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Energy Efficiency Financing for Low- and Moderate-Income Households: Current State of the Market, Issues, and Opportunities

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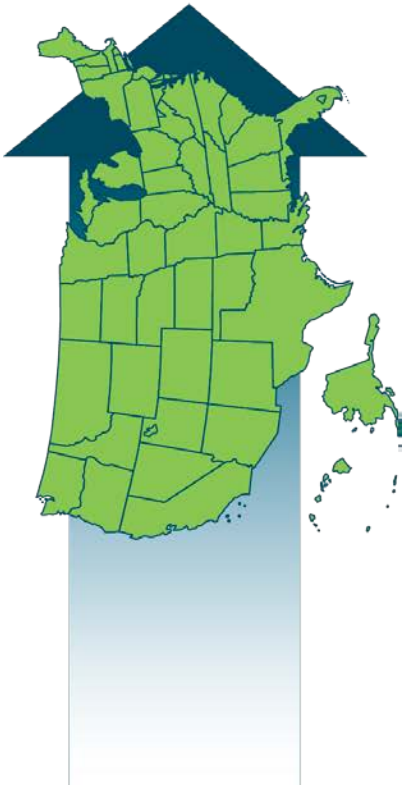
SEE Action

STATE & LOCAL ENERGY EFFICIENCY ACTION NETWORK

Energy Efficiency Financing for Low- and Moderate-Income Households: Current State of the Market, Issues, and Opportunities

Financing Solutions Working Group

August 2017



The State and Local Energy Efficiency Action Network is a state and local effort facilitated by the federal government that helps states, utilities, and other local stakeholders take energy efficiency to scale and achieve all cost-effective energy efficiency by 2020.

Learn more at www.seeaction.energy.gov



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Acronyms

AMI—area median income

CDFI—community development financial institution

CIC—Community Investment Corporation (Chicago)

CMBS—commercial mortgage-backed securities

CPUC—California Public Utilities Commission

CRA—Community Reinvestment Act

DOE—U.S. Department of Energy

DSM—demand-side management

EECLP—Energy Efficiency and Conservation Loan Program

ESA—energy services agreement

ESCO—energy services company

ESPC—energy savings performance contract

FASB—Financial Accounting Standards Board

FHA—Federal Housing Administration

FPL—federal poverty level

GJGNY—Green Jobs, Green New York program

GSE—government-sponsored entities (Fannie Mae and Freddie Mac)

HFA—housing finance authority

HUD—U.S. Department of Housing and Urban Development

HVAC—heating, ventilation, and air conditioning

IOU—investor-owned utility

IRB—interest rate buydown

LIHEAP—low Income Home Energy Assistance Program

LIHTC—low-Income Housing Tax Credit


LMI—low- to moderate-income

LTV—loan-to-value ratio

MF—multifamily

NWWVT—NeighborWorks of Western Vermont

NYCHA—New York City Housing Authority



NYSERDA—New York State Energy Research and Development Authority

OBFOBR—on-bill financing/on-bill repayment

PACE—Property Assessed Clean Energy financing

PAYS®—Pay As You Save®

QA/QC—quality assurance/quality control

QAP—qualified allocation plan

RESPA—Rural Energy Savings Program Act

R-PACE—Residential Property Assessed Clean Energy financing

RUS—Rural Utilities Service (USDA)

SF—single family

SIR—savings-to-investment ratio

TILA—Truth in Lending Act

USDA—United State Department of Agriculture

WAP—Weatherization Assistance Program

WHEEL—Warehouse for Energy Efficiency Loans



Executive Summary

Ensuring that low- and moderate-income (LMI) households have access to energy efficiency is equitable, provides energy savings as a resource to meet energy needs, and can support multiple policy goals, such as affordable energy, job creation, and improved public health. Although the need is great, many LMI households may not be able to afford efficiency improvements or may be inhibited from adopting efficiency for other reasons. Decision-makers across the country are currently exploring the challenges and potential solutions to ramping up adoption of efficiency in LMI households. Many are exploring the use of financing as a potential tool toward meeting that goal.

This report provides an overview of energy efficiency financing programs nationwide—in both the single family (SF) and multifamily (MF) sectors—that are reaching LMI households. These households are defined in multiple ways—for example, for program qualification. For the purpose of examining sector characteristics, this report defines LMI households as those making less than 300 percent of the federal poverty level (FPL).¹ Financing broadly refers to loans or products that enable investments in energy improvements in LMI households, which are recouped from the household over a schedule.²

The report's objective is to offer state and local policymakers, state utility regulators, program administrators, financial institutions, consumer advocates and other LMI stakeholders with an understanding of:

- The relationship between LMI communities and energy efficiency, including important considerations for its use for these households
- Lessons learned from existing energy efficiency financing programs serving LMI households
- The financing products these programs use and their relative advantages and disadvantages in addressing barriers to financing or to energy efficiency uptake for LMI households

Key Characteristics of LMI Households

Following are key characteristics of LMI households that are relevant to energy efficiency and financing program design for LMI households.

Housing Vintage, Housing Stock, and Ownership Patterns


The lower the income, the more likely the household lives in older housing. This has two implications.

- Older housing stock is more likely to need health, safety, and structural work, sometimes before efficiency improvements can be made. These non-energy measures are often ineligible for efficiency financing programs. If the program requires that savings pay for financing payment obligations, adding non-energy measures to a project may not pencil out. This can limit the households that can use financing to pay for efficiency.
- Older housing tends to be less efficient. LMI households spend more per square foot on energy services than higher income households. (Costs for energy services also make up a greater portion of LMI household income.) This highlights the opportunity for efficiency to not only reduce energy consumption in these households but also to relieve financial stress.

Lower income households also are more likely than higher income households to rent (although nearly half of low-income households own their homes) and to live in multifamily housing (although even among low-income households, only about a quarter live in MF housing). There are important regional differences, which underlines how important it is for program administrators to understand their jurisdiction's LMI community and needs. Other implications:

¹ Annual income under 200 percent of FPL is considered low income, and annual income between 200 percent and 300 percent is considered moderate income.

² Some efficiency financing products are not technically loans.

- 
- If renters pay their own utility bills—often the case in individually-metered MF buildings—households will reap the direct financial benefits of efficiency upgrades. Thus, owners have no direct financial incentive to invest in efficiency for these units. This is known as owner-renter split incentives and makes it difficult to reach renters with efficiency, even with financing.³
 - Financing for MF buildings is much different than for SF homes. For example, underwriting for MF projects may be much broader than for SF projects, MF financing generally does not directly impact the borrower’s household finances, and SF borrowers generally do not have to seek consent from other creditors. For this reason, the report examines financing products for SF and MF buildings separately.

Larger Programmatic Context

When considering use of financing for energy efficiency improvements in LMI households, availability of other resources must be considered to determine how financing can leverage these resources and what gaps financing will fill.⁴ Although resources are offered by other public and private organizations, 95 percent of funding for energy assistance that reaches low-income households comes through the federal Weatherization Assistance Program (WAP), federal Low Income Home Energy Assistance Program (LIHEAP), and utility customer-funded low-income programs (Cluett, Amann, & Ou, 2016). WAP and utility programs offer weatherization; LIHEAP’s main focus is bill assistance. These programs are mostly grant-based (i.e., the participant receives the upgrades at no cost).

Many argue that LMI programs should only focus on financial assistance that recipients need not pay back, such as grants.⁵ However, others note that available grant money is far less than is needed to support all cost-effective efficiency improvements. Financing could potentially facilitate significantly more efficiency in LMI homes, enabling households to realize substantial benefits and program administrators to leverage limited budgets. But there are risks to using financing for LMI households.

Consumer Protections

Those risks, such as fraud, abuse, and the penalties of non-payment,⁶ underscore the vital importance of strong consumer protections when using financing for LMI households. It is a broad and complicated field, and it is advisable that decision makers engage stakeholders and seek input from consumer advocates, lenders, and legal counsel. Two ways programs can support consumer protections are:


- **Leverage existing legal framework.** Although some efficiency financing products are not technically loans, existing federal and state legal consumer protections for lending offer a general guide to the protections and principles that decision makers should consider. The following assurances are common elements of such principles and offer guidance on minimum levels of protection needed for the nascent market of specialized energy efficiency financing products for LMI households:
 - *Disclosure:* Before participants enter an agreement, the full costs (including fees and interest) and implications (e.g., how a homeowner’s ability to sell or refinance the house may be impacted) should be clearly disclosed.
 - *Abuse:* Protocols should ensure that abusive practices such as fraud and predatory lending are clearly recognized as unacceptable by lenders and program administrators, and that customers know to whom they can turn if needed.

³ Owners may benefit indirectly, through better tenant satisfaction, higher tenant retention (which can save money on re-leasing a unit), and fewer tenant maintenance calls. Although these may not drive owner adoption of efficiency, they are important benefits.

⁴ For example, utility incentive programs can be leveraged by using them to buy down project costs or to reach LMI households.

⁵ Most low-income energy efficiency programs cover nearly the entire measure or project cost. If a household instead takes out a loan to pay for the measure or project, they eventually pay back the full cost (if unsubsidized) plus financing costs, replenishing program funds.

⁶ If borrowers are unable to repay their loans, they could lose their home, have their power shut off, or suffer negative credit impacts.

- 
- *Affordability*: Program administrators should assess an applicant’s ability to repay financing to ensure loan payments are not burdensome. This includes reviewing the applicant’s income and debt burden.
 - *Protocols to help struggling borrowers*: Forbearance, loan modification, loan forgiveness, and other protocols help borrowers that have difficulty making payments and can help LMI households avoid the consequences of default.
 - **Industry and program practices.** Other industry practices, while not consumer protections, can support affordability and potentially help mitigate some possible risks.
 - *Supporting affordability*: Program administrators and industry stakeholders can coordinate the use of available incentives to buy down project costs, provide subsidies to lower monthly payments, require qualifying projects be cash flow-positive, and focus on households with high energy consumption.
 - *Mitigating risk*: Program administrators and industry stakeholders can bring collections in-house and work to help struggling borrowers, disallow power disconnection as a consequence of nonpayment, certify and train a contractor network, contractually stipulate that contractor payment is contingent on verification of properly functioning equipment, implement robust quality performance and quality control procedures, and offer guarantees on energy savings or proper functioning of efficiency measures.

Additionally, the U.S. Department of Energy (DOE), the state of California, and the industry group PACE Nation have recently taken actions on consumer protections for Property Assessed Clean Energy (PACE) financing (DOE and PACENation releasing guidance documents and California passing AB 2693).⁷

Lessons Learned and Options for Leveraging Financing for LMI Households

To best leverage financing as a tool to promote LMI households’ adoption of energy efficiency, decision-makers should:

- Focus on the specific needs of LMI households in their jurisdiction;
- Ensure robust consumer protections;
- Broadly assess available resources and potential partners, then coordinate and collaborate where possible to assemble the most attractive investment packages—maximizing the use of grants to the extent possible; and
- Collect data to help them understand and best serve LMI households with energy efficiency financing.


Finance Products and Product Features

Financing products and their associated features could address a number of barriers for LMI consumers. This report examines both traditional and specialized financing products:⁸

- **Traditional products** are commonly used to pay for many goods and services, including energy improvements, and may be familiar to LMI consumers, but may not address barriers to efficiency adoption and the use of financing in LMI households. The report covers secured loans (which provide the lender a security interest in the property) and unsecured loans (which offer no security interest). Secured loan programs for energy efficiency have historically only done moderate loan volumes, although Fannie Mae’s Green Financing for multifamily buildings has grown dramatically in the last two years, reaching

⁷ See https://leginfo.legislature.ca.gov/billNavClient.xhtml?bill_id=201520160AB2693 (California), <https://energy.gov/sites/prod/files/2016/11/f34/best-practice-guidelines-RPACE.pdf> (DOE), <http://pacenation.us/wp-content/uploads/2017/02/PACENation-Consumer-Protection-Policies-v2.0-02.17.17-with-attachments.pdf> (PACENation).

⁸ Numbers for unsecured, on-bill, PACE and ESA are almost exclusively single-family investments. Available data for those categories does not allow estimation of investment in multifamily buildings. The numbers include participants of all income levels.



\$3.6 billion in 2016 (Fannie Mae 2017). In 2014, mostly unsecured efficiency programs lent \$200 million.⁹ (Deason, Leventis, et al, 2016).

- **Specialized products** are designed to address such barriers. These include:
 - On-bill products, which allow efficiency investments to be repaid on the utility bill;
 - Property Assessed Clean Energy (PACE) financing, which secures an investment through a special assessment on the property; and
 - Savings-backed arrangements—energy savings performance contracts (ESPCs) and energy savings agreements (ESAs) in which providers take on some performance risk.

In 2014, more than \$76 million was invested in residential energy efficiency through on-bill programs. Residential investment through PACE financing has risen dramatically in the past five years, facilitating \$3.8 billion in clean energy investments (PACENation n.d.). Investment in residential clean energy (all multifamily) through ESPCs accounted for over \$150 million in Energy Service Company (ESCO) revenues in 2014 (Stuart, et al. 2016). There are few firms using ESAs in the single-family residential sector, and there is little information on ESA investment in the multifamily sector.¹⁰

Each product has its potential advantages, disadvantages, and particular considerations. Three areas where financing products can help overcome barriers are affordability, underwriting approaches, and transfers.

Affordability

Because LMI households have little to no discretionary income, monthly payments to finance an efficiency project may be unaffordable for many. Four ways to improve affordability are:

1. **Credit enhancements and buydowns.** Credit enhancements (such as loan loss reserves) can induce a lender to loan capital at lower rates since they reduce the lender's risk. Buydowns are subsidies that reduce total project costs—either the cost of the project itself or the interest rate payments.
2. **Minimizing program costs.** Program administrators can reduce costs through alternative underwriting approaches,¹¹ community-based customer acquisition, automatic payment systems, and low-cost capital sources.
3. **Cash flow-positive rules.** These rules, usually associated with on-bill financing programs, require annual repayments to be less than (or equal to, in the case of “bill neutrality”) projected savings on energy bills. The result should be that, on average over the year, the household pays lower utility bills. However, there are several cautions: it is difficult to accurately estimate savings; in certain months, bills may be higher than before because of seasonal differences in energy use; and a cash flow-positive requirement could limit what projects qualify.
4. **Extended loan terms.** Extending loan terms stretches project costs over a longer period. All else being equal, that lowers monthly payments.

Underwriting Approaches


Alternative underwriting approaches, which put less emphasis on credit scores and other traditional underwriting criteria, may offer some advantages compared to traditional underwriting.

- **Broaden access to financing.** Under traditional underwriting, many LMI households may not qualify for financing. Alternative underwriting approaches could open access for these households.

⁹ Although much energy efficiency investment may go through non-energy-specific unsecured lending.

¹⁰ One company, PosiGen, has made efficiency improvements in over 8,400 single-family homes using an ESA model in which it provides the financing, oversees the contracting work, and offers a first-year savings guarantee (Loeb, Director of Policy and Government Affairs, PosiGen 2017).

¹¹ However, even alternative underwriting approaches that are relatively cheap to administer could be expensive on net if they do a poor job of identifying creditworthy borrowers and result in higher default rates.

- 
- **Speed approval process.** Alternative underwriting approaches may be quicker and less of a burden than traditional underwriting processes, especially for those who need emergency equipment replacement. However, sufficient time should be allowed for borrowers to fully understand and consider the financing arrangement.
 - **Cost less to implement.** For program administrators, alternative underwriting approaches may cost less to implement, since data required for traditional underwriting, such as credit scores, can be expensive to acquire. Approaches based on publicly available data or utility data may cost less.

One caveat is that some alternative underwriting approaches may not capture data to assess an applicant's ability to repay the financing.

Debt Considerations

Debt restrictions are limits a building owner's current creditors put on the further use of credit, constraining the owner's ability to use financing to pay for efficiency. These restrictions are one of the top barriers to using financing for efficiency for multifamily building owners. Another important consideration is financing cycles, the timing for using financing to purchase, refinance, or renovate a building.

- **Debt restrictions.** Some efficiency financing products may be structured in a way that they are not treated as debt, allowing their use even in debt-restricted buildings. Before using such products, an accountant should be consulted.
- **Financing cycles.** Certain products can leverage financing cycles, if the products allow an efficiency project to be included in the purchase, refinance, or renovation of the building. Others can be used to facilitate "stand-alone" projects—energy efficiency projects that do not have a larger scope and which occur outside of the financing cycle.

Transfers

Some efficiency financing programs allow the financing obligation to transfer from one occupant to the next. Transfers may address concerns that efficiency measures will not pay back the investment in savings before a participant leaves the property and can no longer enjoy the benefits. In practice, financing obligations transfer about half the time in situations where it is an option (SEE Action Network, 2014; Goodman & Zhu, 2016).

Stakeholder Coordination and Collaboration

LMI households face a range of challenges to efficiency adoption and the use of financing. As noted in the previous section, financing products and product features have the potential to address some of these. However, when financing is used to promote efficiency adoption, coordination and collaboration among stakeholders (e.g., utilities, community action agencies, housing agencies, local nonprofit organizations, and faith-based organizations) can support LMI efficiency in two ways:

1. **Trust and awareness.** If an efficiency financing program works through or with organizations that have a history, reputation, and network in LMI communities, community members may be more willing to participate. The program also will be able to use partners' networks to reach more LMI households.
2. **Funding.** Programs may be able to collaborate with organizations that could provide full or partial *direct funding* of projects (e.g., community development financial institutions, or healthcare providers that might fund audits); *buy down project costs* (e.g., utility rebate programs); or *cross-fund* projects that might not otherwise be possible (e.g., community action agencies or nonprofit organizations that have funds to make health and safety repairs that must be done before efficiency work can begin).¹²

¹² Some financing offerings allow a certain portion of the loan to be used for these repairs. Otherwise, collaboration with agencies that offer this work for free is a way to make these projects possible.



Data

Data to support improved analysis of LMI energy efficiency financing is needed. Key information broken down by income level would help to: (1) improve understanding of how LMI households use efficiency financing programs, (2) better reach LMI customers, (3) increase efficiency of LMI homes, and (4) responsibly extend financing to LMI households.

Such data includes the following categories.

- **LMI program participation**—e.g., overall number and dollar volume of loans, demographic data (own vs. rent, building type), and credit and wealth characteristics
- **Loan performance data**—e.g., defaults and delinquencies
- **Underwriting process data**—e.g., approval rate and reasons for denials
- **Measures implemented**—e.g., types of measures implemented, number of measures implemented, and efficiency level of the measures implemented
- **Energy savings**—e.g., household energy consumption pre- and post-project, deemed savings values for included measures, and projected and actual bill savings

Program administrators should be encouraged to collect data in a consistent way and make it available for analysis.



1. Introduction

This report addresses ways that financing can help scale up energy efficiency adoption by low- and moderate-income (LMI) households while addressing issues that financing raises for them. The report¹³ provides state and local policymakers, program administrators, state utility regulators, consumer advocates, and other stakeholders with an understanding of:

- Challenges and potential solutions to providing effective financing opportunities for energy efficiency improvements for LMI households;
- Consumer protections issues involved when using efficiency financing in LMI households;
- Existing energy efficiency financing programs available to LMI households and their progress toward program goals; and
- Strategies and options to assure LMI households have the opportunity to benefit from energy efficiency by improving policy and program design related to financing.

Our analysis relies on a review of existing literature; interviews with program administrators, policy makers, financial institutions, consumer advocates, and other stakeholders; and analysis of program and demographic data. The report is a resource that can be used for developing new programs, enhancing existing programs, and considering what financing product options to offer.

LMI households pay substantially more per square foot for energy services and spend a larger portion of their income on energy services than higher-income households (see Section 2.2.4) (Bureau of Labor Statistics 2016).¹⁴ For LMI households, a community that is disproportionately burdened by energy costs (Drehbol and Ross 2016) and by the impacts of energy production (Pastor, et al. 2010), efficiency is particularly important.¹⁵ Although there is significant program funding for energy efficiency for low-income households, many remain unserved—or underserved. Further, moderate-income consumers do not qualify for programs serving low-income households and may not be able to afford to participate in other programs, potentially putting energy efficiency out of reach for them.


It is important to emphasize a caution at the outset. A major challenge with financing for LMI households is affordability. Many households simply cannot afford the capital expense of an improvement or any new regular payments to finance the capital cost. Market-based lenders willing to extend financing to LMI households require fees and finance charges that can make the payments even more unaffordable. Meanwhile, owners of rental housing occupied by LMI tenants may not have a business case to incur financing to pay for efficiency-related improvements because of low market rents for the property, even if improved.

Even with that caution, there is good reason to believe that financing—the use of loans or products that enable investments in energy improvements, which are recouped from the household over a schedule—could help many LMI households, whether living in single-family (SF) or multifamily (MF) housing, benefit from energy efficiency improvements. LMI homeowners and renters pay higher than average costs in the form of utility expenses for wasted energy. Adding a loan payment for cost-effective upgrades can lead to a net reduction in household expenses. For many LMI households, uptake of both gas and electric efficiency may be impeded by market barriers

¹³ This report focuses only on energy efficiency, although financing also is used to fund other building improvements. Efficiency can be anything from a single measure, such as improving the efficiency of an air conditioning unit, to a whole-home retrofit. New construction is not specifically a focus of this report.

¹⁴ For this report, low-income is defined as household income of less than 200 percent of the Federal Poverty Level (FPL), about \$40,000 a year for a family of three, and the income cut-off for the federal Weatherization Assistance Program for low-income families. Moderate income is defined as between 200 percent and 300 percent of the FPL (see “Definitions” section for more).

¹⁵ On average, low-income households (making less than \$40,000 per year) spend 7.8 percent of annual income on energy services; moderate-income households (those making between \$40,000 and \$50,000 per year) spend 6.8 percent; all households spend, on average, 3 percent of annual income on energy services (Bureau of Labor Statistics 2016).



that can be reduced by financing products, particularly if combined with available incentives and grant-based energy and non-energy programs for LMI households.

However, the LMI context is different than for the market as a whole. Market barriers for LMI households may be exacerbated as compared to the rest of the market, there may be additional barriers and different needs, and financing's impact to LMI households—both beneficial and potentially detrimental—can be significant. For example, consumer protections are crucial for a community that is more vulnerable to abuse and that can be more significantly impacted by the consequences of defaulting on a loan, especially if secured by their property. Financing's ability to address LMI market barriers to efficiency adoption could potentially help scale up efficiency in the LMI residential sector by making efficiency more affordable and addressing a number of other potential barriers to the uptake of efficiency in these households.

LMI households comprise a large potential market for energy savings gained through energy efficiency. Approximately 42 percent of U.S. households (about 50 million) have annual incomes of less than \$40,000 per year (EIA 2017). In other words, LMI households, assumed to have insufficient cash reserves to pay for the cost of an upgrade, make up close to half of the homes in the country.

The vast majority of public spending, including government and utility assistance, on energy assistance to these households goes to bill assistance (helping households pay for their energy consumption), rather than to energy efficiency (helping households reduce their energy consumption and consequently lowering their energy costs) (Cluett, Amann and Ou 2016).¹⁶ Energy efficiency can cut their energy consumption, reduce their exposure to rising energy prices, lower their energy bills, improve their health, and increase the comfort of their home (Tom, et al. 2014).


Low-income households may qualify for many energy assistance programs from federal, state, and local governments and their utilities, including efficiency programs. Many of these programs offer a range of services from free, direct-installation retrofits to full home weatherization. Moderate-income households do not qualify for low-income programs because their incomes are too high to qualify, yet they may not have sufficient income or savings to afford energy efficiency and other improvements on their own, even when subsidized through efficiency programs open to all households, such as ratepayer-funded utility rebates and incentives (see Section 2.3). In some instances, improved access to affordable financing could help households in both of these income segments, enabling those who do not qualify for these programs to take on efficiency projects, allowing those who qualify for low-income programs to expand projects beyond program offerings, or to participate when a program is inaccessible (e.g., if participating would take too long because of a waiting list).

Certain financing product design features or enhancements may address a number of barriers that discourage the uptake of efficiency in LMI households. For example, some products use alternative underwriting approaches that allow access to affordable financing for those with poor credit. At the same time, financing faces its own barriers for LMI households—for example, a burdensome application process. Specialized financing product features, described in Sections 3 and 4, may help to overcome these financing-related barriers.

The report is organized as follows.

- Section 2 provides context and background for financing policies and programs for LMI households.
- Section 3 addresses LMI financing policies and programs for single-family homes.
- Section 4 addresses LMI financing policies and programs for multi-family housing.

¹⁶ In 2013, an estimated 81 percent of low-income program support went to federally-funded and utility customer-funded bill assistance, while about 14 percent went to federally-funded and utility customer-funded energy efficiency, according to a recent ACEEE study of the LIHEAP Clearinghouse (Cluett, Amann and Ou 2016). State and local government contributions and private donations made up the balance of support.

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- Section 5 concludes with a summary of lessons learned and options to harness financing as a tool. This section also addresses considerations for using financing to increase efficiency of LMI properties.
 - Appendix 1 is a snapshot of financing products for energy efficiency improvements in the single family and multifamily sectors, comparing them from a consumer’s point of view.

2. Definitions, Characteristics, and Program Support for Low- and Moderate-Income Households

This section provides an overview of LMI households and housing and energy programs that serve them, beginning with definitions of both low-income and moderate-income households and financing. The section then describes characteristics of LMI households, communities, and borrowers; puts energy efficiency financing into the larger context of assistance available to LMI households; examines the role of community-based networks and structures in reaching them; and finally highlights opportunities for expanding efficiency efforts for these households.

2.1. Definitions

2.1.1. Low and Moderate Income

“Low income” is defined in different ways for the purpose of qualification for energy programs and other assistance. This income level is often measured against one of two thresholds: 1) the federal poverty guidelines, often referred to as the federal poverty level (FPL), issued annually by the U.S. Department of Health and Human Services¹⁷ or 2) the area’s or state’s median income (AMI or SMI). To accurately take local economic conditions into account, some programs use the AMI or SMI instead of the FPL, which is a national indicator. Among the programs that rely on the FPL for participant qualification is the Weatherization Assistance Program for Low-Income Persons (WAP), a federal program which provides home weatherization (improving the building shell through measures such as air sealing, insulation, and improved ventilation (DOE n.d.)). WAP defines low-income households as those making at or below 200 percent of FPL, about \$40,000 per year for a family of three (U.S. Congress 2014, DOE 2016).¹⁸ Since WAP’s definition is used nationwide as a qualification for a program that makes efficiency upgrades to homes for low-income households, this report uses this definition to characterize low-income households.

“Moderate income” is a much broader term with no consensus definition. In this report we define moderate income as households making between 200 percent and 300 percent of FPL, which is about \$60,000 per year for a family of three.¹⁹ These households would not qualify for WAP but have, at most, only 50 percent more income than the low-income households that do qualify.

2.1.2. Financing


In this report, financing broadly refers to loans or products that enable investments in energy improvements in LMI households, which are recouped from the household over a schedule. Financing involves the receipt of proceeds to fund an expense and requires regular monthly payments with a declining balance of the amount financed. In the case of energy efficiency improvements, the proceeds may be disbursed to the homeowner, landlord, or contractor, and regular payments are made by the homeowner or the landlord in the case of an apartment building. The amount of the regular monthly payment may be offset entirely or partially by energy cost savings.

We examine both traditional financing products, including secured—first mortgage and junior lien products—and unsecured financing, and specialized products such as on-bill, Property Assessed Clean Energy (PACE), and savings

¹⁷ For more on the FPL, see <https://aspe.hhs.gov/poverty-guidelines>.

¹⁸ The average household in the United States between 2010 and 2014 was 2.63 people (U.S. Census Bureau n.d.).


¹⁹ In some instances, data only allow for analysis of households making up to \$50,000 per year, or about 250 percent of FPL. This is noted where applicable.



backed arrangements, which include energy savings performance contracts (ESPCs) and energy service agreements (ESAs).

- **Secured lending** includes a security interest in the property that serves as collateral for the loan. Information on the level of efficiency investment made through first mortgages (including both private financing and clean energy-specific programs) is limited. Most secured efficiency lending programs have done moderate loan volumes, although Fannie Mae’s Green Financing for multifamily buildings has ramped up dramatically in the last two years, reaching \$3.6 billion in 2016 (Fannie Mae 2017).
- **First mortgages** are referred to as “first” mortgages because they typically are senior to any other loans on the property. They will be paid off first in case of a foreclosure.
- **Junior lien** financing maintains a security interest in the property, but the interest is subordinate to the first mortgage holder. In a foreclosure, they are paid off after the first mortgage.
- **Unsecured** financing has no security interest in the property. Efficiency financing programs that employ unsecured lending have deployed hundreds of millions of dollars. In 2014, for example, mostly unsecured utility efficiency loan programs (excluding on-bill programs) financed nearly \$200 million in residential energy efficiency improvements (Deason, Leventis, et al. 2016).²⁰ Much more efficiency investment may be made through unsecured lending outside of efficiency financing programs. For example, a homeowner may use an unsecured loan or credit card to make a home improvement that includes, but goes beyond, an efficiency upgrade. The efficiency investment portion of the project is not made through an efficiency financing program. Data on these investments are difficult to track and good estimates are unavailable.
- **On-bill** programs allow utility customers to repay investments in efficiency on their utility bills. They are popular and flexible structures, with many variations in features. Residential efficiency investment through on-bill programs in 2014 reached over \$76 million (Deason, Leventis, et al. 2016). Since the late 1970s, on-bill programs have invested over \$1 billion in residential clean energy (SEE Action Network 2014).
- **Property Assessed Clean Energy (PACE)** is a special assessment placed on a property that provides funding for clean energy improvements. Property owners repay the assessment on property tax bills. Residential PACE financing has ramped up significantly in the past five years, facilitating \$3.8 billion in clean energy investments (PACE Nation n.d.).
- **Savings-backed arrangements** are financing tools in which service providers take on the performance risk of efficiency projects—i.e., the risk that energy efficiency measures do not function as intended or the predicted energy savings do not materialize. There are two types:
- **Energy Savings Performance Contracts (ESPCs)** are arrangements between building owners and energy service companies (ESCOs) that are typically financed (generally by a third-party financing provider) and generally backed by a savings guarantee from the ESCO. ESPCs are used to facilitate billions of dollars in clean energy investments each year, although very little of that is focused on the residential sector. In 2014, over \$150 million of ESCO revenue was generated through projects in public housing and other miscellaneous projects (Stuart, et al. 2016).
- **Energy Service Agreements (ESAs)** are frequently marketed as arrangements in which customers pay for energy savings as a service rather than paying for the equipment installed. An ESA provider offers capital for a project, arranges installation of efficiency measures, and shares in the resulting savings.

²⁰ Numbers for unsecured, on-bill, PACE and ESA are almost exclusively single-family investment. Available data for those categories does not allow estimation of investment in multifamily buildings.



There are relatively few examples of residential ESA models and there is little information on ESA investment volumes in either the residential or the nonresidential sectors.²¹

Financing can put efficiency within reach for consumers who do not have sufficient capital to make efficiency improvements. LMI households generally have little or no discretionary income or savings to spend on efficiency and may have higher priorities for any savings that they do have. Financing, therefore, can make efficiency and its associated long-term benefits (e.g., reduced energy cost burden, increased comfort) more accessible for LMI families that otherwise could not afford it.

2.1.3. Opportunity, Rationale, and Benefits of Financing for LMI Households

The efficiency opportunity that financing can create for LMI households is threefold:²²

- 1. Improving efficiency for urgent projects.** For households with an immediate need to take action, such as a failed furnace replacement, financing can make it possible to replace their equipment with a much more efficient model and possibly add supporting measures, such as air sealing of the building shell, which can improve the overall efficiency of the home. This incremental investment can save them money over time and improve health and comfort.
- 2. Expanding conventional efficiency projects.** For those that qualify for low-income energy programs, financing can enable households to go beyond the limited set of measures permitted under the terms of the program. For example, New York's EmPower program offers low-income consumers free air sealing, efficient lighting, and refrigerator or freezer replacement (NYSERDA n.d.). If they would like to expand the project—for example, to replace an old air conditioning unit with a more efficient model—they can apply for financing under the Green Jobs, Green New York program, which is open to all income levels. Financing can also be helpful for serving low-income households when programs are over-subscribed, have long waiting periods, or may disqualify the household for some other reason.
- 3. Making efficiency affordable for moderate-income households.** Many moderate-income households are also income constrained with little or no savings, yet do not qualify for low-income programs. For these moderate-income households, efficiency rebate programs might not make cost-effective efficiency improvements sufficiently affordable. Financing could allow these consumers to take advantage of rebate programs by covering the balance of the upfront costs.


For policymakers, state utility regulators, utilities, and program administrators, there are three main rationales for using program budgets to support efficiency adoption in LMI households:

- 1. Equity.** Financing can be part of a holistic strategy to provide full access to energy efficiency for people of all income levels. To date, most efficiency financing programs do not focus on or may not be accessible to LMI households. Because these households spend a larger share of its income on energy than the average household, reduced energy consumption can significantly cut household costs and increase disposable income.²³
- 2. Efficiency as a resource.** From the perspective of energy utilities and utility customers, energy savings can be a valuable resource. Decreased energy use in LMI households yields all of the direct benefits of reduced consumption from any income segment, such as avoiding energy and capacity costs, stabilizing electricity market prices, and improving system reliability.
- 3. Addressing multiple policy goals.** Helping LMI consumers implement energy efficiency can support public policy goals including job creation, public health, poverty relief, and environmental protection. Other potential benefits for LMI participants include improved comfort, lower home maintenance costs, and improved indoor air quality (Cluett, Amann and Ou 2016). For society as a whole, non-energy benefits also

²¹ One company, PosiGen, has made efficiency improvements to over 8,400 single family homes using an ESA model in which it provides the financing, oversees the contracting work, and offers a first-year savings guarantee (Loeb, Director of Policy and Government Affairs, PosiGen 2017).

²² Where possible, especially for low-income households, any available grant money should form the base of funding for an efficiency project.

²³ Many LMI customers may not use natural gas or electricity for heating, instead using wood or propane. Ensuring that they have access to efficiency for their energy needs is important and often overlooked.



include improved energy security and independence; reduced air emissions; water savings; local economic development; and broad health benefits such as fewer asthma cases resulting from reduced indoor air pollutants and fewer emissions from fossil-fuel combustion (Tohn 2016, Mills and Rosenfeld 1996).

The use of financing may be able to increase the impact of program budgets by attracting a larger customer contribution than, for example, a rebate might. In order for that to happen, there needs to be demand for an efficiency project.²⁴ If there is LMI demand for efficiency but households need access to affordable financing (e.g., low interest rates and long terms) to afford it, then financing may be able to drive efficiency adoption. If LMI consumers do not demand efficiency or do not need financing to afford it, then financing will not drive efficiency adoption nor increase the impact of program budgets.

Furthermore, Lawrence Berkeley National Laboratory (Berkeley Lab) has found that, although a few efficiency financing programs have managed to scale their efforts, most programs are either just starting or have not been able to generate significant volume (Deason, Leventis, et al. 2016).

2.2. Characteristics of LMI Customers, Communities, and Borrowers

2.2.1. Housing Stock and Vintage

LMI households are more likely than higher-income households to live in multifamily housing or mobile homes. In 2009, nearly 25 percent of low-income households lived in multifamily buildings (with five or more units),²⁵ and 10 percent lived in mobile homes. Some 15 percent of moderate-income households lived in multifamily buildings, and 5 percent lived in mobile homes. In contrast, just 9 percent of families making more than \$60,000 per year lived in multifamily buildings, while just about 2 percent lived in mobile homes (see Figure 2-1) (Energy Information Administration 2012). Still, about 65 percent of low-income households and 80 percent of moderate-income households live in single-family units.²⁶

Financing for multifamily buildings is significantly different than financing for single-family housing or mobile homes. For example, to qualify a single-family applicant for a loan, lenders normally look at the applicant's credit score. To qualify a multifamily applicant, lenders tend to look at the cash flow on the property and the applicant's financial statements. Loans for efficiency improvements on multifamily buildings are usually made to the building owner and not the individual unit occupant.

²⁴ It is important that this is "organic" demand resulting from a household's unmet needs and not demand that is created by a contractor upselling improvements that are not necessities.

²⁵ Most multifamily households are renters (M. Zimring, M. G. Borgeson, et al. 2011).

²⁶ These are national numbers; there are important and significant regional variations.

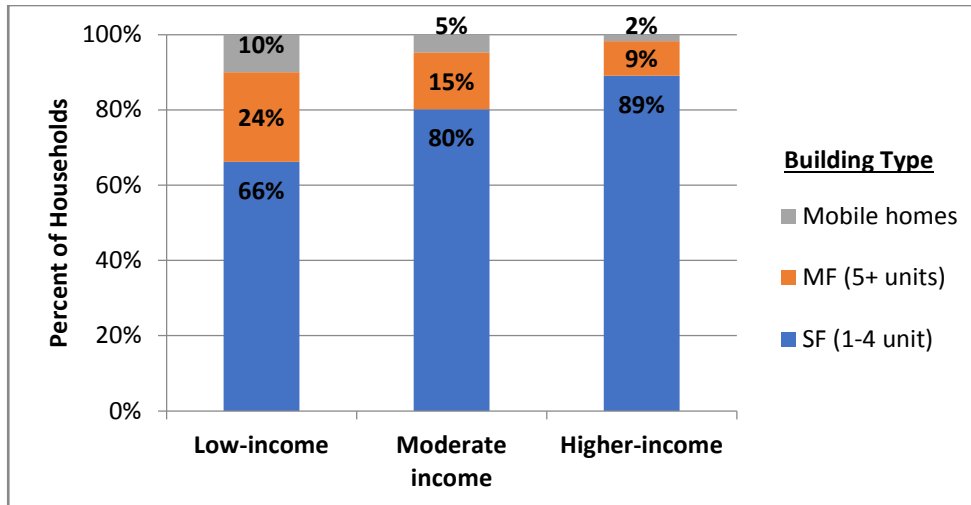


Figure 2-1. Housing stock by income. Lower-income households (both owners and renters) live in multifamily housing and mobile homes at higher rates than higher-income households (Energy Information Administration 2012).

LMI households also live in older buildings than higher-income households. On average, older buildings are less efficient than newer ones, so LMI living spaces may be less energy-efficient and in need of more repairs (see Figure 2-2). In 2009, 45 percent of low-income households and 42 percent of moderate-income households lived in housing that was more than 40 years old, with 33 and 30 percent, respectively, living in housing that was between 20 and 40 years old. Just 22 percent of low-income households lived in buildings that were less than 20 years old, compared to about 35 percent of higher-income households (Energy Information Administration 2012).

In addition to suggesting that LMI housing is typically less energy-efficient—presenting a greater opportunity for efficiency improvements—the prevalence of older housing stock in LMI communities means that health and safety repairs often may be necessary. These repairs may need to be addressed before efficiency upgrades can be installed. For example, John Davies of the Opportunity Council, a community action agency in Washington State that manages the Weatherization Assistance Program work in its area, estimates that they have to decline performing work for one out of every four otherwise eligible homes that request weatherization due to needed repairs (such as those needed for health, safety, or structural integrity) that cannot be funded by WAP due to cost-effectiveness requirements (Davies 2016).²⁷

²⁷ In some areas, Davies approximates the rate is even higher: up to 40 percent. He notes that it can be difficult to quantify the benefits from non-energy measures, which may make it hard to justify including them if a program has cost-effectiveness requirements.

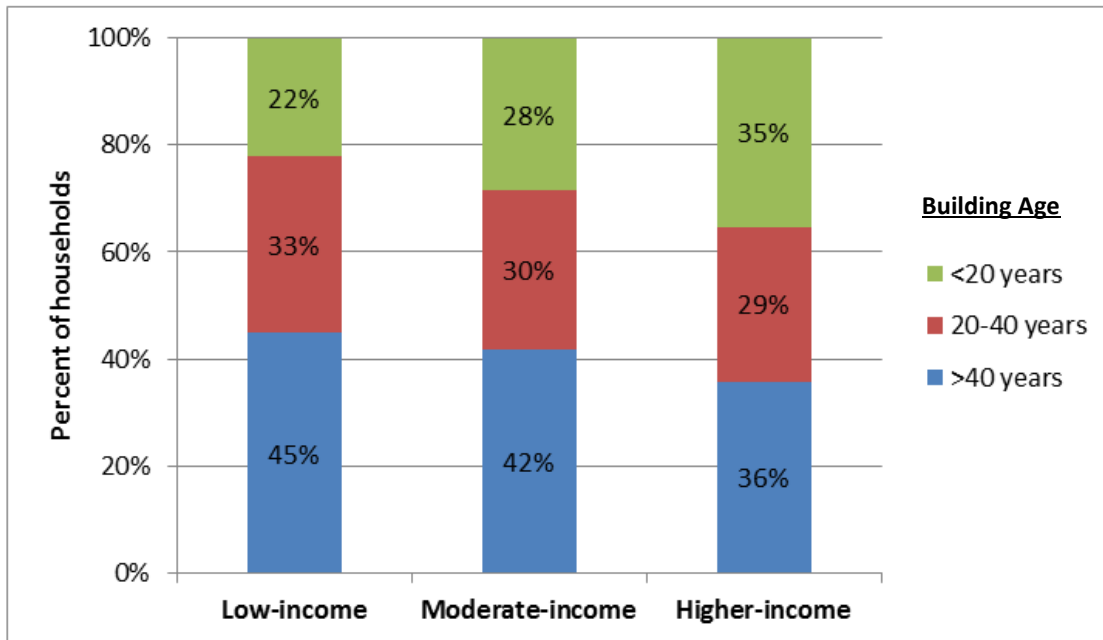


Figure 2-2. Housing vintage by household income. Low- and moderate-income households live in older buildings than higher-income households (Energy Information Administration 2012).

2.2.2. Housing Ownership Patterns (Renters vs. Homeowners)

Figure 2-3 shows that in 2015, LMI households rented at higher rates than higher-income households, but there was still significant ownership in these income categories with nearly half (46 percent) owning their homes.²⁸ Furthermore, LMI homeowners own their homes outright at higher rates than higher-income households (Bureau of Labor Statistics 2016).²⁹ These facts are important for two reasons: 1) LMI homeowners may have equity in their homes that they might use to access better interest rates on loans for efficiency upgrades,³⁰ and 2) since they rent at higher rates, owner-renter split incentives, a barrier to the uptake of energy efficiency, are more prevalent in LMI households.³¹

²⁸ This is, again, an area of major regional variation.

²⁹ Over 62 percent of households with income under \$50,000 per year that own their homes have no mortgage (Bureau of Labor Statistics 2016). This may be due to a high incidence of “generational” homes, homes that have been inherited. There are also significant and important regional variations.

³⁰ Two mitigating factors to LMI homeowners accessing lower-cost, secured financing are: 1) the relatively lower value of their homes limits the amount they may be able to borrow and 2) securing financing to their home puts what may be their most valuable asset, and likely the bulk of their wealth, at risk of being lost. These owners could also potentially be targets for fraud or other abuses.

³¹ Even if renters pay their own utility bills, the fact that they have no long-term stake in the property gives them little incentive to improve its energy efficiency. Property owners also have little incentive to improve the efficiency of the property since renters, who are typically paying the utility bills, would reap most of the benefits of a more efficient living unit. (Property owners can benefit if they can charge higher rent for a more energy-efficient property and have a lower vacancy rate.)

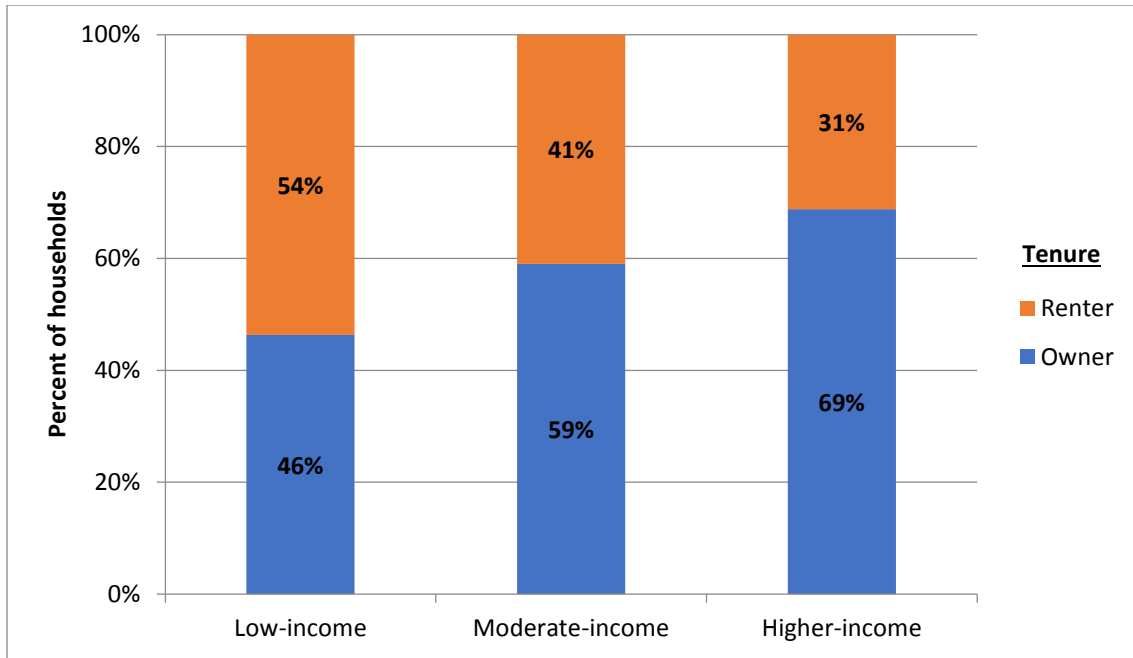


Figure 2-3. Rates of homeowners and renters by income category. Although LMI households rent at higher rates than higher-income households, there is significant homeownership among LMI households (Bureau of Labor Statistics 2016).

2.2.3. Affordable Housing

Affordable housing may be “naturally-occurring,” market rate housing that is affordable, or it may receive some sort of subsidy support. There are several categories of housing support for LMI households: 1) housing supported by the Low-Income Housing Tax Credit (LIHTC), 2) housing subsidies for projects and units (section 8 housing), and 3) public housing.

LIHTC involves private investors receiving a tax credit for investing in affordable housing. Efficiency financing programs that would add debt mid-financing cycle (e.g., with a junior lien loan that must be consented to by the senior lien holders—the private investors) may face substantial difficulty in financing improvements in LIHTC buildings. However, there is support for products such as purchase, refinance, or rehabilitation loans that include additional proceeds to make scheduled repairs (Fannie Mae n.d., HUD n.d.).

For low-income families and individuals, the U.S. Department of Housing and Urban Development (HUD) supports local housing authorities in providing “decent and safe rental housing” through public housing. Approximately 1.2 million U.S. households live in public housing (HUD n.d.). Energy and water utility bill assistance makes up around 22 percent of public housing operating budgets (U.S. Department of Housing and Urban Development 2014). HUD spends an estimated \$6.4 billion a year to support residents’ energy and water utility bills (U.S. Department of Housing and Urban Development 2014).

HUD has its own support networks for energy efficiency for these housing units through initiatives such as HOME Investment Partnerships, the Community Development Block Grant program, and Federal Housing Administration-insured energy efficient mortgages—all of which can be used in part to make efficiency upgrades to public housing, including through ESPCs. HUD also allows public housing authorities to share part of the realized energy savings (U.S. Department of Housing and Urban Development 2008, U.S. Department of Housing and Urban Development 2014).



2.2.4. Energy Consumption

Lower incomes and higher energy consumption per square foot contribute to LMI household energy burdens.³² A household's energy burden is the portion of its income spent on energy costs. Overall, U.S. households spend 3 percent of their income on energy. LMI households spend more than double that: an average of 6.8 percent of their annual income on energy services, compared to 2.3 percent for higher-income households (Bureau of Labor Statistics 2016).³³

Additionally, even though LMI households spend less on energy bills overall, they spend nearly 15 percent more per square foot on energy (\$1.09 per square foot for those making under \$60,000, compared to \$0.95 per square foot for those making \$60,000 or more per year) (Energy Information Administration 2012).

This burden indicates the potentially significant impact energy efficiency could have for LMI households. Low-income households have virtually no discretionary income and often have to prioritize which bills to pay. Such tenuous circumstances highlight: (1) the significance of a monthly loan payment for energy efficiency for these households, (2) the importance of utility bill savings for mitigating that loan payment, and (3) the potential impact of performance risk—the possibility that a project does not generate sufficient savings to diminish or offset the monthly costs of the energy efficiency loan.³⁴

2.2.5. Consumer Protections³⁵

There are varying views on using financing to promote energy improvements in LMI households. Given limited discretionary income of LMI households, any new payment obligation could have potentially negative consequences. Instead, of supporting debt, many argue that programs should focus only on grants and other forms of direct assistance—financial assistance that recipients need not pay back.³⁶ However, because available grant money is far less than needed to support all cost-effective efficiency improvements, financing could facilitate significantly more efficiency in LMI homes, enabling occupants to realize the substantial benefits and program administrators to leverage limited budgets. Regardless of one's point of view, it is clear that consumer protections are an important consideration for efficiency financing in the LMI sector (see Section 3.1).

Several stakeholders interviewed for this report suggested that financing for energy efficiency should not be used in low-income, single-family households. One rationale for using financing to scale up energy efficiency adoption in LMI households is that it will improve the lives of those using it through utility bill savings and other benefits of efficiency. However, in the event utility savings do not exceed the new debt payments, the family would be saddled with an added financial obligation. Another issue is that LMI households are often vulnerable to sales pressure or other factors that could result in unneeded projects. Depending on the type of financing involved, if the LMI households are unable to make their repayments, there is the potential for unintended consequences that could negatively impact LMI households.

If borrowers are unable to repay their loans, they could lose their home, have their power shut off, or suffer negative credit impacts. A lower credit score can make life more expensive and challenging—for example, it can make it harder or more costly to get a loan in the future, or make it more difficult to buy a car, rent an apartment,


³² Note that the relationship between energy consumption and square footage is not linear. Energy consumption for space heating and cooling for a low-income household could be proportionally higher than for a higher-income household, while these households may consume about the same amount of energy for heating water.

³³ These are total energy costs, net of transportation, compared to gross income based on data from the Bureau of Labor Statistic's Consumer Expenditure Survey.

³⁴ Performance risk can also refer to the risk that efficiency upgrades do not perform as represented. Even if a project does generate overall utility bill savings (i.e., it is cash flow-positive), that does not eliminate the chance that the household will default on the loan.

³⁵ For more on consumer protections, see Section 3.1.

³⁶ Most low-income energy efficiency programs cover nearly the entire measure or project cost. If a household instead takes out a loan to pay for all or part of the measure or project, the household eventually pays it back, replenishing program funds.



obtain internet service, secure phone service, or even get a job.³⁷ Thus, strong consumer protections must accompany efforts to use financing to promote energy efficiency.

Sufficient data are not available at this time to analyze default rates based on income. For example, products that use alternative underwriting approaches (e.g., review of bill payment history only) may not capture income data. With much tighter budgets and perhaps more variable income, LMI households may very well default at higher rates than higher-income households. Default on financing is, of course, a great burden for the household and adds to program costs.

Data on overall default rates in some programs with significant LMI participation include the following (NYSERDA, 2017; Loeb, Director of Policy and Government Affairs, PosiGen, 2017; Khouri, 2017):

- NYSERDA's GJGNY reported cumulative residential charge-offs of 1.5 percent.³⁸
- PosiGen reports a default rate of 0.5 percent.
- Less than 1 percent of *securitized* PACE loans have defaulted.³⁹
- Ouachita Electric has had no defaults to date.

A broad set of federal and state consumer protection laws, such as the Truth in Lending Act and licensing requirements, are in place to assure consumers obtain clear information about loans, give consumers certain remedies against violations, and establish some protections against certain practices. These practices include prohibitions on kickbacks, mortgage loans that are made without consideration of the customer's ability to repay, and more. The Consumer Financial Protection Bureau and state officials enforce these requirements, and organizations such as the National Consumer Law Center support the application and enforcement of these requirements.

Specialized efficiency financing products—which incorporate specific features intended to overcome certain barriers to the adoption of efficiency and the use of financing (discussed in detail in Sections 3 and 4)—present their own distinctive consumer protections issues. For example:


- **Power disconnection.** Some on-bill loan products carry the threat of power disconnection in cases of nonpayment. Especially in extreme weather and for fragile persons—e.g., the elderly, families with small children, or those with medical needs—this could be an extreme burden.⁴⁰
- **Transfers.** Both PACE assessments and some on-bill financing instruments may allow the payment obligation to be transferred to a new owner or occupant if the party that originally made the upgrades sells the house or moves before the obligation is paid off. This presents several potential challenges. For incoming occupants that assume these obligations, there must be sufficient disclosure and understanding of what this means for them in terms of the liability they are assuming as well as the associated benefits. This must be done early in any transaction. In any home sale, it is important to assure property appraisers, title companies, and lenders are aware of the assumed obligation.
- **Underwriting.** In order to expand access to capital, some efficiency financing programs are using alternative underwriting approaches—for example, considering only bill payment history. Particularly in cases in which they do not require income information for qualification, lenders may approve some applicants without understanding their ability to repay without hardship.

³⁷ States are beginning to limit employers' ability to use credit scores for screening potential employees. At least 10 states currently ban the practice and, as of 2013, another 26 states had introduced legislation to limit the practice (National Conference of State Legislatures 2014).

³⁸ For NYSERDA, 1.5 percent is the cumulative dollar volume of charge-offs (defined as loans that are more than 120 days past due divided by the cumulative loan dollar volume). This number includes MF housing.

³⁹ According to Kroll Bond Rating Agency.

⁴⁰ However, some of these households could be at risk of disconnection already due to high energy bills. Reducing energy bills could lower their risk of disconnection.

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- **Project performance.** Some efficiency financing models assume that utility bill savings from the efficiency upgrades will cover (or more than cover) loan payments. When these savings are realized, this can be a benefit for the borrower, who then has no cash flow impact from the loan or realizes a cash flow increase. However, if a borrower is counting on those savings and they do not materialize it could potentially be harmful. This performance risk may be mitigated through a conservative savings-to-investment ratio requirement (i.e., requiring monthly charges be *significantly* less than estimated savings) and a guarantee (e.g., requiring that charges be waived if upgrades fail and are not promptly repaired), but the risks must be properly understood.

2.3. Energy Efficiency Financing Programs Within a Larger Context

A number of options can help LMI consumers make energy efficiency improvements. These include low-income programs sponsored by governments and utilities, energy efficiency programs open to all income levels, and assistance programs focused on benefits other than energy efficiency that incorporate some sort of energy assistance into their offerings (such as ones run by state Housing Finance Authorities). These programs are part of a larger context of support for efficiency in low-income households that must be considered to understand the appropriate role of efficiency financing.

2.3.1. Government- and Utility-Customer-Funded Programs for Low-Income Households

Federal, state, and local governments as well as utilities offer programs for low-income customers to better afford energy services. These generally fall into two main categories: (1) utility bill assistance and (2) weatherization. These programs require that participants meet some definition of “low income.” The three largest program categories, making up 95 percent of low-income energy program funding, are the federal Low Income Home Energy Assistance Program (LIHEAP), the federal Weatherization Assistance Program (WAP), and utility customer-funded programs (Cluett, Amann and Ou 2016).

2.3.1.1 Low Income Home Energy Assistance Program (LIHEAP)


The U.S. Department of Health and Human Services houses LIHEAP. LIHEAP funds are allocated to state governments to help low-income households with energy costs. The majority of this help comes in the form of utility bill assistance, but states may elect to use a portion on efficiency upgrades through WAP (NASCS, WAP 2015).⁴¹ In 2015, LIHEAP distributed \$3.39 billion to states for low-income energy support, with approximately \$550 million going to efficiency upgrades for over 50,000 homes (Cluett, Amann and Ou 2016, NASCS, WAP 2015).

2.3.1.2 Weatherization Assistance Program (WAP)

The U.S. Department of Energy (DOE) administers WAP, providing grants to states, territories, and some Native American Tribes for local implementation. WAP’s mission is “to reduce energy costs for low-income families, particularly for the elderly, people with disabilities, and children, by improving the energy efficiency of their homes while ensuring their health and safety” (NASCS, WAP 2015). This is mostly done through improving the efficiency of low-income homes. In 2015, approximately \$191 million was available from DOE to weatherize just over 49,000 homes (NASCS, WAP 2015).

WAP offers a set of prescribed measures authorized by law, with detailed technical requirements designed to install cost-effective measures. If participants want to go beyond the scope of these measures, they must find other support programs or figure out how to pay for the additional upgrades themselves. Funding for WAP is largely dependent on federal appropriations, enabling a commensurate number of homes to be weatherized per year. In some locales, the need is greater than what available resources can support, resulting in wait lists. If for any reason households cannot be served by WAP, community-based organizations may be able to steer applicants to other grant-based programs that could help. Grant-based incentives should be maximized before a LMI

⁴¹ In 2016, states are allowed to use up to 40 percent of LIHEAP funding on efficiency (Cluett, Amann and Ou 2016).



household turns to financing. If a household does choose to use financing, any available grant-based incentives should be maximized to minimize the amount that must be financed.

2.3.1.3 Utility Customer-Funded Low-Income Programs

Most utility spending on low-income households comes in the form of bill assistance (Cluett, Amann and Ou 2016). For example, the California Alternative Rates for Energy (CARE) program run by California investor-owned utilities reduces utility bills for income-eligible customers (those making up to 200 percent of the FPL) by 30 percent to 35 percent for electricity (depending on the utility) and by 20 percent for natural gas (California Public Utilities Commission n.d., Gibbs 2016).

Utilities also run a variety of low-income programs for energy efficiency, ranging from small-scale direct-installation programs to full weatherization. Berkeley Lab's Demand Side Management (DSM) database now collects data on utility DSM programs in 41 states. The data for 2012 indicate that low-income programs funded by utility customers spent approximately \$350 million that year for electric efficiency (I. Hoffman 2015). That same year, WAP spent \$206 million and LIHEAP spent \$436 million (NASCS, WAP 2013).

Low-income programs differ from other utility customer-funded energy efficiency programs in two important ways: (1) energy savings are often just one among several policy functions of these programs (including improved health and safety, equity among customer classes in access to energy savings, and poverty relief) and (2) these programs are typically more expensive than other energy efficiency programs per unit of saved energy (I. Hoffman 2015). Because of the special values and objectives of low-income efficiency programs, cost-effectiveness standards (for society or utilities) may be relaxed.⁴²


The savings-weighted average cost of utility customer-funded efficiency programs for low-income customers in 2012 was \$0.13 per kilowatt-hour (kWh) compared to \$0.04 per kWh for utility efficiency programs in all sectors. Although most utility efficiency programs generate savings in proportion to the share of budget spent on them, program administrators spend 9 percent of their efficiency program portfolio budgets on low-income programs, which generate just 2 percent of portfolio savings (I. Hoffman 2015). However, in addition to energy benefits, these programs also generate non-energy benefits and societal benefits.

Among the reasons for the high cost of low-income efficiency programs funded by governments and utilities are:

- **Challenging outreach.** It is difficult and expensive to reach low-income customers, especially if the program administrator does not have a network, reputation, and infrastructure in the community. For many low-income customers, energy efficiency may not be a high priority, compared to competing needs, so government and utility program administrators must identify customers, reach out to them, and work on getting projects implemented. Among the steps required that take up the customer's time are establishing income eligibility, having an energy audit conducted, and allowing contractors into the home to complete the project. Each of these steps can cause the target participant to give up on the project.⁴³ The money invested in outreach to customers who do not ultimately take on an energy-saving project increases program costs without increasing program savings, thus increasing costs per unit of saved energy. Efficiency financing initiatives in LMI households face these same challenges, in addition to the challenges associated with offering a debt service rather than subsidized offering.
- **Grant focus.** Low-income efficiency programs funded by governments and utilities generally provide mostly grants, requiring little or no customer contribution. That makes program administrator costs for low-income programs more expensive per unit of energy saved than rebate programs, in which

⁴² Vermont, for example, uses the societal cost test to screen efficiency programs for cost-effectiveness but, for low-income programs, a 15 percent adjustment is applied (ACEEE 2017).

⁴³ Each of these steps could potentially require a prospective participant to take time off work, which may be a significant burden or simply not possible.



program funds cover only a portion of the measure cost. A project financed by a customer would necessarily include customer contributions leveraging program budgets.⁴⁴

- **Condition of the housing stock.** Because housing stock for low-income households is often old, in poor condition, and in need of repairs (some of which must be made before efficiency work can be performed), low-income efficiency programs sometimes pay for non-energy measures such as repairing wiring or removing asbestos, when necessary and based on availability of funds. Where substantial remediation of health and safety issues is required, homes to be weatherized are put on hold (“deferred”) until those issues have been addressed. These measures add costs with no accompanying energy savings, increasing the program’s cost per unit of energy saved. Efficiency financing program administrators must balance the benefit of enabling more projects by allowing some portion of a loan to be spent on non-energy improvements (that may improve health, safety, and structural integrity of the home) with the fact that such repairs add costs but generate no energy savings. Community Reinvestment Act compliance by banks, community development block grant funds, and Healthy Homes (HUD) funding are among the options that could be leveraged to finance home repair, as is healthcare and hospital reimbursement where home health hazards exist.

2.3.2. Energy Efficiency Programs for All Income Levels

In addition to low-income programs, utilities run a variety of efficiency programs for residential customers of all income levels. In 2014, expenditures on these programs were nearly \$7.3 billion (Cooper and Smith 2015).⁴⁵ Programs range from appliance rebates to incentives for whole home retrofits and new construction. These programs are open to both low- and moderate-income customers. However, most are largely rebate programs, requiring at least some customer contribution. An examination of electric efficiency programs funded by utility customers in 20 states found that participants in residential programs open to all income levels on average pay more than 40 percent of measure costs while participants in low-income utility efficiency rebate programs pay less than 6 percent (see

Figure 2-4) (Hoffman, et al. 2015). LMI households generally would need some type of support, which could include financing, to cover the balance of measure costs and consumer assurances to protect LMI customers from worsening their financial situations. These rebate programs may effectively buy down efficiency project costs to the point that financing could make sense for LMI customers, if monthly loan payments are affordable.

⁴⁴ Program administrators may achieve more energy savings per dollar spent on financing programs compared to rebate programs. However, that must be weighed against potentially high costs of defaults and credit enhancements. For more, see <https://www4.eere.energy.gov/seeaction/publication/making-it-count-understanding-value-energy-efficiency-financing-programs-funded-utility>.

⁴⁵ This figure reflects spending on *electric* efficiency programs.

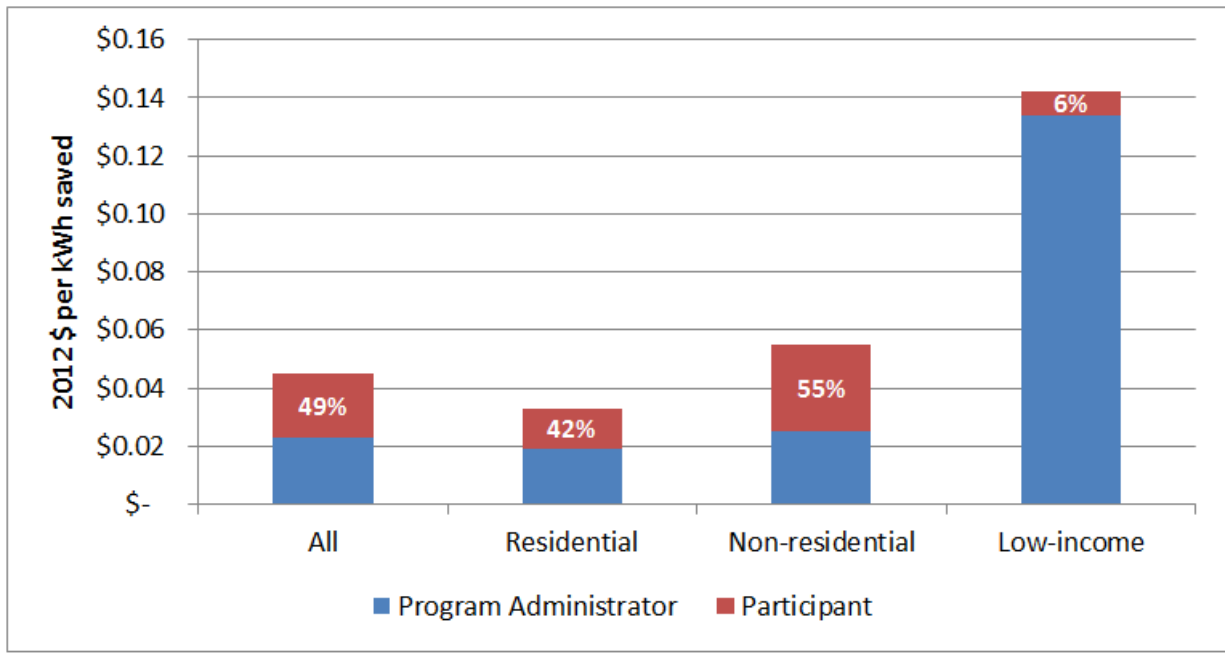


Figure 2-4. Program administrator costs and participant costs for utility efficiency programs. On average, low-income utility efficiency program participants make a much smaller cost contribution than non-low-income program participants (Source: Hoffman, et al. 2015).

2.3.3. Other Programs for LMI Consumers

Some initiatives focused on other social benefits for LMI households, such as affordable housing, do—or can—include support for energy efficiency. For example, state Housing Finance Authorities (HFAs) fund affordable mortgage programs directed at LMI consumers, other community development programs, and home improvement and rehabilitation loans for LMI consumers. Some allow energy efficiency upgrades to be included in their home improvement loans (Zagorski 2016).

2.4. Role of Community-Based Delivery Networks and Structures

LMI households can be hard to reach for a variety of reasons. Understanding these households, having a credible reputation with them, and having an effective infrastructure for developing projects and delivering services are important for successfully operating in this sector. Working through trusted, community-based partners such as community action agencies, community development financial institutions (CDFIs), public housing agencies, community development corporations, nonprofit energy service organizations, and other low-income support organizations provides an opportunity to leverage (1) work that these organizations already do, such as home health and safety upgrades, and (2) their existing infrastructure to keep down customer acquisition costs.

All of these benefits can support successful deployment of efficiency financing for LMI households. For example, in initial market research into developing financing programs for the LMI multifamily sector, the Connecticut Green Bank recognized the value of the community networks and infrastructure to organizations such as Chicago’s Community Investment Corporation, which has worked in the LMI community for decades. To leverage such networks and infrastructure in Connecticut, the Green Bank has made a concerted effort to build relationships with Connecticut housing agencies and CDFIs (O’Neill 2016).⁴⁶

⁴⁶ For example, the Green Bank has invested in a multifamily product called the Low Income Multifamily Energy loan, which is administered by Capital for Change, a CDFI.



2.5. Opportunities for Expansion

Currently, the main drivers for energy efficiency adoption are energy prices and state and local policies, such as Energy Efficiency Resource Standards and building energy codes. The demand that these drivers create may go unmet due to well-documented barriers (examined in Sections 3 and 4), which may be exacerbated in LMI households. To help overcome some of these barriers for LMI communities, financing that is accessible and with affordable terms could help.

Additional opportunities could make financing:

- More attractive, by connecting it with benefits beyond energy and cost savings
- Accessible, through capital made available specifically for lower-income communities and
- Affordable, by buying down project costs or sourcing low-cost capital.

State and local governments can play a role in coordinating and, in certain cases, managing these efforts, and in educating stakeholders about these possibilities.

2.5.1. Increasing Comfort and Integrating Health Benefits

Home energy efficiency improvements such as upgraded insulation, air sealing, and ventilation and heating system improvements can increase comfort and provide measurable health benefits. Such improvements have been associated with reduced hypertension, heart disease, asthma symptoms, and respiratory risks, which lead to fewer hospital and medical visits (Tohn 2016). Recognizing and integrating health considerations and benefits as part of an efficiency project offer two significant opportunities: (1) enhanced marketing and outreach and (2) potential sources of capital to help buy down efficiency project costs, making financing a project either possible or more affordable.


2.5.1.1 Marketing and Outreach

Promoting the comfort and health benefits of efficiency can make projects more attractive, especially for LMI households that disproportionately suffer the respiratory ailments that efficiency upgrades are most associated with improving (Wolstein, Meng and Babey 2010, Woolf, et al. 2015). Additionally, partnerships or collaboration with community hospitals and health organizations can provide a ready-made LMI network for efficiency financing programs to reach out to.

2.5.1.2 Potential Sources of Capital

Healthcare stakeholders have an interest in the health benefits of efficiency because fewer hospital and medical visits mean lower costs for hospitals and insurance companies.⁴⁷ Fifty percent of the country's medical costs are generated by just 5 percent of the population (Jiang, et al. 2015, Mann 2013). Many of these individuals, known as "super-utilizers," suffer from chronic conditions for which efficiency upgrades can address root causes (Tohn 2016, Mann 2013). Medical stakeholders, including Medicaid and Affordable Care Act administrators, are devoting resources to minimizing the cost impact of these individuals (Mann 2013). These stakeholders may be increasingly willing to invest in efficiency as more research is done linking efficiency to health improvements. A number of current efforts illustrate ways funding for healthcare could be used to complement efficiency financing efforts, through funding audits, buying down project costs, or paying for measures that may be ineligible under an efficiency financing program's rules. Following are two examples.

⁴⁷ An initial finding in an Oak Ridge National Laboratory study found that Medicaid-insured participants in Washington state that received weatherization services had significantly lower Medicaid costs (Rose, et al. 2015).

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- **Direct project funding** – Rutland Regional Medical Center in Vermont has hired NeighborWorks of Western Vermont (NWWVT) to implement energy efficiency measures and home rehabilitation in the homes of super-utilizers with chronic respiratory conditions (Tohn 2016).⁴⁸ Home improvements will reduce the hospital’s costs by decreasing the number of medical visits that these residents need. The hospital has committed \$75,000 to upgrade the homes of six regular patients (Biddle 2016).
 - **Funding for home assessments** – A few states have authorized Medicaid to reimburse asthma education, home assessments for factors that contribute to asthma, or both (Ollove 2014, Tohn 2016).⁴⁹ The Building Performance Institute, Inc. (BPI) in partnership with the Green & Healthy Homes Initiative has developed the Healthy Home Evaluator credential for contractors (BPI n.d.). Contractors conducting these assessments may find that efficiency upgrades would ameliorate some of the issues triggering an occupant’s asthma or other health condition.

2.5.2. Focusing Resources

2.5.2.1 Community Reinvestment Act (CRA)

Through the CRA, Congress requires the Office of the Comptroller of the Currency (OCC), the Board of Governors of the Federal Reserve Board, and the Federal Deposit Insurance Corporation (FDIC) to assess regulated financial institutions’ efforts at “helping to meet the credit needs of the local communities in which they are chartered” (OCC n.d.). Financial institutions can meet their CRA responsibilities through qualified lending, investment, and service in LMI communities.⁵⁰ Qualified loans include those used to rehabilitate affordable housing and qualified investments, such as those made to CDFIs and other mission-driven lending institutions (OCC 2014).⁵¹

Banks often fulfill some portion of CRA obligations by purchasing CRA-eligible loans originated by other parties, like CDFIs, or by providing funding for CDFIs to use to make loans. Thus, CRA can indirectly drive some amount of efficiency lending. CDFIs may offer efficiency financing products or they may make loans for home improvement projects that include, but are not limited to, energy efficiency.⁵²

CRA investment has indirectly supported significant funding for energy efficiency through CDFIs that offer efficiency financing to LMI households. For example, Florida’s Solar and Energy Loan Fund (SELF) is a certified CDFI whose goal is to make financing “accessible and affordable” for LMI households “to access and make use of technologies that will improve the value and sustainability of their properties.” SELF has provided low interest loans to fund over \$5.3 million in energy upgrades between 2011 and 2016 (SELF 2016). CRA investment from local banks and financial institutions has made up 17 percent of their loan capital (SELF 2016). State and local governments could potentially find a source of financial support for LMI efficiency financing programs through CRA investments. Increasing financial institutions’ awareness of LMI efficiency financing programs as eligible CRA investments could open up a significant opportunity.

⁴⁸ NWWVT is a community development organization principally supported by NeighborWorks America, a national organization committed to helping people live in affordable homes and strengthen their communities, and the Vermont Community Development Program (NWWVT n.d., NeighborWorks America n.d.)

⁴⁹ States include Missouri, Massachusetts, Minnesota, and New York.

⁵⁰ CRA regulations define low-income as less than 50 percent of AMI and moderate income as between 50 percent and 80 percent of AMI (OCC n.d.).

⁵¹ CDFIs are divided into four categories: Community Development (CD) loan funds, CD banks, CD credit unions, and CD venture funds (OCC 2014).

⁵² Efficiency lending programs that are open to all income levels could only receive CRA credit for loans made to low-income customers — i.e., those that fit CRA criteria.



2.5.2.2 Crowdfunding and Impact Investors

SELF has also engaged two other potential sources of low-cost capital: crowdfunding and impact investors.

- **Crowdfunding** raises project capital from multiple lenders, often via an internet forum serving that goal. For example, Kiva is an international nonprofit organization dedicated to alleviating poverty that uses crowdfunding to fund projects. Kiva is a forum for lenders to make small loans to projects where they would like to make a difference. Working through Kiva, SELF has secured \$400,000 (10 percent of their loan capital) in zero-interest capital for clean energy loans (SELF 2016).
- **Impact investors** invest with the goal of generating both financial returns and positive social and environmental impacts, usually aligned with their programs or mission (CA and GIIN 2015). They have provided nearly \$1.8 million in capital, accounting for a third of SELF's loan capital, charging SELF between 2 percent and 4.5 percent interest. SELF's impact investors are mostly faith-based organizations that see SELF's mission of helping LMI communities access sustainable technologies as consistent with their own missions, particularly in light of Pope Francis' encyclical on climate change (Pope Francis 2015).

2.5.2.3 Rural Utilities Service

The Energy Efficiency and Conservation Loan Program (EECLP) and the Rural Energy Savings Program (RESP) are substantial pools of potential low-cost loan capital for efficiency lending programs available to rural electric service providers by the USDA's Rural Utilities Service (RUS). Loans directly to rural utilities are made at very low rates (just over U.S. Treasury rates for the EECLP and zero interest for the RESP) and can be re-lent to customers for energy efficiency upgrades (EESI n.d.). In Fiscal Year 2016, RESP made \$52 million available to be "focus[ed] on low-income, high-energy-cost communities" (USDA 2016). A portion of the loan can be used for program startup costs (EESI n.d., USDA n.d.). USDA makes \$6.5 billion in loans available annually to utilities for a variety of rural utility infrastructure needs. EECLP allows those loans to be re-lent by rural utilities to their customers for energy improvements to their homes. Approximately \$2 billion per year from the fund goes unused (EESI n.d.).

The EECLP and RESP are significant sources of low-cost capital that can be used to serve LMI customers in rural areas. Roanoke Electric in North Carolina runs a Pay As You Save® (PAYS®) efficiency financing program (see Section 3.3.2 for more on PAYS®) that is funded through EECLP.

3. Single-Family Housing: Financing Efficiency for LMI Households

This section of the report focuses on energy efficiency financing programs for single-family (SF) housing.⁵³ Loans to this market sector differ from those in the multifamily (MF) sector, since most loans for SF properties are personal loans made directly to individuals and directly impact LMI household finances.

⁵³ Single-family borrowers may be tenants, owner occupants, or owners renting property to others.



KEY TAKEAWAYS

Policymakers should use extreme care in ensuring adequate consumer protections are in place.

- Two major barriers to LMI households using financing for efficiency are: 1) lack of awareness (e.g., about efficiency benefits and financing options) and 2) lack of trust in some key market actors. Financing products themselves do not address these barriers, but coordination and collaboration with trusted partners in LMI communities may help overcome them.
- Needed health and safety repairs are often a prerequisite to efficiency work. Without funding to make these repairs, efficiency projects are often left undone. The ability to finance some health and safety repairs could allow efficiency financing programs to serve more LMI homes.
- There is evidence that LMI borrowers may often use financing for emergency replacements. Because of this, lower transaction costs (e.g., a quick turnaround) for the loan application and approval process may often be important for LMI households that need to use financing.
- Some efficiency financing programs, including those not primarily focused on the LMI sector, have seen significant participation by LMI households.
- Several types of financing products can support uptake of efficiency by LMI households by addressing market barriers in that sector. There are important tradeoffs involved with these products and their features.
- Alternative underwriting approaches can be quicker, easier, cheaper, and more inclusive than traditional underwriting, thus helpful for LMI households, but they may not assess the affordability of a loan for each applicant—an important consideration.
- Structuring loans as cash flow-positive can potentially make financing affordable for LMI households, but such financing structures involve important uncertainties (e.g., whether such financing structures result in realized bill savings).


The ability to transfer a loan to a subsequent property owner when the borrower moves may give LMI households confidence that they will not have to pay for measures that they are not benefitting from. Among three programs that offer this option, only about half of participants⁵⁴ transferred their payment obligation.

3.1. Single-Family Housing: State of the Market for LMI Households

Low-income borrowers are disproportionately impacted by unfair and fraudulent lending practices (Wolff 2015), reinforcing the view by some stakeholders that financing should not be promoted for low-income consumers as a way to implement energy efficiency given the risks to these households, including consumer abuses and the consequences of non-payment.

Generally, consumer lending laws are designed to prohibit unfair and fraudulent practices (see “Consumer Protections” text box). Some specialized efficiency financing products—for example, some on-bill products, Energy Service Agreements, and Property Assessed Clean Energy (PACE) financing—are not technically loans and thus may not be subject to compliance with these laws.

⁵⁴ These programs were NYSERDA’s Green Jobs, Green New York, Renovate America’s Hero program, and Midwest Energy’s HowSmart® Kansas. Transfer experience may be related to whether a lien is placed on the building which a future owner would want cleared.



California recently passed legislation focused on consumer protections and PACE,⁵⁵ and DOE recently articulated a set of minimum and additional consumer protections for residential PACE, which refer to industry best practices and other efforts.⁵⁶ In addition, PACE providers have developed their own consumer protection guidelines, published by the industry group PACE Nation, to ensure the industry is engaged with this issue and has a common understanding of best practices. Among other recommendations, the PACE Nation guidelines promote appropriate program disclosures and prohibit misleading marketing.⁵⁷ For more on consumer protections for PACE, see Section 3.3.3.

In addition, it is particularly important to assess the affordability of a loan for LMI consumers, including for financing programs using alternative underwriting criteria. The Truth in Lending Act requires lenders to assess a mortgage loan applicant's Ability-to-Repay the loan. However, some efficiency financing products may not be covered by these laws or their responsibility to comply may be unclear.

CONSUMER PROTECTIONS

Consumer protections are a wide and complicated area. Program administrators should seek substantial stakeholder engagement and input from consumer advocates, lenders, and legal counsel on this subject. Four key areas are:⁵⁸

1. *Ability to pay.* Assessing a borrower's ability to pay requires the lender to engage in analysis of the loan applicant's financial situation. It requires training and careful implementation. The objective is to extend credit only to those who are able to repay their obligations without hardship. A common test for a mortgage loan is that the borrower's total secured debt obligations not exceed 43 percent of their gross income (CFPB 2014). If a borrower is unable to repay a loan in full, depending on the terms of a specific agreement, it could result in loss of property, damage to credit, and, in the case of some on-bill financing programs, power disconnection.
2. *Disclosure.* Without proper disclosure of the costs of financing or the risks involved, borrowers could end up in a much different arrangement than expected. Insufficient disclosure could result in borrowers not understanding the financing terms or the actual costs of the loans, or that the loan could put borrowers at risk of losing their homes or their access to electricity.
3. *Abuse.* Abuse in lending consists of fraud—for example, misrepresentation of a program as free or backed by the government when it is not—and predatory lending, including unscrupulous practices such as charging excessive fees and steering borrowers to higher-cost loans when they qualify for lower-cost loans (Freddie Mac n.d.).
4. *Protocols to help struggling borrowers.* Forbearance, loan modification, loan forgiveness, and other protocols help borrowers that have difficulty making payments and can help LMI households avoid the consequences of default.


A number of federal and state laws are designed to address these concerns, across a range of consumer lending practices, particularly for mortgage loans. For example, the Truth in Lending Act (TILA) requires certain disclosure of costs, waiting periods, and ability to pay requirements, and identifies remedies. The

⁵⁵ See https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201520160AB2693.

⁵⁶ For more information, see <https://energy.gov/sites/prod/files/2016/11/f34/best-practice-guidelines-RPACE.pdf>.

⁵⁷ For more information, see <http://pacenation.us/wp-content/uploads/2017/02/PACENation-Consumer-Protection-Policies-v2.0-02.17.17-with-attachments.pdf>.

⁵⁸ Other important consumer protection matters include licensing requirements, borrower remedies, prohibitions on kickbacks and referral fees, and avoiding conflicts that can arise when contractors expecting to perform work are deputized as loan officers or counselors to the consumer.



Real Estate Settlement Procedures Act (RESPA) requires proper disclosure of home settlement expenses, governs certain settlement practices, and prohibits referral fees and other abuses (OCC n.d., CFPB 2015). The Equal Credit Opportunity Act requires additional measures to assure lenders do not engage in prohibited practices related to protected classes.

Ability-to-Repay Rule refers to provisions of TILA that require “creditors to make a reasonable, good faith determination of a consumer’s ability to repay any consumer credit transaction secured by a dwelling” (CFPB n.d.). Certain state laws address similar concerns but may be preempted on certain mortgage loans. For example, states license and oversee entities that engage in money lending and the contractors that perform efficiency upgrade work.

Regardless of whether a financing product is covered by these laws, precautions should be taken for LMI consumers. Some lender and program administrator practices can help mitigate risks for borrowers. For example:

- Focusing on high-consumption households that can benefit the most from energy efficiency and have the best chance of achieving monthly savings that cover loan payments
- Applying cash flow-positive rules that *require* loan payments to be less than projected monthly savings
- Buying down project costs (e.g., through available incentive programs) to manageable levels and financing only the balance
- Using interest rate buydowns (IRB), credit enhancements,⁵⁹ and extended terms to reduce monthly payment obligations
- Bringing collections in-house and committing to help struggling borrowers meet their obligations
- Implementing forbearance, modification, and forgiveness mechanisms to help those who are struggling to make payments due to economic hardship
- Disallowing disconnections for non-payment of loan charges
- Guaranteeing projected bill savings

Additionally, certain practices help support quality work to ensure the anticipated benefits are realized:⁶⁰

- Using networks of trained and certified home performance contractors (e.g., BPI/RESNET certified)
- Implementing strong quality assurance and quality control (QA/QC) practices to ensure proper installation (e.g., QCI inspections like those used in WAP)

Stipulating that contractor pay is contingent upon verification of proper installation and functioning of efficiency upgrades.

3.1.1. Key Market Actors

Aside from borrowers, capital providers, program administrators, and contractors play major roles in energy efficiency financing for LMI SF homes. Specifically, key market actors include financial institutions and private firms; utilities; federal, state and local governments; contractors; and community-based organizations.

⁵⁹ Credit enhancements, such as loan loss reserves and lender guarantees, reduce a lender’s risk and should, therefore, decrease the interest rate they charge.

⁶⁰ For more, see https://energy.gov/eere/wipo/guidelines-home-energy-professionals_.



3.1.1.1 Capital Providers Put Up Funds for Lending

The largest efficiency financing efforts have been capitalized by private firms. For example, Renew Financial provides PACE financing and owns the Warehouse for Energy Efficiency Loans (WHEEL) portfolio. Another private firm, PosiGen, has generated significant investment in efficiency projects through Energy Service Agreements, much of it going to consumers in low-income areas.

Financial institutions, such as banks, community development financial institutions (CDFIs), and credit unions, mainly act as capital providers.⁶¹ For example, private banks aiming to comply with their Community Redevelopment Act (CRA) obligations may invest in a mission-driven CDFI that directly engages the LMI sector. Some CDFIs have made significant investments in energy efficiency through financing programs. An example is Craft3's on-bill repayment program in Oregon and Washington (SEE Action Network 2014). Credit unions are another example of financial institutions providing capital for efficiency investments. For example, the Mass Save HEAT financing program uses utility ratepayer funds collected through a public goods charge to buy down interest rates to zero on loans from local credit unions for energy efficiency measures (Krantz 2015).

Governments may also provide direct funding to capitalize loans, as the U.S. Department of Agriculture's (USDA) Rural Utility Service (RUS) has done through its Energy Efficiency and Conservation Loan Program and Rural Energy Savings Program.

3.1.1.2 Program Administrators Manage the Financing Programs

Program administrators manage energy efficiency financing programs. The program administrator role is usually filled by utilities, nonprofit organizations or CDFIs.

It is common for Investor-owned utilities (IOUs) to offer energy efficiency incentives for low-income customers—generally grants or rebates. Fewer utilities offer efficiency *financing* programs. IOUs may use ratepayer funds collected through system or public benefits charges to capitalize or provide credit enhancement or interest rate buydowns (IRBs) for efficiency financing programs.⁶² Recent research by Berkeley Lab identified more than 50 efficiency financing programs with utility involvement that are open to residential customers (Deason, Leventis, et al. 2016). Although few of these financing programs have a specific focus on LMI customers, they are open to these customers and may employ features such as alternative underwriting approaches intended to make these products accessible to a broader pool of borrowers. Most programs are small, generating less than \$1 million in loan volume per program per year. Many programs likely do not collect or track participant income data.⁶³ Thus, the degree to which these programs serve LMI customers is uncertain.


Federal, state, and local governments administer efficiency financing programs, as well—for example, through programs offered by government-sponsored enterprises (GSEs) that offer financing services to homeowners like Fannie Mae and Freddie Mac, through Public Housing Authorities, and as PACE administrators.

Governments may offer direct funding for credit enhancements and IRBs. Through mandated public benefits charges that may be used in part for efficiency financing programs, state governments may facilitate funding for loan capitalization, credit enhancements, or both. Federal agencies including the U.S. Department of Housing and Urban Development (HUD), GSEs, the USDA's RUS, and public housing authorities may offer their own efficiency financing products or allow efficiency measures to be included in financing products that are not focused on energy efficiency improvements but rather general home improvements.

⁶¹ CDFIs also often serve as program administrators for efficiency financing programs and help to source capital for programs.

⁶² A credit enhancement is a subsidy that decreases risk of loss to the lender, which may make lenders comfortable reducing interest rates and extending loan terms. An example is a loan loss reserve, a cash reserve that can be tapped to reduce a lender's losses in case a loan is not repaid. IRBs are payments made to effectively reduce a loan's interest rate. Such concessions may make a financing product more attractive to consumers.

⁶³ Programs that employ alternative underwriting approaches—such as qualifying applicants solely through bill payment history—may not request income information during the application process. However, utilities that administer programs have records of customers that receive low-income utility rates.



More than two dozen state housing finance agencies (HFAs), which support affordable housing for state residents, offer efficiency loan programs or allow efficiency measures to be included in their other loan programs. Some 26 HFAs administer energy efficiency programs, 24 HFAs offer weatherization, and many more offer home improvement loan programs that may be used to pay for energy efficiency improvements. For example, the Kentucky Housing Corporation, which invests in affordable housing, has two efficiency loan products: an unsecured loan supporting whole-home retrofits with an estimated average bill savings to date of 20 percent and an unsecured loan for single efficiency measures (Zagorski 2016, KY Home Performance n.d.).

State and local governments are also involved in programs dominated by private firms, such as PACE financing. Under such programs, municipalities collect PACE assessment payments through property tax bills. In addition, the WHEEL program works with states to provide partial capital for efficiency loans.⁶⁴ Programs like these have had significant LMI participation. For example, 23 percent of WHEEL participants make less than 80 percent of the area median income (AMI).

Although most efficiency financing programs do not focus on LMI households, a number include features such as flexible underwriting criteria that attempt to expand access to the credit offered. Some programs are focused on economically distressed areas. For example, Ouachita Rural Electric Cooperative in Arkansas offers financing for home efficiency projects. Its service territory largely serves LMI customers.⁶⁵ Another example is Energize Connecticut's Smart-E loan program, where 20 percent of the loans have gone to customers in Norwich, a community with a median income that is 30 percent below the state median (U.S. Census Bureau n.d., Connecticut Green Bank 2016).

The amount of energy efficiency spending in LMI households supported through non-programmatic financing—for example, bank loans with no efficiency focus—is unknown. However, market rates, traditional underwriting, time-consuming approval processes, and lack of technical support may make these products less attractive for most LMI households who want to invest in efficiency and may put these loans out of reach for many.

3.1.1.3 Contractors Install the Financed Energy Efficiency Measures

Contractors and community-based organizations directly engage with LMI consumers to assess and implement a wide range of improvements, including efficiency measures. Contractors work with homeowners and building managers to scope projects and sometimes work out the means to pay for them. However, contractors advising clients on financing may raise many complicated issues and this option must be approached with care (Federal Trade Commission 2014, NCLC 2010).

Some community action agencies, such as NeighborWorks of Western Vermont and the Opportunity Council in Washington State, have provided efficiency financing products for LMI households. These organizations are trusted partners that financing program administrators can collaborate with to better reach LMI households. These organizations understand the LMI market and have an infrastructure to serve that market.

3.2. Assessing the Challenge: Key Market Barriers in LMI Single-Family Housing

For both government- and market-driven programs to scale up efficiency in LMI households, demand for efficiency in these households must be unlocked. Financing can help by overcoming barriers to efficiency adoption (e.g., the upfront costs of energy efficiency measures) in these households. There are also barriers *introduced* by financing, which are particularly relevant for LMI borrowers. Some financing products and product features have been designed to address these barriers.

⁶⁴ States participating in WHEEL allow their portion of the loan capital to be subordinated, mitigating loss risk for private investors that supply the balance of the capital. This credit enhancement enables WHEEL loans to carry lower interest rates and longer loan terms, resulting in lower monthly payments for borrowers. WHEEL provides loans for energy efficiency, renewable energy measures, and water efficiency measures.

⁶⁵ In the five counties that comprise Ouachita's service territory, median incomes in 2012 were between 9 percent and 21 percent below the state median income (Arkansas Community Foundation n.d.).

3.2.1. Market Barriers to Energy Efficiency

Table 3-1 presents six categories of market barriers that can hinder adoption of energy efficiency in LMI households living in SF housing, and the role of financing in addressing those barriers.

Table 3-1. Common Energy Efficiency Barriers in the LMI Single-Family Sector

Energy Efficiency Barriers	Applicability to LMI SF Sector	Applicability to Financing	Financing-Related Solutions
Awareness	LMI households may not be aware of the benefits of energy efficiency or how to obtain efficiency improvements.	LMI households may not be aware of options to pay for efficiency improvements, (including traditional or specialized financing products), may be unfamiliar with using financing, or may not realize they qualify for financing.	Financing products may directly address awareness barriers, but collaboration with entities that have an infrastructure and network in LMI communities can help. Additionally, integrating financing with other efficiency programs can streamline information gathering and ensure that customers who learn about efficiency programs also understand their financing options.
Affordability	LMI households usually have little wealth. This may put efficiency improvements out of reach for them financially, especially since more energy-efficient products typically carry a price premium.	Financing stretches upfront costs for efficiency into smaller monthly payments that are paid as energy savings and costs are realized, ideally freeing up money in the household budget that previously went to wasted energy. Payments must be kept low to be affordable for LMI households.	Structuring a financing product to be cash flow-positive—i.e., the resulting bill savings from the improvements are greater than the loan payments covering the costs of those improvements—can make a project affordable even for low-income families.
Transaction Costs	Lack of time flexibility and priorities other than energy efficiency can make energy improvements more difficult for LMI households or could put efficiency upgrades out of reach altogether.	Burdensome, lengthy loan application processes and other transaction costs could deter potential borrowers, jeopardizing efficiency projects that financing otherwise could support.	Easy, quick application processes, when possible, can partly address the time barrier. Collaboration with other entities, such as community action agencies, may leverage the time households spend with other programs.
Confidence and Trust	LMI households may have little confidence that predicted energy savings will be realized. The customer may also have a broader lack of trust in the entities that implement efficiency financing programs (utilities, lenders, and contractors).	Borrowers are responsible for loan payments even if they do not realize projected energy savings. They need confidence that savings will materialize. LMI households may not trust entities involved in the financing process (e.g., banks).	Providing an energy savings guarantee could address some potential LMI borrowers' concerns about predicted vs. actual savings. However, confidence and trust issues are addressed mostly through financing <i>program</i> elements rather than financing <i>product</i> features.
Non-Energy Issues	LMI homes tend to be older and in greater need of repair than homes of higher-income households. Non-energy	Requisite non-energy measures increase the size of a loan, but do not provide added energy cost savings to	Expanding eligibility of non-energy measures for efficiency financing programs may facilitate more efficiency projects. Energy



	repairs are often necessary to implement efficiency upgrades (or could impact the upgrades), but provide no energy or bill savings.	mitigate increased loan payments. Particularly for programs with cash flow-positive requirements, this could limit the efficiency projects that qualify for financing.	efficiency work can also be rolled into broader financing products. Collaboration with community-based organizations that sponsor non-energy measures also can facilitate financing of efficiency projects.
Split Incentives	LMI households rent (vs. own) homes at higher rates than higher-income households. Building owners do not realize the energy savings benefits of efficiency in units where tenants pay their own utility bills, which can be a disincentive to the owner making the efficiency investment.	In units where tenants pay utility bills, cash flows from energy savings on those bills will be unavailable to owners. Those cash flows could cover debt repayment obligations on loans to pay for efficiency upgrades.	Tariffed on-bill programs allow utility customers to pay for efficiency measures through a charge on their utility bills. With a landlord's consent, this could make efficiency accessible for renters.

3.2.2. Market Barriers Specific to Financing

While financing can partially or fully address many barriers to energy efficiency adoption it may also *introduce* barriers since the use of financing may be complicated or inaccessible, particularly for LMI consumers. Table 3-2 lists three of these barriers and some solutions that specialized financing products use to overcome them.



Table 3-2. Barriers to Financing Efficiency Upgrades in the LMI Single-Family Sector

Financing Barrier	Applicability to LMI SF Sector	Financing-Related Solutions
Underwriting	Qualifying for financing may be challenging for some LMI consumers. Even LMI consumers that could qualify may not apply assuming that they do not qualify. However, for LMI borrowers it is most important to ensure their ability to repay any financing extended.	Some financing products and programs use alternative approaches to underwriting which either do not take credit scores or debt-to-income ratios into account or give them less weight in an approval decision. This may broaden access to credit but may make it harder to determine the applicant's ability to repay the financing.
Debt Aversion	Because debt may be unaffordable, income may be uncertain, and due to the potential consequences of nonpayment and distrust of financial institutions, or other factors, some LMI households may be hesitant to take on debt.	Some specialized financing products, e.g., on-bill tariffs and PACE, may be promoted as non-debt products.
Risk	Many LMI households may be hesitant to use financing because of the risks: savings may not materialize and nonpayment could result in service disconnection, damage to the borrower's credit, or loss of the borrower's home.	Cash flow-positive projects and energy savings guarantees may reduce the likelihood of loan nonpayment and its consequences.

3.3. Promoting Solutions: Which Financing Products Address Which Barriers?

The financing products included in this report, ones providing significant investment of energy efficiency for LMI households, are unsecured loans, on-bill products, PACE financing, and ESAs. This section defines and describes these products using examples from current energy efficiency financing program offerings. Next we examine barriers addressed by different types of financing products for LMI households as well as barriers to the use of these products.

Reaching LMI households can be challenging. However, a number of financing initiatives have produced substantial loan volumes with these customers. Administrators of these initiatives and loan portfolio data suggest that there is no one product or program feature that disproportionately contributes to this uptake. Each financing product has its own set of features which, in total, may help to reach LMI households. Incorporating these features could allow financing products to address barriers that they may not address otherwise. For example, the WHEEL program uses state government capital, subordinated to capital of the private-sector partner Renew Financial in the case of a bankruptcy. Because of the reduced risk, Renew Financial is able to offer participants lower interest rates and longer terms, making the loans more affordable than they would likely be without the credit enhancement.

3.3.1. Unsecured Financing

Unsecured loans are not secured by collateral. If the borrower defaults on the loan, the lender's recourse is only to the borrower—there is no right to repossess and sell the borrower's property to mitigate losses. Unsecured loan products used to pay for energy efficiency projects include credit cards, personal or "signature" loans from a bank, and unsecured financing offered by equipment manufacturers, vendors, retailers, or contractors (Leventis, et al. 2016). Many efficiency financing programs offer unsecured loans, often with below-market interest rates achieved through some form of credit enhancement or interest rate buydown.

Energy efficiency financing programs that employ unsecured lending have deployed hundreds of millions of dollars in efficiency investments. In 2014, for example, mostly unsecured utility efficiency loan programs (excluding on-bill programs) financed nearly \$200 million in residential energy efficiency improvement (Deason, Leventis, et al.

2016).⁶⁶ Much more efficiency investment may be made through unsecured lending outside of efficiency financing programs; the volume is unknown at this time due to a lack of available data.

3.3.1.1 Summary of Advantages, Disadvantages, and Other Considerations of Unsecured Lending From the Consumer Perspective

This section highlights the particular potential advantages, potential disadvantages, and other considerations for unsecured financing in the context of both (1) barriers to the *use of financing* by LMI households as well as (2) barriers to *efficiency adoption* in those households. Examples follow of how unsecured financing may address key barriers.

Potential Advantages	<ul style="list-style-type: none"> • <i>Transaction costs</i>: These costs are low because unsecured financing has no security interest in the property and no property valuation is required. • <i>Underwriting</i>: No collateral requirement allows people to participate who do not want to put their homes at risk. • <i>Awareness</i>: Unsecured lending is widely used in the broader market, beyond energy improvements.
Potential Disadvantages	<ul style="list-style-type: none"> • <i>Affordability</i>: Since unsecured financing products have no security interest (e.g., collateral), lenders may require higher interest rates, shorter terms (which increase monthly payments), or a subsidy to modify these. • <i>Debt aversion</i>: Unsecured products are debt instruments. Those with an aversion to debt will be hesitant to use these financing products.
Other Considerations	<ul style="list-style-type: none"> • <i>Non-energy issues</i>: Programmatic unsecured loan programs may not allow non-energy measures. Non-programmatic unsecured products do not have limitations on what can be included. • <i>Risk</i>: Nonpayment may damage credit but does not risk the loss of one's home.

3.3.1.2 Barriers Addressed by This Product


Unsecured loan products often present the applicant with lower transaction costs than a loan secured by an asset. The application and underwriting process does not require any valuation of property, recording of a security interest, or a lien. That means eligible borrowers could obtain an unsecured loan quickly and without an asset for collateral.⁶⁷

For example, the WHEEL program has issued over 2,000 unsecured loans for over \$19 million in Pennsylvania, Kentucky, New York, Florida, and Ohio. Nearly a quarter of WHEEL participants have income at or below 80 percent of AMI, and over half of participants are under 120 percent of AMI (Lovejoy 2016).

WHEEL's application process is designed to be simple. It can be done online or over the phone, with same day approvals. This is particularly important for households making emergency replacements (e.g., their heating system has broken down and it is below freezing outside), which may be more common in LMI households given the high proportion living in older housing stock. A recent Energy Programs Consortium study found that over half

⁶⁶ Numbers for unsecured, on-bill, PACE and ESA are almost exclusively single-family investment. Available data for those categories does not allow estimation of investment in multifamily buildings.

⁶⁷ Unsecured loans can be used by 1) consumers who do not own property needed as collateral, 2) those with insufficient equity in their home to qualify for a secured loan, or 3) those who do not want to put their home at risk of repossession. Although unsecured underwriting is an easier process than for secured loans, the criteria may be no different, cutting off access for credit-constrained households.



of low-income WHEEL participants financed just one measure (mostly heat pumps, furnaces, and boilers), suggesting that many loans to LMI participants are used for equipment replacements (Lovejoy 2016).⁶⁸

The value of a quick and easy process is also evident in New York's Green Jobs, Green New York (GJGNY) initiative. It offers two products: the off-bill Smart Energy Loan and the On-Bill Recovery Loan. The Smart Energy Loan is more popular with LMI participants (those with incomes at or below 80 percent of AMI) and, since 2011, has extended over 5,000 loans to participants making below 80 percent AMI (NYSERDA 2016, NYSERDA 2017). Since 2012 when the on-bill option was first offered, over 70 percent of GJGNY energy efficiency loans for LMI households have been Smart Energy Loans (NYSERDA 2016).⁶⁹ Anecdotally, this preference for the Smart Energy Loan product over the On-Bill Recovery Loan has been due to a less burdensome overall process.

One other aspect of WHEEL helps with transaction costs: The program has a contractor network and pays the contractor directly, similar to PACE and many efficiency rebate programs. Having a network of approved contractors makes it easier for borrowers to find someone to do the work and also can make them feel more confident in the work. Paying contractors directly removes a transaction that the borrower would need to complete.⁷⁰

3.3.1.3 Barriers to Use of This Product

There are a few disadvantages to unsecured loans. First, it is clear that they are debt products and those with a debt aversion will be hesitant to use them. Second, these loans have no mechanism to overcome the owner-renter split incentive problem. Additionally, many unsecured efficiency financing programs do not allow non-energy measures. Finally, the added risk to the lender (of having no collateral in the case of nonpayment) comes at a price to the borrower in terms of affordability. Unsecured loans generally carry higher interest rates than secured loans, which can make loan payments challenging for households with low incomes. Credit enhancements or interest rate buydowns can reduce the interest rate. They are often employed when unsecured loans are used in efficiency financing programs.

Subordinated loan capital provided by state governments is a credit enhancement that allows WHEEL to offer lower interest rates than the program might be able to in the absence of the subsidy and to offer the same rate independent of the borrower's credit profile.⁷¹ That may make WHEEL more affordable for LMI households with lower credit scores.

Although WHEEL qualifies applicants with FICO scores as low as 640, the program has found little correlation between participant incomes and credit scores (see Figure 3-1) (Lovejoy 2016). However, the WHEEL data are for *participants only* and are *not* evidence of a weak correlation between income and credit score among *applicants*. To better understand that relationship, it would be necessary to know the income and credit score information of approved applicants, declined applicants, and the customer base more generally.

⁶⁸ Fifty-five percent of lower income participants used their loan for just one measure as compared to only 40 percent of higher income participants. Furthermore, only 18 percent of lower income participants included two measures in their projects while 31 percent of higher income participants did.

⁶⁹ This is a slightly higher proportion of Smart Energy Loans than for the program overall.

⁷⁰ Disbursing funds directly to assure the contractor they will be paid (instead of taking the risk that they would have to pursue the customer for payment long after the project is complete) assures proceeds are spent on the project and not for some other purpose.

⁷¹ This assumes that the borrower qualifies for the loan. For many private, market-rate products a borrower's credit score impacts the interest rate they are offered (FICO 2017). Those with lower credit scores, for example, would pay higher interest rates.

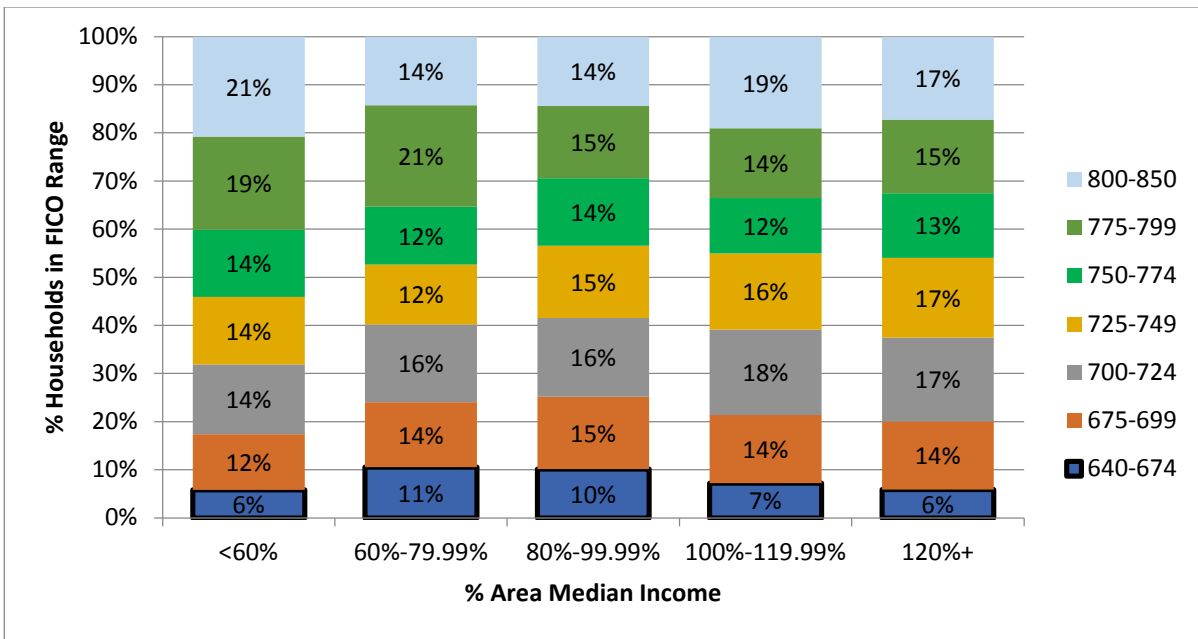


Figure 3-1. WHEEL participant credit scores by income (credit score cutoff for the program is 640). For WHEEL participants, there is little correlation between income and credit scores (Lovejoy 2016).⁷²

3.3.2. On-Bill Financing and Repayment

On-bill arrangements allow borrowers to pay back efficiency investments on their utility bills. It is a flexible approach that may involve alternative underwriting to qualify applicants, structuring the payments so that average monthly repayments are projected to stay the same or go down, and may allow payment obligations to transfer from one occupant to the next.⁷³

Some refer to on-bill *financing* as programs that are capitalized with utility or public money, while on-bill *repayment* programs use third-party, private capital for funding. One structure that is repaid on the utility bill, the Pay As You Save® (PAYS®) approach, has received attention for features that may be valuable for LMI households.⁷⁴ Most on-bill programs use loans, but on-bill tariffs like PAYS® use a voluntary tariff to recover a *utility* investment in energy efficiency on the customer’s property, rather than a loan to the customer to pay for the project. (See “The Pay As You Save® Approach” text box.)

On-bill programs have cumulatively invested over \$1 billion in residential clean energy, over \$76 million in 2014 alone (SEE Action Network 2014, Deason, Leventis, et al. 2016).


3.3.2.1 Summary of Advantages, Disadvantages, and Other Considerations of On-Bill Financing and Repayment From the Consumer Perspective

This section highlights the particular potential advantages, potential disadvantages, and other considerations for on-bill programs in the context of both 1) barriers to the *use of financing* by LMI households as well as 2) barriers to *efficiency adoption* in those households. Examples follow of how programs employ on-bill solutions to address key barriers.

⁷² The data come from 2,079 loans in Pennsylvania, Kentucky, and Ohio between June 2006 and September 2015.

⁷³ These features are not always included in on-bill offerings.

⁷⁴ The Pay As You Save® system is not specifically for LMI households, but some of its features may address certain barriers for LMI households with respect to energy efficiency.


Potential Advantages

- *Awareness:* On-bill programs can leverage the utility or program administrator’s relationship with the customer.
- *Underwriting:* Many on-bill programs use alternative underwriting (e.g., project cost-effectiveness or bill payment history). This may increase accessibility by allowing applicants to qualify that may not qualify under other approaches.
- *Transaction costs:* These costs are low (but can be higher if an audit is required), and no property valuation is required. Alternative underwriting may push transaction costs even lower.
- *Affordability:* Some on-bill programs have requirements to structure the obligation in a way that minimizes cash flow impact to the participant.

Potential Disadvantages

- *Non-energy issues:* Cash flow-positive financing structures may not be able to include health and safety improvements, which do not generate energy savings but may be necessary to implement some efficiency measures.

Other Considerations

- *Confidence and trust:* If there are project performance issues, some PAYS® programs have elected to waive on-bill charges until the program administrator has resolved them.
- *Split incentives:* If a tenant pays project charges through the utility bill, the landlord’s disincentive to invest in efficiency is addressed. If the payment obligation is attached to the meter (not the occupant) and transfers to a new occupant, a renter’s disincentive may be partly addressed.
- *Debt aversion:* On-bill products structured to be investments by the utility rather than the customer (as is the case for some on-bill tariffs) may be seen as a utility service charge.
- *Risk:* There is no potential for loss of home, however, some programs introduce the risk of power being shut off in the case of non-payment.

3.3.2.2 Barriers Addressed by This Product


Paying an efficiency investment on the utility bill reduces transaction costs for participants since they can avoid dealing with a third party—the lender—on a monthly basis. The utility’s involvement can be helpful for awareness since households already deal with their utility for their energy needs. Paying for efficiency improvements on a noticeably smaller energy bill could highlight the benefits of efficiency.

Using alternative underwriting (e.g., bill payment history or project cost-effectiveness) can make on-bill financing available to a wider pool of LMI customers. For example, the GJGNY program uses a two-tiered underwriting system. Tier 1 uses traditional metrics and criteria, Tier 2 uses more flexible criteria and considers bill payment history (SEE Action Network 2014). This approach has allowed more LMI customers to participate.⁷⁵

Using bill payment history alone can also make for a more streamlined application process, reducing transaction costs. However, program administrators must ensure that customers are not just *likely* to pay back their obligations but that they are sufficiently *capable* of doing so. If a LMI household prioritizes paying off its efficiency loan obligation over a basic need, the household does so at a high cost to itself.

Some on-bill offerings require estimated bill savings to be equal to or greater than the added payments for efficiency improvements, resulting in an average bill that is the same or less than pre-efficiency project bills. While this “bill neutrality” or cash flow-positive feature can make financing affordable, decision-makers should consider several factors.

⁷⁵ Of participants making at or below 80 percent of AMI, 23 percent qualified through the Tier 2 underwriting compared to just 8 percent of those making above 120 percent of AMI (NYSERDA 2016). High debt-to-income (DTI) ratios have been the top reason for application denials, with low credit scores a close second (GJGNY 2016). This alternative underwriting is available for both GJGNY products.

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- **Variable inputs affect actual cash flow.** In calculating whether a project will be cash flow-positive, the monthly payment obligation is the most stable factor. Energy rates and energy consumption will vary, which will impact the actual utility bill. If estimated energy savings are not fully realized, the project could have a negative cash flow impact, which could be challenging or impossible for LMI households to shoulder.
 - **Energy savings estimates** – It is challenging to accurately forecast a project’s *energy* savings. This could be especially true in low-income households, which may have frequent changes in the number of household members that could significantly impact consumption patterns. Changes in energy prices could also impact the accuracy of *bill* savings estimates.
 - **Seasonal bills** – Although loan payments will remain steady over the course of the year, utility bills generally vary as the weather changes, with larger bills in the summer and winter and lower bills in spring and fall. Even households whose efficiency projects hit energy savings projections may see months with higher bills than they previously experienced. Budget billing—plans that charge a stable, average bill amount—would better reflect cash flow benefits.⁷⁶
 - **Program requirements could limit project scope and eligible projects.** To achieve a cash flow-positive project, the savings-to-investment ratio (SIR) must be maximized. That may have two limiting effects in the LMI sector.
 - **Sufficient pre-project energy consumption** – Lenders may set minimum loan amounts because of their transaction costs. If a consumer’s existing energy consumption is low, the efficiency project may not be able to achieve monthly savings that exceed the loan payments necessary to support the lender’s minimum loan amount.⁷⁷
 - **Health and safety** – Because savings need to be maximized in a cash flow-positive project, including any needed health and safety measures in projects may not pencil out, which could exclude many LMI homes.⁷⁸

On-bill financing for rental housing presents complicated issues, and there is little programmatic experience to draw on, although Ouachita Rural Electric Cooperative in Arkansas has had some early successes. Theoretically, if tenants pay the utility bills in a rental arrangement, then the tenants would also pay the on-bill loan charge, which removes a major disincentive for the landlord to making upgrades. This could partially overcome owner-renter split incentives, paving the way for more LMI renters to benefit from efficiency financing. (However, the surcharge becomes part of the total cost of housing for the tenant, which could raise complicated issues for landlords in subsidized affordable housing.) Ouachita also waives the efficiency tariff if the efficiency measures fail to perform, which can boost participants’ confidence.

Finally, some on-bill structures may not be considered debt products.⁷⁹ As such they could be attractive for potential LMI borrowers with aversion to debt. Roanoke Electric Cooperative in North Carolina has seen far more interest in their on-bill tariff product (marketed as non-debt) as compared to a previous on-bill *loan* product (a debt product). Anecdotally, this is at least partly because of many customers’ aversion to debt (Wynn 2016).

3.3.2.3 Barriers to Use of This Product


As explained above, non-energy measures can limit the use of on-bill products that have a bill-neutral or cash flow-positive requirement, particularly in the LMI sector with its higher rate of older buildings that may need repairs

⁷⁶ Budget billing would start off based on the prior (pre-improvement) year’s presumably higher bills, a challenge for this approach.

⁷⁷ For example, 20 percent savings on an average monthly bill of \$50 over five years would cover only a \$600 loan (at zero percent interest). Many lenders and program administrators may not deem it worthwhile to make such a small loan.

⁷⁸ Customers that need health and safety upgrades could theoretically buy down project costs by enrolling in a program that provides such upgrades. This highlights the importance of collaboration with other low-income stakeholders, such as administrators of low-income service programs.

⁷⁹ For example, PAYS® advocates argue that PAYS® is a utility investment that is the obligation of the utility meter, rather than the household. (When the occupants leave, the next occupant assumes the PAYS® payments.) Therefore, they view these financing arrangements as utility service charges, not loan debt.



before efficiency work can be performed. Even programs without bill-neutral or cash flow-positive requirements may not allow non-energy measures, or may only allow a certain percentage of a loan to go toward such measures, which may not be sufficient to cover repairs.⁸⁰

Some on-bill offerings allow disconnection of a borrower's power in case of loan nonpayment. This introduces a risk of penalties that other forms of financing do not present. The possibility of losing electricity service can be particularly damaging for LMI consumers, who may not have sufficient savings to remedy the situation. Elderly LMI consumers or those with medical conditions may need power for essential services such as space heating and cooling and refrigerating medication.

THE PAY AS YOU SAVE® APPROACH

One type of on-bill financing is the on-bill tariff, which allows disconnection for non-payment and, as a utility tariff, is attached to the meter rather than the customer. NYSERDA's On-Bill Recovery Finance Loan is an example of one on-bill tariff approach. Another is the Pay As You Save® (PAYS®) approach, which has generated wide interest as a way to help LMI households access clean energy, although it is used for customers of all income levels.⁸¹ PAYS® program administrators feel it offers a unique set of benefits and have found that customer response to PAYS® has been great, and far better than customer response to on-bill loan programs they have run (Agard 2016, Wynn 2016). This text box introduces readers to the PAYS® approach and its benefits and drawbacks in the context of low-income households.

What is PAYS® and how does it work?

Advocates maintain that PAYS® is not a customer loan but, rather, a utility investment that assigns the obligation for cost recovery to a meter rather than an individual (Lachman, President, Energy Efficiency Institute 2016). In the PAYS® model, a utility invests in efficiency improvements for a specific property and recoups its investment through an opt-in utility tariff which adds a charge on the customer's bill for that meter. This structure provides a basis for allowing the obligation to transfer from an outgoing occupant to an incoming occupant and incentivizes the utility to ensure performance of the installed measures.

A key aspect of the PAYS® approach is its cash flow-positive requirement for projects. The Energy Efficiency Institute recommends that monthly tariff payments be 80 percent or less of projected bill savings. All else being equal, participants should see their average utility bills go down. Some other on-bill programs have similar rules but none are as conservative as PAYS®. This rule is also used to qualify projects under PAYS®.

Some utilities may review the account holder's bill payment history to qualify an efficiency project. PAYS® administrators may opt to invest wherever upgrades are cost-effective (i.e., they meet the 80 percent tariff-to-savings ratio), regardless of customer bill payment history or credit history. Program administrators predict that a customer with high energy consumption or a good history of paying their utility bills will likely continue to pay their bills even with an added PAYS® tariff—especially if the total bill actually decreases as a result of the efficiency upgrade.

⁸⁰ Only five of 30 on-bill programs examined in a 2014 SEE Action report allowed non-energy measures (SEE Action Network 2014).

⁸¹ The Pay As You Save® and PAYS® names are trademarked by the Energy Efficiency Institute of Vermont to indicate that certain practices are followed, such as the specific PAYS® cash flow-positive requirement. The organization consults with utilities that request use of the PAYS® name and system. Not all tariffed on-bill programs follow the PAYS® system or use the Institute's copyrighted intellectual property (agreements, forms, and worksheets).



Why might PAYS® be helpful for low-income households?

PAYS® may be more attractive and useful to low-income households than other financing products because:

1. Low-income households are experienced with paying utility bills but may be unfamiliar with taking on a loan and thus reluctant to do so. Furthermore, program administrators have noted that customers have been more willing to participate in PAYS® than in previously offered efficiency loan programs. Advocates believe this is because PAYS® investments are not debt (Agard 2016, Wynn 2016).⁸²
2. For households that are uncertain how long they will stay in their home, the ability to leave the tariff (and the balance of the efficiency investment cost recovery – in addition to the benefits of the improvements) to a successor customer could be valuable. However, experience to date is limited.⁸³
3. The use of the 80 percent tariff-to-savings ratio for PAYS® underwriting may open access to efficiency to a wider group of consumers than other alternative underwriting methods, such as using bill payment history, especially for households with significant efficiency needs.⁸⁴
4. Efficiency projects using the conservative cash flow-positive requirements under PAYS® may stand a better chance of realizing actual lower average bills than less conservative rules or bill neutral rules.
5. LMI households rent at a higher rate than higher income households (Bureau of Labor Statistics 2016). Because PAYS® is considered an obligation of the meter, not the occupant, and should therefore be able to transfer (perhaps more easily than a loan that is structured to be able to transfer), it could be helpful for renters.
6. If, through no fault of the building occupant or owner, the installed energy measures do not function as intended, the PAYS® tariff charges are suspended until the utility or the contractor has repaired the equipment, eliminating significant performance risk for customers.

What has been the experience to date with PAYS®?

Since 2002, 17 utilities have offered PAYS® programs or programs based on the PAYS® model.⁸⁵ Most of these programs have funded just a few hundred projects each to date.⁸⁶

One example is the HELP PAYS® program operated by Ouachita Electric Cooperative in Arkansas. The utility's service territory suffers from persistent poverty. In 2011, in the five counties that make up the cooperative's service territory, median incomes were 10 percent to 21 percent below the state median income (Arkansas


⁸² They maintain that a PAYS® investment, as a tariff, is similar to other utility charges, which are not considered debt. Furthermore, if participants move from the property, the tariff obligation does not follow them like a debt would.

⁸³ Midwest Energy's How\$mart Kansas anecdotally reported that about half of their obligations transferred when an occupant moved (SEE Action Network 2014). This is similar to the experience of programs for other types of products (e.g., PACE) that have tracked and reported transfer numbers.

⁸⁴ It is possible to apply this method to other types of efficiency financing products, including other on-bill products.

⁸⁵ These programs include Smart \$tart at New Hampshire Electric Cooperative and New Hampshire Public Service (now EverSource); How\$mart Kansas, (six utilities in Kentucky offer How\$mart KY™); Windsor Efficiency PAYS®, Green Hayward PAYS®, and WaterSmart On-Bill Pilot Program in California; three prior SolarSaver programs in Hawaii; Upgrade to Save at Roanoke Electric Cooperative in North Carolina; and HELP PAYS® at Ouachita Electric Cooperative in Arkansas.

⁸⁶ One exception is Midwest Energy's How\$mart Kansas program, which has funded over 1,000 projects since the program began in 2007 (SEE Action Network 2014).



Community Foundation n.d.). When a Ouachita customer expresses interest in the program, the program administrator, EEtility, assesses whether the home offers sufficient potential savings for an investment (Agard 2016). Of homes found to be eligible for the HELP PAYS® program, 92 percent of customers that were offered participation in the program decided to take part (EEtility 2016).

HELP PAYS® invested over \$1 million in 131 residential efficiency projects in its first four months (in early 2016) (EEtility 2016). The cost of capital associated with the upgrades is 4.5 percent (EEtility 2016).⁸⁷ Most of the projects included LED bulbs, air sealing, attic insulation, HVAC improvements, and duct sealing. For the 69 single family projects completed through the program, average *net* monthly bill savings have been \$27, with tariff payments of about \$48 on average, less than 80 percent of estimated *gross* bill savings.⁸⁸ The program has also completed 62 projects for multifamily rental units. In these cases, landlords agreed to tenants' participation in the program. In 12 cases (20 percent), co-payments were necessary to meet cash flow requirements; landlords paid the copayments (EEtility 2016)⁸⁹

What challenges exist?


- *Limits on project size*—There are a few challenges to cash flow-positive requirements that may be pronounced for the more conservative PAYS® cash flow guidelines. First, they can limit project sizes. This limitation could also potentially limit the model's overall reach, because the program administrator may deem certain project sizes too small to consider in light of transaction costs.
- *Limits on non-energy measures*—Cash flow-positive rules could constrain the inclusion of health, safety, and other non-energy measures that are a prerequisite for some efficiency projects. This can limit the number of potential projects that can be done.
- *Monthly bill variation*—To forecast savings, PAYS® administrators use estimation software, often in combination with historical meter data for the property. The model projects the reduction in the household's energy use based on its consumption history, taking into account seasonal variations. However, cash flow-positive rules, including for PAYS®, are generally based on *average annual* use, which will be higher than actual use in some parts of the year and lower in others. Furthermore, the estimations are for current energy rates, so price increases could cut into predicted bill savings.⁹⁰ In some months, utility bills following the efficiency upgrade may actually be higher than pre-project bills, even if, on average, utility bills are lower. For low-income households this could be a significant burden. To mitigate these risks, the Energy Efficiency Institute and other PAYS® advocates recommend a conservative guideline: PAYS® cost recovery charges should not exceed 80 percent of the estimated bill savings over a period that is no more than 80 percent of the useful life of the upgrades.
- *Transfer of property*—The transfer feature of PAYS® raises some challenges. An incoming occupant of a property upgraded through PAYS® may have different energy consumption patterns than the original occupant (although the new occupant will use less energy than in the absence of the efficiency improvements). The new occupant may also present a different nonpayment risk. Finally, disclosure of the tariff is important: Incoming occupants are notified of PAYS® tariffs by the

⁸⁷ Because each project is an investment by the utility using its own capital (not a household investment using the occupant's debt), the utility's cost of borrowing is part of the tariff charges to recover the cost of the project.

⁸⁸ Roanoke Electric Cooperative's PAYS® program, Upgrade to Save, uses a projected tariff payment-to-savings ratio guideline of 75 percent and has seen an average realized ratio of 50 percent (Wynn 2016), meaning savings were greater than projected. Midwest Energy's How\$mart Kansas, with a 90 percent tariff-to-savings ratio, saw an average realized ratio of about 100 percent, meaning savings were, on average, roughly equal to tariff payments, thus lower than projected savings (SEE Action Network 2014). This suggests that more stringent guidelines may have an impact on realization rates.

⁸⁹ A customer can provide a co-payment if a project does not meet the 80 percent rule. Nearly a quarter of residential customers did this (EEtility 2016).

⁹⁰ Although, without efficiency upgrades, the impact would be greater.



outgoing occupants.⁹¹ If an incoming occupant balks at agreeing to pay the charge it could ultimately mean they could not receive utility service. Still, there may be more certainty that a *tariff obligation* will transfer to a new occupant compared to a *loan* transferring. For example, an incoming occupant may insist that a loan be paid off before they agree to purchase a property.⁹²

3.3.3. Residential Property Assessed Clean Energy (R-PACE)

Property Assessed Clean Energy (PACE) financing allows homeowners to finance energy efficiency, renewable energy, water conservation, and other home improvements that have a public purpose (as defined in state law) through an assessment collected with their property taxes (DOE 2016).⁹³ The investment is repaid on the homeowner's property tax bill. As a special assessment paid on the tax bill tied to the property, R-PACE financing offers strong security for lenders. For example, any amounts due are paid ahead of other loans secured by liens on the property (even prior recorded liens). If the original borrower moves and there is a remaining balance on the PACE assessment, the payment obligations can transfer to the new owner. PACE has historically used alternative underwriting that may take into account, for example, tax and mortgage payment history rather than FICO scores, emphasizing property value rather than income or credit scores.⁹⁴

RECENT FEDERAL ACTIONS ON R-PACE

On July 19, 2016, the Federal Housing Administration (FHA), a part of the Department of Housing and Urban Development (HUD) that insures mortgages made by approved lenders, announced its guidance for lenders on PACE financing. It stated that FHA will insure mortgages on homes with PACE assessments under certain circumstances: The PACE obligation must be escrowed similar to other special assessments, it must be fully disclosed, the full balance cannot come due in case of delinquent payment, and it will transfer to the new homeowner in the event of a sale or foreclosure (HUD 2016). On Nov. 18, 2016, DOE released "Best Practice Guidelines for Residential PACE." The guidelines cover implementation of residential PACE programs, including everything from defining the scope of the program to quality assurance. A section of the guidelines on consumer protections includes considerations for low-income households. The guide updates a 2010 version of guidelines that DOE had issued on R-PACE (DOE 2016).

A handful of states have residential PACE programs (R-PACE), but they have generated a total cumulative investment of \$3.77 billion since 2010 (PACE Nation n.d.).⁹⁵ California has dominated R-PACE, producing nearly 98 percent of the \$248 million in R-PACE loans used for efficiency in 2014 (Deason, Leventis, et al. 2016). Energy Programs Consortium estimates that customers earning under \$50,000 roughly comprise nearly 30 percent of the customers for the largest R-PACE provider in California, Renovate America (Wolfe 2017).⁹⁶

⁹¹ Participants sign a contract which requires them to disclose the obligation to the incoming tenant.


⁹² Transfer of a loan requires assent from the incoming occupant and the creation of a new debt instrument.

⁹³ In California, R-PACE may also be used for water efficiency and conservation measures, electric vehicle charging infrastructure, and seismic strengthening. Some other states also allow non-energy measures. In Florida, R-PACE may be used for wind mitigation (Florida State Legislature 2016). PACE-enabling state legislation typically specifies eligible uses.

⁹⁴ In June 2017, Renovate America added income review to its underwriting approach (PACE Nation 2017). This would give the company a better understanding of applicants' ability to repay a PACE obligation. Renovate is the largest player in the single family residential PACE market, meaning that a substantial part of the market will be covered by this underwriting approach.

⁹⁵ These include California, Florida, and Missouri. Over \$2.2 billion of the total cumulative investment has gone to energy efficiency since 2010 (PACE Nation n.d.).

⁹⁶ Households making under \$50,000 made up 25 percent of Renew Financial's customers and more than 31 percent of Ygrene's (Wolfe 2017).



The most common R-PACE structure involves a municipality working with an R-PACE provider. Using the municipality’s bonding authority, the PACE provider arranges capital for PACE projects and may administer many aspects of the program, while the municipality collects repayments for the provider.

3.3.4. Summary of Advantages, Disadvantages, and Other Considerations of R-PACE From the Consumer Perspective

This section highlights the particular potential advantages, potential disadvantages, and other considerations for R-PACE in the context of both 1) barriers to the *use of financing* by LMI households as well as 2) barriers to *efficiency adoption* in those households. Examples follow of how PACE programs may address key barriers.


Potential Advantages	<ul style="list-style-type: none"> • <i>Transaction costs:</i> R-PACE requires home equity determination, but many programs have minimized transaction costs for customers by streamlining the approval process. • <i>Underwriting:</i> Underwriting is based on home equity and tax payment history, which may increase accessibility as compared to traditional underwriting. • <i>Debt aversion:</i> As a tax assessment that is not technically a loan, debt-averse consumers may be more willing to participate in PACE. The PACE assessment is structured to transfer to the incoming occupant when a participant moves.
Potential	<ul style="list-style-type: none"> • <i>Awareness:</i> As an emerging product (R-PACE is currently only available in a handful of states), many consumers may not be aware of PACE as a means to pay for efficiency. • <i>Risk:</i> Participants face the potential loss of the home for nonpayment.
Other Considerations	<ul style="list-style-type: none"> • <i>Affordability:</i> Strong security allows long terms, lowering payments. However, interest rates have been higher than mortgage rates. • <i>Non-energy issues:</i> Many programs allow spending to address non-energy issues that could impact installation of a clean energy measure. However, if a savings-to-investment ratio >1 rule is implemented, could limit non-energy spending. These rules have not generally been used with R-PACE.

3.3.4.1 Barriers Addressed by This Product

PACE offers two primary benefits for LMI households: 1) it reduces transaction costs and increases speed to close and 2) it may allow access to efficiency for more LMI households than conventional loans. First, using alternative underwriting (reviewing tax and mortgage payment history) allows PACE providers to complete most of the application approval process before meeting with a potential borrower. This is much faster than the process for a home equity loan or home equity line of credit —two other potential financing solutions. For LMI households that need to make an emergency equipment replacement, the ability to turn the application around quickly could mean that they don’t have to, for example, go without heat while waiting for underwriting approval. However, program administrators should be cautious and ensure that, with such a speedy process and a product that may be unfamiliar to many, participants fully understand the costs and consequences.

Second, PACE’s approach to underwriting may also qualify more LMI applicants than traditional underwriting since it does not rely on credit profiles and may require less equity in the home (e.g., 10 percent) than a home equity loan or home equity line of credit would require. However, like using utility bill payment history to qualify applicants, this approach does not assess the affordability of the loan for borrowers, which is important particularly for LMI consumers (see “California’s AB 2693” text box).⁹⁷

⁹⁷ DOE’s recent “Best Practice Guidelines for Residential PACE Financing Programs” recommends that program administrators review participant income and debt obligations in order to assess affordability of the investment (DOE 2016).



As a special assessment, the PACE obligation may stay with the property (like a property tax) when the property is sold. This could ease concerns of debt averse consumers who do not want to continue their obligation to pay off an efficiency project after they move out of the improved property. In practice, a significant portion of PACE loans do not transfer. Some buyers insist that a PACE lien on the house be cleared before the sales transaction is completed.⁹⁸ For the largest R-PACE program—California’s Home Energy Renovation Opportunity (HERO)—of 773 homes in the program that sold between 2011 and 2015, 45 percent of PACE assessments across all income levels transferred to subsequent owners (Goodman and Zhu 2016).⁹⁹

3.3.4.2 Barriers to Use of This Product

One significant issue for using PACE for LMI households is that, since it is secured to the home, it puts at risk an asset that represents the bulk of many LMI households’ wealth. Losing their home could have consequences not just for the homeowners, but also for their children and grandchildren. Additionally, in many places, PACE is not a recognizable financing product like a mortgage, so homeowners may not be aware of it.

CALIFORNIA’S AB 2693

In 2014, California generated almost all of the residential PACE loan volume in the United States, nearly 98 percent (Deason, Leventis, et al. 2016). On Aug. 30, 2016, the California Legislature passed Assembly Bill 2693, creating the PACE Preservation and Consumer Protections Act. The bill includes consumer protections such as disclosures of costs (similar to the Truth in Lending Act), controls on claims of increased property value, and disclosure of tax penalties for non-payment (California Legislature 2016). In its consumer protection policies updated in February 2017, PACENation, an industry group with over 300 stakeholder members, includes similar guidance on disclosure of costs (PACE Nation 2017).

According to David Gabrielson, the Executive Director of PACENation, “When it comes to PACE, nothing is more important than protecting the interests of homeowners...” (PACE Nation 2016). Given R-PACE’s success in reaching large numbers of consumers—and recognizing its continued and considerable growth — it may be prudent to recognize PACE’s unique features, to strengthen it as a tool for promoting efficiency while ensuring that participants are covered by robust protections.

3.3.5. Savings-Backed Arrangements: Energy Service Agreements

Energy Service Agreements (ESAs) are savings-backed arrangements. They are financing tools in which service providers take on performance risk of efficiency projects—i.e., the risk predicted energy savings do not materialize.

ESA providers review a participant’s energy usage history to set a baseline consumption level against which to measure post-project consumption. The ESA provider is paid from a portion of the resulting *bill* savings, compared to average bills for pre-project energy usage. Underwriting for ESAs may use alternative approaches that can qualify consumers who might be denied eligibility under a traditional approach.

Although ESAs are more commonly used in the commercial sector,¹⁰⁰ at least two firms have been using ESAs in the residential sector (Sealed in New York, and PosiGen in Louisiana, Connecticut, and New York). PosiGen offers solar leases with an optional ESA for energy efficiency measures and, since 2011, has completed over 8,400

⁹⁸ Regulatory issues may make it difficult to sell PACE-encumbered mortgages to Fannie Mae and Freddie Mac, the main buyers of mortgages in the United States (see https://emp.lbl.gov/sites/all/files/lbnl-4552e_0.pdf). Thus, banks may require buyers to have the encumbrance cleared prior to issuing a loan on the property.

⁹⁹ The remaining 55 percent were paid off either at or before closing the home sale (Goodman and Zhu 2016).

¹⁰⁰ Partly because of the comparative difficulty of accurately forecasting energy savings in SF residential buildings.

projects that include energy efficiency, 75 percent for households making at or below 100 percent of AMI (Loeb, Director of Policy and Government Affairs at Posigen 2016).¹⁰¹

3.3.6. Summary of Advantages, Disadvantages, and Other Considerations for ESAs From the Consumer Perspective

This section highlights the particular potential advantages, potential disadvantages, and other considerations for ESAs in the context of both 1) barriers to the *use of financing* by LMI households as well as 2) barriers to *efficiency adoption* in those households. Examples follow of how ESAs may address key barriers.

Potential Advantages	<ul style="list-style-type: none"> • <i>Affordability</i>: Guaranteed or shared savings may help offset payment risks. • <i>Confidence and trust</i>: The energy savings guarantee or shared savings arrangement may provide added confidence. • <i>Risk</i>: There is no potential for loss of the home.
Potential Disadvantages	<ul style="list-style-type: none"> • <i>Awareness</i>: As an emerging product (only available in a handful of states), many consumers may not be aware of ESAs as a means to pay for efficiency. • <i>Non-energy issues</i>: Necessary non-energy work (e.g., health and safety measures) may not pencil out as cash flow-positive, disqualifying some projects.
Other Considerations	<ul style="list-style-type: none"> • <i>Transaction costs</i>: To minimize performance risk, companies need to accurately estimate energy savings, which is complex. This could add transaction costs, depending on how a company manages it. • <i>Debt aversion</i>: With a savings guarantee and savings backing at least some of the payment obligations, debt-averse consumers may be willing to use an ESA, but that is uncertain at this point because of low awareness.

3.3.6.1 Barriers Addressed by This Product

The shared savings structure of ESAs should facilitate projects that are cash flow-positive.¹⁰² Some providers guarantee the bill savings they estimate. For example, for the first year, PosiGen guarantees savings for projects that add efficiency upgrades to their solar installations. A guarantee is an important feature for LMI households, since residential bill savings can be difficult to accurately project, and LMI households may need a cash flow-positive project to afford efficiency upgrades (see “Savings Guarantees” text box).

PosiGen’s ESAs for efficiency upgrades are made for up to 20 years, usually for about \$10 to \$20 per month (Loeb, Director of Policy and Government Affairs, PosiGen 2017). The low payments are achieved partially by maximizing government and utility incentives (effectively buying down project costs), maintaining a low-cost business structure, using a long loan tenure, and through support of the solar incentives. Low monthly payments make it easier for a project to generate a positive cash flow. The company minimizes costs by encouraging customers to set up automatic payments (which cost less than other payment methods), using an alternative underwriting approach that is cheaper than traditional underwriting, and using a grassroots outreach structure that may be more economical than other marketing (see “Engaging Trusted Partners” text box) (Loeb, Director of Policy and Government Affairs at Posigen 2016).

¹⁰¹ About 90 percent of PosiGen customers sign up for ESAs to include efficiency work with their solar installations (Loeb, Director of Policy and Government Affairs, PosiGen 2017).

¹⁰² Because the provider is paid from energy savings, if a project does not end up as cash flow-positive, the provider will not be paid in full.



SAVINGS GUARANTEES

Four practices help PosiGen provide a guarantee on savings:

1. The company collects and analyses at least 12 months of utility billing data to establish a baseline and estimate potential savings.
2. Participating contractors agree to a certain amount of savings and don't get paid if savings don't materialize.
3. The company educates customers on energy conservation, helping them understand ways to maximize and sustain the energy savings their efficiency improvements should generate.
4. The company installs a programmable communicating thermostat in the house and monitors consumption to ensure that the savings materialize. If a project is not generating expected savings, the company sends an agent to figure out and fix the problem.

PosiGen has found that fear of rejection in the loan application process is a big barrier for potential LMI customers. The company has developed an underwriting process that does not consider an applicant's credit profile. Their approach costs less than ones that involve acquiring credit information. Their approval rate is between 75 percent and 85 percent—high compared to some offerings that use traditional underwriting. They have also brought collections operations in-house, allowing the company to work out payment plans with customers who are having trouble making payments. Since inception, the portfolio's default rate is just 0.5 percent. The company has found that LMI customers are as likely to make their loan payments as higher income households (Loeb, Director of Policy and Government Affairs at Posigen 2016).

3.3.6.2 Barriers to Use of This Product


ENGAGING TRUSTED PARTNERS

Lack of confidence and trust can be a key barrier to the uptake of efficiency for LMI households. It is important to engage trusted partners — entities that are familiar to and trusted by these households. For example, PosiGen engages trusted partners in three ways. First, the company hires from within the communities they're serving. Second, the company sources leads from local establishments — e.g., by making donations to local churches for converted referrals generated by their congregations. About two-thirds of the company's customers come from referrals. Third, the referral system serves as a grassroots marketing effort conducted through local partners.

ESAs are specialized financing products which may not be as well recognized or understood as traditional products like unsecured loans, especially in the residential sector. As is the case with several other financing products, non-energy issues can be a barrier to using ESAs for LMI efficiency upgrades. The ESA structure relies on energy savings for repayment and is designed to produce a positive cash flow, making it difficult to include non-energy measures, which generate costs and benefits but produce no energy cost savings.

3.4. Summary

Single-family, LMI households are financially vulnerable and disproportionately burdened by the cost of energy services. Using financing to scale up efficiency in these households presents a significant opportunity (offering financial relief and more comfort among other benefits), but also risks (saddling a household with more financial obligations or the consequences of nonpayment). Although this market is still underserved, LMI households make up a significant portion of the participation for several types of financing: from on-bill to ESAs to unsecured loans.



As part of a holistic approach to energy efficiency policy and program strategies, financing offers *multiple* solutions to barriers to efficiency adoption in LMI households. This is important because the single family LMI market has diverse needs and no one approach will be right for all LMI households. Furthermore, where possible, financing should be used in conjunction with non-financing programs that can help make overall project costs more affordable. However, decision-makers must keep in mind that the tenuous financial circumstances of these households require thoughtful effort and strong consumer protections to ensure that the risks of financing do not create unintended consequences for LMI borrowers.

4. Multifamily Housing: Financing for Efficiency for LMI Households

This chapter describes energy efficiency financing programs primarily targeting owners of private, affordable multifamily (MF) housing.¹⁰³ The term “affordable housing” is used in a general manner to refer to housing that is considered affordable for LMI households. “Affordable” is often considered to mean housing costs (including utilities) that are less than 30 percent of a household’s income (U.S. Department of Housing and Urban Development n.d.). Affordable housing may be subsidized—meaning it receives financing, tax credits, or other government support—or unsubsidized (Ross, Jarrett and York 2016).


KEY TAKEAWAYS

- Although there are successful efficiency financing programs for affordable MF housing that employ a range of product types, few programs exist. They include those run by Fannie Mae, Freddie Mac, Community Investment Corporation of Chicago, and PSE&G in New Jersey.
- Significant opportunities exist to increase energy efficiency financing activity in the MF housing sector, particularly for state and local entities, utilities, and private financial institutions.
- Understanding the barriers that financing products may address, as well as the potential barriers to their use, should help provide a more solid basis for program administrators to choose and design products to serve the needs of the affordable MF markets.
- Program designers should consider both how financing may help address key market barriers to energy efficiency in the affordable MF segment, as well as how to avoid the potential for financing to compound common market barriers or introduce new ones.
- Debt restrictions, put on building owners by existing lenders with an interest in the property, can be a significant barrier to using financing for MF building efficiency upgrades. Some specialized financing products may address this barrier. Some program administrators have observed a tradeoff between attractive financing rates and terms, and the challenge of obtaining lender consent.
- In many cases, non-financing program elements such as technical assistance may be as important as financing components to addressing barriers in this sector, even in a program in which financing plays a key role.

4.1. Multifamily Housing: State of the Market for LMI Households

Energy efficiency financing programs for the affordable MF sector operate within a broader context of funding and financing sources for MF energy conservation. At the federal level, for example, LIHEAP and WAP (discussed in Section 2.3) can be used to fund efficiency improvements in MF buildings.

¹⁰³ While most of the discussion in this chapter focuses on privately-owned affordable housing, financing options for public housing, particularly within the context of energy savings performance contracts, are discussed later in this chapter (see text box, “Public-Sector Affordable Housing: Financing Options for Energy Savings Performance Contracts”).



Other government agencies also play a key role in encouraging energy efficiency in MF housing through financing. For example, the federally-administered Low Income Housing Tax Credit (LIHTC) program gives states discretion to develop scoring criteria for competitive allocations of affordable housing tax credits via state Qualified Allocation Plans (QAPs). Recent analysis of state QAPs demonstrates that incorporating various energy efficiency criteria—such as ENERGY STAR building certification, insulation standards, and HVAC and other equipment standards—is a widespread practice among state housing finance agencies that establish the QAP frameworks (Global Green USA 2013). LIHTC supports approximately 1,400 projects and just over 100,000 housing units per year (U.S. Department of Housing and Urban Development 2014). State agencies also have their own initiatives (see text box, “Utility and Housing Finance Agency Partnerships: A Replicable Model”).

Government-sponsored enterprises (GSEs) Fannie Mae and Freddie Mac have also moved aggressively to encourage energy efficiency in MF housing, an important development given that these two agencies supported over 30 percent of all MF originations at the end of 2014, with an emphasis on supporting affordable housing (Kaul 2015).¹⁰⁴ HUD also provides mortgage insurance premium discounts for energy-efficient properties (HUD 2016). Collectively, the GSEs and federal agencies held or securitized nearly 43 percent of the \$969 billion in outstanding MF mortgage debt at the end of the third quarter of 2014 (Congressional Budget Office 2015). This prominent role in overall MF financing potentially gives federal agencies and GSEs significant leverage to encourage additional energy efficiency within this market segment.¹⁰⁵

Despite these encouraging developments, important gaps remain in the potential to use financing as a tool to promote additional energy efficiency activity in the MF affordable housing market. For example:


- *State and Local Financing Programs*—Few state and local energy efficiency financing programs exist in the LMI MF sector, and even fewer have achieved significant scale. Notable exceptions suggest that additional opportunities may exist in many parts of the country for these programs to finance additional energy efficiency improvements in MF housing. For example, the Chicago Energy Savers program, a partnership between Elevate Energy and the Community Investment Corporation (CIC), has retrofitted 26,500 affordable multifamily units, of which 11,000 have been financed. The program has received support from both the city of Chicago and the Chicago Metropolitan Agency for Planning, which have each contributed American Recovery and Reinvestment Act (ARRA) and other DOE funds to a loan loss reserve account. The Energy Savers program has also received low-cost, flexible capital from the Bank of America foundation and the MacArthur foundation. The success of this program highlights the potential for state or local partnerships to reach significant numbers of MF properties (Wheaton 2016).

UTILITY AND HOUSING FINANCE AGENCY PARTNERSHIPS: A REPLICABLE MODEL

A promising state partnership is developing in Connecticut, where the state’s two housing agencies (Department of Housing and Housing Finance Agency) have partnered with the state’s utilities with help from the state’s Green Bank. Under the partnership, applicants for financing from either agency must now submit a letter of participation identifying energy efficiency incentives they can receive through their utility’s multifamily energy efficiency program, based on a utility program audit. Once either agency has announced a financing award, the applicant must obtain a firm commitment for incentive funding from the utility prior to the housing agency loan closing. This formalized process ensures that energy efficiency opportunities will be incorporated into broader housing finance projects. Compared to establishing a new loan program, this model may be simpler to replicate in other states (Energy Finance Solutions n.d.).

¹⁰⁴ GSEs define “affordable” as housing in which rents and utilities combined equal no more than 30 percent of the income of a “low-income” household, where “low income” is defined as being at or below 80 percent of area median income. GSE MF market share has fluctuated significantly over time, largely due to the activities of private lenders. At the peak of the housing crisis in 2009, GSE market share reached its apex of 87 percent (Shaver 2014). Approximately 80 percent to 90 percent of the GSE MF portfolio is considered “affordable” according to HUD definitions (Kaul 2015).

¹⁰⁵ Some of their recent efforts to promote energy efficiency are described in more detail later in this chapter.

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- *Utility Programs*—Most existing programs focus on incentive-based models to encourage energy efficiency, with few offering options that integrate financing and incentives. In some cases, utility programs may offer financing targeted to single-family homes or businesses, with MF buildings eligible but not a focus. Exceptions to this trend highlight the potential for utility efficiency programs to use financing to help reach significant numbers of MF residents. For example, the PSE&G program in New Jersey, which targets affordable MF housing, employs an integrated on-bill repayment model that has reached over 10,000 MF units since launching in 2009, about 80 percent of which are affordable properties or units (Fredericks 2016).
 - *Private Financing Efforts*—Many private capital providers have not sought to make energy efficiency financing in the affordable MF sector a significant, separate line of business. This may be due in part to a greater focus on supporting efficiency improvements as an integrated component of broader MF financing transactions, when there is borrower demand for them. Capital providers may view the challenges to participation in stand-alone efficiency projects in this sector as a barrier to increasing their activity.¹⁰⁶ As with efficiency financing generally, encouraging an increase in private capital supply may not be sufficient to spur additional energy efficiency without corresponding efforts to boost demand.¹⁰⁷ However, there may be potential to better integrate private capital providers into concerted and organized partnerships designed to reach more MF buildings. For example, private capital providers may have opportunities to increasingly promote discounted MF financing and insurance from Fannie Mae, Freddie Mac, and HUD. In addition, mission-driven capital providers such as community development financial institutions (CDFIs) may be well-positioned to play a greater role in encouraging energy efficiency activity by offering the flexible capital and additional technical assistance to borrowers that such projects in the affordable MF sector may require (Barrett and Stickles 2016).

Given the wide range of market barriers that exist in the MF sector, financing alone is unlikely to drive energy efficiency to significantly higher levels. In the Chicago Energy Savers Program, for example, the capital provider (CIC) relies heavily on its partnership with Elevate Energy to address many of these barriers, such as a lack of awareness and a lack of resources that may be needed to obtain financing, by offering outreach and technical assistance to participants. Financing is offered as an integrated component of these efforts, and both CIC and Elevate offer additional resources, including free energy audits and a dedicated energy analyst who provides assistance in soliciting contractor bids, applying for rebates, overseeing the construction process, and tracking and monitoring post-installation savings (Ruch 2013). This example highlights the fact that non-financing program elements may be as important to addressing barriers as financing components, even in a program in which financing plays a key role.

At the same time, the choice of specific financing products, and the design of specific features within those products, may also play an important role in attracting customer participation. For example, the PSE&G program in New Jersey offers a financing product with zero interest, a streamlined underwriting process based on utility bill payment history, and an on-bill repayment feature that many MF building owners treat as off-balance-sheet expense.¹⁰⁸ While the utility offers financing within a broader program that has several attractive non-financing features (including free energy audits and assistance with the contractor selection process), program administrators report that the structure of the financing product itself is a key feature in encouraging program participation (Fredericks 2016).

¹⁰⁶ These challenges are addressed in the next section of this chapter, a discussion of market barriers.

¹⁰⁷ See Fuller, et al., *Driving Demand for Home Energy Improvements*, Lawrence Berkeley National Laboratory, 2010, <https://emp.lbl.gov/publications/driving-demand-home-energy>.

¹⁰⁸ It is not clear that an on-bill loan, particularly one that stays with the original borrower even if they vacate the property (as is the case in the PSE&G program), should in fact be treated as off-balance sheet, but the program does not dictate to customers how to treat the loans from an accounting standpoint.

4.2. Assessing the Challenge: Key Market Barriers in LMI Multifamily Housing

4.2.1. Market Barriers to Energy Efficiency

As in other market sectors, financing is a tool that addresses some of the important market barriers to energy efficiency projects. Understanding these market barriers and how financing may help address them is therefore essential to program design. Table 4-1 provides an overview of common market barriers to energy efficiency and how they apply to the affordable MF sector. The table also describes how financing relates to each barrier and offers potential financing approaches that may help address these barriers.

Table 4-1. Common Energy Efficiency Barriers and Relevance to Financing in the LMI MF Sector¹⁰⁹

Energy Efficiency Barriers	Applicability to LMI MF Sector	Applicability to Financing	Financing-Related Solutions
Awareness	Multifamily building owners may not be aware of the benefits of energy efficiency, the types of projects that would provide the greatest return on investment, or the programs available to help offset costs and navigate the installation process.	Building owners who need financing for energy efficiency projects may be unaware of options for which they would likely qualify.	Offering financing as an integrated package along with other utility or state and local programs may streamline the information-gathering process and ensure that MF building owners who learn about other efficiency programs (e.g., for audits) also understand their financing options.
Affordability	Multifamily building owners often have tight budgets that may require positive cash flow arrangements to make energy efficiency projects affordable.	Cash flow-positive projects may be especially important in this sector, given the tight budgets of building owners. Yet some types of financing that may facilitate cash flow-positive projects, such as commercial PACE, might be impractical, meaning other options may be needed to facilitate cash flow-positive arrangements in this sector. ¹¹⁰	Rolling efficiency-related work into long-term first mortgage financing may offer a vehicle for cash flow-positive arrangements that take place at the time of building acquisition or refinance. For “stand-alone” retrofits that occur at other times, credit enhancement may in some cases facilitate longer-term, cash flow-positive financing.
Transaction Costs and Other Resources	Multifamily building owners often have limited time and resources to devote to energy efficiency projects, as well as a list of competing priorities that they must address in their properties.	Accessing financing for energy efficiency projects may require building owners to commit additional time and resources to understanding their financing options and the application process.	Programs can offer hands-on technical assistance to walk building owners through the financing application process, along with other aspects of project completion.
Confidence	Multifamily properties often operate with very thin margins.	Financing places cash flow-conscious building owners “on	Some MF financing programs have offered savings

¹⁰⁹ This table focuses primarily on financing for building owners, which is the focus of the vast majority of MF financing programs. Tenant improvement financing structures in which tenants take on payment obligations have not typically been applied to MF energy efficiency loans. One exception is Ouachita Rural Electric Company’s PAYS® program in Arkansas (see Section 3.3.2), which has successfully engaged all renters in two MF buildings in its service territory.

¹¹⁰ While PACE’s senior-lien structure may make PACE lenders comfortable with stretching out loan terms and lowering rates to facilitate cash flow-positive arrangements, obtaining the required consent from existing lenders to have a PACE lien placed on the property may be especially challenging in the LMI MF sector.



	As such, building owners in this sector are particularly concerned about the predictability of savings projections.	the hook” for regular repayment obligations, but does not provide assurance of energy savings sufficient to cover repayments.	guarantees to help overcome concerns regarding the predictability of savings projections.
Non-Energy Issues	Multifamily properties often face health and safety issues that may impede or be affected by energy efficiency installations (e.g., ventilation, combustion safety, moisture and mold, and asbestos).	Energy efficiency financing programs often limit the eligibility of health and safety measures and other support for non-energy measures.	Expanding financing eligibility for health and safety measures as part of energy efficiency products may facilitate more efficiency projects. Collaboration with community-based organizations that sponsor non-energy measures could also help overcome this barrier.
Split Incentives	Multifamily building owners may not realize the benefits of energy efficiency in individually metered properties.	If tenants pay utility bills, cash flows from energy savings on those bills will be unavailable to cover debt repayment obligations.	Mechanisms to share savings among tenants and building owners by adjusting rents upward—offset by reduced utility costs—could provide a vehicle for a portion of cash flows to pass back to owners. Increased rents may raise consumer protection concerns, however, particularly if cash flows are based only on projections and are not guaranteed. Where rents are controlled by regulation, such adjustments would also require regulatory action. ¹¹¹

4.2.2. Market Barriers Specific to Financing

In addition to the market barriers discussed above, which are relevant to all efforts to promote energy efficiency in the LMI multifamily sector, financing itself may introduce certain market barriers. These include challenges imposed by lenders—e.g., underwriting challenges due to project and borrower creditworthiness and restrictions on additional debt that owners may take on for efficiency projects—as well as barriers that affect a borrower’s inclination to take on debt for efficiency work, such as typical financing cycles. Table 4-2 describes these financing-specific barriers and potential solutions that may help overcome them.

¹¹¹ To date, rent adjustments made to address split incentives have not been a common practice, but some lenders have recently worked with HUD and others to address this issue (Schaaf and Latimer-Nelligan 2016).




Table 4-2. Financing-Specific Barriers in the LMI MF Sector

Underwriting	Many affordable MF properties have thin cash flows, and building owners may also be credit-challenged in some cases, which can present obstacles to financial underwriting within the sector.	Securing flexible capital or credit enhancements can help loosen traditional underwriting restrictions on project creditworthiness. Lenders with flexibility may also consider alternative underwriting methods to expand borrower eligibility, such as underwriting projected cash flows from energy savings and examining the borrower's utility bill payment history.
Debt Restrictions	Financing agreements with existing mortgage holders may place restrictions on building owners' ability to take on additional debt, particularly if the property is used as collateral in any new financing arrangement. This challenge is especially relevant when new financing arrangements seek to subordinate existing mortgage holders, though there may also be restrictions even on adding new subordinated financing. Moreover, even new debt that is not secured by the property may impact restrictions in pre-existing financing arrangements regarding the overall amount of debt a borrower can take on.	Some lenders offer junior-lien or unsecured loan products in order to avoid restrictions on debt tied to property as collateral. Other programs have offered financing options that may be treated as "non-debt," such as on-bill repayment and energy service agreements, to avoid debt restrictions, although proper formal accounting treatment of such arrangements remains unclear (Bell, Rogers, & Russell, 2013; Meister Consultants Group, 2012; Lines & Supple, 2010).
Financing Cycles	Some owners of affordable MF buildings may not be inclined to consider stand-alone retrofits outside of other investments that often require larger loans, such as purchasing or refinancing a property. Efficiency program administrators may need to determine how best to target these key decision points while also encouraging stand-alone retrofits.	First mortgage products facilitate work at the time of purchase or refinance. Lenders may consider offering a range of financing options that allow energy efficiency work to be incorporated into larger overall project scopes, but also permit stand-alone energy efficiency projects for customers that are motivated to take on that work as larger projects are underway.

4.3. Promoting Solutions: Which Financing Products Address Which Barriers?

As previous research has established, financing on its own cannot address all barriers to energy efficiency, and no single financing product is likely to be a "silver bullet" (Zimring, Borgeson, Todd, & Goldman, 2013; Kramer, Martin Fadrhonc, Goldman, Schiller, & Schwartz, 2015). At the same time, designing financing products should be done within the context of a detailed understanding of the market barriers that they may help to address. Examples of high loan-volume financing products within the LMI MF sector are designed in a range of ways, from first mortgage financing to junior lien-secured products to products offering on-bill repayment. Yet no one product addresses all of the barriers discussed above and, in a number of cases, the ability of a particular product to address a given barrier remains relatively untested. As such, this report explains how different types of financing products may *address* different types of barriers as well as what barriers each type of product may *introduce*.

Debt restriction barriers emerged as a particular point of concern for the affordable MF sector in discussions with interviewees for this report. This is likely due to the fact that within the realm of subsidized affordable housing, numerous capital providers typically finance each property, creating a multi-layered "debt stack." These lenders



often have rights to refuse to consent to additional loans being taken out on the property.¹¹² While this issue is well known in the energy efficiency industry in the case of senior-lien property assessed clean energy (PACE) products, existing lenders may also restrict even traditional financing that is junior to their own security interests (e.g., a junior mortgage).

Interviewees for this report often framed the issue of product choice as a tradeoff between the attractive rates and terms for more senior financing products and the challenge of obtaining lender consent from existing lenders to use such products. For example, PACE financing with a senior property assessment lien might provide the strongest possible security to facilitate the most affordable rates and terms, but obtaining consent for a senior PACE lien to come ahead of the multiple existing lenders that typically finance affordable housing is likely to be a challenge. By contrast, unsecured financing may be easier to tack on to the bottom of the existing debt stack, but its relative lack of security as compared to the claims of existing lien holders may make it more expensive.

Given this framing, the discussion of specific financing products below follows this general theme, moving from the most senior products to products that are often seen as easier to obtain existing lender approval, and from traditional products with junior or no security to specialized products that in some cases are perceived to fall outside debt stack and therefore not require approval at all. While we discuss a range of barriers relevant to each product, issues regarding debt restrictions show up in every case, often as one of the more central considerations.

4.3.1. Commercial Property Assessed Clean Energy (C-PACE)

Under PACE, financing is placed on the property tax bill and the PACE assessment receives priority rights to the property in a foreclosure sale equivalent to those of a tax lien, which is senior to any other type of financing on the property. Data from PACE Nation analyzed by Berkeley Lab show that providers reported using PACE for just over \$4 million in upgrades in MF buildings between 2009 and 2015 (Deason, Leventis, et al. 2016, PACE Nation n.d.)

4.3.1.1 Summary of Advantages, Disadvantages, and Other Considerations of C-PACE From the Consumer Perspective

This section highlights the particular potential advantages, potential disadvantages, and other considerations for PACE in the context of both (1) barriers to the *use of financing* in LMI MF housing as well as (2) barriers to *efficiency adoption* in the LMI MF sector. Examples follow of how PACE financing may address key barriers.

Potential Advantages	<ul style="list-style-type: none"> • <i>Affordability</i>: Strong security allows long terms and, thus, lower payments. • <i>Underwriting</i>: Some programs use alternative underwriting (e.g., considering equity in the building or tax payment history), which may be less restrictive than a full review of the borrower’s financials. However, underwriting can vary by program.
Potential Disadvantages	<ul style="list-style-type: none"> • <i>Debt restrictions</i>: Senior lien holders may not provide consent.
Other Considerations	<ul style="list-style-type: none"> • <i>Awareness</i>: Program awareness varies by jurisdiction. • <i>Transaction costs</i>: Costs vary by program and sector. • <i>Non-energy issues</i>: Non-energy measures depend on program parameters and may be restricted in practice. • <i>Split incentives</i>: It may be possible to pass costs onto tenants in leasing arrangements that pass on property taxes. This could raise complex issues for subsidized affordable housing owners. • <i>Financing cycles</i>: It may be easier to use C-PACE for stand-alone projects (e.g., projects that only include energy improvements).

¹¹² “Naturally occurring” (unsubsidized) affordable housing often is supported with less complex financing. Nonetheless, existing lenders on unsubsidized affordable housing properties may also place restrictions on borrowers seeking to take on additional debt.



4.3.1.2 Barriers Addressed by This Product

This strong security, which in the MF market can only be obtained with the consent of all existing lenders with an interest in the property, allows PACE providers to offer more favorable rates and terms than may be available through other forms of financing.

The longer terms associated with PACE financing might be expected to facilitate cash flow-positive energy efficiency projects more readily than shorter-term or more expensive financing alternatives. In theory, PACE might also be able to address the problem of split incentives in some cases, particularly in buildings in which “net lease” agreements pass through property taxes to tenants.¹¹³ By passing along the costs of PACE tax assessments, building owners could transfer the costs of energy efficiency improvements to tenants in sub-metered properties who benefit via reduced energy usage.

4.3.1.3 Barriers to Use of This Product

In practice, PACE has yet to demonstrate significant uptake in the affordable MF market. In New York, PACE administrator EnergizeNY has characterized efforts to apply the PACE model to the affordable MF sector as “not an easy lift” (Thielking 2016). Similarly, Connecticut’s Green Bank, which serves as the statewide PACE administrator, indicated that the PACE model is “not really a great solution” for this sector (Stevenson 2016). To date, only two affordable MF properties have used the PACE model in New York, while Connecticut’s Green Bank developed an alternative unsecured MF financing product specifically to avoid drawbacks of the PACE model, which otherwise serves as the Green Bank’s flagship commercial-sector product.

A key issue in applying PACE to the affordable MF sector appears to be the challenge of obtaining lender consent. Typically, PACE requires existing lenders to consent to having a lien placed ahead of their own lien priority.¹¹⁴ In the commercial sector more generally, research indicates that lender consent for commercial PACE has been a somewhat surmountable issue.¹¹⁵ Lender consent requirements, however, may be particularly unattractive to existing capital providers in a relatively risky sector such as affordable MF housing, in which the ability to recover residual value from the property as collateral may be an especially important consideration.

For many properties in this sector, the challenge of obtaining lender consent is compounded by complex financing and ownership structures.¹¹⁶ Among properties that received government-subsidized financing, for example, debt is often provided by multiple lenders as well as tax equity investors. Thus, consent must be obtained from multiple parties.

Despite the challenges of obtaining lender consent, for some affordable MF properties, PACE may still be worth exploring as an option, particularly among unsubsidized affordable MF properties that are not financed through GSEs or with a commercial mortgage-backed securities (CMBS) structure.¹¹⁷ Banks, which collectively have demonstrated at least an initial willingness to grant lender consent, represent a substantial source of first mortgage financing for MF properties, holding approximately one-third of all MF mortgage volume in 2014 (Multifamily Executive 2014). For unsubsidized, bank-financed MF housing, commercial PACE may therefore represent a viable financing option with certain attractive features. The downside of this option is that it may cover only a select portion of the MF market.


¹¹³ A net lease requires the tenant to pay certain costs associated with the building, including utilities.

¹¹⁴ Florida’s commercial PACE program is an exception, in that lender consent is not required if projected cash flows from energy savings exceed annual loan repayment obligations (Moody’s 2016).

¹¹⁵ Survey results suggest lender consent rates for commercial PACE overall may be as high as 80 percent (PACENow 2014).

¹¹⁶ For more on PACE and lender consent, see <http://www.pacenation.us/wp-content/uploads/2015/06/A-Case-for-Lender-Consent.pdf> and <http://pacenation.us/obtain-lender-consent/>.

¹¹⁷ A CMBS loan is a type of commercial mortgage that is packaged into a pool with other similar commercial loans and securitized and sold into the secondary market (Commercial Real Estate Finance Company of America 2016). Within the unsubsidized “naturally occurring” affordable housing segment, properties financed using CMBS structures may not offer an obvious or viable path for obtaining lender consent from the array of securities investors who provide financing on a portfolio of properties.



Jurisdictions that already administer commercial PACE programs to reach the broader commercial sector may wish to explore how PACE could be applied in this sub-segment of the affordable MF market. But launching a commercial PACE program for the express purpose of reaching the affordable MF sector as a whole may not be the most strategic choice.

4.3.2. Secured Financing (First Mortgage)

First mortgage loans are financing products in which the lender provides financing for the purchase or refinancing of an entire property and has a security interest in the property that serves as collateral for the loan. These products are referred to as “first” mortgages because they typically are senior to any other loans on the property.

Most secured efficiency lending programs have done moderate loan volumes, although Fannie Mae’s Green Financing (for multifamily buildings) has ramped up dramatically in the last two years, reaching \$3.6 billion in 2016 (Fannie Mae 2017).

4.3.2.1 Summary of Advantages, Disadvantages, and Other Considerations of First Mortgages From the Consumer Perspective


This section highlights the particular potential advantages, potential disadvantages, and other considerations for first mortgage loans in the context of both 1) barriers to the *use of financing* in LMI MF housing as well as 2) barriers to *efficiency adoption* in the LMI MF sector. Examples follow of how first mortgages may address key barriers.

Potential Advantages	<ul style="list-style-type: none"> • <i>Awareness</i>: First mortgages are widely used in the broader market, beyond energy improvements. • <i>Affordability</i>: Because of strong security and long terms, first mortgages typically have the lowest rates. • <i>Non-energy issues</i>: Traditional private financing can support non-energy work; however, program-related funds may have more restrictions.
Potential Disadvantages	<ul style="list-style-type: none"> • <i>Split incentives</i>: In the case of individually-metered properties where tenants pay utility bills, the landlord has no incentive to pay for efficiency improvements.
Other Considerations	<ul style="list-style-type: none"> • <i>Transaction costs</i>: Costs are high, but are integrated with transaction costs already inherent in overall first-mortgage financing. • <i>Debt restrictions</i>: If energy efficiency financing can be incorporated into overall first-mortgage financing, the owner can avoid debt restrictions, but it may add complexity to the process. • <i>Financing cycles</i>: First mortgages leverage financing cycles, but do not cover stand-alone projects (e.g., projects that only include energy improvements).

4.3.2.2 Barriers Addressed by This Product

Given that first mortgage lenders are accustomed to having first-priority rights to the property and may be reluctant to grant consent for a loan such as PACE to be placed ahead of them, a simpler option in some cases may be to roll energy efficiency work into a first mortgage product at the time that a building is purchased or refinanced. This option avoids debt restrictions, which typically come from the first mortgage provider restricting a borrower’s ability to take on added debt. Instead, the borrower finances the entire property and any energy efficiency improvements altogether through the first mortgage.

Using this approach may also address several other barriers. A key advantage of first mortgage financing for energy efficiency is that it coincides with typical financing cycles during which affordable MF building owners may be addressing other building work as part of an acquisition or refinancing process. At these times, awareness barriers



may be reduced in a first mortgage scenario for several reasons. First, the need for building improvements may already be top-of-mind for building owners who are purchasing or refinancing a property. Second, they may not need to become aware of additional financing options to support energy efficiency work if the first mortgage can support it. The key for energy efficiency program administrators promoting first mortgage financing may be to ensure that building owners are thinking about energy efficiency within the scope of overall needed improvements and that first mortgage products are flexible enough to accommodate incorporating this work.

First mortgage loans typically offer some of the most attractive financing terms available. Rolling energy efficiency work into a single financing product may improve a project's affordability and may also limit the necessary borrower commitment of resources to complete the application and underwriting process, though incorporating energy efficiency into a broader project can make financing more complicated compared to a project that does not seek to add on any such measures. At the same time, incorporating energy efficiency may avoid restrictions on addressing non-energy issues, which often apply in energy-specific financing products.

MORTGAGE PRICE BREAKS FOR ENERGY-EFFICIENT AFFORDABLE MF HOUSING GSES AND HUD LEAD THE WAY


Both Fannie Mae and the U.S. Department of Housing and Urban Development (HUD) have for several years offered flexible first mortgage underwriting and additional loan proceeds for energy efficiency improvements. Now, these entities along with Freddie Mac have begun to offer price breaks on mortgage interest rates (or in HUD's case, Federal Housing Administration (FHA)¹¹⁸ mortgage insurance premiums) for properties that meet certain specified green building certifications—all of which include energy efficiency criteria—or otherwise agree to make energy or water efficiency improvements. Fannie Mae's "Multifamily Green Financing" programs reduce interest rates by up to 39 basis points, and for many loans provide a free energy and water audit and additional loan proceeds (Sper 2016). FHA reduces insurance premiums from 20 to 45 basis points (U.S. Department of Housing and Urban Development 2016). Freddie Mac's "Multifamily Green Advantage" program also offers better pricing, additional loan proceeds, and rebates up to \$5,000 for buildings meeting certain green building criteria (Freddie Mac 2017).

These developments have seen a considerable response in the market. For example, in 2016 alone, Fannie Mae supported \$3.6 billion of Green financing (Fannie Mae 2017). Approximately half of this volume was from loans on properties with Green Building Certifications. Some of this activity comes from buildings that were able to be certified prior to receiving Fannie Mae financing, suggesting that these new financing offerings may not always spur investments that would not have otherwise occurred. Nonetheless, this type of activity may impact the market over the long term by signaling that certified properties can receive better overall mortgage terms from some of the largest financing providers for MF housing. The remainder of Fannie Mae's 2016 Green loan volume financed existing properties that committed to making improvements to reduce whole-property energy or water consumption by at least 20 percent. Both Fannie Mae and FHA also offer price breaks for "supplemental" financing, which allows property owners to make additional energy efficiency improvements after closing on their first mortgage loans (Fannie Mae 2017). These developments have the potential to significantly expand energy efficiency improvements in the affordable MF sector at a national scale.

4.3.2.3 Barriers to the Use of This Product

While first mortgage financing may address a wide range of barriers to energy efficiency improvements in the MF sector, there also are barriers to using this product. First, while incorporating energy efficiency into first mortgage financing may be somewhat more streamlined than undergoing a separate application and underwriting process, for some borrowers (and some lenders), incorporating energy efficiency into an already complex purchase or refinancing process may exceed available resources. For example, one lender interviewed for this report,

¹¹⁸ Through the FHA, HUD insures mortgages on residential buildings (HUD n.d.).



Community Preservation Corporation in New York City, spent several years seeking to facilitate energy efficiency work through first mortgage financing but did not find much demand (Derry 2015). Tackling efficiency at a later time may seem more manageable, though this approach may lead to lost opportunities as building improvement choices are being made.

First mortgage financing can also be a challenge from an underwriting standpoint. For example, first mortgage products often have loan-to-value (LTV) requirements dictating that the total amount of financing extended cannot exceed a certain percentage (e.g., 80 percent) of the value of the property. Given that the amount of financing extended often does not cover the full value of the property, there may be little room in these cases to increase the loan amount to cover additional energy efficiency work within the scope of the first mortgage (Multifamily Loans Inc. 2015).¹¹⁹ In some cases, lenders may have flexibility to adjust LTV ratios, particularly where energy efficiency improvements are projected to increase net operating cash flows. For example, the Fannie Mae

Green Preservation Plus program increases the LTV cap to 85 percent to allow financing of additional energy efficiency improvements (Fannie Mae n.d.). In other cases, however, lenders may have internal or regulatory restrictions that hinder increasing loan values in this manner, or they may package and sell first mortgages to secondary market investors who may restrict underwriting flexibility.^{120 121}

Finally, rolling energy efficiency into a first mortgage product only allows energy efficiency work to take place during typical financing cycles. While this can be an advantage in some cases, it can also restrict the ability of lenders and programs to promote energy efficiency retrofits at other times.

PREDEVELOPMENT LOANS: ENCOURAGING ENERGY EFFICIENCY PRIOR TO FIRST MORTGAGE UNDERWRITING

Another way to encourage the incorporation of energy efficiency into first mortgage underwriting is to offer predevelopment loans that cover energy-related predevelopment costs, such as energy audits and initial design and development work. By extending predevelopment loans to cover energy-specific activities, lenders can help borrowers scope out ways to make construction and renovation projects more energy-efficient. The Connecticut Green Bank and the New York City Energy Efficiency Corporation both offer green predevelopment loans. Other lenders offering predevelopment loans for larger MF projects may have an opportunity to proactively incorporate energy efficiency activity, as well.

4.3.3. Junior Lien Financing


In junior lien financing, the energy efficiency lender maintains a security interest in the property, but the interest is subordinate to the first mortgage holder.¹²² Some junior-lien programs have reached significant volumes in facilitating retrofits of affordable MF buildings. For example, the lender CIC has provided financing for 11,000 MF units in the Chicago area as part of the Energy Savers program, with junior lien loans accounting for the vast majority of this activity. As discussed further below, however, junior lien financing can be subject to restrictions from first mortgage providers and thus may not work in all cases.

¹¹⁹ Higher LTV ratios are not necessarily uncommon, at least in some types of MF lending. For example, in 2014 the average LTV ratio was actually above the property value (102.7 percent) within the MF sector of the commercial mortgage backed securities market (Heschmeyer 2015).

¹²⁰ For example, CIC sells its first mortgages to a consortium of lenders in the Chicago area, with certain LTV restrictions. As a result, CIC uses a separate, junior-lien product to finance most of the energy efficiency work it supports.

¹²¹ Fannie Mae markets the Green Preservation Plus program through its lender network (Sper 2016).

¹²² The additional risk of junior-lien financing must be addressed in some way, which may include a combination of flexible capital sources (such as public or CDFI capital), credit enhancements (e.g., loan loss reserves), or increased interest rates. Given the challenging economics in the affordable MF sector, flexible capital and credit enhancements may be needed to help facilitate MF energy efficiency loans.



4.3.4. Summary of Advantages, Disadvantages, and Other Considerations From the Consumer Perspective

This section highlights the particular potential advantages, potential disadvantages, and other considerations for junior lien loans in the context of both (1) barriers to the *use of financing* in LMI MF housing as well as (2) barriers to *efficiency adoption* in the LMI MF sector. Examples follow of how junior liens may address key barriers.

Potential Advantages	<ul style="list-style-type: none"> • <i>Awareness</i>: Junior liens are widely used in the broader market, beyond energy improvements. • <i>Affordability</i>: Security interest allows long terms and low interest rates (but higher than for first mortgage). • <i>Non-energy issues</i>: Traditional private financing can support non-energy work; however, program-related funds may have more restrictions. • <i>Financing cycles</i>: Junior liens can be used in conjunction with financing cycles and also are available for stand-alone projects (e.g., projects that only include energy improvements).
Potential Disadvantages	<ul style="list-style-type: none"> • <i>Transaction costs</i>: Costs are high due to property valuation. • <i>Split incentives</i>: In the case of individually-metered properties where tenants pay utility bills, the landlord has no incentive to pay for efficiency improvements. • <i>Debt restrictions</i>: Senior lien holders may not provide consent, though this may be of less concern than a first-position lien.

4.3.4.1 Barriers Addressed by This Product

In some cases, junior lien financing may create fewer issues with lender consent than a senior lien product like PACE. Junior lien financing allows existing first mortgage holders who may have provided financing for purchase or renovation of the entire building to retain priority over new lenders financing energy efficiency projects. Given that they retain this priority, first mortgage holders may be more likely to allow junior lien financing to be placed behind them.


Junior lien financing also offers advantages in terms of financing cycles, particularly as compared to first mortgage financing. While first mortgage financing may avoid issues with lender consent in some cases, it is only available for property owners seeking broader property financing. By contrast, junior lien loans can generally be originated at any time, allowing them to be marketed in conjunction with other efforts to incentivize stand-alone MF retrofits. However, in practice junior lien financing might also be used at the time that a first mortgage loan is made. For example, an estimated 80 percent of CIC’s junior lien energy efficiency loans are made in conjunction with first mortgage financing that CIC itself provides (Wheaton 2016). The junior lien is funded with more flexible capital, including a loan loss reserve equal to 29.6 percent of the portfolio and foundation capital provided at a 1 percent interest rate, allowing CIC to extend additional debt to borrowers for energy efficiency work.¹²³ Nevertheless, many of its borrowers use junior lien financing to pursue stand-alone retrofits (i.e., those that do not accompany a first mortgage or refinancing).

4.3.4.2 Barriers to the Use of This Product

Affordability may be a barrier to the use of junior lien financing in some cases, because it typically offers less attractive rates and terms as compared to first mortgage or senior lien financing, reflecting the added risk to lenders. Another possible barrier is the restriction that first mortgage providers may place on borrowers not to take on additional debt.

While the use of junior-lien financing may cause fewer issues with lender consent than PACE financing, debt restrictions can still pose a barrier. For example, Fannie Mae notes that it will only permit junior lien financing “under very limited circumstances . . . with the subordinate lender having very limited rights” (Fannie Mae n.d.). Similar restrictions also apply to mortgages sold to Freddie Mac or insured by FHA (Wheaton 2016). In addition, in

¹²³ “Flexible capital” is capital with flexible underwriting or more attractive interest rates or terms.



the unsubsidized “naturally affordable” market, CMBS lenders typically do not allow subordinate financing, and some banks and local lenders may restrict this type of financing. These types of restrictions impact both the subsidized and unsubsidized naturally affordable MF market. CIC notes that this restriction “has been a problem for us on more than one occasion” (Wheaton 2016).

There are several reasons that may cause first mortgage holders to be concerned about the existence of junior liens. For example, commercial lenders may fear that the property owner, if cash becomes tight, will use available funds to make payments on the second mortgage rather than to maintain the property (C-Loans, Inc. 2008). Alternatively, first mortgage holders may be concerned that if the borrower defaults on the junior mortgage, the subordinate lender will initiate a foreclosure proceeding (Wheaton 2016). While the CIC junior lien product demonstrates that such financing can generate significant loan volume, the fact that an estimated 80 percent of its junior liens are provided in cases in which CIC also provides the first mortgage may also illustrate the potential limitations of this type of product.

4.3.5. Unsecured Financing

Unsecured loans are financing products for which the lender does not take a security interest in the property. Although unsecured energy efficiency financing programs have deployed hundreds of millions of dollars in efficiency investments, the vast majority has been invested in the single-family sector. Much more efficiency investment, in both SF and MF buildings, may be made through unsecured lending outside of efficiency financing programs; volume is unknown at this time due to a lack of available data.


4.3.6. Summary of Advantages, Disadvantages, and Other Considerations of Unsecured Loans From the Consumer Perspective

This section highlights the particular potential advantages, potential disadvantages, and other considerations for unsecured financing in the context of both (1) barriers to the *use of financing* in LMI MF housing as well as (2) barriers to efficiency *adoption* in the LMI MF sector. Examples follow of how unsecured financing may address key barriers.

Potential Advantages	<ul style="list-style-type: none"> • <i>Awareness</i>: Unsecured financing is widely used in the broader market, beyond energy improvements. • <i>Transaction costs</i>: Costs are low as no property valuation is required. • <i>Non-energy issues</i>: Traditional private financing can support non-energy work; however, program-related funds may have more restrictions. • <i>Financing cycles</i>: Unsecured loans can be used in conjunction with financing cycles and also are available for stand-alone projects (e.g., projects that only include energy improvements).
Potential Disadvantages	<ul style="list-style-type: none"> • <i>Affordability</i>: Shorter terms and lack of security mean higher interest rates. • <i>Split incentives</i>: In the case of individually-metered properties where tenants pay utility bills, the landlord has no incentive to pay for efficiency improvements. • <i>Debt restrictions</i>: Unsecured loans are debt instruments and may impact existing debt covenants.
Other Considerations	<ul style="list-style-type: none"> • <i>Confidence and trust</i>: The affordable MF housing market’s level of confidence and trust in unsecured products depend on specific program features.

4.3.6.1 Barriers Addressed by This Product

Given that they do not seek a security interest for a property in which an existing lender may already have an interest, unsecured products may offer the advantage of avoiding debt restrictions in more circumstances than junior lien products. For example, Connecticut’s Green Bank worked with the Connecticut Housing Investment Fund—now known as Capital for Change—to launch an unsecured, MF energy efficiency product specifically to



avoid debt restrictions (Stevenson 2016). In this case, the primary concern was to avoid issues with lender consent related to the Green Bank's flagship commercial PACE product. At the same time, an unsecured product may also avoid debt restrictions with a junior lien product. In particular, unsecured loans do not give the lender the right to foreclose on the property being improved, which may reduce one key concern among first mortgage lenders. However, even unsecured loans may not avoid all debt restrictions.

As with junior lien financing, unsecured loans offer the advantage of being able to close at any time. They are therefore more flexible in that respect than first mortgage financing.

4.3.6.2 Barriers to the Use of This Product

While unsecured loans may avoid some of the restrictions that are often placed on junior secured loans, they nonetheless may create issues with debt restrictions under certain circumstances. For example, existing lenders may require borrowers to maintain certain debt service coverage ratios (typically between 1.10 and 1.25), equal to the annual net operating income divided by total annual debt service. If a borrower takes on a new energy efficiency loan, the additional debt service may be enough to drop the borrower's debt service coverage ratio below the required minimum in its existing loan covenants, unless the increase in operating income is sufficient to offset this effect.

Lenders also may place restrictions on so-called mezzanine debt, in which a lender does not have the right to foreclose on the property being improved, but may have rights to take over ownership interests in any equity in the property after existing debt holders are repaid. Key providers of MF financing such as Fannie Mae place restrictions on the use of mezzanine financing, as do others such as many CMBS lenders. A straightforward unsecured loan would not generally be considered mezzanine debt, but program administrators considering this option may need to consider how the lender's rights are constructed to avoid the perception of being considered a mezzanine loan (Multi-Housing News 2012).


Some existing lenders may even require consent for any unsecured loans that occur after initial first mortgage financing (Harcourt Brown & Carey 2014). However, industry lenders have not observed such restrictions as a common practice (Wheaton 2016).

A bigger issue for unsecured lending may be affordability. Given the lack of security, many lenders could require rates and terms that would be too costly to make a project economical, especially if the lenders did not have recourse to a borrower's other assets or a payment guarantee. As a result, unsecured MF loans have not been commonly offered (Andrews and Rinzler 2014). Programs that do offer such loans for energy efficiency have tended to be funded with low-cost, mission-driven capital, a significant credit enhancement, or both. Given these limitations, an unsecured lending model may pose a challenge from a scalability standpoint in the long run. In the interim, however, this model may be worth exploring among program administrators that may be able to contribute low-cost capital or credit enhancement to spur investment in the near term.

4.3.7. On-Bill Financing and Repayment

On-bill products allow efficiency investments to be repaid through the borrower's utility bills. These financing arrangements address various types of barriers, depending on program design choices (SEE Action Network 2014). Although on-bill programs have invested over \$1 billion in residential clean energy, the vast majority of that has been in single family buildings. Of 30 on-bill programs examined by Berkeley Lab, only five allowed participation by multifamily owners and only two were exclusively focused on MF buildings (SEE Action Network 2014).

Some programs have focused on structuring on-bill financing options as utility tariffs, so that they are treated from a regulatory standpoint in the same manner as other charges on the utility bill (see "The Pay As You Save® Approach" in Section 3.3.2) (SEE Action Network 2014). Whether these products should be treated as debt from an accounting perspective remains somewhat unclear.



4.3.8. Summary of Advantages, Disadvantages, and Other Considerations of On-Bill Financing From the Consumer Perspective

This section highlights the particular potential advantages, potential disadvantages, and other considerations for on-bill programs in the context of both (1) barriers to the *use of financing* in LMI MF housing as well as (2) barriers to *efficiency adoption* in the LMI MF sector. Examples follow of how on-bill programs may address key barriers.

Potential Advantages	<ul style="list-style-type: none">• <i>Awareness</i>: This financing structure can leverage the utility or program administrator’s relationship with the customer.• <i>Transaction costs</i>: Costs are low (can be higher if an audit is required) in part because property valuation is not required. In addition, alternative underwriting may lower transaction costs.• <i>Underwriting</i>: Alternative underwriting, often relying on customer bill payment history, may be used.
Potential Disadvantages	<ul style="list-style-type: none">• <i>Risks</i>: Some programs may introduce the risk of power disconnection for nonpayment.
Other Considerations	<ul style="list-style-type: none">• <i>Non-energy issues</i>: Coverage of non-energy measures that may be necessary depends on program parameters and often are restricted in practice.• <i>Split incentives</i>: It may be possible to pass energy improvement costs onto tenants, but it is rare in practice. Thus, split incentives remain where units are individually metered and tenants pay the utility bills.• <i>Debt restrictions</i>: It is possible that some on-bill variations may be considered non-debt, though proper accounting treatment remains uncertain.• <i>Financing cycles</i>: On-bill is easier to use for stand-alone projects (e.g., projects that only include energy improvements).


4.3.8.1 Barriers Addressed by This Product

Determining whether an on-bill product should be treated as debt may require examining customers’ ability to cancel or get out of their long-term payment obligation. Some on-bill financing arrangements, including most on-bill tariffs, allow a customer to stop payments if they vacate the property. The Financial Accounting Standards Board (FASB), which set accounting guidelines for the private sector, has indicated that financing arrangements with a cancellation option do not need to be treated as debt for the period covered by the cancellation option, unless it is “reasonably certain” that the customer will not exercise that option. In addition, FASB guidance suggests that in order to be treated as non-debt, the cancellation option must not come with a termination penalty (FASB 2016).

In order to determine whether an on-bill arrangement qualifies as non-debt, customers may need to determine first whether they are reasonably certain not to cancel their obligation, and second whether they face a penalty for cancellation. While on-bill tariffs typically do not involve a financial penalty for cancellation, it is unclear whether being required to move out would constitute a penalty in and of itself. While in some cases a customer may already have plans to move out, if their primary desire is simply to cancel the obligation, being required to move out in order to effect the cancellation may arguably constitute a penalty.¹²⁴

Aside from addressing debt restrictions, another key advantage of on-bill programs is that they tend to be relatively streamlined, requiring less of an effort on the part of the borrower to get through the application and underwriting process. This advantage may depend on whether a given on-bill product is set up in a streamlined way. For example, the PSE&G program relies on a review of the borrower’s utility payment history, information that PSE&G has readily available (Fredericks 2016). The simplicity of the program application process may help to

¹²⁴ These sections are meant to provide an overview of the issues involved; they are not accounting advice. For advice on accounting treatment, consult an accounting professional.



partially explain broad participation in the program. Other factors include a zero interest rate and other attractive features within the scope of the utility's overall MF energy efficiency program, such as free energy audits and assistance with contractor selection (Bryant and Ringhof 2010).

Other advantages of on-bill programs include a flexible underwriting method that enables broader participation. For example, customers with outstanding utility charges can participate in PSE&G's on-bill financing program, but they must bring their account current (Fredericks 2016). While this requirement may pose a challenge for some customers, overall it is likely to be less restrictive than more traditional underwriting methods.

In theory, on-bill options may address affordability barriers, as well. California plans to test whether on-bill repayment increases affordability by improving loan performance, compared to other types of loans, but the program had not yet launched as of this writing (CPUC 2013).¹²⁵ Finally, like more traditional debt products, on-bill financing and repayment options offer the advantage of being available at any time, once a program is established.

4.3.8.2 Barriers to the Use of This Product

Once established, there are often relatively few barriers to the use of on-bill financing and repayment options. The larger challenge may be the resources that are often required to establish an on-bill program. Key factors include the willingness of a utility to be an active participant in the program, regulatory and utility hurdles that must be overcome to establish a program, and the resources required to implement administrative processes and upgrade information technology platforms. Given these resource requirements, program administrators may wish to consider whether the projected uptake of an on-bill program is likely to significantly exceed that of more traditional financing options. While the PSE&G program in New Jersey has been successful, no other on-bill program has reached a comparable scale in the MF sector (SEE Action Network 2014). Future clarification of the proper accounting treatment for on-bill programs may also determine whether debt restrictions will ultimately pose a barrier to on-bill programs.

4.3.9. Savings-Backed Arrangements: Energy Service Agreements and Energy Savings Performance Contracts

Savings-backed financing arrangements are energy efficiency transactions in which the borrower's financial rights or obligations are linked to the realization of energy savings. They include energy savings performance contracts (ESPCs) and energy service agreements (ESAs).

ESPCs involve arrangements between building owners and energy service companies (ESCOs) and are typically financed (generally by a third-party financing provider) and usually backed by a savings guarantee from the ESCO. They are common in public and institutional buildings within the MUSH sector (municipalities, universities, schools, and hospitals) and frequently used in public housing (see the text box "Public Sector Affordable Housing"). For example, in 2014, ESPCs for public housing and other miscellaneous projects generated over \$150 million revenue (Stuart, et al. 2016).

The other less common but growing type of savings-backed arrangement is the energy savings agreement (ESA). ESAs are frequently marketed as arrangements in which customers pay for energy savings as a service rather than paying for the equipment installed.¹²⁶ An ESA provider offers capital for a project, arranges installation of efficiency measures, and shares in the resulting savings. It is an emerging model and there is little information to date on ESA investment volumes.

¹²⁵ California's MF financing pilot would not allow utilities to shut off service for non-payment of the energy efficiency financing portion of the bill. In theory, this could reduce the state's ability to test the impact of on-bill repayment on affordability in the MF sector, as the threat of shut-off could potentially improve loan performance. However, researchers have found no correlation to date between loan performance and allowing service disconnection for non-payment of the financing portion of the utility bill (SEE Action Network 2014).

¹²⁶ How such arrangements should be treated from an accounting perspective remains unclear (Kramer and Schiller, Technical Memorandum: Energy Efficiency Financing Options for City-Owned Properties in Dubuque 2016).

4.3.10. Summary of Advantages, Disadvantages, and Other Considerations of Savings-Backed Arrangements From the Consumer Perspective

This section highlights the particular potential advantages, potential disadvantages, and other considerations for ESAs and ESPCs in the context of both (1) barriers to the *use of financing* in LMI MF housing as well as (2) barriers to *efficiency adoption* in the LMI MF sector. Examples follow of how ESAs and ESPCs may address key barriers.

Potential Advantages	<ul style="list-style-type: none"> • <i>Affordability</i>: Guaranteed or shared savings may help offset payment risks. • <i>Confidence</i>: Energy savings guarantee or shared savings arrangements may provide added confidence.
Potential Disadvantages	<ul style="list-style-type: none"> • <i>Awareness</i>: Awareness is relatively low to date for ESAs. Awareness of ESPCs is relatively high in the MUSH market but lower for privately owned properties. • <i>Non-energy issues</i>: Non-energy measures may be more restricted given the need to have savings provide backing for payment obligations. • <i>Split incentives</i>: In the case of individually-metered properties where tenants pay utility bills, the landlord has no incentive to pay for efficiency improvements.
Other Considerations	<ul style="list-style-type: none"> • <i>Transaction costs</i>: To minimize performance risk, companies need to accurately estimate energy savings, which is complex. This could add transaction costs, depending on how a company manages it. • <i>Debt restrictions</i>: It is possible that some variations of savings-backed arrangements may be considered non-debt, though proper accounting treatment remains uncertain. • <i>Financing cycles</i>: Savings-backed arrangements are easier for stand-alone projects (e.g., projects that only include energy improvements).

4.3.10.1 Barriers Addressed by These Products

These products may facilitate additional financing activity by providing consumers with greater confidence that their investment in energy efficiency will achieve the projected energy savings, providing a source of financial support for their repayment obligations.

This type of assurance may be especially helpful in the context of affordable MF housing, in which thin cash flows may discourage customers from taking on energy efficiency investments unless they are confident that the investments are affordable and will improve their bottom line. Savings-backed arrangements may also help address underwriting barriers. To the extent that lenders are confident that savings will materialize for a given project, or on average over a portfolio of projects, they may be more willing to underwrite customers who potentially would be unable to obtain financing based solely on their own general creditworthiness.¹²⁷

In an ESA arrangement, the provider pays a contractor to install energy-saving measures at a customer’s property, while also making arrangements for the customer to repay the ESA provider over time. Some ESAs structure payment obligations to be contingent upon the level of savings actually realized, while others involve fixed payments that are backed by separate savings guarantees.

In theory, ESAs are intended to address many barriers (e.g., affordability, confidence, underwriting, and financing cycles) including debt restrictions. Whether ESAs are successful in addressing this barrier may depend on the specifics of how they are structured, as well as their accounting treatment. For more on debt treatment of financing arrangements, see DOE’s “Energy Upgrades At City-Owned Facilities: Understanding Accounting for Energy Efficiency Financing Options—City of Dubuque Case Study.”

¹²⁷ Some evidence suggests, however, that providing a savings guarantee may not be sufficient to increase demand for energy efficiency investments in the affordable MF sector. For example, the Low Income Investment Fund (LIIF) recently conducted a demonstration project to test the concept of partnering with ESCOs to retrofit privately-owned MF housing. Among the numerous issues identified in the course of the demonstration, a key finding was a lack of demand despite the offer of a savings guarantee. LIIF speculated that this may have been in part because “the complexity of the guarantee and the time and effort required to collect on it left owners with concerns” (Schaaf and Latimer-Nelligan 2016).



4.3.10.2 Barriers to the Use of This Product

Debt restrictions may pose a barrier to the use of energy service agreements, depending on how they are structured and ultimately treated from an accounting perspective. In addition to the question of whether ESAs are treated as service contracts, program administrators may also need to consider whether ESA providers plan to file equipment liens on the installations they provide. If so, existing lenders may need to provide consent for the filing of such a lien. In some cases they may need to enter into either a subordination agreement or inter-creditor agreement to spell out the respective rights of the existing lender and the ESA provider. While existing lenders may be willing to do so for the purpose of allowing the installation of specific measures designed to improve the property, the process required may reduce some of the advantages of “avoiding the debt stack.”

This example points to a more general potential barrier with regard to the use of ESAs—namely, the resources required for borrowers to become familiar enough with the ESA process to be willing to take on this type of financing. A related barrier is simply awareness of ESA financing as an option. It remains a relatively niche option in most building sectors and has not been commonly used in the affordable MF sector. California is exploring the use of ESAs for an affordable MF financing pilot, which may increase familiarity with this type of structure in that state in the future (Carey 2016).

Even where ESAs are used, they may run up against barriers that are particularly common in the affordable MF sector. For example, because ESAs are designed specifically to provide energy savings, other types of work that they can support, such as remediation of health and safety issues and other deferred maintenance, may be limited. While some other financing products have similar limitations, ESAs may be particularly constrained in order to remain within the accounting rules that may govern their favorable balance-sheet treatment. From this standpoint, the model of underwriting energy savings may be something of a double-edged sword. On the one hand, it may facilitate projects that would not otherwise move forward on the basis of a borrower’s creditworthiness alone. On the other hand, the ESA model may restrict the underwriting of certain projects that are more broadly scoped.



PUBLIC-SECTOR AFFORDABLE HOUSING: FINANCING OPTIONS FOR ENERGY SAVINGS PERFORMANCE CONTRACTS

Across the nation, there are approximately 1.1 million units of publicly owned affordable housing supported by HUD and typically owned and maintained by public housing authorities (Center of Budget and Policy Priorities 2016). These units represent approximately one quarter of all subsidized affordable housing nationwide (Ross, Jarrett and York 2016). As with other public buildings, public housing is frequently served by energy service companies (ESCOs) that provide savings-backed arrangements in the form of energy savings performance contracts (ESPCs). ESPCs are typically financed by a third party, and ESCOs generally offer a savings guarantee.

When pursuing ESPCs, housing authorities may need to consider the types of financing arrangements that would be most advantageous. Common forms of public sector financing include bonds, leases, and certificates of participation, which are essentially specialized leasing arrangements in which the cash flows are distributed through a trust to multiple certificate holders. The New York City Housing Authority (NYCHA) recently explored all of these financing options, as well as traditional loans, through an open request for proposals to provide financing for an ESPC transaction with the ESCO Ameresco.


NYCHA received only leasing options in response to its request for proposals. NYCHA officials cited several downsides of bond financing, including high transaction costs, the time and effort required to obtain a bond rating, and the uncertainty of finding bond investors (Puccio 2016). These disadvantages were present even with an ESPC transaction size of \$37.4 million, part of the nation's largest public housing energy efficiency project (Hardesty 2015). By contrast, officials noted that along with lower transaction costs, a leasing model also allowed NYCHA to enter into a master lease agreement, which would make procuring additional financing for future projects much simpler. While some of the advantages of leasing may have been present with a certificate of participation arrangement, NYCHA found that one requirement—that financing providers guarantee they could line up investors within a set timeframe—may have deterred respondents from offering this model. The challenges of these arrangements, along with the likely higher capital costs of traditional loan options, led NYCHA staff to conclude that even if proposals using these models had been submitted, NYCHA likely would have decided to pursue a leasing arrangement anyway (Puccio 2016).

4.4. Summary

Significant opportunities exist to increase energy efficiency financing activity in the affordable MF housing sector, particularly for state and local entities, utilities, and private financial institutions. From federal and federally-sponsored agencies offering mortgage price breaks for efficient MF buildings, to local efforts like the Chicago Energy Savers program providing financing as part of a well-integrated initiative, to utilities like New Jersey's PSE&G facilitating projects through an on-bill program targeted specifically to MF properties, a range of prominent examples demonstrates the potential to make progress in this sector with an assortment of different models.

Despite these examples, relatively few jurisdictions today offer specific financing options for energy efficiency improvements in affordable MF properties. The products and programs described in this chapter may provide more jurisdictions with examples to explore the potential to expand their offerings. Even in jurisdictions that may not have the resources to launch new products, there may be opportunities to promote existing products offered by others, such as federal agencies like HUD and government-sponsored enterprises like Fannie Mae and Freddie Mac.

Given the wide range of barriers that exist in the affordable MF housing sector, no single financing product, nor financing itself, will overcome all barriers. A successful approach to increasing energy efficiency activity in this sector will require a concerted effort among key actors. Nevertheless, financing can play an important role in facilitating more energy efficiency projects, as several programs have demonstrated. Each of the products described in this chapter addresses certain barriers, and each also has limitations. While no financing product may be considered perfect in this respect, understanding the barriers that each product may help overcome (as well as



the potential barriers to each product's use) provides a more solid basis for program administrators to choose and design products to serve the needs of the affordable MF housing markets they serve.

5. Lessons Learned and Options for Financing Efficiency Upgrades for LMI Households

Decision-makers, program administrators, and other stakeholders may be able to leverage financing as a tool to increase adoption of energy efficiency measures for LMI households in both the single family and multifamily (MF) housing sectors. Among the factors for success in using financing to support policy goals:

- Focus on addressing the specific needs of LMI households, such as affordability
- Ensure effective consumer protections targeted to LMI households are in place
- Broadly assess available resources and facilitate coordination and collaboration with key stakeholders such as lending institutions, utilities, and housing agencies at the local, state, and federal levels to assemble the most attractive investment packages, leveraging grants and loans and taking advantage of existing efforts to understand and reach LMI households
- Determine what data are needed to understand and better serve LMI households with financing for energy efficiency improvements and to continuously improve financing programs¹²⁸

This concluding section of the report examines lessons learned in these areas from existing financing programs that help LMI households pay for energy efficiency improvements. It also reviews available options and important considerations for state and local governments and program administrators to leverage financing to ramp up efficiency adoption by LMI households.

5.1. Financing Products and Product Features

There is no one-size-fits-all financing product solution; different products address different barriers and different markets. For example, what works in privately-owned affordable MF housing may not work in publicly-owned MF housing.


Certain financing products and financing product features can help address barriers to the uptake of efficiency measures in LMI households and facilitate greater demand, by increasing affordability of efficiency measures, broadening access to credit for more LMI households, and, through the ability to transfer loans when moving, making projects with long paybacks feasible for more households.

5.1.1. Affordability

LMI households may have little, if any, discretionary income to make monthly payments on a loan for energy efficiency improvements. Financing programs that have reached significant loan volume and LMI participation have offered low interest rates compared to market rates. Financing programs can improve affordability in four ways:

- **Credit enhancements and buydowns.** Credit enhancements are tools to reduce lender risk, which may make lenders comfortable reducing interest rates and extending loan terms. Credit enhancements include subordinate debt, used by programs such as WHEEL, loan loss reserves, and lender guarantees. Buydowns are payments made to reduce project costs or effectively reduce a loan's interest rate. Buydowns may be applied either through a direct subsidy by a program administrator or through available incentives such as utility rebates. All financing product types can improve affordability by using credit enhancements and buydowns. Reducing interest rates and extending terms lowers monthly payments.

¹²⁸ NYSERDA tracks and regularly distributes data for its efficiency financing programs for a number of categories including income, approval rates, credit scores, debt-to-income ratio, average interest rate, and delinquency and default rates.

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- **Minimizing program costs.** Energy efficiency financing providers can reduce their costs, and the cost of their products, and pass along the savings to customers in the form of lower interest rates or lower fees. Examples of reducing costs include alternative underwriting approaches,¹²⁹ community-based customer acquisition, automatic payment systems, and using low-cost capital sources.
 - **Cash flow-positive rules.** These rules require annual loan payments to be less than (or equal to, in the case of “bill neutrality” requirements) projected savings on energy bills. Although any loan can be structured this way, this approach is most often used for on-bill financing programs. This means a borrower could see monthly savings instead of an added loan payment obligation, in theory making such arrangements affordable for LMI households. But this concept raises several cautions—for example, challenges to estimating savings and project volume limitations (see “The Pay As You Save (PAYS®) Approach” text box in Section 3.3.2).
 - **Extended loan terms.** A straightforward way to lower monthly loan payments without requiring a subsidy is extending the term of a loan. Some programs with cash flow-positive rules may extend loan terms to make a project pencil out.

5.1.2. Underwriting Approaches

Alternative underwriting approaches offer several advantages compared to traditional underwriting, including broadening access to financing and speeding approval processes by relying more on publicly available information or utility records and less on expensive credit data.

These approaches may also be faster than traditional underwriting methods. For example, PACE programs generally qualify applicants using publicly available data such as property values, which allow potential candidates to be qualified before a contractor visits them (Bishopp 2015). Many on-bill programs qualify applicants based on utility bill payment history, information utilities can quickly access. A fast approval process is particularly important for emergency replacement of energy-consuming equipment. However, sufficient time needs to be allowed for borrowers to fully understand any agreement they enter into.

From a policy perspective, one downside to these approaches is that if underwriters do not consider applicant income, they may not capture an applicant’s ability to pay in the manner of more traditional underwriting approaches.¹³⁰ Assessing a potential borrower’s ability to pay is particularly important when serving LMI customers. Many programs using alternative underwriting do not collect income data, one of the most important pieces of information for understanding loan affordability. Underwriting approaches that do not consider credit scores will qualify more people with lower scores, yet these scores are one of the best indicators of the likelihood of loan repayment. Including LMI households with poor credit scores must be done thoughtfully.


5.1.3. Debt Considerations for MF Buildings

Two important financing considerations specific to the affordable MF housing sector are:

- **Debt restrictions**—For affordable MF building owners, debt restrictions can be a major barrier to the use of financing. State and local governments interested in promoting efficiency in the MF sector should consider products that may address debt restrictions. They should also note the complications that surround this from an accounting perspective.
- **Financing cycles**—To reach MF building owners, decision-makers should consider how financing products will interact with typical MF financing cycles (i.e., times at which owners are planning to purchase a building, refinance a building, or finance broader projects). Financing efficiency through a first mortgage could catch owners when they are already planning to use financing, whereas using

¹²⁹ However, even alternative underwriting approaches that are relatively cheap to administer could be expensive on net if they do a poor job of identifying creditworthy borrowers and result in higher default rates.

¹³⁰ The Dodd-Frank Act includes the Ability-to-Repay rule which requires lenders of loans secured by a home to take into account eight criteria to ensure that the borrower has the ability to repay the loan (Consumer Financial Protection Bureau 2013).



other products such as a junior lien allows for stand-alone efficiency projects that can be done in between financing cycles, which may be far apart.

5.1.4. Transfers

Allowing a loan to transfer from the original borrower to the subsequent occupant may help address concerns that efficiency improvements will not pay back before the household moves from the improved property. However, the limited data available show that transfers have only occurred about half of the time. In California's HERO program, of 773 households who had made an energy improvement using PACE and subsequently moved, 45 percent transferred the assessment to the incoming occupant (Goodman and Zhu 2016). Similarly, GJGNY participants that moved with a balance on their on-bill loans transferred their loans less than 50 percent of the time (Pitkin 2016). In Midwest Energy's How\$mart Kansas on-bill tariff program, of 150 properties that changed hands, the loan transferred in half the cases (SEE Action Network 2014).

5.2. Stakeholder Coordination and Collaboration

It is important that financing is combined with an array of solutions to address the full range of barriers to efficiency in the LMI sector. For example, for the affordable MF sector, lack of financing is just one of many barriers. Among programs examined for this report, coordination and collaboration among stakeholders (including federal and state entities)¹³¹ was valuable in reaching LMI households and serving their energy efficiency needs. Successful coordination and collaboration is a long-term process that can take several years. It requires learning about others' work and educating stakeholders about energy efficiency financing. It can support LMI efficiency efforts in two main ways:

- **Trust and awareness.** Coordination and collaboration with stakeholders in the LMI sector can overcome these market barriers. For example, community action agencies are trusted partners in LMI communities, and public housing authorities and food banks have established infrastructure in these communities that can be leveraged to raise awareness about efficiency.
- **Funding and capital.** Efficiency financing programs can work with entities that could provide full or partial *direct funding* of projects (e.g., CDFIs or healthcare providers that might fund audits); *buy down project costs* (e.g., utility rebate programs); or *cross-fund* projects that might not be possible without such funding (e.g., community action agencies that have funds to make health and safety repairs that must be done before efficiency work can begin).¹³²


Stakeholders include, but are not limited to, administrators of efficiency and low-income programs; utilities; banks, CDFIs, and credit unions; state and local agencies (e.g., state energy offices, housing finance agencies, and public housing authorities); community action agencies; housing, low-income, and other non-profit agencies; federal government program administrators (e.g., the Weatherization Assistance Program, the Low Income Home Energy Assistance Program, the U.S. Department of Agriculture's Rural Utility Service); contractors; local faith-based organizations; and community hospitals and healthcare providers.

5.3. Consumer Protections

If financing or other types of payment obligations are extended to LMI households to invest in energy efficiency, consumer protections should be in place. These protections should, at a minimum, ensure that participants understand what they are agreeing to, that lenders are not abusing or defrauding borrowers, and that participants are fully able to meet their obligations. For traditional financing products and conventional lenders, an array of federal and state laws provides these protections. However, specialized financing products may not be covered by

¹³¹ Fannie Mae, Freddie Mac, and the FHA, for example, offer multifamily products that may already meet the objectives of state and local jurisdictions.

¹³² Some financing offerings allow a certain portion of the loan to be used for these repairs. Otherwise, collaboration with agencies that offer this work for free is a way to make these projects possible.



these laws, although some product structures and program practices may support the goals of some of these consumer protections. (See Sections 2.2.5 and 3.1.)

Decision-makers should familiarize themselves with federal and state consumer protection laws and seek engagement and input from consumer advocates, lenders, and legal counsel on this subject. States should also make sure that program administrators understand their obligations with regards to lending laws and consumer protections.

5.4. Data

Understanding how LMI households use energy efficiency services and financing generally is important to reaching these consumers and lending responsibly to this community. Many energy efficiency financing programs, particularly those offering specialized products, may not track some key information on their participants. Those that do may not use standard data definitions or characterizations.¹³³


Decision-makers should establish a regular process to provide stakeholders with summary loan data that reflect the many important concerns noted.¹³⁴ Specific areas where additional information, and more consistent data, would be helpful include the following.

- **LMI program participation** – Knowing the level of LMI participation in existing programs could illuminate what offerings LMI consumers see as valuable and attractive, and the market gaps that a financing program may be filling. Important data to collect include:
 - Overall number and dollar volume of loans in the portfolio and the portion going to LMI participants¹³⁵
 - Demographic characteristics of participants (e.g., building type, number of household members, whether they rent or own)
 - Credit and wealth characteristics including income, credit score, debt-to-income ratio, and amount of home equity
- **Loan performance data** – Documenting loan payment delinquencies, defaults, and charge offs or losses by various loan factors, such as borrower income level, property value, and loan origination periods can help program administrators gauge the tradeoff for LMI households between the benefits of financing energy efficiency measures and the risks of taking on debt or other payment obligations. It may also suggest program modifications that could improve performance of loans for LMI households. Important data to collect include:
 - Loan defaults by income (to compare LMI household and overall default rates)
 - Performance of loans by income (to compare to what credit scores predict)
- **Underwriting process** – Clarity and information about programs' underwriting processes can show whether these approaches are achieving their goals (particularly access to credit for more LMI consumers) and whether programs are sufficiently screening for borrowers who are able and willing to repay their debt. Important data to collect are:
 - Description of the underwriting process, including what data are collected

¹³³ For example, a straightforward unsecured loan program that uses a traditional underwriting approach might collect much different credit information than a PAYS® program relying on potential energy savings as the sole underwriting criterion.

¹³⁴ For example, NYSERDA regularly distributes key data on their clean energy financing programs.

¹³⁵ To accurately and consistently capture this information requires a consistent definition of LMI households and an understanding of how the data are obtained. Income data may be obtained in different ways. Some programs may require proof of income in the form on tax documents, while others rely on self-reported data. It should be clear whether all household income has been reported. For example, if there are two or more earners in the household, income will be understated if just the head of household's income is reported.

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- Approval rates and reasons for denial of applications, by income category
 - **Measures implemented** – Knowing what measures are being implemented illustrates how LMI households are using financing and whether financing programs for efficiency are meeting their goals. Important data to collect, for comparison to higher income households, include:
 - What measures and how many measures are being implemented in LMI households
 - The efficiency level of these measures (e.g., SEER ratings for air conditioners)
 - **Energy savings** – Collecting the following information by income level could help answer the question of whether energy efficiency financing programs are saving energy for LMI participants and how cost-effectively:
 - Household pre-project and post-project energy consumption¹³⁶
 - Deemed savings values for measures implemented
 - Projected utility bill savings and actual bill savings


Policy-makers and regulators should encourage program administrators to collect these data in a consistent way and make it available for analysis to improve programs and policies.

¹³⁶ Generally, at least one year of pre-project data is needed to establish baseline consumption levels.



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Appendix: Comparison of Financing Products by Housing Sector

The following tables compare financing products, from the consumer’s point of view, in the single family and multifamily sectors. The tables assess each how well each product can address the barriers facing consumers in each of these sectors and whether the barriers might be particularly significant for any of the products. The tables are a snapshot of financing products that may be helpful under different circumstances. For a fuller examination of the products and the barriers, see Sections 3 and 4.

- Potential advantage: Product likely to address—or designed to address—this barrier.
- Neutral or other considerations: May address or partially address this barrier; some product variations may address this barrier; may have both benefits and drawbacks related to this barrier.
- Potential disadvantage: This barrier could be a particular drawback for this product.



Financing Products for LMI Households in the Single-Family Sector

	Unsecured	On-Bill	PACE	Savings-Backed Arrangements (Energy Services Agreements—ESA)
Awareness	Wide use in the broader market	On-bill programs can leverage the utility or program administrator’s relationship with the customer.	As an emerging product, many consumers are not aware of PACE as a means to pay for efficiency.	As an emerging product, many consumers are not aware of ESAs as a means to pay for efficiency.
Affordability	Since this product has no security interest (e.g., collateral), lenders may require higher interest rates, shorter terms (which increase monthly payments), or a subsidy to modify these.	Some on-bill programs have requirements to structure the obligation in a way that minimizes cash-flow impact to the participant.	Strong security allows long terms and, thus, lower payments. However, interest rates for larger volume programs are higher than mortgage rates.	Guaranteed or shared savings may help offset payment risks.
Transaction Costs	Low because unsecured financing has no security interest in the property; no property valuation required	Low (can be higher if an audit is required); no property valuation required; alternative underwriting may lower transaction costs	Requires home equity determination, but many programs have minimized transaction costs for customers by streamlining the approval process	To minimize performance risk, companies need to accurately estimate energy savings, which is complex. This could add transaction costs, depending on how a company manages it.
Confidence and Trust	Does not specifically address confidence in energy savings	If there are project performance issues, some PAYS® programs have elected to waive on-bill charges until the program administrator has resolved them.	Does not specifically address confidence in energy savings	Energy savings guarantee or shared savings arrangement may provide added confidence



	Unsecured	On-Bill	PACE	Savings-Backed Arrangements (Energy Services Agreements—ESA)
Non-Energy Issues	Programmatic unsecured loan programs may not allow non-energy measures. Non-programmatic unsecured products do not have limitations on what can be included.	Cash flow-positive structures may not be able to include health and safety improvements, which do not generate energy savings but may be necessary to implement some efficiency measures.	Many programs allow spending to address non-energy issues that could impact installation of energy efficiency measures. However, if a savings-to-investment ratio >1 rule is implemented, it could limit non-energy spending. These rules have not generally been used with R-PACE.	Necessary non-energy work (e.g., health and safety measures) may not pencil out as cash flow-positive, disqualifying some projects.
Split Incentives	Does not address split incentives.	In the case of individually-metered properties where tenants pay utility bills, the landlord has no incentive to pay for efficiency improvements. If the payment obligation is attached to the meter (not the occupant) and transfers to a new occupant, a renter's disincentive may be partly addressed.	Does not address split incentives.	Does not address split incentives.
Underwriting	With no collateral requirement, people can participate without putting their homes at risk.	Many on-bill programs use alternative underwriting (e.g., project cost-effectiveness or bill payment history). This may increase accessibility by allowing applicants to qualify that may not qualify under other approaches.	Underwriting is based on home equity and tax payment history, which may increase accessibility as compared to traditional underwriting.	Depends on program.
Debt Aversion	Unsecured products are debt instruments. Those with an aversion to debt will be hesitant to use these financing products.	On-bill products structured to be investments by the utility rather than the customer (as is the case for some on-bill tariffs) may be seen as a utility service charge.	As a tax assessment that is not technically a loan, debt-averse consumers may be more willing to participate in PACE. The PACE assessment is structured to transfer to the incoming occupant when a participant moves.	With a savings guarantee and savings backing for at least some of the payment obligations, debt-averse consumers may be willing to use an ESA, but there is insufficient data to date.



	Unsecured	On-Bill	PACE	Savings-Backed Arrangements (Energy Services Agreements—ESA)
Risk	Nonpayment may damage credit but does not risk the loss of one's home.	There is no potential for loss of home, however, some programs introduce the risk of power being shut off in the case of non-payment.	Potential for loss of home.	No potential for loss of home.



Financing Products for the Affordable Multifamily Housing Sector

	PACE	Secured (First Mortgage)	Secured (Junior Lien)	Unsecured	On-bill financing/on-bill repayment	Savings-Backed Arrangements (ESA, ESPC)
Awareness	Depends on level of program awareness in a given jurisdiction	Wide use in broader market, beyond energy improvements	Wide use in broader market, beyond energy improvements	Wide use in broader market, beyond energy improvements	Can leverage the utility's relationship with the customer	Relatively low to date for ESAs; high in the MUSH (municipalities, sector for ESPCs, less awareness in the private sector)
Affordability	Strong security allows long terms and, thus, lower payments.	Typically lowest rates because of strong security and long terms	Security interest allows long terms and low interest rates (but higher than first mortgages).	Shorter terms and lack of security mean higher interest rates.	Depends on program terms	Guaranteed or shared savings may help offset payment risks
Transaction Costs	Vary by program and sector	High, but integrated with transaction costs already inherent in overall first-mortgage financing	High due to property valuation	Low; no property valuation required	Low (can be higher if an audit is required), in part because property valuation is not required; alternative underwriting may lower transaction costs	To minimize performance risk, companies need to accurately estimate energy savings, which is complex. This could add transaction costs.
Confidence	Depends on program features	Depends on program features	Depends on program features	Depends on program features	Depends on program features	Energy savings guarantee or shared savings arrangement may provide added confidence
Non-Energy Issues	Non-energy measures depend on program parameters and may be restricted in practice	Traditional private financing can support non-energy work; program-related funds may have more restrictions	Traditional private financing can support non-energy work; program-related funds may have more restrictions	Traditional private financing can support non-energy work; program-related funds may have more restrictions	Depends on program parameters; often restricted in practice	May be more restricted because savings must provide backing for payment obligations



	PACE	Secured (First Mortgage)	Secured (Junior Lien)	Unsecured	On-bill financing/on-bill repayment	Savings-Backed Arrangements (ESA, ESPC)
Split Incentives	It may be possible to pass costs onto tenants in leasing arrangements that pass on property taxes. This could raise complex issues for owners of subsidized affordable housing.	In the case of individually-metered properties where tenants pay utility bills, the landlord has no incentive to pay for efficiency improvements.	In the case of individually-metered properties where tenants pay utility bills, the landlord has no incentive to pay for efficiency improvements.	In the case of individually-metered properties where tenants pay utility bills, the landlord has no incentive to pay for efficiency improvements.	May be possible to pass costs onto tenants, but rare in practice	In the case of individually-metered properties where tenants pay utility bills, the landlord has no incentive to pay for efficiency improvements.
Underwriting	Some programs use alternative underwriting, which may be less restrictive than a full review of the borrower's financials. However, underwriting varies by program.	Standard underwriting	Standard underwriting	Standard underwriting	May be alternative; may rely on customer bill payment history	Depends on program
Debt Restrictions	Senior lien holders may not provide consent.	Avoids debt restrictions if energy efficiency financing can be incorporated into overall first-mortgage financing, but may add complexity to the process.	Senior lien holders may not provide consent, though that may be of less concern than a first-position lien.	Debt instrument; may impact existing debt covenants	Some variations may be considered non-debt, though proper accounting treatment remains uncertain.	Some variations may be considered non-debt, though proper accounting treatment remains uncertain.
Financing Cycles	May be easier to use C-PACE for stand-alone projects (e.g., projects that only include energy improvements)	Leverages financing cycles but doesn't cover stand-alone projects	Can be used in conjunction with financing cycles; also available for stand-alone projects	Can be used in conjunction with financing cycles; also available for stand-alone projects	Easier for stand-alone projects	Easier for stand-alone projects