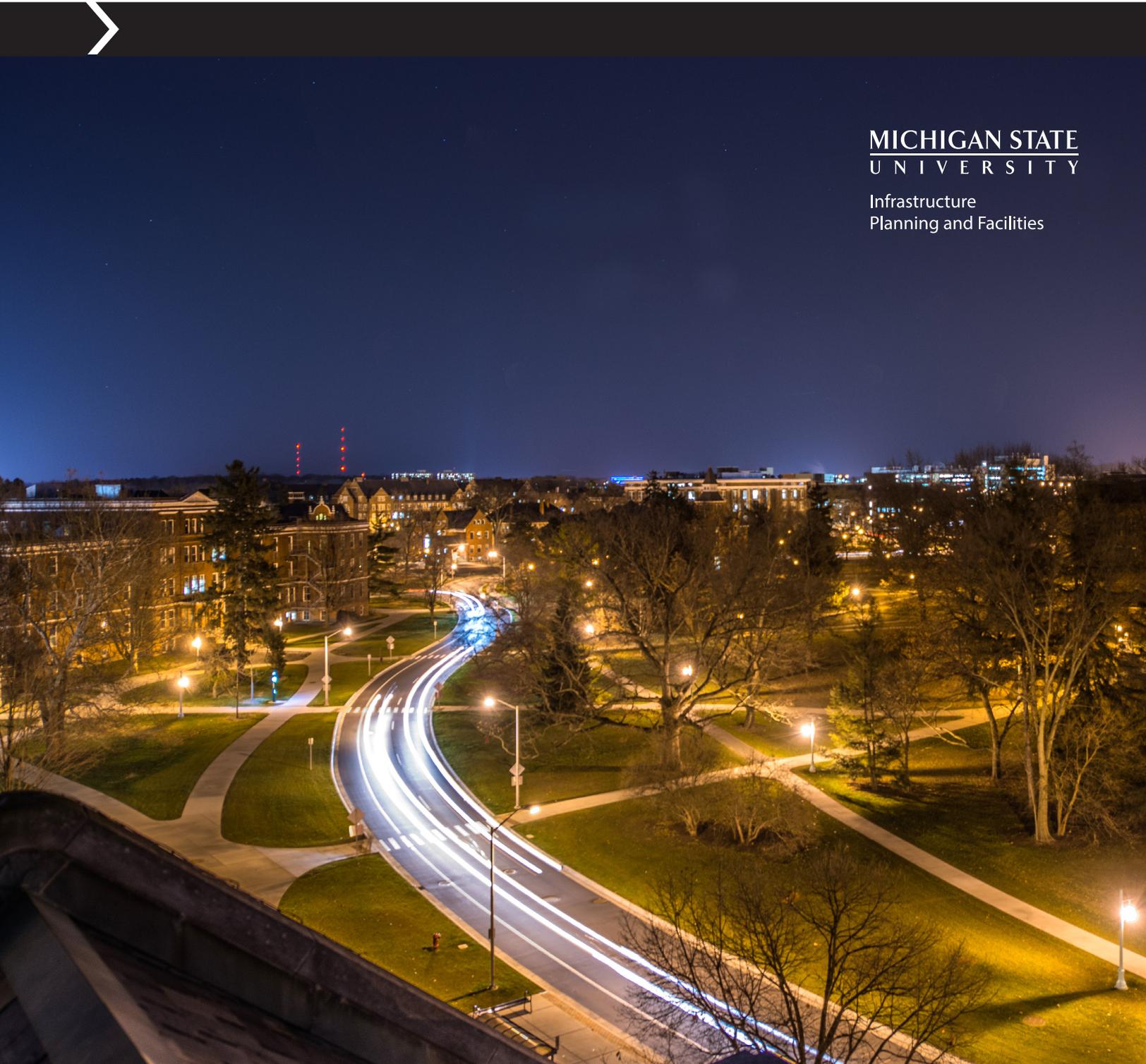


2015

FACILITIES AND **INFRASTRUCTURE** REPORT

MICHIGAN STATE
UNIVERSITY

Infrastructure
Planning and Facilities



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EXECUTIVE SUMMARY

Welcome to the 2014-15 Facilities and Infrastructure Report for Michigan State University.

This report is compiled annually to reflect the current state of MSU's facilities and infrastructure as well as to highlight future planning.

CREATING A NEW FUTURE FOR IPF

IPF is dedicated to developing a high-performance culture by reenergizing its commitment to superb customer service. Over the last year, specific focus areas in this vein include:

- Increasing communication with campus customers.
- Focusing on supervisors and their critical role in leading and inspiring teams to provide superior customer service.
- Investing in focused, high-energy customer service training for all IPF team members.
- Strategic planning that focuses on metrics aimed at improving services.

IPF has progressed toward its goals

by creating a general strategic direction and identifying metrics for performance-based management.

IPF must do its part to maximize the value for each service it provides. To accomplish this, IPF is implementing a plan to align with MSU's mission of teaching, research and outreach. As outlined, this is what the unit will focus on:

- Measure what it does to improve performance;
- Improve clarity of the cost of service for its customers;
- Emphasize short-term goals and share its successes;
- Create vision and values as the unit focuses on people, planning and practices.

Looking ahead, IPF is poised to respond to a variety of challenges that the unit and university face. What follows is a high-level overview of key facilities issues that IPF has tackled in the past year and will continue addressing into the future.

For a list of IPF initiatives, visit:

ipf.msu.edu/facilities2015



ENERGY

As the campus portfolio of buildings continues to grow, including intensive research facilities, IPF is challenged to provide reliable, affordable energy while minimizing environmental impacts.

MSU is installing a new substation to provide energy for FRIB and which can help optimize power-plant operations. This new substation will consist of two 50 MVA transformers, and it will be configured so either transformer can provide 20 MW of capacity for FRIB, replace the current 21 MW of standby service capacity and provide additional megawatts of capacity for campus. The energy costs related to the

increase in campus capacity will be evaluated for the potential to improve the cogeneration balance for the power plant while maintaining overall energy costs. The new substation is scheduled to be available for service in 2017.

Approximately 22 million of the campus's 23 million square feet is served by the T.B. Simon Power Plant, which provides steam and electricity from multiple fuel sources. Future campus energy demands, outlined in Figure 1, are expected to exceed the T.B. Simon Power Plant's current capacity by 2020. IPF is examining a number of options to meet the short- and long-term energy needs of campus.

FIGURE 1

The historical campus steam and electric demand and projected future demands.

FIGURE 1: PEAK ANNUAL STEAM AND ELECTRIC DEMANDS

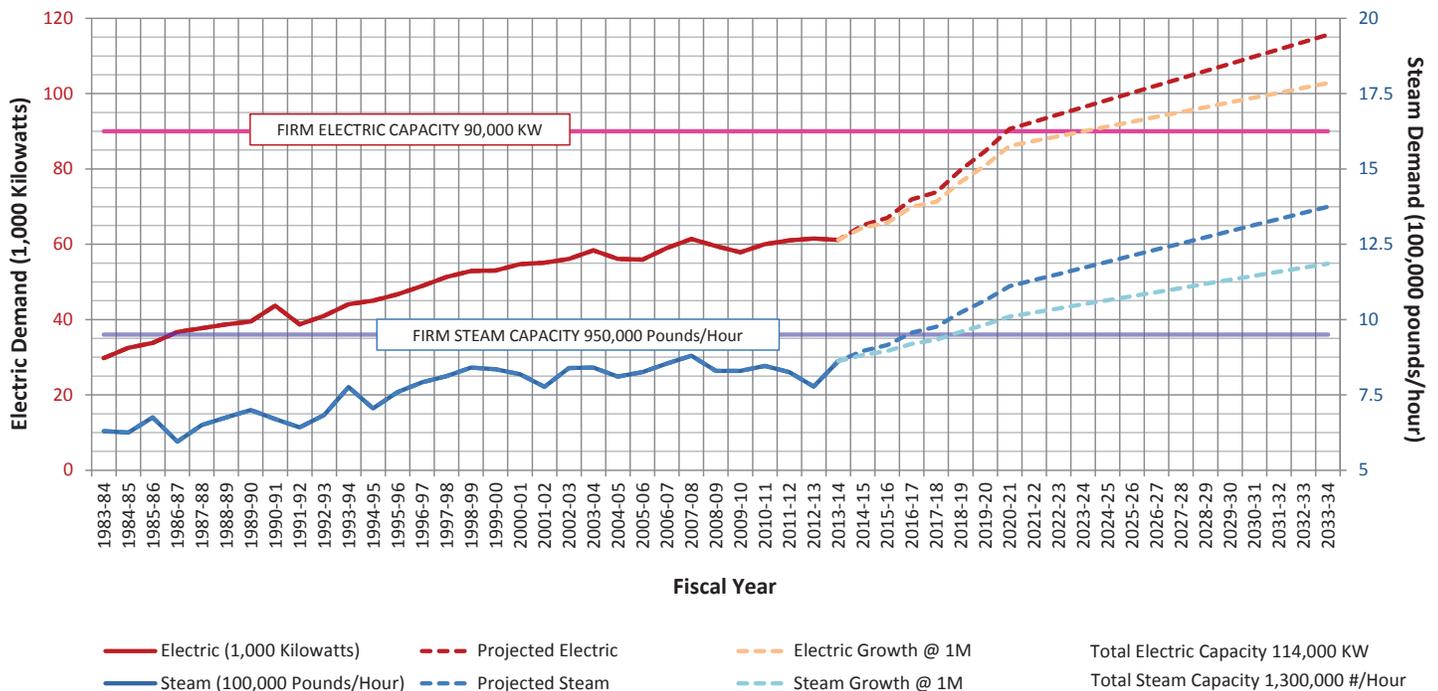
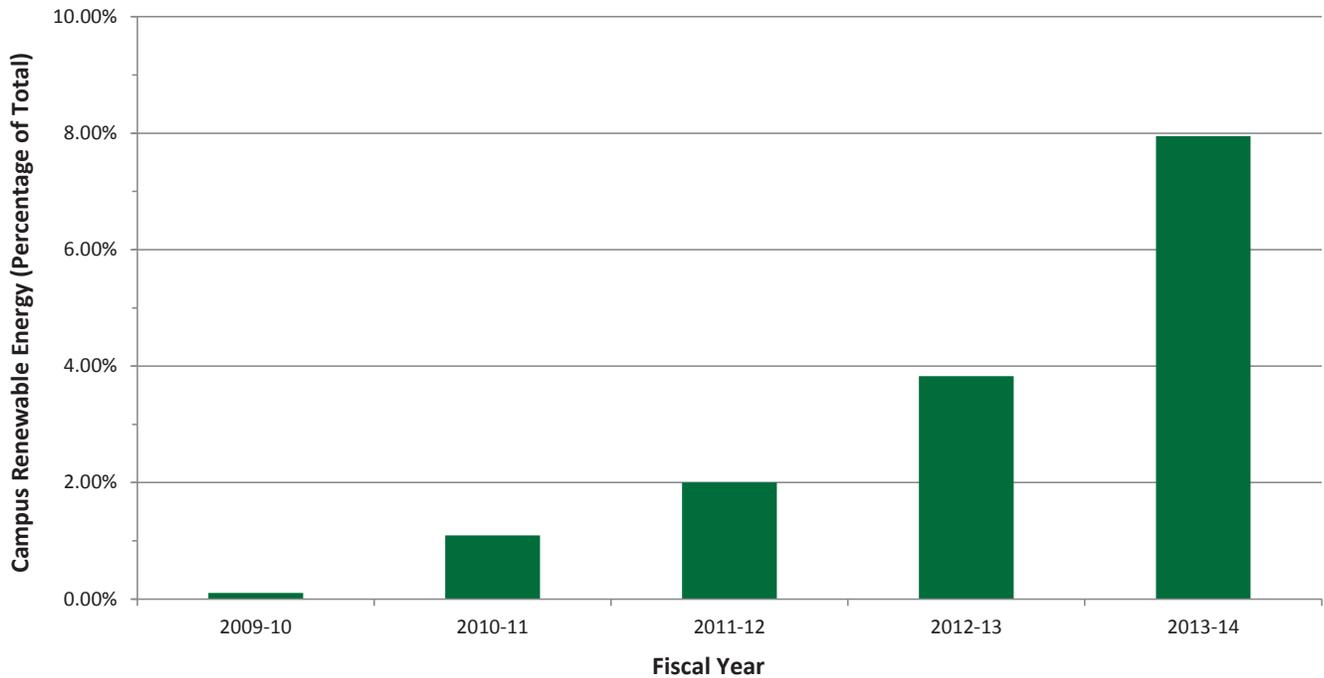


FIGURE 2: RENEWABLE ENERGY PORTFOLIO



NATURAL GAS PROCUREMENT

By evaluating short and long-term natural gas procurement and financial tools, IPF ensures competitive pricing and manages the risk of price escalation. MSU will seek a nationally recognized energy manager to partner with the Gas Operations team.

ENERGY TRANSITION PLAN GOALS

Approved by the Board of Trustees in April 2012, the Energy Transition Plan goals and targets will move the university toward its vision by balancing important variables such as capacity, environment, health, cost and reliability.

Strategizing and measuring progress toward the 2012 plan includes goals to reduce greenhouse gas emissions 30 percent by 2015 and increase renewable energy 15 percent by 2015. To date, greenhouse gas emissions have been reduced by 18 percent from baseline year 2009-10. As referenced in Figure 2, the campus renewable energy portfolio has doubled from fiscal year 2012-13.

To further MSU’s renewable energy portfolio, IPF will partner with a nationally recognized energy integrator to explore competitive ways to access additional renewable energy supplies.

The Sustainability Report (www.sustainability.msu.edu/report/2014) contains additional information about MSU’s Energy Transition Plan accomplishments.

ENERGY CONSERVATION

The university has implemented many energy-conservation projects in the past three years. The most cost-effective strategy for the university, as determined by the Energy Operations team, was to implement energy conservation measures with less than a five-year payback in major facilities on campus.

The existing-building commissioning process uses detailed building systems testing and analysis to identify and correct existing deficiencies to create more efficient operations. Through the process, energy-conservation measures are evaluated and implemented.

These efforts have resulted in more than \$3 million in energy savings to date.

Although existing building commissioning is funded, a funding plan needs to be developed to support the continuous commissioning of buildings after the initial process has been completed.

FIGURE 2

MSU’s renewable energy portfolio includes wind and solar generation, alternative fuels, and energy optimization.



CONSTRUCTION

MSU has a robust capital construction program. This past year, more than \$167 million was expended in completing more than 47 major and minor projects. In addition, MSU closed \$237 million in projects, returning \$7.1 million to the original funding sources. The \$7.1 million returned represents approximately 3 percent of the original budgets.

A selection of the major projects that IPF managed during the past year include:

- Facility for Rare Isotope Beams
- Landon Hall - Dining Renovation
- Spartan Stadium - North End Zone Addition
- Summer Circle Theatre - Kresge Courtyard Renovation
- Chittenden Hall - Renovation

ANNUAL CONSTRUCTION REPORT

Michigan State University's annual construction report, as requested by the Board of Trustees, includes construction projects that have been completed and project accounts that have been closed.

For the complete 2015 annual construction report, visit www.ipf.msu.edu/facilities2015

MAINTAINING THE CAMPUS INFRASTRUCTURE

The Just-In-Time (JIT) facilities condition database represents a comprehensive assessment of all campus infrastructure components. The process used to develop the database assesses the condition of a particular component and estimates the expected failure date based on the assessment. A priority list and schedule of repair, replacement, and maintenance needs is developed.

A video highlighting many of the projects coordinated by IPF in 2014 can be viewed online at:

ipf.msu.edu/campus2014

MSU has older buildings relative to its peers. More than 39 percent of building space on campus is 25 to 50 years old, and more than 34 percent of building space is more than 50 years old.

At MSU, the estimated replacement year is determined based on observations made in the field by IPF preventative maintenance and repair crews. As a result of these observations, the time for replacement or repair of a particular piece of equipment or utility segment is adjusted so that funding resources can be used most effectively. The JIT annual maintenance and replacement costs are then projected over a 10-year period to allow long range planning.

The JIT database is considered and coordinated with other construction and renovation projects on campus and the most critical projects are determined each year using the following “risk-based” criteria.

- Imminence of system failure.
- Potential for human or research safety to be jeopardized.

- Potential for disruption of university and personnel, and the impact of the disruption.
- Probability of escalating damage to other systems or property.
- Near-term programmatic planning affecting JIT projects already identified; opportunities for coordination and cost savings.

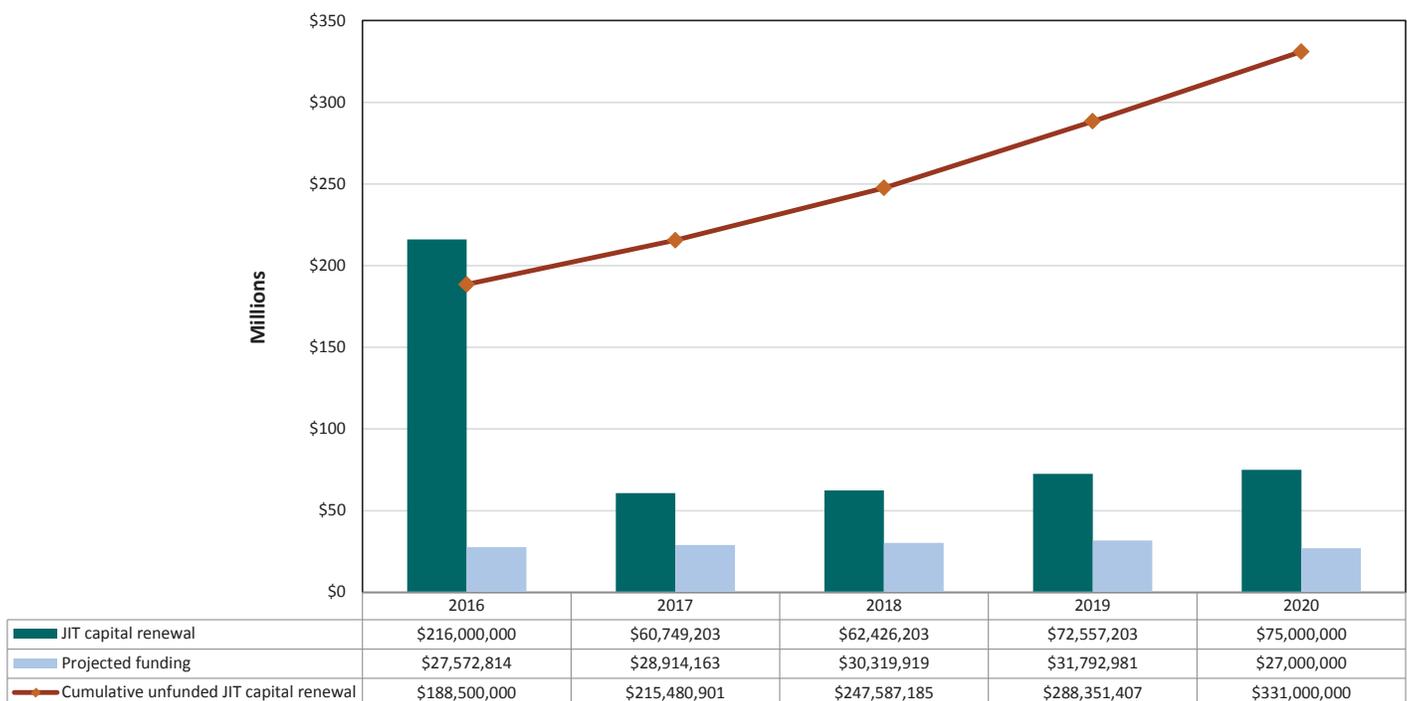
“Critical” projects are considered the greatest risk to the university, and funding is requested for this set of needs before “high-risk” projects are considered. The “low-risk” category of projects, presenting little if any impact to normal university business, and consisting mostly of esthetic issues, have not been addressed with the limited funding available.

As outlined in Figure 3, deferred maintenance needs continue to grow, and MSU now has more than \$188 million worth of neglected facility. The backlog of those needs poses a great risk to university operations.

FIGURE 3

Value of Just-in-Time (JIT) capital renewal needs, the projected funding available, and the cumulative unfunded backlog

FIGURE 3: CUMULATIVE UNFUNDED JUST-IN-TIME CAPITAL RENEWAL



CAMPUS BEAUTIFICATION

IPF is responsible for the long-term physical development of MSU's campus. It develops, implements and manages the campus landscape, following the land-use plan laid out in the Campus Master Plan. Trees are one of MSU's most treasured campus assets and as such IPF takes great care to monitor and maintain the university's diverse arboretum. As referenced in Figure 4, IPF's annual plantings greatly surpass removals. By maintaining all horticultural material and using its nursery and greenhouse to support the plant materials used on campus, IPF can plan for the future development of campus and also maintain the appearance and quality of the campus park.

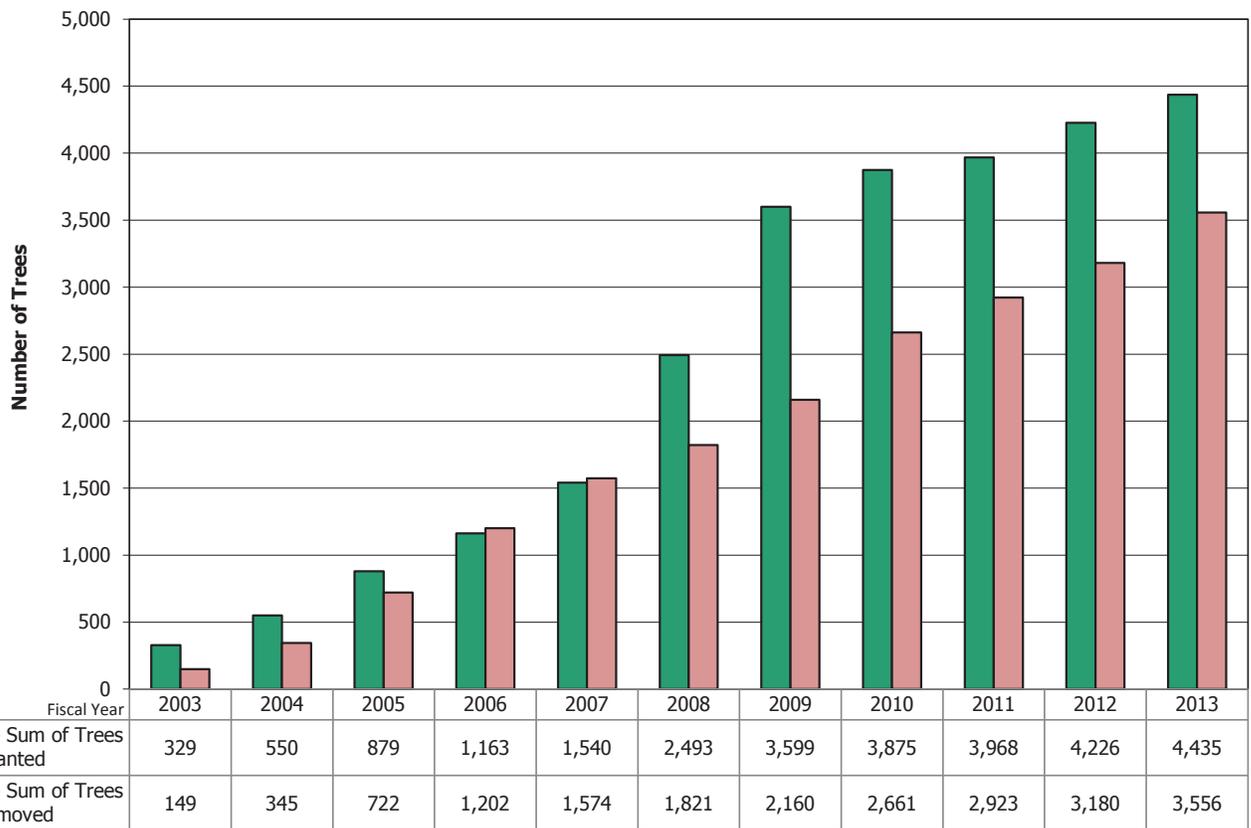
MSU is endowed with a diversity of woodlands and wetlands located on the campus properties. These invaluable natural resources include more than 700 acres in 27 distinct sites. They provide important examples for our rich natural heritage and represent significant, accessible resources for teaching, research, demonstration and nature appreciation.

The stewardship of these natural areas falls under the Campus Natural Areas Committee, an advisory group of faculty and staff representing the multidisciplinary interests and expertise in natural science and resource management.

FIGURE 4

Total increase in tree planting and removals on campus.

FIGURE 4: CUMULATIVE TREES PLANTED AND REMOVED





REAL PROPERTY HOLDINGS

The Land Management Office manages MSU's off-campus properties and facilities. Responsibilities include sale and acquisition of university and MSU Foundation properties, real-estate leases, mineral leases, property easements, performing the due diligence on potential gifts of real property, construction of off-campus agriculture research facilities and space management for the College of Agriculture and Natural Resources. MSU's and the MSU Foundation's current landholdings total over 25,500 acres.

For the complete 2015 listing of MSU's real property holdings, visit www.ipf.msu.edu/facilities2015