



FINANCE
TREASURER'S OFFICE
UNIVERSITY OF MICHIGAN

A low-angle photograph of a tall, light-colored building with many windows, reaching towards a blue sky with scattered white clouds. Lush green trees with dense foliage are in the foreground, framing the top and sides of the building. The sun is visible through the leaves on the left side, creating a lens flare effect.

2022B GREEN BOND REPORT

Furthering the University of
Michigan's Commitment to
Carbon Neutrality

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FROM THE CHIEF FINANCIAL OFFICER

For the University of Michigan, our first issuance of green bonds is about more than getting projects in the ground—it's about living our ideals and continuing forward on a path we have been walking for over a century.

The \$300 million in green bonds issued in March 2022 will allow us to build on our longstanding legacy of sustainability—from our first forestry class in 1881, to the launch of the U-M Biological Station in 1909, to our role in the inaugural Earth Day in 1970.

It will also assist us in meeting our carbon neutrality commitments, which include the procurement of 100 percent renewable purchased power by 2025 and the complete elimination of direct on-campus emissions by 2040—exceeding IPCC's urgent guidance by 10 years.

At U-M, we take our mission seriously and believe that creating a sustainable world for our students, employees, and the communities they call home is a big part of it. We hope that you find the university's inaugural Green Bond Report informative, insightful, and that it provides a look into U-M's focus on sustainability.

More than anything, however, we hope that it shows you our heart and provides at least a spark of inspiration for all of the other issuers out there, large and small, that are every bit as committed to this mission as we are.

No matter where you exist within our community, whether you're a student, a donor, an employee, or an investor—thank you for coming on this journey with us and for your continued support.



Sincerely,



A handwritten signature in dark ink, appearing to read 'Geo S Chatas', with a long horizontal flourish extending to the right.



Geoffrey S. Chatas
Executive Vice President and Chief Financial Officer



A LONG HISTORY OF SUSTAINABILITY

The University of Michigan has a longstanding precedent for supporting sustainability and carbon neutrality initiatives.

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| 1857 ● | Landscaping The U Finding a barren campus upon his arrival in Ann Arbor, Professor Andrew Dickson White takes it upon himself to transform the landscape one tree at a time. |
| 1872 ● | Arbor Day Origins Alumnus J. Sterling Morton originates a tree-planting celebration in Nebraska called “Arbor Day.” Today, this event is celebrated globally. |
|  1881 ● | First Forestry Class Volney Spalding, a U-M botany instructor, teaches a forward-thinking course on forestry that also explores its impact on the social and economic welfare of the country. |
| 1909 ● | Bio Station Begins The U-M Biological Station is founded on a logged-over parcel, enabling students to observe firsthand how natural resource exploitation impacts the environment. |
|  1927 ● | New School, 1st Dean Reflecting its growing breadth of focus, the department of forestry evolves into a full-fledged School of Forestry and Conservation. Its dean for the next 24 years, Samuel T. Dana, is a noted scientist and scholar consulted by two U.S. presidents during his extensive career. When the school moves to a dedicated home on the Diag, the building is named for Dana. |
| 1963 ● | Power Conversion The Central Power Plant is converted from a coal-burning facility to one that uses natural gas. |

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|  | <p>1970</p> <p>Teach-In/Earth Day</p> <p>In mid-March, U-M students Dave Allan, later to become interim dean of the School of Natural Resources and Environment and Doug Scott organize the Teach-In on the Environment, a huge and spectacularly successful prototype for the first Earth Day held five weeks later. Crisler Arena is filled to the rafters for four days, as the campus comes together to learn how they can “give Earth a chance.”</p> |
| <p>1970</p> | <p>Early Green Efforts</p> <p>U-M begins sponsoring vanpools to facilitate employee commuting and institutes a recycling program.</p> |
| <p>1989</p> | <p>Students Go Solar</p> <p>Engineering undergrad Bill Kaliardos founds the University of Michigan Solar Car team, which becomes the most successful solar team on the continent.</p> |
| <p>1993</p> | <p>First Professorship</p> <p>The Max McGraw Professorship of Corporate Environmental Management, U-M’s first professorship dedicated to sustainability, is established between the School of Natural Resources and Environment and the business school.</p> |
| <p>1995</p> | <p>Earthfest Debuts</p> <p>U-M hosts its first annual party for the planet, called Earthfest, which is designed to engage the campus community in sustainability programs and activities.</p> |
| <p>1996</p> | <p>ERB Institute Opens</p> <p>The School of Natural Resources and Environment and the business school establish the Frederick A. and Barbara M. Erb Institute, committed to creating a socially and environmentally sustainable society through the power of business.</p> |
|  | <p>1998</p> <p>LEED Gold Building</p> <p>A five-year program of renovations to the Dana building begins, resulting in U-M’s first Leadership in Energy and Environmental Design certification (Gold). Later the university commits to a LEED Silver certification minimum for all new buildings and additions with an estimated construction budget greater than \$10 million.</p> |

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| <div>1999</div> | <div>Sustainability CTR</div> <p>The interdisciplinary Center for Sustainable Systems (formerly the National Pollution Prevention Center) is established within the School of Natural Resources and Environment to promote research and implementation of the Life Cycle Design Methodology.</p> |
| <div>  <div>1999</div> </div> | <div>First for Justice</div> <p>The nation's first academic program in environmental justice is launched at U-M, promoting research about the causes and consequences of the inequitable distribution of environmental benefits and hazards. Students focus on the mechanisms that give rise to class, gender, racial and other types of disparities.</p> |
| <div>2001</div> | <div>LSA & Environment</div> <p>The new Program in the Environment, located within the College of Literature, Science, and the Arts, offers students a broad liberal arts education in environmental topics.</p> |
| <div>  <div>2006</div> </div> | <div>Graham Institute</div> <p>An initial \$5 million gift from Don and Ingrid Graham, paired with matching funds from U-M, creates the Graham Sustainability Institute, a campus-wide institute to catalyze and coordinate a wide variety of sustainability initiatives. Over the next decade, programs administered by the institute go on to financially support 1,100 students and 200 faculty at U-M.</p> |
| <div>2008</div> | <div>Students Unite</div> <p>The Student Sustainability Initiative (now the Student Sustainability Coalition) launches to bring together like-minded student groups across campus.</p> |
| <div>2008</div> | <div>Tree Campus Honor</div> <p>U-M is recognized as a Tree Campus USA by the Arbor Day Foundation. It continues to be recognized every year after.</p> |
| <div>2010</div> | <div>NOAA & Great Lakes</div> <p>A \$4 million grant from the National Oceanic and Atmospheric Administration funds the creation of the Great Lakes Integrated Sciences and Assessment Center, focused on regional adaptation to climate change and variability.</p> |

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| 2011 ● | Coleman's Plan President Mary Sue Coleman announces the university's sustainability initiative supported by an investment of \$14 million and commits the campus to a series of ambitious goals, including a 25 percent reduction in greenhouse gas emissions by 2025. |
| 2012 ● | Dow Funds Fellows With a gift from The Dow Chemical Company, U-M establishes the Dow Sustainability Fellows program to support scholars committed to finding innovative sustainability solutions on local-to-global scales. |
|  2012 ● | Farming at Matthaei An experimental farm is tilled at Matthaei Botanical Gardens as part of U-M's Sustainable Food Program, and addresses student interest in gaining practical growing experience. The Campus Farm is supported by an award from the Planet Blue Student Innovation Fund, which offers grants of \$5,000 to \$50,000 for student-initiated projects that promote environmental sustainability on campus. |
| 2013 ● | Ambassadors Debut The university launches the Planet Blue Ambassador program, focused on encouraging faculty, staff, and students to engage in personal sustainability actions. It also establishes the Sustainability Cultural Indicators Program, a first-of-its-kind study by the Graham Sustainability Institute and the Institute for Social Research for tracking sustainability culture changes and progress on campus. |
|  2013 ● | Home for Batteries The Battery Fabrication and Characterization User Facility (Battery Lab) is developed in cooperation with the Michigan Economic Development Corporation and Ford Motor Company. |
| 2015 ● | New Progress University leadership reinvigorates campus sustainability progress by committing \$100 million to new efforts relating to climate action, waste prevention, healthy environments and community awareness and action. These efforts include retooling the Central Power Plant to register a 20 percent decrease in greenhouse gas emissions. |

2017

Dow Fellows Program Extended

A new \$3 million gift from the Dow Chemical Co. Foundation to the Dow Sustainability Fellows Program at U-M will enable fellows to continue implementing sustainable solutions for food systems, cities, infrastructure, mobility, consumption and energy systems from Michigan to Sub-Saharan Africa.



2017

Zero Waste Stadium

Michigan Athletics launches zero-waste game days at Michigan Stadium, helping to move U-M closer to reaching its campus sustainability goals.

2017

Grand Opening of SEAS

The opening ceremony for the new School for Environment and Sustainability marks the start of a new path in sustainability research and education that brings together faculty from a wide variety of disciplines and many U-M schools and colleges to address local and global sustainability challenges.

2019

President's Commission on Carbon Neutrality Established


The President's Commission on Carbon Neutrality is established to develop recommendations for how to achieve carbon neutrality for U-M, as well as scalable and transferable strategies that can be used by other institutions and larger communities to achieve the same goal.



2020

Earth Day at 50

Earth Day at 50, a year of lectures, special events and courses dedicated to bringing the U-M campus and community partners together, explores the impact we are currently making on sustainability and how we can rise to the challenge of creating a better future for our planet. From March 2020 onward, the COVID-19 pandemic interrupted in-person Earth Day at 50 programming. Nonetheless, U-M marked the occasion with an array of limited-capacity and virtual offerings, including a series of podcasts and videos covering various resonant topics in sustainability, a panel featuring original "Teach-In on the Environment" organizers, and the annual Peter M. Wege Lecture on Sustainability.

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| 2021 ● | <p>Carbon Neutrality Commission Submits Recommendations</p> <p>The President's Commission on Carbon Neutrality, charged with recommending scalable, transferable, financially responsible and just strategies for U-M to achieve net-zero emissions, submits its final report and recommendations to university leadership. The report includes a set of 50 proposed actions that, if enacted, could enable U-M to achieve net-zero emissions university-wide.</p> <p>U-M Commits to Carbon Neutrality</p> <p>In May 2021, following the release of the final report of the President's Commission on Carbon Neutrality, U-M committed to achieving carbon neutrality university-wide, encompassing the Flint, Dearborn and Ann Arbor campuses, as well as Athletics and Michigan Medicine.</p> |
|  2022 ● | <p>Green Bonds</p> <p>In March 2022, U-M furthers its commitment to carbon neutrality by issuing its first series of Green Bonds (2022B), which will be used to support green buildings, renewable energy infrastructure, and clean transportation capital projects.</p> |

In addition to the milestones outlined in the timeline, current U-M climate action work builds on prior efforts in carbon accounting, energy-use reduction, and commission recommendations. In the 1990s, U-M launched targeted efforts to reduce energy use in buildings. In the early 2000s, the university began quantifying and reporting its greenhouse gas emissions, and prior to the 2021 commission's work, U-M convened the President's Greenhouse Gas Reduction Committee, which delivered its recommendations in 2015. As a product of the committee's guidance, U-M increased the capacity to generate energy on campus at the Central Power Plant, purchased additional renewable energy from local utilities, and continued to invest in energy efficiency.

From February 2019 to March 2021, the U-M President's Commission on Carbon Neutrality worked to recommend a pathway for the university to achieve net-zero greenhouse gas emissions, and in doing so, develop scalable and transferable strategies that other institutions and larger communities can apply to achieve the same goal. The commission released its final recommendations in March 2021 and in May 2021, U-M committed to achieving university-wide carbon neutrality.



CARBON NEUTRALITY COMMITMENTS

In May 2021, U-M committed to achieving carbon neutrality—covering the Flint, Dearborn, and Ann Arbor campuses, and encompassing Michigan Medicine and Athletics. Commitments include:

- Reducing greenhouse gas emissions from purchased electricity (Scope 2) to net zero by 2025.
- Eliminating campus emissions (Scope 1) by 2040.
- Establishing goals by 2025 for a wide range of indirect emission sources (Scope 3).
- Fostering a university-wide culture of sustainability, with justice as a core principle.

U-M is on pace to reduce Scope 1 and 2 emissions by 50 percent by 2025, which exceeds the United Nations Intergovernmental Panel on Climate Change (IPCC) guidance to reduce emissions by 45 percent by 2030. Notable efforts include:

- Planning geo-exchange systems for the Leinweber Computer Science and Information Building, the newly-announced Central Campus residence hall, and the new Ginsburg Center.
- Issuing an RFP to procure 100 percent of purchased electricity from renewables by 2025.
- Enacting new maximum building emissions targets to cover new projects over \$10 million.
- Identifying \$15 million in energy conservation projects—covering approximately 100 buildings and 10 million square feet—to be funded via a shared revolving energy fund.
- Launching an initial emissions reduction dashboard.
- Pursuing 25 megawatts of solar power on the Ann Arbor, Dearborn, and Flint campuses.

U-M also holds a Gold rating from the Association for the Advancement of Sustainability in Higher Education's Sustainability Tracking, Assessment and Rating System (STARS). The STARS methodology covers academics, engagement, operations, and planning and administration. More than 900 participating institutions from 40 countries take part, including 137 that hold Gold ratings and 12 that hold Platinum ratings. All participating Big Ten institutions hold Gold or Silver ratings. In addition, the university has robust investing and construction goals to promote a sustainable future.



SUSTAINABLE INVESTING GOALS

Key objectives

- Secure funding required to transition to a carbon-neutral campus.
- Transition natural resource investments toward enabling a low-carbon economy.

Progress to date

- Issued \$300 million in green bonds to fund infrastructure investments that advance U-M climate action goals.
- Discontinued direct investments in companies that are the largest contributors to greenhouse gases; discontinued investments in funds whose primary focus is oil reserves, oil extraction, or thermal coal extraction.
- 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.
- The endowment is on track to reduce portfolio emissions by more than half by 2030.
- Invested \$420 million in sustainable energy over the past two years.
- Transitioned 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.

Priorities

- Continue investing in campus infrastructure and investments that decrease carbon emissions.
- Pursue a net-zero endowment by 2050 and support a low-carbon economy.



SUSTAINABLE CONSTRUCTION GOALS

Energy Performance Standards

The university's current goal of exceeding American Association of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) 90.1-2013 energy code requirements is 20 percent for all new construction projects and 15 percent for renovation projects with a construction budget of \$10 million or greater. U-M requires numerous mandatory energy conservation measures, comprehensive evaluation of additional energy efficiency measures, comprehensive modeling of energy usage for proposed projects, and development of energy impact statements at each phase of design.

Carbon Emission Targets

In November 2022, the university formally incorporated in the Design Guidelines maximum carbon emissions targets across different building types for all new construction projects as well as major renovation projects with a construction budget of \$10 million or greater. These targets further enhance our goals and support U-M's commitment to achieving net-zero emissions.

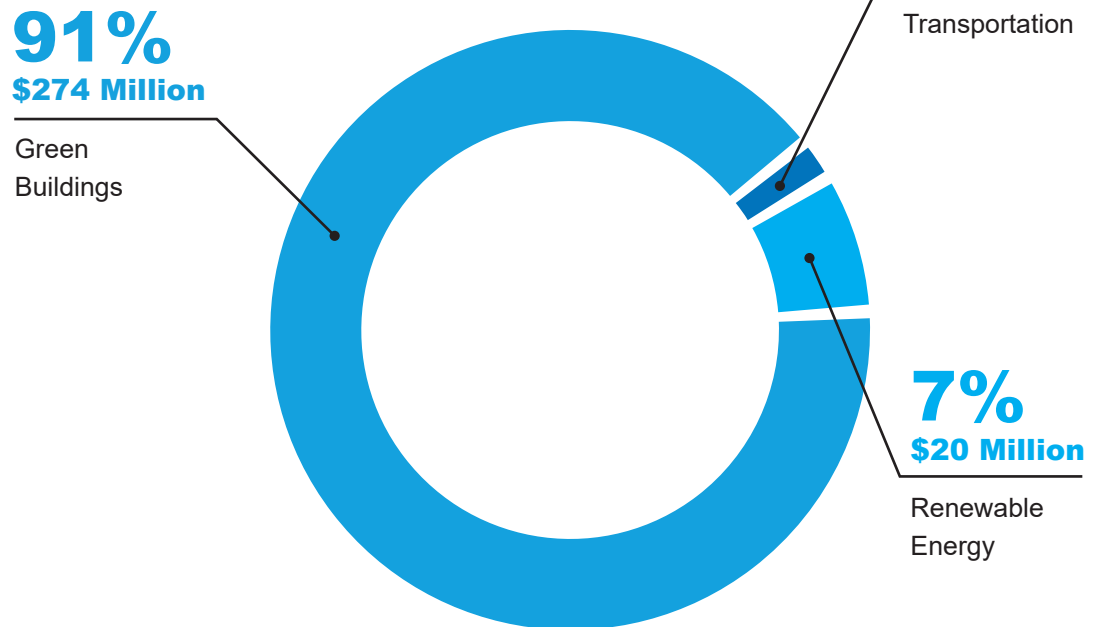
LEED Certification

All new buildings and additions with an estimated construction budget greater than \$10 million are designed to achieve a minimum of Leadership in Energy and Environmental Design (LEED) Silver certification level.

SERIES 2022B GREEN BOND SPENDING

In March 2022, U-M successfully issued its 2022 series of bonds to finance planned future construction and renovation projects. As part of this issuance, the university issued its first green bond series (2022B) to directly support its ambitious sustainability goals. Of the \$300 million in green bonds issued, U-M plans to allocate \$274 million to support green buildings, \$20 million to support renewable energy projects, and \$6 million to support clean transportation.

Green Bond Allocations by Category¹



¹Amounts rounded



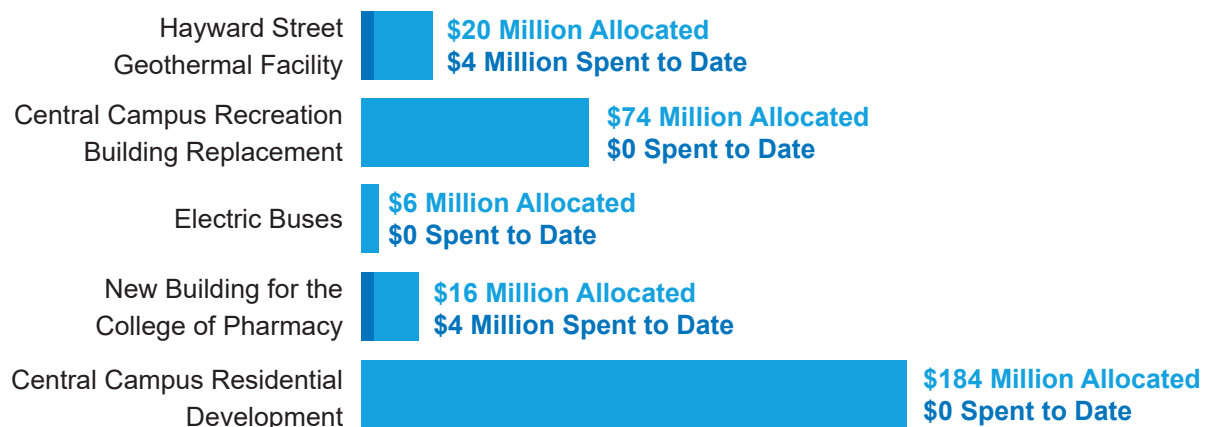
HOW DOES THE GREEN BOND ISSUANCE SUPPORT U-M'S CLIMATE ACTION GOALS?

The campus improvement projects financed by the Series 2022B Bonds are addressing climate transition risks by mitigating greenhouse gas emissions from buildings and the transportation sector. U-M is supporting the climate transition by constructing green buildings, installing renewable energy infrastructure, and prioritizing clean transportation that directly advance decarbonization goals. The Series 2022B Bonds also finance activities which align with a just transition, characterized by the equitable inclusion and accommodation of all individuals, with a special focus on disadvantaged groups who may be directly or indirectly affected by the structural changes necessary for the transition to a low-carbon economy. The Series 2022B Bonds support the just transition by prioritizing projects that will minimize environmental impacts of the university's operations and, in turn, minimize negative impacts on human health.

By financing a variety of projects with educational, health, and environmental benefits, the Series 2022B Bonds also support the following United Nations Sustainable Development Goals: Goal 3—Good Health and Well-Being, Goal 4—Quality Education, Goal 7—Affordable and Clean Energy, Goal 8—Decent Work and Economic Growth, and Goal 11—Sustainable Cities and Communities.

This report covers the period through March 2023. As of March 31, 2023, \$7,787,340.45 in green bond proceeds have been expended.

Green Bond Spending by Project¹



HAYWARD STREET GEOTHERMAL FACILITY



\$20.0 Million

Total Project Budget

\$19.7 Million

Amount of Green Bonds
Allocated to Project

\$3.6 Million

Amount of Green Bonds
Spent to Date

The university's carbon neutrality goals recommend the utilization of district geothermal systems for heating and cooling buildings to reduce carbon emissions and eventually achieve carbon neutrality. This project will build a geothermal plant on Hayward Street adjacent to the Leinweber Computer Science and Information Building to supply its heating and cooling. Geothermal systems are renewable because of the earth's constant temperature underground. The Leinweber Building is ideal for this demonstration project because there is sufficient land available for the system and we can learn the dynamics of a geothermal system in our climate. The project will include 100 borings spaced 20 feet apart with underground piping to a depth of 700 feet in an area approximately two-thirds the size of a football field. As we study comprehensive district geothermal systems for North Campus, we envision this relatively small system could be interconnected as future systems are built.

The geothermal system and the Leinweber Building will be all-electric and the first large-scale university building that will not rely on natural gas for heating. Currently, the university is sourcing 200 million kilowatt hours per year from renewable energy. We anticipate the remaining purchased electricity on the Ann Arbor Campus will be from renewable energy sources prior to the completion of the Leinweber Building resulting in a carbon-neutral operation. The system will be located underground allowing the existing parking lot to be replaced in the same location. This project is also pursuing LEED Gold Certification.

CENTRAL CAMPUS RECREATION BUILDING REPLACEMENT



\$165.0 Million

Total Project Budget

\$74.3 Million

Amount of Green Bonds
Allocated to Project

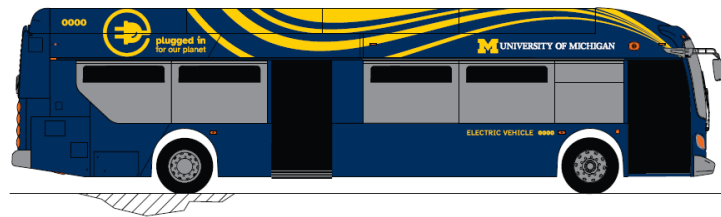
\$0 Million

Amount of Green Bonds
Spent to Date

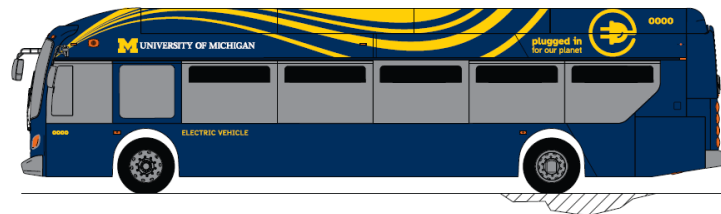
The Central Campus Recreation Building Replacement will contain 200,000 gross square feet and will include modern gymnasiums, a track for jogging and walking, spaces for weight and cardiovascular training, group exercise rooms, aquatics, climbing areas, courts for squash and racquetball, locker rooms, support, and administration spaces. The project will allow greater access and opportunity for students, faculty, and staff to improve their health and well-being.

The building's design and systems include several energy-efficient features that will target an estimated 20 percent energy savings compared with an energy code-compliant building, as defined in ASHRAE 90.1-2013. This project is pursuing LEED Silver certification.

ELECTRIC BUSES



CURB SIDE



STREET SIDE

\$15.2 Million

Total Project Budget

\$6.0 Million

Amount of Green Bonds
Allocated to Project

\$0 Million

Amount of Green Bonds
Spent to Date

In accordance with the university's carbon neutrality goals, the university's Logistics, Transportation and Parking (LTP) division is moving towards an all-electric bus fleet. LTP has purchased an initial set of four battery-electric buses. Supplemental funding from green bonds will assist the university with its transition to electric buses.

NEW BUILDING FOR THE COLLEGE OF PHARMACY



\$141.0 Million

Total Project Budget

\$16.0 Million

Amount of Green Bonds
Allocated to Project

\$4.2 Million

Amount of Green Bonds
Spent to Date

The College of Pharmacy Building was constructed in 1960, with a major addition built in 1992. The building's narrow structural bays and shallow floor-to-floor heights do not allow for the reconfiguration needed for modern research and teaching laboratory spaces or modern classrooms. In addition, the building is not large enough to meet the College of Pharmacy's space needs. As such, the college's teaching, research, and office spaces are distributed across seven campus locations. The construction of a new teaching and research facility (the New Building for the College of Pharmacy) will address its need to modernize and increase its physical space for academic, research, and student support functions. A new 142,000-gross-square-foot building located on the corner of Glen Avenue and East Huron Street will house active learning-style classrooms, laboratories, associated support spaces, faculty and administrative offices, and student-focused areas. The project is designed to achieve LEED Silver certification.

CENTRAL CAMPUS RESIDENTIAL DEVELOPMENT



\$540.6 Million

Total Project Budget

\$184.0 Million

Amount of Green Bonds
Allocated to Project

\$0 Million

Amount of Green Bonds
Spent to Date

U-M will construct new Central Campus housing and dining with the addition of 2,300 beds and a new 900-seat dining facility. This new facility, on the current Elbel Field site, between Hoover Avenue and Hill Street, will enable the university to respond to the increasing demand among students for affordable, on-campus housing on or near Central Campus and better meet the needs of our growing student body. It will also help ensure continued excellence in the overall undergraduate experience. The facility will continue to advance the university's efforts to achieve carbon neutrality by utilizing geothermal exchange systems for heating and cooling the new dining hall, incorporating all-electric equipment for cooking, and designing the entire facility to earn LEED Platinum certification.

Learn more about U-M's green bonds and sustainability at the university:

- [Architecture, Engineering, and Construction](#)
- [Office of Campus Sustainability](#)
- [Planet Blue](#)

Special thanks to these areas for their assistance in producing this report.



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