SOLVING FOR SUSTAINABILIT

The MIT Office of Sustainability's Foundational Work | 2014–2019 This report seeks to communicate the work of the Office of Sustainability, its methodology, programmatic highlights, evolution, and accomplishments, since launching in 2014.

Each section highlights projects which exemplify this approach to solving for sustainability. The projects and accomplishments listed in this document are not intended to be a cumulative list of all the projects the office led, engaged with, or were partners in. The projects highlighted, however, are indicative of the many ways the Office of Sustainability works to fulfill its mission.

The report is organized by the ways in which the work of the office has been executed.



- 2 Building Influence
- 4 Methodology
- 6 Sustainability Leadership
- 8 Communicating Impact
- 11 Campus as a Test Bed
- 12 Working Across Scales



-



Baseline data collected for MIT emissions reduction goal

Project areas established

Sustainability Working Group recommendations released



Sustainability

Plan for Action on Climate Change released

2015

2016 LEED Gold commitment



Fellows program launches





2017

2018

MIT Climate Resiliency Committee launches



- 3 Organizing around Areas of Impact
- **10** Moving from Silos to Systems

2020

Dining wins Kendall Food Prize



2019

Hive Sustainability Garden opens

Pathways to Sustainability Leadership Report



for and earns AASHE STARS

Building Influence -

Launched in 2014, the Office of Sustainability (MITOS) has consistently worked to fulfill its mission to transform MIT into a powerful model that generates new and proven ways of responding to the unprecedented challenges of a changing planet through operational excellence, education, research, and innovation on our campus.

Since its inception, MITOS has worked to reimagine how a university sustainability office should be structured and operate. By viewing sustainability as a challenge to be grappled with at the level of the individual, campus, city, and globe, MITOS has established an innovative, comprehensive, and ever-evolving approach to addressing how an organization needs to transform in light of the biggest challenges of our time.

Working in partnership with the City of Cambridge and Greater Boston; campus departments, labs, and centers (DLCs); student groups; and peers across the region and globe, MITOS has accelerated and supported innovative systems focused on a low-carbon campus, materials lifecycle, campus food systems, healthy people, sustainable mobility, and climate resiliency. MITOS continues to leverage MIT's campus as a testbed for ideas — serving as a microcosm for global issues and solutions.

Looking forward, MITOS seeks to continue this transformative work while understanding that solving for sustainability at MIT means sourcing solutions for the world. Solutions found at MIT are the result of collaboration with stakeholders and individuals across the Institute. In working with individuals and teams across campus, MITOS is able to keep focus on the people at the center of a sustainable campus—understanding their needs, motivations, and unique abilities to contribute to solving for sustainability at MIT.



FIGURE 2 MITOS Scales of Impact

Organizing around Areas of Impact —

The Office of Sustainability prioritizes its work around 11 *Areas of Impact* organized by five categorical themes that depict future attributes of a sustainable campus (see Figure 3).





မိုိ

THRIVING NETWORKS Campus, city, and globe

FIGURE 3 Areas of Impact



ZERO CARBON CAMPUS Climate, Buildings, Energy, Mobility



CLIMATE RESILIENCY

Water, landscape, campus infrastructure

3

MATERIAL LIFECYCLES
Procurement and waste

HEALTHY PEOPLE

Food, vibrant community

Methodology

One of the most distinctive aspects and arguably the underlying value proposition of the Office of Sustainability to MIT is the ability to leverage the campus as a test bed to inform innovation and implementation across our *Areas of Impact*. As depicted in Figure 4, the MITOS staff seek out both faculty and operational experts alike to inform our understanding of the impact of current practices in an effort to inform innovative solutions and a future state.

FIGURE 4

MITOS methodology depicting the role of the test bed

RESEARCH &

PUBLICATIONS

REVISED &

UPDATED MODEL

INNOVATIVE

SOLUTIONS

Research & course engagement Operations & campus infrastructure

 \bigcirc

(4)



Sustainability Leadership —

MITOS is uniquely positioned within MIT to act as a unifier and problem solver. MITOS is able to support research and policy development that advances sustainability solutions across the Institute, allowing these actions to have a multiplier effect. Our goal is for solutions devised with the support of MITOS and collaborative partners to be replicated in new locations on campus and beyond.



Sustainability Connect is a yearly event designed to bring together those at MIT working to create a more sustainable campus and world.

Operating with a team of seven staff members, MITOS is able to have outsized influence relative to its headcount. MITOS has embraced and implemented a stakeholder-based methodology to seek input on the process from problem definition, to solution development, to implementation. With that in mind, MITOS also represents MIT on numerous Cambridge sustainability and energy committees.

Some of the committees to date include leadership on the Campus Sustainability Task Force and the Sustainability Leadership Committee at the institutional level, to working groups organized and facilitated by the office such as the Building Design and Construction, Food and Sustainability, Climate Resiliency, Water Stewardship, and Materials Management Working Groups, all launched between 2014–2020. Staff also contribute to campus-wide committees such as the Transportation and Parking Committee, the Planning Review Committee, the Greenhouse Gas Steering Committee, and Committee for Renovation and Space Planning.

In this role, MITOS has worked to facilitate the processes that have led to the Institute to adopting new frameworks, policies, and standards from design and construction, and procurement and waste systems to food systems, and greenhouse gas mitigation strategies. By design, MITOS has the ability to lead and be agile in response to the changing needs of the Institute and field of sustainability. For example, as MIT looked to revisit their waste hauler contract at the end of a contact term, MITOS led the charge in securing a waste hauler that could better meet the sustainability and data needs of the campus. As students and the campus community pushed for more local food, MITOS worked to secure grant funding to pilot a regional food program at MIT, leading university partners in the process and shepherding a path forward for institutions seeking a similar goal. This ability to respond strategically and deliberately to real-time needs has codified MITOS's role as a campus leader and catalyzer.

Below we highlight areas where MITOS's leadership in projects greatly impacted MIT's sustainability mission and efforts.

STARS GOLD (2018)

MIT first earned a STARS Gold rating in recognition of its sustainability achievements from the Association for the Advancement of Sustainability in Higher Education (AASHE) in 2018. STARS, the Sustainability Tracking, Assessment & Rating System measures and encourages sustainability in all aspects of higher

By design, MITOS has the ability to lead and be agile in response to the changing needs of the Institute and field of sustainability.

education. MITOS led efforts in compiling the data for MIT's submission which was an act of teamwork involving over 75 staff, faculty, and students across the Institute. AASHE's STARS program is the most widely recognized framework in the world for publicly reporting comprehensive information related to a college or university's sustainability performance. Participants report achievements in five overall areas: academics, engagement, operations, planning and administration, and innovation and leadership.

ACCESS MIT (2016)

In 2016, MIT set out to reduce parking demand on campus by 10 percent over two years with the launch of Access MIT. MITOS participated in the design process with researchers and decision makers on the development of the program which combines pay-per-day parking with zero-cost access to MBTA subway and local bus, among other benefits for employees. Access MIT combines flexibility (daily rate parking) and incentives (free local MBTA access) to change the way the MIT community thinks about commuting. Lauded in the 2019 Boston Globe Spotlight series "Seeing Red" for its sophisticated and comprehensive approach to commuter incentives, Access MIT has helped redefine the culture of commuting at MIT and demonstrate what is possible for employer-sponsored transportation programs. MITOS continues to explore new, flexible options as the program has contributed to a nearly 15 percent reduction in on campus parking demand and consistent year over year increases in employee public transportation use.

SUSTAINABILITY WORKING GROUP RECOMMENDATION (2014)

In 2014, MITOS launched four working groups organized around building design and construction, stormwater management, materials management, and energy use in laboratories. The four sustainability working groups, made up of operational staff and supported by faculty, convened for a ten-month period. Their collective recommendations sought to lay the foundation for MIT's emerging commitment to becoming a state of-the-art sustainable campus. Included in these many recommendations was for MIT to commit to a goal of LEED Gold version 4 certification for all new construction and major renovation projects at MIT. The Institute has been guided by this goal since 2016 and seeks to exceed requirement of LEED Gold v4 and pursue other high-performance design standards and industry best practices as called for in the recommendations.



7

Communicating Impact ———

Data is an essential tool to inform and measure meaningful advancement in sustainability. Data provides foundational metrics that tell us where we have been, what we have accomplished so far, and how we can evaluate our progress moving into the future.

It allows us to assess the impact and efficacy of past initiatives, from transportation, to energy, to waste, to food as well as better understand how different elements of the MIT campus system interact and influence one another. Data enables us to make predictions for the potential evolution of the campus system into the future. Developed by MITOS, MIT's Sustainability DataPool provides multiple sources of information to accomplish these possibilities.

By presenting raw data as well as accessible visualizations, MITOS empowers the MIT community in devising solutions to complex problems related to a changing climate. For example, the aforementioned Access MIT relied on complex raw data from multiple sources to identify areas to drive more sustainable commuting as well as measure behavior changes that stemmed from the ideas. That data continues to be collected and analyzed to identify ways to improve the program, while portions of that data, like Blubebike rides, are easily visualized on the DataPool.

Two examples of communicating impact through data are highlighted below.

SUSTAINABILITY DATAPOOL (2016)

Launched in 2016, MITOS's Sustainability DataPool is a collaborative project that provides the MIT community with access to campus sustainability data and visualizations. Using real time data — from building energy use to campus water use — the tool empowers MIT community members by giving them the data they need to understand current performance and inform innovative sustainability solutions and ideas. The DataPool has been cited in research and projects across campus including the DUSP Climate Action Plan, MIT Facts, and Town Gown Report for the City of Cambridge.

GREENHOUSE GAS MITIGATION PLANNING AND REPORTING (2015)

Since the Plan for Action on Climate Change was launched in 2015, MITOS has coordinated and worked closely with offices charged with reducing MIT's greenhouse gas emissions to develop a comprehensive mitigation plan to achieve MIT's emissions commitments. The plan guides the implementation of MIT's mitigation work focused on energy efficiency, transition to lower carbon fuels, renewable energy investments, and test bed projects. Core to this is planning and implementation is the development and delivery of baseline and ongoing performance data.

Energize MIT, a dashboard embedded within the MIT DataPool, realizes MIT's commitment to provide the MIT community with replicable, robust, and transparent data on campus energy use and GHG emissions. Leveraging this standardized data set, MITOS continues to provide the regular analysis and reporting on MIT's performance towards its climate mitigation goals. In addition to providing quarterly reporting to senior leadership, MITOS collects and shares an annual update on the work to meet MIT's greenhouse gas emissions goal.

Working in conjunction with the Department of Facilities, MITOS develops a simple, accessible report on emissions and energy efficiency progress to date, providing an update on the plan for climate action while highlighting major projects and challenges. This report is presented in straightforward language and features graphs, visualizations, and equivalency data so that the MIT community can easily understand the MIT's progress towards its 2030 emissions reduction goal.





— 2015–2019 REPORT

Moving from Silos to Systems

Partnership is an essential tool in reaching aggressive goals to transform campus into a model for sustainability leadership, as called for in the Pathways to Sustainability Leadership report.



These partnerships—like MITOS's vision—are not project based, but systems based. They serve as an example of turning siloed departments, labs, and centers into effective systems supporting sustainability — systems that will advance regardless of staffing or changes in leadership. Established partnerships further energy efficiency, climate resiliency, sustainable campus food systems, and materials management.

Nearly all projects facilitated by MITOS rely on cross-campus collaboration and buy in. Two recent projects which highlight this importance of collaboration follow.

PATHWAYS TO SUSTAINABILITY LEADERSHIP **REPORT (2018)**

Co-chaired by MITOS Director Julie Newman and Arthur and Ruth Sloan Professor of Political Science Andrea Campbell, the Campus Sustainability Task Force developed "Pathways to Sustainability Leadership: Innovation, Transformation, and Mobilization," a vision and plan of action for campus sustainability at MIT through 2025. The report engaged stakeholders and the MIT community in creating what aims to be a standard-bearer for a sustainable future for institutions. The report outlines five elements that make up the Pathway to Sustainability Leadership by MIT. These guiding elements seek to deepen and build upon an already activated foundation of climate and sustainability leadership in a manner that matches the complexity and magnitude of the challenge at hand.

KENDALL FOOD PRIZE (2019)

MIT Dining—and its food service management partner, Bon Appetit — in collaboration with MITOS was one of six winners of the Henry P. Kendall Foundation New England Food Vision Prize. MIT Dining was awarded \$250,000 to explore bold and innovative ideas that strengthen the region's food system. MITOS will help facilitate MIT's winning proposal—so-called "Food from Here"—which has set out to increase the amount of New England-grown food served on campus, while strengthening the capacity of our local farm and processing partners to supply food to the region. The proposed program meets the measurable, sustainable, and replicable goals of the Food Vision Prize while incorporating social justice, food security, and recent recommendations from the MIT Food and Sustainability Working Group. Those recommendations call on MIT to ensure that students have access to "affordable, sustainable, and culturally meaningful food" and to "empower consumers to make informed choices," all inspired by the Institute's innovative spirit.

Campus as a **Test Bed**

MIT president L. Rafael Reif has said that MIT's greatest gift to the world is MIT itself. Building off of that, we believe that MIT's greatest asset in understanding and solving for sustainability is the campus itself.

With 20,000 community members, housing, dining, a Central Utilities Plant (CUP), and approximately 170 buildings and growing, MIT, by design, acts as a testbed for sustainability solutions. MITOS understands and acts on the idea that what can be tested and proven at MIT can serve the world. The Campus Sustainability Incubator Fund seeks to codify this vision by funding on-campus research to develop solutions for MIT to have great impact beyond the campus as well. Additional examples include testing artificial intelligence to improve building controls systems, new materials management approaches in DLCs, and pilot building-specific waste pilot programs across campus.

A selection of current programs that facilitate and leverage the campus as a test bed are below.

THE SUSTAINABILITY INCUBATOR FUND (2017)

The Campus Sustainability Incubator Fund was launched with climate action. This real-world data will help validate models the support of a donor who initially provided \$450,000 to incenand estimates of battery performance and lessons learned can tivize MIT researchers to conduct their applied research on the be applied at MIT and replicated on other campuses. MIT campus in partnership with operational staff. Since 2017, the fund has supported critical research, prototyping an appli-**CLIMATE RESILIENCY (2018)** cation that seeks to solve for sustainability challenges. To date, A climate resilient MIT is an Institute that continues to fulfill projects have included water capture from the power plant, its mission in the face of impacts from climate change. MITOS prototype of carbon neutral cooling, and understanding the is working to facilitate teams to understand and prepare for lifecycle of rubber gloves. The fund supports solutions to solve the flood risk to campus along with extreme heat events. The for high performance design, energy efficiency, material design, MIT Climate Resiliency Committee, managed by the Office of human comfort, and more. Priority is given to inter-disciplinary Sustainability, is tasked with assessing, planning, and operationresearch teams that frame the challenge via a systems-thinkalizing a climate resilient MIT. The Committee is a collaboration ing framework, in an effort to broaden measurable impacts, and among faculty; engineering and facility staff; risk, insurance, and systems-based solutions where feasible. climate science experts; and students individually and collectively driving efforts that grow a climate resilient campus. In **BATTERY STORAGE (2018)** addition to being essential partners with the City of Cambridge Supported by an Incubator Fund grant, the Trancik Lab, led by in comprehensive climate resiliency planning, MITOS has developed flood risk, probabilities, and probalization models as well Assistant Professor Jessika Trancik, has developed a new energy storage project to test software approaches to synchronizing as a flood risk mapping tool to understand the impact of various flood events. energy demand and supply and evaluate the performance of dif-

ferent energy-storage technologies against these use cases. It has the benefit of connecting on-campus climate research with



Working Across Scales -

The scales of impact delineate MITOS's approach to solving for sustainability at the level of the individual, the campus, the city, and the globe.

MITOS relies strongly on the relationships built with students, departments, and peer institutions as well as the City of Cambridge. The scales are also represented in the many ways MITOS facilitates finding solutions for climate challenges. For example, striving for a high energy efficiency campus can occur at the level of the individual with reminders to staff to power down laptops or turn off lights; at the level of the campus with energy retrofits and smart lighting systems in buildings; at the level of the city working with the Boston Green Ribbon Commission; and with the globe, where lessons learned from MIT's first PPA can be applied by other large institutions.

The projects highlighted below are just a few examples of how MITOS has worked at different scales to solve for sustainability at the level of the individual, campus, city, and globe.

CITY OF CAMBRIDGE (2014)

As climate change knows no campus boundaries, much of the work of MITOS is developed collaboratively with the City of Cambridge. MITOS serves as an MIT representative on a number of city committees and teams focused on climate change mitigation and adaptation, as well as materials management, transportation, and water. MITOS has worked closely with the City of Cambridge as part of the Cambridge Compact for a Sustainable Future, the City of Cambridge Climate Change Preparedness and Resilience Plan, the Net Zero Action Plan, the City of Cambridge Climate Resilience Zoning Task Force, and more. MITOS has worked hard to forge new methods of collaboration that build trust, develop better solutions, and accelerate progress with diverse stakeholders. Strategies from these collaborations have direct impact on the campus and city level, while serving as a model for collaborative approach to other universities and municipalities.



30

metric tons of offset greenhouse gas emissions in 2019

87,300 megawatt hours of 87,300 megawatt hours c solar purchased in 2019

SUMMIT FARMS SOLAR FACILITY (2016)

MIT continued to benefit from MIT's 25-year commitment to purchase electricity generated through its Summit Farm Power Purchase Agreement (PPA). The agreement has enabled the construction of a roughly 650-acre, 60-megawatt solar farm on fallow farmland in North Carolina. Through the purchase of solar power, MIT was able to offset nearly 30,000 metric tons of greenhouse gas emissions from our on-campus operations in 2019, equivalent to 40 percent of the Institute's current electricity use. The Summit Farms PPA model has been credited with inspiring a number of similar projects around the country putting additional renewable energy onto the power grid.

SUSTAINABILITY CONNECT (2015-2020)

Since 2015, MITOS has convened Sustainability Connect, an annual meeting to bring together the ecosystem of actors at MIT working to create a sustainable campus and world. Each year, the program incorporates panels and interactive workshops with staff, faculty, researchers and students representing a broad array of departments, ranging from the Department of Facilities to the Innovation Initiative to the MIT Energy Initiative to MIT Medical. The day is meant to strengthen the sustainability network at MIT, build connections between colleagues, and equip attendees with new skills and ideas for action.

STUDENT FELLOWS (2016)

The crucial work of the MITOS team is supported by student fellows who focus on annual priority areas including design, waste, materials, greenhouse gas emissions, and more as needs evolve. These students—both undergraduate and graduate level—have contributed a tremendous amount of work to MITOS and MIT as a whole, including modeling for climate resiliency, establishing MIT's first sustainability garden, and analyzing our parking and transportation trends. Since 2015, MITOS has hosted 69 student fellows in the office, 48 of which were MIT students.



Going forward, the Office of Sustainability is looking to build upon its strong track record of success, established partnerships, and innovative methodology to advance solving global problems at the local level. MITOS is focused on an outcome-oriented vision—imagining MIT as an example of a state-ofthe-art sustainable campus, and understanding the work we must do to get there. The ultimate goal of MITOS is an MIT where sustainably is embedded into the fiber of the Institute and considered in every decision that is made.

The coming year will see the update to MIT's Plan for Climate Action, which will engage the office in further addressing the challenges of climate change at the organizational level and laying the groundwork for a carbon neutral campus. MITOS will continue its work in moving from silos to systems to serve the campus, city, and globe, while also having special focus on the role of the individual in grappling with the challenges and opportunities in sustainability on campus.

Effectively and broadly communicating how community members can support the mission of MITOS is of increased importance for the future. Exciting and meaningful work launched in 2019 supporting sustainable food systems, campus resiliency, and materials management will have increased focus in the coming years to bring about a comprehensive approach to a sustainable campus. This work will also provide important baselines for advancing all areas of impact and determining how to accelerate and scale sustainability solutions at MIT and in the world.





MIT OFFICE OF SUSTAINABILITY

77 Massachusetts Avenue, NE49-3161 Cambridge, MA 02139

sustainability.mit.edu sustainable@MIT.edu