

2019–2020

Ohio State Sustainability Achievements

Even as global challenges in 2020 complicate university life,
Ohio State accelerates its sustainability efforts.



THE OHIO STATE UNIVERSITY



INTRODUCTION

Carbon Neutrality Goals, Global Pandemic Highlight FY2020

Notable advances in Ohio State's new carbon neutrality targets and the dramatic global circumstances surrounding the COVID-19 pandemic created extraordinary situations for university sustainability efforts during FY2020. Through the strategic and

resilient responses to these challenges by university leadership, students, faculty and staff, Ohio State maintained its focus on achieving our sustainability goals, as presented in this FY2020 Sustainability Achievements document.



The Path to Carbon Neutrality: Ohio State Accelerates Climate Action

In April, President Michael V. Drake released the 2020 Ohio State Climate Action Plan, a strategy to cut university carbon emissions in half within this decade, accelerating the university's ability to achieve full carbon neutrality by 2050.

In 2008, Ohio State established the goal to achieve carbon neutrality by 2050 through the Presidents' Climate Leadership Commitment, and in 2011, the first Ohio State Climate Action Plan was released.

The 2011 plan outlined actions the university could take to advance the carbon neutrality goal. As a result of those and other actions, through the 2019 fiscal year, the university decreased its carbon emissions by over 15% while still increasing the amount of built space by nearly 11%.

Advancing upon that success, the 2020 Climate Action Plan outlines how the university could achieve full carbon neutrality by 2050. In particular, the new plan details how we could reduce 55% of our current carbon emissions by 2030, by improving building energy efficiency, diversifying sources of energy and addressing transportation-related emissions.

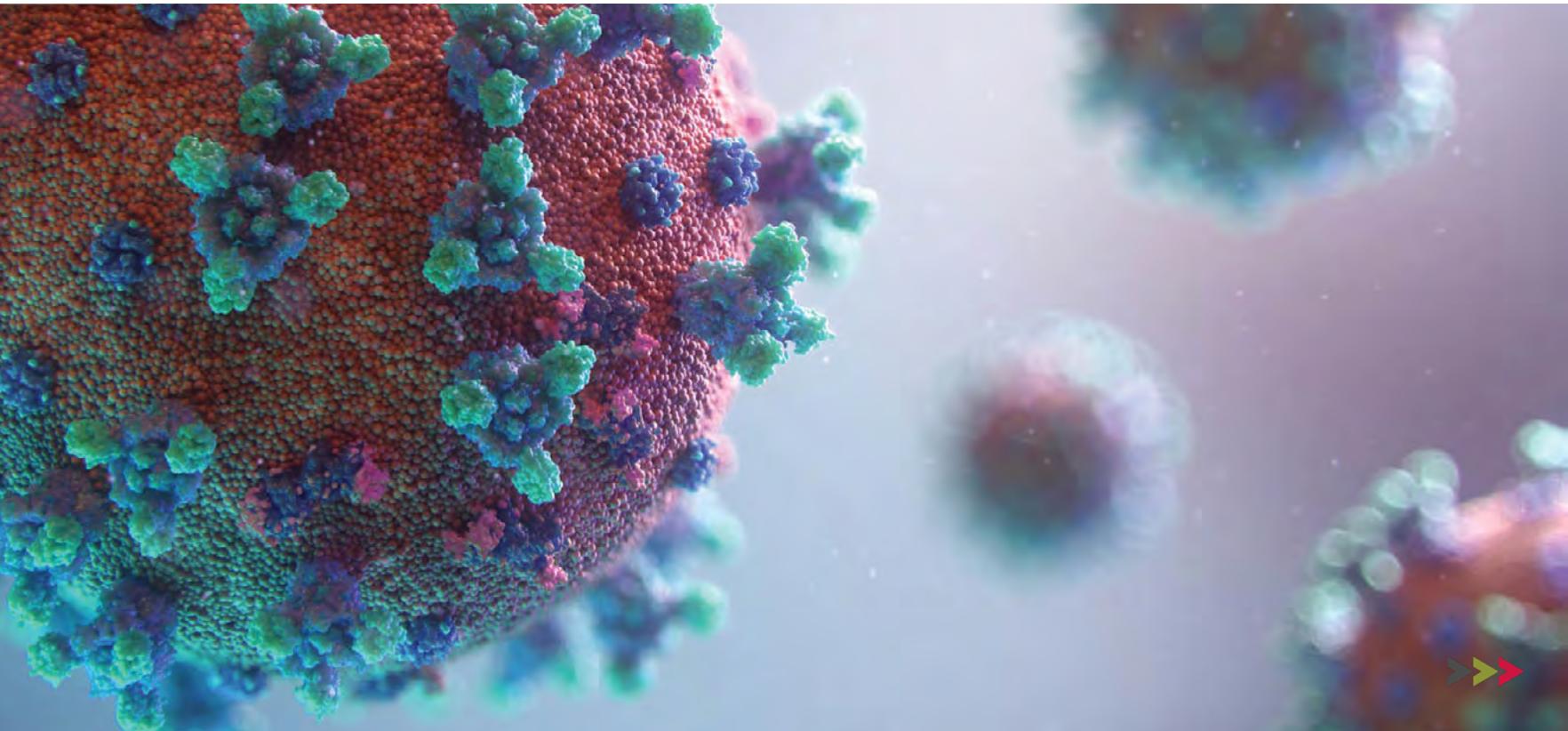
This pace of activity is more aggressive than the International Panel on Climate Change's recommended carbon emission reductions necessary to avoid the most acute human impacts of climate change. As Ohio State's Byrd Polar and Climate Research Center faculty and researchers have demonstrated, climate change is already impacting Ohio lives, evidenced by heavier rainstorm events causing more flooding and decreased agricultural opportunities, and increased frequency and intensity of hot days, causing stress and health impacts to those without access to cooling. [Read more](#)



COVID-19: Impact and Research

The COVID-19 global pandemic brought the world to a virtual standstill, with people everywhere questioning what our next actions should be. In an unprecedented move, Ohio State leaders took bold action to protect students, faculty and staff by transitioning to online teaching and remote work directives. Our dynamic campus, where nearly 100,000 people come together daily, became an almost uninhabited expanse of buildings and green spaces still in need of attention.

Of greater importance was the need for researchers to lend their collective talents to studying and helping to discover advances in the struggle against COVID-19. Ohio State researchers and Sustainability Institute faculty members have taken an interdisciplinary approach to facing the many elements of COVID-19, and three Ohio State sustainability researchers received Office of Research COVID-19 funding fast-tracked for research projects seeking to understand the coronavirus and its impacts. [Read more](#)



Ohio State Celebrates 150th Anniversary and 50th Anniversary of Earth Day

With two major anniversaries in 2020, Ohio State celebrated its 150th anniversary in March and honored the 50th anniversary of Earth Day in April. Both events provided opportunities to look back at Ohio State's commitment to sustainability and resilience. For Ohio State's Sesquicentennial event, the Sustainability Institute created a video that explores the past, present and future of sustainability mobility, featuring several Ohio State faculty members. To celebrate Earth Day, a virtual seminar looked at the environmental challenges faced in 1970, examined where we are today and considered what is ahead as we confront climate change. The Earth Day event was hosted by SI and the Environmental Professionals Network and was attended by more than 300 participants. [Read more](#)



Ohio State Energy Partners Grants Support University Sustainability

FY2020 philanthropic contributions from Ohio State Energy Partners are supporting university sustainability efforts including zero waste, energy models for buildings, water research and education, and graduate training in sustainable energy. OSEP designated \$245,000 of its annual \$810,000 contribution, part of its commitment to academic collaboration, toward sustainability-related projects. In 2017, the university and OSEP entered into the comprehensive energy management partnership. OSEP is a joint venture between ENGIE North America and Axium Infrastructure. The university's Energy Academic Collaboration Council provides support for the grant program. [Read more](#)



TEACHING AND LEARNING

SELCE Survey of Sustainability-Related Undergraduate Courses and Programs Completed

During FY2020, the Sustainability Education and Learning Committee (SELCE), facilitated by the Sustainability Institute, collected information from all Ohio State academic units regarding their sustainability-related undergraduate majors, minors, certificates and individual courses. As a part of this survey process, units were also asked to classify each sustainability course and program using

SELCE's Six-Dimension Framework, which helps to categorize the content being delivered to students: human-natural systems; earth and environmental systems and sustainability; economy, governance and sustainability; society, culture and sustainability; sustainable engineering, technology and design; and health, well-being and sustainability.

In total, 151 undergraduate programs and 670 courses with sustainability content were reported by academic units across the university, including 76 majors, 64 minors and 11 certificates. Of the 76 majors, 42 are in the College of Arts and Sciences, 16 in the College of Engineering and 14 in the College of Food, Agricultural and Environmental Sciences.

NRT Grant Supports Interdisciplinary Research Graduate Training in Sustainable Energy

Ohio State researchers received a \$2.98 million National Science Foundation Research Traineeship (NRT) grant to develop and implement bold, transformative models for science, technology, engineering and mathematics (STEM) graduate education training. Ramteen Sioshansi, integrated systems engineering and Sustainability Institute affiliated faculty, is the principal investigator, leading a core team of faculty drawn from seven Ohio State colleges.

Named "Convergent Graduate Training and EmPOWERment for a Sustainable Energy Future," this grant supports new interdisciplinary graduate research and education in sustainable energy at Ohio State. Launched in autumn 2020, the EmPOWERment program anticipates training up to 20

Ph.D. students annually from diverse fields such as industrial and systems, environmental, materials science and electrical and computer engineering; public policy; computer science; economics; and geography. In addition, a new Graduate Interdisciplinary Specialization in data-driven sustainable energy systems is open to any graduate student.

EmPOWERment also includes a community of practice for any undergraduate or graduate student interested in sustainable energy, and multiple engagement opportunities with industry. Through the NSF funding, the program has more than 32 one-year stipends for NRT fellows, targeted to female and underrepresented minority students. [Read more](#)



Classroom of the Future

With funding from the Ohio State Sustainability Fund, the College of Engineering created a “Classroom of the Future” in Smith Laboratory by redesigning student lab space to be:

- more adaptable to multiple current and future needs;
- ready for future, possibly unknown teaching and learning styles and technology needs;
- equipped with flexible, innovative learning spaces, and inclusive environments for a range of abilities and impairments; and
- constructed using sustainable building materials.



SUSTAINS Students Continue Tradition of Sustainability Impact

Each year, students in the SUSTAINS Learning Community develop and implement projects aimed at improving sustainability at Ohio State while gaining hands-on experience in addressing sustainability issues and impacting campus. A truly interdisciplinary program, of the 43 SUSTAINS students in FY2020, 21 students were enrolled in the College of Food, Agricultural and Environmental Sciences; nine were Engineering majors; seven were from Arts and Sciences; two from Fisher College of Business; and one each from Pharmacy, Public Health, Social Work and University Exploration.

Student projects included a clothing swap to encourage clothing reuse and education about the clothing industry’s environmental impacts. In one day, more than 100 pieces of clothing were donated and traded. SUSTAINS students also proposed a new urban meadow site on the Columbus campus. Urban meadows improve biodiversity and reduce stormwater runoff. Students received approval and plan to begin work on the new site in the upcoming academic year.



Augmented Reality Trees on Campus: The ARTrees Project

Trees provide environmental, economic, cultural and aesthetic value. In 2015, a university sustainability goal was established to increase campus ecosystem services, including increasing overall tree canopy. Ohio State collects data on nearly every tree on campus and recognizes the need for additional plantings. This inspired students in an ArtScience course to create an interactive artwork that visualized future trees as virtual apparitions in augmented reality. With support from the Ohio State Sustainability Fund, staff at the Chadwick Arboretum, ASC Technology Services, the Center for Regional and Urban Analysis, and University Planning, Architecture and Real Estate, students are working with Amy Youngs, art, toward an expanded app to include interactive engagements with trees on campus. [Read more](#)



RESEARCH AND INNOVATION

Arts and Humanities Confront Climate Change

Climate change as a discipline is no longer confined to the scientific arena. People outside the sciences are expressing complicated feelings about climate change by attaching narrative and emotion to the science and visually amplifying environmental realities, allowing audiences a more accessible connection to global warming.

Through collaborative initiatives such as the Livable Futures network with support from the Global Arts + Humanities Discovery Theme, artists, scholars and activists are dissecting climate change and its impacts in bold, new ways. [Read more](#)



Amy M. Youngs, art



Polymer Face Masks to Protect against COVID-19

Judit Puskas, Distinguished Professor in polymer science; food, agricultural and biological engineering; and Sustainability Institute core faculty member, is developing a new polymer face mask that is expected to be more effective in the fight against COVID-19. Puskas has a provisional patent pending for the mask and is working with the Mayo Clinic to create and test the mask to meet safety and efficacy standards of an N95 mask, but with more comfort and usability for wearers. [Read more](#)



A New Way to Turn Heat into Energy

An international team of scientists including Joseph Heremans, mechanical and aerospace engineering and Ohio Eminent Scholar in Nanotechnology, has discovered how to capture heat and turn it into electricity, creating more efficient energy generation from heat from car exhausts, interplanetary space probes and industrial processes.

The finding is a new way of designing thermoelectric semiconductor bits that are not quite magnets but that carry some magnetic flux. Magnets, when heated, lose their magnetic force and become paramagnetic. A flux of magnetism creates a type of energy called magnon-drag thermoelectricity that until this discovery could not be used to collect energy at room temperature. [Read more](#)



Solving Climate's Toughest Questions

Hurricanes demonstrate the immense importance of predicting weather and climate patterns in the short, medium and long term, but key weaknesses in weather and climate models make foreseeing such events difficult. Jialin Lin, geography, tackles these challenges by answering two of forecasting's most pernicious questions: predicting the shift between El Niño and La Niña, and predicting which hurricanes will rapidly intensify. Lin is working on creating more accurate models predicting global warming and its impacts leading an international team of 40 climate experts to create a new book, "Current Frontiers in Climate and Weather Research," identifying the highest-priority research questions for the next 30 to 50 years. [Read more](#)



Interdisciplinary Knowledge for a More Secure World



Mershon Center Brings Climate Change to Security Studies

Increased recognition of the underlying connections between global warming and a nation's security has produced a growing field of research within security studies to understand the impacts of global warming on socioeconomic and political systems. This cross-disciplinary collaboration has become a cornerstone of the Mershon Center for International Studies.

In 2019, the Mershon Center released its five-year strategic plan, which renewed emphasis on security and governance through interdisciplinary research and holistic study. Questions like how environmental dynamics might affect socioeconomic and political processes have become a prominent new aspect of the center's research. Researchers in economics, earth sciences and sociology have found common research interests under the umbrella of climate change and forced migration.



Award-winning Faculty

Rattan Lal, Distinguished University Professor in the College of Food, Agricultural, and Environmental Sciences and an affiliated faculty member at the Sustainability Institute, was awarded the 2020 World Food Prize for increasing the global food supply and reducing hunger by pioneering agricultural methods that restore degraded soil and reduce global warming.



Rattan Lal

Bhavik Bakshi, chemical and biomolecular engineering, was awarded the 2019 Lawrence K. Cecil Award in Environmental Chemical Engineering, for individuals who aid with the preservation of the environment, and the AIChE Sustainable Engineering Forum Education Award, presented to those who make advancements in sustainability engineering education.

Katrina Cornish, horticulture and crop science, joined the American Institute for Medical and Biological Engineering College of Fellows.

Ian Howat, earth sciences, and director, Byrd Polar and Climate Research Center, received the University Distinguished Scholar Award, awarded to Ohio State faculty members who demonstrate scholarly activity, research or other creative works representing exceptional achievements in their fields. Howat is among the world's leaders in the study of glaciers and ice sheets.

Clark Larsen, anthropology, became a member of the American Academy of Arts and Sciences.



OUTREACH AND ENGAGEMENT

Ohio State Supports City of Columbus Effort to Advance Climate Neutrality

In February, Columbus Mayor Andrew J. Ginther announced the city's goal to achieve carbon neutrality by 2050, mirroring Ohio State's own carbon neutrality commitment. Previously, the Bloomberg American Cities Climate Challenge, which aims to accelerate local climate change actions, awarded Columbus a partnership grant to address transportation and building operation-related emissions.

In March, the Sustainability Institute voiced Ohio State's support for Mayor Ginther's first legislation to advance the City's new carbon neutrality goal: a [building benchmarking ordinance](#) to identify city-wide energy and water use patterns and the best conservation opportunities. Highlighting the university's work to track building-level data, the Institute testified in favor of the ordinance to Columbus City Council, which subsequently unanimously adopted the measure.



Ohio State Joins National Effort to Meet UN Sustainability Goals

In August 2019, Ohio State joined a United Nations initiative to help solve global challenges related to poverty, inequality, climate, environmental degradation, prosperity, and peace and justice. The university is now a member of the U.S. chapter of the Sustainable Development Solutions Network, a group of more than 60 leading academic institutions mobilizing global scientific and technological expertise to promote practical solutions for sustainable development, including the implementation of the U.N. Sustainable Development Goals and the Paris Climate Agreement.



Time for Change Week Goes Virtual



Time for Change Week is a sustainability tradition at Ohio State. Each year, students lead a week of sustainability events to teach their peers about sustainability and generate discussion to make the world more sustainable. In 2020, the coronavirus forced student leaders to find creative ways to engage peers virtually. Sustainability students created unique and engaging online events including vegetarian cooking demonstrations, a Zoom conversation about environmental justice, and a video of how to be sustainable while still maintaining social distancing. [Read more](#)





Virtual 50th Anniversary of Earth Day Celebration

Co-hosted by the Sustainability Institute and Environmental Professionals Network, Ohio State's celebration of the 50th Anniversary of Earth Day featured Bart Elmore, history, presenting a look back at environmental successes since the first Earth Day, and Elena Irwin, Distinguished Professor of Food, Agricultural and Environmental

Sciences in Economics and Sustainability Institute faculty director, offering thoughts on where the next 50 years of environmental awareness will lead. Ohio State students provided their take on the importance of recognizing Earth Day, and the university introduced the newly revised Ohio State Climate Action Plan.

ABRC sharing K-12 teaching materials world-wide

In addition to supplying Arabidopsis seeds and DNA to researchers in more than 60 countries, the Arabidopsis Biological Resource Center provides free Arabidopsis seeds to K-12 science teachers like Morgan Gaskill from Boca Raton, Florida, whose AICE biology class worked closely with ABRC Education and Outreach Specialist Courtney Price to develop a robust climate change experiment. The research project, named "Stressed Out!" by the students, will soon be available to teachers around the world.



STEWARDSHIP AND OPERATIONS

University Sees Sustainability Progress from Energy Partnership

Now three years into a 50-year energy partnership with ENGIE/Axiom, Ohio State continues to see improvement in its energy management and sustainability through tangible initiatives such as smart metering and lighting upgrades. The partnership included a \$1.015 billion upfront payment to the university and a \$150 million commitment to support academic priorities. [Read more](#)



University Saves \$2 Million in Energy Costs During Campus Shutdown

To conserve energy and reduce the university's carbon footprint, Ohio State modified when heating and air conditioning occurs as spaces become unoccupied. In March, April and May, nearly \$2.1 million was saved while also decreasing the campus' carbon footprint about 3%. The university plans to implement similar measures throughout the year, having a significant impact on energy use and overall carbon footprint.

[Read more](#)



University Takes Novel Approach to Campus Landscape Management and Learning

By 2025, Ohio State aims to increase its available greenspace while creating new living lab student learning and research opportunities. The University Panel on Ecosystem Services, which included faculty, staff and students, made a series of recommendations that are being implemented across the Columbus campus.

Panel recommendations outlined how the university could accomplish the sustainability goal of increasing the university's "ecosystem services" — benefits that society receives from the natural environment — by 60% by 2025.

Through that work, the university developed a unique "Ecosystem Service Index," or ESI, which defines metrics across four broader categories for campus improvement:

- Protection and Conservation of Core Ecosystems
- Stormwater Management and Water Quality
- Vegetation, Soil and Biodiversity
- Quality of Life

[Read more](#)

Ohio State Athletics Wins 2020 Sustainability Awards

While our athletes do well on the playing surface, the Office of Athletics is winning awards for sustainable athletic facilities. Athletics was recognized by the National Association of Collegiate Directors of Athletics and USG Corporation as the winner of the sixth annual USG NACDA Sustainability Award for the sustainable construction and design practices incorporated into The Schumaker, Covelli Center and Jennings Wrestling Facility. [Read more](#)





Acoustic Technology Helps Conserve Water

State-of-the-art technology is helping Ohio State conserve water. The Office of Facilities Operations and Development partnered with a third-party company to administer a leak detection survey that uncovered two large leaks. Fixing the leaks will save millions of gallons of water per year. [Read more](#)

Golf Course Tree Planting Offers Living Classroom for Local Students

Students from Jones Middle School in the Upper Arlington School District planted 60 trees at the Ohio State Golf Course, increasing the tree canopy and providing an outside the classroom sustainability experience for the students.

[Read more](#)



Wexner Medical Center News



Battelle Decontaminates Used N95 Masks

To assist with the shortage of N95 masks for coronavirus protection, Battelle developed the Critical Care Decontamination System™ (CCDS), which uses concentrated, vapor phase hydrogen peroxide (VPHP), exposing used respirator masks to the validated concentration level for 2.5 hours to decontaminate biological contaminants. As of June 5, the medical center has received back more than 22,000 masks that had been sterilized by the CCDS.



Medical Center Recognized for Environmental Sustainability Leadership

The Wexner Medical Center received the Greenhealth Emerald Award and the Circles of Excellence in Climate from Practice Greenhealth, the nation's leading organization dedicated to environmental sustainability in health care. In FY2019, sustainability efforts resulted in \$3 million in cost avoidance and an increase in landfill diversion to 32% from 28%. [Read more](#)



Zero Waste

Zero Waste Tool Kits Launched by Net Impact

Students have found creative and innovative ways to help achieve Zero Waste. Net Impact, a sustainability in business club, created Zero Waste Event Kits to reduce the need for disposable items at student events. Kits consist of reusable cutlery, cups, plates and bowls, and interested groups can borrow a kit from Scott Dining Hall and return it at the conclusion of their event. Dining staff sanitize the kit and prepare it for the next event. Email dining@osu.edu to check the availability of kits for events.



RecycleMania Wins for Basketball

For the second year in a row, Ohio State claimed the national title in the annual RecycleMania Tournament's Game Day Basketball Diversion Competition. The competition took place on March 1 during a game against Michigan at the Schottenstein Center and delivered a 97.1% waste diversion rate.

[Read more](#)

Ohio State Expands Composting Programs

Ohio State aims to achieve zero waste by 2025 by diverting more than 90% of waste away from landfills as part of its universitywide sustainability goals. Organics diversion is a priority on campus because food waste and organics represent a significant portion of materials landfilled in central Ohio. During FY20, pilot compost programs were launched in 11 buildings, bringing the organics diversion program to 33 locations.





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