While Freddie Mac Multifamily Green Advantage® has provided over $59 billion in financing through loans purchased since program inception in late 2016 through the end of 2019, the population included in this report is specific to green bonds issued in 2019 backed by Green Up® and Green Up Plus® loans. For more information on our programwide impacts, refer to the 2019 Analysis of Green Improvements in Workforce Housing report.
Our Green Origins

Freddie Mac’s commitment to affordable, quality rental housing is central to everything we do, including our research, the products, programs and services we offer, and much more. Our continuous support — in all economic conditions and for markets that might otherwise be neglected — distinguishes us from private 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.

Research shows that the quality and location of a home has a demonstrable impact on life outcomes. Economic mobility is greatly influenced by indicators of opportunity such as access to quality education, proximity to jobs and transportation hubs, and housing affordability. Currently, the need for affordable rental housing is greater than ever and the cost of housing has soared in those areas where opportunity is highest. At the same time, rental housing stock is aging. Over 77% of rental units were constructed prior to 2000. As units age, they become less energy efficient, and tenants often bear the increased utility costs, making housing even less affordable.

By carefully studying these and other factors that contribute to current housing challenges, we identified the opportunity to improve and finance workforce rental housing that:

- benefits tenants and borrowers through lower monthly expenses; and
- simultaneously supports the environment through reduced water and energy consumption.

In 2016, we launched the Freddie Mac Multifamily Green Advantage program, which finances property improvements to make multifamily housing more energy- and water-efficient. Since then, we have been a market leader in providing capital to improve workforce housing.

Over $59 billion in Green Advantage loans since 2016

We put together this report to illustrate the environmental and social impact of these green bonds. At Freddie Mac, we know these efforts are an integral part of achieving our mission and building a better housing finance system. We also know none of this is achievable without you — our Optigo® investor network.

Debby Jenkins
Executive Vice President, Head of Multifamily
Green Program Milestones

2016
We launched our Green Advantage program in August 2016 and introduced our flagship options, known as Green Up® and Green Up Plus®.

2017
Between 2016 and 2019, we continued to improve Green Advantage program standards.

2018
In June 2019, we announced the addition of K-G Deals – our environmental and social impact K-Deal® series – to our securities platform. By year-end, we securitized $2 billion in Green Advantage loans through our K-G and Multi PC programs, giving investors the opportunity to make a direct environmental and social impact through their investments.

2019

2020

Environmental Impact

Water improvements are projected to save 242 million gallons in water per year – the equivalent of filling the Lincoln Memorial Reflecting Pool in Washington, D.C., 36 times, or the annual water usage for over 2,600 households across America.

Annual greenhouse gas emissions are projected to decrease by over 13,700 metric tons, the equivalent of removing 2,866 cars off the road for a year or carbon sequestered by 223,225 tree seedlings grown for 10 years.

Energy reductions are projected to save 175 million kBtu per year – enough energy to power roughly 16,300 homes.

Social Impact

76% of units are affordable to households earning 80% AMI or less.

Improvements are projected to save tenants an average of $218 per unit annually through lower utility costs.

2,697 of units are located in High Opportunity Areas with 55% of these units being affordable to tenants earning 80% AMI or less.

Freddie Mac Multifamily Issued $2 Billion of Green Bonds in 2019

<table>
<thead>
<tr>
<th>2019 Issuances ($ millions)</th>
<th>Volume</th>
<th># of Loans</th>
<th># of Units</th>
<th># of Units Affordable at 80% AMI or less</th>
</tr>
</thead>
<tbody>
<tr>
<td>K-G01</td>
<td>$483.7</td>
<td>19</td>
<td>4,698</td>
<td>3,245</td>
</tr>
<tr>
<td>K-G02</td>
<td>$544.1</td>
<td>17</td>
<td>5,183</td>
<td>4,243</td>
</tr>
<tr>
<td>Multi PCs</td>
<td>$968.5</td>
<td>26</td>
<td>8,399</td>
<td>6,328</td>
</tr>
</tbody>
</table>

CICERO

CICERO provided a second opinion on our green bond framework and awarded Freddie Mac Multifamily the Light Green rating, which recognizes us for closely monitoring energy and water reduction, creating maps of drought and extreme weather impacts to the properties and their communities, and for publishing reports with insight on climate impacts to the properties in our portfolio.

Per CICERO, “these analyses are in line with preliminary climate resilience planning and considered a forward-thinking step not just for the building sector, but for the green bond market. CICERO Green applauds this progressive analysis and encourages Freddie Mac to continue monitoring and reporting it.”

In a way, every K-Deal since 2016 has had some element of green due to the integration of the Green Advantage loans throughout our platform since the creation of the program. The K-G Deal goes a step further, offering environmentally and socially conscious investors the opportunity to invest in bonds that support that mission. Ultimately, these investors are helping to reduce carbon emissions and water usage in thousands of older multifamily units across the country.”

ROBERT KOONTZ, Senior Vice President and Head of Multifamily Capital Markets
**Industry Partnerships**

**Nasdaq**

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 new initiative. Together, we are working to help develop products that are environmentally and socially sustainable.

**ENERGY STAR**

ENERGY STAR® is a voluntary U.S. Environmental Protection Agency program that helps businesses and individuals save money and protect our climate through superior 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 ongoing energy and water property performance.

**Duty to Serve Plan**

Freddie Mac’s three-year Duty to Serve plan outlines our goal to help increase rental and homeownership opportunities in historically underserved markets. As part of this initiative, we are releasing annual reports that assess the impact and property-level data for our Green Advantage program.

**2019 Analysis of Green Improvements in Workforce Housing**

2018 Green Improvements in Workforce Housing

Additional details and research resources are available in Appendix IV.

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**Our Green Resources**

**Multifamily Securities Investor Access**

Our Multifamily Securities Investor Access tool provides performance data for our Multifamily securitizations as well as security, loan and property-level disclosures. This resource tracks green bond-specific information, along with resources such as the offering documents and monthly trustee reports.

**CRT and Structured Deals**

Access information and underlying collateral for Credit Risk Transfer (CRT) as well as structured deals including K-Deals, ML-Deals, SB-Deals and more.

**Multi PC Deals**

Access information related to Multifamily PC mortgage-backed securities and their underlying collateral.

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**Spotlight on Underserved Markets**

2019 Analysis of Green Improvements in Workforce Housing
2019 Environmental Impact

Based on the projected consumption savings of energy and water across our green bond securitizations, we are making a meaningful impact on the environment.

Projected Energy Consumption Savings

<table>
<thead>
<tr>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green bond proceeds have financed energy improvements projected to save</td>
<td>175 million kBtu per year.</td>
</tr>
<tr>
<td>This equates to the energy to power 16,300 American homes.</td>
<td></td>
</tr>
<tr>
<td>Across each Green Advantage loan, this averages to 2.8 million kBtu and</td>
<td>over 8,300 kBtu per unit.</td>
</tr>
</tbody>
</table>

Projected Water Consumption Savings

<table>
<thead>
<tr>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green bond proceeds have financed water improvements projected to save</td>
<td>242 million gallons of water per year, which is the equivalent of</td>
</tr>
<tr>
<td>On average, each Green Advantage loan is projected to reduce the property</td>
<td>filling the Lincoln Memorial Reflecting Pool in Washington, D.C.,</td>
</tr>
<tr>
<td>water usage by 3.9 million gallons of water per year and almost 12,000</td>
<td>36 times or the annual water usage for over 2,600 households across</td>
</tr>
<tr>
<td>gallons of water per unit per year.</td>
<td>America.</td>
</tr>
</tbody>
</table>

The reduction in water consumption will help reduce the strain on an aging water infrastructure that is projected to require billions of dollars for future maintenance and improvements. It will also save property owners and tenants money, given that water costs tend to and have steadily increased year over year.

Targeted Benefits of Green Improvements

While water- and energy-efficient improvements reduce consumption — regardless of where a property is located — there is also the potential for greater environmental impact in some markets. For example, water-saving improvements will be more pronounced for properties located in drought-prone areas. Likewise, energy-saving improvements can have a greater environmental impact when made to properties located in areas with higher carbon-intense energy supplies.

A reduction in a property’s carbon footprint due to energy-saving improvements will be greater when they are located in areas with higher carbon-intense energy supplies.

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3 For additional details, see [https://www.circleofblue.org/waterpricing/](https://www.circleofblue.org/waterpricing/)
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 have a direct impact on the energy-related carbon dioxide (CO2) emissions in that state.

In Exhibit 2, the location of properties backing the green bonds is shown relative to the carbon intensity of the energy supply within that state. States with a more carbon-intensive energy supply are shaded in dark gray, and states having a lower carbon-intensive energy supply are light gray.

Exhibit 2: Green Bond Property Location Relative to Carbon-Intensity of Energy Supply


We found that 15 properties, representing $367,895,000 or 18.4% of the total green bond proceeds, are in states with an energy supply carbon intensity that is above the national average of 54 kilograms of CO2 per million btu (kg CO2/MMBtu). The properties that installed energy improvements in these areas are projected to save 2,960 metric tons of CO2 annually. An additional 20 properties, representing $831,196,000 or 41.6% of the total green bond proceeds, are in states slightly below the national average. The properties that installed energy improvements in these areas are projected to save 4,018 metric tons of CO2 annually.

Regardless of the location of the properties backing the green bonds, the projected savings will have a meaningful impact. Across all green bonds, the implemented green improvements are projected to reduce annual greenhouse gas emissions by over 13,700 metric tons. This is equivalent to the same amount of CO2 as removing 2,866 cars off the road for a year.

Environmental Impact in Areas Experiencing Drought

Exhibit 1 examines the location of properties that were securitized either via a K-G Deal or as a Multi PC, relative to the intensity of areas experiencing drought as of November 5, 2019.

Exhibit 1: U.S. Drought Monitor Map and Green Bond Property Locations


Nineteen properties, representing $429,314,000 or 21.5% of the total green bond proceeds, are in areas that were experiencing drought or were abnormally dry. The properties that installed water conservation improvements in these areas are projected to save 47.2 million gallons of water annually. These are critical savings in drought-prone areas. While not all green loans were originated in drought areas, the water consumption savings will still provide positive impacts, particularly as many states are expected to have water shortages not related to drought.4

Improvements are projected to save 47.2 million gallons of water annually.

4 Reference the Government Accountability Office (GAO) 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

2019 Social Impact

Our green bond proceeds have financed more efficient affordable properties that help tenants save in areas of high utility costs, in high opportunity areas and across different property types.

Tenant Utility Savings in 2019

Green bond proceeds have financed water and energy improvements projected to save $4 million. Tenants will save an average of $218 per unit per year.

3.6% of tenants projected to save between $100-150 per year,
14.5% of tenants saving between $150-200 per year,
27.0% of tenants saving between $200-250 per year,
20.4% of tenants saving between $250-300 per year and
19.3% of tenants saving $300 or more.

Utilities Savings in Areas of High Electric Utility Costs

Savings from green improvements help families reduce their energy consumption cost and allocate funds for other necessities. When looking across all the properties backing green bonds, savings for property owners are projected to be $103 per unit per year. Tenants are projected to save $218 per unit per year, which is the equivalent to almost two months of average electric bills.

Exhibit 3 shows the average monthly electric utility bills by state, relative to the location of the properties backing the green bonds. States with the most expensive electric bill are dark gray and those with the least expensive bill are light gray. The national average electric utility bill is $117. By comparison, the average electric utility bill for states with the most expensive electric bill is $140, or 20%, higher than the national average. We found that 30, or 48%, of properties backing green bonds are in states with the most expensive electric bills. While a reduction in energy consumption has the potential to benefit tenants in all green bond properties, tenants living in properties located in states with the most expensive electric bills will likely see the largest relative electric bill savings compared with those in lower cost electric utility states.

Exhibit 3: Green Bond Property Location Relative to Average Monthly Electric Bill


31% of all multifamily households nationwide report some type of energy insecurity.


5 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/2015/hc/php/hc11.1.php


15
Financing Workforce Housing

For Freddie Mac loan offerings, workforce housing is thought of as units that are affordable to the missing middle. We use a guideline of 80% or less of AMI in most markets, with some variation in cost-burdened markets. These properties tend to be older with fewer amenities, but also include newer properties purpose-built as affordable to households with moderate incomes. In many ways, residents of workforce housing are the backbone of every community where they work. 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 very communities that benefit from their work.

Green bond proceeds have financed properties affordable to 13,816 families earning at or below 80% AMI, representing 76% of all the units. Green bond proceeds have financed properties affordable to 5,161 families earning at or below 60% AMI, representing 28% of all the units.

Green bond proceeds have financed properties with 1,541 or 8.4% of the units affordable to tenants earning at or below 50% AMI.

Financing Mixed-Income Properties

Mixed-income housing can help to deconcentrate poverty and provide access to neighborhoods of opportunity for all residents. It allows for economic diversity, expands the availability of quality affordable housing throughout an area, and provides balance to a community. However, mixed-income housing does not have a consistent, programmatic definition across the industry and can vary by locality or program. For the purposes of our analysis, we include properties that have a mix of units below 50% AMI and above 60% AMI.

Green bond proceeds have financed 20 properties, or 32% of all properties, that have units affordable to tenants earning at or below 50% AMI and above 80% AMI.

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Green bond proceeds have financed 20 properties, or 32% of all properties, that have units affordable to tenants earning at or below 50% AMI and above 80% AMI.
Appendix I: Freddie Mac Overview

Freddie Mac’s mission is to provide liquidity, stability and affordability to the U.S. housing market. Supporting affordable housing and access to credit is integral to what we do. In 2016, we added to that core business a strong focus on energy and water efficiency through our Green Advantage program. Our program is revolutionizing 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 to support housing through the secondary market (we do not originate loans or lend money directly to mortgage borrowers). We support housing primarily by purchasing mortgage loans that originate with lenders. In most instances, we package these loans into mortgage-backed securities, which carry our guarantee. These securities are then sold in the global capital markets. We also invest in mortgage loans and mortgage-related securities.

Since 2008, Freddie Mac has been operating in conservatorship, with the Federal Housing Finance Agency (FHFA) as conservator. FHFA is also our regulator. We are working with FHFA, our customers and the industry to build a better housing finance system for the nation.

Freddie Mac Multifamily

The Multifamily division of Freddie Mac helps to address affordable rental housing needs by purchasing mortgages secured by apartment buildings with five or more units. We enable the purchase, refinancing and rehabilitation of older multifamily buildings and the permanent financing of recently built multifamily buildings. We buy mortgages secured by these buildings from the Freddie Mac Optigo lender network, which has over 150 branches nationwide. Since 1993, we have provided over $681 billion in financing for approximately 91,000 multifamily properties, representing nearly 10.6 billion units. As of December 31, 2019, our total book of business comprised $271 billion of multifamily guarantees, $30 billion of unsecuritized loans, more than $5 billion of multifamily mortgage-related securities, and nearly $5 billion of other investments, plus $35 billion of additional market support (primarily unguaranteed securities).

In 2009, we introduced our K series platform that aggregates and securitizes newly originated multifamily loans made through the Freddie Mac Optigo network.

We developed the Green Advantage program in 2016. It is overseen by a green committee within the Multifamily division, comprising representatives from various Multifamily lines of business: production, underwriting, credit policy, asset management, capital markets and legal. Members of this committee have deep expertise in all aspects of financing multifamily development as well as experience with energy and water efficiency retrofits, energy and water audits, industry standards, and property benchmarking.
Appendix II: The Four Pillars of The Green Bond Principles

Green Bond Principles

The Freddie Mac Multifamily Green Bond Framework (Framework) is aligned with the four core components of the Green Bond Principles, as described in the Framework.

1. Use of Proceeds
   a. The proceeds of Freddie Mac’s green bonds are used to finance both the Green Up and Green Up Plus loans that serve as collateral in the K-G Deals, our environmental and social impact K-Deal series, as well as Multi PCs.

2. Process for Project Evaluation and Selection
   a. K-Deals are generally backed by newly acquired mortgages underwritten to Freddie Mac’s industry-leading underwriting standards.
   b. Eligible green mortgage loans need to satisfy:
      i. The underwriting criteria described in the Green Advantage Term Sheet
      ii. The requirements documented in the Freddie Mac Multifamily Seller/Servicer Guide
      iii. Obtain one of the following Green Reports:
         1. Green Assessment®
         2. Green Assessment Plus®

3. Management of Proceeds
   a. Green bond issuances will be designated through a K-G Deal and green bonds may also be issued through Multi PCs. Green bond proceeds are reported monthly by the master servicer and trustee as part of the standard investor reporting package.

4. Reporting
   a. Freddie Mac is committed to reporting asset-level and portfolio-level performance for green bonds backed by properties financed using our Green Advantage offerings.
   b. Green bond information will be available through the Multifamily Securities Investor Access tool.
   c. External Reviews — Completed by CICERO and WegoWise by AppFolio.

Appendix III: Impact Reporting Methodology

Freddie Mac is committed to reporting the impacts associated with properties financed using our Green Up and Green Up Plus options. 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.

The Green Advantage program parameters have evolved each year to meet the requirements set by FHFA for green loan treatment related to the multifamily lending cap. Exhibit 3 provides details of the program requirement by year. For 2019, the consumption savings threshold was increased to require a total of 30% whole property savings, with a required minimum of 15% coming from energy consumption reduction and the remaining 15% coming from either energy or water consumption reduction.

While Freddie Mac Multifamily Green Advantage has provided over $59 billion in financing through loans purchased since the program inception in late 2016 through the end of 2019, the population included in this report is specific to green bonds issued in 2019 backed by Green Up and Green Up Plus loans. For more information on our programwide impacts, refer to the 2019 Analysis of Green Improvements in Workforce Housing report.

Program Parameters

The Green Advantage program parameters have evolved each year to meet the requirements set by FHFA for green loan treatment related to the multifamily lending 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.

<table>
<thead>
<tr>
<th>Requirements</th>
<th>2016-2017</th>
<th>2018</th>
<th>2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consumption Savings Threshold</td>
<td>15% owner-paid, tenant-paid or whole property energy OR water reduction</td>
<td>25% whole property energy OR water reduction</td>
<td>30% whole property reduction from a MINIMUM 15% energy and 15% energy AND/OR water</td>
</tr>
</tbody>
</table>

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 who meet Freddie Mac’s qualification requirements (Green Consultants), including understanding of the ASHRAE standards and having 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. 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 and deliver completed green reports to Optigo lenders who transmit them to Freddie Mac during the loan due diligence process.

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. These 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 ($) 

Greenhouse gas (GHG) emissions projections are calculated within the Form 1106 following the Portfolio Manager methodology. 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. 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.

Mixed Income

Mixed-income housing does not have a consistent, programmatic definition across the industry and throughout history, and can vary by locally or program. For this analysis, we looked at properties that have rents affordable to very low-income renters (50% AMI) and renters making more than 80% AMI.

Distance from Transit

We measured walking distance in miles from each property to the nearest transit stop using Google Maps. Transit stops include stops on bus routes, train lines and subway lines.

Life Expectancy

Life expectancy is often used as a measure of how healthy an individual or a community is. In our report, we obtained life expectancy from the U.S. census tract of each area that properties backing green bonds are located in and ran that data against the national life expectancy average of 78.6 as of 2017. According to the Centers for Disease and Control Prevention and the National Center for Health Statistics, “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.”

High Opportunity Areas

While an industry-wide definition of high opportunity areas does not exist, there are five common and distinguishing features. For purposes of this report, we rely on FHFA’s definition in the Duty to Serve regulation. High opportunity areas include areas designated by Housing and Urban Development as a “Difficult Development Area”, as well as areas designated in a state’s Low-Income Housing Tax Credit Qualified Allocation Plan (QAP) as a high opportunity area, whose poverty rate is lower than the rate established by FHFA. Indicators of opportunity, as identified through Freddie Mac’s and the National Housing Trust’s review of all 50 states’ QAPs, include high income and low poverty, strong economic growth, high-achieving schools, well-developed public transit, and access to quality health care.

https://www.cdc.gov/nchs/fastats/life-expectancy.htm
Appendix IV: Our Workforce And Green Research

Freddie Mac’s three-year Duty to Serve plan outlines our goal 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, the Freddie Mac Multifamily research team is publishing a series of reports that assess and address underserved markets, high opportunity areas and the impact of our Green Advantage program. Additionally, we are releasing property-level data on the improvements that have been made through our Green program. These reports, and the research that went into writing them, are the sources of much of the social and environmental statistics in this publication.

View our recent research at mf.freddiemac.com/research/duty-to-serve or click on the links below.

2019 Analysis of Green Improvements in Workforce Housing
2019 Furthering Opportunity in Areas of Concentrated Poverty
2019 Affordable Housing in High Opportunity Areas – Case Studies

Educational Attainment
Access to education is an indicator of opportunity as previously defined through our research. The American Community Survey (ACS)\(^{13}\), 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 green 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.

Average Income
The ACS was also used to determine the average income of the population within areas in which properties backing green bonds are located. Income levels are an indicator of opportunity, similar to access to transportation and access to education. The data collected by ACS are at U.S. census tract level, and the data represents a comprehensive measure of all cities and towns throughout the country. In our report, we ran data against the national median household income of $61,937 as of 2018 to the average income of the town that each property is located in.

Data Review
The data used in this impact report was checked for missing data elements and reasonable cost and savings estimates. The 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 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.

Green Bond Impact Report Supplemental Data
Please refer to the green bond impact report supplemental data file posted on the Multifamily Securities Investor Access website for loan level information.

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13 https://www.census.gov/programs-surveys/acs/about.html
Mission Map

The Freddie Mac Multifamily Mission Map synchronizes data from multiple sources to help lenders and investors better understand affordable housing opportunities in hard-to-serve markets.

Multifamily Podcasts

Steve Guggenmos, vice president of Research & Modeling, and Corey Aber, senior director of Mission, Policy and Strategy, discuss 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 MBA, Harvard’s Joint Center and Novogradac provide their unique insights into the multifamily housing market. The 2019-2020 series includes over 25 episodes. Several highlights are below.

Workforce Housing Preservation with Brad Andrus from Bridge Investment Group
Multifamily Fundamentals with Jamie Woodwell from the Mortgage Bankers Association
Green Improvements in Workforce Housing with Peter Giles and Justin Thomson in Freddie Mac Multifamily
Social Impact Investing with Bobby Turner from Turner Impact Capital
Multifamily Trends with Chris Herbert from the Joint Center for Housing Studies at Harvard

Contact Us

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

Disclaimer

All presented information in this product overview is as of December 31, 2019, unless stated otherwise. The publication date of this report is April 22, 2020.

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