Freddie Mac
MULTIFAMILY

Impact Bonds Report
2023

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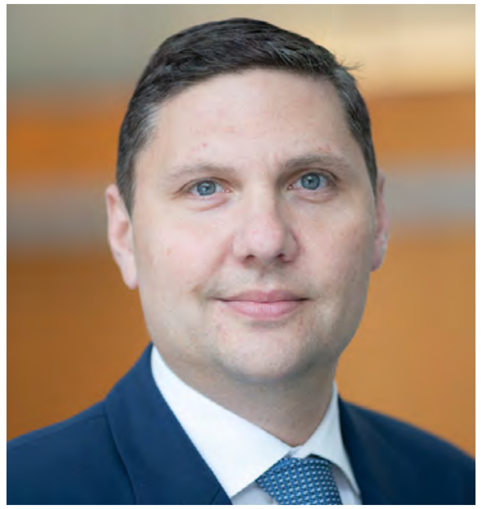


"Renters across the nation continue to face persistent housing challenges. We remain committed to tackling those issues in the housing finance system."

Supporting liquidity, stability and affordability in the face of market and economic headwinds is a core principle of our business. And, throughout 2023, we remained a consistent and steady issuer in the market, financing stable, sustainable and affordable rental housing across the nation. During these times, our Impact Bonds are an especially important part of our business.

Since 2019, we've issued approximately $20 billion in Impact Bonds, all of which adhere to a defined framework and support our broader housing mission, while keeping stakeholders' needs in mind. In 2023, a majority of our Impact Bonds issuances were from Social Bonds, totaling over $2.6 billion. Over $567 million of these Social Bonds provided liquidity to Small Financial Institutions with a distinct mission of addressing affordable housing challenges. Through this vehicle, we are enabling those institutions to create a positive impact in their niche markets, which is especially critical in volatile markets. Additionally, over $2 billion of Social Bonds were issued with the purpose of expanding access to housing for underserved groups considered to be among the most vulnerable.

Given the past years' challenging market environment, fewer borrowers opted to make green improvements that add energy- and water-efficiency to their properties; our Green Bonds results from the past two years reflect the less robust overall market. However, we're optimistic about the future of our green program and will continue to evaluate program enhancements to better support our borrowers and tenants in lowering their environmental impact and monthly expenses.

Thanks to the support of like-minded investors focused on overcoming housing challenges and addressing environmental, social and sustainability issues, we made a tangible impact in 2023. And in the year ahead, we're well-positioned to continue adapting and developing innovative solutions that support borrowers and tenants while meeting the demand of the market and investors.

Robert Koontz

Senior Vice President, Multifamily Capital Markets

Freddie Mac Sustainability Strategy

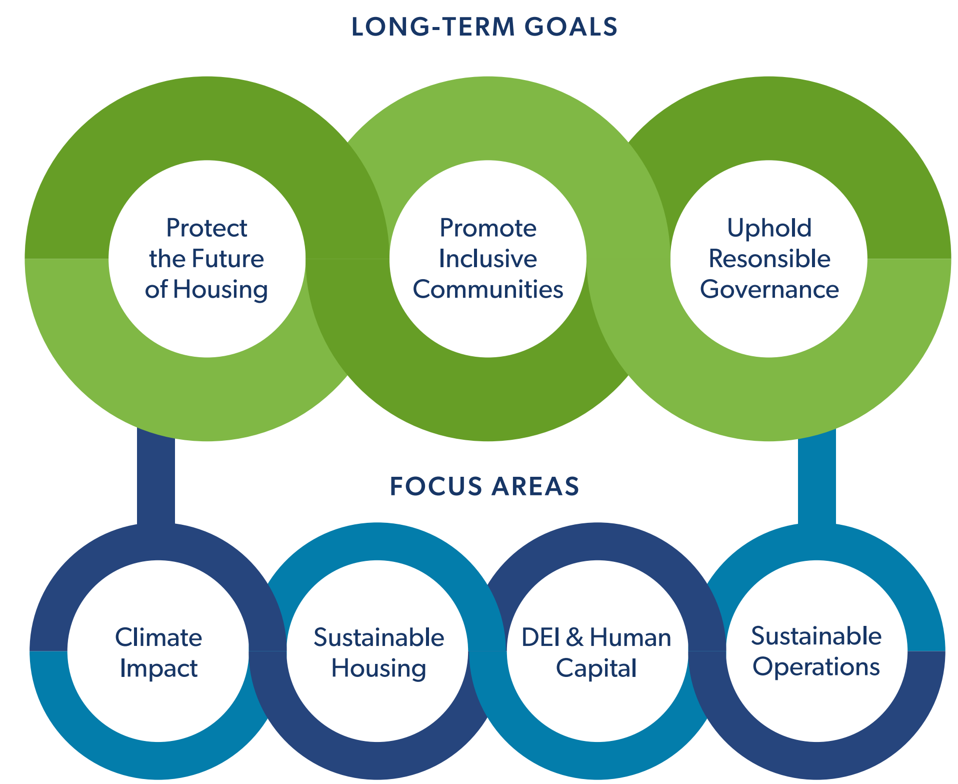
Freddie Mac's mission is to provide liquidity, stability and affordability to the housing market. We are driven to meet the country's broader housing needs by providing affordable, sustainable and equitable access to housing. This includes integrating environmental, social and governance strategies into our business and operations, which we accomplish through carefully developed long-term goals and areas of focus designed to support the achievement of those goals.

Our Approach to Sustainability

In a changing world, our sustainability efforts help ensure we can continue to Make Home Possible equitably and responsibly, for families across the nation. To that end, Freddie Mac has implemented an enterprisewide sustainability strategy that supports the continued success and longevity of our business, the housing industry and the planet. See our Sustainability Website for more details.

Sustainability Strategic Framework

Our Sustainability focus areas are interconnected and designed to play a distinct part in accomplishing our Corporate Strategic priorities and all three long-term Sustainability goals.



Freddie Mac Multifamily Impact Bonds Strategy

Freddie Mac's commitment to affordable, quality and sustainable rental housing is central to everything we do, including our research, products, programs and services we offer and much more. Our ongoing support — in all economic conditions and for markets that might otherwise be overlooked — distinguishes us from other funding sources. Driven by a genuine desire to effect change, we confront persistent housing challenges through innovative thinking that helps expand access to housing in all areas of financing.

With that in mind, we offer Impact Bonds, comprising Green, Social and Sustainability Bonds, that target a specific impact area relating to certain environmental or social challenges. We have strict selection criteria and detailed prescreening procedures for each offering.

Green

Environmental impact in workforce housing

$5.6 Billion
of total issuance since 2019

Social

Looking deeper into our mission of supporting affordable housing by targeting additional social impact causes

$7.2 Billion
of total issuance since 2020

Sustainability

Supporting sustainable communities by financing affordable housing, may include certain environmental features

$7.0 Billion
of total issuance since 2020

GlobalCapital US Securitization Awards 2023

Climate Bonds Initiative 6th Climate Bonds Awards

Environmental Finance Bond Awards 2023 Winner
Social bond of the year – agency

Environmental Finance Sustainable Debt Awards 2024 Winner
Sustainability bond of the year – agency

"Freddie Mac recognizes the measurable impact of green and social financing tools to support affordable, sustainable housing for American families. We are pleased to be recognized by the Climate Bonds Initiative, Environmental Finance and GlobalCapital for our commitment to impactful housing."

- Robert Koontz
Senior Vice President, Multifamily Capital Markets

Impact Summary for Multifamily Impact Bonds

Based on Combined Annual Data since 2019

ENVIRONMENTAL IMPACT

Water improvements are projected to save over 570 million gallons of water per year — the equivalent of filling the Lincoln Memorial Reflecting Pool in Washington, D.C. 84 times,[1] or the annual water usage for over 6,222 households across America[2]

Energy reductions are projected to save over 418 million kilobtus (kBtu) per year — enough energy to power over 11,364 homes[3]

Annual greenhouse gas (GHG) emissions are projected to decrease by 34,730 metric tons — the equivalent of removing 7,728 cars from the road for one year or carbon sequestered by 574,264 tree seedlings grown for 10 years[4]

SOCIAL IMPACT

Impact Bonds Proceeds Financed:

49.5% — **99,657** units, or **49.5%** of total units, affordable to tenants earning at or below 50% area median income (AMI)

72.8% — **146,417** units, or **72.8%** of total units, affordable to tenants earning at or below 60% AMI

91.1 % — **183,384** units or **91.1%** of total units, affordable to tenants earning at or below 80% AMI

Impact Report Supplemental Data: Please refer to the Impact Report supplemental data file posted on the Freddie Mac Impact Bonds webpage for loan-level information.

1 The Lincoln Memorial Reflecting Pool holds approximately 6,750,000 gallons of water according to https://en.wikipedia.org/wiki/Lincoln_Memorial_Reflecting_Pool

2 On average, each person uses 80-100 gallons of water per day. Our calculation is based on 100 gallons/day/person (https://www.usgs.gov/special-topics/water- science-school/science/water-qa-how-much-water-do-i-use-home-each-day?qt-science_center_objects=0#qt-science_center_objects). The average household size for 2023 is 2.51 people (https://www2.census.gov/programs-surveys/demo/tables/families/time-series/households/hh4.xls)

3 In 2022, the average annual electricity consumption for a U.S. residential utility customer was 10,791 kilowatt-hours (kWh), an average of about 899 kWh per month (https://www.eia.gov/tools/faqs/faq.php?id=97&t=3)

4 Calculated using https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator

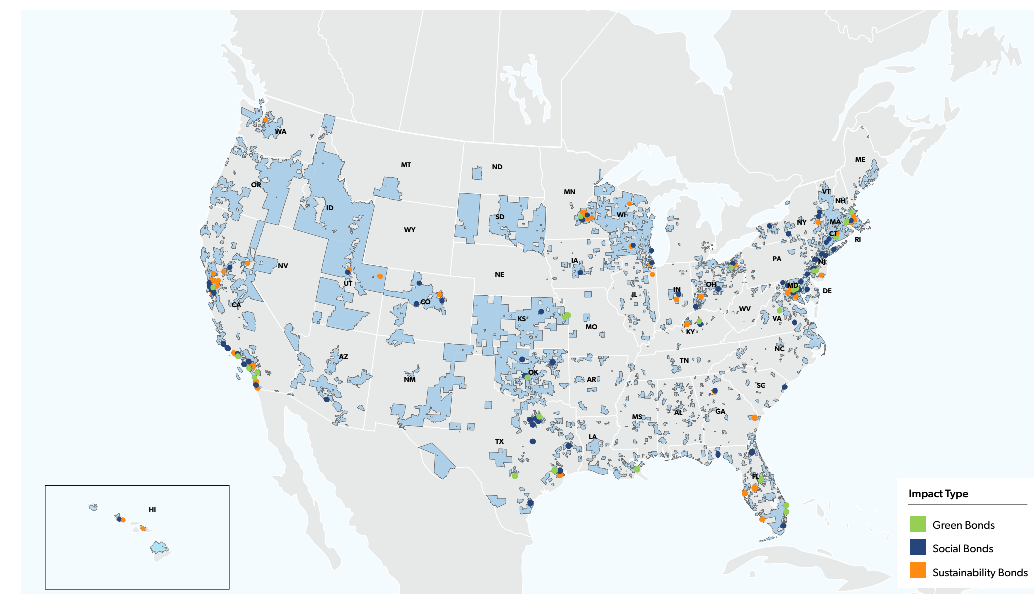
Financing in High Opportunity Areas

Freddie Mac uses the definition of High Opportunity Areas (HOAs) as described in the Duty to Serve Regulation and the associated Duty to Serve Evaluation Guidance published by the Federal Housing Finance Agency (FHFA). Per Duty to Serve, an HOA is an area designated as a Difficult Development Area (DDA) by the U.S. Department of Housing and Urban Development or designated as an HOA by a state's Qualified Allocation Plan (QAP).

- Difficult Development Area: Certain areas designated by HUD as a DDA during any year covered by the Freddie Mac Duty to Serve Underserved Markets Plan (Plan) or in the year prior to a Plan's effective date, with a poverty rate that falls below 10% (for metropolitan statistical areas (MSAs) or below 15% (for non-MSAs)), are identified by FHFA as HOA. It is important to note that HUD's DDAs were developed using zip codes (for MSAs) and counties (outside of MSAs) as the geographic units. Because Duty to Serve's designation using DDAs is at the census tract level, there are some cases of geographic discrepancy.
- Qualified Allocation Plan: Certain census tracts from eligible Low-Income Housing Tax Credit (LIHTC) QAPs are identified by FHFA as HOAs. These have a poverty rate that falls below 10% (for MSAs) or below 15% (for non-MSAs).

A list of census tracts can be found using Freddie Mac's Multifamily Mission Map or on FHFA's website. A list of eligible LIHTC QAPs can be found here.

Impact Bonds proceeds have financed 185 properties with 27,794 units located in HOAs



Source: The Freddie Mac Multifamily "Mission Map" at https://missionmap.freddiemac.com/#/main

Industry Partnerships

Nasdaq launched the Sustainable Bond Network in December 2019. Freddie Mac Multifamily is a member of its advisory board and is dedicated to the success of the initiative. Together, we are working to help develop products that are environmentally and socially sustainable.

ENERGY STAR® is a voluntary U.S. Environmental Protection Agency program that helps businesses and individuals save money and protect our climate through enhanced energy efficiency. Similarly, WaterSense is a voluntary EPA program that focuses on water efficiency by certifying products that save at least 20% water versus standard models, and by providing resources to help individuals save money and enhance water efficiency — helping to conserve water for future generations.

Freddie Mac has been an ENERGY STAR partner since 2014. In 2024, we recently became a WaterSense promotional partner and have recognized the value of WaterSense products through their implementation at properties funded through our Green Advantage® program. Through our K-G series and Multi PCs®, our Green Bonds consolidate all utility data into the ENERGY STAR Portfolio Manager® system where we track the effectiveness of the ENERGY STAR and WaterSense products implemented at the properties.

Green Bonds

Green Bonds Program Overview

By carefully studying factors that contribute to current housing challenges, we identified opportunities to improve and finance workforce rental housing that:

a. benefit tenants and borrowers through lower monthly expenses; and
b. simultaneously support the environment through reduced energy and water consumption.

In 2019, we launched the Freddie Mac Multifamily Green Bonds program backed by loans financing projects resulting in 30% energy- and water-efficiency improvements with a minimum of 15% energy reduction. Through this program, we have also been an important capital provider for environmental improvements in workforce rental housing.

2023 ENVIRONMENTAL IMPACT

Water improvements are projected to save over 43 million gallons of water per year — the equivalent of filling the Lincoln Memorial Reflecting Pool in Washington, D.C. six times[5], or the annual water usage for over 478 households across America[6]

Energy reductions are projected to save over 27 million kBtu per year — enough energy to power over 746 homes[7]

Annual GHG emissions are projected to decrease by 2,542 metric tons, the equivalent of removing 566 cars from the road for a year or carbon sequestered by 42,032 tree seedlings grown for 10 years[8]

2023 SOCIAL IMPACT

74.1% of units are affordable to families earning at or below **80% AMI**

Improvements are projected to **save tenants an average of $319 per unit annually through lower utility costs**

1,049 units are located in **HOAs**

Please refer to Appendix III on page 55 for a description of our impact reporting methodology.

[5] See footnote 1
[6] See footnote 2
[7] See footnote 3
[8] See footnote 4

The Four Pillars of the Green Bond Principles

The Freddie Mac Multifamily Green Bonds Framework is aligned with the four core components of the International Capital Market Association's (ICMA) Green Bond Principles and focuses on our use of proceeds, the process for project evaluation and selection, the management of proceeds, and transparency through regular reporting.

- Our use of proceeds
- The process for project evaluation and selection
- The management of proceeds
- Transparency through regular reporting

Green Bonds Issuance Snapshot

Freddie Mac Multifamily has issued approximately $5.6 billion of Green Bonds since 2019

Issuance Year	Deal Type	Volume ($ millions) by Deal Type	Volume ($ millions) by Year
2019	K-G Deal	$1,027.8	$1,996.3
	Multi PCs	$968.5	
2020	K-G Deal	$1,227.7	$1,255.1
	Multi PCs	$27.4	
2021	K-G Deal	$1,104.0	$1,308.2
	Multi PCs	$204.2	
2022	K-G Deal	$484.2	$484.2
2023	K-G Deal	$481.6	$512.1
	Multi PCs	$30.5	
Total		$5,555.9	


Freddie Mac Multifamily Green Bond Second Opinion

In 2021, CICERO Shades of Green provided a second opinion on our Green Bonds Framework and awarded the framework its *Light Green* rating, which recognizes us for having transparent and robust selection criteria and proceeds management processes. They also recognize our framework for supporting important steps for emissions reduction and climate resilience in the housing market, as well as our annual reporting.

Per CICERO Shades of Green, "Freddie Mac's Green Up® and Green Up Plus® loan offerings are successfully mobilizing investments in energy- and water-efficiency in the US residential building sector at scale." They add that, "Freddie Mac's Green Up and Green Up Plus loan offerings are building the breadth and depth of publicly accessible utility consumption data for the US residential market by requiring energy and water use data reporting for the whole building on all such loans."

Environmental Impact
of our Green Bonds

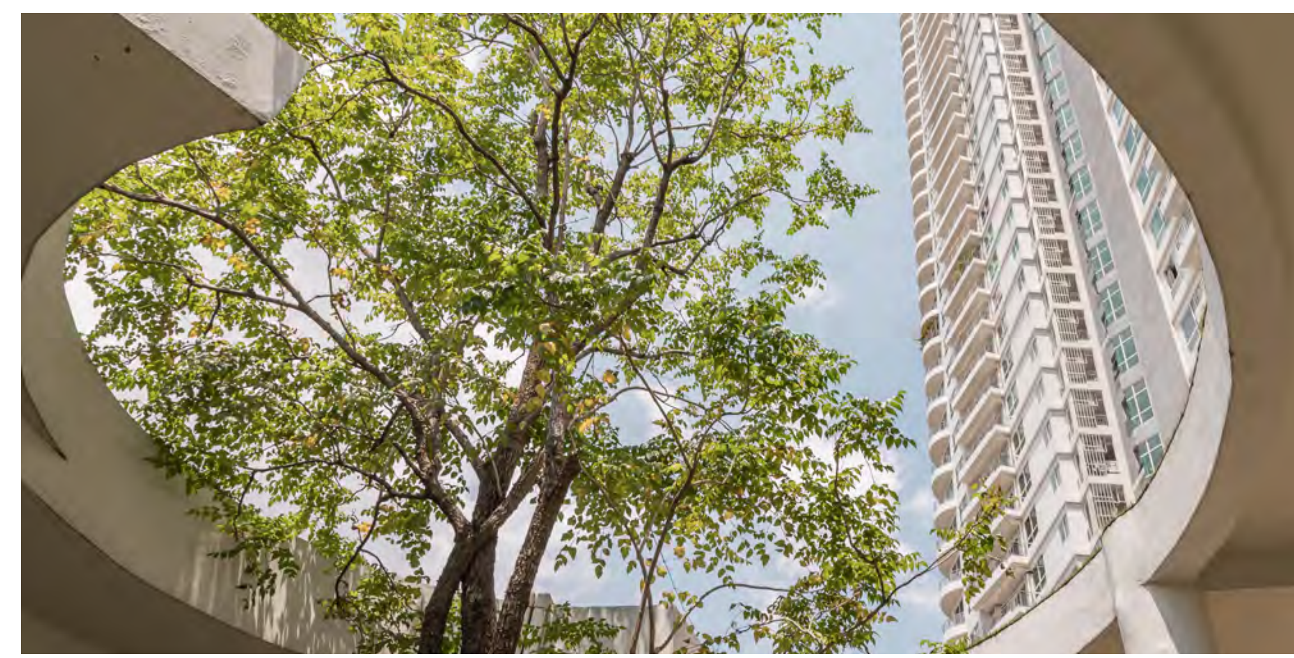
Energy- and water-efficiency improvements supported by our Green Bonds are making a positive impact on the environment.

2023 Projected Energy Consumption Savings of Green Bonds

Green Bonds proceeds financed energy improvements that are projected to save **over 27 million kBtu per year**. This equates to enough energy to power **over 746 homes**.[9] On average, each Green Up/Green Up Plus loan is projected to reduce the property energy usage by **over 7,113 kBtu per unit per year**, which is enough energy to provide lighting for an average household for over three years.[10]

2023 Projected Water Consumption Savings of Green Bonds

Green Bonds proceeds financed water improvements that are projected to save **over 43 million gallons of water per year**, which is the equivalent of filling the Lincoln Memorial Reflecting Pool in Washington, D.C. **six times**[11], or the annual water usage for **over 478 households**[12] across America. On average, each Green Up/Green Up Plus loan is projected to reduce the property water usage by **over 11,114 gallons of water per unit per year**, which is the equivalent water usage for **over 483 loads of laundry per unit per year**.[13]



9 See footnote 3

10 U.S. households consumed an average of 654 kWh of electricity for lighting in 2020 (https://www.eia.gov/consumption/residential/data/2020/c&e/pdf/ce5.3a.pdf)

11 See footnote 1

12 See footnote 2

13 We assume a standard washing machine uses on average 23 gallons of water per load (https://www.epa.gov/watersense/start-saving)

Green Bonds Measurement & Verification

Freddie Mac's commitment to transparency and reporting is at the core of our Sustainability and Impact Bonds strategies. Our Green Bonds reporting includes not only disclosure regarding the projected impacts of installed measures, but also quantification of the property's energy and water consumption reduction and cost savings through a process called measurement and verification (M&V).[14] Please reference the Green Bonds M&V tab in the 2023 Impact Bonds Report Supplemental Dataset to view the reported actual savings data.

Borrowers have two years post-loan origination to install energy- and/or water-efficiency improvements at their properties. For Green Up/Green Up Plus loans originated in 2019 and beyond, we require the borrower to engage a third-party data collection firm to collect, input, and report actual energy and water usage (Benchmarking Data) on an annual basis. Properties must have completed their efficiency improvements and reported at least six months of post-improvements Benchmarking Data to be eligible for M&V analysis. Additionally, the reported Benchmarking Data has multiple data quality and completeness assessments performed internally by Freddie Mac Multifamily and externally by WegoWise by Measurabl to determine suitability for further M&V analysis. To date, **60 Green Up/Green Up Plus loans backing Green Bonds** have received either an energy, water or combined M&V analysis, depending on the improvements made at the property.

Out of 50 properties receiving an energy M&V analysis, **32 of those properties** realized positive savings compared with their reported baseline utility usage prior to improvements. The average energy-efficiency improvement across these **32 properties** was **18.8%**

Out of 46 properties receiving a water M&V analysis, **27 of those properties** realized positive savings compared with their reported baseline utility usage prior to improvements. The average water-efficiency improvement across these **27 properties** was **20.1%**

The M&V results for the properties highlighted above demonstrate real savings at the properties, but there were also some properties that did not realize the expected savings based on their reported data. Various multifamily-related data challenges[15] likely contributed to the results. Nonetheless, we expect that the implemented energy- and water-efficiency improvements helped to lessen the increased consumptions occurring at those properties. We intend to continue reporting M&V data in future Impact Bonds Reports as we receive it from borrowers.

[14] See Appendix III: Impact Bonds Reporting Methodology for more details on the M&V analysis

[15] Data challenges experienced at properties, such as occupancy density or tenant behaviors, often are outside of the borrower's control. For additional details, see Appendix III: Impact Bonds Reporting Methodology

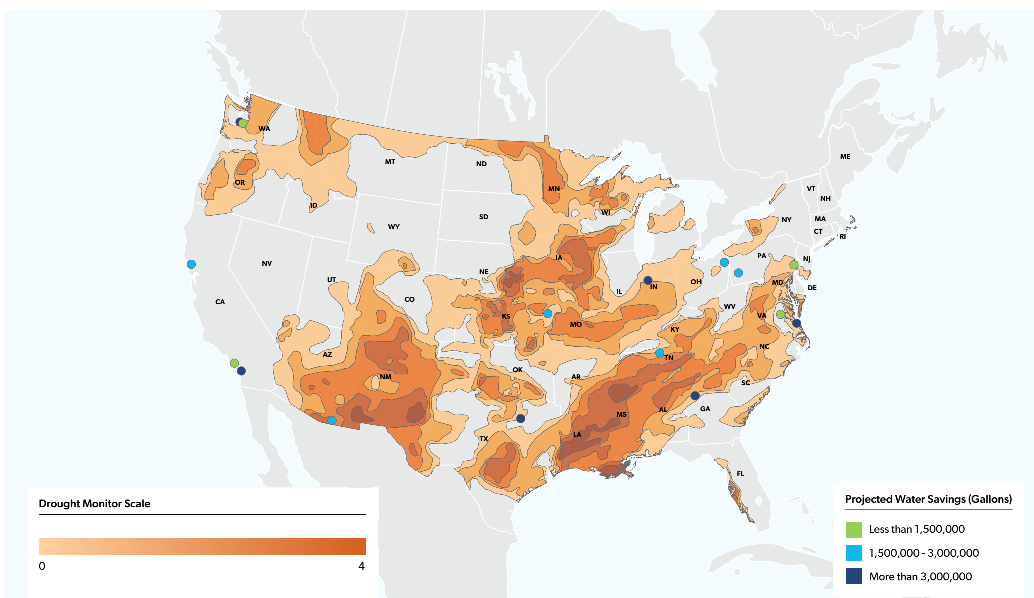
Additional Benefits of Green Improvements

While energy- and water-efficiency improvements reduce consumption regardless of where a property is located, the environmental impact from such improvements will be greater in certain markets. For example, the impact of water-efficiency improvements will be more pronounced for properties located in drought-prone areas. A reduction in a property's carbon footprint due to energy-efficiency improvements will be greater when the property is located in an area with more carbon-intense energy supplies.

2023 Environmental Impact in Areas Experiencing Drought

The map below sets forth the location of properties that were securitized through Green Bonds in 2023, relative to the intensity of areas experiencing drought as of December 12, 2023.

U.S. Drought Monitor Map and Green Bonds Property Locations



Source: U.S. Drought Monitor provided by the National Integrated Drought Information System, https://droughtmonitor.unl.edu/Maps/MapArchive.aspx

As of December 12, 2023, 28.05% of the U.S. and Puerto Rico and 33.52% of the contiguous 48 states are experiencing a type of drought, according to the U.S. Drought Monitor.[16] Many areas of the country are also experiencing shorter-term (typically less than six months) drought conditions.[17] **Eight properties**, representing **$204.7 million** or **40.0%** of the total 2023 Green Bonds proceeds, are in areas that were experiencing drought or were abnormally dry. The properties in those areas are projected to save over **20 million gallons** of water annually; these are critical savings in drought-prone areas. **Three** of the eight properties in those areas are projected to each save more than **3 million gallons** of water annually. While not all loans were originated in drought-prone areas, the water consumption savings outside those areas will still provide positive impacts, particularly as many states are expected to have water shortages not related to drought.[18]

[16] https://droughtmonitor.unl.edu/DmData/DataTables.aspx

[17] See U.S. Drought Monitor provided by the National Integrated Drought Information System: https://droughtmonitor.unl.edu/Maps/MapArchive.aspx

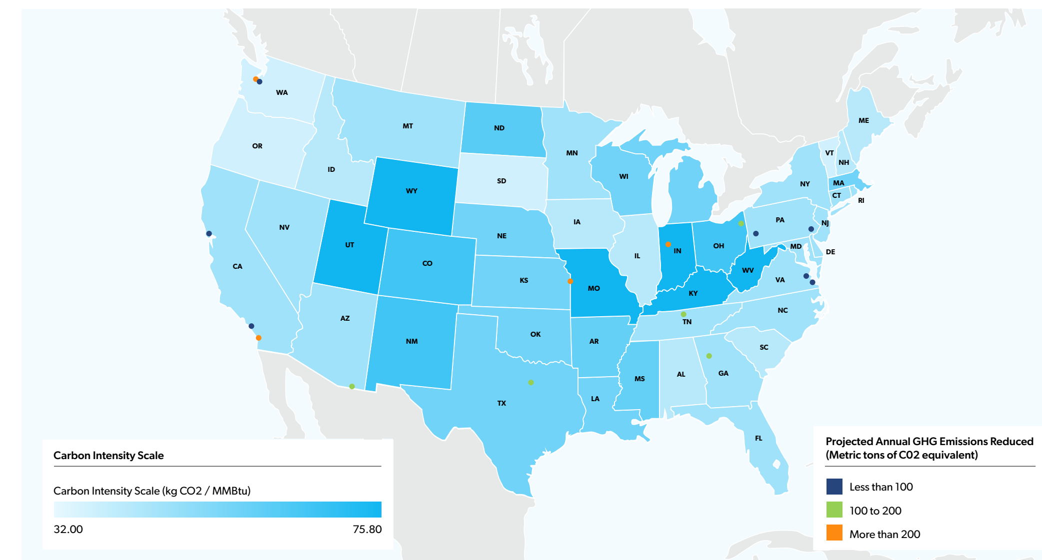
[18] Reference the Government Accountability Office study (https://www.gao.gov/assets/670/663344.pdf) or more information at the following EPA webpage: https://www.epa.gov/watersense/how-we-use-water

2023 Environmental Impact based on Carbon Intensity of Energy Supply

Each state has a unique profile of the types of fuel sources used to produce energy. Carbon-producing fuel sources such as coal, petroleum and natural gas vary in the amount of carbon produced and will directly impact a state's energy-related carbon dioxide (CO_2) emissions.

The map below shows the location of properties backing the 2023 Green Bonds relative to the carbon intensity of the energy supply within that state. States with a more carbon-intensive energy supply are shaded in dark blue, and states with a lower carbon-intensive energy supply are light blue. The properties are represented based on the projected reduction of annual GHG emissions.

2023 Green Bonds Property Location Relative to Carbon Intensity of Energy Supply



Source: Freddie Mac tabulation of 2021 U.S. Energy Information Administration (EIA) Energy-Related Carbon Dioxide Emissions by State data, https://www.eia.gov/environment/emissions/state/excel/table6.xlsx

Two properties, representing **over $28 million** or **5.6%** of the total 2023 Green Bonds proceeds, are in states with an energy supply carbon intensity that is above the national average of **50.2 kilograms of CO_2 per million Btu** (**kg CO_2/MMBtu**)[19], where installed energy improvements are projected to save **425 metric tons of CO_2 annually**. **Both properties** located in those states are projected to each save more than **100 metric tons of CO_2 annually**. Improvements made on properties in those areas will have a greater impact than properties in states where the carbon intensity of the energy supply is lower.

Overall, across all Green Bonds, the implemented green improvements are projected to reduce annual GHG emissions by **2,542 metric tons**. This is equivalent to the same amount of CO_2 as removing **566 cars**[20] from the road for one year.

[19] https://www.eia.gov/environment/emissions/state/excel/table6.xlsx

[20] See footnote 4

Social Impact
of our Green Bonds

Our Green Bonds proceeds financed energy- and water-efficient affordable properties that help tenants save in areas of high utility costs, in HOAs and across different property types.

2023 Tenant Utility Savings

Green Bonds proceeds financed energy and water improvements that are projected to save tenants over **$1.2 million per year**. Tenants are projected to save an average of **$319 per unit per year.** In-depth data analysis shows **4.8%** of tenants are projected to save between $100-$200 per year, **43.4%** of tenants between $200-$300 per year and **36.4%** of tenants are projected to save $300 or more per year.

2023 Utilities Savings in Areas of High Electric Utility Costs

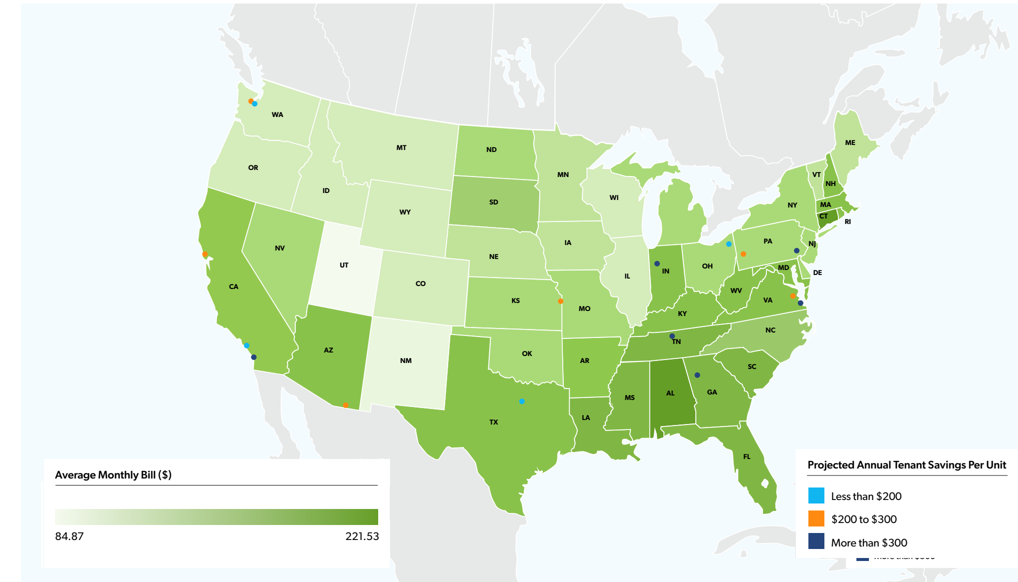
Nearly one-third (31%) of all multifamily households nationwide report some type of energy insecurity, such as forgoing or reducing necessities like food and medicine to pay an energy bill or keeping their home at an unhealthy or unsafe temperature.[21] Savings from green improvements help families reduce their energy consumption costs, allowing them to allocate additional funds to other necessities.

The following map shows the average monthly electric utility bill by state, relative to the location of the properties backing our Green Bonds. The properties are represented based on projected tenant savings per unit. States with the most expensive electric bill are dark green, and those with the least expensive bill are light green. The national average electric utility bill is $135.25 per month.[22] By comparison, the average electric utility bill for states with the most expensive electric bill is $160.52 per month, or almost 19% higher than the national average. We found that approximately **five** or approximately **31%** of properties backing Green Bonds in 2023 are in states with the most expensive electric bills. While a reduction in energy consumption has the potential to benefit tenants in all Green Bonds properties, tenants living in properties located in states with the most expensive electric bills will likely see the largest savings. In fact, tenants in **three** or **60%** of properties in states with the highest electric bills are projected to save more than $300 per unit per year. When looking across all Green Bonds, average savings for property owners are projected to be **$128 per unit per year**. Tenants are projected to save an average of **$319 per unit per year**, which is more than two months of the national average electric bill.

[21] We looked at the Residential Energy Consumption Survey and the reported energy insecure households from the number of apartments in buildings with five or more units (https://www.eia.gov/consumption/residential/data/2020/hc/pdf/HC%2011.1.pdf)

[22] https://www.eia.gov/electricity/sales_revenue_price/xls/table_5A.xlsx

2023 Green Bonds Property Location Relative to Average Monthly Electric Bill



Source: Freddie Mac tabulation of 2022 U.S. EIA Residential Average Monthly Electric Bill data, https://www.eia.gov/electricity/sales_revenue_price/xls/table_5A.xlsx

In addition to energy savings contributing to reduced utility costs, the water consumption savings will help reduce strain on the country's aging water infrastructure that is projected to require $625 billion for pipe replacement, treatment plant upgrades, storage tanks, and other key assets to ensure the public health, security and economic well-being of our cities, towns and communities.[23] Water utility growth rate is rising faster than other utility services (e.g., electricity, natural gas) at an average of 4.2% per year due to increased operations and maintenance of treatment facilities.[24] Households are seeing their costs increase as approximately 24% of households nationwide are paying more than 4.5% of their household income on water bills — a level that is considered unaffordable by the EPA.[25] Water consumption savings will help reduce the water bills of property owners and tenants, helping to lessen the impact of the increased water bills.

Financing Workforce Housing

Workforce housing is affordable to the 'missing middle' — those making modest incomes in markets across the country. While workforce housing properties tend to be older and have fewer amenities, they may also include newer properties intentionally built to be affordable to households with moderate incomes.

For our loan offerings and Impact Bonds, we define workforce housing as units with rents affordable to households making at or below 80% AMI in most markets, with some variation in cost-burdened markets. In many ways, residents of workforce housing are the backbone of their communities. They are teachers, police officers, firefighters, health care professionals, and service industry professionals such as cooks, retail employees or custodians. These individuals may be aspiring homebuyers or renters who do not qualify for subsidized housing and at the same time cannot afford the market rates for housing in the communities that benefit from their work.

[23] See results from the EPA's 7th Drinking Water Infrastructure Needs Survey and Assessment available at https://www.epa.gov/dwsrf/epas-7th-drinking-water-infrastructure-needs-survey-and-assessment

[24] https://www.bluefieldresearch.com/ns/up-43-over-last-decade-water-rates-rising-faster-than-other-household-utility-bills/

[25] https://www.mckinsey.com/industries/electric-power-and-natural-gas/our-insights/us-water-infrastructure-making-funding-count

Green Bonds Proceeds in 2023 Financed:

21.7 % **865** units, or **21.7%** of total units, affordable to tenants earning at or below 50% AMI

47.1 % **1,873** units, or **47.1%** of total units, affordable to tenants earning at or below 60% AMI

74.1 % **2,947** units, or **74.1%** of total units, affordable to tenants earning at or below 80% AMI

Directing Capital Toward Historically Underserved Markets

Affordable and mixed-income housing in one of the following areas can help direct capital to provide stable, quality housing and become a foundation for economic opportunity.[26]

Number of units financed by Green Bonds proceeds located in Duty to Serve Underserved Markets in 2023:[27]

Deal Type	Rural	High Needs Regions	Persistent Poverty Counties (Rural)	Areas of Concentrated Poverty		High Opportunity Area		Opportunity Zones
				Qualified Census Tracts	Racially or Ethnically Concentrated Area of Poverty	Qualified Allocation Plan	Difficult Development Area	
K-G	297	0	0	1,365	0	625	539	452
PC	0	0	0	0	0	0	0	0
Total	**297**	**0**	**0**	**1,365**	**0**	**625**	**539**	**452**

26 https://mf.freddiemac.com/research/duty-to-serve

27 The market categories referenced in this table are defined in the Duty to Serve Underserved Markets Regulation (the Duty to Serve Regulation, 12 CFR 1282.1) and the associated Duty to Serve Regulation, published by FHFA. A list of census tracts for each category can be found using Freddie Mac's Mission Map or on FHFA's website. Please refer to the Freddie Mac Impact Dictionary for more information.

Social Bonds

Social Bonds Program Overview

We confront persistent challenges to affordable and workforce housing through innovative re-thinking that helps expand access to housing by involving all areas of financing. To increase our impact and attract capital to support social impact initiatives, we introduced Social Bonds in 2020 to target opportunities that go deeper into our mission of supporting affordable housing.

Our Social Bonds proceeds are dedicated to either:

I. Provide liquidity to:

- Community Development Financial Institutions
- Housing Finance Agencies
- Small Financial Institutions operating in underserved markets

II. Finance loans for:

- Properties for underserved populations (persons with disabilities, aging population, refugees and others)
- Transitional Housing
- Housing for extremely low-income households (at or below 30% AMI)
- The Rental Assistance Demonstration (RAD) program

The Four Pillars of the Social Bond Principles

The Freddie Mac Multifamily Social Bonds Framework is aligned with the four core components of ICMA's Social Bond Principles and focuses on our use of proceeds, the process for project evaluation and selection, the management of proceeds, and transparency through regular reporting.

Our use of proceeds

The process for project evaluation and selection

The management of proceeds

Transparency through regular reporting

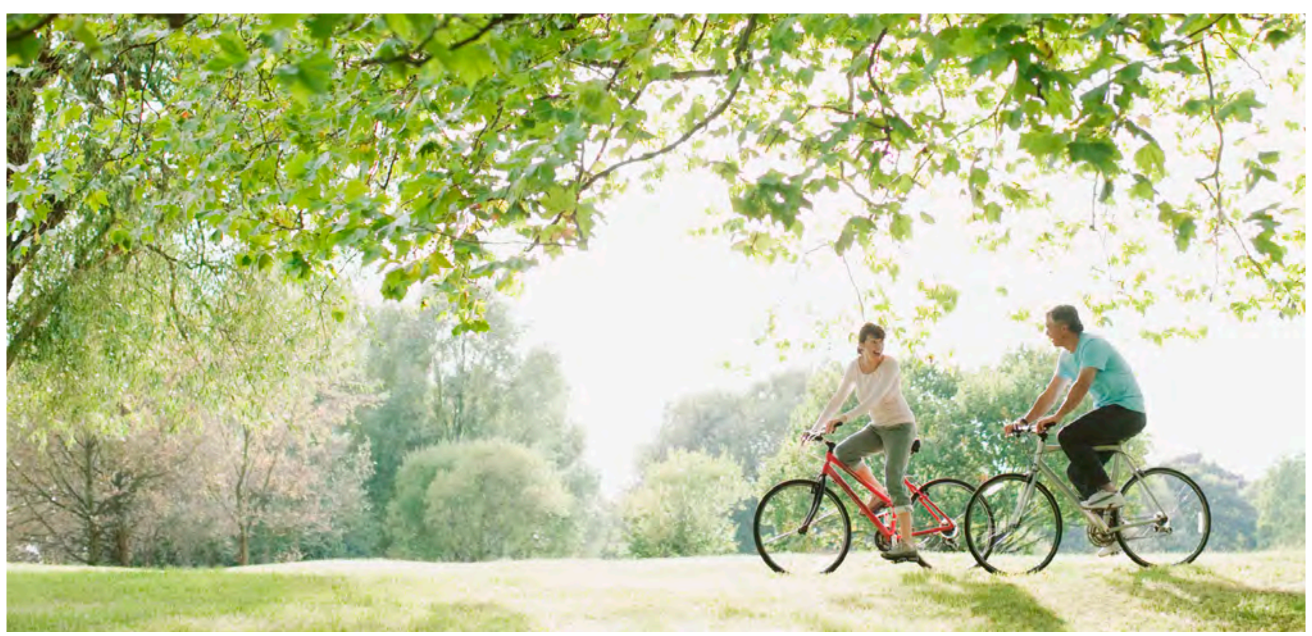
Freddie Mac engaged an independent third party, Sustainalytics, to evaluate our Social Bonds Framework. This opinion is published on the Freddie Mac Multifamily website and in applicable offering documents.

Sustainalytics is confident that Freddie Mac Multifamily is well positioned to issue Social Bonds and that the Freddie Mac Multifamily Social Bonds Framework is robust, transparent and in alignment with the core components of the Social Bond Principles.

Social Bonds Issuance Snapshot

Freddie Mac Multifamily has issued approximately $7.2 billion of Social Bonds since 2020

Issuance Year	Deal Type	Volume ($ millions) by Deal Type	Volume ($ millions) by Year
2020	Q-Deal	$189.5	$877.0
	M-Deal	$398.9	
	P-Deal (PC REMIC)	$106.6	
	Multi PCs	$181.9	
2021	P-Deal (PC REMIC)	$333.7	$1,424.6
	Multi PCs	$1,090.9	
2022	Q-Deal	$498.2	$2,279.5
	M-Deal	$95.4	
	P-Deal (PC REMIC)	$92.8	
	Multi PCs	$1,593.1	
2023	Q-Deal	$438.1	$2,659.1
	M-Deal	$129.8	
	Multi PCs	$2,091.1	
Total		**$7,240.2**	



2023 Social Impact

Of the units financed with Social Bonds proceeds in 2023, **73.5%** of units are affordable to families earning at or below **50% AMI**.

Affordability of Units in 2023

# of Units Affordable at or below 30% AMI	# of Units Affordable at or below 50% AMI	# of Units Affordable at or below 60% AMI	# of Units Affordable at or below 80% AMI
12,623	17,664	21,010	22,716

Underserved Populations in 2023[28]

Underserved Population	# of Loans Supporting
Disabled	34
Seniors/Aging Population	44
Transitional	17
Veterans	6

[28] A single property can be occupied by one or more underserved population category. Please refer to Impact Report Supplemental Data for more details: https://mf.freddiemac.com/investors/impact-bonds

2023 RAD Projects

The HUD RAD program was created to give public housing agencies a tool to preserve and improve public housing properties and address the $26 billion nationwide backlog of deferred maintenance. The RAD program also gives owners of three HUD "legacy" programs (Rent Supplement, Rental Assistance Payment and Section 8 Moderate Rehabilitation) the opportunity to enter long-term contracts that facilitate the financing of improvements. For more information visit HUD's webpage for the RAD program.

3,015 units financed by Social Bonds proceeds were with **RAD**

Directing Capital Toward Historically Underserved Markets

Affordable and mixed-income housing in one of the following areas can help direct capital to provide stable, quality housing and become a foundation for economic opportunity.[29]

Number of units financed by Social Bonds proceeds located in Duty to Serve Underserved Markets in 2023:[30]

Deal Type	Rural	High Needs Regions	Persistent Poverty Counties (Rural)	Areas of Concentrated Poverty		High Opportunity Area		Opportunity Zones
				Qualified Census Tracts	Racially or Ethnically Concentrated Area of Poverty	Qualified Allocation Plan	Difficult Development Area	
Q	1,006	0	0	1,344	45	515	248	599
M	0	0	0	1,072	100	0	0	734
Multi PCs	1,409	601	433	9,563	4,912	908	962	5,389
Total	**2,415**	**601**	**433**	**11,979**	**5,057**	**1,423**	**1,210**	**6,722**

2,175 of the units financed by Social Bonds are located in HOAs with **94.9%** of these units being affordable to tenants earning at or below **80% AMI**

[29] See fotnote 26
[30] See footnote 27

M-070 and Q-024 Deal Spotlights

M-070, a $129.8 million transaction, and Q-024, a $134.6 million transaction, are both Social Bonds transactions completed with Cedar Rapids Bank & Trust (Cedar Rapids), a Small Financial Institution (SFI).

A key component of Freddie Mac Social Bonds is providing liquidity to social impact institutions such as SFIs. These transactions provided Cedar Rapids with needed liquidity to continue lending in their markets. In volatile markets, this liquidity is essential, particularly for SFIs.

Proceeds from the underlying loans were used to finance 42 rental properties across 15 states that serve low- to very low-income residents. All properties supported by the transactions are subject to regulatory agreements. These agreements play an important role in preserving affordability at properties by requiring units to be set aside at certain affordability levels, which is more important now than ever with rapidly rising costs of living. Additionally, all loans financed through Q-024 are supported by 9% LIHTC, which plays a critical role in creating new affordable housing as well as rehabilitating existing affordable housing. One of the primary goals we strive to achieve through Social Bonds besides financing affordable housing is to preserve affordability.

Through these transactions and our partnership with SFIs such as Cedar Rapids, we are making an important social impact in various areas of our country.

M-070 proceeds financed properties with:

44.1% **668** or **44.1%** of the units affordable to tenants earning at or below **30% AMI**

62.5% **948** or **62.5%** of the units affordable to tenants earning at or below **50% AMI**

98.4% **1,492** or **98.4%** of the units affordable to tenants earning at or below **60% AMI**

100.0% **1,516** or **100.0%** of the units affordable to tenants earning at or below **80% AMI**

Q-024 proceeds financed properties with:

29.0% **623** or **29.0%** of the units affordable to tenants earning at or below **30% AMI**

73.3% **1,576** or **73.3%** of the units affordable to tenants earning at or below **50% AMI**

92.6% **1,991** or **92.6%** of the units affordable to tenants earning at or below **60% AMI**

100.0% **2,150** or **100.0%** of the units affordable to tenants earning at or below **80% AMI**

M-070 and Q-024 Properties Highlights

Catalunya Apartments — 5180 E 22nd Street in Tucson, Arizona

Catalunya Apartments is a 140-unit property located in Tucson, Arizona supported through the M-070 transaction. The Tax-Exempt Loan (TEL) and taxable bond funded by Cedar Rapids were used to finance a rehabilitation of the property. Per the property's LIHTC Agreement, for 30 years, 139 units must be rented by households making 60% of AMI or less, with two of these units set aside for tenants earning at or less than 50% AMI. Additionally, 90 units, or approximately 64% of units, are affordable to tenants earning at or less than 30% AMI. The property is also located in an Area of Concentrated Poverty (ACP) designated as a Qualified Census Tract (QCT). Catalunya Apartments helps provide housing to extremely low-income tenants in ACPs, allowing them a place to live with affordability preservation.

Park Avenue Estates — 125 South Czech Hall Road in Yukon, Oklahoma

Park Avenue Estates is a 92-unit property supported by the Q-024 transaction located in Yukon, Oklahoma, approximately 15 miles west of Oklahoma City. Per the property's 9% LIHTC agreement, at least 40% of the units must be affordable at 50% AMI and all of the units be set aside for those aged 55 or greater, with 10 of these units set aside for tenants with disabilities. Additionally, the property is located in an HOA designated by the state's QAP. The increasing cost of rents has a disparate impact on the aging population, making developments like Park Avenue Estates important, particularly in HOAs.

Patterson Place — 420 East Main Avenue in Bismarck, North Dakota

Patterson Place is a 117-unit property supported by the Q-024 transaction located in Bismarck, North Dakota, an ACP designated as a QCT as well as in an Opportunity Zone. Fifty-nine of the units are required to be affordable at 30% AMI through the property's Land Use Restrictive Agreement (LURA). Opportunity Zones are areas that are considered economically distressed per the Internal Revenue Service, making affordability provided through this transaction particularly impactful.

Multi PC Properties Highlights

WA4827 Castleton Supportive Housing — 1544 Castleton Avenue in Staten Island, New York

Castleton Supportive Housing is a 48-unit midrise property located in Staten Island, New York. The ground floor of the development includes a 2,000 square-foot community center to provide services to the local community including financial counseling, public benefits, health education, tutoring, family and legal services, and a food pantry. Castleton Supportive Housing consists of 31 units reserved for tenants experiencing homelessness, which is widely needed, particularly in New York City. Through this transaction, we are going beyond affordable housing and help support the reduction of homelessness in New York City.

WA1635 Westside Residence Hall — 733 Hindry Avenue in Inglewood, California

Westside Residence Hall is located in the city of Inglewood, California, approximately 17 miles from Los Angeles. Per the property's LURA, 301 of the property's 315 units must be transitional housing primarily available to veterans of the United States Armed Forces. Additionally, the LURA requires 18% of units be affordable to tenants earning at or less than 50% AMI, which is much needed in this very high-cost market. Westside Residence Hall provides affordable housing to some of the area's most vulnerable populations.

WE5038 Northside Transit Village II — 3181 Northwest 77th Street in Miami, Florida

Northside Transit Village II is a 180-unit property in Miami, an ACP designated as a QCT as well as an Opportunity Zone. According to the property's LURA, 100% of units must be set aside at 60% AMI, five units must be affordable at 22% AMI, and nine units must serve residents who are persons with disabilities. Projects such as Northside Transit Village II preserve rents in areas where affordability is greatly needed.

Sustainability Bonds

Sustainability Bonds Program Overview

Sustainability Bonds are intended to attract capital to support economic mobility for residents and economic growth for communities.

The availability of affordable and workforce housing is fundamental to sustainable communities since it provides the foundation for creating economic opportunity for residents and communities alike.

Sustainability Bonds proceeds will be used to finance multifamily properties that:

- provide affordable housing to low- to moderate-income families;
- have features and/or are located in areas that further economic opportunity for residents; and
- may include certain environmental impact features

In addition, our Sustainability Bonds are consistent with the following United Nations Sustainable Development Goals:

- Goal 1: No Poverty;
- Goal 7: Affordable and Clean Energy;
- Goal 10: Reduced Inequalities; and
- Goal 11: Sustainable Cities and Communities

2023 ENVIRONMENTAL IMPACT

Eight properties that reported projected savings from existing energy- and water-efficiency improvements are, on average, expected to reduce **energy consumption by 31.8%** and **water consumption by 24.3%**

2023 SOCIAL IMPACT

92.4% of units are affordable to families earning at or below **60% AMI**

2,145 units are located in **HOAs**

Sustainability Bonds proceeds financed **six mixed-income properties**, or **6.4%** of all properties backing the Sustainability Bonds, with units affordable to tenants earning at or below **50% AMI** and tenants earning above **80% AMI**

The Four Pillars of the Sustainability Bond Guidelines

The Freddie Mac Multifamily Sustainability Bonds Framework is aligned with the four core components of the ICMA's Sustainability Bond Guidelines and focuses on our use of proceeds, the process for project evaluation and selection, the management of proceeds, and transparency through regular reporting.

- **Our use of proceeds**
- **The process for project evaluation and selection**
- **The management of proceeds**
- **Transparency through regular reporting**

Sustainability Bonds Issuance Snapshot

Freddie Mac Multifamily has issued approximately $7.0 billion of Sustainability Bonds since 2020

Issuance Year	Deal Type	Volume ($ millions) by Deal Type	Volume ($ millions) by Year
2020	K-SG Deal	$579.1	$971.5
	ML-Deal	$392.4	
2021	K-SG Deal	$659.7	$2,420.7
	ML-Deal	$1,761.0	
2022	K-SG Deal	$1,215.7	$2,032.6
	ML-Deal	$695.8	
	M-Deal	$121.1	
2023	ML-Deal	$1,534.5	$1,534.5
Total		**$6,959.2**	

Freddie Mac engaged an independent third party, Sustainalytics, to evaluate our Sustainability Bonds Framework. This opinion is published on the Freddie Mac Multifamily website and is available in the applicable offering documents.

Sustainalytics is confident that Freddie Mac Multifamily is well positioned to issue Sustainability Bonds and that the Freddie Mac Multifamily Sustainability Bonds Framework is robust, transparent, and in alignment with the four core components of the Sustainability Bond Guidelines.

Social Impact
of our Sustainability Bonds

Affordability of Units in 2023

# of Units Affordable at or below 50% AMI	# of Units Affordable at or below 60% AMI	# of Units Affordable at or below 80% AMI
7,985	12,905	13,485

Financing Mixed-Income Properties

Mixed-income housing can help to deconcentrate poverty and/or provide access to neighborhoods of opportunity for low- and moderate-income residents. This type of housing creates economic diversity and expands the availability of quality, affordable housing throughout an area.

In 2023, our Sustainability Bonds financed **six mixed-income properties** (**6.4%** of all properties backing our Sustainability Bonds), with all these properties in an **ACP**, which is a region that is characterized by persistently high poverty levels, low economic opportunity and high housing costs relative to income. Mixed-income housing in ACPs helps limit turnover and vacancy at the property level, resulting in more stable rental income than would be experienced by an unrestricted, market-rate property. The creation and preservation of mixed-income housing in ACPs is essential to furthering residential economic diversity, which can lead to greater economic and social mobility for residents, as described in our research series on underserved markets.[31]

Mixed-Income Property Highlights

Costa Azul Senior Apartments — 10829 Fulton Wells Avenue in Santa Fe Springs, California

Costa Azul Senior Apartments, securitized through ML-20, is a 280-unit property located in Santa Fe Springs, California, approximately 14 miles from downtown Los Angeles. The location is considered an ACP designated as a QCT and an HOA designated as a DDA. The property is a mixed-income development with 20% of units affordable to tenants making at or less than 50% AMI with the remaining 80% of the units designated as market rate, as required by the TEL and LIHTC agreements. Additionally, this property is age-restricted to tenants 55 years or older, providing affordable and market-rate units for the aging population. Mixed-income developments located in ACPs play an important role in the deconcentration of poverty and upward mobility for tenants.

6.4%

Sustainability Bonds proceeds financed **six mixed-income properties**, or **6.4%** of all properties backing the Sustainability Bonds, with units affordable to tenants earning at or below 50% AMI and tenants earning above 80% AMI

[31] https://mf.freddiemac.com/docs/Affordable_Housing_in_Areas_of_Concentrated_Poverty.pdf
https://mf.freddiemac.com/docs/acp_case_study.pdf
https://mf.freddiemac.com/docs/mixed_income_pipeline_acps.pdf

Financing Housing in Areas with High Opportunity Characteristics

HOAs are located all over the country and are home to roughly 18% of the population, over 56 million people.[32] These areas, which can provide economic opportunity and economic mobility for residents, are often high-cost areas as they are highly sought after for the benefits they offer. The population and housing demand in these areas increase faster than supply or local policies can accommodate. In our research on HOAs[33], we found five primary indicators of opportunity: access to education, economic growth/jobs, income levels, access to health care and access to transportation. Addressing these factors can foster greater economic mobility and help people achieve positive life outcomes, regardless of their socioeconomic background.

Access to opportunity is not just limited to HOAs. Properties backing our Sustainability Bonds have access to public transportation and are in census tracts that have above-average life expectancy[34], high educational attainment and/or strong income levels for their market.

In 2023, Sustainability Bonds financed **2,145 units** located in **HOAs**

Directing Capital Toward Historically Underserved Markets

Affordable and mixed-income housing in one of the following areas can help direct capital to provide stable, quality housing and become a foundation for economic opportunity.[35]

Number of units financed by Sustainability Bonds proceeds located in Duty to Serve Underserved Markets in 2023:[36]

Deal Type	Rural	High Needs Regions	Persistent Poverty Counties (Rural)	Areas of Concentrated Poverty		High Opportunity Areas		Opportunity Zones
				Qualified Census Tracts	Racially or Ethnically Concentrated Area of Poverty	Qualified Allocation Plan	Difficult Development Area (FHFA)	
ML Total	547	201	150	7,420	1,193	772	1,601	2,902

32 https://mf.freddiemac.com/docs/Affordable_Housing_in_High_Opportunity_Areas.pdf
33 https://mf.freddiemac.com/research/duty-to-serve/20191203-affordable-housing-high-opportunity-areas
34 https://cdc.gov/nchs/data/series/sr_02/sr02_181.pdf
35 See footnote 26
36 See footnote 27

Environmental Impact

of our Sustainability Bonds

Sustainability Bonds are backed by multifamily properties that meet required social impact criteria and may include certain environmental impact features. This combination contributes to the overall sustainability of these properties.

The environmental features include properties:

1) meeting a high level of required energy- and/or water-efficiency building standards;
2) receiving a nationally recognized Green Building Certification;
3) having existing energy- and/or water-efficiency improvements; or
4) that are transit-oriented developments, i.e., located within half a mile of public transportation.

Of the **94 properties** backing the Sustainability Bonds securitizations in 2023, **76** had an environmental impact feature and **10** had more than one feature.

Environmental Impact Indicator	# of Properties Supporting
Building Standards for Energy-Efficiency	0
Green Building Certifications	5
Existing Energy- and Water-Efficiency Improvements	8
Transit-Oriented Development	74

Building Standards for Energy Efficiency

Properties identified as meeting these environmental impact criteria were built to a higher energy standard than properties built to the baseline building standards. Our Sustainability Bonds Framework focuses on recognizing standards that were generally 15% more efficient when compared with the baseline energy standard. While we are not able to project the savings achieved at these properties, studies have shown that higher energy standards have the potential to significantly impact the environmental savings of a property as well as energy cost savings.[37]

Green Building Certifications

Our Framework lists acceptable Green Building Certifications recognized within the industry.[38] Green Building Certifications take a holistic view of sustainability. In addition to focusing on energy and water efficiency, industry-accepted certifications also focus on the impacts of the design, development and operations of the site, with a focus on impacts to the tenants as well as the community. By design, these certifications are focused on improving the sustainability of any property pursuing the certification.

[37] The Department of Energy evaluated the potential savings impacts of energy-efficient building codes and estimates cumulative savings for residential and commercial buildings from 2010-2040 in theamount of $182 billion in energy cost savings and 840 million metric tons of CO2 emissions avoided. For more details see https://www.energycodes.gov/about/results

[38] See the Sustainalytics Second Opinion of our Sustainability Bonds Framework for an in-depth review of the industry-recognized Green Building Certifications: https://mf.freddiemac.com/docs/sustainalytics-2nd-opinion-sustainability-bonds.pdf

Green Certification Property Highlights

Knowles Manor — 3910 Knowles Avenue in Kensington, Maryland

Knowles Manor, securitized in ML-17, is a 94-unit property located in Kensington, Maryland. The property is ENERGY STAR Certified, meaning it has an ENERGY STAR score of 75 or higher on the EPA's 1–100 scale, indicating that it performs better than at least 75% of similar buildings nationwide. This can help lower utility expenses for borrowers and tenants and lower the property's emissions. Additionally, all units are affordable to tenants earning at or less than 60% AMI. The property helps preserve affordable housing through their LIHTC Agreement, which reserves 11 units for tenants earning at or less than 30% AMI and 73 units for tenants earning at or less than 60% AMI. The property is also a transit-oriented development, allowing tenants to easily access public transit. Developments like Knowles Manor are important for fostering sustainable communities and creating more affordable and environmentally friendly places to live.

Existing Energy- and Water-Efficiency Improvements

Our Sustainability Bonds Framework recognizes properties at which energy- and/or water-efficiency improvements have already been made. These properties must meet a minimum amount of expected energy and/or water savings based on the implemented improvements.[39] **Eight properties** that reported savings from existing energy- and water-efficiency improvements are expected to save roughly **31.8%** in whole-building energy usage along with **24.3%** in whole-building water usage based on the reported types of energy- and water-efficiency improvements implemented. These improvements are particularly important given the average year built for properties receiving improvements is **1999**.

The most common improvements implemented at properties include interior and exterior LED lighting, ENERGY STAR certified refrigerators, dishwashers and HVAC systems, and low-flow water fixtures.

[39] See Appendix III: Impact Bonds Reporting Methodology for more details on existing energy- and water-efficiency improvements

Existing Energy- and Water-Efficiency Property Highlights

Westgate Apartments— 5202 La Ventura Drive East in Jacksonville, Florida

Westgate Apartments, securitized in ML-20, is a 168-unit property located in Jacksonville, Florida. The property is subject to a TEL/Bond agreement that requires all units be affordable to tenants earning at or less than 60% AMI. Westgate Apartments recently installed energy- and water-efficiency improvements at the property, which can help lower utility expenses as well as lower emissions. This is particularly important at older properties such as Westgate, which was constructed in 1980. By installing efficiency improvements at this location, affordability is preserved through lowering utility bills for tenants as well as lowering the property's environmental impact on its community.

Transit-Oriented Development

The largest source of GHG emissions in the U.S. are transportation-related, accounting for about 28% of total GHG emissions.[40] Developing properties that encourage alternate transportation can help reduce transportation-related GHG emissions through decreased vehicle-miles traveled, reduced fuel consumption and increased usage of lower impact transit systems. Freddie Mac has defined transit-oriented development as properties located within a half mile of public transportation.[41]

78.7% In 2023, our Sustainability Bonds financed **74 transit-oriented developments** or **78.7%** of all Sustainability Bonds properties financed that year

There are meaningful potential environmental benefits from transit-oriented developments with some transit-oriented developments estimated to have a 35% lower carbon footprint than conventional developments.[42] Additionally, by virtue of being near transit, these properties improve the ability of tenants to access more opportunities, including jobs, education, and other goods and services.

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40 See the EPA, Sources of Greenhouse Gas Emissions, Transportation at https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions in Appendix III

41 See Appendix III: Impact Bonds Reporting Methodology for more details on transit-oriented development

42 Cervero, Robert and Sullivan, Cathleen. Toward Green TODs, August 2010: https://escholarship.org/uc/item/20q8993s

Appendix I: Freddie Mac Overview

Freddie Mac's mission is to provide liquidity, stability and affordability to the U.S. housing market. We interpret that mission expansively to meet the country's broader housing needs by providing affordable, safe, sustainable and equitable housing. In 2016, we added to our core Multifamily business a strong focus on energy- and water-efficiency through our Green Up and Green Up Plus programs. Our programs are continuing to lead the way in the financing of energy- and water-efficiency retrofits in the U.S. rental housing market.

Freddie Mac

Freddie Mac is a government-sponsored enterprise chartered by Congress in 1970, with a mission to provide liquidity, stability and affordability to the U.S. housing market. We do this primarily by purchasing single-family and multifamily residential mortgage loans originated by lenders. In most instances, we package these loans into guaranteed mortgage-related securities, which are sold in the global capital markets, and transfer interest rate and liquidity risks to third-party investors. In addition, we transfer a portion of our credit risk exposure to third-party investors through our credit risk transfer programs, which include securities- and insurance-based offerings. We also invest in mortgage loans and mortgage-related securities. We do not originate mortgage loans or lend money directly to mortgage borrowers.

Since 2008, Freddie Mac has been operating in conservatorship, with FHFA as Conservator. FHFA is also our regulator. The conservatorship significantly affects our business and activities.

Freddie Mac Multifamily

Our Multifamily segment provides liquidity and support to the multifamily mortgage market through a variety of activities that include the purchase, securitization and guarantee of multifamily loans originated by our Optigo® network of approved lenders. Our support of the multifamily mortgage market occurs through all economic cycles and is especially important during periods of economic stress. During these periods, we serve a critical countercyclical role by providing liquidity when many other capital providers exit the market. Central to our mission is our commitment to support greater access to quality, affordable and sustainable rental housing, particularly in underserved markets.

Since 1993, we have provided over $954 billion in financing for approximately 108,000 multifamily properties, representing nearly 12.5 million apartment units. As of December 31, 2023, our multifamily mortgage portfolio comprised $408 billion of securitized mortgage loans, $22 billion of unsecuritized mortgage loans and $11 billion of other mortgage-related guarantees.

Freddie Mac Multifamily Impact Team

Our Impact Initiatives team manages the strategy behind our Impact Bonds offerings. This team carefully prescreens each loan, ensuring it conforms to our frameworks. This team is headed by Luba Kim-Reynolds, who joined Freddie Mac in 2016. Luba spearheaded the strategy behind our Multifamily Impact Bonds offerings, which is a critical component of our Sustainablility strategy. The team also includes Christopher Lopez, a Multifamily capital markets senior associate, who supports Impact Bonds and Impact initiatives.

Appendix II: Our Insights

Multifamily Research

Freddie Mac's Multifamily Research team publishes a wide range of research covering multifamily market conditions and forecasts as well as papers that support our affordable and mission-driven housing goals. Gain market insight into industry trends, forecasts and more at our Research Page.

Multifamily Podcasts

The Multifamily podcast series is hosted by Corey Aber, vice president of Multifamily Mission, Policy & Strategy; Luba Kim-Reynolds, head of Multifamily Investor Relations & Impact Initiatives; and Sara Hoffmann, head of Multifamily Research. The episodes cover many current industry topics, including the affordability crisis, climate impacts, housing preservation, investment opportunities and market trends. Subject matter experts who've joined the show include guests from renter resource organizations, the Mortgage Bankers Association and numerous other institutions to provide their unique insights into the multifamily housing market. The series includes over 90 episodes since 2019 and several of our recent releases are highlighted below.

Claire Kramer-Mills from the Federal Reserve Bank of New York discusses decarbonization of affordable housing in the state and New York City; the impacts of legislation on affordable properties; and the electrification process.

Lisa Brylowski from Brookfield Real Estate helps demystify decarbonization and electrification by explaining how to manage green assets in the commercial real estate space and for multifamily properties.

Whitney Airgood-Obrycki, from the Joint Center for Housing Studies of Harvard University, dives into their rental report to share the state of the rental housing market.

Appendix III: Impact Bonds Reporting Methodology

Green Bonds

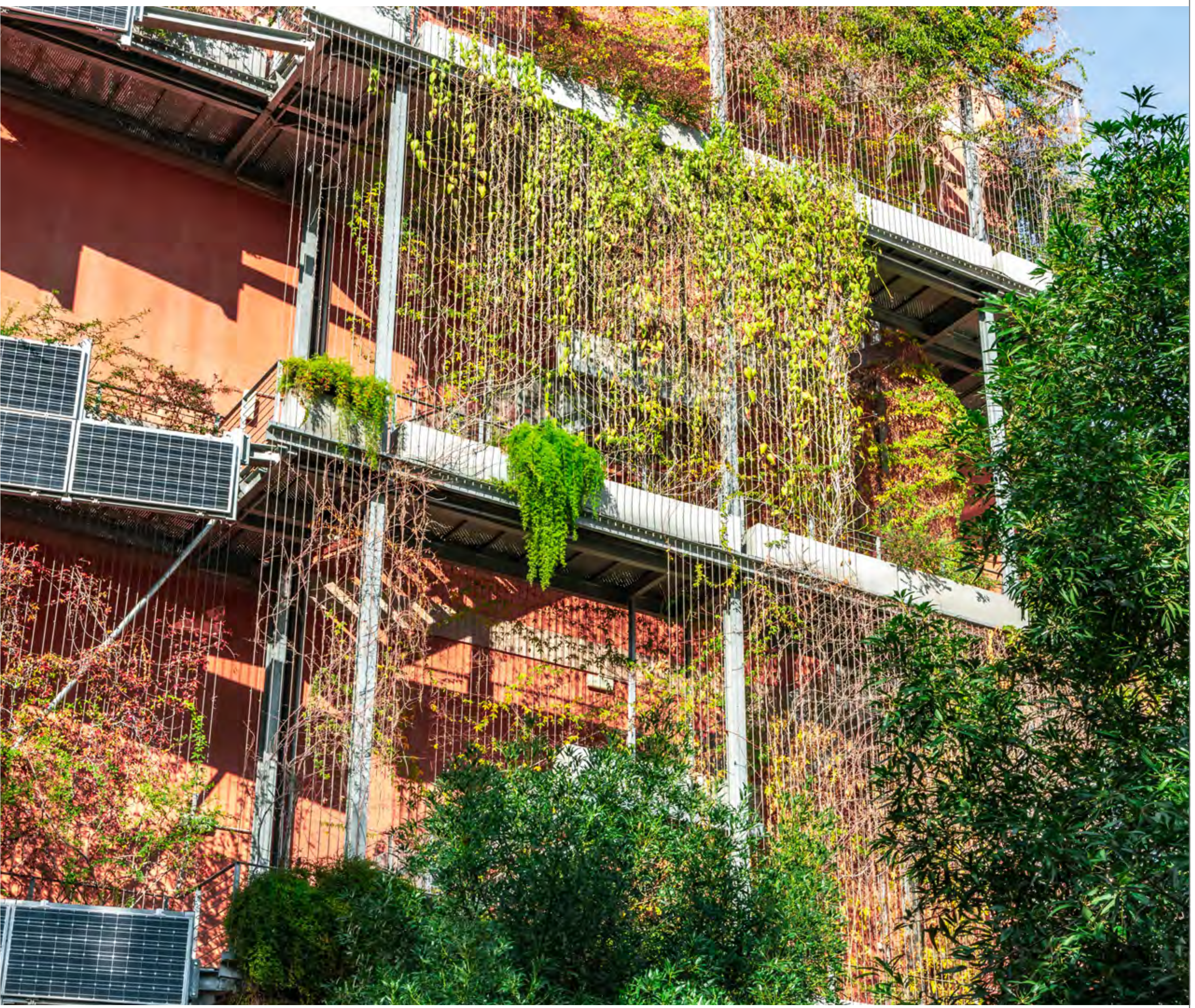
Freddie Mac is committed to reporting the impacts associated with properties financed using our Green Up and Green Up Plus loans. In this report, we provide projected environmental and social impacts based on estimates developed prior to the implementation of the green improvements (ex ante projections). The estimates are based on data collected for each property backing the Green Bonds. Additionally, we have begun to receive actual reported energy and water usage data (Benchmarking Data) that allows for realized savings analysis. See Measurement and Verification section below.

While Freddie Mac Multifamily Green Up and Green Up Plus have provided over $65 billion in financing through loans purchased since program inception in late 2016 through the end of 2023, the population included in this report is specific to Green Bonds issued in 2019 through 2023 backed by Green Up and Green Up Plus loans. For more information on our program-wide impacts, refer to the 2021 Analysis of Green Improvements in Workforce Housing report.

Program Parameters

The Green Up and Green Up Plus program parameters have evolved each year to meet the requirements set by FHFA for green loan treatment related to the multifamily loan purchasing cap. The chart below provides details of the program requirement by year. The type of data used in this impact report typically allows for aggregation across all Green Bonds issued but the shifts in program parameters limit the asset-to-asset level comparisons.

Program Year(s)	Consumption Savings Threshold	Benchmarking Data Consultant	Affordability at Workforce Housing Levels
2016-2017	15% owner-paid, tenant-paid or whole property energy OR water reduction	Not required – borrower or third party could enter Benchmarking Data	Not required
2018	25% whole property energy OR water reduction	Not required – borrower or third party could enter Benchmarking Data	Not required
2019-2023	30% whole property reduction from a MINIMUM 15% energy and 15% energy AND/OR water	Required – borrower must engage prior to loan origination	Required between November 2019 and March 2023. Otherwise not required.



Efficiency Improvement Data from Green Reports

Data analysis was performed by compiling basic property-level information with data from the Green Assessment® or Green Assessment Plus® (both Green Reports) received when a borrower pursues a Green Up or Green Up Plus loan. Basic property-level information is provided by Optigo lenders during loan origination and includes data such as state, county, year built and number of units.

Green Reports

The Green Assessment is a report meeting the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Level I standard with certain additional requirements including the analysis of water performance at the property, the reporting of Portfolio Manager metrics and documentation of existing property conditions. It also includes cost and savings calculations provided through simplified modeling and the use of industry-recognized formulas and standards. The Green Assessment Plus meets all these requirements but also aligns with the ASHRAE Level II protocol, which increases the level of due diligence and analysis required.

The Green Reports are prepared by consultants selected by Optigo lenders and must meet Freddie Mac's qualification requirements (Green Consultants), including having an understanding of the ASHRAE standards and an industry-recognized certification demonstrating proficiency in energy and water audits.

Green Consultants collect a 12-month period of historical utility consumption data for the whole property (common and individual tenant areas) from the property owner and evaluate the building conditions and the performance of equipment, fixtures and systems on the energy and water consumption at the property through rigorous property inspections. If any of the whole-property data is unavailable, Green Consultants must collect all common area and at least 10% of tenant-consumption data. Most commonly, the tenant-paid consumption is unavailable, and, in these instances, Green Consultants will make every effort to obtain the data from local utilities, typically requesting aggregated data. If utility providers do not provide the requested data or do not provide it within the required timeline, Freddie Mac will allow Green Consultants to estimate the missing consumption data based on their experience with other buildings of similar use, size, occupancy, construction and location.

Green Consultants input the historical utility consumption data into ENERGY STAR Portfolio Manager (Portfolio Manager), a free online tool maintained by the EPA. Portfolio Manager produces the ENERGY STAR score, Energy Use Intensity, Water Score and Water Use Intensity of the property. Freddie Mac is given access to this data in Portfolio Manager.

Based on the evaluation of the current property conditions and the historical utility consumption data, Green Consultants create a baseline for property performance and make recommended energy and water conservation measures (EWCM). Borrowers choose which EWCM to implement to achieve increased energy and water efficiency at their property. Green Consultants document all results in the Form 1106 and deliver completed Green Reports to Optigo lenders who transmit them to Freddie Mac during the loan due diligence process. We collect the data contained within the Form 1106 through an automated process and use it for our analysis.

Data Quality Framework

Beginning in 2018, Freddie Mac Multifamily engaged WegoWise in a series of projects to create a framework for our data collection and reporting practices. Those projects built the foundation for performing actual savings analysis on properties receiving the energy- and water-efficiency improvements.

Our initial engagement with WegoWise was set up to analyze, at the time, a 10% sample of the overall portfolio to understand the quality of the data received from the Green Reports. That analysis focused solely on historical consumption data provided by the borrowers and entered in Portfolio Manager by the Green Consultants. WegoWise used their own internal data collection practices, developed through its extensive experience benchmarking over 70,000 buildings, to create a data quality assessment framework. Using the framework to evaluate the sample set of properties, the data quality assessment found the data acceptable for ongoing savings analysis and provided recommendations for data quality improvements.

In response to the recommendations made from the initial data quality assessment, Freddie Mac Multifamily worked with WegoWise to develop a Benchmarking Data Collection Best Practices Guide to create more consistent data collection throughout the entire loan process and to produce higher quality data and reports. We have worked to implement these best practices through adjustments to our loan agreements, requiring the collection of both energy and water data, regardless of the type of improvements (energy or water) being implemented at the property. We also require the collection of a minimum of 10% of tenant data. For Green Up loans originated in 2019 and beyond, we require the borrower to engage a third-party data collection firm to collect, input and monitor the Benchmarking Data. We also provided general and individualized training to our servicers along with resources such as on-demand instructional videos for the annual reporting process.

The final aspect of our data quality framework was developed through our multiple engagements with WegoWise to perform M&V analysis. As part of the M&V analysis process, we evaluate the submitted Benchmarking Data against data quality indicators as an initial data quality assessment. WegoWise then performs an additional, more in-depth assessment of the data to ensure completeness and data quality to determine suitability for further M&V analysis.

Environmental and Social Impacts

The expected environmental and various social impacts are based on Green Consultant estimates developed prior to the implementation of the EWCM. Those estimates include:

- Projected annual consumption savings figures for both energy and water
- Projected annual tenant cost savings in U.S. dollars ($)
- Projected annual owner cost savings in U.S. dollars ($)
- Projected cost of equipment and labor to install improvements in U.S. dollars ($)

GHG emissions projections are calculated within the Form 1106 following the Portfolio Manager methodology.[43] Green Consultants break out the energy-consumption savings by the fuel type used at the property (e.g., electricity, natural gas, etc.), which is then converted to a standard common unit, kBtu, using conversion factors published by Portfolio Manager.[44] This allows consumption from all fuel types to be aggregated into one site energy-consumption savings figure. Using this site energy-consumption value, emissions factors are applied to produce the GHG emissions projections for the property.

[43] https://www.energystar.gov/buildings/tools-and-resources/portfolio-manager-technical-reference-greenhouse-gas-emissions
[44] https://www.energystar.gov/buildings/tools-and-resources/portfolio-manager-technical-reference-thermal-conversion-factors

Measurement and Verification (M&V) Analysis

There are varying approaches for determining actual savings for energy or water projects. The most widely accepted framework is defined by the Efficiency Valuation Organization (EVO), which publishes the International Performance Measurement and Verification Protocol (IPMVP). IPMVP defines four M&V options (A-D) for determining savings depending on the property, project and reporting needs.

M&V Approach	Explanation	Savings Calculations
Retrofit Isolation – IPMVP Options A & B	Considers only the affected equipment or system independent of the rest of the property through ongoing measurements taken at the equipment level	Engineering calculations of baseline and reporting-period utility usage based on measured and estimated values; ongoing utility benchmarking not required
Whole Facility – IPMVP Option C	Considers the total energy use and de-emphasizes specific equipment performance using continuous measurement of utility usage during baseline and post-retrofit periods	Analysis of baseline and reporting-period utility data using regression analysis to correlate usage with independent variables such as weather and occupancy
Simulation Software – IPMVP Option D	Builds simulation models showing energy performance of a whole facility calibrated with actual billing data and requiring engineering expertise	Comparison of simulation of the performance period to the period of the utility data

For the M&V analyses, WegoWise followed Option C of IPMVP along with the ASHRAE Guideline 14- 2014 by using the Whole-Building Performance Approach. This approach compared pre-retrofit or baseline data with post-retrofit data. Our aim was to obtain the highest quality Benchmarking Data which will include at least 12 months of both pre- and post-retrofit whole-property consumption and cost data, provided in monthly increments for each utility type (electric, gas, water, etc.). The whole-building data should also allocate usage and cost based on who pays for the utility, the owner or the tenants. Given our requirements for data collection and reporting have evolved over time, not all data provided includes the above factors but still met the thresholds for inclusion in the savings analysis. Additionally, our Benchmarking Data Collection Guide provides the best practices for collecting the data and alternative approaches when the best practices cannot be followed.

The amount of post-retrofit property data available ranged from a minimum of six months to a maximum of 44 months. When the data was provided in monthly intervals, it allowed for regression analysis to be used to correlate energy or water use with weather and allowed for adjustments to be made for seasonal variations. Data provided in a yearly interval prevented weather normalization, but analysis was still made through a year-over-year comparison.

WegoWise completed energy M&V analyses on a combination of owner-paid, tenant-paid or whole-building data depending on the data provided to Freddie Mac at each property. The M&V analysis may not always represent the entire property's consumption and cost. For instance, if owner-paid electric usage was only provided, the percentage savings calculated would only represent the owner-paid savings and not savings across the entire property. The accompanying dataset provides this property-level detail including the energy savings coverage and total cost savings fuel coverage. The savings coverage specifies the area of the property (owner/common areas or whole property) and utility for which the M&V analysis was performed. The utilities analyzed include water, electric only, gas only, or both electric and gas (energy).

WegoWise used all available post-retrofit data for each property to determine both cumulative consumption and cost savings and also average annual savings. In cases where utility data was not reported, WegoWise estimated costs using billing rates provided in the baseline data or the Green Reports. If the cost data was unavailable from these sources, the costs were estimated using publicly available rate information for the property's utility company.

For water M&V analysis, the data received was generally whole-building data as most properties are master-metered. This is helpful in obtaining whole-building consumption data but prevents understanding the usage between the owner and tenant. Water costs arrangements can vary but an industry standard Ratio Utility Billing System (RUBS) split between owner and tenants was used to allocate cost savings between owner and tenant. WegoWise used a split of 15% allocated to the owner and the remaining 85% allocated to the tenants.

Metered energy data (electric and gas) is typically tenant-paid, making it more challenging to obtain. As a result, the energy M&V analysis more often had tenant data missing. If tenant data was missing, tenant savings could not be calculated for the property. When tenant data was unavailable, the overall cost savings would still be calculated but the cost savings would not be allocated between owner and tenant. When tenant data was provided, this allowed for tenant-specific savings analysis to be performed. Given these limitations, the actual cost savings can vary from the projections provided for the baseline figures.

Data challenges exist in multifamily properties that may impact the results of the savings analysis. Some properties did not realize the expected savings based on their reported data while other various data challenges prevented a small number of properties from being able to produce an accurate, reliable M&V report. Challenges impacting reporting included:

1. Data challenges:
   a. Availability of tenant data
   b. Lack of reported data
   c. Not enough post-retrofit data
   d. Inaccurate estimated data (baseline or post-retrofit data)
   e. Single datapoint for annual energy or water usage

2. Rate increases or fixed costs remain high

3. Equipment issues: Incorrectly installed, tenants' removal/tampering

4. Usage variations: Behavioral or occupancy changes at the property, new amenity installed, energy/water spikes

We have worked to improve the challenges inherent in collecting and reporting multifamily utility data as described in the Data Quality Framework section. While we have seen improvements each year, we will continue evaluating and implementing ways in which we can improve these results.

Data Review

The data used in this report was checked for missing data elements and reasonable cost and savings estimates. The Green Report data is also reviewed at underwriting to check for accurate property information and to check that figures in the Green Reports meet program requirements. Where possible, anomalies or errors were corrected; where correction was not possible, where data was not provided or where data was not available, an N/A is listed in the associated property-level data available in the Multifamily Securities Investor Access tool. However, we are not responsible for and do not guarantee the accuracy or validity of any data from the Green Reports provided to Freddie Mac Multifamily and used in developing the property-level dataset. The dataset or the reported existing energy- and water-efficiency improvements should not be viewed as projections, forecasts, predictions or opinions with respect to value. The dataset is intended for general information and should not be used for financial reporting, accounting reporting or investment decisions. The dataset should not be construed as an effort to sell or the solicitation of any offer to buy any security in any jurisdiction where such offer of solicitation would be illegal.

Contact Us

For additional information, please contact the Freddie Mac Multifamily Investor Relations team at MF_CM_InvestorRelations@freddiemac.com.

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