Fast Forward: MIT's Climate Action Plan for the Decade

A commitment to leadership in solving the climate crisis

May 2021

Massachusetts Institute of Technology

Letter to the Community

May 12, 2021

To the members of the MIT community:

In the fall of 2015, we announced MIT's first climate action plan. Today, building on that five-year vision, we share a new plan that mobilizes MIT's strengths to address this accelerating crisis: **Fast Forward: MIT's Climate Action Plan for the Decade**.

You can find the highlights on MIT News.

The plan is guiding our actions already. At the same time, it is a living document, and we welcome your thoughts. Please email fastforwardclimate@mit.edu.

The challenge

The challenge, in broad strokes: Humanity must find affordable, equitable ways to bring every sector of the global economy to net-zero carbon emissions no later than 2050. At the same time, as a species, we must adapt to effects of climate change we can't prevent, taking special care for those with the fewest resources, who have contributed least to the problem but are likely to be hurt first and worst.

To do all that in less than 30 years, we need to pursue two tracks simultaneously – and at fast-forward speed:

- On track one, we must go as far as we can, as fast as we can, with the tools and methods we have *now*. These include science, technology, policy, markets, infrastructure, and levers for behavioral and cultural change. As one example, the new federal commitment to cut emissions to 50% of 2005 levels by 2030 will likely spur powerful incentives for industries, institutions and individuals to leap towards change. All of us can be part of track one, right now.
- On track two, societies around the world need to invest in, invent, and deploy *new* tools—and promote the new institutions and policies, tuned to each region, that it will take to reach the 2050 goal.

  Ultimate success depends on breakthroughs. Current tools alone will not get us to the target.

At the same time, it will be crucial to educate and empower the members of the next generation, as they will inherit the impacts of this problem and the ongoing challenge of solving it.

In all these areas, MIT is in an extraordinary position to make a difference – and to set a standard of climate leadership. With this plan, we commit to a coordinated set of leadership actions to spur innovation, accelerate action, and deliver practical impact.

With gratitude and admiration

In sharing this plan, we offer two profound thank-yous:

- First, to the hundreds of MIT faculty, postdocs, staff, alumni, and students who have, for the past five years and often much longer, devoted themselves to every aspect of the climate challenge. Together, they have given us a far more precise and predictive understanding of Earth's climate, advanced important new ideas for wringing carbon out of the global economy, enriched MIT's climate and energy curriculum, created award-winning ways to explain the climate crisis to general audiences, and reduced MIT's carbon footprint while the campus continued to grow.
- Second, we are indebted to the hundreds of community members – including the student working groups that presented at the Climate Action Advisory Committee's open meeting in February – who offered ideas and perspectives on the new plan's vision and emphasis.

The work before us

Given MIT's distinctive strengths, the work before us is to help humanity gain the tools and concepts to solve the existential problem of global warming, and the will and capacity to use them.

This plan aims to produce positive consequences for the whole human family – and we recognize that it has special significance for the generation that includes our students. Over the next 30 years, while the global population grows, the demand for higher living standards increases, and the planet continues to warm, the profound societal transformation that must take place to maintain a habitable Earth will increasingly be led by our students and their peers. They will live in the future whose qualities, for good or ill, will be shaped by actions that human beings around the world take now.

In facing this challenge, we have very high expectations for our students; we expect them to help make the impossible possible. And we owe it to them to face this crisis by coming together in a whole-of-MIT effort – deliberately, wholeheartedly, and as fast as we can.

Sincerely,

L. Rafael Reif, President
Maria T. Zuber, Vice President for Research
Richard K. Lester, Associate Provost
Anantha Chandrakasan, Dean of Engineering
Glen Shor, Executive Vice President and Treasurer

Introduction

Human actions have resulted in a climate crisis that threatens the systems that support life for all species. In order to avert the worst outcomes of climate change, we must find affordable, equitable ways to bring every aspect of the global economy to net-zero carbon emissions no later than 2050.

To meet this mid-century imperative, we must pursue the following strategies:

- Go as far as we can, as fast as we can, with the tools and methods we have *now*. These include science and technology, policy, markets, infrastructure, and levers for behavioral and cultural change.
- Invest in, invent, and develop *new* tools—and promote the new institutions and policies needed to deploy them rapidly, wisely, and equitably.
- Educate and empower the next generation, who are inheriting this problem and must ultimately solve it.

Background

In fall 2015, at the UN Climate Conference in Paris, 195 nations agreed to reduce global greenhouse gas emissions so as to limit temperature increase in this century to 2°C above pre-industrial levels, and to pursue means to limit the increase to 1.5°C, in order to maintain a global climate habitable for human beings. At that time, the National Oceanic and Atmospheric Administration's Mauna Loa Observatory, which has been measuring carbon dioxide in the Earth's atmosphere since 1958, was reporting that concentrations had reached an alarming 402 ppm, the highest in human history.

Just two months earlier, and after more than a year of community conversation, MIT adopted and began to implement its first Plan for Action on Climate Change. As the introduction explained,

> *This plan embodies the fundamental agreement across our community that the problem of climate change, the subject of serious work at MIT for decades, demands society's urgent attention; that given our mission, history and capabilities, MIT has a particular responsibility to lead; and that the moment is now.*

The plan touched on practically every aspect of MIT's work. In the years since its adoption, people throughout the Institute have applied their minds and hands to thousands of activities aimed at addressing the many aspects of the climate crisis. Here are a few examples:

- Our scientists have advanced the understanding of the Earth's climate system, including investigating the role of Arctic ice cover in regulating the speed and salinity of a major ocean current; finding that chlorofluorocarbons continue to

threaten the Antarctic ozone layer; and modeling projected health effects from China's pledge to reduce CO_2 emissions.

- MIT researchers have explored ways to refine existing renewable energy technologies, improve battery storage, modernize the electrical grid, devise practical methods for carbon capture and storage, and harness the potential of fusion to transform the world's energy system.
- Faculty across the Institute have expanded MIT's climate and clean energy curricular offerings, and students have responded by completing sustainability and energy minors, certificates, and courses, and by undertaking research projects and internships.
- MIT faculty and staff created new, award-winning communications resources to give the public accessible, evidence-based explanations of climate science and the possibilities for climate change mitigation and adaptation.
- The Institute as a whole has reduced its direct carbon footprint, even as the campus grew. To expand the supply of renewable energy; retire older, less sustainable power sources; and offset more of MIT's emissions, it also brought together partners to create one of the nation's largest solar farms.

And yet, since MIT launched that first plan, our planet has continued to warm due to the continued buildup of greenhouse gasses in our atmosphere. The primary cause is human activity, especially the burning of fossil fuels. Because those fuels are the energy source for almost every aspect of modern life, achieving a steep and rapid decline in their use will require an unprecedented global economic and technological transformation.

The New Plan

Like the first plan, our new climate action plan is focused on MIT's uncommon capacities to address the problem at hand: our powerful research engine; a community of scholars primed to work at the intersection of disciplines; experience moving ideas from lab to impact; and long-standing ties with industry and the public sector, domestically and globally. This plan includes many new steps to reduce our own emissions and climate impact. But the plan's fundamental purpose is to marshal all of MIT's capabilities:

- to make the greatest possible contribution to decarbonizing the global economy and its energy systems;
- to increase humanity's capabilities to adapt to the climate changes that will certainly occur; and
- to build greater resilience into all of our activities, infrastructure, and systems.

Through more than a year's worth of climate symposia and many months of direct discussions about the plan with every segment of our community (see Appendix), several themes emerged that infuse all of the plan's commitments.

The Centrality of Science

Since the 1970s, MIT faculty have pioneered efforts to understand the essential dynamics of global warming and its effects across land, atmosphere, oceans, and ice sheets: This research is our strategy's foundation. With this new plan, MIT redoubles its bedrock commitment to expand humankind's knowledge of the forces disrupting the climate, which are imperiling all species and warping the natural systems that support life. MIT will increase its efforts to achieve a deeper understanding of these questions, to advocate for science as the compass for climate policies, and to press for public and private support for climate research.

The Need to Innovate and Scale

Decarbonizing the world's economy in time to avoid the most damaging consequences will require new ideas, transformed into practical solutions, in record time. Speeding adoption of today's renewable energy technologies is essential. But the mid-century global goal will be out of reach without workable solutions for massive carbon-intensive sectors, such as heavy transport and the production of cement and steel, and without cost-effective ways to extract large quantities of carbon dioxide from the air.

This will require breakthroughs in science and technology; entrepreneurs who turn these breakthroughs into products and services; companies willing to pilot them and scale up solutions; and strong, effective public policies that encourage their global adoption in the shortest possible time. Building on existing MIT efforts, from the MIT Energy Initiative (MITEI) to The Engine, the new Climate Grand Challenges and MIT Climate and Sustainability Consortium target this complex challenge.

The Imperative of Justice

As difficult as it will be to reach net-zero carbon emissions by mid-century, the world must meet this challenge, and it must do so fairly. The world's energy systems must be decarbonized at the same time as improving living standards for people in the developing world increase the demand for energy. As developed countries, including the United States, shift from fossil fuels, millions of workers, their families, and their communities will need help navigating the restructuring of industries, loss or change of jobs, and disruption to their way of life. Disadvantaged and minority communities that have borne the brunt of the economic and health consequences of systemic environmental injustice must be heard and have their concerns addressed. And everywhere, the communities most likely to feel climate impacts first and worst tend to have the fewest resources to protect themselves. Attending to these issues of fairness and justice is both morally and politically necessary; the world will not solve the climate problem without solving the intertwined problems of equity and economic transition.

The Indispensable Need for Engagement

Central to MIT's plan is a commitment to active engagement—with government, major industries, startup ventures, academia, media, and society generally. This approach reflects

MIT's historic strength in working with a wide range of partners to solve problems, test and prototype solutions, and bring them to scale. Just as important, it reflects the reality that the only practical way to decarbonize the global economy is to work with the people who make it run. Every sector of society must rise to this challenge, and MIT stands ready to help.

The Power of Coordination

MIT's let-a-thousand-flowers-bloom approach to climate action has produced inspiring progress in research, education, and innovation across the Institute. The independence and initiative of our faculty remain essential, and leadership will continue to support the critical work underway in MIT's departments, labs, centers, and institutes (DLCIs). But a more coordinated approach—with clear structures for decision making, action, and accountability—will amplify the Institute's strengths so that its climate efforts deliver far more than the sum of their parts. Two new cross-Institute entities—the Climate Steering Committee and the Climate Nucleus—will perform this important function, informed by working groups that will make recommendations on how to increase impact, accelerate progress, and attract large-scale support.

This plan reflects a deep conviction that MIT, with its formidable strengths in research, innovation, entrepreneurship, and teaching, and its ability to speak authoritatively and convene participants from a wide range of viewpoints, has both the opportunity and the obligation to make an important difference. In the pages that follow, we set forth an array of actions and commitments designed to mobilize all of MIT to:

- Catalyze advances in science, technology, and policy to spark, foster, and speed adoption of important innovations
- Educate future generations of leaders, problem solvers, and citizens
- Inform the work of governments and leverage their power to accelerate progress
- Reduce MIT's own climate impacts
- Coordinate MIT's climate efforts, maximize impact, and enhance accountability

The Mauna Loa Observatory is now measuring carbon concentrations of 417 ppm. There is no time to lose. The MIT community must move ahead with renewed purpose and shared urgency.

Spark, Foster, and Speed Adoption of Important Innovations

MIT's initial climate action plan emphasized research and development to produce solutions to climate change. MITEI's Low-Carbon Energy Centers, along with The Engine, the spinoff and startup incubator created by MIT, were the Institute's first concerted attempts to create specialized centers where vital clean-energy innovations at different stages of development can flourish. The new plan builds on these thriving efforts and magnifies their effect.

How can MIT best increase the probability of breakthrough innovations and their accelerated adoption at scale? That is the key strategic question facing us now. We believe the following actions offer the answer.

Advance the Climate Grand Challenges

At its launch in July 2020, Climate Grand Challenges (CGC) dared MIT faculty to come up with bold, interdisciplinary answers to the most difficult unsolved problems in climate science, climate policy, carbon removal, reducing emissions, adaptation, and human impacts. Nearly 100 ideas emerged, built on advancing and applying forefront knowledge in the physical, life, and social sciences; engineering; design; and the humanities. A whole-of-MIT initiative, CGC is now mobilizing the MIT research community around transformative projects that have the potential to make major advances in solving the big problems that currently stand in the way of an effective global climate response.

Expand and develop the MIT Climate and Sustainability Consortium

Aiming to help vastly accelerate the adoption of large-scale, real-world climate solutions across industries and around the globe, in January 2021, the Institute announced the MIT Climate and Sustainability Consortium (MCSC). As companies endeavor to meet net-zero carbon commitments, MCSC works with sector-leading companies to build an environmental innovation marketplace based on collaboration, not competition. In fields from aerospace to artificial intelligence, personal devices to packaged foods, MCSC member companies are working with MIT researchers and each other to dramatically speed the creation, testing, and deployment of practical climate solutions within their production processes, supply chains, and service models. Solutions that emerge from the CGC may naturally find early applications through the consortium.

Establish a new Future Energy Systems Center

MITEI is launching the Future Energy Systems Center, a new member-supported initiative to foster and inform interdisciplinary energy research at MIT and accelerate our progress toward a net-zero carbon future. The center will coalesce the ongoing technoeconomic and systems-oriented research from MITEI's Low-Carbon Energy Centers under a common umbrella, creating a unified energy system analysis capability with integrated research workstreams. These will initially include carbon capture, utilization, and storage; mobility; the electric power system; energy storage and low-carbon fuels; industrial processes; and buildings and infrastructure. The center will provide a single point of entry to the energy research ecosystem at MIT for energy-related firms and other organizations that need to stay abreast of the rapidly changing energy landscape.

The foregoing initiatives are primarily concerned with technological innovation and uptake. MIT's work to create and strengthen public policies conducive to climate progress is outlined below. The following commitments will enhance and deepen MIT's human capital devoted to both technological and policy advances.

Broaden and coordinate the pool of faculty talent through strategic hiring

Through coordinated, strategic hiring across all five schools and the college, MIT will devote at least 20 upcoming faculty openings to climate- and sustainability-focused talent over the next five years.

Create a mid-career ignition grant to inspire bold new work

MIT will establish a new mid-career ignition grant for faculty working in fields related to climate change and clean energy, or who wish to transition their research efforts to contribute in this area.

Deepen and diversify graduate student and postdoctoral talent focused on climate and sustainability

MIT will add up to 100 new Climate and Sustainability (graduate and postdoctoral) Fellows across all five schools and the college, both to work on today's projects and to better prepare them for future work in this field. Fundraising for these fellowships will be a priority.

Educate Future Generations of Leaders, Problem Solvers, and Citizens

Over the next 30 years, while the global population grows, the demand for higher living standards increases, and the planet continues to warm, the entire world needs to transform to a net-zero carbon economy. This transformation will increasingly be led by people who are now or will soon be students. Young people now studying at MIT and other universities are already showing the way toward a world that is more sustainable, prosperous, and just, and will shoulder the responsibility to lead the change.

MIT is extremely well positioned to prepare students as leaders and citizens in this struggle. The Institute offers a deep selection of climate and sustainability courses, programs, and co-curricular opportunities; the recruitment of 20 or more faculty focused on climate and sustainability will surely inspire more of these offerings.

To make sure that every student graduates with a serious grasp of the scope of the climate problem and pathways to solutions, MIT will take the actions outlined below.

Establish a new Climate Education Working Group

The Climate Education Working Group, which will include faculty and students drawn from all five schools and the college, will assess current curricular and co-curricular offerings and develop recommendations for increasing participation in and strengthening climate-related education at MIT.

Create a Sustainability Policy Hub for undergraduate and graduate students

A new Sustainability Policy Hub, coordinated by the Technology and Policy Program, will identify, augment, and publicize opportunities for students to assist and learn from sustainability policy makers, and form connections with one another and with policy-

engaged faculty. The Hub will also foster greater awareness of the Institute's extensive—though largely decentralized—policy activity. Early projects will include facilitating additional climate policy internships in Washington, DC through the MIT Washington Office and exploring the possibility of a Climate Visitors program to bring climate policy leaders to campus.

Provide an in-depth climate research experience to undergraduates

MIT will build on the highly popular Undergraduate Research Opportunities Program (UROP) to make a climate or clean-energy research opportunity (CROP) or experiential learning opportunity available to every undergraduate who wants one.

Infuse climate and sustainability learning opportunities throughout the curricula

MIT will continue to introduce climate and sustainability topics and examples in courses and problem sets, particularly in the General Institute Requirements. All schools with design-related programs will incorporate environmental sustainability as a fundamental principle. In the same way that design considers efficiency, safety, or visual appeal, sustainable processes and materials must also be essential factors and methodologies, and must be developed and added to design curricula.

Deepen humanistic understanding of the climate crisis

There has never been a time when the consequences of our cumulative actions have so profoundly affected the systems that support life for all species. MIT will expand its Council on the Uncertain Human Future, which launched in 2020, to include students and postdoctoral scholars in the 2021–22 academic year. The council performs a convening function, bringing together groups to reflect on the world's climate crisis, weigh its implications for all living things, and think seriously about how people will need to live, now and in the future.

Organize and host a new series of climate symposia

Building on the success of the 2019–20 Climate Action Symposia series, which more than 12,000 people attended in person or online, MIT will present a new series. Potential areas of focus are climate challenges and justice for the developing world, and the UN's Sustainable Development Goals.

Educate high school audiences about climate change

MIT will continue ongoing work in the Center for Energy and Environmental Policy Research (CEEPR) to develop a science-based climate curriculum for students in grades 9 through 12. The project places particular emphasis on reaching populations who are underserved and on countering climate denial messages.

Inform the Work of Governments and Leverage Their Power to Accelerate Progress

Public officials and policy makers are essential to driving progress on climate change. MIT will take every feasible opportunity—at the city, state, federal, and international levels—to

share evidence-based knowledge of climate science, as well as technology- and policy-based solutions, with those officials whose decisions can facilitate or impede the world's transition to a decarbonized economy.

Establish a new Climate Policy Working Group

Working closely with the MIT Washington Office, a new faculty-led Climate Policy Working Group will convene faculty members engaged in policy-relevant climate research and assist them in reaching out to officials who make and implement policy at the federal, state, and local levels. As part of this effort, MIT will continue to host science-based seminars for congressional staff on climate change, renewable energy, and climate policy topics. The working group will also explore interest in a climate policy center that would allow for sustained and coordinated climate policy engagement at the Institute.

Improve assessment of climate-related financial risk through increased disclosure

Led by MIT Sloan, the Institute will launch a new cycle of research and convening around strengthening corporations' climate-related financial disclosures. This effort will aim to improve assessments of enterprise valuations by making more information available to investors about firms' exposure to climate risks, thus improving markets' allocation of resources.

Analyze and document the early stage of the decarbonization revolution

MIT will develop a series of case studies of companies that have transitioned to decarbonized and more-sustainable modes of operation. The MIT Climate and Sustainability Consortium will take the lead on this work.

Expand the reach of MIT's modeling expertise and tools

Many audiences in government, industry, and nongovernmental organizations (NGOs) have found MIT-created models—Energy–Rapid Overview and Decision Support (En-ROADS), the Economic Projection and Policy Analysis Model (EPPA), and the Sustainable Energy System Analysis Modelling Environment (SESAME)—helpful in explaining climate and economic dynamics and in exploring possible scenarios, actions, and tradeoffs. The Climate Policy Working Group will explore ways to make greater use of these powerful tools and to develop new ones.

Continue to address socioeconomic challenges associated with the clean energy transition

MIT will continue to engage with communities affected by the transition to a low-carbon economy. CEEPR's Roosevelt Project and ESI's Here and Real Project work to develop practical policy solutions focused on job creation and community support in regions affected by the upheaval in carbon-intensive industries.

Advance climate and energy solutions for the developing world

MIT will continue to address the challenges faced by the developing world due to climate change and the energy transition. The Institute will build on existing efforts, including the following:

- The Abdul Latif Jameel Poverty Action Lab's King Climate Action Initiative, which designs, evaluates, and scales innovative solutions at the intersection of poverty and climate change
- The Global Commission to End Energy Poverty, a MITEI research and outreach program launched in 2019 with the support of the Rockefeller Foundation that brings together leaders in energy, climate, and economic development to seek ways to advance access to low-carbon electricity services in the developing world
- ESI's Natural Climate Solutions Program, which combines technological innovation with community-led natural climate solutions to protect the Amazon as the world's most diverse natural environment
- The Climate Resilience Early Warning System Network (CREWSNET), a campus–Lincoln Lab collaboration to improve fine-grained climate projections and empower at-risk communities

Continue to tell the science-based climate story to the world

MIT will continue to send delegations of faculty, researchers, students, staff, and postdocs to the UN's annual Conference of the Parties to engage with governments, other universities, and NGOs on a renewed process to accelerate reductions in global greenhouse gas emissions. MIT will also undertake a campaign to increase the audiences for its award-winning Climate Primer and TILclimate podcast, its revamped Climate Portal, and its extensive online course offerings.

Reduce MIT's Own Climate Impacts

The Institute remains on track to meet or exceed its goal from the 2015 plan to reduce its net carbon emissions by 32% by 2030. Yet as we accelerate our work on global climate solutions, we are intensifying our local focus, too.

MIT's 2015 climate plan committed to using the campus community as a "test bed for change." In response, the Institute reexamined every aspect of its operations, including campus energy generation, heating, cooling, lighting, materials, and mobility. Given the facts on the ground—the state of New England's electrical grid, the age of many campus facilities, the state of available carbon-reducing technologies, current public policies, the energy intensity of much advanced scientific research, and our northern climate—this "test bed" work has delivered the sobering if expected lesson that dramatically reducing the direct carbon footprint of an organization like MIT is hard. Therefore, as we proceed with more direct cuts, we are also employing other strategies.

Direct campus impacts

Achieve net-zero carbon emissions by 2026, with a goal of eliminating direct emissions by 2050

Initially, the majority of new reductions will be achieved through new large-scale off-campus renewable energy, storage, and infrastructure projects to neutralize or sequester remaining direct campus greenhouse gas emissions. We are actively collaborating with other major institutions, including universities and governments, to finance and participate in this needed transition. Forming these relationships and enabling these projects will help make sustainable energy supplies and facilities more available nationwide, particularly in proximity to disadvantaged communities, while demonstrating their feasibility. By creating momentum for large renewable energy projects, MIT can offset its carbon emissions while promoting equity, benefiting local economies, and improving public health.

Over the longer term, achieving progress toward stopping climate change also requires additional direct reductions in carbon emissions. The state of the planet's atmosphere makes it imperative that such reductions occur as quickly as possible. MIT is determined to eliminate all direct campus emissions by 2050, recognizing that making this happen will depend on significant advances in carbon-reducing technologies and a decarbonized electrical grid in New England. To advance toward this goal, MIT is now committing to the following specific on-campus decarbonization steps:

- All future MIT fleet purchases of light-duty vehicles will be zero emission, subject only to availability.
- MIT will increase the capacity of renewable (primarily solar) energy installations on campus by a minimum of 500% (from 100kw to 500kw) by 2026.
- MIT will initiate the conversion of campus shuttle bus vehicles to zero-emission buses by 2026.
- MIT will increase campus car-charging stations by a minimum of 300% (from 120 to 360) by 2026.

Establish a new Carbon Footprint Working Group

To advise on how best to continuously decarbonize campus operations, the Office of the Vice President for Campus Services and Stewardship and the Office of Sustainability will organize a new Carbon Footprint Working Group. This group, which will include faculty, staff, students, and postdocs, will begin meeting in fall 2021. While its agenda will change over time, the working group will initially be tasked to begin developing a roadmap to decarbonization by 2050. It will also provide oversight and ideas regarding the following initial priority commitments:

- MIT will develop and publish in 2022 a carbon offset strategy for MIT-sponsored travel.
- MIT will establish and publish in 2022 a quantitative set of food, water, and waste systems impact goals that inform and advance MIT's commitment to climate.

- MIT will evaluate and expand its greenhouse gas portfolio accounting to include priority Scope 3 emissions (e.g., sponsored MIT travel, commuting) by 2023.
- MIT will continue to advance climate resiliency plans and mitigation strategies for the campus and publish an adaptation roadmap for the campus by 2025.
- MIT will expand its greenhouse gas portfolio accounting to include off-campus locations—such as Bates Research and Engineering Center, Haystack Observatory, and Endicott House facilities—by 2026.
- MIT will explore possibilities to employ artificial intelligence to reduce on-campus energy consumption.
- MIT will encourage all DLCIs to participate in preparing and implementing their own carbon footprint reduction and sustainability plans, building on the pilot program outlined in the School of Architecture and Planning's 2020 climate action plan.

Our campus will continue to be a "test bed for change" as we navigate a path towards net-zero.

A more sustainable portfolio

MIT's endowment assets are overseen by the MIT Investment Management Company (MITIMCo). The MIT endowment's primary weapons in the fight against climate change are the resources it provides to help support the activities of MIT's faculty, staff, and students. Recognizing the importance of the climate change challenge, MIT also has committed to the following actions:

- To undertake an intensive analysis of how to achieve net-zero carbon by 2050 in a broad and diversified investment portfolio
- To post its environmental, social, and governance investment framework on the MITIMCo website
- To offset the carbon footprint of the new Volpe development in Kendall Square as a step toward a carbon-neutral investment portfolio
- To develop at Volpe all-electric residential buildings (eliminating on-site fossil fuels), to install a state-of-the-art wastewater recycling system (reducing potable water consumption), and to raise the entire site to the projected 2070 100-year flood elevation
- To actively participate in Climate Action 100+ and its program of engagement with major companies

Coordinate MIT's Climate Efforts, Maximize Impact, and Enhance Accountability

To achieve the greatest practical impact, MIT needs to unite its efforts. Voices across the community have counselled that increased coordination could have enormous potential value, from cross-pollinating ideas among different disciplines to developing a unified

vision and strategy for raising funds. To that end, MIT will establish two new cross-institute committees, replacing the Climate Action Advisory Committee created in 2016.

The **MIT Climate Steering Committee** will consist of the vice president for research, the associate provost for international activities, the executive vice president and treasurer, and the deans of the five schools and the college. The Steering Committee will provide ongoing strategic planning and oversight, set priorities, commit resources, coordinate the efforts of operating units, evaluate progress, and ensure Institute-level accountability for the climate plan. It is expected that the Steering Committee will meet six times per year.

The **MIT Climate Nucleus** will consist of representatives of DLCIs that have significant responsibilities under the climate plan. The Nucleus will have responsibility for managing and implementing the elements of the plan, including program planning, budgeting and staffing, fundraising, external and internal engagement, and program-level accountability. The Nucleus will, on a regular basis, make recommendations to the Steering Committee about how to amplify MIT's impact in the climate sphere.

The membership of the Climate Nucleus will be determined by the Climate Steering Committee. The Steering Committee will modify the composition of the Nucleus from time to time as different activities emerge into the foreground or programmatic goals are accomplished. It is expected that the Nucleus will meet once per month during the academic year.

In addition to the Steering Committee and the Nucleus, working groups will be organized as needed to focus on particular areas of opportunity or challenge. They will collect data, conduct analyses, provide a forum for community input, and make recommendations to the Nucleus for consideration and possible presentation to the Steering Committee for approval and adoption. The first working groups will focus on climate policy, climate education, and carbon footprint.

The Nucleus will also welcome the input of teams of advisors from across MIT, including staff, students, faculty, postdocs, and alumni. The Nucleus will prepare and submit to the Steering Committee an annual report on progress under the plan, which the Steering Committee will review and post on the climate portal. In addition, the Steering Committee, Nucleus, and all working groups will meet together annually to discuss current issues, challenges, and opportunities and to give the community an opportunity for dialogue and engagement.

Moving Ahead Together

The core ideas that informed MIT's 2015 plan—the imperative to lead and to act; an emphasis on science and innovation; an outward-facing, global orientation; and a deep

commitment to collaborate to find solutions—remain foundational and have been reinforced by the experiences of the last five years.

This new plan is intended to guide MIT's actions through the remainder of this decade. It is a living document, and will be modified and improved as circumstances require. As recent years have demonstrated, unexpected developments can drastically alter even the best-laid plans. But they can also provide an opportunity for learning, growth, resilience, and creative problem solving.

The 2018 Intergovernmental Panel on Climate Change Report starkly presented the challenge society faces to achieve rapid progress on cutting emissions in this decade:

> *Without increased and urgent mitigation ambition in the coming years, leading to a sharp decline in greenhouse gas emissions by 2030, global warming will surpass 1.5°C in the following decades…*

It is early in the decade, but in this race, humanity is behind.

Near the end of this decade, children will be born who will be part of MIT's Class of 2050. We can still make the discoveries and the changes necessary to stop human-driven climate change within their lifetimes. But we need to come together now, both within MIT and with like-minded people and institutions everywhere, if our common effort is to succeed.

The Institute's leadership looks forward to continued engagement with all segments of our community as MIT works to accelerate progress in combatting the climate crisis. To share your thoughts and ideas about the plan, please email fastforwardclimate@mit.edu.

Appendix

The following is a partial list of meetings, forums, presentations, and other events at which MIT administrators and academic leaders received ideas and feedback relating to climate action. It does not include the many less formal gatherings and discussions with students, faculty, staff, and alumni that occurred during this timeframe that also helped to shape the content of this plan.

Climate Action Advisory Committee Meetings (Bimonthly, 2016–2021)

Three MIT Energy Initiative Faculty Engagement Sessions (March 2019)

Six Climate Action Symposia (2019–21)

Alumni Climate Webinar (April 2020)

D-Lab Summer Course on Climate Action Plan (June–September 2020)

18 Climate Grand Challenges Faculty Planning Workshops (2020–21)

Climate and Sustainability Consortium Faculty Forum (January 2021)

Campus Carbon Footprint/Test-Bed Forum (February 2021)

Department Heads Meeting (February 2021)

Student Voices Climate Action Advisory Committee Forum (February 2021)

MIT Faculty Meetings (May 2019; March 2021)

MIT Academic Council Meeting (March 2021)

External Partnerships Engagement Forum (March 2021)

MIT Corporation Meeting (March 2021)

Undergraduate Association Advisory Board Meetings (March/May 2021)

Viewpoints from the MIT Community Engagement Forum (April 2021)

Science and Engineering Council Meeting (April 2021)