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HOUSING A CHANGING CITY

BOSTON 2030



CHAPTER 7

2014



GREEN AND SUSTAINABLE HOUSING

As a coastal city, rising seas, storm surges, and other extreme weather events pose a significant threat to Boston's infrastructure and neighborhoods, including its housing stock. The City is currently in the process of updating its Climate Action Plan, which will be released by the end of 2014. The updated plan will help ensure Boston achieves its carbon reduction goals and is prepared for the impacts of climate change. It is important that Boston's housing goals support this initiative.

Boston is a national leader in preparing for the impacts of climate change and reducing greenhouse gas emissions to mitigate climate change. The City has set aggressive carbon reduction goals of 25 percent by 2020 and 80 percent by 2050. Boston's current Climate Action Plan, with active involvement and support from Boston's residents, businesses, institutions, and community partners, has helped the city make significant progress towards reaching these goals.

But while these efforts are beneficial, Boston must prepare for the potential of more severe weather events, and must aid Bostonians in retrofitting aging housing stock to not only withstand those challenges, but also to become more energy-efficient and self-sustaining overall. Boston must also strive to produce new green housing that positively contributes to the environment and to the city.



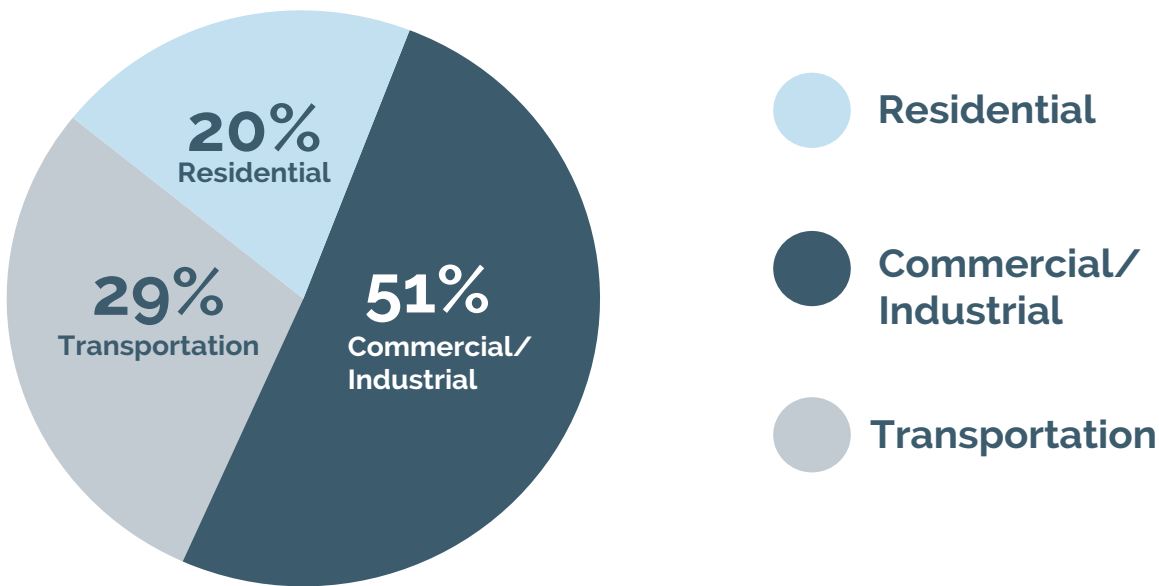
More than 20 Percent of Boston’s Carbon Footprint Comes from Housing

Residential housing accounts for approximately 20 percent of citywide greenhouse gas emissions (Graph 2). The City’s Climate Action Plan calls for the residential sector to reduce emissions by approximately 100,000 metric tons of CO₂e by 2020. National and regional policies such as the Regional Greenhouse Gas Initiative (RGGI) and new proposed Federal power plant regulations will continue help reduce emissions from our buildings over time. However, if Boston is to reach its greenhouse gas reduction goals, Bostonians must make significant reductions in the amount of energy used in our homes.

Accommodating and Encouraging Growth in the City

Boston’s successful growth is a critical factor in the regional and state effort to reach carbon reduction goals. The more jobs and people that migrate to Boston, as opposed to the surrounding suburbs, the lower the region’s carbon footprint will be. Urban dwellers generally live in smaller housing units than suburban residents, using less energy to heat and cool. According to the 2014 Vehicle Census of Massachusetts, city dwellers are also more likely to take public transportation, bike, or walk to work (Graph 3).

GRAPH 2: Greenhouse Gas Emissions by Sector



The lack of affordable and more moderately priced housing is often a driving force for people leaving the city. A robust plan to not only accommodate Boston's growth, but also to encourage it through increased production of more affordable and accessible housing, will make for a healthier, more sustainable city and region.

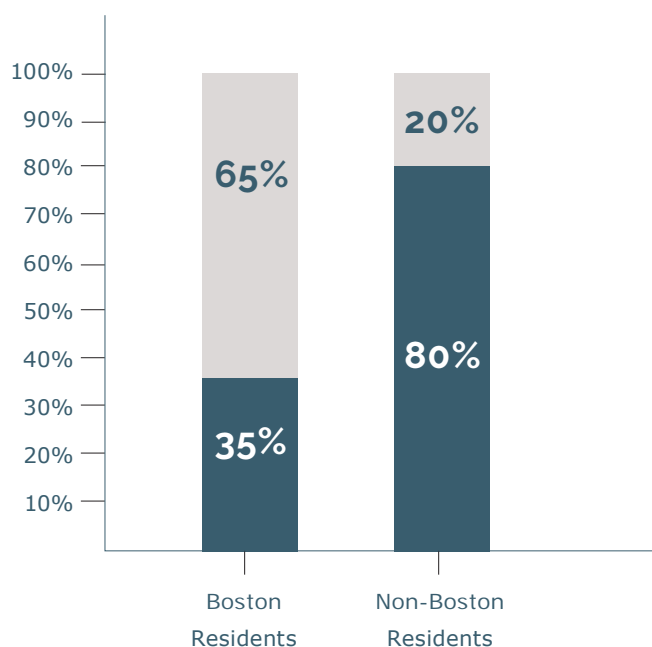
Preparing for Climate Change

Even if the world were to stop emitting greenhouse gas emissions today, the planet would continue to warm due to the carbon that has already been released into our atmosphere. While the City is taking steps to reduce emissions, it must ensure that all housing, public or private, existing or proposed, is

prepared for the impacts of climate change over the projected lifespan of the building.

To address the matter of climate vulnerable properties, Boston completed "Climate Ready Boston: Municipal Vulnerability to Climate Change" in 2013. The report assessed how climate change might impact city services, facilities and infrastructure. As part of this report, the Boston Housing Authority (BHA) identified seven high-priority vulnerable properties, which account for approximately 1,500 units of housing in low-lying, coastal areas. The BHA's upcoming annual and five-year capital construction plans will begin to address these vulnerabilities. In the short term, buildings will be upgraded when old or outdated equipment is replaced.

GRAPH 3: **Commuter Mode Share**



Legend

- Drive alone
- Take alternative transportation

Source: Vehicle Census of Massachusetts, Metropolitan Area Planning Council, 2014



In addition, more extreme weather events will adversely impact Boston's energy delivery system, and Boston's homes should be prepared to respond to more frequent power outages. Ensuring that homes are well-insulated in the event of a power outage is an important way to help homes remain comfortable and safe in adverse conditions.

Green Buildings

A growing segment of new homes in Boston and across the US are being built to green building standards. According to the US Green Building Council (USGBC), a building is "green" when the planning, design, construction, and operation of that building begins with several central considerations, including energy use, water use, indoor environmental quality, material selection, and the building's effects on its site. While there are a variety of standards and models for green buildings, the most commonly adopted standard is the USGBC Leadership in Energy and Environmental Design (LEED). More than 140 buildings in Boston have LEED Certification.

In 2007, Boston became the first city in the U.S. to adopt green building standards by amending Article 37 of the municipal zoning code to require that

all large-scale projects meet LEED certification standards. Expanding green building design into the residential market will be key to enhancing the sustainability of Boston today and in the future.

Energy Affordability

With home energy use estimated to cost Bostonians between \$1,500 and \$4,000 per year, reducing the costs through energy efficiency and other reduction measures will not only help the City meet its greenhouse gas reduction goals, but will also help keep homes more affordable. According to the State Department of Energy Resources, Massachusetts has the sixth highest electricity costs, and the seventh highest natural gas costs in the US.

Despite a recent dip in natural gas prices, prices are back on the rise. Since natural gas is the primary fuel for generating electricity in the region, NSTAR raised their electricity rates between 2013 and 2014. The cost of home heating oil, which is the primary heating fuel for 31 percent of Massachusetts residents according to the US Office of Energy Information Administration Survey, is also rising. Prices have tripled since 1990 and doubled since 2005.

Green and Sustainable Housing: Key Issues

The cost of green buildings: debunking the myth

Despite study after study demonstrating otherwise, conventional wisdom holds that green buildings are more expensive to build and operate than traditional construction. A recent review from USBGC of roughly 21,000 projects totaling 3 billion square feet made a compelling business case for green buildings, surmising that “building green does not necessarily need to cost more, particularly when cost strategies, program management and environmental strategies are integrated into the development process right from the start.”

The story of 81 Brent Street, Dorchester’s first LEED Platinum home, is a prime example. After being told that green, affordable housing was not possible in her neighborhood, Cynthia Loesch, a community leader with no building experience, set out to prove otherwise. At the end of the project, Ms. Loesch was able to build a three-family home for approximately \$450,000, a cost on par with conventional construction. The home is 45 percent more energy efficient than the average home, and since the home was completed in 2011, the Loeschs have yet to turn on their heating system.



81 Brent St: This LEED Platinum home in Dorchester is 45% more energy efficient than the average home.



Getting from Energy Efficient to Energy Positive

As the City continues to advance green building through innovative policies and practices, it must also look beyond energy efficient buildings toward energy positive homes. Boston's Energy Positive (E+) Housing Program has demonstrated that energy positive homes are possible. The primary requirement of an E+ home is that it generates more energy than it consumes. The first project, completed in August 2013, was a four-unit development that will produce approximately twice as much energy as it consumes. While the units did cost about 15 to 20 percent more than a conventional unit, they sold quickly and will have reduced expenses over time.

Retrofitting Boston's Existing Housing Stock

While greening new construction is important, Boston must also make significant improvements to its existing building stock, both in terms of energy efficiency and climate preparedness. Since only one percent of the city's building stock is replaced each year, an extensive retrofitting plan is essential. The City of Boston, in partnership with the Commonwealth and the utility companies, has excellent residential energy efficiency programs. In 2013, Boston was named the most energy efficient city in the nation based on its policies and programs, and Massachusetts was named the most energy efficient state. Through the City's Renew Boston program, residents living in buildings with four or fewer units can receive a free energy assessment that



Boston's first Energy+ housing development in Roxbury produces about twice as much energy as it consumes.

includes energy efficient light bulbs, a programmable thermostat, and other products to help reduce energy consumption. The assessment also connects them to rebates, incentives, and installation services for home weatherization.

Most energy efficiency and renewable energy programs and incentives, such as Renew Boston, primarily target homeowners who are in a position to make the investments in their homes and will reap the savings; however, renters make up 66 percent of the city's residents. In addition, low-income homeowners may not have the capital to make these investments.

To that end, innovative financing and incentives are key to motivating landlords, renters, and homeowners to make the necessary investments in Boston's existing housing. To address the renter-related energy efficiency challenge, Renew Boston developed the "Whole Building Incentive", which provides landlord coordination support and additional utility incentives when all units in duplexes and triple-deckers undergo weatherization at the same time.

Boston recognizes the significance of multifamily building energy performance and looks to recapitalize and reinvigorate the Energy Retrofit Program. Originally funded by the Federal American Recovery and Reinvestment Act and Boston's Inclusionary

Development Program funding, the program helped owners perform energy audits on affordable multifamily buildings to evaluate building performance and undertake strategic energy improvements. Boston will work with partners such as the Local Initiatives Support Collaborative, New Ecology, Action for Boston Community Development, the Commonwealth's Clean Energy Center, and Boston Community Capital to create a new program that provides technical and financial assistance to owners of affordable multifamily properties, creating operating savings and stabilizing project cash flow.

Boston's existing housing stock will also need to be retrofitted to prepare for the changing climate, coastal flooding, and extreme heat. Boston's coastal neighborhoods such as East Boston, Dorchester, South Boston, the North End, and Charlestown are particularly vulnerable to sea-level rise and storm surge. There are a variety of actions that homeowners, renters, and landlords can take in the near term to minimize this risk and the potential damage that can occur.



Green and Sustainable Housing: Goals

The following goals provide a high-level framework concerning Boston's leadership in green housing. More specific goals and actions relating to sustainable housing will be released with the 2014 Climate Action Plan Update.

1. Increase energy efficiency of existing housing units

Building system upgrades and home weatherization will be critical for meeting the city's climate action goals. It will also help stabilize monthly energy bills for residents.

2. Work to reduce carbon impacts and incorporate advanced sustainable building design in new housing developments

Progressively advocate for green building and energy efficiency standards for all new and major renovations of residential building as the markets develop. Work to achieve these standards with minimal impacts to overall development costs.

3. Prepare Boston's housing stock for sea-level rise, extreme heat and natural disasters

The City will continue to work on educating renters and homeowners alike about projected climate impacts, and what they can do to prepare their homes. Simultaneously, the City will explore policy options, planning initiatives, and incentives to ensure that new and existing housing is prepared for the effects of climate change.



Solar panels on Old Colony BHA housing

Green and Sustainable Housing: Actions

1. Recognize and promote green building leaders

The City of Boston will expand its efforts to recognize leadership in green building design and construction. The annual Greenovate Boston Awards should recognize a residential green building renovation and new construction project each year. Furthermore, the City should help facilitate and organize an annual Green Home tour, which will provide education for homeowners, contractors and builders.

2. Incorporate green building education into job training programs

The City of Boston will partner with local high schools and universities to help students develop the job skills necessary for a changing and evolving green building industry. As an example, the City will strive to mirror the partnership that was established with the New England Regional Council of Carpenters on the four-unit E+ development in Roxbury, where up to 125 union carpenters and apprentices donated skills and gained experience in E+ building.

3. Explore energy scores for residential housing

A home energy score is similar to a car's mile-per-gallon rating. There are a variety of programs and standards for scoring or rating homes based on their energy efficiency. The City will explore promoting such rating systems for homes and apartments.

4. Enforce the building energy code

Boston adopted the stretch energy code in 2010 to improve the energy efficiency of new construction. As of 2014, this stretch code has been fully adopted across the state. The City of Boston will continue to support the building industry to help them meet these building code energy standards.

5. Identify opportunities to integrate no-cost energy assessments into the permitting process

A home renovation project is an ideal time to undertake home energy efficiency improvements. The City should explore how to coordinate no-cost home energy assessments with the permitting process, in order to encourage Boston households to take advantage of the energy programs that are available.

6. Continue to explore new outreach strategies for Renew Boston

Renew Boston will continue to utilize and expand community-based outreach to sign up residents for home energy assessments and to support eligible projects through the weatherization process. The City will also explore ways to improve the coordination between Renew Boston's outreach and the Boston Home Center to further drive participation in the program.



7. Improve owner access to retrofit project finance

Working with its partners, the City will continue to promote financing programs for multi-family housing energy efficiency and resiliency projects. In addition, the City will strengthen current programs, develop innovative financing structures, and commit new investment capital to funding building system upgrades.

8. Ensure developers, owners, and tenants understand how climate change will impact housing and provide guidance on preparing their homes and buildings for these impacts

To reach and motivate its residents, the City will continue and expand its outreach campaign about the projected climate impacts facing neighborhoods and what individuals can do to reduce their vulnerabilities. The City will identify technical and financial resources, with special attention to the needs of low-income and vulnerable populations.

These resources will support residents in preparedness actions, such as elevating utilities in the basement, insulation, hurricane-proofing roofs, and landscaping strategies that reduce extreme heat and mitigate flooding.

9. Prioritize new construction along public transit and increase other options for alternative modes of transportation

Where feasible, encourage infill and density along existing and proposed public transportation corridors. Explore reform of parking standards to accommodate non-automobile centric development; increase the bikeability and walkability of Boston's neighborhoods by accelerating implementation of the Complete Streets Guidelines.

10. Ensure that BHA buildings meet their current Climate Action Goals

By 2020, the BHA will reduce energy and water consumption in their properties by 25 percent. Options to exceed this goal will be explored.