

DECARBONIZING AFFORDABLE HOUSING IN MASSACHUSETTS

How MassHousing and the new Massachusetts Community Climate Bank™ can deliver Qualified Projects and help consortiums meet their Greenhouse Gas Reduction Fund (GGRF) goals.





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EXECUTIVE SUMMARY



The Massachusetts Housing Finance Agency (MassHousing), the lead sponsoring agency of the Massachusetts Community Climate Bank™ (MCCB™), is an ideal partner for National Community Investment Fund (NCIF) consortiums seeking to meet their GGRF goals.

Massachusetts Governor Maura Healey [created the MCCB™ in June 2023](#) as the nation's first green bank dedicated to affordable housing. MassHousing will incubate and steward the growth of MCCB™, in collaboration with two partners that are experienced in delivering green energy solutions into sectors beyond affordable housing, the Massachusetts Clean Energy Center (MassCEC) and the Massachusetts Development Finance Agency (MassDevelopment), and the bank will grow beyond its initial focus on affordable housing decarbonization.

MassHousing's leadership of the Massachusetts Community Climate Bank™ combines MassHousing's 50-plus years of experience

delivering complex financial transactions and structuring public-private housing finance solutions with a new, clean finance vehicle dedicated to decarbonizing Massachusetts's affordable housing stock.

MassHousing has a seasoned and capable underwriting staff that knows how to get challenging deals done. They have financed deep energy retrofits, apartments that meet Passive House standards, solar panels, EV chargers and other sustainability features, in projects that serve low-income and disadvantaged communities.

The Agency's Homeownership Division makes and services mortgages for low- and moderate-income homeowners and owners of 1-, 2-, 3-, and 4-family properties, many of which were built a century ago and are prime candidates for retrofits. MassHousing currently has a servicing portfolio of more than 23,000 first mortgages, and experience creating and delivering affordable home loan products to lower-income, disadvantaged

communities – including home improvement loans – and is already developing programs for homeowners to decarbonize their properties.

The placement of MCCB™ at MassHousing recognizes MassHousing’s experience, underwriting team, portfolio of loans, data, partnerships in the real estate and affordable housing ecosystems, and commitment to make the ambitious goals of the GGRF a reality. MassHousing has provided more than \$32 billion to finance more than 98,000 rental units and more than 108,000 home loans over five decades. MassHousing knows Massachusetts on a city-by-city, town-by-town basis, with an active presence in 41% of all subsidized rental housing in Massachusetts.

The MCCB™ is organized to promote clean energy solutions for low- and moderate-income households by leveraging federal, state, and private funds. Massachusetts has prioritized accelerated investment in affordable homes – where residents bear a disproportionate burden of energy costs, and where families have been disproportionately impacted by pollution from fossil fuels.

MassHousing and the MCCB™ offer NCIF coalitions a strong pipeline of investable Qualified Projects, an existing source of public and private matching funding, and a platform for delivering immediate decarbon-

ization results in Justice40 communities, all in alignment with GGRF priorities. Further, the Agency, working with the MCCB™, is poised to provide funds for all Priority Project Categories.

MassHousing connects NCIF coalitions to a significant portfolio of apartment communities that can be retrofitted. Specifically, MassHousing has identified an investable universe of Qualified Projects representing approximately **250 apartment communities** with roughly **28,000 rental units**. All these developments are candidates for retrofits, conversions and other decarbonization efforts over the next five years. Roughly **120** (48%) of the apartment communities in the investable universe of **Qualified Projects are in Justice40 Census tracts**. Approximately 100 developments, with 10,000 units, are expected to be ready for commitment in the first year GGRF becomes available.

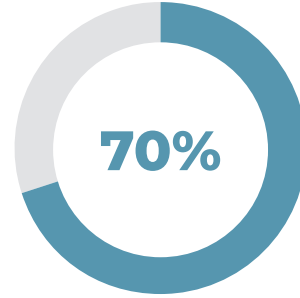
Clean Communities Investment Accelerator (CCIA) funds will help to scale the work of the MCCB™ and accelerate its growth and capacity as it expands beyond its initial focus on affordable housing into other sectors prioritized in the GGRF.

THE MASSACHUSETTS CONTEXT

Decarbonizing the built environment is key to Massachusetts's goal of reaching Net Zero by 2050



Residential and commercial buildings are responsible for 30% of all greenhouse gas emissions in Massachusetts



In Massachusetts cities, buildings are responsible for up to 70% of greenhouse gas emissions

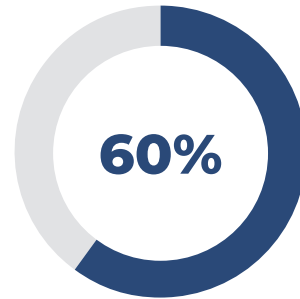
RESIDENTIAL BUILDING SQUARE FOOTAGE

39%

built prior to 1950

66%

built prior to 1980



60% of all building emissions are generated by 1-4 family homes

The state has some of the oldest residential housing stock in the nation with vast numbers of homes reliant on oil heat

Sources: MA Exec. Office of Energy & Environmental Affairs, City of Boston, U.S. Census Bureau

Massachusetts has, for decades, focused on addressing and mitigating climate change. The state's decarbonization goals and regulatory infrastructure align with the GGRF's goals.

The Commonwealth and its local governments have embraced a wide range of incentives and requirements that will accelerate a building decarbonization financing market and enable community lenders to deploy GGRF funding successfully in Massachusetts.

The highlights of these efforts include:

- The [Global Warming Solutions Act of 2008](#) which benchmarked greenhouse gas (GHG) emissions across Massachusetts and legally committed the state to lowering emissions. The state has since committed to achieving Net Zero GHG emissions by 2050.
- The [Massachusetts 2050 Decarbonization Roadmap](#) which lists steps needed to realize the emissions target in each sector and is supported by a detailed analysis of emissions and mitigation solutions across the state's building sector.
- Massachusetts enactment of its first [stretch energy code](#) in 2010, with an emphasis on energy-efficient cost-effective construction. Since 2010, 300 (out of 351) Massachusetts cities and towns have adopted the stretch code. This year's update added a third energy code, a specialized municipal opt-in stretch energy code, to ensure new construction that is consistent with Massachusetts greenhouse gas limits.
- The [City of Boston implementation of the Building Emissions Reduction and Disclosure Ordinance \(BERDO\)](#) in 2013. BERDO requires large buildings in Boston to report their annual energy and water use to the City and to reduce their greenhouse gas emissions over time. The goal is to reduce emissions gradually to net zero by 2050.
- The City of Cambridge implementation of [the Building Energy Use Disclosure Ordinance \(BEUDO\)](#) in July 2014. This ordinance requires owners of larger buildings to track and report annual energy use to the City and to reduce their greenhouse gas emissions on a schedule determined by the size and type of their building. Amendments to the Ordinance passed in 2023 require large commercial buildings to reach Net Zero Emissions by 2035, while small commercial buildings must reach Net Zero Emissions by 2050.
- Governor Maura Healey's [Executive Order in January 2023 establishing the position of Climate Chief and creating an Office of Climate Innovation and Resilience](#) within the Governor's Office. The Climate Office ensures that climate policy is centered in each agency within the executive branch so these agencies create an all-of-government response to climate change.
- The creation of the [Massachusetts Community Climate Bank™ \(MCCB™\) by the Healey/Driscoll Administration](#) in June of 2023 and the decision to place it within MassHousing, making it the first green bank in the nation to launch with a specific focus on decarbonizing affordable housing.

OVERVIEW OF MASSHOUSING

Mission and Background

MassHousing is a quasi-public agency created in 1966 by an act of the Massachusetts legislature (Chapter 708 of the Acts of 1966). It was one of the first housing finance agencies in the country at that time and is often referred to as the state's affordable housing bank. MassHousing does not receive any money from the state to support its operations. Rather, the Agency raises its capital primarily by issuing tax-exempt and taxable bonds and then uses the proceeds from the sale of those bonds to make loans to low- and moderate-income homebuyers and to developers of rental housing who agree to keep a portion of the units affordable over the long term.

MassHousing has provided more than \$32 billion for affordable housing since its inception, financing more than 108,000 home mortgage loans and producing or preserving more than 98,000 rental units. MassHousing has averaged \$1.4 billion in annual lending over the past five years, has \$6.8 billion in total assets, and has an AA+ bond rating from S&P. ⁰¹

One-quarter of all subsidized rental units in Massachusetts are in MassHousing's rental lending portfolio. MassHousing is also a Project-Based Contract Administrator for the U.S. Department of Housing and Urban Development (HUD). Between MassHousing's own loan portfolio and the developments MassHousing oversees for HUD, the Agency has an active presence in 41% of all subsidized rental housing in Massachusetts.

⁰¹ All MassHousing-specific information within this document has been obtained from sources which are publicly available, including but not limited to information statements, annual reports, five-year goal reporting, and other internal reporting. For more information contact MassHousing at webinfo@masshousing.com or 617-854-1000.

About the Massachusetts Community Climate Bank™ (MCCB™)

The Massachusetts Community Climate Bank™ (MCCB™) is an ambitious new climate finance initiative announced by Governor Maura Healey in June 2023 to accelerate achievement of the state's clean energy goals. The mission of MCCB™ is to facilitate investment in projects that will reduce greenhouse gas emissions in key sectors of the Massachusetts economy. Offering a variety of financial solutions that are broad enough to work across the Commonwealth will allow the MCCB™ to promote an equitable transition to a net-zero future and meet the Commonwealth's 2050 decarbonization goals.

The initial focus of MCCB™ is to support decarbonization strategies in the residential sector and specifically in the low- and moderate-income multi-family rental and single-family homeownership markets. MassHousing is the lead sponsoring agency of the MCCB™ and will draw on its decades of housing finance and investment expertise and lending capabilities serving these markets to advance the MCCB™ mission. MassHousing operates at significant scale, having financed over \$6.8 billion in residential loans over the last ten years, and has a history structuring financing solutions for decarbonization and clean energy projects including complex deep-energy retrofits and passive house standards.

The MCCB™ is positioned to aggregate state, federal, philanthropic, and private funds to complement existing programs and introduce new programs and resources. The MCCB™ will offer capital and innovative financing structures to support the integration of energy efficiency, electrification, and clean energy technologies into building construction, renovation, and preservation projects

across the Commonwealth.

The MCCB™ has established a cooperative effort among MassHousing and its partner state agencies, the [Massachusetts Development Finance Agency \(MassDevelopment\)](#) and the [Massachusetts Clean Energy Technology Center \(MassCEC\)](#) through a Memorandum of Understanding. Through this collaboration, the MCCB™ benefits from both complementary and specialized expertise in economic development and building decarbonization technology and market development. The capabilities of MassDevelopment and MassCEC are discussed below.

The Massachusetts Community Climate Fund

The Massachusetts Community Climate Fund (the “Fund”) is a special purpose fund held within MassHousing that is dedicated to supporting MCCB™ lending, investing, and operating activities. The Fund is seeded with \$50 million from the state of Massachusetts and will aggregate additional capital from state, federal, private, and philanthropic sources. The Fund will make loans and provide other financial products to eligible projects under specific program criteria and terms. Fund products will be incorporated into a project’s overall capital structure and complement MassHousing’s role as a construction and permanent lender. Fund products will also be made available for eligible projects and activities through partnership channels.

MCCB™ and the Greenhouse Gas Reduction Fund

The MCCB™ is exceptionally well-positioned to deploy federal Greenhouse Gas Reduction Fund (GGRF) funds rapidly, specifically National Clean Investment Fund (NCIF), Solar

for All (SFA), and Clean Communities Investment Accelerator (CCIA) funds, into Qualified Projects – especially in view of the prioritization of net-zero emissions buildings and projects that provide affordable housing and benefit low-income and disadvantaged communities. The MCCB™ collaboration with MassDevelopment and MassCEC will further the collective capabilities of the bank as it operates in careful coordination to make investments that will reduce greenhouse gas emissions across key sectors of the Massachusetts economy. With regard to structure:

- MassHousing will serve as the primary MCCB™ deployment channel for housing and housing-related products. MassHousing will incorporate GGRF funds alongside MCCB™ capital sources to support housing-related projects that reduce greenhouse gas emissions, which will include housing-adjacent elements such as solar energy generation and storage, zero-emissions transportation infrastructure, and other carbon-reducing measures not traditionally categorized as part of housing construction or renovation.
- MassDevelopment and MassCEC will serve as MCCB™ deployment channels for funding projects that support the reduction of greenhouse gas emissions in other priority sectors. As additional GGRF and other sources become available to fund decarbonization strategies across the larger economy, MassHousing, acting through MCCB™, will engage these state partners for high-impact decarbonization investment opportunities primarily within the commercial building and transportation sectors.

MASSHousing STRATEGIC LENDING CAPABILITIES



Multi-Family

MassHousing finances the new construction, renovation, and preservation of affordable and mixed-income rental housing communities.

MassHousing lends directly to multi-family rental developers and provides permanent loans, bridge loans and construction financing, utilizing both taxable and tax-exempt mortgage products. The Agency executes transactions utilizing bond financing, HUD risk-sharing insurance, HUD Multi-Family Accelerated Processing (MAP) and Ginnie Mae securitizations. MassHousing financing is frequently paired with federal and state low-income housing tax credits, HOME funds, and other local housing funding. The Agency also offers mid-cycle financing that provides liquidity to properties and developers and finances moderately-scaled property improvements.

MassHousing utilizes in-house staff throughout the multi-family loan cycle: from origination and underwriting, to design and construction monitoring, and ongoing asset management and financial reporting.

MassHousing Rental Housing At-A-Glance

Fiscal Year 2023 (July 1, 2022 – June 30, 2023)

\$650.8 million
in total financing

29
rental communities financed

3,369 total units
created or preserved
(3,239 affordable, 130 market-rate)

410 loans
serviced with an outstanding
balance of \$5.2 billion (as of 6/30/23)



Single-Family

MassHousing provides financing for home mortgage loans to qualified low- and moderate-income homebuyers in Massachusetts. Loans are originated and closed through a statewide network of partner lenders and then purchased by MassHousing and serviced in-house. MassHousing’s “high-touch” loan servicing helps to maintain low delinquency rates and avoid foreclosure.

The Agency is committed to providing loans that are sustainable and affordable for the long term and to addressing the racial homeownership gap in Massachusetts. In the last 10 years, MassHousing has quadrupled the number of loans made to homebuyers of color.

The vast majority of MassHousing home mortgages are insured through the Agency’s own Mortgage Insurance Fund. MassHousing also has the capacity to finance mortgages in partnership with the Federal Housing Administration (FHA) and Ginnie Mae.

MassHousing Single Family At-A-Glance

Fiscal Year 2023 (July 1, 2022 – June 30, 2023)

\$728.6 million
in total financing for homeownership

2,197
first mortgage loans

76%
of homebuyers earned no more than 100% of area median income

49%
of homebuyers self-identified as persons of color

23,614 loans
serviced with an outstanding balance of \$3.9 billion (as of 6/30/23)

MASSHOUSING'S TRACK RECORD OF FINANCING PROJECTS THAT MEET THE EPA'S QUALIFIED PROJECTS CRITERIA



Multi-Family

MassHousing has financed numerous rental housing communities with energy efficient systems. This includes \$408 million in financing for the creation of 1,600 new rental homes that meet Passive House standards, as well as energy efficiency retrofits. MassHousing has a robust pipeline of Qualified Projects and NCIF funding can bring them to fruition.

MassHousing's developer partners increasingly seek to build net-zero and Passive House communities and to retrofit their properties to meet state and local goals.

MassHousing staff have the expertise to deliver funding for net-zero emissions buildings including loan origination and underwriting, design and construction management, asset management, loan servicing and financial reporting. MassHousing has extensive experience underwriting proposals for rental housing with various sustainability features, including solar panels, building envelope sealing, heating and cooling system upgrades, efficient hot water heating systems, low-flow plumbing fixtures, EV chargers, and more.

The Agency's design and construction staff also have experience validating the use and capital cost of decarbonization technologies. MassHousing is an administrator for the Climate Ready Housing Program, a state-funded capital grant program to accelerate the decarbonization of affordable housing in Massachusetts. The pilot program is deepening the pipeline of decarbonization projects in the state and creating greater cost certainty among funding agencies with respect to the costs of decarbonization technologies.

MassHousing is actively engaged to advance the decarbonization of affordable rental housing across Massachusetts quickly and at-scale.

Below are examples of mixed income rental housing communities that MassHousing has financed with significant energy efficiency components.

There are other examples in the appendix.



25 Sixth Street

Chelsea

\$10.4 million in MassHousing financing as well as Commonwealth Builder program funds are supporting a 56-unit new rental and homeownership development that will meet Passive House standards.



Castle Square Deep Energy Retrofit

Boston

MassHousing financed a deep energy retrofit at the 500-unit Castle Square in Boston, resulting in a 50% reduction in energy usage at the property. Castle Square is LEED-Platinum certified.



Rivermark Apartments

Cambridge

MassHousing provided \$87.2 million to rehabilitate this 300-unit rental development. The owner replaced the windows and re-clad the concrete structure with custom thermal panels that significantly improved the efficiency of the building's mechanical systems and positioned the property for future electrification. The property's owner is also adding EV charging stations to resident parking areas.



Treehouse at Easthampton Meadow *Easthampton*

MassHousing has awarded funds from the state's **Climate Ready Housing Program** and expects to refinance this property soon. The owner has engaged with New Ecology to scope a deep energy retrofit that will fully electrify the property and eliminate the use of fossil fuels on site, replacing gas furnaces with air source heat pumps. The retrofit will also improve insulation of building envelopes. The project will result in a 50% reduction in energy usage, a 24% reduction in carbon emissions, and a 21% reduction in water usage.



The Loop at Mattapan Station *Boston*

MassHousing financed the construction of this new 135-unit mixed-use affordable housing community, which was constructed adjacent to a light rail transit line, on a surplus parking lot. The project sponsor built the Loop to meet Passive House standards, and the property features both a rooftop solar array and an innovative battery storage system for emergency back-up power.



Anne M. Lynch Homes at Old Colony *Boston*

As part of the phased modernization and replacement of 845 functionally obsolete public housing units, MassHousing has financed the construction of deeply affordable rental homes that utilize Passive House design. Sustainable design and rooftop solar will result in substantially lower energy usage, more efficient operations for the buildings' owners, and improved comfort and air quality for residents. Project partners include the Boston Housing Authority and the AFL-CIO Housing Investment Trust.

Multi-Family New Construction

MassHousing provides construction financing, short-term bridge loans, and permanent mortgages that support the creation of new affordable rental homes in Massachusetts. MassHousing works with its development partners to support the adoption of advanced building performance standards. To date, MassHousing has provided \$408 million in financing for the creation of 1,600 new rental homes that meet the Passive House standards. Transactions have involved new ground-up development, as well as the demolition and replacement of obsolete public housing units with new Passive House rentals. Many of these transactions have involved specialty financing supporting the cost of advanced building techniques and systems.

Multi-Family Preservation

Affordable housing developers typically finance large-scale property improvements by refinancing their properties. Because affordable housing properties have limited cash flow from monthly rental income, property owners use periodic refinancing transactions to generate the capital needed to deliver major property improvements. MassHousing uses tax-exempt and taxable mortgage transactions to refinance affordable housing communities across Massachusetts. As part of these transactions, MassHousing secures extended affordability protections for low-income residents.

As a senior mortgage lender with an unmatched reach across the state's subsidized affordable housing stock, MassHousing is uniquely positioned to support deep energy retrofits in affordable housing. Through its work to preserve affordable rental housing, MassHousing actively tracks a substantial pipeline of anticipated property modernization projects. MassHousing can achieve scale in housing decarbonization by working with affordable housing developers to add

additional decarbonization technologies to regularly planned property modernization efforts.

The Agency has financed deep energy retrofits and zero-over-time renovations through its work preserving and improving affordable rental housing. MassHousing led a public-private financing package that supported the largest affordable housing preservation and deep energy retrofit of its kind, at the 500-unit Castle Square community in Boston's South End.

MassHousing and the MCCB™ will utilize federal decarbonization funding as an additional source in the Agency's affordable housing transactions, matching dedicated decarbonization funds with public and private funds, and significantly accelerating the pace of net-zero emissions technologies for the benefit of low- and moderate-income households. [See next section](#) for more details on these opportunities.

Multi-Family Mid-Cycle Transactions and Capital Equipment Lending

MassHousing's Multi-Family Division executes mid-cycle mortgage transactions that allow project sponsors to access secondary debt between refinancing cycles. The Agency can also accommodate developers seeking capital improvement loans to finance equipment purchases – such as solar panel arrays and hot water systems – that would lessen a property's demand for carbon-intensive energy but may not require a full mortgage refinancing transaction.

The installation of rooftop solar panels typically requires a lender's approval and the subordination of the solar lease to the lender's first mortgage. MassHousing has adopted a rooftop solar policy that creates a streamlined, transparent and predictable approval process for solar leases. MassHousing is well-positioned as a lender to accommodate

rooftop solar in its rental lending portfolio.

Single-Family

MassHousing's Home Ownership Division can deliver decarbonization solutions at-scale for low-, moderate- and middle-income homeowners. The Agency's mortgage lending programs serve single-family and 2-4 unit residential buildings, which make up more than half of all building emissions statewide.

Smaller residential properties have relatively low intervention costs and a high potential for decarbonization impact through building envelope improvements and the electrification of heating and hot water systems. These improvements may also reduce utility costs for residents – an especially important factor for lower-income households.

MassHousing is a trusted partner for its homeowner borrowers. The Agency currently has a portfolio of more than 23,000 home loans that are actively serviced in-house, with an outstanding principal balance of \$3.9 billion. This includes both first mortgages and subordinate loans. Roughly 60% of current borrowers have incomes under 80% of AMI. A substantial share of MassHousing's borrowers live in environmental justice communities. A noteworthy benefit for MassHousing's borrowers is MIPlus™, mortgage payment protection insurance. While traditional mortgage insurance only benefits the lender, MassHousing's MIPlus™ product benefits the borrower as well by paying the principal and interest on their mortgage for up to six months in the event that the homeowner becomes unemployed.

MassHousing also provides second-mortgage loans for certain types of home improvements, including lead-paint removal, septic system repair and general home improvements. This existing infrastructure for second-mortgage home improvement

loans positions MassHousing to deploy loan products that can incentivize homeowners to decarbonize their properties. MassHousing also has the capacity to support single-family decarbonization through other channels including bridge lending to rebate-eligible households.

Mission-Based Market-Building Activities

MassHousing complements its core lending business with a variety of mission-driven market-building activities that strengthen communities, advance equity and wealth-building, and support housing stability. These mission-based activities may be leveraged to further decarbonize affordable housing in low-income and disadvantaged communities.

The **CommonWealth Builder Program** is a nationally recognized program developed by MassHousing, which supports the production of new affordable homeownership opportunities in communities of color — many of which were formerly redlined and denied equitable access to home mortgages by federal, state and local policies. The program, launched in 2021, has committed financing for the construction of more than 530 new homes. Roughly 2,400 additional units, representing \$342 million in program funding demand, are in the program's pipeline. MassHousing has used the CommonWealth Builder Program to advance the creation of new affordable condominiums built to Passive House standards, and the program's pipeline may be used to unlock additional net-zero emissions buildings.

MassHousing's **Neighborhood Stabilization Program** provides capital grant funds for the redevelopment, reconstruction, renovation or repair of blighted and substandard residential properties across the Commonwealth. The program fosters investment in lower-income residential neighborhoods,

while advancing homeownership for BIPOC residents. Program guidelines prioritize deep renovation or redevelopment projects that include MBE and WBE development team members, and projects that incorporate sustainable and climate resilient designs, building materials and construction methods.

Other Priority Project Categories

MassHousing is committed to building a pipeline of Qualified Projects that meet the EPA's Priority Project Category of Net-Zero Emissions Buildings. In addition, MassHousing can deliver Qualified Projects in the other two Priority Project Categories in housing-adjacent projects, such as EV charging infrastructure attached to housing properties and solar + storage in housing complexes.

In addition to MassHousing's deep expertise financing decarbonized and electrified housing, the Agency has worked to incorporate distributed generation and zero-emissions transportation technologies into its lending portfolio. MassHousing finances new housing that benefits from rooftop solar arrays and EV charging stations and has enacted streamlined approvals for incorporating new solar arrays and solar leases into existing properties.

Additionally, through the partnership of MCCB™, Massachusetts Clean Energy Center (MassCEC) and MassDevelopment, the Agency is well positioned to extend financing programs to the other two Priority Project Categories, distributed Energy Generation and Storage and Zero-Emissions Transportation.

NEAR-TERM MULTI-FAMILY INVESTMENT OPPORTUNITIES: THE SIGNIFICANT TRANSFORMATIONAL SCALE OF MCCB™



As a portfolio lender, MassHousing maintains detailed information about the rental properties in its portfolio, which are overseen by an actively involved asset management staff at the Agency. MassHousing has evaluated its multi-family rental development portfolio pipeline to identify properties where the MCCB™ can deploy GGRF resources in Qualified Projects to reduce greenhouse gas emissions over the next five years (2024 to 2028).

MassHousing estimates a five-year total investable portfolio of roughly **250 multi-family developments, totaling approximately 28,000 units**.

Within this total investable portfolio, approximately 120 developments (48%) are located in Justice40 disadvantaged Census tracts. Ninety developments (36%) are located in Boston or Cambridge, where they are subject to local ordinances that require large buildings to reduce their greenhouse gas emissions and achieve net zero by 2050.

Type	Devs	Units
Portfolio Developments: Developments currently in MassHousing’s debt portfolio eligible for refinance/recapitalization in the next five years (2024 to 2028)	208	25,162
Non-Portfolio Developments: Developments in MassHousing’s active pipeline that are (a) net new developments to the housing stock or (b) developments not yet in MassHousing’s debt portfolio (includes Passive House new construction)	42	2,721
TOTAL	250	27,883

The majority of the investable universe is comprised of developments currently in MassHousing’s multi-family lending portfolio, which will be eligible for refinancing or recapitalization within the next five years.

Of the 42 non-portfolio developments, 28 (67%) totaling 1,855 units are new construction developments. Of these, six developments, totaling 396 units, are expected to be built to Passive House standards.

Low-cost financing through GGRF will enable MassHousing to work with property owners and developers to reduce significantly the life-time emissions from these buildings.

Performance Years

MassHousing expects approximately 100 developments totaling 10,000 units to be committed in Year One of the GGRF Period of Performance.

	Portfolio Developments	Non-Portfolio Developments
Year 1	89 developments (9,430 units)	10 developments (650 units)
Year 2	15 developments (1,939 units)	10 developments (650 units)
Year 3	22 developments (2,715 units)	10 developments (650 units)
Year 4	14 developments (1,354 units)	7 developments (457 units)
Year 5	68 developments (9,724 units)	5 developments (314 units)
Total	208 developments (25,162 units)	42 developments (2721 units)

Building Archetypes

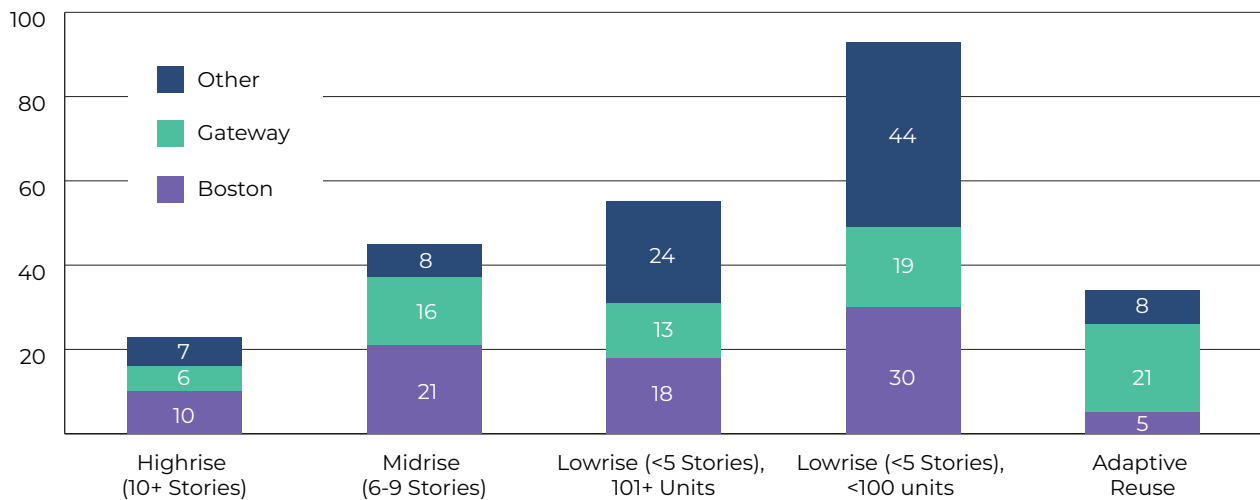
MassHousing organized the investable portfolio into five building archetypes by grouping developments with similar building characteristics. These building archetypes are associated with differentiated clean technology solutions that may be implemented to achieve specific decarbonization goals.

For example, a low-rise building (less than five stories) with over 101 units typically has ample roof exposure and is therefore a more suitable candidate for solar solutions than a high-rise archetype with limited roof exposure.

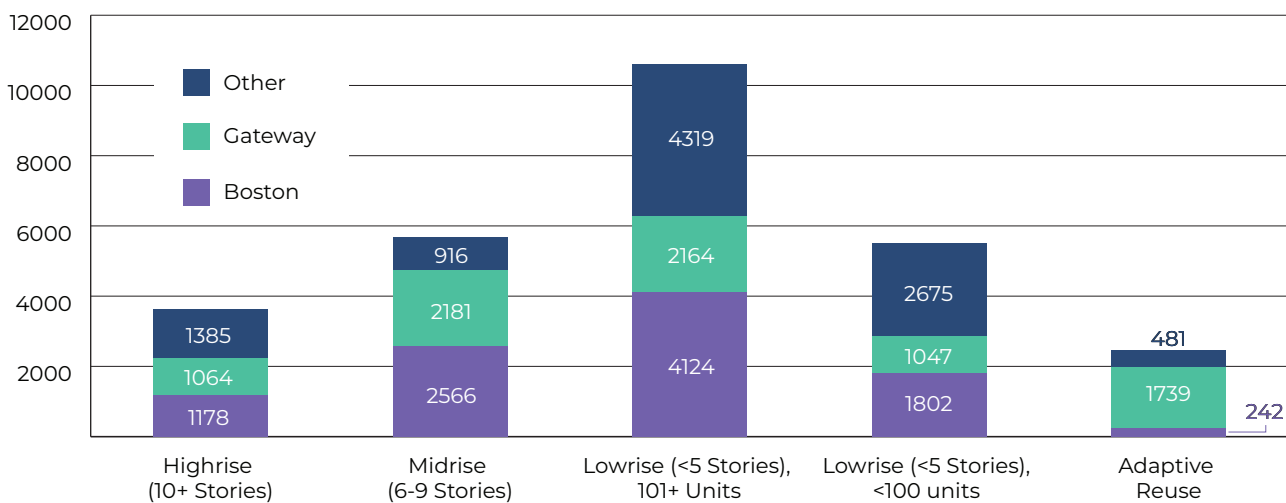
These building archetypes provide an initial method of assessing and estimating the potential for greenhouse gas reduction opportunities based on the weighted array of clean technology solutions. MassHousing continues to develop a vetted pipeline of Qualified Projects that includes technical and cost analysis of potential projects.

Archetype	Devs	%	Units	%
High-rise (10+ stories)	23	9%	3,627	13%
Mid-rise (6-9 stories)	45	18%	5,663	20%
Low-rise (less than 5 stories), 101+ units	55	22%	10,607	38%
Low-rise (less than 5 stories), less than 100 units	93	37%	5,524	20%
Adaptive Reuse	24	10%	2,462	9%
TOTAL	250	—	27,883	—

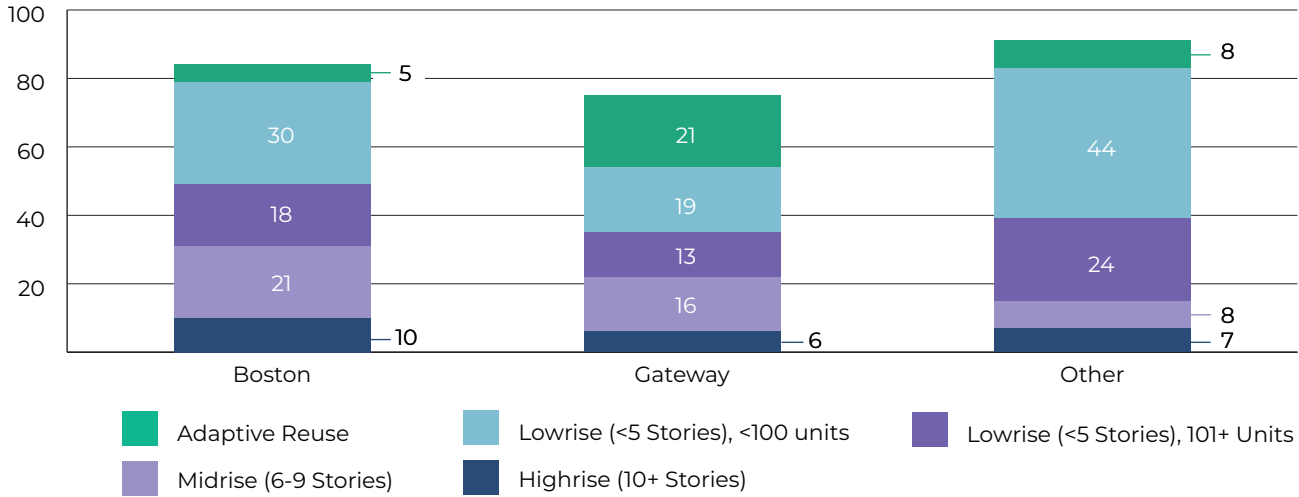
Investable MH Portfolio by Archetype | Number of Developments



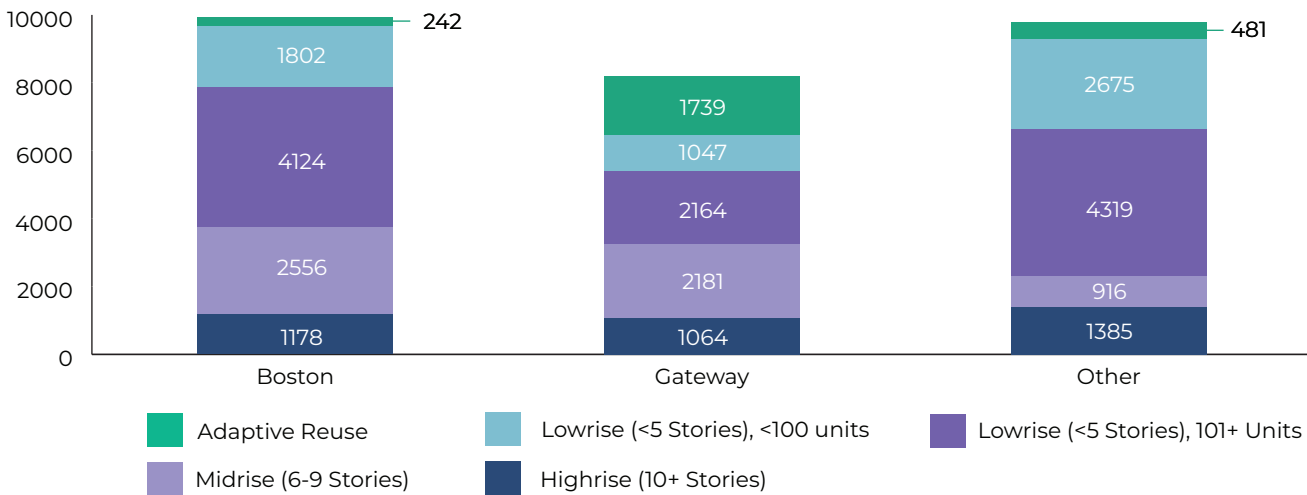
Investable MH Portfolio by Archetype | Number of Units



Investable MH Portfolio by Archetype | Number of Developments



Investable MH Portfolio by Archetype | Number of Units



Total Development Cost of MassHousing’s Investable Universe

MassHousing estimates that the total development cost (TDC) for the investable portfolio over this period will be a range of approximately \$11 billion to \$14 billion (approximately \$400,000 to \$500,000 for a total development costs per unit). MassHousing’s bond funded senior debt financing of the investable portfolio over this period will vary but may approximate \$3 billion to \$6 billion.

MassHousing assessed the investable portfolio to identify the scale of the strongest candidates for decarbonization solutions and those that may achieve net-zero emissions building standards. The Agency estimates that 10,000 units (or 50 to 100 developments) out of the 28,000 total investable units in the portfolio will prove to be the strongest candidates for GGRF-funded decarbonization solutions. This represents about one-third of the overall investable portfolio. However, this figure may change significantly depending on the final priorities and objectives of the EPA GGRF funding.



Incremental Cost of Decarbonization

MassHousing assessed the potential incremental cost of decarbonization solutions. Drawing on internal analytic comparisons, proprietary research, and generally available actuarial estimates, MassHousing models that the incremental cost per-unit of specific decarbonization solutions is expected to range from \$40,000 to \$100,000 or more in certain cases. The incremental per-unit cost of decarbonization solutions will vary materially depending on the depth and breadth of the specific requirements of a building. For example, buildings that already meet certain high-efficiency standards may only require a minimal level of investment to achieve deeper decarbonization gains. Many aged buildings will require more extensive retrofit solutions to achieve the highest decarbonization goals, including electrification-readiness upgrades, pre-weatherization improvements, and health and safety improvements required for energy upgrades. ⁰²

On the next page is an illustrative sensitivity table that demonstrates the range of potential incremental costs per-unit associated with building decarbonization solutions. The table illustrates that a conservative estimated pipeline of 10,000 units requiring a minimum viable incremental cost per unit of \$50,000 will necessitate \$500 million of funding to achieve a certain level of decarbonization. However, as progress continues higher along the cost per-unit curve seeking to achieve the highest standards of decarbonization, the cost may double to \$100,000 and necessitate \$1 billion of incremental funding. On average, as shown in red in this chart, between \$600 million and \$800 million (between \$60,000 and \$80,000 per unit) is the estimated amount required to achieve a substantial reduction in emissions in these 10,000 units. Lesser reductions are still possible with \$400 million - \$500 million, and greater reductions are possible with \$900 million to \$1 billion.

Two additional reference points are shown in blue and green. First, Massachusetts residents make up approximately 2% of the population of the United States. If \$14 billion in NCIF funds were made available to states based on population, Massachusetts may expect to receive approximately \$280 million. In blue, the table illustrates how a state's proportional share of funding would be applied to units at various levels of decarbonization standards. Second, in green, the table illustrates the level of funding that may need to be deployed if the entire investable portfolio is to be targeted for decarbonization.

⁰² These "pre-weatherization" improvements include health and safety repairs (lead and asbestos remediation, moisture problems, electrical and plumbing repairs) such that the property can install insulation and/or other weatherization materials.

Investable MH Portfolio by Archetype | Number of Developments

		Total Investment Level						
		Average Estimated Income Cost-Per-Unit						
		\$40,000	\$50,000	\$60,000	\$70,000	\$80,000	\$90,000	\$100,000
Total Potential Units (2024-2028)	1,000	40.0M	50.0M	60.0M	70.0M	80.0M	90.0M	100.0M
	2,000	80.0M	100.0M	120.0M	140.0M	160.0M	180.0M	200.0M
	3,000	120.0M	150.0M	180.0M	210.0M	240.0M	270.0M	300.0M
	4,000	160.0M	200.0M	240.0M	280.0M	320.0M	360.0M	400.0M
	5,000	200.0M	250.0M	300.0M	350.0M	400.0M	450.0M	500.0M
	6,000	240.0M	300.0M	360.0M	420.0M	480.0M	540.0M	600.0M
	7,000	280.0M	350.0M	420.0M	490.0M	560.0M	630.0M	700.0M
	8,000	320.0M	400.0M	480.0M	560.0M	640.0M	720.0M	800.0M
	9,000	360.0M	450.0M	540.0M	630.0M	720.0M	810.0M	900.0M
	10,000	400.0M	500.0M	600.0M	700.0M	800.0M	900.0M	1.0B
	11,000	440.0M	550.0M	660.0M	770.0M	880.0M	990.0M	1.1B
	12,000	480.0M	600.0M	720.0M	840.0M	960.0M	1.1B	1.2B
	13,000	520.0M	650.0M	780.0M	910.0M	1.0B	1.2B	1.3B
	14,000	560.0M	700.0M	840.0M	980.0M	1.1B	1.3B	1.4B
	15,000	600.0M	750.0M	900.0M	1.1B	1.2B	1.4B	1.5B
	16,000	640.0M	800.0M	960.0M	1.1B	1.3B	1.4B	1.6B
	—	—	—	—	—	—	—	—
	26,000	1.0B	1.3B	1.6B	1.8B	2.1B	2.3B	2.6B
	27,000	1.1B	1.4B	1.6B	1.8B	2.2B	2.4B	2.7B
	28,000	1.1B	1.4B	1.7B	2.0B	2.2B	2.5B	2.8B

KEY PARTNERSHIPS TO MEET GGRF GOALS IN NON-HOUSING SECTORS

The MCCB™ formed a cooperative partnership with MassDevelopment and MassCEC. Through these partnerships the MCCB™ is able offer coordination and deployment channels for funding projects that support the reduction of greenhouse gas emissions in other priority sectors primarily within the commercial building and transportation sectors.

MassDevelopment

The Massachusetts Development Financing Agency (MassDevelopment) is a quasi-public economic development finance agency and land bank committed to achieving three goals: stimulating business, driving economic growth, and helping communities thrive across Massachusetts. MassDevelopment's work in finance and development impacts many facets of the Massachusetts economy in cities and towns across the Commonwealth. Priorities include providing low-cost and creative financing options for a range of organizations, sustainably redeveloping surplus properties, transforming the Commonwealth's Gateway Cities, and promoting the Massachusetts manufacturing and defense sectors. MassDevelopment supports and finances higher-risk ventures that traditional market actors do not undertake. It has teams that are deeply embedded in the communities that have historically suffered disinvestment and are seeking revitalization.

MassCEC

MassCEC is a state economic development agency dedicated to accelerating the growth of the clean energy sector across the Commonwealth to spur job creation, deliver state-wide environmental benefits and to secure long-term economic growth for the people of Massachusetts. MassCEC works to increase the adoption of clean energy while driving down costs and delivering financial, environmental, and economic development benefits to energy users and utility customers across the state. MassCEC currently funds over 65 programs, including financing for early stage companies and technology development, pilots for the decarbonization of buildings and transportation, and investments in training to build a skilled, diverse clean energy workforce. MassCEC drives innovation by serving as a clearinghouse and support center for the clean energy technology sector — helping companies and communities access capital and other vital growth resources.

MassCEC, along with the Massachusetts Department of Energy Resources, is an applicant for the GGRF's Solar for All funding.

NOTES AND REFERENCES

MassHousing-specific information and statistics within this document have been obtained from sources which are publicly available, including but not limited to information statements, annual reports, five-year goal reporting, and other internal reporting.

For more information contact MassHousing at:

www.masshousing.com, webinfo@masshousing.com or 617-854-1000.

Contextual information on the Massachusetts housing market and emissions-related statistics has been obtained from the following sources:

City of Boston. Boston's Carbon Emissions. <https://www.boston.gov/departments/environment/bostons-carbon-emissions>.

MA Executive Office of Energy and Environmental Affairs. n.d. Massachusetts Clean Energy and Climate Metrics. <https://www.mass.gov/info-details/massachusetts-clean-energy-and-climate-metrics>.

Massachusetts Executive Office of Energy and Environmental Affairs. 2020. "Massachusetts 2050 Decarbonization Roadmap." <https://www.mass.gov/doc/ma-2050-decarbonization-roadmap/download>.

Massachusetts Executive Office of Environmental Affairs. 2020. "Buildings Sector Report: A Technical Report of the Massachusetts 2050." Commonwealth Of Massachusetts. <https://www.mass.gov/doc/buildings-sector-technical-report/download>

Office of the Massachusetts Governor. 2023. Governor Healey Announces Creation of Massachusetts Community Climate Bank, Nation's First Green Bank Dedicated to Affordable Housing. June 13. <https://www.mass.gov/news/governor-healey-announces-creation-of-massachusetts-community-climate-bank-nations-first-green-bank-dedicated-to-affordable-housing#:~:text=The%20Climate%20Bank%20will%20accelerate,lenders%20through%20innovative%20finance%20produ>.

U.S. Census Data. n.d. DP04 Selected Housing Characteristics. <https://data.census.gov/table?q=DP04&y=2022>.

APPENDICES

Proposed Structure for Funding of Qualified Projects with NCIF Sources

Overview

MassHousing/Massachusetts Community Climate Bank™ (MCCB™) offers NCIF funding partners full-service capabilities to deploy Greenhouse Gas Reduction Fund (GGRF) grants in Qualified Projects in the affordable housing sector. The MassHousing multi-family practice provides complete in-house origination, underwriting, loan closing, asset management, loan servicing, and compliance services on an existing portfolio of \$5.3 billion with \$730 million in annual new originations. These capabilities coupled with MassHousing's institutional expertise structuring financing funded by capital market bond issuances and coordinating a wide range of subsidy sources will ensure that NCIF funding for eligible decarbonization uses will be managed effectively and integrated into the capital stack for the multi-family affordable housing projects that MassHousing expects to finance over the next five years.

Proposed Vehicle for NCIF Funding

MassHousing/MCCB™ is ideally suited to deploy a customized NCIF-funded debt instrument to finance carbon-reducing construction, renovation, and rehabilitation projects as part of its portfolio of financing products for multi-family affordable housing projects. NCIF funds made available to MassHousing/MCCB™ will be structured as a separate funding source with specific criteria in connection with existing MassHousing financing rather than and a stand-alone product. Repayment of the NCIF sources is expected to be paid from available NOI on agreed upon terms rather than variable and based on savings estimates. Other financial instruments including equity investments, warehoused loans pools, and insurance guarantees may be considered but likely do not support the goals.

Scale

The MassHousing Pipeline exercise (in the [Multi-Family section](#)) illustrates a conservative expectation of 10,000 units representing approximately \$600 million to \$800 million of incremental investment potential in decarbonization-linked solutions. 10,000 units represents about one-third of the total investable universe MassHousing expects to finance during this period. MassHousing/MCCB™ seeks to secure a minimum of \$280 million in commitments from NCIF funding partners under one or more MOUs that establish a funding program with clear, uniform parameters so that MassHousing/MCCB™ is positioned to deploy funds efficiently and with clear timelines to achieve the highest impact. In order to manage expectations of the scale and availability of NCIF funding to meet likely demand, MassHousing intends to publish a program framework for eligible borrowers to detail purposes and conditions of the NCIF source.

Procedures

MassHousing/MCCB™ proposes to arrange a single agreement vehicle (MOU) with NCIF Funding Partners that will authorize MassHousing/MCCB™ to offer borrowers uniform loan terms for Qualified Projects that meet standards set by GGRF and NCIF Grantee partners. MassHousing will identify and underwrite Qualified Projects using the pre-agreed program

framework. At the time a Qualified Project is ready to advance to a loan commitment, MassHousing will seek the Grantee's approval. Grantees will review MassHousing/MCCB™ loan commitments and approve draw downs to fund the project-level loans within a negotiated timeframe.

Illustrative General Borrowing Assumptions for NCIF	
Borrower	MassHousing (Mass Climate Fund)
Security	Non-recourse to MassHousing as Borrower
Loan Type	Construction-to-Permanent or Permanent Only
Loan Priority	Subordinate to a Qualified Project (Direct or Participation)
Interest Rate	Assumed 0.5% - 2.00%
Repayment	Project NOI or cash-flow based and not savings dependent
Debt Service Coverage	Determined by Senior Loan
Loan-to-Value Ratio	Determined by Senior Loan
Term/Amortization	Up to 40-years plus construction, fully amortizing
Affordability Restriction	Minimum of 20% at 80% AMI
Prepayment Lockout	15-year lockout
Construction Security	Sponsor completion guarantee (various forms)
Third-Party Reports	Appraisal, Phase 1 ESA
Operating Security	Determined by Senior Loan
Construction Wages	Prevailing or Davis Bacon (Construction Only)
Asset Management	MassHousing-approved Tenant Selection Plan, Affirmative Fair Housing Marketing Plan
Loan Servicing	MassHousing's Asset Management and Servicing Division

Internal Lending Capabilities

Selection and Approval of Rental Developments

The focus of MassHousing's rental bond programs is to finance well-planned and well-designed dwelling units for low- and moderate- income persons in locations where there is need for such housing. Under its housing programs, MassHousing may make loans for the construction, acquisition, rehabilitation and/or permanent financing of such housing. Such loans, as a general rule, are secured by a first mortgage lien on real property or on a leasehold estate but may be secured with such other security as MassHousing may determine.

In selecting developments, MassHousing considers, among other factors, the extent of the demand for the proposed housing in the market area, the quality and location of the proposed site, the design and manner of construction of the proposed development, the marketability of the proposed units, the experience and stability of the development team, the quality and experience of property management and the sufficiency of projected revenues to pay anticipated debt service and operating expenses.

In some instances, MassHousing's design standards exceed federal minimum property standards in an attempt to foster better housing design and energy conservation, to contain construction and operational costs, and to meet the special needs of residents of the Commonwealth.

The Feasibility Review Process

Loans for rental developments are originated by the Rental Business Development Division and underwritten by the Rental Underwriting Division. The Rental Business Development Division is responsible in general for evaluating the initial feasibility and desirability of proposed developments and receiving and screening applications for mortgage loans in accordance with established criteria. Loan proposals originated by Rental Business Development Division are underwritten for commitment by the Rental Underwriting Division and processed for conformance with MassHousing's threshold criteria, including compliance with statutory and regulatory requirements and MassHousing's underwriting standards.

Closing Requirements

In order to close on loans for developments that have successfully completed the feasibility review process and received mortgage loan commitments from MassHousing, mortgagors must enter into various traditional financing arrangements and may be required to provide additional security for such loans. The closing is the process by which the required mortgage and other legal documents evidencing MassHousing's interest in the real and personal property constituting the development and setting forth the obligations of MassHousing and the mortgagor during and after loan documents are executed, delivered and as applicable, recorded. Only following the closing will MassHousing disburse any MassHousing loan proceeds to the mortgagor, whether for construction or permanent financing.

Construction Monitoring and Completion Provisions

MassHousing's experience in financing developments thus far indicates that financial difficulties are most likely to occur during construction or in the initial four years of operation. Accordingly, MassHousing has established various requirements and procedures intended to

ensure timely completion of construction and to provide reserves in the event difficulties are encountered during construction or the early years of development operation.

Assurance of Completion (Developments Involving a MassHousing Construction Loan)

MassHousing requires the mortgagor and general contractor for each development to execute a construction contract acceptable to MassHousing. Under this contract, the general contractor agrees to complete construction in conformity with the plans and specifications approved by MassHousing. In order to assure completion of construction, the general contractor provides bonds and/or escrow arrangements in such amounts as determined and approved by MassHousing.

Monitoring During Construction (Developments Involving a MassHousing Construction Loan)

After the mortgage loan closing, a pre-construction meeting is held by MassHousing's staff with the mortgagor's supervising architect and representatives of the general contractor and mortgagor in order to outline MassHousing's requirements during construction. MassHousing requires weekly inspections by the mortgagor's supervising architect to ensure adherence to the construction schedule and conformity with the plans and specifications, and, where applicable, requires periodic payroll submissions to permit monitoring of the payment of prevailing wages. MassHousing's field representative visits each development at various stages throughout construction but typically at least monthly. These scheduled visits are often planned to coincide with job conferences conducted by the mortgagor's supervising architect and include the contractor, subcontractors and the owner representative. MassHousing staff review and approve all payment requisitions, which are submitted monthly by the contractors and the owner and generally represents the value of work in place. MassHousing also recommends approval or disapproval of construction change orders. These change orders are approved by the mortgagor, the mortgagor's supervising architect, the contractor, and, if necessary, by the bonding company or other surety. It is MassHousing's policy presently that all costs associated with a construction change order are secured in advance by the mortgagor if no contingency funds or other reserves are available to fund such change orders.

Monitoring During Construction (Developments Involving a MassHousing Permanent Loan Only)

In instances where MassHousing is providing a permanent loan as a take-out to another lender's construction period financing (and, if applicable, a bridge loan), MassHousing's construction period monitoring is less extensive than described above. Closing of MassHousing's permanent loan is conditioned upon satisfactory completion of the proposed development in accordance with MassHousing-approved plans and specifications and other conditions, and, as such, risks associated with construction difficulties and cost overruns are largely mitigated. In such instances, MassHousing's monitoring during construction entails periodic inspections by MassHousing's field representative to ensure that the project is being built in accordance with MassHousing approved plans and specifications. MassHousing also generally has the right, with certain limitations, to reject any change order which it determines will adversely affect the quality or the scope of construction, the use and occupancy of the Development or the terms of the Permanent Loan Commitment.

Risk Analysis and Asset Management

Each year, MassHousing conducts an analysis of the developments in its rental bond programs. The goal of the risk analysis is to flag potential operating and management problems in order to prevent them entirely or fix them in their early stages. It is a tool MassHousing continues to refine as part of its commitment to limit any compromise to the health of the rental bond programs. The analysis uses key indicators common to all developments and establishes grades in each category. This allows the Rental Management Division to establish an order of priorities and identify properties that require the most attention.

Each development is evaluated in terms of three risk categories. The financial risk rating looks at the debt-service coverage, loan-to-value ratio and loan status. The physical condition risk rating evaluates the capital improvements that will be needed over time, the reserves available to pay for them, and the results of any physical inspections. The compliance risk rating evaluates the ability of the management company to comply with contractual affordability restrictions, submit the required reports in a timely manner and ensure that protections afforded to residents meet the requirements of the Agency's mission. The data used in these ratings are derived from the annual audited financial statements with respect to each development and MassHousing's annual Asset Management Review (AMR). Asset managers follow up during the year on outstanding issues. ***(See information about AMRs below.)***

Institutional Capabilities to Deliver Technical Assistance

MassHousing has adopted policies and review procedures for evaluation of the developments that it expects to finance and has established certain procedures for regulating and monitoring operations with respect to such developments. The policies, procedures and requirements discussed below represent a sample of current policies, procedures and requirements generally observed by MassHousing in processing loans for construction and/or permanent financing of rental housing developments, which may be modified from time to time as experience or changed conditions necessitate.

Asset Management staff of the Rental Management Division review the physical condition and financial performance of each development in the Agency's loan portfolio. The tools used to monitor the portfolio are the Asset Management Review (AMR) and MassHousing's Financial Statement Review process.

Asset Management Review (AMR)

Asset Managers conduct an AMR on their assigned developments. The review includes a physical inspection of the exterior and interior physical condition and a sample of units. The physical inspection portion of the review will allow the Asset Manager the opportunity to see and discuss the efficiencies and effectiveness of improvements funded through the Climate Bank with the property management staff.

Financial Statement Review (FSR)

Each development in the Agency's loan portfolio is required to submit an annual financial statement to the Agency at the end of the development's fiscal year. The results of the financial statement review process inform the department's work throughout the year and

allow the asset management team the opportunity to evaluate the financial performance of the portfolio, address programmatic issues and assess the overall effectiveness of the risk management process.

Throughout the year, Asset Managers are able to conduct an impact analysis using data obtained during the financial statement review process. In support of the Climate Bank initiative and potential required reporting, MassHousing anticipates generating line-item reports to analyze the financial impact of the improvements over time.

