



# UNIVERSITY of HOUSTON

## FACILITIES MANAGEMENT

**SUSTAINABILITY PROFILE:**  
Staff Development,  
Programs and Projects,  
and Community Engagement



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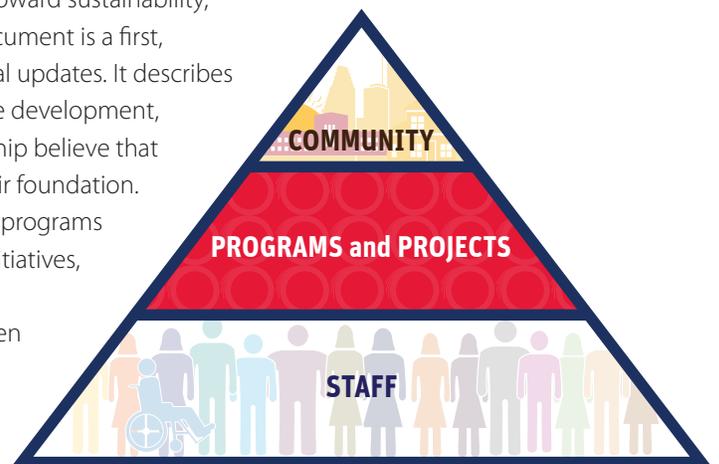
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## EXECUTIVE SUMMARY

The University of Houston (UH) established its Campus Sustainability policy in 2009<sup>1</sup>. This policy committed UH to follow campus guidelines on sustainability as provided by the UH Board of Regents and the UH Sustainability Taskforce. It also ties the university's perspective to that of the Association of Advancement for Sustainability in Higher Education Sustainability in Tracking & Rating System (AASHE STARS).

In the ensuing three years, under the direction and leadership of Melissa Rockwell-Hopkins, Executive Director, the Facilities Management (FM) unit of the university's Division of Administration and Finance, endeavored to enhance its policies, practices and focus to serve the mission of the unit while making notable contributions to the success of university sustainability. By 2012, FM's interest had become a passion; staff began to recognize the group as having an identity that related to the STARS program's structure and the group re-organized to both embrace and better align with these interests.

This Sustainability Profile document memorializes FM's progress toward sustainability, its aspirations and its tactical plans for the next two years. The document is a first, both in its issuance and in its intention to set the stage for biennial updates. It describes FM's ten-point sustainability identity in three realms: staff resource development, programs and projects and community engagement. FM leadership believe that the strength, invention and dedication of the group's staff are their foundation. From there, it can create and execute interesting and meaningful programs and projects. Finally, because the staff fuel the success of these initiatives, it gives FM reason to engage with the university community. Future FM Sustainability Profiles will track the evolution of these ten points reflective of the challenges and successes that the group experiences. However, the fundamental relationship of progress to the foundation of staff will remain a constant.



## INTRODUCTION

The University of Houston sustainability identity is largely linked to its Office of Sustainability, guidance provided by the UH Board of Regents and UH Sustainability Taskforce and the university's active participation in the Association of Advancement for Sustainability in Higher Education STARS program. In 2012, the University of Houston Facilities Management (FM) group decided to embrace sustainability and drastically altered its direction in doing so. This was inspired by Albert Einstein's observation that "we can't solve problems by using the same kind of thinking we used when we created them." The decision can be viewed as a reinvention for FM, a unit whose mission is to manage the university's real property to an optimum level of quality and to contribute to the university's growth and development plans and activities. That year, FM changed its organizational structure to best carry out its approach to sustainability. This document is a guide for FM staff and the university community to understand the imprint of FM's sustainability. Inspired by the words: "We Think, Therefore We Are. Becoming Benchmarks of Service, Stewardship and Sustainability", this

FM's mission and service activities are tied to fiscal responsibility, accountability and customer service; its objective is to satisfy these while ensuring that students, faculty, staff and visitors experience an attractively maintained and welcoming campus. FM's core values are referred to as "PRITAS":

- P Professionalism
- R Respect
- I Integrity
- T eaming
- A ccountability
- S ervice

<sup>1</sup> See <http://www.uh.edu/af/universityservices/policies/mapp/14/140101.pdf>



report brings concrete meaning to FM sustainability through examples of newly launched and anticipated programs, projects and engagement. This document reveals a deliberate approach. The first phase of priority activities is tactical; FM is largely acting upon those things over which it has responsibility and authority.

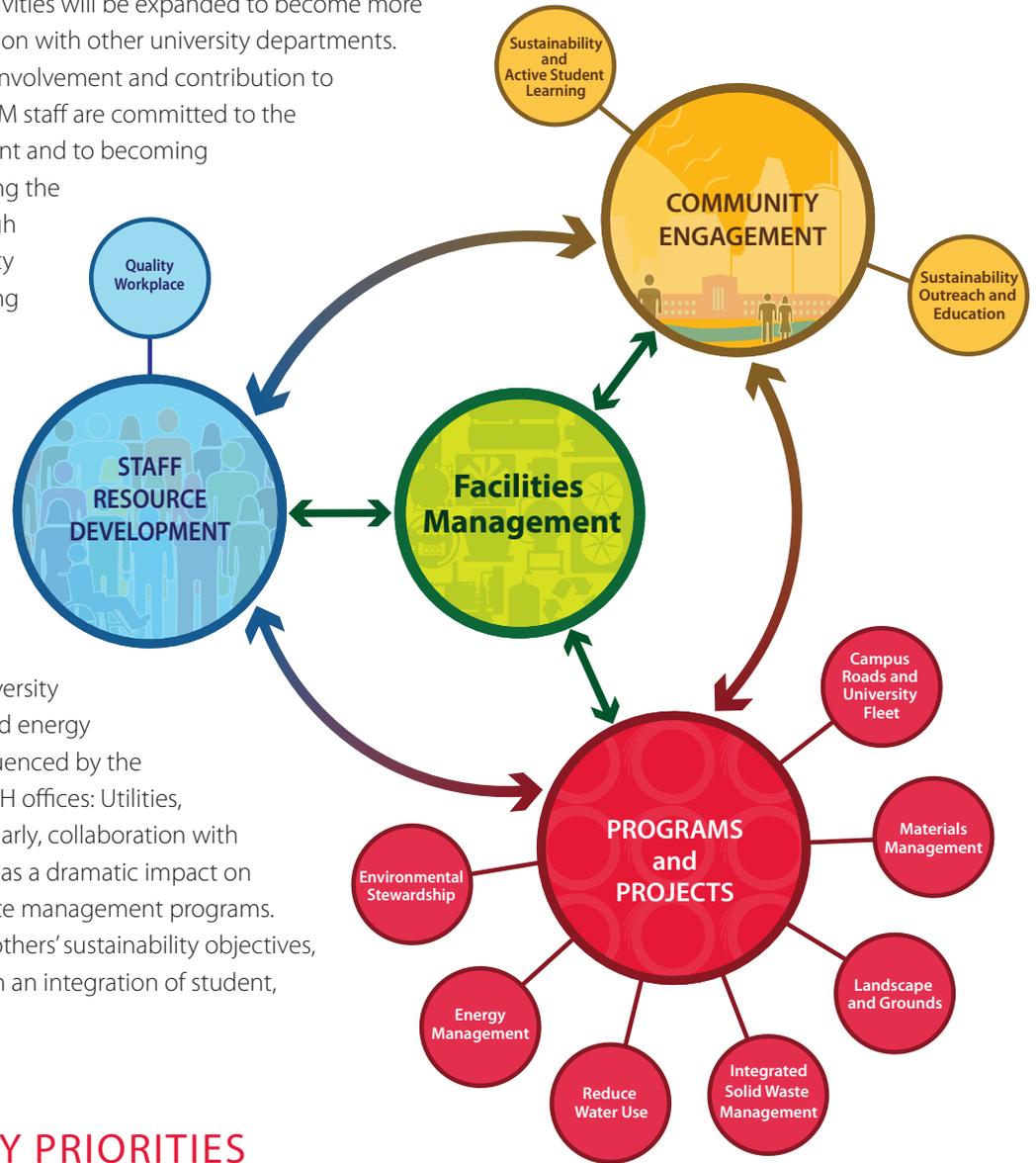
With successes, FM sustainable activities will be expanded to become more complex and/or involve collaboration with other university departments.

In striving to enhance the group's involvement and contribution to university sustainability activities, FM staff are committed to the activities described in this document and to becoming

ever more capable of demonstrating the

effectiveness of their efforts through cost analysis, adopting sustainability assessment tools and benchmarking their accomplishments. The reader will see that this document, expected to serve as the model for biennial FM sustainability profiles, anticipates enhanced use of metrics and analysis tools.

The success of the FM sustainability approach rests on collaboration and teamwork between FM and others in the university community. For example, water and energy conservation – an FM goal – is influenced by the everyday activities of three other UH offices: Utilities, Operations and Maintenance. Similarly, collaboration with Building Services and Operations has a dramatic impact on the success of FM's integrated waste management programs. Finally, FM staff also contribute to others' sustainability objectives, particularly those that are based on an integration of student, staff and faculty interests.



## OVERVIEW: FM SUSTAINABILITY PRIORITIES FOR FY2014 AND FY2015

### STAFF RESOURCE DEVELOPMENT

1. **Sustainability in the Workplace** – Leverage staff productivity and willingness to be inventive to realize FM sustainability objectives. Weave sustainability into all manner of staff education and training, from sessions that provide context and inspire, to addressing routine issues of minimum expectation and expected schedule. FM is striving to embrace the person within the employee and is actively engaging their workforce with training, communication, development programs, educational opportunities and recognition programs.



## PROGRAMS AND PROJECTS

2. **Environmental Stewardship** – Issue biennial sustainability profile reports to document the accomplishments and set expectations for the unit’s upcoming activity. Think holistically: complete the UH’s Infrastructure Master Plan as an integration of studies that comprehensively document conditions, critical needs and priorities to ensure the ongoing health, safety and efficiency of campus infrastructure.
3. **Energy Management** – Strategically select buildings for energy audits and retrocommissioning. Aggressively pursue cost-effective opportunities to invest in building energy conservation measures. Create a system of building energy metering, including software for central management. Improve operation at the two campus central plants through testing new approaches and installing new technologies.
4. **Reduce Water Use** – FM started to manage its water use for conservation in the last three years. It is now positioned to become more sophisticated about its understanding of conservation opportunity in infrastructure, landscape and buildings and is positioned to collaborate within the university to improve means of managing stormwater and campus flooding events.
5. **Integrated Solid Waste Management** – Develop and implement a systematic approach to accomplishing the university’s 2020 goal of 40% solid waste diversion.
6. **Landscape and Grounds** – Actively participate in university efforts to recreate its tree canopy and institute low water use/reduced chemical use landscape management practices.
7. **Materials Management** – Select and use materials to reduce hazard risk without compromising desired level of quality of service.
8. **Infrastructure and University Fleet** – Procurement and management to reduce greenhouse gas emissions.



## COMMUNITY ENGAGEMENT

9. **Sustainability and Active Student Learning** – Partner with faculty to offer students opportunities to apply their learning outside of the classroom.
10. **Sustainability Outreach and Education** – Contribute to a university and community initiatives that support FM sustainability objectives. Express FM’s dedication to active learning through deliberate and concerted communication efforts.



## FM PRIORITIES:

### STAFF RESOURCE DEVELOPMENT

#### 1. Sustainability in the Workplace

##### ON THE HORIZON

Many aspects of the work environment impact the motivation, efficiency, effectiveness and satisfaction of employees. One aspect of FM’s commitment to sustainability is attending to these human resource attributes as part of its drive for productive and life-long learning FM staff. FM’s quality of workplace goals are to meet or exceed all university workplace guidelines and rules relating to human resources and to bring sustainable principles and practices to the forefront through education and training, hiring practices and recognition programs.



## FY2014 AND FY2015 ACTIVITIES

FM will undertake the following:

- Comply with university guidelines and standards
- Provide staff with exceptional training and information to motivate them at work and inspire effort and energy in support of FM sustainability programs and projects

To comply with university human resource guidance and standards and take affirmative steps to educate and motivate FM staff to outperform on sustainability related programs and projects, FM will:

- Make timely submissions of all university records and reports on human resource activity
- Maintain or exceed current levels of staff diversity
- Target FM custodial staff for improved wage rates, additional training, better equipment and supplies and recognition for excellence. Training will focus on streamlining operations, simplifying processes, improving efficiency, improving data and technology and enhancing accountability.
- Test telecommuting and condensed workweek pilot programs
- Support staff's interest in formal education through flexible work schedules to provide for enrollment in degreed programs
- Provide dynamic forum at which experts discuss current issues and challenges important to FM's sustainability interests. The FY2014 and FY2015 training agenda will include green cleaning, IFMA Facility Management Professional training and certification (FMP) and IFMA Sustainability Facility Professional training and certification (SFP). The goal for 2013 is for 65 FM staff members to earn both their FMP and SFP credentials<sup>2</sup>.
- Continue FM focus groups
- Analyze and pursue funding for workspace designs that have been proven to improve collaboration and morale
- Commit to using expertise about FM's most important sustainability areas of focus as a criteria for new candidate selection

## METRICS

- Employee diversity profile
- Number of employees engaged in IFMA training
- Custodial staff productivity
- Metrics on results of telecommuting test pilot
- Number of staff accommodated in their desire for flexible schedules to allow them to enroll in degreed programs
- Successful pursuit of funding for improved workspace design

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<sup>2</sup> At this writing 43 FM staff have earned their FMP and 13 have earned their SFP.

## FM PRIORITIES:

# PROGRAMS AND PROJECTS

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## 2. Environmental Stewardship

### ON THE HORIZON

Environmental stewardship is achieved with understanding of the relationship between activities and their impacts. FM's environmental stewardship initiatives are integrated activities and metrics. These initiatives have strategic purpose; with each, the objective is to set goals and make and track progress over extended timeframes.

### FY2014 AND FY2015 ACTIVITIES

FM will undertake these environmental stewardship activities:

- Issue its first biennial Sustainability Profile (FY2014)
- Maintain resource focus on the most important of its environmental stewardship responsibilities
- Issue a comprehensive and integrated infrastructure master plan (FY2014) in collaboration with the Facilities Planning and Construction (FPC) area of the Department of Plant Operations
- Contribute to university design and construction standards (FY2014)
- Continue to address and support critical life/safety initiatives



The biennial Sustainability Profile will be structured for readers to track progress over time and will also provide for exploration of new issues and approaches. The report will feature system indicators, a reporting-out on meaningful and practical-to-track metrics and it will account for FM's increasing use of tools to predict the cost effectiveness and environmental value of its activities.

Key among FM's responsibilities is provision of services to support the university's energy and infrastructure needs. In a shift toward sustainable practices, perhaps no metric is of greater interest than building energy use intensity, as it represents the combining of the effects of building design and construction, building management and operation, building user patterns and habits and the efficiency of the university's central utility plants. Since 2005, the university's building energy use intensity has shifted from 167 kBtu/sf to 118 kBtu/sf. This is attributed to retrocommissioning, building system investments and central plant equipment upgrades. These include installing high efficiency chillers, flow controls and piping upgrades; adding several variable frequency drives; installing new building control systems; improving university design standards; and enhanced staff training. Each Sustainability Profile will explore this metric, reporting both the numbers and the university's explanation of them.

FM has a strong life/safety program with a dedicated group of staff members and university partners who continue to respond to and address compliance issues and requirements for the university's physical environment. FM will keep sustainability in the forefront for all response and planning activities, restoration efforts and vendor selection processes.

A metric of emerging importance is campus water use and water reduction. In FY2014, FM's sustainability report will incorporate this metric. As with energy use, FM will work towards reporting building level water use. It will also report on water use and reduction measures at campus central utility plants and in the landscape.

The UH Infrastructure Master Plan will address water, sanitary sewer, stormwater, natural gas, chilled water, condensate and steam, electrical and fiber optics. The plan will chronicle:

- Existing system condition and capacity
- Existing backlog of investment needs
- Maintenance level targets
- Next generation technologies and the opportunities of upgrading to them
- System reinvestment strategies.



The Infrastructure Master Plan will integrate eight studies<sup>3</sup>.

Study	Status	Outcome
Chilled Water, Condensate and Steam Capital Improvement Plan	Substantially complete	Investment needs identified
Electrical Capital Improvement Plan	Substantially complete	Investment needs identified
Landscape, Sidewalk & Irrigation Capital Improvement Plan	Substantially complete	Plan under development
Utility Survey (locate water, sanitary, storm, natural gas and fiber optics)	Substantially complete	Up-to-date utility mapping
Water, Sanitary & Storm Capital Improvement Plan (includes drainage and retention)	Substantially complete	Investment needs identified
Campus Road System Improvement Plan	Substantially complete	Investment needs identified
Infrastructure Improvements Integration Plan (will integrate all CIP's and IT needs)	Under development	Plan under development
Facilities Conditions Assessment	Substantially complete	Financial element under development

The university's interest is to ensure that its buildings and facilities are constructed to meet stipulated longevity goals, are efficiently operated, effectively support programed use and offer aesthetic appeal and comfort to building occupants. Since 2010, FM has contributed to development of the Administration and Finance Division's master construction specifications and to improving the university's design standards. FM will continue this support, ensuring that the documents are current with best sustainability building management practices. FM will author a companion policy that describes its practices to sustainably operate and maintain buildings<sup>4</sup>. This will be a compilation of new practices and those described in existing policies and standard operating procedure documents.

## METRICS

- Issue first Sustainability Profile
- Operationalize means of regular reporting and assessment of building energy use intensity and campus water use intensity
- Proactive peer review to draft version(s) of UH Infrastructure Master Plan
- Proactive peer review of UH design guidance
- Author sustainable building O&M policy

## 3. Energy Management

### ON THE HORIZON

FM will establish a goal for reduced building energy use intensity<sup>5</sup> and an assessment of the metric value potential of its contributing activities. It will be translated into a greenhouse gas reduction metric. This will become the FM energy strategy.



Solar array on University of Houston's Central Plant, building 515.

<sup>3</sup> To enhance the utility of this master plan, the findings of its system reinvestment section will be provided in text and through a Graphic Information System and a Graphical User Interface tool. The Graphical User Interface tool was developed in 2012 as part of the Master Transportation Plan with the intention of housing related data generated for other campus infrastructure systems.

<sup>4</sup> This will address a number of issues, including building energy and water use, cleaning materials and practices, site stormwater management and indoor air quality.

<sup>5</sup> By building type.

## FY2014 AND FY2015 ACTIVITIES

FM will undertake the following:

- Energy audits and retrocommissioning (FY2014 and FY2015)
- Install building sub-meters and use meter data for system management (FY2014 and FY2015)
- Improve central plant operations (FY2014 and FY2015)
- Innovate in buildings as tests and as the foundation for systematic enhancements.



*Meter technicians, Jose Cases and Thanh Huynh, read campus meters.*

FM will continue to conduct energy audits in three buildings every year and initiate a system of building retrocommissioning. It will use the data generated through both activities to identify performance and cost-justified investments to improve building energy demand. FM will share this information with the Utilities and Planning staff so that they can combine that information with the findings of the Facility Condition Analysis to prioritize and plan for coordinated building investments.

To date, FM has managed contractor's auditing of nineteen campus buildings, representing over 2 million sf and has realized an energy savings of over \$487,000. FM staff has undertaken this effort with CenterPoint Energy and will continue during FY2014 and FY2015.

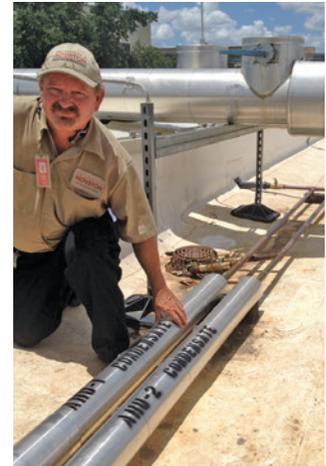
Complete and accurate building energy use data is critically valuable. It provides the means to:

- Measure campus energy use
- Optimize system operation
- Generate data about the financial impact of energy conservation actions and investments
- Increase accuracy of fund allocations to support the utility needs of auxiliary units
- Bill customers (auxiliary units)
- Provide data for energy and water management and building energy audits
- Serve as an important source for educating the university community about its resource use

Meter installation and utility measurement are responsibilities shared by a number of units within the Division of Administration and Finance: FM, Business Services, Facilities Planning and Construction and Utilities and Operations. To undertake this initiative, a new unit – Utilities and Operations – will assume management and coordination responsibilities.

FM's responsibilities in this program are to ensure that the meters are effective, that the data collection system is robust, that it is supported with an efficient data storage and retrieval system and that resources are assigned to analyze data. FM's role in this program is to acquire and install metering software, install new meters and tie-in new and existing meters to the new software system<sup>6</sup>.

<sup>6</sup> This includes an iPad/Campus Web/Jace interface.



*Philip Webster shows the new air conditioning condensate piping which will return the condensate to the cooling towers instead of going to the drain system.*

### UNIVERSITY OF HOUSTON METERING PROGRAM: PHASED IMPLEMENTATION

Installation of approximately 170 electric, chilled water, domestic water and steam meters in high priority locations. Meters will cost \$2.5 million and installation will occur over the next three-to-five years. Installation represents added university meter maintenance, staffing and calibration costs.

- **Phase 1** – Science and Research segment: 41 meters with cost of nearly \$600,000.
- **Phase 2** – Auxiliary Buildings segment: 51 meters with cost of nearly \$740,000.
- **Phase 3** – all other facilities over 40,000 gsf segment: 75 meters with cost of nearly \$1,135,000.



FM assumes an open-minded attitude and tests its ideas for energy conservation in buildings. For example, it is installing forty water bottle stations, an investment that saves electricity as compared to traditional water coolers and has the environmental advantage of reducing campus purchases of bottled water. FM is also testing the value of controls and varied setback schedules to reduce building energy demand while still satisfying building users' comfort needs. A third example of an innovation it is testing is installing oversized fans in large rooms as a supplement to the building mechanical system. Each of these tests and others, will be tried in the next two years with their results to be made available for considering as the basis for future investments.

FM staff is committed to studying and testing means of improving the operation of the university's two central plants. This includes pilot test of new operational practices and of installing emerging and recently emerged technologies. These innovations include:

- Complete the installation of three hi-efficiency, 7-ppm ultra-low NOx boilers as replacement for older low NOx boilers that produce 40 ppm of NOx particulates
- Expand FM's pilot program for collecting cooling condensate air conditioning water and returning it to a central plant
- Submit the capital request to install a variable speed drive for the central plant's chilled water pump #7
- Develop plans for installations of wind and solar-fueled energy generation to offset purchased energy usage



*Bill Jenkins, Stationary Engineer, adjusts the firing rate on one of the new Victory Boiler Hi-efficiency, Lo-NOx Boilers in the Central Plant.*

#### FM CENTRAL UTILITY PLANTS PILOT PROGRAMS

1. Condensate cooling water collected and returned to the central plant for reuse in the cooling towers saved over 11 million gallons in a 10-month period. This equates to 13 cents cost avoidance of new water introduced to the cooling tower sumps per square foot of conditioned space.
2. Variable speed chillers, chilled water pumps and variable speed cooling tower fans have proven to be cost effective installations for the central plants.
3. Installing an energy server that tracks the output of all metering devices.
4. New system for mechanical and electrical equipment documentation, preventive maintenance and predictive maintenance.
5. Enhanced tools to support control room functioning.
6. Passive rainwater reuse system for cooling tower sumps.

#### METRICS

- Number of meters installed, the number of meters tied to the new software system and funds recovered from auxiliary unit billings.
- Number of energy audits/year
- Number of retrocommissioning projects completed/year
- Return on investment profile for energy conservation measures implemented
- Reduced electricity use for the campus (weather-adjusted)
- Reduction in campus greenhouse gas emissions associated with Scope 1 and Scope 2 emissions
- Development of a capital plan for the university's central utility plants.
- Boiler emissions performance compared to permitted allowance

## 4. Reduce Water Use

### ON THE HORIZON

FM will establish a goal for reduced campus water consumption associated with infrastructure, buildings and grounds. FM will assess its available means of impacting each. This will become the FM water conservation strategy.

### FY2014 AND FY2015 ACTIVITIES

FM will undertake the following:

- Reduce grounds-associated water consumption (FY2014 and FY2015)
- Prepare to reduce building-associated water consumption (FY2014 and FY2015)
- Innovate at the central plants to reduce infrastructure-associated water use (FY2014 and FY2015)
- Support university stormwater management (FY2014 and FY2015)

The drought of 2010 and 2011 changed FM's attitude and approach to lawn management. Now, irrigation occurs every second or third day and mulch is used in greater volumes.

"Smart" irrigation controllers were piloted and shown to be an effective means of irrigation control. FM will endeavor to expand its means of reducing grounds-associated water use.

FM will develop a water balance to understand campus water use. This will be the basis of an analysis of activity that FM can take to reduce campus water use in its infrastructure, buildings and grounds. It will be used to formulate resource plans to support this initiative.

Energy productions consume significant amounts of water; supply of water and wastewater processing consume significant amounts of energy. As energy is conserved, so too is water and vice versa. While innovation at the university's central plants has been prompted by interests in energy efficiency, FM will broaden its perspective to recognize and pursue innovations that also benefit water conservation. As the cost of water has increased by more than 60% in Houston since 2000, it is expected that many of the potential water saving measures will have an attractive return on investment.

The University of Houston's Environmental Health and Life Safety office is author of the campus Spill Prevention Control and Countermeasure Plan, which is designed to keep oil, diesel and gas out of the storm drains. Its contents are incorporated into FM staff training. In addition, the two collaborate in making bi-annual inspections of the campus bulk fuel tank farm, spill equipment and alarm system.

Flooding is a recurring problem at the university and is expected to become more regular and intensive with climate change. FM will support EHLS and other university entities in collaborative efforts to identify means of improving campus stormwater management, including flood prevention and flood response.

### METRICS

- Potable gallons of water consumed/year<sup>7</sup>
- Gallons of other water sources consumed/year<sup>8</sup>
- Number of management enhancements to support reduced water use
- Completion of campus water balance
- Number of shared inspections with EHLS for spill response
- Number of pro-active steps to support university improvements to flood and stormwater management

<sup>7</sup> For landscape use, building use and in infrastructure (weather adjusted).

<sup>8</sup> Ibid.



*Brittney Wolf, Class of 2015, refills her water bottle.*



## 5. Integrated Solid Waste Management

### ON THE HORIZON

FM will continue its expansion of number and volume of materials that it diverts from the waste stream, both solid waste and special wastes. FM will improve its ability to account for diversion rates by individual or groupings of materials.

### FY2014 AND FY2015 ACTIVITIES

FM will undertake the following:

- Modify its solid waste management related practices, including supporting the findings of the Central Facilities strategic solid waste management plan, expected to be released in 2015 (FY2014)
- Attach university recycling logo to the recycling collection trucks
- Collaborate with other university groups to improve the recycling program through improved receptacles, improved signage and enhanced efforts to guide the university community's recycling habits.



*Jacquie Vargas, Facilities Management Communications Manager, demonstrates campus outdoor recycling.*

The UH objectives for its solid waste management are to limit generation, maximize recycling and composting (referred to collectively as “recycling” or “waste diversion”) and dispose of solid waste in ways that most effectively protect human health and the environment. In FY2012 the university community generated 3,636 tons of solid waste, 25% of which was recycled or composted.

Integrated Solid Waste Management (ISWM) involves regular evaluation of needs and opportunities combined with responses—initiatives and activities—to present conditions and a perceived future state. In FY2015, Central Facilities is expected to release a strategic solid waste management plan that includes an assessment of current operations. Based on cost-effectiveness and ease of implementation, the document will establish short- and long-term goals and an implementation schedule. It is expected to quantify existing costs and identify means of containing or reducing costs while expanding the program. In the longer-term, the UH ISWM will address means of reducing the amount of waste generated and increased diversion of special wastes.

FM recommends that the university broaden its existing ISWM services – such as the single-stream recycling service, move-out programs, materials reuse initiatives (office materials, clothes, etc.) and Dining Service food waste collection – and introduce behavior modification initiatives such as sustainability awareness week, a network of volunteer building coordinators, a no-print day and recycling video contest. FM expects its responsibility to the initiatives described in this strategic solid waste management plan to include:

- Maximize recycling of materials used and collected by FM
- Explore and pursue avenues to further reduce campus waste
- Explore and pursue opportunities for FM to purchase renewable and reusable products.
- Contribute to the education and training of students, staff and faculty about waste reduction and recycling

Anecdotal evidence suggests that many in the university community do not realize that the university has a recycling program. This might be caused by the fact that university collection trucks are not designated with a logo to identify them as recycling trucks. FM will address this problem in FY2014. A second challenge is that the university hasn't made its practices uniform; common wisdom suggests that it is imperative to unify the types (styles) of campus recycling bins, collection practices and signage (including labeling). In FY2014, FM will work with the Sustainability Committee to address this second set of issues.

## BASICS OF SOLID WASTE MANAGEMENT

**Waste Prevention/minimization.** Also called “source reduction,” waste prevention strategies work to prevent or minimize waste from being generated through reductions to packaging, generation of reduced packaging, design of products with longer lifespans and reuse of products and materials.

- **Recycling and Waste Diversion.** These terms refer to the process of collecting, reprocessing and/or recovering materials (organic and inorganic) from the waste stream to manufacture new materials or products.
- **Disposal Waste** that is not recycled or composted is landfilled or combusted. Some landfills and combustion facilities capture valued resources – methane and waste heat – and process it for productive reuse.

Initially introduced as an annual, single-day clean-up event, Adopt-a-Spot is growing in popularity and success as it broadened its scope and purpose. Today it is a regular element of FM’s sustainable approach to integrated solid waste management. While it maintains the campus waste and recycling collection function, Adopt-a-Spot is also becoming the vehicle for addressing challenging waste management problems such as abiding by document retention standards through recycling and identifying convenient and cost effective means of reusing and recycling the university’s unwanted office furniture and equipment. Adopt-a-Spot serves a programmatic function and is testament to the value of volunteerism. In FY2014 and FY2015, FM will continue to cultivate its success and visibility on campus.

Thirteen BigBelly® solar-powered trash and recycling receptacles were installed on campus in 2012. They offer the advantages of reduced maintenance costs, of a “smart” system that signals when the receptacles need to be emptied, and of an improved aesthetic. FM is so satisfied with the results of the pilot – each unit replaces 5 trash containers and 5 recycling containers and has a return on investment of under two years – that it has decided to install an additional 70 BigBelly® units in FY2014.

In 2012, FM and the FPC launched an effort to increase university recycling of construction and demolition waste from building renovations. In FY2014, the two will develop an assessment of the university’s construction and demolition debris waste recycling potential and further develop policies to accelerate the progress of this initiative. In FY2014, the two will collaborate to examine system support for this activity, including:

- Means of providing contracting preference to local salvage companies
- Means of providing contracting preference to locally-sourced and manufactured materials with high recycled content
- Means of modifying university standards to give preference to materials, equipment and supplies that are long-lived and/or easily reused or recycled

<sup>9</sup> Solid waste that is typical of everyday university activities

## UNIVERSITY OF HOUSTON: SOLID WASTE MANAGEMENT

The University of Houston Solid Waste Management Department collects and manages all waste generated on-campus by the residential, dining services, commercial and education and general program areas. The university diverts 25% of its waste<sup>9</sup> and has a goal of diverting 40% by 2020. The university has a single stream collection process that collects materials from participating campus buildings, from the Energy Research Park UH Sugarland, UH Downtown and UH Small Business. Materials designated for the sort-free recycling containers are:

- Paperboard: empty cereal, pop and frozen food boxes
- Cardboard and food-free pizza boxes
- Phonebooks, catalogs and paperback books
- Newspapers and inserts
- Junk mail and envelopes
- Tin or steel cans
- Brown paper bags
- Plastic bottles and containers #1-#7 Rinsed plastic containers
- Office, school paper, scratch pads and manila folders
- Aluminum cans, beverage containers and clean aluminum foil
- Magazines, brochures and pamphlets



In its capacity of manager of the university's fleet, FM recycles oil filters, oil, coolant and batteries, extends oil and coolant drain intervals and uses bio-based oils and lubricants.

Landscape grass clippings will either be left on the lawns and/or composted with other landscape waste for reuse on the university campus. FM will first locate and develop an area for composting that is approximately 3 acres in size. MacGregor Woods is seen as the ideal spot because it contains a cleared area that was previously used for storing landscape waste. Or, if that is not feasible, FM will secure an arrangement with a local entity to provide the composting service to the university. A management plan will be developed to be administered by the Grounds Department.

## METRICS

- Track university waste diversion and waste disposal rates by program<sup>10</sup>; using standard metrics of weight and cost as compared to traditional handling (disposal) methods
- Track the number of materials introduced into the university waste diversion programs
- Track the number of recycling collection trucks with recycling logos as a portion of total recycling collection trucks
- Track the number of uniformly designed recycling receptacles as a portion of total number of receptacles
- Track the number and type of community education events, including release through the internet or hard copy of written information about the university's waste diversion program
- Increase the number of Adopt-a-Spot locations by 5 in each of FY2013 and FY2014
- Number of 70 BigBelly® units installed on campus

## 6. Landscape and Grounds

### ON THE HORIZON

FM's responsibility for grounds maintenance extends to sustainability interests, such as ensuring that the landscape is universally accessible and that it is beautifully sustained, but with minimal chemical application and watering. FM will continue to establish expertise in these arenas and share it with other units within the university to build momentum and university-scale decision making to support FM's chemical and water reduction goals and objectives.

### FY2014 AND FY2015 ACTIVITIES

FM will undertake the following:

- Reduce grounds-related water use (FY2014 and FY2015)
- Reduce grounds-related chemical use (FY2014 and FY2015)
- Modify plant selection strategies to support water and chemical use goals (FY2014 and FY2015)

The design and condition of the university's landscape and grounds are often considered to represent university stewardship values. They therefore make a lasting impression on visitors and on members of the campus community. FM's primary landscape and grounds role is maintenance. FM, in reducing landscape water and chemical use, sees this responsibility as an opportunity to showcase the value of its sustainable decision making. The role also positions FM as a key stakeholder in the university's drafting of plans, policies and procedures to address the campus landscape aesthetic, guide transition to fully ADA compliant status, restore the campus tree canopy, better protect the landscape (lawn and paved surfaces) from vehicular and pedestrian traffic, reduce litter and limit stormwater discharge to the municipal system.

<sup>10</sup> This will be presented to identify the results of individual programs, such as the move-in/move-out collections and building contractor construction debris waste diversion

In FY2014, FM will start the phased installation of a central control system that will reduce water and energy used in association with lawn and grounds maintenance. It will monitor the functioning of the irrigation system by detecting leaks and broken heads, shutting down individual zones to prevent associated water loss and notifying staff of the problem. The system's sensors will measure the water content of soil to then automatically adjust run times.

To optimize the longevity of the university plantings and to minimize the need for watering and chemical treatment of them, FM will select plants that meet the campus climate characteristics. A master planting list will be developed and adopted into the campus design guidelines.

With the University Grounds Supervisor, FM will draft an integrated pest management plan to limit its use of pesticides on the campus landscape. This plan is to be tactical, addressing action thresholds, identification and monitoring of pests, pest prevention and pest control. Elements of it will be borrowed or extracted to constitute FM specific policies and standard operating procedure documents for ease of FM staff education and use.

## METRICS

- The number of zones connected to the central irrigation control system each year
- Adoption of the revised plant list into the campus design guidelines
- Acreage converted to the preferred plant list
- Active contribution of FM staff in the drafting of the university's integrated pest management plan (for landscape) and related FM policy and standard operating procedure documents
- Reduced volume of pesticides applied to campus landscape each year.
- Amount of purchased landscape compost materials as compared to university generated compost.
- Completion of a plan to improve the sidewalk experience – ADA compliance, safety, restricted vehicle access
- Active contribution by FM staff to the university's landscape master plan (primary responsibility for developing this documents rests with FPC)

## 7. Healthy Materials

### ON THE HORIZON

An active program of procuring reduced toxicity products matched with best management practices for use and disposal is considered a central FM sustainability accomplishment. Already institutionalized, it will be perpetuated during the term of FY2013 and FY2014 and beyond, including improved strategies for measuring the program's success.

### FY2014 AND FY2015 ACTIVITIES

FM will undertake the following:

- Reduce grounds- and building-related chemical use (FY2014 and FY2015)
- Reduce the toxicity of materials selected for new construction and renovations (FY2014 and FY2015)
- Improve materials tracking (FY2014 and FY2015)

A significant and noteworthy new aspect of the university's materials management will be improved pest control, both in the landscape (see the "Landscape and Grounds" section of this text) and in campus buildings and structures. In FY2014/FY2015, the university will modify its practices to ensure that pesticides are applied only as needed to maintain pest population at (or below) acceptable levels and that selected pesticides are effective, while less toxic than easily available alternatives. Elements of it will be borrowed or extracted to constitute FM specific policies and standard operating procedure documents for ease of FM staff education and use.



FM will expand its research to identify additional preferred (healthy) products and materials for building use. An FM staff member will be designated to manage materials research, including petitioning input from architects contracted with UH. This person will also analyze the wisdom for FM of establishing a purchasing preference for Green Seal® or EcoLogo® products. She or he will be responsible for developing a system for tracking FM experiences with preferred materials and their prices.

## METRICS

- Number of products and materials identified by FM as preferred (healthy)
- Purchased volumes of all preferred products (and of materials that they are meant to replace), costs<sup>11</sup>,
- Issuance of an FM progress report on the integrated pest management initiatives for buildings and structures

## FM HEALTHY MATERIALS SELECTION ACCOMPLISHMENTS

- Carpet tile is used on the UH campus wherever carpeted floors are scheduled. Carpet tile products approved for use at UH contain 20-40% of Post-Consumer and Post-Industrial materials and about 3% Renewable Materials. The tiles are washable, cleanable, replaceable and directionless, which reduces maintenance and simplifies remodeling. Because the tiles are manufactured from Low Emitting Materials, indoor air quality is improved.
- Ceiling grid system – the university’s standard contains 30% recycled content and currently has the highest percentage of post-consumer content (23%) in the industry.
- Ceiling tiles – The university standard is manufactured with 65% pre-consumer and 15% post-consumer materials and meets the LEED criteria for low-emitting materials. The tiles have a 30 year life, are easily recycled and can be purchased from two manufacturers located within 500 miles of the university.
- Ceramic tiles – university restrooms feature ceramic tile on the floors and walls. Ceramic tiles are composed of naturally occurring inorganic, inert raw materials. Ceramic floor tiles can be constituted with up to 45% waste material from roofing manufacturing. Tiles are produced with a water-based, VOC-free glaze, are chemically stable and are resistant to bacteria and most chemicals. Most of the university’s tiles are manufactured within 500 miles of the campus.
- Epoxy Terrazzo floors are increasingly used in heavily traveled ground floors of new campus buildings. A centuries-old flooring system, the terrazzo matrix includes not only post-industrial stone, but commonly includes post-consumer recycled glass and plastics. Terrazzo floors are seamless and do not support microbial growth and so inhibit the spread of bacteria, viruses and mold. Terrazzo is also a low maintenance material, requiring less water and detergent and fewer chemicals for cleaning; the floors typically last the life of the structure and can often be refinished to as-new condition at low cost.
- Gypsum board – used in campus walls and ceilings, these meet GreenGuard Indoor Air Quality standards. Recycled content requirements are similar to those of acoustical ceilings.
- Master Painters Institute™ Green Performance™ Standard certified paints – the university requires this certification for campus paints. This ensures low VOC paints, ones that do not exceed the U. S. Environmental Protection Agency limits. As a test of the ease and effectiveness and reducing VOC emissions, FM measured the lost opportunity if it had purchased low-VOC paint throughout 2012. With today’s paint purchasing policy, |FM avoided 1,587 pounds of VOCs from being released into our atmosphere.
- Stainless steel toilet partitions – preferred by the university, these are typically constructed with 60% recycled content and are 90% recyclable at the end of their service life. Bacteria die faster on stainless steel and stainless steel is naturally resistant to corrosion.

<sup>11</sup> Cost of total materials procured (alternative and materials they are meant to replace) and of associated materials management and disposal.

## 8. Infrastructure and University Fleet

### ON THE HORIZON

FM will research, test and advance its efforts to reduce greenhouse gas emissions and toxics use related to the university fleet, including setting goals for each. It will identify and institutionalize means to improve the sustainability of its road management practices.

### FY2014 AND FY2015 ACTIVITIES

FM will undertake the following:

- Assess and immediately implement cost effective opportunities to reduce fleet's greenhouse gas emissions and reduce its chemical use (FY2014 and FY2015)
- Implement a pilot program to reduce the use of fleet cars (FY2014 and FY2015)
- Assess and take steps toward implementing cost effective ways to surface and maintain the university road system in ways that will reduce related chemical use (FY2014 and FY2015)

FM maintains infrastructure and provides the university with vehicles and other mobile equipment that is safe and reliable. It is responsible for maintaining UH's pool of 425 vehicles. In FY2014, FM will complete an assessment of the university road system – its condition, suitability and needed improvements. FM will develop, plan and prioritize the size of the current and future fleet of vehicles. It will consider the current and future use of alternative fuels (including diesel-electric, plug-in hybrid, 100% electric, hydrogen fueled, B20 or higher biofuel, E85 or higher ethanol fuel), advanced fuel injection systems, idle shut-off systems, right-sizing of the fleet to ensure sustainability within the fleet and recycling of oil, anti-freeze, metals, tires and batteries. Finally, FM will launch a pilot program for FM staff. FM is promoting staff health and sustainability through its Ride Red bike initiative. This is a bike-share program which will use Cougar Cards. Pilot Ride Red bike stations are planned for the General Services building, the Central Plant and the Moody Residence area. Program responsibility will be shared by Auto Shop with support from FM Technical Services and the pilot will be evaluated in December, 2013.

### METRICS

- Complete the Campus Road System Improvement Plan (see the "Environmental Stewardship" section of this text)
- Establish the next steps in "greening" the university's fleet
- Implement the Ride Red bike initiative.

### FM PRIORITIES:

## COMMUNITY ENGAGEMENT

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## 9. Sustainability and Active Student Learning

### ON THE HORIZON

As FM advances the sustainability of its programs and projects and its ability to apply metrics to the selection and environmental impact of them, it will become ever better positioned to engage with faculty and students in out-of-classroom learning experiences, both in and out of the classroom. Ultimately, FM desires to pro-actively invite faculty and staff to collaborate with FM staff in the design, execution and assessment of FM sustainability initiatives.



## FY2014 AND FY2015 ACTIVITIES

FM will undertake the following:

- Support faculty-initiated requests to use FM data and/or resources to support sustainability-related teaching experiences (FY2014 and FY2015)

The nature and focus of FM's responsibilities offer attractive opportunities for the university to offer practical applications to their classroom learning. FM supports faculty to develop sustainability-related curriculum, including projects to actively engage students in resource stewardship, particularly in relationship to water and energy use and conservation.

## METRICS

- Number of faculty requests for FM support or collaboration that are well-satisfied



## 10. Sustainability Outreach and Education

### ON THE HORIZON

FM seeks to always contribute to a university culture of sustainability. As such, it values efforts to communicate within the university about its own and others' experiences in pursuit of sustainability. As FM advances the sustainability of its programs and projects and its ability to apply metrics to the selection and environmental impact of them, it will become ever better positioned to engage the university community in ways that educate and motivate participation. Ultimately, FM desires to be seen as an expert voice and one of the university's featured units for sustainable practices, including data and analysis.

## FY2014 AND FY2015 ACTIVITIES

FM will undertake the following:

- Initiate and support others in the university community in their sustainability-related outreach and education initiatives
- Develop and implement a communications strategy (FY2014 and FY2015)

FM staff will initiate and will respond affirmatively to requests to support student groups and other UH offices in activities that advance energy management, water management and integrated solid waste management. As feasible, FM staff will do the same for other issues and activities for which it has responsibility, such as materials management/toxics use reduction and landscape management.

FM staff's experiences with this type of activity includes:

- Annual RecycleMania competitions
- The zero-waste stadium initiative
- Authoring articles and white papers about sustainably for university publication
- Staff support for the Sustainability Task Force and for the Building Coordinator Subcommittee on Sustainability.
- Presentations at the local, state, and national levels of various campuses and organizations such as APPA, CAPP, TAPPA, and IFMA.

In preparation for this, FM will develop a budget proposal during FY2014 for support of its outreach within the university (external to the Division of Administration and Finance) and the university community.

FM will author a policy that describes its strategy for communicating about FM sustainable programs and projects. It will include the following:

- References to university-wide policies and rules that relate to FM communication activities
- Internet – guidance on types of information to be posted and applications
- External media – guidance on types of information to share and any relevant protocol constraints
- Within the university – guidance on the collection and sharing of sustainability accomplishments
- Improved public access – guidance on contents and presentation
- FM staff designee as communications person – guidance on the scope or responsibilities of this position
- Direction to put FM sustainability activity and measured progress as a standard agenda item at monthly FM core leadership meetings

FM will collaborate with Student Housing and Residence Life to launch a recycling outreach campaign with the objective of motivating increased participation. This could include creation of a program logo, coverage in the university newspaper, posting of flyers and posters, articulation of additional recycling goals (such as participation rates and expansion to more entertainment and athletic events) and creation of a recycling webpage (linked to the FM site). On this site, quantities and expenditures will be published that reflect what the University of Houston is currently accomplishing in its recycling efforts.

## METRICS

- Number of student group activities that FM staff support
- Number of Administration and Finance Division community outreach and education activities that FM staff support
- Number of other university community outreach and education activities that FM staff support
- Number of FM open houses and other FM generated outreach and education initiatives
- Submission of university funding proposal during FY2014
- Receipt of university funds for the outreach and education proposal (FY2015 start date)
- Issuance of communication policy
- Number of FM sustainability outreach and engagement internet postings per year
- Number of campus sustainability-related reports, policies and standard operating procedure memos posted on the internet
- Number of FM sustainability activities covered by the media per year
- Number of FM core leadership meetings that include FM sustainability activity and measured progress on the agenda (compared to total number of FM core leadership meetings)
- Number of sustainability-related presentations





## FACILITIES MANAGEMENT SUSTAINABILITY TEAM –

**Jerry Bogna** (Assistant Director, Auxiliary Facilities Services, FMP/SFP); **Michael Burriello** (Assistant Director, Central Plants and Mechanical Services, FM Sustainability Program, Sustainability Profile Managing Editor, FMP); **Shannon Jones** (Director, Minor and Planned Projects, FMP); **Sameer Kapileshwari** (Sr. Director/Interim Executive Director, Facilities Management, FMP/SFP); **Joe Morris** (Assistant Director, Facilities Zone Maintenance, FMP/SFP); **Jeanne LaMontagne** (Assistant Director, Planning, FPC); **Ray Mosley** (Manager, Campus Custodial Program, FMP); **Jim Norcom** (Director, Compliance, Emergency and Project Delivery Programs, FMP); **Camille Porter** (Director, Service Program Administration); **Avinash Rahurkar** (Assistant Director, Technical Services, FMP/SFP); **Cynthia Ramos** (Program Manager, FMP); **George Rea** (Assistant Director, Business Services, FMP); **Melissa Rockwell-Hopkins** (Executive Director, Facilities Management, FMP/ SFP); **Georgeann Smith** (Director, Business Services); **Neal Smith** (Manager, Auto Fleet Services); **Jacque Vargas** (Communications and Marketing Manager, Sustainability Profile Managing Editor, FMP); **Carlos Villarreal** (Associate Director, Central Facilities Services, FMP/SFP); **Roger Warner** (Assistant Director, Grounds, Solid Waste/Recycling, Pest Control, FMP/SFP); **Steve Wright** (Sr. Project Manager, Minor In House Construction, FMP); **Mike Yancey** (Director, Planning, FPC)

**Team Leader:** Melissa Rockwell-Hopkins

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