



REGENERATIVE
CRISIS RESPONSE
COMMITTEE

MAKING GREEN MORTGAGES **MAINSTREAM & ACCESSIBLE**

December · 2021

ACKNOWLEDGEMENTS

The **Regenerative Crisis Response Committee** would like to express its appreciation to the many individuals who contributed to the development of this report. We are particularly indebted to Megan Greene and Adam Tooze for their extraordinary efforts researching, developing, and championing these ideas. Thanks also to the team at Conveners.org, who serve as the RCRC Secretariat, for coordinating, supporting, and promoting our work. Special recognition and appreciation are due to Jennifer M. Silvi, who served as the paper's lead author and editor, and to our Research Fellows, Rohan Kocharekar and Hannah H. Braun, who contributed to policy research and authored many sections of this paper. We would also like to show our gratitude to José Rivadulla who designed the final report. A very special thanks to SaraJoy Pond from the RCRC Secretariat who edited, reviewed and coordinated publication of the final manuscript.

We are especially indebted to the leaders and experts in the green mortgages market who generously shared their knowledge, insights, time, and support of this policy brief. Thank you for your guidance and for your trust in the RCRC and its mission. We would like to especially recognize Simone Beaty and colleagues from The Federal Home Loan Mortgage Corporation (Freddie Mac) for sharing their expertise with us.

Finally, we would like to thank the **Hewlett Foundation** for their generous financial support of this research and the RCRC.

ABOUT THE **AUTHORS**



Megan Greene

is a Senior Fellow at the Mossavar-Rahmani Center for Business and Government at Harvard Kennedy School and is also the Global Chief Economist at Kroll Institute.



Adam Tooze

holds the Shelby Cullom Davis chair of History at Columbia University and serves as the Director of the European Institute.



Jennifer M. Silvi

is a policy and climate finance expert who serves as the Managing Director of the RCRC Secretariat. She is a graduate of Columbia University's School of International and Public Affairs.



Rohan Kocharekar

is a consultant and researcher working on sustainable development and climate finance policy issues. He is currently a PhD Candidate at Oxford University. He is a graduate of Columbia University's School of International and Public Affairs, SciencesPo Paris, and the University of St. Andrews.



Hannah H. Braun

is a consultant and researcher on energy systems and markets, energy and sustainability policy, subsidy reform, and climate finance. She is a graduate of Brown University and Columbia University's School of International and Public Affairs.



TABLE OF **CONTENTS**

- 5 • [About The RCRC](#)
- 8 • [Why We've Written These Whitepapers](#)
- 11 • [Executive Summary](#)
- 13 • [The Moment](#)
- 16 • [Context](#)
- 24 • [A Path Forward](#)
- 42 • [Conclusion](#)
- 45 • [References](#)

ABOUT THE **RCRC**

The **Regenerative Crisis Response Committee (RCRC)** is a nonpartisan group of senior leaders from the banking, financial services, regulatory, and policy arenas who care deeply about ensuring the United States' economic recovery is durable, equitable, and puts us on a path toward lasting sustainability.¹

Founded in late 2020, the RCRC works under the mandate to identify, compare, and recommend changes in fiscal, monetary, and financial regulatory policies that are likely to **enable the United States to achieve net carbon neutrality before 2050.**

¹"Our Work – Regenerative Crisis Response Committee," accessed October 24, 2021.

RCRC SENIOR LEADERS



LAWRENCE BAXTER

- Educated in South Africa and England as a lawyer
- Practiced as an attorney, member of the NC State Bar and the bar of the Fourth Circuit Court of Appeals
- PhD in Regulation In the US since 1985
- Tenured faculty at Duke



GINA-GAIL FLETCHER

- Professor of Law at Duke Law
- Taught securities regulation, financial regulation, and corporate governance courses over the past 8 years
- Practiced at Gibson, Dunn, & Crutcher LLP prior to academia



PETER FISHER

- Under Secretary of the US Treasury for Domestic Finance
- Executive Vice President at the Federal Reserve Bank of New York
- Head of Fixed Income portfolio management at BlackRock
- Director of the Financial Services Authority of the UK



MEGAN GREENE

- Senior Fellow at Harvard Kennedy School, writing a book on income and wealth inequality and in doing so spending a lot of time looking into how to upgrade jobs and create “good” (high hour, high wage) ones. Infrastructure for sustainability is a no brainer!



STEPHANIE KELTON

- Former Chief Economist on the US Senate Budget Committee
- Senior Economic Advisor to Bernie Sanders’ presidential campaigns
- Senior Fellow at Schwartz Center for Economic Policy Analysis
- Professor of Economic Policy at Stony Brook University



JAY SHAMBAUGH

- Professor of Economics & International Affairs at George Washington University
- Senior fellow of Economic Studies at the Brookings Institution
- Former member of President Obama’s Council of Economic Advisers.
- Former Director of the Hamilton Project.



JOSEPH STIGLITZ

- Co-chair of the High-Level Expert Group on the Measurement of Economic Performance and Social Progress at the OECD
- Chief Economist of the Roosevelt Institute
- Former senior vice president and chief economist of the World Bank



ADAM TOOZE

- In 2019, Foreign Policy Magazine named Adam one of the top Global Thinkers of the decade



SARAH BLOOM RASKIN

- Colin W. Brown Distinguished Professor of the Practice at Duke Law School
- Senior Distinguished Fellow of the Global Financial Markets Center
- Senior Fellow of the Duke Center on Risk



WHY WE'VE WRITTEN THESE WHITEPAPERS

Time and again, the U.S. economy has shown itself to be vulnerable to severe shocks, regardless of their origin. Both the susceptibility to disruption and the ability to recover from it have characterized the impact of historical shocks on households, firms, and communities. From the Great Depression to the Global Financial Crisis, and to the COVID-19 pandemic's recent effects on the economy; fiscal and monetary policy interventions have repeatedly had to be deployed—belatedly—to restore financial stability.

Most recently, the COVID-19 pandemic underscores the vulnerability of the U.S. economy to severe shocks. Over the course of nearly two years, unemployment rates spiked, millions of Americans struggled with food insecurity, and a massive government effort was needed to stabilize household finances and the economy. Whether such shocks are anticipated or not, the government typically operates in the same fashion; it is more inclined to clean up in the aftermath of a destabilizing event as opposed to taking calculated steps to guard against probable systemic risks.

Climate change is exactly this kind of threat—one that is palpable, global, systemic, and one for which we are exceedingly ill-prepared as a society. We must overcome the default U.S. policy approach and take immediate, ambitious, proactive steps to safeguard our economy. These whitepapers are the RCRC's call to take immediate and inclusive action to enhance resilience and employ every tool at our disposal to curtail this existential threat before it is too late.

While governments around the world, including that of the United States, have made pledges and bold commitments to reduce carbon emissions to net-zero by 2050, follow-on action to transition away from fossil fuels is required and action thus far has been lackluster. Overall political ambition has been too small and too short-sighted to actually realize the inclusive transformation needed to avoid the worst effects of climate change. To accelerate such an inclusive transition, we consider both non-regressive policy tools and incentives to build a **resilient** financial system that supports scaling down emissions to net-zero by 2050.

The RCRC is a collection of economists, lawyers, former regulators, and policy experts—and we believe that it is still possible to chart a path, take action to reshape the economy and avoid the worst effects of climate change. Achieving this will take the swift implementation of smart policies.

Ultimately, we are hopeful. It is our view that monetary, fiscal and financial regulatory policy can either work to support the transition to a net-zero future or it can remain entrenched with incumbent technologies, thinking and solutions in service to the status quo.² *We believe that government-led scaling of the green mortgage market, swift implementation of new guidelines on Federal procurement, a shift away from carbon offsetting schemes to actual emissions reductions, and regulations that support the alignment of financial sector activity with our net-zero goals are targeted solutions the Federal Government can implement to help align the economy with our Paris Agreement targets.* Not only will action on these fronts help lower our emissions profile but it will also boost American jobs, businesses, and competitiveness, as well as support economic recovery from COVID-19.

² Inspired by: Michel Aglietta and Etienne Espagne, "Climate and Finance Systemic Risks: More Than an Analogy? The Climate Fragility Hypothesis," CEPII Working Paper (Paris: Centre d'Etudes Prospectives et d'Informations Internationales (CEPII), February 1, 2016), 7.





Our goal is to illuminate key policy actions the U.S. Federal Government could implement to incentivize behavior that will accelerate and support an inclusive transition to net-zero carbon emissions. Through government leadership, we can create the conditions for a just transition and improve climate accountability.

“We should not be asking whether we can afford to act on climate change. We should be asking whether we can afford not to. A failure to reduce emissions will create a real and permanent drag on the economy. Previous economic recessions have been temporary; but without action, severe climate impacts and their damage to our economy will become the new normal. At a certain point, we will not rebound or recover.”³

- Senate Democrats’ Special Committee on the Climate Crisis, August 2020

“

We should not be asking whether we can afford to act on climate change. We should be asking whether we can afford not to. A failure to reduce emissions will create a real and permanent drag on the economy. Previous economic recessions have been temporary; but without action, severe climate impacts and their damage to our economy will become the new normal. At a certain point, we will not rebound or recover.”

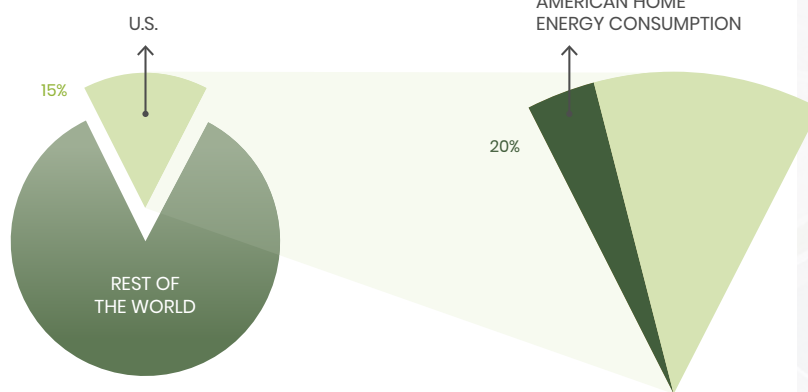
- Senate Democrats’ Special Committee on the Climate Crisis, August 2020

³ “The Case for Climate Action: Building a Clean Economy for the American People” (Senate Democrats’ Special Committee on the Climate Crisis, August 25, 2020), 4.

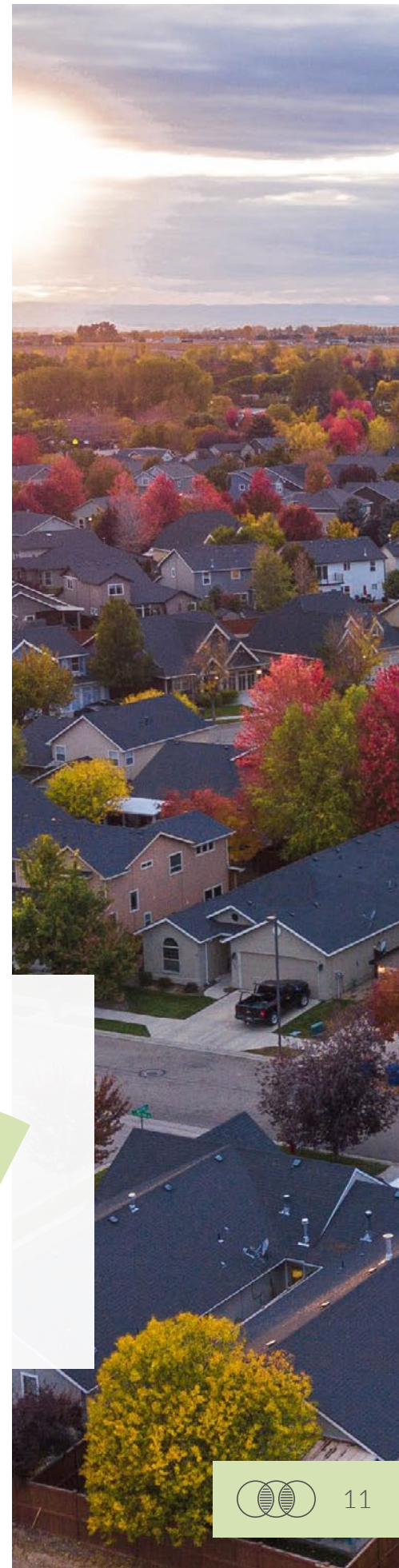
EXECUTIVE SUMMARY

The United States (U.S.) accounts for around 15% of global greenhouse gas emissions (GHG).⁴ Of this share of emissions, 20% can be traced back to American home energy consumption. With 142 million homes in the U.S., there exists both a daunting challenge and an enormous opportunity to transform the U.S. housing stock toward an era of green living. Through favorable home mortgage loans, clear federal regulatory criteria for ‘green mortgage’ investments, and greater investments from mortgage lenders for sustainability-focused retrofits, the U.S. can build a stronger path towards meeting its net-zero emissions target by 2050. The path for the U.S. to meet the ambitious goals set out under the Paris Climate Agreement will not be easy. Massive investments will be needed in home retrofits and energy-efficient renovations. The Federal Government, however, has the power to set clear and substantial market signals, as well as the necessary capital investment required to catalyze the greening of the home mortgage market.

GLOBAL GREENHOUSE GAS EMISSIONS (GHG)



⁴ "Each Country's Share of CO2 Emissions," Union of Concerned Scientists, August 12, 2020.





This Committee recommends **four key areas** where the Federal Government can take strong action within the home mortgage market:

1

Develop a national standard for what a green mortgage entails, which would establish a clear set of criteria for the home mortgage market.

2

Direct the Federal Housing Finance Agency (FHFA) to undertake a directives process to spur green mortgages for multi- and single-family homes.

3

Incentivize the GSEs, such as Fannie Mae and Freddie Mac, toward scaling up their green mortgage business market.

4

Allocate investments in building up the technical capacity needs and oversight infrastructure needed to assess residential real estate-based emissions and advise on home retrofits.

THE MOMENT

Often overlooked as a main contributor to greenhouse gas emissions, home energy consumption accounted for nearly 20% of total U.S. emissions in 2020.⁵ While policymakers have primarily been focused on incentivizing relatively simple actions, such as switching to more energy efficient light bulbs and appliances, **more comprehensive home renovations are required to bring residential energy consumption-related emissions to net-zero by 2050.**⁶

Until we act, America's homes, offices, shops, and warehouses will continue to leak heat in the winter and cool air in the summer. With nearly 142 million homes in the U.S., massive investments are required to upgrade, revitalize,



To achieve net-zero emissions by 2050, the International Energy Agency (IEA) estimates that direct building emissions will need to fall by 50% by 2030.

and retrofit buildings to achieve its net-zero GHG commitments. Make no mistake, this will be no easy feat. **To achieve net-zero emissions by 2050, the International Energy Agency (IEA) estimates that direct building emissions will need to fall by 50% by 2030.**⁷ These targets equate to a 6% reduction in building sector emissions per year by 2030.

To achieve these dramatic GHG cuts, the building stock must be connected to alternative low carbon energy sources, building envelopes upgraded, and high efficiency appliances installed. A key, and thus far untapped, financial incentive for such investments are green mortgages. Green mortgages provide a readily available resource the Federal Government can and must leverage to encourage large-scale

⁵ Adam Tooze, "Green Mortgages: Homes Need to Catch up to Climate Change," The Hill, May 13, 2021; Benjamin Goldstein, Dimitrios Gounaridis, and Joshua P. Newell, "The Carbon Footprint of Household Energy Use in the United States," ed. M. Grange Morgan, Proceedings of the National Academy of Sciences of the United States of America 117, no. 32 (August 11, 2020): 19122–30.

⁶ Robert Walton, "Biden Decarbonization Focus Shifts to Buildings, with Goal to Triple Efficiency, See up to \$200B in Savings," Utility Dive, May 19, 2021.

⁷ Ian Hamilton et al., "Launched: 2020 Global Status Report for Buildings and Construction," Global Alliance for Buildings and Construction, UN Environment Programme, December 16, 2020.

investments in energy efficiency renovations across the country. Under a green mortgage, a bank can offer a loan to upgrade an existing home with energy-saving features or for the purchase of a new home that already has these options.⁸

In the past, the government has supported home energy savings and retrofits with programs such as tax credits (i.e.: Residential Energy Tax Credits found in 26 U.S. Code §25C)⁹ or appliance rebate programs run at the state and local levels or by utilities. These sorts of programs are effective policy tools and have worked to spur upgrades in the past; however, alone they are not designed to provide financing for the deep “whole home” upgrades that many homeowners will need to retrofit their residence to a high energy efficiency standard. Similarly, existing tax credits or rebate incentives may not be significant enough to help all families with the costs associated with retrofitting a home. For lower income Americans, greater support and access to financing must be provided. In sum, the existing programs must be supplemented with additional pathways for homeowners to access financing to upgrade their home if they so choose.

The appetite for green mortgages from investors, including insurers, banks, and money managers, is enormous.¹⁰ Encouraged by the Federal Housing Finance Agency (FHFA), green mortgages at Fannie Mae, the largest issuer of green mortgages in the world, drastically increased over the last decade.¹¹ In fact, Fannie Mae has issued around \$88 billion of Multifamily Green Mortgage-Backed Securities (MBS) from 2012 to 2020, with \$13 billion in 2020 alone.¹²



8 Lindsay VanSomeren and Jordan Tarver, “Your One-Stop Shop For Green Loans,” *Forbes*, March 1, 2021.

9 “Federal Income Tax Credits and Other Incentives for Energy Efficiency,” ENERGY STAR®, accessed October 25, 2021.

10 Arthur Johnson, “Single-Family Green Mortgage-Backed Securities Blossom in First Year,” *Fannie Mae Perspectives Blog* (blog), April 22, 2021.

11 “Fannie Mae Expanded Its Nearly \$88 Billion Green Bond Business in 2020, Adding Single-Family Green Bonds to Its Offerings,” *Fannie Mae*, June 16, 2021.

12 “Fannie Mae Expanded Its Nearly \$88 Billion Green Bond Business in 2020, Adding Single-Family Green Bonds to Its Offerings.”



This growth has also been fueled by strong demand from global capital markets, with investors seeking safe and green assets. By 2030, the International Finance Corporation (IFC) reports that investments in energy efficiency improvements within the building sector will represent one of the biggest global investment opportunities, estimated to total around \$24.7 trillion by 2030.¹³



By 2030, the International Finance Corporation (IFC) reports that investments in energy efficiency improvements within the building sector will represent one of the biggest global investment opportunities, estimated to total around \$24.7 trillion by 2030.

Green mortgages similarly offer a win-win for both banks and borrowers.¹⁴ For borrowers, green mortgages can increase the value of their properties once they are more energy efficient, and they will enjoy the cost savings of living in a more efficient home. For banks and other investors, it could reduce risks to their balance sheets and recognize energy-efficient assets in their risk profiling.¹⁵

¹³ “Building Green—the Business Case,” IFC Insights, International Finance Corporation, December 2019.

¹⁴ “Building Sector Emissions Hit Record High, but Low-Carbon Pandemic Recovery Can Help Transform Sector – UN Report,” UN Environment Programme, December 16, 2020.

¹⁵ “What Are Green Mortgages & How Will They Revolutionise Home Energy Efficiency?,” World Green Building Council, accessed October 26, 2021.

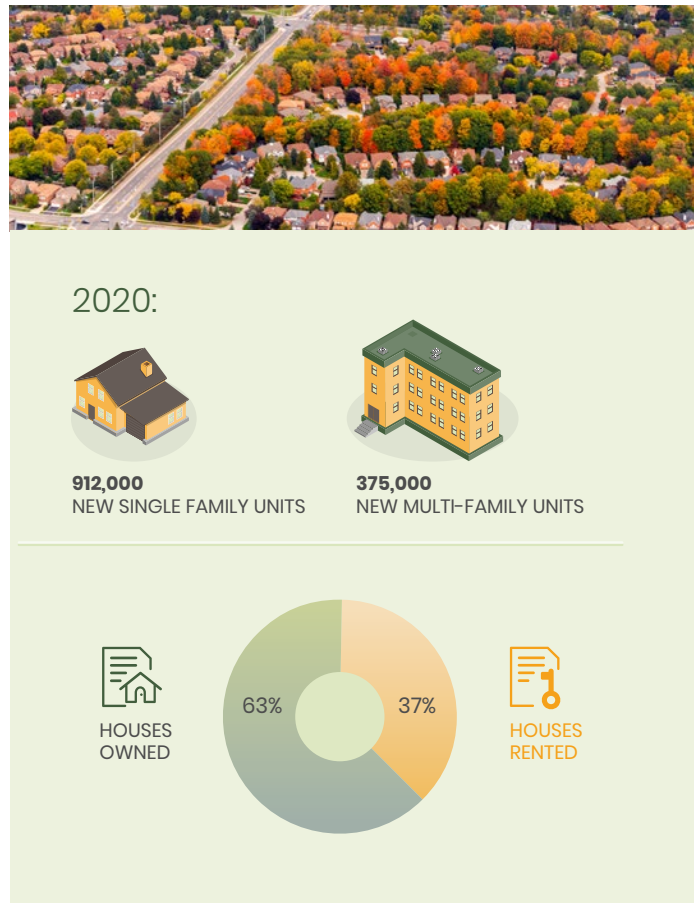
CONTEXT



U.S. HOUSING STOCK, EMISSIONS, AND EFFICIENCY STANDARDS

As of Q2 2021, the total U.S. housing stock consists of close to 142 million housing units.¹⁶ The number of residential housing units has been steadily increasing year-on-year for at least the last ten years.¹⁷ However, even though 2020 alone saw over 900,000 new single-family homes and 375,000 multi-family units constructed, nationally the median build year is 1977 with more than half of U.S. homes constructed before 1990.¹⁸ About 63% of housing units are owned, compared to 37% that are rented.¹⁹

Characterized by high energy demand, the residential sector is the third largest energy consuming sector in the United States following the industrial and transportation sectors, respectively.²⁰ This is fueled largely by rising electricity consumption which has been



16 According to the U.S. Census Bureau, "Housing unit is a house, an apartment, a group of rooms, or a single room occupied or intended for occupancy as separate living quarters. Separate living quarters are those in which the occupants live separately from others in the structure and which have direct access from the outside of the building or through a common hall. For vacant units, the criteria of separateness and direct access are applied to the intended occupants whenever possible. If the information cannot be obtained, the criteria are applied to the previous occupants. Tents and boats are excluded if vacant, used for business, or used for extra sleeping space or vacations. Vacant seasonal/migratory mobile homes are included in the count of vacant seasonal/migratory housing units. Living quarters of the following types are excluded from the housing unit inventory: Dormitories, bunkhouses, and barracks; quarters in predominantly transient hotels, motels, and the like, except those occupied by persons who consider the hotel their usual place of residence; quarters in institutions, general hospitals, and military installations except those occupied by staff members or resident employees who have separate living arrangements." U.S. Census Bureau, Housing Inventory Estimate: Total Housing Units in the United States, FRED, Federal Reserve Bank of St. Louis (FRED, Federal Reserve Bank of St. Louis), accessed October 26, 2021.

17 "A Snapshot of the Nation's Housing Stock," U.S. Census Bureau, May 21, 2020.

18 "Characteristics of New Housing," U.S. Census Bureau, accessed October 26, 2021; "American Housing Survey (AHS) - AHS Table Creator," U.S. Census Bureau, 2019; "Residential Energy Consumption Survey (RECS); Table HC2.1 Structural and Geographic Characteristics of U.S. Homes by Housing Unit Type, 2015," U.S. Energy Information Administration (EIA), May 2018.

19 "Residential Energy Consumption Survey (RECS); Table HC9.1 Household Demographics of U.S. Homes by Housing Unit Type, 2015," U.S. Energy Information Administration (EIA), May 2018.

20 Total energy consumption in 2020: 31,073.074 trillion BTU by the industrial sector; 24,295.285 trillion BTU by the transportation sector; 20,803.162 trillion BTU by the residential sector, and 16,762.815 trillion BTU by the commercial sector. "Total Energy," U.S. Energy Information Administration (EIA), accessed October 26, 2021.



steadily increasing since the 1950s.²¹ Though building improvements, the increased use of efficient appliances, and population migration to warmer climates have resulted in a decline in average annual energy use, U.S. households are consuming more energy than ever before.²² Energy consumption varies based on factors such as geography, number of individuals per household, a building’s physical characteristics, and number and type of equipment used, however on average space heating and air conditioning account for over half of a household’s yearly energy needs, followed by energy demand for appliances and consumer electronics.²³ Families living in detached single-family homes consume three times more energy than families living in apartment complexes.²⁴

The U.S. EPA estimates that the residential sector’s total greenhouse gas emissions, which increased by 10%

between 1990 and 2019, account for 5.8% of total U.S. emissions.²⁵ This rise in emissions can mostly be attributed to an almost 18,000% increase in the use of fluorinated gases essential for air conditioning, followed by emissions of carbon dioxide, methane, and nitrous oxide during fossil fuel combustion.²⁶ Direct emissions result from the use of fossil fuels in heating and cooking, waste and water management, and refrigerant leaks.²⁷ Indirect emissions include the consumption of electricity generated offsite for lighting, appliances, and other similar uses. The EPA’s GHG calculation for households would be higher if electricity



Residential emissions account for 20% of the U.S. total, a figure which equals more than South Africa’s total emissions in 2018.”

21 “Total Energy.”

22 “Use of Energy Explained; Energy Use in Homes,” U.S. Energy Information Administration (EIA), June 23, 2021.

23 “Use of Energy Explained; Energy Use in Homes.”

24 “Use of Energy Explained; Energy Use in Homes.”






25 The EPA’s estimates for 2019 GHG emissions by economic sector: transportation 28.6%, electricity generation 25.1%, industry 23%, agriculture 10.2%, commercial 6.9%, U.S. territories 0.4%. Total emissions were over 6,558 MMT CO2 equivalent. “Greenhouse Gas Inventory Data Explorer,” U.S. Environmental Protection Agency, accessed October 26, 2021.

26 “Greenhouse Gas Inventory Data Explorer,” U.S. Environmental Protection Agency, accessed October 26, 2021.

27 Refrigerant leaks have many sources, from factory defects, to wear-and-tear, and to the improper disposal or maintenance on air conditioning units. Through Final Rule 40 CFR Part 82, Subpart F, the EPA prohibits technicians from ‘venting’ refrigerant into the air, however in practice this rule can be difficult to enforce. “Sources of Greenhouse Gas Emissions,” U.S. Environmental Protection Agency, accessed October 26, 2021; “Stationary Refrigeration - Prohibition on Venting Refrigerants,” U.S. Environmental Protection Agency, accessed October 25, 2021.



OF TOTAL HOUSING UNITS:

- 
80%
 DID NOT PERFORM AN ENERGY AUDIT
 (7.5% DID)
- 
50%
 DID NOT HAVE SMART METERS
 (22% DID)
- 
50%
 ARE ONLY "ADEQUATELY" INSULATED
 (30% ARE WELL INSULATED)
- 
1%
 USE EXCLUSIVELY LED LIGHT BULBS INDOORS
- 
50%
 USE HEATING EQUIPMENT THAT IS 10+ YEARS OLD

sector emissions were allocated based on sector end-use; 31% of the electricity sector's emissions can be attributed to residential and commercial consumption.²⁸ This brings other GHG emissions estimates for the residential sector closer to 20% of the U.S. total, a figure which equals more than South Africa's total emissions in 2018.²⁹ In general, indirect emissions of CO₂ decreased between 1990 and 2019 in part thanks to the shift from coal to natural gas and renewables.³⁰ Still, the residential and commercial sector constitutes a large share of domestic electricity use.

There is room for energy efficiency improvements in the U.S. housing sector. According to

the EIA's 2015 Residential Energy Consumption Survey,³¹ 80% of total housing units had not performed an energy audit while just 7.5% had.³² About 50% of housing units do not have smart meters (compared to about 22% that did), about 50% are only "adequately" insulated (compared to about 30% that are "well" insulated), only 1% use exclusively LED light bulbs indoors, and close to 50% utilize heating equipment that is at least 10 years old.³³ Green building techniques, green retrofits, and the adoption of energy efficiency products and practices represent a few opportunities to reduce emissions in this sector.³⁴

28 "Sources of Greenhouse Gas Emissions."

29 Goldstein, Gounaridis, and Newell, "The Carbon Footprint of Household Energy Use in the United States"; "Historical GHG Emissions," Climate Watch, accessed October 26, 2021.

30 "Total Energy."

31 Housing characteristics data were collected between August 2015 and April 2016.

32 "Residential Energy Consumption Survey (RECS); Table HC2.1 Structural and Geographic Characteristics of U.S. Homes by Housing Unit Type, 2015."

33 "Residential Energy Consumption Survey (RECS); Table HC2.1 Structural and Geographic Characteristics of U.S. Homes by Housing Unit Type, 2015"; "Residential Energy Consumption Survey (RECS); Table HC5.1 Lighting in U.S. Homes by Housing Unit Type, 2015," U.S. Energy Information Administration (EIA), May 2018; "Residential Energy Consumption Survey (RECS); Table HC6.1 Space Heating in U.S. Homes by Housing Unit Type, 2015," U.S. Energy Information Administration (EIA), May 2018.

34 "Sources of Greenhouse Gas Emissions."

GREEN MORTGAGES: THE KEY TO ACCELERATING **EQUITABLE** **CLEANTECH INVESTMENTS**

In 2019, there were over 44.5 million households with at least one regular mortgage, of which about 70% were obtained since 2010.³⁵



In 2019, there were over 44.5 million households with at least one regular mortgage, of which about 70% were obtained since 2010."

good news is that many of the technologies needed to decarbonize U.S. homes already exist, however they often cost more than their less efficient substitutes and therefore need additional support to gain traction with consumers. Thus, in order to reach net-zero by 2050 and prevent "carbon lock-in" in the housing sector, greater emphasis needs to be placed on scaling new design and construction standards and expanding multifamily housing.³⁸

For many Americans, these are long-term investments; with average existing mortgage terms running 27 years and medium terms running 30 years.³⁶ As financial institutions and various investors have become increasingly interested in ESG, green securities, and other green investments--the mortgage market represents a tremendous opportunity to help fill the existing gap for market-ready green investments.³⁷ **The**



As financial institutions and various investors have become increasingly interested in ESG, green securities, and other green investments--the mortgage market represents a tremendous opportunity to help fill the existing gap for market-ready green investments."

35 "Fixed rate loans, adjustable rate loans, ARM, or any loan where a fixed amount was borrowed and must be repaid at predetermined intervals. Regular mortgages include all mortgages not classified as home-equity credit lines or reverse annuity mortgages. Regular mortgages include home equity lump sum mortgages, but exclude home-equity credit lines and reverse annuity mortgages." "American Housing Survey (AHS) - AHS Table Creator"; "American Housing Survey for the United States: 2019; Appendix A; Subject Definitions and Table Index" (U.S. Department of Housing and Urban Development and U.S. Census Bureau, 2019).

36 "American Housing Survey (AHS) - AHS Table Creator."

37 Greg Hopkins, David Heslam, and Rita Ballesteros, "Build Back Better Homes; How to Unlock America's Single-Family Green Mortgage Market" (RMI, 2021).

38 Post-WWII policies encouraged single-family, suburban housing development. Low-carbon homes tend to be smaller and characterized by denser settlement patterns, hence the emphasis on multi-family housing complexes. Yale School of the Environment, "What Is Driving Reductions in Residential Greenhouse Gas Emissions in the US?," ScienceDaily, May 5, 2021; Goldstein, Gounaridis, and Newell, "The Carbon Footprint of Household Energy Use in the United States."

Greening the residential sector also presents an opportunity to address inequity and support the Biden administration’s Build Back Better initiative.³⁹ It is estimated that 31% of households experience energy insecurity, 21% reduce or forgo food or medication in order to cover energy bills, 5-6% are unable to use heating or cooling equipment, and 15% receive disconnect or ‘delivery stop’ notices. The majority of American households pay more for energy than they do for property taxes or home insurance, and yet energy costs are not factored into mortgage affordability calculations.⁴⁰ Past funding barriers have led to underinvestment and, consequently, substandard housing⁴¹. A green mortgage plan has the potential to address energy poverty (by reducing energy costs) and homeownership disparities (by redirecting investment toward historically marginalized groups).⁴²

Green mortgages can become an investment vehicle that can meet both investor demand and consumer demand for green home improvements. While inroads have been made in creating a market for multifamily green mortgage-backed securities, a similar market for single-family homes is lacking.



The majority of American households pay more for energy than they do for property taxes or home insurance, and yet energy costs are not factored into mortgage affordability calculations."



39 “Residential Energy Consumption Survey (RECS); Table HC11.1 Household Energy Insecurity, 2015,” U.S. Energy Information Administration (EIA), May 2018; “The Biden Plan to Build Back Better by Advancing Racial Equity Across the American Economy,” Joe Biden for President: Official Campaign Website, accessed October 26, 2021.

40 Hopkins, Heslam, and Ballesteros, “Build Back Better Homes; How to Unlock America’s Single-Family Green Mortgage Market.”

41 Hopkins, Heslam, and Ballesteros.

42 Bracken Hendricks et al., “Economics Recovery Begins at Home: Retrofitting US Housing Stock for Jobs, Health, Savings, and the Climate” (Roosevelt Institute and Evergreen Collaborative, March 2021).

HOME OWNERSHIP AND THE “AMERICAN DREAM”

Over the last century, home ownership has been a cornerstone of the American Dream. Since the end of the Great Depression, the Federal Government has systematically encouraged, through decades of financial incentives and legislative subsidies, the idea that owning a home was the first step toward (and best determinant of) financial security, generational wealth and upward mobility. For many, a home will not only be their largest financial asset, but it also serves as a cultural hallmark of adulthood and stability. Since then, American families have sought out these mortgages for their piece of the American Dream and a fast-track to the middle class.

Historically, government-sponsored enterprises (GSEs) such as Fannie Mae and Freddie Mac, offered affordable 30-year mortgages to a large segment of the American population, all the while **systematically excluding many minority and low-income households**. The legacy of these 20th century redlining practices, which kept marginalized families out of more desirable neighborhoods—has now also put them at greater risk to suffer from extreme weather



The legacy of these 20th century redlining practices, which kept marginalized families out of more desirable neighborhoods—has now also put them at greater risk to suffer from extreme weather events and heat waves made more severe and more frequent as a result of climate change.

events and heat waves made more severe and more frequent as a result of climate change.⁴³

The Financial Crisis of 2008-09 and the Great Recession also impacted American society in an indelible way, the effects of which we are still dealing with today. At that time, roughly eight million homes were foreclosed on and

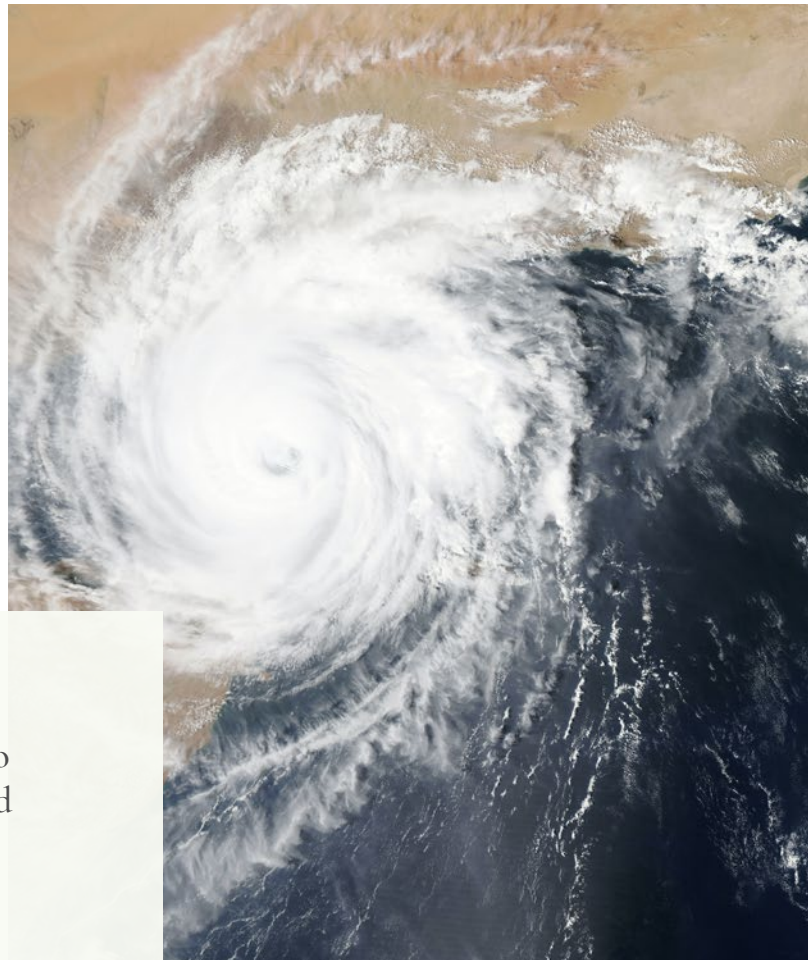
⁴³ Brad Plumer and Nadja Popovich, “How Decades of Racist Policy Left Neighborhoods Sweltering,” The New York Times, August 24, 2020.

around \$7 trillion in home equity was erased. With the impact of COVID-19 continuing to disrupt the economy and certain housing markets, and with the climate crisis threatening to damage millions of homes in the coming decades, it is time to reevaluate the role of homeownership in the American Dream through a new, green lens.

The Biden Administration has already demonstrated an initial commitment to greening the U.S. building stock through the Department of Energy's Better Buildings Initiative and Low-Carbon Buildings Pilot program.⁴⁴ Although these are admirable steps in the path toward low and no emission buildings, a great deal more needs to be done at a national level.

If the U.S. is to meet its goals of net-zero emissions by 2050, every mortgage issued today should be a green mortgage. Within the coming decades, the commitment made by the Federal Government should be to ensure that every American homeowner and tenant should

live in an energy efficient home, unburdened by the costs of excessively high utility bills. With the support of the Federal Government and incentives to foster greater access to green mortgages, millions of homes and businesses will be able to transition to higher energy efficiency standards, and reduce energy demand in the built environment for all Americans. Only then can the American Dream truly be accessible to all who seek it.



If the U.S. is to meet its goals of net-zero emissions by 2050, every mortgage issued today should be a green mortgage.

⁴⁴ "Fact Sheet: Biden Administration Accelerates Efforts to Create Jobs Making American Buildings More Affordable, Cleaner, and Resilient," The White House, May 17, 2021.

An aerial photograph of a lush green field, possibly a golf course or a park, featuring several circular paths or patterns in the grass. On the right side of the image, there is a large, semi-transparent circular graphic that overlaps the field's patterns. The text "A PATH FORWARD" is centered in the upper half of the image in a white, sans-serif font.

A PATH
FORWARD

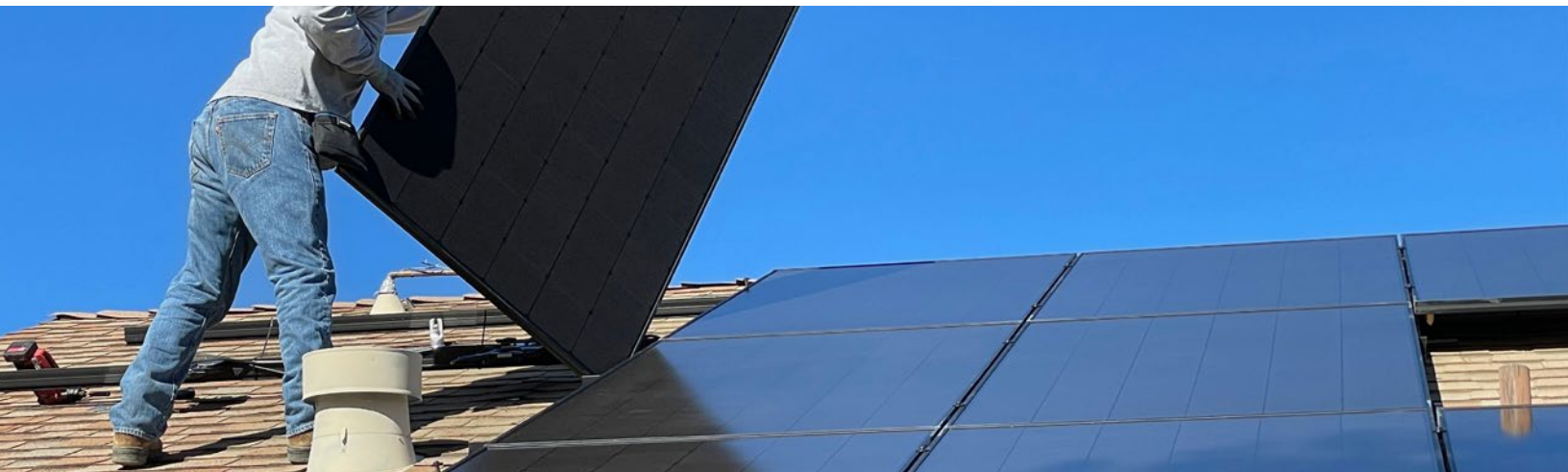
1. DEVELOP A NATIONAL STANDARD FOR A **NET-ZERO ‘GREEN’ HOME**

Currently, there is no uniform, federal-ly-sanctioned definition for green mortgages. This creates a series of challenges for home mortgage buyers, GSEs, and other investment lenders that seek to fund or purchase green mortgages. With such discrepancies and variations in what a green mortgage actually entails, there is room for both market distortions and greenwashing. For example, it has been argued that GSEs are able to package mortgage-backed securities as “green”, even though many of those mortgages may only make minor adjustments to overall home energy efficiency.⁴⁵

In addition, state and local governments, through subsidies and preferred-rate

mortgage loan agreements, may be incentivizing minor home energy efficiency improvements over more substantive, long-term energy reductions. This imbalance not only creates a patchwork of regressive policy incentives, but it creates only small energy reductions that do little to meet the U.S. commitments to the Paris Climate agreement, all while incurring costs to the governments involved. Without a clear definition, green mortgages may end up creating more confusion for homeowners and ultimately, may disincentivize investments toward more comprehensive home energy emissions reductions.

At the same time, the appetite for green mortgages is immense. With investors



⁴⁵ Naveena Sadasivam and Clayton Aldern, “Has Fannie Mae’s \$95 Billion in Green Bonds Made Anything Greener?,” *Grist*, August 11, 2021.

continuing to rapidly seek out green investment portfolios, this action will have immediate and long-term effects in spurring additional market shifts toward GHG emissions reductions. The appetite for green bonds is well demonstrated. For example, since 2012, Fannie Mae has issued nearly \$95 billion in green bonds. This makes the GSE the largest issuer of green bonds in the world.⁴⁶ Over the last year alone, Fannie Mae has similarly issued nearly \$14 billion in Multifamily Green Bonds and nearly \$94 million in Single-Family Green Mortgage-Backed Securities (MBS), since their inception in 2020.

In the same vein, investor demand is also driving the need to identify whether these investments are having any actual environmental impact and allow for comparison between financial products. **Without a clear standard tied to specific home energy efficiency and emissions reductions, any home mortgage lender would be able to advertise or package efficiency measures under a green mortgage label, hindering comparability and accountability for real emissions reductions.** We already see these sorts of discrepancies in the current market, where Fannie Mae and Freddie Mac have two separate standards for what makes a mortgage “green.” For example,

Fannie Mae requires homeowners seeking a single family green mortgage loan to provide evidence that their building has obtained one of 40 sustainability certifications approved by the organization [i.e. Leadership in Energy and Environmental Design (LEED)- certified] or reduce water and energy use by 30% within the first year of securing a loan.⁴⁷ On the other hand, Freddie Mac’s GreenCHOICE Mortgages require homeowners to make basic energy and/or water efficiency improvements with a focus on solar panel installation.⁴⁸

The RCRC, therefore, recommends that the Federal Government, under the purview of the FHFA, set a clear national standard defining a green mortgage. This standard should include a specific set of criteria for home efficiency standards, and should be tied to home energy use and water savings. Existing home energy rating programs, such as DOE’s Home Energy Score or Home Performance



The RCRC recommends that the Federal Government, under the purview of the FHFA, set a clear national standard defining a green mortgage.

⁴⁶ “2020 Green Bond Impact Report; Our Next Chapter in Green Bond Leadership” (Fannie Mae, 2021).

⁴⁷ Sadasivam and Aldern, “Has Fannie Mae’s \$95 Billion in Green Bonds Made Anything Greener?”

⁴⁸ “GreenCHOICE Mortgages®,” Freddie Mac Single Family, accessed October 25, 2021.

with ENERGY STAR⁴⁹ could be referenced or built upon as part of the FHFA's definition of a green mortgage. This first practical and straightforward policy proposal will have a substantive effect in reducing GHG emissions from the energy used to both heat and cool nearly two hundred million single and multi-family homes in the U.S.⁵⁰ In setting a national standard for green mortgages, and by extension, green bonds, the FHFA is able to set a high bar for quality control around home energy and efficiency standards. This will lead to more effective and efficient GHG emissions reductions from home energy usage.

The FHFA has the authority to set such standards for its regulated entities, which include two of the largest home mortgage lenders in the country. In 2020, Fannie Mae and Freddie Mac owned roughly 62% of the U.S. mortgage market (totaling about \$4.6 trillion).⁵¹ Through

the issuance of Fannie Mae's multifamily and single-family green bond issuances since 2012, the organization estimates to have prevented 634,000 metric tons CO₂ equivalent of GHG emission from being released into the atmosphere.⁵² This is equivalent to roughly 137,000 passenger vehicles being removed from the road.⁵³ **A national standard will help codify a uniform measurement for these energy reductions, in addition to comparative energy efficiencies across home mortgage lenders.**

It must be mentioned that there is already concrete work being done to address this issue. The RCRC applauds the policy moves by the FHFA in seeking to identify and assess future climate and natural disaster risk associated with its regulated entities.⁵⁴ The FHFA released a Request for Information (RFI) earlier this year seeking input into the



Since 2012, the organization estimates to have prevented 634,000 metric tons CO₂ equivalent of GHG emission from being released into the atmosphere. This is equivalent to roughly 137,000 passenger vehicles being removed from the road."

49 "Home Energy Score," U.S. Department of Energy Better Buildings Initiative, accessed October 27, 2021; "Expert Home Improvements," ENERGY STAR®, accessed October 27, 2021.

50 "Single-Family vs Multifamily Homes in the U.S. 2021," Statista, October 18, 2021.

51 "What Types of Mortgages Do Fannie Mae and Freddie Mac Acquire?," Federal Housing Finance Agency (blog), April 14, 2021; Sheeraz Raza, "Fannie Mae: Who Owns The U.S. Mortgage Markets?," ValueWalk, March 7, 2016.

52 "2020 Green Bond Impact Report; Our Next Chapter in Green Bond Leadership."

53 Jessica Leung, "Decarbonizing U.S. Buildings" (Arlington, VA: Center for Climate and Energy Solutions (C2ES), July 2018).

54 "Climate and Natural Disaster Risk Management at the Regulated Entities; Request for Input" (Federal Housing Finance Agency, January 2021).

Agency's supervision and regulation of each regulated entity's management of such risks. These are positive and concrete steps toward creating a national standard, which can be applied across the green mortgage lending sector. **The RCRC encourages the FHFA to adopt a standard definition through a fast-track process and issue immediate guidance to ensure that all new mortgages issued this coming year will meet the criteria set under a green mortgage standard.** In addition, the RCRC recommends incorporating an equity component to the national standard. In addressing the barriers to sustainable green mortgage opportunities, the FHFA can require the GSE's goals to align with their practices in advancing housing finance equity with energy efficiency reductions.



The RCRC encourages the FHFA to adopt a standard definition through a fast-track process and issue immediate guidance to ensure that all new mortgages issued this coming year will meet the criteria set under a green mortgage standard.



2. LED BY THE FHFA, UNDERTAKE A DIRECTIVES PROCESS TO SPUR GREEN MORTGAGES **FOR MULTIFAMILY AND SINGLE FAMILY HOMES**

Loans have been harder to acquire since the start of the COVID-19 pandemic despite a drop in mortgage rates. Lenders, concerned about forbearance, defaults, and higher costs due to a fall in credit availability and lender liquidity, as well as investors pulling out of mortgage-backed bonds, have tightened mortgage criteria. For example, Wells Fargo temporarily suspended its purchase of nonconforming loans and refinancing, JPMorgan Chase announced a new temporary FICO score threshold of 700 and minimum 20% down payment, and some nonbank lenders have increased the minimum credit score to qualify for FHA loans (which are typically geared towards buyers with lower credit scores and down payments). As a consequence, homebuyers are finding that their mortgage applications are more likely to be rejected, that they no longer qualify for loans, and that the time required to “lock in” a mortgage rate has increased dramatically. So far, Ginnie Mae (for its FHA loans) has responded to mortgage



As a consequence, homebuyers are finding that their mortgage applications are more likely to be rejected, that they no longer qualify for loans, and that the time required to “lock in” a mortgage rate has increased dramatically.”



servicers' requests for a liquidity facility to help make payments to bondholders while the Federal Reserve began purchasing conforming mortgage-backed bonds, but market risks are still high.⁵⁵ COVID-19 dealt a blow to the

⁵⁵ Diana Olick, “Here’s Why It’s Suddenly Much Harder to Get a Mortgage, or Even Refinance,” CNBC, April 13, 2020.



The RCRC recommends that the FHFA revise Fannie’s and Freddie’s underwriting criteria to account for and give preference to potential borrowers with green loan needs in order to increase the volume of green housing loans on the market.

previously healthy mortgage market, but this is just the tip of the iceberg compared to the impending, permanent financial quagmire resulting from climate change.

Mortgage underwriting takes into account employment history and income, assets and liabilities, and credit history as criteria that verify that the homebuyer and the property being purchased meet a loan’s standards. There are seven key factors that determine the interest rate on a mortgage, and therefore mortgage affordability and accessibility: credit score, home location, home price and loan amount, down payment, loan term, interest rate type, and loan type.⁵⁶ **Therefore the RCRC recommends that the FHFA revise Fannie’s and Freddie’s underwriting criteria to account for and give preference to potential borrowers with green loan needs in order to increase the volume of green housing loans on the market.** As outlined above, the current market lacks attractive and accessible

green mortgage incentives, and the mortgage application process poorly caters to the green loans market.

There is precedence for implementing the mechanisms of change we need in order to reach net-zero emissions by 2050. Between 2018 and 2020, the Fannie and Freddie charter acts—which established the secondary mortgage market and made mortgages more accessible and affordable to the public—and the Federal Housing Enterprises Financial Safety and Soundness Act of 1992 were amended. Here, the FHFA approved a joint credit score solicitation prepared by Fannie and Freddie that sought to evaluate new credit score models with the purpose of supporting the “safe and sound path to sustainable homeownership.” This initiative set the criteria for the solicitation, validation, and approval process for third-party credit score models that GSEs can use.⁵⁷ In August 2021, the FHFA announced that going forward,

⁵⁶ Nicole Shea, “Seven Factors That Determine Your Mortgage Interest Rate,” U.S. Consumer Financial Protection Bureau (blog), September 29, 2017.

⁵⁷ “12 CFR Part 1254, RIN 2590-AA98, Validation and Approval of Credit Score Models” (Federal Housing Finance Agency, August 13, 2019); “Fact Sheet: Validation and Approval of Credit Score Models - Final Rule” (Federal Housing Finance Agency), accessed October 24, 2021; “Fannie Mae and Freddie Mac Publish Joint Enterprise Credit Score Solicitation,” Federal Housing Finance Agency, February 18, 2020; “Credit Score Models,” Freddie Mac Single-Family, accessed October 25, 2021; “Credit Scores,” Federal Housing Finance Agency, November 10, 2020.

rental payment history will be included in Fannie Mae’s underwriting process. This decision does not serve as an additional burden on the homebuyer or lender, and can help individuals with positive rental payment history to qualify for loans.⁵⁸ **Credit, underwriting, and other mortgage-related standards can be modified to better meet the needs of the American people.** Therefore, the FHFA and the GSEs must now focus on implementing new directives processes and other similar procedures to shift the market to one that prioritizes green mortgages. The Federal Government, through the FHFA and its GSEs, has the policy and market power to transform the mortgage market to one that encourages emissions reductions from the housing sector and both prepares for, and mitigates the effects of, climate change.

For example, FHFA could revisit its use of the FICO model for assessing credit risk. The joint credit score solicitation process described above still often locks out underserved borrowers and potential homeowners. Used by 90% of top U.S. lenders when making lending decisions, FICO⁵⁹ scores range from 300 to 850 and are based on a borrower’s payment history, amounts owed, length of credit history, credit mix, and how recently they’ve applied for new credit. A “good” score starts at 670 points; the higher one’s FICO score, the more likely they are to receive credit approval faster and the lower their interest rate is expected to be.⁶⁰ This model requires adjustment in order to support both the green mortgage market and underserved communities. For example, **FHFA could consider granting green mortgage holders bonus points to compensate for their FICO scores, which would otherwise be too low to be eligible for a loan. Alternatively, preferential interest rates could and should be applied to mortgages that are green, regardless of the FICO score.** Both actions incentivize uptake of green mortgages and increase their accessibility to marginalized populations.

Furthermore, the FHFA could **reconsider its so-called conforming loan limits,**



The Federal Government, through the FHFA and its GSEs, has the policy and market power to transform the mortgage market to one that encourages emissions reductions from the housing sector and both prepares for, and mitigates the effects of, climate change.”

58 “FHFA Announces Inclusion of Rental Payment History in Fannie Mae’s Underwriting Process,” Federal Housing Finance Agency, August 11, 2021.

59 There are various types of FICO scores, including Classic FICO, FICO Auto Scores, FICO 2, FICO 4,, FICO 5, FICO 8, and FICO 9. Each one utilizes a unique base scoring method (based on the source from which data is collected, such as Equifax, TransUnion, and Experian) and may be industry-specific (such as for the mortgage market or auto loans). FICO 8 and FICO 9 are most widely used. Kiah Treece and Jordan Tarver, “What Is A FICO Score, And Why Should You Care?,” Forbes, August 25, 2021.

60 “How Lenders Use FICO® Scores in Credit Checks,” myFICO, accessed October 25, 2021; Treece and Tarver, “What Is A FICO Score, And Why Should You Care?”

which are the limits for mortgages to be acquired by Fannie and Freddie, adjusted yearly as per the Housing and Economic Recovery Act of 2008 (“HERA”).⁶¹ The upfront costs of greening the housing stock through new green-builds or renovations are high; without adjusting the conforming loan limits, green-builds may become ineligible for GSE support. Alternatively, homebuyers should not be penalized for wanting to invest in green properties by paying higher interest rates on their loans. Instead, they should be incentivized to make the investment with an attractive interest rate (or interest rate reduction) or greater down payment flexibility (that is not then penalized with a higher interest rate). **These higher costs are offset by climate mitigation and climate change preparedness resulting from a greener, more environmentally-safe housing stock.**

Fannie and Freddie could build in greater flexibility in other ways, namely with respect

to the way that a borrower’s income and assets are taken into account. Recently, in light of the pandemic’s impacts on jobs, Fannie and Freddie made changes to underwriting guidelines—requiring income and asset documentation to be dated within 60 days of the initial application compared to the previous 120 days (the time period for confirming self-employed status was revised from 120 days to 10 days). Likewise, Fannie temporarily adopted stock, stock options, and mutual fund policy revisions that help these assets comply with credit underwriting requirements. The purpose of these changes is to have the most up-to-date information about a borrower’s ability to repay the loan.⁶² A similar concept could be applied to green mortgages, where income and asset standards are assessed in a more flexible manner so as to increase the number of green mortgage holders. Alternatively, a green mortgage holder could be compensated with an interest rate or other reduction. This flexibility should keep in mind

that underserved populations do not have the luxury of using stocks and mutual funds to support their mortgage applications; in such cases, the FHFA could permit Fannie and Freddie to navigate this client group with greater leniency and consider other applicable underwriting criteria, such as the previously mentioned decision to include

“

The upfront costs of greening the housing stock through new green-builds or renovations are high; without adjusting the conforming loan limits, greenbuilds may become ineligible for GSE support.”

⁶¹ “FHFA Announces Conforming Loan Limits for 2021,” Federal Housing Finance Agency, November 24, 2020.

⁶² “Fannie Mae, Freddie Mac Tighten Some Standards, Loosen Others amid Coronavirus Crisis,” HousingWire, March 31, 2020.



Income and asset standards are assessed in a more flexible manner so as to increase the number of green mortgage holders."

rental payment history. Unlike COVID-19-related leniencies, these should be permanent and limited to green loans.

Green mortgages could also become a separate category of affordable homeownership options. Fannie currently has various programs that cater to clients seeking low down payment financing, discounted fees, or refinancing options that take into account little to no equity.⁶³ A specialized, so-called "Duty to Serve"⁶⁴ program specific to the green mortgage agenda could encourage green borrowing across socio-economic groups, accepting potential borrowers whose creditworthiness may be insufficient under current standards by designing the homeownership option in a manner that is inclusive by default. The FHFA could see this through by a "Duty to Underserved Markets" rule similar to the one already in place that requires GSEs to develop three-year plans (informed by public feedback) and submit its

resulting evaluations to Congress. The 2018-2020 Plan focused on conducting research and outreach to understand underserved markets, facilitating market collaboration and participation, developing policies and standards to expand the market so as to be inclusive of the underserved market, increasing the purchase

of loans in these markets, and developing new or expanding current products to meet these newly determined needs.⁶⁵ This exercise would not only help to develop a specialized green mortgage market but would also give Fannie and Freddie a platform through which to build this uniform, standardized market together. As it did with other programs, implementing the "Duty to Underserved Markets" rule would, among other issues, help determine the number of green loans that the GSEs would purchase over the course of the three-year plan and its yearly growth thereafter. These plans must be ambitious, rigorous, and



A specialized, so-called "Duty to Serve" program specific to the green mortgage agenda could encourage green borrowing across socio-economic groups"

⁶³ These include the HomeReady Mortgage, Standard 97 Percent Loan-to-Value Mortgage, and Refi Plus/ Home Affordable Refinance Program, among others. "Affordable Mortgage Lending Guide" (Federal Deposit Insurance Corporation), accessed October 24, 2021.

⁶⁴ DTS currently includes the following underserved markets: Manufactured Housing, Affordable Housing Preservation, and Rural Housing. "Duty to Serve Program," Federal Housing Finance Agency, accessed October 25, 2021; "Duty to Serve Data," Federal Housing Finance Agency, accessed October 25, 2021.

⁶⁵ "Affordable Mortgage Lending Guide," 96.

robust if the nation is to achieve net-zero emissions by 2050.

Finally, legislation similar to HERA would further push the market to go green. This act, under which the FHFA was created, was passed by Congress in 2008 following the subprime mortgage crisis. It included several sub-title acts. The Housing Assistance Tax Act, for example, offered a refundable tax credit (and emergency assistance) for qualified first-time homebuyers. In another example, the FHA Modernization Act increased the FHA's loan limit from 95% to 110% of the area median home price (up to 150% of the GSE conforming loan limit), placed a moratorium on the U.S. Department of Housing and Urban Development's risk-based premiums, and authorized the FHA to insure up to \$300 billion of 30-year fixed-rate refinance loans up to 90% of appraised value for distressed borrowers.⁶⁶ Given the emergency situation we are in with respect to climate change, green mortgages require similar preferences. It would benefit American homeowners, lending institutions, and the state of the climate to pass such legislation before it is too late.



Given the emergency situation we are in with respect to climate change, green mortgages require similar preferences. It would benefit American homeowners, lending institutions, and the state of the climate to pass such legislation before it is too late."

⁶⁶ "Housing and Economic Recovery Act of 2008," Pub. L. No. 110-289, 122 Stat. 2654 (2008); Adam Hayes, "Housing And Economic Recovery Act (HERA)," Investopedia, January 1, 2021.

3. ALLOCATE FEDERAL DOLLARS TO CAPACITY BUILDING **ACROSS THE GREEN MORTGAGE MARKET**

The housing market is vast and expanding—in the last year alone, there were nearly 1.3 million new single-family homes built.⁶⁷ **In order for green mortgages to effectively take root in the home mortgage market, there needs to be enough technical capacity and know-how to assess energy efficiency measures and install upgrades.** This technical capacity support may take the form of additional home inspectors, home energy auditors, or third-party verification. At the moment, banks, lenders, and GSEs, such as Fannie Mae and Freddie Mac, do not have enough internal technical capacity to quantify the sheer number of single family housing units in the U.S. that would qualify for a green mortgage, let alone perform the baseline emissions/efficiency assessments, outline the eligible upgrades and corresponding incentives, and follow up with inspections and/or certifications.

A dramatic expansion of the green mortgage market would create tens of thousands of high-paying jobs related to home energy efficiency products, services and audits. The



In order for green mortgages to effectively take root in the home mortgage market, there needs to be enough technical capacity and know-how to assess energy efficiency measures and install upgrades."

RCRC, therefore, recommends that additional funds be allocated for scaling-up technical capacity, either through additional federal funds set aside for the FHFA or through federal training programs, which address the skills and capacity gap in the broader green home market. Even with such funding, bottlenecks may occur in training the tens of thousands of appraisers, property managers, and home energy auditors needed to assess both future and existing U.S. housing stocks. Acting now will ensure the necessary technical capacity is there to meet the market's future demand for home energy efficiency upgrades and retrofits.

Capacity building can only happen successfully with accurate and comprehensive data.

⁶⁷ Rose Quint, "What Home Buyers Really Want," Special Study for Housing Economics (National Association of Home Builders, March 2021).

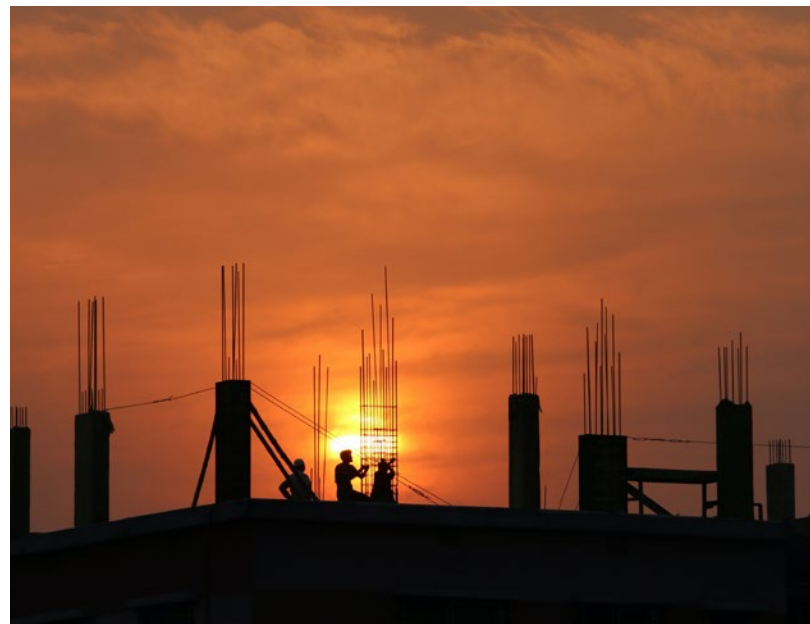


The RCRC recommends that additional funds be allocated for scaling-up technical capacity, either through additional federal funds set aside for the FHFA or through federal training programs, which address the skills and capacity gap in the broader green home market.

Now more than ever, **we need green housing and green mortgage data to be thoroughly collected and made publicly available.** For example, the U.S. Energy Information Administration (EIA) releases data under programs such as the Residential Energy Consumption Survey (RECS) and Commercial Buildings Energy Consumption Survey (CBECS)⁶⁸. With respect to the former, published data covers household characteristics (including fuels used and end uses, appliances, electronics, lighting, space heating, air conditioning, water heating, and household energy insecurity), home energy use and costs (by fuel, end uses, consumption and expenditure estimates, and space heating consumption estimate), as well as detailed microdata. These categories are further broken down into climatic region, housing unit type, year of construction, and number of household members. The U.S. Census Bureau’s American Housing Survey similarly provides housing unit characteristics data as well as home improvement and

mortgage characteristics data, among a vast amount of additional information.⁶⁹

Clearly U.S. agencies already collect a massive array of data, however this data generally lacks focus on green energy, consumption, and construction credentials. The closest data points already regularly collected relate to energy consumption, the use of LED-lighting, and generic information relevant



⁶⁸ “Consumption & Efficiency Data,” U.S. Energy Information Administration (EIA), May 2018.

⁶⁹ See for example: “Residential Energy Consumption Survey (RECS); 2015 RECS Survey Data,” U.S. Energy Information Administration (EIA), accessed October 25, 2021; “American Housing Survey (AHS) - AHS Table Creator”; “Characteristics of New Housing”; “Use of Energy Explained; Energy Use in Homes.”

to insulation. We urgently need more nuanced housing market data to understand (1) the types of efficiency improvements required in the current housing stock, (2) the lessons learned from installing net-zero technologies in newbuild construction, and (3) the amount of financing and technical support that will be required to make the adjustments necessary for us to reach net-zero by 2050. Given their areas of expertise, we recommend that the Department of Energy (DOE) and EIA set the criteria for data collection, conduct the collection process, and run these analyses. Finally, it should be noted that while data gathering is urgent, it should not preclude the important regulatory work outlined above to scale a green transformation in the mortgage market.



We urgently need more nuanced housing market data to understand (1) the types of efficiency improvements required in the current housing stock, (2) the lessons learned in newbuild construction, and (3) the amount of financing and technical support that will be required to make the adjustments necessary for us to reach net-zero by 2050. Given their areas of expertise, we recommend that the Department of Energy (DOE) and EIA set the criteria for data collection, conduct the collection process, and run these analyses.



A Tale of Two Coasts - California

There are 10 million single-family housing units in California, of which, 65% were built before energy efficiency standards were implemented in 1978. Half of the state's homes consume the vast majority of their energy from heating water and interior spaces. **As the most populous state in the nation, California's policy incentives and financing options for home energy efficiency upgrades create a huge opportunity to implement long-term GHG emissions reductions.**

California currently offers "green-like" mortgage financing through California's Green Bank, under the State Treasurer's Office. More specifically, **California provides energy efficiency loans to homeowners and tenants through the Residential Energy Efficiency Loan (REEL) Assistance Program.** This program provides financing options from the State of California to help residents save energy via home energy efficiency renovations and improvements. The program offers a credit enhancement as a way to mitigate any risks of future default. As a result, energy efficiency loans would, in theory, enable the eight currently-approved lenders to offer lower rates and higher loan amounts.⁷⁰

⁷⁰ "GoGreen Home Energy Financing; Energy Efficiency Loans for California Homeowners and Tenants," California State Treasurer's Office, accessed October 25, 2021.



A Tale of Two Coasts - Florida

If there is any state in the U.S. that should be concerned about the impacts of climate change on the housing market, it's Florida. With its many miles of coastline, various studies have focused on Florida's property market given its vulnerability to the climate crisis. For instance, a 2014 study estimated that some Floridian's homes and commercial properties would be underwater before their 30-year mortgages would be paid off.⁷¹ Another study estimates that between \$15 and \$23 billion of existing property would be underwater by 2050, while others project that more than 1 million homes—representing 40% of all at-risk homes in the U.S.—are at risk due to sea level rise by 2100.⁷² Finally, **one in eight Florida properties (representing a total value of \$400 billion—half of the expected lost housing value nationwide) are predicted to be underwater by 2100 if water levels rise by the six feet projected.**⁷³

Five years ago, daily high-water levels in Miami had already been increasing by about an inch a year. While insurance is essential for buyers looking to purchase property in such areas prone to flood-risk, not all impacts of climate change (like

71 Krishna Rao, "Climate Change and Housing: Will a Rising Tide Sink All Homes?," Zillow, June 2, 2017; Kate Gordon, "The Economic Risks of Climate Change in the United States" (The Risky Business Project, June 2014), 17.

72 Rao, "Climate Change and Housing: Will a Rising Tide Sink All Homes?"; Gordon, "The Economic Risks of Climate Change in the United States"; "Underwater; Rising Seas, Chronic Floods, and the Implications for US Coastal Real Estate" (Union of Concerned Scientists, June 2018), 6.

73 Rao, "Climate Change and Housing: Will a Rising Tide Sink All Homes?"; Gordon, "The Economic Risks of Climate Change in the United States"; "Underwater; Rising Seas, Chronic Floods, and the Implications for US Coastal Real Estate," 6.

rising sea levels, more intensive rainfall and flooding patterns, and temperature increases) are insurable. Flood-control infrastructure is unlikely to prevent these major damages from occurring⁷⁴, a significant cause for concern given that the state's economy is highly dependent on real estate and that property is an important source of wealth to local homeowners.⁷⁵ **Florida policymakers and residents should therefore be paying special attention to the climate crisis and taking decisive steps to prepare its housing market for the drastic changes underway.**

Even though Florida is ranked number one in the country for highest number of homes at risk, housing development continues.⁷⁶ **Real estate prices may drop significantly (or even fall to zero) as property becomes less attractive while homeowners may be forced to default on their mortgages or find that the lost value on their homes is unrecoverable.** Exacerbating this problem is an increase in insurance premiums, which would likely result in a drop in the average value of a home and a total statewide economic loss of about \$5 billion.⁷⁷ The state's economy thus hangs in the balance. Lenders have already taken note following the damage from major hurricanes in the past 20 years, increasing the shares of private mortgages sold to Fannie and Freddie.

Florida currently has a number of energy efficiency and retrofit financing programs, but none seem to have a green mortgage focus. Florida Statute 163.08 "Supplemental authority for improvements to real property" from May 2010 implemented the Property Assessed Clean Energy (PACE, previously known as Property Assessed Financing, or PAF) program, in which the state helps to finance energy efficiency, renewable energy, and wind mitigation upgrades for buildings.⁷⁸ In 2014, it implemented national-level State Energy Program (SEP) funds for public improvement projects while cities like Orlando, West Palm Beach, and Margate have also municipal-level retrofitting with the objective of reducing

74 Sean Beckett and Brock Lacy, "Life's A Beach," Economic & Housing Research Insight (Freddie Mac, April 2016), 2, 5.

75 Primary residences represent 42% of medium homeowner wealth in the country. Jonathan Woetzel et al., "Will Mortgages and Markets Stay Afloat in Florida?," McKinsey & Company, April 27, 2020.

76 Florida also leads in the category of highest property and tax base values at risk from changes resulting from the climate crisis. "Underwater; Rising Seas, Chronic Floods, and the Implications for US Coastal Real Estate," 5–6.

77 Woetzel et al., "Will Mortgages and Markets Stay Afloat in Florida?"

78 Hal S. Knowles III, Paul D'Arelli, and Pierce Jones, "Property Assessed Financing," My Florida Home Energy, June 2015; "Supplemental Authority for Improvements to Real Property," Pub. L. No. 163.08, Title XI County Organization and Intergovernmental Relations, Chapter 163 Intergovernmental Programs, accessed October 25, 2021; "PACE Program," Satellite Beach Florida, accessed October 25, 2021.

waste and emissions.⁷⁹ Ongoing programs include the Florida Counties Low-Income Residential Energy Efficient Grant Program and the Florida Renewable Energy Tax Incentives.⁸⁰ In addition to energy efficiency and other retrofitting activities, Florida tends to focus more on weatherization programs.⁸¹

While weatherization and other adaptation strategies will remain an important part of Florida’s climate change action plan—they alone are not enough. Limiting warming to less than 1.5°C is the only way to truly protect Florida’s homes.

Therefore, policymakers should consider a green mortgages strategy to transform the building stock, helping to mitigate climate change and prevent further warming.

79 “Orlando, FL,” U.S. Department of Energy Better Buildings Initiative, accessed October 25, 2021; “West Palm Beach, FL,” U.S. Department of Energy Better Buildings Initiative, accessed October 25, 2021; “Margate, FL,” U.S. Department of Energy Better Buildings Initiative, accessed October 25, 2021; “Weatherization and Intergovernmental Programs Office Project Map – Florida,” U.S. Department of Energy Office of Energy Efficiency & Renewable Energy, November 15, 2016.

80 “Energy Programs,” Florida Department of Agriculture & Consumer Services, accessed October 25, 2021.

81 “Weatherization and Intergovernmental Programs Office Project Map – Florida”; “Department of Energy Recovery Act State Memos; Florida,” Recovery Act Snapshot (U.S. Department of Energy, June 1, 2010).

CONCLUSION



A little more than two decades remain before the U.S. will either achieve or fail to meet its goal in reaching net-zero GHG emissions. Even with the current administration’s laudable investments in clean energy technologies and increased interest in green mortgage buying from a larger share of asset owners, the U.S. is far from on-track to meet its goals of GHG emission-neutrality. Given that more than one hundred million single and multi-family homes in the U.S. continue to leak heat in the winter and cool air in the summer, there is a clear need for substantially more investments and technical capacity development to improve the energy inefficiencies of the U.S. housing sector. With the average mortgage term lasting around 27 years, new regulatory guidelines will be needed to ensure that all new mortgages issued in the next coming years are ‘green’. In addition to setting home energy standards for new construction, the Federal Government and the FHFA must also ensure that more investments are geared towards retrofits and improved energy performance of the country’s existing housing stock.

The good news is that Americans already highly value home energy efficiency, with 79% of homebuyers surveyed last year indicating that a high ENERGY STAR rating is either “essential” or “desirable” for their new home.⁸² However, even with this enthusiasm, the relatively high cost of home retrofits or a highly efficient new build coupled with the absence of standardized home energy efficiency comparison tools that would allow consumers to quickly identify more efficient homes—makes it unlikely that a majority of these homebuyers will



There is a clear need for substantially more investments and technical capacity development to improve the energy inefficiencies of the U.S. housing sector."

⁸² Quint, "What Home Buyers Really Want."



79%

of homebuyers surveyed last year indicated that a high ENERGY STAR rating is either "essential" or "desirable" for their new home.



seek out a green mortgage without additional incentives and national policy support.⁸³

Moreover, achieving the goals codified in the Paris Climate Agreement will require more ambitious and immediate action from the Federal Government. New regulatory guidelines will also be needed to ensure clear, specific, and robust metrics are outlined for what a green mortgage actually entails. Additionally, new investments will be needed to build-out the supply chain of home value assessments, retrofits, and energy audits. While these financial, technical, and political challenges may seem daunting, these recommendations provide realistic and comprehensive policy measures toward meeting the country's ambitious climate goals. Through these investments and incentives toward green mortgages, the U.S. will be able to catalyze new market investments in the U.S. real estate sector, in addition to creating thousands of new jobs. The burgeoning market interest for ESG-related assets has already been illustrated through the billions of dollars flowing to GSE-backed green mortgages in the last couple of years. Now is the time to catalyze and harness those investments to meet the U.S. pledge to reduce GHG emissions in the housing market.

⁸³ "The Way Ahead for the UK's Green Mortgage Market" (Green Finance Institute), accessed October 24, 2021.