

## Department of Facilities

The Operations and Campus Planning, Engineering, and Construction (CPEC) areas in the [Department of Facilities](#) continue to work together to deliver the best possible services to the MIT community. This was in evidence during the year through numerous smooth transitions from construction projects to operational areas, as well as in the integration of management and the development of the Accelerated Capital Renewal program. Through the collaboration of Operations and CPEC with the administration area, strides were made to grow the renewal program in the future. Facilities groups worked together to develop models to help MIT make significant progress toward improving the campus's physical assets.

The Department of Facilities continues to build on its partnership with the MIT community through events such as the annual Facilities forum and the Comprehensive Stewardship Program, which completed its first year of operation.

### Administration

#### Communications

This year, the communications team continued its work on the in-house redesign of the Security and Emergency Management Office (SEMO) website and launched the site early in 2013. Because the Card Office became a part of SEMO in 2011, its web pages were incorporated into the new SEMO website.

In May 2013, the communications team partnered with the business systems team to design and produce a metrics and updates report for departmental building managers. Director of operations John DiFava and assistant director Marty Dugal began meeting individually with building managers and delivering to them a customized report that includes utility and work order statistics for each building that their department occupies.

In fall 2012, the CPEC contracts administration manager asked the communications team to create a requisition-contract initiation form that would take the place of five previously used forms. Team member Melody Craven received an All Star Award for her contributions in creating this customized digital form. In addition, this year Ms. Craven was promoted from communications assistant to print and web design specialist.

#### Environment, Health, and Safety

Facilities worked to develop and improve the safety culture of operations staff to positively influence operational safety. Actions taken included collaborating with MIT's central Environment, Health, and Safety Office (EHS) to provide informational training and awareness through the new Coffee and Conversation series; increasing training for tradespeople and supervisor groups; providing new hire orientation training; and increasing field time in assessing challenges faced by the Operations groups.

The new Coffee and Conversation series is a monthly initiative partnering Operations and Central EHS for all Facilities managers and supervisors. The vision of the program is to work on common goals in a commitment to health, safety, and environmental stewardship on campus.

Training and education efforts include a partnership between the Comprehensive Stewardship Group (CSG), Facilities EHS, and Central EHS with a monthly toolbox talk to review and address current environment, health, and safety issues. The Occupational Safety and Health Administration (OSHA) 30-hour training course continues to be supported by operations management as a tool to deliver a high level of safety training, and is a required training course for managers and supervisors in Facilities Operations.

Since the final ruling of the OSHA Global Harmonization Standard was published on March 26, 2012, Facilities EHS has been working to get all employees affected by this change trained by the December 1, 2013, deadline. An online Safety Data Sheet program was also implemented to ensure all Facilities information meets the new requirements.

The addition of a second Facilities EHS staff member enhanced customer focus and field time and has helped to identify training and programs that can be greater developed to continue to reduce occupational hazards.

Facilities EHS worked closely with CPEC to ensure that new buildings and renovations meet safety needs for employees. In the upcoming year, the EHS team looks forward to continuing the improvement of rooftop safety, revision and review of existing Facilities EHS programs, safety training, and the implementation of a facilities-specific Electrical Safety Program.

### **Finance and Accounting**

In FY2013, the finance and accounting team, in cooperation with Information Systems and Technology (IS&T), completed two projects to improve the efficiency of the accounting processes. The first project allows for the scanning of “goods receipt” documents at the stock room window, creating the ability to review online daily transactions and to produce audit documentation without a paper file. This effort will reduce staff time and will lead to savings in paper file management. The second project used previously developed SAP functionality to automate the generation of 7,500 lines of journal vouchers for ProCard processing. This project will improve efficiency and minimize manual data entry errors. The finance and accounting team continually works to improve its ability to serve the Department of Facilities.

### **Human Resources and Labor Relations**

The human resources and labor relations team implemented the Halogen web-based performance management development system in February with a successful launch for the support and administrative staff performance appraisals. The system allows for a significant foundation for designing, monitoring, and reporting on employee development initiatives. Facilities also piloted the executive vice president’s performance development review process as part of a collaborative effort to compare commercially available systems versus the development of in-house tools.

In May, the department made a change in the top three management positions of the William R. Dickson Cogeneration Plant. These positions at the Central Utilities Plant (CUP) are being filled by an energy management consulting company for a three-year period. The change in direction benefits CUP through new observations by power industry experts. The transition was positively received by service staff. Measureable improvements in developing a collaborative and safety-conscious culture are in process.

The Service Employees International Union Local 615 labor contract was negotiated and is expected to be ratified in July 2013. Through positive working efforts at the labor-management meetings with teams from Human Resources and Labor Relations, MIT Labor Relations, and the Union, several labor-management initiatives were identified.

### **Information Technology**

The applications and desktop services (ADS) group continued to play an active role in both department and Institute-wide initiatives. The project to modernize SAP plant maintenance, which is used for work order management in operations, continues. In collaboration with IS&T, this multiyear effort made significant progress. The first phase of the project, which focused on master data, was completed. The second phase, which introduces additional functionality and significantly enhances the community interface, is under way with a planned go-live in December 2013. Planning also began for the third phase, which focuses on mobile access by facilities service staff.

The ADS group continues to enhance mobile functionality within the department with iPads and iPhones for employees whose work will benefit from using them. The ADS group also participated in the Institute-wide Information Technology (IT) Resiliency Task Force, which is focused on increasing availability of critical IT resources. In addition, the team began an upgrade of the Kronos time and attendance system and helped expand the use of the SCLogic application to more areas within Facilities.

### **Operations**

The operations group had a busy year between launching new initiatives and the ongoing maintenance of the growing facilities profile. The most significant new initiative is the move to improve service levels in the new or newly renovated buildings on campus. This initiative, called “comprehensive stewardship,” has already grown to include 12 buildings. With this new model, these buildings are able to be stewarded through increased proactive work and planned system renewal. Other initiatives include the formation of the dedicated Fleet Management group and the creation of the sustainability area within the Department of Facilities.

In an effort to improve the overall expertise of supervisory staff within the organization, operations sponsored training for many managers and supervisors to complete the Association of Physical Plant Administrators Educational Facilities Professional exam and the Certified Educational Facilities Professional exam. Several managers and supervisors now hold this nationally recognized designation.

The director’s office developed a campus-wide, client-focused meeting program this year. These meetings with individual occupant groups have been extremely valuable

in helping shape how the organization can better serve the community in the future. Currently in development is a modernization project of the work order management system that will be part of the Atlas web interface. This new ordering system, scheduled to launch in December 2013, will provide a customer-friendly interface while also supplying Facilities staff with more tools and information for reporting.

Through comprehensive stewardship, strategic program development, project prioritization, and execution, operations plays a key role in MIT's capital renewal efforts.

### **Custodial Services**

During the past year, Custodial Services continued its focus on maintaining the appearance of the Institute's newer buildings at a consistently high level while still presenting all Institute buildings in the best possible light. By employing the most effective cleaning technologies, Custodial Services has been able to maintain all spaces in a consistent, sustainable manner.

An example of the sustainable technology utilized within Custodial Services is the EC H2O Auto Scrubber. These machines are used to maintain most of the Institute's common areas. The machines require no detergent or chemical. Ordinary tap water is put into the scrubbers, given an electrical charge that converts the tap water into a cleaning chemical with about a 40-second shelf life, and water is dispensed on the floors as a cleaning solution. The solution is scrubbed and vacuumed up as plain water containing residual from the floor cleaning. This system is safer and more effective than the traditional chemical-based cleaning.

Custodial Services also continued its green cleaning program by employing one Green Seal-approved cleaning chemical that is effective in most of the cleaning processes (general cleaning, as well as carpets and floor coverings).

During this past year, Custodial Services expanded the Working Foreman program. This position was developed two years ago to give staff an opportunity for advancement. The working foreman position was created to assist supervisors with many of the operational functions within Custodial Services. There are currently eight working foremen. The program has been very successful, improving communication and collaboration among supervisors, custodial staff, and the community.

The Integrated Pest Management (IPM) program continued to make improvements Institute-wide. The weekly IPM working team, consisting of representatives from Facilities EHS, Repair and Maintenance, Grounds Services, Custodial Services, the consultant entomologist, and the pest control vendor, addresses issues within the academic portfolio of buildings. The mission of the IPM program is to find and address the root causes of pest-related issues.

Custodial Services continues to respond to changing needs within the MIT community. During the last year, it expanded the 6 pm to 2 am shift because of increased Institute activity during the evening hours. The traditional 4 pm to 12 am custodial schedule did not meet productivity expectations due to limited access. As new staff members come

on board, they are scheduled from 6 pm to 2 am, which has proven very beneficial with increased production and quality of work.

Custodial Services also worked with the Institute's major paper supply vendor to schedule deliveries in most Institute locations starting at 5 am. This has freed up loading docks and streamlined the actual delivery of the product.

In the year ahead, Custodial Services will continue to pursue excellence through mentoring and staff development as well as employing the best technology available. Within Custodial Services, Breeze Custodial Solutions has been implemented, a software program that enables organization and evaluation of custodial schedules, training, quality control, and cost issues. This program will be a valuable tool to assist in making more informed operational decisions. Finally, during this year's contract negotiations, an agreement was reached on a joint labor-management committee designed not only to discuss labor relations issues, but also to address issues of staff development and career opportunities.

### **Customer Service Center**

The Customer Service Center (CSC) continues to be a successful vehicle of communication and process improvement. During the past year, a satisfaction survey began to be included with all closed work order emails. CSC has responsibility for survey follow-up. The input received from the surveys has been a valuable catalyst for some of changes in the SAP Modernization Project. CSC worked closely with the Repair and Maintenance group and CSG to ensure quality communication to improve response to customers.

### **Fleet Management**

In March 2013, the department moved the responsibilities of vehicle maintenance from Grounds Services to create a new area called fleet management. Its charge is to expand service beyond Facilities and provide maintenance for MIT-owned vehicles campus-wide. The vehicle maintenance team is located in a full-service facility on campus that features the most current diagnostic and repair equipment available.

During the next year, fleet management will be conducting surveys of the community to gather information about existing vehicles on campus. In addition, it will have a presence on the Facilities website to promote its services.

### **Grounds Services**

Renewing gardens on campus was a primary focus of Grounds Services during the past year. The garden at Gray House is an ongoing project that includes enhancements to the front gardens and plantings around the house. In addition, the team continued its efforts to improve the landscape and hardscape around campus.

A key initiative was the creation of a database of tree inventory. This new accurate accounting of trees will allow the Grounds Services teams to monitor tree growth and schedule appropriate pruning as needed throughout the year.

The installation of irrigation systems on east and west campus will enhance the maintenance of several gardens and landscaped areas. These include academic areas, Building 66, McDermott Court, and two residence halls—Buildings W70 and W71.

In September, Grounds Services staff relocated to buildings on west campus. This new space brings the group closer to campus and includes parking for Grounds Services vehicles.

Initiatives for the upcoming year include hardscape, sidewalk, and parking lot enhancements. These include the repaving of sidewalks along Amherst Alley from Massachusetts Avenue to Danforth Street, sidewalk repair on Vassar Street east, and landscaping at the Hayward Parking Lot.

### **Mail Services**

As the Institute added buildings to campus, Mail Services adjusted to a changing workload without expanding hours or personnel. In fact, Mail Services has reduced its workforce by almost one-third (10 positions) in the last 10 years. In addition, the staff improved their delivery standards to over 98% by delivering in one business day all US Postal Service mail, interdepartmental mail, and packages.

Several of the vehicles used by Mail Services are electrically powered either partially or totally. This has led Mail Services to be a primary force behind the new electronic vehicle checks, which improve the readiness of the Facilities fleet of vehicles.

During the upcoming year, Mail Services plans to embark on a campaign to educate the community about the different types of campus addresses and how to use them. This will help inform the different vendors who bring mail, packages, and freight to the campus and will streamline internal delivery. In addition, Mail Services is revising how it handles freight deliveries in order to reduce the delivery time from the present three-business-day standard. At the same time, the group is implementing new technology, including an identification scanner for deliveries and establishing a suspicious package protocol.

### **Off-campus Facilities**

A primary focus this year was on adapting the campuses for the Bates Linear Accelerator Center and the Wallace Astrophysical Observatory to accommodate the increase in academic research programming. In addition, operations continues to seek appropriate funding to improve and renew structures and systems that are in need of repair or replacement. A major accomplishment was in the successful start-up, operation, and maintenance for the new Massachusetts Green High Performance Computer Center in Holyoke, MA.

#### ***Bates Linear Accelerator Center***

Over the past year, a primary emphasis for the Bates Linear Accelerator Center, in Middleton, MA, has been improving and renewing structures, systems, and equipment in need of replacement while supporting the reconfiguration of the facility. Additionally,

particular attention continues to be paid to the High Performance Research Computing Facility and supporting systems.

Recent improvements and upgrades at the Bates Center include the renewal of an underground water main, interior space restoration, maintenance and repairs to electrical substations #2 and #6, site tree/brush cutting to reduce the perimeter overgrowth, and the replacement of the administrative building roof. Additional projects with electrical systems; heating, ventilation, and air conditioning systems; and paving and sprinkler modifications are currently in the project design and development stages. The wind turbine study and data collection continues with the Keystone Tower Company relative to the site being used as a beta site for the development of a new design for wind turbine posts.

### ***Wallace Astrophysical Observatory***

The Department of Facilities continues to support Department of Earth, Atmospheric, and Planetary Science users at the Wallace Astrophysical Observatory, while making some very noticeable improvements to the facility in the past year. Improvements include the replacement of all exterior windows with new low-E argon windows, paving and landscaping to the main access road, and forestry grooming to reduce the interference with the projection angle required for the larger telescopes at the site.

### ***Technology Square***

Facilities support for the Department of Bioengineering and the Institute for Soldier Nanotechnology, located in Building NE47, 500 Technology Square, continues with a high level of satisfaction from the occupants of the space and users of the laboratories.

### ***Katahdin Hill—Lincoln Laboratory***

Projects at the Katahdin Hill facility, adjacent to Lincoln Laboratory, in Lexington, MA, included exterior caulking and painting, roof replacement, and interior painting of public spaces. Facilities staff are currently working with MIT Medical on a renovation project of the reception area and interior rooms in Annex 5.

### ***Massachusetts Green High Performance Computer Center***

Operational support from Facilities at the new Massachusetts Green High Performance Computer Center has been ongoing over the past year. The transition from construction and commissioning moved on to operation and maintenance with the collaboration of MIT, the University of Massachusetts, Boston University, Northeastern University, and Harvard University.

### ***Parking and Transportation***

The Parking and Transportation office continues to promote the commuter connections brand by attending several campus events in an effort to make students and staff aware of the many commuting options available to them. The office also supported and encouraged campus bicycle safety by conducting four bike safety/repair clinics, and a giveaway of 400 sets of bike lights and 300 reflective leg bands. The office also assisted

with a giveaway program of 400 bike helmets. The office again led MIT's participation in the MassCommute Bicycle Challenge, with MIT bicyclists winning second place in the 2012 challenge.

Sustainability initiatives include bicycle-related programs, carpooling, and alternate fueled vehicles. The office oversaw the installation of two Hubway bike-share stations on campus and continued the bike rack replacement program throughout campus. Programs to encourage alternate use of transportation offered include the Zipcar 18+ program, which allows students 18 years of age and over to open a Zipcar account; 20 Zipcars on campus; and the Zimride rideshare website that assists MIT students and staff with creating a carpool or finding a ride. In addition, the office upgraded the shuttle fleet, which is now 100% handicap accessible, operable on bio-diesel fuel, and installed with WIFI.

The recent installation of automated event parking equipment in the Albany Garage, in addition to the West Garage, allows more event attendees to self-park for a modest fee at large campus events, including the presidential inauguration; commencement; the alumni reunion; the officer Sean Collier memorial service; Department of Athletics, Physical Education, and Recreation events; admissions events; the New England Kid's Triathlon; and the Cambridge Carnival.

The office is currently working on an expansion of the Hubway bike-share system on campus, a pilot of the Somerville Saferide Shuttle, and the installation of a parking guidance system. The office continues its support of six electric vehicle charging stations.

The Parking and Transportation office managed the operation of the MIT parking system, Shuttle Services, and commuter programs, including the allocation of 4,204 parking spaces in 39 locations, the application and distribution process for 7,660 annual parking permits, 67,000 monthly subsidized Massachusetts Bay Transportation Authority (MBTA) passes, and nearly one million passengers on the campus shuttles.

## Recycling

The US Environmental Protection Agency (EPA) honored MIT with a 2010 and 2011 Food Recovery Challenge Achievement Award. The EPA applauded MIT for its demonstrated commitment to improving sustainable food management practices and for setting the example of putting food scraps to higher and better uses. Other food waste-related initiatives include a Food Waste Project and Trash Audit with MIT Sloan School of Management graduate students to determine the MIT Sloan community's knowledge and understanding of what is wasted. The data collected can be analyzed to help educate the entire MIT community. In addition, MIT's food waste/compost program continues to grow, with an expansion to the graduate and undergraduate residence buildings NW30 and NW10, NW35's Thirsty Ear, and Senior House.

MIT'S overall recycling rate has risen 2%, from 46 % in 2011 to 48.1% in 2012. There was also a 100-ton drop in solid waste. This progress is a result of continued growth in the food waste program and single-stream recycling retention efforts.



The Recycling program continued its collaborations with the City of Cambridge's recycling department. Through this relationship, the recycling and solid waste supervisor collaborated with Cambridge mayor Henrietta Davis and MIT first lady Chris Reif to create the first "Pop Up Recycled Shop" and turned a 15-foot box truck cabin into a living room, displaying what could be found at reused outlets around the city.

MIT awarded its e-waste contract to M&K Recovery for a three-year time period. This will be the first time that MIT will receive rebate funds from electronic waste. In addition, the program is in the process of bidding out its recycling and trash contract, with a contract expected to be signed in summer 2013.

Effective July 1, 2013, the Recycling and Solid Waste Management program will move from Grounds Services into the new sustainability area, under operations.

### **Repair and Maintenance**

During the past year, Repair and Maintenance (R&M) made progress in several areas, including improving communication, enhancing work processes, and increasing sustainability. The Operations Center was renovated to allow for more interaction between operators and supervisors while performing different functions. The new design also allowed for the hanging of LED display boards to make life safety systems and building management system status more visible and to improve efficiency in the 24/7 operation.

Other efforts to improve communication and work process were the creation of an anonymous, online suggestion box to allow the staff to make recommendations on improving unit operation. In addition, R&M modernized the two-way radio system to provide better communication campus-wide. Also, the group established better relations with CPEC through monthly meetings where project status and support is discussed. R&M established a collaborative relationship with the new CSG group, sharing resources as needs and demands change.

Sustainability efforts included working with the Efficiency Forward team to look for ways to save energy through light fixture retrofitting and relying on the Central Utility Plant for compressed air rather than running many individual air compressors around campus. In addition, the instrument systems supervisor received the Certified Energy Manager credential to help heighten awareness of energy savings opportunities within the Institute.

R&M brought more support to the Integrated Pest Management program by hiring a skilled mechanic to take care of structural issues that allow pests to get into campus buildings.

The group restructured its budget to better reflect the organization and to drive financial accountability with each team within R&M. In addition, it established a mobilization unit for the preventative maintenance team to move people, parts, and supplies closer to the jobsite for better efficiency.

In the coming year, the R&M group will continue to look for ways to work more efficiently and make the best use of resources given the need to provide project support and to deal with aging campus buildings.

### **Security and Emergency Management Office**

The Security and Emergency Management Office (SEMO) is actively involved in Phase I of the Housing office's security upgrade, which in part involves the installation of contact monitoring points for all entry and exit doors with associated video monitoring capabilities in seven of the residences. The upgrade will allow the front desk worker of these residence halls to actively monitor all entry points in real time. This project provided SEMO with the opportunity to initiate an upgrade of the central server to a new and more robust software system while balancing load levels from the current central server. In addition to this project with Housing, the demand by the MIT community for increased video cameras has raised the number in the system to approximately 600 cameras.

SEMO staff are in the process of designing and implementing the transfer to the central server system of the last remaining access control systems on campus. This will reduce MIT's overall costs while increasing effectiveness and efficiencies in campus-wide access control capabilities. Currently, the access control system maintains approximately 39,000 identification cards with individual access control capabilities in the associated 2,200+ card readers.

Other areas within SEMO remain active also. The number of pre-employment background checks continues to grow exponentially with departments, laboratories, and centers realizing the value, and in some cases the legal requirement for such checks. The Card office is implementing a program where all MIT identification cards issued to employees and students have a preprogrammed chip allowing the holder to activate the card as an MBTA Charlie Card for use on subways and bus systems. The Key Distribution office continues to administer and monitor requests and documentation while working closely with Repair and Maintenance and the Customer Service Center.

The emergency management section was actively involved in several incidents that affected the overall wellbeing of the campus. These incidents included preparations for Hurricane Sandy, the East Cambridge power outage, the blizzard of 2013, the hoax gunman on campus, the Boston Marathon bombings, and the shooting of officer Sean Collier. SEMO was also involved in security for the memorial service held for Officer Collier, in April.

Following all activations of the Emergency Operations Center, an after action review is conducted in order to assess what was done well and where improvements should be implemented. Much was learned during this year and processes were improved. This was the evident on the night of the Officer Collier shooting when a notification to the community was sent within six minutes of SEMO being notified of the event. Effective communication continued throughout the night and into the following day to ensure that MIT was ahead of the media with information to the community. A screen shot

of the emergency information web page was displayed prominently on media outlets, including CNN.

In the upcoming year, SEMO will continue to grow in its role of providing a wide variety of services to the MIT community, including disseminating emergency information efficiently.

### **Vendor Management**

Vendor management, a centralized resource within operations, expanded its role as a source to qualify and contract with service providers. The scope includes developing requests for proposals, analyzing bids, budgeting, and summarizing data across all operational areas in search of vendor management solutions that maximize cost benefits, quality service, and timely response. Annual savings continue to be realized over the life of the contracts. A new process was introduced with Procurex Reverse Auctioning, which is intended to further cost savings. The qualified vendor and contract database continues to grow.

### **Utilities**

#### ***Central Utilities Plant***

The Central Utilities Plant continued to provide reliable, low-cost electrical, steam, and chilled water service to the majority of the Institute's buildings, laboratories, and centers. Utilities personnel conducted tours of CUP for numerous groups, including some from other universities and outside organizations.

To ensure its continued and reliable operation, the gas turbine underwent routine maintenance at two different points during the year. These maintenance efforts were highly successful and resulted in reliable operation of the gas turbine throughout the year.

A new rotary screw, oil-free air compressor, with an integrated air dryer and variable speed drive, was also added to CUP this year. This more efficient air compressor, AC 3, provides instrument air to CUP and to a number of buildings on campus. It is anticipated that AC 3 will save approximately 1 million kWh of electricity per year.

In June, NAES was brought in to operate CUP. NAES is in the business of operating similar plants, and improvements in management, safety, and efficiency are expected during the three-year term of the agreement. MIT employees will continue to operate the plant under NAES management.

MIT's partnership with Ictec, a firm specializing in improving commodity purchasing strategies and dispatching production assets to maximize efficiency and minimize costs, has continued to deliver significant utility savings. In the two-and-one-half years of this partnership, MIT has saved approximately \$1.9 million in avoided commodity costs.

### ***Chilled Water Production***

Investigatory work proceeded to determine why chillers 3 and 4 were not achieving their rated capacity. This long-standing situation was traced to problems with the original chilled water pumps not being capable of achieving the discharge pressure necessary to circulate chilled water for the growing campus. Initial design work is under way to determine the most cost and energy efficient solution. This work will be executed at the time of the chilled water plant expansion for the Nano-Materials, Structures, and Systems facility (nMaSS).

Plant management and operators completed a critique of the chilled water plant expansion completed in 2010. The process was initiated in anticipation of the next expansion for nMaSS to determine what parts of the system have worked well and where further modification may be necessary. Few problems surfaced and generally the plant has worked very well.

### ***Steam Production***

Funded by capital renewal funds and based on a detailed condition survey, Utilities continued to make extensive repairs to the campus steam supply system. These long-overdue repairs will enhance steam delivery reliability and safety on campus. The past year, 600 feet of steam line adjacent to Vassar Street was replaced from Massachusetts Avenue west. This section of line has seen numerous repairs and was beyond further ability to be repaired.

During the past few years, Utilities made numerous scheduled and unscheduled repairs to the steam and condensate system on the west campus. This section of the campus steam distribution system is in poor condition, and Utilities is pursuing alternative approaches to replacing it. Currently, Facilities is studying the feasibility of replacing most of the west campus steam system with an expansion of the medium temperature hot water system that currently serves Buildings NW30, NW35, and W79. This approach would substantially reduce the cost of maintaining the district energy system on the west campus. Over the past year, the continued development of this project has led to a decision to develop a more comprehensive approach, which may include a connection to the CoGen plant waste heat boiler, with the potential for using waste heat instead of steam for part of the hot water load.

An agreement was reached with Veolia to allow MIT to purchase and sell steam as costs and technical situation merit. This agreement will provide an alternate source of steam to meet part of the campus load during periods of maintenance or when steam purchase is less than making steam in MIT's own boilers, such as during days that gas is curtailed.

### ***Electricity***

The past year, MIT, working with NSTAR, the Institute's electrical utility provider, completed the fifth feeder from Putnam Substation and is now working to complete the sixth feeder that will be shared with NW21.

Significant work has also been done to determine the most cost- and technically-effective solution to the requirement for additional power for the campus. The analysis has been combined with the pending end of life for the existing CoGen Turbine forecast for late 2016. Five options have been identified and the analysis is nearing completion. Work will have to commence on the proposed solution among the five options in 2013 to have the power available when nMaSS is scheduled to come on line.

## **Campus Planning, Engineering, and Construction**

FY2013 has been a transition year for the Campus Planning, Engineering, and Construction (CPEC) group as the Institute moves toward the next round of major capital projects. In addition to the completion of a partial renovation of Buildings E17/E18 as swing space for capital renovations, the National Institutes of Health/Division of Comparative Medicine project in the basement of Building E25, and the completion of the David H. Koch Childcare Center on Vassar Street scheduled for August 2013, work is proceeding on the renovation of Building E52 for the Department of Economics, MIT Sloan School of Management; a conference center in Building 2 for the Department of Chemistry and the Department of Mathematics; design development for nMaSS; and the second year of the ACR program.

Facilities accomplished its goal of a reduction of electrical demand of 34 million kWh as part of the Efficiency Forward initiative with NSTAR, which led to a three-year renewal of the program with a 21 kWh reduction target. The Institute presented an MIT Excellence Award in the Greening MIT category to the Facilities Systems Engineering Group and EHS staff who worked on the Efficiency Forward initiative.

In FY2014, CPEC will maintain focus on active projects and programs, as well as on the development of the utility projects required to support future demand and enable redundancy and resiliency, chilled water expansion, repowering the Cogen at CUP, and electrical expansion. For the capital renewal program, the goal will be to develop a program that is in “steady state,” with a focus on building systems (such as elevators, roofs, facades, and fire alarms). In collaboration with the Office of the General Counsel, CPEC is revamping its design and construction contracts, its information group is working on the development of Sharepoint as a platform for project development and management, and its engineering team is updating the Design Book, the repository of MIT construction standards.

## **Campus Planning and Design**

### ***Feasibility Studies***

Campus Planning and Design (CPD) completed a series of undergraduate housing planning studies to evaluate existing conditions and baseline renovation costs for four dormitories deemed most in need of renewal. The dormitories selected for study included East Campus (Buildings 62 and 64), Bexley Hall (Building W13), Burton-Conner (Building W51), and MacGregor House (Building W61). Since the discovery of deterioration of the structural exterior walls at Bexley Hall, CPD has responded to a number of requests to develop options for interim and/or long-term replacement undergraduate housing.

CPD completed a report after engaging a consulting firm to develop a building program to address current and future needs of the East Campus Parallels community. Based on this program, the consultants developed conceptual-level design options that will inform future renovation decisions.

CPD planners worked with the Capital Projects Group and completed a report with options for renovating Building 31 to satisfy future requirements for the building's principal occupants, the Department of Aeronautics and Astronautics and the Department of Mechanical Engineering.

Other CPD studies include:

- A feasibility study for a consolidated communications center, which would co-locate command centers for campus operations, MIT Police, SEMO, and an emergency communications center
- Beginning phase 2 of "Facilitating Space for Innovation and Entrepreneurship Activities." This phase looks at multiple campus sites for small, medium, and large versions of the proposed program
- Beginning a study of Killian Court to address issues of universal access, and developing a selective renewal plan

### ***Planning Projects***

The new CSX railroad pedestrian crossing now connects the West Annex parking lot with one end of Pacific Street, culminating a nine-year process of negotiation and strengthening the ties between the west and northwest campus neighborhoods.

The Committee for the Review of Space Planning (CRSP) requested CPD to undertake a project to develop a strategic framework plan for the northwest section of the MIT campus. A discovery phase began in fall 2012 to update information about the existing research buildings in the northwest sector, including visual assessments of utilization and condition, as well as structural floor loading capacities and accessibility compliance. A second phase intended to articulate alternative future development scenarios will begin in summer 2013. Materials from this later phase are intended to inform a shared strategic vision for the northwest sector. Future incremental investments can then be formulated in a way to advance realization of this shared vision.

Informed by the report of the Faculty Task Force for Kendall Square and its desire for an alternative design approach for east campus and the MIT Gateway, CPD worked iteratively with the executive vice president and treasurer and the associate provost to develop a scope, process, and governance document. Once the committees were populated, CPD began working with the Faculty Design Committee and the East Campus Steering Group to develop a request for proposal for an east campus planning study. These efforts provide a framework for MIT community input for east campus and the Kendall Square Initiative.

At the request of the Office of the Provost, CPD is leading a comprehensive study of the space needs for the Department of Mechanical Engineering and the Department of Civil and Environmental Engineering, which occupy nearly 260,000 net assignable square feet (NASF), 210,000 NASF of which is on the main campus. The study is taking a holistic view of how the departments are utilizing space on campus and will analyze potential consolidation and space moves.

CPD continued to monitor the fundraising activities for Walker Memorial Hall and worked to develop an alternative solution for a new facility for the Music and Theater Arts section. This activity is currently on hold awaiting a status report on fundraising.

CPD continues to act in an advisory role for campus planning and design review of the Skolkovo Institute of Science and Technology. The project is completing the design development phase and excavation is expected to start summer 2013.

CPD led the negotiation effort with the State of Massachusetts, resulting in an agreement by which MIT would grant a ground lease on the edge of the Bates Linear Accelerator Center site to the state for use as a parking lot. The business terms have been agreed upon and the lease negotiations should be completed this fiscal year.

### ***Ongoing Activities***

Staff members of CPD participate on committees both at MIT and with the City of Cambridge. These include the Committee for the Review of Space Planning, the Building Committee, the Transportation Committee, the Pedestrian Committee, the Events Scheduling Working Group, and the Summer Usage of MIT Facilities. CPD continues working with MIT Human Resources and the associate dean of student disability services to address accessibility issues across the campus. CPD supports the MIT Investment Management Company's planning efforts for the redevelopment of Kendall Square, and a CPD member sits on the board of the Kendall Square Association. City of Cambridge committees include the Bicycle Committee and the Pedestrian Committee. Finally, CPD represents MIT on the board of A Better City.

CPD continues to conduct permitting activities and fulfill regulatory requirements of municipal, state, and federal government, such as the City of Cambridge Parking Inventory, Dumpster Licensing, Department of Conservation and Recreation permits, etc. The City of Cambridge is conducting a zoning review of the Osborne Triangle as a result of a down-zoning petition, and CPD is representing MIT in the public process.

### **Systems Engineering Group**

#### ***Energy Conservation***

The Systems Engineering Group (SEG) exceeded a three-year commitment with NSTAR to reduce annual energy consumption. During 2012, the third year of the Efficiency Forward initiative, more than 10 million kWh were saved, 32% of which was from lighting system upgrades. MIT and NSTAR have committed to three more years with the Efficiency Forward program to save an additional 21 million kWh of electricity and 150,000 therms of natural gas annually.

SEG continues to lead the development of an Energy Management System. The system will establish a framework that enables MIT to achieve its policy commitments and demonstrate conformance with the requirements of the international standard. This could result in the ultimate goal of International Organization of Standards certification for the campus.

SEG staff contribute to the Campus Energy Task Force, also known as Walk the Talk, and have led several discussions about energy efficiency projects undertaken on campus. This included a presentation of SEG-developed and -implemented lighting standards that are applicable to new construction and renovation projects.

Following a decision by one of the Building Automation System vendors to eliminate a current product, SEG collaborated with Operations staff and led an effort to evaluate other products currently on the market. This process resulted in two new vendors being selected that met the engineering and operational requirements of both groups. In addition, pricing on a project resulted in \$200,000 in savings due to the competition between the two vendors.

### **Capital Projects**

The Capital Projects Group (CPG) is charged with managing the full spectrum of project activities from programming through occupancy on all projects with a project budget in excess of \$5M. In order to accomplish this task, CPG reaches out to and integrates the input from technical experts at the Institute and throughout the department.

### **Completed Projects**

CPG completed the renovation of the Division of Comparative Medicine's multispecies vivarium in the basement of Building E25. The project was made possible by a \$15 million grant from the National Institutes of Health using American Recovery and Reinvestment Act of 2009 funds.

### **Projects in Process**

Significant projects for the group include two major renovations for Building 2. CPG successfully relocated existing occupants and started construction activities on the complete renovation of the north bar of Building 2 to house laboratories for two Department of Chemistry faculty members and the renovation of four classrooms, including two in Building 4, for the Registrar's Office. A design solution was reached for the Department of Mathematics for renovating the south and east wings of Building 2, plus the construction of a new fourth floor addition onto the building. With the approach approved, a reengaged design team completed the designs so that interior demolition can begin in fall 2013, and new construction begins in early 2014. Occupancy is projected for January 2014 for Chemistry, and January 2016 for Mathematics. The Mathematics department is being relocated to Building E17 for the duration of the construction period.



A conceptual design study for nMaSS, which will be located on the site now occupied by Building 12, was predicated on maximizing the development possibilities of the site. Upon review of the conceptual design study and the estimated cost to complete the design and construction, Schematic Design has begun on a building roughly 75% the size of the maximized structure. The top occupied floor of the new building has been identified as the new home for the Chemistry undergraduate teaching laboratory, replacing outdated facilities in Building 4.

Design activities for the renovation of Building E52 are complete. The project will house the Department of Economics and portions of MIT Sloan, as well as a conference center. Existing occupants are being relocated due to the extent of renovations. Construction cost proposals have been received within the project budget; construction will begin in August 2013, with occupancy projected for January 2016.

The group initiated design activities for a multiphased renovation of Building 66 for the Department of Chemical Engineering, which will allow laboratories and offices to be renovated and outdated infrastructure to be replaced. The project will upgrade the building infrastructure and make comprehensive renovations to more than half of the space while the building remains occupied. The final design of the renovation is under way and construction is anticipated to begin in fall 2013.

### **Project Management, Renovations, and Capital Renewal**

The number of staff in the group has grown to 26 employees due to an increase in the volume of work generated by the Accelerated Capital Renewal program.

#### ***Renovations***

An accomplishment of the renovations group is the completion, commissioning, and startup of the Massachusetts Green High Performance Computing Center in Holyoke a collaboration of five schools, two companies, and the State of Massachusetts. This project will achieve at least a Leadership in Energy and Environmental Design (LEED) Gold rating, with a strong possibility of a LEED Platinum rating from the US Green Building Council.

Among the other highlighted projects for the CRSP Renovations group are the opening and rebuilding of the Building 10 Dome Oculus and Skylight System and the refurbishment of the inner dome finishes, including new energy efficient lighting. The team completed the swing office space floors in Buildings E17 and E18, new office and garage space for Grounds Services, and Americans with Disabilities Act upgrades to the MIT Museum Buildings N51 and N52.

#### ***Capital Renewal***

The renovations team completed its first year of the three-year ACR program with many successes and further development of the program. Facilities is developing the Capital Renewal team and has hired or assigned several staff members, including a program manager, an associate program manager, a financial analyst, and several project managers.

Multiple strategies to address the deferred maintenance issue were developed and are in various stages of planning and implementation. These include:

### **Comprehensive Building Upgrades**

To maximize the investment of capital renewal funds through larger renovations, 17 Rapid Response Feasibility Studies identified the deficiencies in each building and three possible renovation options to address deferred maintenance. Four projects (Buildings 2, 66, W15, and W16) have committed funds to address deferred maintenance and seven other buildings were identified as likely and next round projects.

### **Targeted Systems**

To repair or replace deteriorated systems in the highly ranked buildings, 28 projects have been presented and endorsed at a committed amount of \$36M out of the \$75M allocated to this segment of the program.

### **Committee for the Review of Space Planning**

To support infrastructure needs associated with specific CRSP projects, five projects committing \$3.7 million of the \$12 million for this segment of the program were started.

### **Maintenance Repairs Operations and Utilities**

Maintenance repairs operations is smaller in nature and intended to replace equipment that has failed or is failing. Utilities is intended to address deferred maintenance in CUP and the utilities distribution network. To date, 48 projects committing \$6.6 million of \$7.5 million allocated in maintenance repairs operations and 20 projects committing \$9.9 million of \$17.5 million allocated have been started.

Highlighted projects within the ACR program include:

- Buildings 4 and 6 façade repair and window replacement in conjunction with the Building 2 Department of Chemistry project
- NW13 envelope repairs
- NW61 Random Hall envelope repairs
- W31 Armory masonry rebuild
- Building 35 parapet masonry rebuild
- Roof replacements at Buildings 1, 7A, W11, E15, 51, Sailing Pavilion, and W92
- Elevator renewals in Buildings 9, 10, 16, 48, and 68
- Fire alarm upgrades in Buildings E19, 7, W33, and 26
- Installation of sprinkler mains in Building 1 to enable new laboratories and future renovations
- New laboratory waste system in Building 1 to enable new laboratories
- Restroom renewals in Buildings 14 and 35
- W20 kitchen exhaust ductwork major cleaning, rebuild, and access enabling
- W20 grease trap system installation correcting code deficiencies and enabling the building for food service

## Facility Information Systems

The Facility Information Systems (FIS) group members were active in several Institute initiatives and supported a number of large events at MIT with critical information about campus infrastructure. FIS participated in the Emergency Operations Center and were summoned to campus in order to provide support during several emergencies, including a campus-wide power outage and the shooting of Officer Collier. In addition, FIS worked closely with the Office of Institute Events to help plan the Collier memorial service and Commencement. During the memorial service, FIS was the liaison between MIT and the City of Cambridge and was responsible for production maps and layouts to support state, local, and federal activities.

The FIS assistant director serves as a committee member for the IT Resiliency Task Force sponsored by IS&T. This group was charged with identifying vulnerabilities and suggesting areas of improvement to MIT's network infrastructure in the event of a power outage. FIS served the role of subject matter expert for the accessibility of campus information and also served a role with the generation graphics and text for the final report. The report is scheduled to be completed in fall 2013.

Other initiatives in which FIS is actively involved include the Office of the Executive Vice President and Treasurer (EVPT) Experience Teams and the Mapping Initiative, for which FIS was a cosponsor. With this initiative, FIS developed working prototypes and was a key contributor to EVPT's Integration Team. FIS presented these concepts at Administrative Hub presentations, organized by EVPT. FIS provided input for the steering committee for the Office of the Provost's Space Economy initiative about data management policies and conducted testing of the Space Management System (SMS).

## Space Accounting

FIS officially "retired" the use of the legacy space database INSITE in FY2013. Replacing it is an industry-standard platform that is better supported and more scalable than the Institute's legacy system. In addition to upgrading systems, FIS also hired a database administrator to manage the space system. This position manages the space database and its subsequent upgrades and is responsible for data integrity, application upgrades, and training.

FY2013 was also the year in which FIS conducted their biannual space survey of research space. This effort was conducted to support the Office of Sponsored Program's efforts for indirect cost recovery. Using new techniques learned in FY2012, the six-month audit process was accomplished in four months.

To support more accurate reporting space, FIS conducted a third laser measurement survey in the main block. This one million gross square foot (GSF) survey brings the total to three million GSF, using these new techniques. FIS also began to modernize their space files with this data to utilize three-dimensional Building Information Modeling techniques. The scale of this effort is the first of its kind in the industry.

Data warehouse feeds were modified in FY2013 to accommodate better reporting from the data warehouse. Working closely with IS&T, FIS updated its data export routines to provide more detailed information about space allocations and building locations. This new feed was done to support various initiatives that were started in FY2013, including the Office of the Provost's SMS, IS&T's e911 initiative, and the operations SAP Modernization Project.

### ***Archiving and Digital Documentation***

FIS continued to process project closeout materials for FY2013 and is currently up to date with its records. These files were successfully indexed/filed into the department's digital archives, and thousands of documents were digitized during FY2013 with the use of co-ops.

To improve response to its customers, FIS implemented the Institute's ticketing system with the assistance of IS&T. Using this system, FIS was able to determine that it fulfilled over 790 requests for project documentation, with 70% of these requests being fulfilled within 24 hours, and that it provided archival access to 49 other departments, laboratories, and centers throughout the Institute.

In FY2012, FIS developed a collaboration framework with SharePoint and branded it "Facilitiespoint." This site was completed in early FY2013 and training was conducted throughout the year. It has been utilized by number of different departments. A major upgrade was also performed with the assistance of IS&T, and training will continue through FY2014.

Maryla Walters, Facilities archivist for 16 years, retired in 2012. Maureen Jennings, who formerly held the head archivist position at Harvard University, became the Facilities archivist early in 2013.

### ***Mapping***

FIS continued to provide mapping support to all departments at MIT, including the online campus map (whereis) and the MIT mobile application. During FY2013, EVPT assigned to FIS responsibility for the online campus map (whereis) and the visitor's map that has been handed out for decades through the Events and Information Center. Both products are now under FIS oversight and preliminary plans to update these services were created.

In addition to the existing services, FIS produced a prototype for EVPT's mapping initiative. This prototype allowed FIS to determine an appropriate infrastructure to provide a more robust mapping service to the Institute. The first release of these new capabilities will be featured in the EVPT Administrative Hub, scheduled to release in fall 2013.

## Summary

The two major focus areas for the Department of Facilities in the upcoming year are collaboration and improving customer service. As the department moves forward, it is critical that it become a partner and facilitator to help achieve the goal of one administration for the Institute. Equally important is the idea that understanding its customers, their needs and desires, and working with them in an effective manner will help to support the mission of MIT.

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