CLIMATE ACTION AT THE UNIVERSITY OF MICHIGAN



planetblue.umich.edu

This page: Catalyst Leadership Circle Fellows visiting a solar farm in Traverse City. (Photo by Sarah Lee, Graham Sustainability Institute)

Cover image: Tiles at the UM-Dearborn Environmental Interpretive Center. (Photo by Kelly Jones, Planet Blue Ambassador)

GRID

o the leaders and best,

Since joining the University of Michigan community last October, I've been continually struck by the vast impact that this university can make — in the classroom, in the community, and around the world. It's also clear to me that together, we must continue to take meaningful steps toward addressing one of the world's most pressing issues, the climate emergency.



That's why I've been so pleased to see firsthand how this university is making ambitious, multifaceted progress — advancing climate action through innovative operations, community partnerships, applied research, campus involvement and sustainable investments. This report describes the breadth of our engagement on these topics and our commitment to achieving carbon neutrality and fostering a shared culture of sustainability.

We call our collective approach "Planet Blue." It's an approach that speaks to the urgency of our shared challenge ahead as well to our dedication, as a university community, to being a climate leader. This issue affects nothing less than the entire planet, and as I've learned in the last year, there's nothing more Michigan than blue.

Meaningful climate action will require all of us. Planet Blue begins with you. As a great public university, U-M can serve as a livinglearning lab toward a more sustainable and just world — now, and for generations to come. In that spirit of collaboration and action, I'd like to acknowledge and thank you for your contributions in moving this university forward. We're counting on your energies, ideas, and expertise.

Sincerely,

Santa J. Ono President

APPLIED EDUCATION & COMMUNITY-DRIVEN ACTION

8,500+ Planet Blue Ambassadors advancing sustainability through their studies, work and life at U-M, on and off-campus. Students engaged in peer-to-peer activities by the Student 6,000+ Sustainability Coalition, U-M Sustainable Food Program and Planet Blue Student Leaders. 1,550 Tons recycled and 120 tons composted by Michigan Medicine in 2022. Unique customers of the Farm Stand—a student-run, student-1,000+ grown, student-access project. 800+ Sustainability courses. Faculty leading research, teaching, and engagement efforts across a 700+ myriad of environmental topics. Graduated students admitted to the Excellence in Sustainability 230 Honors Cord Program, proudly wearing student-made, naturally-dyed, Michigan wool cords. 128 Student organizations focusing on sustainability or the environment. Green Teams motivating their colleagues to create more sustainable **98** workplaces. \$420M Of university portfolio invested in sustainable energy over the past two years. FY23 from a central revolving energy fund to units throughout the **\$5**M university pursuing energy efficiency projects. Granted from the Graham Sustainability Institute's Carbon Neutrality \$350K Acceleration Program to seven applied projects, covering new approaches to direct air capture, battery recycling, emissions in aviation and more. Granted from student leaders to 24 student- and staff-led \$115K sustainability initiatives across campus, ranging from a mobile space for the Farm Stand to a wastewater microbial carbon capture device.

PROGRESS

28% decrease in greenhouse gas emissions* since 2010 0% change in greenhouse gas emissions* from FY22 14% increase in total building area since 2010

CARBON NEUTRALITY COMMITMENTS

- 2025 Reduce greenhouse gas emissions from purchased electricity (Scope 2) to net zero.
- 2040 Eliminate emissions from direct, on-campus sources (Scope 1).
- 2025 Establish goals for a wide range of indirect emission sources (Scope 3).
- Foster a universitywide **culture of sustainability,** with **justice** as a core principle.

*Quantified emissions include those from direct, on-campus sources (Scope 1) and purchased electricity (Scope 2).

Universities are today's testing grounds for tomorrow's climate solutions. Through education, research, operations, campus life and community partnerships, U-M is innovating toward a more sustainable world.

> Solar installations on U-M's North Campus in Ann Arbor. (Photo by Fatimah Bolhassan, Graham Sustainability Institute)

The U-M Emissions Reduction Dashboard illustrates universitywide greenhouse gas emissions by year and future carbon neutrality targets. As demonstrated below, U-M is markedly reducing its Scope 2 emissions now and expects to achieve net-zero emissions for purchased electricity by 2025.



planetblue.umich.edu/carbonneutrality

Notes: UM-Dearborn data is not available prior to FY14, so FY10-FY13 values are assumed to be equal to FY14 values. This assumes limited emissions changes between FY10 and FY14, which is consistent with the data-informed emissions trends on the Ann Arbor and Flint campuses.

During FY23, U-M furthered its commitment to climate action, through collaborations with the city of Ann Arbor for onsite solar installations, new universitywide maximumemission building standards, expanded progress tracking tools and more.

CAMPUS SOLAR

FY23 progress

In February, U-M announced plans to build onsite solar installations across the university, **issuing a request for information** to build out 25MW of photovoltaics across the Dearborn, Flint and Ann Arbor campuses. The RFI calls for projects with 15 to 20 megawatts of capacity on the Ann Arbor campus, and one to five megawatts each at Dearborn and Flint. The total amount of electricity that would be generated by the installations is estimated to equal the power consumed by approximately 3,000 homes annually.

The university and the city of Ann Arbor are collaborating in this effort and have cross-promoted opportunities. The city previously contracted for more than four megawatts of solar installations on municipal facilities and has since sought an additional one to two megawatts through its own request for proposals.

Next steps

After it reviews proposal responses and selects a vendor, U-M aims to have solar installations fully operational within the next few years. The university is prioritizing potential projects that are built on large rooftops and over parking decks and parking lots. U-M will also prioritize "behind-the-meter" installations, which supply electricity to buildings directly on-site rather than through the electrical grid. The university will ensure that selected vendor plans complement campus master planning efforts.

CAMPUS GEOEXCHANGE

FY23 progress

As of this report's publication, U-M has drilled 99 700-foot bores for a **geoexchange facility** adjacent to the Leinweber Computer Science and Information Building on North Campus. The system will supply the building's heating and cooling, enabling it to become the first large-scale university building to not rely on natural gas for heating. Geoexchange systems are also planned for the dining hall of the **newlyannounced** Central Campus residence hall, which will add 2,300 beds to campus, and for the new Ginsberg Center building planned for Central Campus.

U-M designs all new building and renovation projects to be compatible with renewable energy-driven heating and cooling systems.

Next steps

U-M is pursuing geoexchange facilities, through a phased approach, as a key strategy toward decarbonizing all heating and cooling infrastructure. Ultimately, the university aims to build district-level geoexchange systems that serve multiple buildings at once.

The Ginsberg Center geoexchange system will consist of eight onsite 535-foot vertical well bores. Boring took place in September.

RENEWABLE PURCHASED ELECTRICITY

FY23 progress

U-M procured more than one-third of its purchased electricity from Michigan-sourced renewables during FY23, largely as a product of the **launch** of three wind parks. The new facilities enabled the university to meet a 2011 goal to reduce greenhouse gas emissions on the Ann Arbor campus by 25% by 2025 — three years ahead of schedule.

Next steps

After issuing a March 2022 request for proposals, U-M has been working with a developer to create a new renewable facility that will allow the university to reach 100% renewable purchased electricity by 2025. Key considerations include community engagement, justice and equity, implications for land use, habitat and wildlife, and research and education.

The carbon reduction from U-M's renewable electricity purchasing will be equivalent to removing every motor vehicle registered in Ann Arbor — approximately 70,000 — from the road.

ENERGY CONSERVATION MEASURES & FUNDING

FY23 progress

U-M allocated \$5 million from a central revolving energy fund to units throughout the university pursuing energy efficiency projects during FY23. The revolving fund launched in FY22, with \$25 million in seed funding to dispense with zerointerest financing over five years. Initial projects consisted primarily of LED lighting upgrades across approximately 100 buildings and 10 million square feet of building space.

Next steps

Energy cost savings from projects financed by the revolving fund allow the fund to replenish and sustain over time. The fund will continue to dispense zero-interest financing to university units pursuing energy efficiency projects likely with an increasing focus on more complex projects, such as heating, ventilation and air conditioning (HVAC) improvements or building envelope upgrades.



New flooring, containing almost 3,500 recycled water bottles, installed as a pilot project outside of the Natural Sciences Building Greenhouse at UM-Dearborn. (Photo by Grace Maves, Planet Blue Ambassador)

CAMPUS PLANNING & BUILDING STANDARDS

FY23 progress

U-M embarked on two long-term planning efforts during FY23: **Vision 2034**, "a collective strategic visioning process to imagine our shared future for the next 10 years"; and **Campus Plan 2050**, "to realize the future of the Ann Arbor physical campus." The university has engaged Sasaki Associates to collaborate with U-M stakeholders in the development of 5 and 10-year development planning horizons and a long-term, 25-year plan that will establish priorities and inform capital investments. Carbon neutrality is a primary focus in each planning effort.

In addition, North Campus utility master planning efforts have prioritized decarbonizing heating and cooling infrastructure, with an ultimate goal for the campus to be emission-free by 2040.

The university **enacted** its first maximum emissions targets, covering all new construction and major renovation projects over \$10 million, across 14 building types. Targets are intended to reduce life-cycle greenhouse gas emissions and improve energy efficiency. Faculty at the A. Alfred Taubman College of Architecture and Urban Planning informed the new standards, building upon the work of an internal analysis team affiliated with the former President's Commission on Carbon Neutrality.

Next steps

As planning efforts take shape, U-M will continue to heighten carbon neutrality and climate action as central priorities. With new maximum building emissions standards in place, U-M Facilities & Operations is implementing pilot programs centered around building air leakage testing, building envelope sealants, ongoing verification of building system performance and refined maintenance practices. The university will refine design guidelines iteratively to reflect best-in-class approaches.

U-M also aims to construct a new carbon-neutral residential complex targeting LEED Platinum certification.

VEHICLE DECARBONIZATION

FY23 progress

In a first step toward completely decarbonizing the university vehicle fleet, a set of four electric buses **arrived** on the Ann Arbor campus in June 2023, including three 40-foot buses and one 60-foot articulated bus. Delivery had previously been delayed by supply chain issues as well as safety recalls by the National Highway Transportation Safety Administration.

Electric buses are estimated to contribute 74% less greenhouse gas emissions than standard diesel-powered buses. They also typically carry lower energy and maintenance costs over time.

U-M electric buses look similar to much of the current fleet, but with decals that read "plugged in for our planet" — intended to contribute to a campuswide culture of



sustainability and encourage community members to learn more about university sustainability efforts. In preparation for the buses' arrival, U-M implemented substantial electricvehicle charging infrastructure into its new transportation center on North Campus.

Next steps

The first set of electric buses will be put into regular service on the Ann Arbor campus during the Fall 2023 semester. A duplicate order is scheduled to arrive in June 2024. U-M also purchased 30 battery-electric vehicles for the Ann Arbor campus for FY24 delivery and aims to continue replacing campus vehicles with low/zero-carbon alternatives. The university will build additional electric vehicle charging infrastructure in accordance with demand, and collaborate in that effort with the city of Ann Arbor.



INDIRECT IMPACTS (SCOPE 3)

FY23 progress

U-M carbon accounting experts have assessed preliminary confidence levels around current Scope 3 greenhouse gas emissions and identified categories for establishing quantitative goals. Categories include commuting, solid waste, wastewater and upstream emissions of purchased fuels.

U-M **announced** a partnership with Delta Air Lines to spur the widespread adoption, research and transparency of sustainable aviation fuel (SAF). Under Delta's program, participating institutions provide financial contributions toward SAF use and can claim associated emissions reductions. U-M's contribution represents a lifecycle emissions reduction of more than 1,500 metric tons of CO2, as compared to conventional jet fuel — equivalent to removing approximately 326 gasoline-powered vehicles from the road for one year.

SAF is a biofuel, made from renewable feedstocks such as used cooking oil, tallow or agricultural residues. It is a less-carbonintensive alternative to conventional jet fuel, with current potential to reduce lifecycle emissions by more than 75%. U-M is the first university to partner with Delta on an SAF agreement.

Next steps

To address emissions associated with commuting, the university aims to install 113 electric charger spaces for facultyand staff-associated vehicles between July 2023 and March 2024. The latest Sustainability Cultural Indicators Program (SCIP) **study** also provides commuter mileage data for UM-Flint and UM-Dearborn, which will inform future strategies. The university is also assessing emissions reduction strategies related to purchased goods, food procurement, and drinking and wastewater purchasing.

INVESTMENTS

FY23 and prior progress

In 2022, U-M **announced** the issuance of \$300 million in "green bonds." The proceeds from these can only fund capital projects that support environmental or climate-related goals. During FY23, the university published its inaugural **green bond report** and interactive **dashboard**.

Since announcing a modified natural resources investing strategy in 2021, the university transitioned its public equities portfolio to an ex-fossil fuels index that excludes companies named on the Carbon Underground 200, a list of top coal, oil and gas companies. U-M also discontinued direct investments in companies that are the largest contributors to greenhouse gases, as well as investments in funds that primarily focus on oil reserves, oil extraction, or thermal coal extraction.

During FY23, the Office of Investments announced that it invested \$420 million in sustainable energy over the past two years. Avoided emissions from U-M investments in 2023 are on track to exceed the total amount of greenhouse gases produced by the Ann Arbor campus.

Next steps

U-M will continue to pursue a net-zero endowment by 2050. The university endowment is on track to reduce portfolio emissions by more than half by 2030. U-M will continue to prioritize funding campus infrastructure and investments that decrease carbon emissions.

PARTNERSHIPS

FY23 progress

At the direction of university president Santa J. Ono, U-M is now the lead institution in the University Climate Change Coalition (UC3), which connects 23 of the world's leading research universities and university systems committed to accelerating climate action on campus, in communities, and at a global scale. During FY23, U-M joined the U.S. EPA Green Power Partnership and is ranked tenth among universities for green power use. It also became the first university to **join** the First Movers Coalition — a coalition of organizations using their purchasing power to create demand for innovative clean technologies across several industrial sectors.

The university remains an active member of the Midwest Climate Collaborative, the Association for the Advancement of Sustainability in Higher Education, the U.S. Department of Energy's Better Climate Challenge, the Big Ten and Friends Sustainability group and the Ivy Plus Sustainability Collaborative. U-M also coordinates regularly with the city of Ann Arbor and public-sector organizations in Washtenaw County.

Next steps

U-M is establishing targeted priorities for UC3 and identifying areas ripe for collaborative engagement on the part of R1 institutions (doctoral universities with very high research activity). The university will continue to collaborate with city of Ann Arbor representatives and will work with community partners to address equity and justice implications related to carbon neutrality efforts.

In early FY24, the Graham Sustainability Institute launched the Center for EmPowering Communities to help Michigan municipalities tackle planning and zoning challenges related to renewable energy projects.





Change Coalition



TRANSPARENCY & ACCOUNTABILITY

FY23 progress

In March, the Association for the Advancement of Sustainability in Higher Education (AASHE) **awarded** U-M a Gold rating. The organization's Sustainability Tracking, Assessment & Rating System (STARS) measures and encourages sustainability across participating colleges and universities, covering academics, engagement, operations, and planning and administration. U-M earned 73.84 points — more than four higher than its previous submission, due in large part to new investing strategies and renewable power purchase agreements.

More than 900 participating institutions from 40 countries take part in the STARS program, including 137 that hold Gold ratings and 12 that hold Platinum ratings. All participating Big Ten institutions hold either Gold or Silver ratings.

Over the course of the year, the university **unveiled** a series of new or modified tools that track sustainability work. An update to the U-M emissions-reduction dashboard, which tracks universitywide progress toward carbon neutrality, includes a new trendline covering the square footage of U-M buildings over time — demonstrating a 25% decline in total emissions despite a 14% increase in building space.

A new, parallel dashboard tracks Ann Arbor campus sustainability metrics, allowing users to gain a quick glimpse of campus performance related to energy use, emissions, transportation, waste, and land and water use.

Next steps

U-M will continue to iterate on its public progress tracking tools, with an initial focus on expanding the emissions reduction dashboard to segment emissions by university unit and visualize various Scope 3 emission categories.

CAMPUS ENGAGEMENT

FY23 progress

Last year, the Excellence in Sustainability Honors Cord program granted **locally-made cords** to 230 graduating students. The Student Sustainability Coalition (SSC) continues to support student-led projects and connect student organizations with administrators working towards common goals. In January, an SSC co-president **introduced** Vice President Kamala Harris to kick off a White House panel on climate action that took place at Rackham Auditorium. SSC students were then invited to **commemorate** Earth Day at the Naval Observatory in Washington, DC.

Following the Planet Blue Ambassador's expansion to UM-Flint and UM-Dearborn during FY22, the program now boasts more than 8,500 U-M community members living, studying and working sustainably throughout the university. There are also new sustainability coordinators on the Flint and Dearborn campuses.



Various university units have brought on sustainabilityspecific staff. Student Life Sustainability expanded its staff, the College of Literature, Science, and the Arts hired a new carbon neutrality program manager, and Michigan Medicine expanded its environmental, social and governance (ESG) leadership.

Next steps

Going forward, sustainability staff aim to collaborate with unit leaders to implement carbon neutrality strategies throughout the university. Inherent in this effort is meaningfully addressing equity and justice implications pertaining to various actions.

LEADERSHIP

FY23 progress

In addition to highlighting carbon neutrality in future campus planning efforts, university leaders continue to elevate sustainability and climate action as a U-M priority. University leaders have met regularly with a group of student advocates from a number of different campus organizations.

U-M conducted a national search for an associate vice president for campus sustainability.

Next steps

In early FY24, the Board of Regents approved the hiring of Shana S. Weber as associate vice president for campus sustainability. Weber was formerly the founding director of Princeton University's Office of Sustainability and began her U-M role in September.

The university aims to embue carbon neutrality leadership within its various schools, colleges and units. As part of this objective, U-M will also establish a new vice provost position to guide sustainability research and education. The U-M Board of Regents approved the establishment of this position in May 2023.

ACADEMICS & RESEARCH

FY23 progress

The 2023 Provost's Seminar on Teaching focused on **advancing** climate education. Ongoing collaboration aims to recommend ways for all U-M students on the Ann Arbor campus to gain knowledge and skills to turn climate literacy into action.

The Graham Sustainability Institute **announced** five sustainability catalyst grants designed to advance technical and behavioral interventions toward greater sustainability. Projects cover community solar, agrivoltaics, carbon-neutral building materials, aviation fuel waste reduction and sustainable archeology. To date, the institute has awarded nearly \$3 million to twenty multidisciplinary projects with significant potential to help reduce net carbon emissions.

The College of Engineering and the Office of the Vice President for Research (OVPR) **launched** the Institute for Energy Solutions, which aims to accelerate an equitable transition to a more sustainable energy future. The College of Engineering, OVPR, and the School for Environment and Sustainability also **launched** MI Hydrogen, a new initiative to provide the leading research necessary to accelerate the use of hydrogen beyond current industrial limits.

Next steps

U-M will explore opportunities to integrate sustainability within core curricula, and will continue to support critical research that addresses the climate crisis. These efforts will scale as sustainability leadership structures take shape within the Office of the Provost.





ABOUT THE UNIVERSITY OF MICHIGAN

One of the nation's top public universities, the University of Michigan has been a leader in research, learning and teaching for more than 200 years. With one of the highest research volumes of any public university in the country, U-M is advancing new solutions and knowledge in areas ranging from the COVID-19 pandemic to driverless vehicle technology, social justice and carbon neutrality. Its main campus in Ann Arbor comprises 19 schools and colleges; there are also regional campuses in Dearborn and Flint, and a nationally ranked health system, Michigan Medicine. The university also boasts a world-renowned intercollegiate athletics program and has been the site of many important events in U.S. history, including JFK's announcement of the Peace Corps, LBJ's "Great Society" speech, and the clinical trials of the Salk polio vaccine. U-M's alumni body is one of the largest in the world and includes a U.S. president, scientists, actors, astronauts and inventors.

A Non-discriminatory, Affirmative Action Employer.

STATEMENT ON THE ANISHINAABE LAND TRANSFER

The University of Michigan is located on the traditional territory of the Anishinaabe people. In 1817, the Ojibwe, Odawa, and Bodewadami Nations made the largest single land transfer to the University of Michigan. This was offered ceremonially as a gift through the Treaty at the Foot of the Rapids so that their children could be educated. Through these words of acknowledgment, their contemporary and ancestral ties to the land and their contributions to the University are renewed and reaffirmed.

REGENTS OF THE UNIVERSITY OF MICHIGAN

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Drafted by the Office of the Vice President for Communications, with contributions from the Office of the President, the Graham Sustainability Institute, the Office of Campus Sustainability, Facilities & Operations, Student Life, Planet Blue Ambassador, Information & Technology Services, and Business & Finance.

Designed by Graham Sustainability Institute Marketing and Communications.

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