

Current Practices in Efficiency Financing: An Overview for State and Local Governments

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Acronyms

ARRA-American Recovery and Reinvestment Act

CAEATFA-California Alternative Energy and Advanced Transportation Finance Authority

C&I-Commercial and Industrial

C-PACE-Commercial Property Assessed Clean Energy

DTI-Debt-to-income ratio

ECM-Energy conservation measure

EE-Energy efficiency

EEM-Energy efficient mortgage

ESA-Energy Service Agreement

ESCO-Energy Services Company

ESPC-Energy Savings Performance Contract

FASB-Financial Accounting Standards Board

FHFA-Federal Housing Finance Agency

FHA-Federal Housing Administration

GSE-Government-sponsored enterprise

HEL-Home equity loan

HELOC-Home equity line of credit

HVAC-Heating, ventilation, and air conditioning

HUD-Department of Housing and Urban Development

IRB-Interest rate buydown

IRS-Internal Revenue Service

ITC-Investment tax credit

LTV-Loan-to-value ratio

MBS-Mortgage-backed securities

MESA-Managed Energy Service Agreement

MUSH-Municipalities, Universities, Schools, and Hospitals

NYSERDA-New York State Energy Research and Development Authority

OBT-On-bill tariff

O&M-Operations and maintenance

PACE-Property Assessed Clean Energy financing

PV-Photovoltaic

R-PACE-Residential Property Assessed Clean Energy

TELP-Tax-exempt lease purchase agreement

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Executive Summary

In recent years there has been significant growth in the size and sheer number of energy efficiency financing programs. The term “energy efficiency financing” refers to debt or debt-like products that support the installation of energy efficiency measures by allowing costs to be spread over time. The implementation of the American Recovery and Reinvestment Act (ARRA) led to a proliferation of energy efficiency financing programs, which was followed in subsequent years by the launch of green banks in several states and the ramp up of other ratepayer-supported financing initiatives in various jurisdictions. These activities have brought increased attention to energy efficiency financing as an area of programmatic interest. Yet the propagation of various types of financing in a growing number of markets may have also left some policymakers and program administrators with questions as to what categories of products and programs are best suited for their situation.

Objectives

Though circumstances for efficiency financing programs vary widely, this report supports decision makers in answering those questions by offering an overview and key insights into the use of specific types of customer-facing financing products (i.e., financing between a lender or program administrator and the customer). Specifically, it provides state and local government decision makers with:

1. A typology of financing products,
2. An overview and characterization of current energy efficiency financing products and activity, and
3. Information and decision support regarding the features and relative merits of efficiency financing approaches in different market sectors.

These resources provide a context to help state and local governments review any current efficiency financing efforts they may be engaged in and assess options going forward taking into account their energy efficiency policy objectives. The next section lays out a typology of efficiency financing, giving a framework for understanding the advantages and disadvantages of different products.

Typology of Energy Efficiency Financing Products

In this report, we distinguish between “traditional” financing products (e.g., loans and leases) that are commonly used to pay for energy efficiency as well as many other goods and services, and “specialized” products (e.g., PACE and on-bill financing products) that are specifically designed to support energy efficiency and other clean energy installations and to overcome market barriers (see Figure ES-1).¹ Examples of strategies to overcome barriers include flexible underwriting that is not necessarily tied to traditional credit metrics, the ability to pass through certain costs to tenants, the ability to transfer a loan from one building owner to the next, and savings guarantees. In contrast, traditional financing products may be much more familiar to customers and contractors given their common use in other contexts, although they typically do not include features offered in specialized efficiency financing products that are designed to mitigate specific barriers. Below is an overview and characterization of the product types that fit within this typology.

¹ The focus of this report is on primary market financing products that are customer-facing and support the initial installation of end-use efficiency measures. See [“Accessing Secondary Markets as a Capital Source for Energy Efficiency Finance Programs”](#) for more information on secondary market financing approaches that involve investor purchases of cash flows from primary market financing vehicles.

Traditional Products

Unsecured lending, including unsecured loans and credit cards, is not backed by collateral that could be used to mitigate a lender's losses in case of non-payment. Benefits of unsecured lending include access to capital for those without home equity and a quick, easy application process. However, the lack of collateral makes these loans generally more expensive than comparable secured loans.

Secured lending, including mortgages, home equity loans, and home equity lines of credit (HELOC), is backed by collateral, usually tied to the property that receives efficiency improvements. This added security allows lenders to charge lower interest rates and offer longer loan terms. It can also result in a longer, more complicated application process compared to unsecured lending or leasing.

Leases, which include *capital leases* (ultimately involving a purchase of leased equipment) and *operating leases* (no purchase is intended at the outset), are agreements under which a lessee (the equipment user) pays a lessor (the equipment owner) for the possession and use of an efficiency measure or measures. Compared to secured loans, leases have a quicker application process and may cover all costs including operations and maintenance. They may have shorter terms than secured loans, though, which could mean higher monthly payments and, for efficiency projects, may only be offered for larger projects.

Specialized Efficiency Financing Products

Certain financing products have been developed specifically with energy efficiency in mind. Examples include on-bill finance, property assessed clean energy (PACE) financing, and various forms of savings-backed arrangements. In some cases, specialized products have played a key role in encouraging greater investment in energy efficiency, such as performance contracting arrangements in institutional and public sector markets.

On-bill financing and repayment arrangements let borrowers pay back the cost of efficiency improvements on their utility bill.² Paying on the bill may be more convenient and familiar. Several different features can be used with on-bill products. These structures can potentially open up access to financing for more people; make for a fast and easy application process; result in a negligible or positive cash flow impact for the borrower; allow borrowers that move to transfer any balance to the incoming occupant; and they may survive a bankruptcy. However, the success of transfers and on-bill loans' ability to survive a bankruptcy or foreclosure are relatively untested features and it is difficult to ensure that a project will be cash flow positive. Furthermore, costs to upgrade billing systems to accommodate these loans can be significant.

Property Assessed Clean Energy (PACE) financing enables participants to pay off clean energy investments through a special assessment applied by their municipality. PACE offers lenders strong security, making long loan terms possible (this can mean lower monthly payments for borrowers). It also uses an alternative underwriting approach that opens up access to financing for more consumers, and it can transfer to a new occupant if a borrower moves before the loan is paid off. PACE has faced significant regulatory challenges but has also generated more loan volume than other types of specialized financing products.

Savings-backed arrangements, including Energy Savings Performance Contracts (ESPC), Energy Service Agreements (ESA), and Managed Energy Service Agreements (MESA), typically involve the service provider (rather than the building owner) assuming the performance risk of efficiency projects by guaranteeing or sharing energy savings.

² *On-bill financing* refers to programs in which public, utility customer, or utility shareholder capital is used as the source of capital while *on-bill repayment* refers to lending arrangements in which private capital providers serve as a program's capital source.

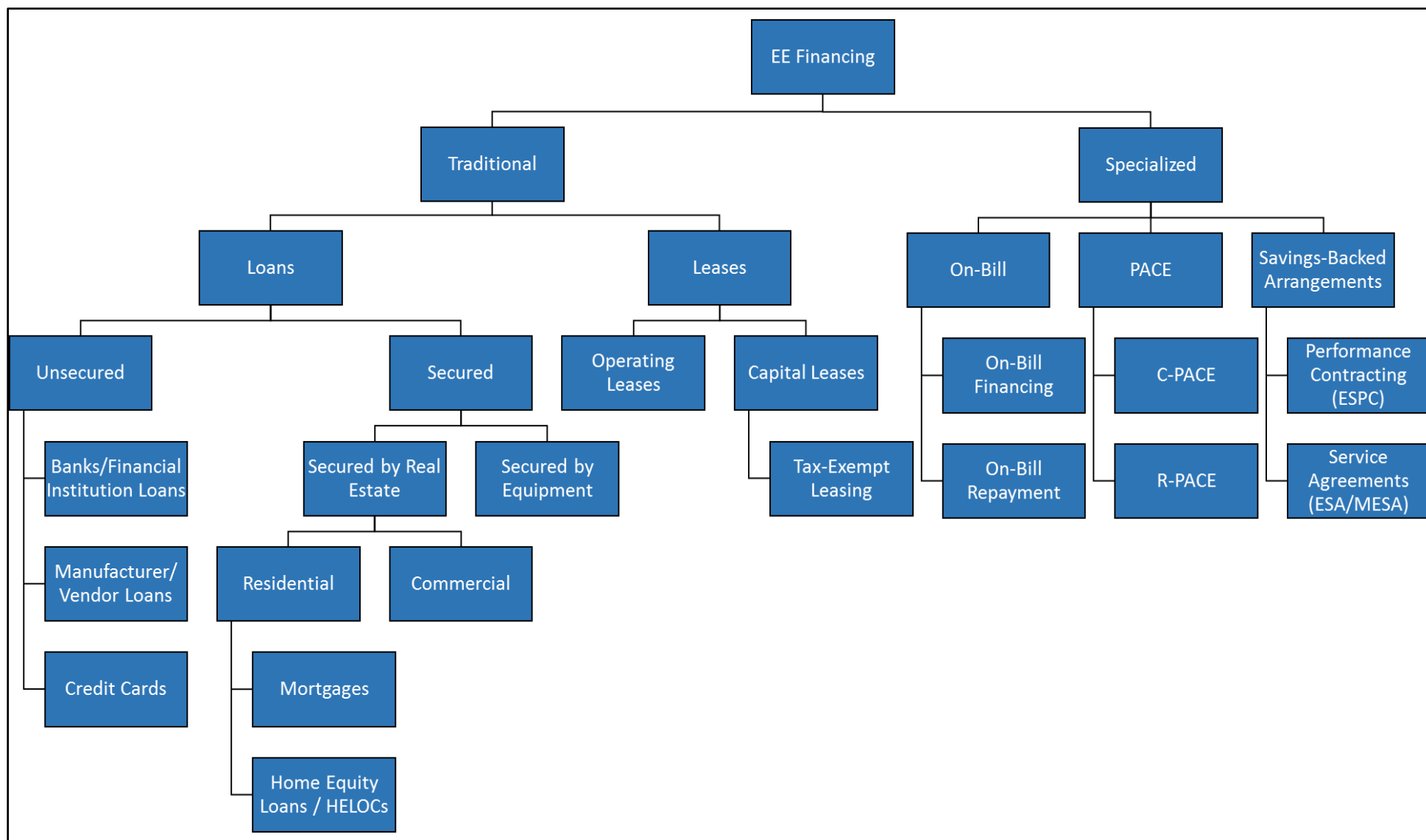


Figure ES-1: Typology of energy efficiency financing products

Energy Savings Performance Contracts (ESPC) are arrangements generally offered by Energy Service Companies (ESCOs) that guarantee some level of energy savings for the customer. Customers typically arrange financing through a third party.³ ESPCs are mostly used in the MUSH sector and, in 2014, facilitated far more investment in efficiency than other specialized financing products (Deason, Leventis, Goldman, & Carvalho, 2016).⁴ They are used for large projects (several hundred thousand dollars and above).

Energy Service Agreements (ESA) and *Managed Energy Service Agreements (MESA)* are agreements between a customer and the ESA or MESA provider who provides financing for the project and delivers energy savings (i.e., negawatt hours) at a negotiated price (less than retail rates for energy services). MESAs are a variant of ESA in which the provider becomes a signer on the customer's utility bill (or bills) and pays the bills directly, keeping the difference between the actual bill and an estimated average bill. Consumers can use ESAs and MESAs to finance efficiency projects with no up-front cost, while minimizing their performance risk and price risk, i.e., the risk that energy prices will increase. ESAs and MESAs are complex arrangements and have supported relatively little investment volume to date.

These financing products can be used to promote energy efficiency by overcoming barriers to investment in efficiency. All financing products help to overcome a major barrier to the uptake of energy efficiency, high up-front costs, by stretching those up-front costs into smaller, more affordable monthly payments. However, there are a number of other barriers to efficiency adoption—which vary from market sector to market sector—and different financing products have been developed to address them as well. The following section looks at market barriers, which barriers impact which market sectors, and provides a quick guide on different financing products that might address different barriers.

Financing and Market Barriers

Certain types of financing products may offer solutions to barriers that impact the way in which customers view the value proposition of energy efficiency. When contemplating various financing options, program administrators and policymakers may want to consider the relative magnitude of each barrier and the potential effectiveness of the proposed financing solution.⁵

It is useful for policymakers and program administrators to assess the types of barriers that are most relevant to customers in specific market sectors. To illustrate, based on our judgment, we highlight the *relative* importance of several financing-related barriers in seven distinct market sectors: single family overall (SF-GEN), low-to-moderate income single family (SF-LMI), affordable multifamily (MF-AF), market-rate multifamily (MF-MKT), small business (C&I-SB), large commercial and industrial (C&I-L), and the Municipalities, Universities, Schools, and Hospitals (MUSH) sector (see Table ES-1).

Filled-in circles suggest that a particular barrier may be especially important in that market sector, while empty circles suggest that the barrier may be relevant but perhaps not paramount. Blank cells do not necessarily imply that the barrier does not exist in that sector, but rather that it may not be important enough to drive the design of an efficiency financing program.⁶

³ Performance contracting is included in our financing typology because financing is typically an essential element of these types of arrangements.

⁴ The MUSH market consists of municipalities, universities, schools, and hospitals.

⁵ It should be noted that none of these financing solutions are likely to be foolproof in their ability to improve the value proposition of energy efficiency.

⁶ This table is intended to be illustrative; stakeholders may wish to conduct a similar exercise in their own jurisdictions. For example, positive cash flow may be especially important in income-constrained market sectors, though it may be a potentially attractive feature in other sectors as well.

Table ES-1: Relative importance of barriers in various market sectors

Market Barrier	SF-GEN	SF-LMI	MF-AF	MF-MKT	C&I-SB	C&I-L	MUSH
Access to Capital ⁷		●	●		●		
Cash Flow	○	●	●	○	○	○	○
Application Process ⁸	●	●	●	○	●	○	○
Owner-Renter Split Incentives ⁹	○	○	●	●	●	●	
Occupancy Duration ¹⁰	○	○	○	○	○	○	
Customer Debt Limits ¹¹		○	●		○	○	●

Efficiency financing can enhance the value proposition of energy efficiency by addressing these barriers:

- **Access to Capital:** All financing products offer and enhance an eligible customer's access to capital and any financing product can be made more flexible via credit enhancement. For example, on-bill financing is sometimes paired with flexible underwriting criteria based on utility bill payment history.
- **Cash Flow:** Conceptually, any financing product may offer cash-flow-positive terms (i.e., projected bill savings will more than cover the added loan payments) to customers, depending on the scope of the project. Interest rates can be lowered and terms extended on any product through credit enhancement, potentially expanding the number of cash flow positive projects. Secured loans and PACE may facilitate positive cash flow projects because the security associated with these products tends to allow for longer terms and lower rates without credit enhancement. Savings-backed arrangements, such as ESPCs and ESAs, tend to be structured so as to be cash flow positive. Some on-bill programs also use cash-flow-positive structures.
- **Application Process:** Unsecured loans and leases tend to have simpler application processes than secured products or PACE, which require determining the value of the collateral and gathering information on existing mortgages. On-bill financing programs that use utility bill payment history as their sole underwriting criteria can often be approved quickly.
- **Split Incentives:** On-bill and PACE are each sometimes discussed as offering potential solutions to the problem of split incentives, though actual examples have not been well documented to date. In theory, on-bill arrangements may allow costs to be repaid by tenants, though whether that could also include passing through of common-area improvements in multifamily buildings, particularly to multiple tenants, is less clear. PACE allows for costs to be passed through to tenants when tenant leasing arrangements include the responsibility to pay property taxes.
- **Occupancy Duration:** Both on-bill and PACE can be structured to transfer to new occupants if borrowers relocate before all loan payments have been made so that tenants can realize the full benefits of energy efficiency projects.

⁷ 'Access to Capital' and 'Cash Flow' are barriers that result from liquidity constraints faced by consumers that may want to invest in efficiency measures. They may not have sufficient capital to pay for energy improvements outright or their cash flow may be constrained, making financing of energy improvements difficult.

⁸ Some application processes to qualify for financing can be sufficiently burdensome that they present a barrier to the use of financing for some consumers.

⁹ If tenants pay their own utility bills, and thus would reap the benefits of an efficiency investment, then building owners have little incentive to invest in efficiency measures. This is known as owner-renter split incentives.

¹⁰ Consumers may be hesitant to invest in efficiency measures that will not pay back during their tenancy. Thus, occupants that rent or own for short durations may not want to invest in energy efficiency measures.

¹¹ There are a number of types of debt limits that could potentially keep a building owner from using financing to pay for efficiency (e.g., maximum debt-to-income ratios and debt covenants imposed by existing lien holders). These could reduce the amount that the building owner can borrow.

- **Debt Limits:** In some cases, certain financing products (e.g., operating leases) may be treated as off-balance-sheet, possibly addressing customer constraints regarding taking out additional debt. Accounting treatment of specialized products is less certain.¹²

The next section gives an overview of how traditional and specialized products may address these barriers.

Traditional vs. Specialized Products

Traditional Products

Traditional products may be more familiar to both customers and financial institutions and may be simpler for program administrators to implement. In some cases, these advantages may be important to the success of a financing program. Certain traditional products, such as unsecured loans and leases, may also offer other advantages such as quick and simplified approval processes.

Traditional efficiency financing products may also have certain disadvantages. For example, some traditional products may not offer rates and terms that allow them to be cash-flow-positive for comprehensive retrofit projects. They also may not address concerns regarding the length of borrower occupancy, split incentives, or balance-sheet treatment.

Stakeholder outreach or other research may be valuable to help determine whether such issues are likely to outweigh the potential advantages of the use of familiar and streamlined traditional products in a given jurisdiction.

Specialized Products

Specialized financing products also offer various potential advantages and drawbacks. They are often considered attractive, in part because they are designed to mitigate or address barriers specific to energy efficiency investments. However, it is important to recognize that specialized efficiency products may not always be preferable to traditional financing products. Opinion Dynamics and Dunskey Energy Consulting recently conducted a survey of California homeowners and found that only three percent of those who had made energy upgrades had paid for them using some form of specialized efficiency financing product.

Using financing can potentially enable more consumers and businesses to invest in energy efficiency. A range of both traditional and specialized financing products is available to address various barriers to the adoption of efficiency. As interest in efficiency financing grows—and the number of efficiency financing initiatives grows—state and local governments should assess these financing products in the wider context of financing products available to their target markets. Understanding the advantages and disadvantages of different product types in specific market sectors can support decision makers in choosing financing products that add the most value for their constituencies.

¹² For information on the advantages and disadvantages off-balance-sheet financing, consult an accounting professional.

1. Introduction: Current Practices in Efficiency Financing

Estimates of untapped, cost-effective energy efficiency potential are in the hundreds of billions in the United States alone (Rockefeller Foundation, 2012) (Booz & Co., 2013). However, as a nation we achieve only a small percentage of this potential (National Action Plan for Energy Efficiency (NAPEE), 2008). Many factors may contribute to this underinvestment in energy efficiency, including a lack of information on the benefits and costs of energy efficiency measures, split incentives between developers and buyers or tenants and landlords, adoption costs or the “hassle” of energy upgrades, and uncertainties over future energy prices or energy efficiency technologies’ performance (Jaffe & Stavins, 1994). The high upfront cost of some energy efficiency measures or projects also limits the adoption of energy efficiency. Financing, which allows consumers to pay these upfront costs over time, is one potential option to enable investment.¹³

The American Reinvestment and Recovery Act (ARRA) provided significant funds for clean energy and energy efficiency. At least 35 states established some form of financing program using ARRA dollars, deploying at least \$650 million of ARRA funds (Goldman, Stuart, Hoffman, Fuller, & Billingsley, 2011). This experience provided significant insights on how financing can support energy efficiency goals and, in many states, emphasized the strategy of attracting private investment into energy efficiency financing programs (Zimring, et al., 2011).¹⁴ In the wake of this ARRA-supported activity, we now understand better how financing can be used in combination with other program design elements to drive customer demand. New financing products have emerged that are tailored to energy efficiency and the role of financing in achieving energy efficiency policy goals has been refined from this experience.

In most states, state and local energy efficiency program budgets have returned to their pre-ARRA levels. In this more challenging funding environment, an increasing number of state and local policymakers are interested in exploring the role that energy efficiency financing can play in leveraging limited resources. Some jurisdictions are testing new approaches in which policy makers have directed administrators to launch large-scale financing programs, often using a combination of public or utility customer funds and third-party private capital.¹⁵ This larger pool of capital would make more loans, leases, and other financing solutions available to customers interested in energy efficiency upgrades.

Objectives

The primary objectives of this study are to provide state and local government decision-makers with (1) an overview and characterization of current energy efficiency financing activity, (2) describe and discuss a typology of traditional and specialized financing products, and (3) provide information and decision support regarding the features and relative merits of these various energy efficiency financing approaches. This snapshot of energy

¹³ Note that while financing may address the first cost and other barriers, without support from policies and program design structures that address other barriers to energy efficiency uptake, financing alone is not sufficient to drive demand for energy efficiency (Fuller, 2008; Kramer, Residential Financing on the Ground: Lessons Learned from Programmatic Examples, 2014).

¹⁴ See also <https://bbnp.pnnl.gov/> for additional information and case studies of programs that integrated financing into their ARRA-funded efforts.

¹⁵ Examples of this approach include: *New York*, NYSEDA requested \$947 million of utility customer funds to capitalize the Green Bank (which came primarily from re-directing uncommitted system benefit charge funds for traditional efficiency programs) (NYSEDA, 2014); *Connecticut*, which advanced a “goal of transitioning programs away from government-funded grants, rebates, and other subsidies, and towards deploying private capital to finance energy efficiency” (Connecticut Department of Energy and Environmental Protection, 2013, p.8); *California*, which allocated \$65 million to launch a suite of statewide energy-efficiency financing pilots to “stimulate deeper EE projects than previously achieved through traditional program approaches” (California Public Utilities Commission, 2013, p.3); *New Jersey*, which proposed a shift of \$200 million away from existing programs and into financing (New Jersey Board of Public Utilities, 2015).

efficiency financing provides context that can help state and local governments review their current efforts and assess options going forward given their efficiency policy objectives. Some states and local governments may choose to administer a program themselves without seeking private capital contributions; some may partner with other actors and seek private capital; and many will choose more than one or a hybrid approach.

Energy Efficiency Financing Products: A Typology

In this study, the term “energy efficiency financing” refers to debt or debt-like products that support the installation of energy efficiency measures by allowing costs to be spread over time.¹⁶ We distinguish between “traditional” financing products (e.g., unsecured and secured loans and leases) and “specialized” products (e.g., PACE and on-bill financing products) that are designed specifically to support energy efficiency and other clean energy installations.

Figure 1-1 provides a typology of energy efficiency financing, using the classification scheme of “traditional” and “specialized” financing products as an organizing framework. Typically, specialized financing products are designed to address specific market barriers that are perceived to hinder greater uptake of energy efficiency. Traditional financing products may be much more familiar to customers and contractors given their common use in other contexts. In some cases, this familiarity and simplicity may offer the advantage of reduced complexity, which can mitigate a barrier to customer investment in energy efficiency.

¹⁶ The focus of this report is on primary market financing products that are customer-facing and support the initial installation of end-use efficiency measures. See [“Accessing Secondary Markets as a Capital Source for Energy Efficiency Finance Programs”](#) for more information on secondary market financing approaches that involve investor purchases of cash flows from primary market financing vehicles.

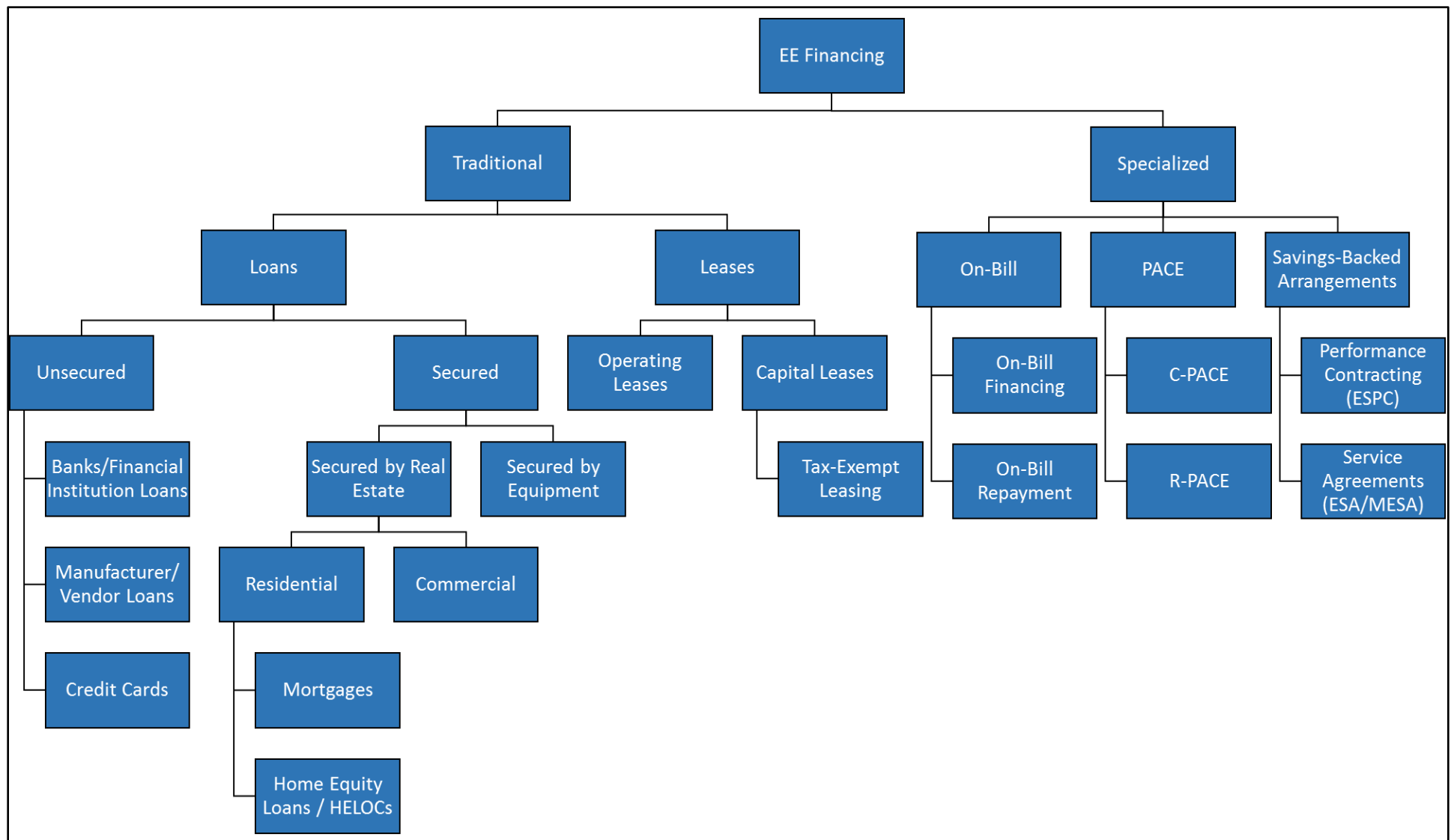


Figure 1-1: Typology of energy efficiency financing products

Traditional Products

Unsecured loans are loans that are not tied to any form of collateral. This means that the lender does not have the legal right to sell any of the borrower's assets in order to recover any unpaid value of the loan. Unsecured loans are typically available from most banks, other traditional private lenders, as well as many manufacturers and vendors of energy efficiency equipment because of their direct integration into the contractor sales process. Consumer credit cards are also a common form of unsecured lending.

Secured loans are financing arrangements that are attached to some form of collateral, typically the property in which the upgrade is being installed or in some cases the equipment itself. Secured lending includes mortgages, home equity loans and home equity lines of credit (HELOC).

Leasing is an agreement under which a lessee (equipment user) pays a lessor (equipment owner) for the possession and use of an asset, either for a fixed period of time or with the intention of ultimately purchasing the equipment. There are two types of leases: operating leases and capital leases. *Operating leases* can be treated as off-balance-sheet expenditures at present, although the Financial Accounting Standards Board (FASB) has recently declared that off-balance-sheet treatment will be phased out beginning in 2018.¹⁷

Specialized Efficiency Financing Products

Certain financing products have been developed specifically with energy efficiency in mind. Examples include on-bill finance, property assessed clean energy (PACE) financing, and various forms of savings-backed arrangements. In some cases, specialized products have played a key role in encouraging greater investment in energy efficiency, such as performance contracting arrangements in institutional and public sector markets.

On-billing financing and repayment are specialized financing structures that allow customers to repay the cost of energy improvements on their utility bill. The specific term "*on-bill financing*" refers to programs in which public, utility customer, or utility shareholder capital is used as the source of capital. "*On-bill repayment*" refers to lending arrangements in which private capital providers serve as a program's capital source.

Property assessed clean energy (PACE) financing allows state and local governments to support energy efficiency and renewable energy improvements on private property through voluntary special assessments that are repaid through property tax bills. PACE is a relatively new financing product that has faced significant regulatory challenges.

Savings-Backed Arrangements, which include Energy Savings Performance Contracts (ESPC), Energy Service Agreements (ESA), and Managed Energy Service Agreements (MESA), typically involve the service provider (rather than the building owner) assuming the performance risk of efficiency projects by guaranteeing or sharing savings.

Energy savings performance contracts (ESPC) are typically offered by energy service companies (ESCOs) and include turnkey, comprehensive services and are facilitated through a combination of financing and savings guarantees. The ESCO provides a savings guarantee directly to the customer; currently, most customers that enter into guaranteed savings contracts with ESCOs arrange financing with a third party financial institution.¹⁸ Performance contracting is included in our financing typology because financing is typically an essential element of these types of arrangements.

Energy Service Agreements (ESA) and *Managed Energy Service Agreements (MESA)* directly offer financing to customers in addition to arranging for the management of efficiency projects. In an *energy service agreement*

¹⁷ See: <http://www.fasb.org/jsp/FASB/Page/BridgePage&cid=1351027207574>.

¹⁸ Historically, ESCOs frequently advised customers on finding financing for their projects. However, the 'Dodd-Frank Wall Street Reform and Consumer Protection Act' of 2010 contains strong restrictions on the role that ESCOs can play in helping customers find financing (Gilligan, 2016).

(ESA), the customer enters into a service agreement with the ESA provider who provides financing for the project and provides energy savings (i.e., negawatt hours) at a negotiated price (less than retail rates for energy services). MESAs are a variant of ESA in which the provider becomes a signer on the customer's utility bill (or bills) and pays the bills directly, keeping the difference between the actual bill and an estimated average bill.

Traditional vs. Specialized Products

Traditional Products

Traditional products may be more familiar to both customers and financial institutions and may be simpler for program administrators to implement. In some cases, these advantages may be important to the success of a financing program. Certain traditional products, such as unsecured loans and leases, may also offer other advantages such as quick and simplified approval processes.

Traditional efficiency financing products may also have certain disadvantages. For example, some traditional products may not offer rates and terms that allow them to be cash-flow-positive for comprehensive retrofit projects. They also may not address concerns regarding the length of borrower occupancy, split incentives, or balance-sheet treatment.

Stakeholder outreach or other research may be valuable to help determine whether such issues are likely to outweigh the potential advantages of the use of familiar and streamlined traditional products in a given jurisdiction.

Specialized Products

Specialized products are often considered attractive, in part because they are designed to mitigate or address barriers specific to energy efficiency investments. However, it is important to recognize that specialized efficiency products may not always be preferable to traditional financing products (see Figure 1-2).

Financing and Market Barriers

Certain types of financing products may offer solutions to barriers that impact the way in which customers view the value proposition of energy efficiency. When contemplating various financing options, program administrators and policymakers may want to consider the relative magnitude of each barrier and the potential effectiveness of the proposed financing solution.¹⁹ They may also want to assess the types of barriers that are most relevant to customers in specific market sectors. Chapter 8 provides a guide to barriers that may be addressed by different financing products and the *relative* importance of several financing-related barriers in distinct market sectors.

¹⁹ It should be noted that no financing solution is likely to be foolproof in its ability to improve the value proposition of energy efficiency.

Traditional and Specialized Financing Products Used by California Residential Customers: Survey Results

Results from a recent study by Opinion Dynamics and Dunskey Energy Consulting suggest that traditional financing products are still more widely used by customers that choose to finance projects. Figure 1-2 provides recent survey results on the use of traditional and specialized products in the California residential sector. Seventy five percent of residential customers that made energy improvements did not use financing. Among the 25% of customers that did use financing, 81% used conventional financing, while only 14% used specialized efficiency financing products.

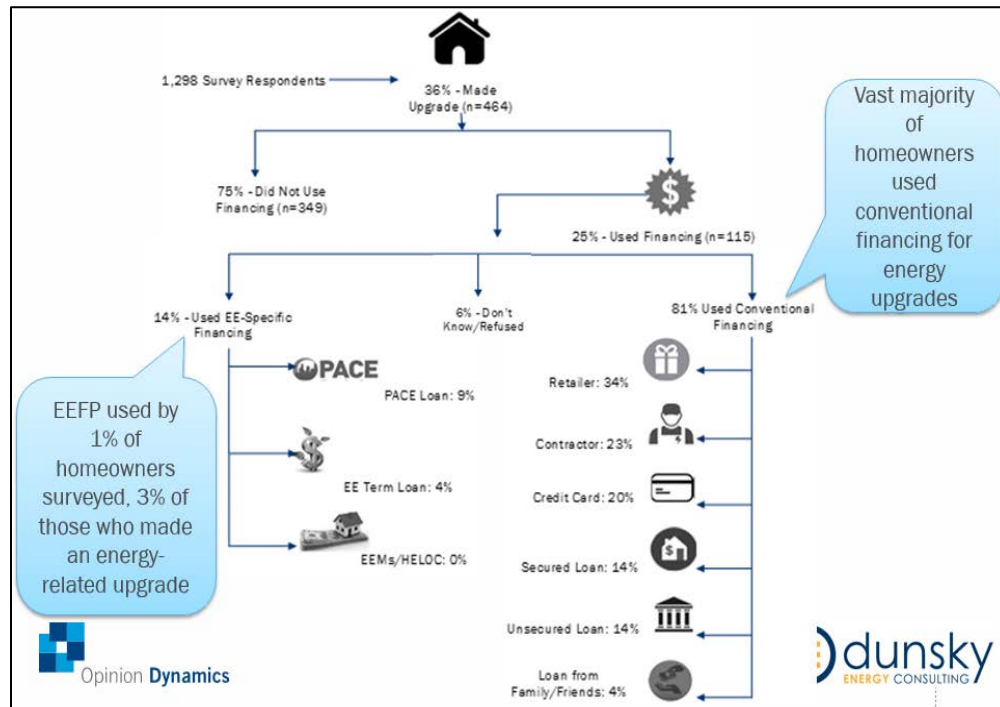


Figure 1-2: Use of traditional and specialized financing products in California's residential sector

Source: Opinion Dynamics, Dunskey Energy Consulting 2015.

Rationales for Offering Financing for Energy Efficiency

Energy efficiency financing programs have evolved to serve a range of public policy and market needs since their inception in the 1970s. Understanding historical motivations as well as new rationales for energy efficiency financing may help state and local officials assess and define their strategic objectives for efficiency financing programs. The following rationales have shaped and influenced *how* policy makers approach the overarching goal of using financing to encourage greater investment in cost-effective energy efficiency:

1. **Affordability.** In the late 1970s and early 1980s, when energy efficiency financing programs were first pioneered as a way to encourage energy efficiency activity, interest rates were much higher than today. One-year treasury bills peaked at over 14 percent interest in the early 1980s and other forms of debt, like home mortgages and credit cards, carried even higher interest rates (Federal Reserve). Given this high interest rate environment, the affordability of energy efficiency improvements—and financing to pay for them—was a key consideration for policymakers and program administrators, leading many to offer below-market rate (subsidized) loans.
2. **Access to Credit.** Some energy efficiency financing programs have been designed with the explicit intent of expanding access to capital among traditionally underserved populations (e.g., small businesses, low and moderate income households). In the years immediately following the housing crisis, this rationale was particularly relevant.

3. **Driving Demand.** Some energy efficiency financing programs are appealing because they appear to remedy tenant-owner split incentives, balance sheet treatment of debt, or long project payback periods for comprehensive retrofits. In theory, consumers that already have access to conventional loan products may be driven to adopt energy efficiency because these specialized products or programs might be more feasible, more attractive or more convenient than traditional financial products.
4. **Increasing Impact by Stretching Public or Utility Dollars.** Interest in financing is part of a broader trend in some states where policymakers and program administrators are looking to leverage private capital in order to stretch the impact of limited program funds, encourage significant cost contributions by participating consumers, and mitigate rate impacts.
5. **Increasing Savings by Transforming Markets.** In recent years, policymakers in several jurisdictions are experimenting with large-scale investments in energy efficiency financing that are intended to mitigate market barriers and recruit large amounts of private capital into the energy efficiency market. These programs aim to eventually transform and scale the market for energy efficiency financing.²⁰

As interest in and the scale of financing programs increases, state/local policymakers need to be aware of key program design issues and challenges confronting program administrators:²¹

- Targeting Consumers
 - Can attractive capital be extended to credit-challenged consumers at “acceptable” risk to those consumers and in a way that delivers low-cost energy savings?
 - How much and in what ways is access to capital a barrier to customers making efficiency improvements, and in which market segments?
- Driving New (Additional) Demand
 - Is financing an effective tool for driving consumer adoption of energy efficiency? For which consumers and at what cost?
 - Do public- or utility-supported financing offers generate additional demand for energy efficiency, or do they simply displace investment that would have happened through existing traditional financial products (e.g., a home equity line)?
- Features of Financial Products
 - Are specialized efficiency financing products (e.g., PACE, on-bill loans) more effective in overcoming barriers to energy efficiency adoption than traditional financing products?
 - What is the relationship between loan terms and design features offered to consumers and adoption rates of energy efficiency technologies?
- Interaction with Existing Efficiency Programs
 - How does financing interact with and complement existing efficiency program designs that utilize rebates, technical assistance, etc.?
 - Is their demand- and savings-stimulating effect greater in aggregate than separately?

Post-Recovery Act Financing Players

As energy efficiency financing matures, we observe a more diverse mix of actors and participants:

1. **State and Local Governments** remain active in energy efficiency financing, with many hundreds of millions of public dollars managed by state and local agencies available to finance clean energy projects in

²⁰ See SEE Action report, “Making it Count: Understanding the Value of Energy Efficiency Financing Programs Funded by Utility Customers” for more information on this concept and an exploration of early regulatory oversight efforts.

²¹ “Getting the Biggest Bang for the Buck Exploring the Rationales and Design Options for Energy Efficiency Financing Programs” explores these rationales in more detail and also guides readers through a line of questioning designed to understand what problem financing can solve and how progress can be assessed.

various market sectors.²² State and local governments frequently offer unsecured loans from revolving loan funds or loan loss reserves to support private lenders (see Chapter 2 – Unsecured Loans).

2. **Utilities** administer a range of financing programs including on-bill financing loan programs (see Chapter 5 – On-Bill Finance). These programs are typically offered to increase the impact of other utility-offered energy efficiency programs (e.g., rebates, technical assistance).
3. **Private Firms**²³ offer financial products that can be used for a range of activities, including energy efficiency. While it has not been quantified, it is likely that the majority of energy efficiency activity is either (1) paid for without the use of financing or (2) is financed without oversight or involvement of public (e.g. state/local governments) or utility sector. For example, a homeowner completing a major home remodel may also increase wall/floor insulation and replace windows or a commercial building owner may do a lighting retrofit upgrade as part of remodeling retail or office space for a new tenant. Private market activity is important to understand when designing a public- or utility-supported program, as these offerings will inevitably interact with financing options available from the private market. Many jurisdictions aspire to use public-supported financing only when there is a demonstrated “market gap” where the private market for financing is not adequately serving demand for energy efficiency upgrades.

Other *specialized* private firms offer energy efficiency financing solutions, sometimes in partnership with a public or utility-sector administrator (see Chapter 6 – PACE and Chapter 7 – Savings-Backed Arrangements).

4. **Emerging Organizations**, including Green Banks, which we define as standalone public or quasi-public entities created to use existing public funds (e.g., ratepayer funding, greenhouse gas allowance proceeds) to attract private capital to clean energy projects, have also become active. Green Banks are operating currently in several states; there is growing interest in the idea of dedicated clean energy financing agencies as a way to increase savings from energy efficiency activity. To date, Green Banks have offered a range of financial products, from unsecured loans to energy savings agreements.

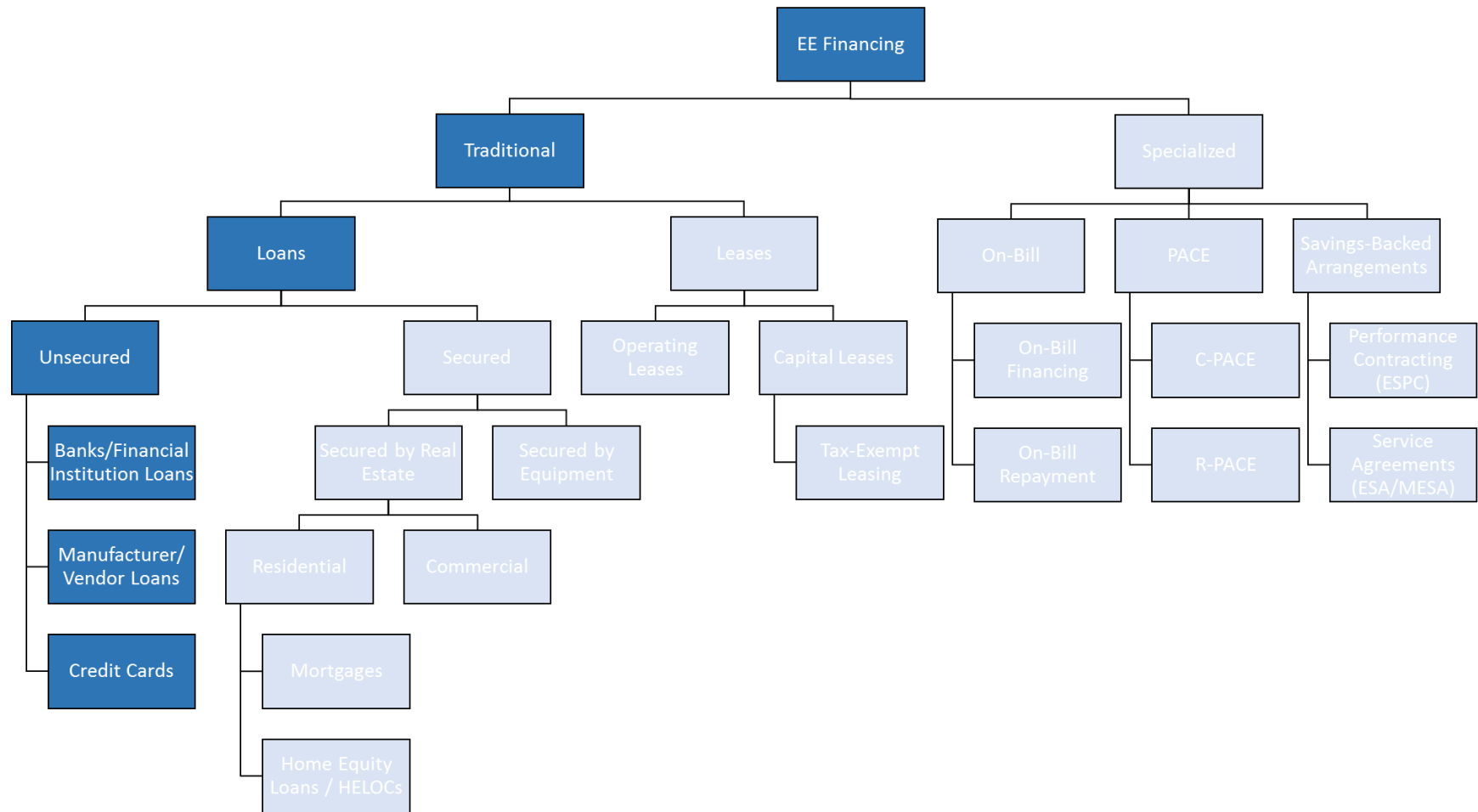
Report Organization

The remainder of this report is organized as follows. Each chapter can be read as a stand-alone piece. Chapters 2 through 4 focus on traditional financing structures that can be used for energy efficiency: unsecured loans (Chapter 2), secured loans (Chapter 3) and leases (Chapter 4). Chapters 5 through 7 discuss financial products that are specialized for energy efficiency, including on-bill loans (Chapter 5), property assessed clean energy financing (PACE) (Chapter 6), and savings-backed arrangements (Chapter 7). Finally, Chapter 8 discusses the relative merits of efficiency financing approaches and how they can be used in different sectors.

²² Total dollars deployed may be larger than this, due to leverage from private capital partners.

²³ Many state/ local government or utility programs utilize private capital, however these efforts have a more public character (e.g., authorized by federal/state legislation, overseen by state regulators that regulate electric utilities). In contrast, fully private sector financing activity takes place without the knowledge, influence, or oversight of any public or quasi-public financing program administrator.

Unsecured Loans



2. Unsecured Loans

Key Takeaways

- Unsecured loans are widely used in energy efficiency financing. Consumers frequently use unsecured loans for reactive measures (e.g., HVAC replacement when equipment breaks down), in part due to shorter application processes and no collateral appraisal or lien requirements.
- Because they have no collateral, unsecured loans carry higher interest rates than comparable secured loans (e.g., home equity lines of credit, mortgages).
- Unsecured loans have been used by a range of program administrators including state and local governments, utility-sponsored programs, and private sector entities. All market segments have been reached with unsecured loans.
- The largest unsecured loan programs have reached hundreds of millions of dollars in scale.
- Participation rates as percent of total eligible consumers remain low.
- Unsecured loan interest rates vary; some program administrators choose to reduce interest rates in the hopes of attracting more consumers. Both programs with below-market interest rates and with higher interest rates (e.g., 6-8%) have achieved significant volume.
- Unsecured loans are often used to finance single-measure upgrades rather than comprehensive whole-home projects.

What is Unsecured Lending?

Unsecured loans are not secured against collateral, meaning the lender does not have rights to the borrower's assets if the borrower does not make their loan payments. There are many types of unsecured loan products that may be used to support energy efficiency projects, including credit cards, personal or "signature" loans from a bank, and unsecured financing offered by equipment manufacturers, vendors, retailers or contractors. Unsecured lending is common outside of energy efficiency, including credit card purchases and student debt.

Why Unsecured Lending?

Given the lack of collateral, interest rates on unsecured loans are generally higher than those on secured loans. Generally efficiency programs that employ unsecured lending bring down interest rates or extend loan terms through credit enhancements (e.g., a loan loss reserve to decrease lender risk) or interest rate buydowns. The more attractive loan terms, as compared to market rate products, may encourage consumers to choose more efficient equipment through the program. Nonetheless, unsecured loans may offer a number of advantages for energy efficiency, including:

- Unsecured loans are often less complicated to process and can be done more quickly than secured loans. An unsecured loan product may help reduce transaction barriers, which can be an important consideration in facilitating energy efficiency projects (see sidebar titled "Keystone HELP").²⁴
- Some borrowers may not have sufficient equity in their home or commercial assets to qualify for a secured loan. Figure 2-1 shows the share of homes with negative equity by state as of Q4 2014. Offering an unsecured loan product may broaden access to financing for borrowers in this category. National

²⁴ Some energy efficiency financing programs that primarily use secured loans have achieved high volumes, which may raise questions as to whether processing times for secured loans necessarily inhibit deal flow. These issues are discussed in more detail later in chapter 2 and chapter 3 (secured loans).

studies also suggest that about 20% of homeowners with mortgages have less than 20% equity in their home, which is a typical threshold used to determine whether a homeowner could access a mortgage (CoreLogic, 2014).

- Some borrowers may not want to place other assets (such as a home or commercial building) at risk. An unsecured option may be more attractive to these borrowers, reducing one potential barrier to energy efficiency adoption.

With these advantages in mind, program administrators often choose to provide credit enhancements and reduce unsecured lending rates to customers while retaining the other features of this financial arrangement that are attractive.

How Have Unsecured Loans Been Used?

Unsecured loan programs are a relatively straight forward option for financing energy efficiency; unsecured loans for efficiency-related projects are widespread in the United States. Many unsecured loan programs are relatively small (i.e., in the tens of millions of total volume), although a few well-known programs have grown to larger volumes. Loan programs with large dollar volumes may not necessarily signal broad market penetration. Most efficiency financing programs “have reached only a very small subset of property owners” (Palmer, 2012).

Market Segments

Many of the nationally recognized unsecured loan programs focus on the residential sector. Many employ credit enhancements or interest rate buydowns to improve loan terms. Examples include:²⁵

- **Massachusetts HEAT Loan:** The HEAT loan program offers 0% financing available over a seven-year term. Loan capital is provided by a network of over 70 local banks and credit unions providing

Keystone HELP

The Keystone HELP Program has provided over \$100 million of financing to more than 13,500 Pennsylvania homeowners since 2006. Peter Krajsa, EVP of Renew Financial, and former CEO of AFC First (the program manager which Renew acquired in 2015), credits the program’s success, in part with its ability to address the “financing twilight zone” of projects between \$3,000 and \$15,000 that are too big for credit cards but too small for home equity lines. Keystone HELP provides a convenient, fixed-rate, contractor-driven financing offer to address this gap. Keystone HELP loans are a fixed APR, typically 4.99% to 7.99% for equipment replacements, with terms up to ten years. Renew Financial has invested in instant credit approval and online or over-the-phone contractor portals where documents can be uploaded to streamline approvals and make it as convenient as possible for homeowners facing emergency equipment replacements as well as comprehensive energy upgrades to consider energy efficient alternatives.

Negative Equity Share by State Q4 2014

Negative Equity Share as of Q4 2014

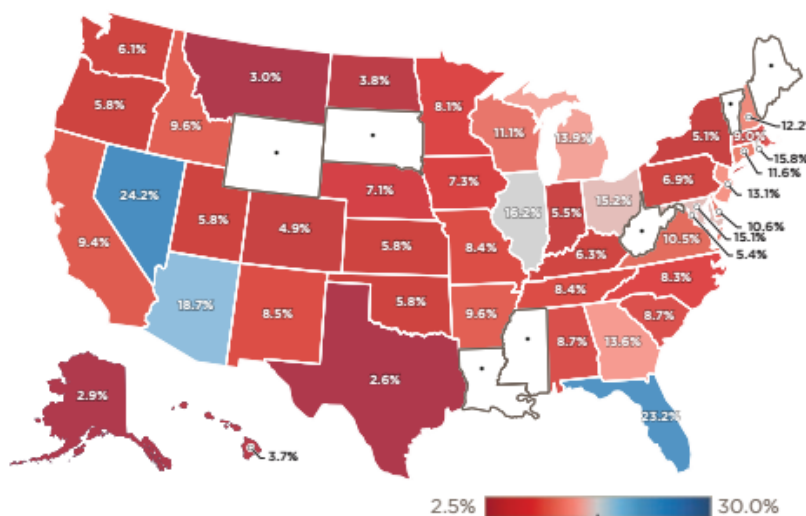


Figure 2-1: Share of homes with negative equity as of Q4 2014
Source: CoreLogic

²⁵ Some loans in these portfolios may include a UCC lien. These liens are effectively used as disclosure to future buyers that the equipment has an unpaid loan on it. They are unlikely to lead to the recovery of the property for a lender in case the loan is not paid. (Brown & Braithewaite, 2011)

capital at a starting rate of 5%; utility customer funds are used to buy interest rates to consumers down to 0%. The HEAT loan is one of the largest unsecured loan programs nationally, with recent annual volumes in the range of \$100 million.

- **Pennsylvania’s Keystone HELP program:** The Keystone HELP program has made approximately \$100 million of residential unsecured loans. Loans were initially capitalized by State Treasury funds and later by the Warehouse for Energy Efficiency Loans (WHEEL) turnkey financing program.²⁶ Pennsylvania is now offering loans through national financing solution through energyloan.net.
- **New York’s Green Jobs Green New York “Smart Energy” loan:** The Smart Energy Loan is an off-bill unsecured residential option offered alongside on-bill repayment program as part of the Green Jobs Green New York initiative. The future status of the program is somewhat uncertain and may evolve depending on the outcome of New York’s “Renewing the Energy Vision” and NYSEDA’s “Clean Energy Fund” proposals.
- **Michigan Saves:** Initially supported with ARRA funding, the Michigan Home Energy Loan Program is now an ongoing statewide program supporting residential energy efficiency improvements with a loan loss reserve, contractor network, network of lenders, and marketing and outreach. Since 2011, nearly \$30 million of residential loans have been originated. Loans are offered at or below 7% interest for up to 10 years.
- **Sacramento Municipal Utility District (SMUD) Residential Loan Program:** Offered since the 1980s, the SMUD Residential Loan Program offers both secured and unsecured loans for home energy upgrades. Unsecured loans are offered at 11% and can be used for building insulation, duct testing, duct sealing, and other envelope improvements. Nearly \$500 million of loans have been originated since 1987.

Other well-established programs focus on non-residential markets, including:

- **Texas LoanSTAR Program:** Operated by the State Energy Conservation Office for over 20 years, LoanSTAR’s \$162 million revolving loan fund program has provided nearly \$400 million in 3% interest unsecured loans to over 200 government agencies, schools, and hospitals. The program is available to any public entity in Texas.
- **Nebraska Dollar and Energy Savings Program:** Established in 1990, Nebraska’s Dollar and Energy Saving Loan Program is a \$37 million revolving loan fund that has supported over 28,000 energy efficiency upgrades in the residential, municipal, agricultural, small business and industrial sectors. The loan fund coordinates with a network of over 250 lenders to co-invest zero percent interest funding with market-rate loans, resulting in a blended interest rate to borrowers ranging from 2.5 percent to 5 percent.

Turnkey Solutions

Efforts to scale up energy efficiency financing have spurred some new unsecured lending options that operate as “turnkey” solutions across multiple jurisdictions around the country. Two models in this category are the residential programs offered by 1) the Warehouse for Energy Efficiency Loans (WHEEL) administered by Renew Financial and supported by the National Association of State Energy Officials (NASEO) and the Energy Programs Consortium (EPC), and 2) Kilowatt Financial (now a part of Spruce). Both of these models offer standardized loan programs designed to minimize program design work needed from participating jurisdictions. These programs are also intended to appeal to secondary market investors, who can provide large amounts of capital at rates that may be the most attractive option at very large scales. In the short run, however, the costs of these programs may be higher than those of some other options (see *Financing Energy Improvements on Utility Bills* (State and Local Energy Efficiency Action Network, 2014) for more information).

²⁶ Keystone HELP loans make up a large majority of WHEEL Loans, but the program is no longer participating in WHEEL. See WHEEL case study in (State and Local Energy Efficiency Action Network, 2015)

Typical Structures

Unsecured loan programs have been administered in various ways. In some cases, they have operated purely as revolving loan funds seeded with public or ratepayer capital and administered by a state agency or utility. In other cases, private sector lenders have been recruited as program partners to augment public resources. One of the advantages of unsecured loan programs is that they are relatively simple for local lending partners to understand and participate in. Often, the partnership simply involves an agreement that a government or utility partner will cover some portion of loan losses in exchange for lenders offering more favorable terms or flexible underwriting to facilitate energy efficiency projects

Typical Rates and Terms

Unsecured lending rates and terms vary widely depending on the capital source, type of lender, underwriting criteria, borrower characteristics, and credit enhancements (if offered). Typically there is significant flexibility in setting rates and terms when public or ratepayer money is used as a capital source, and returns in the low-to-mid single digits may be sufficient to cover costs of any third-party vendors hired to handle aspects of loan administration. However, in some unsecured loan programs, lending could reach a scale beyond the available amount of capital from public or ratepayer sources, in which case private capital may be needed to fund the program. Some private companies have developed turnkey solutions to help programs attract private capital (see sidebar titled “Turnkey Solutions”).

Rates and terms also vary significantly among private lenders. In some cases, local lenders such as community banks and credit unions may offer the lowest rates for unsecured loan programs, with rates in the single digits and loan terms up to 10 years or longer. Some larger institutions offer rates comparable to those offered by local banks and credit unions, but several larger lenders active in the energy efficiency space have historically required higher rates of return (e.g., Fannie Mae, GE Money).

Design Options

Issues to consider when designing an unsecured energy efficiency loan program include:

Program administration. Who administers the program, and what role(s) should the state and local actor take on?

Options include direct public agency administration, working with a utility or other ratepayer-funded program administrator, partnering with a third-party organization (e.g., a nonprofit agency), or participating in a multi-jurisdictional turnkey model (see sidebar “Turnkey Solutions”). Programs that are overseen and “administered” by state or local entities may still rely upon local or national financing entities to provide capital and handle other

GEOSmart Financing Clearinghouse

The Electric Gas and Industries Association (EGIA) facilitates the GEOSmart financing clearinghouse, which offers loans to residential and commercial customers with no public or utility-customer funded support. GEOSmart works with a network of over 2,500 contractors, manufacturers, and distributors to train them on how offering financing can increase business and enable more high-efficiency projects. In 2014, GEOSmart surpassed \$1 billion of loans originated.

Capital for the GEOSmart clearing house comes from many major capital providers including Wells Fargo and Enerbank. Participating contractors can choose among offers from participating lenders. Participating contractors may also receive incentives from manufacturers to incentivize sales of high-efficiency equipment.

GEOSmart focuses on contractor relationships and training and seamless application processes. Most GEOSmart loans can be completed by phone or using an iPad. Funds are available within 24-48 hours. Most GEOSmart loans have been used for solar or geothermal heat pumps (approximately 40% of projects) or for HVAC systems (approximately 50% of projects). FICO scores have ranged from 700-780 depending on project type.

aspects of loan administration. Larger national institutions may offer turnkey solutions that reduce administrative hassles and may reduce time and dollars spent on program design. At the same time, local partners may in some cases offer lower rates and potentially have more established relationships in the community that can potentially be leveraged.

Capital source. Where should the capital come from for the loan program? Should state or local funds be lent out directly, or used to attract private capital from other sources?

Direct lending of public or ratepayer capital typically allows for the most flexible and attractive rates, terms, and underwriting criteria to be offered. However, budget constraints may require that programs access private capital if the volume of lending activity increases significantly (see Sidebar titled “GEOSmart Financing Clearinghouse,” for example).

Credit enhancements. If private capital is used, how can public or ratepayer funds be used most effectively to reduce credit risks and improve loan terms?

“Loan loss reserves” refers to a fund available to cover some portion of losses associated with non-payment of loans —typically a small percentage of any portfolio. Such reserves or commitments have been used effectively to bring down customer financing charges by several percentage points. In the cases that we have examined, these commitments appear to present relatively low risk to program administrators. Additional “interest-rate buy-downs” (i.e., direct payment of interest costs on every individual loan) may be needed in some cases, but this will increase program costs. Currently, there is little empirical data available on the correlation between interest rates and energy efficiency market activity. If significant expenditures are planned to reduce interest rates below market rates, then it may be advisable to consider a formal impact evaluation on the effectiveness of such a strategy.²⁷

Rates and terms. What rates and terms are most attractive, practical, or achievable in the context of both program goals and program constraints?

The flexibility to determine rates and terms generally depends on the capital source being used. Public and ratepayer capital can generally be lent out more flexibly than private capital, but is often limited by budget constraints. Some of the larger programs that use unsecured financing are focused on driving rates down at very large scales by accessing capital from secondary market investors. These efforts are still in their early stages (State and Local Energy Efficiency Action Network, 2015).

Underwriting criteria. What factors should be used to determine borrower eligibility for the loan?

Underwriting borrowers of unsecured loans typically involves examining traditional lending criteria (e.g., the borrower’s overall creditworthiness, expected income available to pay ongoing loan obligations). As energy efficiency loan performance has generally been strong, it may be possible to expand access by establishing flexible underwriting criteria (e.g., utility bill payment history, reduce minimum credit scores) either using public/ratepayer capital or negotiating with private lenders. In the case of private lenders, more flexible underwriting may correlate with higher rates for individuals or portfolio-wide in order to cover higher risks, though credit enhancements may also help cover these risks. Risks to credit-challenged customers should be considered from a consumer protection standpoint. Little public information is available specific to the long-term performance of loans made to credit-

²⁷ For example, the Energy Trust of Oregon conducted an impact evaluation of interest rate buydowns done as a part of their State Energy Loan Program (SELP). For more see (Kunkle, Waterman-Hoey, & Dethman, 2004).

challenged customers.²⁸ As such, flexible criteria should be established carefully and prudently, with ongoing monitoring of loan performance for credit-challenged customers.

Application process. Who can originate the loans, and how does the process work?

Unsecured loans can often be “pre-approved” very quickly, particularly in the residential sector. In some cases, lenders may choose to pre-approve applications based only on information provided by the customer, which can speed up the pre-approval process. A credit check and income verification will generally follow, but even these underwriting processes are typically simpler and more streamlined than those required for secured lending. In some cases, certain financial institutions will qualify contractors to originate financing arrangements directly with the customer, which means that loans can be originated almost immediately. Other financial institutions prefer to maintain direct relationships with their customers without introducing contractors as an intermediary.

How State and Local Actors Can Get Involved

One of the most common ways that state and local actors can get involved in supporting unsecured loan products for energy efficiency is by taking actions that make these loans available to customers at the time repairs are needed or improvements being considered as well as making the loan terms more attractive (e.g., with lower rates, longer terms that lower monthly payments, or more flexible underwriting criteria). Typically state and local actors attempt to make loans more attractive by either reducing the risk on an overall portfolio of unsecured loans or by paying some of the financing costs associated with taking out an unsecured loan.

Credit Enhancements and Subordinate Capital

State and local actors can reduce the risk of a loan portfolio by offering a loan loss reserve to cover some or all of the losses that a lender might experience. A guarantee can also reduce risk to lenders, wherein a state or local actor commits to paying for all or part of a lender’s losses, without necessarily establishing a dedicated account for this purpose. A third option involves a state or local actor (or similar entity) actually providing funds to be lent out along with funds from a private lender, with a commitment that any losses will first impact the returns on the state or local capital (often called “first loss” or “subordinate” capital). Some “turnkey” programs offered by private companies across multiple jurisdictions (e.g., WHEEL) involve this type of arrangement with various state and local actors.²⁹

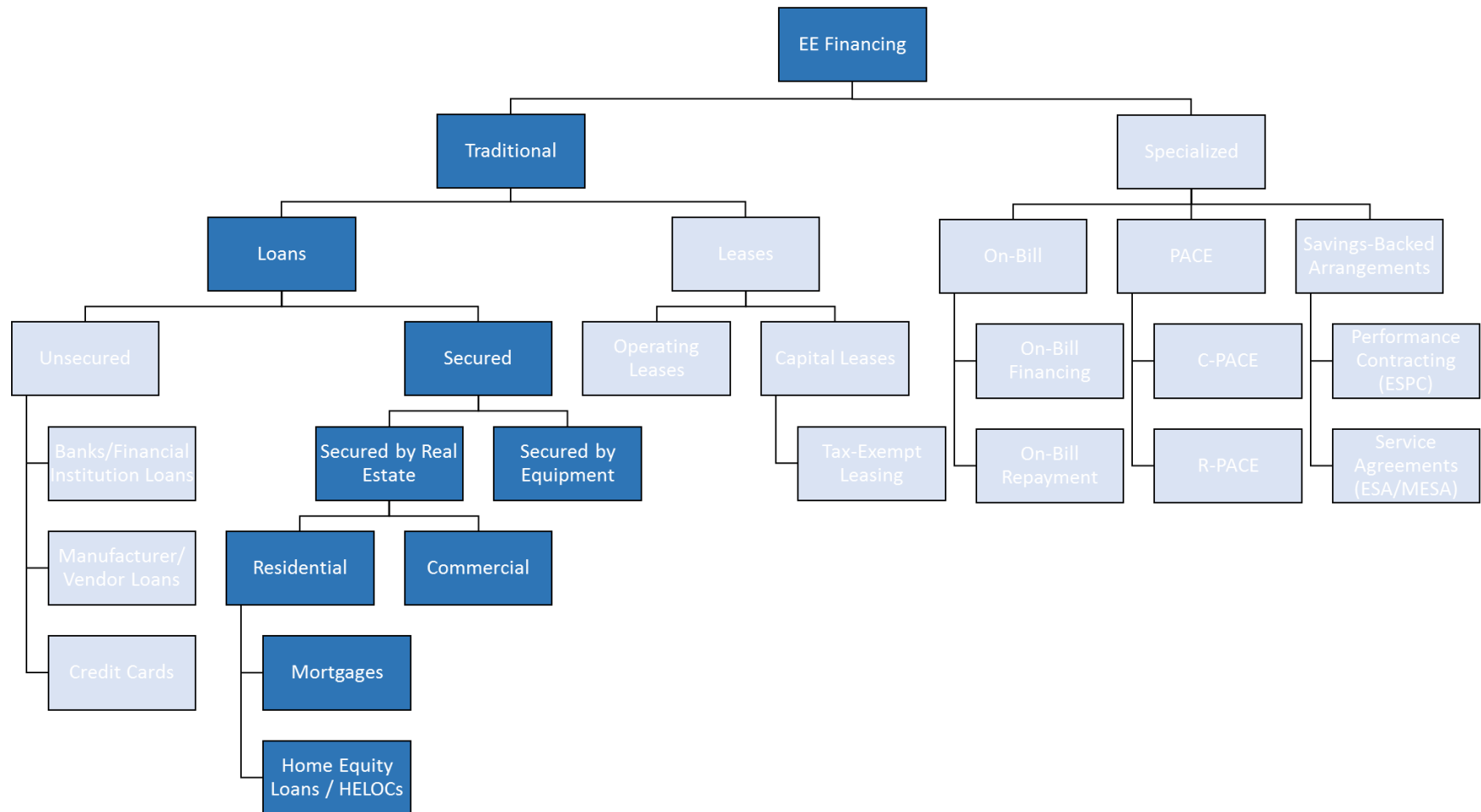
Interest-Rate Buy-Downs (IRB) and Other Cost Reductions

State and local actors may also pay some of the financing costs associated with loans for energy efficiency projects. A common way of doing this is by paying directly for some or all of the interest costs charged by a particular lender. These interest rate buydowns (IRB) are typically structured so that the borrower sees a reduced rate that accounts for the fact that the state or local actor will be paying some of the interest costs. State and local actors may also reduce financing costs by paying other costs (e.g., application or processing fees) that may be associated with unsecured loans or by directly assuming some of the responsibilities of loan program administration.

²⁸ Loan performance on longer-lived loans is exposed to and may be impacted by multiple economic cycles. This may affect how secondary markets view such loans, a fact that program administrators should consider when designing an efficiency financing product. (State and Local Energy Efficiency Action Network, 2015)

²⁹ The Warehouse for Energy Efficiency Loans (WHEEL) is a large scale capital provider for loans offered through energy efficiency programs. (National Association of State Energy Officials, 2016)

Secured Loans



3. Secured Loans

Key Takeaways

- We use the term “secured loan” to refer to a loan secured by real property such as a conventional mortgage.
- For residential consumers, secured loans typically may offer lower interest rates than other forms of energy efficiency financing. For commercial and industrial customers, secured loans present challenges, since buildings have complicated existing financing structures that make it difficult to add new secured interests. Given these drawbacks, secured lending may be most appropriate for the residential sector.
- Because the collateral that secures a loan can reduce a lender’s losses if a loan is not repaid, secured loans are often offered at lower interest rates than equivalent unsecured products.
- Secured loans may take longer to execute and have higher transaction costs than some other energy efficiency financing products.
- An energy efficient mortgage (EEM) expands underwriting to take into account the increased cash flow resulting from efficiency improvements. Although EEMs have been offered by number of Federal Agencies and Government-Sponsored Enterprises, to date, uptake of these products has been modest.
- Home equity loans and home equity lines of credit (HELOC) are often used for home improvements and renovations. These are points at which homeowners may consider energy-related improvements and, thus, may represent a leverage point for convincing homeowners to take on an efficiency improvement or add to one that they were already planning.

What is a Secured Loan?

Secured loans give a lender the right to take possession of a specified asset (collateral, which is usually property or equipment) belonging to a borrower if the borrower defaults, such as by not making scheduled payments on the loan. A lien is placed against the collateral property by the lender when the loan is extended. This security mitigates a lender’s losses in case of a default and can also decrease the risk of default since the loss of collateral can be a significant consequence to the borrower.

To ensure that the collateral—and the transaction costs of turning the collateral into cash in the case of a default—is sufficient to offset a lender’s risk, lenders generally lend only part of the value of the collateral asset. The difference, paid for by the borrower, is the borrower’s equity in the asset (i.e., “down payment”). The amount of the loan compared to the value of the collateral is known as the loan-to-value (LTV) ratio.³⁰

Home mortgages, home equity loans, home equity lines of credit (HELOC), and car loans are four common types of secured loans. For home mortgages, home equity loans, and HELOCs, the home serves as the collateral whereas,

³⁰ If there are other loans secured by the property, the lender may use the Combined Loan-to-Value ratio (CLTV)—the combined loan value divided by the asset value—or the Home Equity Combined LTV ratio (HCLTV), if a Home Equity Line of Credit (HELOC) is secured by the property. The HCLTV combines all loans plus the HELOC credit limit, regardless of the amount outstanding, and divides that by the property’s value.

for a car loan, the automobile is the collateral.^{31 32} Lenders may allow longer terms and more flexible underwriting for a secured loan compared to an unsecured loan.

It is likely that a significant amount of residential energy efficiency is financed through home equity loans, HELOCs, and other secured loans that are not promoted explicitly as energy efficiency loans. For example, a homeowner doing a major renovation or remodel project in their home may include some energy efficient elements in the project and pay for the total project through a HELOC. This investment goes largely undetected by the energy efficiency community. Similarly institutional financing products, such as the Department of Housing and Urban Development's (HUD) Title I Home and Property Improvement Loans, administered by the Federal Housing Authority (FHA), may be used to make energy efficiency upgrades, although they are not designed for energy efficiency specifically.³³

Some private lenders, state and local governments, and federal agencies also offer secured lending products specifically dedicated to promote energy efficiency in the residential sector.

Energy Efficient Mortgages (EEMs): Leveraging a Common Secured Lending Product

Home mortgages are one of the largest loan categories in the U.S. economy in terms of dollar volume. In 2014, over \$1 trillion in mortgages were either originated or refinanced (Forbes, 2015). The conventional residential mortgage instrument is highly standardized, and this factor contributes to the robust secondary market among institutional investors. The conventional residential mortgage typically does not account for borrower utility expenses or attributes of the house other than confirming total property value through an appraisal.

Periodically since the mid-1980s, various federal agencies have tried to increase and raise the visibility of energy efficiency in the home mortgage process. A number of secured loan products with an energy efficiency focus have been tried. These products are often deemed Energy Efficient Mortgages (or EEMs). Typically, the loan allows a borrower to add debt to their mortgage—either at the time of purchase of the house or when the property is refinanced. The additional amount is used to finance energy-related improvements. EEMs have been sponsored by the Federal National Mortgage Association (Fannie Mae), HUD, the Federal Home Loan Mortgage Corporation (Freddie Mac), the US Department of Veterans Affairs, and the US Department of Agriculture (Kolstad, 2014). An EEM expands underwriting to take into account the increased cash flow resulting from efficiency improvements and may also provide cash incentives for costs involved in the process (Farhar, 2000). EEM products may apply to a first time mortgage, a refinancing, or both.³⁴

Green Mortgage-Backed Securities (Green MBS)

The overall market for mortgage-backed securities (MBS) is quite large with issuances of between \$1-2 trillion annually since 2006 (Federal Home Loan Mortgage Corporation, 2015). Conceptually, green mortgage-backed

³¹ Another form of secured loan files a UCC, which is a notice in the public records of a loan tied to specific equipment (not real property) even if lender recovery of the equipment might be uneconomic. These liens mostly serve as disclosure to a new owner that an unpaid loan exists on the equipment and won't likely result in any recovery in cases of non-payment. (Brown & Braithewaite, 2011). UCCs are commonly used with commercial equipment, like a chiller.

³² A HELOC is "a line of credit extended to a homeowner that uses the borrower's home as collateral." Some homeowners may not have built up sufficient equity in their homes for a HELOC to be a viable option for financing an energy improvement (see: <http://www.investopedia.com/terms/h/homeequitylineofcredit.asp>). HELOCs are open for a set amount of time with a set limit of credit at a variable interest rate. The funds can revolve as they are repaid by the borrower. Home Equity Loans are lump sum loans with a fixed interest rate based on a borrower's equity in their home. See <http://www.bankrate.com/finance/debt/home-equity-loan-vs-line-of-credit-1.aspx>.

³³ Until May 2015, the PowerSaver Loan pilot program, which focused on reducing a structure's energy consumption, was an option to add to FHA's Title I loan products. See http://portal.hud.gov/hudportal/HUD?src=/program_offices/housing/sfh/title/ti_about.

³⁴ Energy Improvement Mortgage (EIM) is sometimes used to refer to products that work like an EEM but are used for existing houses or are part of a refinancing.

securities (MBS) are bond instruments backed by pools of mortgages that qualify. A Green MBS product could include EEMs, conventional mortgages and refinancing that support clean energy projects, and conventional mortgages secured by high-efficiency houses. Through a Green MBS, EEMs could access the capital available in the overall MBS market and could potentially reduce the price of borrowing for home owners that want to take on energy efficiency projects. A Green MBS would be analogous to a Green Bond for the housing market³⁵ (Henderson P. , 2015).

In 2014, Fannie Mae began to issue Green MBS through their Green Preservation Plus program (GPP).³⁶ GPP offers a 10 basis point (hundredths of a percent) reduction on affordable multifamily building loans that will be partly used to make efficiency improvements. If the Fannie Mae Green MBS pilot is successful, it could pave the way for Green MBS backed by EEMs in other market sectors.

Home Equity Loans

Home equity loans and lines of credit are financing instruments commonly used for home improvements. Efficiency improvements may often be a part of these improvements and these products may be often be used for emergency replacement of measures like boilers. These loans are typically secured by a lien that is subordinate to the primary purchase money lien and require the borrower to have equity in the home above the loan balance on the primary lien (hence the common name “home equity” loan).

Home equity loans traditionally require an appraisal to substantiate the home value (though automation has reduced these costs in recent years). Additionally, they often have higher financing charges than a mortgage. For a period following the 2008 recession, home equity loans were more difficult to obtain for many consumers. To date, few programs have sought to leverage the use of subordinate lien, secured loans in this context to encourage greater integration of energy efficiency into such projects. This may be an area worthy of greater exploration in the future.

Why Use a Secured Loan?

The advantages and disadvantages of secured loans are different for the residential versus the commercial and industrial sectors. Most homebuyers must take out a loan to buy their house. Secured lending may be attractive to homeowners because they have:

- A home that they can use as collateral;
- An existing mortgage that can be used to finance energy efficiency work; and
- Hands on experience with how secured lending works (through their experience with their home mortgage).

For EEMs, another advantage compared to unsecured loans is that payments are tax deductible for home mortgages. If energy efficiency project costs can be rolled into the mortgage, those costs can further reduce the borrower’s taxable income.

However, secured loans have higher transaction costs and take longer to execute than unsecured loans. For example, a secured loan requires a property valuation of the collateral asset while an unsecured loan does not. A property valuation can include a visit to the property and a review of zoning laws and other regulations that govern use of the property. Secured loans may be most appropriate for large, proactive energy efficiency projects versus reactive, emergency replacement projects (e.g., a failing furnace).

³⁵ Green Bonds are bonds used to raise money for green activities as declared by the issuer. The market for Green Bonds has grown rapidly with \$36.6 billion in issuances in 2014.

³⁶ GPP is an expansion of the Green Refinance Plus program that Fannie Mae started in 2011.

Commercial and Industrial (C&I) consumers tend to avoid the use of secured loans (or any type of debt) explicitly or exclusively for financing stand-alone energy efficiency retrofits.³⁷ There are several reasons for this:

- Most firms prefer to take on debt primarily for core business activities.
- Taking on debt in any form can affect a company's credit profile—a secured loan places an additional lien on the firm's property and impacts its solvency ratios (such as the firm's debt-to-equity ratio), which can factor into their cost of capital.
- Transaction costs are higher for secured lending than other types of efficiency financing. For example, commercial secured loans require that valuation of the collateral property be conducted whereas unsecured loans and leases do not.
- Unlike some other efficiency financing products, which might receive off-balance-sheet treatment from auditors, secured loans for most energy efficiency investments must be recorded on the balance sheet as capital expenditures (CapEx) and, therefore, must be paid from a firm's CapEx budget. This has several adverse impacts:
 - Efficiency projects must compete with core business investments and may be left out of the budget altogether to ensure that higher-priority projects have funding.
 - Because many companies only produce the CapEx budget once a year, it could add several months (up to a year) to a project's timeline.
 - It decreases the firm's net cash flow making the firm look less attractive to investors and lenders.
 - For capital expenses, a full tax deduction cannot be taken in the first year but must be depreciated over time. In contrast, ordinary and necessary operating expenses are fully tax deductible in the year they take place (Internal Revenue Service (IRS)). Loan repayments that are treated as off-balance-sheet are accounted for as operating expenses.³⁸ For many common energy efficiency measures, IRS rules are unfavorable, requiring that depreciation take place over 39 years (Nadel & Farley, 2013; Internal Revenue Service (IRS)). Since borrowing terms for efficiency projects are usually well under 20 years, the tax treatment that secured loans receive as on-balance-sheet expenses is a disadvantage compared to efficiency financing products that receive off-balance-sheet treatment.

Other financing products (e.g., PACE, on-bill loans, and Energy Service Agreements) may garner off-balance-sheet treatment, making them more attractive for commercial consumers.

How Have Secured Loans Been Used to Date?

A number of federal agencies and government-sponsored enterprises (GSEs) offer secured loans—EEMs in particular—for efficiency financing. Both Fannie Mae and the Department of Housing and Urban Development (HUD), through the FHA, have offered energy efficient mortgages. Their initiatives insure the loans of participating lenders to add extra capital to home mortgages for implementing energy efficiency measures. Some of the initiatives allow the energy savings generated from efficiency improvements to be considered in underwriting. Because neither Fannie Mae nor HUD directly extend the loans—private lenders do that—loan terms may differ from product to product and from market to market.

HUD Offerings

On and off since the 1980s, HUD has worked through private lenders to offer energy efficient mortgages to help homeowners pay for energy improvements. A Home Energy Rating System (HERS) audit of the property must show

³⁷ For major rehabs and redevelopment, businesses may be more willing to use secured financing for efficiency upgrades because it may be viewed as more tied to their core business activity.

³⁸ For more information on the advantages and disadvantages of off-balance-sheet financing and for information specific to your situation, consult an accounting professional.

that the efficiency measures are cost-effective. Project costs can be included in the mortgage with no down payment for the energy package portion. However the borrower must pay an upfront insurance premium of 1.75% of the base mortgage amount. If the additional energy package makes the total mortgage more than the buyer can borrow, the anticipated energy savings, which increase the borrower's cash flow, can be considered in the underwriting (Kolstad, 2014). HUD's private lending partners allow this because the FHA insures up to 90% of any given EEM loan (up to 10% of a lender's portfolio) (U.S. Department of Housing and Urban Development (HUD), 2012).

HUD-insured EEMs have seen modest uptake. Between 2006 and 2013, fewer than 7,000 loans were originated (although this number does not include loans in 2008 and 2009, for which data were unavailable) (Kolstad, 2014). In 2014, interviews and focus groups regarding the HUD EEM program found three broad challenges to the loans' uptake:

- **Marketing**
 - **Market placement** – Users of HUD products are exposed to its other home improvement financing products, like HUD's Title I Property and Home Improvement Loans or 203(k) Rehabilitation Mortgages. Both products can be used for energy efficiency projects and do not require a home inspection or a HERS rating (and thus require less work than an EEM).
 - **Market focus** – Some respondents indicated that users of FHA products are not a good target for energy efficiency upgrades. FHA borrowers typically seek lower than market interest rates with more accommodating underwriting criteria. They may be more interested in low costs than in ensuring that their home is energy efficient.
 - **Marketing Impact** – Both housing counselors and prospective buyers reported a lack of awareness of the EEM product and little understanding of energy efficiency concepts.
- **Transaction costs** – Both lenders and consumers perceived transaction costs to be high. The HERS rating and home inspection were particularly burdensome. Some prospective buyers also reported being overwhelmed by having to oversee home improvements at the same time as managing a home purchase.
- **Low demand for efficiency** – There was little demand for energy-related improvements among the respondents; they were more interested in cosmetic improvements to their properties. The mortgage insurance premium also made the loans less attractive (Kolstad, 2014).

HUD PowerSaver

HUD's PowerSaver loans, offered between 2011 and 2015, were a variant of the Title I Home and Property Improvement Loan product that focused on financing energy improvements (Zimring, Hoffman, & Borgeson, HUD PowerSaver Pilot Loan Program, 2010). Secured loans of up to \$25,000 were available for up to 20 years (loans up to \$7,500 were unsecured). Like EEMs, HUD allowed expanded underwriting for PowerSaver loans based on efficiency savings and let mortgage holders finance energy improvements through their home mortgage. The loan required the borrower to obtain verification of the expected savings associated with energy improvements.

Over the four years that PowerSaver was available, fewer than 1,500 loans were originated. Unsecured loans of less than \$7,500 comprised the overwhelming majority of these loans.

FHA is a loan insurance program. Any FHA insured loan requires qualified lenders to "sell the loan" to customers and originate the loan, including processing of all loan requirements.

Fewer than 1,500 loans were originated in the PowerSaver program. The overwhelming majority of these loans were unsecured (Freedberg, 2015). Several program features may have constrained adoption. One factor is that lenders expected to originate the loan also could offer equally or more attractive loan products (e.g., average interest rates on PowerSaver loans were between 6.99% and 9.99%) (Freedberg, 2015). Lenders and borrowers

indicated that some program requirements were burdensome (e.g., higher-than-average 10% lender cash reserve requirement, verification of expected savings). Additionally, lenders have faced challenges substantiating the basis to offer different terms for purchase or refinance of a high-efficiency house as compared to other houses.

Fannie Mae Offerings

The current structure of Fannie Mae's EEMs is the addition of an Energy Improvement Feature to their standard mortgage products. The Energy Improvement Feature supports efficiency projects of up to 10% of the value of the mortgage. For costs above that, borrowers can access additional funds by combining a Fannie Mae HomeStyle® Renovation Mortgage to their primary mortgage.³⁹ Using the Energy Improvement Feature requires having the financed property rated through the HERS process; Fannie Mae offers a \$250 loan-level price adjustment credit to help lenders or borrowers offset this cost (depending on which party pays for the rating)⁴⁰ (Fannie Mae, 2015).

Fannie Mae's program is similar to the HUD program in that Fannie Mae insures mortgage products of approved lenders and also agrees to buy the loans from participating lenders.

How State and Local Actors Can Get Involved

State and local governments can support the use of secured lending for energy efficiency in their jurisdictions in several ways. They can give EEMs a bigger profile through education and they can work with contractor networks as a channel to reach consumers and encourage the use of investment in efficiency through EEMs.

Several state governments offer their own secured efficiency loans. For example, the Minnesota Housing Finance Authority's Fix Up loan program provides secured home improvement loans of up to \$50,000 for 6.99% for up to 20 years. If the borrower uses the loan for energy efficiency improvements, the interest rate drops to 4.99% for up to \$15,000.⁴¹

Local governments and municipal utilities also offer their own secured financing products. The Sacramento Municipal Utility District's (SMUD) Residential Loan Program, in operation since 1987, has a secured loan product to help customers replace old inefficient equipment with new, more efficient models. The loans cover up to \$30,000 in improvement costs at 6.99% for up to 15 years (Sacramento Municipal Utility District (SMUD)). Between 1990 and 2011, the program extended 84,000 loans (an average of over 4,000 per year), in a service territory of approximately 560,000 residential accounts. One reason for the program's success may be that it is a 'contractor-driven' initiative in which participating contractors—who must have successfully completed SMUD's loan finance training—sit down with customers to walk them through the process. (Hayes, Nadel, Granda, & Hottel, 2011)

Finally, one area for exploration for state and local governments is the potential of advancing efficiency through Home Equity Loans (HEL) and Home Equity Lines of Credit (HELOC). There are several reasons that HELs and HELOCs could be an effective tool for promoting efficiency:

1. These products are often used for home improvements and renovations, which are times when homeowners may consider energy-related improvements.

³⁹ Fannie Mae's new HomeStyle Energy loan, launched in April 2016, allows homeowners to finance up to 15% of the home's current appraised value with up to \$3,500 in efficiency work with no energy requirement for an energy report. For more on the HomeStyle Energy loan see <https://www.fanniemae.com/content/faq/homestyle-energy-faqs.pdf>.

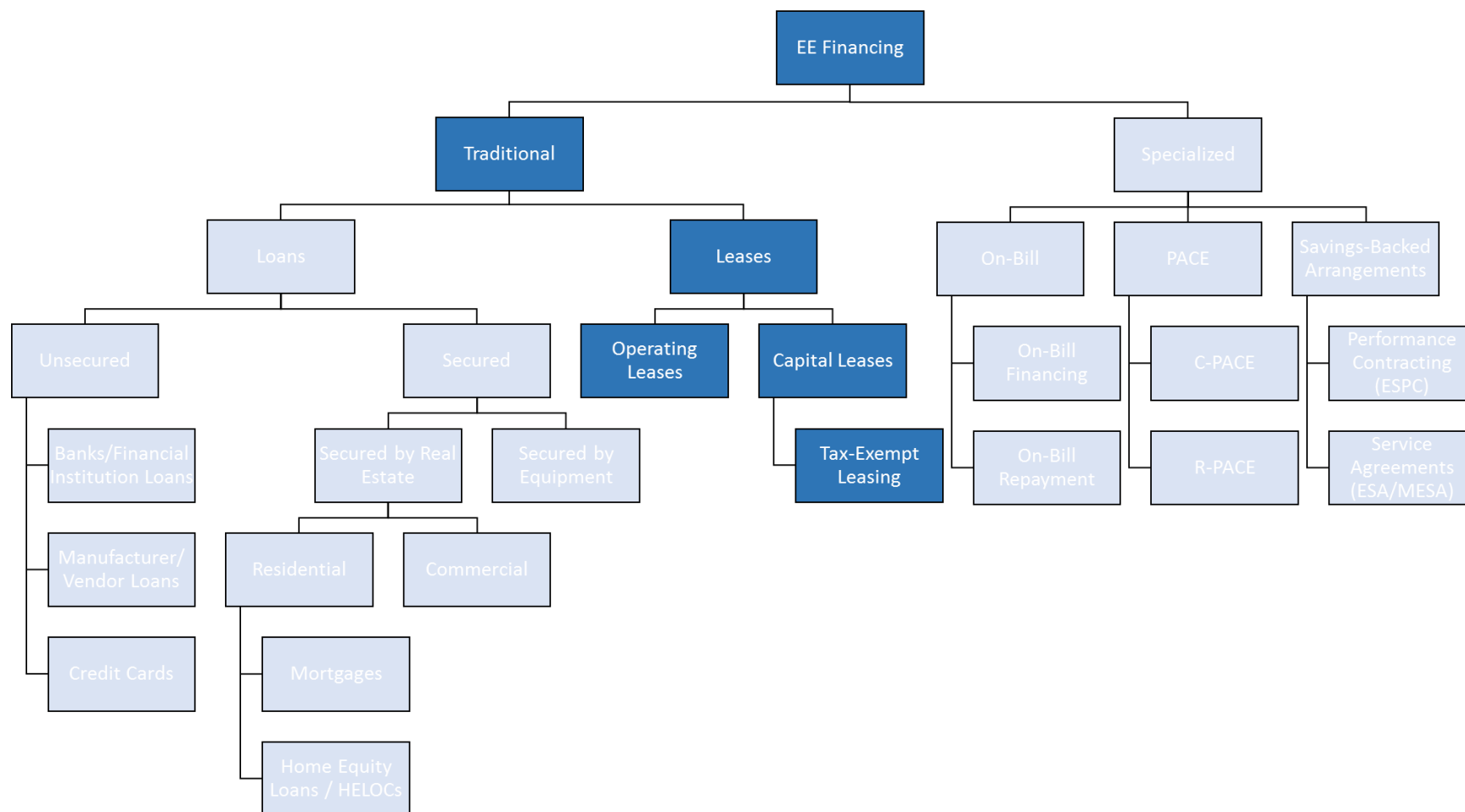
⁴⁰ HERS ratings may be included in efficiency project costs and financed through the mortgage product.

⁴¹ See: <http://www.mnhousing.gov/wcs/Satellite?c=Page&cid=1358904985835&pagename=External/Page/EXTStandardLayout>, <http://www.mnhousing.gov/wcs/Satellite?c=Page&cid=1358905012534&pagename=External%2FPage%2FEXTStandardLayout>, and <http://www.mnhousing.gov/wcs/Satellite?c=Page&cid=1403283957557&pagename=External%2FPage%2FEXTStandardLayout>.

2. When homeowners take out a HEL or HELOC—unlike with a first mortgage—they are not dealing with the significant undertaking of navigating a home purchase in addition to managing efficiency improvements, so they may be more open to considering efficiency improvements.
3. Lenders do not feel the pressure to close the deal as fast as possible so an efficiency improvement, from the lender's perspective, may be seen as a way to increase the size of a HEL or HELOC instead of a potential impediment to closing the deal.

HELs and HELOCs may represent a leverage point for convincing homeowners to either take on efficiency improvements or add to the efficiency improvements that they were planning.

Leases for Energy Efficiency Equipment



4. Leases for Energy Efficient Equipment

Key Takeaways

- Two types of leases are used to finance equipment: operating leases (in which a lessor retains ownership of the leased asset) and capital leases (in which the lessee intends to buy the asset). The Tax-Exempt Lease Purchase Agreement (or TELP), a type of capital lease, is often used for financing energy efficiency projects in the Municipalities, Universities, Schools, and Hospitals (or MUSH) sector.
- Leases can finance both hard and soft costs of efficiency projects. Project costs may be accounted for off the balance sheet in an operating lease.⁴² Leases often have a faster turnaround, easier approval, lower transaction costs, and more flexible terms than secured loans or bond financing.
- Leases are used extensively in the private sector for all kinds of equipment; however, there has not been significant use of leasing among private sector customers in energy efficiency-focused programs.
- Leases specifically for funding energy efficiency measures have been targeted at public/institutional sector customers. Tax-Exempt Lease Purchase agreements have been widely used in the Municipalities, Universities, Schools, and Hospitals (MUSH) market because they allow lessees to take on project costs without exceeding debt limits or requiring burdensome approval processes. This can be important to MUSH market building owners and managers, which account for significant portion of ESCO customers.

What is a Lease?⁴³

A lease is an agreement under which a lessee (equipment user) pays a lessor (equipment owner) for the possession and use of an asset, either for a fixed period of time or with the ultimate intention of buying it. Energy efficient equipment leasing is similar to leasing a car: the lessee needs a car and pays a leasing company, the lessor, for the right to keep and use the car for some period of time. Like car leasing, equipment leasing may also ultimately lead to an outright sale of the leased equipment. In the case of energy efficient equipment, leasing usually ends in the lessee purchasing the equipment.⁴⁴ Leasing can be used as an alternative to cash, loans, bond financing, energy service agreements, or other financing options for efficiency projects. Since the financial structure of a lease can be similar to that of a loan or a service agreement, the Internal Revenue Service (IRS) and the Financial Accounting Standards Board (FASB) have issued guidance to distinguish among the three (see sidebar on “Lease, loan, or service agreement”).

A lessor must, at absolute minimum, make back whatever money is spent on the leased asset. To recoup this investment, the lessor recovers or depreciates the cost of the asset over the term of the lease.⁴⁵ The lessor must make money on the transaction, so there is also an interest charge.⁴⁶ The composition of a lease payment is analogous to that of a loan payment, in which the principal payment allows the lender to recover the initial investment and the interest is the price of borrowing that asset (see Figure 4-1).

⁴² Beginning in 2018, off-balance-sheet treatment for operating leases will no longer be allowed.

⁴³ Energy efficient equipment leases are not related to Green Leases. Green Leases are not a financial vehicle but, rather, a contract between a building owner and a tenant which attempts to address the split incentives that impede the uptake of energy efficiency in tenant-occupied buildings.

⁴⁴ It is possible that a lessee could return energy efficient equipment at the end of the lease term but, given the nature of energy efficient equipment—which is often imbedded or integrated into the building structure—this is impractical and rare.

⁴⁵ In a capital lease, the lessee may take any depreciation benefit.

⁴⁶ Interest charges on operating leases are implicit and not disclosed.

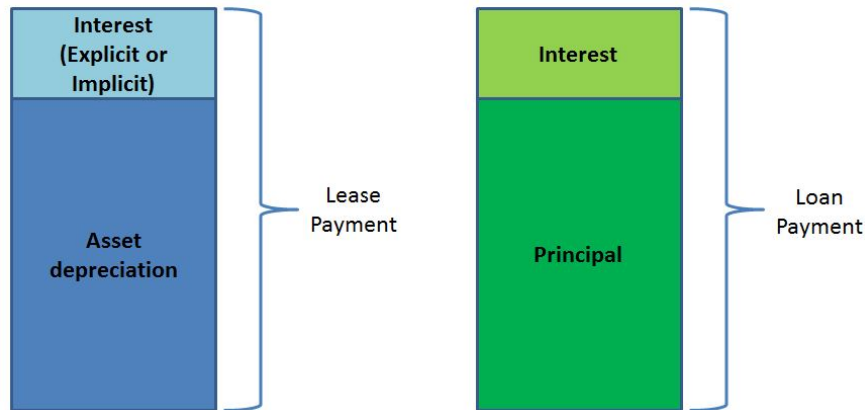


Figure 4-1: Composition of a lease payment and loan payment

A Simple Leasing Structure

In a simplified leasing structure, a lessee (user of the equipment, generally a building owner) would approach a developer, often an Energy Services Company (ESCO), to implement one or more energy conservation measures (ECMs) at the lessee's site (e.g., a lighting system). Some common ECMs that are leased are lighting systems, heating and cooling systems, energy management systems, and co-generation plants. The developer would then find a leasing company (lessor) to finance the system, or the lessee would make arrangements with a leasing company of their choice.⁴⁷ The developer recovers its investment through the sale of the lighting system to the leasing company. The leasing company now owns the lighting system and, through a lease agreement with the lessee, a stream of lease payments (see Figure 4-2).

Lease, loan, or service agreement?

How an agreement is defined—whether or not it is a lease and what kind of lease it is—determines the accounting and tax treatment of the agreement. The Financial Accounting Standards Board (FASB) and the Internal Revenue Service (IRS) have developed guidelines to determine whether an agreement is a lease, a loan, or a service agreement. Each has its own tax and accounting treatment. Tax and accounting treatment can impact the entity's ability to borrow and raise money; can affect the project's financial feasibility; and can determine whether the project is even a possibility according to the rules and regulations governing the entity's financial management.

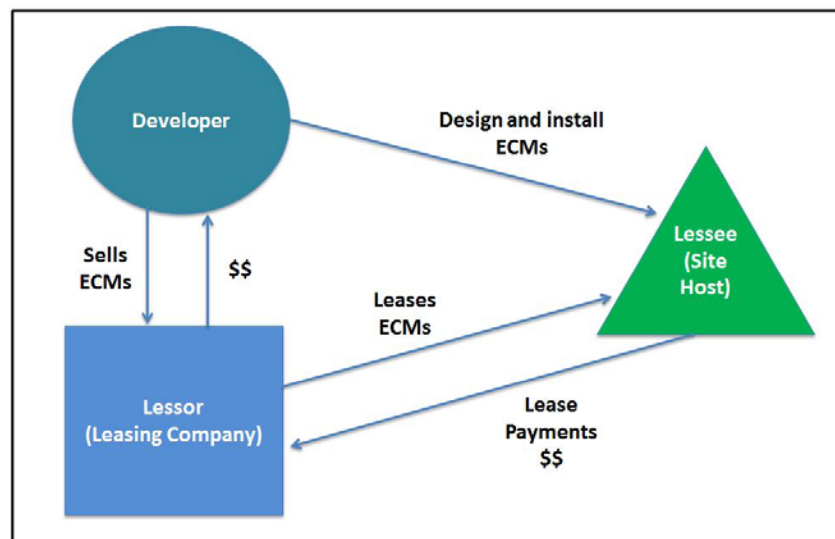


Figure 4-2: Simplified leasing structure for a set of energy conservation measures (ECM)

⁴⁷ Leasing companies are generally banks, independent leasing companies, and captive leasing companies, which are subsidiaries or affiliates of equipment manufacturers.

Why Are Leases Used?

Commercial, industrial and institutional building owners have at least five options for paying for energy efficiency: cash, loans, bond financing, a savings-backed arrangement,⁴⁸ or leasing. Leasing may address barriers to the uptake of energy efficiency that these other forms of financing may not, including:

- **Financing of both hard and soft costs.** Leases may be attractive for firms that prefer to use financing—as opposed to cash—to cover costs that are not related to their core business. Private firms may choose leasing for energy efficiency projects over other forms of financing because leasing can cover 100% of hard and soft costs (e.g., installation) whereas loans generally require a down payment (e.g., some sort of equity in the project) and may not cover soft costs.
- **Cost treatment.** Leases may be attractive to entities that are limited in the amount of debt they can undertake. Operating leases allow lessees to treat project costs as off-balance-sheet (see Off-balance-sheet treatment sidebar).⁴⁹ In the MUSH market in many states, TELPs with non-appropriation clauses can be used to invest in efficiency while adhering to limits on the amount of debt that the entity can take on. It also enables them to afford energy improvements without having to issue a bond or seek voter approval.⁵⁰
- **Faster turn-around, easier approval** than ESAs, bonds, or secured loans.
- **More flexible terms** with regards to payment schedules than bonds or secured loans.⁵¹

How Have Leases Been Used to Date?

Most leasing activity for energy efficiency takes place in the MUSH market and the commercial and industrial (C&I) sector; lease transactions are typically large, which limits the number of projects using leases in the residential sector.⁵² Leasing has been infrequently used in large state or utility customer-funded programs with several exceptions.⁵³

Design Options

There are two types of leases: operating leases (also known as true or tax leases) and capital leases (also known as finance or non-tax-oriented leases). A

Off-balance-sheet treatment

Off-balance-sheet treatment allows a financial obligation (e.g., the cost of an energy efficiency project) to be treated as an operating expenditure as opposed to a capital expenditure. Capital expenditures are long-term financial obligations that decrease the free cash a firm has (now and in the future) and can, therefore, materially impact the financial position of an entity. For accounting purposes, capital expenditures can impact an entity's credit rating, and can also impact the premium that investors charge to lend money to that entity. In contrast, operating expenditures are treated as short-term obligations that do not encumber future cash flows. They can be listed in the footnotes of the entity's balance sheet, thus not affecting measures of financial health that incorporate debt (like solvency ratios), which investors use to make investment decisions about the entity. Recent rule changes will disallow off-balance-sheet treatment beginning in 2018.

⁴⁸ For example, an Energy Service Agreement (ESA). For more on savings-backed arrangements, see Chapter 8.

⁴⁹ Using an operating lease to finance efficiency may be challenging due to the nature of energy efficiency measures. Furthermore, a 2016 FASB rules change will effectively eliminate off-balance-sheet treatment of operating leases beginning in 2018 (see 'Operating leases' below and <http://www.fasb.org/jsp/FASB/Page/BridgePage&cid=1351027207574>).

⁵⁰ Many MUSH market entities are tax-exempt.

⁵¹ In some aspects, leases may be less flexible than loan financing. Unlike a loan, lessees may not be able to end lease agreements early, or may incur penalties if they do so.

⁵² Residential solar projects or large, whole-home upgrades may reach this threshold.

⁵³ Two exceptions are Texas' Energy Conservation Plan and California's upcoming Small Business Lease Program. The Texas program pays for energy conservation measures through the state's (separate) Master Lease Purchase Program—which was created to help state agencies finance capital equipment. California's Small Business Lease Program will offer small businesses leases backed by a loan loss reserve. California customers will have the option of paying off the lease on their utility bill. See <http://www.txdps.state.tx.us/energyconservationplan.htm> and <http://www.treasurer.ca.gov/caeatfa/cheef/sbpl/index.asp>.

version of a capital lease that is important in the MUSH market is the Tax-Exempt Lease (TELP) Purchase Agreement, also known as a municipal lease (see Figure 4-3).

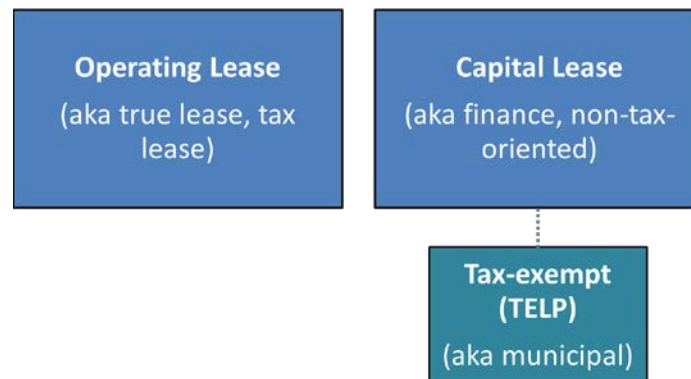


Figure 4-3: Types of leases

Operating Leases

Under an operating lease, the lessor maintains ownership of the leased equipment and the lessee does not have to account for the expense on its balance sheet.⁵⁴ The FASB has announced rules that will eliminate this off-balance-sheet treatment of operating leases beginning in 2018.⁵⁵

Operating leases are also called tax leases because they allow a third party owner, the lessor, to use tax benefits associated with the leased asset, such as accelerated depreciation or an investment tax credit. They are not commonly used for energy efficiency projects but have been the dominant financing structure for the residential solar photovoltaic (PV) market, which can utilize federal tax credits (see “Leases in the Residential Solar Photovoltaic (PV) Market” below). In many cases, tax credits are more valuable to a lessor, who may have more tax liability than the lessee. Lessees always have the option to buy leased equipment at the end of a lease term, so the IRS and FASB have issued guidelines to distinguish an operating lease from a capital lease, with the focus on determining who is the true “owner” of the leased equipment (FASB, 1976) (IRS, 2014). To adhere to these guidelines and be termed an operating lease, lease terms must include the following:

- Leased equipment must have at least one year of useful life at the end of the lease term.
- At least 10% - 20% of the equipment’s residual value must remain at the end of the lease term.
- If the lessee purchases the equipment at the end of the lease term, it must pay at least fair market value.

In an operating lease, the lessee may treat lease payments as operating expenses. This allows the lessee to preserve its solvency ratios (e.g., the lease will not impact debt-to-equity ratios) and allows a debt-constrained lessee to obtain equipment without running up against its debt limit.⁵⁶ Many energy efficiency equipment measures are integral to the property where they are installed (e.g. lighting systems, HVAC systems). Thus, entering into operating leases is impractical for many types of energy efficiency projects.

⁵⁴ Leasing costs would have to be recorded in the footnotes of the balance sheet.

⁵⁵ See http://www.fasb.org/jsp/FASB/Page/BridgePage&cid=1351027207574#section_2.

⁵⁶ Lessees may be debt constrained for reasons that include: covenants on bonds the lessee holds which limit future debt that may be incurred; administrative limits; an approval process over which the lessee does not have control (e.g. voter approval); or a firm may want to limit its leverage for financial stability.

Capital Leases

Under capital leases, the lessee intends to ultimately purchase the leased equipment;⁵⁷ capital leases are the most common type of agreement for leasing energy efficient equipment. Lessees in a capital lease may benefit from any tax advantages of ownership (e.g., depreciation deductions and any available tax credits). They may also be able to deduct the implicit interest portion of their lease payment as an operating expense. However, the costs must be recorded as a capital cost and they impact a firm's solvency ratios (e.g., debt-to-equity ratio).

Capital leases must:

- Extend beyond 75% of the life of the asset;
- Include a transfer of ownership to the lessee by the end of the lease term for a 'bargain' price (i.e., below market value or nominal); and
- Comprise a stream of lease payments whose net present value exceeds 90% of the asset's fair market value. (IRS, 2014).

Capital lease terms usually charge the lessor with responsibility for the operation and maintenance of the leased asset. Since many firms would prefer not to focus on operations and maintenance, a capital lease may be a more practical option than buying the asset outright.

Tax-Exempt Lease Purchase Agreements

Tax-exempt lease purchase agreements (TELPs), also known as municipal leases, are capital leases undertaken by tax-exempt entities. At the end of the lease, the lessee owns the leased asset. The implied interest portion of the lease payments is tax-exempt for the lessor. (Graynor, 2004)

TELPs often have non-appropriation clauses which allow termination of the lease in case the lessee is unable to appropriate the funds necessary to make its lease payments.⁵⁸ TELPs are 'non-budgetary items': they generally do not impact the lessee's debt limits and do not require approval by voters. (Bolinger M. , 2009)

Leases in the Residential Solar Photovoltaic (PV) Market

Third Party Ownership (TPO) structures, mainly leases and power purchase agreements (PPAs), have dominated the solar PV market since 2008. This is the result of a TPO's ability to stretch high up fronts cost for PV systems into affordable monthly payments; monetize the Investment Tax Credit (ITC); and access larger federal tax benefits and transfer some of those benefits to host owners.

Both commercial and residential solar PV earn a 30% ITC. However, until 2009, the residential ITC was capped at \$2,000. Using an operating lease allowed a third-party commercial firm to own a solar system, taking the full 30% ITC, and then lease it to a residential customer that wanted to install solar PV.

After the lifting of the residential ITC cap, other advantages still made TPO more attractive than host ownership. Section 1603 of the American Recovery and Reinvestment Act (ARRA) allows commercial, but not residential, buyers to take a 30% cash grant instead of the ITC, and commercial buyers (integrated solar firms) often use fair market value as the tax basis for their ITC, which can be significantly higher than a PV unit's sale price, which is what most host owners use as their tax basis.

The lifting of the residential ITC cap and a recent trend of commercial claimed tax bases coming down has had the effect of diminishing the advantage of TPO over host ownership. This has resulted in loan financing gaining ground against leasing in the residential solar PV space in recent years (Bolinger & Holt, 2015).

⁵⁷ However, the title stays with the lessor.

⁵⁸ In a normal capital lease or an operating lease, if a lessee wants to end their contract they are responsible for paying the present value of the remaining stream of lease payments. Friedman Luzzato, an affiliate of Carlyle Capital Markets, which has worked in the TELP market since 1982, indicated that none of their lessees has ever invoked a non-appropriation clause.

How State and Local Actors Can Get Involved

Several states run programs to encourage energy efficiency through lease financing. The financing is typically provided by private lenders through a bidding process and the only expenses to the state are administrative costs. Thus, leasing programs may be attractive for state and local governments because they often do not require subsidies by state or local governments.

Examples include Washington State's Local Option Capital Asset Lending (LOCAL) program, Virginia's Energy Leasing Program, and Mississippi's Energy-Efficiency Lease Program; these programs use enhanced leasing terms to encourage state and local agencies to make energy improvements in their facilities. These programs generally offer lower interest rates than agencies, by themselves, could otherwise obtain as well as technical, legal, and financial assistance.

Mississippi

The Mississippi Development Authority's (MDA) Energy and Natural Resources Division works with Friedman Luzzato & Company to offer the state's Energy Efficiency Lease Program. The program aims to "provide public and private non-profit entities with the lowest cost of long-term financing for their energy efficiency projects and equipment through tax-exempt lease purchase financing." (MDA, 2013) Lease terms include a non-appropriation clause allowing participants to use this financing without having to first seek approval for increasing their debt load.

Friedman Luzzato & Company issues a standardized request for proposal to state, regional, and national lenders, and they underwrite the leases based on the credit of the lessee. As of July 2015, interest rates were generally between approximately 2.25% and 3%; terms are up to 10 years. Since the program began in 2013, there have been seven leases totaling \$32.5 million with no defaults.

Virginia

The Commonwealth of Virginia's Department of Treasury administers the Virginia Energy Leasing Program, which offers low interest rate leases for Commonwealth state agencies, institutions, boards, and authorities for projects of \$100,000 or more. Virginia's program is similar to Mississippi's program in that the Department of Treasury issues a Request for Proposal from lenders to solicit the lowest interest rates available. The Commonwealth uses a Master Lease structure in which the Commonwealth of Virginia is the lessee and individual leases are added as appendices to the Master Lease. (Virginia Department of Treasury, 2015)

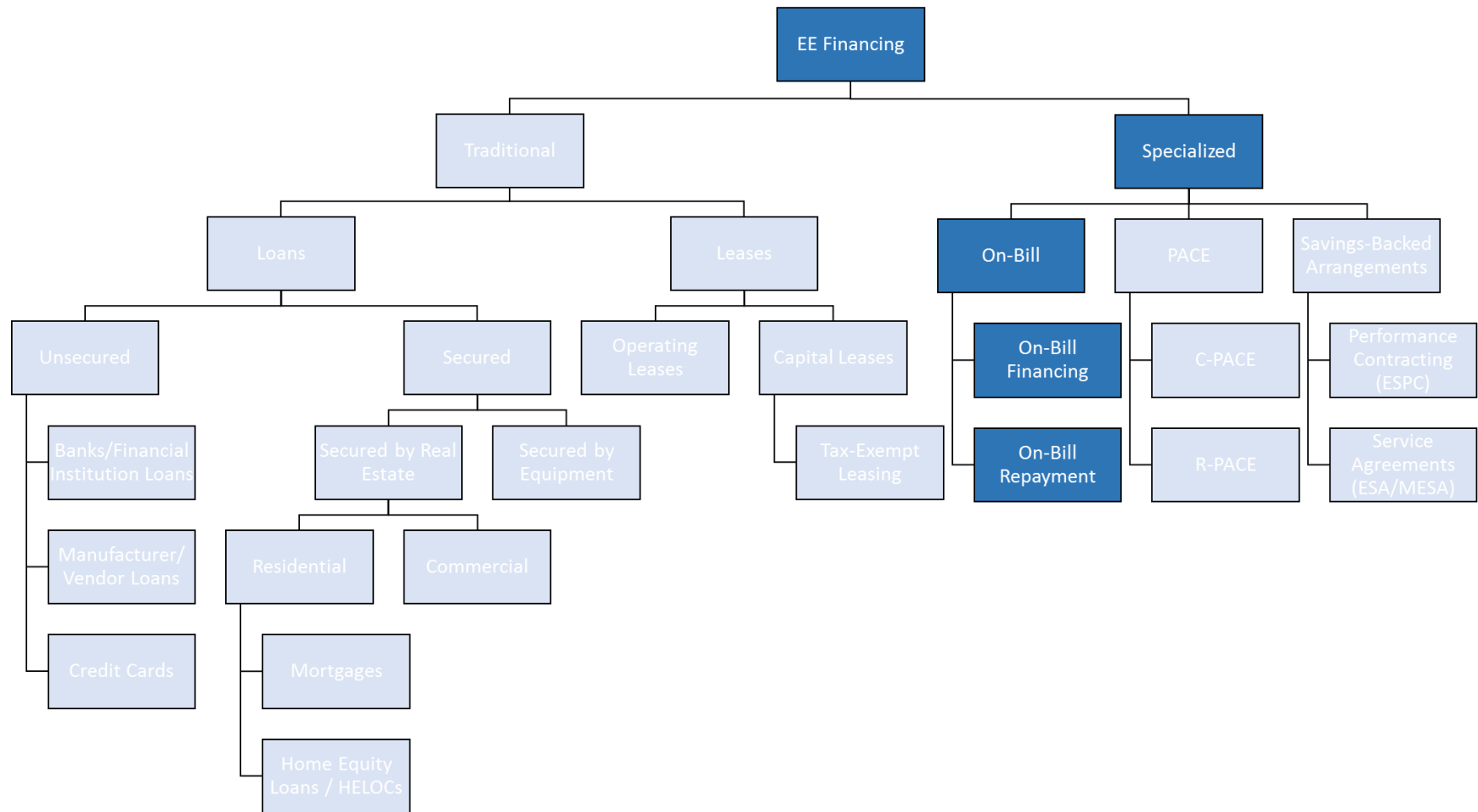
This structure has two advantages in terms of lowering interest rates. First, using a Master Lease structure reduces the transaction costs of negotiating individual lease agreements. Second, the credit of the Commonwealth, which is generally stronger than that of individual state entities, allows lenders to underwrite the Master Lease using more favorable credit data.⁵⁹

As of June 2015, the Energy Leasing Program offered 12-year leases at 2.1% interest and 15-year leases at 2.5% interest. The program has entered into 40 leases for over \$140 million and there have been no defaults.⁶⁰

⁵⁹ Personal communication between LBNL and Debora Greene, Senior Public Finance Analyst, Commonwealth of Virginia Department of Treasury, July 15, 2015.

⁶⁰ Personal communication between LBNL and Debora Greene, Senior Public Finance Analyst, Commonwealth of Virginia Department of Treasury, July 15, 2015.

On-Bill Finance and Repayment



5. On-Bill Finance and Repayment

Key Takeaways

- On-bill finance and repayment loans refer to specialized financing structures that allow consumers to repay the cost of energy improvements on their utility bill. Proponents argue that on-bill loans are more convenient and effective than off-bill alternatives at addressing some of the barriers to customer investment in energy efficiency projects.
- On-bill loans have been offered by some utilities since the 1970s to fund a range of energy efficiency and renewable energy improvements. At least 45 programs are active, serving all customer market segments. The majority of programs focus on the residential sector while the majority of loans, by dollar volume, have been made to non-residential customers (due to larger loan size).
- Over \$1.83 billion have been loaned through on-bill mechanisms since the 1970s. Cumulative default rates are low, ranging from 0-3%. In 2014, over 20,000 on-bill loans were made for \$179 approximately million. (Deason, Leventis, Goldman, & Carvallo, 2016)
- Several types of entities administer or sponsor on-bill initiatives: investor-owned and publicly-owned utilities, rural electric cooperatives, state agencies, and private or non-profit entities.
- On-bill programs that have achieved significant uptake in their target market typically offer below market rate financing combined with one of two approaches: (1) allowing consumers to finance almost any “energy-related” improvements with particular focus on single measures (e.g., high-efficiency equipment, windows); or (2) coupling on-bill lending with robust financial incentives and rebates.
- State and local entities can support on-bill programs with well-considered enabling legislation or with public funds used to capitalize loans or provide credit enhancements.

What is On-Bill Finance and Repayment?

On-bill financial products allow consumers to repay loans on their utility bill. Broadly, this involves:

- A lender providing funds for consumers and businesses to make energy improvements on their property,
- The utility adding the loan payments to the consumer’s utility bill, and
- The borrower paying their combined energy and loan bill.

The energy improvements that on-bill loan products finance generate energy savings for the consumer that can offset loan payments partially, fully, or more than fully, in effect lowering the customer’s average monthly bill. On-bill loan products can finance energy efficiency measures, distributed generation (e.g., solar photovoltaic), and non-energy measures, which can be important to customers in some market segments.

Why On-Bill?

On-bill programs may be promising for several reasons. First, consumers typically have extensive experience making utility bill payments; it is already a routine part of their lives so they may see it as a more viable option than other ways of paying for efficiency. It is also conceptually attractive to display energy savings resulting from an investment alongside the loan payment on the utility bill. Second, on-bill proponents argue that on-bill loans (perhaps aided by the threat of service disconnection for non-payment, see “Design Options”) may experience lower default rates compared to financing that is not repaid on the utility bill. If on-bill loan programs result in

lower default rates, program administrators may be able to offer more attractive financing (e.g., lower interest rate, longer loan term) than would otherwise be available, leading in theory to greater customer participation in the program. Lower default rates could also warrant relaxing underwriting criteria to expand the number of consumers that qualify for financing energy-related improvements. Third, some on-bill programs also include features that are designed to address other barriers to efficiency, such as renter/owner split incentives, long project paybacks, and balance sheet treatment of the repayment obligation, which lead to under-investment in certain market segments.

Since the late 1970s, 232,000 on-bill loans have been extended at a value of over \$1.83 billion.

Some argue that owners or renters who implement an energy improvement and move from the property should be permitted by the on-bill program structures to “transfer” the loan repayment obligation to a subsequent occupant. They argue this can help address the problem of current occupants paying for improvements from which future occupants will benefit, and would therefore make on-bill financing more attractive to those owners who might sell their property before paying off the loan—and to renters, a hard-to-reach market segment.⁶¹

How Has On-Bill Been Used to Date?

On-bill products are not new. They have been used to finance energy improvements since the late 1970s and more than 232,000 on-bill loans have been extended at a value of over \$1.83 billion (State and Local Energy Efficiency Action Network, 2014). As of late 2015, we identified programs operating in 32 states* (see Figure 5-1).⁶² In 2014, over 20,000 on-bill loans were extended for \$179 million (\$76 million in residential loans, \$89 million in commercial and industrial loans, and \$14 million in institutional loans).^{63*} (Deason, Leventis, Goldman, & Carvalho, 2016) While overall on-bill activity is significant, almost 90% of that volume has been concentrated in just five programs.⁶⁴ These five programs have been operating for at least a decade and have either allowed single measures or have provided generous incentives/rebates or below market-rate financing, which may have helped to drive these high volumes (State and Local Energy Efficiency Action Network, 2014).

Small Business Energy Advantage

On-bill programs serving small businesses have managed to achieve large volumes by offering generous incentives. For example, the Small Business Energy Advantage on-bill program offered by United Illuminating and Connecticut Light & Power provides substantial rebates of up to 50% of project costs for including two or more measures, plus 0% interest on-bill financing to pay for the balance. Since 2001, the utilities have loaned over \$180 million to nearly 30,000 customers.*

⁶¹ Transfers and renter participation are not limited to on-bill tariff structures and renter participation is not necessarily allowed with on-bill tariffs. Generally, renters may participate in on-bill schemes if transfers to subsequent renters are allowed, program rules allow, state legislation is amenable, and owners give consent.

⁶² Unless marked with an asterisk (*), all summary statistics in this section on performance and annual and cumulative loan volumes come from (State and Local Energy Efficiency Action Network, 2014), which includes on-bill programs in the U.S., Canada and the United Kingdom.

⁶³ Volume numbers from Deason, et al are specifically for electric efficiency spending (spending on renewable measures and gas measures are not included)

⁶⁴ The five programs comprising over 90% of on-bill activity are Tennessee Valley Authority’s (TVA) Energy Right Solutions Program, National Grid’s Small Business and large Commercial & Industrial program, Alliant Wisconsin’s Shared Savings program, United Illuminating’s Small Business Energy Advantage program, and Connecticut Light & Power’s Small Business Energy Advantage program.

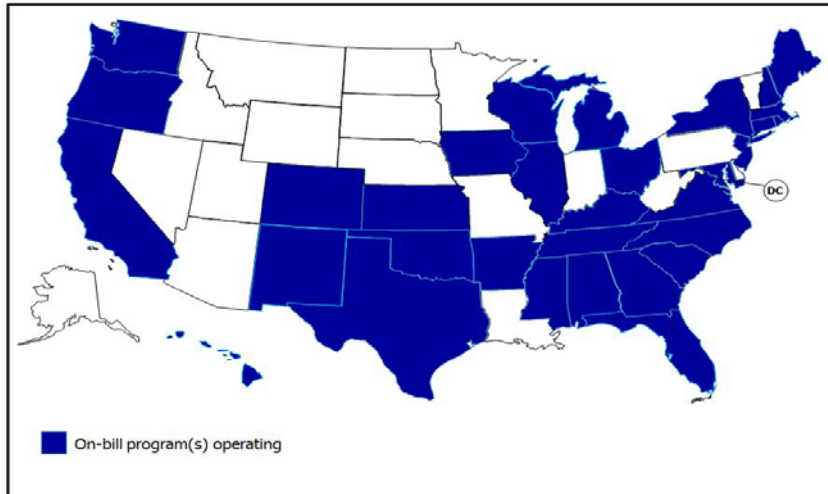


Figure 5-1: States where on-bill programs are operating

Several types of entities sponsor on-bill programs: investor-owned and publicly-owned utilities, rural electric cooperatives, state agencies, and private or non-profit entities.⁶⁵ Although their programs generally do not generate large loan volumes, many cooperative utilities offer on-bill financing, either their own program or through a program developed by an umbrella entity (e.g. Tennessee Valley Authority). Rural electric cooperatives often cite added value to their customers as their motivation for running on-bill programs.

On-bill programs serve all customer sectors. The majority of programs reviewed focus on the residential sector with a few programs that allow loans to or focus on the multifamily sector. By quantity, the residential sector represents nearly 80% of participants while the non-residential sector represents over 40% of loan volume, due to larger project size (see sidebar titled “Small Business Energy Advantage” for information on serving small business with on-bill loans) (see Table 5-1).

Some on-bill programs allow the repayment obligation to transfer from the customer who originated it to a subsequent building occupant who is a utility customer, by deeming the repayment part of the utility service. Because on-bill programs can transfer the repayment obligation from one occupant to the next (the charge would continue to stay on the utility bill of the improved property), on-bill can allow renters to participate. There is little data on the participation of renters, although at least one program, Midwest Energy’s How\$mart Kansas program, has had a fairly significant uptake by renters (120 out of 989 residential projects were taken on by renters as of 2013). (State and Local Energy Efficiency Action Network, 2014)

Table 5-1: Number of programs serving different sectors and historic on-bill program activity by sector

Customer Sector	Number of Programs Serving	Lifetime Loan Volume	Average Loan	Number of Participants
Residential	20	\$1.05 billion	\$5,787	182,324
Non-residential	7	\$775 million	\$15,400	50,339
Total	27	\$1.83 billion	\$7,867	232,663

⁶⁵ In California, the Ratepayer Integrated On-bill Payment Program (RIOPP) pilot is a joint initiative of the MacArthur Foundation and a non-profit, the California Housing Partnership Corporation.

Administrators of on-bill programs offer a range of interest rates, from as low as 0% to 8% and loan terms range from 2 to 15 years (see Table 5-2).⁶⁶ Loan terms and conditions may be influenced by the source of capital used, see “Design Options” section).

Table 5-2: On-bill product terms and historic performance

Sector	Interest Rates	Terms	Range of Default Rates; Median Default Rate
Residential	0% - 8%	1 – 15 years	0% - 3%; 0.08%
Non-residential	0% - 3%	2 – 15 years	0.6% - 2.9%; 0.9%

Lifetime default rates across all programs have ranged from 0% to 3% (see Table 5-2). These default rates are low compared to common types of unsecured consumer lending, which may range from mid-single digits to low double-digits.⁶⁷ Perhaps the most compelling evidence is that the Tennessee Valley Authority and Alliant Wisconsin programs have been in operation for decades with over half a billion dollars in volume each; yet default rates are reported at or just below 3%.

Design Options and Considerations

When creating policy or developing on-bill programs, decision makers should consider the design options available and the tradeoffs of each. These options can be categorized into four key program design considerations:

- The use of disconnection;
- Meter attachment;
- Source of capital;
- Assessing consumer creditworthiness; and
- Measure eligibility.

Disconnection and Meter Attachment

On-bill loan products might have fewer delinquencies when nonpayment leads to service interruption / power disconnection. However, many state regulators and consumer advocates (and utilities) might resist treating utility service as a consumer loan collection function without broad protections. Similarly, treating

On-Bill Tariffs: A Game Changer?

Some proponents maintain that loans treated as on-bill tariff (OBT) products will be paid by customers at the same rates that utility bills are paid, because the OBT structure is so similar to the utility charge. They argue that, with a sufficient volume and history, capital for on bill loans would be provided by secondary market investors at low cost relative to other consumer loan products.

They cite two OBT features in particular: 1) automatic transferability of the loan (which could allow longer loan terms and lower monthly payments, could address owner-renter split incentives, and could protect the borrower from paying for benefits for future occupants of the property) and 2) the fact that on-bill loans may survive bankruptcy.

However, these features are relatively untested. For example, conventional 30-year mortgages are not “transferred” to the subsequent purchaser, but are paid off at sale, yet mortgages command the lowest financing charges of any consumer loan product.

Also, whether monthly repayments styled as an on-bill tariff will be treated as a utility expense (and survive a bankruptcy) or dismissed as a loan is untested at scale and in a variety of scenarios, such as when loan obligations are held by investors.

⁶⁶ Two programs, Midwest Energy’s How\$mart in Kansas and Iowa Gas’ Low-Interest Financing Program offer 30-year loans for geothermal systems.

⁶⁷ These comparisons are highly challenging due to how different kinds of lenders count “defaults” and delinquencies, comparison across loan types (such as home equity loans), and tracking across economic cycles such as recessions. Appropriate comparison data on unsecured consumer lending default rates is difficult to identify. This range of estimates comes from several sources that include: (1) program administrators in New York and Pennsylvania that offer off-bill residential unsecured energy efficiency loans indicated that default rates have been or are projected to be in the mid-to-high single digits; (2) 2011 data from Transunion suggesting that delinquencies on residential debt could be as low as 4%; and (3) 2014 Federal Reserve data suggesting that charge-off rates for non-real estate consumer loans (assuming a seven year financial product lifetime to convert annual rates to lifetime rates) are approximately 14%. Delinquencies may or may not become defaults, so comparing delinquency rates to default rates is not an apples-to-apples comparison.

the loan payment as a utility service charge that would be assumed by a subsequent utility customer might appear to offer some advantages to the customer who originates the loan, but raises many questions for the utility about notice to subsequent customers before they rent or purchase a property. Different product structures can be created based on whether nonpayment of the loan leads to disconnection of energy service and whether the charge is attached to the account holder or to the meter. We divide these structures into three types of programs observed in the field:⁶⁸

1. Line Item Billing – no disconnection, no meter attachment.

In this design, the utility bill is simply used as a tool for participating consumers to make payments. In the event that a participant fails to make payments, the loan would enter a collection function just as any unsecured loan and not connected to utility service. Loan losses would be handled just as any other unsecured loan.

2. On-Bill Loan with Disconnection—disconnection allowed, no meter attachment.

On-bill loans with disconnection rights are treated as debt of the consumer, and the threat of utility service termination may act as an added inducement for the consumer to repay the loan.⁶⁹

3. On-Bill Tariff (OBT)—disconnection allowed, meter attached.⁷⁰

On-bill tariffs attach to a utility meter rather than the consumer. Non-payment of on-bill tariff charges can also lead to utility service termination. On-bill tariffs are designed to automatically transfer to the new owner upon sale. The structure can arguably accommodate renters and may be less risky from a lender’s perspective.

Assessing Consumer Creditworthiness

Program administrators and policy makers have adopted a range of approaches on how on-bill loans should be underwritten. Consumer eligibility involves multiple considerations. Some view on-bill programs as a way to extend access to credit-challenged consumers and achieve greater consumer participation and energy savings as a result. We identify four main underwriting approaches:

- 1) Traditional: using metrics like FICO score and debt-to-income ratio (DTI);
- 2) Expanded: employing traditional metrics but allowing relaxed criteria (e.g. a lower minimum FICO score or a higher maximum DTI);
- 3) Alternative: relying solely on utility (or other) bill payment history; and
- 4) Hybrid: blending the alternative approach with one of the two other approaches.

Our analysis of existing on-bill programs did not find an association between choice of underwriting criteria and participant default rates. A range of underwriting approaches—including those that rely primarily on utility bill payment history and other factors available to the utility, such as eligibility for low-income programs —may be effective in identifying creditworthy applicants (State and Local Energy Efficiency Action Network, 2014). However, the choice of underwriting criteria is an important design issue for program administrators because it appears to significantly influence on-bill program application approval rates. The one program that relies on

Analysis did not find an association between choice of underwriting criteria and participant default rates. However, choice of underwriting appears to significantly influence application approval rates.

⁶⁸ 56% of program administrators in our sample reported on the structure of their on-bill loan product. Of programs that reported, 8 use line item billing, 9 use on-bill loans, and 5 use on-bill tariffs.

⁶⁹ For a closer look at the use of power disconnection with on-bill loans, see (Kramer, Disconnection and On-Bill Repayment: An Analysis of Risks and Benefits, 2014)

⁷⁰ It is important to differentiate the definition of tariff for the purposes used here from the definition of tariff often used in the utility regulatory proceedings. For this report’s purposes, a tariff is a charge that is undifferentiated from any other utility bill charge.

traditional underwriting criteria rejected around eight times as many applications as the median rejection rate of on-bill loan programs that rely primarily on utility bill payment history (State and Local Energy Efficiency Action Network, 2014).

Program administrators should also examine regulatory requirements associated with making eligibility decisions for consumer credit, such as the Equal Credit Opportunity Act, state licensing requirements.

Measure Eligibility

On-bill programs that have achieved significant uptake in their target market have typically taken one of two approaches: (1) allow consumers to finance almost any energy-related improvements with particular focus on high-efficiency HVAC equipment or windows; or (2) couple on-bill lending with robust financial incentives and rebates (see sidebar titled “Butler Electric Cooperative”). The former approach raises questions about the extent to which these initiatives lead to comprehensive retrofits or significantly transform existing efficiency services markets, while the latter approach may raise questions regarding cost-effectiveness (and potential rate impacts) of these programs. We also found that programs requiring “bill neutrality” (estimated project savings are greater than or equal to loan payments) have often struggled to achieve significant market penetration and do not appear to have significantly lower default rates.

Butler Rural Electric Cooperative’s (REC) Energy Efficient Improvement Loan Program

Since 1982, Butler REC in Southwestern Ohio has offered their 11,000 residential members on-bill loans to finance whole home energy efficiency measures. Participants can finance 100% of project costs (up to \$25,000) at a 3.5% fixed interest rate for up to 10 years. Qualification for a loan depends on traditional credit scores and bill payment history. The program has made over 500 loans for \$7.5 million dollars (average loan is \$15,000) with defaults under 1%. Participants can also take advantage of generous rebates. For example, in 2014, Butler introduced a \$1,200 rebate for geothermal systems and made over \$350,000 in loans, all for geothermal systems.

Source of Capital

Historically, on-bill programs have utilized public, utility customer, or shareholder capital to fund loans. Programs that use these three sources of capital, designated as on-bill *financing* programs, have produced the bulk of on-bill loan volume (see Table 5-3). Many programs begin as pilots that do not require the more significant private capital needed to scale a program or have used limited public funds (e.g., ARRA grants). In recent years, more on-bill programs have attracted private capital instead of public funds; these are known as on-bill *repayment* programs. When on-bill programs begin to scale, utility customer funds or even utility shareholder dollars may not be sufficient to capitalize new loans. In these cases, program administrators must seek funding elsewhere and, if it can be accessed, private, non-utility shareholder capital can provide an abundant, sustainable source of loan capital.

There are multiple pathways to tapping into private investor monies but the choice of pathway may have significant impacts on program administration costs, risks, and flexibility in program design.⁷¹ Some program administrators have been reluctant to provide guarantees against losses to private sector on-bill investors. However, experience to date suggests that this credit enhancement strategy is worth consideration. Credit enhancements may be an effective way to access pools of low-cost private capital, at low risk to utility bill-payers, while maintaining program flexibility.

⁷¹ For example, some programs are tapping networks of private lenders, revenue bonds, and secondary market sales of their existing portfolios (State and Local Energy Efficiency Action Network, 2015).

Table 5-3: Definition, dollar volume, and percent of total volume of programs reporting on their source of capital

Program Type	Source of Capital	\$ Volume	% of Total \$ Volume
On-bill Financing	Utility shareholder, utility bill-payer, or public funds (e.g. taxpayer funds, greenhouse gas auction proceeds)	\$1.2 billion	66%
On-bill Repayment	Private investors (non-utility investors)	\$631 million	34%

Source: (State and Local Energy Efficiency Action Network, 2014)

Program Design Considerations

Utility Billing System Upgrade Costs

Adopting an on-bill financing program can require significant upgrades to utility billing systems. New York State utilities spent over \$1.2 million to upgrade their systems, partly to accommodate on-bill loans (State and Local Energy Efficiency Action Network, 2014) and California has approved \$10 million for billing systems upgrades for their on-bill pilots (Spasaro, 2016).⁷² These costs may not be representative for all utilities that implement an on-bill loan charge. In fact, some rural electric co-ops were able to accommodate on-bill loans “by hand” resulting in no additional software costs. However, in general some upgrades may be required and information technology (IT) consultants can be expensive compared to on-bill program administration budgets. Baltimore Gas and Electric was able to take advantage of an IT system upgrade that was scheduled for other reasons. If this had not been possible, the upgrade costs would have been difficult to justify, given the size of the financing program and its budget.

Transferability

The ability to transfer a loan to a new occupant can allow borrowers to pay for energy improvements only while they benefit from them. Transferability also allows programs to serve renters, who are historically difficult to reach through energy efficiency programs.

New York State utilities spent over \$1.2 million to upgrade their billing systems, partly to accommodate on-bill loans.

However, few programs have had a significant number of transfers, offering little empirical evidence of the success of this feature. Even in New York’s program, which allows this transfer, it appears few home buyers accept the prior owner’s loan repayment obligation. One reason for this is that conventional mortgage lenders uniformly require a home purchaser to obtain the house “free and clear” of loan obligations, and frequently require title insurance to assure that the homeowner (and the lender by extension) obtain such clear title. Some observers suspect the few transfers that have occurred have occurred because this new practice may be escaping the notice of the title searches intended to identify outstanding loan obligations. It is possible mortgage lenders (and title insurance companies) will require any unpaid on bill loan balances to be fully paid by the buyer or seller at closing, thereby obviating any arguable value of the transfer mechanism. (Henderson P. , 2016)

There is at least one notable counter-example to the argument above. Midwest Energy’s How\$mart Kansas, had a high proportion of renters and frequent transfers (150 out of 989 residential loans).⁷³ In a transfer situation, half of new occupants chose to take over the loan (i.e., the loan transferred), while the other half asked that the loan be paid off by the previous occupant (i.e., the original occupant paid off the balance of the loan). (State and Local Energy Efficiency Action Network, 2014)

⁷² California’s higher costs are partly due to the need to accommodate multiple lenders and multiple pilots (seven in total).

⁷³ The 150 transfers included some renters.

How State and Local Actors Can Get Involved

Implement Legislation that Supports On-Bill

In a number of states, on-bill programs have been accompanied by state enabling legislation. Sometimes, as in the case of California and Hawaii, state governments have played a key role in establishing and administering the institutions necessary for large-scale on-bill programs. Legislation can lock in key program design features so policymakers should be informed about key program design features, and their tradeoffs, before codifying them into law.

For example, the original on-bill legislation for Illinois' Energy Efficiency Loan program required eligible measures to pass a modified cost effectiveness test that included the measure's full cost, which is a strict way to determine cost effectiveness. The result for Nicor Gas, one of five participating utilities, was that no measures qualified for on-bill loans. ComEd, another of the five participating utilities, only had one measure that could be included in the program (ENERGY STAR® refrigerators). Initially, this led to minimal uptake for these on-bill programs. Moreover, private sector lending partners were not able to make money on such small loans (e.g., for a refrigerator). Subsequent legislation ultimately modified this rule and allowed any measure in a utility's DSM portfolio to be included in the on-bill program.

Capitalize or Support On-Bill Loans with Public Funds

Some states have set up revolving loan funds to capitalize on-bill programs. Examples include the Georgia Environmental Finance Authority's grant to several electric cooperatives which was used, for example, to establish revolving loan funds that capitalize on-bill loans to municipal utility customers. State agencies can also assist with sale of an on-bill loan portfolio. For example, the New York State Energy Research and Development Authority's (NYSERDA) sale of its on-bill portfolio at attractive terms was only possible due to a guarantee provided by the New York State Environmental Facilities Corporation's Clean Water Revolving Fund.⁷⁴

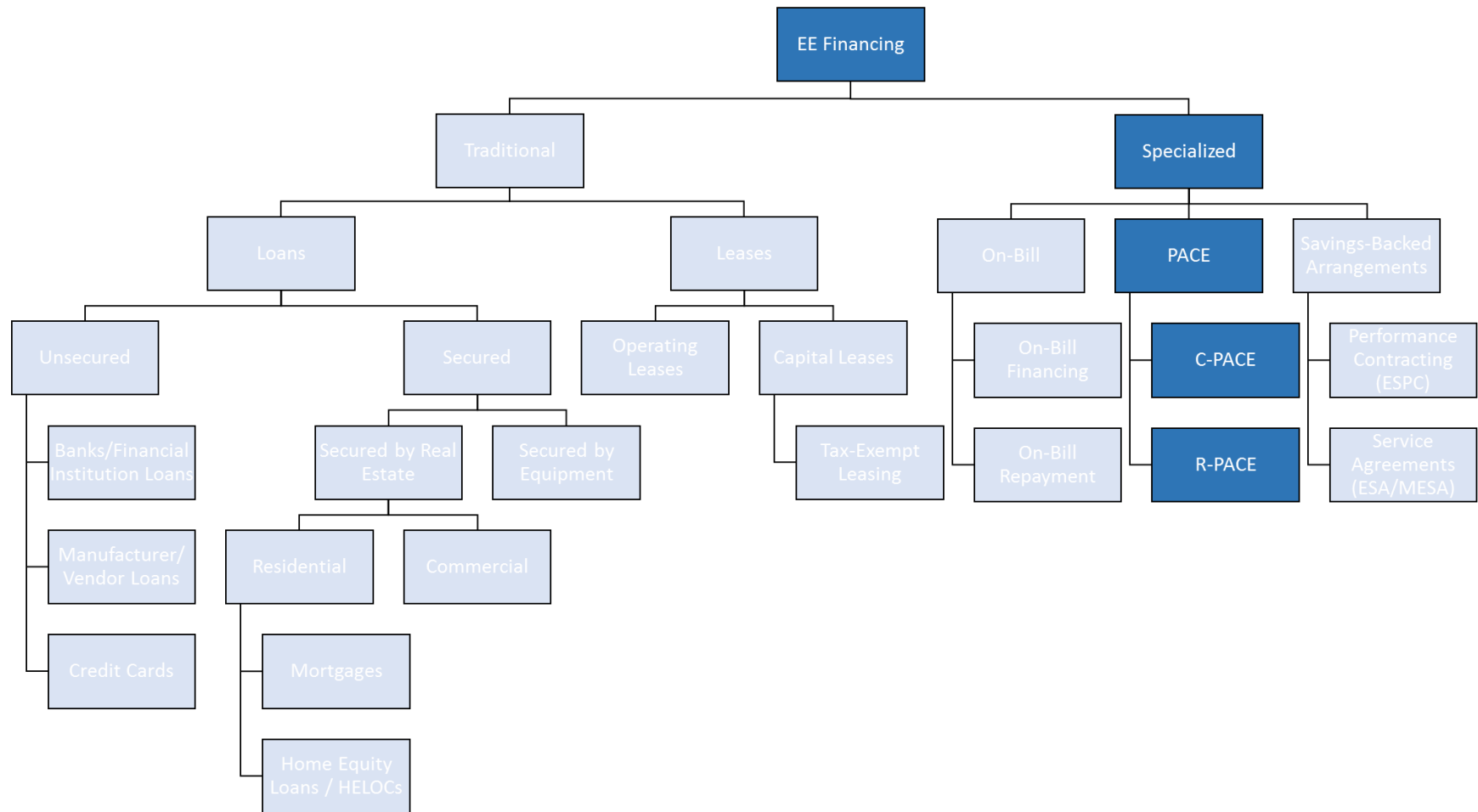
Direct Program Implementation

We found that state governments are typically not involved in the direct administration of individual on-bill programs.⁷⁵ However, there are numerous examples of local governments administering on-bill programs through municipal utilities (e.g., Fort Collins Utilities in Fort Collins, Colorado and a number of members of Electric Cities of Georgia, an association of municipal utilities). Local governments that have municipal utilities might consider offering on-bill loans to promote energy efficiency if their efficiency goals align with some of the potential advantages of this financing structure.

⁷⁴ NYSERDA is a state agency that administers an on-bill program.

⁷⁵ NYSERDA is one exception.

Property Assessed Clean Energy



6. Property Assessed Clean Energy

Key Takeaways

- PACE financing allows state and local governments to support financing for energy efficiency and renewable energy improvements on private property through special assessments that are repaid through property tax bills.
- In the residential sector, recent statements by the FHA and the FHFA suggest that PACE lenders may voluntarily subordinate their claims in order to address regulatory concerns.⁷⁶ The potential impact of these design changes on the willingness of PACE lenders to continue offering rates and terms attractive enough to result in cash-flow-positive financing remains unclear.
- In the residential sector, the vast majority of projects have been concentrated in California, although several programs are operating in other states. Solar PV accounts for approximately one third of the residential measures installed in terms of dollar volume, with energy efficiency measures (e.g., high efficiency HVAC systems and windows) making up most of the remaining measure mix.
- In the commercial sector, over 80 percent of projects have been concentrated in three states (California, Ohio, and Connecticut). Approximately half of these projects are energy efficiency projects, 40 percent are renewable-only projects, and 10 percent are a combination or another measure type (e.g., water efficiency).
- In practice, many PACE projects consist of capital-intensive renewable and energy efficiency measures (e.g., new HVAC units, windows, doors, and replacement of aging equipment) that may be driven by external market factors. The effectiveness of PACE in encouraging comprehensive home retrofit projects or encouraging more efficient choices remains somewhat unclear.
- The combination of cash-flow-positive financing and the transferability of PACE assessments is often intended to drive demand for energy efficiency improvements, particularly for proactive and/or comprehensive projects, by offering an attractive value proposition.
- The significance of the transferability of PACE also remains somewhat unsettled. In California, approximately half of all residential PACE assessments are cleared during sale, and mechanisms are still being implemented to assure that title companies and lenders are aware of outstanding loan balances in the purchase/sale transaction.

What is Property Assessed Clean Energy?

Land-secured financing districts, also called special assessment districts, have been used in the United States for more than 100 years to pay for infrastructure improvements deemed to be in the public interest. PACE financing allows state and local governments to extend the use of land-secured financing districts to fund energy efficiency and renewable energy improvements on private property through voluntary property assessments.⁷⁷ This extension requires state-by-state enabling legislation that specifies what types of measure are eligible for PACE financing. PACE assessments are repaid on the property tax bill and, proponents would argue, are intended to survive foreclosure.

⁷⁶ See (Golding, 2015) and (Pollard, 2016).

⁷⁷ In California, PACE may also be used for water efficiency and conservation, electric vehicle charging infrastructure, and seismic strengthening. Some other states also allow non-energy measures (e.g., in Florida PACE may be used for wind mitigation). PACE-enabling legislation typically specifies eligible uses.

Why Is PACE Used?

PACE is a specialized financing product that involves a novel use of a municipality's powers to provide funding for clean energy projects. Proponents argue that PACE may be uniquely able to overcome some of the barriers that limit energy efficiency adoption, including:

- PACE offers 100% financing of project costs;
- PACE's strong form of security may allow for long loan terms that enable larger projects with longer paybacks;
- PACE assessments attach to the property, not the original borrower, allowing occupants to pay for improvements only so long as they benefit from those improvements;⁷⁸
- PACE may also make attractive, long-term financing for energy improvements available to a wider range of consumers, because PACE financing is not contingent solely on an individual's credit history.⁷⁹

How Has PACE Been Used to Date?

Residential

The residential PACE concept was developed in the mid- to late-2000s and the first PACE programs were implemented in California and New York in the late 2000s. Statements from federal mortgage regulators (see sidebar "FHFA on Residential PACE") and subsequent lawsuits slowed the rollout of residential PACE programs and shifted focus onto commercial PACE.⁸⁰ Despite an uncertain regulatory outcome, residential PACE programs in California and Florida have moved forwards, with the vast majority of residential PACE projects concentrated in California.^{81,82,83}

Over 47,000 residential PACE assessments worth nearly \$960 million have been placed across California, with concentration in Riverside, San Bernardino, San Diego, Los Angeles, Sonoma, and Placer counties (Elias, 2015) (McNeill, 2015) (Fruscha, 2015) (Windeshausen, 2015). Over 75 percent of these assessments, by count and by dollar volume, have been originated since 2014 (see Figure 6-1). In 2014, PACE supported \$267 million in investment for electric efficiency (Deason, Leventis, Goldman, & Carvallo, 2016). Of this, \$248 million went to residential customers, about \$12 million went to commercial and industrial customers, and less than \$1 million went to institutional customers. That year, 12,000 residential loans were generated compared to less than 30 non-residential loans (Deason, Leventis, Goldman, & Carvallo, 2016).⁸⁴

⁷⁸ In practice, PACE assessments in California are often paid off during a transfer of ownership, although many have transferred to subsequent homeowners. PACE assessments are more likely to carry through a refinancing, and at least two have carried through foreclosure proceedings.

⁷⁹ No programs use FICO score as an eligibility criterion, however some use history of past defaults or history of delinquency on property taxes.

⁸⁰ PACE program administrators have been exploring ways of expanding residential PACE using a subordinated PACE lien structure, as has been allowed under Fannie Mae guidelines since 2010. See (Fannie Mae, 2016), page 793.

⁸¹ Residential PACE programs in Missouri, Vermont, and Maine have also been implemented; some programs work around the FHFA's concerns; in Missouri, St. Louis PACE offers PACE only to homeowners with no mortgages, while Vermont and Maine subordinate the PACE assessment to the first mortgage.

⁸² PACE in Florida has been stalled by several law suits, some of which have been resolved. Three residential programs operate in the state: Ygrene's Clean Energy PACE program, The Florida PACE Agency, and the Florida Green Energy Works Program, which Renew Financial recently invested in. Thus far, Florida has not shared exact project volume amounts; however it is estimated that a combined \$25 million of residential and commercial PACE assessments have been placed in South Florida (Hemlock, 2015).

⁸³ Small multifamily properties of 1-4 units are eligible under residential PACE programs. Large multifamily properties or 4 or more units are eligible for commercial PACE programs. Less than several dozen large multifamily projects have been completed.

⁸⁴ All numbers from Deason, et al are for electric efficiency only; renewable and gas measures are not included.

Approximately one-third of PACE assessments have been used to fund solar photovoltaic (PV) systems. In California, PACE assessments average over \$20,000, and, even though credit checks are not used in underwriting these loans, the typical FICO score of individuals receiving PACE assessments is between 700 and 720. Interest rates range from 6 to 9 percent, depending on program administrator and length of the assessment (years).

Regulatory Issues

As PACE has developed, it has had a controversial regulatory history at the federal level. This includes guidance to lenders from two key actors in the mortgage market: the Department of Housing and Urban Development's (HUD) Federal Housing Administration (FHA) and the regulator of Fannie Mae and Freddie Mac, the Federal Housing Finance Agency (FHFA). The FHA insures mortgages for lenders, while Fannie Mae and Freddie Mac buy mortgages from lenders, impacting a large part of the mortgage market.

The Federal Housing Finance Authority (FHFA), created in 2008, is an independent regulatory agency that works to ensure that the housing government-sponsored enterprises (GSE) (e.g., Fannie Mae and Freddie Mac) operate in a safe and sound manner. In July 2010, FHFA issued guidance to the GSE warning that first-lien PACE assessments "present significant risk to lenders and secondary market entities" and directed the GSEs to undertake risk mitigation actions to protect themselves against PACE-encumbered mortgages (e.g., adjusting allowable loan to value ratios, tightening borrower debt-to-income ratios) (FHFA, 2010). In Fall 2010, New York, Florida, and California sued the FHFA and, as a result of the California case, which was eventually dismissed, FHFA did issue a proposed rulemaking that introduced three risk mitigation options that might allow GSE to purchase PACE-encumbered mortgages including provision of a guarantee, insurance, or protective standards such as strict underwriting criteria for the PACE assessment (FHFA, 2012). However, since 2011, the FHFA has periodically issued "lender letters" or other statements to the GSEs reiterating its original position on first-lien PACE assessments.

In 2013, the California legislature and the California Alternative Energy and Advanced Transportation Financing Authority (CAEATFA) established a \$10 million loss reserve fund that will compensate first mortgage holders for direct losses experienced in a foreclosure that are attributable to a PACE lien covered under the program. The loss reserve is intended to "ease concerns expressed by the FHFA by providing funds to reimburse the first mortgage lender for the PACE payments it paid while in possession of the property during a foreclosure." (Office of Governor Edmund G. Brown Jr., 2014) The FHFA responded in May 2014 noting that "the FHFA is not prepared to change its position on California's first-lien PACE program...FHFA has carefully reviewed the Reserve Fund ... and while I appreciate that it is intended to mitigate these increased losses, it fails to offer full loss protection to the Enterprises ... and FHFA has concerns about the Reserve Fund's ongoing sustainability." (Office of the Director, Federal Housing Finance Agency, 2014) To date, no claims have been received against the loss reserve.

On July 19, 2016, the White House and the Department of Housing and Urban Development (HUD) issued guidance outlining the conditions under which FHA would insure a PACE-encumbered property. Those guidelines include:

- PACE loans must be subordinated to FHA-insured mortgages;
- the PACE loan cannot be subject to acceleration (i.e., the full outstanding obligation cannot be demanded once payments become delinquent);
- the PACE lien cannot restrict transfer of the property to a new owner;
- there is full disclosure of the PACE lien to any subsequent owner; and,
- after sale of the property, the PACE obligation, including any outstanding balance transfers to the new owner. (HUD, 2016)

The implications of this announcement—particularly the subordination of PACE loans—are not yet clear, however several PACE administrators and industry groups have used a "contractual subordination" of PACE assessments that has been trialed in California. In theory, contractual subordination would be an agreement by the PACE lender that, in the event of a default or foreclosure, the PACE assessment would become subordinate to the mortgage (Renovate America, 2015) (PACENow, 2015). In testimony to the California legislature on June 9, 2016, however,

FHFA General Counsel Alfred M. Pollard stated that, from FHFA’s perspective, “Liens running with properties *that are not extinguished through foreclosure* are not true second liens, even if termed ‘subordinated’.”⁸⁵ (California Legislature, 2016)

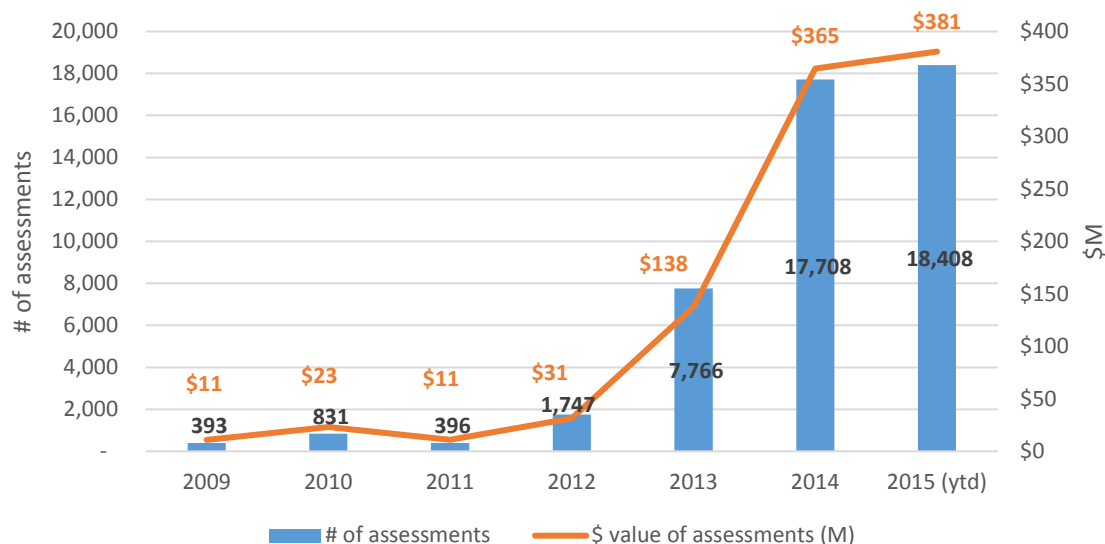


Figure 6-1: California residential PACE assessments, 2009-2015

Commercial

After FHFA’s actions, many jurisdictions switched their focus to commercial PACE programs, which are not as affected by FHFA because (1) commercial mortgages often require the borrower to obtain lender consent when incurring new debt, which arguably includes through tax assessments, (2) lenders are often notified when tax assessments are added to the property and (3) the Office of the Comptroller of the Currency (OCC), which regulates commercial banking, raised these concerns in 2010 (Office of the Comptroller of the Currency (OCC), 2010), but has subsequently not been as vocal in raising concerns regarding PACE assessments. Some commercial PACE programs choose to require lender notification or lender consent before a PACE assessment can be placed.

Thirty-one commercial PACE programs in 13 states have funded projects, and five programs have been launched but have not yet funded projects (PACE Nation, 2015). While there are many commercial PACE programs, over 80 percent of projects have been completed by a few programs in Connecticut (the Connecticut Green Bank), Ohio (the Toledo Lucas Port Authority program), and California (CaliforniaFIRST, Sonoma County Energy Independence Program, Ygrene Clean Energy Works, Figtree PACE, and mPower Placer County) (see Table 6-1).

⁸⁵ Emphasis is LBNL’s.

Table 6-1: Commercial PACE activity by state since 2009 (as of Q2 2015)

State		# of Commercial PACE Programs That Have Funded Projects	Approximate # of Projects Funded	Estimated PACE Funding in Commercial Sector
CA		10	143	\$60,000,000
CT		1	76	\$50,000,000
OH		3	100	\$21,000,000
MO		3	12	\$4,000,000
FL		4	8	\$5,000,000
WI		1	2	\$3,000,000
MI		2	6	\$1,600,000
CO		1 (inactive)	29	\$1,500,000
MN		2	9	\$900,000
DC		1	2	\$400,000
UT		1	1	\$100,000
NY		1	2	\$100,000
AR		1	1	\$30,000

Source: (PACE Nation, 2015)

Total volume of commercial PACE programs is relatively modest, with 700 projects and \$220 million deployed as of the end of 2015 (PACE Nation, 2015). Of these 700 projects, approximately 48% are energy efficiency projects, 39% are renewable energy, and 13% are a combination or another measure type (e.g., wind protection, water efficiency) (PACE Nation, 2015). Most commercial PACE projects have focused on the retail, office, hospitality, and industrial market segments (PACE Nation, 2015). PACE project sizes vary significantly (see Figure 6-2).

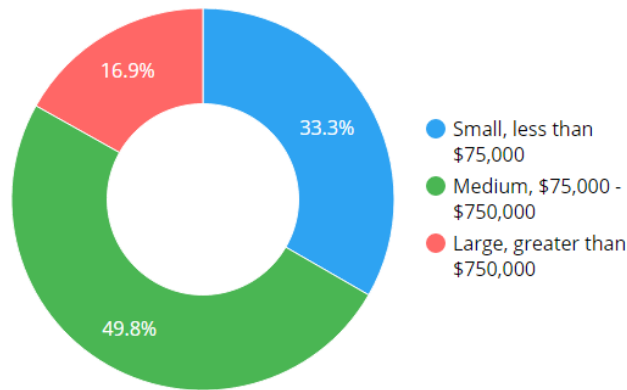


Figure 6-2: Number of commercial PACE project by project size (\$) (2009-present)

Source: (PACE Nation, 2015)

Design Options and Considerations

Level of Program Organization

PACE programs may be organized at local, regional, or state-wide levels:

- Local Organization.** The PACE program is operated within the jurisdiction of a single local government, typically a town or city. This organizational structure was common in the earliest PACE programs (e.g., Berkeley and Palm Desert in California and Boulder, Colorado). Local program organization offers municipalities the greatest flexibility in program design but may place additional administrative and start-

up cost burden on the municipality. While some local PACE programs remain, there is a trend towards regional and state-wide approaches.

- **Regional Organization.** A single PACE program is operated across the jurisdictions of multiple local governments in a region, each of which typically opts into the regional program. Examples include California FIRST and California HERO. Regional programs are often developed where there are existing regional governance entities willing to act as PACE program sponsors. In regional programs, local governments retain responsibility for placing PACE assessments on properties, and collecting payments. The regional model may enable local governments to maintain some level of flexibility to tailor PACE programs to regional needs while minimizing program administration costs through the centralization of program functions and the potential to recover these costs across a larger customer base.
- **Statewide Organization.** A PACE program is operated at statewide scale and municipalities are eligible to opt into the program. Connecticut's commercial PACE program is organized at a statewide level. Program administrators establish a single set of program rules and participation processes for the entire state, which may be more attractive to contractors, customers and capital providers than navigating differing protocols across multiple local or regional programs.

Type of Program Administrator

PACE program sponsors have two basic choices in selecting a program administrator: public or quasi-public administrator or private administrator.

- **Public or Quasi-Public Administrator.** A public or quasi-public entity is responsible for program administration. The administrator commonly subcontracts certain program functions (e.g., quality assurance, marketing) but retains responsibility for overall program management. A public or quasi-public administration model offers a program sponsor the greatest control and flexibility in program design but places a larger administrative burden on sponsors.
- **Private Administrator.** Private PACE administrators may be paid for their administration services only (fee for service model) or may provide both administrative services and the exclusive right to finance PACE improvements (one stop shop model). A one stop shop administrator may offer PACE programs at no cost to program sponsors in exchange for the exclusive right to fund assessments in the jurisdiction. This potential benefit to taxpayers should be weighed against the risks of reducing competition among financiers to deliver attractive capital to participants.

Capital Source

Similar to other energy efficiency financing products, the up-front capital to fund PACE improvements may come from a range of public and private sources. A program administrator's choice of capital source is often closely tied to the policy goals driving PACE activity.

- **Public Capital.** Program administrators may use taxpayer or other public monies (e.g., Regional Greenhouse Gas Initiative proceeds) to fund PACE assessments. This model provides the most flexibility to program administrators with regards to the interest rates and terms at which PACE assessments are offered.⁸⁶ This approach was common with early PACE programs (e.g., Ann Arbor, MI; Sonoma, CA).
- **Private Capital.** Private capital is generally accessed in one of three ways, although variations are possible.
 - **Program Administrator Acts as Warehouse.** A program administrator uses public capital to initially fund PACE assessments. They then hold these assessments ("warehouse" them) until they have aggregated a sufficient pool of assessments to sell to private investors. Packaging and re-selling PACE

⁸⁶ The use of public capital may also reduce the perception of a need for savings-to-investment ratio requirement greater than one, which is sometimes promoted as a way of protecting or satisfying private capital investors. For example, the Sonoma program, which uses public capital, does not have an SIR requirement, which may in some cases expand the number or scope of eligible projects.

assessments can have financial and transaction costs, so program administrators typically seek to accumulate a relatively large pool (e.g., \$20 million) of assessments before pursuing a secondary sale. Connecticut used this approach with its Commercial PACE portfolio.⁸⁷

- o **Private Program Administrator Funds Assessments.** The program administrator secures a line of credit or other investment capital to fund PACE assessments. The private entity may then choose to (1) hold these assessments as an investment or (2) re-sell them in a secondary market transaction. In several cases, the private entity has negotiated to have public entities harness public bonding mechanisms on their behalf to facilitate this secondary markets transaction. California's HERO program is an example of this approach.
- o **Open Market Model.** One or more financial institutions invest in individual PACE assessments at terms negotiated with the property owner. Any qualified financial institution may participate, avoiding program sponsor or administrator involvement in capital provision. In the open market approach, multiple financial institutions could be interacting with program administrators, which may necessitate additional infrastructure to coordinate activities.

Transferability

The potential for the balance of a PACE assessment to be assumed, by a subsequent owner upon a property's sale—known as transferability— may create additional value.⁸⁸ Transfer of the PACE assessment is intended to align the realization of the PACE-funded project's benefits (e.g., comfort, lower utility bills) with repayment of the obligation. Transferability may help overcome the "long project payback" barrier, whereby potential participants are reluctant to invest in projects with long paybacks because they anticipate leaving a property before the full benefits of the improvements are realized. With PACE, consumers may have increased confidence that they will only be responsible for making PACE payments while they are occupying the property and benefiting from the improvements.⁸⁹

In practice, PACE assessments are often cleared during a sale; in California, over half of assessments are cleared during a sale (Goodman & Zhu, 2016). To date, there has been relatively little quantitative impact analysis on the importance of transferability (e.g., whether it has substantial value in overcoming property owner reluctance to make long-payback investments in energy improvements or their ability to monetize the value of these improvements during property transfers).

Security

Typical financial products are either secured by property (e.g., a lien on the property, as in a home mortgage) or by a borrower's contractual commitment to repay (e.g., consumer loans). Secured financial products typically create less risk of loss for lenders, leading to lower interest rates and longer loan terms than unsecured loans (all else being equal).

PACE assessments, as special tax assessments placed on a property rather than a loan secured against the property, are senior to all other non-tax debt on a property.⁹⁰ However, recent discussions regarding contractual

⁸⁷ See (State and Local Energy Efficiency Action Network, 2015) for a description of this transaction.

⁸⁸ Optional transferability is available for other financing tools, including on-bill financing products. Financial tools featuring optional transferability require that purchasers explicitly consent to the transfer of the obligation. See (State and Local Energy Efficiency Action Network, 2014) for a more detailed discussion.

⁸⁹ Importantly, the value of automatic transferability in overcoming the long payback barrier is based on the assumption that subsequent owners will value the improvements for which they are being asked to assume the assessment payments. In the event that subsequent owners do not value these improvements, one could reasonably assume that they will simply reduce the amount that they are willing to pay to purchase a property or require the outgoing property owner/tenant to clear the assessment (i.e., pay the balance) as a condition of the sale.

⁹⁰ In response to the FHFA's position on residential PACE, several states chose to design their PACE assessments as subordinate to the first mortgage. This choice may lead to higher interest rates.

subordination introduce the idea that PACE lenders could voluntarily agree that their claim via the PACE assessment would be subordinated to the mortgage in the event of serious default or foreclosure (see sidebar “Recent Developments” section above). The effect of contractual subordination on interest rates and mortgage regulator approval of residential PACE remains to be seen.

Underwriting Criteria

One of the key features typical of PACE programs is the relatively flexible set of underwriting criteria that is generally used. Since PACE assessments are placed on the property tax bill, underwriting criteria generally direct program administrators to look at a borrower’s tax payment history to determine the risk of nonpayment. Other criteria may be examined as well (e.g., mortgage payment history and any past bankruptcy declarations). Common metrics such as credit scores are generally not used.

Other underwriting criteria are often included at least partially to protect other creditors who will come behind the assessment once it is placed. For example, programs typically seek to ensure that there is sufficient equity in a property even after the assessment is made to adequately cover all debt holders. These types of metrics can help secure mortgage holder consent in the commercial sector and are intended to help address regulatory concerns in the residential sector.

Some programs also require that anticipated savings from PACE exceed the investment cost (e.g., savings to investment ratio (SIR) greater than 1). To date, it is unclear whether SIR requirements correlate strongly with superior loan performance.

Eligible Measures

PACE financing can be used to fund a range of improvements, including energy efficiency, renewable power systems, and non-energy upgrades such as wind protection or water efficiency measures. Allowing a wide range of measures, including non-energy measures may increase demand and program volume.

Single Measures versus Comprehensive. Some property owners will prefer a multi-measure building upgrade while others will want to replace one or two key measures. In setting guidelines regarding measure eligibility, policy makers must balance between driving participation by “meeting the market where it is” versus encouraging or requiring more comprehensive multi-measure upgrades. If an important policy goal is program volume and job creation, policy makers may decide to allow single-measure projects, with an option to shift more towards multi-measure projects over time. If the primary policy goal is to encourage comprehensive efficiency retrofits, then a program might be structured to require a minimum level of energy savings or include a required set of energy efficiency measures. To date, the majority of residential PACE projects have implemented solar PV systems, HVAC installations, or window replacements.

Savings to Investment Ratio. Savings to investment ratio (SIR) is defined as the value of expected bill savings over the lifetime of an improvement (or PACE assessment) divided by the project’s upfront or financed costs.⁹¹ Some PACE programs require projects to achieve a SIR of one or greater.

Thus far, there is little evidence regarding whether SIR requirements lead to lower rates of financing non-payment, particularly where energy costs are a small portion of a borrower’s budget. However, some in the lending and investing community have indicated a preference for positive-SIR underwriting.⁹² In some cases, SIR requirements

⁹¹ Jurisdictions vary in their specific SIR definition (e.g., what discount rate is used to calculate present value, how savings are defined).

⁹² For example, see PACENow “Lender Support Study,” p. 7 (“It’s all about the cash flow” for existing lenders providing consent): <http://pacenation.us/wp-content/uploads/2012/12/Lender-Support-Guide-12.28.20121.pdf>. See also, Moody’s announcement regarding PACE and CMBS loan documents (“Mortgage lenders could be in favor of incurring additional PACE leverage if energy savings are clearly and convincingly substantial enough to outweigh the risk, and thus benefit CMBS investors... [but] in all cases

are promoted as a way to ensure that PACE programs support only those projects in which the energy benefits outweigh the costs. However, it is important to distinguish whose costs are being examined. SIR is designed to weigh the *participant's* costs and benefits. Another option may be to compare *program* costs and benefits or to adopt measure and project eligibility criteria that are consistent with other energy efficiency programs in a given jurisdiction.⁹³ Future research on the actual usefulness of SIR as a consumer and investor protection device may be helpful.

Quality Assurance

Many existing energy upgrade programs have established quality assurance and quality control (QA/QC) protocols. PACE programs should consider leveraging these existing structures as PACE-financed measures are likely to be similar to those covered by existing programs. Some common protocols include:

- Maintaining a list of eligible contractors that have been trained or vetted by the program administrator.
- Offering a list of qualified improvements that can steer participants towards high-value projects that generate savings.
- Conduct post-installation inspections and/or monitor actual energy usage in order to verify savings and identify non-performing measures, projects, or contractors.

Open Questions

Value Proposition. The fundamental value proposition of the PACE model is often framed as cash-flow-positive financing, which is made possible through low rates and long terms tied to its strong security, and which can be sustained over the loan financing term because of its transferability feature. However, to date, there is little empirical evidence from process or impact evaluations that PACE financing is responsible for significantly scaling up proactive or comprehensive energy efficiency investments in residential or commercial markets. Whether PACE financing at scale can be used to do so in the future remains to be seen. Additional evaluation studies of PACE programs could be quite informative.

Attribution. Typically, the goal of publicly supported energy efficiency programs is to encourage savings that would not have occurred in the absence of the program. Going forward, it may be important to assess the extent to which PACE financing is responsible for more efficient choices in installed measures (e.g., HVAC equipment replacements, window replacements).

Can PACE Broaden Access? Often, PACE assessments are not based on a specific borrower's credit history. Thus, PACE has the potential to expand access to clean energy financing beyond highly credit-worthy consumers. However, based on current experience, it is unclear whether PACE financing has significantly expanded access to under-served customer markets. The average FICO of residential PACE participants has hovered around 700-720 (Fadrhonic, et al., 2016). To some degree, there may be a correlation between creditworthy borrowers as defined by traditional metrics and those customers with a solid tax and mortgage payment history who have equity in their property to take on a PACE assessment. As PACE matures, policymakers need to assess the extent to which PACE facilitates access to financing by underserved consumers.

Lender Consent. Commercial PACE programs typically require either lender notification or lender consent to PACE assessments. For the most part, commercial PACE programs have been able to obtain this consent; over 80% of

the lender should be in the position to make that credit determination.”), https://www.moody.com/research/Moodys-CMBS-loan-documents-need-to-explicitly-address-PACE-clean-PR_309970.

⁹³ If a program is able to invest a small amount of public or ratepayer funds into a PACE financing program that results in energy benefits greater than that investment, that activity may be worthwhile from a program standpoint. This may be true even if it means that the customer is personally willing to float the difference between the energy benefits that accrue to them and their own personal costs. In some cases, customers may be willing to do this because of the substantial non-energy benefits that are often associated with energy-related measures.

transactions in 2013 included lender consent and over 80 financial institutions have given consent to commercial PACE (PACE Nation, 2014). However, commercial properties whose mortgages have been packaged into commercial mortgage backed securities may have difficulty obtaining this consent, since their mortgages have been repackaged and sold to multiple investors. PACE advocates are investigating this issue.⁹⁴

How State and Local Actors Can Get Involved

Enable PACE via Legislation

PACE has been enabled in 31 states and the District of Columbia (National Council of State Legislatures, 2014). A state or local champion of PACE legislation can be helpful in bringing PACE to a state where it is not yet enabled. Several resources for constructing PACE enabling legislation are available.⁹⁵

Commission a Gap Analysis

Several jurisdictions have supported market studies or gap analyses to assess if PACE is the appropriate fit for their energy efficiency goals, resources, and community's needs. If such a study has not been completed, policymakers and/or program administrators may wish to consider supporting a study that could help them determine whether a PACE program would be a good fit in their jurisdiction. Some example market analyses include Connecticut (Connecticut Clean Energy Finance and Investment Authority, 2015); Multnomah County, Oregon (Multnomah County Office of Sustainability, 2012); Massachusetts (Massachusetts Department of Energy Resources, 2012); and Vermont (Vermont Public Service Department, 2013).

Outreach and Education

Lack of awareness and familiarity with PACE as a financing option has often limited the number of deals and increased the time needed to complete projects (Fischer, 2015). States and local jurisdictions could support marketing and education efforts for PACE, in collaboration with PACE program administrators. This education may need to be focused not only on property owners, but also underwriters, appraisers, financiers, and contractors, who all need to understand PACE to some degree to be comfortable with its use.

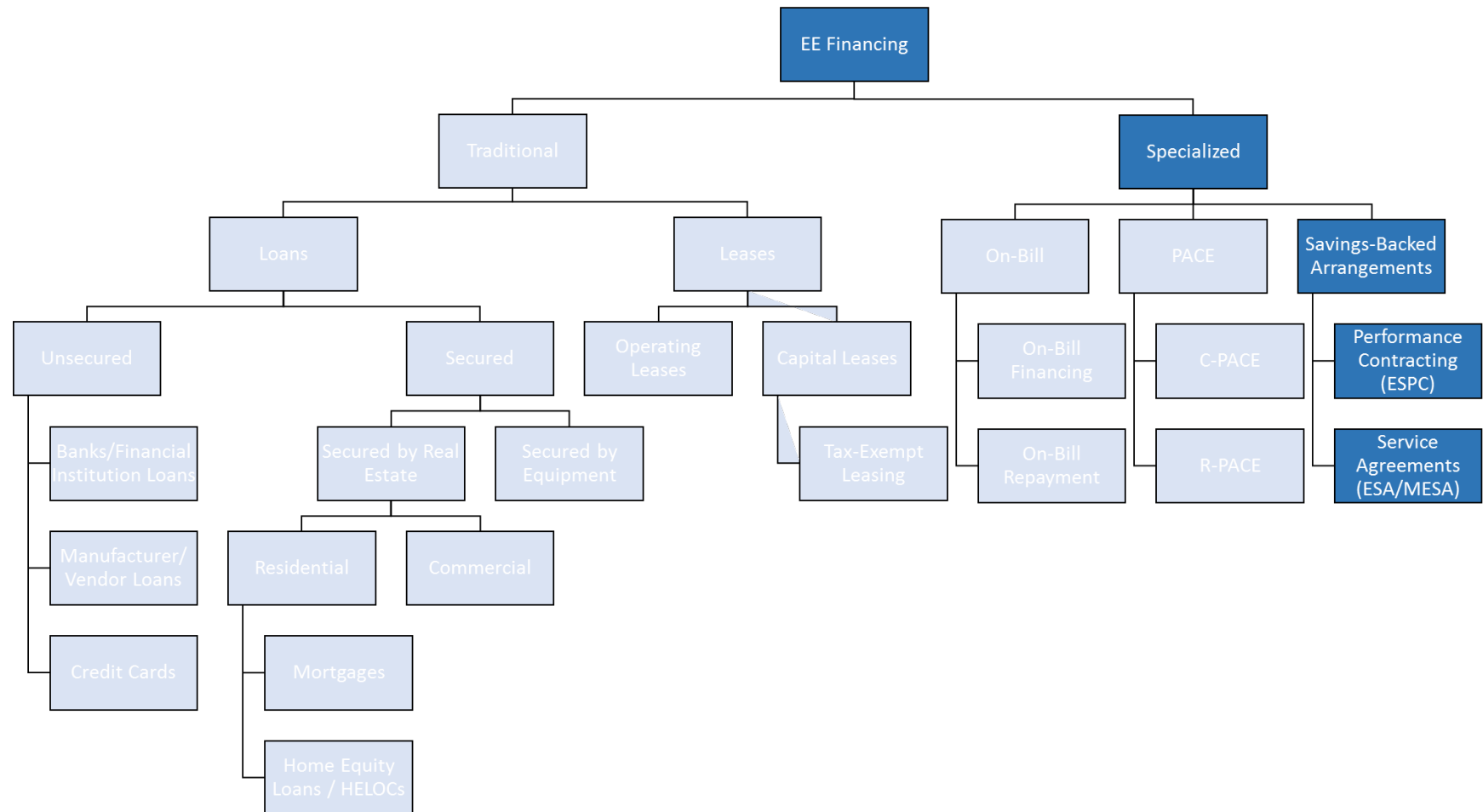
Support PACE with Public Resources

Some jurisdictions (e.g., Connecticut; Sonoma County, CA; and Toledo, Ohio) have made use of public or utility customer funds to support a PACE program. The specifics of how public funds are used vary among jurisdictions; in some instances, this support is only temporary. However, state and local actors may want to consider if the use of public funds to jumpstart a PACE program is a viable option in their particular situation.

⁹⁴ See PACE Nation's Lender Support Handbook: <http://pacenation.us/wp-content/uploads/2013/09/8.30.2013-Lender-Support-Handbook.pdf>.

⁹⁵ PACE Nation's enabling legislation checklist (found at <http://www.pacenation.us/wp-content/uploads/2015/03/PACE-Legislative-Checklist1.pdf>) or legislation protocol (found at <http://www.pacenation.us/wp-content/uploads/2015/09/PACENow-legislation-protocol1.pdf>) may be useful for states considering enacting enabling legislation.

Savings-Backed Arrangements



7. Savings-Backed Arrangements

Key Takeaways

- More money is spent on energy efficiency through energy savings performance contracts (ESPC) than through all other specialized efficiency financing products. Most ESPC activity takes place in the public and institutional markets (e.g., federal/state/local government buildings, K-12 schools, universities, and hospitals).
- The Energy Service Agreement (ESA) and Managed Energy Service Agreement (MESA)—a subset of ESAs—are multi-party financing arrangements that do not require public funds.
- ESAs allow building owners and managers to implement energy efficiency measures with no up-front costs; minimize the project performance risk and utility bill price risk; delegate operation and maintenance responsibility to a third-party; and potentially garner off-balance-sheet treatment for project costs.
- ESA providers pay the up-front project costs and thus must raise capital by attracting investors to each project, which adds significant transaction costs. Given the transaction costs, ESA projects tend to be large (e.g., from one hundred thousand to several million dollars) and targeted at large energy users. Two companies have been piloting a modified version of an ESA in the single-family residential sector and have served several hundred households.
- ESAs are complex and a relatively new structure with little activity to date. At present, ESAs are not well understood in the marketplace. This lack of awareness is currently a major constraint on the growth of this type of energy services product.

Savings-Backed Arrangements

In savings-backed arrangements, building owners or managers are insulated from performance risk—the possibility that the efficiency measures they invest in will not generate the anticipated savings.⁹⁶ These arrangements are backed by savings guarantees or shared-savings-type mechanisms. Such mechanisms can be complex, which can make these arrangements more expensive and can introduce transaction costs. Energy Savings Performance Contracts (ESPC), Energy Services Agreements (ESA), and Managed Energy Services Agreements (MESA) are savings-backed arrangements.

What is an Energy Savings Performance Contract (ESPC)?

Energy savings performance contracts (ESPC) are arrangements between energy service companies (ESCOs) and their customers (building owners and managers) that guarantee that the customer's efficiency project will realize a certain amount of energy savings, generally sufficient to offset the project's costs (and debt service payments). In cases where a project does not achieve the guaranteed savings, the ESCO typically makes up the financial shortfall to the customer.

Work for ESPCs is typically performed by ESCOs and include turnkey, comprehensive services such as whole-building energy audits, design and installation of energy efficiency (and possibly onsite generation) measures,

⁹⁶ In the case of many savings-backed arrangements, anticipated savings are expected to exceed financing payments, in effect making the project cash-flow positive.

measurement and verification of savings, and ongoing maintenance of equipment. Financing of ESPCs is often done through a third party financial institution.⁹⁷

Some customers that enter into an ESPC with an ESCO might use cash to pay for a portion of the project cost. However, financing is a key element in the majority of ESPCs. For example, leasing is commonly used to pay for projects developed under ESPCs (Stuart E. , Larsen, Goldman, & Gilligan, 2013). In these agreements the lease contract between the lessor and the customer is separate from the ESPC contract between the ESCO and the customer.

Figure 7-1 depicts a typical ESPC arrangement in which the ESCO develops a project with no up-front costs to the customer and provides a savings guarantee; the customer obtains financing from a third party and makes debt service payments over the term of the contract; and the customer obtains new high-efficiency equipment (or onsite generation) and retains savings after the contract term ends.

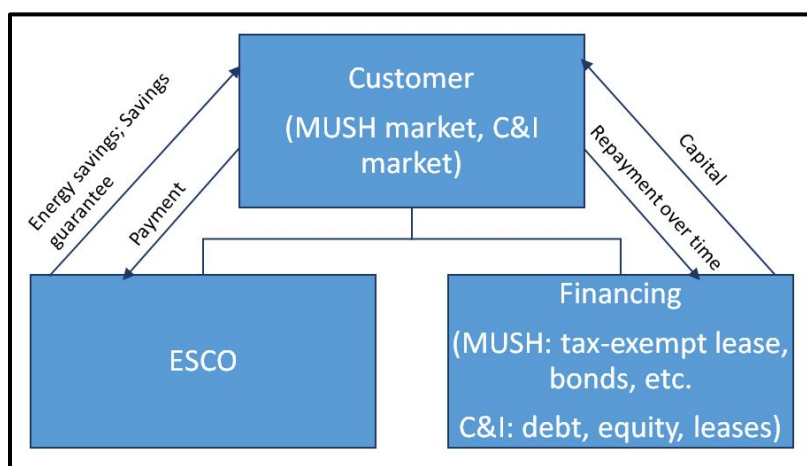


Figure 7-1: Typical ESPC arrangement

How Have ESPCs Been Used to Date?

The amount of money spent on energy efficiency through ESPCs is far greater than what is spent on all other specialized efficiency financing products. About 84% of the approximately \$5 billion ESCO market takes place in the public and institutional sector (e.g., state government buildings, and the MUSH market (i.e., municipalities, universities, schools, and hospitals)). The use of ESPCs (and reliance upon ESCOs to execute efficiency projects) is very common in the institutional market. (Stuart E. , Larsen, Goldman, & Gilligan, 2013) In 2014, \$4.1 billion in investment were made through ESPCs, with \$3.9 billion in the public and institutional market and \$171 million in the commercial and industrial market (Deason, Leventis, Goldman, & Carvallo, 2016).

What is an Energy Services Agreement (ESA)?

Energy Services Agreements (ESA) and Managed Energy Services Agreements (MESA)—a subset of ESAs—are contractual arrangements that allow a third party (i.e., the ESA or MESA provider) to implement energy efficiency measures for a customer who then pays for those measures through the resulting energy savings.⁹⁸ ESA providers retain ownership of the energy conservation measures (ECMs) that they implement; the projects that are

⁹⁷ Historically, ESCOs frequently advised customers on finding financing for their projects. However, the ‘Dodd-Frank Wall Street Reform and Consumer Protection Act’ of 2010 contains strong restrictions on the role that ESCOs can play in helping customers find financing (Gilligan, 2016).

⁹⁸ Throughout this chapter, “ESA” will refer to both ESAs and MESAs unless otherwise specified.

supported by an ESA can be financed through debt, equity, or lease financing.⁹⁹ (Wilson Sonsini Goodrich & Rosati (WSG&R), 2014) ESA providers work with energy service companies (ESCOs) or energy service providers (ESPs) to determine the customer's energy consumption baseline; design and install the ECMs; and manage the operations and maintenance (O&M) of the ECMs (see Figure 7-2).

ESAs are complex structures that involve the customer, the ESA provider, a special purpose entity (SPE), an ESCO or ESP, and investors. In a basic ESA arrangement, an ESA provider sets up a SPE for each client project (see Figure 7-2). A SPE is a subsidiary company of the ESA provider that is established to manage the complexities of each project to limit the risks of any given project to the ESA provider.

The ESA provider is an equity stakeholder in the SPE; the SPE may raise additional funds through the sale of equity to other investors or through debt or lease financing. The SPE enlists an ESCO or ESP to conduct an investment-grade energy audit of the customer's facility, determine average baseline energy consumption, and recommend ECMs that may be installed in the facility. If the customer wants to move forward, the SPE hires an ESCO or ESP to perform the work on the customer's facility and enters into an energy savings performance contract. The customer then pays the SPE for the realized energy savings (compared to the baseline consumption). The SPE uses the payments from the realized savings to compensate the ESA provider and its equity and debt investors and their leaseholders (lessors).

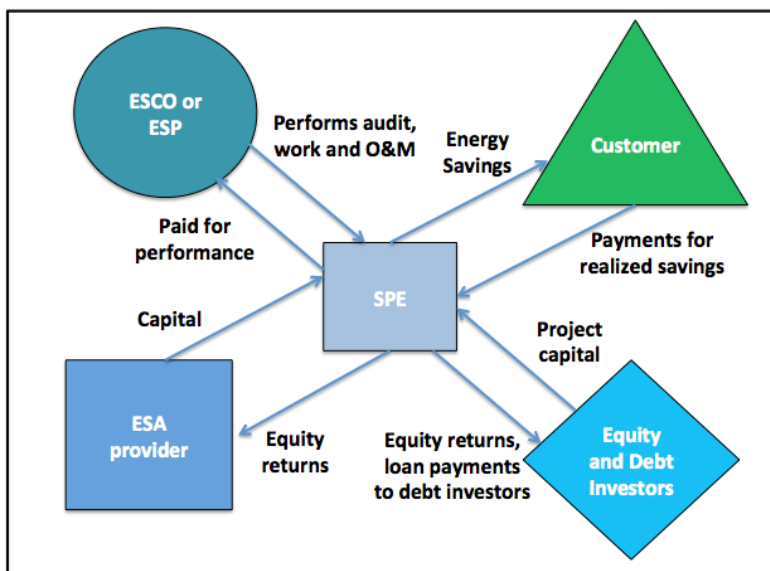


Figure 7-2: A basic ESA structure

ESA vs. MESA

ESAs and MESAs offer different payment structures to customers and, as a result, different risks. Both structures rely on rigorous monitoring and verification (M&V) to determine the energy savings that can be credited to the SPE, and ultimately, to the ESA or MESA provider.

ESA Structure

Under an ESA structure, after a project is completed, the customer continues to pay their utility bill but, ideally, it would be significantly lower than their average utility bill prior to the project. The customer also receives a separate bill from the ESA provider which charges the customer for the kilowatt hour savings (or negawatt hours) produced by the ECMs at a pre-negotiated rate that is lower than the per kilowatt hour tariff rate charged by the

⁹⁹ At the end of the contract term, the customer may buy the ECMs for fair market value.

utility to provide energy (see Figure 7-2). An escalation rate for this negawatt hour charge is built into the ESA agreement to reflect expected increases in utility rates over time. Thus the *customer* takes price risk—the risk that utility rate tariffs increase more slowly than the escalation rate. The ESA provider assumes the performance risk—the risk that the ECMs do not produce the estimated energy savings. The ESA provider can mitigate this performance risk by negotiating a guaranteed energy savings contract with the energy service provider hired to implement the project.¹⁰⁰

Once a project agreement has been executed, the customer’s payments to the ESA provider are secure and predictable. These stable, annuity-like revenue streams may make investment in ESA provider SPEs attractive to institutional investors (Hinkle, President, CEO and Board Member, Metrus Energy, 2015).

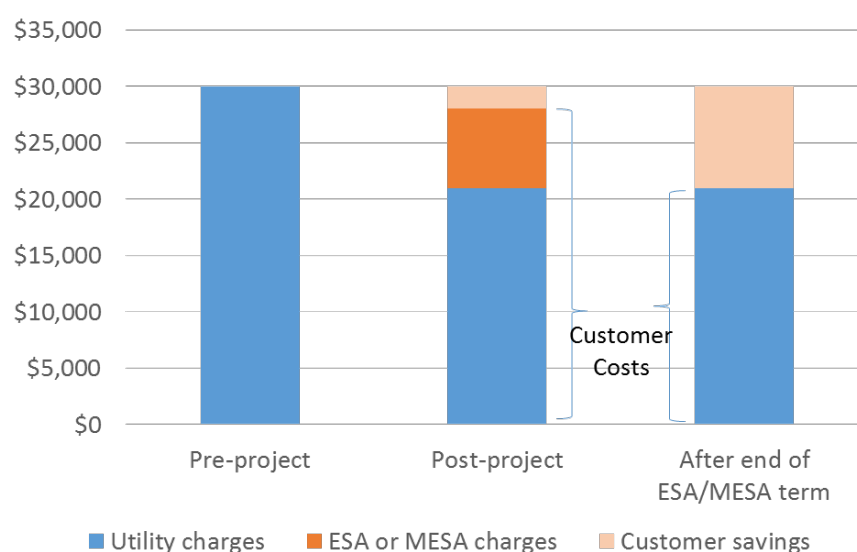


Figure 7-3: Hypothetical monthly costs for a customer with an ESA

MESA Structure

In a MESA agreement, the provider becomes a signer on the customer’s utility account and takes over responsibility for paying the customer’s utility bill.¹⁰¹ The provider and the customer agree to a monthly MESA bill amount based on historical consumption, specific inputs such as occupancy rate and weather, and the forecast energy savings. The forecast savings are charged at a lower rate than the utility’s tariffed rates to the customer. Thus, the customer pays a guaranteed bill amount each month that is less than they paid before the MESA. This is the guaranteed monthly bill amount that the MESA provider charges the customer (in Figure 7-3, the utility charges plus MESA charges in the post-project scenario).¹⁰² Each billing cycle, the MESA provider pays the customer’s utility bill and invoices the customer for the guaranteed monthly bill amount.¹⁰³ The difference

¹⁰⁰ Risk can also be mitigated through buying insurance policies such as the energy-specific, specialized products offered by Energi (<https://www.energi.com/>).

¹⁰¹ Although the MESA provider can make payments as a signer, it does not have full responsibility for the account; all repercussions of nonpayment impact the primary account holder solely.

¹⁰² An escalation factor is built into this number to protect the MESA provider from utility rate increases, but if rates on tariffs increase faster than the escalation factor, the MESA provider has to pay the difference.

¹⁰³ A MESA provider can implement efficiency measures for electricity, gas and water, and take over all three utility bills so that the customer just has to pay one bill instead of six (i.e. three utility bills and three energy service agreement bills), another added value of the MESA arrangement.

between the guaranteed monthly bill and the utility bill is the MESA provider's revenue (equal to the ESA or MESA charges in the post-project scenario in Figure 7-3).

With the MESA structure, the provider assumes project performance risk as well as utility price risk—the risk that utility tariffed rates will increase more than expected. The provider takes in the guaranteed monthly bill amount from the customer, which includes an escalation rate to anticipate utility tariff increases. If, over time, tariffs increase more than the escalation rate, then the MESA provider loses out.

Residential ESAs

We found two companies, Effortless Energy of Chicago and Sealed in New York, that have begun to offer variations of ESA and MESA in the single-family residential market. Many of the transaction costs are reduced or eliminated because the companies enter directly into contracts with the customers (no SPE); they do much of the work themselves (no ESCO or ESP needed); and they assume more performance risk than non-residential ESA providers. Each of the companies uses a distinct model.

Effortless Energy offers a Home Energy Efficiency Services Agreement (HESA), wherein they provide the up-front capital for the project, using investor money. Each project's realized energy savings are used to compensate investors. Effortless Energy installs the efficiency measures and then bills the homeowner for the energy savings at a lower rate for each saved kilowatt hour than the utility charges to provide a kilowatt hour. Thus, the customer's overall energy costs go down. Effortless Energy tries to mitigate its performance risk by analyzing at least two years of a building's historical consumption data using interval meter data to measure baseline consumption as accurately as possible. On average, HESA customers have saved 15% on their electricity bills and 20% on their gas bills in the dozen projects that Effortless Energy has completed in the Chicago area (Tramm 2015).

Sealed, a home performance contractor, offers a Guaranteed Efficiency Savings Agreement (GESA). Sealed does not cover up-front project costs but helps customers find financing and performs the work. Since project costs are handled by the customer, Sealed's capital is not at risk or tied up in individual projects. Like in a MESA, Sealed signs on as a billing agent to the customer's utility bill so that the customer can pay Sealed for both their utility bill and the Sealed bill with one payment (Sealed pays the utility bill for the customer). Sealed guarantees the savings to their customers and, thus, takes on the performance risk for the project. Sealed has completed over 300 projects on Long Island in New York and claims that demand for GESA has been growing rapidly (Frank, 2015).

Why Would Customers use an ESA?

There are a number of reasons that ESAs may be attractive to customers:

- 100% financing of a project's hard and soft costs;
- The ability to delegate O&M responsibilities to a third party;
- Mitigation of a project's performance risk; and
- Under a MESA structure, mitigation of utility bill price risk.

How Have ESAs Been Used to Date?

ESAs have a relatively brief track record and have not reached significant scale or volume to date. Most projects have been in the commercial and industrial sector with some projects done at private, non-profit facilities. A few ESA providers claim to have raised several hundred million dollars dedicated to capitalizing *potential* ESA contracts.¹⁰⁴ However, fewer than two dozen companies offer ESAs or MESAs in just a handful of states (see Table 7-1). For example, Metrus Energy has funded about \$30 million through ESA contracts over the last four years with no cases of nonpayment; their contracts are generally for 10 years (see sidebar for case study of Metrus' BAE Systems and Kuakini Medical Center projects).

¹⁰⁴ ESAs are private contracts.

Table 7-1: Examples of companies offering some form of Energy Services Agreement

Metrus Energy	SparkFund
Green City Finance	Clean Feet Investors
SClenergy	Maximum Energy Professionals
Effortless Energy	Sealed
Enerdigm	Noesis

Considerations and Open questions

A challenge for ESA providers is finding interested customers and closing deals. Hurdles for ESA providers include: (1) the fact that many potential customers do not know about or understand the ESA structure, (2) the complexity and transaction costs associated with an ESA, and (3) the limited track record of ESA providers and limited reach in terms of geography. Transaction costs include everything from legal costs to investment grade audits to costs for operations and maintenance. Multiple aspects of ESAs are complex, from the number of actors involved to the calculation of customer payments.

How State and Local Actors Can Get Involved

Enabling legislation can be important for ESPCs: it establishes eligible market sectors (e.g., state/local governments, K-12 schools, universities/colleges); it can identify a lead state agency to develop ESPC guidelines, rules, etc.; and it can define key features in ESPC contracts (e.g., maximum contract term, eligible measures and activities, EM&V requirements). Almost all states have some legislation allowing the use of ESPCs and delineating eligible customers, policy objectives, and high-level program guidelines.

ESAs are private sector products that do not require legislation. Given the limited experience and relative newness of the ESA concept, state/local government actors could decide to support education and outreach efforts, including technical assistance to help potential customers understand ESAs and the different steps involved in the process (Hinkle & Schiller, *New Business Models for Energy Efficiency*, 2009). Additionally, residential ESA proponents point out that state public utility commissions could promote this ESA model by requiring utilities to make historical utility data more easily accessible to the account holder.

BAE Systems and Kuakini Medical Center

Metrus has worked with BAE Systems, a defense and aerospace technology company with over 83,000 employees in 40 countries, to retrofit four of their facilities using the ESA structure to finance the projects. Metrus entered into an ESPC with Siemens (an ESCO) to design and install the projects and maintain the ECMs. BAE's payments to Metrus for realized energy savings are an operating expense, just like utility bill payments. The first two sites report saving more than \$500,000 annually on their utility bills. Plans for other facilities are under way.

In 2014, Metrus completed their largest ESA project to date, a \$5.8 million retrofit of Kuakini Medical Center in Hawaii. The project will save Kuakini a reported \$1.1 million dollars per year on their utility expenses and will decrease their energy use by 3.5 million kWh and 10,800 therms of natural gas per year (Metrus Energy).

8. Conclusion

The increasing size and number of energy efficiency financing programs illustrates financing's growing popularity as a way to promote demand-side energy efficiency. In addition to traditional financing products, new financing products have emerged that are tailored to specifically address barriers to energy efficiency adoption. When state and local governments are introduced to these new products, they must quickly understand not just the products themselves but, equally importantly, these products' strengths and weaknesses in the context of other financing products available to their target participants.

This report offers state and local government decision-makers an overview and characterization of current energy efficiency financing products and activity; it describes and discusses a typology framework for thinking about the larger context of financing products available; and it provides information on the features and relative merits of these various products to help policymakers and program administrators make decisions about them.

Traditional vs. Specialized Products

We have organized financing products into the traditional and specialized products that are available to consumers to pay for energy efficiency improvements. Policymakers cannot think of financing products for efficiency in isolation because consumers will not think of these products in isolation. When offered a specialized financing product—which they may not be familiar with—a consumer will most likely assess that offer in terms that they are familiar with (e.g., does the product meet their needs and address barriers, often in comparison to a traditional financing product).

- **Access to Capital and Cash Flow:** These are liquidity constraints faced by consumers who may want to invest in efficiency measures. They may not have sufficient capital (i.e. access to capital) to pay for energy improvements outright or their cash flow may be constrained, making financing of improvements difficult.
- **Application Process:** Some application processes to qualify for financing can be sufficiently burdensome that they present a barrier to the use of financing for some consumers.
- **Split Incentives:** If tenants pay their own utility bills, and thus would reap the benefits of an efficiency investment, then building owners have little incentive to invest in efficiency measures.
- **Occupancy Duration:** Consumers may be hesitant to invest in efficiency measures that will not pay back during their tenancy. Thus, occupants that rent or own for short durations may not want to invest in energy efficiency measures.
- **Debt Limits:** There are a number of types of debt limits that could potentially keep a building from using financing to pay for efficiency (e.g., maximum debt-to-income ratios and debt covenants imposed by existing lien holders). These could reduce the amount that the building owner can borrow or prohibit them from borrowing at all.

From the examination of traditional and specialized products in this report, we find the following pros and cons for each (see Table 8-1 and Table 8-2). These comparisons and the following analyses of barriers by sector and by product should help state and local decision-makers weigh the tradeoffs of different products when contemplating a new efficiency financing activity, modifying an ongoing effort, or assessing an effort's success.

Table 8-1: Pros and cons of traditional financing products

Traditional Financing Products	
Pros	Cons
• Familiarity to Customers • Wide Use by Financial Institutions • Simplicity of Administration • Ease of Underwriting and Fast Approvals (unsecured loans and leasing)	• May Not Be Cash-Flow Positive • May Not Be Transferable • Do Not Solve Split Incentive Issues • On-Balance Sheet (except operating leases until 2018)

The familiarity of traditional products to customers and financial institutions, as well as potentially simpler implementation for program administrators, may be important to the success of a financing program. The quick, simplified approval processes for unsecured loans and leases may also be attractive to potential borrowers.

However, traditional financing products may not offer rates and terms which allow them to be cash-flow-positive for comprehensive retrofit projects and may not address concerns regarding the length of borrower occupancy, split incentives, or balance-sheet treatment.

Table 8-2: Pros and cons of specialized financing products

Specialized Financing Products	
Pros	Cons
• May Expand Access to Capital • May Be Cash Flow Positive • May Be Transferable • May Be Off-Balance-Sheet • May Address Split Incentives	• Less Familiar to Customers • Less Familiar to Financial Institutions • Administrative Complexity • Product Complexity

Specialized products are often considered attractive, in part because they are designed to mitigate or address barriers specific to energy efficiency investments. However, it is important to recognize that specialized efficiency products may not always be preferable to traditional financing products simply because of their positive features.

Barriers, Market Sectors, and Financing Products

We highlight the *relative* importance of the financing-related barriers explained earlier for seven distinct market sectors (see Table 8-3). Table 8-4 provides a high-level summary of barriers that are addressed by specific financing products that are discussed in this study. Filled-in circles suggest that a particular barrier may be especially important in that market sector or largely addressed by a given product, while empty circles suggest that the barrier may be relevant but perhaps not paramount or a product may have medium potential for addressing a barrier. Blank cells do not necessarily imply that the barrier does not exist in that sector, but rather that it may not be important enough to drive the design of an efficiency financing program.¹⁰⁵ A blank cell in Table 8-4 indicates that the product generally does not address the barrier.

¹⁰⁵ This table is intended to be illustrative; stakeholders may wish to conduct a similar exercise in their own jurisdictions. For example, access to capital may be an important financing-related barrier in income-constrained market sectors (e.g. SF-LMI, MF-AF). Positive cash flow may be especially important in income-constrained market sectors, though it may be a potentially attractive feature in other sectors as well.

Table 8-3: Relative importance of barriers in various market sectors

Market Barrier	SF-GEN	SF-LMI	MF-AF	MF-MKT	C&I-SB	C&I-L	MUSH
Access to Capital		●	●		●		
Cash Flow	○	●	●	○	○	○	○
Application Process	●	●	●	○	●	○	○
Owner-Renter Split Incentives	○	○	●	●	●	●	
Occupancy Duration	○	○	○	○	○	○	
Customer Debt Limits		○	●		○	○	●

Note: Market sectors include: single family overall (SF-GEN), low-to-moderate income single family (SF-LMI), affordable multifamily (MF-AF), market-rate multifamily (MF-MKT), small business (C&I-SB), large commercial and industrial (C&I-L), and Municipalities, Universities, Schools, and Hospitals (MUSH).

Table 8-4: Barriers addressed by financing products

	Unsecured	Secured	Leasing	On-Bill	PACE	Savings-backed Arrangements (ESPC, ESA)
Access to Capital	○	○	○	●	○	○
Cash Flow	○	●	○	○	●	●
Application Process	●		●	●		
Owner-Renter Split Incentives				○	○	
Occupancy Duration				●	●	
Customer Debt Limits			○	○	○	○
CHAPTER	CH. 2	CH. 3	CH. 4	CH. 5	CH. 6	CH. 7

- **Access to Capital:** All financing products offer and enhance an eligible customer's access to capital and any financing product can be made more flexible via credit enhancement. On-bill financing is highlighted because it is sometimes paired with flexible underwriting criteria based on utility bill payment history.
- **Cash Flow:** Conceptually, any financing product may offer cash-flow-positive terms to customers, depending on the scope of the project. Interest rates can be lowered and terms extended on any product through credit enhancement, potentially expanding the number of cash flow positive projects. Secured loans and PACE are highlighted because the security associated with these products tends to allow for longer terms and lower rates without credit enhancement, which may facilitate more positive cash flow arrangements. Savings-backed arrangements, such as ESPCs and ESAs, are highlighted because they tend to be structured so as to be cash flow positive.
- **Application Process:** Unsecured loans and leases tend to have simpler application processes than secured products or PACE, which require determining the value of the collateral and gathering information on existing mortgages. On-bill financing programs are also highlighted as applications based on utility payment history for underwriting purposes can often be approved quickly.
- **Split Incentives:** On-bill and PACE are each sometimes discussed as offering potential solutions to the problem of split incentives, though actual examples have not been well documented to date. In theory, on-bill arrangements may allow costs to be repaid by tenants, though whether that could also include passing through of common-area improvements in multifamily buildings, particularly to

multiple tenants, is less clear. PACE allows for costs to be passed through to tenants when tenant leasing arrangements include the responsibility to pay property taxes.

- **Occupancy Duration:** Both on-bill and PACE can be structured to transfer to new occupants if borrowers relocate before all loan payments have been made so that tenants can realize the full benefits of energy efficiency projects.
- **Debt Limits:** In some cases, certain financing products (e.g., operating leases) may be treated as off-balance-sheet, possibly addressing customer constraints regarding taking out additional debt. Accounting treatment of specialized products is less certain.¹⁰⁶

As financing is increasingly relied upon to promote energy efficiency adoption, a full understanding of the financing products employed and the broad range of options available to energy consumers will be key to implementing efficiency financing initiatives that successfully enable consumers to pay for efficiency upgrades.

¹⁰⁶ For information on the advantages and disadvantages off-balance-sheet financing, consult an accounting professional.

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