

Adapting Energy Efficiency Programs to Reach Underserved Residents

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Contents

Introduction.....	2
Strategies to Better Reach All Underserved Customers.....	3
For Income-Eligible Customers.....	12
For Renters and Multifamily Residents.....	19
For Rural Customers.....	22
Conclusion.....	25
References.....	27

Introduction

Utilities and third-party program administrators¹ operate energy efficiency programs to help their customers save energy. Residential energy efficiency programs can lower energy bills, improve thermal comfort and indoor air quality, and make homes more resilient to climate change (Hayes et al. 2022). However, ACEEE research has repeatedly identified a pervasive problem among these residential programs: their inability to fully serve all customer segments, especially those most in need.

Participants of residential energy efficiency programs tend to be disproportionately white, higher-income, college-educated homeowners (Amann, Tolentino, and York 2023). Due to systemic racial, economic, social, and geographic inequities,² the following customer groups³ tend to be underserved by residential energy efficiency programs:

- Communities of color
- Nonnative English speakers
- Low- and moderate-income customers
- Residents of multifamily buildings
- Renters
- Rural customers
- Tribal nations
- Residents of mobile or manufactured homes

This toolkit is written for energy utility and state-level program administrators aiming to improve program participation among historically underserved⁴ customers. Program

¹ A third-party program administrator can be any non-utility organization that runs an energy efficiency program. Examples include nonprofits, private companies, or state-sponsored organizations.

² For more information on energy inequity, see the section "Systemic Patterns and Causes of Inequities" in the report *How High Are Household Energy Burdens? An Assessment of National and Metropolitan Energy Burden across the United States*. <https://www.aceee.org/research-report/u2006>.

³ We acknowledge the importance of reaching all these underserved customers. However, our toolkit primarily addresses the customer groups that were of highest concern to the program administrators we interviewed.

⁴ This toolkit defines "underserved" customers as those who have historically reported low levels of participation in energy efficiency programs. There may be some overlap between "underserved" customers and "hard-to-reach" customers. The latter group refers to customers who face geographic, language, or political obstacles to accessing energy services. Underserved customers may also be classified as "marginalized" or "disadvantaged" customers, but this toolkit uses the term "underserved" for consistency.

administrators⁵ can consult the toolkit as a reference to learn about strategies that others have successfully employed. The toolkit is organized by customer segment (all underserved customers, income-eligible customers, renters and multifamily residents, and rural customers), and each section provides proven strategies, examples of how the strategies have been applied in the field, and additional resources for further reading.

Each strategy in the toolkit has indicators of feasibility and impact. A strategy can earn an easy, medium, or difficult rating for feasibility. For impact, a strategy can result in moderate, high, or very high impact. The authors determined feasibility and impact ratings based on our research and discussions with experts at ACEEE.






The toolkit is based on an extensive literature review and interviews with stakeholders representing organizations that provide residential energy efficiency programs. It was developed to assist the interviewed stakeholders,⁶ but utilities and program administrators across the country can learn from its findings and recommendations.

Strategies to Better Reach All Underserved Customers

The following section presents strategies and resources to increase program participation among all underserved customers. In later sections, we delve further into more specific customer segments and strategies to serve them.

⁵ In this toolkit, the term "program administrators" encompasses both utilities and third-party organizations that run energy efficiency programs, unless otherwise specified.

⁶ NYSERDA, SoCal Gas, and Energy Trust of Oregon

Strategy	Feasibility	Impact
 Pursue equitable community engagement.	Medium	Very high
 Establish a one-stop shop.	Difficult	Very high
 Create and disclose equity metrics.	Medium	High
 Develop a diverse and inclusive energy efficiency workforce.	Difficult	High
 Tailor marketing based on customers' preferences and behaviors.	Easy	Moderate

PURSUE EQUITABLE COMMUNITY ENGAGEMENT

Feasibility: Medium

Impact: Very high

Utilities and state-level program administrators can engage with community members, particularly those that have been historically underserved, to design programs that effectively meet their needs. Effective community engagement can help identify and overcome common barriers faced by many customers, such as language barriers, limited finances, and limited access to technology. A significant barrier can be the low community trust of utilities and low awareness of available programs, especially among low- and moderate-income customers. A study by Uplight reported that 31% of low- and moderate-income customers did not think their utility would offer a service like bill payment assistance, and 50% of customers were unaware of utility energy efficiency offerings (Uplight 2023). Equitable community engagement can also provide a forum for accountability and measurement of program success (e.g., sharing metrics of program success with target communities to get their feedback).

Building trust is critical for developing robust relationships with communities, particularly those that have been systematically burdened by the existing energy system. Program administrators can work to build this trust by taking strong actions to advance energy equity. However, equity is a broad concept and advancing an equitable energy system requires simultaneous attention to multiple dimensions of energy equity. The Urban Sustainability Directors Network has proposed an energy equity framework that defines multiple dimensions of equity, such as procedural equity that involves all stakeholders in the

decision-making process; distributional equity that ensures fair distribution of benefits and burdens; and structural equity that reforms systems to promote more just outcomes (Park 2014).⁷ Figure 1 explains how an equitable energy system encompasses all these types of equity.

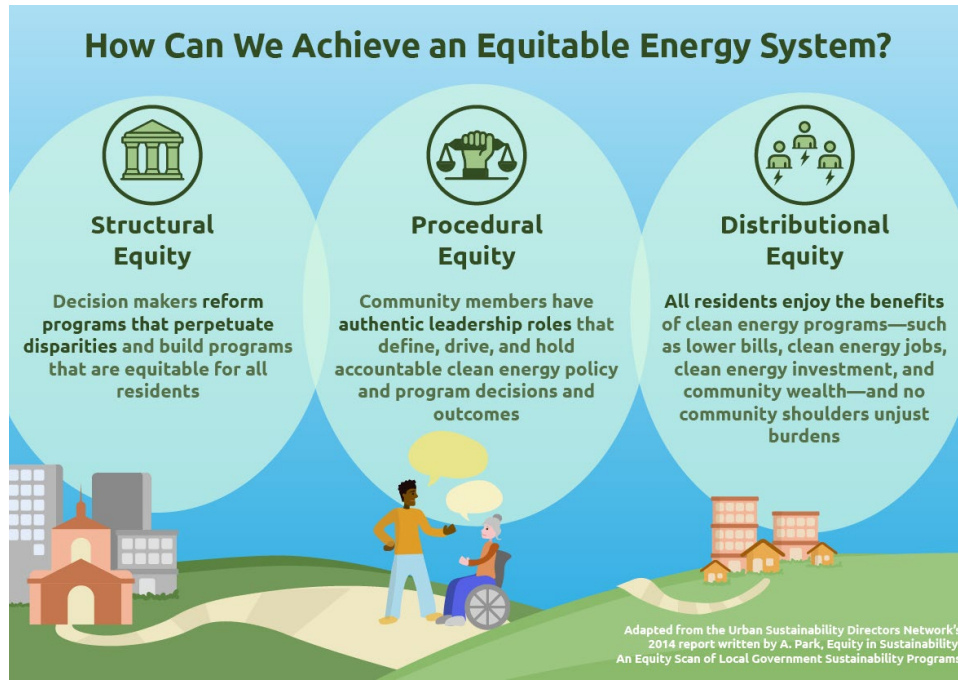


Figure 1. Explanation of three types of equity (structural, procedural, and distributional) and how they contribute to an equitable energy system

To help advance procedural equity, program administrators should engage deeply with community groups, compensate community members for their time, and ensure all community members have access to the resources they need to participate. A procedurally equitable approach also supports other dimensions of equity because community members provide the program administrator with accurate and representative information to inform programs.

Program administrators can collaborate with community groups who represent underserved communities. To work with community groups, program administrators should set up two-way, long-term relationships that involve listening to these groups as well as disseminating information. It is critical for community groups and community members to be granted seats on advisory and decision-making bodies and to have decision-making power. Their

⁷ Refer to ACEEE's *Leading with Equity Initiative: Key Findings and Next Steps* (2021) for expanded definitions and explanations of each of these types of equity.

responsibilities for these bodies should be clearly described at the outset (e.g., are they informing or advising the bodies, asking for input from constituents, sharing decision making, or cocreating something new). By sharing leadership responsibilities with community groups, program administrators can ensure accountability and that community members are receiving tangible benefits from the programs they are providing input toward.

Some examples of effective program engagement with targeted communities are

- The Equity Advisory Group pilot project convened by the DC Department of Energy and Environment (DOEE) and the Georgetown Climate Center have engaged local community groups for short-term project planning (Georgetown Climate Center 2018).
- Providence’s Racial and Environmental Justice Committee brings a racial equity lens to the city’s sustainability work (City of Providence 2023).
- Minneapolis’s Green Zones Initiative seeks input and puts decision-making power into the hands of residents.

Compared to other members of advisory or decision-making bodies, underserved community members are less likely to have the financial resources or time needed to attend meetings or events. Therefore, it is important to compensate them for their time and expertise. For example, Philadelphia Gas Works gives Visa gift cards to residents who participate on their customer advisory panel (Z. Popkin, manager, Philadelphia Gas Works, pers. comm., September 28, 2023).

Nine states have established some version of financial compensation to facilitate advocates’ participation in state-level energy proceedings before their utility regulatory commissions (Drehobl 2021). In at least one state, Oregon, legislation that enables this compensation explicitly allows environmental justice advocates to receive compensation for their participation (Oregon PUC 2023).

ESTABLISH A ONE-STOP SHOP

Feasibility: Difficult

Impact: Very high

Traditionally, utilities have offered energy efficiency programs in distinct categories based on sector (e.g., single-family residential, multifamily housing, commercial) (York et al. 2015). These program silos can make it difficult for customers to identify and apply for the most appropriate energy efficiency program for their needs. A one-stop shop model can refer to a single point of contact for program information, application submission, and technical assistance or a single program that offers a variety of services. This model can break down program silos and make the enrollment process easier for participants. Simplifying the application process allows customers to easily apply and receive multiple upgrades. A one-stop shop should cover at least one market segment, but an ideal model would group multiple market segments under a single application and program.

The Philadelphia Energy Authority's Built to Last program offers a one-stop shop for home repair, energy efficiency, and healthy housing interventions. Eligible applicants must be homeowners whose annual household incomes fall below a maximum amount. After applying, a homeowner then receives a home assessment that evaluates potential for health and safety repairs, energy upgrades, and rooftop solar installation (Philadelphia Energy Authority 2023). The Philadelphia Energy Authority then enlists partner organizations to implement the necessary repairs and upgrades. Although Built to Last is still in its early stages, the program's long-term aims are to improve the quality of Philadelphia's affordable housing and spur economic growth among underserved communities. More information on Built to Last can be found in a box on page 17.

CREATE AND DISCLOSE EQUITY METRICS

Feasibility: Medium

Impact: High

Program administrators should create metrics related to equity goals and evaluate progress over time. Metrics are particularly effective for improving equity when they are transparent and paired with accountability processes. That is, collecting evaluation data creates some internal pressure to improve equity outcomes, but making the data publicly accessible and pairing that data collection with increased accountability (e.g., sharing it directly with affected communities or including equity in the metrics provided to oversight committees/agencies which evaluate the programs and hold administrators accountable) is even more effective.

The process of defining and measuring metrics is important. Metrics should be based on impact as opposed to output (e.g., assessing improved quality of life for low- and moderate-income households or number of homes receiving comprehensive retrofits is preferable to assessing the number of households reached with marketing messages about the program). Energy burden⁸ is a useful metric for identifying households that can benefit most from energy upgrades. Other potential equity metrics include demographic and geographic information on customers who participate in various utility programs (e.g., the number of participants from rural communities, communities of color, or low-income households); program participants' self-reported satisfaction; or economic or career improvement among program participants. During the baseline and repeated measurements, administrators should clearly and specifically describe the metrics they are using and how they align with organizational goals.

Comparing the participants' outcomes to non-participants in the same target communities further strengthens the evaluation. Regardless of the metrics used or the evaluation design,

⁸ An energy burden refers to the percentage of annual income that a household spends on energy bills. For more information on energy burdens, see the strategies targeting low- and moderate-income customers.

administrators should collect the data regularly, systematically, and objectively. ACEEE recommends working alongside community members to determine the best metrics for tracking equitable outcomes and the way data should be collected and evaluated for accuracy. Community members can also help program administrators publicize equity metrics to foster a sense of trust and accountability within underserved communities.

Program administrators can establish an evaluation plan for measuring equity outcomes. They should regularly check these measures of success to make any necessary program changes. One example of a well-designed plan for creating and evaluating equity metrics is the Massachusetts Program Administrators' 2022–2024 Energy Efficiency Plan (Commonwealth of Massachusetts 2022; Massachusetts DPU 2022). It was developed through a series of community workshops and includes equity metrics such as program participation demographics and the degree of benefits from programs distributed across environmental justice populations.⁹ The plan's equity metrics include the level of community workforce development and the number and quality of community partnerships.

DEVELOP A DIVERSE AND INCLUSIVE ENERGY EFFICIENCY WORKFORCE

Feasibility: Difficult

Impact: High

In addition to increasing program capacity and enrollment, expanding workforce opportunities for underserved communities is another way that these customers and their communities can benefit from energy efficiency programs. Energy efficiency programs require a capable workforce that can effectively implement energy upgrades, and many of the same groups that are underserved by residential energy efficiency programs are also underrepresented in the energy efficiency workforce. Clean energy jobs¹⁰ can pay 8–19% more than national average hourly wages (Rambert 2022), so recruiting more workers from underrepresented communities could help improve career opportunities and financial stability for these individuals. Employing such workers can also improve engagement with community members due to better trust and understanding of the targeted communities. Further, households who save on energy bills can spend or reinvest their money in other areas to contribute to economic growth (ACEEE 2017).

⁹ In Massachusetts, a neighborhood can be classified as an environmental justice population based on income level, percentage of ethnic minorities, or percentage of residents with limited English proficiency (Commonwealth of Massachusetts 2023).

¹⁰ In addition to energy efficiency, the clean energy sector encompasses renewable energy, electric vehicles, clean storage, and grid modernization (Rambert 2022).

Setting equity-related workforce development goals is a logical first step for program administrators looking to scale up their energy efficiency workforce. Program administrators and cities could work together to develop goals such as training and hiring a certain percentage of workers from underserved communities, employing a certain percentage of local contractors, and creating targeted programs for underrepresented groups.

Incorporating a whole-person approach to training workers can further improve equitable outcomes. A whole-person program approach involves "[recognizing] each program participant's intrinsic dignity, regardless of economic output or life circumstance, and acknowledges the adversity they face" (Rambert 2022, 200). For example, a program can offer mental health services in addition to job training to address health needs that may be more prevalent in underserved communities. These additional services can help correct social inequities in addition to economic inequities.

The Rising Sun Center for Opportunity in California's Bay Area and San Joaquin County operates multiple workforce development programs for local youth, women, previously incarcerated individuals, and low-income residents. As part of its 2021–2023 strategic plan, Rising Sun intends to create an anti-racism program and track data related to diversity, equity, and inclusion (Rising Sun Center for Opportunity 2020). In addition to on-the-job training, Rising Sun participants can access mental health services and career development services (Rambert 2022). Rising Sun's Climate Careers program teaches young people how to implement energy efficiency and water conservation upgrades for residents. The program also offers professional development workshops. Seventy-six percent of young participants have reported that Climate Careers positively impacted their future, and 96% of participants have reported increased skill development (Rising Sun Center for Opportunity 2021).

TAILOR MARKETING BASED ON CUSTOMERS' PREFERENCES AND BEHAVIORS

Feasibility: Easy

Impact: Moderate

Although financial concerns are highly influential factors in energy decision making, utilities are often surprised to learn that home comfort and health can also be strong motivators of residential upgrades (Sussman and Chikumbo 2017). This shows the importance of conducting preliminary research with a targeted population and tailoring marketing messages for target customers. Sharing testimonials from individual participants can also inspire new people to enroll in programs. Positive testimonials from participants speak to how successfully the program has changed individual lives.

Tailoring marketing requires learning about customers' specific needs, preferences, and behaviors. Two approaches are particularly effective. The first involves thinking of the decision to participate in a program as a process with stages and tailoring marketing based

on where the customer is in that process.¹¹ Each stage of the process calls for a slightly different marketing message: basic information when a customer is unfamiliar with the program; emphasizing social norms, myth busting, highlighting key benefits,¹² or other persuasive social science-based communications when a customer is unsure about applying; and step-by-step instructions when a customer plans to apply. A second approach to encouraging program participation involves identifying the perceived barriers to, and benefits of, participating. Once the barriers and benefits are identified through preliminary research (interviews, surveys, literature review, or direct observation), program administrators can design marketing messages (and sometimes larger systems and program changes) to overcome those barriers and highlight the benefits.

Examples of behavioral science-based marketing for energy- and environment-related behavior change are plentiful. Many case studies are available on the website [ToolsOfChange.com](https://www.tools-of-change.com) (searchable by geographic region and type), including one from 2022 in which an energy-saving game was designed and marketed to various segments of historically underserved utility customers in Australia (Swinton et al. 2022). Game designers did extensive background research on this segment of the population and created a game that was widely adopted and significantly effective in reducing energy consumption. This sort of “gamification” strategy may be effective with a specific target population for a specific series of behaviors, but not necessarily others.

Another low-income-focused example from the United States (also a [ToolsOfChange.com](https://www.tools-of-change.com) case study), “Chicago’s Go Program” uses a behavioral science-based approach to encourage energy efficient travel. The program first involved community-level research and networking to determine barriers to behavior change. Based on these meetings, they opted to use hyper-local approaches that differed slightly for each neighborhood. For example, a “local ambassador” strategy was used, along with “Go Kits” (including walking, biking, transit, and bike share information) to encourage community members to change the ways they get around. The right behavioral science-based strategy should be selected depending on the target audience, target behavior, context of the action, feasibility of the strategy, and other factors.

¹¹ See the Transtheoretical Model (also sometimes called the “stages of change model”) by Prochaska and DiClemente (1982)

¹² “Social norm” messages highlight that many similar others (or high-status others) are already participating in the program. “Myth busting” messages address common misperceptions about the programs. “Benefits marketing” refers to creating marketing campaigns that focus on the benefits of the programs that align closely with customers’ values and interests (e.g., health, home comfort, or bill savings).

RESOURCES

ACEEE: [ACEEE's Leading with Equity Initiative: Key Findings and Next Steps](#)

ACEEE: [Leading with Equity: Recommendations for State Decision Makers, Utilities, and Regulators to Advance Energy Equity](#)

ACEEE: [Toward More Equitable Energy Efficiency Programs for Underserved Households](#)

ACEEE: [Fostering Equity through Community-Led Clean Energy Strategies](#)

ACEEE: [Expanding Opportunity through Energy Efficiency Jobs: Strategies to Ensure a More Resilient, Diverse Workforce](#)

Facilitating Power: [The Spectrum of Community Engagement to Ownership](#)

Initiative for Energy Justice: [The Energy Justice Workbook](#)

McKenzie-Mohr & Associates: [Community-Based Social Marketing](#)

People's Climate Innovation Center: [Resource List for Community Engagement](#)






Rising Sun Center for Opportunity: [Climate Careers](#)

Tools of Change: [Tools of Change](#)

Urban Sustainability Directors Network: [Equity Foundations 1.0 Training](#)

For Income-Eligible Customers

Many low- and moderate-income¹³ customers live in substandard, inefficient homes that waste substantial amounts of energy. Higher energy consumption results in higher energy burdens, the percentage of annual income that a household spends on energy bills (ACEEE 2019). Weatherization, the practice of updating a building's envelope to make it more resilient to extreme temperatures, can help lower energy burdens. However, weatherization requires a home to be in adequate condition, so buildings with significant structural problems or health hazards are often deferred from service. These deferrals can entrench inequities by leaving behind the households who would benefit most from envelope upgrades. Because weatherization deferrals further delay income-eligible households from receiving energy efficiency benefits, addressing issues that cause deferrals will be a key component to helping these customers.

	Strategy	Feasibility	Impact
	Establish a program for addressing pre-weatherization repairs.	Difficult	Very high
	Target customers who fall just outside of income eligibility limits.	Medium	High
	Braid funding from WAP, LIHEAP, and other income-eligibility programs.	Medium	High
	Offer income-eligible rebates with direct installation measures.	Easy	Moderate
	Reform cost-effectiveness tests for income-eligible customers.	Difficult	Moderate

¹³ Definitions of low-income and moderate-income customers can vary by state. Most tend to use area median income or the federal poverty level as benchmarks. For the purposes of this toolkit, low- and moderate-income customers are those whose income levels qualify them for certain utility programs or for federal programs like the Weatherization Assistance Program (WAP) and the Low-Income Home Energy Assistance Program (LIHEAP). These customers may also be referred to as "income-eligible residents."

ESTABLISH A PROGRAM FOR ADDRESSING PRE-WEATHERIZATION REPAIRS

Feasibility: Difficult

Impact: Very high

Many weatherization projects cannot be completed if a home has physical issues like old or faulty wiring, a broken roof, asbestos, mold, and even excessive household clutter (Wilson and Tohn 2011; Bratburd 2021). These deferrals can further exacerbate inequities because the households who could benefit most from energy upgrades are the ones who are most likely to experience deferrals. Deferrals highlight the need for program administrators to embed health and safety repairs as part of their residential energy efficiency programs.

Generally, energy upgrades that improve a building's envelope can block pests, moisture, and air pollution from entering a home, thereby improving indoor air quality and reducing risk of respiratory illness (Hayes et al. 2022). Efficient heating and cooling systems are also essential, especially as climate change increases the frequency of extreme weather events (Morales and Nadel 2022). However, deferred homes must first be repaired before income-eligible residents can receive the health and energy benefits of weatherization. Enrolling deferred homes in a housing rehabilitation program could help more income-eligible customers receive weatherization services.

Virginia's Weatherization Deferral Repair Program is a "pre-weatherization" program for remediating health and safety problems in low-income households. The program is open to Virginians who meet the income requirements for the U.S. Department of Energy's Weatherization Assistance Program (WAP). Homes enrolled in the program receive repairs specifically for issues that have resulted in the home's weatherization deferral. Common eligible repairs include roof repair or replacement, plumbing repair, or mold remediation (Virginia DHCD 2023). Virginia's Housing Innovations in Energy Efficiency (HIEE) program funds the Deferral Repair Program. HIEE receives additional funding from Virginia's participation in the Regional Greenhouse Gas Initiative, indicating the benefits of leveraging outside funding sources for pre-weatherization repairs (Pitt et al. 2023).

In April 2023, Duke Energy launched a High Energy Use Pilot Program to serve households with high energy burdens in the City of Charlotte, Forsyth County, and Guilford County. The program is open to households at or below 200% of the federal poverty level, and roughly 40% of eligible households have significant health and safety hazards that inhibit energy upgrades (Brierton and Kauffman 2023; Duke Energy 2023). To remedy this problem, the City of Charlotte is dedicating \$1 million in American Rescue Plan Act funding for necessary repairs. With this funding, the pilot can serve up to 1,000 eligible participants within the first two years (Duke Energy 2023).

For an additional example of this strategy, see the case study of Philadelphia Housing Authority's Built to Last program at the end of this section.

TARGET CUSTOMERS WHO FALL JUST OUTSIDE OF INCOME-ELIGIBILITY LIMITS

Feasibility: Medium

Impact: High

Households whose incomes exceed the maximum limits of income-eligible programs may still lack the financial resources to fund energy upgrades on their own (Amann, Tolentino, and York 2023). These moderate-income customers could benefit from simple points of entry and flexible financing options. For example, the website Enervee works with utilities to compile the most efficient appliances into a single online shop. Enervee assigns an efficiency score to each product, and users can filter by price range to ensure that they only see appliances that are within their budgets (Enervee® 2023; Amann, Tolentino, and York 2023). Users can also sign up for price alerts that notify them when the price of a product falls. Making these data publicly available to customers increases access to energy-efficient appliances for customers with limited incomes.

Program administrators can also expand their definitions of “income eligible.” Setting a more inclusive income limit can help programs serve a greater number of households. For example, Wisconsin’s Focus on Energy Home Performance program offers an income-eligible track for residents who make 80% or less of the state median income. This threshold is meant to include moderate-income customers as well as low-income households. The program offers whole-home weatherization services along with higher-than-standard rebates for income-qualified households (Gilleo, Nowak, and Drehobl 2017).

BRAID FUNDING FROM WAP, LIHEAP, AND OTHER INCOME-ELIGIBILITY PROGRAMS

Feasibility: Medium

Impact: High

Program administrators, particularly utilities, often lack sufficient funding to make health and safety repairs prior to energy efficiency upgrades. There are multiple funding sources that program administrators can access to scale up residential energy upgrades for low- and moderate-income customers. Braiding funding is the practice of combining multiple funding sources for the same program, and it can solve the issue of inadequate funding for home repairs (Hayes and Gerbode 2020). The Department of Energy’s Weatherization Assistance Program (WAP) and the Department of Health and Human Services’ Low Income Home Energy Assistance Program (LIHEAP) are two common federal funding sources. WAP funds free, whole-home weatherization for low-income households. LIHEAP helps low-income households who struggle to meet household energy needs, providing immediate bill assistance or weatherization that would make a home more energy efficient in the long run (ACF 2022). When braiding funds, it is important to keep track of different eligibility requirements. WAP generally serves households at or below 200% of the federal poverty guideline, while LIHEAP eligibility criteria can vary based on guidelines set by grant recipients (DOE 2023b; ACF 2022).

Braiding funding is especially important for expanding in-home health and safety upgrades that can reduce weatherization deferrals. Thanks to the Inflation Reduction Act, the Environmental Protection Agency now administers the multi-billion-dollar Greenhouse Gas Reduction Fund. Although the Greenhouse Gas Reduction Fund primarily targets financial institutions, its funds can go toward a variety of projects that promote decarbonization. For example, funds can support "enabling upgrades" (e.g., roof repairs) that make rooftop solar installation possible (EPA 2023). Several other federal health funding sources can help bridge these funding gaps. Table 1 displays potential sources for in-home health and safety repairs.

Table 1. Health funding sources

Source	Administering agency	Applicability
Medicaid	CMS, HHS	Potential for reimbursement of in-home modifications; new program funding models
Children's Health Insurance Program Health Service Initiative	CMS, HHS	Mechanism for unlocking funding for state-backed initiatives that provide a broad array of treatment services
Preventative Health and Health Services Block Grant	CDC	Grant funds for states for underserved areas of public health
Social Impact Partnerships to Pay for Results Act Grants	Department of the Treasury	Support for projects that can demonstrate the ability to reduce the need for other federal spending, including on health care
Lead Hazard Control Grants	OLHCHH, HUD	Funding for home assessments and hazard remediation
National Asthma Control Program	CDC	Coordination funds and resources for in-state networks of asthma responders and services, with guidance emphasizing the built environment

Source: adapted from Hayes and Gerbode (2020)

CMS, HHS = Centers for Medicare and Medicaid Services, Health and Human Services

CDC = Centers for Disease Control and Prevention

OLHCHH, HUD = Office of Lead Hazard Control and Healthy Homes, Department of Housing and Urban Development

Columbia Gas of Ohio's Home Weatherization Assistance Program (HWAP) and WarmChoice® programs show what residential energy efficiency programs can accomplish when they combine multiple funding sources. HWAP receives funding from the federal WAP,

LIHEAP, and the Ohio Department of Development Energy Assistance Programs, while WarmChoice also receives utility funding. Both programs target low-income Ohioans, with priority given to customers with high energy burdens or high natural gas usage (COAD 2023; Gilleo, Nowak, and Drehobl 2017). Columbia Gas of Ohio also funds necessary health and safety repairs to ensure that homes can receive energy upgrades. For another example of this strategy, see the case study of Philadelphia Energy Authority's Built to Last program at the end of this section.

OFFER INCOME-ELIGIBLE INCENTIVES WITH DIRECT INSTALLATION MEASURES

Feasibility: Easy

Impact: Moderate

Program administrators sometimes offer higher rebates for installing energy-efficient upgrades to lower-income customers so that these customers have lower up-front costs. However, rebates alone may not be enough to make energy upgrades affordable for households with limited incomes. To overcome this obstacle, program administrators can offer grants to help lower-income customers cover immediate up-front costs of upgrades. Program administrators can also combine income-eligible rebates with free direct-installation upgrades like LED lighting and low-flow showerheads. Direct-installation upgrades are typically inexpensive upgrades that can produce quick energy savings; they can encourage customers to pursue deeper energy savings by providing an opportunity for customers to directly engage with contractors (DOE 2023a; Drehobl, Ross, and Ayala 2020).

In Connecticut, electric and gas utilities administer the Home Energy Solutions – Income Eligible (HES-IE) program for customers whose income is 60% below the state median (Connecticut DSS 2023). Eligible customers receive a home audit that bundles weatherization measures like air and duct sealing. Additional measures include installation of LED lights and low-flow showerheads and upgrades to heating and cooling systems (Kelley et al. 2022; Gilleo, Nowak, and Drehobl 2017). After implementing these no-cost services, contractors may refer customers to other upgrades that can produce deeper energy savings and any relevant rebates. The HES-IE program then offers additional incentives to customers based on their energy savings (Eversource 2023). The program's combination of no-cost, direct-installation upgrades with referrals to additional rebates has led to broad program participation and substantial savings per income-eligible customer (Gilleo, Nowak, and Drehobl 2017).

REFORM COST-EFFECTIVENESS TESTS FOR INCOME-ELIGIBLE CUSTOMERS

Feasibility: Difficult

Impact: Moderate

Utilities often use cost-effectiveness tests to help them determine whether they should implement or continue an energy efficiency program or portfolio (Specian, Gold, and Mah 2022). Unfortunately, energy efficiency programs for low-income households frequently fail

a cost-effectiveness test due to high per capita program costs that can exceed direct energy-saving benefits (Drehobl, Ross, and Ayala 2020; Morales and Nadel 2022). To remedy this, legislatures or state regulatory commissions can exempt low-income programs from having to meet cost-effectiveness standards or can modify cost-effectiveness tests to incorporate additional benefits beyond energy savings such as improvements in health. In fact, 12 states¹⁴ already include exemptions or special provisions for measuring cost effectiveness of low-income programs (Berg and Mah 2023). Such exemptions can simplify the process of designing and implementing a low-income energy efficiency program. In states that do not allow special exemptions or provisions, utilities can advocate for reforms that will allow such provisions.

The most used cost-effectiveness tests exclude non-energy benefits from their calculations, which further inhibits implementation of low-income energy efficiency programs. Energy efficiency can benefit low-income households beyond just utility bill savings, so quantifying non-energy benefits can give utilities a better understanding of how their programs improve the lives of low-income customers. For example, the Societal Cost Test (SCT) is a cost-effectiveness test that accounts for non-energy benefits such as comfort and health (Guidehouse 2020; Berg and Mah 2023). Vermont is one state that uses the SCT as its primary cost-effectiveness test. For the SCT, Vermont employs a low-income adder of 15% to estimate benefits for low-income customers (Roe 2021). Accounting for these multiple benefits can facilitate implementation of income-eligible energy efficiency programs for low-income households.

Case Study: Philadelphia Energy Authority's Built to Last Program

The Built to Last program demonstrates the benefits of establishing a one-stop shop, addressing pre-weatherization repairs, and braiding multiple funding sources. The program aims to bridge service gaps that could arise when homeowners try to apply for multiple programs. For example, the Weatherization Assistance Program defers more than 25% of Philadelphia applicants due to excessive moisture, mold, structural issues, and other safety hazards (Philadelphia Energy Authority 2022). Built to Last remedies this problem by making necessary repairs before implementing energy upgrades like rooftop solar and high-efficiency heat pumps.

The Philadelphia Energy Authority collaborates with different home repair companies to pool together resources and funding. In 2022 these partnerships allowed the program to

¹⁴ Arizona, Connecticut, Illinois, Maine, Massachusetts, Michigan, New Jersey, New Mexico, Pennsylvania, Texas, Virginia, and Wisconsin

meet 70–80% of home restoration costs (Philadelphia Energy Authority 2022). To cover the remaining costs, the program has turned to grants and microfinancing. Combining multiple funding sources will be critical for meeting the high demand of Built to Last. As of October 2023, the Built to Last program is working with households who were waitlisted in the spring of 2023 (Philadelphia Energy Authority n.d.).

RESOURCES

ACEEE: [Building Better Energy Efficiency Programs for Low-Income Households](#)

Better Buildings: [Finance Navigator](#)

Elevate: [Success Story: Electrification with Florence Pacheco](#)

Elevate: [Building-Electrification Program FAQs](#)




Enervee ®: [Enervee® Score](#)

National League of Cities: [Grant Application Bootcamp](#)

The White House: [Bipartisan Infrastructure Law Technical Assistance Guide](#)

For Renters and Multifamily Residents

Residential energy efficiency programs tend to have greater participation rates among homeowners and residents of single-family homes. For renters, one of the biggest challenges to program participation is the split incentive problem. A split incentive occurs when the person who receives the energy efficiency upgrade benefits is different from the person who pays for efficiency upgrades (Samarripas et al. 2021). This is one of many reasons why program administrators face more challenges in reaching renters and residents of multifamily homes, preventing these customers from accessing energy efficiency benefits.

	Strategy	Feasibility	Impact
	Adopt escalating rebates or other funding practices that avoid the landlord-renter split incentive.	Difficult	Very high
	Engage with building owners and managers to steer them toward energy-efficient upgrades.	Medium	High
	Offer multiple options for energy upgrades.	Medium	Moderate

ADOPT ESCALATING REBATES OR OTHER FUNDING PRACTICES THAT AVOID THE LANDLORD-RENTER SPLIT INCENTIVE

Feasibility: Difficult

Impact: Very high

The split-incentive problem occurs when building owners are not motivated to pay for energy-efficient upgrades because the renters, not the building owners themselves, would receive the immediate benefits. Typically, building owners are motivated to lower their up-front costs while renters are motivated to reduce their monthly operating costs (Amann, Tolentino, and York 2023). If building owners take on costs but do not receive benefits, then they may not have any motivation to pursue energy-efficient upgrades. On the other hand, renters likely lack both the authority to make major changes and the motivation to pay for upgrades (Samarripas, York, and Ross 2017). A program funding model that avoids this split incentive is necessary for scaling up renters' participation in energy efficiency programs.

One promising funding model offers building owners incentives for in-unit improvements if whole-building upgrades achieve a certain level of energy savings. This model can encourage multifamily building owners to pursue deep energy savings that can significantly reduce tenants' energy bills, especially if building owners receive rebates to upgrade specific

units. Georgia Power offers a Multifamily Home Energy Improvement Program to encourage whole-building energy upgrades of multifamily homes. If a project achieves at least 20% electric savings, multifamily building owners can receive a rebate of \$500 per unit. The program advertises lower energy bills and better comfort to residents, as well as better tenant retention for building owners (Georgia Power 2023). Thanks to multiple financing options and high energy savings, building owners can also enjoy acquiring new, highly efficient equipment at substantially smaller costs.

ENGAGE WITH BUILDING OWNERS AND MANAGERS TO STEER THEM TOWARD ENERGY-EFFICIENT UPGRADES

Feasibility: Medium

Impact: High

Substantive energy efficiency improvements are often out of reach for low-income households living in rental housing. To make significant changes, program administrators should engage building owners and building managers/operators. Most or all the power to create physical improvements lies in the hands of these individuals and companies.

ENGAGING WITH BUILDING OWNERS

We recommend three approaches for forming partnerships with building owners and encouraging them to make energy upgrades (Jarrah and Tanabe 2022): (1) engage local associations and leverage existing relationships (e.g., with state housing finance agencies, affordable housing advocacy organizations, local housing authorities, or local real estate trade, building owner, and investor associations), (2) make participation easy, which may require simplifying programs, and (3) be flexible (e.g., do not mandate a specific list of qualified measures and *do* suggest energy upgrades at times that coincide with planned maintenance).

An excellent example of an easy-to-navigate program is the Dane County Efficiency Navigator Program in Wisconsin (Jarrah and Tanabe 2022). As a partnership between Elevate Energy and Sustain Dane, the program reduces barriers for property owners for buildings with rents at or below 80% of the area median income by providing a one-stop shop for energy efficiency, water efficiency, and solar energy upgrades. Property owners receive free energy assessments and a step-by-step three-year implementation plan for any suggested projects, alongside technical assistance for navigating the complexities of programs, incentives, and contractors. As of 2023, the program has helped buildings save an average of \$300 to \$500 in annual energy costs (Sustain Dane and Elevate 2023).

ENGAGING WITH BUILDING OPERATORS

Property management staff and building operators hold less power to make energy improvements than owners, but nonetheless have some control and influence over how energy is used in buildings. For this group, Strategic Energy Management (SEM)-type programs can be useful (e.g., Eisen and Johnson 2023). SEM programs can include some direct installation measures that usually do not require property owner's approval, but their

primary strategy is to educate and discuss opportunities for saving energy through regular maintenance operations. Program administrators could assess each property to learn about existing building systems and potential areas for improvement, and then provide energy benchmarking data and scorecards to inform staff on building energy performance relative to other similar buildings. This can help motivate operations staff to save energy. Once the motivation is established to reduce energy use, program administrators should offer assistance for achieving that goal. For example, hosting a regularly scheduled call with staff to discuss progress, concerns, and issues can be effective.

Atrium Health (formerly Carolinas Healthcare Services) is a healthcare network in the southeastern United States that created an excellent program to empower building operators to make efficiency improvements (Kassirer and Cowan 2019). The program included training for building operators on building automation systems and other energy efficiency opportunities, as well as engagement with the broader ecosystem of facilities management executives to provide support and encouragement. Buildings started using less energy, and operations staff often stated they enjoyed the new challenge of reducing energy consumption.

OFFER MULTIPLE OPTIONS FOR ENERGY UPGRADES

Feasibility: Medium

Impact: Moderate

Although whole-building upgrades are the most effective way to achieve deep energy savings, there are benefits to offering simpler, less intensive options. Energy audits, appliance rebates, and smart thermostats are some options that program administrators can offer to multifamily building owners who are not able to pursue more comprehensive upgrades. Taking advantage of these simpler offerings can help multifamily buildings save energy quickly. Building owners may also find motivation to pursue deeper energy upgrades in the future, depending on their satisfaction with initial upgrades.




To reach renters, program administrators can offer direct install services that would not require tenants to gain approval from their landlords. These could be free or low-cost measures that could help renters achieve immediate energy savings and utility bill reductions. Program administrators may need to work with local governments to enact policy reform that allows tenants to upgrade their homes. For example, the city of Hartford, Connecticut, changed its housing code to allow tenants to make minor energy efficiency upgrades (Samarripas and Jarrah 2021). Although tenants can only make temporary improvements (e.g., adding removable storm windows versus installing a low-e window), the amended housing code is a positive step for expanding tenants' rights.

RESOURCES

ACEEE: [Energy Equity for Renters Toolkit](#)

For Rural Customers

Rural communities often have trouble accessing energy efficiency programs due to their remote locations, limited broadband access, and high cost of program delivery (Shoemaker, Gilleo, and Ferguson 2018). The prevalence of propane and fuel oil as heating sources has also posed challenges due to volatile prices and lack of energy efficiency funding from fuel suppliers (Ross, Drehobl, and Stickles 2018). Living in a rural area exacerbates many of the program barriers that low-income customers and renters typically face. For example, travel distances can be long for contractors, which increases costs and limits contractor choice for customers. These obstacles can further inhibit renters from pursuing energy efficiency, especially if they are also dealing with a landlord-tenant split incentive. The following strategies can serve customers who live outside an urban area or urban cluster.¹⁵

	Strategy	Feasibility	Impact
	Coordinate program offerings within the same state or same region.	Medium	Very high
	Offer fuel-neutral energy efficiency programs.	Difficult	High
	Increase access to high-quality broadband.	Easy	Moderate

COORDINATE PROGRAM OFFERINGS WITHIN THE SAME STATE OR SAME REGION

Feasibility: Medium

Impact: Very high

Rural communities can be difficult to reach due to having sparse populations spread over large geographic areas. The municipal utilities (munis) and electric cooperatives (co-ops) that often serve rural customers typically have lower staffing and financial capacity compared to the utilities that serve urban and suburban customers (Shoemaker and Singletary 2021). To overcome limited capacity within a single organization, munis and co-ops can partner with other stakeholders (e.g., government agencies, other utilities, third-party program administrators) to deliver services. In addition to utilities, state energy offices, state housing

¹⁵ The United States Census Bureau defines an urban area as a block or tract with at least 50,000 residents while an urban cluster has a population ranging from 2,500 to 49,999 residents. Any locality outside an urban area or urban cluster is considered rural (Ross, Drehobl, and Stickles 2018).

finance agencies, and community action agencies could fund weatherization services for rural households. Coordinating program offerings among several organizations that serve the same territory could make it easier to reach rural residents in isolated locations.

Strategically scheduling projects within the same town or region can also facilitate deployment of energy efficiency upgrades. Program administrators can arrange for contractors to be in a specific town for a set number of days to complete as many projects as possible during that time. The contractors can then "rotate" between other towns and complete the same process there. With this practice, contractors do not need to spend as much time and resources traveling between different locations to carry out projects.

The Clean Energy Resources Teams (CERTs) is a public-private partnership that connects Minnesota residents and businesses with necessary resources for clean energy projects. The partnership consists of the University of Minnesota's Extension Regional Sustainable Development Partnerships, the Great Plains Institute, the Southwest Regional Development Commission, and the Minnesota Department of Commerce. Each organization offers unique services, from sharing university knowledge with communities to providing technical assistance to operating statewide energy efficiency programs (CERTs 2023). CERTs offer seed grants to communities across Minnesota, which have funded projects like EV charging station installation and energy efficiency education in rural communities (CERTs 2022).

OFFER FUEL-NEUTRAL ENERGY EFFICIENCY PROGRAMS

Feasibility: Difficult

Impact: High

Homes in urban and suburban areas typically have electric or natural gas heating systems, but many rural residents rely on fuel oil or propane to heat their homes. The high cost of infrastructure expansion has made it difficult for rural residents to switch fuels, which can exclude them from energy efficiency programs run by electric or natural gas utilities (Ross, Drehobl, and Stickles 2018). Program administrators that serve rural customers could make their programs fuel neutral so that any resident can participate regardless of their home's heating source. For example, Arkansas allows investor-owned utilities to offer efficiency programs that cover water, gas, propane, and electricity. Expanding energy efficiency opportunities can improve energy affordability for rural residents, especially given the higher costs of propane and fuel oil and the higher energy burdens among rural households (Ross, Drehbol, and Stickles 2018; ACEEE 2018).

INCREASE ACCESS TO HIGH-QUALITY BROADBAND

Feasibility: Easy

Impact: Moderate

Online marketing is a common way program administrators spread information about their energy efficiency services, but rural customers who lack broadband may not be able to access this information. Broadband is also necessary for installing smart devices that can facilitate demand response programs. In 2021, 28% of rural Americans did not have access to broadband (Vogels 2021). Pairing broadband expansion with energy efficiency upgrades

could help offset increased electricity costs associated with higher Internet usage. Installing broadband would also allow rural customers to install smart thermostats and gain better access to available energy efficiency program information and energy data.

In Missouri, the electric co-op Co-Mo Electric began offering high-speed Internet as one of their available services. Co-Mo Electric launched a fiber-to-the-home network program in 2011, when only 15% of their customers had broadband access. Five years later, the co-op offered fiber services to 100% of its customer base (Shoemaker, Gilleo, and Ferguson 2018). Thanks to the incorporation of broadband services, Co-Mo Electric was able to refer their customers to Take Control & Save, a website that provides information on weatherization, energy-efficient appliances, and solar power installation to customers of affiliated co-ops (ACEEE 2018; Take Control & Save 2023).

RESOURCES

ACEEE: [Connecting Communities with Historic Federal Clean Energy Investments](#)

Rural.gov: [Rural Partners Network](#)

The White House: [Bipartisan Infrastructure Law Rural Playbook](#)

Conclusion

In this toolkit, program administrators can explore various strategies to increase program uptake among their underserved residential customers.

To better reach all types of underserved customers, this toolkit recommends

- **Pursuing equitable community engagement.** Involving community members in the program design process can build trust and ensure that a program truly prioritizes the needs of underserved communities.
- **Establishing a one-stop shop.** Providing a single point of contact or creating a single program that offers multiple services can make program enrollment easier for customers.
- **Creating and disclosing equity metrics.** Creating equity metrics allows program administrators to track their program's impacts, and publicizing such impacts can hold them accountable to reaching underserved communities.
- **Developing a diverse and inclusive energy efficiency workforce.**
 - Bringing clean energy workforce opportunities to underserved communities can improve the economic well-being of individual workers and the communities that they serve.
- **Tailoring marketing based on customers' preferences and behaviors.** Customers are more receptive to marketing that communicates the issues they care about most.

To better reach income-eligible customers, this toolkit recommends

- **Establishing a program for addressing pre-weatherization repairs.** Addressing necessary health and safety repairs is important for ensuring all households can access weatherization, especially those who would benefit most.
- **Targeting customers who fall just outside of income eligibility requirements.** Expanding the definition of "income eligible" can allow program administrators to serve a greater number of households.
- **Braiding funding from WAP, LIHEAP, and other income-eligibility programs.** Leveraging multiple funding sources can increase capacity for scaling up weatherization programs.
- **Offering income-eligible rebates with direct-installation measures.** Bundling direct-installation measures with generous income-eligible rebates can help low- and moderate-income customers access immediate, affordable energy upgrades.
- **Reforming cost-effectiveness tests for income-eligible customers.** Modifying cost-effectiveness requirements can spur implementation of more income-eligible programs.

To better reach renters and multifamily residents, this toolkit recommends:

- **Adopting escalating rebates or other funding practices that avoid the landlord-renter split incentive.** Funding models that ensure tenants receive energy efficiency benefits without significant costs to building owners can increase implementation of energy upgrades in rental housing.
- **Engaging with building owners and managers to steer them toward more energy-efficient upgrades.** Since building owners and managers typically have the most power to initiate energy upgrades, engaging these actors will have the greatest impact on program enrollment.
- **Offering multiple options for energy upgrades.** Free or low-cost upgrades that are readily available to renters can provide them with immediate energy efficiency benefits.

To better reach rural customers, this toolkit recommends

- **Coordinating program offerings within the same state or region.** Partnering with other organizations within the same region can make it easier to reach isolated rural populations.
- **Offering fuel-neutral energy efficiency programs.** Allowing customers to enroll regardless of their home's heating source can spur program enrollment among rural customers who do not use electricity or gas to heat their homes.
- **Increasing access to high-quality broadband.** Improved broadband access can give rural customers more opportunities to enroll in energy efficiency programs and access additional technologies (e.g., smart thermostats).

From reduced energy costs to healthier, more comfortable homes, energy efficiency can produce a lot of benefits. However, these benefits are frequently out of reach for many customers who already suffer from economic and social hardships. Increasing program uptake among low- and moderate-income customers, renters, multifamily residents, and rural households can reduce high energy burdens and improve quality of life for households who have been left behind by business-as-usual programs. Program administrators who incorporate these strategies when modifying or creating programs improve their ability to reach their underserved customer groups.

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