



Chapter 11 Space & Sustainability

Goals

Campus space must support the academic and research missions of the University. This means adding space as it's needed as well as applying comprehensive policies on allocation and use of existing space, while doing the capital planning necessary to meet the institution's needs.

The U-M has added a focus on sustainability, which is related to space and to other business practices. As such, the university has set goals for greenhouse gas emissions, carbon output of university vehicles, and production of waste, among others.

Overview

The physical plant of the University of Michigan Ann Arbor campus is extensive, covering 3,207 acres locally. The campus includes 559 buildings with 2,783 classrooms and instructional laboratories, 1,589 study rooms, and 8,100 research labs/rooms. The U-M is responsible for 29 miles of roads and 7.4 million square feet of sidewalks, steps, ramps, and plazas. More than 16,500 trees and countless gardens populate the campus, as well as 24.3 million square feet of turf. Fiber optic cable extends more than 200 miles throughout the campus, supporting data centers, file servers, computers, and tablets.

Space utilization guidelines exist for classrooms, food service, research activities, and offices. Space management contributes to efficiency and cost containment while also ensuring that there is enough space available for effective teaching.

Planet Blue is the campus sustainability initiative, which includes educational, research, operational, and community engagement programs. In 2015, the University became a signatory to the American Campuses Act on Climate Pledge,

joining more than 200 universities and colleges that committed to “significant action to reduce greenhouse gas emissions, increase campus sustainability, and incorporate environmental sustainability in academic curricula.”¹ In summer 2016, the U-M was one of eight institutions that received the Sustainability Award in Facilities Management² from a national organization of physical plant administrators.

In early 2019, the U-M launched the President's Commission on Carbon Neutrality³. This 17-member body released recommendations in March 2021 for reducing the U-M's carbon emissions to levels that will help the institution reach its 2025 and 2040 sustainability goals.⁴ Recommendations included converting natural gas-based heating and cooling systems to all-electric or geothermal systems. In February 2023, the Ann Arbor campus announced that it had reached two of the 2021 goals: greenhouse gas emissions have dropped by 25% compared to the 2006 benchmark, and the application of chemicals to campus grounds has declined by 40% (compared to 2006).

For More Information

Space Planning and Utilization

(provost.umich.edu/resources-policies/space-planning/)

Planet Blue (planetblue.umich.edu/)

U-M sustainability education, research, and campus operations

U-M Sustainability Goals

(ocs.umich.edu/sustainability-goals/)

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¹ “University takes the American Campuses Act on Climate Pledge,” *University Record*, Nov. 20, 2015.

² “U-M wins national award for campus sustainability excellence,” *University Record*, July 25, 2016.

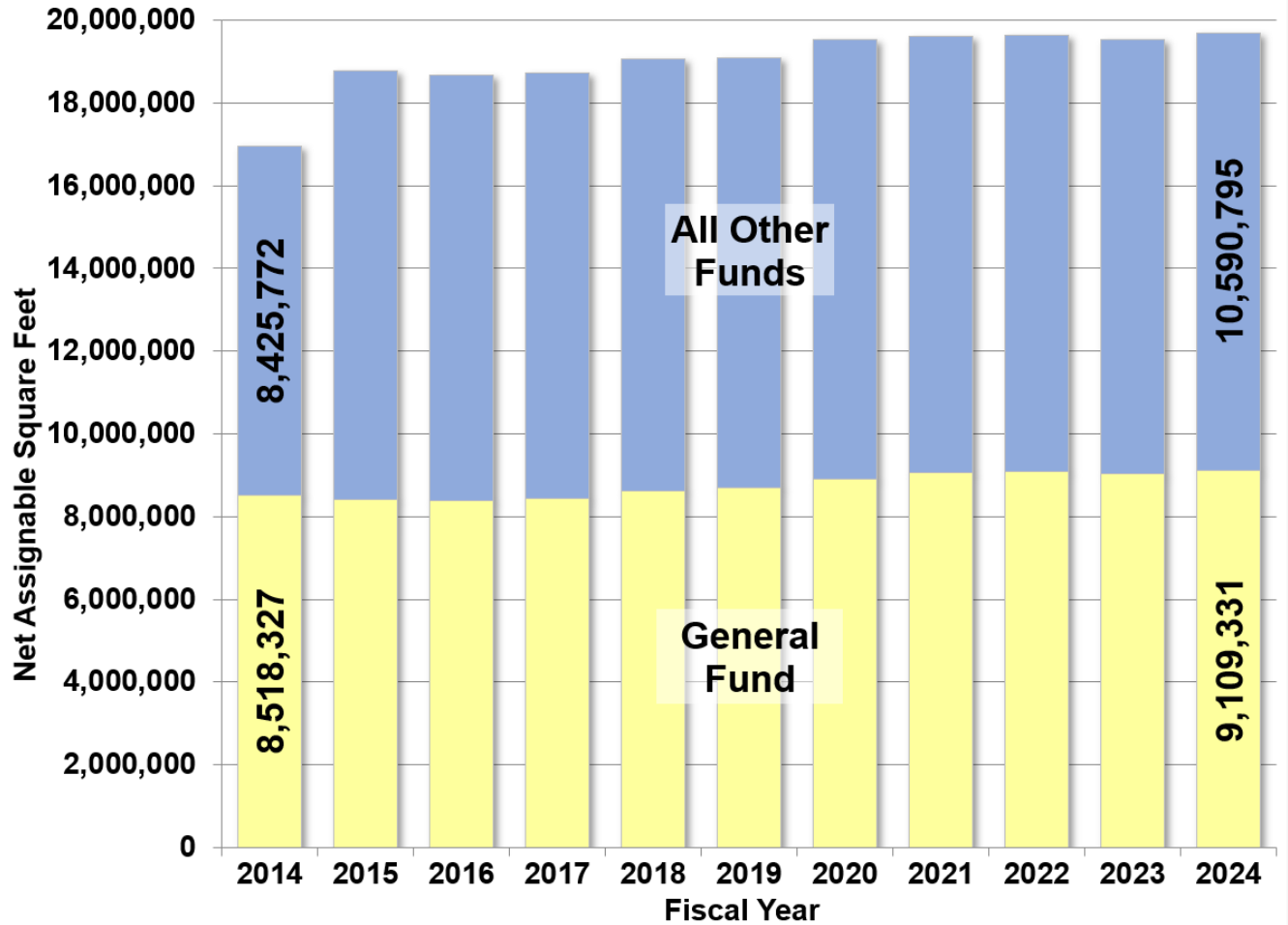
³ “University launches Commission on Carbon Neutrality,” *University Record*, February 4, 2019.

⁴ “Carbon neutrality commission submits final report and recommendations,” *University Record*, March 18, 2021.

⁵ “U-M joins Better Climate Challenge in effort to cut emissions,” *University Record*, May 24, 2022.

Ann Arbor campus space is divided about equally in being supported by the General Fund and by other funds. Compared to 2014, the General Fund now supports an additional 591,004 square feet, a 6.9% increase⁶.

11.1 Total Facilities Space by General Fund and All Other Funds⁷, FY2014-FY2024.



SOURCE: U-M Annual Space Management Survey Reports

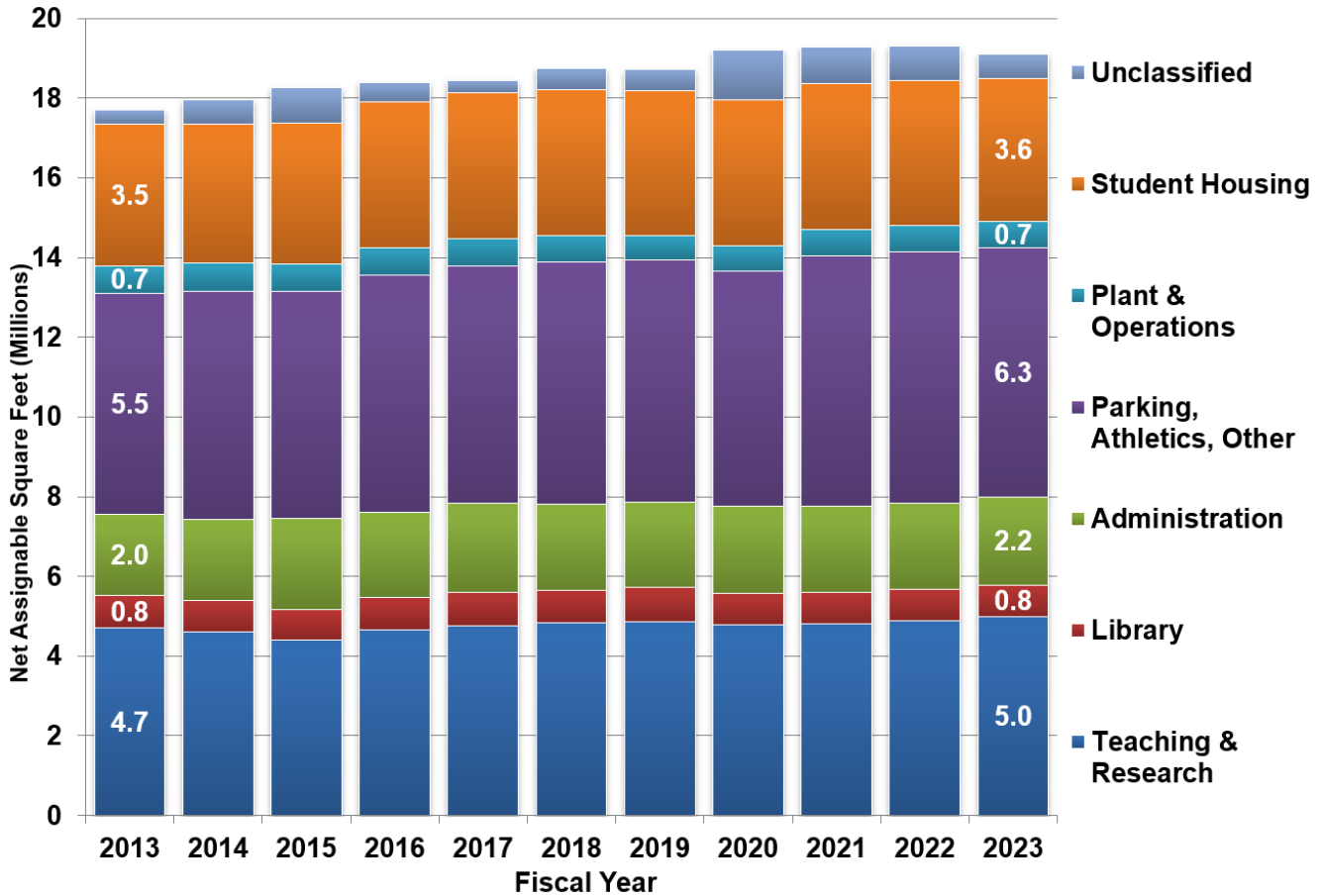
Ann Arbor campus space⁵ supported by the General Fund is used for teaching, research, student services, support of the campus physical plant, and administration. All Other Funds space is used for the hospitals and health system, residence halls, parking structures and varsity athletic facilities. These space categories are labeled “net assignable,” which means they exclude common areas, such as hallways, staircases, and lobbies.

⁶ In this chart, General Fund space excludes the North Campus Research Complex and the non-Medical-School portion of the Health System.

⁷ See Chapter 10, Figure 10.2 for details about the definitions of “All Other Funds.”

Ann Arbor campus space has increased by 1.15 million net assignable square feet over the last decade at an annual growth rate of about 1.0 percent. All types of space are needed to support the University’s mission.

11.2 Ann Arbor Campus Space by Function, FY2013-FY2023.



SOURCE: U-M Office of Space Analysis

Neither this chart nor 11.2.1 includes the space assigned to the U-M Health System or the North Campus Research Complex.

Space in the unclassified category is either not in use or being remodeled. Plant and Operations includes space used in the operation and maintenance of the University’s physical plant, its heating/cooling and other utilities services, central information technology services, and some special service operations, such as printing services.

About 5/6 of the space in the Parking, Athletics, Other category is used by parking and athletics. The remainder supports activities such as development, government and

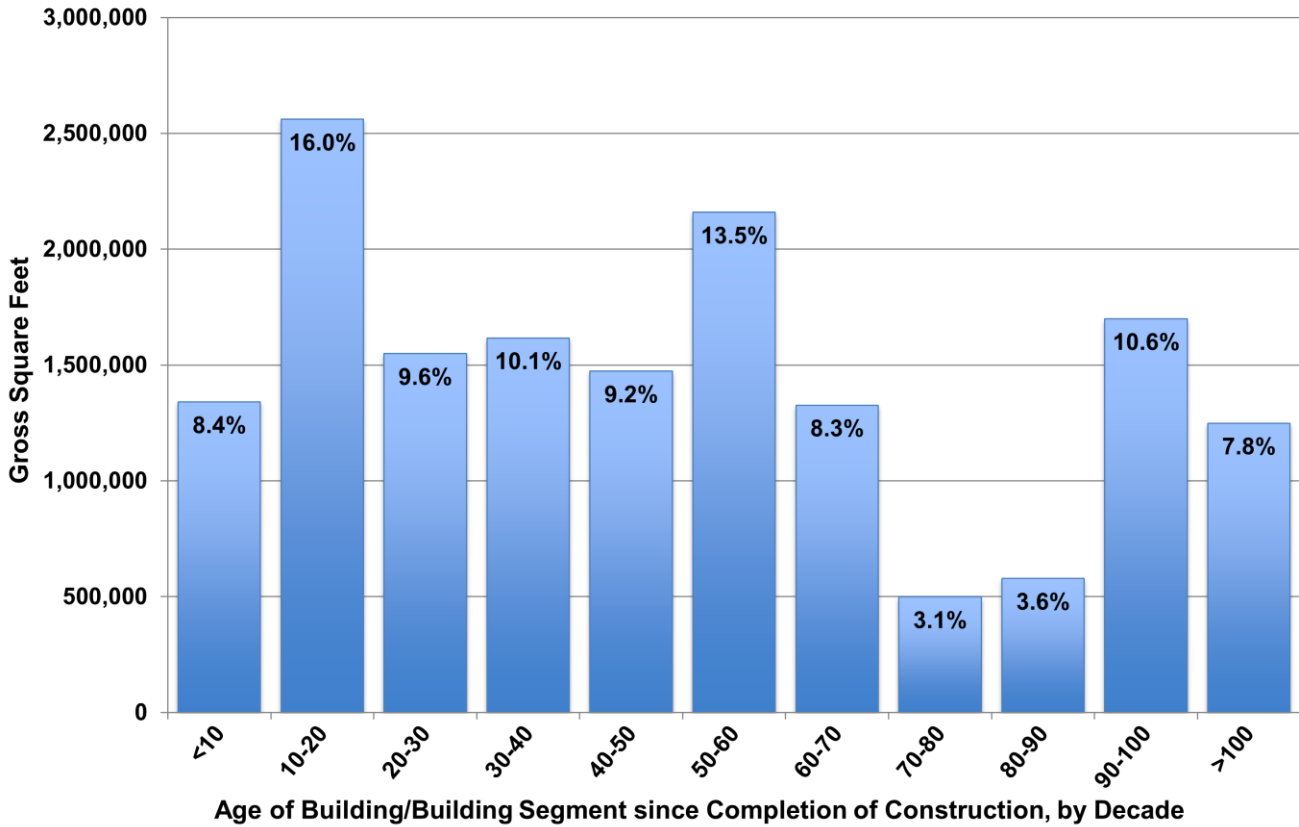
community relations, student clubs and organizations, as well as University space leased to private entities or operated under a management agreement with an outside entity (i.e. food service in the student unions). The need for parking and the growth in athletic facilities have driven this category to grow the most over the decade displayed.

Administration combines space used by central functions, departmental functions, and student administration and student services.

Net assignable space excludes hallways, restrooms, elevators, and custodial areas.

More than half of the buildings on campus have been built or remodeled in the the last 50 years. Almost one-fifth of the buildings on campus are at least 90 years old.

11.3 Age of Ann Arbor Campus General Fund Space, by 10-year Increments through FY2023.



SOURCE: U-M Space Dataset

The General Fund building space for the Ann Arbor campus⁸ and nearby areas totals 16 million gross square feet. Buildings on campus that are more than 100 years old include the President’s House, Newberry Hall, Tappan Hall, Burnham House, and two barns at Matthaei Botanical Gardens; the 100-year-old structures contribute about 850,000 gross square feet to the campus total.

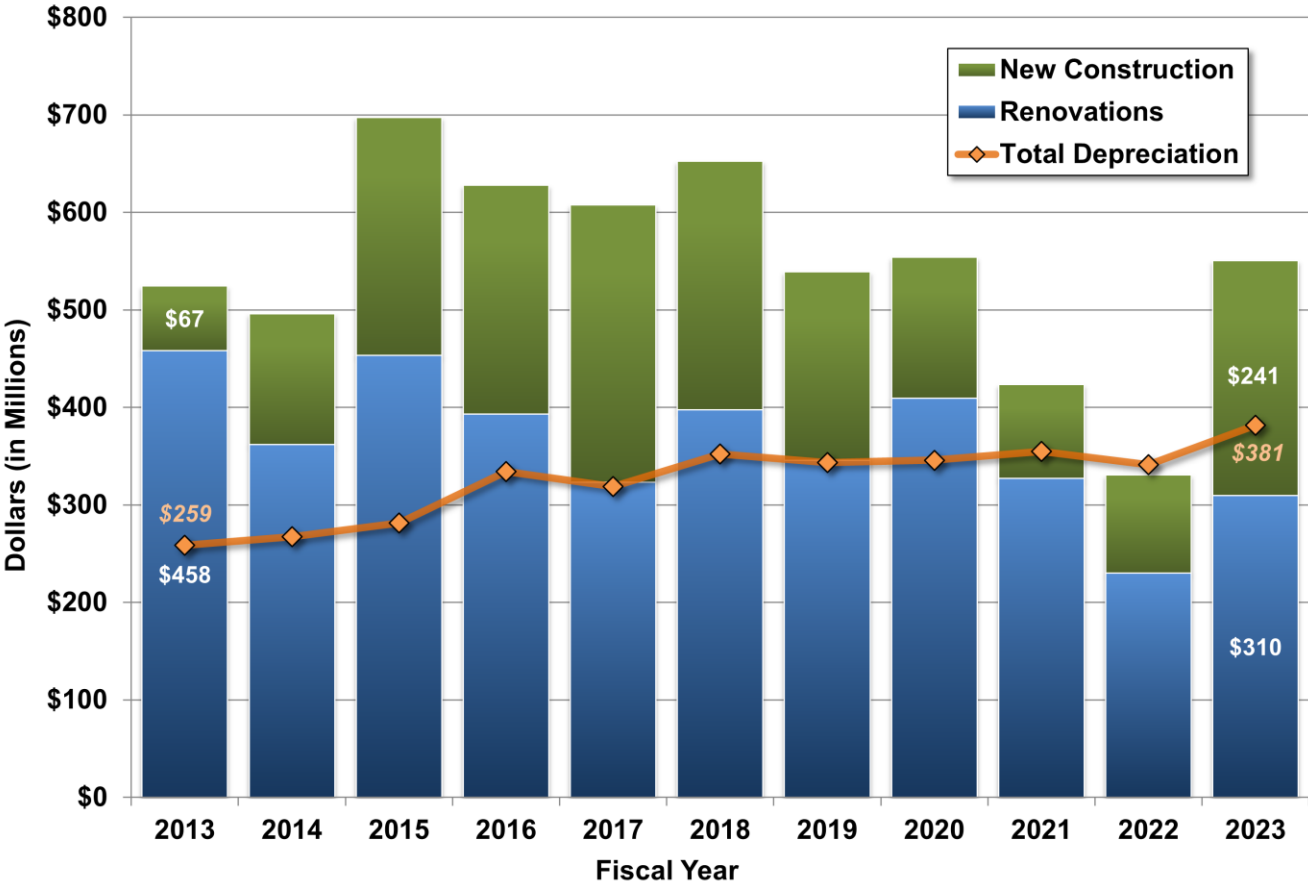
The last 20 years saw a large increase in new construction on campus tied to several U-M initiatives. During this period, the U-M campus added the Biomedical Sciences Research Building, Undergraduate Science Building, Palmer Commons, Computer Science Building, and the Ross School of Business building.

Buildings associated with auxiliary activities (e.g., U-M hospitals and clinics, student residence halls and athletic facilities) are not included in this chart because these facilities are not supported by the General Fund. Also, this chart does not include the North Campus Research Complex, a group of buildings acquired by the University in 2009.

⁸ This chart excludes the non-Medical School parts of Michigan Medicine and the North Campus Research Complex.

The University tries to maintain a balance between adding new space and renovating existing space on campus.

11.4 U-M General Fund Renovation and New Construction Expenditures, Adjusted for Inflation⁹, and Depreciation of the U-M Physical Plant, FY2013-FY2023.

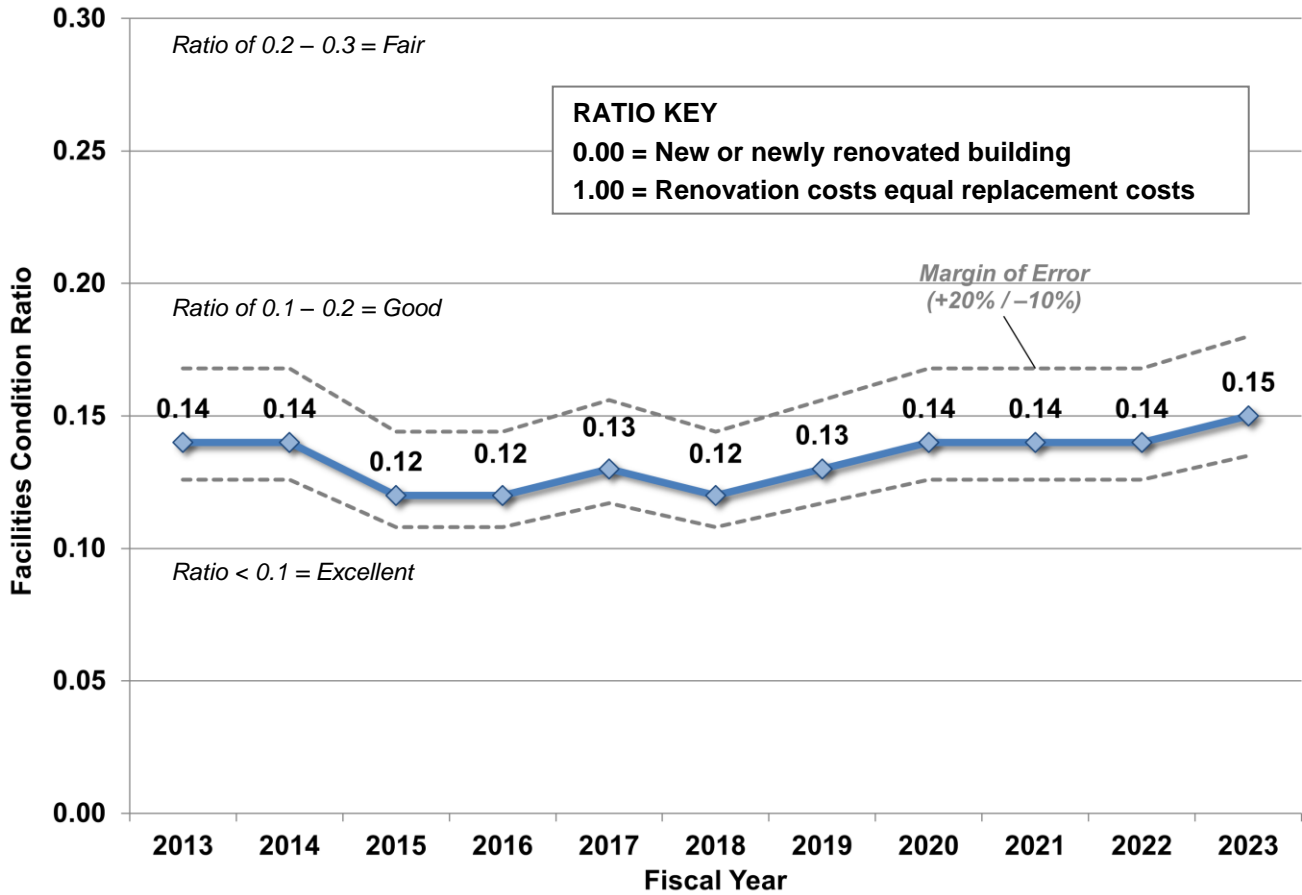


SOURCE: U-M Office of Financial Analysis

⁹ Based on December 2022 Building Cost Index, *Engineering News-Record*.

The overall condition of General Fund buildings on the Ann Arbor campus has remained consistent. The U-M continues to monitor building condition by identifying and prioritizing infrastructure needs.

11.5 Ratio of General Fund Infrastructure Renovation Costs to Total Replacement Costs, FY2013-FY2023.



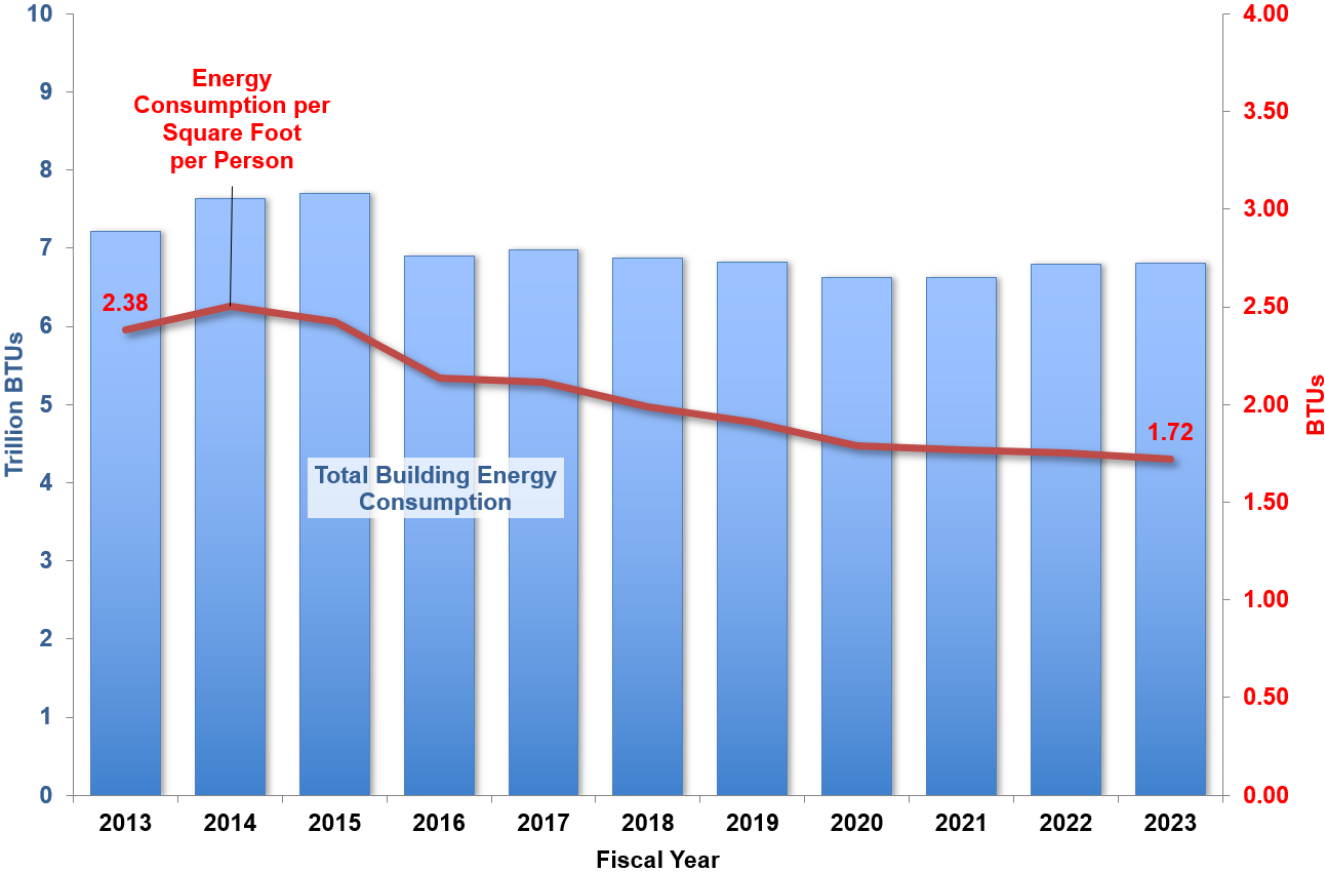
SOURCE: U-M Office of Financial Analysis

The facilities condition ratio is an indicator of building condition that divides the cost of needed building renovations by the cost to replace those structures. The ratio maximum of 1.0 indicates that the cost of renovating the existing facilities equals their total replacement. A ratio of 0 would mean no renovations are necessary; that is, the facilities are all new or newly renovated. A ratio of 0.2-0.3 is

generally considered Fair, 0.1-0.2 is considered Good, and below 0.1 is considered Excellent.

Total energy use in campus buildings and energy use per square foot per person has declined compared to a decade ago because new construction and remodeled space is more efficient.

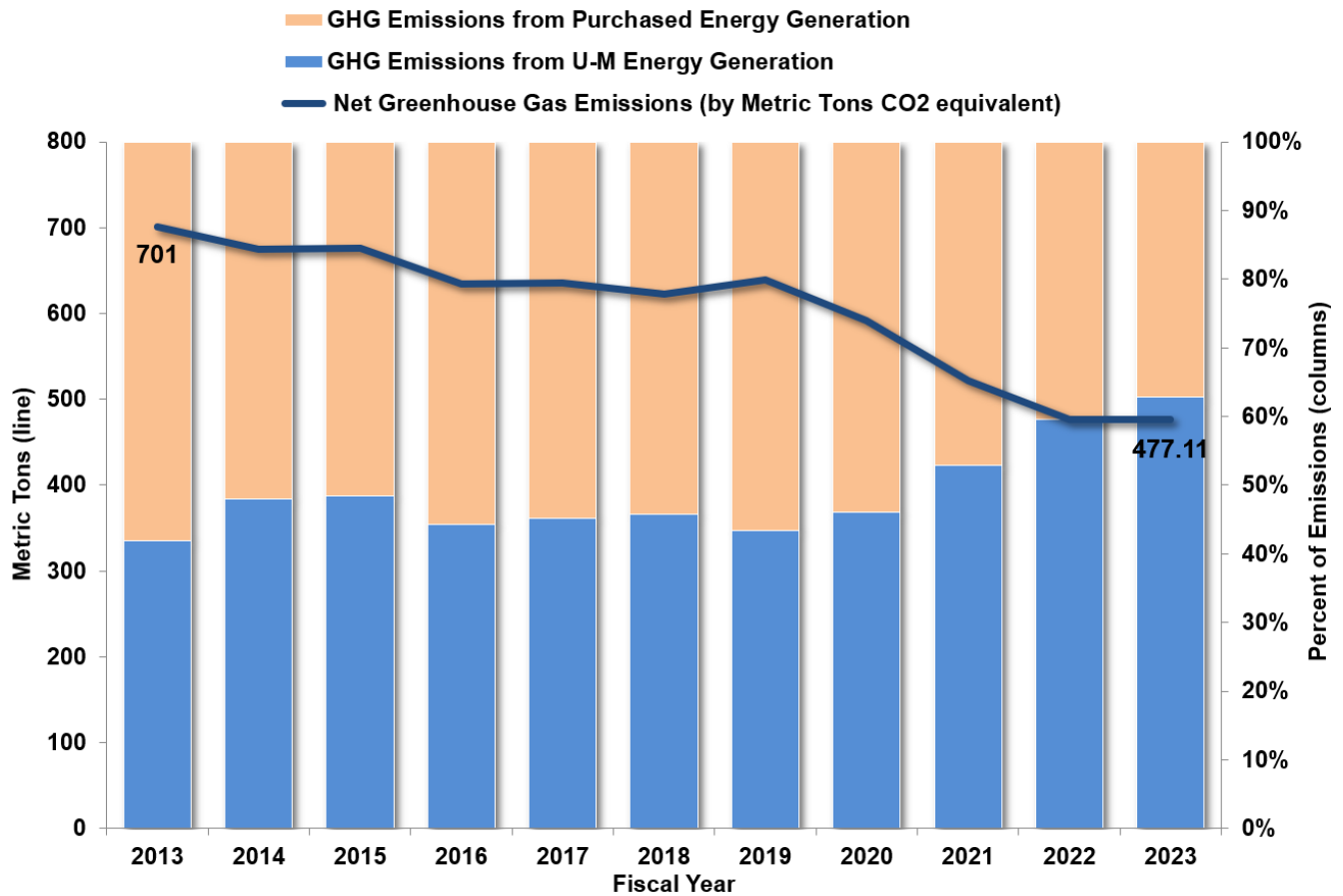
11.6.1 Building Energy Use, Total and per Square Foot per Person, FY2013-FY2023.



SOURCE: U-M Utilities and Plant Engineering

Net greenhouse gas emissions from campus buildings and vehicles have declined over the past several years as the fuel source for generating electricity has shifted to natural gas over coal.

11.6.2 Greenhouse Gas Emissions, Total and Percent of Emissions by Energy Generation Source, FY2013-FY2023.

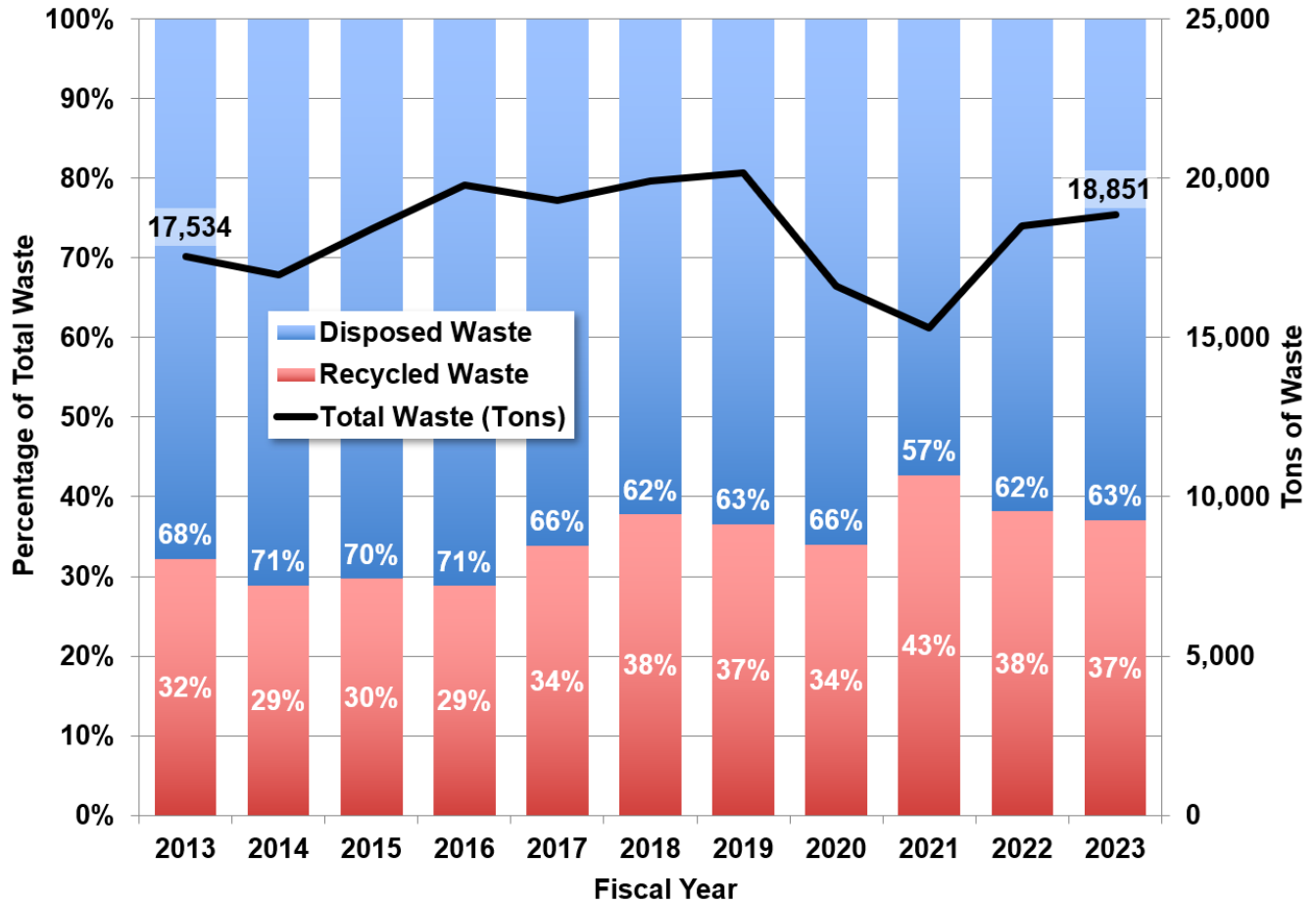


SOURCE: U-M Utilities and Plant Engineering

The level of greenhouse gas emissions is influenced by two factors: total energy usage and the energy provider. University-generated energy is optimized for efficient production and to limit greenhouse gas production. The university also purchases some energy generated that utilities produce at coal-fired plants, which produces higher levels of greenhouse gases. As natural gas becomes competitive with coal as a fuel source, U-M’s external energy providers are shift to this fuel, greenhouse gas emissions have fallen. Also, U-M is making strides in producing energy from renewable sources.

The total waste generated at the University of Michigan increased in FY23 as on-campus work and educational activities returned following a lift in pandemic-related restrictions.

11.6.3 Total Waste and Percent Recycled Compared to that sent to a Landfill, FY2013-FY2023.



SOURCE: U-M Waste Management

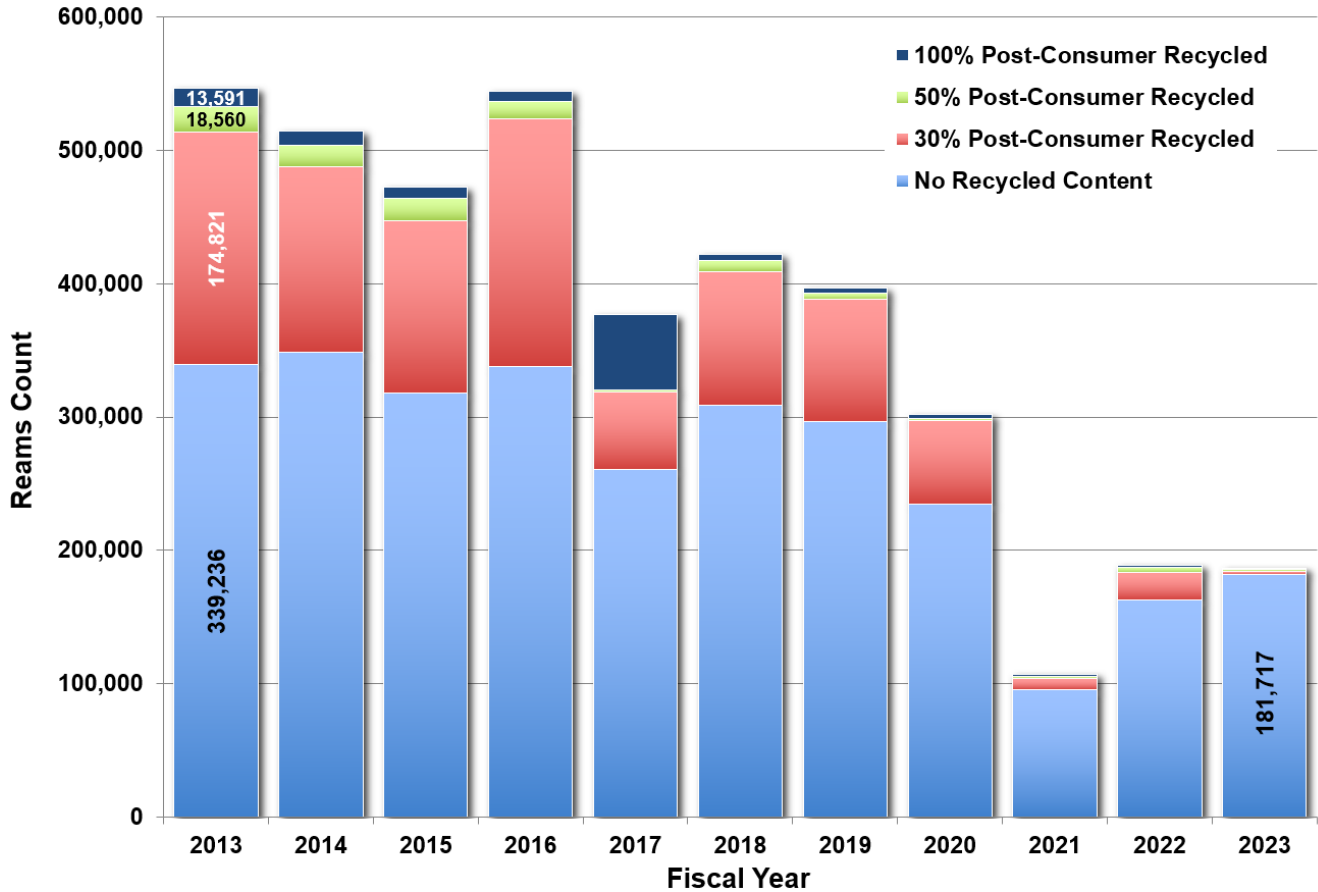
The values in the red columns indicate the percentage of total waste that was recycled. Total waste tends to track the overall space in use, which is increasing, so there is constant tension between space growth and waste that is recycled.

In fall of 2020, the U-M Office of Campus Sustainability¹⁰ introduced "Where to Throw," a web application that allows the user to enter an item's description and find out the best method of reuse, recycle, composting, or, if necessary, disposal. See ocs.umich.edu/resources/where-to-throw/.

¹⁰ 'Where to Throw' search tool eases campus waste disposal decisions, *The University Record*, Oct. 15, 2020.

The total amount of paper purchased by the University decreased in FY2023 compared to the previous year.

11.6.4 Paper Purchased by Percent Recycled Content, FY2013-FY2023.



SOURCE: U-M Office of Campus Sustainability

The changes in the types of paper used on campus over the last three years is difficult to interpret. In FY2020 total paper use declined, which might be both part of a trend to reduction in paper consumption, but also an effect of the campus closing down during the last half of the fiscal year due to the pandemic.

The large drop the following year would appear to be linked to the near total shutdown of on-campus activity. In FY2022, as people returned to on-campus activity, paper use increased, although recycled paper use appears to be at a level less than expected. Total paper purchased decreased slightly in FY2023 compare to FY2022.