Environment, Health, and Safety Office

Executive Summary

During the past year, the Environment, Health, and Safety Office (EHS) continued its strong presence serving the academy through its interactions with faculty, postdocs, graduate and undergraduate students, and staff. We also collaborated closely with other administrative offices, particularly the Department of Facilities and the Division of Student Life, to support their efforts to meet the Institute's mission.

2011 was the tenth anniversary of the establishment of the Institute's EHS management system. Our focus this past year was to assess the status of the system and identify opportunities to make sure the EHS Office was in alignment with the Institute's mission and to leverage our resources for increased efficiencies. This allows us to be in a better position to absorb the continuing increases in research and regulatory activity within budget constraints while supporting cutting-edge research in a safe and compliant manner and assisting the Institute in carrying out its mission.

In particular, using our balanced scorecard approach we revisited several initiatives we had undertaken in the previous two fiscal years intended to increase efficiencies, enhance delivery of services, and strengthen partnerships with other administrative units and the academy:

1. Reviews of 12 key EHS processes (e.g., training, inspections, hazardous waste) were revisited
2. Eleven Facilities and EHS joint work group recommendations (e.g., on asbestos, injury reporting, contractor safety) were reviewed for completion and prioritization
3. Four Institute programs (integrated pest management, controlled substances, shipping of hazardous materials, and transportation) with an EHS component but no central oversight were assessed
4. Eighteen findings from an FY2009 third-party independent audit of our management system were addressed

In addition, the following new initiatives were completed:

1. Five additional EHS processes were reviewed with a view to strengthening and streamlining them.
2. A new principal investigator (PI) orientation course was developed and piloted in two departments, laboratories, and centers (DLCs)
3. A program called SecureConstruct was implemented to help manage our construction activities
4. A template was developed for addressing EHS issues in international collaborations

5. An Institute-wide control program for explosives used in research was implemented
6. Actions were intitiated to reduce the Institute's incidence of injuries and illnesses

In FY2011, several major activities required significant EHS involvement, including the move of laboratories into the new Koch Institute for Integrative Cancer Research facility and the decommissioning and decontamination of the newly acquired 8 Carleton Street laboratory facility. We also assisted in the delivery of two major federal organized emergency response exercises (Tech Thunder and Operation Urban Shield).

Nanomaterials research continues to be a developing and growing trend at MIT, affecting both engineering and life science departments. As a consequence, EHS spends more effort each year monitoring nanoresearch and disseminating information. For the first time this year, a government agency, the National Institute of Occupational Safety and Health, issued proposed occupational health standards for nanomaterials (carbon nanotubes and nanofibers and nanosized titanium dioxide). EHS conducted air monitoring of drilling composites and published the results in the technical literature. Additionally, EHS performed hazard evaluations in four departments (Laboratory for Manufacturing and Productivity, Center for Materials Science and Engineering, Department of Chemical Engineering, Department of Mechanical Engineering) and is advising multiple labs regarding the purchase of filtered enclosures for nanomaterial work.

EHS drafted what became the final comment letter from MIT to the Environmental Protection Agency (EPA) in response to its advance notice of proposed rule making for reauthorization of PCB uses under the Toxic Substances Control Act. EHS also provided additional support to a comment letter submitted on behalf of the Campus Safety, Health, and Environmental Management Association. In response to these and numerous other comment letters that underscored the complexity of PCBs in building materials and the implications of PCB remediation, in July 2011 EPA announced that it will address PCB use reauthorization under two separate rules, with PCB uses in building materials the focus of the second rule-making activity.

Accomplishments

8 Carlton Street: Direct engagement of the EHS staff in managing the hazardous materials aspect of the Carlton Street building decommissioning and decontamination project provided a savings to MIT in the range of several hundred thousand dollars.

Brownfields: MIT continues to capitalize on opportunities to sell earned environmental restoration tax credits in the open market. In FY2011, MIT generated a net of $6 million. Approximately $1 million in available credits was identified for future recovery. This program was initiated and is managed by EHS.

Massachusetts Green High-Performance Computing Center (MGHPCC) Supercomputer Facility Project: EHS provided the MGHPCC Corporation with environmental staff assistance in activities related to identification and management of environmental risks.

Pest management: Through a collaborative process led by EHS with Facilities, Housing, Student Life, and Food Services, the MIT campus pest management focus has moved from a reactionary extermination approach that allows cyclical return of pests to an approach that addresses and eliminates the conditions providing a habitat for pests. This approach effectively mitigates the potential for re-infestation and does not involve the use of chemicals. We consolidated what had been separate contracts between vendors and several administrative units on campus into one Institute-wide contract.

Hazardous waste: Hazardous waste volumes increased by 20 percent while the rise in program costs was contained to 9 percent. The increased volume was due to the increase in research activity and the move into the new Koch Institute facility. The cost of waste, as expressed in dollars per pound of waste disposed, has decreased from $1.72 in FY2004 to $1.32 in FY2010 and $1.23 in FY2011.

Figure 1. Trends in Hazardous Waste Generation and Costs

Training: Development and delivery of EHS training is a major effort, both as a regulatory requirement and, more importantly, as a risk reduction indicator.

Core course training completion metrics: Some DLCs have lab-specific training that is DLC-wide. We added a metric for this year and, as expected, there are better completion rates for this compared to the classroom version, which is more difficult to administer. All other metrics remained steady relative to last year.

Table 1. Training Completion Rates for Common Environment, Health, and Safety Courses over the Past Three Years

Course	FY2009		FY2010		FY2011	
	Completion rate	Total trainees	Completion rate	Total trainees	Completion rate	Total trainees
General Chemical Hygiene and Hazard Communication	98.7%	6,717	98%	4,760	97%	4,541
Lab Specific Chemical Hygiene and Hazard Communication	87%	4,574	87%	3,847	85%	2,843
DLC Lab-specific Training	—	—	—	—	93%	980
Bloodborne Pathogens	94%	1,246	92%	1,329	91%	1,401
General Biosafety	98%	2,640	96%	2,357	97%	2,358
Radiation Safety	96%	897	94%	783	94%	706
Laser Safety	97%	1,106	95%	1,181	93%	934
Managing Hazardous Waste	91%	5,239	90%	4,878	90%	4,221

Note: We believe that all of those who needed specific training prior to working with hazardous materials and equipment have completed their training. The data do not reflect those who have left MIT and have not been archived or those who signed up to take a course out of interest or future needs but have not taken it yet.

* New in FY2011.

Seventy-five percent of PIs enrolled in the Managing Hazardous Waste course are up to date with their training, as compared with 71% in 2010. In addition, 2,057 Institute personnel completed the training needs assessment for the first time this year (compared to 2,013 in 2010).

Overall Environment, Health, and Safety Training Metrics

Table 2. Number of Participants (Seats) Trained, by Fiscal Year

	FY2009	FY2010	FY2011
Total EHS web courses completed	7,870	7,506	8,211
Total EHS classroom participants	17,556	16,533	16,986
Total EHS web courses and classroom participants	25,426	24,039	25,197

Note. All figures include Lincoln Laboratory.

Some trends in EHS training are highlighted below.

- The number of web and classroom participants increased 4.8%.
- The number of EHS classroom participants increased 2.7%, compared to a 5.8% decrease in FY2010.
- EHS classroom attendance averaged 22 students.
- The number of web-based participants increased 9.3%.
- Web delivery of EHS session increased slightly to 32.5%, compared to 31% in FY2010.

- The cost per student for web-based training was $15.49 (compared to $12 in FY2010). This cost should be drastically reduced once MIT launches the full SAP enterprise learning module.

Injury and Illness Reporting and Investigations

The EHS Office continues to work with DLCs to use the incident reporting and investigation system, which centralizes and electronically links all information related to an incident, facilitates data handling, and provides online access to reports on injuries to Department of Facilities management, EHS Office staff, and DLC EHS coordinators.

The incidence rate of total recordable injury and illness cases for calendar year 2010 (1.9) is shown in Figure 2, along with data for the previous four years. This rate showed a slight increase of 0.1 from the previous year but is well below the calendar year 2009 (latest available data) private industry (3.6) and Massachusetts (3.6) rates and is less than the incidence rate for colleges and universities (2.2). In collaboration with the DLCs, EHS has developed and implemented programs in areas such as training, inspections, and accident investigations; we believe that such programs contribute to keeping our injury rates low.

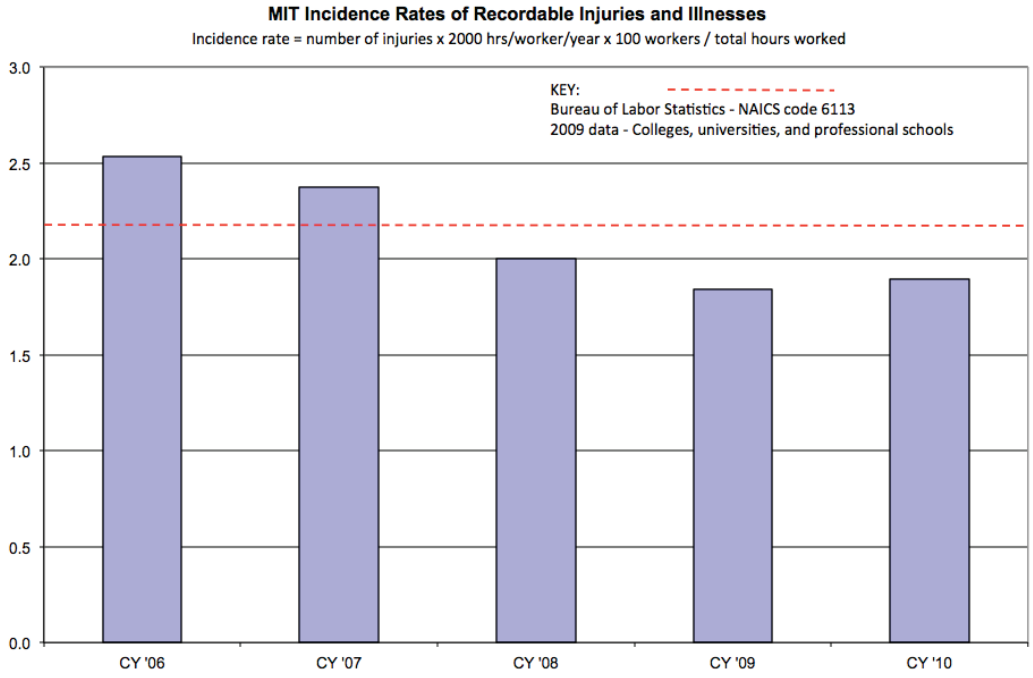

Figure 2. MIT Incidence Rates of Recordable Injuries and Illnesses

Each year, MIT participates in a survey of occupational injuries and illnesses with the Bureau of Labor Statistics (BLS). This survey compiles injury data from thousands of workplaces and is the only comprehensive measure of work-related injuries and illnesses in US workplaces. Data from this survey are useful for illustrating health and safety trends within different sectors of the US workforce. Injury and illness data provided by MIT are grouped in the Educational Services category. Recently, BLS released injury/illness data from 2009.

Table 3 presents MIT injury/illness data in comparison with the latest BLS data for colleges, universities, and professional schools. Four different incidence rates are shown: The 200,000 hours in the incidence rate formula represents the equivalent of 100 employees working 40 hours per week, 50 weeks per year, and it provides the standard rate base.

Table 3. Injury and Illness Rates for MIT and Other Universities

Rate category	MIT (2010)	All US Universities (2009)
Total (total recordable injury and illness cases)	1.9	2.2
Days away (cases involving days away from work)	0.93	0.6
Job transfer/restriction (cases involving job transfer or restricted work activity only)	0.4	0.3
DART (total cases involving days away from work, days of restricted work activity, and/or job transfer)	1.3	0.9

Note. Injury and illness incidence rates are computed with the following formula: (number of injuries and illnesses × 200,000)/employee hours worked.

The following is a breakdown of the five types of incidents most commonly recorded at MIT in 2010: overexertion caused by carrying, lifting, or pulling objects (24%); injuries due to improper handling of objects (including foreign objects in the eye) (19%); falls (11%); injuries caused by stationary or falling objects (11%); and repetitive motion injuries (4%).

Trends for the last five calendar years in numbers of days of restriction/job transfer, number of days away, and total number of injuries at MIT have generally been downward. MIT saved an estimated $428,547 in calendar year 2010 relative to the cost of lost productivity if the number of days away had remained the same as calendar year 2003, and the Institute has saved an estimated $2.1 million over the past seven years (see Table 4).

Trends in MIT's incidence rate of days away from work are shown in Figure 3. The rate edged slightly down from last year toward the national college and university rate of 0.6. If MIT were at that 0.6 rate instead of the present 0.93 rate, the estimated annual savings would be approximately $193,000 (details of these calculations are shown in Table 5).

Table 4. Cost Savings from Reductions in Number of Days Away, 2003–2010

Year	Number of days away	Number of FTEs	Cost of FTEs	Cost if days away equal to 2003	Cost savings
2003	2,721	13.605	$816,300	$816,300	$0
2004	2,295	11.475	$705,713	$836,708	$130,995
2005	2,079	10.395	$654,885	$857,115	$202,230
2006	1,385	6.925	$448,740	$881,604	$432,864
2007	2,124	10.620	$705,380	$903,644	$198,264
2008	1,375	6.875	$468,053	$926,235	$458,182
2009	1,948	9.74	$679,677	$949,384	$269,707
2010	1,522	7.61	$543,278	$972,540	$428,547

Note: Cost calculations used the following estimated compensation levels: 2010, $71,484; 2009, $69,782; 2008, $68,080; 2007, $66,420; 2006, $64,800; 2005, $63,000; 2004, $61,500; and 2003, $60,000. FTE = full-time equivalent.

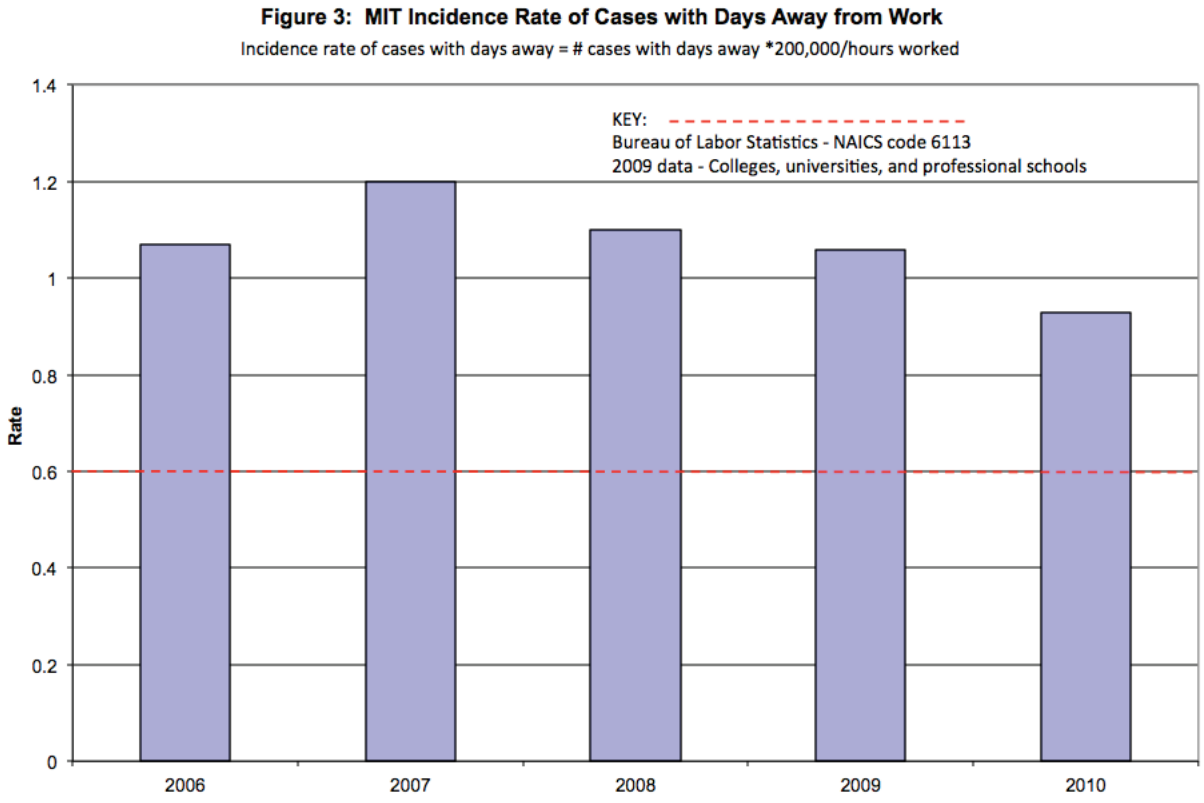

Figure 3. MIT Incidence Rate of Days Away from Work

Table 5. 2010 Cost Savings if MIT Were at the National College and University Incidence Rate for Days Away from Work

Rate	Days away rate	Number of cases	Number of FTEs lost	Cost of lost productivity at $71,484 per FTE
MIT	0.93	96	7.6	$543,278
US colleges and universities	0.6	62	4.9	$350,272
Difference	0.33	34	2.9	$193,006

Note: Number of cases was calculated as follows: rate × hours worked/(2,000 hours per work week × 100 workers). FTE = full-time equivalent.

Biological Research

Over the last 10 years, there has been continued growth in the number of faculty engaged in biological research and participating in the Biosafety Program and the Committee on Assessment of Biohazards and Embryonic Stem Cell Research Oversight at MIT. This growth is a reflection of the increased funding in biological research, the fundamental applicability of ongoing MIT bioresearch, and the use of new technologies in life science research at MIT. National Institutes of Health funding has reached 34 percent of the total research dollars at MIT and continues to be the single largest source of research funds at the Institute.

Much of our oversight program is built upon the interrelationship among EHS staff, the PIs, and their lab groups. We met with our PIs to discuss their research and the risks inherent in their work and procedures, to assist with registrations, to conduct live training sessions at their lab group meetings, and to inspect and visit their laboratories. Our intent is to remain a highly visible and easily approachable resource for our researchers.

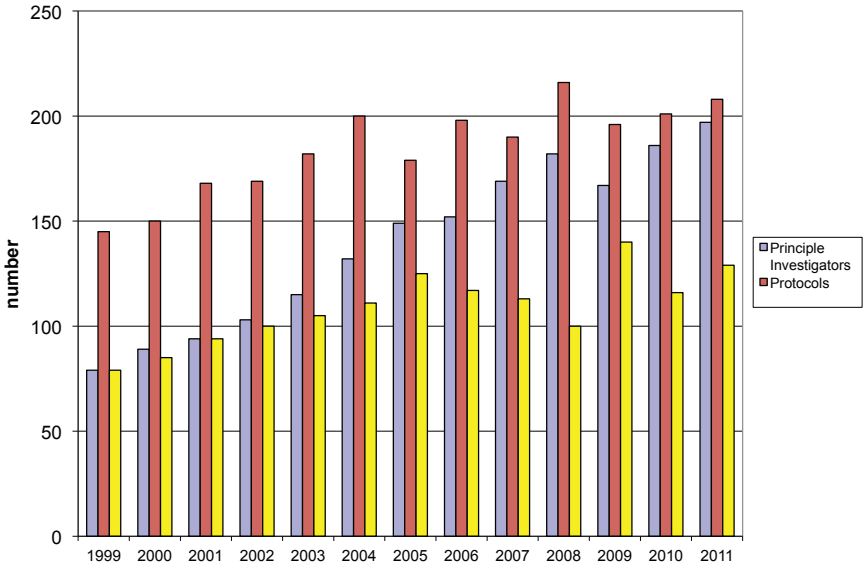

Figure 4. Biological Research Registrations and Principal Investigators in Science, Engineering, and VP for Research from FY1999 to FY2011

EHS endeavors continue to minimize the number of research registrations for each PI. We expect to see the start of a new synthetic biology research center within a year once space renovations are completed. The core members, four new faculty members, are already here but are not housed in their final location. We are not sure how big this center might eventually become, but synthetic biology is a very "hot" area of research and graduate students are flocking to it. In addition, a new faculty member has been hired to establish an induced pluripotent stem cell (iPS) generation core facility at MIT. Once this core facility is up and running, we expect to see additional investigators entering this area of research.

Our oversight program has been well ahead of new regulations, and because of the forward-looking nature of our oversight program, new regulations have had minimal effect on MIT investigators in the areas of animal biosafety, human embryonic stem (hES) cells and iPS cells, and synthetic biology. We are looking at strengthening the program for risk identification and management of "dual-use research" to be sure we will be well positioned to put a revised program in place if and when final government requirements are published.

Several aspects of our oversight programs have been adopted by other institutions. The most recent example is Partners Health Care Inc. Partners adopted our registration and review process for hES cell-based research, integrating it into the organization's Institutional Biosafety Committee. The company also adopted our form and plans to implement it for all of their hospitals, offices, and other facilities in Boston, including the hospitals in the Longwood area.

Sustainability Program

The Sustainability Program was established to collaboratively develop, strengthen, and realize MIT's institutional commitments to integrate principles of sustainability and environmental stewardship into all aspects of MIT's facilities, activities, and operations in a manner that enhances the Institute's core education and research mission. The Sustainability Program advances its mission by providing leadership in visioning, planning, facilitating, coordinating, communicating, and executing programs and projects that bring best practices into our campus operations.

FY2011 saw the continued progress of the Sustainability Program—and sustainability improvements across campus—with a deepening of existing stewardship initiatives and the initiation of new ones focused on energy and an expansion of our partnerships with faculty, students, and staff.

FY2011 Program Highlights

Enhancing Campus Operations

Recognition

In 2011, several aspects of MIT's sustainability and facilities work were recognized with respect to accomplishments and leadership status among the Institute's national,

regional, and local peers. Specifically, MIT's campus energy work—focused on energy efficiency and community engagement—was recognized with several awards.

- MIT was named a "Business Leader for Energy Efficiency" by the Northeast Energy Efficiency Partnerships for Efficiency Forward, the Institute's groundbreaking energy efficiency program in collaboration with NSTAR.
- The city of Cambridge recognized the depth and breadth of our sustainability work, which focusing on engineered infrastructure work as well as promoting individual action to address climate and energy issues, with a 2011 GoGreen Award in the Energy category. With GoGreen Awards for our sustainable transportation programs in 2009 and our waste and recycling programs in 2006, MIT has earned recognition from the city for all three of our major sustainability programs.
- Massachusetts Interfaith Power and Light, a nonprofit organization of leading faith-based organizations, presented the EHS sustainability deputy director (who had been nominated by an MIT faculty member) with its "Leading by Example" award for leadership in the development and coordination of MIT's campus climate and energy work.
- The Massachusetts Department of Transportation recognized MIT's alternative transportation program with its ECO Award for Excellence in Commuter Options.

MIT accepted an invitation from US Department of Energy (DOE) secretary Stephen Chu to be the only university to pilot the Global Superior Energy Performance Partnership, a new DOE-supported public-private partnership designed to accelerate energy efficiency improvements in commercial buildings and industrial facilities. MIT's campus energy program was also recognized by DOE with the award of a technical assistance grant to participate in its Commercial Building Partnerships program, which seeks to leverage national energy laboratory expertise in identifying significant energy efficiency strategies on campus.

Energy Efficiency

From FY2007 through FY2011, MIT accumulated annual energy savings of more than 160,000 MMBTU from thermal and electrical projects, resulting in over $3.5 million in cumulative annual savings. This represents an annual reduction of more than 5 percent of MIT's total energy use. In FY2011 alone, MIT reduced its electricity use by over 14 million kWh, including work accomplished through our 2010 Efficiency Forward program and additional work completed in FY2011 (see also the MIT Department of Facilities report to the president).

In January 2011, MIT marked a milestone: the Efficiency Forward program concluded its first year of collaboration with very strong success. The program achieved an energy reduction of 13 million kWh, exceeding the first-year goal (10 million kWh) by 30 percent.

An important component of the Efficiency Forward program is to inform and engage the community in encouraging other local organizations to adopt similarly focused

efficiency programs. On January 11, MIT president Susan Hockfield and NSTAR CEO Tom May hosted "Efficiency Forward: Partnering for Success," a forum recognizing the important role energy efficiency plays in Massachusetts' clean energy economy and celebrating the strong progress of the MIT/NSTAR collaboration.

Sustainable Design

In FY2011, the new Sloan School of Management and Koch Institute for Integrative Cancer Research buildings were completed, and both are anticipated to achieve a strong "gold" rating from the US Green Building Council's Leadership in Energy and Environmental Design program for their high level of sustainable design. The design teams used an integrated process to achieve greener buildings that tackle energy use head on and challenge current conventional heating, ventilation, and air conditioning needs to improve system efficiencies. The new Sloan School and Koch Institute buildings will use 45% and 30% less energy, respectively, than typical similar buildings. The EHS Office's industrial hygiene program worked closely on the laboratory ventilation design in the Koch Institute building to challenge conventional rules of thumb and maximize energy efficiency while enhancing occupant safety and comfort.

Improving Transportation Options

Aggressive transportation demand management programs at MIT include subsidized Massachusetts Bay Transportation Authority (MBTA) passes, ride shares, van pools, and local car sharing services, as well as significant investments in bicycle infrastructure. A key metric for measuring transportation program success showed a strong improvement in FY2011: MIT's percentage of single-occupant vehicle trips declined to 19 percent, a rate significantly below the state and national average. The EHS Sustainability Program supports MIT's alternative transportation programs by promoting best practices and commuter choices through its Green Ambassadors program and other outreach efforts.

Waste and Recycling

The EHS Sustainability Program continued to support progress in waste minimization, recycling, composting, and pollution prevention activities. In FY2011, MIT's recycling rate increased to 47 percent, a 7 percent increase from 2009 levels. The Sustainability Program organized and implemented a dorm move-out clothing drive in collaboration with the MIT Women's League, the Division of Student Life, the EHS Office, and others. The event collected over 2,000 pounds of clothing for the MIT Women's League and local area charities.

Supporting Student Educational and Engagement Opportunities

The EHS Sustainability Program is helping realize MIT's goal of opening our campus operations as a living laboratory—via Undergraduate Research Opportunities Program (UROP) projects, special classes, internships, theses, and research projects—to foster students' emerging technical and leadership skills in helping to define and solve our energy challenges. For example, one campus sustainability UROP project worked with the EHS Headquarters Office, the Office of the Vice President for Finance, the MIT Center for Transportation and Logistics, and Staples Inc. to assess the MIT community's interest and preferences in purchasing environmentally preferable office supplies from

Staples. Also, through the Center for Transportation and Logistics, two supply chain management master's students researched and designed a reusable delivery tote system for Staples to pilot on the MIT campus to reduce resource use.

In FY2011, the Sustainability Program continued to manage, administer, and grow the MIT Energy Initiative (MITEI) Student Campus Energy Project Grant Fund, which awards grants to support innovative student projects on campus that advance our campus energy and environmental stewardship goals. Since 2007, 47 grants totaling over $40,000 have been awarded.

The Sustainability Program and the Department of Facilities partnered with the MITEI Energy Education Office to develop campus-focused research projects that addressed campus sustainability issues. The Sustainability Program has taken the lead in collaborating with the MITEI Education Task Force on approaches to enhance the use of the campus as a learning laboratory for undergraduates in the energy minor and freshman education programs.

Administrative units, including the Department of Facilities and EHS Headquarters Office, continued to support curricular, project-based learning activities by developing and advising campus energy-related projects for, among others, ESD.123 Industrial Ecology, the Sloan School of Management's executive education program, and the Freshman Pre-Orientation Program (FPOP).

Building Community Awareness and Engagement

A Network of Change Agents

The Green Ambassadors program was established in 2009 to create and empower a network of individuals interested in taking action in their own lab, office, or dormitory to promote more sustainable practices at MIT. By the end of FY2011, the program had grown to include 300 staff, faculty, and student volunteers modeling and promoting the Institute's energy and environmental stewardship objectives. The EHS Sustainability Program manages and supports this popular initiative.

Building Awareness on Campus and Beyond

A key component of our campus sustainability program is building awareness in the community to both inform and expand support and input for our activities. Examples include the following:

- MIT Alumni Leadership Conference session on campus energy progress
- Efficiency Forward forum event for large regional energy customers
- Submission of progress report on the Global University Leaders Forum/ International Sustainable Campus Network Sustainable Campus Charter
- Presentation of *greeningMIT* exhibit at the MIT150 open house
- Representation at events such as the Earth Day Fair, Transportation Fair, and HR Staff Engagement Fair

- Leadership of an interdepartmental team to plan and execute Earth Day and Earth Week activities
- Planning and implementation of a dorm move-out clothing drive in collaboration with the MIT Women's League, the Division of Student Life, EHS, and others
- Tech Reunion alumni panel on MIT sustainable design practices
- Publication of news articles on campus energy projects for the News Office and MITEI

In January 2010, President Hockfield joined 25 of her national and international counterparts in signing the World Economic Forum's Global University Leaders Forum Sustainable Campus Charter. The charter reaffirms MIT's commitment to embrace sustainable development principles that guide campus operations toward a more energy-efficient and sustainable future. The charter provides an additional platform to engage with and share our experience with many international peer institutions on the important issues surrounding campus sustainability. In January 2011, the EHS Sustainability Program developed and submitted MIT's first annual progress report to share the Institute's activities with the global community.

Supporting and participating in local and regional environmental initiatives is an important role of EHS Headquarters and the EHS Office. Together, the Sustainability Program and the EHS Office represent MIT in a number of off-campus community initiatives and programs to share information, learn best practices, and enable others to take action. Examples include participation in the Boston Green Ribbon Commission, the Northeast Campus Sustainability Consortium, the Ivy Plus Sustainability Working Group, Greater Boston Breathes Better, the Campus Consortium for Environmental Excellence, Cambridge Public School Volunteers, the Boston Consortium, the Clean Charles Coalition, the Campus Safety Health and Environmental Management Association, the Cambridge Energy Alliance, the US Environmental Protection Agency, the Massachusetts Department of Environmental Protection, Recyclemania, and many more.

Upcoming Sustainability Program Goals

- Work collaboratively with the Department of Facilities and other key departments to develop, coordinate, and execute a focused agenda for the Campus Energy Task Force in support of the new executive vice president, who will be joining as co-chair.
- Develop and implement a collaborative approach for setting Institute-wide sustainability goals and performance metrics to support activities related to the Global University Leaders Forum Sustainable Campus Charter and other Institute-wide programs.
- Work collaboratively with the Department of Facilities and other key departments and academic units to develop energy conservation and efficiency measures to support the MIT Efficiency Forward commitments for the remaining two years. This includes a focus on engaging faculty and staff in joint collaborations and expanding outreach and education on program implementation.

- Help realize a collaborative student learning program and campus energy project-based curriculum development in partnership with the MITEI Education Task Force.
- Deepen collaboration, engagement, and integration of the EHS Office to enable adoption of energy-efficient practices and behaviors across our laboratories and other areas of MIT.
- Strengthen community outreach for, awareness of, and engagement in campus sustainability activities through enhanced outreach efforts, expanded campus events, new behavior change campaigns, and strengthened Green Ambassadors programming. This includes a focus on developing methods to measure and monitor impacts of behavior-based programs.

FY2012 Objectives

- *Develop a process to increase awareness of EHS standard operating procedures:* During the last 10 years, we have developed over 100 standard operating procedures that describe or guide key activities performed at the Institute. These procedures are very detailed, and many have a wide diversity of audiences who need to adhere to them. We plan to develop a process to increase the awareness of these procedures in the community, provide quick use guides, and identify key members of the community who could benefit most from them.
- *Complete 10 design guidelines:* Each year we have developed specific and detailed guidelines for the design of facilities that have an EHS component. These are intended for use by architects and engineers who design or manage new construction or renovation activities at the Institute. We initiated this program four years ago and identified over 100 specific guides that could support the MIT building system design handbook maintained by the Department of Facilities. We have completed 40 and plan 10 more for the upcoming year.
- *Monitor reporting of student accidents and injuries:* We routinely track injury and illness rates for employees as required by the Occupational Safety and Health Administration and use this information to prioritize our efforts and implement procedures to reduce these rates. This is not required for students, but in an effort to improve our overall program we are partnering with MIT Medical to pilot a program to identify and track students who report to MIT Medical with an injury or illness that may be related to their work at the Institute. The intent is to assess the magnitude of such incidents and identify the causes in order to design appropriate preventive measures.
- *Provide EHS staff with professional development opportunities:* This is a continuing effort to ensure that EHS staff members maintain proficiency in their appropriate disciplines while obtaining broader skills in the other related EHS disciplines. This will enhance our efficiency in delivery of services and provide growth opportunities for our staff.
- *Assess machine shop policies (including working alone policy and program evaluation):* The recent death of a student at Yale working alone in a machine shop has

initiated an assessment of such activities at the Institute. This has led us to look beyond machine shops and at all activities that may present an immediate hazard if the work is done alone.

- *Implement the Construct-Secure program:* Construct-Secure is a construction safety program that allows us to assess the qualifications of contractors to perform work in compliance with all applicable regulations and in a safe manner. It was initially designed for the construction industry, and we have begun to use it on capital projects and large-scale renovations. We are exploring the potential to use it to assess all contractors who perform maintenance-type activities on campus. The goal is to reduce the potential for accidents and incidents that can put the Institute at risk and ultimately decrease the cost of these types of activities on campus.
- *Develop a template for an awareness course on international research:* The recent trend to enter into agreements with governments, universities, or research institutions outside the United States has presented some unique challenges with respect to EHS issues and regulations. Building on our recent experiences with the Campus for Research Excellence and Technological Enterprise (CREATE) in Singapore and the Skolkovo Institute of Science and Technology (SIST) in Russia, we plan to establish a process that could be used in future agreements to assure that EHS issues are identified and addressed early on and to develop a guide for faculty, staff, and students that identifies the policies and procedures that will be employed at the particular host site.
- *Implement a biowaste pilot project:* The current practice of autoclaving waste biological materials generated in laboratories and shipping them offsite for incineration is costly as well as time consuming for laboratory personnel. We plan to pilot a process that would eliminate the need for autoclaving prior to shipment offsite. If successful, this will save up to $50,000 per year in disposal costs and a significant amount of time for lab personnel, as well as possibly eliminating the need for some autoclaves and realizing associated savings in energy and space.
- *Perform a comprehensive written risk assessment of undergraduate laboratory experiments:* While we do not have any reason to suspect the safety of undergraduate laboratory experiments, there has not been a systematic evaluation of the experiments performed. We currently review undergraduate laboratory experiments that use radioactive or microbiological agents and chemicals upon request. We plan to pilot a program to perform a more comprehensive and systematic hazard analysis of at least five undergraduate experiments to assess the potential hazards and to recommend practices or materials that might provide an additional level of safety without altering the educational value (and perhaps even enhancing it).
- *Conduct at least two student/staff contests with EHS improvements as the goal:* In an effort to engage the community more in safety, and learning from our colleagues in Singapore who have utilized this approach successfully, we plan to pilot at least two contests that ask participants to develop “safety videos” or something

similar around a specific topic. The first one will focus on machine shops as part of that initiative.

- *Improve database access, utilization, and applications for EHS support purposes:* This has been an ongoing process, in collaboration with Information Services and Technology (IS&T), to improve the accuracy and usefulness of EHS metrics we collect and to reduce the burden on researchers to comply with existing regulations.
- *Conduct a new PI EHS orientation:* This is an effort to help new faculty who perform research with hazardous materials or equipment to understand their responsibilities and become aware of the resources available to assist them. We developed and successfully piloted this initiative in two departments this year and plan to expand it to the Institute.
- *Conduct a laboratory hazard assessment:* EHS currently assesses the use of radiation-producing material or equipment and biological materials as required by regulations. We are investigating a process to conduct a more comprehensive hazard assessment that also includes chemical and physical hazards. The intent would be to categorize our labs based on level of hazard and to prioritize our resources based on risk. We plan to pilot the process in a few labs this year.
- *Ensure consistency of inspections:* Currently all laboratories are inspected twice per year. These inspections are performed by a combination of DLC EHS coordinators and EHS Office staff. This results in approximately 50 different people conducting inspections. In order to verify and assure consistency, we plan to implement coordinator/lead contact training on documenting inspections as well as develop methods to perform a quality assurance/quality control assessment of inspection consistency. In FY2011, two laboratories were shut down by the Cambridge Fire Department due to poor housekeeping. This has prompted us to focus on this issue in FY2011 inspections.
- *Develop an accurate inventory process:* The Institute Council on EHS, at the urging of the Institute Committee on Toxic Chemicals, has directed EHS to establish a working team among Procurement, EHS, and IS&T to investigate the possibility of working with our vendors to obtain a real-time, accurate inventory of chemicals used at the Institute.
- *Enhance sustainability:* The goal is to advance sustainability actions by rededicating the task force and strike team models previously successfully used for this program. This is intended to complement the successful Green Ambassadors program.
- *Monitor emergency management:* In conjunction with the MIT Police and the Department of Facilities, EHS will oversee the certification process for MIT's emergency management program (See also the Department of Facilities report to the president).

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