# Equitable Strategy Guide: A Toolkit for Greenhouse Gas Reduction through Home Appliance Upgrades and Energy Retrofits of 1-4 Unit Residences

**Business as usual is no longer enough.** Communities of color, Native communities, and those who are economically marginalized are disproportionately impacted by the risks and realities of climate change. Homes and farms are damaged. Workers and businesses face the impact of ongoing economic and climate-related shifts. Lives and livelihoods are at stake. At the same time, the unprecedented level of investment flowing into our new clean energy economy represents a significant opportunity for low-income communities and communities of color to address longstanding systemic inequities. To meet this vision of an equitable clean energy transition, we need to structure investments ***to ensure that resilience and greenhouse gas reduction are engineered into*** ***every investment, every building, every business, every project, everywhere, for everyone***.

The Inflation Reduction Act (IRA) includes historic funding and opportunities to fuel greenhouse gas reduction for low-income and disadvantaged communities. ***In particular, the Environmental Protection Agency’s (EPA) $27 billion Greenhouse Gas Reduction Fund (GGRF) represents a critical tool for realizing the vision of a more equitable, climate resilient future.*** The University of New Hampshire’s Center for Impact Finance (CIF) and the Natural Resources Defense Council (NRDC) have led a “sprint design process” to develop “equitable strategy guides” to inform equitable greenhouse gas reduction with GGRF funds through traditional lending lines of business in key market sectors.

Through this “sprint design lab process”, supported by CIF and NRDC staff and consultants, ***expert teams have shared knowledge and developed recommendations for delivering equitable resilience and greenhouse gas reduction through coordination, cooperation, and collaboration by all members of the project development ecosystem:*** Community Development Financial Institutions (CDFIs), community development banks and credit unions, Minority Depository Institutions (MDIs), Green Banks, and other mission lenders; community development corporations; environmental advocates; contractors; community groups; and others committed to a just, resilient future.

The resulting strategy guides address how to (1) integrate and normalize greenhouse gas reduction into development services, financing, and asset management and (2) how to coordinate and collaborate on the most impactful ways to deploy EPA’s GGRF dollars to scale clean energy financing in low income and disadvantaged communities and maximize community benefits such as economic development, quality jobs, resilience, affordable housing, and sustainable food systems. Recommendations are grounded in deep, hands-on expertise, developed through working groups of dozens of relevant market participants and stakeholders who together estimated the investment opportunity in each market sector, identified barriers and potential solutions to scaling each lending line of business, brainstormed about collaborations necessary for project development, and discussed funding priorities.

Each design lab engaged a cohort of experienced lenders, developers, and thought leaders reflective of the project development and finance process for that market sector to develop an Equitable Greenhouse Gas Reduction Strategy Guide. Many thanks to all who participated.

## Scope

In this guide, we make the case that equitable investments in appliance upgrades and energy retrofits for single family homes and 2–4-unit buildings for low-income and disadvantaged communities (DACs) should be a key strategy for the EPA’s GGRF. Below, we describe the potential opportunities in this sector, and make concrete recommendations to ensure efficiency, effectiveness, accountability, and above all else equity in implementation. We have attempted to keep our focus tight on these specific assets and the market sector that designs, develops, and finances them. For overall recommendations around the implementation of the GGRF and for additional equitable strategy maps, please consult the Center for Impact Finance’s webpage “[An Equity-Centered, Collaborative Approach to Greenhouse Gas Reduction for Low-Income and Disadvantaged Communities](https://carsey.unh.edu/center-for-impact-finance/current-projects/equity-centered-collaborative-approach-greenhouse-gas-reduction-low-income-disadvantaged-communities)”.

## Overview of the Opportunity

Increased investment in home appliance upgrades and energy retrofits of single-family and small, owner-occupied 2-4-unit buildings could deliver significant greenhouse gas reduction as well as meaningful co-benefits in health, resilience, and economic development.

* In this roadmap, to align with energy efficiency program design which tends to separate programs and funding streams into single family (1-4 unit) and multifamily (5 units and above), we are focused on **owner-occupied buildings that house 1 to 4 households, including single family homes**.
* The energy use in residential and commercial buildings accounts for **40% of total energy use** in the US and the burning of fossil fuels in buildings accounts for **13% of total US emissions**.[[1]](#footnote-1)
* In 2019, ACEEE’s “*Halfway There*” analysis found that home energy retrofits could deliver **3.8 quadrillion Btus in energy savings and 148 million metric tons in US carbon emissions reductions by 2050**.[[2]](#footnote-2)
* There are additional benefits to home energy retrofits, such as the opportunity to add **cooling as a health and climate resilience strategy**, and **improving indoor air quality and health,** particularly for those living in neighborhoods and buildings with the worst current health outcomes.
* However, **investment in home energy retrofits lags far behind what it needs to be to achieve climate goals**. A 2021 International Energy Agency Report projects that existing residential buildings need to be retrofitted at the rate of 2.5% per year to reach the goal of net zero emissions by 2050. This is ***25 times*** the current rate of home retrofits completed by leading US programs (Home Performance with Energy Star and the Weatherization Assistance Project).[[3]](#footnote-3) On the plus side, annual budgets for home electrification total more than $166 million among 32 programs reporting data, a 53% increase from 2020.[[4]](#footnote-4)
* **The mainstream community development space provides several channels to reach low- and moderate-income (LMI) communities and underserved homebuyers and homeowners that should be leveraged:**
  + **Community Development Credit Unions (CDCUs) and Community Development Banks, as well as Minority Depository Institutions (MDIs), have borrower and depositor relationships with millions of households nationwide**. For example, the Inclusiv network of 492 CDCUs serves 18.3 million members nationally. Almost all of these organizations offer home loans and consumer and personal loans that could be used to finance home energy retrofits, rooftop solar, and purchases of efficient appliances. Many of these organizations are also certified as Community Development Financial Institutions (CDFIs). A number of nonprofit loan funds, most of whom are certified as CDFIs, also have loan programs for home purchase and home repair for LMI and underserved communities.
  + **Many nonprofits provide housing counseling services, which typically include financial education and counseling, homebuyer education and counseling, and post-purchase counseling to homeowners.** As of 2021, there were 1,619 HUD-certified housing counseling agencies, spread across all 50 states in the US. These agencies serve thousands of households. For example, in 2021, the NeighborWorks network of nonprofits, which consists of about 250 organizations, counseled 470,700 clients; it helped 22,000 families purchase their first home. Some of these housing counseling agencies are also CDFIs.
  + **Community development nonprofits also provide home repair programs, typically including an inspection of the home, management of a scope of work for a contractor, and financing.** The NeighborWorks network of nonprofits reported 79,100 homes repaired in 2021.
  + **A nationwide network of about 800 providers implements the DOE** [**Weatherization Assistance Program**](https://www.energy.gov/eere/wap/weatherization-assistance-program) **(WAP), with funding distributed to them through State Energy Offices.** Providers include Community Action Program (CAP) agencies, other nonprofits, and local governments. WAP has historically reached about 35,000 households per year, according to DOE, although the Bipartisan Infrastructure Bill increased funding so numbers may rise in the short to medium term.
  + **There are an estimated 4,600** [**Community Development Corporations**](https://www.naceda.org/index.php?option=com_dailyplanetblog&view=entry&category=bright-ideas&id=25%3Awhat-is-a-community-development-corporation-&Itemid=171) **(CDCs) across the US; many of these develop affordable for-sale housing.** This for-sale housing is generally already built to a high standard, but there could be opportunities for deeper-green new construction with the right supports.
  + [State Housing Finance Agencies](https://www.ncsha.org/about-us/about-hfas/#:~:text=HFAs%20have%20provided%20affordable%20mortgages,program%20and%20other%20financing%20programs.) provide mortgages for first-time homebuyers, helping 152,888 households in 2020.

## Key Players

Here is a description of the key “players” – the lenders, developers, installers, technical assistance providers, policy and advocacy groups, community groups, and other organizations are currently working in this space. Meaningful greenhouse gas reduction in this sector will require coordination and collaboration by all of these players, across the ecosystem.

* ***State and Local Policymakers:*** Set policies and mandates to achieve climate targets, develop programs to help customers access them, and sometimes authorize funding to support these goals. These policymakers include State Energy Offices that often serve as a vehicle for distributing federal funds.
  + For example, nine states (California, Colorado, Hawaii, Illinois, Massachusetts, Minnesota, New York, Tennessee, and Vermont) have already passed goals or guidelines to encourage decarbonization. Additionally, Maine, New Jersey, and Rhode Island have supportive policies in place with pending rules or guidelines.
* ***Regulators:*** Set specific energy efficiency and decarbonization targets for utilities under their jurisdiction and approve of ratepayer funding to enable such programming. Regulators monitor utility performance every few years and put in place interim adjustments if programs are not performing as desired. Regulators also can approve the creation of specific lending programs for energy efficiency and decarbonization investments, allowing utilities to implement on-bill financing programs (which are generally provided by third party capital providers), funding lenders to provide discounted loans, or funding green banks (such as the Connecticut Green Bank and the New York Green Bank).
* ***Utilities:*** Oversee and manage energy efficiency and decarbonization programs to achieve the targets set for them by the regulators, usually using ratepayer funds (though these can be supplemented by carbon taxes and other sources of funds, such as penalty payments, wholesale electricity market revenues, and state budget funds). In some states, such as New York, Oregon and Vermont, there is a state-wide entity that plays an important role in designing and administering such programs.
* ***Program Managers/Implementers***: Organizations that specialize in energy efficiency programs that conduct outreach and support homeowners to identify and implement home energy retrofits. These programs include:
  + Weatherization Assistance Program providers, as well as nonprofit home repair providers, both described above.
  + A number of smaller regional mission-oriented non-profits or small businesses that focus mainly on multifamily buildings but have deep technical expertise, such as Association for Energy Affordability, Elevate Energy, New Ecology, and Blocpower.
  + Some state or local organizations that have more of a focus on 1 to 4 unit residential such as Energy Outreach Colorado, Community Choice Aggregators in California (such as East Bay Community Energy).
  + Large private sector companies with a national footprint, such as Franklin Energy, ClearResult, ICF, and Willdan, operate demand-side management or efficiency programs on a contract basis for utilities and state energy offices.
* ***Contractors:*** Are the lifeblood of single-family home programs as they do the bulk of the energy efficiency and decarbonization retrofits. While some contractors are large and have a regional or national presence, most are small and operate at a local scale. Contractors can provide a broad array of decarbonization retrofit services, or may just specialize in one technology, such as HVAC or plumbing, for example. Generally, contractors are licensed by the state for specific activities, which may impact the kinds of retrofits they can do. Contractors are usually the primary interface with homeowners and help homeowners make investment decisions.
* ***Manufacturers and Distributors****:* Produce and distribute the building decarbonization equipment and appliances to enable improved and decarbonized home energy performance. Manufacturers can also provide contractor education programs and work with installers to broaden their understanding and expertise in newer technologies.
* ***Retailers*:** Are the point at which homeowners make decisions about appliance purchases and many home improvement purchases as well. They provide a channel through which energy efficiency rebate programs operate and can also play a role in educating households about their options.
* ***Lenders:*** Help homeowners to finance energy efficiency and decarbonization investments, either as part of the home mortgage or through standalone financing. Key players who can play a role in reaching homeowners in LMI and underserved communities include:
  + CDCUs, Community Development Banks and MDIs
  + Nonprofit loan funds~~,~~ and
  + Some Green Banks, such as SELF in Florida (which is also a CDFI), have retail-level lending programs; a number of others, such as the CT Green Bank, Michigan Saves, and Colorado Clean Energy Fund, have partnered with community lenders to help them provide attractive lending products to consumers.
* There is also a large array of ***community and advocacy groups*** that work to advocate on behalf of certain priorities (such as environmental justice, affordable housing, improving diversity in the clean energy workforce, and addressing energy burden in LMI communities) or for specific geographic communities.
* ***Homeowners:*** Are the ultimate decision maker about what home energy retrofits and appliance replacements they will invest in. Their preferences and priorities, as well as their financial capabilities, all play an important part in the retrofit investment decision-making process.

## Social Equity Concerns

Investments have the capacity to both raise and address social equity concerns. Here are some important issues to keep in mind and opportunities to address environmental justice.

* **LMI customers and renters face serious obstacles to enjoying the benefits of more efficient and decarbonized homes.** **Their challenges are, however, somewhat different.**
  + LMI homeowners must pay for the investment but often can’t afford the high upfront cost of the investment (even after factoring in incentives). They are also often unaware of incentive opportunities, exacerbating these financial challenges.
  + LMI renters lack control over their home energy systems and are reliant on the owner of their property to make needed investments. In addition, they may be subject to rent increases if the landlord chooses or is forced to upgrade equipment. Also, renters may be subject to evictions during renovations and after renovations if the retrofits have changed in metering configurations (for example, changing to tenant meters so renters must pay for heat after an upgrade when previously heat was master metered).
* **Importantly, LMI households will benefit the most from home retrofits:**
  + They are more likely to live in older buildings with poor heating, ventilation, and indoor air quality. This has a direct impact on air pollution (and associated health impacts) from gas appliances as well since the impacts are worst in smaller homes.
  + They are more likely to struggle with higher energy burdens.
  + They are also at higher risk of bearing the brunt of damage caused by climate change-induced extreme weather events.
  + Reducing the energy burden and improving home health and safety can also help to keep housing affordable for LMI households.

## Deal Economics

Typically, single-family homes and 1-4-unit properties are financed with conventional mortgages or special mortgage products through Federal programs. Most home improvements are paid for out of home improvement loans or homeowners’ cash out of pocket. Many energy retrofits and renewable energy systems are incentivized with rebates, discounts, tax credits, and low interest rates through Federal, state, utility, and private programs. Grants or other subsidies may be necessary in high-cost areas or areas with low electricity prices. Home appliances are often financed through retailer installment payment plans or credit cards. Below, we cover key deal economics:

***Home energy retrofits include different project types:***

* + Efficiency improvements (e.g. insulation, air sealing, efficient appliances, lighting)
  + Rooftop solar
  + Home electrification/decarbonization (e.g. changing from oil furnaces and water heater to heat pumps; electrifying appliances such as stoves)
  + [Manufactured homes](https://www.aceee.org/sites/default/files/publications/researchreports/a124.pdf) offer their own set of opportunities and challenges. Older manufactured homes can be much less efficient, although updated [efficiency standards](https://www.federalregister.gov/documents/2022/05/31/2022-10926/energy-conservation-program-energy-conservation-standards-for-manufactured-housing) for new manufactured housing should improve the situation going forward. There are opportunities for [community solar](https://rocusa.org/news/mascoma-meadows-is-first-n-h-roc-to-go-solar/) in resident-owned manufactured housing communities.
  + Development of green affordable new homes is also an important way to deliver energy justice benefits to low-income communities. In addition, all-electric new construction of 1-4 family homes is cheaper to build than mixed fuel construction, in addition to providing the health benefits described above.
* **Single family energy retrofit and decarbonization investment economics vary extensively depending on geographic location**:
  + Climate will affect how much energy a home uses and what kind of retrofits are needed:
    - Decarbonization can be very expensive in cold climates, for example, because more investment is needed to ensure that the building enveloped is sealed.
    - The inclusion of on-site solar increases upfront costs, but generally brings down payback periods.
  + Energy prices, which can vary extensively, will impact how quickly the investment pays back (see for example a recent [report](https://static1.squarespace.com/static/5b6a482db27e39e8fcf65bbf/t/6298044502087000c9537c03/1654129734671/BEI-DC+Customer+Economics+Analysis_Dec+2020_FINAL.pdf)) on the economics of such investments in Washington, DC by BEI).
    - Areas with low electricity and gas prices, such as the Pacific Northwest, have more challenging economics.
    - However, the overall trend of increased gas prices resulting from the war in Ukraine is starting to be felt more broadly across the country.
  + State and local policies and mandates encouraging decarbonization can exert pressure on homeowners to make retrofit investments.
  + State and local incentives help defray the up-front costs of these investments.
    - Programs with robust incentives include California, Colorado, Hawaii, Massachusetts, New York, and Rhode Island.
  + The soft costs of getting a project done (permitting, construction management, etc.) can lead to increased project costs, which are currently not covered by many incentive programs. Policymakers should be mindful to these costs and consider ways to reduce soft costs, whether that be through specific reduced fees for “green” projects or through larger scale projects that focus on soft cost reduction in a specific technology (such as the federal [Sunshot](https://www.energy.gov/eere/solar/sunshot-initiative) initiative)
  + Contractors are often challenged in growing their business, or running it profitably, because the cost of acquiring a customer is fairly high in this market segment. Anything that policymakers can do to facilitate or encourage customer engagement will reduce customer acquisition costs, improving overall project economics. Examples might include mandates (see bullet above), city led communication and outreach campaigns, other campaigns or initiatives with employers or building owners, etc.
* **The economics of individual measures also varies by the individual home, depending on how that home was built and how conducive the existing structure and systems are to an energy upgrade.** For example, a heat pump installation will be easier if it can use existing ductwork; a home’s construction can make it easier or harder to install insulation; and structural issues with roofs or electric service panels may need to be addressed in order to go solar; etc. As a result, the cost curve of which upgrades are most cost-effective will vary by the individual home.
* **Total project costs vary with the depth of measures taken.** Weatherization Assistance Program (WAP) projects may run at around $7,500 to $10,000; the average loan size for the Smart-E home energy program runs at around $12,000; and deep decarbonization projects can run upwards of $50,000 per home (though this would generally also include additional health and safety upgrades). Generally, deeper retrofits—because they include measures with longer payback periods—have larger subsidy needs to make them financeable, but depending on the state there can be large projects (such as rooftop solar) with short payback periods.
* **The Inflation Reduction Act (IRA) and the Bipartisan Infrastructure Law (BIL) provide significant financial support for home energy retrofits, significantly improving project economics for many measures, while funding is available**:
  + The IRA establishes a $4.5 billion “High Efficiency Electric Home” rebate program, which will be run by state energy programs. Households under 80% of AMI can get 100% of costs covered for measures such as heat pumps, heat pump water heaters, electric service upgrades, and other measures, up to $14,000. Households between 80-150% of AMI can get 50% of costs covered. The new US DOE [Office of State and Community Energy Programs](https://www.energy.gov/scep/office-state-and-community-energy-programs) will work with states to implement both this program and the HOMES rebate program discussed immediately below.
  + The IRA also establishes the $4.3 billion HOMES rebate program, also to be run by state energy offices, a performance-based rebate that will provide LMI households of up to $8,000 per dwelling unit and 80% of project costs for whole-house retrofits that provide energy savings of 35% or greater.
  + The IRA extends the residential rooftop solar tax credit (ITC) at 30%, and also provides a 30% tax credit for energy efficiency retrofits and HVAC upgrades, although this credit may not exceed $1,200 annually. Neither of these tax credits was made refundable, which creates a barrier for LMI households.
  + The BIL provided $3.5 billion in funding for the Weatherization Assistance Program, which is a dramatic ramp-up for a program that historically received approximately $300 million per year.

## Barriers to Market Development, Deployment, and Impact

In this section, we describe the complicated set of economic, physical, regulatory, and social barriers to developing the energy retrofit market for this sector, getting investable deals, and achieving impact. The challenges are particularly acute in LMI and disadvantaged communities.

* **A number of issues can cause homeowners to be reluctant to implement home energy retrofits**, **including:**
  + High up-front costs.
  + Uncertainty about overall benefits from investment.
  + Reluctance to replace equipment before the end of its useful life. In turn, many equipment purchases (such as water heaters) are made on an emergency basis, which means consumers have less time to be educated on the most efficient options and when less efficient equipment may be more attractive due to lower up-front costs and/or in-store availability.
  + Customer lack of knowledge of or familiarity about efficiency or electrification measures, resulting in confusion about which measures to prioritize and invest in.
  + The “hassle factor” – jobs, family, and other obligations may prevent homeowners on focusing on the energy retrofit opportunities even if they could save substantially on their energy bills.
  + Overall lack of awareness of existing energy efficient mortgages and loan products: borrowers remain unaware of the scalable low-cost financing tools that can be leveraged to offset up front cost burdens associated with energy efficiency and electrification upgrades.
  + Overall lack of awareness about financial incentives for efficiency and electrification.
* ***LMI Households Face Additional Barriers:***
  + May not have sufficient taxable income to be able to utilize tax credits for solar and for energy efficiency upgrades that otherwise would provide substantial additional subsidy. In particular, the lack of refundability of the residential solar tax credit (ITC), even under IRA, means that alternative structures such as solar leases or power purchase agreements are needed to help LMI homeowners access the ITC.
  + Many low-income homeowners may live in housing with other repair and maintenance needs that must be addressed first, to allow for the installation of energy retrofits and to ensure a safe and healthy home. For example, homes may have outdated wiring, failing roofs, and health hazards such as mold, lead, or vermiculite or asbestos insulation. As a result, double-digit percentages of low-income homeowners are [unable to access even the DOE Weatherization Assistance Program](https://www.npr.org/2022/05/13/1096114029/low-income-energy-efficient-weatherization-program-3-5b-needy), instead having their homes “deferred” out of weatherization or energy efficiency programs, meaning that they cannot be served until these underlying health and safety retrofits are implemented. Unfortunately, other housing assistance programs are funded by different federal agencies, often operated out of different organizations at the community level, and often have different regulatory approval processes and timelines, leading to coordination challenges.
  + Households may lack up front capital needed to purchase new equipment and may not be able to wait for rebates to be paid after installation of measures.
  + Many LMI customers are renters who do not control investment decisions about their home, resulting in the “split incentive” problem discussed above.
  + This is exacerbated by the currently high fuel prices, which are having a dramatic impact on the finances of low- and moderate-income households in areas that are predominately heated by propane and diesel. The extra they are having to spend to heat their home this winter is the less they have available to invest in new equipment next year.
* **Integrating significant energy retrofit work into a mortgage at the time of a home purchase is challenging because both the homeowner and everyone else in the deal are usually focused on other concerns.** Especially in a rising rate environment, where refinancing the first mortgage is not desirable, home improvement financing is likely to be the major way in which lenders support homeowners with energy retrofits.
* **Illustration from RMI’s Bringing Clean Energy Home Report of challenges faced by households in making home energy retrofit decisions**:

Timeline

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* **Whole building retrofits are complex and expensive; it requires designing efficiency, weatherization and building shell improvements, wiring and panel upgrades which can be challenging for customers to manage and afford**.
* **Contractors play a vital role in explaining home energy retrofits and marketing them to homeowners but also can serve as an obstacle:** 
  + The contractor’s preference is to close the deal as quickly and efficiently as possible so may try to market lowest cost solution, which is often fossil fuel fired (if more efficient than equipment being replaced).
  + Some contractors lack understanding of and extensive experience with decarbonization technologies like heat pumps. Heat pump hot water heaters are a particular challenge as they require both plumbing and electrical expertise.
  + Home energy audits are not set up to assess and recommend electrification technologies.
  + Shortages of appliances can also exacerbate these challenges.
* **There is a major shortages of qualified installers, in particular** [**electricians**](https://energynews.us/newsletter/electrician-shortage-jeopardizes-electrification/) **and** [**plumbers**](https://www.tradesmeninternational.com/news-events/plumbers-in-demand/#:~:text=The%20National%20Homebuilder's%20Association's%20Spring,build%20new%20homes%20post%2Dpandemic.)**, which has** [**intensified since the pandemic**](https://www.forbes.com/home-improvement/contractor/labor-materials-shortage-impacts-renovations/)**.** This workforce challenge varies depending on the region and on the technical field and needs to be addressed regionally.
  + The Buy America and Davis-Bacon provisions, which require that goods be made in the US and that prevailing wage is paid for services, in the IRA may make it more difficult for smaller contractors to participate in IRA funded projects.
  + It is difficult for implementers and contractors to expand their operations outside of their state due to licensing requirements, capital needs, and other challenges.
* **There is insufficient data publicly available to make the case that home energy retrofits do result in improved home energy performance, and energy savings.** This data needs to be collected and disseminated on a wide scale to help inform investment decisions by households and underwriting decisions by lenders.
* **There are numerous federal rebates and tax, as well as state and local specific incentives, but this complexity makes it harder for local policymakers to keep track of and to help support building owners, particularly for low- and moderate-income households.**
* **In addition, historically, government has operated in a siloed manner through agencies that have specific areas of expertise, such as housing, health, and energy.** Addressing the challenges in existing buildings means that we need to work across these silos, at all levels of government.
* Need for a secondary market to scale financing as many local lenders do not have the liquidity to scale up.

## Recommendations for Deployment of GGRF Dollars

Below are a set of recommendations for greenhouse gas reduction in this sector, through equitable deployment of GHGRF dollars and other Federal, public, and private investments. These recommendations are grounded in deep, hands-on expertise and were developed through working groups of relevant market participants and stakeholders who together explored the investment opportunity in this market sector, identified and discussed barriers to scaling this particular lending line of business, and considered potential solutions and funding priorities. Contributors considered how best to deploy GHGRF funds into this space, with a focus on the highest priority strategies needed to turn on the spigot of creditworthy, impactful decarbonization projects in LMI communities.

Importantly, the working group considered the needs for ecosystem-building supports such as:

* Market development and customer acquisition
* Capacity building funding for key types of organizations in the space
* Workforce development
* Training and technical assistance
* Lending capital (debt and equity)
* Secondary market supports

***Key elements of a system to reach LMI and underserved homeowners should include:***

1. Increased strategic outreach to homeowners.
2. Affordable and flexible financing products.
3. Expanded technical assistance and a simplified interface with customers to support homeowners as well as lenders.
4. Contractor support and development.

**A national or set of regional service platforms to coordinate multiple actors and complicated work streams, as more fully described below:**

* ***Outreach to homeowners****:* Contractors, installers, and retailers will continue to be critical channels through which homeowners learn about possibilities to “go solar” or install weatherization measures with utility energy-efficiency programs helping to raise market awareness as well. However, community-based programs should be engaged to help to reach people and help them identify projects that can save energy /reduce GHGs while also saving them money and improving their health and comfort. Such community-based programs play an important role in addressing distrust in low to moderate income communities of what offers contractors may be offering and educating consumers generally. Examples include:
  + **“**[**Solarize campaigns**](https://rmi.org/solarize-campaigns-helping-communities-of-color-access-rooftop-solar/)**” run by community-based organizations, and similar grassroots outreach efforts around efficiency and electrification.** (Example: Sonoma Clean Power program used local advocates (termed “block captains”) in specific neighborhoods to act as champions for energy efficiency and decarbonization among their peers, expanding communication, understanding and enrollment in the program).
  + **One-stop shop programs like the** [**HEAT Squad**](https://www.heatsquad.org/) **that combine grassroots marketing with technical assistance to homebuyers.** Such technical assistance programs can provide low-cost energy audits (or at a lower level of intervention, “virtual” energy audits where an expert has a video call with the homeowner); assistance in identifying and accessing rebates, incentives and financing; and supervision or inspection of contracted work for quality control. Analysis by AEA and EEFA has demonstrated that one stop shop programs strongly increase the chances that buildings complete the retrofit process.
  + **Working with financial counseling and education providers (such as credit unions and NeighborWorks organizations) to integrate content around energy cost burdens and savings opportunities into the services they provide.** Inclusiv has been developing a counseling tool to do exactly that. Rewiring America has also created a [calculator](https://www.rewiringamerica.org/app/ira-calculator) to help households find out what IRA funding they can qualify for. Organizations implementing these community-based outreach programs will need funding to do so.
  + **Local governments can plan an important role in collaborating with these efforts, as happened for example with SELF in St. Petersburg, FL.**
* ***Affordable and Flexible Financing Products****:*
  + **Financing efforts targeting LMI and underserved communities should integrate rebates, tax credits, flexibly underwritten loans, and state and local rebates and incentives to provide an affordable package to these communities.** For rooftop solar for low-income households, solar leasing or power-purchase agreement programs can provide access to the 30% solar tax credit that would otherwise not be available. GHGRF funding could be used to provide loan loss reserves, interest rate buydowns, and/or a slug of patient capital so that community-based lenders can help homeowners borrow for clean energy on affordable terms. Consideration should also be given to whether GHGRF dollars, used as grants, could help to complete low-income weatherization assistance projects that might otherwise have to be deferred.
  + **Consider designing simple financing programs, that are low-cost, easy to understand and convenient to use. Standardization is key to scaling financing solutions.** Examples of financing programs that incorporate some of these elements include:
  + California’s Go Green which has proved to be a scalable program.
  + Sealed Home Advantage which offers convenience and an innovative financing structure based on energy savings.
  + Mass Saves HEAT Loan, which offers interest free financing for up to $25,000 for energy efficiency and decarbonization investments with a term of up to 7 years.
  + National Energy Improvement Fund Energy Plus Improvement loan, which offers a convenient and efficient platform.
* **Home lending in general should also be viewed as a “capital moment” where decisions about home energy investments should be incorporated into the transaction and underwriting whenever possible.** Strategies to better integrate energy concerns into home lending processes include:
  + Leverage home energy cost data to include energy savings in the cost of home ownership when underwriting a borrower’s credit worthiness.
  + For new homes, set building performance standards that developers and builders who borrow funds are required to achieve to qualify for favorable lending terms.
  + Train lenders to initiate conversations with borrowers about existing green mortgage and loan products.
  + Provide reduced interest rate financing options to borrowers completing a home energy performance audit by a certified assessor.
  + Support the appraisal industry in creating and implementing standards for appraising homes that incorporate high energy performance in the home’s appraised value.
  + Automate green home data into underwriting and appraisal systems to reduce existing complexity, time, costs and inefficiency associated with processing green equipment mortgages. Such data should include access to energy cost estimates, green efficiency ratings or certifications, the disclosure of on-site renewables, etc.
  + Support investments to procure more granular, standardized and accessible national home energy data.
  + Note that state Public Utility Commissions have been collecting and analyzing data on energy efficiency program performance for many years and may be a good resource for how to stand up tracking and measurement systems.
* **Expanded technical assistance** **and a simplified interface with customers is needed to support homeowners as well as lenders**:
  + **Create or leverage state or regional specific “eligible measure lists” of energy efficiency improvements** to streamline project evaluations and provide lenders with a set list of upgrades that will reliably deliver long term savings from efficiency upgrades.
  + **Ensure that all contractors are trained on rebates and incentives** for the most efficient equipment so that even emergency equipment replacements result in upgrades to low carbon solutions.
  + **Engage third party professionals to inspect completed project upgrades** to ensure that they are verified and consistent with expected outcomes.
  + **Support the creation of an assessment index standard** to help borrowers better understand what steps they need to take to improve the performance of their home.
  + **Assist borrowers in identifying local grants, subsidies, and tax incentives** that can be used to offset upgrade costs and provide gap funding to cover the lag in receiving those funds.
* ***A Service Platform****:* Home energy upgrades involve coordination of multiple actors and complicated work streams, particularly between the lender and the contractor. Rather than individual programs setting up their own bespoke systems to manage this work, a more cost-effective and impactful system would be to set up either a national or a set of regional service platforms that can help recruit and vet contractors, manage workflows between contractors and lenders, determine eligible measures and review project scopes of work, conduct quality control, give lenders confidence that the technical aspects of the job are being handled well, provide standards for how energy / carbon savings will be measured, provide some level of product standardization to help new lenders enter this line of business and to support secondary market development, and help customers obtain rebates and incentives. The [Smart-E program](https://www.inclusiveprosperitycapital.org/smart-e-loan/), which has served over 60,000 customers in CO, MI, and CT through partnerships between green banks and community-based lenders, and is currently expanding to AZ, NM, and TX, provides such a platform. SELF, a CDFI and Green Bank, is also offering a turn-key residential lending platform to other lenders to help existing and new lending entities jumpstart their climate lending programs. GHGRF funding will be needed to continue to build, enhance and expand these kinds of platforms.
* ***Contractor Support and Development****:* 
  + **Given workforce shortages, effort is needed to ensure a skilled staff.** This includes creating qualified contractor lists and beefing up and coordinating existing workforce training programs as demand rises, before creating new workforce development programs. It is important to balance the demand and supply of workforce to ensure that contractor pay and benefits are not negatively affected as new workers are added. The IRA invests very little in workforce development overall – while the tax credit legislation creates incentives for developers to hire apprentices, the IRA only devotes a total of $200 million for state-based home energy efficiency contractor training grants. GHGRF funding should be considered to fund subrecipients who can provide workforce programming to address critical gaps while achieving positive economic impacts for communities. Ways to seek out new workers could be through collaboration with Historically Black Colleges and Universities (HBCUs) and with veterans, as seen through the Green Jobs for Veterans initiative.
  + **Loan programs for contractors to grow their business are also a critical need and represent an opportunity to grow the green economy to boot**; existing small business lenders should be supported to provide loans and technical assistance to small installer/contractor businesses.
  + **State and local governments could—and should—help new contractors that don’t have the needed track record and experience to enable them to participate in lender programs** by creating a guarantee or certification program that is based on demonstrated capabilities.
  + **State and local governments, in conjunction with universities and other training programs and unions and larger employers, can help stand up apprenticeship programs.** Small contractors are too busy to hire contractors and yet newly trained individuals need on the job training.

**Other organizations to loop into this discussion:** contractors associations, realtors, business associations, labor unions, developers.

## Conclusion

Significant greenhouse gas reduction is achievable through strategic, equitable, investment in home appliance upgrades and energy retrofits of single-family and small, owner-occupied 2-4-unit buildings. What’s more, such investments will deliver meaningful co-benefits in health, resilience, and economic development.

Meaningful greenhouse gas reduction in this sector will require coordination and collaboration by lenders, developers, installers, technical assistance providers, policy and advocacy groups, community groups, and other key players, across the ecosystem. Successful investment strategies will address the complicated set of economic, physical, regulatory, and social barriers to developing the energy retrofit market for this sector, getting investable deals, and achieving impact, challenges that are particularly acute in LMI and disadvantaged communities.

Key elements of a system to reach LMI and underserved homeowners should include (1) increased strategic outreach to homeowners, (2) affordable and flexible financing products, (3) expanded technical assistance and a simplified interface with customers to support homeowners as well as lenders, (4) contractor support and development, and (5) a national or set of regional service platforms to coordinate multiple actors and complicated work streams.

Together, we can reinvigorate the community development field through deep commitment to resilience and climate change mitigation and begin to structure investments to ensure that resilience and greenhouse gas reduction are engineered into every deal, every building, every business, every project, everywhere, for everyone.

## Acknowledgements

The development of this strategy guide was spearheaded by [Bridgett Neely](https://fireflyenergyconsulting.com/about), Founder and President of Firefly Energy Consulting, under a contract with Natural Resources Deference Council. NRDC staff and staff of the University of New Hampshire’s Center for Impact Finance provided comments and input.

More than 20 individuals from green banks, community finance organizations, energy efficiency implementation companies and policy advocates contributed important recommendations and on-the-ground intelligence as well as model products, programs, and participated in two working sessions held in late 2022.

## Links to Relevant Literature and Websites

**Articles**

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* BEI, [Berkeley Funding Gap Analysis for Residential Building Electrification](https://www.beicities.org/city-resources), July 2022
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* [Cohn, Charlotte and Nora Wang Esram, Building Electrification: Programs and Best Practices, ACEEE, February 2022.](https://www.aceee.org/research-report/b2201)
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**Websites**

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* <https://www.aceee.org/research-report/u2205>
* <https://www.latimes.com/environment/newsletter/2020-06-25/will-the-rich-continue-to-be-the-main-beneficiaries-of-californias-clean-energy-future-boiling-point>
* Rewiring America IRA Benefit [Calculator](https://www.rewiringamerica.org/app/ira-calculator)

1. Cohn, Charlotte and Nora Wang Esram, ACEEE, Building Electrification: Programs and Best Practices, February 2022, p. 1 [↑](#footnote-ref-1)
2. Amman, Jennifer, Rohini Srivastava, and Bick Henner, ACEEE, Pathways for Deep Energy Use Reductions and Decarbonization in Homes, December 2021, p. 1 [↑](#footnote-ref-2)
3. Amman, Jennifer, Rohini Srivastava, and Bick Henner, ACEEE, Pathways for Deep Energy Use Reductions and Decarbonization in Homes, December 2021, p. vi. [↑](#footnote-ref-3)
4. ACEEE, Building Electrification, p. viii [↑](#footnote-ref-4)