



MILKEN INSTITUTE

FINANCING THE RESIDENTIAL RETROFIT REVOLUTION



Financial Innovations Labs™ bring together researchers, policymakers, and business, financial, and professional practitioners for a series of meetings to create market-based solutions to business and public policy challenges. Using real and simulated case studies, Lab participants consider and design alternative capital structures and then apply appropriate financial technologies to them.

This Financial Innovations Lab™ report was prepared by Martha Amram, Penny Angkinand, and Betsy Zeidman.



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RETROFIT REVOLUTION

FINANCIAL INNOVATIONS LAB™ REPORT

ACKNOWLEDGMENTS

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Even the historic levels of federal funding now being directed toward residential energy efficiency programs are insufficient for the magnitude of the task at hand. We need the right financing vehicles to draw private capital into this sector.



INTRODUCTION

“Recovery Through Retrofit’ is a blueprint that will create good green jobs – jobs that can’t be outsourced, and jobs that will be the cornerstones of a 21st-century economy...And, thanks to the Recovery Act’s unprecedented investments in energy efficiency, we are making it easier for American families to retrofit their homes—helping them save money while reducing carbon emissions and creating a healthier environment for our families.”

— Vice President Joe Biden, October 2009

“Financing mostly has languished as a ‘silent’ partner in achieving energy efficiency over the past three decades. It received substantial attention thirty years ago with zero-interest loans for residential weatherization, and then slipped off the radar.... The reasons are many – a hassle to arrange financing separate from the purchase and installation of efficiency measures; higher competing uses for borrowed funds; payback periods of three, five, or ten years that exceed an owner or occupant’s expected use of a home or business; high transaction costs; or the principal-agent problem.”

— California Public Utility Commission, September 2009

There are currently 130 million homes in the United States—and their combined residential energy usage accounts for 20 percent of the nation’s greenhouse gas emissions. Studies have consistently found that nationwide energy efficiency upgrades would not only significantly reduce emissions and create green jobs, but would pay for themselves. According to “Recovery Through Retrofit,” a recently released White House report that lays out the groundwork for building a sustainable home retro fit industry, existing techniques and technologies in retrofitting can reduce energy usage by up to 40 percent in a given home, potentially saving some \$21 billion annually in home energy bills.¹

Greening existing buildings has become a top priority for the U.S. Department of Energy (DOE) and the White House. The availability of multi-billion dollar funding from the federal stimulus package (the American Recovery and Reinvestment Act of 2009, or ARRA) has paved the way for launching various programs aimed at improving residential energy efficiency. The DOE has issued a request for proposals (RFP) for a new Retrofit Ramp-Up initiative, specifically seeking out “game-changing” programs. It has encouraged state and local governments to create financing mechanisms that can leverage public money to drive the broader adoption of retrofits.² President Obama has also proposed the HOMESTAR program, which would help households pay for retrofit projects, thereby reducing their high upfront costs.

Stimulus funding represents the largest injection of federal funding for energy efficiency in U.S. history. But given the enormous cost of comprehensively retrofitting millions of homes, even these record sums are insufficient. It is therefore crucial to use the public funds in such a way that private investors are given an incentive to deploy their capital as well.

Residential energy efficiency financing programs have existed for years in various states and municipalities—but so far, none has caught on widely enough to attract private capital. Taking a retrofitting program to scale requires improvement in several areas: marketing of products and services to likely customers; a trained workforce capable of extensive, quality field implementation; financing offers that are replicable; and the ability to sell loan pools into a national secondary market, allowing for a more rapid and systematic recycling of funding back into loan programs.

Furthermore, there is an inherent tension in the need to tailor programs to local conditions and preferences—thus yielding multiple, relatively small loan programs—and the need for large, homogeneous pools of securities that can capture the transaction



efficiencies of modern financial markets. State and local governments, the administrators of most of the energy efficiency financing programs, design programs to meet their region’s needs but look to access broader pools of private capital.

Achieving the goal of sweeping residential retrofits is a tall order. That was true even before the current downturn, but now it is even more challenging. As of this writing, the lending environment remains tight, consumers are wary of taking on more debt, and the secondary markets are just beginning to thaw (even for existing products with proven track records).

Recognizing the importance of overcoming these obstacles and developing a more substantial market for energy efficiency financing, the Milken Institute, in conjunction with the Ford Foundation and the Energy Programs Consortium, convened a Financial Innovations Lab™ in November 2009. This event brought together the various players necessary to build out viable programs. Together the participants

considered approaches to creating workable products and programs, and preparing them for the time when the secondary market begins to function more smoothly.

This group of experts had never previously pooled their knowledge and viewpoints. They included investors, lenders, federal and state energy officials, energy efficiency experts, and leaders from utilities, clean tech companies, foundations, and community organizations. Some had experience with existing state programs; some knew how to structure complex financial transactions; some understood government regulation; some could discuss the mechanics of retrofits. Together they explored strategies for building a sustainable and scalable national market for energy efficiency.

The day's discussion underscored the fact that market growth will depend on successfully integrating program design and financial product design. Program rules

shape the risk/return trade-off that drives the financial products. Consumers respond to program features such as ease of billing or attractive payment terms, but these details vary considerably across smaller, locally focused programs. Many observers advocate establishing a national program, thus achieving the kind of broad standardization needed for national loan pools and securitization (which would lower costs).

Several innovative pilots are under way (and are described later in this report). With the availability of government funding to attract private capital, it may be possible to take them to scale. But this will require some early adopters in the financial industry who see the opportunity. They must be willing to provide first-risk capital and work with program providers to shape a consumer offering that promotes energy efficiency standards and meets investor needs.



Who will kick-start the market? What kind of “sweeteners” can be added to securities to entice early adopters?

ISSUES & PERSPECTIVE

EXISTING PROGRAMS: INCOMPLETE AND SMALL SCALE

For decades we've known that energy efficiency is the cheapest route to reducing greenhouse gases. The highly compelling data on the savings that can be realized from efficiency measures have led states, cities, and utilities to mount retrofit programs since the early 1980s.³

Yet penetration rates remain very low; only a small fraction of the U.S. population has participated. Part of the challenge in taking a retrofit program to scale is overcoming consumer reluctance, which arises from high up-front costs and substantial uncertainty about future energy savings benefits.

Another challenge is the patchwork of existing programs. During the Financial Innovations Lab, Mark Wolfe and Howard Banker of the Energy Programs Consortium (EPC) noted the daunting array of initiatives: 205 loan programs in 45 states, 64 energy efficiency delivery programs in 34 states, 16 local delivery programs in 11 states, and 125 utility loan programs in 33 states. Many of these are funded by “public benefit” charges, which are small fees added onto every residential bill. The size of each program tends to fit the available funds; most are not set up to grow to a larger scale.

Four main categories of program and financing models have emerged in recent years, each with substantial benefits and some drawbacks. Each will be described in greater detail later in this report.

- **Energy efficiency mortgages (EEM):** Also called “green mortgages,” these loans allow potential borrowers to add the cost of home improvements that create efficiency to their new mortgages. This program is supported by the White House⁴ and has been in place since the early 1980s. But this model has its challenges: In a hot housing market, borrowers lose time while assembling an EEM, possibly losing the house they are bidding on; in a credit crunch, expanding mortgage capacity becomes unattractive. In recent years, fewer than 1,000 EEMs per year have been completed.⁵
- **Unsecured home improvement loans:** These are typically made available through heating and cooling contractors. Credit approval is quick, and the programs help contractors close sales on efficient equipment—but private capital for this type of financing has dried up as capital markets remain frozen.
- **Property tax-based financing (Property-Assessed Clean Energy, or PACE):** This program finances energy efficiency upgrades through long-term loans paid back by a voluntary increase in property taxes over ten to twenty years. Homeowners get the benefits of low up-front costs and the ability to transfer the remaining loan payments to a new owner if the house is sold. But setup requires complex coordination among local government officials, and with the financing provider. Further, this is still a new product without the track record needed to attract capital in a tough market.

- On-bill payment through utilities:** This program allows homeowners to pay back loans for energy efficiency improvements through their utility bills. The utility does not actually finance the loan; it partners with another entity that provides capital and servicing. Like PACE financing, the program benefits include the removal of up-front costs and the ability to transfer loan obligations to the next homeowner. The challenges include coordinating billing with the utilities, establishing protocols for missed payments or outright defaults, and, as with PACE, the limited track record of a newly developed product.

All of these innovative programs have paid attention to financing details and offer homeowners access to capital for home upgrades. But their adoption rates remain quite low (in some cases because the product is new); the one program that did reach scale (unsecured home improvement loans) is now limited by tight credit markets. Making more dramatic progress will require moving beyond the pilot phase and providing the initial risk mitigation that will attract greater private investment to this space.

PUBLIC FUNDING ALONE CAN'T DO THE JOB

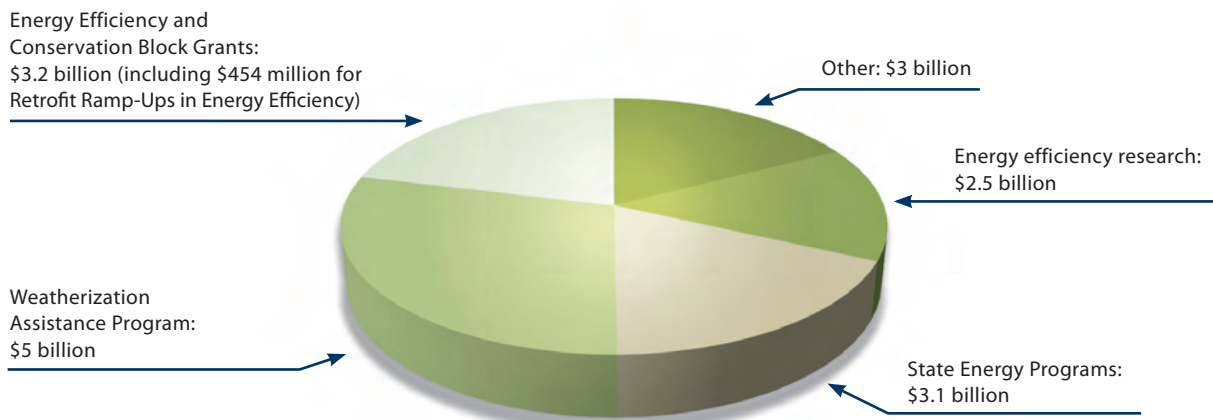
Residential energy efficiency had a momentous year in 2009. ARRA allocated \$36.7 billion to the U.S. Department of Energy, approximately \$16.8 billion, or 46 percent, of which was designated for the Office of Energy Efficiency and Renewable Energy (EERE). EERE used the opportunity to build the foundation for a more energy efficient housing sector (see figure 1).

The largest portion of the EERE funds (\$5 billion) went to the Weatherization Assistance Program (WAP), which covers 100 percent of the cost of retrofitting low-income houses (those occupied by residents at or below 200 percent of the poverty level). These represent one-third of the nation's 120 million housing units, or 40 million households. WAP aims to retrofit 2.5 million low-income housing units a year. But this ambitious goal is likely to cost \$15 to \$20 billion annually—3 to 4 times the total WAP allocation from ARRA funds. Furthermore, the retrofit

FIGURE

1

DOE's allocation of funding for residential energy efficiency



Source: U.S. Department of Energy.

goal greatly exceeds the historical experience; only 6 million homes have been weatherized under WAP in the past thirty years.⁶ As WAP illustrates, there is not nearly enough federal money to fully subsidize residential energy efficiency, even if the goal is limited to low-income households alone.

For a host of other reasons, EERE now aims to retrofit all 120 million housing units in the country, at an estimated cost of \$1.2 trillion.⁷ It's clear that most of this funding cannot come from Congress, or from cash-strapped state and local governments.

CAPITAL IS STILL SHARPLY CONSTRAINED FOR THE RESIDENTIAL SECTOR



Even with federal stimulus funding factored into the equation, retrofit markets still face significant challenges in the current environment. At the end of 2009, nearly a quarter of U.S. homeowners with mortgages were underwater (that is, they owe more on their mortgages than their homes are worth).⁹ A consumer in this precarious financial situation is unlikely to pursue home improvements, especially on a property that the bank essentially owns. With no equity, it is impossible for a

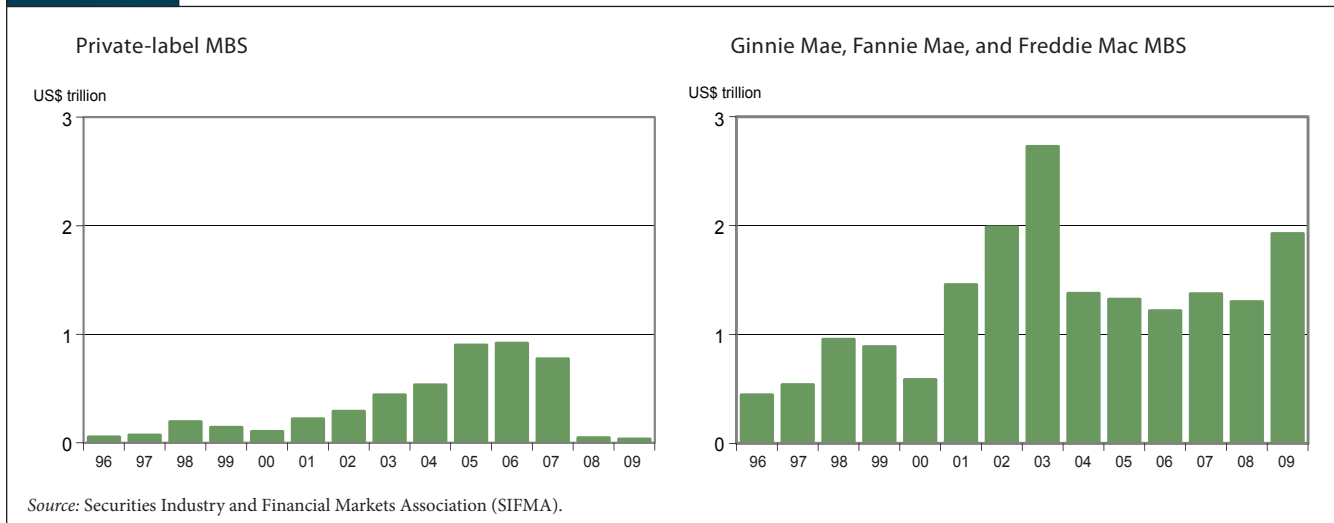
For this effort to succeed, funding must come primarily from the private sector.

To catalyze the necessary public-private partnership, DOE issued a competitive request for proposals in late 2009. The RFP offered \$454 million to locales to design innovative energy efficiency programs that will leverage government funding to obtain private capital at a 5-to-1 ratio.⁸ Public funds could be used for program delivery, but also for innovative financing mechanisms including loan guarantees, credit enhancements, and other “sweeteners” for the capital markets.

homeowner to obtain a second mortgage or home equity loan (the financing source for most home improvements in the boom years). Additionally, most households are currently focused on deleveraging.

Digging one layer deeper into the mortgage market, it is clear that the private-sector side has collapsed. Investors are reluctant to put their money into mortgage-backed securities (MBS); the only transactions currently being completed are through quasi-government agencies (see figure 2 on the following page). This stall in a well-understood financial instrument implies that it will be very challenging to find investor appetite for the innovative securities that need to be introduced in order to catalyze the residential energy efficiency market.

Another way to finance home improvements for energy efficiency is through unsecured home improvement loans. These loans are part of the asset-backed security (ABS) market, which includes bonds or notes backed by the cash flow from non-mortgage asset classes, including credit card receivables, auto loans, student loans, and some types of corporate debt.

FIGURE
2*Private-label and federal agency MBS issuance, 1996–2009*

Unfortunately, the ABS markets are also in a sharp contraction (see figure 3). New issuance has fallen by 80 percent, from a peak of \$754 billion in 2006 to \$154 billion in 2009. Home equity loans have also contracted very sharply, from \$484 billion in 2006 to \$6 billion in 2009.

The Term Asset-Backed Securities Loan Facility (TALF), which helped to stabilize the ABS market in the immediate aftermath of the crisis, came to an end on March 31, 2010, with still-unknown consequences. Many credit market participants believe that transaction volumes will never return to their pre-crisis levels; the markets must recognize a new, smaller “normal.”

But even in this challenging environment, there is interest in financing residential energy efficiency. In fact, a recent study shows a growing number of investors are interested in diversifying their portfolios by investing in green fixed-income financial instruments.¹⁰

Given the credit crisis, how might a new financial product achieve success? First, the product must be designed so that it can be sold into the secondary capital markets. This is critical to achieving national scale. Securitization—the act of packaging loans and selling them into the secondary market—brings new investors to the table, adds liquidity to the market, and drives down the cost of capital. Despite the recent problems in the mortgage market, securitization worked well for decades, facilitating the entry of additional capital into the market.

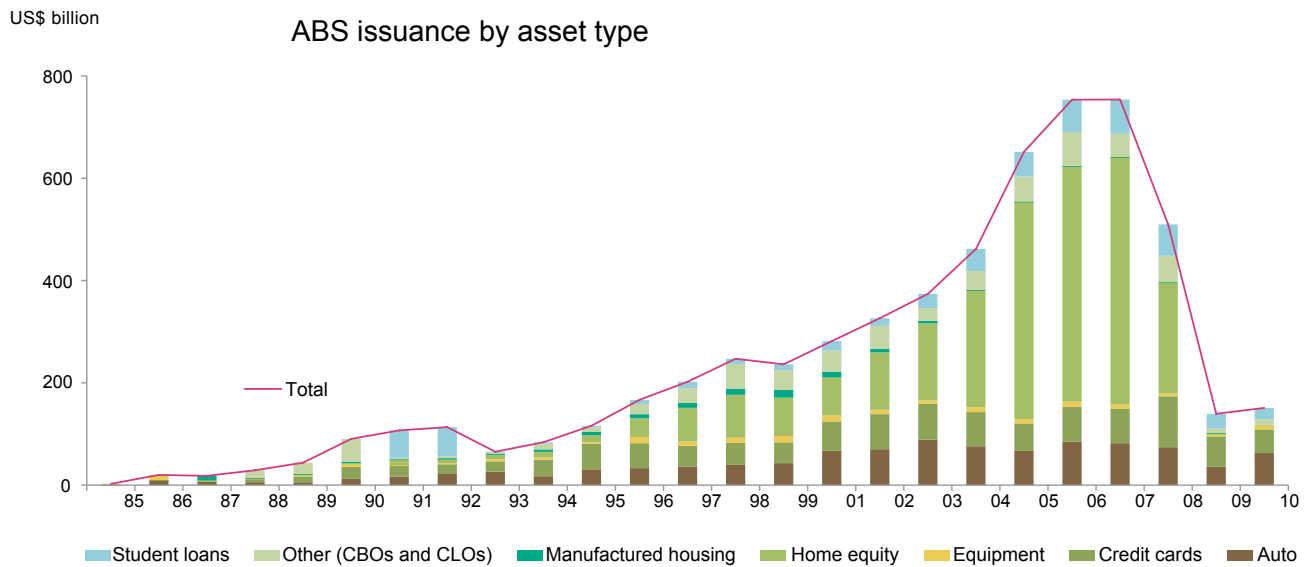
Second, the product must be standardized to work within a single national loan pool. Securitization is cheapest and most efficient when the pool is large and homogeneous. Loans from current energy programs typically vary from location to location, hindering the formation of a national pool. Characteristics that could be standardized include eligibility requirements, the rate and term of loans, cash flow verifications, and the like (see Appendix 1 for more detail).

“We have to figure out what we must homogenize across the products to be able to get comfort in the capital markets.”

*George McCarthy,
Ford Foundation*

FIGURE
3


Decline in asset-backed securities (ABS) issuance



Note: The fast-growing asset classes included in the “other” category are collateralized bond obligations (CBOs) and collateralized loan obligations (CLOs). Other emerging asset classes also include auto leases, small-business loans, short-term auto dealer inventory loans, and trade receivables.

Source: Securities Industry and Financial Market Association (SIFMA).

Many important questions were raised during the Lab. Where will private funds come from? Who will kick-start the market? Who will be the early risk takers? What kind of “sweeteners” can be added to securities to entice early adopters? Will the private sector step forward only when public funds have been depleted? The Lab participants explored the key questions in depth, identifying the next steps for financing residential energy efficiency.



“How do you pull all of these very complicated and complex and disparate elements into a package that can go into the capital markets, raise the kinds of billions of dollars that we’re talking about to make a sustainable impact, and do that in the most efficient way?”

Henry D. Lanier, Forsyth Street Advisors

PROGRAM DESIGN SOLUTIONS

A key point that emerged from the Lab was that program design and financial instruments will need to be integrated in order to achieve national scale. Suggested solutions came from both policymakers and financial market experts, and fall into the following categories:

SOLUTION

1

Identifying the most effective financing options

Recently, several pilots of innovative residential energy efficiency financing programs have been launched around the country. Each of them has different advantages and risks, and data from successful pilots are needed to learn about their performance and risk. Lab participants emphasized that until it is clear which of these programs works best, it is important to support as many as possible and to ascertain which programs fit which regions. The knowledge gleaned from this process will help policymakers identify which programs have the greatest potential to work in nationwide implementation.

SOLUTION

2

Engaging consumers

Lab participants identified two program features necessary to engage consumers: consumer confidence and convenient transactions.

Potential customers have to be comfortable with the new home improvement, the contractor, the potential savings, the form of financing, and the payback period or cost/benefit ratio before they will seriously consider a transaction. Their confidence can be increased via endorsements from local entities such as a utility; municipal, state, or federal government; and/or the product manufacturer. To make home improvement financing easy, programs should offer fast and high-quality service, access at point-of-sale, simple loan applications, and a simple repayment process.

Of the financial products discussed, unsecured home improvement loans and energy efficiency mortgages are most readily accessible and easiest to understand due to their use of existing distribution systems. On-bill payments through utilities and PACE are relatively new and not widely available, yet consumers would welcome the easy repayment process.

One way to simplify how energy efficiency financing is offered to consumers is to deliver it through contractors. Strong contractor networks raise penetration rates, according to Lab participants from EnerBank, the Pennsylvania Keystone HELP, and the New York State Energy and Research Development Authority (NYSERDA).

To streamline the financing implementation process, a few states have set up “one-stop-shopping” programs. In June 2009, Maine established an independent state authority, Efficiency Maine Trust, an administrative unit that puts the

state’s energy-related programs together under one roof. Adam Krea from Maine Housing described the key components of the state’s program, which encompasses quality control, inspections, contractors, energy auditors, and financing. Oregon has had a similar program, the Oregon Energy Trust, in place since 1999, and Delaware established the Sustainable Energy Utility in June 2007 to serve as a one-stop resource.

Lab participants noted that successful programs clearly define key roles: marketing and outreach to engage consumers; a delivery channel (e.g., energy auditors

and contractors); and financing with a reasonable return to investors. A supportive policy environment is also important to ensure the cooperation of utilities, cities, counties, and states.

As John Berdes of Shorebank Enterprise Cascadia (SBEC) noted when describing the partnership model of the on-bill payment through the utilities (see p. 26), if a program fails, other states considering adoption may shy away, interpreting the failure as resulting from low demand, when in fact it resulted from an uncoordinated policy environment.

SOLUTION

3

Tipping replacement decisions toward energy efficiency

Retrofit programs generally have two goals: deeper penetration into the market (i.e., more retrofits) and greater energy efficiency per house (i.e., deeper retrofits). Sometimes these goals are at odds with one another: capturing greater market share is easier if the price point is lower, but completely retrofitting an entire house is more expensive than upgrading a single appliance.

When an appliance or heating system breaks down, the incremental cost of replacing it with a more energy-efficient unit often has a very quick payback—especially after utility rebates. But in many parts of the country and for many appliances and systems, it seldom pays to retire a working unit early for energy-efficiency savings. Thus, the diffusion of efficient technology is tied to the replacement market.

Lab participants pointed out that to achieve deeper retrofits, it is important to move consumers from a reactive stance (upgrade when something’s broken) to a more proactive mindset (upgrade now). Meeting current retrofit goals will require far more aggressive and targeted marketing than what has been undertaken by existing energy efficiency programs. There must be incentives to “push” retrofits out to the market rather than waiting for customers to replace one appliance at a time.

Marketing efforts also need to take into account the multiple factors that go into consumer retrofit decisions. Studies have found that consumers have three very distinct motivations for a home energy efficiency upgrade: improved comfort, savings on energy bills, and reduced carbon emissions.¹¹

To encourage more comprehensive retrofits, several strategies were discussed: offering a multi-tiered incentives program to increase awareness of Energy Star-branded appliances; making the unsecured home improvement loan a point of entry to a more comprehensive retrofit; and making energy efficient mortgages more mainstream. As one participant said, “Think about energy efficiency mortgages as a potential feature on a much larger percentage of all mortgages made in the United States.”

State and local housing finance agencies were identified as possible new partners in promoting whole-house upgrades. Potential homeowners come to the agencies to refinance their mortgages, so they are already prepared to spend money. The agencies have the ability to provide tax and program elements and could easily add energy efficiency financing incentives to the package. A coordinated policy environment is needed to create a consumer-friendly program that is attractive to the capital markets.

SOLUTION

4

Devising uniform national program standards to create national loan pools

Tapping into a secondary market will vastly increase the amount of private capital flowing to energy efficiency retrofits. However, secondary markets require large pools of standardized and homogeneous loans. Lab participants noted that the lack of national standards for energy efficiency loans is one of the major constraints limiting investor interest. Unless a large, standardized pool is created, energy efficiency loan products cannot take off, even when the securitization market rebounds.

Currently, every locale creates its own energy efficiency program, possibly accompanied by a unique financing product. The program's particular constraints and rules shape the terms and risks of the financial product. These local characteristics produce small loan pools.

In addition, most energy efficiency loans are for small amounts. It costs more to bundle these small loans for the secondary market, since many more loans are needed to make a pool of reasonable size.

Neither of these conditions is attractive to financial market players. As one participant said, "Investors in a secondary market will not pick up the phone and will not spend half an hour reading an offering memorandum unless they believe they see an investment of at least \$50 million to \$100 million."

Given the diversity of locales and loan products, Lab participants encouraged cities and states to work together to establish national standards for energy loan programs. This will require homogeneity of products across geographies, economic climates, and very different types of lending environments.

Cities and states should also develop pre-established program parameters, making it easy for other states and communities to join or replicate. This template should include financing and capital formation features, as well as best practices in marketing, outreach, and program administration.



SOLUTION

5

Adding strong credit enhancements to attract early private capital

As most energy efficiency financing programs are still fairly small, it is unlikely that investors have seen enough volume to be able to properly evaluate the risks and returns. Credit enhancements can help attract the early adopters by removing some of their risk.

But there is a bit of a chicken-and-egg problem at work here: While credit enhancements help drive volume, volume is necessary to access a full array of credit enhancement alternatives. Lab participants stated that it would be helpful if there were a national market shaped by underwriting criteria; then they could shape local programs to its standards.

There are several types of credit enhancements. Funding can be used for loan-loss reserves or loan guarantees; alternatively, it can be used to purchase loan-level insurance to cover potential losses.¹² For example, if the expected default rate is 4 percent, this level of loss for investors could be covered by the guarantee. Investors would then lower their required risk premium, and homeowners could be offered lower interest rates.

An alternative way to provide loss protection for investors is to attach a credit enhancement to the loan pool in the secondary market. This is a well-understood process in the field of financial engineering—and the cost of implementing portfolio insurance in the secondary market can be cheaper than a direct buydown of interest rates for homeowners.

As Susan Leeds of the Natural Resources Defense Council noted, early credit enhancements can help open the market. Socially motivated investors, who seek a measurable impact in exchange for a reduced financial return, could take an early position and provide the enhancement needed to help build the market.

“Obviously, to make these programs work, we need to get to low interest rates. One of the best ways to do that, particularly for something that’s new and for which there is not an established secondary market, is through credit enhancement.”

*Susan Leeds,
Center for Market
Innovation,
Natural Resources
Defense Council*

GOVERNMENT'S ROLE IN SCALING UP THE RESIDENTIAL RETROFIT MARKET

Government as a key player

Lab participants pointed out that government is the only key player that can make diverse participants (private lenders, local governments, utilities, etc.) ramp up energy efficiency retrofits quickly. Therefore, new national legislation to support energy efficiency is essential. Jeffrey Pitkin of the New York State Energy Research and Development Authority shared that state's experience: The recently enacted "Green Jobs—Green New York Act of 2009" aims to make 1 million homes energy efficient in five years, using \$112 million of Regional Greenhouse Gas Initiative (RGGI) funds. The law also requires the state to have a fully functioning revolving loan program for retrofits up and running within six months.

Regulatory restrictions and consumer lending requirements as barriers

Government can be a catalyst, but it can also pose roadblocks that need to be removed:

- Consumer lending requirements have been an obstacle to offering on-bill payment schemes for single-family-home retrofits in many states (as opposed to multi-family and commercial retrofits); utilities do not want to become regulated as lenders. Oregon is currently trying an on-bill payment pilot program, discussed later in this report. In California, on-bill financing programs have been offered as a financing option for retrofitting small businesses, but not for the residential sector. Jeanne Clinton from the California Public Utilities Commission explained, "Our utilities are loath to do residential financing. They do not want to become subject to consumer lending requirements and try to integrate that into their lending and building systems, so California is enamored with the idea of PACE."
- Lab participants also identified the Davis-Bacon wage requirement, a condition of using the ARRA public energy funds, as an impediment to integrating public money into existing energy programs. Davis-Bacon rules require that contractors and subcontractors meet minimum salary requirements for their workers and provide weekly payroll reports. Many of the small,

independent contractors involved in installing energy efficient products and systems find it problematic to deal with the logistics of extensive paperwork and documentation.

Clarity regarding the legal and regulatory framework as a key to securitization

The legal and regulatory framework for financing programs is also an important aspect of attracting private investors into the retrofit markets.

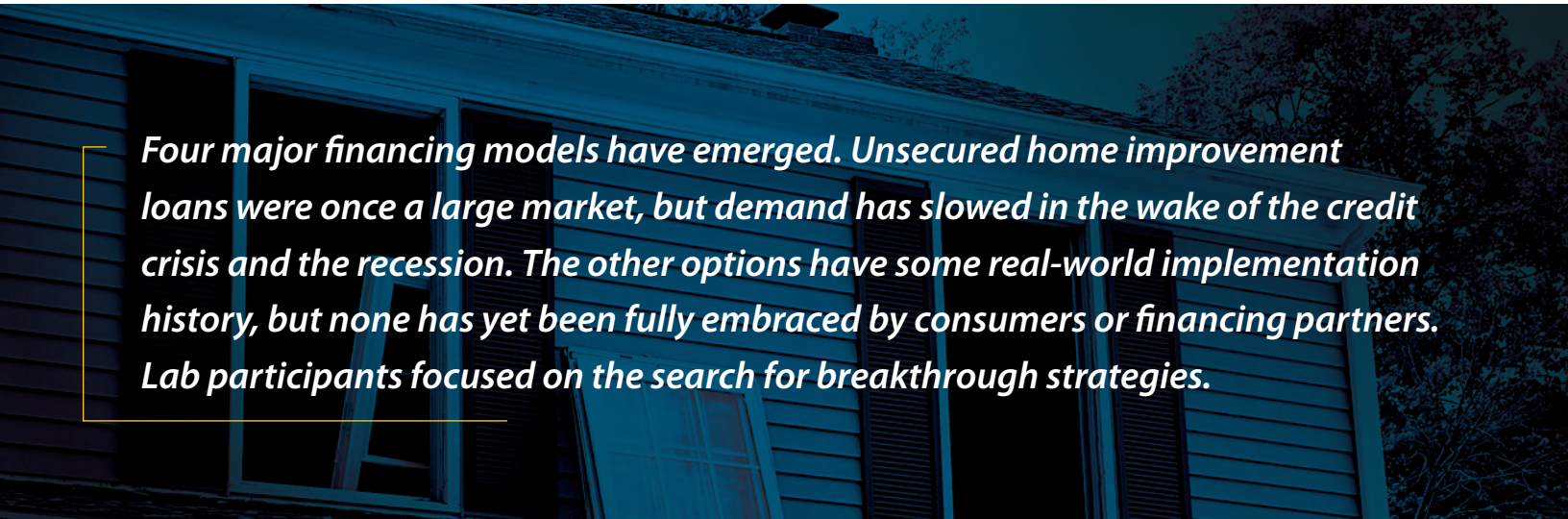
Fitch recently provided a ratings overview for tariff bonds (securitized assets backed by the on-bill tariff-based financing program).¹³ Slightly different from the on-bill payment program, on-bill tariffs use a utility's bill collection system that is actually attached to the meter so the repayment of a loan falls to the next customer when the current homeowner moves (by contrast, in on-bill financing, the full loan must be repaid upon the move). Unlike the way it treats other asset classes, Fitch includes different legal and regulatory features in the rating criteria since the program is established under utility regulators or other legislative authority.

Irrevocability is identified as one criterion for AAA ratings; changing regulations can have a major impact on performance. Participants highlighted the chance of such reversals as a significant barrier to private capital entering a market. They emphasized that the government should specify details and minimize the likelihood of regulatory reversals.

Additional legislation and regulatory policies still needed

To ramp up retrofits, Lab participants believe we need legislation spelling out the mechanisms for on-bill payment systems and giving local government the authority to establish special assessment improvement districts and/or assessments for PACE programs.

Additional policies to increase incentives and/or mandates for energy efficiency upon the purchase or sale of a home (which could be done through codes or standards) will certainly help national scale-up.



Four major financing models have emerged. Unsecured home improvement loans were once a large market, but demand has slowed in the wake of the credit crisis and the recession. The other options have some real-world implementation history, but none has yet been fully embraced by consumers or financing partners. Lab participants focused on the search for breakthrough strategies.

FINANCING SOLUTIONS

Four innovative models emerged in 2009 as the leading contenders for delivering financing for single-family residential energy efficiency upgrades on a national scale. Table 1 compares the key features of each program that could impact the likelihood of adoption and scaling. During the Lab, participants evaluated each strategy in detail, searching for the catalysts and program design changes that might be able to give these models wider acceptance and greater momentum. Multi-family homes face different challenges and require tailored financial product features. These are discussed separately at the end of this section.

TABLE

1

Single-family residential energy efficiency financing models

	Energy efficient mortgages	Unsecured home improvement loans	PACE (on-bill financing through property taxes)	On-bill payment through utilities****	On-bill financing through utilities****
Approval criteria*	Scoring system increases incentives	Attached to specific purchases	Need checklist and verification	Need checklist and verification	Need checklist and verification
Program design challenges	Homeowner and contractor risk	Homeowner and contractor risk	City- or county-sponsored program, so local risks apply	Program sponsor (and utility) must address	Utility-sponsored program, so implicit link
Limits on availability**	Higher credit scores needed	Credit score checked	Homeowners only (does not apply to renters)	Utility bill payer	Utility bill payer
Disposal upon sale of home	Paid off at time of sale	Paid off independent of home sale	Stays with property	Stays with meter	Stays with meter
Defaults***	N/A	1% to 2%	N/A	Less than 1% (Sacramento's utility uses UCC fixture lien)	Less than 1%
Mechanism for aggregating and scaling up the market	Existing mortgage broker infrastructure	Existing retail/trade loan market	Needs brand-new infrastructure	Needs brand-new infrastructure	Limited by loan pool vs. utility size; novel for utility bond market
Who bears interest rate risk?	Investors in secondary market	Program sponsor and investors in secondary market	City/county/financing partners	Program sponsor	Utility
Secondary market	Large MBS market	Large ABS market	New market; not eligible for federal tax exemption	Large ABS market	New market

* Programs typically have a list of qualifications. In some locales, there is a post-upgrade inspection. Differences are by locale, not by type of program.

** Many of these programs have minimum loan-to-value criteria.

*** Default rates are based on similar programs, since these are recently launched pilot programs; actual default data are not yet available.

****In on-bill *payments* through utilities, no utility funds are used to make loans. Banks and lenders provide the funding, which consumers repay via their utility bills. Utilities collect the loan payments, and are typically paid a service charge by the lender. In on-bill *financing*, the utility uses its own funds to make the loans for efficiency upgrades, and allows consumers to repay via their monthly bills.

SOLUTION 1	<i>Energy efficiency mortgages</i>
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Premise: Energy efficient mortgages (EEMs) are based on the principle that energy savings create disposable income—and thus, the ability for a homeowner to carry a larger mortgage. Because the homeowner is presumed to have higher credit quality than otherwise, in theory, the mortgage carries a lower default risk and can be issued at a lower interest rate.

EEMs allow homeowners to pay for the cost of energy efficiency upgrades with tax-advantaged mortgage interest rates, while avoiding large up-front out-of-pocket costs and aligning payments with the long periods it may take for some of the energy-efficiency upgrades to pay off.

Key challenges: Only 1,066 FHA-insured EEMs were originated in the United States in 2007. The numbers in previous years were even lower.

Three challenges have emerged: First, the link between energy savings and lower default rates has not been proven, so it is unclear if the energy savings are sufficient to make it worthwhile for lenders to reprice the loans. Second, the loans are more difficult to sell

into the secondary markets, increasing lender risk. Finally, since EEMs are more complicated loans, they are more difficult to make, but since lenders receive no additional compensation for the added work, there is little incentive to offer them.

Use of existing infrastructure: The marketing of EEMs should be easy because homeowners know how to obtain a mortgage and refinance, so the lender can simply introduce energy efficiency into the transaction. Further, the mortgage market infrastructure is huge and efficient, with very low transaction costs.

Experience with the product: The EEM has been available in all fifty states for more than a decade. Currently, EEMs are sponsored by the FHA, Fannie Mae, the VA, the USDA, and state housing finance agencies.

During the Lab, Howard Banker from Energy Programs Consortium (EPC) proposed several solutions to the product’s design flaws based on lessons learned to date. These are outlined in table 2 below. Key provisions include creating an inexpensive, nationally available audit tool to reduce customer costs; qualifying

TABLE 2		<i>Energy efficient mortgages: Lessons learned</i>	
Design problems		Proposal for redesign	
Audit tool is expensive, requires immediate out-of pocket outlay prior to loan approval, and is not available everywhere.		Make an inexpensive audit tool available nationally (possibly using a federal subsidy).	
Lender is required to assume increased borrower lending capacity based on predicted savings, but there is no hard data linking energy savings to decreased default rates.		Do NOT qualify borrowers based upon predicted savings. Qualify them on their credit risk to drive better loan performance.	
Loans are expensive to process, but no additional lender margins are available.		Increase lender margins to drive lender interest (requires an additional subsidy).	
Loans are more expensive to consumers.		Provide federal or state loan subsidies so the loan is less expensive to lenders and to consumers.	
<small>Source: Energy Programs Consortium.</small>			

borrowers based on credit risk rather than projected savings; and reducing the cost to the customer and to the lender by using federal and state programs to drive down the interest rate.

Given the potential energy savings, EPC recommends a federal, state, or Fannie Mae/Freddie Mac subsidy to reduce costs in the early years while performance data are gathered. Pilot programs offering Energy Star–branded mortgages are currently under way. If EEMs reach sufficient volume, performance will be demonstrated and loans can be priced for the secondary market.

Any mortgage provider can use the Energy Star–branded mortgage as long as the product meets two conditions. First, it must produce at least a 20 percent improvement in the whole home’s energy use. Second, because the Energy Star brand helps lenders with marketing, lenders must provide consumers with some additional benefit, such as covering the cost of the audit or the appraisal or reducing the interest rate. The pilot programs will demonstrate if these features increase consumer adoption.

Policy support: The EEM has received policy support at the highest level, from the White House.¹⁴

SOLUTION

2

Unsecured home improvement loans

Premise: When heating and cooling systems fail and must be replaced, homeowners can often obtain unsecured home improvement loans through their contractor to pay for the replacement. If contractors could refer them to various types of loans offered by different financial institutions (with more plentiful choices all made cheaper through subsidies), the consumer’s replacement decision is more likely to tip toward energy-efficient systems. Capital to support unsecured home improvement loans for greater energy efficiency comes from both public and private sources (including Fannie Mae, state and local budgets, and banks). Several programs were presented during the Lab.

- *Public loan programs:* Widely available through partnerships with utilities and local banks, the Fannie Mae Energy Loan is the largest public source of unsecured loans. After originating a loan, the Fannie Mae–approved lender transfers loan obligations to Fannie Mae but continues to service the loan. It is one of the very few loan programs with a functioning secondary market at this time. However, it will be challenging to expand, as the interest rate is high (currently between 12 and 15 percent).
- *Pennsylvania’s Keystone Home Energy Loan Program (HELP):* Homeowners receive loans for energy efficient home improvements at attractive terms in a program provided and subsidized by the state of Pennsylvania. Keith Welks from the Pennsylvania State Treasury explained that “people who took out these loans should be able to pay for them with the savings they realized and not have to chip in any money on their own.” The state administers the program and acts as a secondary market, buying loans from lenders through its pension funds. By acting as a ready buyer, the state secures the availability of residential home improvement lending and lowers the interest rate offered to consumers.
- *EnerBank:* Louise Kelly, CEO of EnerBank USA, shared the features of the bank’s unsecured home improvement lending business. Its experience is that the payment terms matter greatly for consumer adoption. EnerBank offers “same as cash” loans: Borrowers who repay the loan within the payment period (generally a year) pay no interest. “Same as cash” loans constitute 93 percent of EnerBank’s business, and 90 percent of these borrowers repay before the original term expires. Thirty-five percent of the loans are made to low- and moderate-income homeowners.

Key challenges: While it might be expected that delinquencies and defaults would be a key challenge for these programs, loan-loss rates have been historically very low and have only risen slightly during the recession. The reason? Self-selection by borrowers, who are largely homeowners with no plans to move, great credit scores, and high home equity values. EnerBank reports a ten-year loss rate of only 0.8 percent, with a small but manageable rise in 2008 and 2009. There is little need for a secondary market partner as so many loans are paid off in the first year.

Unsecured home improvement loans have also been offered for over a decade in Pennsylvania, through a program run by the state. But, this public program growth is now constrained by the lack of a secondary market appetite for unsecured home improvement loans. The Pennsylvania HELP program faces a stall as state agencies (Treasury and Housing Finance) cannot absorb additional loans into their portfolios. Consumer demand for HELP loans remains strong, but to continue the program, the state needs a buyer for its loan pools.

Use of existing infrastructure: While funds for unsecured loans are constrained by the current credit crisis, a large and efficient infrastructure for processing and securitization already exists. Contractors sell the loans as part of their offerings, banks originate the loans, and the secondary markets securitize them as part of ABS financings. A strong base of expertise is already in place.

Experience with the product: Unsecured home improvement loans have been used in utility-sponsored retrofit programs for decades.

Policy support: Policymakers are currently giving scant attention to this instrument. When the credit markets were functioning well, this type of program flourished and needed relatively little support. But in the current environment, forms of debt that look less like loans are believed to be more attractive to consumers (see the next two solutions described below).

Early adopters to break bottlenecks: Lab participants from AFC First and EnerBank, two banks with these programs under way, highlighted product designs and strategies for scaling up. Pennsylvania's Keystone HELP program offers a tiered interest rate to attract proactive purchasers, with the best rates reserved for comprehensive home performance loans. EnerBank's loan origination and credit decision are made quickly over the phone, making loan sales easy for both contractors and homeowners. The gross loan approval rate is 75 percent (the average FICO score of borrowers at origination is 772). The distribution system is central: Homeowners are referred to the bank by contractors who participate in private-label loan programs sponsored by manufacturers, distributors, franchisors, municipalities, utility companies, or industry associations.

Recently, despite the secondary market constraints, AFC First and EnerBank have seen rapid growth for their programs. Louise Kelly from EnerBank reported that the bank's business, which is solely unsecured home improvement lending, grew 45 percent from 2008 to 2009. Peter Krajsa, chairman and CEO of AFC First, reported an average annual 30 to 40 percent increase in loans through the HELP program. With access to a broader secondary market this program could grow. Other states could allocate energy efficiency funds to a similar program.

“It typically takes five to ten minutes for an EnerBank lender to enter the application information into our system and give the application the credit decision, all during the original phone call.”

*Louise Kelly,
President and CEO,
EnerBank USA*

SOLUTION
3

Property tax-based financing (PACE)

Premise: Property Assessed Clean Energy (PACE) programs provide homeowners with funding for energy efficiency home improvements and solar installations. The homeowner repays the loan through a voluntary increase in his or her property tax bill. Funds are provided by a local bond mechanism (similar to a municipal bond issued for a specific purpose, but taxable at the federal level). Repayment terms are long (ten to twenty years), and since repayment is tied to the tax bill and carries the same seniority over the mortgage, default rates should be generally low.

PACE offerings overcome the barrier of high up-front costs for homeowners undertaking retrofits. The loan obligation moves to the next owner of the property if the home is sold. In theory, the energy savings would be greater than the increase in property tax, generating a positive cash flow to the homeowner.

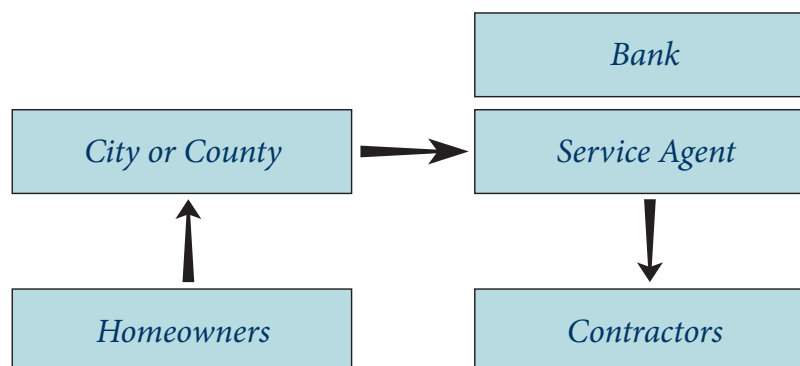
Key challenges: Local leaders must set up a legal infrastructure to issue these tax-based financings (it is similar to that needed for municipal bond issues).

But the pool of loans is not tax-exempt at the federal level, so it cannot be sold into the tax-free municipal bond market. This decreases liquidity significantly, as the tax-free segment of the overall market totals about \$600 billion per year, while the taxable segment is only \$6 billion per year. Additionally, the lack of an active securitization market limits liquidity. Once the secondary markets do open, government agencies and/or philanthropic funds could provide credit enhancement to pools of loans, enabling purchase at lower risk.

Another challenge is that a PACE loan, as a voluntary property tax increase, is designed to take seniority over an existing mortgage. New mortgages can be issued with this seniority clearly spelled out, but seniority status for existing mortgages has been challenged. It is not a matter of simply getting the mortgage lender to agree to a change in status; most mortgages are not held by the original lender, but have been placed in securitized loan pools held by a large number of investors. Financial institutions holding large mortgage pools are very concerned about losing their senior position. While PACE

FIGURE
4

PACE program cash flows



Source: Securities Industry and Financial Markets Association (SIFMA).

advocates have issued sample legal opinions, and local governments have an interim process to declare seniority on the voluntary property tax increase, this legal issue is not definitively resolved.¹⁵

Use of existing infrastructure: This program requires legal infrastructure at the local level and the development of new niches in the financial markets to absorb the loan pools. While both of these aspects are generally similar to existing infrastructure created for other purposes, they must be developed and implemented in an era of extremely tight municipal budgets and risk-averse capital markets.

Experience with the product: Currently, sixteen states have passed state legislation for PACE programs, allowing municipalities to create financing districts. Pilots have been launched in California (Sonoma County, Berkeley, and Palm Desert); Babylon, New York; and Boulder, Colorado.¹⁶ In these programs, home loans have been financed out of general obligation funds, so the market's acceptance of these new financial products has not yet been tested. Homeowner acceptance has been good, but project scale to date has been small in each locale.¹⁷

Policy support: The White House included the PACE program as a major component of the national "Recovery Through Retrofit" plan. The California Energy Commission has funded expansion of PACE throughout California with its allocation of the ARRA funds for energy efficiency.¹⁸

Early adopter to break bottlenecks: Whether programs are administered by local government staff or by an outsourced administrative partner (such as the startup company Renewable Funding), the key bottleneck is the transfer of loans from the originator to the secondary markets. An early aggregator and purchaser of bonds would resolve a key risk.

Susan Leeds, Senior Finance Fellow of the Center for Market Innovation at the Natural Resources Defense Council, argued that a credit enhancement term by the federal government, or possibly state and local government, is needed for PACE-backed bonds to be placed in the secondary market. She observed that private markets are not in a position to provide this insurance, but PACE bonds may have strong appeal to new lenders since they are secured by tax liens and have seniority to mortgage debt.

SOLUTION

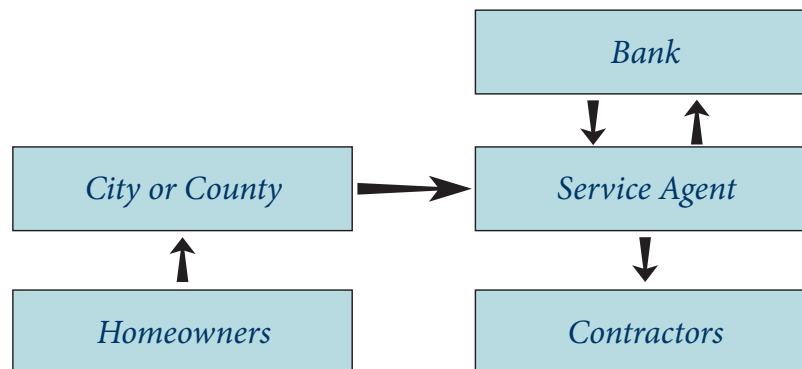
4

On-bill payment through utilities

Premise: On-bill *financing* of energy efficiency loans has been a favorite program of utilities for more than two decades.¹⁹ These programs use capital from the utility to fund a loan program. Repayments are collected by the utility, often as an insert to the monthly energy bill. On-bill financing programs have been very small, and are constrained from achieving scale by utilities' lack of capital and the complexities of expanding the programs within the regulatory structure under which utilities must operate.

A new twist added to this model is solving some of the challenges that prevented this approach from achieving critical mass. Utility-sponsored on-bill *payment* programs involve partnership with a financing provider that provides capital and loan administration; the utility receives a small fee for servicing assistance as repayment is processed through the utility. The separation of payment collections from financing allows the utility to avoid being regulated like a bank and earn a simple premium for its collection services. In theory, this program has lower risk and scales well.



FIGURE
5*On-bill payment cash flow through utilities*

Source: Securities Industry and Financial Markets Association (SIFMA).

Key challenges: Utility billing software is rigid, brittle, and expensive to change. Actual on-bill implementation could be difficult, leading to two bills being sent to the homeowner. Not all utilities are viewed favorably by their customers, which could slow adoption.

Policy support: This has received less policy attention than other programs. Eyes are watching recently launched pilots in Portland, Oregon (see below), and Seattle.

Experience with the product/use of existing infrastructure: There have been some attempts to mount an on-bill financing program for the residential sector, but none has taken root, largely due to the regulatory problems mentioned above. The on-bill payment program through utilities has better prospects, but is still a new idea.

Early adopter to break bottlenecks: A sizable pilot program was launched in Portland, Oregon, by Clean Energy Works Portland.²⁰ In collaboration with Shoreline Cascadia Bank, the Oregon Energy Trust (Oregon's residential energy efficiency provider), and three local investor-owned utility companies, this program has provided energy efficiency loans to 500

Portland homes with no up-front costs, allowing long-term loan repayment via utility bills.

John Berdes of Shoreline Cascadia Bank noted that this program requires an extraordinary amount of partnering and collaboration across the various parties. The financial terms are also innovative and expected to change as the program matures. Initially CEWP provides 100 percent financing to homeowners at a variable rate of 2 to 6 percent, with twenty-year loan terms. It is expected that the loan term will shorten and the collateralization requirements will relax over time, once liquidity and risk management are established. Initially, Shoreline Cascadia will assume the credit risk, and will cover losses via subsidies. Losses up to 10 percent are covered.²¹

One of the large areas of investment the Oregon program required was a unified software platform for loan origination and processing; this platform works for three separate utilities. It is hoped that access to loan payment history, the best predictor of default risk, will help with underwriting and servicing. The platform is intended to become a regional demonstration project.

A MODEL FOR FINANCING MULTI-FAMILY RESIDENTIAL ENERGY EFFICIENCY RETROFITS

Like single-family homes, multi-family housing developments have received federal attention and financial support to enable retrofits. At the Lab, Michael D. Lappin of the Community Preservation Corporation (CPC) described the CPC Green Financing Initiative, a public/private partnership that provides incentives and financing to the owners of apartment and condo buildings in New York City for efficiency upgrades. The CPC recently received \$1 billion in credit to lend to property owners; half of this funding came from Freddie Mac, and the rest was from the New York State Employee Retirement System, the New York City Employees Retirement System, and several private lenders. He mentioned that mortgage insurance was a key component of the initiative that helped the CPC secure funding; all of the projects financed by CPC are insured by the State of New York Mortgage Agency.

“New York State has a program of mortgage insurance which I think is unique in the country,” he said. “It has been responsible for billions of dollars being pumped into the lower- and moderate-income areas of New York State. I’m always shocked at why it hasn’t been adopted in other states.... Long-term investors like the public pension funds don’t look at the variations in individual mortgages; they look at the uniformity in the mortgage insurance.”

Lappin noted that the initiative incorporates several key elements.

It takes advantage of existing infrastructure in the mortgage finance system as a fundamental part of the lending process. It typically requires third-party reports, a standard credit review of borrower and property, an energy audit and assessment, and inclusion of retrofit work scope into an overall physical upgrade. Acting as a virtual one-stop resource, the program, launched in October 2009, currently offers about a 6 percent interest rate on loans.



CONCLUSION

The Financial Innovations Lab demonstrated that there is a great deal of interest in financing energy efficiency—from utilities and environmental advocates, from state and local governments, and from the Obama administration. It also showed that investors look forward to participating in the market, but only when the economic argument works for them. To set the stage, the following components must be in place:

- The market must grow. Without a larger market, energy efficiency retrofits will remain too expensive, and without more transactions, there will be no access point for institutional investors.
- In order for the market to grow, more consumers must be convinced to retrofit—and they will only do so if there are sufficient numbers of well-designed, affordable programs at their disposal.
- Program design must extend beyond energy efficiency requirements. Equal emphasis needs to be placed on financing design and consumer-friendly convenience.
- Programs must work at the local level but not add too many local provisions. They must aim to create loans that can be placed into large, national loan pools.
- There is a unique opportunity to leverage public resources, but private capital needs an access point, and hence there is an important role for early adopters and financial innovation.

In this economic climate, undertaking a sweeping national movement toward energy efficient retrofits is easier said than done. State and local governments across the country are facing budget crises, while homeowners, intent on reducing their debt load, are hesitant to take on new obligations. The mortgage meltdown crushed the securitization market, which is only now beginning to slowly open up again.

So how can the energy about energy efficiency overcome these obstacles?

- **Build on successes.** This report highlighted several models that are up and running in different places across the country: PACE, unsecured home improvement loans, EEM mortgages, and on-bill payment through utilities. It's crucial to identify which models work best and replicate them.
- **Look for best practices.** Focus on the features that different financing programs share so that the best local programs can be combined into a single national initiative. Integrate program and financial product design so that incentives align for the long-term goal of attracting private capital.
- **Identify some first movers in the private sector willing to take a financial risk.** Mission-oriented investors who are committed to promoting sustainability could play an important role, as can market-rate investors seeking tax-advantaged options.

No one party can solve this problem. It will require a public-private collaboration and market acceptance by homeowners. Further, it demands an integrated program and financing design. Only when all these pieces come together will we be able to retrofit America's homes.

Working together, providers of public, private, and philanthropic capital could enable energy efficiency financing to reach scale. Once we're on our way to retrofitting America's homes, the nation is on its way to a more sustainable future.

APPENDIX I

Financial Innovations Lab Participants

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APPENDIX II

EXISTING STATE RESIDENTIAL ENERGY EFFICIENCY LOAN PROGRAMS: PROGRAM DESIGN SUMMARY

State Programs: Design											
Sponsoring entity	Program name	State	Source of capital	Financing mechanism	Collection mechanism	Enhancements	Work scope/Eligible measures	Who processes application?	Credit requirements	Audit requirement	Security interests
AFC First Financial Corporation	Keystone Home Energy Loan Program	PA	PA Treasury, Housing Finance Agency & Energy Dev Authority	Retail installment contract (RIC) or mortgage	Separate monthly bill from lender	Below-market interest rate	Energy efficiency (EE) solar, wind, and geothermal	Sponsoring entity	FICO>640 ~65% approved	Qualifying contractors only, auditor required only for "Whole House," funds are released upon customer's signature	Loan loss reserve fund; some loans also secured with mortgage
Cambridge Energy Alliance	Cambridge	MA	Lender funds	Consumer loan	Separate monthly bill from lender	Negotiated reduced rate	EE, solar thermal, solar PV	Lender	Varies; lender does underwriting 30-79% approved	tba	Unsecured
City of Berkeley	Berkeley FIRST	CA	Municipal bond	Special tax levied	On property tax bill	Interest payments are tax deductible	EE, solar thermal, solar PV	tba	Must own property and be current on property tax payments	tba	Secured by lien on home
ECO-Link	Energy Conservation for Ohioans	OH	Participating lenders, with OH treasury review	Consumer loan	Separate monthly bill from lender	Interest rate reduction	EE	Banks	Must be approved by lender	Borrower must submit EE audit sheet with app for funding; contractor must be approved	Unsecured
Efficiency Vermont	Home Performance with ENERGY STAR® Loan Program	VT	Lender funds, plus public benefit charge	Consumer loan or mortgage	Separate monthly bill from lender	Interest buy-down	EE	Lender	Varies based on loan product 100% approved	tba	Some loans are secured with home equity or another asset (e.g., a car)
First Electric Cooperative	Home Improvement Loan Program	AR	National electric coop funds	Consumer loan or mortgage	On utility bill	Below-market interest rate	Heat pump required, other EE allowed	Utility	No set bar, review credit and bill payment history ~100% approved	tba	Fixture filing, plus loans over \$2,500 secured with mortgage
Focus on Energy	Targeted Home Performance	WI	EFS	Consumer loan	Separate monthly bill from lender	Below-market interest rate	Range of approved measures	Lender	Credit must be approved by lender; proof of income required (for loans over \$4,000)	None (customer signs certificate of completion)	Unsecured
Main Housing	Home Energy Loan Program (HELP)	ME	Eight private lenders	Bank loan	Separate monthly bill from lender	Below-market interest rate	List of approved repairs, insulation is required if necessary.	Lenders	DTI 45% or less; LTV of up to 106% of all loans; no credit qualifications	Audit is required to develop scope; auditors can be certified by BPI, State of Maine, NE HERS, or RESNet	Unsecured
Manitoba Hydro	Power Smart Residential Loan	Canada	Utility's general revenue funds	Consumer loan	On utility bill	Below-market interest rate	EE	Utility	No set bar, review credit and bill payment history ~94% approved	tba	Unsecured

State Programs: Design											
Sponsoring entity	Program name	State	Source of capital	Financing mechanism	Collection mechanism	Enhancements	Work scope/ Eligible measures	Who processes application?	Credit requirements	Audit requirement	Security interests
MassSAVE program	HEAT Loan	MA	Many local lenders, including credit unions	Consumer loan	Separate monthly bill from lender	Below-market interest rate	Prescribed list of standard items, including boiler, water heater, windows, duct sealing, etc.	Lender	Must be customer of one of program's participating utilities	Requires Home Energy Assessment to develop scope. All work receives "Verification Inspection."	Unsecured
Mau Electric Company	SolarSaver Pilot	HI	Public benefit charge	Tariffed installation program	Separate bill within the utility bill envelope	Zero percent interest	Solar hot water	Contractor	No set bar, review credit and bill payment history	tba	Disconnection for nonpayment
Midwest Energy	HowSmart™	KS	Utility's general revenue funds and state housing fund	Tariffed installation program	On utility bill	Below-market interest rate	EE	Utility	Good utility bill payment history	tba	Disconnection for nonpayment
MN Center for Energy and Environment	Rental Energy Loan Fund	MN	State revolving loan fund	Mortgage	Separate monthly bill from sponsoring entity	Below-market interest rate	EE	Sponsoring entity	No set bar, review DTI and cash flow of property	tba	Secured by lien on home
Nebraska Energy Office	Dollars and Energy Savings Loans	NE	Lender funds, oil overcharge funds	Consumer loan	Separate monthly bill from lender	Below-market interest rate	EE, renewables	Lender	Lender does not underwrite, approval rate varies	Pre-qualified improvements can be done without audit; other improvements require audit	Varies based on lender's requirements
NYSERDA	Energy Smart Loan Fund	NY	Lender funds, plus public benefit charge	Consumer loan	Separate monthly bill from lender	Interest buy down, additional \$ for low income	EE, solar thermal, solar PV, wind (must meet NYSERDA standards and installed by BPI HPWES Contractor)	Lender	Lender does not underwrite, approval rate varies	Customer and contractor must sign certificate of completion	Loans over \$7,500 must be secured
NYSERDA	Home Performance with ENERGY STAR® Loan Program	NY	Fannie Mae funds and public benefit charge subsidy	Consumer loan	Separate monthly bill from lender	Below-market interest rate, additional \$ for low income	EE (BPI-certified contractor conducts initial audit)	Lender	FICO > 640 ~65% approved	NYSERDA conducts post-completion audits	Unsecured
Sacramento Municipal Utility District	Residential Loan Program	CA	Utility's general revenue funds	Consumer loan	Separate monthly bill from utility	Below-market interest rate	EE, solar thermal, solar PV (pioneered use of technologically advanced duct sealing measures in early 2000s)	Utility	Yes, std bank metrics used plus bill payment history 73% approved	Must use contractor from approved list; installations must be as per SMUD specs / standards; SMUD does random quality assurance inspections	Secured with a fixture filing to the property
Vermont Gas Systems	Retrofit Loan Program	VT	Lender funds, plus expenses added to rate base	Consumer loan	Separate monthly bill from lender	Below-market interest rate; loans guaranteed	EE improvements that reduce gas use	Utility	Low bar as loans are guaranteed ~100% approved	tba	Secured by lien on home; loans guaranteed by VGS
Viewtech Financial Services	Fannie Mae Loan Program	CA	Fannie Mae funds	Consumer loan	Separate monthly bill from lender	Below-market interest rate	EE	Sponsoring entity	FICO >640 ~60-70% approved	tba	Unsecured Retail Installment Contract (RIC)

Sources: Various state websites, Energy Programs Consortium, and Marrian Fuller (2009) "Enabling investment in energy efficiency: A study of energy efficiency programs that reduce first-cost barriers in the residential sector," California Institute for Energy and Environment and Efficiency Vermont.

EXISTING STATE RESIDENTIAL ENERGY EFFICIENCY LOAN PROGRAMS: PROGRAM RESULTS SUMMARY

State Programs: Results								
Sponsoring entity	Program start date	Target market	Marketing channels	Average loan amount	Interest rate and term	Financing issued in 2007	% consumers served in 2007	Default rate in 2007
AFC First Financial Corporation	2005	Single family owner occupied	Contractors	\$6,000 unsec \$10,000 max sec \$35,000 max	Unsec 8.99% for 3, 5 or 10 years Sec 6.375-8.875% for 10 years	~1,500 loans \$9 million	<0.1% (1,500 loans 4.8 million homes)	<0.5%
Cambridge Energy Alliance	2008	All sectors	Public announcements, articles, etc	Max \$25,000	9.75% for ECSB 1-3% for Citizens' if <80% AML <10 years	n/a	n/a	n/a
City of Berkeley	September 2008	Residential and commercial property owners	tba	tba	5-7% (tba) 20 years	n/a	n/a	n/a
ECO-Link	September 2009	Single family	State, lenders	\$25,000 max	Market rate with 3% buy-down from state; up to five years (OH Treasury deposits CD at bank, and uses earnings to reduce loan rate)	n/a	n/a	n/a
Efficiency Vermont	2006	Single family owner occupied	Sponsor promotes, some contractors promote	\$8,000 \$15,000 max	Buy down 3.5% Final interest varies ~2-6.5% 5 years max	34 loans \$257,000	<0.1% (34 loans 250,000 homes)	None so far
First Electric Cooperative	2000	Single family owner occupied	Through utility	\$11,000 \$15,000 max	7.5% up to 5 years	7 loans \$76,900	<0.1% (7 loans 65,000 homes)	<1%
Focus on Energy	2003	1-2 family home	Through state	\$10,000 max	9.9% up to 10 years	n/a	n/a	n/a
Maine Housing	Major overhaul in 2008	1-4 family home	Lenders, direct mailing from state to homeowners	\$30,000 max	3.95% up to 15 years	n/a	n/a	n/a
Manitoba Hydro	2001	Single family owner occupied	Contractors' suppliers, utility	\$4,800 \$7,500 max	6.5% up to 5 years	8,100 loans \$39 million	<1.9% (8,100 loans 420,000 homes)	<0.2%
MassSAVE program	2000	1-4 family home	State and participating lenders	\$15,000 max	0% up to 15 years	n/a	n/a	n/a
Maui Electric Company	2007	Single and multi-family rented or owned	Contractor and utility	\$5,000 no max	0% 8 year term average	16 loans \$80,000	<0.1% (16 loans ~40,000 homes)	None so far
Midwest Energy	2007	Single and multi-family rented or owned	Contractor and utility	\$4,000 no max	4% interest 15 years	48 loans closed \$188,000 (since Aug 2007)	n/a	None so far
MN Center for Energy and Environment	1990	Single and multi-family rental units/homeowner units	Info to landlords, contractors / direct mailing, radio	\$8,000 \$10,000 max	4% up to 5 years / 6.25%	21 loans \$164,000/ 73 loans, \$469,000	<0.1%	~3-5%

State Programs: Results								
Sponsoring entity	Program start date	Target market	Marketing channels	Average loan amount	Interest rate and term	Financing issued in 2007	% consumers served in 2007	Default rate in 2007
Nebraska Energy Office	1990	Single and multi-family property owners; commercial and farms	Contactors, lenders	\$9,000 SF max \$35,000 MF max \$75,000	Under 5% on average (2.5% post ARRA) up to 10 years	784 loans \$7.1 million	<0.1% (784 loans ~700,000 homes)	<0.01%
NYSERDA's Energy Smart Loan Fund	1998	Single and multi-family property owners	Lenders and contractors	SF \$11,000 \$20,000 max MF varies widely	Buy down of 4% term varies	SF 340 loans \$3.8 million MF 29 loans \$23.2 million	<0.1% (369 loans ~6 million homes)	<1%
NYSERDA's HPWESLoan Program	2003	Single family owner occupied	Contractors	\$7,800 \$20,000 max	5.99% for 3, 5, 7 or 10 years	541 loans \$4.2 million	<0.1% (541 loans ~6 million homes)	~2-3%
Sacramento Municipal Utility District	1977	Single family owner occupied	Network of 180 contractors	\$8,7500 no max	7.5% up to 10 years (PV up to 20 years)	3,200 loans \$28 million	<0.6% (3,200 loans ~520,000 homes)	1.80%
Vermont Gas Systems	1993	Single and multi-family with larger than average gas use	VGS staff, contractors	\$4,380 no max	0% for 3 years 2% for 5 years 4% for 7 years	66 loans \$289,000	<0.18% (66 loans ~36,000 homes)	~0% (1 in 10 years)
Viewtech Financial Services	1995	Single family owner occupied	Contractor and utilities advertise	\$10,000 \$20,000 max	12.49% Up to 12 years	3,000 loans \$3 million	n/a	~2%

Sources: Various state websites, Energy Programs Consortiums, and Marrian Fuller (2009) "Enabling investment in energy efficiency: A study of energy efficiency programs that reduce first-cost barriers in the residential sector." California Institute for Energy and Environment and Efficiency Vermont.

ENDNOTES

1. "Recovery Through Retrofit," White House Report/ Middle Class Task Force, Council on Environmental Quality, October 2009, http://www.whitehouse.gov/assets/documents/Recovery_Through_Retrofit_Final_Report.pdf (accessed March 16, 2010).
2. "Financial Assistance Funding Opportunity Announcement," U.S. Department of Energy, October 2009, <http://www.eecbg.energy.gov/Downloads/EECBGCompetitiveFOA148MON.pdf> (accessed March 16, 2010). The Retrofit Ramp-Up application deadline was December 2009; award recipients will be notified in March 2010, with awards distributed in May 2010.
3. Since the early 1980s, several jurisdictions in the United States have adopted Residential Energy Conservation Ordinances, a policy tool applied to homeowners and rental property landlords for upgrading energy efficiency.
4. "Recovery Through Retrofit."
5. According to Mark Wolfe and Howard Banker of the Energy Programs Consortium (EPC), the number of FHA EEMs originated per year was 430 in 2005, 861 in 2006, and 1,066 in 2007.
6. Gil Sperling, public statement, NASEO Annual Meeting on Transforming America's Energy Future, National Association of State Energy Officials, September 13-16.
7. Estimate provided by the Energy Programs Consortium.
8. U.S. Department of Energy, press releases: "DOE to Fund up to \$454 Million for Retrofit Ramp-Ups in Energy Efficiency," September 14, 2009, <http://www.energy.gov/news2009/8005.htm>; and "Vice President Biden Unveils Report Focused on Expanding Green Jobs and Energy Savings for Middle-Class Families," October 19, 2009, <http://www.energy.gov/news2009/8148.htm>.
9. According to FirstAmerican CoreLogic, some 11.3 million U.S. homeowners had negative equity at the end of 2009.
10. "Green Fixed Income Investing," Community Capital Management, July 2009.
11. Staff report to the Association of Bay Area Governments (ABAG) Executive Board, Solar and Energy Efficiency Financial District, September 2, 2009 (http://www.abag.ca.gov/seed/SEED_Sept2009.pdf).
12. State Energy Program (SEP) funds may not be used for loan guarantees, whereas the Retrofit Ramp-Up program (under EECBG funds) can be used for different forms of credit enhancements. See the DEO memo outlining the allowable uses of ARRA funds at <http://www.eecbg.energy.gov/solutioncenter/financialproducts/creditenhancement.html>.
13. Fitch Ratings, "Rating Criteria for U.S. Utility Tariff Bonds," October 27, 2009, www.fitchratings.com.
14. "Recovery Through Retrofit."
15. For the latest information, see www.pacenow.org.
16. The sixteen states that have passed PACE legislation are California, Colorado, Illinois, Louisiana, Maryland, Nevada, New Mexico, New York, North Carolina, Ohio, Oklahoma, Oregon, Texas, Vermont, Virginia, and Wisconsin. Legislation is pending in Arizona and New York. Florida and Hawaii have existing ability to launch PACE programs. See www.pacenow.org.
17. Analysis of the Sonoma County PACE program at the end of 2009 is contained in an appendix to its ARRA grant application, via funds administered by California's State Energy Program. See www.energy.ca.gov/recovery/awards/PON-400-09-401_Final_Proposals/index.php.
18. See the list of awards for ARRA-funded energy projects by the California Energy Commission at <http://www.energy.ca.gov/recovery/awards/>.
19. For an overview of on-bill financing, see Merriam Fuller, "Enabling Investment in Energy Efficiency: A Study of Energy Efficiency Programs That Reduce First-Cost Barriers in the Residential Sector," prepared for California Institute for Energy and Environment and Efficiency, Vermont, May 21, 2009.
20. <http://www.cleanenergyworkspportland.org/>
21. The ShoreBank Septic Loan program was funded by the Bill and Melinda Gates Foundation; the current loss rate of this product is 5 percent.

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