The Boston Foundation

# POWERING UP TOGETHER

## CHALLENGES AND OPPORTUNITIES IN GETTING TO NET ZERO IN BOSTON'S SMALL BUILDING STOCK

## ACKNOWLEDGMENTS

This special Boston Foundation report was produced in partnership with Boston's Green Ribbon Commission, a coalition of city leaders supporting Boston's climate ambitions; and Prime Coalition, a nonprofit with a mission to unlock catalytic capital and change the future of climate finance. The Foundation is grateful for these partners' depth of knowledge and dedication to their respective callings. Special thanks to Isidor Studio for the elegance and visual logic of this publication. In drafting this report, our indefatigable reporter/writer Katherine Ellison called on more than a dozen major recent studies and interviews with nearly 70 energy and finance experts hailing from city and state government agencies, academia, environmental justice and community development groups, and the private sector. Although not all the people interviewed are quoted or mentioned by name in the following pages, we owe a debt of gratitude to all the interviewees and their organizations for their generosity with their time, experience, and insights—all of which helped to inform and deepen this report. These essential contributors are listed on page 63.

## ABOUT THE BOSTON FOUNDATION

Founded in 1915, the Boston Foundation is one of the most influential community foundations in the country. Partnering with community members, donors, the public sector, businesses and nonprofits, we aim to repair past harms and build a more equitable future for our city and region. Supported by the Annual Fund for Civic Leadership, we publish research into current critical issues, convene people in public forums to discuss the city's agenda and the region's trends—and use our shared knowledge to advocate for public policies that promote equity and opportunity for everyone. TBF is also one of New England's largest grantmakers, supporting nonprofits in Greater Boston through our endowment and working closely with our donors to support nonprofits locally, nationally and internationally.

# POWERING UP TOGETHER

## Challenges and opportunities in getting to net zero in Boston's small building stock


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**Dear Reader,**

In 2024, our region experienced flooding, heatwaves and other extreme weather events. These climate disruptions took a significant toll on our shoreline and infrastructure, and impacted the physical, financial and psychological well-being of residents.

Thankfully, this past year also gave us reason to celebrate and be hopeful. We've seen bold climate action emerge at the city, state, and federal level. In 2024, Massachusetts announced the largest offshore wind selection in New England's history. Governor Healey and Mayor Wu both identified climate as a top issue, appointing leadership to bring a climate lens to the efforts of their administrations. And, as part of its Justice40 initiative, the Biden Harris administration selected three New England nonprofits, one based here in Roxbury, to distribute $50 million in federal funds to grassroots organizations focused on climate and environmental justice.

In her book *Not Too Late, Changing the Climate Story from Despair to Possibility*, writer, historian and activist Rebecca Solnit also provides a hopeful view, one which urges us to act. She reminds us that "we are deep in an emergency. But it is not too late, because the emergency is not over. The outcome is not decided. We are deciding it now." I share Solnit's belief that it is not too late, as do the private, public and civic institutions coming together to address the climate emergency here at home. Many of these organizations are centering equity and social justice in their efforts, fueling climate solutions that protect the individuals and communities most vulnerable to and disproportionately impacted by climate change.

In 2022, the Boston Foundation issued our inaugural Boston Climate Progress Report, which laid out four "big lifts," or system-transforming actions which our region and state must accelerate to sharply reduce net carbon emissions. The report emphasized that real change requires transformational action, which can only happen with coordination, partnership, and investment across all sectors. We cannot rely on government alone.

In this, our second installment of the Climate Report, you will find a blueprint for action and partnership, one which considers the challenges at hand and the players already at work as well as where donors and investors can step in to support and help us meet this moment with urgency and care.

I believe philanthropists have an important role to play. As you'll see in the pages that follow, by providing capital for climate solutions like the electrification and retrofitting of small building stock, philanthropists can and are accelerating progress.

The message is clear. We must act now and work together to ensure that Boston is a healthy, equitable and climate resistant community for today's residents and the generations of residents to follow. I look forward to discovering the ways the Boston Foundation can partner with you to meet this moment with the urgency and hope it requires.

M. Lee Pelton
President & CEO
The Boston Foundation

# EXECUTIVE SUMMARY

## Both the City of Boston and the Commonwealth of Massachusetts have pledged to achieve net zero greenhouse gas emissions by 2050, and have embarked on ambitious efforts to reach these goals. Both have also set an interim goal of **reducing emissions by 50 percent by 2030.**

In November 2022, however, the Boston Foundation's Inaugural Boston Climate Report found Boston was off-track to meet its interim goal. The report called for an all-hands-on-deck response and identified four "Big Lifts"—multidecade, multiplatform projects—that would markedly speed progress. Number one: "Retrofitting the Small Building Stock." Not only do many small buildings need to be electrified, the report said, but they also offer opportunities to deploy rooftop solar and improve living conditions.

We define "small buildings" primarily as the roughly 70,000 residential buildings occupying fewer than 20,000 square feet, and thus exempt from BERDO, the city's greenhouse-gas ordinance governing larger buildings. The category also includes 6,165 non-residential small buildings, including restaurants, clothing stores, labs, gyms, laundries, flower shops, libraries, and houses of worship, according to estimates by the Building Electrification Institute (BEI).

### Boston's small building inventory includes...

**70,000**
**Residential buildings**

**6,165**
**Non-residential small buildings**

Reducing greenhouse gas emissions in existing buildings by increasing energy-efficiency, replacing fossil fuel-powered appliances with electric ones, and adding renewable energy when possible is a multi-step process we'll refer to in this report as "powering up." Powering up all of Boston's small buildings might address more than 19 percent of the city's greenhouse gas emissions.

Yet progress on this front has been frustratingly slow and hard to track. Using heat pumps—efficient, electric-powered heating and cooling appliances—as an indicator of retrofit progress is telling. Despite increasing interest in heat pumps and their central role in achieving the City's emissions reduction goals, their adoption has been only inching ahead. Data show that over the past 14 years, Boston issued permits for fewer than 700 of these appliances. That's well behind other efficiency updates such as solar and weatherization; meanwhile, around 15,000 new gas systems were installed over that time. Recent data do show a steadily upward trend, however, that has started to accelerate over the past two years. For instance, Boston's Green New Deal Data Dashboard, which instituted a new tracking system for such projects over the last year, found that 597 household units received heat pumps between 2023 and 2024.

This is encouraging, but not enough. A report from the BEI earlier this year stated that at the current rate, it would take Mass Save, the Commonwealth's leading energy-efficiency incentive provider, almost 100 years to reach all of Boston's low- and middle-income homes.

## HURDLES

The work ahead is daunting, due to a long list of obstacles beginning with staggering expense. Powering up all of Boston's small homes could cost between $13.5 and $15.8 billion, the lion's share of which stems from decades of deferred maintenance, resulting in serious health and safety problems, primarily in Boston's most-neglected neighborhoods. Such repairs must precede any energy-efficiency improvements, and while new government resources will help narrow the funding gap, they won't close it. Even after government spending and industry rebates, the BEI has found a $7-9 billion funding shortfall.

**Powering up all of Boston's small homes could cost between $13.5 and $15.8 billion.**

Our investigation revealed other major reasons for the slow progress, helping to explain why, even as Massachusetts touts its net-zero goal, the Commonwealth's gas utilities are planning to invest as much as $20 billion in repairs of aging pipes to transport fossil fuels.

Arguably the most intractable challenge is the current high cost of electricity compared to gas—a matter of public policy. Massachusetts has some of the highest electricity rates in the country. Switching to electricity can leave some homes with at least temporarily higher utility bills. Officials at both Mass Save and Action for Boston Community Development (ABCD), an antipoverty group conducting outreach to low-income residents, have told us that it's for this reason that at times they have actually *discouraged* gas customers from getting heat pumps, devices that can dramatically cut carbon emissions.

Another policy-related challenge is Mass Save's role as the lead entity in pursuit of Boston's climate goals. The ratepayer-funded, utility-run, government-managed program is Boston's designated energy-efficiency incentive provider, with a nearly $5 billion proposed budget for 2025-2027. But critics question whether utility firms are best positioned to champion climate goals.

**Massachusetts has some of the highest electricity rates in the country.**

Legislators should also address obstacles to fair financing of retrofits. The costs of almost all incentives and concessionary loans are now shouldered by ratepayers, a strategy that has proved both inadequate and inequitable. While all Massachusetts utility customers pay into the system, those with low incomes—and few liquid assets—are usually less able to take advantage of its benefits. Similarly, renters, households that speak languages other than English, and small businesses are chronically underserved by Mass Save. Government action might help speed progress in powering up by supporting new tools including on-bill financing or other innovative means to equitably fund deferred maintenance and retrofits.

Finally, local and Commonwealth policy changes will also be needed to address workforce shortages, with too few trained contractors, and increasing demands on an overtaxed electrical grid.

# OPPORTUNITIES

## Despite this array of public-policy challenges, private philanthropists could play a leading role in helping Boston get on track to be a national leader in the fight against climate change and particularly in tackling the challenge of powering up small buildings.

Of course, in the short-term, impact investors and mission-driven venture capitalists can explore investments in existing ventures, some of which may be profitable in time. That includes new geothermal energy networks and a long list of emerging technologies aimed at improving options for heating and cooling systems, insulation paneling, battery storage, and more. Corporations seeking to conform to new environmental regulations may want to investigate a new kind of greenhouse-gas "offset," derived from powering up buildings.

In a potentially more transformative option, impact capital could help pay to design and launch an effort—independent or attached to an existing organization—to streamline and coordinate the powering-up of Boston's small buildings. Currently more than a dozen actors are vying to participate in Boston's quest to electrify small buildings, with property owners often bewildered by an ever-changing field of organizations, technologies, incentives and financing mechanisms. Building owners and tenants need a seamless process to achieve affordable, comprehensive retrofits, and Boston needs a clear sense of who is in charge of this key city objective.

### WHAT IS CATALYTIC CAPITAL?

When we talk about catalytic capital, we refer to an investment that accepts higher risks or lower returns compared with a conventional investment. Its aim is less profit than impact. Its presence enables other sources of capital that cannot tolerate the same risk to invest in potentially high-impact endeavors. In other words, by unlocking other investments, it serves as a "catalyst" to achieving full funding for an impact enterprise.

# CALL TO ACTION

Based on our review of this report, the Boston Foundation, with the support of the Boston Green Ribbon Commission and Prime Coalition, is calling on systems-focused philanthropists seeking long-term climate and equity impact in Boston to **help develop a new effort to transform the way Boston pursues its small-building retrofit goals**.

Philanthropic capital could support a robust design process for identifying and developing a program within an existing entity or creating a new entity to help steer private and public players to collaborate on specific, measurable outcomes.

**We recommend that a dedicated team be established to work collaboratively with existing organizations to explore options and weigh the strengths and weaknesses of each approach against the needs identified by this report.** This team should be capable and eager to advance racial equity from the beginning of the design phase onward, sharing our view that racial equity is critical to success.

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***A thoughtful design phase would include:***

- Recruiting and hiring staff members;
- Exploring elements of a "business plan" for the proposed program that would incorporate a budget, personnel, expected outcomes, and governance;
- Obtaining continued philanthropic participation to construct, fundraise, implement, and evaluate the program beyond the design phase.

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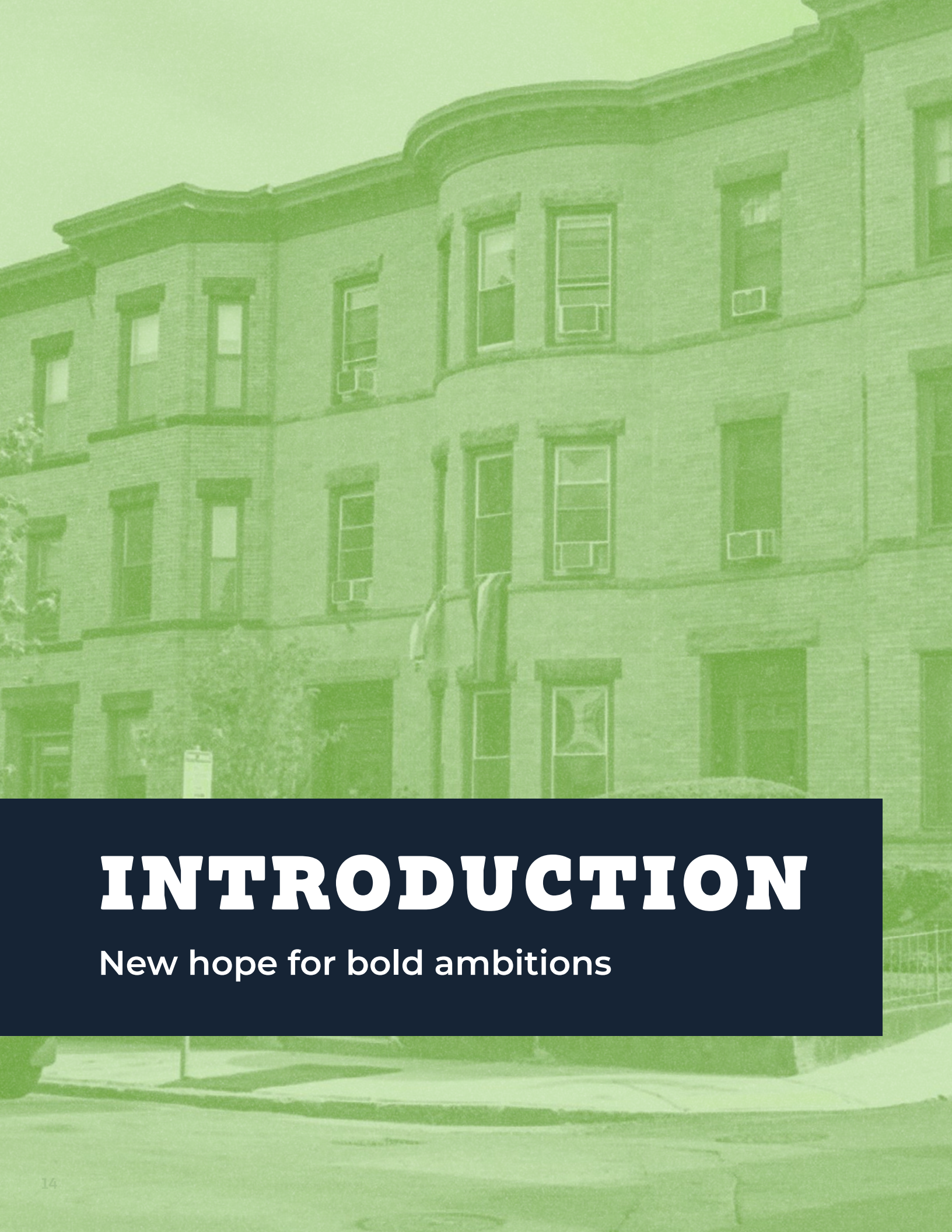
With adequate support, we envision that a program designed through 2026 could be launched as early as 2027.



# INTRODUCTION

## New hope for bold ambitions

Eighty-one-year-old Adelina Skerritt, a retired department-store saleswoman and grandmother of seven, lives by herself in a three-story brick townhouse in Dorchester. She barely affords her mortgage and groceries on her $2,000 monthly income from Social Security and her late husband's pension. Her gas was turned off for lack of payment in 2009, and while she still has electricity, those bills have accumulated to more than she can ever hope to pay.

In the winter of 2023, after the weather turned cold, she was using four electric space heaters while wearing a bathrobe over her clothes all day long. One of her sons had begun to suggest it was time she moved out of the home that she and her late husband, both immigrants from the West Indies, had restored over the past 30 years. That's when she received a mailed offer from the City of Boston for a free energy assessment and possibly new appliances to reduce her monthly energy bills.

Skerritt called the City, which connected her to the nonprofit antipoverty group Action for Boston Community Development (ABCD). As a Community Action Agency, ABCD is embedded in communities throughout Boston, providing a wide range of services. Its energy-focused programs cover 100 percent of the cost of all authorized work, as well as project management and quality control on behalf of low-income customers. Today Skerritt has a new heat pump, keeping her home at a comfortable 68 degrees. She no longer has to wear her robe all day, and she's thinking she might stick around a little longer.

"I was kind of shocked," she says, after being told she wouldn't have to pay for the heat pump. "Maybe even a little panicked. I'm not accustomed to getting anything for free. But it's so much nicer now."

Skerritt's energy upgrade owes to Boston's ramped-up efforts to help property-owners make their buildings more energy-efficient, reduce their greenhouse gas emissions, and improve their quality of life. The city has been trying to meet its ambitious target of getting to zero greenhouse gas emissions by 2050. The Commonwealth shares that goal, but if current trends continue, neither Boston nor Massachusetts will meet it.

In November of 2022, the Boston Foundation's Inaugural Boston Climate Progress Report found the city was off-track to reach its interim goal of cutting greenhouse gas emissions by 50 percent before 2030.

The report recommended four "Big Lifts"—multiplatform, multidecade efforts—to speed progress toward stated targets. Among these: reduce greenhouse gas emissions from Boston's small building stock through the electrification of heating and cooking appliances, substantial insulation and tightening of building envelopes, and integration of energy storage.

To be sure, energy-efficiency programs have made major progress in Boston's large, managed buildings, where ownership by a single entity and economies of scale make the work relatively simple. Furthermore, the City now mandates, through its Building Emissions Reduction and Disclosure Ordinance (BERDO), that buildings occupying more than 20,000 square feet meet emissions reductions targets that get to net zero by 2050 (see sidebar). In BERDO, Boston created a nation-leading policy to spark action on large buildings. The challenge ahead is how to tackle emissions from a sprawling stock of small buildings.

In 2022, we reported that just over 100 permits were issued for heat-pump installations in Boston's single-family, two-family, and three-family homes over the previous year, and that between 2019 and 2021, only 17 whole-home electric retrofits were completed.

## BERDO BASICS

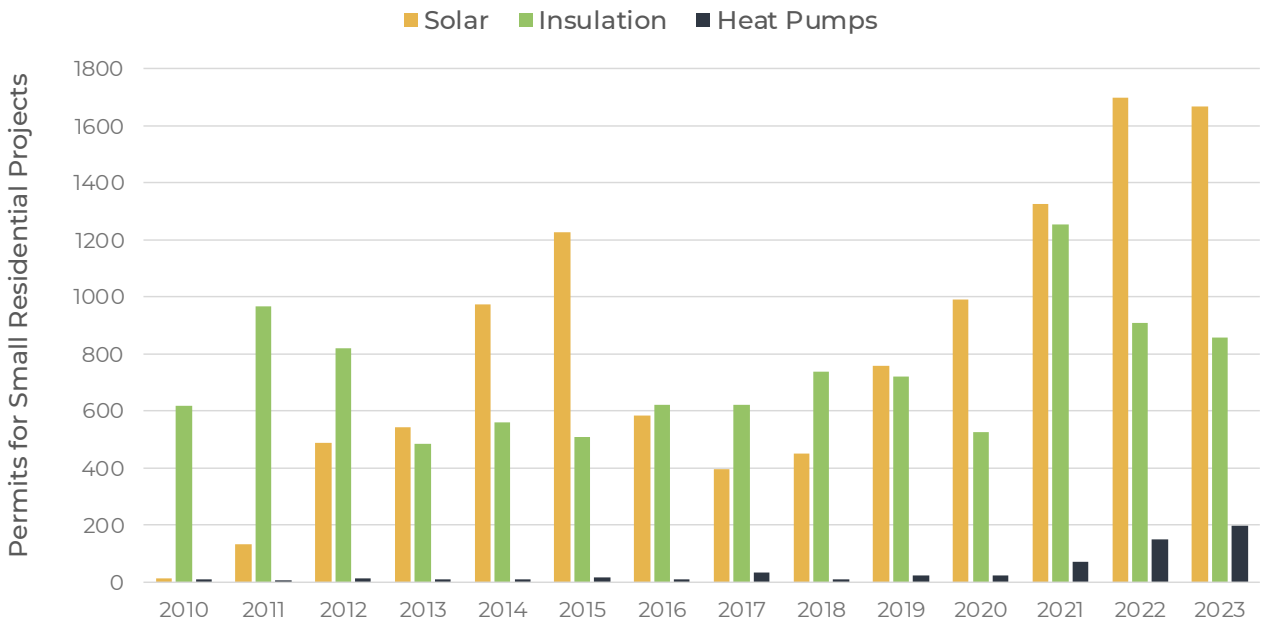
In 2013, the City of Boston took a major step forward in regulating building emissions by enacting the **Building Emissions Reduction and Disclosure Ordinance** (BERDO), which requires large commercial and residential buildings to report on their energy and water use. In 2021, Boston put teeth in that measure by setting incremental, five-year limits on emissions to reach zero by 2050. The ordinance applies to commercial buildings occupying 20,000 square feet or more and residential buildings with at least 15 units.

Together, these represent roughly 4 percent of Boston's buildings but more than half of its carbon emissions from buildings. Building owners can take several steps to comply, including by increasing efficiency, switching off fossil fuels, buying cleaner, renewable power, and making payments for any emissions over the building's limit.

Compliance with the emissions limits starts in 2025—but the City's sharp attention to the issue already has led to greater energy-efficiency in big buildings as owners try to avoid the penalties.

There is no similar regulation for buildings smaller than 20,000 square feet.

**Permits issued for heat pumps, solar, and insulation since 2010**




**NOTE:** Boston instituted a new tracking methodology in 2024. As of September, 628 heat pumps were installed, a significant swing.
**SOURCE:** City of Boston Permits through September 20, 2024.

## HEAT PUMPS VS. OTHER IMPROVEMENTS

Heat-pump use is worth tracking because the devices are essential to electrify homes, replacing fossil fuel–powered systems that are buildings' heaviest CO2 emitters. Four times more efficient than gas furnaces, they heat homes and water by extracting heat from the air (or less commonly, the ground) and moving it where needed, reversing the process for cooling.

Unlike solar arrays and insulation, heat pumps are a newer technology; units with cold climate capabilities only entered the US market in 2013. Permit data show that the pace of heat-pump installation has sorely lagged that of solar and insulation projects over the past 14 years. During this same time, Mass Save supported more than 15,000 natural gas system installs—for reasons our reporting outlines below.

To be fair, efforts to distribute heat pumps didn't ramp up until 2016; however, sparked by recent state and city efforts, the IRA, and a variety of local initiatives, uptake has started to climb. Based on installations so far this year, 2024 is on track to exceed prior years. Even so, in a February 2024 report, the Building Electrification Institute noted that at the current rate of progress, it would take Mass Save, almost 100 years to reach all of the city's low- and middle-income homes.

# WHY SMALL BUILDINGS MATTER

We prioritize this Big Lift because the challenge is large but the benefits beyond decarbonization are greater than in any other effort.

Boston's small buildings are responsible for more than 19 percent of the city's greenhouse gas emissions, and half of the emissions from buildings. Most of these small buildings are people's homes; what happens to them matters for individuals' and communities' health and well-being. Strategically reducing these emissions would not only help accelerate progress in fighting climate change. It would help our century-old housing stock meet the challenges of the next 100 years, and fairly treat residents who too often have experienced decades of income inequality and racial injustice.

For those whose health is threatened by increasingly common heat waves, electric heat pumps can provide central air-conditioning in a way that not only is more efficient but provides more comfort than the ubiquitous, energy-hogging window units. More energy-efficient, better-ventilated buildings provide cleaner, healthier air. The extra benefits of retrofitting small buildings include fewer costly trips to emergency rooms due to respiratory problems or heat stroke, more protection from viruses such as COVID, fewer absences from school, and more productivity at work.

**Boston's small buildings are responsible for more than 19 percent of the city's greenhouse gas emissions.**

The move to efficient electrification is needed to preserve energy affordability and advance equity. While gas is cheap today, today is the cheapest that gas will ever be. As wealthier consumers depart the gas system, the ongoing cost of that system will be increasingly concentrated on those with the least ability to leave it: renters, and households with limited access to capital. Looking further down the road, retiring our antiquated gas system could also financially transform the city, adding billions of dollars of value to an emerging local clean-energy economy.

Because of these many potential boons, this report will often refer to the multistep process of retrofitting (upgrading energy-related equipment) and decarbonizing (reducing greenhouse gas emissions) as "powering up." Reducing energy burdens on people and businesses can have unexpected and cascading benefits for entire communities—empowering them as well.

# AN URGENT MISSION

The bad news has become all too familiar, with hotter summers, rising seas, and more destructive storms revealing the vulnerabilities left by decades of neglect. As climate disruptions increasingly threaten public health and infrastructure, Boston—like many other cities, states, and community groups—has stepped up to try to defend its residents by both mitigating greenhouse gas emissions and preparing to adapt to unavoidable impacts.

Fairness is a major challenge. Most of the tens of billions of dollars needed to get Boston's small buildings powered up will have to be spent in parts of the city long scarred by historic inequities, including redlining. In these neighborhoods, residents suffer the highest rates of poverty and bear the heaviest burdens from rising energy bills and increasing climate-change impacts. Low-income Bostonians shoulder as much as three times the "energy burden"—the share of their income dedicated to utility bills—as the average household and suffer significantly more from chronic illness than wealthier neighbors. Roxbury, Mattapan, and Dorchester have the city's highest rates of asthma, triggered by not only pollen and pollution but indoor mold, which thrives in wetter weather.

Researchers are tracking other tolls of the climate crisis, including upticks in deaths from cardiovascular disease, and even increasing rates of dementia as temperatures rise. Neighborhoods with dilapidated housing are also at higher risk of power outages, which can force residents to endure extreme heat and cold, lose food for lack of refrigerator power, and go without needed medical equipment, such as home dialysis and CPAP machines.

Roseann Bongiovanni, executive director of GreenRoots, an environmental justice organization based in Chelsea, joins critics who say inequities are baked into Massachusetts' current home-energy economy. While Bostonians of all income levels pay into the energy-efficiency programs each month, lower-income people on average don't access the same level of benefits, including flexible loans and rebates. Mass Save's budgets are mostly made up of ratepayer tariffs: on average, a 2-cent surcharge per kilowatt of electricity and 27-30-cent surcharge per therm of gas.

Of the more than 119,000 heat pumps Mass Save proposes to install between 2025 and 2027, as described in its draft budget, only 22,200 of those would be in low-income homes and only 5,685 in moderate-income homes, noted a critique by the Metropolitan Area Planning Council. "In the final plan, we need to see a clear indication from the sponsors that they are on track to close the gap in spending for underserved customers as soon as possible," the analysis said.

# HELP ON THE WAY

## The good news is that Boston, like other U.S. cities, now has an unprecedented chance to tackle its small-buildings challenge.

The Biden-Harris administration has acknowledged the urgency of the climate crisis—and how much work needs to be done—devoting unprecedented federal resources to wean America off fossil fuels. This includes a $27 billion Greenhouse Gas Reduction Fund designed to mobilize financing and private capital, prioritizing the most vulnerable communities. That's on top of $369 billion for climate change projects related to farming, transportation, renewable power, and more (see IRA sidebar). The IRA's impact, including additional, uncapped tax incentives for clean and more efficient energy, could encourage $11 trillion in clean-energy investments by 2050, according to Goldman Sachs.

Boston officials are hopeful yet wary about this financial boon, given the boom-and-bust history of federal funding for municipalities. With presidential elections less than a month away, no one can safely predict what's next.

"This is a huge, unprecedented investment in climate, a once-in-a-generation opportunity, and we're going to take advantage of it in Boston," says Oliver Sellers-Garcia, Boston's first Green New Deal director. "It's wonderful that it's going to get a lot of things started and set a path," he adds. "It's just not the sustained funding we need."

Indeed, Boston had a similarly remarkable opportunity to try to confront its building efficiency challenges during the Obama administration's Recovery Act, which at the time also delivered unprecedented public investments to this end. From 2009 to 2011, the federal government provided $90 billion in grants and tax incentives to try to transform the energy system. Some of these funds helped launch the Renew Boston Residential Energy Efficiency Program, an acclaimed city campaign that ended after the money ran out (see page 25).

In search of more durable strategies, Massachusetts recently channeled unprecedented resources into trying to curb greenhouse gas emissions from buildings. In June 2023, in close collaboration with the Massachusetts Clean Energy Center (MassCEC), Boston city officials, and the Green Ribbon Commission, state officials launched the nation's first climate bank focused on affordable housing. The State Department of Environmental Protection seeded the bank with $50 million, which could grow exponentially by capturing more public and private investment, including some of the billions of new federal dollars.

## IRA BASICS

The **Inflation Reduction Act** (IRA) is a historically ambitious omnibus law targeting everything from insulin prices to corporate taxes to energy-efficiency, and, yes, inflation reduction.

Signed into law by President Joe Biden on August 16, 2022, the 725-page document dedicates $369 billion for a wide array of climate-change measures, from wind turbines to EV manufacturing to agricultural conservation. A separate $27 billion Greenhouse Gas Reduction Fund is made up of competitive grants meant to deliver lower energy costs and economic revitalization to communities, particularly those that have historically been left behind. More than one-fourth of those funds will go to competitive grants for solar power distribution.

Two other IRA programs administered by the Environmental Protection Agency will specifically encourage home energy retrofits. Things are moving so fast that the acronyms have been changing before our eyes. Home Efficiency Rebates (HER, previously known as HOMES) funds whole-house retrofits, and the Home Electrification and Appliance Rebates (HEAR, but previously HEEHRA) helps low- and moderate-income households choose electric power in appliances.

These grants are in addition to previously existing large tax credits supporting heat pumps and other energy-efficiency upgrades in homes. The U.S. Department of Energy has allotted Massachusetts $146 million of these funds ($73.2 million from HER and $72.8 million from HEAR).

It is worth noting that while the IRA brings remarkable opportunities, specifics are still evolving, and vigilance is needed to ensure that funding gaps, particularly effecting low- and moderate-income people, are avoided through policy and philanthropic approaches.

For its part, Mass Save on April 1, 2024, proposed a 2025-27 budget of $4.99 billion. That's up from its 2022–24 budget of $3.94 billion.

Heartening as these developments may be, they're still far from enough to help Boston make good on its climate promise. "To be honest, we really don't have the money to decarbonize our buildings," says Mary Wambui-Ekop, co-chair of the Massachusetts Energy Equity Working Group at the Energy Efficiency Advisory Council). "To meet our goals, we need much more than the ratepayers and government are paying, and it wouldn't be fair to ask the ratepayers to pay any more while most are already struggling under the weight of high energy burdens."

# A THOUSAND FLOWERS BLOOMING

To prepare this report, we investigated many instances throughout the country where public and private actors are speeding adoption of clean energy in buildings. In the following pages, we describe several examples, with particular attention to where catalytic capital—including in the form of a pooled impact investment or low-interest loan from a nonprofit—is helping to scale new solutions so quickly that there's hardly time to spread the word.

This report is not intended to be a comprehensive survey of all relevant efforts, nor an effort to thoroughly assess individual initiatives. Our aim instead is to illustrate the variety of compelling approaches to powering up small buildings, pointing out pros and cons, and to demonstrate the importance of skillful coordination in making speedy progress.

### MORE ABOUT CATALYTIC CAPITAL

An investment that is more patient and flexible about the timing and rate of return is "catalytic" in that it can enable impact that would not be possible without it. It comes in many forms: debt, equity, guarantees, etc. It can be provided by individuals, organizations, funds, corporations, foundations, or others. And it can be used to seed, scale, or sustain an enterprise.

## WHAT'S IN A RETROFIT?

TBF's 2022 *Climate Progress Report* ran this schematic illustrating the many facets of powering up small buildings. The options keep growing.

# 1

# SMALL BUILDINGS, BIG PROBLEMS

## From costs to complexity, hurdles to powering up abound

In 2010, Boston had an extraordinary chance to try to power up low-income homes. Nationwide, the Obama administration's American Recovery and Reinvestment Act was delivering billions of dollars to cities in grants and tax incentives to help transform the energy system. Bradford Swing, then Boston's director of Energy Policy and Programs under Mayor Thomas Menino, used some of the funds to launch the Renew Boston Residential Energy Efficiency Program in partnership with NSTAR, National Grid, Mass Energy Consumers Alliance, and Next Step Living, designed to sell building owners on insulating their properties—for free.

Much like the IRA's largesse today (see IRA sidebar, page 23), the Recovery Act funds promised a way to help pay for a troublesome gap between project costs and incentives delivered by Mass Save. Swing initially assumed residents in Boston's aging triple-deckers would be eager to take advantage of the free money to tackle deferred maintenance in their homes—issues including asbestos, lead, poorly insulated walls and unsafe staircases that, according to city building codes, must be resolved before energy-efficiency work can begin. But as he soon discovered, the challenge went well beyond the financial.

"We went door to door and said here's a $2,600 insulation job for free, and I can't tell you how many doors were slammed in our face once it became clear how often people would need to be home to deal with it," Swing recalls. "The amount of work to get people in three units to agree on anything at all—the timing, who's going to be home—is unbelievable." Language and cultural differences compounded the problem. About 37 percent of Bostonians aged five and older speak a language other than English at home, most commonly Spanish, Chinese, Haitian Creole, Portuguese, Cape Verdean Creole, and Vietnamese.

# BOSTON'S SMALL BUILDINGS AT A GLANCE

Boston's small buildings range from the Victorian-era brownstones and brick townhouses of Back Bay to the single-family postwar homes in Hyde Park to the thousands of commercial and municipal buildings, from libraries to markets to churches and synagogues, scattered throughout the city. In the quest to power up all these structures, the largest and most difficult segment, accounting for nearly half of the residential stock, is Boston's roughly 17,000 "triple-deckers." These three-unit wood-framed buildings were built mostly between 1880 and 1930. Social unrest and "White flight" in the 1960s and 1970s aggravated existing underinvestment and deterioration of this building stock. Approximately 6,800 triple-deckers now house low-income residents earning below 60 percent of the area median income, according to the Building Electification Institute.

## BOSTON'S BUILDING STOCK

Boston has roughly

**86,000 buildings**

including...

**70,000 residential structures**

occupying less than 20,000 square feet

**6,165 non-residential buildings**

occupying less than 20,000 square feet, including restaurants, clothing stores, labs, gyms, libraries, and houses of worship

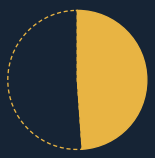
## BOSTON'S SMALL RESIDENTIAL BUILDINGS INCLUDE:

**32,668 (47%)**

are home to households earning less than 80% of the area median income, or $95,200 per year for a family of four.

**30,555 (44%)**

are single-family homes, with a median construction year of 1925.



**34,195 (49%)**

are 2-4-unit homes, with a median construction year of 1905.

**2,660 (4%)**

are mid-rise, multifamily (4-6 floors) homes, on average built in 1909.

**2,244 (3%)**

are low-rise, multifamily homes (1-3 floors), on average built in 1917.

**Sources:** *City of Boston Climate Action Plan, 2019, Building Electrification Institute report: Boston Funding Gap Analysis for Residential Building Decarbonization, updated Feb. 2024, and interviews with BEI researchers. Note: The number of non-residential buildings was an estimate provided to the Boston Foundation and not included in the BEI's published report.*

Even so, before the program's money ran out, Renew Boston managed to weatherize some 2,500 residential buildings and 700 small businesses, according to Swing. A 2012 consultant's report called the Renew Boston program "very successful—a win-win situation. New companies such as Next Step Living provided jobs for many people in the area, contributing to the economic health of the city. Boston residents now have more energy-efficient homes resulting in lower energy bills and more comfortable living spaces. As homes become more energy efficient, less energy will be wasted and the city of Boston will ultimately consume less of the Earth's resources."

Swing's difficulties nevertheless illustrate what energy experts say is one of the highest hurdles in the race to power up homes economically: the large transaction costs of finding and persuading each new customer, when so many residents, for various reasons, would prefer to avoid the hassle. "I haven't seen this problem solved anywhere, and it sucked my soul out through my toes," Swing says.

Tepid customer engagement is just one of many challenges slowing progress toward powering up Boston's small buildings—and it's not even the most daunting one.

## A PARTIAL LIST OF HURDLES

- Consumer inertia or uncertainty about where to begin
- Lack of regulation (such as BERDO) mandating small-building retrofits
- Time and effort required by customers to deal with the complexity of understanding and pursuing retrofits
- Enormous backlog of costly deferred maintenance that must be done before energy retrofits begin
- Shortage of trained contractors (and contractors who reflect the city's diversity), which slows projects and drives up costs
- Conflicting interests of landlords and tenants
- Current higher price of heating with electricity versus natural gas
- Some community mistrust of utility-run Mass Save program
- A "mish-mash" of public, nonprofit and for-profit agencies pursuing residential retrofits

# STAGGERING COSTS

Eighty percent of Boston's 86,000 buildings, large and small, still need to undergo deep energy-efficiency retrofits and be electrified, according to city data. Big-building owners have an urgent new reason to power up, in the form of an ordinance that, beginning in 2025, will fine owners that don't report and comply with updated greenhouse gas emissions limits (see BERDO sidebar, page 16). There is no similar requirement to date for Boston's 76,165 small buildings, unless they are undergoing substantial improvements that must comply with new building codes.

Retrofits are typically paid for upfront or financed on relatively short terms, of seven years or less. Even though the new Mass Community Climate Bank's low-interest loans have a 20-year term with no repayment during the first 18 months to bridge incentives and tax credits, low- and moderate-income residents are still less likely likely to benefit from a program requiring a monthly payment. Most incentives are paid retroactively, calling for some upfront investment before the rebate or tax credit makes them more affordable. That gives Boston's wealthier owners of big and small buildings alike a major advantage, since they tend to have more liquid capital and the capacity to afford larger monthly payments.

And the burden of expenses facing small-building owners is staggering. Powering up Boston's small buildings could cost between $13.5 and 15.8 billion, according to the Building Electrification Institute (BEI). Small-building owners face costs that average between $78,000 for a single family home and $240,000 for a building with two to four units.

These costs are high for a variety of reasons, but leading the list is decades of deferred maintenance, which have led to serious health and safety problems, including asbestos, mold, lead, pests, rot, leaking roofs, and fire-prone wiring—primarily in Boston's most-neglected neighborhoods. Repairs to these troubles must precede any energy-efficiency improvements, and in Boston, they've caused many small buildings with low-income owners to be "deferred"—usually indefinitely—for subsidized energy upgrades.

While new government resources may help pay for some of this work, they won't be nearly enough. Even after government spending and industry rebates, the BEI calculates a $7-9 billion gap that must be filled for projects to proceed. (See *The Price Tag*, next page.)

Massachusetts' building energy transition "is moving community-by-community, door-by-door, and boiler-by-boiler, with each building type and appliance costly, complex, and deeply personal to retrofit," says the webpage of the Building Electrification Accelerator, a nonprofit network that seeks to speed up decarbonization in Massachusetts. Without more deliberate planning and organization, it adds, Massachusetts communities "will fail to meet their climate goals or meet them in ways that are profoundly inequitable."

# THE PRICE TAG

When you address existing health and safety issues, update electric systems, add ductwork and ventilation, modernize building shells, and use electric appliances, costs add up.

**$78,000—$107,000**

for a single-family home

**$54,000—$80,000**

***per unit*** for multifamily buildings

Many of these costs are typical for renovation projects over the past few years, but are beyond the reach of most property owners today.

Low- and moderate-income (LMI) households in Boston's small- and medium-sized buildings face a **funding gap of $21,000-$58,000 per unit to decarbonize**, even after securing available Mass Save and federal government incentives.

An estimated **$100-200 million in additional local or regional public investments** would be needed annually in Boston through 2050 to comprehensively decarbonize all LMI households.

## $13.5-15.8 billion

The total cost to power up Boston's small buildings, with a total funding gap of $7–9 billion.

**Source:** Boston Funding Gap Analysis for Residential Building Decarbonization, Building Electrification Institute report, February 2024

# WORKFORCE WOES

In Boston as in the rest of the country, a shortage of skilled and trained electricians and contractors is slowing progress to power up homes and small businesses. (That pace increases costs, as prices for parts continue to climb.) The average age of tradespeople has been increasing and fewer young people want to join the professions. “We’re trying to scale and ramp up at a time when the overall workforce is contracting and it’s harder and harder to attract people into the trades,” says Jim Hunt, senior vice president at Eversource Energy.

A recent report by Associated Builders and Contractors found a monthly average of 390,000 job openings in the construction industry in 2022, with roughly a quarter of existing workers older than 55. When property owners do find contractors, electricians and plumbers are often reluctant to install electric heat pumps, either because they are unfamiliar with them or think they don’t work as well as natural gas systems.

In a November 2022 report, the Massachusetts Commission on Clean Heat urged state officials to expand and support workforce development programs to address gaps in the decarbonization workforce. “Market forces on their own may not be sufficient to incentivize the rapid labor market growth needed to meet emissions targets,” the commission warned. Greater workforce diversity is also a pressing need, say multiple sources. One city official told us, "The lack of diversity (ethnic, racial, language, etc.) in the contractor workforce is a major weakness of our current system, which exacerbates the barriers for households that speak languages other than English or prefer to work with firms that share a common background. We also know that minority-owned businesses receive only a small fraction of Mass Save spending.”

In its 2025–27 budget proposal, Mass Save pledged to collaborate with MassCEC, the Commonwealth’s quasi-state economic development agency, to increase workforce diversity by doubling existing funding from $12 million to $24 million a year and seeking to “expand” training opportunities.

## CASE STUDY A TRUSTED VOICE GETS RESULTS

### Energy contractor Abel Vargas says homeowners can easily be sold on powering up their property—as long as they understand the benefits.

Last year, Vargas' company weatherized 250 units in his hometown of Lawrence. By April 2024 he had already served another 142 residences and was preparing to start installing heat pumps in units where doing so will lower the home's utility bills.

To achieve these results, both the message and the *messenger* matter, says Vargas. Contractors and public officials who say they struggle with communicating with landlords or owners simply "don't know how to deal with them," he adds. "They don't know how to engage on the phone. Some people think the problem needs to be solved by people with college degrees. But lived experience and attitude are more important."

Per capita income in Lawrence, where Vargas was born and raised, is less than $27,000, and the majority of its 79,000 residents hail from Puerto Rico, the Dominican Republic, and Guatemala. Vargas, whose parents are Dominican, was working as a city business development officer in 2020 when he noticed that wealthier property owners were getting most of the financial incentives offered by contractors working with Mass Save to upgrade their homes. "Companies from outside the city felt comfortable knocking on doors in Andover, but not so much in Lawrence," he says.

Vargas launched his company, Valley Home Insulation, to pursue what he says was "both a fairness thing and a market opportunity."

As a vendor for Mass Save who contracts with the nonprofit antipoverty organization Action for Boston Community Development (ABCD), Vargas serves Lawrence homeowners as a general contractor, figuring out what a building needs and how best to pay for it. "For a for-profit business, we operate more like a social service," Vargas says. "We provide hand-holding that's often missing from big systems that expect people to be able to navigate their way through them." Most work comes his way by word-of-mouth, largely from homeowners who need to upgrade heating equipment but first must tackle problems including asbestos, faulty wiring, and poor insulation.

Boston Impact Initiative (BII), a nonprofit focused on helping to close the racial wealth gap, has given Vargas business coaching and a low-interest loan that helped him buy a third truck and hire three more workers. Today he has 30 employees in five crews, all residents of Lawrence.

BII's CEO Betty Francisco says additional catalytic funding could be "transformative" for Vargas, adding, "He can hardly keep up with the growth right now because there's so much demand for clean energy solutions in our communities." And that's also true for other contractors, says Eversource Vice President Jim Hunt, who says catalytic capital could play a "huge role" in growing the workforce to power up more homes.

The key, says Vargas, is to "empower people who aren't traditionally empowered. You take a kid who knows Roxbury or Mattapan and they can do exactly what I'm doing in Lawrence."

**"Empower people who aren't traditionally empowered."**

**Abel Vargas,**
Energy contractor

## TENANTS' TROUBLES

Given that approximately 65 percent of Bostonians rent, most of the city's inhabitants share a special obstacle to powering up.

It's known as the "split incentive." Renters, who in most cases pay the utility bills, may be more eager to power up to try to lower their monthly costs, while landlords generally lack that motivation and would still have to cope with all the hassle of contracting laborers and financing improvements.

Sometimes those landlords live far away. "In East Boston," says Bongiovanni at GreenRoots, "we found that the leakiest, most energy-inefficient buildings were not owner-occupied. People we spoke with didn't even know who their landlord was; they just sent a check to Miami."

The other side of this dilemma is that often landlords pay for renters' heating bills if the building shares a common boiler system. If the building switches to heat pumps, which are individually installed in each residence, tenants may end up having to pay for heating in addition to their rent.

What's more, even when landlords do get on board, improving their properties with energy-efficiency upgrades, many then feel justified in raising the rents, even when incentives have lowered the cost of the work. "We need new policies to make sure that predatory behavior doesn't happen—perhaps some sort of matching grant requiring the landlord to say we'll allow the tenants to stay for another two years at least," says Bongiovanni.

In September 2023, Boston Mayor Michelle Wu announced a new effort intended to help address this problem. The Healthy and Green Retrofit Pilot Program promised funds for owners of two- to four-unit owner-occupied buildings to "jumpstart the decarbonization and electrification of Boston's smaller building stock, while preserving affordability and preventing tenant displacement." The pilot offered energy assessments, construction management, and forgivable loan financing, while requiring that in return for the free city assistance, participating building owners must agree not to displace tenants in good standing for at least 10 years or to "unreasonably" raise rents. The pilot program received more than 300 applications for 30 spots.

Other cities are trying different approaches, which Massachusetts and Boston might integrate into local efforts. These include an award-winning program informally known as "the Energy Efficiency Rent Boost" launched by Atlanta, Georgia's Housing Authority in November 2022.

Like many federally subsidized housing authorities, Atlanta Housing pays rents but not utility bills for some of its 22,000 households receiving rental vouchers, most of them home to families earning less than 60 percent of the area median income. Paying a monthly "boost" to landlords who agree to efficiency upgrades has helped families save money—and stay in their homes. Participating landlords are also eligible for special low-interest loans from the Solar and Energy Loan Fund, a community development financial institution. Atlanta Housing pays boosts based on the extent of the work completed, while landlords can use the extra money to pay back their loans. By the spring of 2024, the program had increased efficiency, reduced greenhouse gas emissions, and lowered utility bills for some 400 families.

**Some of the most serious obstacles impeding progress in powering up Boston's small buildings can only be solved by policymakers at the Commonwealth level. In addition to the threat of "renoviction" and displacement from "green gentrification" as retrofits raise home values and monthly costs, the basic cost of fuel needs attention.**

# PRICING PARADOX

## Today it costs more to provide the same amount of heat with electricity than with gas, despite the efficiency associated with an air source heat pump.

The replacement of gas heat with an electric heat pump can increase heating bills—although it is important to note that heat pumps are typically far cheaper for cooling than window unit ACs. Without aggressive energy-efficiency measures, however, bills can rise. This fact has been a key barrier to customer adoption of heat pumps.

“A heat pump could be three times more efficient than a gas furnace, but electricity currently can cost four to five times more than natural gas,” points out Grayson Bryant, a senior associate at Cadmus, a sustainability and energy consultancy.

Until this problem is resolved, the cheaper price for gas will continue to thwart efforts to power up Boston’s small buildings. Mass Save’s practice (driven by policy) has been to calculate whether a change will be cost-effective before agreeing to subsidize it. That’s why its 2024 rebate application form notes (in small print) that ”customers with pre-existing natural gas heating are not eligible for income-qualified rebates.” Only those customers heating and cooling their homes with oil, propane, or electric resistance are eligible for rebates. It doesn’t matter that natural gas is a fossil fuel, emitting greenhouse gas emissions and pollutants in the home. The Mass Save calculation prioritizes energy costs over climate goals.

Likewise, even as ABCD’s website encourages adoption of heat pumps, as does that of Mass Save, ABCD personnel have been discouraging property-owners heating with gas from installing them. “We’re primarily an antipoverty organization, so it would be against our mission to encourage people to do something that would raise their monthly bills,” says James Collins, director of ABCD’s Climate Equity & Impact department.

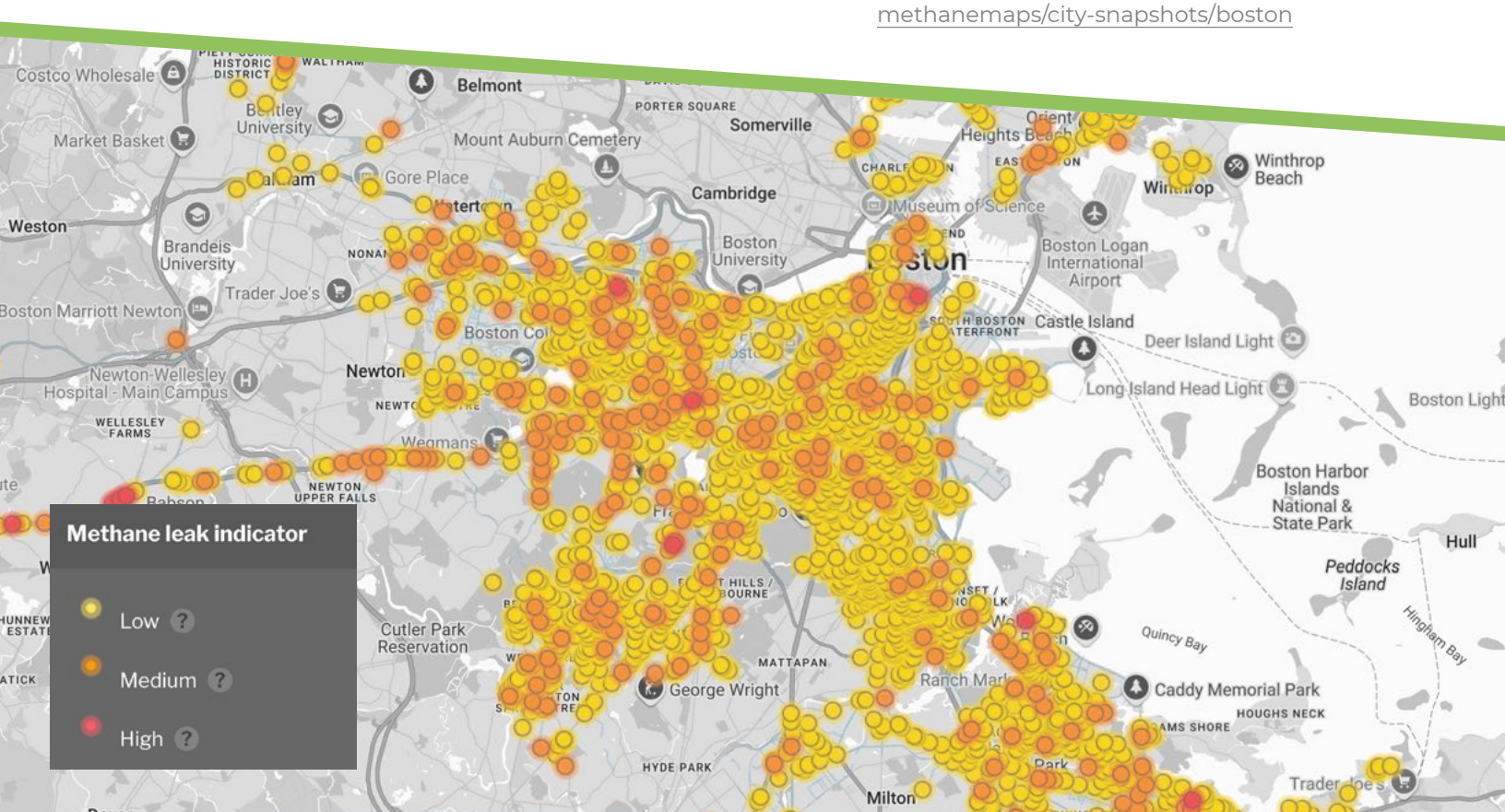
Mass Save and ABCD *do* encourage electric heat pump purchases for homes powered by “delivered fuels” such as oil and propane, or electric resistance, since in those cases a switch would indeed lower bills. Based on census data, City officials estimate that about 20,000 households (not buildings) use oil, 7,300 propane, and 82,000 electricity. In those households, switching to electric heat pumps can pay for the investment costs in under 10 years. ABCD installed heat pumps in about 200 such homes in Boston in 2023, Collins said.

However, this situation is changing in two key ways. First, while prices fluctuate in the near term, gas will get progressively more expensive relative to electricity over time. The cost of maintaining the city’s aged and leaky gas infrastructure keeps climbing. And as those who can afford to exit the gas system depart, the fixed costs are split between fewer remaining customers. (These are likely include renters and homeowners with limited access to capital.)

Second, the state’s Interagency Rates Working Group is exploring ways to reduce the cost of heating through electricity using smart rate design that more fairly recovers costs from people who electrify their heat. Both National Grid and Unitil have proposed novel rate designs for lowering the cost of heating with electricity and slashing bills for their lowest income customers. Smart rate design is one of the reasons why Maine has seen significant growth in heat pump adoption.

Powering up Boston’s building stock via electrification is an effort to preserve and enhance affordability in the context of evolving costs that will have an impact on consumers. Accelerating these policy shifts to undo the pricing paradox will be important to achieving Boston's net-zero goals.

The heavy maintenance load of our aging gas infrastructure is evidenced in this Environmental Defense Fund interactive map of system leaks: edf.org/climate/methanemaps/city-snapshots/boston



# POWER & TRUST

Mass Save has an impressive resume of energy saving work. Despite many accolades, some still question whether it should remain in charge of decarbonization efforts in Boston and the Commonwealth. The ratepayer-funded organization is run by energy utilities, including Eversource and National Grid, both of which sell electricity and natural gas and primarily make money through investing in these systems. Efforts to electrify and reduce energy demand can run up against existing incentives.

Analysts suggest this is one reason that Mass Save has a credibility problem with potential customers. Trust is essential in motivating property-owners to consider retrofits, yet "residents are much more skeptical of utility companies when it comes to learning about home energy efficiency," the Goodman Research Group reported in a 2012 evaluation of Boston's outreach efforts. In addition, residents in arrears on utility bills (a significant share of low- and moderate-income ratepayers) are often reluctant to participate, fearing repercussions from the utility to whom they are in debt. Those most in need of help fear seeking it.

Heat-pump distribution is progressing much faster in other states, led by Maine and Vermont, where power firms don't manage the process. After beating a 100,000 heat-pump goal in 2023, ahead of schedule, Gov. Janet Mills announced a new target of 175,000 additional heat pumps to be installed by 2027, to reach nearly half of all Maine households. True, Maine and Vermont have had a notable advantage because many more homes there were heated by fuel oil and propane. As we've noted, that makes the switch a financial no-brainer for consumers, since it immediately saves money. But their efforts have also been spurred on by aggressive, independent, quasi-state agencies—Efficiency Maine and Efficiency Vermont—that have no conflict of interest in rapidly cutting greenhouse gas emissions.

Mass Save "is failing to take the steps necessary to achieve the transformative levels of building decarbonization required," wrote the Commonwealth's Climate Chief Melissa Hoffer earlier this year, in a report urging structural changes to the organization. Some Commonwealth lawmakers advocate at the least restructuring Mass Save's leadership to include representatives of government agencies and environmental justice communities. "I want natural gas off the starting team," State Sen. Michael Barrett has said. "I want public interest representatives, government officials, and electric power leaders on the field, representing Massachusetts interests."

Mass Save is trying to improve; Heat-pump installs beat goals the program set for 2023. It missed targets in partial displacements of existing fossil fuel use only because full displacements were so popular. Customers and the workforce were ready, but Mass Save failed to plan for such success.

Mass Save and the utilities that administer its programs are evolving, yet important questions remain on whether the current framework can get the job done and, if not, what should be put up in its place (see table, next page).

## MASS SAVE DELIVERY ON STATEWIDE HEAT PUMP GOALS, 2023

| FUEL | DISPLACEMENT TYPE | HOUSEHOLDS 2023 | 2023 GOAL | % OF GOAL |
|---|---|---|---|---|
| **Oil** | Full | 13,726 | 3,300 | 416% |
| | Partial | 5,593 | 8,780 | 64% |
| **Propane** | Full | 1,753 | 1,099 | 160% |
| | Partial | 1,225 | 1,761 | 70% |
| **Gas** | Full | 12,556 | 75 | 16741% |
| | Partial | 10,502 | 264 | 3978% |
| **Electric Resistance** | | 8,744 | 3,336 | 262% |
| **Total** | Full Fuel | 28,035 | 7,810 | 471% |

**Source:** MA Energy Efficiency Advisory Council 2024 Second Quarter Program Administrators' KPIs

# A SEEMING MISHMASH

Beyond the prominent roles played by Mass Save, ABCD, and the City of Boston, various nonprofit and for-profit groups and state and city agencies are pursuing residential energy-efficiency pilots and programs. The number and variety of players can make it even more difficult for Bostonians to know where to start.

"A 'mishmash' would be an accurate way to describe it; it's very difficult for property owners to navigate all this alone, and that's an underlying barrier to progress," says Eva Rosenbloom, manager of REALIZE-MA, itself one of more than a dozen entities aiming to speed Massachusetts' carbon-free building retrofits. "This is true not just in Boston but the rest of the country," she adds. "The whole process, no matter what kind of buildings we're talking about, is incredibly segmented, very complicated, and highly burdensome administratively."

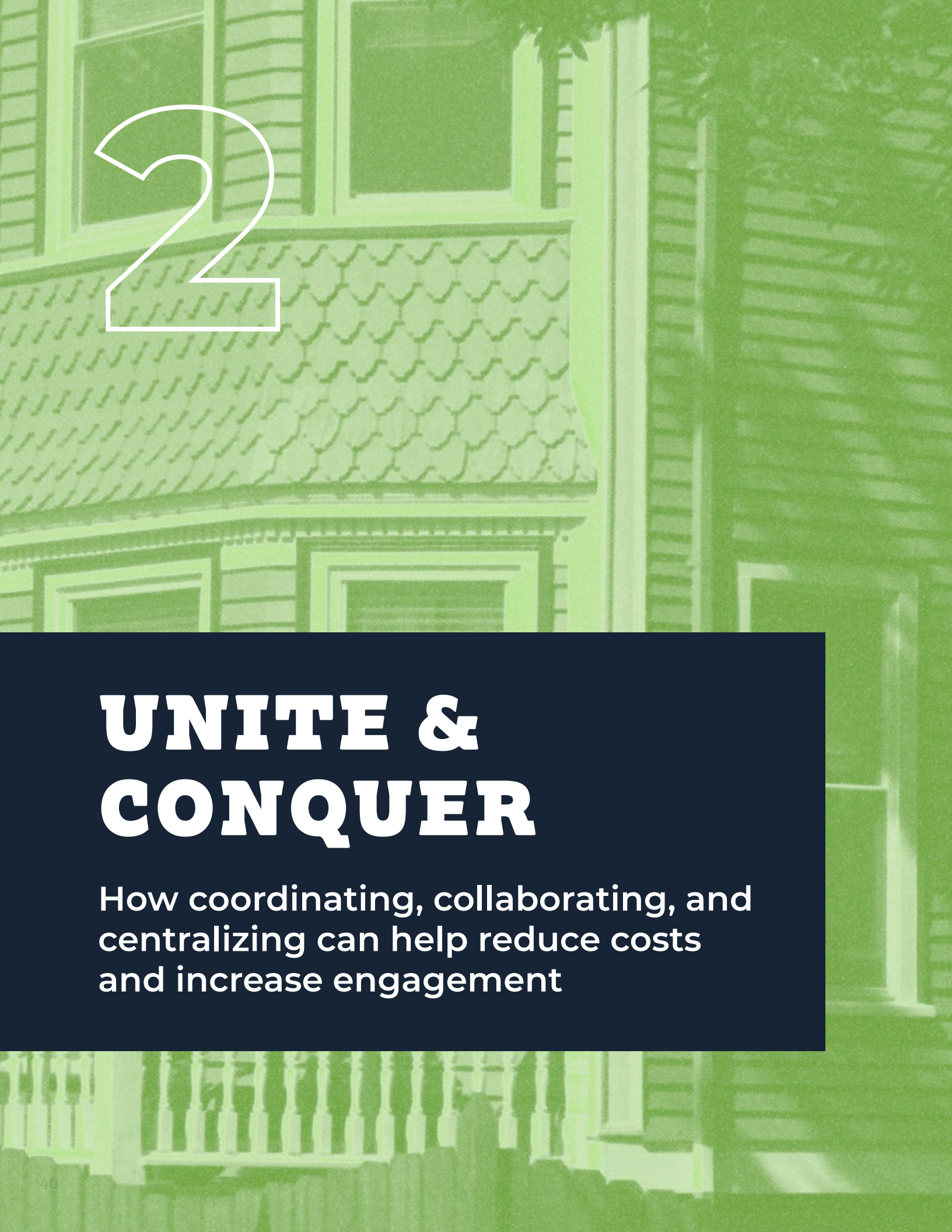
Administrative efforts are proliferating at every level—to serve consumers, explore new technologies, manage the grid, and more. One of the newest Commonwealth agencies trying to spur decarbonization is the Office of Energy Transition, created in March 2024. Housed in the Executive Office of Energy and Environmental Affairs, it's charged with "ensuring the availability and readiness of electrical infrastructure, electric and gas transition coordination, and a just transition for impacted workers and businesses." The Department of Energy Resources, MassDevelopment, and the Federal Funds and Infrastructure Office also deal with related programs.

## MANY GOOD ACTORS; DIRECTOR WANTED

The landscape can be bewildering to the neophyte, and challenging even to the pro working in the field. There are customer-serving organizations that cover many aspects of the small-building retrofit process, from marketing to construction to funding, sometimes competing and sometimes coordinating. There are similar sounding firms that serve other businesses rather than property owners and there are any number of municipal, state, and federal agencies at work on retrofit and related problems. There are CBOs and CDFIs and tech and finance and other nonprofits crowding the landscape alongside venture-backed or for-profit startups. In conversations for this report, we encountered:

- **Consulting firms** that work with Mass Save, MassCEC, contractors, and consumers; others that specialize in turnkey energy strategies for buildings.
- **Nonprofits** aimed at making Massachusetts' energy incentives and workforce more inclusive; neighborhood-based environmental justice organizations; national groups working to accelerate decarbonization in Massachusetts; and startups working with Boston's Housing Authority, MassCEC and other groups on innovative pilot programs.
- **Networks or coalitions of entities** seeking to accelerate building decarbonization or further diversity in the clean-energy workforce or fund housing and climate groups.
- **Funding sources** that are focused on affordable housing and clean energy, or on helping to create a more inclusive economy.
- **City offices, agencies, programs, and pilots** that support clean-energy initiatives, and state bodies like the EEAC to guide or support the Commonwealth's energy-efficiency efforts or MassCEC to grow its energy economy or MassDev to offer financing and development resources to help city economies grow; and national programs with local branches

Boston will have the best chance of rapid progress toward its net-zero goal if it can streamline and centralize these dispersed and sometimes siloed efforts to power up buildings. Improved data-collection and transparency is essential to this effort. Finding the funding to do it all will take determination and creativity.



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# UNITE & CONQUER

## How coordinating, collaborating, and centralizing can help reduce costs and increase engagement

Alexandra Markiewicz and her husband, Jeff Geisinger, had lots of advantages when they recently decided to power up their two-family colonial home in Roslindale. Both are high-income, well-educated and savvy consumers—Markiewicz works for the Massachusetts Bay Transportation Authority and Geisinger is an architect. They also received extraordinary support from a MassCEC pilot program to help decarbonize low-rise residential buildings. In yet another advantage, the couple had been heating their home with an oil-fired boiler, meaning the switch to electricity wouldn't increase their heating bill. Yet even this privileged couple was surprised and discouraged by the hardships they encountered.

Initially hopeful to learn they could secure a zero-interest HEAT loan from Mass Save, once Mass Save performed a free energy assessment, they then found they would have to wait four months for their inspection. (Further legwork with MassCEC helped them find a different assessment firm so they could move ahead more quickly.)

The pilot program offered up to $30,000 in support for retrofits. Yet among the unanticipated costs was $12,000 to upgrade their home's electrical panel, which was significantly more expensive than they had budgeted due to additional equipment needed to adhere to local building code requirements. Markiewicz says she was shocked to discover that only one U.S. firm manufactures a required meter socket and was so behind demand that she was initially told she'd have to wait at least a year for the part. (Her resourceful electrician tracked one down sooner.)

Previously Markiewicz and Geisinger had paid for their tenant's heating costs, but the switch to electricity meant the tenant was now responsible. So in another unanticipated expense, the couple reduced the tenant's rent by 5 percent to compensate for those increased bills. Today Markiewicz so appreciates the improved comfort in her home and knowing she's doing the right thing by the climate that she says she'd do the whole project again in a heartbeat. Yet she adds, "It's insanely expensive to do this work, and it does not make financial sense without major subsidies."

Of course, apart from the cost, retrofits can be a huge hassle, as Markiewicz's experience shows. In a landscape that's often overwhelmingly complex, featuring ever-changing technologies, business rules, and incentives, powering up a home takes patience, time, money and effort. Building owners must find contractors, arrange times for the work to be done, negotiate prices, understand technology options, and secure financing. Customers, community groups and contractors involved in this effort need all the handholding they can get.

To confront this problem, energy experts strongly favor a "one-stop shop" strategy for powering up homes—a central, trustworthy entity that can manage everything from energy assessments to project planning to general contract services to financial aid. This approach is "akin to walking into a car dealership and picking your make and model, features and aesthetic specifications, and financing and maintenance plan all at once," said a recent blog from the Rocky Mountain Institute. Many experts agree that one of the best current examples of this trend, designed for low-income homeowners, is Philadelphia's Built to Last project. It's "the most impressive organization in the country by far along these lines," says Peter Curtice, a senior advisor to Rewiring America, the country's largest electrification nonprofit.

# A FULL-SERVICE CONCIERGE

A quasi-governmental agency housed at the Philadelphia Energy Authority (PEA), Built to Last combines federal, state, municipal, and philanthropic funds in a comprehensive concierge service focused on repairing and retrofitting homes in high-poverty neighborhoods. The project hosts collaboration among a long list of agencies, nonprofits, utilities, state and federal offices, and nonprofits including Habitat for Humanity. The result is free-of-charge upgrades to make homes safer, healthier, and more energy-efficient, while also creating jobs, many directly through a PEA-developed training program.

With a three-year budget of $16.8 million, Built to Last hopes to have powered up 250 single-family homes by the end of 2024. As of September 2024, its website says, "We have begun to contact individuals who applied to join the wait list in May of 2023. Homeowners who applied after that time should expect a wait of over 2 years." Built to Last anticipates more federal funding through the IRA, as well as state and local funding sources that will help it reach its goal of completing 10,000 holistic home repairs by the end of 2033. Mass Save is currently Boston's closest equivalent to a one-stop shop, but its offerings lag models such as Built to Last. Meanwhile, the Boston Home Center is taking a "one-stop-shop" approach with its retrofit pilot, and Built to Last was studied during design. A key difference is that the Philadelphia program focuses on single-family homes. Serving small multifamilies adds significantly to the complexity.

Ideally, such a coordinated entity can accomplish whole-home retrofits, orchestrating multiple facets of a project while providing clients with all applicable financial incentives. It can be a nexus for contractors and community agencies assisting low-income renters and owners, as well as more well-off homeowners who might be discouraged by a retrofit's complexity and time demands.

With smart marketing strategies and a captivating brand, a one-stop shop may convince building owners to power up before gas equipment breaks down, and they don't have time to study their options.

Not least, a high-quality one-stop shop could achieve economies of scale, reducing costs by strategically reaching out to many potential clients at the same time, and powering up buildings in a coordinated way, working with neighborhood blocks rather than going house by house.

That sort of scale—a "whole neighborhood" strategy—is essential for contractors to make any profits, says Richard Kauffman, chair of the New York State Energy Research and Development Authority (NYSERDA). It simply doesn't make sense to approach Boston's small buildings one by one. The transaction costs, including all the time and expense in outreach, are prohibitive. With a big group of buildings, especially similar types such as storefronts or triple-deckers, plus organized outreach, it becomes more attractive. If buildings are bundled together, energy savings may be enough to attract an energy service company, Kauffman says (see case study, page 44).

## CASE STUDY ESCOS: THE OUTSOURCED APPROACH

Al Subbloie makes it look easy. The New York City-based serial entrepreneur is founder and CEO of a for-profit firm that monetizes energy-efficiency—reducing building owners' bills at no upfront cost to them, while providing profits to investors. Budderfly is part of a fast-growing industry of "energy service companies," or ESCOS. Its sweet spot is restaurant franchises, including Taco Bells and KFCs, almost all of them under 20,000 square feet. And its clients include four Subway restaurants and nearly 100 Ninety-Nine pubs in the Greater Boston area.

Budderfly offers a single-vendor, pay-for-performance deal for a process most property owners find dauntingly complex and costly. It starts by assessing a building and suggesting improvements that it guarantees will save significant energy and money, reducing the customer's bills by 5 to 10 percent at minimum. Decarbonization isn't its overarching goal, but it reliably and significantly cuts greenhouse gas emissions by increasing efficiency.

After signing an Energy Service Agreement with the new client, Budderfly becomes the customer of record with the utility firm, while the client pays the company a fixed rate for power for 10 years or more. During that time, Budderfly regularly upgrades the property with new equipment as needed.

The model is well-matched for small businesses, like restaurants, that lack cash for retrofits. "Being more energy-efficient, having less of a carbon footprint, that's all important to us, but when you look at the costs it gets tricky," says Lee Rathbun, director of HR and restaurant facilities for Restaurant Growth Services, LLC, the parent organization for the Ninety-Nine restaurant chain.

All restaurants use a lot of energy, and many have outdated freezers and heaters. For the Ninety-Nine chain, which signed its contracts in 2022, Budderfly has invested an average of $100,000 in each restaurant, a "win-win partnership," according to Rathbun, which he expects will cut energy use by at least 20 percent over the next 10 years.

Customers working with an ESCO may not get the same level of savings as if they were to do the work themselves. But ESCOs' upfront resources and know-how offers enviable convenience, helping explain why they've recently attracted major philanthropic and for-profit investment, as well as deals with cities including Cambridge and Boston.

While some firms have disappointed clients, and others have struggled to make their model work, Subbloie says Budderfly has grown by at least 60 percent each year since it was launched in 2017, by sticking to "the midmarket" of easily replicable buildings, mostly restaurants, smaller than 100,000 square feet. But he told us he's intrigued by the prospect of trying to retrofit residential buildings, especially if there were a way to bundle them together to economize. "It's not going to be ridiculously profitable, but it would be a fun conversation," he says.

# SPEEDING ELECTRIFICATION

Several cities throughout the United States have been trying to power up faster by launching community-driven "accelerators" aspiring to be the first place for potential clients to go to learn about options and get help with contractors and financing.

One of the standouts is the NYC Accelerator, sponsored by New York City's mayor's office, which provides free resources, training, and one-on-one guidance to help building owners improve efficiency. "Every city is going to need one of these," says Accelerator financing specialist Andrew Chintz, whose office works with buildings starting at 5,000 square feet, with special tracks for houses of worship, co-ops, and multifamily buildings. "We direct people to incentives—we have about 70 programs all mapped out according to what you want done," he adds.

In a similar effort, and in contrast to Boston and Massachusetts, the states of Maine and Vermont have made remarkable electrification progress, as we've noted above, led by the independent, quasi-state agencies Efficiency Maine and Efficiency Vermont, and funded by utility ratepayers and grants.

Utilities provide most of Efficiency Maine's budget but aren't calling the shots. Instead, a Board of Trustees makes decisions with oversight from the state's Public Utilities Commission. Efficiency Maine has been relatively free to transform the state's market. Mainers don't have to wait for rebates as Bay Staters do; those are instantly applied at retailers like Home Depot by scanning a QR code at check-out. Rebates make heat pump prices competitive, and for low-income Maine residents, the appliances and installation are provided for free by Maine's housing agency.

In some cases, community choice aggregators (CCAs) are trying to become electrification clearinghouses. Active in at least 10 US states, and run by local governments, CCAs offer a choice to energy consumers who want greener and sometimes more affordable power, even while still receiving transmission services from an investor-owned utility firm. (Boston's CCA, Boston Community Choice Electricity, is the largest of nearly 200 CCAs in Massachusetts.) Ratepayers are the CCAs' main source of funds, while some also distribute state and federal incentives.

In Redwood City, California, Peninsula Clean Energy, the CCA for San Mateo County, is developing a bold plan, expected to debut in late 2024, to offer as many as 750 free or nearly free, whole-home, turnkey retrofits for low-income applicants. Until now, it has been using its budget to provide residents with special rebates, on top of what state and federal governments offer, for home-electrification equipment, which it can sometimes offer for free. Its revamped site will include a free hotline concierge service offering guidance for home retrofits. PCE's mission-driven nature comes through in its transparency—it posts quarterly financial reports online—and some of its recent accomplishments.

# PEER PRESSURE POWER

An independent one-stop shop can increase consumer confidence and enthusiasm with transparent data and peer pressure, advantages Boston currently lacks. Picture those school fund-drives with giant thermometers posted showing steadily rising temperatures to indicate money raised toward a goal. A brand-forward website focused on powering up Boston's buildings could mobilize action in a similar way, counting properties that have kicked fossil fuels. "You have to repeatedly engage homeowners," says Chad Laurent, a principal at Cadmus. "That's how the solar campaigns have been so successful in the past. You have to communicate the message over and over again."

Providing consumer-centered data can help overcome inertia driven by doubt or confusion. For example, Efficiency Maine's website lists registered heat-pump installers in order of how many rebates they've issued, letting potential customers easily find someone active and experienced. Other information hubs, like California's Clean-Energy Connection, vet and even register contractors, and make it easy to find someone local.

Surveys show that trusted messengers are essential both for initial outreach and subsequent hand-holding in neighborhoods distrustful of government and corporations (see Case Study: A Trusted Voice, page 32). Neighbor-to-neighbor contacts, aka "community-based social marketing," may be one of the most persuasive tools to change behavior.

"Let's imagine going to a church and saying to church leaders in a neighborhood, we'll give you $50 for every hot lead for residential retrofit with the following characteristics," suggests NYSERDA's Kauffman. "Talk to contractors working in that neighborhood and specify multiple projects that might be oranges, grapefruits, and tangerines, but are similar enough. That $50 would be meaningful for the church but not so much for the project, and you might create a real scale of development in that neighborhood."

# REDUCING REDUNDANCY?

In recent years, Boston and Massachusetts officials have recognized the need for more coordination. In late 2022, the Commission on Clean Heat urged state officials to set up a customer-friendly "building decarbonization clearinghouse," while the state's Executive Office of Energy and Environmental Affairs has consulted with a climate advisor, VEIC, on its potential design, according to MassCEC's Program Director Meg Howard.

In Boston, Mayor Wu's Office of Housing has been working with a consultant from the Rocky Mountain Institute (RMI) to expand the Boston Home Center site to include resources to power up small buildings. The smart idea is to merge electrification options with existing financial support for low- and moderate-income home repairs. For 30 years, the Boston Home Center has provided home repair services to eligible homeowners. Working with RMI allowed the BHC to develop a strategy to braid decarbonization and resilience into its current program offerings, allowing for both repairs and electrification to move forward together.

The City's Environment Department is also working to build out its support for small-building owners, hiring new staff who will be responsible for providing guidance for Bostonians looking to power up their homes and businesses and developing new programs to accelerate the pace of electrification efforts, particularly in low-income neighborhoods and communities of color.

For the past three years, Boston has been participating in the Community First Partnership, Mass Save's initiative to work with municipalities and community-based organizations to target outreach at underserved customer groups like renters and small businesses. With funding from Eversource and National Grid through this partnership, Boston has hired an Energy Advocate tasked with helping small-building owners navigate the various programs available to help them power up their buildings. The city is also expanding its Retrofit Resource Hub website, originally designed to provide resources for owners of larger buildings required to comply with BERDO, to add more information about powering up small buildings. Unfortunately, at this writing, the Retrofit Resource Hub site, launched in July, does little more than refer small-building owners to Mass Save. Environment Department staff are coordinating with other city offices and with the various programs providing funding for retrofits with the aim of ensuring a "no-wrong-door" approach that helps Bostonians connect to the appropriate resources regardless of where they start.

A dedicated effort to better coordinate across disparate organizations, equipped with purpose-built leadership and ample financial support, could concentrate these good ideas and efforts, reducing redundancy and customer confusion. Even better if the same coordination-focused effort could bring together disparate streams of financing.

3

# A RIVER OF FUNDS

## Combined funding streams can make powering up affordable

As a primary care physician in a hospital serving some of Boston's poorest residents, Anna Goldman is familiar with the ways home energy problems can make people sick. After years of hearing stories of patients leaving their gas-powered oven doors open to heat their homes or limiting their use of electric devices such as nebulizers and CPAP machines, she created Clean Power Prescription, which she describes as a first-in-the-nation pilot program that lets Boston Medical Center (BMC) providers write patients prescriptions to reduce their energy bills.

Working with Eversource Energy, the program helps reduce low-income patients' electricity bills by transferring credits the hospital earns from solar power on its roof into the patients' accounts. Goldman began recruiting patients in March 2024, with hopes to expand to as many as 100 households by year's end. On average, participants will get about $50 in credits each month for a year, representing about a one-third reduction in a typical bill. Enrollees will also be referred to social service agency ABCD to see whether they are eligible for discounted or free home energy-efficiency upgrades.

Environmental justice tax credits in the Inflation Reduction Act make the program a financial win for BMC, Goldman explained, because in return for the aid to the community, the hospital will get more funds to grow its solar array, creating a virtuous circle. "Energy definitely is a core issue for health, so it's really exciting to have new ways to address this complex issue," Goldman says.

The hospital's project is one of many approaches afoot to organize and pay for energy-efficiency improvements with innovative combinations.

Lots of promising ideas have been coming from government, business, nonprofits, and entrepreneurs. But just as the jumble of vendors and permits and deferred maintenance can be dizzying to anyone planning a retrofit, so are the financing options. Even as more money pours in from federal agencies, the various spouts seem scattered. And besides these, there are ratepayer-generated funds, local government, for-profit, nonprofit, and philanthropic dollars in play, all of which could have greater impact if better coordinated. Efforts under way to scale up coordination to manage and cover costs include multiple partners at all levels—Mass Save, community action agencies, the City of Boston, new companies, and grassroots organizations. We examine a few of those streams, some innovative funding strategies, and promising models for weaving sources together for bigger impact.

## POLICY POSSIBILITIES

Commonwealth legislators could take ***three broad actions*** to increase the availability, affordability, and equitable distribution of electrification retrofit financing:

1. **Develop clearer, long-term policies** to finance a robust clean-energy transition. Ratepayer tariffs currently pay for almost all incentives and concessionary lending, yet they are not enough to pay for all the needed work.

2. **Streamline financial support** for individual building owners pursuing retrofits while
   - Increasing the terms and lowering interest rates for retrofit loans
   - Expanding financing tools to cover required pre-retrofit building upgrades
   - Simplifying the financial options and the processes to access them

3. **Support development of efforts** to scale retrofits to the block or neighborhood level (which should speed execution and lower per unit costs).

# GREEN BANKING

Massachusetts' new Community Climate Bank is one of at least 21 "green banks" in 16 states and the District of Columbia to launch since 2011, but so far is unique in its clear mandate to address affordable housing. Gov. Maura Healey and Boston Mayor Wu have been closely involved in its creation, hoping it will not only help reach climate goals but address a housing crisis, expand environmental justice, and create thousands of new jobs.

At the bank's June 2023 launch, Mindy Lubber, president and CEO of CERES, a Boston-based nonprofit that enlists private capital to solve sustainability challenges, hailed what she called "a novel form of public-private partnership to equitably address some of the most vexing challenges" to climate progress. In April 2024, the bank launched the $20 million Energy Saver Home Loan Program, its first consumer product. Its aim is to help property owners cut energy use and reduce or eliminate reliance on on-site fossil fuels by "providing affordable financing and high-touch customer service features," according to the launch announcement.

Massachusetts seeded the bank, based within MassHousing, with $50 million, an amount that might grow substantially with anticipated federal infusions. The launch was just in time: Last April, the Environmental Protection Agency announced $20 billion in grants to eight community development banks and nonprofit organizations that will make grants and loans of their own to combat climate change in disadvantaged communities. Some of this money could flow to the Massachusetts bank.

Green banks aren't traditional banks with deposits but rather mission-driven lenders that deploy catalytic capital—such as loans with lower interest rates, longer terms, and more tolerance for risk—to pursue environmental goals. Community Climate Bank Director of Policies and Programs Maggie Super Church says she is confident the bank will be able to service some of the forthcoming federal loans. "We're pretty far ahead of other states in designing and launching a program for this segment of the market," she says. The bank will work closely with the state's clean energy development agency, the Massachusetts Clean Energy Center (MassCEC), and the state's finance and development agency, MassDevelopment, sharing expertise to vet new projects.

Some state officials hope the bank's mission will soon extend from housing to include small businesses—especially those in struggling, mid-sized gateway cities that have lost manufacturing industries and jobs.

# MORE FINANCIAL INNOVATION

## Novel financial strategies are emerging to help speed climate progress all over.

The Boston Medical Center program described above creatively blends resources (solar power savings), delivery mechanisms (doctors' prescriptions), and overall expansive thinking about a problem (including non-medical factors, such as poor housing conditions, that can lead to major medical expenses). Another health-care driven effort serves Baltimore, where the nonprofit Green & Healthy Homes Initiative (GHHI) has been partnering with health-care providers for years to improve health conditions in low-income homes. Vigorous fundraising and receipt of huge government outlays, most recently including a $50 million IRA pass-through grant, have positioned the organization to dramatically scale up its operations. It makes financial sense, says GHHI president and CEO Ruth Ann Norton, for private and government entities to support energy-

### SOLUTION OR NEW PROBLEM?

Some good ideas can turn sour in the hands of bad actors:

**PACE LOANS**

Back in 2010, *Scientific American* hailed PACE loans as a world-changing idea and programs have been backed by big foundations. In 2015 President Obama remarked on their promise. But some PACE lenders have been investigated by the FBI. In 2021, TV commentator John Oliver devoted nearly 22 minutes to denouncing the strategy. In May 2023, the Consumer Financial Protection Bureau, an independent U.S. government agency, reported that PACE loans raised borrowers' annual property tax bills by about $2,700 on average; that borrowers were relatively more likely to live in Black or Hispanic areas; and that loans increased the risk of mortgage delinquency over two years, regardless of the borrower's race.

**CARBON CREDITS**

Carbon credits, or "offsets," are not a new idea. They seek to monetize an environmental good, such as planting a tree or installing a solar panel. The idea is to put a specific value on a reduction of carbon emissions in a way that can be bought and sold, so that a business trying to meet environmental goals (regulatory or just annual report bragging rights) can do so indirectly. Alas, almost as soon as carbon-credit markets emerged, so did rampant abuse, particularly when involving offsets from faraway (possibly fabricated) forests and soil–markets critics say are "riddled with fraud." These practices have given offsets a dubious name.

efficiency—even decarbonization—in addition to conventional home repairs to remove asbestos, lead, and safety hazards geared to improve health in long-neglected low-income neighborhoods. "We can prove outcomes on health-care savings, which is a massive opportunity to have hospital systems readjust their thinking about social determinants of health," Norton says. This strategy confronts one of the main obstacles to progress in Boston: the lack of money to pay for all the work required to get homes ready for electrification.

Back in Massachusetts, the Ipswich Municipal Electric Light Department and the Northampton-based Center for Ecotechnology have been working on a small pilot program exploring a financing model for energy upgrades that doesn't depend on loans or grants. "Tariff-on-bill financing" allows consumers to power up their homes and pay for it out of energy savings accruing on their monthly utility bills, at a rate lower than the energy savings. This can make clean-energy improvements more affordable and accessible without having to tap rebate programs that can take a long time to deliver.

And at MassDevelopment, officials have been looking into a controversial tool known as Property Assessed Clean Energy (PACE) loans to spur building owners to power up.

## LOANS

PACE loans finance clean and efficient energy equipment at no upfront cost, usually carrying below-market interest rates and terms that can exceed 20 years, compared with the commercial loan average of seven. They attach to a property, rather than a person; truly more of a lien than a loan. Interest is charged on property tax bills, and when that property is sold, the debt transfers to the new owner.

Residential PACE loans have drawn complaints because predatory lenders have oversold the benefits to homeowners who've gotten stuck with larger-than-expected payments, and then struggled to sell. These issues have dampened uptake, and Boston officials say they will not consider PACE loans given their inequitable history.

MassDevelopment launched a commercial PACE program in 2020. To date, it has only closed deals on three large properties, but with interest rates starting to fall, officials hope to expand the lending to smaller buildings. "People shouldn't take a bad situation in states that don't have enough rules and apply it to Massachusetts," says Marcos Marrero, MassDevelopment's executive vice president of community development.

## CARBON CREDITS

In San Francisco, for-profit startup WattCarbon offers a new way to think of another oft-maligned financial energy strategy: carbon credits. Carbon credits have been rightly besmirched due to fraud-riddled markets involving trees and soil. But new players are switching things up, selling credits based on direct energy upgrades to businesses that want to offset their energy use.

Partnering with Colorado-based building electrification company Elephant Energy and QuitCarbon, a concierge retrofit consulting firm in San Francisco, WattCarbon creates its offsets by facilitating clean-energy upgrades in buildings, including by arranging low-cost loans. It claims to rigorously register each gram of carbon and watt of electricity, calling its offsets "Energy Attribute Certificates." The approach is gaining attention. "It's a new market mechanism and system of measurement that could fill a crucial gap in the emissions reduction puzzle," *Fast Company* raved last year. Peter Curtice, senior advisor to Rewiring America, says the promise of this new kind of carbon credit is in "[using] the funds to stack together with other incentives to get that last-mile support that's needed to make a project work."

In Boston, Larry Chretien, executive director of the Green Energy Consumers Alliance, says the model could support Massachusetts' goals by supplying a market for carbon mitigation spurred by pending regulation that would obligate fuel providers to increase clean-energy options. "Utilities are going to be looking everywhere for possible offsets," he says, adding that small buildings could benefit by joining together as they power up to combine their credits for sale.

WattCarbon still has to prove that without its help, a given energy improvement wouldn't have happened—the rationale for the value of the credits. Although the effort (and others like it) remains a work in progress, it represents clear improvement over planting a tree for its $CO_2$-uptake value—and hoping it won't die.

## NETWORKED ENERGY

A creative approach to easing the pain of upfront costs of powering up is to share expenses with neighbors. Sunwealth, a national for-profit investment firm based in Cambridge, has financed nearly 200 community-based solar projects in Massachusetts since 2014. That represents a total of 16.3 megawatts of installed capacity with up to 25 percent cost-savings on utility bills for customers including affordable housing providers, nonprofit organizations, schools, and residential subscribers, says Martha Buckley, the firm's senior manager of investor development. Sunwealth receives both market-rate and impact investments.

In another home-grown innovation, the nonprofit climate solutions incubator HEET has developed a plan for gas utilities to switch to networks of geothermal energy. HEET began making progress on this effort in 2017, when it commissioned a feasibility study that convinced Eversource and National Grid to request permission from regulators to pilot the first installations. HEET then helped gain Department of Public Utilities approval.

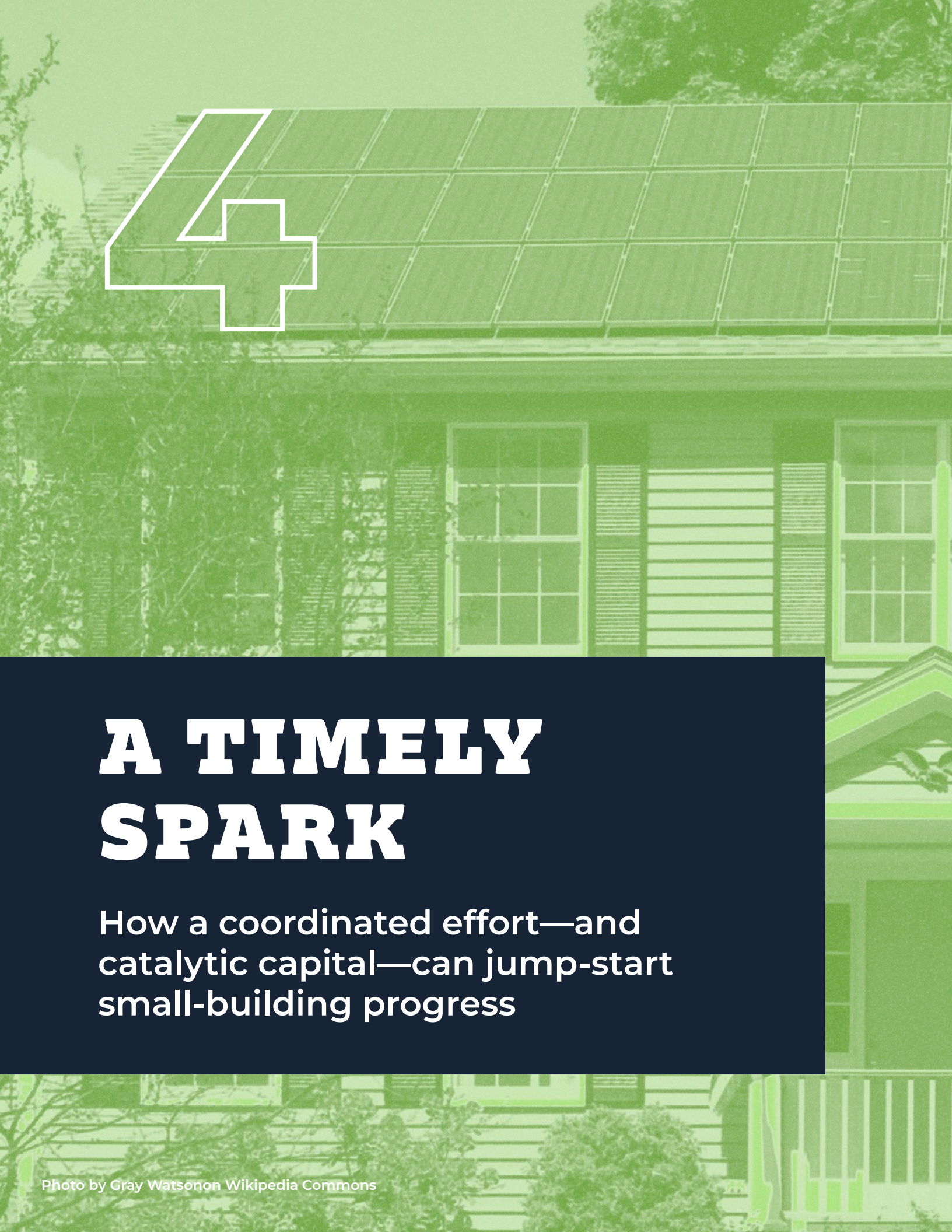
In April 2024, Eversource launched the state's first test of a utility-built thermal network. More than 140 customers living and working in 37 buildings in Framingham—including a fire station, part of a school, public housing units, single-family homes, and small stores—began drawing energy for heating and cooling carried by pipes from holes drilled several hundred feet into the ground. Next up are National Grid systems serving part of the UMass Lowell campus and more than 100 low-income families at Franklin Field Apartments, a Boston Housing Authority property in Dorchester. HEET founders Audrey Schulman and Zeyneb Magavi are excited about involving private investors for the future.

"Geothermal is very exciting," says the Climate Bank's Church, adding, "it's not inconceivable that we could help a utility access funding for residential use at some point in the future."

# CONTRIBUTIONS & COLLABORATION

Ideally, many of these parallel or complementary funding initiatives could weave together to make an even stronger result, while keeping a spotlight on equity. "Even with all the financial resources becoming available, there's still a need for jump-starters," says Eva Rosenbloom, manager of REALIZE-MA, which aims to speed up the state's deep-energy and carbon-free building retrofits: Speed and scale in this field have been elusive, no question. But they're not impossible. They'll just take a lot more than easy money. That's why there's such a strong case here for thoughtful philanthropists who are keen to put their resources to work on needs that tend to be the most overlooked or seem the most intractable. Chief among these: figuring out how to get all the forces now scrambling to try to power up buildings to pull together so that the whole is greater than the sum of its parts.

> **"A trillion dollars could fall from the sky and it would still have to be administered."**
>
> **Bradford Swing,**
> Former director of Energy and Policy Programs for the City of Boston



4

# A TIMELY SPARK

## How a coordinated effort—and catalytic capital—can jump-start small-building progress

Photo by Gray Watsonon Wikipedia Commons

"We are more than just a gym," says the Cambridge YMCA website—and that's more than just a slogan. The nonprofit, housed in a five-story, 140-year-old red-brick building, provides child care, art and recreation classes, and wellness programs for seniors and kids after school, all in addition to its ample fitness center. That's why it was such a gift to the community, eight years ago, when public-spirited investors pooled funds, including catalytic capital, to pay for an overdue energy makeover.

Thanks to a pool of impact investments organized by Renew Energy Partners, (not to be confused with Boston's 2010 Renew Boston Residential Energy Efficiency Program), a Boston-based energy-efficiency development and finance firm that normally works with larger buildings, the Y, which has 40,000 usable square feet, got new LED lights and an energy-management system that turns off power when it's not in use, plus new insulation and a new steam-heating system. The $120,553 package, with no money down, reduced the Y's electricity use by 15 percent and its gas use by nearly 50 percent, according to Renew's calculations.

"We never could have afforded this on our own," says Cambridge Y Chief Financial Officer Mark Zoltco. "We didn't even have money to change the lightbulbs." With the money saved, the Y has been repaying its angel investor lenders at a lower-than-market rate, with cash left over for other needed building improvements. It has all added up to a surprising magnifier of success.

"The new lights made everything brighter, more open and inviting to folks, and then we were able to get more fitness equipment, and everything snowballed from there," Zoltco says. Membership rose from 1,800 before the upgrades to a pre-COVID peak of 3,000, which provided even more revenue to keep refurbishing. (The lower utility bills also benefit Caritas Communities, which owns and manages 128 single-room occupancy units in the same building.)

Renew Energy Managing Principal Charlie Lord says the project was part of an experiment that began in 2015. A team that included the Boston-based HEET Climate Solutions Incubator helped assess and retrofit a total of five YMCAs in Massachusetts and Connecticut, saving money with a template of services that could easily be scaled up. Additional impact investors included Cienega Capital and Boston Impact Initiative, a nonprofit philanthropy that invests in people and businesses to help create a more inclusive economy.

The model used was an energy service agreement (see Case Study: ESCOs, page 44), which assesses a building's energy needs and organizes upgrades that save on utility bills, after which it splits the savings. Zoltco calculates the deal has been saving the Y at least $8,000 a month. When its 10-year lease with Renew Energy Partners ends later this year, the Y's savings should increase.

Lord estimates the Cambridge Y project is annually sparing the planet 163 metric tons of $CO_2$ a year, equal to emissions from 34 cars. "The fact that we were able to do it means these kinds of deals can be structured to work," Lord says. "You just need the right kind of investors."

While the Y is not technically a small building, the story illustrates the cascade of benefits that can be unleashed by catalytic financing and a smart approach to energy.


SRO facility at YMCA in Cambridge
(Image Via Google Streetview)

# DESIGN FOR TRANSFORMATION

## Based on this report's assessment of the landscape, coordination of the "mish-mash" of entities focused on similar goals appears among the highest priorities.

Building owners and tenants need a seamless process to achieve affordable, comprehensive retrofits. A purpose-built program would have the potential to pursue several crucial goals at once, including: develop community trust, channel catalytic capital into retrofit projects, and accelerate powering-up efforts at a pace consistent with Boston's climate targets. Any such program or entity must start with a thoughtful design phase, supported by funding that prioritizes outcomes for the public good rather than private benefit.

Given the strength, passion, and diversity of public and private agencies already trying to lead this field, the best approach may be to work to strengthen one of them instead of creating something brand-new, as long as the effort is capable and adequately resourced to address the acute gaps we've identified.

The most immediate needs are for coordination among the multiple consumer-facing agencies and offerings, alongside aggregation and deployment of catalytic capital into projects. Yet in later phases, other functions of a well resourced program might include workforce development, data collection, and even a clearinghouse for lobbyists and legislators on the most vexing issues, such as the gas-electric rate differential, continued investment in fossil fuel infrastructure, and the inequity of the current distribution of incentives.

Among other purposes, this new or reshaped entity could take the lead on driving coordination across public and private organizations where it is lacking. It would have a recognizable brand with strong marketing and outreach and be the first place for customers, contractors, and community groups to turn for information and guidance. The new program could also help unite catalytic public and private capital, vouching for the impact of each investment and mobilizing resources to fill financial gaps.

As Betty Francisco, CEO of Boston Impact Initiative, says: "There are so many ways more capital could make a difference, from low-cost loans to credit enhancements and loan-loss guarantees that could help us and other funders offset risks and support larger investments in climate-critical companies."

There are myriad ways that philanthropic capital and dedicated leaders could help Boston get on track toward meeting its worthy climate goal. There just isn't much time to spare.

# CALL TO ACTION

Based on our review of this report, the Boston Foundation, with the support of the Boston Green Ribbon Commission and Prime Coalition, is calling on systems-focused philanthropists seeking long-term climate and equity impact in Boston to **help develop a new effort to transform the way Boston pursues its small-building retrofit goals**.

Philanthropic capital could support a robust design process for identifying and developing a program within an existing entity or creating a new entity to help steer private and public players to collaborate on specific, measurable outcomes.

**We recommend that a dedicated team be established to work collaboratively with existing organizations to explore options and weigh the strengths and weaknesses of each approach against the needs identified by this report.** This team should be capable and eager to advance racial equity from the beginning of the design phase onward, sharing our view that racial equity is critical to success.

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***A thoughtful design phase would include:***

- Recruiting and hiring staff members;
- Exploring elements of a "business plan" for the proposed program that would incorporate a budget, personnel, expected outcomes, and governance;
- Obtaining continued philanthropic participation to construct, fundraise, implement, and evaluate the program beyond the design phase.

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With adequate support, we envision that a program designed through 2026 could be launched as early as 2027.

# APPENDIX

# STAKEHOLDER INTERVIEWEES, BY AFFILIATION

**Action for Boston Community Development (ABCD)**
James Collins, Director Climate Equity & Impact Department
Sharon Scott-Chandler, President & CEO

**Alaska Heat Smart**
Andy Romanoff, Executive Director

**All In Energy**
Gabe Shapiro, Co-Founder & Co-Executive Director of Partnerships

**Atlanta Housing Authority**
Kenneth Mingo, Manager, Inspection Services,
Adelaide Steedley, Senior Director for Strategy, Policy & Innovation

**BlueHub Capital**
DeWitt Jones, Executive Vice President

**Browning the Green Space**
Kerry Bowie, Founder, President, & Executive Director

**The Boston Foundation**
Rebecca Price, Senior Director of Donor Alignment and Impact Investing

**Boston Housing Authority**
Joel Wool, Deputy Administrator

**Boston Impact Initiative**
Betty Francisco, CEO,
Zak Neville Young, Director of Integrated Capital Solutions,
Henry Noël Jr., Investment Director

**Boston Medical Center**
Anna Goldman, Medical Director of Climate and Sustainability & Primary Care Physician

**Budderfly**
Al Subbloie, Founder and CEO

**Building Decarbonization Coalition**
Panama Bartholomy, Executive Director

**Building Electrification Institute**
Caytie Campbell-Orrock, Deputy Director

**Build It Green - California**
Catherine Squire, Co-Founder

**The Cadmus Group**
Grayson Bryant, Senior Associate
Chad Laurent, Principal

**Cambridge YMCA**
Mark Zoltco, Chief Financial Officer

**Catalytic Capital Consortium**
Stacey Xiao, Program Officer

**City of Boston**
Katherine Diaz, Green New Deal Policy and Implementation Analyst
Hannah Payne, Director of Carbon Neutrality
Oliver Sellers-Garcia, Boston Green New Deal Director and Commissioner of the Environment Department
Kristen Simmons, Program Lead for Residential Decarbonization
Bradford Swing, Former Director of Energy Policy and Programs
Brooks Winner, Building Decarbonization Program Manager

**Clean Energy Venture Group**
James Ellis, Partner

**Clean Energy Ventures**
Daniel Goldman, Co-Founder & Managing Director

**Climate Impact Advisers**
Jessica Luk-Li, Founder & Principal

**COEUR ALASKA Kensington Mine**
Rochelle Lindley, Community & Government Affairs Manager

**The Community Preservation Corporation**
Danielle Donnelly, Assistant Vice President, Sustainability Programs & The Climate Friendly Homes Fund

**EcoLogical Solutions Inc.**
Tedd Saunders, Chief Sustainability Officer; also President of the Saunders Hotel Group

**Energy Efficiency Advisory Council (EEAC)**
Mary Wambui-Ekop, Co-Chair, Massachusetts Energy Equity Working Group

**Eversource Energy**
Jim Hunt, Executive Vice President, Corporate Relations & Sustainability
Tilak Subrahmanian, Vice President

**Firefly Energy Consulting**
Bridgett Neely, Founder & President

**Green & Healthy Homes Initiative**
Ruth Norton, President & CEO

**Green Energy Consumers Alliance, Inc.**
Larry Chretien, Executive Director

**GreenRoots**
Roseann Bongiovanni, Executive Director

**HEET**
Zeyneb Magavi, Executive Director
Audrey Schulman, Co-Founder, now Co-Executive Director of HEETlabs

**Individuals**
Alexandra Markiewicz, homeowner
Adelina Skerritt, homeowner

**LISC Massachusetts**
Emily Jones, Deputy Director

**LK Hillside**
Judy Ko, Principal

**MA Building Electrification Accelerator**
Cora Weissbourd, Facilitator and Co-Founder
Anna Wright, Facilitator and Co-Founder

**MassCEC**
Thomas Chase, Program Director
Meg Howard, Program Director
Peter McPhee, Senior Program Director

**Massachusetts Community Climate Bank** Maggie Super Church, Director of Policies & Programs

**MassDevelopment**
Marcos Marrero, Executive Vice President
Wendy O'Malley, Senior Vice President-Green Financing

**New York City Accelerator**
Andrew Chintz, Financing Specialist

**NYSERDA**
Richard Kauffman, Chair

**NYU Stern Center for Sustainable Business**
Marianna Koval, Director, Invest NYC SDG Initiative

**Peninsula Clean Energy**
Rafael Reyes, Director of Energy Programs

**Philadelphia Energy Authority**
Alon Abramson, Vice President of Residential Programs

**Prime Coalition**
Sarah Kearney, Founder & Executive Director

**QuitCarbon**
Cooper Marcus, CEO

**REALIZE-MA**
Eva Rosenbloom, Manager

**Restaurant Growth Services, LLC**
Lee Rathbun, Director of HR & Restaurant Facilities

**Rewiring America**
Pete Curtice, Senior Advisor
Joel Rosenberg, Senior Program Manager- Special Projects

**Sunwealth**
Martha Buckley, Director

**Sustainable Energy Authority of Ireland (SEAI)**
Brian O'Mahony, Head of National Retrofit & Communities

**University of California, Berkeley** Daniel M. Kammen, Professor of Energy

**Valley Home Insulation**
Abel Vargas, President

**Watt Carbon**
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