

The Climate Project at MIT

In her inaugural address in May 2023, President Sally Kornbluth called on the MIT community to mount a “bold, tenacious response” to the global threat posed by climate change, which she described as “the greatest scientific and societal challenge of this or any age.” Drawing on the insights and perspectives of many at MIT and beyond, this new plan responds to President Kornbluth’s call.

The goal is for MIT to become, within the next decade, one of the world’s most prolific and collaborative sources of technological, behavioral, and policy solutions for the global climate challenge.

The plan will have succeeded if, after 10 years, MIT’s work with our partners has changed the expected trajectory of global climate outcomes for the better. Achieving this will require a whole-of-MIT mobilization around new climate solutions. We must be bolder in our research choices and more creative in how we organize ourselves to strengthen our impact. We must also build more effective collaborations with partners in our own region, elsewhere in the United States, and around the world, and our efforts must be integrated into a broader strategy to accelerate the entire cycle of activities needed to implement new technological, behavioral, and policy solutions at scale.

The plan describes a new approach to the climate challenge, designed to help the MIT community and our partners develop solutions to some of the toughest problems impeding an effective global climate response. It includes new arrangements for promoting cross-Institute collaborations and new mechanisms for engaging with external partners. The plan also outlines an expanded role for MIT in helping to advance climate-focused centers of excellence, innovation, and impact around the world. The overall objective is to enable MIT to do bigger things faster in the climate domain and to work more effectively with our scaling partners to help implement practical advances, both locally and globally.

More than 300 faculty members—about a third of the MIT faculty—are already working with their students and members of the research staff on different aspects of the climate problem. Almost all of our academic departments are involved in some way, as are more than a score of interdepartmental labs, centers, programs, and initiatives. This decentralized structure reflects the best traditions of MIT as a “bottom-up,” entrepreneurial institution. But it also imposes limits on our effectiveness. It complicates the task of assembling the large teams needed to address the inherently multidisciplinary nature of many climate-related problems. It can also confuse our students and faculty as well as our partners, who sometimes bemoan the absence

of a “front door” for MIT’s climate work. Key operational objectives of the new plan are as follows:

- Enable a more holistic approach to problem-solving
- Work more productively, quickly, and flexibly across disciplinary and organizational boundaries
- Provide greater focus and coherence to our efforts.

The plan builds on [Fast Forward: MIT’s Climate Action Plan for the Decade](#), but the urgency of the climate challenge now demands an out-of-the-ordinary organizational approach. We will not pursue the normal academic course of action when a major new field or problem area rises to prominence—establishing a new research program or center, a new educational curriculum or degree program, or a new institute or school. These processes of institution building (and sometimes physical building) take too long. Instead, our approach is designed for speed of implementation, flexibility, and impact. Later, if the situation calls for it, we may consider a more permanent academic structure, such as a new school for climate. In the meantime, our core educational mission will both inform and be supported by every aspect of this new plan.

Organization of the Climate Project

The centerpiece of this approach, the **Climate Project at MIT**, has three interconnected components: **Climate Missions** and their offshoots, **Climate Frontier** projects, and the **Climate HQ**. Each will be supported by a combination of philanthropic and sponsored research funds. Internal MIT funds will be used to accelerate the launch of the Climate Project at MIT and to augment external financial support.

Climate Missions

The Climate Missions are MIT-wide problem-solving communities. Each mission will address a broad domain where solutions are required for effective climate response and where a critical mass of excellent research capabilities exists at MIT. The initial set of missions is as follows:

Decarbonizing Energy and Industry

Decarbonizing the world’s industries with affordable low-emissions electricity and fuels and climate-relieving industrial innovations.

- Electric power grid
- Heavy industries (cement, steel, chemicals, textiles, etc.)
- Agriculture
- Computers and communications

- Air, sea, and land transportation

Restoring the Atmosphere, Protecting the Land and Oceans

Removing, managing, and storing greenhouse gases. Protecting ocean and land ecosystems.

- CO₂ removal
- Methane reduction and removal
- Natural carbon sinks
- Protecting biodiversity
- Food and water systems

Empowering Frontline Communities

Supporting the world's most vulnerable populations with technologies, finance, and policies for climate relief and resilience.

- Remediating the adverse health effects of climate change
- Policies for poverty alleviation and climate resilience and relief
- Climate risk forecasting for resilience

Building and Adapting Healthy, Resilient Cities

Designing, building, and adapting habitable, resilient cities.

- Urban transportation
- Blue and green urban infrastructure
- Building energy efficiency
- Urban air, water, and biodiversity
- Urban finance and government
- Urban resilience and climate justice

Inventing New Policy Approaches

New institutions and incentives, policies/systems for rapid scaling, and decision support tools.

- Climate finance and trade policy
- Industry strategy
- Progress measurement and technology assessment
- Modelling energy transition pathways
- Carbon market innovations

Wild Cards

Unconventional solutions outside the scope of the other missions.

The task of these mission-focused communities is to help MIT identify and advance new solutions to tough problems that stand in the way of an effective global climate response. These advances will include “big bets”: potentially transformative developments focused on problems whose solution would have game-changing consequences for the world. They will also describe the *integrated systems*—technological, regulatory, industrial, financial, social, and political—needed for climate-relieving innovations to deliver public benefits at scale.

The missions will attract outstanding researchers, practitioners, and other stakeholders from inside and outside MIT and will mold them into dynamic, multidisciplinary problem-solving communities.

Each mission will have three main roles:

- Assessing national and global progress within its domain
- Identifying critical gaps and bottlenecks constraining progress, as well as promising new pathways for effective action
- Selecting, launching, and supporting projects to accelerate progress

Each mission will have a faculty director and an executive director. An advisory group consisting of leading faculty from across the Institute and external experts will help guide the work of each mission. For some missions, we will explore combining forces with other leading universities or research institutes if that will accelerate progress.

A key role of mission leadership will be to promote engagement with companies, impact investors, and social and technological entrepreneurs, as well as governments, nonprofits, and philanthropists.

The mission leaders will form road-mapping teams to assess global progress. The teams will articulate near- and long-term goals and milestones and will identify critical gaps and bottlenecks that are constraining progress. Proposals from the MIT community and beyond will be solicited to address these gaps or otherwise accelerate progress toward the mission. The leaders and their advisors will identify the most consequential actions that MIT can take in support of the mission. New projects will be launched if funds are available and if the mission community and its partners are well-positioned to achieve impactful results. These will range in size from single-investigator projects to larger-scale projects with multiple principal investigators (see **Climate Frontiers** below). A key responsibility of mission leadership will be to preserve space for out-of-the-box, potentially transformative approaches.

Mission leaders will allocate key resources for these projects, including student fellowships and Undergraduate Research Opportunity Program projects (UROPs), and where possible, existing labs, centers, programs, and initiatives will host the projects. The main educational contribution

of the missions will be to provide opportunities for MIT students to participate in creative problem-solving at the knowledge frontier.

MIT's climate-active labs, programs, centers, and initiatives will choose to affiliate with one or more of the missions, or with one or more of the core activities of the Climate HQ (see below). The current [Climate Grand Challenges](#) projects will similarly affiliate with the appropriate mission or Climate HQ activity.

Climate Frontier Projects

The projects launched by the missions will take on “MIT-hard” problems that are either roadblocks to climate progress or whose resolution may create important new pathways for effective climate action. These Climate Frontier projects will receive funding through the missions. They will have clear milestones, deliverables, and accountability. They will closely involve prospective end-users and will have well-developed plans for translation, field-testing (if needed), and scale-up. Possible projects include developing and testing prototypes based on proof-of-principle technologies; large data-collection projects; testing and evaluating the impact of new policy implementations; and problem-solving to support large-scale deployment of industrial technologies and systems. The larger projects will be carried out by a single large team or by smaller teams working in parallel on pieces of a bigger problem. They will span basic and applied research, engineering, systems analysis, and manufacturing, if relevant. They may include innovation at the component, subsystem, and system levels. They will require operational and scientific excellence and will be professionally led and managed. Taken together, the Climate Missions and Climate Frontier Projects constitute a new model of accelerated, university-led innovation seeking impact on the climate problem at scale.

Climate HQ

The Climate HQ will support fundamental research in the core scientific and humanistic disciplines related to climate and will promote engagement between researchers in these disciplines and the missions. The Climate HQ will also support climate education activities led by the departments and other units, and will encourage all of MIT's departments, laboratories, centers, and initiatives (DLCIs) to engage in climate-related research and education.

Climate HQ leaders will work with the DLCIs on climate-related faculty recruiting and hiring and will coordinate with the school deans on assigning full faculty chairs, career development chairs, and startup packages. The Climate HQ will also coordinate with the leaders of the Climate Missions on allocating UROPs, graduate fellowships, and postdoctoral fellowships, junior faculty seed funds, and senior climate innovation fellowships.

The Climate HQ will support the continued development and implementation of an MIT-wide Climate Corps, a student-centric initiative to elevate climate-related, community-focused service in MIT's education and culture.

The Climate HQ will work with MIT's online learning platforms to promote the development and delivery of online climate-related educational materials to support the education of people around the world who want to play a role in seeking solutions to the climate challenge.

The Climate HQ will work with the Office of Sustainability to reduce MIT's own climate footprint.

The Climate HQ will coordinate and support MIT's contributions to public education on the climate issue, including social media; the climate portal, primer, and podcast; the MIT Museum; *MIT Technology Review*; etc.

The Climate HQ will organize a flagship annual conference or forum on climate solutions. This event will reinforce the standing of the Boston area as a global center of climate-related innovation and progress.

The Climate HQ will administer a global competition for researchers and innovators working in fields relevant to the Climate Missions.

The Climate HQ will be the primary advocate for funding and developing a central, multipurpose physical space for the MIT climate community.

The plan also includes two supporting strategies: developing a new climate "scaffolding," to strengthen MIT's impact on climate outcomes; and a global climate strategy.

Climate Scaffolding, with a Climate Impact Team at the Core

The plan recommends steps to strengthen MIT's climate "scaffolding"—the structures, processes, and people who connect our research and educational activities to the practical world of climate impact and response. The climate scaffolding builds on the existing MIT infrastructure for translation, innovation, and entrepreneurship, as well as the innovation ecosystem that surrounds us, including The Engine, Lab Central, and Greentown Labs. The plan recommends, as a strategic objective, developing a **Climate Impact Team, a new cohort of dedicated professionals** at MIT: project managers, designers, and engineers; "matchmakers" and "accelerators" to build and maintain relationships between MIT faculty researchers and our impact/scaling partners; "ambassadors" to develop and manage our relations with international research partners; mentors to support and encourage student-centric engagement with people and communities around themes of climate, equity, and service; analysts to support road-mapping and to monitor and record the impact of MIT activities; and

resident senior climate impact fellows armed with practical, timely information about real-world experience needed for well-targeted research, innovation, and education. While the Climate HQ will be the organizational home for the Climate Impact Team, the cohort will work across all three elements of the Climate Project at MIT. Enabling these people to thrive at MIT may require cultural changes and other new approaches.

The plan for the climate scaffolding also includes leveraging the capabilities for rapid prototyping and scaling at MIT Lincoln Laboratory and MIT Bates Research and Engineering Center, which have a long history of implementation and building in hard-to-execute environments.

The plan also calls for the Climate Project to support the continued development of the surrounding local and regional economy into one of the world's great centers of climate-related industrial and financial innovation.

Global Climate Strategy

Finally, the plan outlines a **strategy for global engagement** on climate, working with international universities and developing new international philanthropic partnerships for the missions. At a time of increasing fragmentation and disorder in international relations, the need is greater than ever before for internationally oriented organizations like MIT to step forward to work with partners on the global dimensions of the climate challenge. This aspect of the plan builds on MIT's role and reputation as a global leader in research, education, and innovation. It also builds on our experiences in capacity-building around the world and the inclinations of our entrepreneurial, outward-looking faculty to go wherever in the world important problems are to be found and where their knowledge, methods, insights, and rigor can help find solutions.

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This plan is inspired by the Institute's history of rising to meet major national or global challenges, including our contributions to the Apollo Project and the mapping of the human genome. The archetypal example is the MIT Rad Lab, an unprecedented collaboration among government, industry, and academia through which almost half the radar systems deployed in World War II were designed and developed in a four-year burst of intense innovation involving more than 3,000 people at MIT. The Rad Lab is remembered today for the urgency of its wartime mission, its exceptional level of coordination and pooling of resources across disciplines, and its decisive impact on the outcome of the war. But not even the Rad Lab is a true precedent for the extraordinary scope, scale, and complexity of the climate challenge. There is no guarantee that the Climate Project at MIT will succeed in all its goals. But there is a strong desire among our faculty for prompt action and a greater-than-usual willingness to experiment with new ways to deploy our intellectual resources in service of this worldwide

mission. MIT is unusual and perhaps unique among the world's universities in its ability to **mobilize all of our disciplines around a mission-driven, solution-focused, global approach to the climate challenge**. We invite current and new partners in academia, industry, finance, philanthropy, and government to join us.