report for a Raleigh nonprofit that provides sustainable energy in Uganda, reducing waste in waterways with NC Sea Grant, engaging migrant farm workers about COVID-19 vaccination, broadening awareness of food insecurity among students, and assisting with marketing for a sustainable tourism effort.

Forbes 30 Under 30

Jenkins MBA student Olivia Watkins was named one of *Forbes* 30 Under 30 for social impact for co-founding the Black Farmer Fund, which works to build a resilient food ecosystem and community investment fund to better support Black farmers.



Sustainability Stewards

This fiscal year, the impact of 30 student leaders in the Stewards leadership development program included:

- Hosting an Environmental Justice Symposium, Meatless March activities and the Earth Showcase art exhibit
- Creating a Sustainable Living Certification for students
- Completing grants to install shower timers in a residence hall, as well as create a solar-powered arboretum on campus known as SolarSpace

Winning Idea at Make-A-Thon

The Make-A-Thon sustainability challenge pivoted to virtual in January 2021. Students competed in teams to create the best sustainability solution. The winning idea was an app that connects grocery stores with food-based charities to reduce food waste.



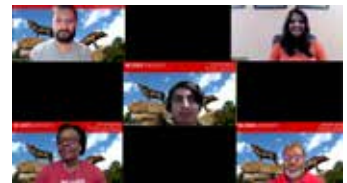
Strawless Step Forward

Students Shannon Dolan and Annalise Hafner received a Sustainability Fund grant to distribute 1,000 reusable straw kits to students on campus. Plus, after observing that coffee locations in Talley Student Union automatically added straws to drinks, Dolan and Hafner reached out to NC State Dining. Within just a few days, straws were moved to the counter and available if students wanted one, resulting in less plastic straw waste.



Ideathon Team

Poole College of Management students placed seventh in the first annual Ideathon Experience. The team, "Pack of Ideas", competed against teams from the Americas, Europe and Asia charged to create and present solutions for a post-COVID world. The team's solution focused on ecology and climate change using electricity-generating stationary bicycles located in gyms, houses and schools.



Sustaining Student-Led Infrastructure Projects

A group of College of Natural Resources students in the CNR Engaging Leaders Program spent the Spring 2021 semester researching the viability of long-term Sustainability Fund projects on campus. The students prepared a written proposal and presentation addressing the challenges and gaps in processes with the sustainability of some funded projects. The proposal also included a set of post-award guidelines and a rubric to increase the longevity of Sustainability Fund projects.



Community and Culture

Goal: Accelerate a culture of sustainability, inclusivity and well-being on campus and in the community.

Sustainability Named A Core Value



In April 2021, the university adopted a new 2021-2030 Strategic Plan and named sustainability as a value:

Sustainability – in our commitment to wise stewardship of resources, prudent financial planning and environmentally responsible operations.

Sustainability Grants Awarded

The NC State Sustainability Fund awarded \$137,000 in grants to projects including:

- A new campus greenhouse to provide campus plants for curriculum and research-based projects
- Rocky Branch Trail Learning Garden, which will include the addition of various edible and pollinator vegetation to sites along this campus trail
- Campus as a Classroom Internship pilot program, which is designed to create sustainability-related student learning opportunities on campus
- Support for the NC State student chapter of Engineers Without Borders to complete a clean water project in Guatemala
- Partial funding for installation of rooftop solar at Fitts-Woolard Hall
- Equipment to create compost tea, which will be tested by Grounds Services on campus landscapes
- Construction for new trails in Lake Raleigh Woods
- Student project known as “SolarPack” that aims to create an affordable solar-powered vehicle
- Development of an Ocean Advocacy Workshop

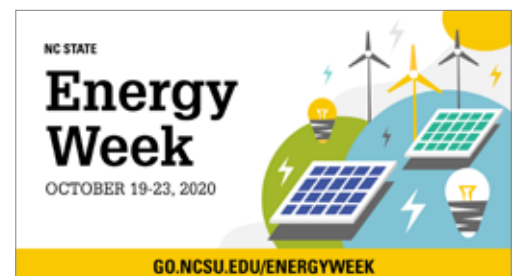
New Inclusive Excellence Certificate

In the fall of 2020, the Office for Institutional Equity and Diversity launched a new campus training program called the Inclusive Excellence Certificate.



Campus Farm Adds Kitchen

The cooking kitchen, developed this fiscal year at the NC State Agroecology Education Farm, provides a venue to facilitate cooking classes for students. Supplementing the teaching kitchen at the newly renovated Carmichael Gym, the farm’s kitchen offers education on a variety of fruits and vegetables, their uses and how they are grown. Classes and workshops serve as a platform to engage students in discussion of global and local challenges of food security and accessibility.



Energy Week Debuts

The NC State Energy Collaborative launched the university’s first Energy Week Oct. 19-23, 2020, with a series of virtual events. The purpose of this new annual emphasis is to increase visibility of the university’s energy use, research and opportunity to shape a clean energy future.

Alternative Service Break

Student Leadership and Engagement offered virtual alternative service break opportunities, including sustainability-related Solar Spark Collegiate Conference and “We are the river” virtual tour with the Coharie Tribe.

Wellness Outreach

NC State Wellness and Recreation reached 1,964 students through its ThriveWell programs and outreach, which included 134 experiences such as educational sessions and workshops, wellness challenges and campus-wide collaborative events.

First SDG Action and Awareness Week

As part of the university’s commitment to the University Global Coalition, NC State Global coordinated a series of campus events as part of UN Sustainable Development Goals Action and Awareness Week March 1-5, 2021.

Sustainability and Innovation Workshop

The Department of Forest Biomaterials offered a summer faculty-led workshop series for the program’s graduate students. Topics included: Green Materials and Biomimicry, Green Chemistry, Environmental Life Cycle Analysis, Techno Economic Tools for Sustainable Economy, Sustainable Design, Start ups, and Sustainable Business and Innovation.

30 events were part of NC State **Earth Month** (April 2021)

642 participants at the **Sustainability Partners** event series hosted by the Staff Senate’s Resources and Environment Committee.

5 campus events achieved **sustainable event certification** during fiscal year 2021.

59 sustainability-related offerings hosted by the **Osher Lifelong Learning Institute (OLLI)** at NC State. The program provides non-credit courses, study trips and events for adults aged 50+.

130 **sustainability-related university events** during fiscal year 2021.

Addressing Food and Housing Security Among Students

- FeedThe Pack Campus Food Pantry distributed 131,800 pounds during 8,936 visits. This fiscal year the pantry began receiving campus-grown produce from the Agroecology Education Farm.
- 1,622 Pack Essentials applications were submitted by students, resulting in: 837 grants provided from the Student Emergency Fund totaling \$333,475, 18 meal scholarships totaling \$23,931, and 1,055 meals provided for students to eat in campus dining halls.
- NC State Steering Committee on Student Food and Housing Security launched a planning effort for a new host home program to prevent student homelessness, secured funding for a graduate assistantship to serve as a basic needs navigator for students and created an online advocacy training course.



Sustainability Partnerships

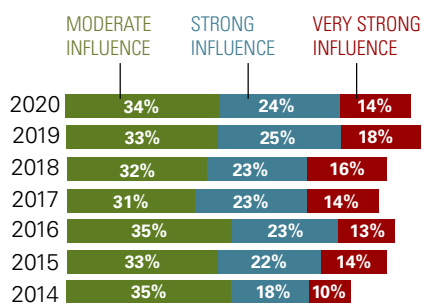
NC State's Office of Partnerships has fielded an increase in companies interested in collaborating with the university to advance their sustainability strategies. Through a new partnership with **FUJIFILM Diosynth Biotechnologies**, NC State is working to support the company's sustainability goals. College of Design researchers are helping shape biodiversity strategies at the company's new facility, which will manufacture life-saving medicines and vaccines. NC State also provides expertise on an ecosystem services approach for the development, which will create 725 jobs and infuse \$2 billion into the state's economy. The sustainability partnership was a key driver in the company's decision

to grow in North Carolina, where it is the largest life sciences investment in state's history.

With the Plant Sciences Initiative set to open in 2022 on Centennial Campus, **BASF** has been a critical partner in its development and funds and mentors students focused on environmental agriculture. Other collaborations over the last year have involved sustainability research in plant sciences and crop protection with the goal of bringing new solutions to market. BASF and NC State have been partners for decades, collaborating on more than 100 research projects.



72% of incoming students in 2020 indicated the university's commitment to the environment and sustainability influenced their decision to attend NC State.



Online Sustainability Orientation

New campus hires engage in a new sustainability orientation online module in reporter.ncsu.edu as part of the employee onboarding process.

Assessing Covid-19's Impact on Students

An October 2020 survey conducted by NC State professor Mary Haskett and staff member John Dorris indicated that 15% of NC State students experienced homelessness since the pandemic began and nearly 25% experienced food insecurity in a 30-day period. The survey also identified declines in wellness and learning, with nearly 90% of students who have experienced homelessness reporting that their learning was negatively impacted by their living situation.

Sustainable Wolfpack

NC State Athletics launched its Sustainable Wolfpack initiative as a part of its aim to be a national leader for innovative practices in sports sustainability. The launch featured a website, online pledge and a new Sustainable Wolfpack annual emphasis at a home football game.

Operations, Planning and Design

Goal: Model sustainability through efficient, innovative facilities and operations that educate the campus community and improve the quality of life.



Here Comes The Sun

NC State partnered with Powerhome Solar to add an array of energy-saving solar panels on top of the Murphy Center in January 2021.

Extended Winter Break Expands Energy Savings

NC State avoided \$389,000 in energy costs from Dec. 24-Jan. 3, which is the typical winter break. Extra setback efforts from Nov. 25-Dec. 23 and Jan. 4-18 collectively generated an additional \$485,000 in avoided energy costs.



Top (Air) Quality

Employees from the Facilities Division and Environmental Health and Safety implemented a comprehensive indoor air quality plan to mitigate against COVID-19.



Bee Campus USA

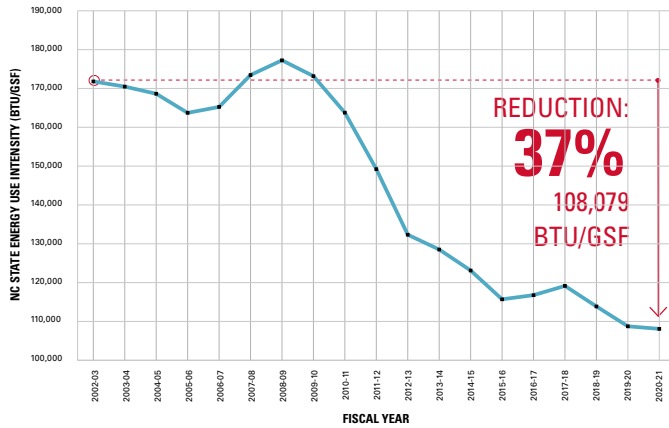
NC State became a certified Bee Campus USA in spring 2021 for its ongoing efforts to conserve pollinator species.



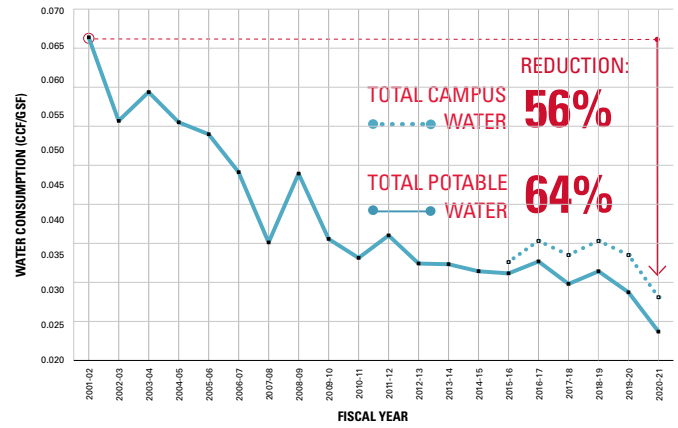
Greenhouse Effect

Grounds Services is saving money and boosting sustainability by growing flowers and plants in its own greenhouse on the west side of campus. The goal is to grow half of the perennials planted on campus, minimizing the amount purchased from suppliers.

CAMPUS ENERGY USE PER GROSS SQUARE FOOT

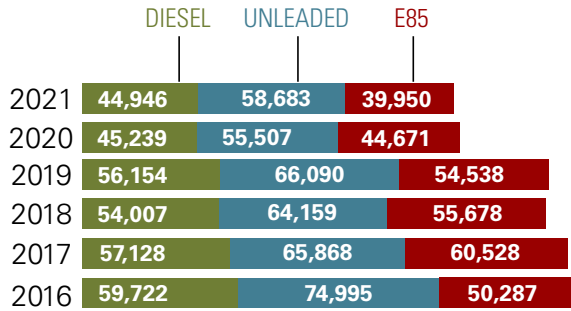


CAMPUS WATER USE PER GROSS SQUARE FOOT

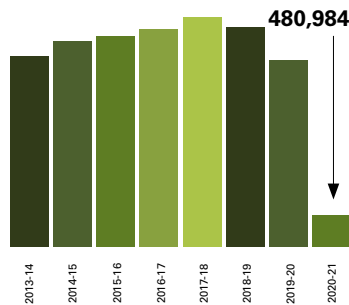


FUEL TYPE USED IN FACILITIES DIVISION*

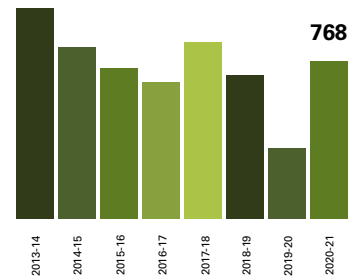
*The Facilities Division, which includes Motor Pool, is one of NC State's largest vehicle fleets



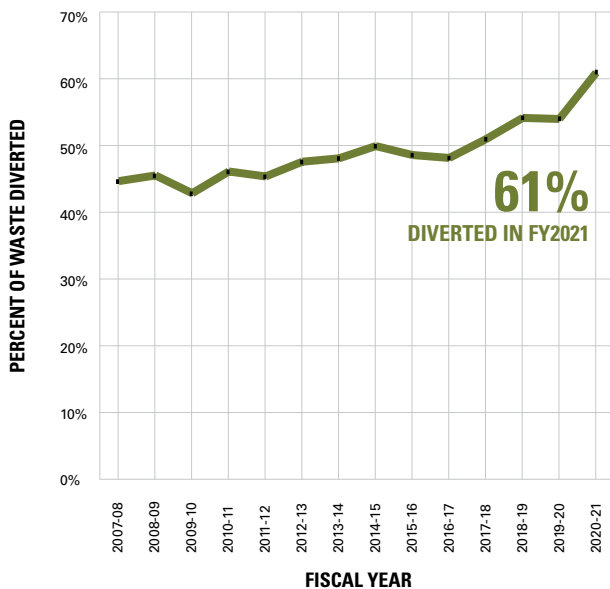
WOLFLINE BUS PASSENGER BOARDINGS



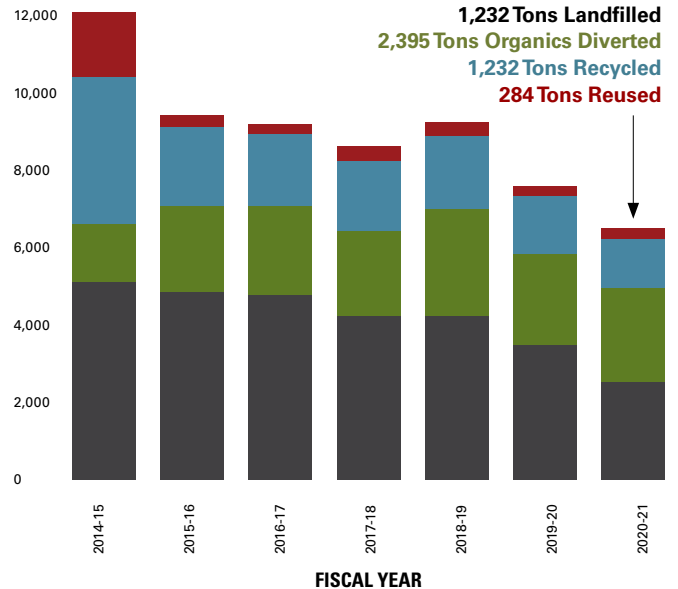
PARTICIPANTS IN WOLFTRAILS ALTERNATIVE COMMUTER PROGRAM



CAMPUS WASTE DIVERTED FROM LANDFILL



TONS OF CAMPUS MATERIAL



Sustainability On The Roof

At Carmichael Gym, Facilities Division employees leveraged the COVID-19 closure to install a roof overlay at a fraction of the estimated cost, extending the life of the existing roof, which frequently required repairs.



Campus Paper Use Declines

The Office of Information Technology (OIT) worked with five new campus units to scan or import 529,023 documents into the OnBase digital document management system in fiscal year 2021, bringing the total number of managed documents to more than 12.5 million. OIT also saw a significant decline in the number of pages printed throughout the campus WolfPrint service, dropping from 1.34 million in 2019-20 to 663,635 this fiscal year.

\$10 Million Milestone

In summer 2021, the collective energy savings generated by Building Maintenance and Operations' Commissioning Team within the Facilities Division topped \$10 million since 2014.

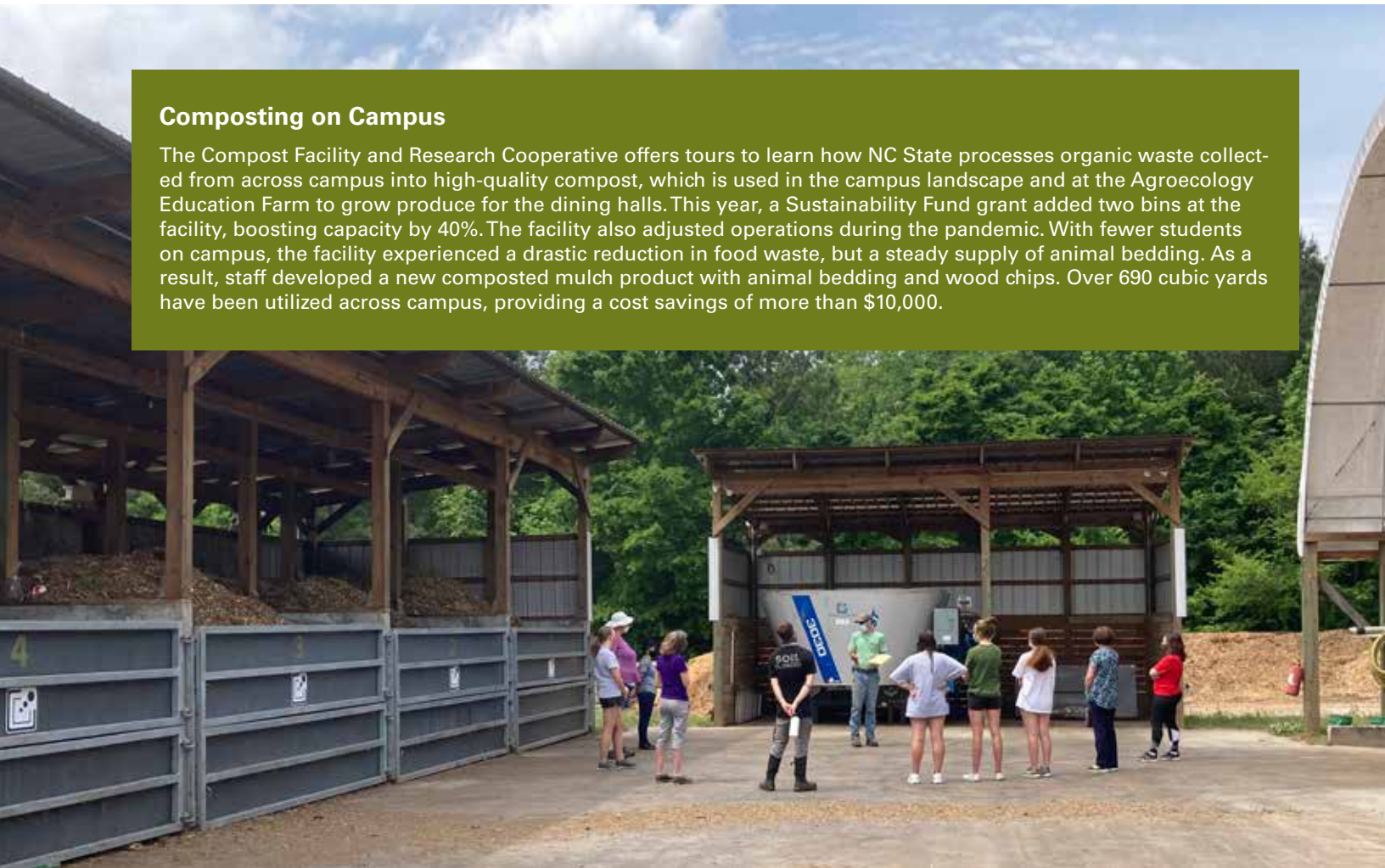


Virtual Meetings Reduce Emissions

The Office of Information Technology reported that 3,894 individuals used Google Meet for video conferencing in an average week in fiscal year 2021, with 916 using it in an average day and 8,438 using it in an average 30-day period. This is a significant increase over pre-pandemic use of the service and contributes to reduction in emissions from what previously would have been in-person meetings requiring travel.

Composting on Campus

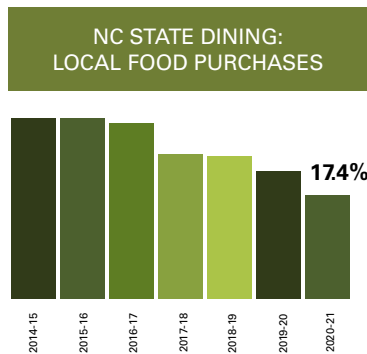
The Compost Facility and Research Cooperative offers tours to learn how NC State processes organic waste collected from across campus into high-quality compost, which is used in the campus landscape and at the Agroecology Education Farm to grow produce for the dining halls. This year, a Sustainability Fund grant added two bins at the facility, boosting capacity by 40%. The facility also adjusted operations during the pandemic. With fewer students on campus, the facility experienced a drastic reduction in food waste, but a steady supply of animal bedding. As a result, staff developed a new composted mulch product with animal bedding and wood chips. Over 690 cubic yards have been utilized across campus, providing a cost savings of more than \$10,000.





Two New Campus Buildings Open

Fitts-Woolard Hall and Carmichael Wellness and Recreation Center opened this fiscal year. Both facilities incorporate sustainability features and are expected to achieve Leadership in Energy and Environmental Design (LEED) certification.



Grounds Services Goes Electric

In June 2021, Grounds Services replaced some gasoline and diesel-powered vehicles and hand-held power tools with battery-powered equipment to reduce noise and emissions. Three electric vehicle and tool charging stations on campus support this first deployment of tools. The goal is to create districts on each campus dedicated to electric equipment as close to 100% as possible.

11,134

pounds of clothing, small goods and food diverted from the landfill and donated to nonprofits during residence hall student move-out

Compost Collection Expands

The College of Veterinary Medicine implemented composting throughout its campus buildings. A Wake County grant provided 420 compost pails for residents at Western Manor and ES King Village campus apartments. The new Fitts-Woolard Hall, renovated Bureau of Mines and 111 Lampe buildings opened as Zero Waste Workplaces. Also, the College of Natural Resources became a Zero Waste Workplace with new compost collection bins, dumpsters and plastic film collection points.

1,150

GoPasses distributed to campus community for regional bus transportation

478

new bicycle registrations on campus



Sustainability To-Go

With to-go meals increasing during the COVID-19 pandemic, NC State Dining provided reusable Pack-n-Go containers to all students and held their commitment to using compostable packaging. Dining also provided outdoor composting bins and moved to a strawless, compostable sip lid in Fall 2020 to reduce plastic waste.

Awards and Recognition

Global Ranking for Sustainability Impact

In its first year participating, NC State ranked in the **2021 Times Higher Education Impact Ranking**, which evaluates the research, stewardship, outreach and teaching contributions of universities toward the United Nations' 17 Sustainable Development Goals (SDGs). NC State ranked:

- No. 1 in the U.S. and tied for No. 6 in the world on the goal of "Industry, Innovation and Infrastructure" (SDG Goal 9)
- No. 7 in the U.S. and No. 41 in the world for "Clean Water and Sanitation" (SDG Goal 6)
- No. 7 in the U.S. and No. 64 in the world for "Zero Hunger" (SDG Goal 2)
- Tied for No. 30 in the U.S. for "Partnerships for the Goals" (SDG Goal 17)
- Overall, NC State ranked in the top 300 out of 1,115 universities around the globe and tied for No. 16 among U.S. universities.

Co-Curricular Innovation

NC State's Social Innovation Fellows program won the U.S. Association for Small Business and Entrepreneurship **Excellence in Co-Curricular Innovation Award**, recognizing colleges' and universities' exceptional achievement in the field.

Top Green College List

The Princeton Review ranked NC State **30th** on its 2020 "Top 50 Green Colleges" list announced Fall 2020.

An 'Energy Elite'

Among 187 U.S.-based research colleges and universities with energy programs, NC State was named **one of 10 "Energy Elite" colleges and universities** by the American Energy Society (AES), cited as "the most accomplished and least recognized program in the country."

NC State Sustainability Awards

Winners were Martina Gonzalez Bertello (student category), Dr. Seth Murray (faculty category), Connor Celentano (staff category), University Housekeeping (department/organization category), Feed the Pack (student-led initiative category) and Wilson College of Textiles Sustainability Committee (innovation/impact category).

Communications

Goal: Propel awareness and sustainability at NC State and beyond.

134,625 pageviews on sustainability.ncsu.edu

3,083 average weekly reader of NC State's sustainability e-newsletter

9,743 followers on NC State sustainability social media accounts

1,432 incoming students in fiscal year 2021 requested information about campus sustainability – an increase of 7% from the previous year.

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

100 copies of this report were printed for campus
distribution on 100% post-consumer recycled
paper that is Forest Stewardship Council Certified.