EMERGING CLIMATE TECH REQUEST FOR INFORMATION: SUMMARY REPORT

APRIL 2025

CITY of BOSTON

EXECUTIVE SUMMARY

Boston is a place where people come to do big things that will change the world! And right now, we need to innovate and activate climate change solutions in our city and around the globe.

Mayor Wu

The City of Boston's Emerging Climate Technology Request for Information (RFI) was launched by the Office of Emerging Technology to explore ways the City can better support climate tech startups, remove barriers to innovation, and foster a thriving climate tech ecosystem that advances the City's climate goals.

Through the RFI, over 50 climate tech startups provided insights on the challenges they face and recommendations for how the City can enhance collaboration, streamline processes, and create opportunities for innovation. The City will use the findings from this report to identify next steps to strengthen Boston's role as a climate technology leader.

KEY CHALLENGES AND RECOMMENDATIONS

1. FINANCIAL CONSTRAINTS:

At all maturity levels, climate tech startups face financial constraints as a barrier to development, including difficulties from securing pilot funds to high upfront costs for scaling.

Recommendations for the City: Create funded pilot opportunities and access to non-dilutive funding and municipal resources, *e.g.*, access to data and lab space.

2. MARKET VALIDATION AND EARLY ADOPTION BARRIERS:

Demonstrations and real-world testing are required to gain industry and market trust, but they are hard to secure.

Recommendations for the City: Implement municipal pilot programs, act as an early adopter, increase public awareness, and provide networking opportunities.

3. REGULATORY COMPLEXITY:

Lengthy and complex regulatory processes create barriers to technology implementation and pose financial risks.

Recommendations for the City: Create adaptive policies that support emerging, innovative solutions and provide educational resources for startups navigating municipal processes.

4. SCALING AND MANUFACTURING:

Startups face many hurdles when transitioning from a small-scale pilot project to full-scale commercialization, facing high costs and resource constraints.

Recommendations for the City: Offer post-pilot support, including off-take agreements, long-term contracts, and other resources to help companies scale production.

CONCLUSION

While each respondent identified unique needs, there is remarkable consistency in both challenges they face and solutions they proposed. This report, while not on exhaustive list, outlines next steps the City will take over the next six months in response to the RFI results.

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INTRODUCTION

In order to meet Boston's 2030 and 2050 carbon neutrality and climate resilience goals, the City must continue leveraging innovative solutions to combat climate change while fostering equitable growth and resilience in our communities. As the hub for groundbreaking climate tech companies, Boston is committed to supporting emerging businesses that are trying to tackle the most pressing climate issues. Through this RFI, the City sought to better understand how to support climate tech startups by leveraging municipal resources. From the responses shared, the goal was to identify key barriers and recommendations of opportunities to nurture a thriving climate tech ecosystem within the City.

BACKGROUND

In December 2024, the Office of Emerging Technology released the Emerging Climate Tech Request for Information (RFI) to understand the current challenges facing climate tech startups and opportunities for the City to support the climate tech ecosystem while advancing the City's climate goals.

The RFI sought input from emerging businesses that are trying to tackle the City's core climate challenges, including but not limited to:

- Building Decarbonization
- Climate Resilience
- Energy Transformation
- Clean Transportation

The RFI was structured in two sections:

- Section I asked respondents to provide information about their companies, including the climate challenges they address, technology maturity, and support needed for advancement.
- Section II focused on the company's current challenges, the most valuable types of City support, and the structure of an ideal municipal pilot program.

The insights gathered directly inform the findings and recommendations presented in this report and help shape the City's next steps in supporting climate tech innovation.

SECTION I: STARTUP PROFILES

58 *climate tech startups with innovative solutions for a variety of climate challenges* and at various stages of development responded to the RFI.*

NOT EXHAUSTIVE

*Majority of the responses focused on addressing building decarbonization, with little to no representation of technology addressing climate resilience, one of the key priorities for the City.

BREAKDOWN OF TECHNOLOGY SOLUTION TYPES*

ENERGY EFFICIENCY AND BUILDING DECARBONIZATION

30%

Solutions in this category included drone-enabled energy audits and retrofit navigation, automated retrofit planning at scale, AI-powered software for energy monitoring and decarbonization, cloud-based platforms for benchmarking and prioritizing energy efficiency, prefabricated exterior wall insulation systems, next-generation insulated glass, HVAC optimization to reduce energy use, de-risked retrofit financing, solutions that minimize the need for electric panel upgrades, agile micro-factories for low-carbon home construction, and personalized decarbonization roadmaps.

ENERGY STORAGE, POWER GENERATION AND GRID SOLUTIONS

23%

Solutions in this category included high-energy density supercapacitors, advanced energy storage and management systems, microgrids, solar panels, decentralized AI-optimized grid technology, biological batteries, robot fleets for solar development, geothermal exploration tools, AI-powered permitting software for renewable energy projects, wind energy workforce training. hydrogen fuel cells, and zero-emission mobile power units.

***While many of these solutions tackle multiple climate challenges, they have been grouped according to the primary issues they address.

CLEAN TRANSPORTATION

16%

Solutions in this category included Level 1 electric vehicle (EV) charging infrastructure, EV charging reimbursement software, robotic sails for maritime shipping, EV manufacturing, fleet electrification as a service, light electric vehicles for short-haul cargo transport, mobile and on-demand e-bike repair, and modular charging hubs for shared micro mobility infrastructure.

WATER AND ENVIRONMENTAL QUALITY

12%

Solutions in this category included biological solutions to plastic waste reduction, water desalination and purification technology, low-energy wastewater and PFAS removal, real-time water chemistry monitoring, and AI-powered air quality sensors.

FOOD AND AGICULTURE

7%

Solutions in the category included data-driven crop optimization tools, platforms to connect farmers with urban customers, indoor vertical farming, and biological alternatives to chemical fertilizers.

OTHER: INCLUDING MATERIALS AND MANUFACTURING. RESILIENCE, AND CARBON CAPTURE

11%

Solutions in this category included ultra-low carbon concrete and cement alternatives, passive cooling paint, nature-based eel grass restoration solutions, direct air capture systems that sequester indoor CO_2 for use as an aggregate for low-carbon materials like plastic and concrete, as well as carbon capture applications for data centers.

LOCATIONS OF CLIMATE TECH STARTUPS

While the majority of responding companies are based in Massachusetts, with approximately 20% located in Boston, those from outside New England cited the following reasons for seeking collaboration with the City:

1

Engagement with the Massachusetts' Climate Tech Ecosystem

Several respondents are actively engaged with key organizations in Massachusetts' climate tech ecosystem, including Greentown Labs, Mass Mobility Hub, and the Alliance for Climate Transition (ACT). Many companies are also exploring opportunities to move manufacturing to New England and conduct pilot projects within Massachusetts.

2

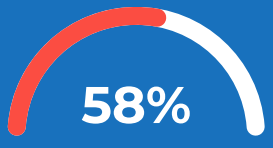
Connections to New England

Many respondents have strong ties to New England, with several companies founded in the Greater Boston area, while others have leadership or founders who live nearby or have affiliations with local universities. Some companies have already established a customer base in the region, while others are considering relocating their headquarters.

3

City of Boston's Innovation and Climate Commitment

Respondents view Boston as a leader in climate innovation and a key market for their technologies. Those focused on building decarbonization cited the City's leadership in building performance standards as a significant incentive to collaborate. Boston's diverse building stock is an ideal testing ground for companies to develop, refine, and scale their solutions across various building types.

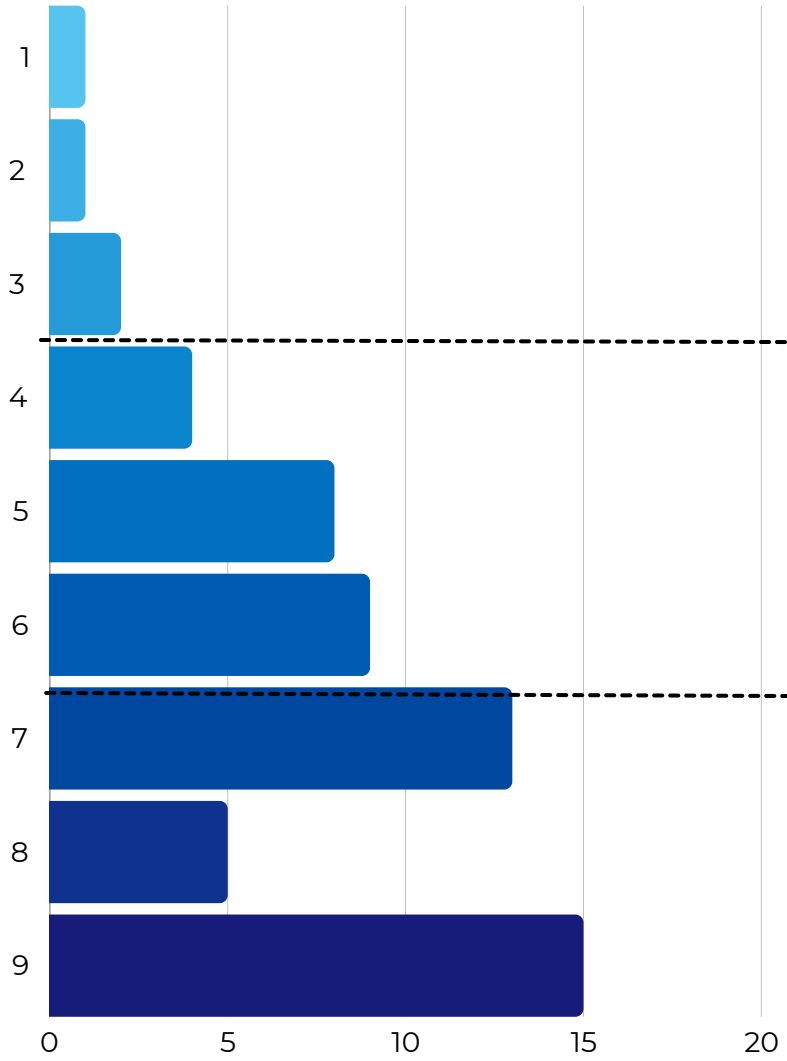


of companies that responded are from the Greater Boston Area.

COMPANIES MATURITY LEVEL & KEY NEEDS TO ADVANCE

While climate tech companies have varying needs depending on their maturity level, all identified funding or financial incentives as a critical need for growth and advancement.

RESPONDENTS' TECHNOLOGY READINESS LEVEL*



RESEARCH

KEY NEEDS TO ADVANCE:

Funding for **pilots**, advanced testing environments, technical **mentorship**, **collaboration** with municipalities and research institutions

DEVELOPMENT

KEY NEEDS TO ADVANCE:

Funding support, **testing** and validation, **collaboration** opportunities, **commercialization** support

DEPLOYMENT

KEY NEEDS TO ADVANCE:

Government **endorsements**, **policy** support, regulatory **guidance,** financial **incentives, scaling** commercial deployments

***Technology readiness levels (TRL) are a measurement system used to assess and estimate the maturity level of technologies.

SECTION II: CHALLENGES & RECOMMENDATIONS

CHALLENGE #1: FINANCIAL CONSTRAINTS

"Limited financial resources for scaling pilot programs, developing new products, and accelerating commercialization."

CHALLENGE #2: MARKET VALIDATION & EARLY ADOPTION

"Limited access to platforms or pilot opportunities that showcase our technology in real-world applications to build trust and drive adoption."

CHALLENGE #3: REGULATORY COMPLEXITY

"Simplified contracting and procurement processes are critical to accelerating deployments."

CHALLENGE #4: SCALING & MANUFACTURING

"The biggest challenge we're currently facing is scaling quickly enough to make a significant impact on climate change."

CHALLENGE #1: FINANCIAL CONSTRAINTS

*At all technology maturity levels, climate tech startups identified **financial barriers as a key challenge**. Financial barriers include high upfront costs for deployment and scaling, limited funding for pilots, investor hesitation due to unproven market demand, slow procurement and complex bidding processes preventing opportunities in the public sector.*

RECOMMENDATIONS

Provide Pilot Funding and Incentive Opportunities
Respondents emphasized that grant-funded pilot programs would enable them to deploy and test their solutions within the City. It was also suggested that subsidies or co-investment in projects could help offset the high upfront costs associated with commercializing climate technologies.

Facilitate Access to Non-Dilutive Funding
Respondents noted that collaboration with municipalities would increase the technology's validation and credibility and could unlock funding sources. Others suggested non-dilutive funding options, such as grants and incentive programs. City facilitated introductions to potential customers were another funding opportunity suggested.

Support Access to Infrastructure and Resources
Respondents cited the need for support for additional lab space, including wet lab facilities; designated testing or sampling sites; data access; and investment for workforce expansion.

CHALLENGE #2: MARKET VALIDATION AND EARLY ADOPTION

The climate tech startups identified ***limited market awareness and industry trust, difficulty securing pilot and demonstration opportunities, and challenges connecting with key stakeholders*** *as barriers to their ability to scale solutions, attract customers, and increase investment.*

RECOMMENDATIONS

Implement Pilot Programs for Real-World Testing
Respondents recommended that the City (i) establish a structured pilot program where startups can develop and test their technology on municipal infrastructure, including buildings and transportation fleets; (ii) designate municipal assets that can be used as testbeds; (iii) develop a fast-track approval process for pilots to reduce delays and accelerate deployment.

Act as an Early Adopter
Respondents recommended that the City (i) procure emerging technology to encourage broader adoption and (ii) create a framework for scaling successful pilots, *e.g.*, long-term municipal contracts.

Increase Public Awareness
Respondents recommended that the City (i) host City-sponsored demonstrations showcasing solutions, (ii) integrate emerging tech in City events, (ii) increase educational awareness through outreach and workshops, and (iii) provide technology validation or endorsements to other potential customers.

Provide Networking Opportunities
Respondents recommended that the City (i) host networking events for startups to connect with municipal leaders, potential customers, and other stakeholders and (ii) facilitate partnerships with dedicated points of contact to streamline collaboration with City Departments and align solutions with municipal needs.

CHALLENGE #3: REGULATORY COMPLEXITY

*Climate tech startups highlighted that **lengthy and complex** permitting processes delay pilot programs and commercialization while increasing financial risks. Procurement and zoning regulations are often designed for **traditional, established technologies**.*

RECOMMENDATIONS

Adaptive Policies
Respondents emphasized the need to reform regulatory policies, like zoning, procurement, and permitting, to support and enable emerging innovative climate solutions and accelerate their technologies.

Regulatory Guidance and Streamlining
Respondents recommended that the City provide clear guidance on identifying procurement opportunities and overall municipal procurement process navigation. Respondents also suggested streamlining the permitting process to reduce delays.

CHALLENGE #4: SCALING AND MANUFACTURING

Climate tech startups identified barriers in transitioning from small-scale to commercialization, citing high upfront capital costs, limited access to affordable manufacturing space, workforce constraints, and the high cost of real estate.

RECOMMENDATIONS

Post-Pilot Support
Respondents suggested several ways to support scaling after a successful pilot, including off-take agreements, expanding technology deployment to additional municipal buildings, and establishing long-term contracts.

Many of the previous recommendations, including funding incentives and networking opportunities, can also help address scaling challenges.

SECTION III: NEXT STEPS

While respondents identified unique needs, there was remarkable consistency in both the challenges they face and the solutions they propose. This is not an exhaustive list of actions the City will take to support innovation, the following steps outline the City's response to the RFI over the next six months.

01 CREATE MUNICIPAL PILOT OPPORTUNITIES FOR REAL WORLD TESTING AND VALIDATION

Provide Avenues to Participate in City-Led Pilot Programs
Establish climate tech pilot opportunities that offer startups a structured pathway to showcase their technology and conduct real-world testing. The program would match startups with interested City Departments, provide funding support, and facilitate technology validation.

Participate in External Pilot-Matching Programs
Identify and engage in external pilot-matching programs to position the City as a hub for testing and deploying innovative climate solutions.

02 EASE PROCUREMENT AND PERMITTING CHALLENGES TO INTEGRATE INNOVATIVE SOLUTIONS

Develop Educational Materials and Resources
Create synchronous and asynchronous opportunities and resources for startups to better understand public procurement and technology deployment permitting requirements.

Identify and Address Key Regulatory Hurdles
Engage all applicable stakeholders involved in procurement processes to identify mechanisms to increase adoption. Create pathways to streamline permitting processes and reduce timeline challenges for specific technologies.

03 INCREASE AWARENESS, NETWORKING, AND STRATEGIC PARTNERSHIPS

Facilitate Start-Up - Departmental Relationships
The Office of Emerging Technology serves as a point-person to bring new innovative ideas to the attention of City Departments and facilitate the connection of startups to relevant Departments and departmental resources.

Organize Public Events and Demonstrations
Host events and demonstrations, like Climate Tech on the Plaza, to highlight emerging technologies and their real-world applications and increase a startup's visibility to investors, potential customers, and other stakeholders.

Create Opportunities for Startups to Engage with Local Leadership
Establish a cross-sector working group to support networking, knowledge sharing, and collaboration between startups, municipal leaders, and industry experts while also leveraging regional purchasing power to support startup growth and scaling.

First Annual Climate Tech on the Plaza, June 2024

ACKNOWLEDGEMENTS

This summary is the result of a collective effort and shared commitment to advancing Boston's climate tech ecosystem. Thank you to the following City Cabinets for their support throughout the process:

Economic Opportunity and Inclusion
Environment, Energy, and Open Space
Finance
Innovation and Technology
Mayor's Office

We look forward to continued collaboration as we work toward implementing the recommendations, exploring the next steps, and supporting innovative climate solutions.

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