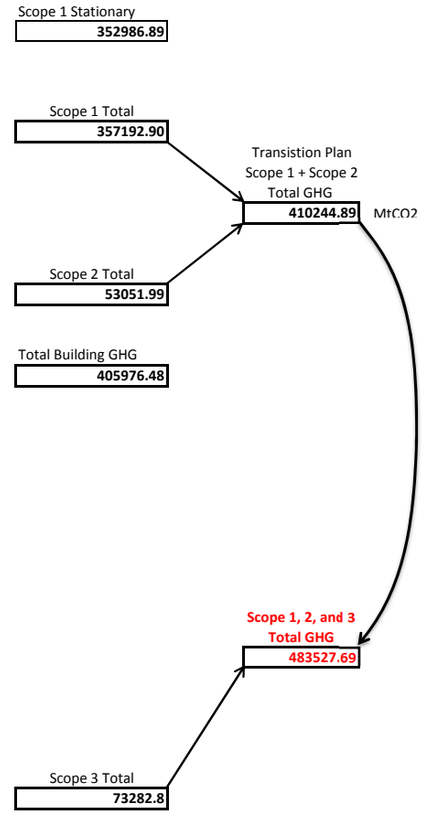
FY 2018

				Building Energy from Central Plant Service			Building Energy from Distributed Service			Transportation Energy		
Scope 1 Emissions	Direct Emissions											
Power Plant Fuels					MMBTU	GHG MtCO2						
	Natural Gas	Boiler 1	1000 cubic feet	6,013,614.00	6,284,002.29	328944.69						
		Boiler 2	1000 cubic feet			0.00						
		Boiler 3	1000 cubic feet			0.00						
		Boiler 4	1000 cubic feet			0.00						
		CTG 6	1000 cubic feet			0.00						
		Duct Burner 6	1000 cubic feet			0.00						
		Misc	1000 cubic feet			0.00						
				6013614.00	**6284002.29**	**328944.69**						
								MMBTU	GHG MtCO2			
Building Fuels	Natural Gas		1000 cubic feet				437,734.30	456,119.14	23944.07			
	Kerosene		Gallons				1170.0	156.8	11.43			
	Propane		Gallons				15080.1	1381.3	86.71			
									24042.21			
										Central Motor Pool	Auxiliaries	GHG MtCO2
Transportation Fuels	Propane		Gallons							1249.0	247.4	137.07
	Gasoline		Gallons							306034.0	29877.0	2979.53
	B-5		Gallons							57065.0	55881.1	1146.40
	Diesel		Gallons								533.0	5.41
			Solar Adj	-59.86	-62.55	-62.4						**4268.41**
				Plant - Scope 1		**328882.28**	Buidlings - Scope 1		**24042.21**	TX - Scope 1		**4268.41**
Scope 2 Emissions	Indirect Emissions											
Purchased Electricity					MMBTU							
	Tie Line	Consumers Energy	MWH	45606.7	155610.06	34205.03						
	Buildings	Consumers Energy	MWH				21246.77	72493.96	15935.07			
	Buildings	Lansing BWL	MWH				3882.53	13247.18	2911.89			
		Solar	MWH	7542.11	25733.68	0.00						
						363087.30			**42889.18**			
					MMBTU			MMBTU		Total MMBtu		
				Central Supply	6,465,283	89.4%	Distributed Supply	543,398	10.6%	7,008,682		

Scope 3 Emissions* Other Indirect Emissions

Solid Waste	to Landfill		20470.17
	Credit for landfill gas generation		-20668.27
Paper	Net for all types		3133.56
Utility Transmission and Distribution Losses		* values as calculated by Sightlines for the Sustainability Report	2377.64
Waste Water			338.88
Air Travel	Direct Sponsored		13420.88
	Study Abroad		13305.45
Commuting	Employee		18357.79
	Student		22546.7



Sustainability report

A FIVE YEAR REVIEW AND REAFFIRMATION OF INTENT, AUGUST 2017

CONTENTS

July 24, 2017

To: Michigan State University Board of Trustees

The Energy Transition Plan (ETP), accepted by the MSU Board of Trustees in 2012, sought to balance energy capacity, health, reliability, environment and cost. This report summarizes the progress we've made with regards to sustainability at MSU following adoption of the plan, and includes a summary of strategies to meet the goals and a recommendation for validation or revision of the goals. It provides a comparison of energy progress achieved by our institutional peers and an outline of MSU's recent energy improvements. Also included are estimates for impacts relating to activities in FY2017 and a roadmap for the next five years of energy progress. This process ensures that MSU continues to make progress toward its long-term vision of sustainability.

We have reviewed the original goals and assumptions of the ETP and reaffirm their intent, as MSU remains commited to displaying leadership in sustainability and enacting sustainable practices in a financially acceptable manner. But in order to maximize impact on each goal, we recommend that the university employ a more centralized facilitating body to implement the practices, initiatives and strategies that truly drive progress. While the original goals should remain, we also recommend that the language is refined to accomodate the financial, academic and other operational variables that impact energy progress.

The outcomes and recommendations from this review will be used as part of our more extensive engagement of campus leaders on the integration of sustainability into operational and academic strategy, and will be launching in the fall of 2017. A separate Energy Plan, outlining an energy roadmap for the T.B. Simon Powerplant will be discussed with the Board of Trustees in October. The Energy Plan will focus on improving reliability, maintaining flexibility and realizing additional cost savings through improvements in energy generation.

Best Regards,

Ann Erhardt, MM, ISSP-SA
Director of Sustainability
Infrastructure Planning and Facilities

cc: Dan Bollman, Associate Vice President of Infrastructure Planning and Facilities

ENERGY TRANSITION PLAN REVIEW

An overview of the ETP's progress over the first five years since the plan's inception on the following goals:

Fiscal Year	% Campus Renewable Energy	% GHG Emission Reduction
FY 2015	15%	30%
FY 2020	20%	45%
FY 2025	25%	55%
FY 2030	40%	65%

ETP: FIVE-YEAR REVIEW

In 2012, Michigan State University's Energy Transition Plan (ETP) was formed to address growing campus energy needs within a framework that encouraged sustainable transition alongside changing technologies and regulations. To ensure that this plan continues to serve these needs and is appropriately facilitating progress, it is reviewed every five years to report on the following:

KEY ACCOMPLISHMENTS

I. FY 2016 demonstrated a total renewable energy portfolio increase of 10.4% from baseline year through numerous projects. *(See Figure 1)*

a. Geothermal installation at Bott Building (2012)

b. MSU's South Campus Anaerobic Digester (2013)

c. Installation of solar carports in 2017 across MSU's campus is projected to increase portfolio by another 2-3%.

II. FY 2016 yielded a total GHG emissions reduction of 27.7% from baseline year. *(See Figure 2)*

a. The reduction in coal as a fuel source at the T.B. Simon Power Plant contributed to the majority of GHG emission reductions over a five year period. To learn more, see the Infrastructure Planning and Facilities (IPF) Annual Report.

b. The elimination of coal entirely in FY 2016 is expected to reduce GHG emissions by 2-3%.

c. The Better Buildings Challenge, investment in MSU Transportation's hybrid vehicle fleet and investment in Energy Conservation Measures (ECM) also contributed to 2-3% in reductions.

Figure 1

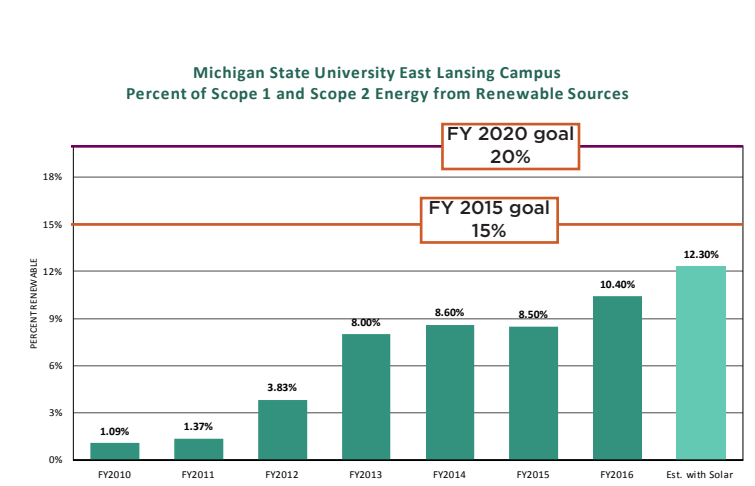
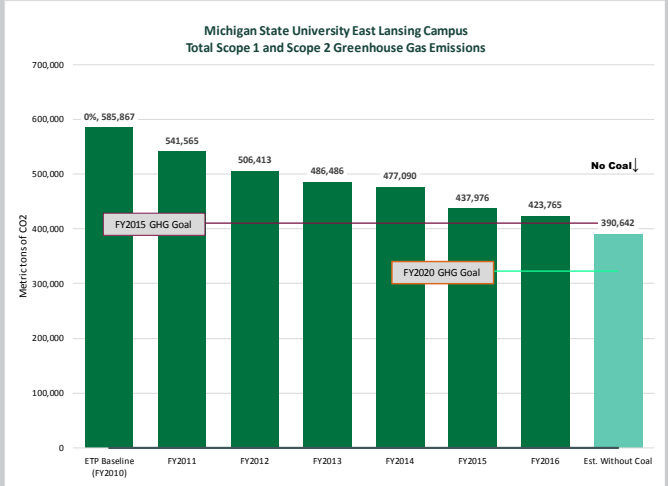


Figure 2



KEY ACCOMPLISHMENTS, CONTD.

III. Used energy savings to reallocate 7% of the energy budget to the academic side, helping to keep tuition costs from rising

a. Energy saving measures beginning to bear fruit, leading to increased cost savings.

IV. MSU continues to foster research relationships between students, faculty and external stakeholders.

a. Student groups, like Student Planning of Advanced Retrofit Technology Applications (SPARTA), use campus as a test site for renewable energy technology. (See Figure 2)

V. Campus continues to serve as a location for sustainable demonstration projects.

a. MSU's South Campus Anaerobic Digester
b. MSU's Energy Innovation Award and Student Solar Design Competition

VI. Information about MSU's Energy Conservation Measures (ECM's) practices are shared at town hall meetings.

a. Space temperature controls at zone level
b. Retrofit lighting

VII. Through the Better Buildings Challenge, MSU IPF identified and shared key information regarding building efficiency that can be applied to many university spaces.

a. Staff broadly demonstrate efficient practices and become peer ambassadors for efficient behaviors
b. Presentations on our progress to organizations such as APPA, SCUP, BIG10 & Friends, AASHE, Better Buildings (DOE), EPA, ABMA and COOA

VIII. Met the Governor's energy reduction goals as outlined in Public Act 342.

KEY ENERGY INVESTMENTS

Project summaries of significant energy investments that impacted GHG emissions reduction, renewable energy portfolio growth and general campus sustainability.

Fuel Source Switching

INVESTMENT: $3.0 million

Impacts

In April 2016, MSU announced that it would no longer burn coal in its on-campus T.B. Simon Power Plant. The university's final coal delivery arrived in September of 2015. **By the end of 2016, MSU completely discontinued the burning of coal** and switched almost entirely to natural gas.

The switching of fuel sources has drastically reduced particulate matter 2.5 emissions, lowered fuel costs, and decreased costs of converting the input fuel into electricity and heat within the power plant. The fuel conversion is resulting in **250,000 tons of CO_2 emissions reductions** - approximately equivalent to planting half a million trees annually, a **43% reduction in overall CO_2 emissions from campus.**

Leaders of environmental efforts on campus celebrate the final delivery of coal to the T.B. Simon Power Plant.

Surplus Store and Recycling Center

INVESTMENT: $13.3 million

Impacts

MSU'S 74,000 square foot Recycling Center and Surplus Store serves as a hub for waste diversion operations on campus and in the greater Lansing community, including a 24-hour recycling drop-off center. Technology at the facility allows employees to collect and bale their own materials and sell directly to the market, nearly quadrupling recycling revenue since 1990.

In **FY 2015-16, MSU diverted 60% of its waste, preventing over 216 tons of material from entering the landfill. 4,138,221 pounds of recyclable material were collected from the public drop-off center.**

Through a pilot project of construction waste clean up, the Surplus and Recycling Center **diverted 216 tons of wood, dirt, rock and more, saving $46,000 in landfill costs.**

MSU's Surplus Store and Recycling Center Facility off Green Way Drive.

Anaerobic Digester

INVESTMENT: $5.0 million

Impacts

MSU's South Campus Anaerobic Digester turns food waste and animal excrements into half a megawatt of electricity, day and night, every hour of every day of the year. **A sustained 400kW of electricity and 450kW of heat is produced continuously, which is used to offset energy purchasing in 10 south campus buildings.** The facility produces high quality organic fertilizer which is used on our own agricultural fields, contributing to a tremendous reduction in chemical fertilizer purchases.

The digester is now estimated to pay for itself within 7-8 years, several years ahead of the originally-projected 15-year payback.

Leaders involved with design, planning and construction of MSU's Anaerobic Digester cut a ribbon to commend the opening of the facility.

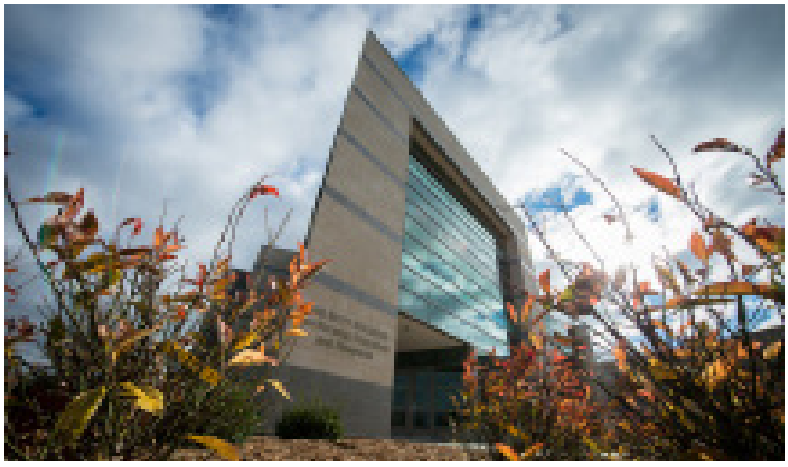
Bott Building Geothermal Field

INVESTMENT: $750,000

Impacts

Opening in 2012, the Bott Building for Nursing Education and Research became the first campus facility to use geothermal energy for heating and cooling. In its first year, **the geothermal field contributed approximately 467 million BTU of geothermal energy to the overall building energy consumption, an approximate share of about 20% of the total consumption in the building.**

Nearly 75% of the building's space uses natural daylight, reducing the need for artificial lighting. The building earned LEED certification from the U.S. Green Building Council and amounts to **significantly lower annual energy costs, helping MSU use the least amount of electricity per square foot in the Big Ten.**



The Bott Building for Nursing Education and Research on Bogue Street.

Better Buildings Challenge

INVESTMENT: $5.0 million/year in BBC Energy Conservation Measures

Impacts

Through the Better Buildings Challenge, MSU committed to increasing energy efficiency by 20% on 20 million square-feet of contiguous campus by 2020. After just two years of the program, the university was more than halfway to meeting that goal. **In 2013, Anthony Hall was selected as a showcase project, and over ten conservation measures were installed, with an expected annual cost savings of $536,000, or 34% of the building's total consumption.**

Energy conservation measures to reduce consumption through this program include enhancing building insulation, improving steam traps, adding LED lighting, using variable speed fans, etc. **These investments typically result in a 5-year payback.**

A photo collage highlighting features within MSU's new Bio Engineering Facility.

Spartan Treasure Hunts

INVESTMENT: Assessment of 40 buildings on the East Lansing campus

Impacts

The Spartan Treasure Hunt (STH) program, was adopted in 2014 and integrated with campus retro-commissioning to improve engagement of building occupants and facilitate the identification of efficiency opportunities. During a typical event, teams of building occupants and facilities experts tour a building and identify best practices that lead to energy savings, waste reduction, water conservation, and improvements to their environment.

To date, **40 buildings have been evaluated, totaling 8,116,124 square feet, and 1,105 energy conservation measures have been identified.**

Jason Vallance and Andrew Luzenski perform a Spartan Treasure Hunt in Kedzie Hall in June of 2016.

Aircuity

INVESTMENT: $1.6 million

Impacts

Aircuity creates smart airside solutions through its intelligent building platform, significantly reducing energy costs and improving the indoor environmental quality for occupants. Based on several prior Aircuity installations creating measurably better environments on campus, the university implemented the Safe Sustainable Labs concept.

Today the program consists of 268 Lab installations in 7 buildings that are saving the university over half a million dollars per year. Aircuity has given Environmental Health and Safety additional means to closely monitor the labs while saving energy and helping the university to meet its goals. **MSU is continuing to expand their airside program with installations in two more lab buildings planned for the next year term.**

A photo of Anthony Hall, which was outfitted with Aircuity installations along with six other campus buildings.

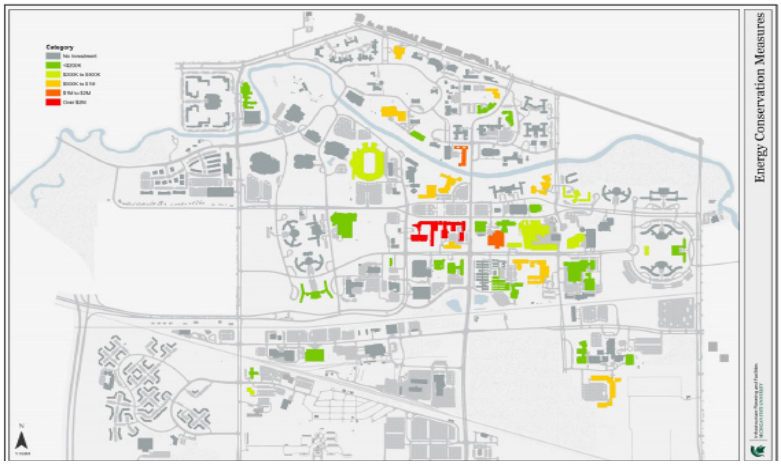
Energy Conservation Measures

INVESTMENT: $40.2 million

Impacts

Energy Conservation Measures (ECMs) have been identified across MSU through retro-commissioning, Capital Renewal opportunities, collaboration with student groups (such as SPARTA), and as part of building renovation projects. Examples of successful ECMs include retrofitting existing HVAC systems with new technology, making efficiency upgrades to cooling systems, implementation of preventative maintenance strategies, window replacements and LED lighting control system installation.

ECMs on campus have amounted to **over $10 million in savings since 2010 and nearly $1 million received from Consumer's Energy as part of their incentive program.** Currently, with the completion of all funded ECMs, **a 13% reduction in steam and electricity use is expected on campus.**



A map highlighting where many of the Energy Conservation Measures have been implemented on campus.

Spartan Green Certification

INVESTMENT: 794 Certified Spaces

Impacts

MSU's Spartan Green Certification is an online self-assessment program that educates, assists and recognizes campus units taking steps toward energy efficiency and conservation, waste reduction and recycling, water conservation, and sustainable purchasing practices.

The program offers certification opportunities for MSU offices, information technology spaces, science laboratories, kitchens and MSU extension spaces, and **since the program's inception in 2010, a total of 794 spaces have been certified on campus.**

Student Project Fund

INVESTMENT: $163,000 has been awarded for student sustainability research

Impacts

To support MSU's commitment to furthering knowledge and improving life around the world through the convention of research, MSU Sustainability's Be Spartan Green Project Fund provides financial support for students looking to use campus as a laboratory to investigate solutions for today's most pressing and relevant sustainability issues.

A total of **48 student grants have been awarded since the programs inception in 2012, amounting to an investment of over $160,000, helping to position MSU as an educational leader in the area of sustainability.**

Laurie Thorp, Director of the Residential Initiative on the Study of the Environment, at Bailey Hall with students who funded the Bailey Bee Project through a Be Spartan Green Student Project Fund grant.

ENERGY PROJECTS IN PROGRESS

An overview of approved projects that will continue reducing energy use and will be completed within the next five years.

Data Center Redesign (2016)

INVESTMENT: $46.0 million

Impacts

The new central data center on MSU's campus will be constructed following an aggressively low **Power Usage Effectiveness (PUE) target < 1.3, which will dramatically cut the energy we consume to cool larger computer systems on campus.**

The redesigned **data center will consolidate over 70 facilities across campus** that house computing equipment, providing flexible and expandable white space at the lowest possible energy consumption for data center cooling. **Annual utility savings as a result of the data center consolidation are estimated at approximately $600,000.** Efficiencies in processing, security and more standardization will improve business operations, decrease cost, and reduce risk to MSU.

Construction progress as of August 25, 2017 on the MSU central data center.

Solar Carport Installation (2017)

INVESTMENT: $2.5 million connection cost

Impacts

In partnership with Inovateus Solar and Customer First Renewables, a solar initiative is under construction to cover MSU's five largest commuter parking lots with carports that have solar panel roofs. **This will be the largest non-utility owned solar park in the state of Michigan by a factor of 10,** and will provide students opportunities for academic research.

The array will provide **15% of the total electricity used on campus during peak times, producing 15,000 MWh of energy per year,** and is projected to save the university **$10 million dollars in avoided electricity costs over the next 25 years.**

Additionally, the solar array will account for **over 10,000 metric tons reduction in Greenhouse Gases per year.**

Construction progress as of August 25, 2017 on one of MSU's five commuter parking lots getting outfitted with a solar carport.

PEER AND INDUSTRY BENCHMARKING

A comparison between MSU's progress and that of institutional peers and industry organizations across a range of metrics related to sustainability.

INSTITUTIONAL PEER BENCHMARKING

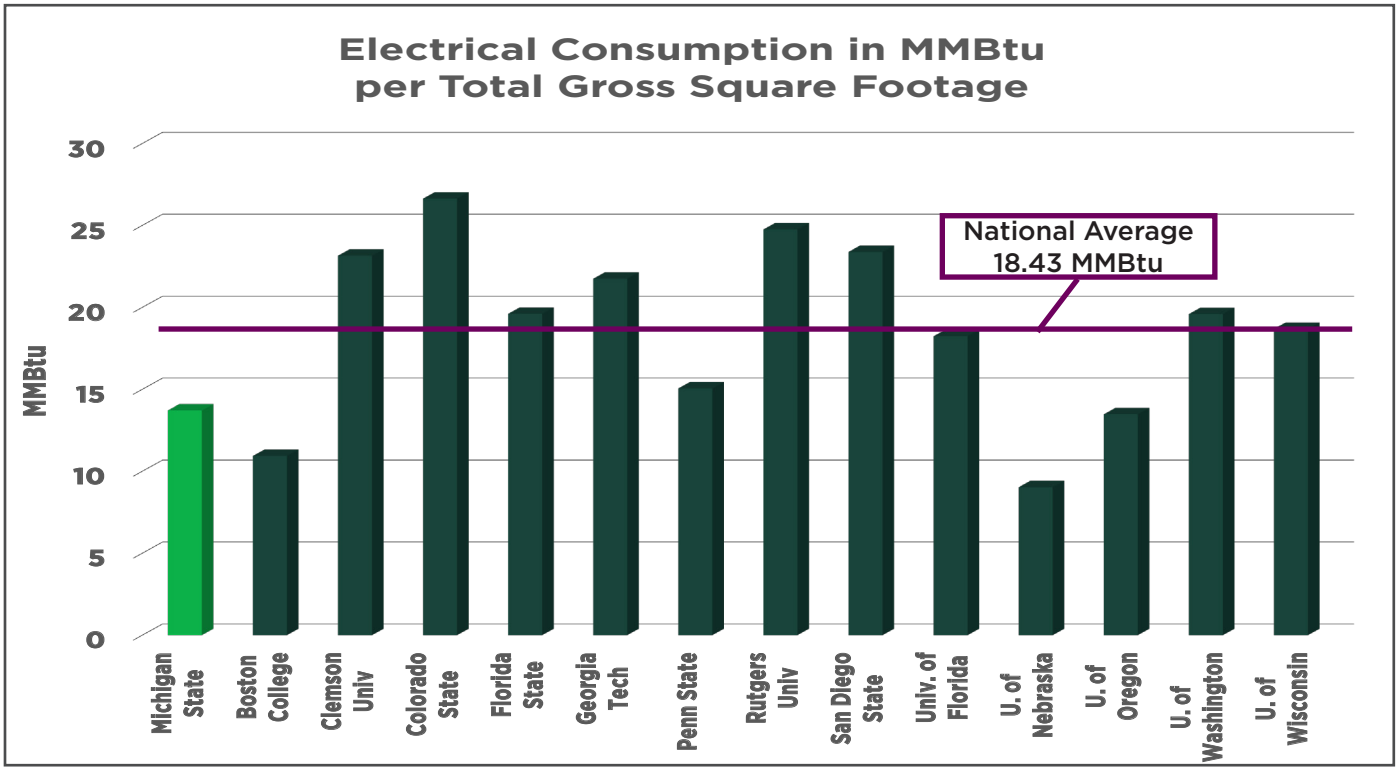
The data in the following section, serving to compare MSU's performance against institutional peers across a range of sustainability metrics, can be found within the 2014-15 APPA/NACUBO Key Facilities Metrics Report, unless otherwise specified. The purpose of the report is to increase an institution's knowledge of their own consumption: crucial knowledge for improving strategic planning. The report captures Btu (energy), electrical, water, waste and carbon.

GREENHOUSE GAS EMISSIONS

Comparison of Scope 1 Greenhouse Gas emissions data from the Association for Advancement of Sustainability in Higher Education (AASHE) STARS 2.0, baseline year 2009-10 to performance year 2014-15, demonstrates that MSU has reduced emissions by 30 percent. This reduction surpasses all institutional peers, nearly 10 percent more than the next best reduction of 21 percent at the University of Minnesota. Additionally, data from the 2014-15 APPA/NACAUBO Key Facilities Metrics Report demonstrates that in a study of BIG 10 universities, MSU ranks third in relative energy improvement. The data represented in figures one, two and three can be found within this APPA/NACUBO Report from 2014-15.

ENERGY CONSUMPTION

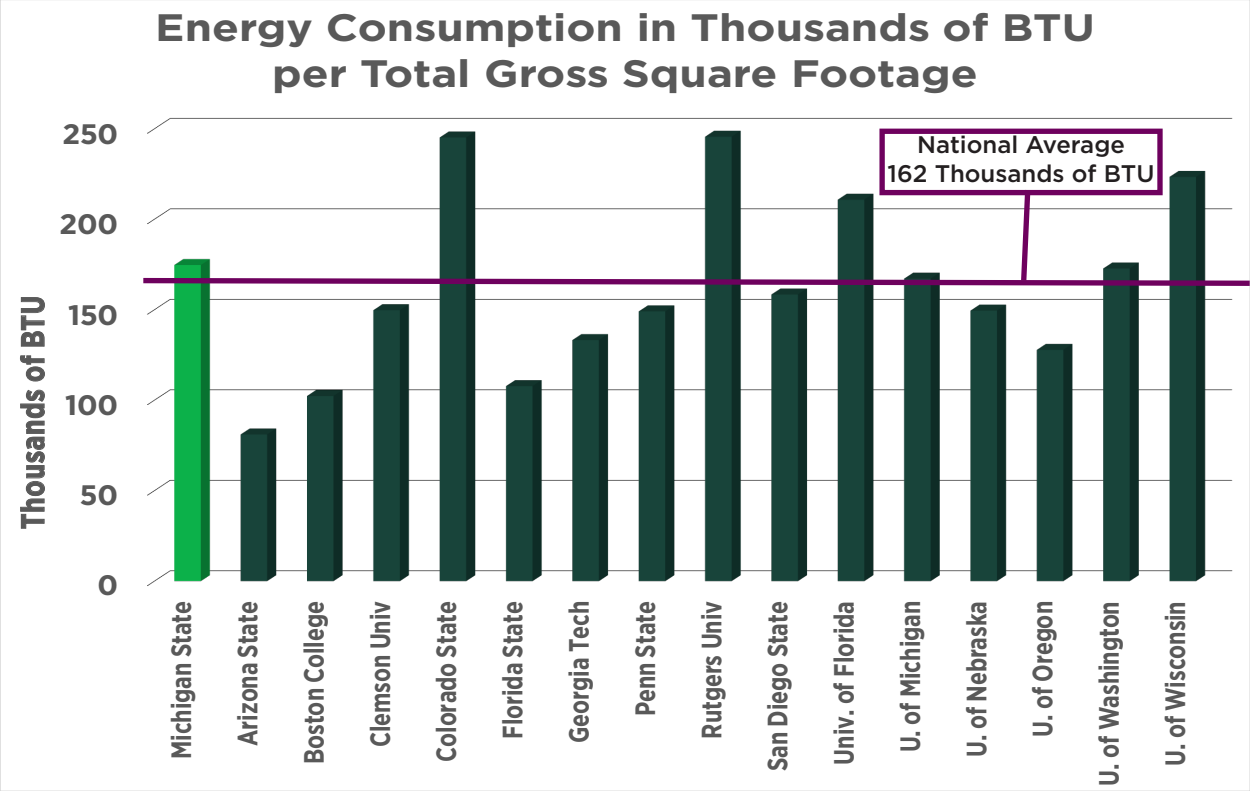
Figure 1: Electrical consumption in MMBtu per total gross square footage



From the APPA/NACUBO Key Facilities Metrics Report for 2014-2015: MSU is significantly below average in electrical consumption per total gross square footage, at only 13.71 MMBtu compared to an institutional average of 18.43 MMBtu.

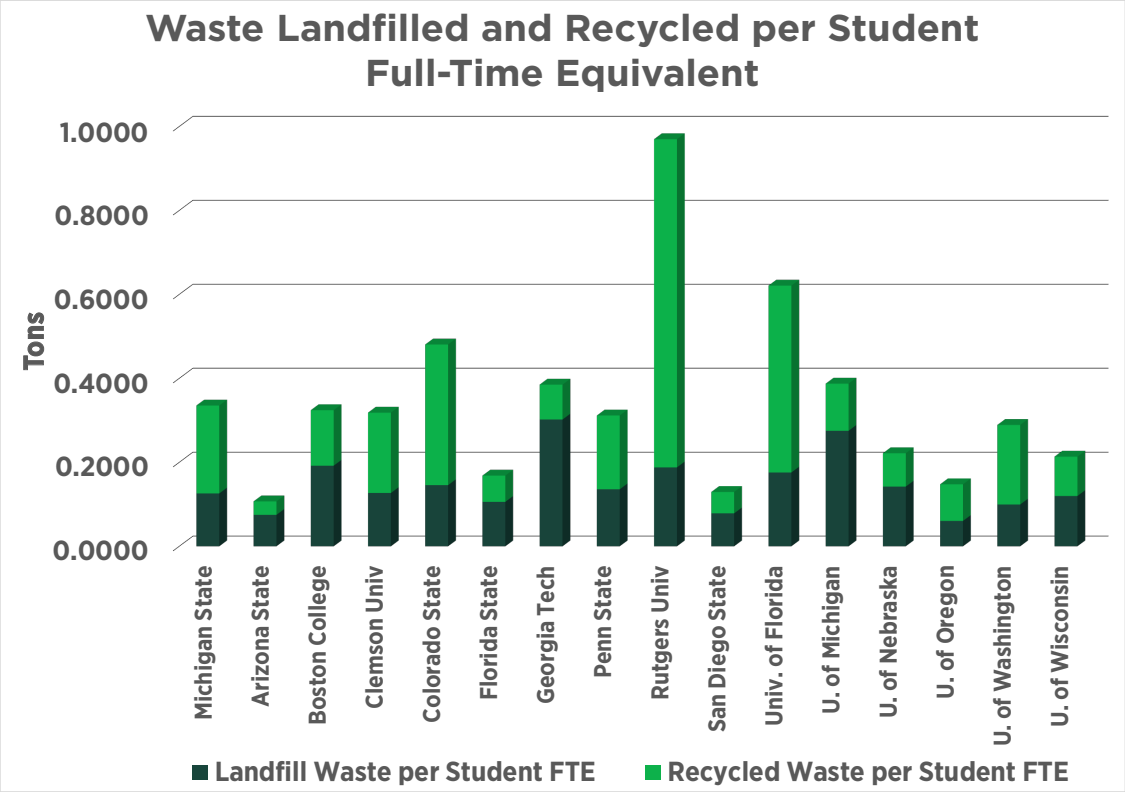
ENERGY CONSUMPTION CONTINUED

Figure 2: Energy consumption in thousands of BTU per total gross square footage



LANDFILLED AND RECYCLED WASTE

Figure 3: Waste landfilled and recycled per student full-time equivalent



From the APPA/NACUBO Key Facilities Metrics Report for 2014-2015: MSU is below average in landfilled waste per student and above average in recycled waste per student, surpassing institutional peers with smaller student bodies and campuses.

INDUSTRY BENCHMARKING

A more thorough review of our energy progress requires comparison of our achievements and goals against industry organizations that lead the way in sustainability. MSU not only utilizes institutional peers as a format for evaluating success, but also considers the dynamic industry organizations that provide relevant points of comparison as we look toward outlining goals for MSU's future of energy progress.

As an example, Walmart has increasingly adapted to global pressures such as rising energy demands, worsening water security and climate change. The organization's goals for lessening energy consumption have amounted to a 26 percent reduction in emissions from their operations as a result of their increasing reliance on renewable energy. By comparison, MSU has reduced Greenhouse Gas emissions by 30 percent, occurring as a result of similar increases to our renewable energy portfolio.

Additionally, Walmart's goals for eliminating waste in their operations have amounted to achievement of a 77 percent landfill diversion rate. Similarly, MSU has reached nearly the same diversion rate, at approximately 70 percent landfill diversion from campus.

MSU's commitment to sustainability is illustrated clearly through comparison with industry organizations, as often the university's achievements, across areas such as emissions reductions and waste diversion, illustrate that MSU is reaching similar sustainability goals, or even surpassing industry successes.

STATE OF MICHIGAN COMMITMENTS AND STANDARDS

In 2016, Governor Snyder signed Public Act 342 into law, amending Act 295 to increase the renewable portfolio standard from 10 percent in 2015 to 12.5 percent in both 2019 and 2020, and finally 15% by 2021. The new act became effective in April of 2017. **"Energy efficiency doesn't mean doing less; it means doing as much or more, but using less energy to get it done,"** said Synder, **"Energy efficiency is the best example of a no-regrets policy Michigan can have. It makes us more reliable, more affordable and protects our environment."**

In 2015, as reported by the electric providers in the state, the number of energy credits generated is equivalent to 9.6 percent of retail sales. As allowed by the Act, electric providers used banked energy credits and excess energy optimization to achieve the 10 percent requirement. In 2015, all 68 of Michigan's electric providers met the 2015 requirements. Projections for 2016 forecast continued increases in renewable energy credits.

By comparison, Michigan State University parallels the state of Michigan's commitments to increasing our renewable energy portfolio through a combination of emissions reductions, efficiency upgrades and improvements made to our campus energy generation infrastructure. Currently, MSU's renewable energy portfolio comprises 8 percent of energy generation, not far from reaching the achievements of electric providers in the state. Construction of solar carports on five commuter lots on campus is expected to generate 15,000 MWh of energy per year, approximately 15 percent of the university's energy consumption during peak times.

SUMMARY OF RECOMMENDATIONS

A review and reevaluation of the goals detailed in the original Energy Transition Plan: a vision for the future of energy progress at MSU.

RECOMMENDATIONS

The original Energy Transition Plan, approved by the Board of Trustees in 2012, was created to address the needs of a continually growing campus, while following a framework that facilitated increases in support for sustainable facilities, paralleling the dynamic landscape of technology and regulation. A review of the original ETP must ensure that MSU's plans for the future of energy progress, on campus and beyond, continue to encourage the appropriate improvements and reductions. Please refer to the Appendix for identified challenges

A compilation of stakeholder information, reviews of performance as well as current supporting projects, and benchmarking against both institutional peers and industry organizations reveals that the original goals of the ETP remain valid. However, the methods enlisted to reach those goals and the timeline within which the university will meet them require reevaluation.

The future Energy Plan for Michigan State University continues to view the transition to a 100 percent renewable energy portfolio as our vision for the future. However, rather than committing to a date by which this will occur, the new Energy Plan endeavors to, instead, commit to yearly increases of approximately three percent within this renewable energy portfolio.

While global issues such as energy demand, water security, food supplies and climate change continue to rise to the forefront of concern, MSU understands that advancement in the area of sustainability requires strategic planning. Review of the original ETP in consideration of MSU's future Energy Plan demonstrates that, while MSU's progress in sustainability shows strong leadership, a thorough plan for future success will ensure our continued commitment to reducing the university's impact on the environment.

Summary of recommendations:

- The goals of the original Energy Transition Plan remain valid as a long term vision for MSU's future Energy Plan
- The methods and timeline for achieving this vision will be reevaluated and adapted to meet the demands of a dynamic environmental landscape
- MSU will enlist the Roadmap Objectives found in the following section to ensure the university remains viable as a leader in sustainability

SUSTAINABILITY 2.0 - FUTURE PLAN

A summary of the steps MSU is taking over the next five years to continue energy progress through sustainability engagement with the campus community.

SUSTAINABILITY 2.0 - FUTURE PLAN

To remain relevant throughout the technological, regulatory, and environmental changes in the higher education landscape, the Energy Transition Plan should be dynamic and adaptive. The original goals of ETP have been reviewed, and their intent reaffirmed. As MSU has reached the first five-year mark, departments within MSU will lead the process to review the current plan, engage a wide audience of stakeholders, and provide the President and Board of Trustees with recommendations for the future of energy and sustainability on campus.

In order to ensure continued sustainability for MSU as a business, an evolving and leading approach to energy and sustainability should be adopted, protecting key resources for the university and community stakeholders, and garnering the longevity of the university.

Additionally, while increasing conservation and reducing energy demand are critical to the global future, energy tomorrow cannot cost more than it does today. MSU will pursue sustainability in the largest sense, with consideration to the longevity and financial success of the university, conserving resources, avoiding risk, reducing waste and "greening" transportation.

To meet this rising challenge at MSU, under leadership of the Executive Vice President and Administrative Services, energy progress will focus on the following objectives:

ROADMAP OBJECTIVES

I. Stakeholder Engagement in Energy and Sustainability Future.

- Enhance two-way communication with other communities and entities to generate innovative ideas and perspectives about the university's energy future
- Engage leading edge companies, universities, and municipalities for partnerships
- Engage MSU and other leading researchers

II. Invest in energy technologies that have a five year (or less) payback.

- Research and employ cutting edge energy technologies
- Advance in sustainable infrastructure
- Invest in Power Plant efficiency and augmentation
- Conserve energy in the built environment

III. Embed sustainability into the campus fabric.

- Develop sustainable business principles across the institution
- Form cross-sector sustainability committee to continue to advance sustainability initiatives on campus
- Work with departments and colleges to integrate sustainability into their strategic plan
- Create a distinctive vision for sustainability on campus

IV. Advance sustainability in infrastructure.

- Mobility Planning (Transportation Demand)
- Power and Water Infrastructure
- Material and waste management infrastructure
- Planning, Design, and Construction, Commissioning, Capital Renewal and other conservation strategies
- Expand renovation and construction standards: LEED, ASHRAE, etc.

EXPLORATION OF THE ROADMAP OBJECTIVES

Exploration of the above "Roadmap Objectives" will allow MSU to develop and implement a plan for future energy progress and sustainability on campus. MSU Administrative Services will lead a review process of the current plan with the ultimate goal to provide the President with recommendations for a comprehensive energy and sustainability plan.

I. Conduct technical review of Energy Transition Plan progress and outcomes to date including but not limited to the following activities. (Spring 2017)

a. Review the current assumptions of the plan for relevance and future viability
b. Review current metrics, goals and strategies; are they reasonable, achievable, aggressive, etc.
c. Review current progress and implementation of goals; improve physical environment, invest in sustainable energy research and development, and become an educational leader in sustainable energy
d. Review plan for gaps and opportunities since inception
e. Assess greenhouse gas emission goals for development and inclusion of Scope I, II, III
f. Review current vision of "transition" and assess next level of energy planning
g. Review current regulation, policy, technology and energy modeling

II. Engage and build consensus on priority energy, environment and climate issues through active engagement, focus groups, interviews and town hall meetings. (Begins Fall 2017)

III. Incorporate energy transition planning and emerging concepts of organizational resiliency by comparing impact of renewables vs. conservation strategies.

IV. Incorporate transportation demand management (Mobility Plan) concepts relative to impacts on university energy goals.

V. Provide supplementary data to infrastructure and utility planning to support strategic space planning initiatives especially the focus on research growth.

VI. Establish key performance indicators for all aspects of the plan.

VII. Provide assessment of current plan and recommendations for future evolution of MSU's Energy and Sustainability Plan.

APPENDIX

Key barriers and drivers of success as identified by Infrastructure Planning and Facilities business leaders, recommendations for the future of energy progress at MSU.

IDENTIFIED CHALLENGES AND RECOMMENDATIONS

To gain deeper understanding about the ETP's implementation and alignment with university sustainability goals, qualitative data was collected from MSU Infrastructure Planning and Facilities (IPF) business leaders, specifically seeking to identify key barriers and drivers of success, while also informing recommendations for the future of the plan. The following challenges were identified as top concerns for participants, and recommendations were made to address each.

CHALLENGE	RECOMMENDATION
Lack of centralized ownership and integration of the plan beyond IPF.	- Identify centralized leadership of the plan; EVPAS - Identify facilitating body of the plan; Sustainability department. They will oversee and track the implementation of projects and efforts that directly contribute to each goal
Limited financial investment capability and ability to demonstrate holistic value of investments	- Expand and align internal reporting by linking energy metrics to IPF Scorecard and Office of Planning and Budgets - Integrate energy and performance progress reporting into high level data for Business Leaders, Manager and other IPF decision makers to enhance sustainability strategies by department
Irregular reporting as a result of vague goals that can't be quantified and no uniform reporting method.	- Develop a uniform internal reporting structure, to be executed by the Sustainability department, with contributing data provided by various IPF units - Add supporting ancillary goals to each of the core goals, which each contain measurable benchmarks - Restructure benchmark language, i.e. "We will reduce GHG emissions by the maximum reasonable projection given current technology and investment potential."
Lack of facilitated collaboration between departments, leading to isolated projects and efforts	- Establish engagement structure for facilitating body; Sustainability department will engage departments outside of IPF to learn their sustainability status/ efforts - Engagement should identify where various strategies can be implemented to generate cost/energy savings
Difficulty externally communicating the goals, progress and milestone accomplishments	- Rename the plan "MSU's Energy Plan." - Reduce the external visibility of the original ETP document; reduce to a single page on IPF's website - Make the revised energy and sustainability plan externally visible on sustainability.msu.edu, to be managed by the Sustainability department, and use as a regular communication tool - Use example-based storytelling in external communication, using collaborative projects and milestone achievements to showcase goal progress
Slow adoption of plan and outlined energy strategies	- Evaluate current strategies contributing to progress on goals - Establish additional energy benchmarks, including Scope III emissions goals, and interally communicate those goals to MSU units, encouraging collaboration and innovation - Align Energy and Sustainability Plan with other broad campus plans; Mobility Plan, Campus Land Use Master Plan, etc.