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Founded on the principles of sustaining natural resources, engaging the community, and helping to build a prosperous economy, the university’s engine long has been powered by innovation, inclusivity and enrichment in fulfilling its core mission of education, research and service.

In the fabric of this mission is a university-wide approach to environmental stewardship and sustainability—in growing its world-class instruction and research, maintaining affordability by lowering operational costs, and working to ensure that we not only have resources for tomorrow, but for a better tomorrow benefitting all future generations globally.

That is how MSU approached environmental sustainability—not as a catch phrase or a feel-good afterthought, but integral to everything we do, sustaining our community, our world, our purpose.

This report shows how the MSU community is leading by example, by working toward goals that reduce its environmental impact and leverage its academic and research expertise. In some areas, much progress has been made, in others, efforts are just beginning. In all situations, MSU remains persistent, relentless, and practical in the pursuit of reducing its environmental footprint.
Commissioning of buildings through the Better Buildings Challenge is expected to yield up to 34% energy reduction.

MSU has reduced greenhouse gas emissions by 14% from 2009-10 to 2011-12.
At many institutions of higher education, energy use has become a focal point for academic and operational departments. Michigan State University has combined its institutional resources to be an example of prudent energy use through its practice and research.

**ENERGY TRANSITION PLAN**

Adopted by the Board of Trustees in April 2012, the **Energy Transition Plan** sets the standards that guide future energy decisions, similar to how the Master Plan guides the university’s growth. By design, this plan sets high-level goals and recommends strategies to meet the energy needs of the campus, reduce carbon emissions, and implement renewable energy infrastructure.

![Energy Consumption Graph](image1)

**FIGURE 1**
Consumption is calculated using total building square footage served by the T.B. Simon Power Plant and total British Thermal Units (BTUs) generated by the T.B. Simon Power Plant.

![Energy Consumption Graph](image2)

**FIGURE 2**
The average annual energy consumption of the Michigan State University East Lansing campus community also has dropped significantly despite the growing population.
The Energy Transition Steering Committee was composed of a diverse group of 25 faculty, staff and students representing a variety of viewpoints and expertise. The committee identified three goals for energy that include:

- Improve the Physical Environment
- Invest in Sustainable Energy Research and Development
- Be an Educational Leader in Sustainable Energy.

The Energy Transition Plan utilizes solid data and research from MSU faculty, students and staff as well as outside experts, and addresses critical variables—reliability, cost, health, environment and capacity—that impact MSU’s many stakeholders in the proximate community, across the state, and throughout the world.

**CONSERVATION & EFFICIENCY**

The Energy Transition Plan called for the prioritization of conservation and efficiency to reduce overall energy demand. Conservation activities result in pushing out the need for additional energy infrastructure, therefore reducing near term capital costs. Energy efficiency has im-

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**FIGURE 3**
This graph depicts the current status of buildings undergoing the commissioning process and indicates completeness of energy conservation measures (ECMs) identified in the commissioning process.

**FIGURE 4**
This graph shows the actual metered energy reduction of both electrical and steam consumption measured in thousands of BTUs in buildings where commissioning is finished, maintenance and repairs (M&R) are done, and ECMs are substantially complete.
proved over the past few years despite adding new space to campus, but now there are even more aggressive strategies to reduce demand. Figures 1 and 2 show that energy use per person and per gross square foot have steadily decreased, indicating improvements in energy efficiency.

COMMISSIONING

Optimizing the performance of energy-consuming equipment is another way MSU is reducing its energy demand.

Established in August 2007, the Commissioning Services unit of MSU’s Physical Plant Division performs testing and balancing of campus facilities and mechanical equipment to ensure that they perform effectively and efficiently.

After completing the commissioning process, a Continuous Commissioning Plan is developed. These plans, unique to each facility, allow for ongoing evaluation of heating, ventilation, and cooling (HVAC) and control system so that operations problems can be addressed quickly and energy use is optimized.

After buildings are fine-tuned through the commissioning process, additional energy conservation measures (ECMs) are identified and implemented.

The commissioning process is ongoing, with 16 buildings currently being evaluated and adjusted with energy conservation measures. Three buildings have been completed with all maintenance and energy conservation measures identified by commissioning. Figures 3 and 4 show commissioning projects and the actual energy reductions in the three completed buildings. Following full implementation, the efforts at these buildings are expected to result in a 34 percent drop in energy consumption at the building level as indicated in Figure 5. The continuous commissioning process, or “ongoing commissioning,” is in development to ensure the energy savings measures identified and implemented are maintained throughout the life of the building.
LIGHTING UPGRADES

Lighting equipment on streets, in buildings and parking structures across campus is being upgraded to reduce energy demands resulting from old technologies or lack of lighting control. Additionally, MSU is partnering with Consumers Energy and Lansing Board of Water and Light, the local utility providers, to take advantage of incentives for energy efficient upgrades, thereby aiding off-campus power plants in reducing greenhouse gas emissions by reducing the energy demands on campus. Currently, 16 projects at MSU are earning rebates through the local utilities’ energy efficiency incentive programs.

Benefits of the energy efficiency incentive projects are being realized as projects are completed. Recently, the interior lighting of the Wharton Center Parking Ramp was upgraded to internal induction units that require less maintenance, have a longer life, provide superior light quality, and use less electricity than the previous lighting. In addition, the lamps include a sensor that automatically dims the lights when vehicles or pedestrians are not nearby without greatly reducing lighting quality. The photos and graph above illustrate the difference in light quality and energy use after lighting improvements were made at the Wharton Center Parking Ramp.

MOTION SENSORS

Automated controls, such as motion sensors, are essentially switches that power on or off a device. In many spaces on campus it is necessary to automatically control lighting systems based on the...
Harnessing Student Creativity

Led by Dr. Andre Benard, Joseph Hagerty, Liz Starke and Scott Tarnowsky, this research project will set strategies and methods for reducing energy consumption. Their research will take place in three representative buildings on campus where these reduction strategies will be tested, while transferring the remaining energy load to renewable energy sources, reducing the need for fossil fuel consumption.

This project was funded by the Office of Campus Sustainability's Seed Grant Fund. Selected proposals best address MSU’s goals of reducing greenhouse gas emissions, energy consumption and waste.

Occupancy of the space itself to avoid wasted energy. Motion sensors are used in MSU classrooms to switch from manually controlling lighting to automatically controlling lighting based on occupancy.

Currently, 549 motion sensors control 215 classrooms in 42 buildings across 332,270 square feet. These lighting systems power down when not in use but power on when needed by an occupant, thus reducing electrical demand and emissions.

In addition to classroom space, Information Technology (IT) Services started working with Facilities Planning and Space Management during fall 2011 to retrofit computer labs. Motion sensors were added to 25 of the older public computer labs so that lights turn off with inactivity. New labs built on campus have motion sensors as part of their construction standards.

CLASSROOM TECHNOLOGY CART UPGRADES

Since fall 2011, IT Services has been in the process of upgrading technology carts in 158 classroom spaces around campus. The new Crestron Touch-Panel Control Systems on technology carts negate the need for multiple remote controls in rooms and provide instructors with a tech-friendly user interface. Crestron Systems also incorporate power-save software, enabling systems to shut down and power up at set times each day. The automation saves energy while extending the useful life of technology equipment. Crestron Systems are currently in 63 classrooms, which can potentially save up to 520kW per year; the remaining 95 classrooms will have Crestron units installed over the next two years.
Students for Sustainable Spaces

A new student group has emerged on campus and is making big strides toward improving campus sustainability.

The U.S. Green Building Council (USGBC) Students of MSU formed in the spring of 2012. After much hard work and dedication, the student group has established official recognition as an MSU student organization and is striving to maintain a high level of activity in events and functions promoting everything from solar panels and motion-sensor lighting to low-flow fixtures.

In the first half of 2012, the group led a number of events, including the Campus Conversation Nationals 2012, a nationwide resource-use reduction competition. In the 2013 school year, the group will host a gathering at the 2013 USGBC Students Regional Conference to promote leadership, sustainable education, networking and green technologies.

While the USGBC Students MSU group aims to educate the students of Michigan State on sustainable building practices, it also strives for continued education of its members. In November, 12 USGBC students traveled to San Francisco for the 2012 GreenBuild International Conference and Expo to expand their knowledge and draw national attention to MSU’s sustainability efforts.

CLASSROOM CONSOLIDATION

Many building systems on MSU’s campus serve multiple areas of any given building. For example, an air handler unit and chiller that provides air conditioning and ventilation to one classroom also may provide air conditioning and ventilation to another space. When a building system is active, it consumes almost 40 percent of the total energy demanded by the building and its occupants. If spaces that are served by a running building system are unoccupied while the building system is active, excessive energy is wasted to heat or cool the unoccupied space.

Classroom consolidation involves scheduling the use of a building’s instructional spaces in conjunction with the planned building system HVAC runtime to avoid using energy when a building is unoccupied.

Classroom consolidation practices have resulted in the cumulative reduction of more than 3,430 mega-watt hours of electrical energy, along with reduced heating needs, and saved MSU nearly $380,000 in utility costs since 2009.

ENERGY EDUCATORS

Building occupants are the “wild cards” in facilities management. Often, uninformed behaviors can defeat even the best designed building system. In fact, 50 to 60 percent of energy use in commercial buildings is directly related to how occupants use their space. When people understand how critical their actions are to the performance of their building, they are more likely to make better energy decisions.

Energy Educators are energy specialists who help people understand energy systems in their building. The energy educator program empowers building occupants to take responsibility for their space and to be an active participant in maintaining efficient building performance.
The T.B. Simon Power Plant supplies the majority of power required to support the university’s core mission. Over time, the demand for energy on campus has grown with increases in campus population and square footage. Similarly, the cost of supplying energy to campus also has increased, challenging Michigan State University to meet its energy needs while reducing its dependence on expensive, and potentially harmful, fuel choices.

Figure 7 shows that MSU has reduced greenhouse gas emissions by 14 percent since 2009-10. This reduction was achieved largely through switching from coal to natural gas and utilizing biofuels at the power plant. Energy produced from natural gas emits fewer greenhouse gases per unit of electricity than coal.

Utility Billing System

Another way to educate building occupants on their energy use is through the utility billing system. The Campus Utility Billing site allows users to examine their own utility usage and provides information on how to be good stewards of MSU’s resources. The system is connected to smart energy meters on campus, thus providing real-time use information for energy, water, steam and other utilities.

Although only auxiliary units such as Residential and Hospitality Services and Athletics receive a bill in the system, energy use information is available for all major buildings.

When people identify energy challenges or questions, the energy educator is able to follow-up with a customized solution. By engaging people in their work space, energy educators are able to assess behaviors, understand occupants’ energy demands and concerns, and promote case-specific benefits to saving energy. All of these activities are orchestrated to remove barriers and enhance the benefits of sustainable behavior while promoting a new culture of conservation and sustainability on campus.

MOVING TO CLEANER ALTERNATIVE FUELS

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gas emissions than energy produced from coal. Natural gas prices have been favorable recently, situating natural gas as a preferred fuel while reducing the impact of fuel choice on the utility budget and greenhouse gas emission volumes.

Since 2009-10, the university has moved from 15 percent natural gas to 62 percent natural gas in 2011-12 at the power plant.

RENEWABLE ENERGY

Renewable energy is currently a small part of MSU’s power portfolio. As of the end of FY 2012, 2 percent of the campus’ energy comes from renewable resources. Biomass at the power plant and two photovoltaic (solar) arrays—a 10-kilowatt system at the MSU Pavilion and a 40-kilowatt system at the Surplus and Recycling Center—contribute to this percentage. The new geothermal system and anaerobic digester will be captured in the renewable energy percentages for next year.

BIOMASS

As the university explores various technologies for large-scale renewable energy generation, the existing power plant has been increasing the use of biomass, a renewable fuel. Last year, MSU received a permit to expand its use of biomass in the power plant. At this time, biomass is not fully utilized due to the challenge of finding reliable and cost-effective renewable biomass fuels, as well as biomass that has similar energy values as fossil fuels. Efforts to increase the supply of reliable biomass for the plant continue.

GEOTHERMAL ENERGY

MSU’s first geothermal system was completed in fall 2012 and will heat and cool the new Bott Building for Nursing Education and Research. The new building is a three-story, 50,000-gross square-foot facility that links to the existing Life Science Building located on Bogue Street south of Service Road in the South Academic District. The building expansion would have required an estimated $2.4 million to construct central steam and chilled water connections to the existing campus system, which is near capacity. In addition to offering renewable energy by using heat from the Earth, the geothermal design’s construction cost is estimated at $750,000, saving MSU more than $1.6 million.
Food Waste and Energy

The anaerobic digester is fueled with animal waste and food scraps. Luckily for MSU, its fuel is affordable and easy to source.

Residential and Hospitality Services, with other academic units, is expanding its food waste program to capture pre and post-consumer food waste to go to the digester.

MSU researchers within the Department of Biosystems and Agricultural Engineering, as well as partners in MSU Recycling and Surplus and MSU Anaerobic Digestion Research and Education Center (ADREC) are working together to overcome logistical barriers and challenges to optimizing this project.

Providing post-consumer pulped kitchen scraps from residence halls already has significantly reduced the amount of food waste going to landfills while enabling critical research in alternative energy. From March 2012 to April 2012, Case Hall (South Pointe Dining Hall) and The Gallery Dining Hall in Snyder Phillips Hall diverted over 1,100 pounds of pre-consumer and post-production food waste to the digester. Between July 2011 and April 2012, Brody Square Dining Hall diverted 30,000 pounds of pulped food waste.
**BEING AN EDUCATIONAL LEADER**

**BETTER BUILDINGS CHALLENGE**

MSU is one of six higher education institutions to join the **Better Buildings Challenge**, a joint White House and U.S. Department of Energy initiative that calls on chief executive officers, university presidents, and state and local leaders to make a substantial commitment to energy efficiency. The initiative also recognizes the partner organizations for achieving results in energy efficiency. In showcasing their facility improvements and solutions, the Department of Energy hopes to inspire billions of dollars in new investment and savings in commercial buildings and industrial plants nationwide.

The partners, including MSU, work to help make university, commercial and industrial buildings in the United States more energy efficient. MSU has committed to achieve a 20 percent reduction in energy use by 2020 across approximately 20 million square feet. It’s estimated if all partners in the program reach a similar goal, the energy reduction would save American businesses more than $40 billion in energy costs. MSU’s first showcase project as part of the Better Buildings Challenge is Anthony Hall, where significant energy efficiency improvements are under way.

**SHARING LESSONS LEARNED**

As MSU makes progress toward achieving the goals of the Energy Transition Plan, many faculty and staff are taking the time to share lessons learned from the process. In April 2012, MSU President Lou Anna K. Simon, Department of Energy Senior Advisor Gilbert Sperling, MSU Energy and Environmental Engineer Lynda Boomer, and Fishbeck, Thompson, Carr and Huber Engineer Paul Koops participated in a panel discussion, **A Conversation with the President on Energy and Economic Impact**, about the Energy Transition Plan and the Better Buildings Challenge and their impact on MSU and the Michigan economy. The event was webcast broadly and reached more than 116,000 people through in person attendance, webcast viewers, and Twitter followers.

**NEXT STEPS**

MSU has leveraged its academic expertise, operational experience, and partnerships to explore future energy solutions. New practices and technologies being considered include:

**CONSTRUCTION STANDARD CHANGES FOR GREATER ENERGY EFFICIENCY**

The **MSU Construction Standards** are used for architects and engineers who provide professional services to MSU.

Prior to August 2012, the construction standards required a 24 percent energy improvement over a typical building design to the energy efficiency standard required by the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE). A thorough analysis was conducted using energy modeling. The analysis showed that MSU could pursue up to a 50 percent average energy efficiency over a typical building designed to the energy standard outlined by ASHRAE 90.1. As a result, MSU engineers are validating the modeling information and considering a higher energy standard.
PURCHASING GREEN ELECTRICITY

In addition to adding renewable technologies to campus, MSU could purchase green energy from a local utility to increase renewable energy used on campus. Local utilities are required, through the Michigan Renewable Portfolio Standard, to have 10 percent of its energy come from renewable resources by 2015.

WIND

A wind study on south campus is collecting wind speed data to determine the economic feasibility of utility-scale wind generation in the East Lansing area. MSU engineers and external consultants will study the feasibility of a utility-scale wind project and determine whether this is a viable option for MSU.

THERMAL ENERGY STORAGE

Currently, the Engineering and Architectural Services department is studying thermal storage options for campus, large scale solar, large scale wind turbines and a hybrid geothermal system. Engineers and architects are partnering with students and faculty to study renewable generation technologies as they apply to the campus micro-grid, including integration into existing building fleet, along with the economics of the applications. The integrated energy planning model is then utilized to compare variables, including long-term economic impacts, environmental benefits, and contributions to the Energy Transition Plan goals.

Michigan State University has made significant progress toward its energy goals and will continue to engage the university community to find solutions to the global challenge of energy use and conservation.

Torrefied Wood

Other technologies and fuels are being considered to further reduce the impact of the T.B. Simon Power Plant. Torrefied wood, a wood-char product which handles well in existing fuel conveying systems and contains a stored energy value similar to coal, is one renewable fuel under consideration, complementing existing biofuel usage and supplementing existing solar and potential wind projects. Currently, Biosystems and Agricultural Engineering faculty and MSU power plant staff are investigating the use of torrefied wood in the power plant.

Torrefied wood is not commercially available in Michigan. Part of the research is looking at the feasibility of developing infrastructure and markets for torrefied wood within the state. This project is an example of how MSU is promoting sustainable energy research by using the campus as a living-learning laboratory for developing, evaluating and demonstrating new technologies.
MSU participates in the annual CATA Clean Commute Challenge, receiving first place in the 2011-12 school year.

MSU has five electric vehicle charging stations on campus.

TRANSPORTATION
According to the Environmental Protection Agency, in 2010, transportation contributed approximately 27 percent of total greenhouse gas emissions. Transportation is also the largest end-use source of greenhouse gases (including direct emissions and emissions from electricity use), and accounts for 45 percent of the net increase in total U.S. greenhouse gas emissions from 1990-2010.

Transportation studies conducted in 2009 and 2011 for the Environmental Stewardship Systems Team and Office of Campus Sustainability identified several opportunities to offer a broader suite of sustainable transportation options. These options, coupled with the migration of the MSU fleet to more efficient hybrid and flexible fuel vehicles, are helping on-campus transportation become more sustainable and shrink the university’s environmental footprint by reducing vehicular miles traveled, vehicular emissions, and single vehicle occupant trips to, from, and around campus.

The MSU campus vehicle fleet is comprised of 1,048 vehicles of various types. These include the campus motor pool and service vehicles for operations departments. Reducing greenhouse gas emissions and using less fuel continues to be a priority for Transportation Services.

In the last few years, Figure 1 shows steady growth of hybrid vehicles, electric vehicles, and flexible fuel vehicles (vehicles that can run on gasoline or a blend of up to 85 percent ethanol, or E85 fuel). Each hybrid saves an average of 250 gallons of fuel annually. Transportation Services also uses a biofuel blend, E10 (10 percent ethanol) for its regular fuel and B5 diesel fuel (5 percent biofuel) is used for diesel vehicles.

**FIGURE 1**

MSU continues to decrease its emissions by increasing the number of environmentally friendly vehicles in the university fleet. This graph shows the breakdown of number of environmentally friendly vehicles in the MSU fleet by year.
In January 2011, MSU initiated a car-sharing program with the private company Zipcar, Inc. The overarching goal is for the car-share program to help expand transportation options by offering students, staff and faculty a convenient and cost-efficient transportation alternative that, when combined with other transportation options at MSU, will help reduce the number of cars on campus.

Today, the program includes six vehicles in three campus locations, all of which are well utilized, with vehicles in lot #50 in highest demand. The program has doubled in size in the past 12 months, now serving nearly 500 members (8 percent faculty and staff, 86 percent students, and 6 percent community members). In March 2012, Zipcars use reached a level of utilization to warrant assessment for program expansion per Zipcar performance standards.

According to Zipcar, independent studies show that each car has the potential to remove approximately 15 personal vehicles from the road. This translates to approximately 90 personally-owned cars removed from campus. According to figures derived from the study, *Greenhouse Gas Emission Impacts of Car Sharing in North America* (Susan Shaheen & Elliot Martin, June 2010) it is estimated that MSU car share members have reduced their personal CO2 emissions between 455,400 and 662,400 pounds per year.

In a June 2012 survey of MSU and nine additional peer institution Zipcar members, 40 percent of respondents reported that using the program was a rationale for not purchasing a new car and more than 14 percent indicated that the program allows them to leave their car at home. In addition, nearly 68 percent of the members surveyed said they are less likely to bring a car to campus next year. The survey also revealed that members were more likely to use public transportation, bike, walk, or carpool.
MSU has several on-campus charging stations for university electric vehicles, and has added five for public use inside the Kellogg Center parking ramp and Spartan Stadium’s parking lot #79. The Kellogg Center station is a collaborative effort with the Lansing Board of Water & Light, the MSU Physical Plant, MSU Office of Campus Sustainability, and MSU Residential and Hospitality Services. Funding was provided through a grant from the U.S. Department of Energy.

Stations feature charging outlets that can accommodate a 208-volt car plug-in, minimizing charging time. They are open to the public for a $2.50 hourly rate, which also covers parking fees. It normally takes about four hours for an electric vehicle to charge.

The stations allow MSU community members to choose alternate fuels that will reduce GHG emissions on campus.

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**ELECTRIC VEHICLE CHARGING STATIONS**

**CARPOOLING**

Carpooling can significantly reduce traffic congestion, parking problems and emissions. MSU allows staff and faculty the option of purchasing carpooling permits that offer the same parking privileges as individual permits but at reduced cost. Groups from two to five individuals can participate at an annual cost ranging from $140 to $261 depending on the number of individuals. Participants also are eligible for one calendar day per month when they can drive their own car in the event of scheduling conflicts.

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**Increased Carpooling at MSU**

A team of faculty, staff and students, with help from external transportation partners, is exploring methods to increase carpooling, thus decreasing vehicle congestion and emissions. In 2011, just 35 people were registered as working at MSU and using the carpooling permits. Participation is a very low percentage considering the university faculty and staff population, indicating steps could be taken to leverage greater participation.

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MSU reduced waste to landfills by 41 percent from 2009-10 to 2011-12.

Logistics changes reduced vehicle emissions by 62.2 metric tons of CO₂ equivalent.
MSU, as a city within a city, procures a wide array of goods and services that run the gamut of office supplies, animal and human care items, facilities maintenance items, construction services, highly technical scientific equipment, energy, chemicals, computer software, contracted services, and more. Given the diverse nature of the purchases, one way to determine MSU’s success in reducing inputs to campus is to measure and trend the use of a commonly used item such as copy paper. This is an item that is broadly used, has traditionally been a high-use item in many areas on campus, and is of relatively low cost on a per unit basis such that price does not always drive the decision. Based upon these factors, this commodity can be used as an indicator of a shift in procurement behavior.

Reducing paper use across campus continues to be a key indicator for reducing inputs to the campus. While there has been a consistent downward trend in overall paper use, 2011-12
saw a significant decrease thought to be the result of institutional systems changes migrating several processes from paper to electronic format. These efforts have cut paper use by 39 percent from peak paper use over the past seven years.

In addition, University Stores stocks a number of products that have a portion of recycled content, including copy paper, paper towels, napkins, plastic bags and more, and tracks their usage on an annual basis. University Stores’ sales activities show use of these products has increased 30 percent over the past six years, demonstrating an awareness within the supply chain and campus to seek out and use recycled content products.

**TOTAL COST OF OWNERSHIP AND CONTINUOUS IMPROVEMENT**

The campus issues more than 10,000 purchase orders annually with an average total annual purchase of $300 million. The total cost of ownership considers, but is not limited to, the cost to acquire an item, related expenses to use the item (such as electricity cost), the cost of other items required in order to use the item (e.g. replacement filters needed for water filtration systems), maintenance costs to support the use of the item, and long range disposal costs. By considering these costs at the onset of a purchase, the university can make a fully informed decision and understand the impact the purchase will have on the university over its useful life.

Several resources are available to help staff make procurement choices differently, including ongoing professional development and increased awareness, modifications to procurement procedures, evaluation of existing standards, establishment of additional parameters for determining a best value, enhanced analytical requirements to measure, and the impact of product use and disposal as part of the purchase equation. Building a procurement model incorporating the
total cost of ownership quantifies aspects of purchases that traditionally have been considered qualitative.

## LOCAL PURCHASING

Fifty percent of Michigan State University’s spend is within the state of Michigan. Local procurement practices can reduce produce safety and quality risk, lower environmental costs and stimulate the local economy. Programs such as Farm to MSU and the MSU Beef Program are examples of ways that MSU is partnering with local and regional businesses.

Local purchasing is not limited to off campus businesses. The Student Organic Farm and the Bailey GREENhouse provide a hands-on, living/learning laboratory for students to grow organic foods and sell them to MSU dining halls.

## LOGISTICS

Improving logistics provides MSU another opportunity to reduce environmental and economic costs in the supply chain. In 2011-12, University Services Logistics entered into a pilot program with United Parcel Service (UPS). The program, now permanently in place, includes re-engineering Central Receiving activities, retrofitting University Services parcel delivery.

### UPS Delivery Times

![Graph of UPS Delivery Times](image)

**FIGURE 3**

Package delivery times have improved as a result of the UPS logistics program. Due to a more efficient logistics system, 41 percent of packages delivered by MSU were delivered prior to UPS’s typical delivery time of 10:30 a.m. before the change.

**FIGURE 2**

Number of local and regional food suppliers.

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### Farm to MSU

Creating sustainable food systems includes supporting local agriculture, the Farm to MSU Program has in its mission a commitment to providing mechanisms connecting Michigan products to the MSU community. Vendors must support this vision to contract with MSU.

MSU Bakers and Food Stores also partner with local and regional farmers and vendors to purchase as much local and regional foods as possible. RHS Culinary Services has continued success in procuring local foods and supplies for the MSU community. Through a collaborative of MSU Culinary Services and a variety of MSU community partners, Michigan farmers sell their products to MSU through third-party logistics vendors. Rolled out in August 2008, the program involves local and regional farmers within Michigan and a surrounding state radius of 650 miles of East Lansing, MI.

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**FIGURE 2**

Number of local and regional food suppliers.
SUPPLY CHAIN

Sustainability Underfoot
After a few years of laboratory research and field demonstration/evaluation efforts on MSU’s campus, Dr. Parviz Soroushian, a civil and environmental engineering professor, and doctoral student Roz-Ud-Din Nassar now are walking all over their work.

The pair developed a large-scale flatwork construction using recycled glass to create concrete for campus use. With support from the MSU Physical Plant, Campus Sustainability, and Recycling, mixed-color waste glass was collected on MSU’s campus, milled in an outside facility, and shipped to a Lansing ready-mixed concrete plant where 20 percent of cement was replaced with milled waste glass to create the mixture for MSU.

A concrete supplier and a contractor agreed to use the recycled glass concrete in construction of the flatwork placed on the MSU campus throughout September 2012.

What’s One Metric Ton of CO2?
One ton (2,000 lbs) of CO2 is enough to fill:

- 1,575,900 soda cans
- 2,200 square foot home

One ton of CO2 is emitted by:

- Driving the average car from Las Vegas to Atlanta (2,000 miles)
- Powering the average home for one month
- 350 garbage bags rotting in a landfill
- The average coal power plant over the course of only 9 seconds

Emissions can be avoided by:

- Preventing 60 cars from driving for one day
- Replacing 3 incandescent light bulbs with Compact Fluorescent or LED bulbs
- Growing 40 tropical trees for one year

Source: Greener U Carbon and Energy Translation Kit

University Services is planning to expand the pilot program to additional carriers beyond UPS. The expansion is expected to provide additional reductions in vehicle activity on campus, resulting in savings to the university through gained economies of scale in the areas of greenhouse gas emissions, fuel use and risk mitigation.

While not an exhaustive list, results of this program thus far include:

- Reduced greenhouse gas emissions of 62.2 metric tons CO₂ equivalent, which is similar to taking more than 3,700 cars off the road for a day
- Decreased service vehicle traffic by 22 hours daily
- Reduced vehicle stops/starts by 345 daily equating to 89,000 annually
- Cut fuel usage of University Services delivery vehicles by 1,000 gallons
- Dropped five service vehicles from use on campus (three UPS trucks, two University Services vehicles), resulting in increased risk mitigation by reducing the potential for vehicle accidents on campus
- Improved delivery times with 41 percent of UPS packages delivered by 10:30 a.m., the start time for UPS deliveries on campus prior to the pilot program

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The university promotes the highest and best use of materials to eliminate waste through a hierarchy of decisions based on source reduction, reuse, recycling, composting, digestion, waste-to-energy and landfilling. Highest and best use is
defined as maximizing the efficient use of resources through recovery of materials with consideration to the greatest social, economic and environmental impacts. Combining surplus, recycling and waste functions into a comprehensive materials end-of-life management system provides for efficient collection and processing of materials that strives to be financially self-supporting.

MSU also is committed to being a community resource and partner in waste reduction promotion and education. Through strategic community engagement, MSU has built a network of public and private partners to share knowledge and resources advancing waste reduction initiatives and other related community programs.

HIGHEST AND BEST USE OF MATERIALS

Reuse is the disposition method of choice for MSU. The benefits are numerous:

- It provides the highest value per pound for materials.
- It provides quality materials at reduced costs that benefit a wide variety of consumers from personal use to not-for-profit organizations, schools and businesses.
- It requires less energy, water and labor than manufacturing new products.

Materials not suitable for reuse are processed for recycling through the campus

FIGURE 4
MSU manages reuse through its Surplus Store. In FY 2011-12, the store processed 1,892,811 items for resale, ranging from more than 1 million pounds of residence hall furniture to 5.6 million pounds of composted animal waste.

FIGURE 5
MSU continues to reduce waste going to the landfill. Since 2008-09, waste has decreased more than 41 percent.

FIGURE 6
Adopting a highest/best use philosophy is more economically sustainable. Reusing items provides the highest value per pound whereas putting materials in the landfill is a cost to the university.
material recovery facility (MRF) or sold directly to recycling vendors. In 2011-12, more than 3.7 million pounds of materials generated from the MSU campus were processed through the MRF.

Recyclables are sorted with the intent of selling them to end users for the manufacture of like products (copy paper to copy paper, for example). Where possible, closed-loop recycling/purchasing programs are supported, allowing the university to purchase goods made from the very materials that had been delivered to the vendor for recycling by MSU. One such program saw more than 1.02 million pounds of white paper recycled by a company that in turn sells recycled content paper through University Services. An additional 1.8 million pounds of corrugated cardboard were recycled by the primary vendor of interior office recycling containers for the university.

One of the many benefits of processing recyclables for highest and best use is increased revenue as clean/sorted materials are in high demand. More than 50 grades of scrap metal were sorted for recycling, resulting in $397,371 in gross revenue, compared to about $200,755 if materials had not been sorted. A change to plastics sorting by type resulted in a 370 percent increase in gross revenue, and at the same time afforded an opportunity to form a partnership with a local plastics processor.

Waste-to-energy and landfilling are used to dispose of materials that are not reused or recycled. Due to the proximity of sanitary landfills to MSU, they are the predominant method for the proper disposal of “waste” materials. MSU sent 13.5 million pounds to local landfills in 2011-12, representing a 1.4 percent reduction by weight from the previous fiscal year. An additional 107,793 pounds of carpeting and 12,280 pounds of unrecoverable wood waste were sent to off-campus waste-to-energy facilities that incinerate these materials to produce renewable energy.

EFFECTIVE AND EFFICIENT MANAGEMENT PRACTICES

Merging surplus, recycling and waste functions in 2009 created a comprehensive waste management solution for campus where the highest and best use of materials philosophy can be applied consistently at each level of the disposition process. Materials formerly destined for the landfill now can be evaluated for alternative higher use.

As a result, the program has generated more than $185,000 in annual savings through efficient material handling, including a 37 percent reduction in truck hours and a 43 percent reduction in labor devoted to collection of material.

MSU Surplus Store and Recycling Center continues to expand its construction and demolition debris collection efforts to get a better sense of both the waste and recycling generated at these projects, with the goal of providing the widest range of highest use options for material disposition. In 2011-12, Surplus Store and Recycling received 1,000 more individual requests for service related to construction and demolition debris projects than in 2010-11. That included the first complete new construction project, the Farm Lane MSU Federal Credit Union branch facility. Although pounds of material sent to landfills reduced just 41 percent compared to 2011, the overall yardage decreased 21 percent, resulting in $42,627 savings for the same period. This is accomplished through maximizing compaction of all waste loads to ensure that only full trucks/containers are shipped to landfills.

PARTNERSHIPS

In addition to partnering with on-campus experts, MSU has partnered with Big Ten Colleagues, nationally recognized supply chain consultants and the community to improve environmental, economic, and community sustainability.
SUPPLIER WORKSHOP

The MSU-hosted 2012 Supplier Workshop, *Understanding Our Impact, Reducing our Environmental Footprint Together*, brought together suppliers, buyers, faculty and key campus stakeholders to find commonality and openly discuss sustainability considerations and the supply chain. The workshop was an intermediate outcome of a Scope 3 emissions study by an external consulting firm analyzing the university's top spend suppliers for Food Stores and Purchasing. It has been a platform for continued discovery and creative thinking about approaching sustainable procurement.

The workshop has resulted in a higher degree of engagement with suppliers and internal organizations, including:

- Exploring availability of recycled content goods through the supply chain operations.
- Identifying and contracting for closed-loop acquisition processes of key commodities where there is a market for re-use of the materials by the supplier. An example is an arrangement being explored to acquire toner cartridges from the same company receiving the university’s empty cartridges for recycling, creating an endless loop with minimal waste.
- Continued evaluation of inbound and outbound shipment processes for increased consolidation and reduction of vehicles on campus.
- Establishment of sustainable procurement guidelines for purchases by involving University Services in sustainability efforts in a more active manner, allowing MSU to collect and analyze data to better understand purchasing behavior.

Where’s the Beef?

In 2010, the Department of Animal Science and MSU Bakers and Food Stores entered into a pilot project that brought MSU born and raised cattle back to campus to be served through the residential dining service. Animal Sciences worked through challenges to find opportunities to make this value chain viable and the project has continued.

Cattle are born, raised and preconditioned at the Upper Peninsula Research Center in Chatham, MI, and the Beef Cow/Calf Teaching and Research Center in East Lansing, finishing at the MSU Beef Cattle Teaching and Research Center in East Lansing. They are harvested at Ebels Meat Processing in Falmouth, MI, and processed into boxed beef at Byron Center Meats in Byron Center, MI. The meat then is distributed to MSU Food Stores by Sysco Grand Rapids. The project encompasses approximately 100,000 pounds of live cattle.

As part of the project, Animal Sciences also is modeling an experimental traceability system that utilizes radio frequency identification and two-dimensional bar coding as part of a Michigan Animal Agriculture Initiative and USDA-AMS grant.

In fiscal year 2012, MSU Bakers and Food Stores processed 72 steers, bringing 40,000 pounds of MSU beef for use in Residential Dining and the Kellogg Hotel and Conference Center.
SUPPLY CHAIN

BIG TEN ENERGY EFFICIENCY PROJECT

Energy use is another important procurement consideration. University Services, in collaboration with the Office of Campus Sustainability, is leading an effort with the Big Ten and Friends Environmental Stewardship Group to identify commonly used laboratory equipment to potentially develop guidelines and labeling for energy programs such as Energy Star. Monthly conference calls provide the group a forum to discuss methods for proceeding, identify key stakeholders on the campuses who need to be involved in the efforts, and strategize additional impacts the collective effort can have for members’ respective universities.

The group has developed a consolidated listing of equipment for participating universities, providing a basis for selecting equipment to take forward to national organizations for labeling consideration. Ultralow temperature freezers have been identified as the initial target equipment to take forward. The group is determining the best means for proposing data to Energy Star to begin the guideline development process.

Additional benefits of participation in this group have been realized through development of common language to be used by Big Ten and Friends purchasing departments for collecting energy use information from suppliers in order to determine the total cost of ownership when conducting bids or acquiring scientific equipment.

COMMUNITY ENGAGEMENT

Community engagement is essential to the success of Surplus Store and Recycling. By involving the community, the concept of the living/learning lab is put into motion, providing a window into the management of products through their life cycle. This creates abundant educational and research opportunities for the campus and community at large. In addition, as a progressive leader in the Greater Lansing area, it is important for Surplus Store and Recycling to be an active participant in local programs and initiatives. Surplus Store and Recycling delivers numerous departmental benefits, including increased program awareness, revenue, and customer base, while at the same time helping to provide sustainable community collection and education efforts.

Community Reuse Days are week-long collections of reusable and recyclable materials from student, faculty and staff. During its first full year, more than 3,000 pounds of materials were collected. In addition to direct environmental stewardship, the program helps educate the MSU community about materials that can be reused and provides an outlet for hard-to-recycle items. When coupled with the Public Recycling Drop-Off Center, Community Reuse Days provide a comprehensive solution for the management of most materials generated by these groups.

Pack-Up, Pitch-In

Since 1996, MSU has been encouraging students to “pack up and pitch in” during move out days at the end of each semester. Materials collected include clothes and shoes, non-perishable food, plastics, glass, paper, electronics, bikes, carpet, loft beds and more.

In 2011-12, the event increased recycling 13 percent, food donations 41 percent, glass recycling 208 percent, and carpet recycling to 11 percent. Goals for the 2012-13 school year have been set and include better collection methods for large reusable items and e-waste, ensuring responsible disposal/reuse, and increased education to students, particularly international students and late-exam takers, to bump up recycling numbers.

Additional waste is collected through Recycle Rama, created with assistance from MSU as a supporting member of the Regional Recycling Coordinating Committee. The annual event collects hard-to-recycle materials through a partnership of Ingham County, City of Lansing, City of East Lansing, Delhi Township, Michigan
Recycling staff teach students how to recycle during Sparticipation. These efforts resulted in diverting 96 percent of the event’s waste to landfills.

EMISSIONS STUDY

MSU is contracting with the firm who provided the original Scope 3 Emissions study that led to the Supplier Workshop for MSU’s top spend suppliers as conducted in 2009-2010. The follow-up survey and analysis will provide a comparative report of the university’s emissions in 2011-12 as compared to 2008-09. The study’s scope also has been expanded to a broader number of suppliers to obtain additional insight.

CLOSED-LOOP REMANUFACTURED TONER CARTRIDGE SUPPLIER RELATIONSHIP

Although MSU collects and returns printer toner cartridges for remanufacturing purposes, the university does not have a closed-loop process in place to return cartridges to the same company from which they are procured with a percentage of re-use returning to MSU.

In addition to these events, the Public Recycling Drop-off Center collects the widest array of materials on a continual basis. Materials collected at the drop-off center accounted for more than 3.2 million pounds, or 45 percent, of the total volume of recyclables processed through the Materials Recovery Facility, and equated to $184,523 in gross revenue in 2012.

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At present, MSU is utilizing a high number of OEM (Original Equipment Manufacturer) toner cartridges but the market for remanufactured toner cartridges has changed significantly over the past 10 to 15 years. University Stores and Purchasing have entered into conversations with Surplus and Recycling operations and suppliers regarding the benefits of a closed-loop system for acquisition and remanufacturing of print toner cartridges. Requirements for a closed-loop system will be determined by a focus group of key stakeholders and a competitive bidding process will help MSU determine the best option.
WATER

Erickson Hall Bioretention Basin (rain garden) helps to filter rainwater for a cleaner Red Cedar River.

MSU has reduced campus water use by 11% from 2009-10.
Like energy, water is one of the most widely used resources on the campus and in the state. It is used abundantly in residence halls, dining facilities, research labs, and for irrigation. With water being so ubiquitous in the state of Michigan, it can be easy to forget that it requires the same sustainable management principles as other natural resources and its production is directly related to energy consumption. Michigan State University has been at the forefront of many important water management issues. Rain gardens, green roofs, and no grow zones are outfalls of a comprehensive integrated storm water management program. Internationally-renowned water experts and institutes call MSU “home”.

However, despite these successes, the campus water management and distribution system still has many holes, and MSU has room for improvement. Responding to this challenge, MSU conducted a water audit in 2010 to better understand campus water use and consumption. The audit identified the major uses of water and opportunities for better data collection and management. A follow-up study completed in 2011 further refined water use and identified potential conservation activities.

Results of both water studies, in concert with interviews with water experts on campus, were compiled into a recently completed consultant report, Michigan State University and Water, which identified three definitive recommendations for MSU:

- Create a structure to generate water management goals at the university-wide level or exploration of strategic options and their trade-offs that will serve as context for goal setting.
- Consider new ways of addressing water quality issues in delivering water to the university community.
- Leverage the university’s national and international water experts to create a living/learning laboratory to inform campus operations, benefit the research community, and enhance the reputation of MSU.

Armed with two studies and a comprehensive consultant’s analysis, the next step in water is to use the re-engineered Systems Team for Sustainability to set goals and priorities for water management on campus. The Systems Team has engaged a broad group of faculty, staff and students and will begin exploring sustainable water management, among other issues.

In the interim, several units already have begun looking for opportunities to improve sustainability. Residential and Hospitality Services (RHS) identified water conservation as a key element of its Sustainability Vision Plan, and has implemented water-efficient bathroom fixtures and green cleaning practices to reduce water use.
Mean, Green, Clean

Campus buildings are cleaner and greener than ever thanks to new environmentally-conscious cleaning methods and materials.

In 2010, MSU adopted the Operating System 1 (OS1) process, utilizing an application of industrial engineering programs in custodial services. This process provides improved cleaning methods and products for more efficient cleaning.

MSU has been lauded for these efforts. Building Services have received rave reviews of their cleaning processes, from professors suffering from dust allergies to self-proclaimed “pack rats” who, after seeing the difference in cleanliness, were more motivated to keep their own areas clean.

MSU Residence Education and Housing Services also received the Cleaning Industry Management Standards (CIMS) award for the new OS1 cleaning process implemented on campus. This award was received with honors from the worldwide cleaning industry association ISSA, along with the CIMS-Green Building certification, which recognizes MSU as being environmentally conscious in its cleaning and maintenance practices.

CAMPUS WATER USE AND CONSUMPTION

Well field and reservoir production records indicate that campus water withdrawal and use are decreasing. Water withdrawal data are somewhat impacted by improved well production metering that began in 2009-10. In addition, in 2010-11, the Brody Complex and Kellogg Center switched to purchasing softened water from East Lansing.

MSU-WATER

When people think about water, they tend to think about how we can reduce water use. However, water quality is a very important aspect of water resources management on the Michigan State University campus. MSU is fortunate to have abundant water resources.

High quality groundwater serves as the drinking water source for the campus community; numerous wetlands exist throughout the MSU property and the Red Cedar River winds through the main campus. Baseline studies were conducted as part of the MSU-WATER (Watershed Action through Education and Research) initiative to determine the state of water quality and the impact of campus activities on it.

FIGURE 1
Campus water use, from both campus wells and Mount Hope provider, in millions of gallons. Since baseline year 2009-10, campus has reduced its water usage by 11%.
Phosphorous-Free Water

Dr. Steve Safferman is part of a team developing a new method of removing phosphorous from our wastewater—a problem seriously affecting lakes and streams across the country. In addition, Dr. Safferman and colleagues at Columbus, Ohio, based-MetaMateria Technologies, are devising a cost-effective way of recovering the phosphorous, which then can be reused for fertilizer products.

They found that a nano-media made with waste iron can efficiently absorb phosphorous, making it a solid that can be easily and efficiently removed and recovered for beneficial reuse. There are indications that their method of phosphorous retrieval is much more cost effective than processing phosphate rock.

The material should be commercially available for use within two years. Phosphorous is a finite material; analyses show that the supply of phosphorous may become limited within the next 25 to 50 years. This research is funded, in part, by a National Science Foundation Small Business Innovative Research Grant. Safferman’s research also is supported by MSU AgBioResearch.

NEXT STEPS

While data indicate that water use is decreasing on campus, there still are many missed opportunities for greater conservation. The Systems Team has preliminarily discussed benchmarking MSU’s water use and consumption against like institutions to gain a better understanding of an appropriate water conservation goal. In addition, the outside experts who conducted the water audit and members of the Systems Team believe that MSU should continue improving water use information and analysis.

A dynamic team of students, faculty and staff members continues to build upon those studies to ensure that campus water resources are protected. Efforts include ongoing water quality monitoring throughout the Red Cedar River watershed, updating the wellhead protection plan for the University’s water supply wells, and developing and implementing a stormwater management plan in cooperation with numerous community partners throughout the Greater Lansing area.

Left: Red Cedar River 1960s. Right: Red Cedar River today.
In 2012, MSU finished fourth out of 605 schools in RecycleMania, an national recycling competition.

Students can pursue campus sustainability projects with the Be Spartan Green Student Project Fund.

MSU offers 15 environmentally focused undergraduate majors and a sustainability specialization.

ENGAGEMENT
Becoming environmental stewards is an important step in achieving sustainability at Michigan State University (MSU). The collaboration between academic and residential leaders resulted in the creation of MSU Neighborhoods. Undergraduate students living on campus are part of a neighborhood where they can plan their time at MSU and beyond, get the resources they need to succeed academically, see the world from global perspectives, learn by doing, and live a healthy life.

As students expressed their desire to become more involved in environmental stewardship, the Neighborhoods was a natural place to engage students. Recently, representatives from Michigan State University’s residential colleges and programs, Residential and Hospitality Services, and Student Affairs and Services created the MSU Neighborhood Engagement Project Grant Program focused on sustainability, intercultural understanding, and free speech and

Students celebrate Earth Month by participating in Eco Craft Night at the MSU Union, where they made reusable lunch boxes out of recycled milk jugs.
Engineering Going Green

After staffing struggles and increasing importance of environmental efficiency at MSU, the Environmental Engineering Bachelor’s Degree from the College of Engineering was made available to students in 2010, with the first degree awarded on December 10, 2011.

The purpose of the degree program is to train students to use the principles of biology and chemistry to develop solutions to environmental problems. Required courses to earn the degree include a range of subjects, such as mathematics, biology, chemistry, physics, humanities and social sciences. After the requirements are completed, students can then choose one of three environmental engineering paths—geoenvironmental, water resources, or a personally-designed specialization approved by the department.

The U.S. Bureau of Labor Statistics shows that environmental engineering is one of the few engineering disciplines that is predicted to experience growth in the next 10 years, with research and initiatives being placed into emerging water contaminants, climate change, the design and management of landfills, soil remediation and ecosystem restoration.

The Environmental Steward Program provides an opportunity for faculty and staff in academic and non-academic units to become involved in the Be Spartan Green campaign. Each steward is educated on waste reduction, energy conservation, alternative transportation, water conservation, and promoting behavior change within his or her unit.

With more than 700 environmental stewards on campus, sharing messages about campus sustainability has become faster and easier. When the program began in 2008, the focus was to increase the number of stewards, including students, faculty and staff. Having achieved these goals, the 2012-13 goals are more acute. Campus Sustainability is looking to increase environmental steward participation by 20 percent in buildings with high energy use as determined by building reports.

FACULTY & STAFF ENGAGEMENT

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For 2011-12, environmental stewards were introduced to themed programming and messaging. A goal for 2012-13 is to increase collaboration across campus units on these communications and events to foster relationships, create dialogue, and expand reach.

GREEN CERTIFICATION

Now in its third year, the Green Certification Program is becoming a key part of unit planning. More than 480 units, sub-units and campus living spaces have earned the certification after taking steps necessary to reduce their environmental footprint on campus with initiatives for communication and education, energy efficiency and conservation, waste reduction and recycling, water conservation, and procurement.

The Green Certification application consists of a checklist of best practices for sustainability. Departments earning Green Certification have confirmed that they practice 70 percent or more of these practices. The most practiced and least practiced behaviors have been identified to help leaders understand what behaviors departments can easily demonstrate, and those that may be more difficult to demonstrate. The goal this year is to understand and reduce barriers of the best practices.

Environmental Stewards In Action

The Chemistry building at Michigan State University is more than lab coats and test tubes. Thanks to facility leaders, faculty, staff and students, the Chemistry building is providing a sustainable space for research and development.

The Biochemistry unit is a great example of moving beyond the expected in energy reduction and environmental practices. The Biochemistry Research Store has been consolidating research-related campus orders to reduce the amount of paperwork and packaging materials used. The packing materials that are received are reused in packing materials to send to other departments.

In addition, several faculty and staff ride bikes instead of driving cars, frequently notify building occupants about recycling drives, and lead others by their personal conservation actions. A new building addition also is outfitted in environmentally friendly fixtures, including recycled green glass flooring, low-flow restroom fixtures, and motion sensor lighting.

Another major project has been to reduce energy use of laboratory fume hoods. After requesting usage numbers from the MSU Physical Plant, Chemistry Engineer and Architect Bob Rasico could easily pinpoint major problem areas in the building and move toward educating students and staff on energy reduction. With more than 250 fumes hoods in the building, this was a large project to integrate, but through teaching and by using demand ventilation sensors, the building has seen impressive reductions in energy usage.
ENGAGEMENT

GREEN LEAGUE

Recently Campus Sustainability partnered with faculty and staff on a Department of Education Fund for the Improvement of Post-Secondary Education (FIPSE) grant to utilize competency-based education. Specifically, Campus Sustainability worked with the Gaming, Entertainment and Learning lab in the College of Communication Arts and Sciences to develop an educational game to help employees develop systems thinking and critical thinking competencies for sustainability. In the end, improving these competencies will help stewards and their units to more fully engage in sustainable behaviors by integrating sustainability in decision-making. The game, Green League, was being piloted at the time of this report’s publication.

EXTERNAL ENGAGEMENT

MSU strengthens its environmental stewardship and sustainability programs by working with partners across the country. The university builds its reputation by both collaborating with external partners and sharing its expertise in national and international forums.

BIG TEN & FRIENDS ENVIRONMENTAL STEWARDSHIP GROUP

The Big Ten and Friends Environmental Group began in 2009 as a result of the Big Ten Financial Officers meeting to identify and plan for long-term issues of environmental stewardship. Membership includes all of the Big Ten institutions and University of California-Irvine, Notre Dame, University of Chicago, and the University of Texas.

Not only have the institutions collaborated with each other, they have brought in external speakers to stimulate discussion on how institutions can constantly improve environmental stewardship. External partners have included Dr. Paul Rowland, Executive Director of the Association for the Advancement of Sustainability in Higher Education (AASHE); Jean Lupinacci, Chief of the Energy Star Commercial and Industrial Branch of the EPA Energy Star Program; Nick Travis, Director of Project Development and Investment Services; Rob McKenna, Senior Consultant of Energy Strategies, LLC; and Kevin Lyons, Assistant Professor of Supply Chain Management at Rutgers University.

Now in its third year, the Big Ten and Friends Environmental Stewardship Group continues to thrive. One meeting per year focuses on energy and related topics, whereas the other meeting provides an opportunity to discuss other sustainability initiatives. In addition, group collaborations have created an environment where colleagues across the Big Ten and Friends institutions can call upon each other at any time to discuss ideas and share information.
SHARING THE MSU STORY

As MSU works to improve sustainability, its efforts are becoming nationally recognized. MSU was once again recognized in the Princeton Review’s 2012 Guide to 322 Green Colleges, which salutes “the nation’s most environmentally responsible ‘green colleges.’”

In addition, MSU faculty and staff are being tapped to share its expertise and experiences. Faculty and staff have given talks at major conferences such as the Association for the Advancement of Sustainability in Higher Education, National Association of College and University Business Officers, and the Behavior Energy and Climate Change Conference.

The U.S. Government called upon MSU at least two times in 2011-12 to provide expertise in areas such as supply chain and energy efficiency.

In practice and through partnerships, the world-grant mission resonates throughout environmental stewardship and sustainability programs.
FUTURE FOCUS AREAS
Much work has been done to achieve the high levels of sustainability already reached by Michigan State University. The university’s commitment to creating a better planet for all generations is clear in its practices, its policies and its people.

Working together toward a common goal has made sustainability a key component of MSU’s core values and culture. The framework set in A Vision for Sustainability charts a clear and enterprising path for MSU, laying out a broad agenda for permanently integrating sustainability into the university-wide policy and planning process. Our first steps have been taken, and many successes already are evident in the physical campus, broader engagement of faculty, staff and students, and with the elevation of MSU as a major player in developing sustainable practices in higher education.

We have answered President Lou Anna K. Simon’s call to be Bold by Design, but the next steps will take even greater collaboration and bolder action.

• The Energy Transition Plan goals are aggressive and achieving these goals cannot be an operational solution alone. The MSU community must leverage all of its assets – students, faculty, staff, alumni and other partnerships – to achieve the agreed upon targets over the next 20 years.

• Water is an important and emerging area that must be prioritized. The university is in the infant stage of understanding conservation opportunities and establishing a systems approach to managing water. The Systems Team for Sustainability must move aggressively to better understand the water system and help the university shape a comprehensive water management system.

• Sustainable food systems are rapidly being integrated into the MSU enterprise, but educating diners on the environmental and social impacts of food decisions is emerging as an area of interest of students, faculty and staff. More effort must be placed here.

• Waste and recycling efforts have produced successful results, but a broader and sustainable supply chain approach should drive collaboration between MSU suppliers, University Purchasing, consumers, and Surplus and Recycling.

These steps will not be easy, but MSU already has shown the innovation and commitment needed to navigate emerging territories and technologies.

With the hallmarks of MSU’s land-grant heritage providing a solid foundation, the university will continue to engage a diverse community, help build a prosperous economy while sustaining natural resources, and educate its students to become environmentally responsible citizens.

The next generation of solutions for MSU’s campus will reach far beyond the immediate community, profoundly impacting lives worldwide, and placing Michigan State University as a world leader in global sustainability.