OUR MISSION

PLANT OPERATIONS, A MEMBER OF THE UNIVERSITY COMMUNITY, PROVIDES AND SUSTAINS THE PHYSICAL ENVIRONMENT FOR THE UNIVERSITY TO ACHIEVE ITS GOALS OF EXCELLENCE IN EDUCATION, RESEARCH, AND PUBLIC SERVICE.

PLANT OPERATIONS INCLUDES PLANT BUILDING AND GROUNDS SERVICES, CONSTRUCTION SERVICES, FACILITIES MAINTENANCE, PLANT ADMINISTRATIVE SERVICES, UTILITIES AND PLANT ENGINEERING, WORK MANAGEMENT, PLANT MATERIAL AND MOVING SERVICES, PLANET BLUE OPERATIONS TEAM, AND PLANT ACADEMY.

OUR VISION

To be:

- an organization where continuous and measurable improvement in services is the standard
- recognized by the University community for excellence in service, as a partner in solving our customers’ problems, and as the provider of choice
- an innovative leader in facilities management
- an organization where all employees are treated equitably and honestly
- an effective, diverse work community
- a learning organization, where all staff members are empowered and supported in reaching their full potential
- a workplace where the atmosphere of trust encourages creativity and innovation

GUIDING PRINCIPLES

Our vision can only become reality through the efforts of all members of the Plant Operations team. This requires that everyone identify processes that need to be improved and the milestones that must be achieved as we seek to be the provider of choice for those we serve. We will be guided by these principles:

Focus:
We exist to serve the needs of the University through partnerships and mutual understanding.

Respect for People:
Respect for people and their intrinsic worth is the cornerstone of our relationships with one another, our customers, and our suppliers. We appreciate the diversity of the human family and recognize our differences as sources of collective strength and wisdom.

Environmentally Responsible:
We will respect the physical environment that we share. We will wisely use and preserve the resources at our disposal by reducing waste, recycling, and whenever feasible, using recycled materials.

Empowerment:
We are a Plant Operations team. Team members are stakeholders in the success of the enterprise and must be involved in the decisions that affect their work lives. “Empowerment,” with its freedoms, responsibilities and boundaries, describes the intended work culture. Empowerment requires competence, sharing of information, and ongoing learning. We are dedicated to becoming the best workforce in our industry. A person seeking to improve service to a customer will not be blamed for taking reasonable risks.

Innovation:
We are a learning organization. We recognize that improvement of ourselves, our work processes, and our methods is essential to our success. We must be creative. We must challenge our own thinking. We must seek to learn from our mistakes.

Integrity:
How we do our work and how we relate to each other are of paramount importance. Our conduct must conform to the highest, uncompromising standards of trustworthiness and character. We will never knowingly make decisions that harm people or that are not in the best interest of the division or the University.
“In the end, all business operations can be reduced to three words: people, product and financial performance. Unless you’ve got a good team, you can’t do much with the other two.” —Lee Iacocca

From Our Director

The above quote sums up the Plant Operations team. It is comprised of many exceptional and diverse people that share a common goal, to support the University of Michigan in being a great public institution of higher education, research, and public service. Without a strong base of experienced and dedicated people, Plant cannot serve the needs of this great institution.

The Plant Operations team has worked diligently over the past five years to transform itself from a highly knowledgeable and competent organization to a best-in-class team that is focused on working proactively in an organized and data driven manner. Having completed the implementation of three lead strategies enhancing the quality of services while reducing the total cost of ownership, Plant is continuing to implement additional strategies building on predictive and proactive highly efficient maintenance practices. The Facilities Maintenance and Building Services departments have transformed into fully scheduled and planned work environments. Together they have demonstrated that proactive working is superior to reactive working and reduces the cost of ownership in the long run. Combined these departments have produced over $5 million in savings annually while improving service levels to the community.

Our third initiative, Planet Blue Operations Teams, continues to rack up energy savings of over $4 million annually. Making energy conservation part of our everyday business is reaping sizable benefits. Building on the above successes, Plant Operations has developed though a comprehensive process that engaged all principle stakeholders, its third Strategic Business Plan. Titled Vision 2018, it details our major objectives for the next five years.

In this annual report, we have represented our accomplishments and highlights for the past year and our plans and vision for future years.

Rich Robben, Executive Director For Plant Operations
During FY13, Facilities Maintenance (FM) completed implementation of the department’s major restructuring initiative and launched two new maintenance regions – Central Campus West and South Campus regions. Additionally, all remaining planned Central Shop activities were converted to the new planning and scheduling format.

By fiscal year-end, 100% of our over 306 campus side staff was trained in the new work processes. The activation of the regions has entailed physical site build-out for office and shop space, computer installations and networking, and full training of field and supervisory staff in use of the work order portal. Pre-implementation customer roll-out meetings have accompanied every region activation. Region customers now have full visibility of all work details, all plans and all schedules of staff supporting work within their buildings or areas of responsibility.

The three (3) year roll out has resulted in a $3.0 million reduction in general funding while improving the efficiency and throughput of the department.

SLA GROWTH IN FACILITIES
In FY13, Facilities Maintenance added new service level agreements (SLAS) with campus auxiliary units for an estimated value of $1.36 million. We now have over 100 active service level agreements throughout campus with customers including Athletics, Housing, Parking & Transportation Services, University Unions, and Information Technology Services. The total estimated annual value of the active SLAs is $3.06 million.

Some highlights for FY13 include finalizing SLAs with Housing (newly remodeled Hill Region dormitories-Couzens, Mosher-Jordan, Stockwell and Alice Lloyd), Parking & Transportation Services (16 parking structures and office space), and Information Technology Services (data centers). In addition, we have expanded our SLAs with Athletics to include 26 buildings and we continue to provide football game day coverage.

We have also developed service level agreements for specialized equipment such as the University Unions elevators, Pierpont Commons chiller, BSRB icemakers, and School of Public Health kitchen equipment.

During FY13, FM has performed approximately $2.5 million in SLA-related maintenance work (an increase of nearly $1 million from FY12).
The new Michigan Cleaning program (OS1) finished FY13 with 90% of staff and facilities serviced by Plant Building and Grounds Services (PBGS) in the program. The four year roll out was completed by August 2013. Service levels have stabilized with a 6% improvement over the FY09 average while absorbing approximately $2.1 million in general fund reductions. Non-general fund business continues to grow with the addition of several Athletic facilities and growth in the North Campus Research Complex adding the equivalent of 13 additional custodial positions.

**Highlights for the year include:**

- Exceeding our 80% score goal for the annual OS1 audit.
- Winning the “Best Environmental Program” award at the OS1 Symposium held in New Orleans.
- Winning a Telly Award for the production of a five minute education video titled “A Short History of the Custodian”.
- Passing the recertification for the Cleaning Industry Management Standard program along with the addition of a “Green Building Award” for environmentally responsible cleaning practices, and finishing the year with a small but significant general fund surplus given the FY14 reductions they absorbed.

**Plant Building Services** continues to implement their custodial restructuring program titled OS1. This was a four year project that was completed in August 2013. The program has realized substantial savings, improved service levels, and won multiple awards as previously noted in this report. In addition, PBS finished the year with a positive general fund balance. Custodial work continues to be challenged by increasing facility utilization including scheduled and unscheduled events, increased facility access and hours of operations, and the proliferation of food services.

**Grounds Services** completed 52 total projects totaling $904,000 in billings. Highlights include $211,000 in NCRC irrigation and landscape, $188,000 for Alice Lloyd/Palmer Field irrigation and landscape, $102,000 for East Quad irrigation and landscape, $77,000 for Lawyers Club/Munger Residence irrigation, and $49,000 for Spring and Fall Campus landscaping and NCRC tree programs. Grounds sustainability programs for FY13 include invasive plant material and controlled burns in the North campus area, development of a compost tea fertilizer using the winter deicing brine makers, and the purchase of a propane powered riding mower.

**Waste Management Services**, which includes Recycling Programs, continued to keep costs in check and had no increase in tipping rates to the campus. The recycling office championed a paperless initiative in PBGS resulting in several new paperless reporting programs and the installation of wireless service in all PBGS facilities. In addition, WMS continues to be a high performer in both the customer and employee surveys. Staff in WMS received a bonus through Business & Finance for their scores. See more in the Waste Reduction and Recycling Section under Environmental Sustainability.
DISTRIBUTED BACKUP POWER PROJECT
Approximately $600,000 of first cost and $10,000 per year of Operations & Maintenance cost was avoided when a backup power system supplied by an independent and reliable Detroit Edison (DTE) energy source replaced what would have been five separate building on-site generators on the Athletic Campus. The traditional one-generator-per-building approach would have cost $1.5 million and required enterprise space and contributed to greenhouse gas emissions. The design of this project used integrated power reliability assessment methods resulting from Plant Operations’ engagement in National Fire Protection Association and Institute of Electrical and Electronics Engineers standards development. These methods now track in state and local energy and safety codes across the US and provide the technical basis for reducing, at least by half, the cost of getting backup power to many UM research laboratories.

CENTRAL POWER PLANT COMBUSTION GAS TURBINE STUDY
The engineering consulting firm of Black and Veatch has been contracted to update and verify the earlier version of the Combustion Turbine Feasibility study. Work on the study began in May and completion is scheduled for October 2014. The purpose of the study is to confirm that the addition of two 15 megawatt combustion gas turbines with heat recovery steam generators added to the existing plant would provide an economic benefit to the University, as well as improve the reliability of the power supply on Central Campus and possibly the Ingalls substation. In addition, the study will identify any possible risks or fatal flaws that are sufficiently unmanageable such that the project would not meet its intended goals. These risks will include financial regulation, construction safety, environmental, fuel supply, and space limitation risks. Based on previous studies the green house gas reduction from the operation of the new plant would be approximately 86,000 metric tons of CO2 annually. This is due to offsetting the purchase of DTE power which has a significant coal burning power plant base.
ELECTRIC CONTRACT NEGOTIATIONS
The current electrical contract between the University and DTE will end December 31, 2014. Since October of 2012, the University and DTE have been meeting monthly to discuss issues that need to be addressed prior to the end of the existing contract term and before entering into a new contract. Currently, the main issues are: improved power reliability and quality, more predictable power costs over the term of a new contract, the University’s sustainability objectives, and the ability of DTE to support the long term electrical growth needs of the University. The goal of these meetings is to have all of these issues ironed out and agreed to before the end of the current contract term.

Lighting control systems were installed in 29 buildings, for a total estimated project cost of $2.1 million. Twenty one of those projects were lighting improvements only, in some cases replacing existing lighting with LED lighting, which provides savings in electrical power and maintenance. The other seven projects controlled the HVAC systems as well, so that when a space is unoccupied, the lighting and the ventilation are shut down, saving electricity, as well as heating and cooling. Average energy savings is about a six year payback, so the estimated annual savings is about $350,000. Large projects included Randall Labs ($308,000), Angell Hall ($186,000), and Krause ($177,000).

There are 18 lighting and HVAC control projects currently in construction, for a total estimated cost of $2.1 million, with an estimated annual savings of $350,000, for a 6 year payback. Some of the larger projects include East Hall ($310,000), MSRB III ($322,000), and BSRB ($542,000).

CHILLED WATER REGIONALIZATION
The North Campus Chiller Plant system was extended to serve the Phoenix Memorial Addition and renovated spaces in Phoenix Memorial. The Law School Chiller Plant (located in South Hall) was extended to serve the renovated Lawyers Club. Construction began for extending the North Campus Chiller Plant system to the GG Brown addition. Construction began on the South Quad Chiller Plant which will serve South Quad, West Quad, Michigan Union and the new Munger Residence. Schematic Design began for connecting the Palmer Commons Chiller Plant (serving Palmer Commons, Life Science Institute, and Undergraduate Science Building) to the Fletcher Street (Dental) Chiller Plant (serving Dental/ Kellogg, Health Services, Michigan League, and Power Center), as well as connecting to Rackham. Study/Planning began for renovating the MSRB 2 Chiller Plant (serving MSRB 1 & 2 and Medical Science 2) and connecting it to the MSRB 3 chilled water system. Study/Planning began for connecting the newly renovated Chemistry chilled water system to the chilled water systems at Kraus and the Angell-Haven-Mason complex.

In FY12, over 50 million ton hours of chilled water were produced by regional chilled water plants saving an estimate $3.4 million of energy. New projects currently in progress are the interconnection of the Fletcher, Palmer, and Rackham chiller plants. The annual savings of these interconnections is estimated at $1 million.

Construction Services
CONSTRUCTION SERVICES REALIGNMENT
In 2002 Construction Services established its current organizational structure. The department’s Construction Engineering Managers lined themselves up with their major customers on campus (Engineering College/North Campus, Medical School, LSA, Hospital, and the remainder of campus). The campus has changed significantly in the past eleven years and some of the small and minor work orders which had been performed by Facilities Maintenance were now the responsibility of Construction Services. These changes necessitated a change in the structure of the organization and work began to determine the proper structure for the department so it could deliver efficient and cost effective services to the campus while maintaining a strong customer focus.

The senior managers in the department developed the following mission statement for their effort:
Adapt the organizational structure of Construction Services to improve our current processes and increase flexibility during times of fluctuating workloads and changing customer expectations.

Once the mission was clear, the managers evaluated many alternative structures for the department and then evaluated each structure’s pros and cons. This evaluation resulted in the decision in March to separate the department into two major focus areas; Construction and Services. The data from the FMS work order system indicated the department was performing approximately 2800 work orders annually totaling $1 million in services work (later renamed Minor Work orders).

<table>
<thead>
<tr>
<th>WORK ORDERS</th>
<th>RANGE</th>
<th>COST</th>
<th>% OF DEPARTMENT</th>
<th>LABOR HOURS</th>
<th>FTE’S</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; $1,000</td>
<td>$828,453.00</td>
<td>4.1%</td>
<td>9,227</td>
<td>5.2</td>
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<tr>
<td>$1-5,000</td>
<td>$2,621,435.00</td>
<td>13.0%</td>
<td>25,595</td>
<td>14.62</td>
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<tr>
<td>$5-20,000</td>
<td>$4,252,740.00</td>
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<tr>
<td>$20-100,000</td>
<td>$7,278,170.00</td>
<td>32.1%</td>
<td>56,338</td>
<td>32.1</td>
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<tr>
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<td>$300-500,000</td>
<td>$592,449.00</td>
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<td>2.5</td>
<td></td>
</tr>
<tr>
<td>&gt; $500,000</td>
<td>$539,494.00</td>
<td>2.7%</td>
<td>2,236</td>
<td>1.2</td>
<td></td>
</tr>
</tbody>
</table>

In addition, the number of areas on campus was reduced from five to three; Hospital/Medical School/NCRC, Central Campus, and North Campus/Athletics/Housing/South Campus.

The department began the transformation into its new organization in March with the reassignment of some of the buildings that were changing Senior Managers. This has been 100% completed. The department has hired a new manager to oversee the minor work orders and this group has been in full operation since Fall 2013.

2013 was a very busy year for Construction Services in the North Campus Research Complex. The department completed renovation work orders for 17 laboratories and completed almost $2.0 million in laboratory improvements supporting the occupancy needs of this facility. The projects ranged in costs from $15,000-490,000.
Work Management
In FY13 the regional rollout was completed for the Facilities Maintenance department. During the regional rollout, a planned and scheduled work flow process was introduced. The schedule compliance graph is a key metric for the Plant Operations planning and scheduling process. Adherence to schedule leads to the achievement of the planned and scheduled objectives. The objectives of planning and scheduling are to even out the work flow for maintenance groups, target the right people for the right work at the right time with the right tools and parts, lower cost, and optimize the uptime of a facility’s systems and assets.

Planning and scheduling work flow processes start with an asset supervisor evaluating the request for work and determining if the request is at a level of complexity that would benefit from planning. If the work request is urgent, it is sent directly to the craft. If the asset supervisor determines that the work request requires a lower complexity of tasks to complete, they send the work directly to scheduling. If the asset supervisor determines that the work would benefit from planning, the asset supervisor sends the work order to the planner by changing a status in the work order computer system (FMS). The planner then processes the work order and produces a work plan. The work order is sent to the scheduler to schedule and then sent to the craft for work completion. The work plan outlines the sequence of tasks, and a listing of the tools, materials, shutdown requirements, safety requirements, and the equipment required for work completion. The work plan information is then stored in a document library for future use. Planning and scheduling is in a process of maturation with the final hiring of personnel in FY13. The work flow process is starting to settle into place with operational and Work Management personnel learning to excel in new roles and responsibilities. In FY14 we look forward to entering a stage of continuous process improvement that targets higher performance and operational excellence.

The Materials Service Unit provides maintenance, repair, and operations stocked and non-stocked items for the Plant Operations regions and shops, Housing, Athletics, College of Engineering, and Literature, Science and Arts. The staffing in the Materials group has expanded to include three Order Clerk Seniors, currently ordering all materials and equipment in support of the Central Shops and Facilities Maintenance Regions. The Order Clerks have realized cost avoidance savings of $50K for FY13.

Materials Spend Analysis (Includes FMS orders/lines) is as follows:

<table>
<thead>
<tr>
<th>MATERIALS SPEND ANALYSIS</th>
<th>FY 2012</th>
<th>FY 2013</th>
<th>% CHANGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material Spend</td>
<td>$31.8M</td>
<td>$25.4M</td>
<td>-20.1%</td>
</tr>
<tr>
<td>Transaction Lines</td>
<td>123,166</td>
<td>104,056</td>
<td>-15.5%</td>
</tr>
<tr>
<td>Average Transaction</td>
<td>$330.90</td>
<td>$244.10</td>
<td>-26.2%</td>
</tr>
</tbody>
</table>

Moving, Trucking and Receiving is an internal service provider to UM offering services for office and laboratory moves, erecting scaffolding and rigging in support of Facilities Maintenance, special event set ups (i.e. commencements), heavy equipment movement on behalf of Plant Operations shops/units, and chemical/hazardous moves across campus. Our staff also provides moving services on behalf of the campus units within and outside the State. Moving and Trucking generated revenue of $1.205M, up 6% over last year through May of FY13.

Moving and Trucking has taken on the responsibility of supplying the elevator weights for testing in the regions and bears the responsibility of storing and tracking the availability of the elevator weights.

Moving and Trucking was called upon by the 2013 Solar Car Team to provide delivery service of their support trailer to the Port-Of-Call in Savannah, GA for shipment to Australia; this was accomplished in May 2013. They will also provide the delivery service of the solar car to a designated Port-Of-Call when determined by the Solar Car Team. This trip will either be to Cincinnati, OH or Chicago, IL.
SAFETY TRAINING OF PLANT OPERATIONS WORKFORCE AND STAFF

Plant Operations uses a training tracking software to manage our training program. These data reflect that Plant conducted 85 formal safety training sessions in FY13, including new employee orientation, covering topics from basic safety orientation to advanced safety training (e.g., confined space entry, asbestos abatement, etc.), for an average of over 2.5 labor-hours per plant worker. Plant also conducts supervisor lead informal safety training on a regular monthly basis at the shop level (monthly safety talks). This accounted for an average of over 2 labor-hours per worker. All total, Plant conducted an average of almost 5 labor-hours of safety training per worker in FY13.

HIGH VOLTAGE ARC FLASH MITIGATION

After determining the ways and means of accomplishing Arc Flash Mitigation during a pilot program several years ago, an Arc Flash Mitigation Program was initiated during FY13. The University’s distribution systems were modeled utilizing SKM PowerTools to determine short circuit current at each unit substation on campus and in turn permitted the Arc Flash energy to be calculated using another module from the same piece of software. The Arc Flash hazard levels at nearly every unit substation have been identified and the unit substations appropriately labeled. Due to the continuous changing environment of the University’s distribution systems, the labeling efforts are now in maintenance mode and labels are updated when necessary for system and equipment changes.

The result of the analysis identified 48 unit substations on Central Campus and 16 unit substations on North Campus that required some means of Arc Flash Mitigation. The different means are breaker retrofits, trip unit retrofits, and some require the adjustment of trip units. The Arc Flash Mitigation efforts were spread over five years on Central Campus and four years on North Campus. The efforts of the High Voltage shop and Electrical Operations & Engineering were able to address the Arc Flash hazards at 22 unit substations during FY13, which was the first year of the program.

| Occurrences and severity are down from last year. Five year trends in occurrences are slightly down, while severity is up. For FY13, sprains/strains from ergonomic and fall related incidents, mostly to shoulders, backs, and knees, accounted for the highest costs. Cuts and bruises from contact injuries also accounted for significant incidents and costs, but to a lesser extent. |
RECYCLING AND WASTE REDUCTION
The Waste Reduction & Recycling Office completed a post-consumer food waste composting pilot in conjunction with the Michigan League, diverting 900 lbs of food waste from the landfill during the Fall 2012 semester. The results of the pilot have informed departmental prioritization regarding composting expansion on campus.

Event composting expanded during FY13 with Waste Management Services providing composting carts and trainings for events at the Art & Architecture Building, Rackham Graduate School, the Law School, Athletics and the Alumni Center.

In October, a sort was conducted of the trash from six representative campus buildings. This sort showed improvement in the amount of recyclables placed in the trash and indicates that the largest gains in waste-to-landfill diversion can come from composting.

The Back-to-Basics poster campaign (shown below) was administered in FY13. This campaign provided more than 1,050 new recycling posters to units across campus. These posters rely heavily on pictures, eliminating the need to read lists of acceptable items and making recycling more accessible to those for whom English is a second language.

A series of recycling interventions were conducted in four under performing campus buildings. Targeted buildings were the Modern Languages Building, the LSA Building, CC Little/Pharmacy, and the Dental School. After a series of stakeholder interviews regarding possible issues, four themes emerged that were developed into interventions: recycling bins, recycling behaviors, recycling signage, and students. Recycling rates increased in all targeted buildings except for the Modern Languages Building as the intervention targeting students that was slated for that location did not occur due to lack of student interest.

Finally, work began on a scrap metal policy for Plant Operations which is intended to track the amount of scrap metal recycled by Plant Operations, reduce liability associated with informal removal agreements, and ensure that generated revenue is captured by the department.
SUSTAINABLE LABORATORY PROGRAM

In 2013 the Planet Blue Operations Team and Utilities and Plant Engineering have continued to implement laboratory ventilation recommissioning to functionally test the controls and to reduce airflow minimum rates to the guidelines set by Occupational Safety and Environmental Health. A pilot project at Life Science Institute deployed laboratory fume hood proximity sensors to provide an alert when unoccupied fume hood sashes are left open. A large scale project at School of Public Health II is in design to provide upgraded occupancy-controlled ventilation in conjunction with lighting controls. Pilot projects are under development to provide occupancy-controlled ventilation to other feasible locations.

PLANET BLUE OPERATIONS TEAM (PBOT)

FY 2013 was a transition year for PBOT, going from three individual teams to a self-directed team with three Regional Energy Managers (REM), one shared REM with the Medical School, an Energy Conservation Liaison, and a Communications Specialist covering 143 General Fund buildings. In FY14, PBOT will continue advancements for energy conservation on campus with a focus on operational excellence. By identifying energy waste via building walk-throughs, monitoring fan schedules and run-time reports, utility consumption variations, recommissioning, BAS programming/trending, steam trap testing, and distribution of motion sensing power strips. PBOT will continue to engage occupants and serve as a main contact for building facility managers and the regions. PBOT outreach efforts included a sustainability open house at the Ross School of Business and the Ann Arbor Green Fair. Also, the launch of the “Stop Energy Waste” campaign that included posters (see below) and thermomagnets. PBOT continues to experience savings in Planet Blue buildings in FY13 totaling a cost avoidance of over $4.1 million.
In the fall of 2012, the Institute of Social Research and the Graham Sustainability Institute announced a groundbreaking effort known as the Sustainability Cultural Indicators Program (SCIP). The SCIP is a comprehensive study designed to assess the sustainability knowledge, behaviors and attitudes of faculty, staff and students on campus. The program will collect data and provide key findings and index scores for 15 key indicators over a period of 5 years, with 2012 providing the baseline data.

From this data, Plant Operations learned much about the behaviors of people on campus and their awareness of our programs, including the Planet Blue Operations Team and the Office of Waste Reduction and Recycling. The SCIP showed that for faculty and staff, the areas of energy conservation and recycling scored consistently higher than all other behaviors, including travel, sustainable food purchases and protecting the environment. The graph at right shows the scores for each of these values on a scale of zero to ten.

For a different perspective, the SCIP also evaluated these same behaviors across different sections of campus, showing higher scores in areas where these Plant Operations programs had been implemented. The scores for “conservation behavior” in our campus areas were 7.1 on average, compared to 6.4 in other areas. Similarly, “waste prevention behavior” scored 7.3 on average in our areas; other areas averaged 6.9.

The first year SCIP report shows the effectiveness of our robust programs compared to areas of campus where our programs do not cover. We plan to continue our efforts in creating awareness and changing behavior in the coming years and hope to see these scores increase even more. For more information, visit the SCIP homepage at http://bit.ly/U-MSCIP

LOW SODIUM DIET GOOD FOR CAMPUS AND THE ENVIRONMENT

Plant Building and Grounds Services (PBGS) has reduced its salt and sand use by 50% since the mid-1990s. This milestone has been achieved by leveraging technology, using alternative materials and methods, and additional calibration and operator training.

When weather conditions allow, PBGS uses liquid deicing material comprised of salt brine, magnesium chloride, and an engineered agricultural product instead of the traditional granular products. Anti-icing practices improve the level of service and reduce total salt use by applying a small amount of liquid salt to the paved surface ahead of an approaching storm, which reduces the chance of snow and ice bonding. This allows for better mechanical removal, thus reducing deicing chemical needed. The liquid de-icer can be applied at lower temperatures and also acts as a sticker/spreader to hold it in place before the storm.

On salt spreading trucks, the ground speed control equipment and the associated in-cab computer system enable precise applications regardless of vehicle speed. Vehicles are also equipped with pavement and ambient air temperature sensors, which allow operators to understand how to best manage resources.

Provided that customer convenience is not compromised, PBGS also closes some non-essential areas of campus for maintenance purposes. This practice reduces maintenance costs, speeds up reaction time, reduces potential exposure to liability, and reduces the use of chemical deicers.

PBGS will continue to research innovative best practices and materials that improve service without compromising safety or performance and are deemed least damaging to University facilities and the environment.
Over the past ten years, approximately $12 million has been cut from the Plant Operations General Fund. The budget reduction line on the graph above tracks the General Fund reduction over the time period. As is evident by the graph, there was a sharp increase between the Fiscal Year (FY) 2009 and Fiscal Year 2011. It was during the time period that Plant began the Building Services Custodial reengineering, and Facilities Maintenance (FM) began the implementation of the FM Restructure. Both initiatives saved Plant Operations in excess of $4 Million. Also, as illustrated by the graph above, that Plant Operations General Fund has not kept pace with inflation over this period. The green area shaded at the top of the bar graph depicts the amount of inflation that Plant Operations did not receive each year.

As depicted by the graph above, the Plant Operations General Fund dollar per square foot (nominal dollars) has steadily increased over the past eleven years. There were a few years when the average declined (FY 04, FY05, FY11), but in general there has been some upward pressure on the average. However, over this same period, when inflation is factored in, the average has steadily declined over the period from $3.44 to $2.78.
MEASURING SATISFACTION
Business and Finance conducts customer and employee satisfaction surveys on alternate years to measure the B&F units’ achievement towards two major goals outlined in the Strategic Framework:

- Become employer of choice for high-performing individuals
- Become a provider of choice for our customers

In general, employees in units that indicate less overall job satisfaction evaluate themselves as not providing as high a level of customer service. This is correlated with lower satisfaction scores reported by the customers themselves. Conversely, increasingly satisfied employees see themselves as working harder to satisfy customers, and this is positively correlated with increasingly satisfied campus customers.

EMPLOYEE SATISFACTION / SURVEY
A Plant-wide design and implementation plan for communication and outreach to address results of the Employee Survey was active within each department in 2012. Department leaders conducted meetings with employees to actively inquire and develop shared understanding about the interests and needs perceived to both impact and improve employee engagement and satisfaction.

Successive and productive sessions resulted in a body of data and early action plans to support solutions within each department. This effort in 2012 established a solid base from which initiatives and daily efforts continue to grow today.

CUSTOMER SATISFACTION / SURVEY
“Continuous improvement” best describes the array of customer-facing efforts taken in 2012 to address customer satisfaction interests. Threaded throughout ongoing programs — from the Facility Users Network (FUN), to training, to routine customer meetings — each measure of the B&F Customer Survey was engaged to shape the improvement of discussions, customer education and progressively improve tangible tools to assist customer needs for information (e.g. FMS portal). Quality service program improvement — from OS1 Team Cleaning to Facilities Maintenance Restructuring — was a relentless, daily effort in 2012 in addition to effective change management across all stakeholders. Our commitment to Operational Excellence informs every effort within our daily business to achieve optimal operations for our customers and, in turn, support their satisfaction.

The graphs show the correlation between employee satisfaction and customer satisfaction, as measured in the most recent Business & Finance satisfaction surveys. Plant departments strive to attain high scores for both employee and customer satisfaction.

PLANT GROUNDS SERVICES
Employee satisfaction continues to improve while customer satisfaction remained largely unchanged between 2010 and 2012. Both scores are still high and we are pleased that customer satisfaction has not been negatively impacted, despite some service cuts related to budget reductions and external pressures to the Grounds department, such as diverting our management attention and resources to completing the Building Services restructuring.

PLANT BUILDING SERVICES
Customer satisfaction has improved while employee satisfaction has dropped between 2010 and 2012. This is most likely attributed to our internal and external influences. Though we have improved service, our staff have been subjected to major changes including ASFCME contract concessions, national economic stresses, and the disruption associated with our major OS1 restructuring.
CONSTRUCTION SERVICES Employee and Customer satisfaction is extremely important to employees and managers in Construction Services. Over the past five years our department has achieved high scores in both of these areas. Construction Services’ Labor Management Council is working on three major initiatives to improve employee satisfaction. The department also realigned our organization in 2013 to better serve the needs of our customers.

UTILITIES AND PLANT ENGINEERING The employee satisfaction scores of 2012 were down slightly (one point) from the 2010 survey as a result of staffing changes within the unit. Staffing again has taken a marked change this year. Therefore, we are working to strengthen the team concept of the unit and provide individuals with more opportunities to step up and be a bigger part of the unit.

The customer satisfaction scores are up over past survey as a result of unit branding and presenting the unit to the University community as team players. The department’s willingness to take on additional duties to strengthen and improve the University community is being recognized.

FACILITIES MAINTENANCE Employee satisfaction decreased slightly over the past survey, anticipated due to the length of the FM Restructuring initiative and significant change experienced by staff. FM implemented new processes for planning and scheduling and reassigned staff from central shops to regions.

Customer satisfaction decreased over the past three years, anticipated due to the duration and change in service processes related to FM Restructuring. The new planning and scheduling processes will provide more precise service scheduling, consolidated service calls, and increased work detail accountability. A planned $3 million budget reduction reduced the total available service hours to support general fund buildings.

MATERIALS & MOVING SERVICES Over the past four years there have been incremental increases in employee satisfaction scores. There was a management change in 2007 and employee engagement was incorporated in decision making where staff would feel the impact. As a result of this practice, there has been an increase in employee satisfaction.

Customer satisfaction is a core value within this work group. Customer satisfaction scores have remained high in spite of lower employee satisfaction scores; this is because the employees are diligent about the service they provide to campus users.

WORK MANAGEMENT Employee satisfaction scores show a double digit increase and represents a high mark from the previous two surveys. Work Management introduced a number of initiatives with a goal to strengthen the relationships. Initiatives such as Strength Finders, Meyers Briggs, and emotional intelligence presentations have helped management and staff explore better ways to communicate and work together. Work Management has also worked on improving communication and has introduced a Work Management monthly newsletter and now holds quarterly all staff meetings.

Customer satisfaction scores show an increase from 7.55 to 7.89 from 2009 to 2011. The Plant Operations Call Center focused on their interaction with the customer adding a “thank you” in their initial greeting and taking measured approach.
ABOUT THE STRATEGIC PLANNING PROCESS
In October 2012, Plant Operations launched a year of investment into organizational assessment, unprecedented stakeholder involvement, design and development for its next five-year business plan, Vision 2018. Strategic planning is regarded by APPA as “making decisions today in an effort to mold the future”, building “on an organization’s strengths while recognizing a changing and competitive external environment.”

Fully engaged in this premise, the Plant Operations Lead Team (POLT) threaded an ambitious series of planning/design meetings with repeated outreach to frontline employees, supervisor groups, Facilities Users Network members, campus facilities leadership, and U-M executives in an effort to accurately shape and hone our plan. The milestones of this process are now summarized.

PREPARATION FOR VISION 2018 AND REVIEW OF METRICS
POLT elected to maintain a Balanced Scorecard framework for Vision 2018: People, Stakeholders, Finance and Internal Business Process. The four-way focus is comprehensive, recognized across stakeholders, and has served effectively for more than a decade of strategic business planning in Plant Operations.

Each Plant department launched a SWOT assessment: “Strengths, Weaknesses, Opportunities, Threats.” Kick-off meetings and collaborative online tools were used to record input from each area. The Plant Director conducted a “Preferred Future” activity with the Facilities Users Network, creating new and important information for study.

Focus Teams were created to analyze metrics that would later inform our future vision, direction, and key challenges. The data set included B&F Employee and Customer Survey results, Sightlines facilities benchmarking reports, financial data, U-M Mission/Vision/Goals, and direct input from top executives.

FORMULATION OF VISION / DIRECTION, KEY CHALLENGES AND GOALS
Successful strategic planning demands an iterative process. Following data analysis, Focus Teams authored and presented initial drafts for Vision 2018. Brainstorming and writing activities were looped with presentations for POLT peer review.

Each team returned periodically to the body of metrics and assured that our most critical themes were being addressed. Drafts were occasionally presented to employee groups and stakeholders for reaction and ideas. Their questions and critique helped to compose a better product over time. These interactions also provided for timely “drilling” into topics that would evolve into meaningful action plans.

RESULTS
Plant Operations Vision 2018 Strategic Plan became official in September 2013. Action plans were developed with details and timetables to align individuals and groups with the strategy. Top imperatives for Plant-wide focus have been identified for the first active year of our strategic plan. Cross-functional teams and Plant leadership will join in concerted effort to improve employee and customer satisfaction and refine systems for greater business efficiency.
## Summary of Vision 2018

### PEOPLE

**Vision/Direction:** We cultivate an environment of mutual respect, collaboration, accountability, and inclusion.

<table>
<thead>
<tr>
<th>Key Challenge</th>
<th>Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>A high performance culture</td>
<td>Refine skills, tools and practice for high performance and accountability</td>
</tr>
<tr>
<td>Innovative methods for staff development and employee recognition</td>
<td>Invest in the future and celebrate employee contributions</td>
</tr>
<tr>
<td>Active partnerships between staff and management</td>
<td>Increase communication and employee engagement</td>
</tr>
</tbody>
</table>

### STAKEHOLDERS

**Vision/Direction:** Our charge for asset-focused Operational Excellence is supported by effective relationships with our stakeholders.

<table>
<thead>
<tr>
<th>Key Challenge</th>
<th>Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant communication</td>
<td>Increase communication and stakeholder education</td>
</tr>
<tr>
<td>Maximum efficiency</td>
<td>Support optimal operation through planning, execution and reporting of work</td>
</tr>
<tr>
<td>Engage stakeholders in data driven decision-making</td>
<td>Employ data to lead Operational Excellence and continuous improvement</td>
</tr>
</tbody>
</table>

### FINANCE

**Vision/Direction:** We are fiduciaries of the resources given to Plant Operations to optimize service levels in support of the University’s physical assets for the campus community.

<table>
<thead>
<tr>
<th>Key Challenge</th>
<th>Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enhance service levels in an environment of reduced resources</td>
<td>Develop Business Intelligence for productivity and efficiency</td>
</tr>
<tr>
<td>Manage costs associated with unfunded mandates</td>
<td>Innovative cost-sharing with stakeholders to fund valuable initiatives to the University</td>
</tr>
<tr>
<td>Amplify transparency in decision-making and operations</td>
<td>Plant Operations will increasingly influence the financial criteria for asset management and project development</td>
</tr>
</tbody>
</table>

### INTERNAL BUSINESS PROCESS

**Vision/Direction:** Employ technology and consolidated resources to create best in class business processes and service measurements for Plant Operations and its stakeholders.

<table>
<thead>
<tr>
<th>Key Challenge</th>
<th>Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advance technology for productivity and information with reduced resources</td>
<td>Optimize use of technology</td>
</tr>
<tr>
<td>Standardization</td>
<td>Continuously improve internal business processes for consistency and efficiency</td>
</tr>
<tr>
<td>Campus sustainability</td>
<td>Advance campus sustainability through ongoing technical innovation and building occupant campaigns</td>
</tr>
<tr>
<td>Promote a culture of organizational change</td>
<td>Effectively manage transitions and inspire leadership at every level towards the future</td>
</tr>
</tbody>
</table>
Plant Operations continues to lead the nation in leveraging the economic footprint of the $300 billion US education facilities industry to add value to campus infrastructure at all State of Michigan campuses and every educational institution and university-affiliated health care system in the United States. These results owe much to its mastery of the American national standards development process; coordinated with a growing number of like-minded institutions. Beginning with a single vote on the National Electrical Code in 1997, a network of nearly 100 subject matter experts has grown to respond smartly to new regulatory concepts and to drive new concepts of its own into infrastructure markets where our industry is a significant stakeholder. The financial success of this enterprise is summarized in the figure below.

These results find their inspiration in the thousands work points for which Plant Operations is responsible—backflow prevention; emergency eyewash and showers, fire dampers, integrated fire protection and smoke control systems, sprinkler system construction, steam traps, carpet cleaning, material recycling, illumination safety, elevators, electro-mobility, emergency generators, electrical wiring, and power system reliability, and in many other technologies. The trend will continue to accelerate as we persist in driving safety and sustainability concepts into the product, installation, operations and maintenance standards governed by the American National Standards Institute (ANSI). Two advocacy achievements during the past year are noteworthy:

- **Success in changing the 2014 National Electrical Code so that less electrical energy is brought into every building.** This drives down the first cost of constructing the entire electrical power chain and reduces operational hazards significantly.

- **Success in catalyzing the creation of an American national standard for the custodial industry that will result in significant reduction to the total cost of ownership when benchmarks have a national standard in support of public health and workplace safety.**

UM is now the only university in our industry with a member appointed to the National Fire Protection Association Research Foundation—one of the highest positions of influence in our industry. This position gives the University a leading voice in the direction of safety and sustainability research in the US. A workgroup is now in action to discover the degree to which the University of Michigan may strengthen its leadership in infrastructure standards by engaging proactively with all ANSI members that are stakeholders in our industry. The gains to the University will accumulate in all dimensions of value delivery.

### Success in International Infrastructure Standards Advocacy Benefits The University of Michigan

<table>
<thead>
<tr>
<th>Area</th>
<th>Annual Avoided Cost Opportunities in $ Billions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total US Education Facilities Annual Spend (including university-affiliated health care research and clinical delivery facilities)</td>
<td>$300B</td>
</tr>
<tr>
<td>Annual Electro-Technology Spend</td>
<td>$60B</td>
</tr>
<tr>
<td>Harvard University Endowment</td>
<td>$30B</td>
</tr>
<tr>
<td>UM Annual Budget</td>
<td>$6B</td>
</tr>
<tr>
<td>Est. Annual Savings to UM-Only</td>
<td>$0.018B</td>
</tr>
<tr>
<td>FEEDER &amp; BRANCH CIRCUIT SIZING</td>
<td>2017 NFPA 70</td>
</tr>
<tr>
<td>ANSI STANDARD FOR CUSTODIAL SERVICES SIMON INSTITUTE $100M—$10,000M</td>
<td></td>
</tr>
<tr>
<td>SERVICE TRANSFORMER KVA REDUCTION</td>
<td>2014 NFPA 70</td>
</tr>
<tr>
<td>ALUMINUM CONDUCTOR TORQUE TABLES</td>
<td>2011 NFPA 70</td>
</tr>
<tr>
<td>LIMIT POWER OUTLET TIMERS</td>
<td>2010 ASHRAE 90.1</td>
</tr>
<tr>
<td>FIRE PUMP NO FLOW TESTING ROLLBACK</td>
<td>2008 NFPA 25</td>
</tr>
<tr>
<td>LIMIT FLASH HAZARD CALCULATIONS &amp; LABELING</td>
<td>2002 NFPA 70</td>
</tr>
</tbody>
</table>

Assertive advocacy in American national standards development processes by the University of Michigan since 1997 has produced total cost of ownership reduction opportunities that are now available to the entire US education industry:

- **$1B—$10B US Education Industry**
- **$100M to $1B State of Michigan**
- **$1M-$10M University of Michigan**
Plant Operations Highlights
by the Numbers

PLANT OPERATIONS

15 million sq ft of general fund buildings at an average cost of $3.77 per sq ft

8 million sq ft in U-M Health System

12 million sq ft in Housing, Athletic Campus and Other Auxiliaries

THE PEOPLE OF PLANT

1492 Total Employees which includes part-time employees

1294 of which are bargained-for staff, contract and temporary employees

IN FY 13 WE ACHIEVED:

89% preventive maintenance completion rate

105,609 completed work orders

65% of hours worked were scheduled

GENERAL FUND

$56,940,939 FY 13 Maintenance Budget

$75,725,671 FY 13 Utilities Budget

PLANT SAVES THE PLANET

Maintains 16,660 trees on campus

3068 Tons of waste recycled for a recycling rate of 30%

$4 million in annual avoided energy costs

8.4% reduction in energy consumption

Reduced carbon emissions by 20,000 metric tons

In FY 13 we achieved:

8 million sq ft in U-M Health System

12 million sq ft in Housing, Athletic Campus and Other Auxiliaries