

Impact Bonds Report 2022





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“Housing plays a critical role in fostering stable and sustainable communities. The challenges facing affordable housing puts this core component of our society at risk.”

Supporting quality, sustainable and affordable rental housing through all economic cycles is a central tenet of Freddie Mac’s Multifamily business. And our continued presence in the market throughout its recent volatility once again

demonstrates our commitment to support liquidity, stability and affordability.

Our Impact Bonds are integral to this commitment. Through these offerings, we provide investors with an opportunity to support housing affordability as they pursue their environmental, social and sustainability goals. Since 2019, we have issued over \$15 billion in Impact Bonds, all of which adhere to a set of defined frameworks and provide support for these important objectives, while keeping in mind the needs of stakeholders.

During times of market turbulence, access to liquidity is critical. One of the goals of our Social Bonds is to better support social impact institutions, such as community development financial institutions, housing finance agencies and small financial institutions. These institutions need more support in economic downturns so they can continue addressing affordability housing challenges in their respective, often underserved communities. One notable example from 2022 was a \$92.8 million Social Bonds transaction supporting over 1,500 units across four seniors housing properties in Arizona. More than half of the units were affordable to seniors with incomes at or below 50% of area median income. Transactions like these are important, because there is an acute shortage of rental housing for low- to moderate-income seniors who are on fixed incomes and struggle to keep up with inflation.

In addition to supporting safe and affordable housing for renters, we also continue to focus on how to best meet the needs of our investors. Throughout the past year, there has been increased demand and regulatory pressure for more disclosure in impact investing. We understand the importance of transparency to our investors and have responded accordingly. We began including borrower savings realized from energy- and/or water-efficiency improvements with this year’s report. This is just the first step toward increased transparency, and we look forward to sharing more in the future.

We’re proud of the impact we’ve achieved to date, but there’s still more work ahead. The affordable housing crisis continues as supplies tighten and costs rise.

Despite these obstacles, we are well positioned to continue producing innovative solutions, like our Impact Bonds program, that both support sustainable multifamily housing and meet investor demand.

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 interpret that mission expansively to meet the country’s broader housing needs by providing equitable access to affordable and sustainable housing. In 2022, this included integrating ESG strategies into our business and operations, which we accomplished through four pillars. These pillars are informed by a robust materiality assessment completed in 2020 to identify and prioritize ESG issues of importance to our stakeholders, long-term business and mission. We revisit this materiality assessment on a regular basis, and will do so in 2023. As of 2022, our pillars were as follows:



Purpose

Mission: Deliver solutions to meet the country’s housing needs in good times and bad, promoting greater access to affordable and sustainable homes and rental properties

- Address longstanding issues of inequity in housing
- Provide liquidity, stability and affordability to the housing market, particularly in underserved communities across the country



Planet

Climate: Promote environmentally sustainable single-family and multifamily housing to help reduce climate-related risks and increase affordability

- Attract impact capital to the housing market
- Increase resilient, efficient and environmentally sustainable housing



People

Diversity, Equity, and Inclusion: Develop our future workforce and strengthen the housing market through diversity, equity, and inclusion (DEI)

- Build greater DEI at Freddie Mac
- Promote DEI among our partners and suppliers throughout the industry and community



Practices

Sustainable Operation: Provide stability to the housing industry through outstanding risk management

- Further integrate sustainability in our business and operations
- Reduce carbon emissions from our operations

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, the 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 that relates to certain environmental or social challenges. We have strict criteria and detailed prescreening procedures for each offering.



Green

Environmental impact in workforce housing

\$5.0 Billion

of total issuance as of December 2022



Social

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

\$4.6 Billion

of total issuance as of December 2022



Sustainability

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

\$5.4 Billion

of total issuance as of December 2022



“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 and Environmental Finance 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 526 million gallons of water per year — the equivalent of filling the Lincoln Memorial Reflecting Pool in Washington, D.C., 78 times¹ or the annual water usage for over 5,767 households across America²



Energy reductions are projected to save over 390 million kilobtus (kBtu) per year — enough energy to power over 10,776 homes³



Annual greenhouse gas (GHG) emissions are projected to decrease by 32,188 metric tons — the equivalent of removing 7,163 cars from the road for one year or carbon sequestered by 532,231 tree seedlings grown for 10 years⁴

SOCIAL IMPACT

Impact Bonds Proceeds Financed:



45.9%

73,142 or **45.9%** of the units backing the Impact Bonds are affordable to tenants earning at or below 50% area median income (AMI)



69.5%

110,627 or **69.5%** of the units backing the Impact Bonds are affordable to tenants earning at or below 60% AMI



90.6%

144,235 or **90.6%** of the units backing the Impact Bonds are affordable to tenants earning at or below 80% AMI



51.7%

82,341 or **51.7%** of the units backing the Impact Bonds are located in areas where 25% or more people 25 years old or older have at least a bachelor's degree, and **22,801** or **14.3%** of the units are located in areas where the population with at least a bachelor's degree is at least 1.5x higher than the national average⁵



36.3%

57,798 or **36.3%** of the units backing the Impact Bonds are located in areas where life expectancy is at or above the national average⁶, and **40,500** or **25.4%** of the units are located in areas where life expectancy is at or above 80 years old

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 2022 is 2.5 people (<https://www2.census.gov/programs-surveys/demo/tables/families/time-series/households/hh4.xls>)

³ In 2021, the average annual electricity consumption for a U.S. residential utility customer was 10,632 kilowatt-hours (kWh), an average of about 886 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>

⁵ The national average for people who are 25 years old or older with at least a bachelors degree is 33.7% of the related population (<https://data.census.gov/table?q=S1501&tid=ACSST5Y2021.S1501>)

⁶ The 2019 national average is 78.8 (https://www.cdc.gov/nchs/data/factsheets/factsheet_NVSS.pdf)

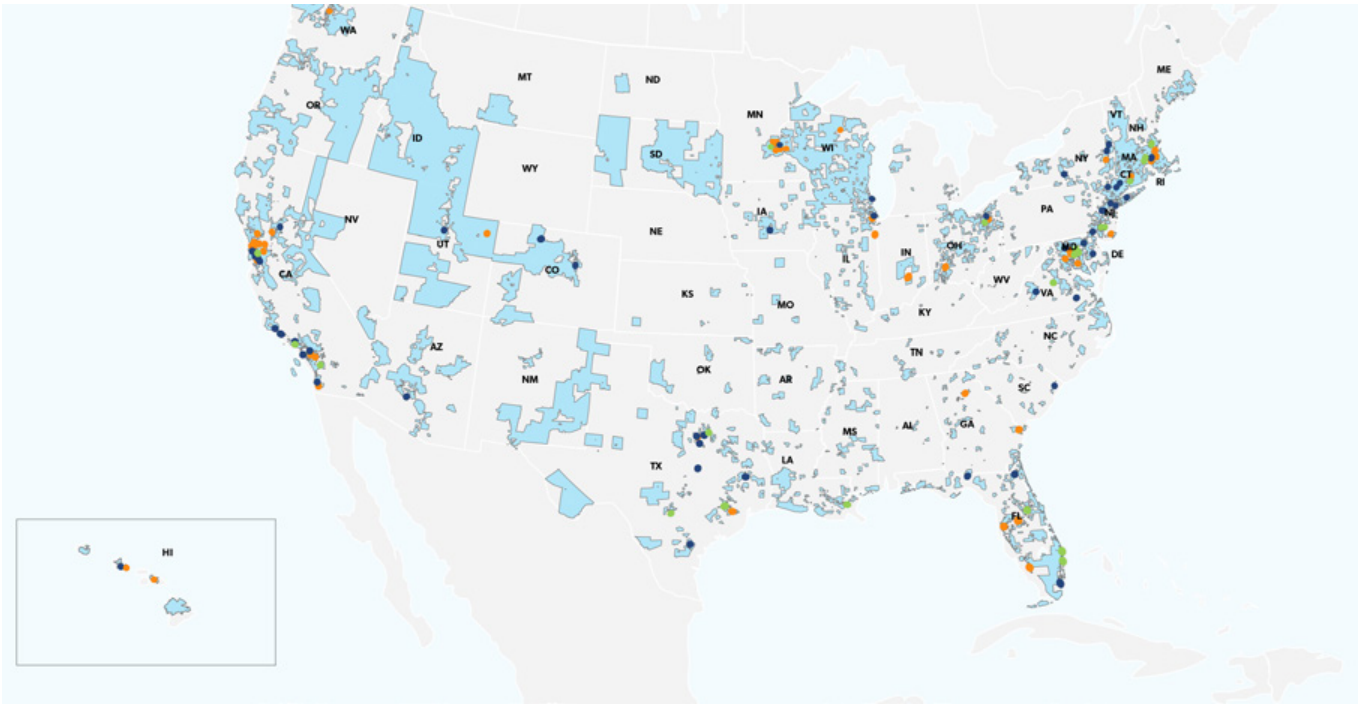
Financing in High Opportunity Areas

Freddie Mac uses the definition of High Opportunity Areas 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, a High Opportunity Area is an area designated as a Difficult Development Area (DDA) by the U.S. Department of Housing and Urban Development or designated as a High Opportunity Area 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 High Opportunity Areas). 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 High Opportunity Areas. 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 137 properties with 20,874 units located in High Opportunity Areas



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



Industry Partnerships

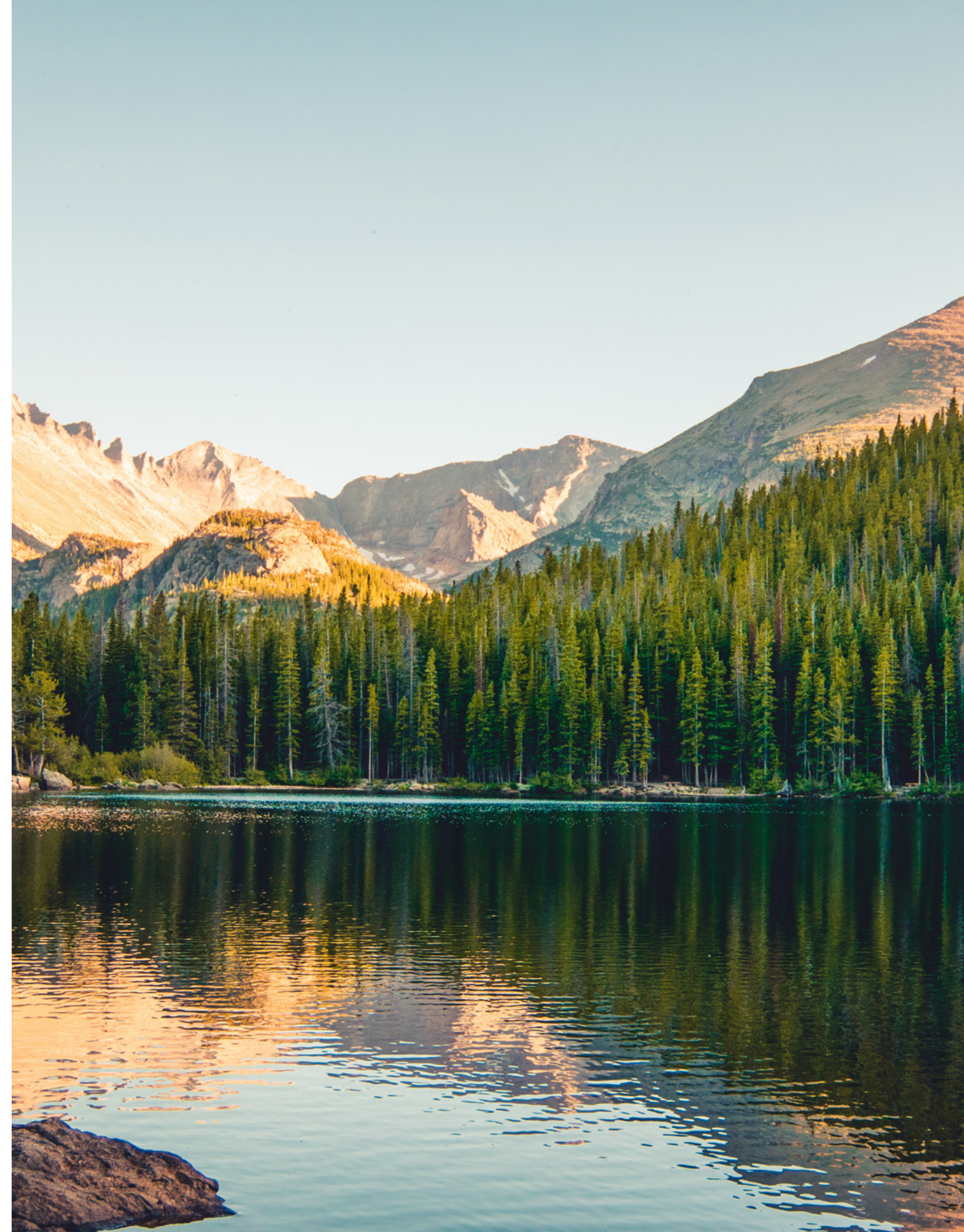


Nasdaq launched the [Sustainable Bond Network](#) in December 2019. Freddie Mac Multifamily is a member of its advisory board and is dedicated to the success of the initiative. Together, we are working to help develop products that are environmentally and socially sustainable.



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.

Freddie Mac has been an ENERGY STAR partner since 2014. Through our K-G series and Multi PCs®, our Green Bonds consolidate all utility data into the ENERGY STAR Portfolio Manager® system to track properties' ongoing energy and water performance.



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 Freddie Mac Multifamily Green Bonds program backed by loans financing 30% energy/water efficiency improvements with a minimum of 15% energy reduction. Since then, we have been an important capital provider to improve workforce housing.

2022 ENVIRONMENTAL IMPACT



Water improvements are projected to save over 41 million gallons of water per year — the equivalent of filling the Lincoln Memorial Reflecting Pool in Washington, D.C., six times⁷ or the annual water usage for over 453 households across America⁸



Energy reductions are projected to save over 31 million kBtu per year — enough energy to power over 873 homes⁹



Annual GHG emissions are projected to decrease by 3,266 metric tons, the equivalent of removing 727 cars from the road for a year or carbon sequestered by 54,004 tree seedlings grown for 10 years¹⁰

2022 SOCIAL IMPACT



94.0% of units are affordable to families earning at or below **80% AMI**



Improvements are projected to **save tenants an average of \$255 per unit annually through lower utility costs**



886 units are located in **High Opportunity Areas**

Please refer to Appendix III on page 57 for a description of our impact reporting methodology.

⁷ See footnote 1

⁸ See footnote 2

⁹ See footnote 3

¹⁰ 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 \$5.0 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
Total		\$5,043.7	



In 2021, [CICERO](#) 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, “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 securitizations are making a measurable impact on the environment.



2022 Projected Energy Consumption Savings of Green Bonds

Green Bonds proceeds financed energy improvements that are projected to save **over 31 million kBtu per year**. This equates to enough energy to power **over 873 homes**.¹¹ On average, each Green Up/Green Up Plus loan is projected to reduce the property energy usage by **6,794 kBtu per unit per year**, which is enough energy to provide lighting for an average household for two years.¹²



2022 Projected Water Consumption Savings of Green Bonds

Green Bonds proceeds financed water improvements that are projected to save **over 41 million gallons of water per year**, which is the equivalent of filling the Lincoln Memorial Reflecting Pool in Washington, D.C., **six times**¹³ or the annual water usage for **over 453 households**¹⁴ across America. On average, each Green Up/Green Up Plus loan is projected to reduce the property water usage by **8,660 gallons of water per unit per year**, which is the equivalent water usage for **over 376 loads of laundry per unit per year**.¹⁵

The water consumption savings will help reduce strain on the country’s aging water infrastructure that is projected to require billions of dollars for future maintenance and improvements.¹⁶ 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.¹⁷ 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.¹⁸ Water consumption savings will help reduce the water bills of property owners and tenants, helping to lessen the impact of the increased water bills.

¹¹ See footnote 3

¹² <https://www.eia.gov/todayinenergy/detail.php?id=38452>

¹³ See footnote 1

¹⁴ See footnote 2

¹⁵ We assume a standard washing machine uses on average 23 gallons of water per load (<https://www.epa.gov/watersense/start-saving>)

¹⁶ See results from the EPA’s 6th Drinking Water Infrastructure Needs Survey and Assessment available at https://www.epa.gov/sites/default/files/2018-10/documents/corrected_sixth_drinking_water_infrastructure_needs_survey_and_assessment.pdf

¹⁷ <https://www.bluefieldresearch.com/ns/up-43-over-last-decade-water-rates-rising-faster-than-other-household-utility-bills/>

¹⁸ <https://www.mckinsey.com/industries/electric-power-and-natural-gas/our-insights/us-water-infrastructure-making-funding-count>

Green Bonds Measurement & Verification

Freddie Mac’s commitment to transparency and reporting is at the core of our ESG 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).¹⁹ Please reference the Green Bonds M&V tab in the 2022 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, **22 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 15 properties receiving an energy M&V analysis, **11 of those properties** realized positive savings compared with their reported baseline utility usage prior to improvements. The average energy-efficiency improvement across these **11 properties** was **15.9%**



Out of 19 properties receiving a water M&V analysis, **12 of those properties** realized positive savings compared with their reported baseline utility usage prior to improvements. The average water-efficiency improvement across these **12 properties** was **18.2%**

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 challenges²⁰ 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. For more details on the impact energy-/water-efficiency improvements had at select properties, please reference our [2022 Impact Bonds Report Viewpoint](#).

¹⁹ See Appendix III: Impact Bonds Reporting Methodology for more details on the M&V analysis
²⁰ 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



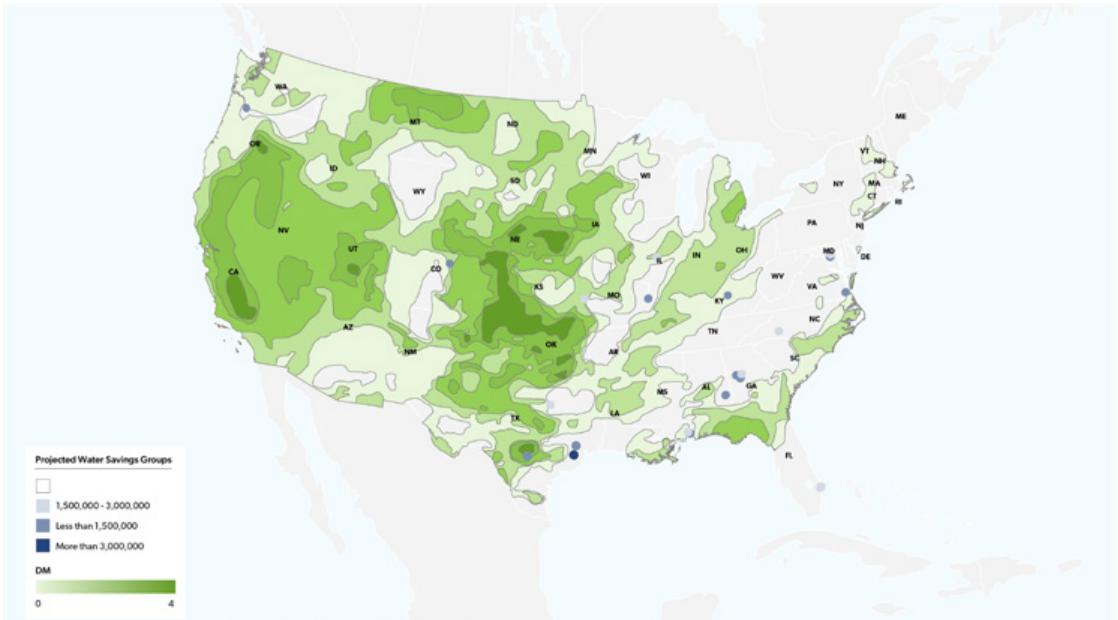
Targeted Benefits of Green Improvements

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.

2022 Environmental Impact in Areas Experiencing Drought

The map below sets forth the location of properties that were securitized via a K-G Deal in 2022, relative to the intensity of areas experiencing drought as of December 27, 2022.

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>

Recently, the southwest North American region is experiencing its worst drought in 1,200 years and several of the country’s reservoirs have reached their lowest levels on record due to drought conditions.²¹ Many other areas of the country are also experiencing shorter-term (typically less than six months) drought conditions.²² **Six properties**, representing **\$88 million** or **18.2%** of the total 2022 Green Bonds proceeds, are in areas that were experiencing drought or were abnormally dry. The properties in those areas are projected to save over **7 million gallons** of water annually. These are critical savings in drought-prone areas. **One** of the six properties in those areas is projected to save more than **2 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.²³



²¹ <https://news.climate.columbia.edu/2022/02/14/megadrought-in-southwest-is-now-the-worst-in-at-least-1200-years-study-confirms/>

²² See U.S. Drought Monitor provided by the National Integrated Drought Information System: <https://droughtmonitor.unl.edu/Maps/MapArchive.aspx>

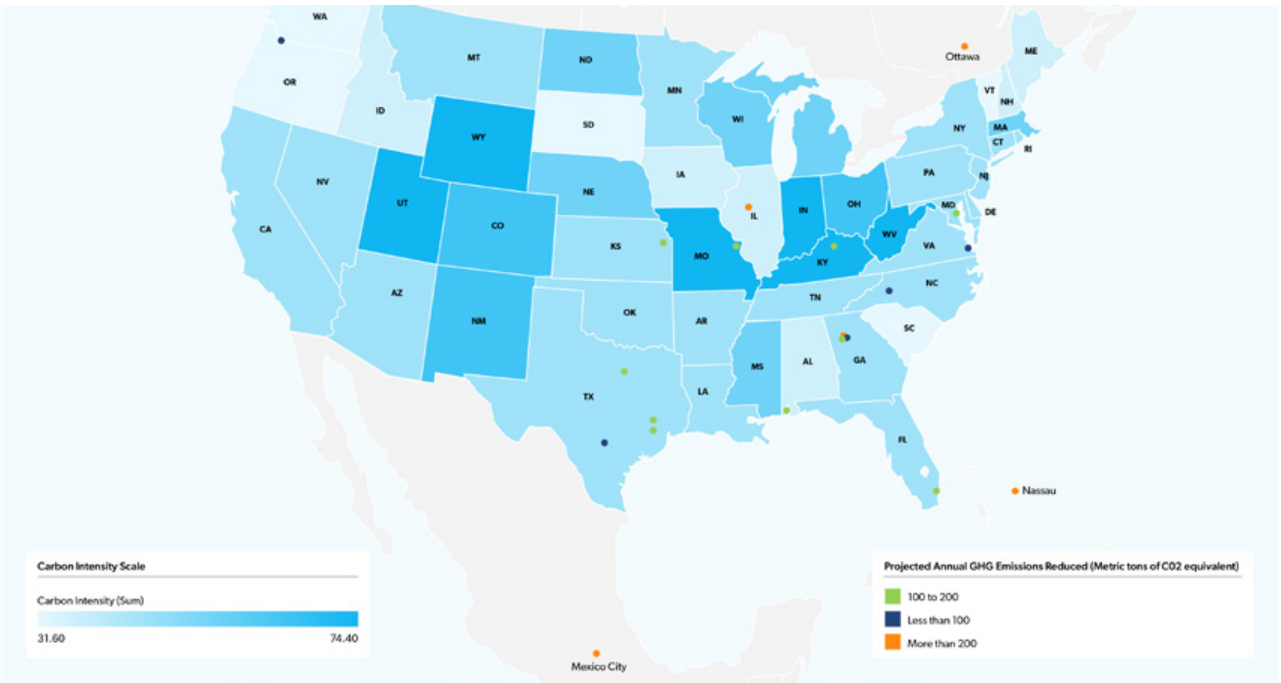
²³ Reference the Government Accountability Office study (<https://www.gao.gov/assets/670/663344.pdf>) or more information at the following EPA webpage: <https://www.epa.gov/watersense/how-we-use-water>

2022 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 (CO₂) emissions.

The map below shows the location of properties backing the 2022 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.

2022 Green Bonds Property Location Relative to Carbon Intensity of Energy Supply



Source: Freddie Mac tabulation of 2020 U.S. Energy Information Administration (EIA) Energy-Related Carbon Dioxide Emissions by State data, <https://www.eia.gov/environment/emissions/state/excel/table6.xlsx>

Eight properties, representing **over \$211 million** or **43.6%** of the total 2022 Green Bonds proceeds, are in states with an energy supply carbon intensity that is above the national average of **49.5 kilograms²⁴ of CO₂ per million Btu (kg CO₂/MMBtu)**. The properties in those areas that installed energy improvements are projected to save **991 metric tons of CO₂ annually**. **Five properties** located in those states are projected to save more than **100 metric tons of CO₂ 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 **3,266 metric tons**. This is equivalent to the same amount of CO₂ as removing **727 cars²⁵** from the road for one year.


²⁴ <https://www.eia.gov/environment/emissions/state/excel/table6.xlsx>

²⁵ 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 High Opportunity Areas and across different property types.



2022 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 **\$255 per unit per year**. In-depth data analysis shows **26.9%** of tenants are projected to save between \$100-\$200 per year, **38.5%** of tenants between \$200-\$300 per year and **30.8%** of tenants are projected to save \$300 or more per year.

2022 Utilities Savings in Areas of High Electric Utility Costs

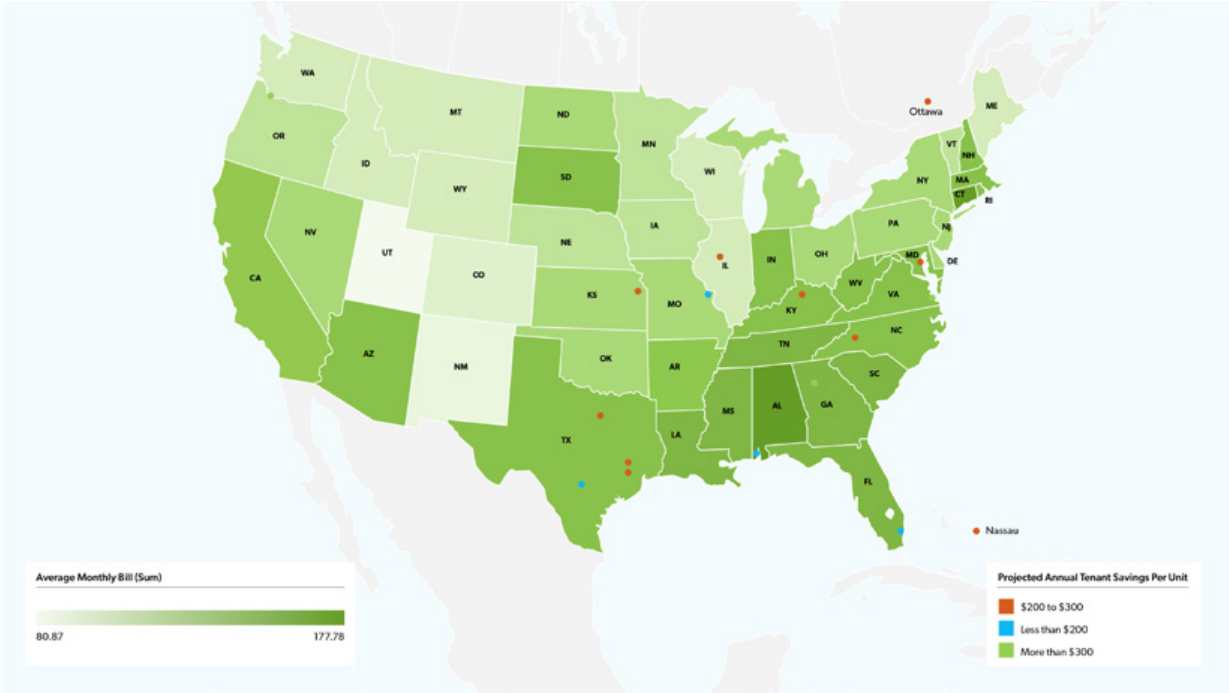
Nearly one-third (31%) of all multifamily households nationwide report some type of energy insecurity, such as forgoing or reducing necessities like food and medicine to pay an energy bill or keeping their home at an unhealthy or unsafe temperature.²⁶ Savings from green improvements help families reduce their energy consumption costs, allowing them to allocate additional funds to other necessities.

The following map shows the average monthly electric utility bills 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 \$121 per month²⁷. By comparison, the average electric utility bill for states with the most expensive electric bill is \$140 per month, or almost 16% higher than the national average. We found that approximately **14** or **54%** of properties backing Green Bonds in 2022 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 **seven** or **50%** 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 **\$79 per unit per year**. Tenants are projected to save an average of **\$255 per unit per year**, which is more than two months of the national average electric bill.

²⁶ 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>)

²⁷ https://www.eia.gov/electricity/sales_revenue_price/xls/table5_a.xlsx

Green Bonds Property Location Relative to Average Monthly Electric Bill



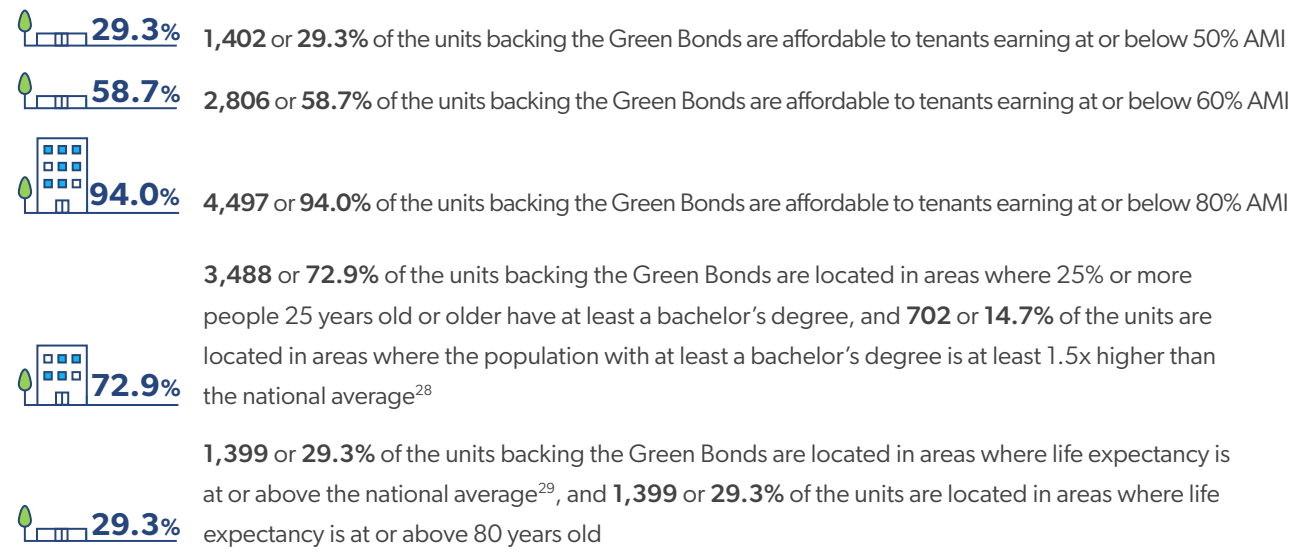
Source: Freddie Mac tabulation of 2021 U.S. EIA Residential Energy Consumption Survey data, https://www.eia.gov/electricity/sales_revenue_price/xls/table5_a.xlsx

Financing Workforce Housing

Fundamentally, 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. These individuals may be aspiring homebuyers or renters who, as the missing middle, 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.

Green Bonds Proceeds in 2022 Financed:



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.

Number of units financed by Green Bonds proceeds located in Duty to Serve Underserved Markets in 2022:³⁰

Deal Type	Rural	High Needs Regions	Persistent Poverty Counties (Rural)	Qualified Census Tracts	Racially or Ethnically Concentrated Area of Poverty	Qualified Allocation Plan	Difficult Development Area	Opportunity Zones
K-G	160	0	0	1,219	0	702	886	296
Total	160	0	0	1,219	0	702	886	296

²⁸ See footnote 5

²⁹ See footnote 6

³⁰ 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, affordable and workforce housing challenges 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 (HFAs)
 - Small Financial Institutions (SFIs) 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)
 - Minorities, Women and Disabled Individuals-Owned Borrowers (MWD OB)
 - 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 \$4.6 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	
Total		\$4,581.1	



2022 Social Impact

Of the units financed with Social Bonds proceeds in 2022, **51.7%** of units are affordable to families earning at or below **50% AMI**

Affordability of Units in 2022

# 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
7,132	12,120	19,378	21,892

Underserved Populations in 2022³¹

Underserved Population	# of Loans Supporting
Disabled	18
Seniors/Aging Population	36
Transitional	3



³¹ 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.html>

2022 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 <https://www.hud.gov/RAD>.



2,729 units financed by Social Bonds proceeds were with **RAD**

2022 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.

Number of units financed by Social Bonds proceeds located in Duty to Serve Underserved Markets in 2022:³²

Deal Type	Rural	High Needs Regions	Persistent Poverty Counties (Rural)	Qualified Census Tracts	Racially or Ethnically Concentrated Area of Poverty	Qualified Allocation Plan	Difficult Development Area	Opportunity Zones
Q	204	0	0	1,455	688	120	39	1,302
M	0	0	0	463	320	0	0	0
P (PC REMIC)	0	0	0	415	0	0	0	305
Multi PCs	1,098	0	148	5,836	3,001	1,152	1,062	1,861
Total	1,302	0	148	8,169	4,009	1,272	1,101	3,468

³² See footnote 30



2,020 of the units financed by Social Bonds are located in High Opportunity Areas with **95.1%** of these units being affordable to tenants earning at or below **80% AMI**



10,828 or **46.2%** of the units backing the Social Bonds are located in areas where 25% or more people 25 years old or older have at least a bachelor’s degree, and **4,890** or **20.9%** of the units are located in areas where the population with at least a bachelor’s degree is at least 1.5x higher than the national average³³



8,325 or **35.5%** of the units backing the Social Bonds are located in areas where life expectancy is at or above the national average³⁴, and **5,038** or **21.5%** of the units are located in areas where life expectancy is at or above 80 years old

³³ See footnote 5

³⁴ See footnote 6



P-013 Deal Spotlight

P-013 was an issuance of \$92.8 million in Social Bonds supporting more than 1,500 units across four seniors housing properties in Arizona. More than half of the units are affordable to seniors with incomes at or below 50% of AMI according to Freddie Mac’s affordability guidelines.

The loans originated by Berkadia Senior Housing & Healthcare are for properties owned by Christian Care, which is the largest provider of nonprofit seniors housing and health care services in Arizona. Christian Care focuses on providing housing for low- and moderate-income seniors.

“Freddie Mac is committed to supporting affordable multifamily seniors housing through this social bond issuance,” said Robert Koontz, senior vice president of Freddie Mac Multifamily Capital Markets. “We continue to use our innovative execution paths to support our affordable housing mission and provide investors the opportunity to do so as well.”

“Freddie Mac is thrilled to provide financing that supports affordable housing for more than 1,500 Arizona seniors,” said Kathy Ryser, senior director of Underwriting for Freddie Mac’s Multifamily Seniors Housing team. “This work aligns directly with our mission and helps meet a tremendous need in the market.”

In accordance with our Social Bond Framework, proceeds of Freddie Mac’s Social Bonds are used either to provide liquidity to social impact financial institutions for financing of affordable housing or to finance multifamily properties originated by the Freddie Mac Multifamily Optigo® network that are affordable to an underserved population. Institutions receiving liquidity and properties financed from Social Bonds proceeds are expected to foster various socioeconomic opportunities for residents and their communities, in addition to providing affordable housing to low- to moderate-income families.

- 19.2%** P-013 proceeds financed properties with **301** or **19.2%** of the units affordable to tenants earning at or below **30% AMI**
- 51.6%** P-013 proceeds financed properties with **809** or **51.6%** of the units affordable to tenants earning at or below **50% AMI**
- 59.2%** P-013 proceeds financed properties with **929** or **59.2%** of the units affordable to tenants earning at or below **60% AMI**
- 73.0%** P-013 proceeds financed properties with **1,145** or **73.0%** of the units affordable to tenants earning at or below **80% AMI**

In spring 2023, this transaction was recognized by *Environmental Finance*, an online news and analysis service that reports on sustainable investment, green finance and companies active in the environmental market.



P-013 Properties Highlights

Fellowship Square Historic Mesa — 35 West Brown Road in Mesa, Arizona



This property is located in Mesa just 19 miles east of Phoenix. Per Duty to Serve, Mesa is considered an Area of Concentrated Poverty (ACP). An ACP is defined as an area in a Qualified Census Tract (QCT) or a Racially or Ethnically Concentrated Area of Poverty (R/ECAP). This means that this area has a significant concentration of poverty and minority populations. Of the 415 units, more than 20% are reserved at 30% AMI and more than 50% are reserved at 50% AMI, supporting both very and extremely low-income levels. This property helps alleviate the great need for affordable seniors housing, especially in underserved communities.

Fellowship Square Phoenix and The Oasis — 2002 West Sunnyside Avenue in Phoenix, Arizona



The 305-unit, affordable, garden-style seniors housing facility located in Phoenix comprises assisted living and memory care for the aging population of Maricopa County. The property’s average rents are well below the market for both independent and assisted living (IL and AL, respectively). Further, 59% of the property’s units are reserved at 50% AMI, supporting those with very low-income levels. Just over 15% are reserved for those with extremely low-income at 30% AMI. Fellowship Square Phoenix and The Oasis is located in a designated Opportunity Zone, playing an important role in economic development and job creation.

Fellowship Square Tucson and The Oasis at Fellowship Square Tucson — 8111 East Broadway Boulevard in Tucson, Arizona



Fellowship Square Tucson and The Oasis at Fellowship Square Tucson is a 612-unit affordable seniors housing facility located in Tucson that has completed three renovations since 2000. The property’s IL rent is 51% less than the average IL rent in the Tucson metro and AL rent is 26% less than the average in the Tucson metro. 58% of the units are reserved for the very low-income aging population and 20% are reserved for the extremely low-income aging population.

Q-017 and Q-019 Deal Spotlights

Q-017 and Q-019 comprise a combined issuance of \$498.2 million in Social Bonds. These transactions were completed with Merchants Bank of Indiana, an SFI.

A key component of Freddie Mac Social Bonds is providing liquidity to social impact institutions such as SFIs. These transactions provided Merchants Bank of Indiana with needed liquidity to continue lending in their markets.

Proceeds from the underlying loans were used to finance rental properties in 11 states that serve low- to very low-income residents. In addition to providing affordable housing to low- to moderate-income families, institutions receiving liquidity and properties financed from Social Bonds proceeds work to foster various socioeconomic opportunities for residents and their communities.

Merchants Bank of Indiana developed the MPACT Program, which supports the initiative of Positively Advancing Communities Together to make an “MPACT” in the communities where their employees live and work. The program’s mission is aimed at supporting the advancement of affordable housing, improving education with an emphasis on financial literacy, and stimulating economic development in their communities.

Units Affordable

- 6.4%

Q-017 and Q-019 proceeds financed properties with **347** or **6.4%** of the units affordable to tenants earning at or below **30% AMI**
- 30.9%

Q-017 and Q-019 proceeds financed properties with **1,680** or **30.9%** of the units affordable to tenants earning at or below **50% AMI**
- 67.6%

Q-017 and Q-019 proceeds financed properties with **3,670** or **67.6%** of the units affordable to tenants earning at or below **60% AMI**
- 89.8%

Q-017 and Q-019 proceeds financed properties with **4,876** or **89.8%** of the units affordable to tenants earning at or below **80% AMI**

Q-017 and Q-019 Properties Highlights

Twin Parks — 711 and 725 Garden Street and 2260 Crotona Avenue in Bronx, New York



Located just 10 miles outside of Manhattan, Twin Parks is an affordable rent-restricted, 274-unit property backed by HUD’s Section 236 Preservation Program, keeping 100% of the units restricted to 80% of the AMI. Taking this a step further, Twin Parks keeps a majority of their units affordable to those making at or less than 50% AMI and over 40% of the units available to those making at or less than 30% AMI, heavily supporting tenants at both very and extremely low-income levels. This level of affordable housing preservation is desperately needed in high-cost markets like New York City, and plays an important role in providing housing in underserved communities.

Bradford Run — 3604 Briarwick Drive in Kokomo, Indiana



Bradford Run is a 292-unit property located just north of Indianapolis. The complex supports our mission of affordability by reserving more than 80% of their units for very low-income individuals, including 38 units for extremely low-income individuals at 30% AMI. These rents allow the property to remain affordable for the majority of the local population.

Brighton Apartments — 2745 Rottingdean Drive in St. Louis, Missouri



Brighton Apartments is a fully affordable and conveniently located 202-unit property, established just 15 miles north of the central business district. Further, it’s 0.25 miles from Interstate 270, 8 miles from the St. Louis Lambert international Airport and less than 2 miles from Christian Hospital, which hosts a variety of health care services for those in need. The property itself is 99% targeted toward individuals who fall within the very low-income bracket, with 200 of the 202 total units affordable up to 50% AMI.

Multi PC Properties Highlights

WA3193 Avondale Trace — 5206 West Wendover Avenue in High Point, North Carolina



An important part of our Social Bonds is supporting underserved communities. Avondale Trace is located in High Point and has 72 rehabilitated units providing the majority of their housing for individuals who fall within extremely low-income levels, up to 30% AML, including eight units set aside for those experiencing disabilities or displacement issues. The property contains a 30-year Land Use Regulatory Agreement (LURA) to support 9% LIHTC and made significant improvements for tenants utilizing Freddie Mac’s Unfunded Forward Commitment. Further, this deal is supported by the North Carolina Housing Finance Agency.

WA3196 E’Port Family Homes — 158-168 First Street and 200-214 Third Street in Elizabeth, New Jersey



E’Port Family Homes is a 60-unit property located in Elizabeth and supported by the Housing Authority of the City of Elizabeth, comprises LIHTC and a rent-restricted Section 8 Housing Assistance Payment (HAP) to support those with disabilities, specifically with mental health and addiction issues. The majority of the units support extremely low-income individuals at 30% AML. It is further supported by the National Equity Fund, City of Elizabeth HOME Agreement and the Federal Home Loan Bank of New York’s affordable housing program. This property is located 16 miles southwest of Manhattan and 7 miles south of Newark, two of the region’s largest employment centers. Further, it’s located 2.5 miles from the Elizabeth train station, which allows direct accessibility to both cities.

WE6044 NYCHA Pennrose Bundle - LIHTC — Brooklyn, New York



This transaction funds 949-units supported by the New York City Housing Authority (NYCHA) and is primarily designed to support individuals with extremely low-income levels in the extremely high-cost market of King’s County. There are 245 units restricted for senior citizens across the bundle, with locations that offer a Head Start Early Education Program and two senior-citizen centers to support the aging population. The property was renovated in 2021, is supported by 9% LIHTC under LURA, a RAD HAP contract and the Section 8 Project Based Voucher HAP contract to sustain its affordable housing objectives.



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, the 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

ENVIRONMENTAL IMPACT



Nine properties that reported projected savings from existing energy- and water-efficiency improvements are, on average, expected to reduce **energy consumption by 20%** and **water consumption by 16%**

SOCIAL IMPACT



89.9% of units are affordable to families earning at or below **60% AMI**



4,675 units are located in **High Opportunity Areas**



Sustainability Bonds proceeds financed **eight mixed-income properties**, or **5.6%** of all properties backing the Sustainability Bonds, with units affordable to tenants earning at or below **50% AMI** and 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 \$5.4 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	
Total		\$5,424.7	



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 2022

# of Units Affordable at or below 50% AMI	# of Units Affordable at or below 60% AMI	# of Units Affordable at or below 80% AMI
14,420	20,284	21,765

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 2022, our Sustainability Bonds financed **eight mixed-income properties** (5.6% of all properties backing our Sustainability Bonds), with one of these properties in an **ACP**, which are regions that are 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.³⁵

K-SG3 Property Highlights

Mobley Park Apartments—401 East 7th Avenue in Tampa, Florida



Mobley Park Apartments is a 238-unit, mixed-income property located in Hillsborough County, Florida, which is an ACP. The property is subject to affordability restrictions per a tax-exempt bond LURA between the HFA of Hillsborough County and SP Mobley Park LLC. Per the agreement, at least 40% of the units must be rented to tenants whose income is at or below 60% AMI. Further, the regulatory agreement requires the owner to establish a Homeownership Opportunity Program whereby 5% of the resident’s gross rents are set aside for a resident that moves from the property into homeownership. This property plays an important role in encouraging economic mobility in its community and deconcentrating poverty.

5.6% Sustainability Bonds proceeds financed **eight mixed-income properties**, or 5.6% of all properties backing the Sustainability Bonds, with units affordable to tenants earning at or below 50% AMI and above 80% AMI

³⁵ 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

High Opportunity Areas are located all over the country and are home to roughly 18% of the population, over 56 million people.³⁶ 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 High Opportunity Areas³⁷, 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 High Opportunity Areas. Properties backing our Sustainability Bonds have access to public transportation and are in census tracts that have above-average life expectancy³⁸, high educational attainment and/or strong income levels for their market.



In 2022, Sustainability Bonds financed **4,675 units** located in **High Opportunity Areas**



12,637 or **56.0%** of the units backing the Sustainability Bonds are located in areas where 25% or more people 25 years old or older have at least a bachelor’s degree, and **3,029** or **13.4%** of the units are located in areas where the population with at least a bachelor’s degree is at least 1.5x higher than the national average³⁹



8,441 or **37.4%** of the units backing the Sustainability Bonds are located in areas where life expectancy is at or above the national average⁴⁰, and **5,736** or **25.4%** of the units are located in areas where life expectancy is at or above 80 years old

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.

Number of units financed by Sustainability Bonds proceeds located in Duty to Serve Underserved Markets in 2022:⁴¹

Deal Type	Rural	High Needs Regions	Persistent Poverty Counties (Rural)	Qualified Census Tracts	Racially or Ethnically Concentrated Area of Poverty	Qualified Allocation Plan	Difficult Development Area (FHFA)	Opportunity Zones
K-SG	2,108	0	0	6,189	1,387	1,780	757	1,585
M	0	0	0	140	0	372	0	0
ML	419	299	0	3,919	914	973	1,308	1,964
Total	2,527	299	0	10,248	2,301	3,125	2,065	3,549

³⁶ https://mf.freddiemac.com/docs/Affordable_Housing_in_High_Opportunity_Areas.pdf

³⁷ <https://mf.freddiemac.com/research/duty-to-serve/20191203-affordable-housing-high-opportunity-areas>

³⁸ https://cdc.gov/nchs/data/series/sr_02/sr02_181.pdf

³⁹ See footnote 5

⁴⁰ See footnote 6

⁴¹ See footnote 30

Environmental Impact of our Sustainability Bonds

Sustainability Bonds are issued for 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 **143 properties** backing the Sustainability Bonds securitizations in 2022, **112** had an environmental impact feature and **nine** had more than one feature.

Environmental Impact Indicator	# of Properties Supporting
Green Building Certifications	6
Existing Energy-/Water-Efficiency Improvements	12
Transit-Oriented Development	103

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.⁴²

Green Building Certifications

Our Framework lists acceptable Green Building Certifications recognized within the industry.⁴³ 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.

⁴² 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 the amount of \$138 billion in energy cost savings and 900 million metric tons of CO2 emissions avoided. For more details see <https://www.energycodes.gov/about/results>.

⁴³ 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>

K-SG4 Property Highlights

Ironwood Apartment Homes — 1950 Universal City Boulevard in Universal City, Texas



Ironwood Apartment Homes is a 140-unit property located in Bexar County, Texas. This property received a Freddie Mac Green Certified loan as it has a Green Globes Certification from the Green Buildings initiative. It is also located about 14 miles northeast from the San Antonio central business district, with direct access to common lines of transportation within half a mile of the property, which can be considered a transit-oriented development.

Further, all of the units are available for individuals up to 80% AMI. Ironwood Apartment Homes plays a valuable role in creating sustainable communities through bringing a green building certification to an affordable property.

Existing Energy-/Water-Efficiency Improvements

Our 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.⁴⁴ **Nine properties** that reported savings from existing energy- and water-efficiency improvements are expected to save roughly **20%** in whole-building energy usage along with **16%** 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 **1992**.

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.



⁴⁴ See Appendix III: Impact Bonds Reporting Methodology for more details on existing energy-/water-efficiency improvements





ML-14 Property Highlights

The Renaissance at West River — 1545 West Main Street in Tampa, Florida



The Renaissance at West River is a 160-unit property located less than 2 miles northwest of downtown Tampa. The property has 100% of the units affordable to tenants making at or less than 60% AMI. Per regulatory agreement, units must be reserved for the aging population, persons with disabilities, and elderly persons experiencing homelessness.

This property is located in an ACP and a QCT, as well as a R/ECAP. Additionally, The Renaissance at West River installed energy- and water-efficiency improvements at the property, helping lower utility costs for its residents. Efficient and sustainable housing is important to preserving affordability in these communities.

Transit-Oriented Development

Transportation-related GHG emissions accounts for about 28% of the total U.S. GHG emissions, making transportation the largest source of U.S. GHG emissions.⁴⁵ 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.⁴⁶

72.0% In 2022, our Sustainability Bonds financed **103 transit-oriented developments** or **72.0%** of all Sustainability Bonds properties financed that year

There are meaningful potential environmental benefits from transit-oriented developments with some transited-oriented developments estimated to have a 35% lower carbon footprint than conventional developments.⁴⁷ Additionally, by virtue of being near transit, these properties improve the ability of tenants to access more opportunities, including jobs, education, other goods and services.

⁴⁵ See the EPA, Sources of Greenhouse Gas Emissions, Transportation at <https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions> in Appendix III

⁴⁶ See Appendix III: Impact Bonds Reporting Methodology for more details on transit-oriented development

⁴⁷ 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 program is 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 mortgage 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 \$877 billion in financing for approximately 104,000 multifamily properties, representing nearly 12.5 million apartment units. As of December 31, 2022, our multifamily mortgage portfolio comprised \$389 billion of securitized mortgage loans, \$17 billion of unsecuritized mortgage loans and \$10 billion of other mortgage-related guarantees.

Freddie Mac Multifamily ESG Team

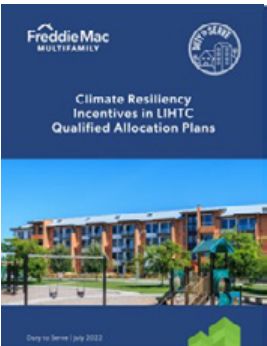
Our ESG Initiatives team manages the strategy behind our Impact Bonds offerings. This team carefully prescreens each loan, ensuring it conforms to our frameworks. The ESG Initiatives team takes the lead as Freddie Mac Multifamily addresses the ESG risks and opportunities relating to our securities. This 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 ESG strategy. The team also includes Christopher Lopez, a Multifamily capital markets associate, who supports Impact Bonds and ESG initiatives.

Appendix II: Our Research and Duty to Serve



Freddie Mac’s [Duty to Serve Underserved Markets Plan](#) outlines our efforts to help increase rental and homeownership opportunities in historically underserved markets and provide access to safe and affordable housing throughout the nation. As part of this initiative, Freddie Mac Multifamily has published a series of reports that assess and address underserved markets, High Opportunity Areas and climate resiliency incentives. You can view the full series on our website at <https://mf.freddiemac.com/research/duty-to-serve>.

In 2018, we began releasing annual reports that track property improvements made through our Green Up and Green Up Plus programs. Click on our 2022 reports below to learn more.



Multifamily Podcasts



Steve Guggenmos, vice president of Multifamily Research & Modeling, and Corey Aber, vice president of Multifamily Mission, Policy & Strategy, cover a wide range of topics on the [Multifamily podcast series](#), including the affordability crisis, housing preservation, investment opportunities and market trends. Subject matter expert guests from Harvard University’s Joint Center for Housing Studies (JCHS), the National Low Income Housing Coalition and numerous other institutions provide their unique insights into the multifamily housing market. The series includes over 75 episodes and several of our recent releases are highlighted below.

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 2022, the population included in this report is specific to Green Bonds issued in 2019 through 2022 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	30% whole property reduction from a MINIMUM 15% energy and 15% energy AND/OR water	Required – borrower must engage prior to loan origination	Required – Changed in Nov. 2019
2020-2022	30% whole property reduction from a MINIMUM 15% energy and 15% energy AND/OR water	Required – borrower must engage prior to loan origination	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.⁴⁸ 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.⁴⁹ 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.

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.

⁴⁸ <https://www.energystar.gov/buildings/tools-and-resources/portfolio-manager-technical-reference-greenhouse-gas-emissions>

⁴⁹ <https://www.energystar.gov/buildings/tools-and-resources/portfolio-manager-technical-reference-thermal-conversion-factors>

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 seven months to a maximum of 32 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.

Impact Bonds

Life Expectancy

Life expectancy is often used as a measure of the health of an individual or community. In our report, we obtained life expectancy from the U.S. Census tract of each area in which properties backing Green Bonds are located and ran that data against the national life expectancy average of 78.8 as of 2015.⁵⁰ According to the Centers for Disease Control and Prevention and the National Center for Health Statistics⁵¹, “The methodology used to calculate the U.S. census tract abridged life tables consisted of several stages. First, through a collaboration between the National Vital Statistics System registration areas and the National Center for Health Statistics, death records of U.S. residents (excluding residents of Maine and Wisconsin) for deaths occurring in 2010 through 2015 were geocoded using decedents’ residential addresses to identify and code census tracts. Second, population estimates were produced based on the 2010 decennial census and the 2011–2015 American Community Survey 5-year survey. Third, a methodology that combined standard demographic techniques and statistical modeling was developed to address challenges posed by small population sizes and small and missing age-specific death counts. Last, standard, abridged life table methods were adjusted to account for error introduced by population estimates based on sample data.”

Educational Attainment

Access to education is an indicator of opportunity as previously defined through our research. The American Community Survey (ACS)⁵², part of the U.S. Census Bureau, was used in order to determine the educational attainment of the population within areas in which properties backing Impact Bonds are located. The measures used by ACS are at the U.S. Census tract level. Our focus for this report was on the percentage of people per area with a bachelor’s degree as a measure of educational attainment.

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-/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.

⁵⁰ Calculations are based on available life expectancy data in accordance with the U.S. Census Tract and the Centers for Disease Control and Prevention: https://www.cdc.gov/nchs/data/factsheets/factsheet_NVSS.pdf

⁵¹ https://www.cdc.gov/nchs/data/series/sr_02/sr02_181.pdf

⁵² <https://www.census.gov/programs-surveys/acs/about.html>

Contact Us

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