



RECENT INNOVATIONS IN FINANCING FOR CLEAN ENERGY

Prepared by
Matthew H. Brown and Beth Conover

October 2009

Southwest Energy Efficiency Project
2260 Baseline Road, Suite 212 • Boulder, Colorado 80302 • tel: 303-447-0078 • fax: 303.786.8054
www.swenergy.org

Acknowledgements

The authors are grateful for the contributions of many people for review and provision of valuable information for this report. Most importantly, Howard Geller, Executive Director of the Southwest Energy Efficiency Project, provided valuable advice, guidance and review of this report. This report benefited substantially from the time that numerous people volunteered to describe and provide data and information about their programs. These include: Dennis O’Conner, United Illuminating; Frank Spasaro and Jill McGhee , Sempra Energy Utilities; Glenn Cayer, Manitoba Hydro, Mike Volker, Midwest Energy; Ann Livingstone, Boulder County; Hank Ryan, Small Business California; Stephen Ponce-Pore of the Bank of Colorado and Peter Krajcsa, AFC First. Heather Braithwaite provided valuable research assistance and review for this report. Gene Dilworth at SWEEP edited the report.

The Southwest Energy Efficiency Project is grateful for the generous financial support of the SeaChange Foundation that enabled preparation of this report.

Questions or comments about this report should be directed to Matthew H. Brown, matthew@conoverbrown.com.

About SWEEP: The Southwest Energy Efficiency Project is a public interest organization dedicated to advancing energy efficiency in Arizona, Colorado, Nevada, New Mexico, Utah, Wyoming. For more information, visit www.swenergy.org.

TABLE OF CONTENTS

<i>Acknowledgements</i>	<i>ii</i>
<i>List of Tables</i>	<i>iv</i>
<i>List of Figures</i>	<i>iv</i>
<i>Executive Summary</i>	<i>v</i>
<i>I. Introduction</i>	<i>1</i>
A. Background	1
B. Why Use Financing for Energy Efficiency?	3
<i>II. Innovations in New Financing Programs</i>	<i>5</i>
A. Capital Sources	5
B. Loan Terms	9
C. Repayment Mechanisms	11
D. Determining Measures That Qualify for Financing	14
E. Choosing the Target Market	15
F. Interest Rates and Take-up Rates	16
G. Default Rates and Credit Quality Criteria	17
H. Transaction Points	18
<i>III. Program Profiles</i>	<i>20</i>
A. Third Party Loan	21
Keystone Home Energy Loan Program (HELP) – State of Pennsylvania	21
Clean Energy Finance Program – State of Colorado	24
B. On-Bill Loan	25
Power Smart Residential Loan – Manitoba Hydro, Canada	25
Sempra Energy Utilities, California.....	27
United Illuminating, Connecticut.....	29
C. On-Bill Tariff Programs	32
How\$mart® – Midwest Energy, Kansas.....	32
D. Property and Local Government Fee-Based Financing Mechanisms	34
BerkeleyFIRST (Financing Initiative for Renewable and Solar Technology) – Berkeley, California.....	34
ClimateSmart Loan Program – Boulder County, Colorado	37
The Babylon Project – Town of Babylon, New York.....	40
E. Home Mortgage	42
Colorado ENERGYSTAR® Mortgage – Governor’s Energy Office & the Bank of Colorado	42
<i>Conclusion</i>	<i>44</i>

List of Tables

Table 1: Loan Term Calculations for Hypothetical Project.....	10
Table 2: Third Party Loans	11
Table 3: On-bill Loans	12
Table 4: On-bill Tariff	12
Table 5: Property Tax or Municipal Fee-based Financing	13
Table 6: Energy Efficiency Mortgage Loan	14
Table 7: Prescribed Measures	15
Table 8: Audit-based Approaches.....	15
Table 9: Default Rates and Credit Quality Criteria	17
Table 10: Transaction Points	19
Table 11: Summary of Financing Mechanisms and Specific Programs	20
Table 12: Measures Installed by Manitoba Hydro.....	26
Table 13: Sample Special Tax Calculation.....	35

List of Figures

Figure 1: Sempra Utilities 18-month Cumulative History.....	28
---	----

Executive Summary

Many consumers and businesses lack the funds to complete major energy efficiency retrofit projects in their home or business. This barrier has been exacerbated by the 2008-2009 economic recession. Thus, easily accessible financing at attractive loan terms is an important strategy for increasing the level of energy efficiency retrofit occurring throughout the United States.

In the past five years, several new public and private financing innovations have emerged to support energy efficiency and renewable energy in homes and small businesses. These have been tested primarily as pilot projects supporting small-scale investments in energy efficiency and solar energy, and have led to new innovative programs. These innovations may possess the potential to move from a small-scale pilot financing effort to a very large-scale program that reduces energy use, energy bills and emissions of greenhouse gases.

This report reviews and provides profiles of innovative energy efficiency financing programs, many of which may serve as models for broader replication. We cover financing programs offered by utilities, private lenders, local and state governments. The financing mechanisms covered in this report are described below.

Private sector loans with public capital: Such programs consist of a third party lender that originates and services loans, often with government capital as the source of the funds. The Keystone Home Energy Loan Program (HELP) in Pennsylvania is an example, with the Pennsylvania State Treasury providing funds to capitalize a loan program. This program also features grant funds from utilities and the Pennsylvania Energy Development Authority that provide a five percent loan loss reserve. This approach in Pennsylvania has worked particularly well for “emergency replacement” efficiency measures, such as a furnace that needs replacing in mid-January or an air conditioner requiring replacement in mid-August.

On-bill utility loans: Under this approach, utilities pay for energy efficiency retrofits, use contractors to install efficiency measures, and recover their costs by charging participating customers for the measures as an itemized charge on their utility bill. On-bill utility loan programs come in two varieties: (1) an on-bill loan that a utility makes directly to a business, government, institution or homeowner; and (2) an on-bill energy service charge on a consumer’s bill that stays with the property in the event the homeowner or business moves to another location. Manitoba Hydro, Sempra Energy Utilities and United Illuminating provide examples of the on-bill loan; Midwest Energy provides an example of the on-bill energy service charge. The on-bill mechanism has worked well for small businesses that need simple, turnkey approaches to improve their energy efficiency or for homeowners seeking financing for more modest energy efficiency measures.

Property and local government fee-based financing: This approach involves loans from a local government to a property owner for energy efficiency or renewable energy projects. In the property tax-based mechanism (illustrated by the programs in Berkeley, California and Boulder County, Colorado), a homeowner agrees to take a lien on the relevant property to secure a loan. The homeowner pays for the loan through an adder placed on the property tax bill. Default places this property tax payment obligation ahead of the first mortgage obligation. The government-fee based payment mechanism (illustrated by the program in Babylon, New York) does not require homeowners to place a lien on their property. Nonetheless, failure to pay results in the defaulted payment being placed on the property tax bill, and failure to pay the property tax bill results in an obligation placed ahead of the first mortgage. The property tax-based mechanism, given the relative complexity of taking on a new property lien, is most appropriate for larger scale home retrofits that incorporate major energy efficiency measures or solar energy. Because it is not tied to a mortgage, this mechanism does not need to take place at the time a homeowner takes on a new mortgage or mortgage refinance.

Home mortgage-based financing: This approach supports energy efficiency in that a bank lends funds at a subsidized, advantageous interest rate if a home meets or is upgraded to energy efficiency standards such as ENERGY STAR®. The example cited in this paper is the partnership between the Bank of Colorado and the Colorado Governor's Energy Office. In this case, the State and the Bank share the cost of an interest rate buydown for ENERGY STAR® homes. This mechanism is suited only to homeowners purchasing or refinancing a home. Given the comparative complexity of taking out a new loan or home refinance, it may be most appropriate for larger efficiency retrofits or efficiency retrofits that also incorporate solar power.

A number of conclusions can be drawn from the profiles and program reviews contained in this report.

- 1) No single mechanism will meet all financing needs. Utilities, private lenders, and local and state governments have developed a number of innovative financing programs. These programs and others can serve target markets at different transaction points. Some are streamlined and designed to provide quick access to money to buy energy-efficient appliances (furnaces or air conditioners, for example). Others are more complex, but provide access to larger amounts of money to fund a full-scale efficiency retrofit or an efficiency/solar energy installation through a second mortgage, a secured loan or a primary energy efficiency mortgage.
- 2) Instead of choosing a single loan product and hoping that it covers all energy efficiency markets, it may be appropriate to either (1) choose *one target market* (e.g., the appliance replacement market, the small business market, or the residential full efficiency audit and retrofit market) and focus a loan product and financial resources on that market; or (2) create a *portfolio of loan products* to serve different markets. An approach of developing a portfolio of loan products

will serve borrowers who have differing needs, such as those buying a home, those who want to upgrade the energy efficiency of their business, or those who must replace a broken HVAC system.

- 3) There appears to be a trade-off between complexity of the loan product and take-up rates. Some loan products fund only efficiency measures identified through an energy audit as cost effective measures on a property-by-property basis. This audit, performed by trained and certified energy auditors, can identify a wide range of efficiency measures. The alternative to the audit-based approach is a more streamlined, less expensive approach based on a list of eligible prescriptive measures. The audit approach can result in greater energy savings per participant, but has more obstacles to participation and thus lower participation rates than the prescriptive approach. This is point is exemplified by the Pennsylvania Keystone HELP program.
- 4) Capital sources can be as varied as the programs that support them; however, the capital sources need to match the needs of the markets that they serve. Programs use a variety of capital sources including utility capital, bond issuances, public benefit funds, bank loans, private sector investor capital or government general funds.
- 5) Loan terms can be short, from 2-5 years in the case of some small business on-bill loan programs; can be moderate, in the case of an on-bill tariff program in which loan terms are designed around the life of the efficiency measures (often as much as 10 years); or can be longer if the loan is tied to a property tax or a mortgage, ranging as high as 30 years in this case. Longer loan terms are common in the government market (government customers are assumed to be the most stable), while shorter terms are typical in the small business market which may tends to see high turnover.
- 6) Interest rates vary from a low of zero percent to a high of 8.99 percent (although the higher interest rate has subsequently been reduced to 6.99 percent). In some markets, such as the emergency replacement market for HVAC equipment, a highly subsidized interest rate may not be critical to program success. In other markets, such as the small business energy efficiency retrofit market or the home mortgage market, there appears to be greater sensitivity to the cost of funds. In these markets, a low or zero percent interest rate may be more important.
- 7) Another common theme of the programs we profile is the heavy involvement of contractors, and sometimes retailers, in program delivery. Contractors have, or can build, strong relationships with their customers and are typically the first point of contact with customer/borrowers. Successful programs often empower contractors and retailers to sell the energy efficiency products (whether they be complete efficiency audits/retrofits or single efficiency measures such as a furnace replacement), and make the contractors or retailers the link to financing.

- 8) Risk management and credit enhancement is critical. Default rates for efficiency programs have been low, typically less than one percent. These low default rates are likely a result of careful underwriting in a small number of programs and the fact that energy efficiency measures actually reduce borrowers' day to day expenses, thus making loan payments affordable. However, it is unlikely that energy efficiency lending has a long or strong enough credit history to attract a large amount of outside capital and investors without additional credit enhancements (loan loss reserves and guarantees, for instance) to secure payment.
- 9) Some programs seek to attach loan repayment to secure payment streams such as the utility bill, municipal charges, or the property tax. Each of these repayment mechanisms provides security beyond what would be available through a simple unsecured, third party billing. However, each also faces barriers. Utility companies may not be enthusiastic about placing financing charges on their utility bill; banks and secondary market mortgage investors may object to repayment obligations tied to a property tax that take priority over the first mortgage in case of default.
- 10) A successful financing program should support, and not be a barrier to, customer participation. Financing should remain streamlined, easy-to-access, and quick. Customers need to know that they will have access to financing, but they are not participating in a program simply because it offers good financial terms; they are striving for lower utility bills, an upgraded home or business property, and more comfortable living and working spaces.
- 11) Only a few financial institutions have participated in energy efficiency or renewable energy lending programs so far, and these tend to be specialty lenders or investors such as AFC First in Pennsylvania or Renewable Funding in Berkeley, California. It is notable that these specialty lenders or investors either hold on to the loans to maturity or have a specialty secondary market (such as the Pennsylvania Treasury) to which they sell loans. Likewise, relatively few utilities offer financing for energy efficiency measures or projects. Broader participation from banks, utilities, and other lenders will be needed in order to move energy efficiency financing into the mainstream.

In summary, financing for energy efficiency is more complex than rebate or grant programs. But the benefits of financing, including the potential for leverage and for low or no subsidization, provide new opportunities for overcoming barriers to the adoption of energy efficiency measures. Financing is not a panacea; rather it should be viewed as a complement to other strategies such as building energy codes, appliance efficiency standards, or utility rebate programs. We hope this paper will help those in the field understand both the challenges to and opportunities for using energy efficiency financing in a productive manner.

I. Introduction

In the past five years, several new public and private financing innovations have emerged to support energy efficiency and renewable energy in homes and small businesses. These have been tested primarily as pilot projects supporting small-scale investments in energy efficiency and solar energy, and have led to innovative new programs. These innovations may possess the potential to move from a small-scale pilot financing effort to a very large-scale program that reduces energy use, energy bills and emissions of greenhouse gases.

The innovations described in this paper will be useful to those who are:

1. at the early stages of developing financing mechanisms,
2. considering how to allocate existing funding to new financing programs; and
3. looking to attract new capital to existing programs.

After a brief background discussion, this paper describes and contrasts the major features of a number of financing tools currently being applied at the state and local government level around the country. Several of these emerging models are then described in greater detail.

A. Background

The substantial scale of financial, environmental, reliability and security benefits that accrue from energy efficiency are well accepted in many sectors of government as well as the private sector. As an example, a recent McKinsey & Company study estimated that widespread energy efficiency improvements in buildings and industry over the next decade could save consumers \$1.2 trillion. But numerous barriers stand in the way of large-scale adoption of energy efficient products and practices, despite huge potential savings.¹

A report released by the California Institute for Energy and Environment summarized five broad categories of barriers to realizing the long-term benefits from energy efficiency:²

1. *Transaction costs*: The time and effort required to secure information, fill out forms, apply for financing and arrange for contractors may outweigh the perceived benefits from efficiency.
2. *Lack of information*: Many homeowners and small businesses do not have the information they need to build, remodel or purchase in the most energy efficient way.

¹ Granade, Hannah Choi, and Et al. *Unlocking Energy Efficiency in the US Economy*. Rep. McKinsey & Company, 2009.

² Fuller, Merrian. *Enabling Investments in Energy Efficiency*. Rep. Oakland, CA: California Institute for Energy and Environment, 2008.

3. *Uncertainty of savings*: Actual energy and cost savings may deviate from projected savings.
4. *Split incentives*: Split incentives occur if the party that must make the investment in energy efficiency (a landlord, for instance) is different from the party that benefits (a renter, for instance).
5. *Initial capital investment*: The first cost, and lack of capital to pay that cost, deters investment. The same McKinsey & Company report referenced above also identified a need to “identify methods to provide the significant upfront funding required...to capture energy efficiency.”

It is critical to note that financing is not the only barrier to making efficiency investments. An effective financing program must incorporate design features that address other barriers. Financing—both raising capital and designing a program—is about much more than finding money and making it available to lend. It is also about making the programs simple for borrowers to use, and marketing the programs effectively. Often this means plugging the ideal financing mechanism into the existing channels that people already use to procure heating, air conditioning, lighting, insulation or other products, thereby making it easy for homeowners or small businesses to understand their options and to make efficiency investments without an overwhelming amount of paperwork or time. This paper describes several methods to develop such integrated programs, while focusing primarily on the programs’ financing elements.

Financing programs in this sector are not new. State governments, some utilities and local governments have operated such programs since the late 1980s. Not all of these financing programs have been designed to offer large numbers of loans, nor have they reached a significant portion of the population. Despite the existence of more than 150 different loan programs in the United States, these programs have only reached 0.1% of their potential borrowers.³ For example, a program in Idaho had a loan volume of somewhat more than 500 since its inception in 2001, and one in Kansas had a loan volume of only 91 its first two years of operation. These state-based loan programs were among a first generation of such financing programs, often capitalized through funding provided by the federal government with an account known as the Petroleum Violation Escrow Fund, which is now largely depleted. They have provided a useful foundation upon which many of the second generation programs are based.⁴

Newer programs represent a second generation of financing for energy efficiency and, in many cases, small-scale solar energy. These may have the potential to offer many more loans, well beyond the relatively small scale of many first generation loan programs. They have focused on simplifying the application process, marketing effectively to a target sector, accessing larger and new sources of capital, enhancing credit quality, and finding ways to extend the payment terms over multiple years.

Three factors make this a particularly ripe time for consideration of new loan programs:

³ Ibid.

⁴ Brown, Matthew H., *Energy Efficiency Loan Programs*. Rep. Washington, DC: Alliance to Save Energy, 2009.

1. The nation is experiencing a severe economic recession that is squeezing family and business budgets, such that fewer people or businesses have the capital necessary to front the cost of energy efficiency investments.
2. New sources of capital are now available for energy efficiency through the federal government. Federal stimulus funds from the State Energy Program (SEP) can be applied to loan programs, as can funds from the local government Energy Efficiency and Conservation Block Grants (EECBG) program. The national total of SEP and EECBG funds exceeds \$6 billion. State and local governments are now considering the use of a portion of these funds to capitalize loan programs.
3. Climate change represents a tremendous challenge, and energy efficiency measures can cost-effectively combat climate change, *if* capital is made available to provide the up-front investment in efficiency measures.

B. Why Use Financing for Energy Efficiency?

It is worth asking why the public or private sector would consider financing efficiency investments over other options. After all, financing programs are almost always more complex to operate than the most common alternative—rebate programs. Financing programs require a long-term commitment of financial and human resources to collect principal and interest. In most cases they also require a credit evaluation process that is not necessary for a straightforward rebate program. The answer is multifold.

1. *Financing expands the amount of capital available to invest by attracting new sources of capital for energy efficiency and renewable energy projects.* Financing energy efficiency investments gives a return on capital to investors that is unavailable in rebate or grant programs. This return provides an opportunity to bring to bear new sources of capital including bonding or private lender capital. New federal tax credit bonds, known as Qualified Energy Conservation Bonds, are an example of one type of capital that requires a financial return but that could also be used to support energy efficiency loan programs. Other federally subsidized or private sources become available to capitalize a financing program as well.
2. *Financing expands the number of players that can support energy efficiency or renewable energy.* Utilities and some government entities operate rebate programs because they have access to capital that does not require a return; public benefit charges in many states provide money that can be used to fund rebates. Financing programs allow lending institutions, ranging from banks to credit unions to consumer credit companies and others, to administer loan programs and bring their own capital to those loan programs.
3. *Financing means “skin in the game” for customer/borrowers.* Financing implies that customer/borrowers must pay back the money that they have borrowed to

install energy efficiency measures. This “skin in the game” may encourage them to operate and maintain equipment better than if a utility simply gave it to them. This was one factor that California considered when designing its on bill financing programs.⁵

4. *Financing programs extend the life of limited government funds.* A rebate or grant program by definition provides funding with no return. Once it is spent in the form of a rebate or grant, it is gone. A financing program that generates a return of both the capital invested as well as a return on that capital through a revolving fund can finance new investments in energy efficiency or renewable energy many times over.
5. *Financing programs can complement rebate or grant programs.* In many cases, a financing program can operate in tandem with a rebate program, so the two are not mutually exclusive. As an example, United Illuminating, a Connecticut utility that offers an on-bill loan financing program for small business customers, also offers a companion rebate to customers that can be used to reduce the amount borrowed. A \$25,000 energy efficiency retrofit, for example, could be covered by a \$10,000 rebate and a \$15,000 loan.

As financing tools have become more sophisticated and easier to use, and as new sources of capital have become available, creative financing programs offer a way to overcome some of the barriers to realizing the full potential of energy efficiency. Given the increasing public interest in larger-scale retrofits, financing mechanisms are quickly becoming an essential tool for utilities and government agencies charged with advancing energy efficiency.

⁵ Based upon discussions with Hank Ryan, Small Business California.

II. Innovations in New Financing Programs

This section describes eight categories of innovations to consider in developing an energy efficiency financing program:

- A. Capital Sources
- B. Loan Terms
- C. Qualifying Measures
- D. Target Sectors and Markets
- E. Interest Rates
- F. Default Rates, Underwriting and Credit Enhancements
- G. Transaction Points
- H. Financing Program Structures

The goal of all these financing mechanisms is to provide a loan product that is appropriate for its market. For instance, a loan product for a \$30,000 solar installation in a home is very different from a loan product to fund a \$4,000 furnace. Several of the loan products, such as property tax-based programs or on-bill tariffs, aim to stretch out the loan term as long as possible in order to create low monthly payments. Each product also attempts to manage the risk of defaulting loans, with either strict underwriting criteria, loan loss reserves or other credit enhancements, or by attaching a security (such as a property lien) to a loan. Almost all of them attempt to gain access to low-cost sources of capital as well, so that they can offer attractive interest rates.

A. Capital Sources

One of the innovations in recent clean energy finance programs has been to access new sources of public and private capital, including bank capital (through a loan), federal funds, and state treasury funding. Other sources of capital are emerging as well.

A number of the financing programs featured in this paper have combined two or more sources of capital, each with different features. For example, as noted above, both the Pennsylvania and Colorado state programs have used such flexible funding sources to offer a credit support. The ClimateSmart program in Boulder, Colorado blends PABs, stimulus funds and bonds to create a larger pool of capital than would otherwise be available.

This section describes examples of each of these capital sources, some of which are described in more detail later in this paper.

- *Loans*: The energy efficiency program in Racine, Wisconsin may use up to \$200,000 in loan capital from the Bank of America to capitalize its efficiency program. This \$200,000 was originally part of a \$500,000, 3% loan provided to the Delta Institute (www.delta-institute.org), which is helping the City of Racine

to design the financing program. The terms of precisely how this funding will be transferred from the Delta Institute to the City of Racine are still being developed.

The bank that made this loan was willing to make it in part because it would receive Community Reinvestment Act (CRA) credit for the loan.⁶ The original terms of the loan required that it be used exclusively to support an energy efficiency effort.⁷

- *Federal Funds:* New federal stimulus funds can be used to support energy efficiency loan programs. Milwaukee, Wisconsin is using stimulus funds from the EECBG program to capitalize its loan program, while Boulder County, Colorado is using EECBG funds to assist in covering a portion of loan program administrative costs. The State of Colorado is developing a loan program capitalized by SEP funds.
- *Treasury Funds:* Pennsylvania's Keystone Home Energy Loan Program (HELP) began with an initial capitalization of \$20 million over a three-year period from the State Treasury. The Colorado Clean Energy Finance Program will begin operations with a \$4 million annual capital pool from the State Treasury. The treasury offices that capitalized these loan programs did so not because they were specifically focused on supporting energy efficiency or renewable energy, but rather because the loan program met the criteria for three critical factors:
 1. *Liquidity:* The energy efficiency loans supported by the State Treasury capital are probably not highly liquid, meaning that it would be more difficult for the Treasury to sell those loans rather than hold on to them.
 2. *Risk:* The loan program structures combined several different sources of capital to provide sufficient risk mitigation and credit supports so that the Treasury offices could feel that their funds were invested at an acceptable level of risk.
 3. *Return:* The loan programs in Pennsylvania and Colorado provide the Treasury with an acceptable return.
- *General funds:* Tax revenues can sometimes capitalize an energy efficiency or solar energy loan program. The Energy Independence Program in the City of Palm Desert, California, for example, is supported through general funds. However many jurisdictions are now experiencing reduced tax revenues and budget cuts, which limits their ability to capitalize loan programs with general funds at this time.

⁶ Information about CRA is available at <http://www.ffiec.gov/CRA/default.htm>.

⁷ LaSalle Bank in Chicago made the original loan to the Delta Institute. LaSalle Bank was then purchased by another lender, ABN AMRO, and subsequently sold to the Bank of America. The Bank of America is now primarily interested in making loans that are larger than \$500,000 for similar investments in the future.

- *Bonding*: Energy efficiency loan programs may be supported by several types of bonds:
 - *Private Activity Bonds (PABs)* are issued pursuant to federal statute and IRS regulations, and are federally tax-free. PABs are typically used to support projects that benefit lower income borrowers and are allocated to states and local governments on the basis of population. This allocation is known as a volume cap. Authorized agencies of state and local government can issue private activity bonds at a non-taxable interest rate up to their volume cap. The Colorado volume cap, for example, is slightly more than \$400 million. Boulder County's municipal financing for energy efficiency and solar energy is capitalized in part through PABs.
 - *Revenue Bonds* are distinguished by a guarantee of repayment solely from revenues generated by a specified entity associated with the purpose of the bonds.
 - *General Obligation Bonds* are tied to the creditworthiness of the entity that issues them. The interest on these bonds is typically taxable and therefore comes at a higher interest rate than the rate for private activity bonds. Boulder County, Colorado used some general obligation bonds to support the ClimateSmart loan program.
 - *Tax Credit Bonds* known as Qualified Energy Conservation Bonds (QECBs) may offer a new source of funding to support energy efficiency loan programs. Like a PAB, QECBs are volume-capped according to population for each state, as well as for local governments with populations greater than 100,000, and tribal entities. Total QECB allocations nationwide are \$3.2 billion through a one-time allocation. No state has yet begun a program that would use such funds, although such programs are under development in several states.

- *Public authority, utility or public benefit fund capital* can capitalize or support a loan program. The United Illuminating program in Connecticut has access to the state's public benefit fund to cover loan defaults. The Keystone HELP program has access to a 5% loss reserve through funds put up by the Pennsylvania Energy Development Authority and the state's utilities. Midwest Energy capitalized its loan program with internal utility capital.

- *Private investor capital*: The BerkeleyFIRST solar loan program is capitalized in part through a private investor (Renewable Funding www.renewfund.com) that purchases the loans on a periodic basis.

- *Lender capital* can leverage government contributions of loan capital. Colorado's ENERGY STAR® Mortgage Program is supported with lender capital to provide base capital for lending and a 50-50 match of state and Bank of Colorado capital to provide a reduction in points for the loans.

Three other sources of capital are not specifically designated for energy projects, but are generally available to homeowners or businesses.

- *Home equity line of credit or mortgage re-financing:* In the case of a home equity line of credit, homeowners take out a secured loan that is secured by a lien on their home. The loan is tied to the amount of equity they have in their home. This credit instrument is typically set up as a line of credit that a homeowner can borrow against, up to a cap, on multiple occasions. Rates are typically variable based on a prime rate plus an adder that depends on credit scores, and the loan term is as long as 30 years. Interest costs are often tax deductible.

Home equity lines of credit have been a popular way for people to pay for their energy retrofits in the past, but they are only useful if people have equity in their homes. Recent downward trends in home prices have meant that fewer people have a great deal of equity against which they can borrow, while recent tightening in the overall lending markets has also meant that these instruments may be less useful than they have been in the past.

In the case of a mortgage refinance, homeowners take out another mortgage on their home. One of the more common types is known as a Section 203(k) mortgage, which allows the homeowner to purchase or refinance and rehabilitate a home that is at least 1 year old. A portion of the loan proceeds are used to pay off the existing mortgage and the remaining funds are placed in an escrow account and released as rehabilitation is completed. As with a home equity line of credit, interest costs are often tax deductible.

- *Consumer credit:* Consumers take out an unsecured credit card, similar to one that they would use at a home improvement store such as Lowe's or Home Depot. Although these credit cards may have incentive rates for a 3-12 month period, they then move to higher interest rates of 13% per annum or greater.
- *U.S. Small Business Administration (SBA) 7(a) and 504 loan programs:* The SBA offers loan programs for small businesses that can be used to finance energy efficiency. These may be useful for larger improvements, but are unlikely to be appropriate for smaller retrofits in the \$7000-\$12,000 range.
 - SBA 504 programs provide loans for small businesses to finance the purchase of fixed assets, potentially including energy efficiency measures. These loans are meant to finance capital improvements larger than most business energy efficiency retrofits, but they could be useful for manufacturer energy efficiency improvements in particular. The 504 program has three tiers, with maximums of \$1.5 million when meeting a job creation or community development goal; \$2.0 million when meeting a public policy goal; and \$4.0 million for small manufacturers.

The 504 program is designed as an economic revitalization program focusing on job creation, so any loans must be shown to create or retain jobs, with a typical benchmark of one job for each \$50,000.

Loan interest rates are tied to five- and ten-year U.S. Treasury issues with maturities of 10 and 20 years available. The project assets that the loans finance typically serve as collateral, although a personal guarantee from the business owner is also required.⁸

- SBA 7(a) programs provide loan guarantees that a small business may take advantage of for a variety of investments, including energy efficiency. Banks and other lenders participate in 7(a) loan programs as certified lenders making loans to small businesses. The SBA makes a partial loan guarantee available to the lender; if the borrower fails to pay back the loan, or a portion of the loan, the SBA will reimburse the lender for part of the defaulted amount (up to the percentage of loan guarantee). Most of the SBA guarantees are for up to 75%. The maximum loan amount is \$2 million (with a guarantee of up to \$1.5 million).

Loan terms are designed to be long—up to 25 years for equipment. Interest rates negotiated between the lender and the borrower but are subject to SBA maximums. The maximums are tied to prime rates, and depend on the loan maturity. Longer maturity loans carry higher interest rates. For instance, a \$30,000 loan with a maturity of less than 7 years carries an interest rate set at a maximum of prime plus 3.25%. All business owners with a 20% or greater interest in the business are required to personally guarantee these loans. Fees apply to these loans as well, so a fee loan of \$150,000 would face a 2% fee on the guaranteed portion of the loan.

7(a) loan programs are among the most commonly used SBA small business loan products, but they are not as easy to use as, for example, a utility on-bill finance program. Barriers to the use of a 7(a) loan program include the transaction costs (e.g., the time to submit an application), the requirement for a personal guarantee from the business owner, and loan fees.⁹

B. Loan Terms

Loan terms vary according to the kinds of measures that the loan programs are designed to finance and the basic structure of the loan programs. Loan terms range from 2 to 30 years.

⁸ For more information on the SBA 504 program, see <http://www.sba.gov/services/financialassistance/sbaloantopics/cdc504/index.html>.

⁹ For more information on the SBA 7(a) program, see <http://www.sba.gov/services/financialassistance/sbaloantopics/7a/index.html>.

- The shortest loan terms are for personal or business loans. The Keystone HELP program typically structures its loans with a 5- to 7-year term; although terms can be longer, they rarely are. The Sempra Energy Utilities and United Illuminating on-bill loans can be up to 60-month (five year) term.
- Mid-length loan terms often occur in on-bill tariff programs. Loan terms in these programs vary according to the expected energy savings and useful life of the measure being installed. These factors typically combine to produce immediate financial savings for consumers. Finance terms are often approximately 10 years. Longer terms can be arranged, since one of the advantages of the on-bill tariff programs is that the payment obligation can be transferred from one homeowner to the next when the home is sold.
- The longest loan terms finance the largest investments, such as solar energy and whole-house efficiency retrofits. The BerkeleyFIRST property tax-based program for solar energy and the Boulder County ClimateSmart program both have 20-year loan terms. Energy efficiency mortgages—which could be designed for efficiency measures or for solar energy installations—match the life of the underlying loan, typically 15 to 30 years.

Loan terms are important because they affect the monthly principal payments for a loan. Several financing programs (notably those that are mortgage-based, property/municipal fee-based and tariff based) are designed to create a long loan term. The United Illuminating on-bill finance program made the following calculation for three different 0% interest loan terms (see Table 1 below). These calculations demonstrate the power of a longer loan term; slightly more than doubling the loan term in this case increases the cash flow benefit from \$25 to \$332 each month.

Table 1: Loan Term Calculations for Hypothetical Project

<i>Hypothetical Project</i>			
Annual Energy Savings:	42,301 kWh		
Annual Energy Cost Savings:	\$6,927		
Monthly Energy Cost Savings:	\$577		
	16 Month Term	24 month Term	36 Month Term
Project Cost (net of \$7,800 rebate)	\$8,835	\$8,835	\$8,835
Monthly 0% Loan Payment	\$552	\$368	\$245
Net Savings (Between Energy Cost Savings and Monthly Principal & Interest)	<u>\$25</u>	<u>\$209</u>	<u>\$332</u>

Source: United Illuminating Company, 2008.

C. Repayment Mechanisms

The newest energy efficiency financing programs use one of several repayment mechanisms including third party billing, payments on the utility bill, municipal service charges or property taxes, and energy efficient mortgages. Each repayment mechanism is appropriate for different kinds of transactions. The following descriptions and tables provide a summary of these mechanisms along with advantages or disadvantages of each.

Third Party Loan and Payment

A third party loan is provided by a lender other than a utility or a government entity (whether a bank, credit union or other source). Payment is independent of utility bills or government bills. The government may provide loan capital and some credit enhancements but a third party performs all the loan servicing. An example of such a program is the Keystone HELP program offered by AFC First in Pennsylvania.

Table 2: Third Party Loans

<i>Advantages</i>	<i>Disadvantages</i>
<ul style="list-style-type: none"> ➤ Easy to administer and establish ➤ Does not require utility involvement as financing entity, a role that many utilities prefer to avoid. ➤ Provides an easy way for third party lenders to participate in, and finance, efficiency programs. 	<ul style="list-style-type: none"> ➤ Term is typically limited to 60 months, meaning greater monthly loan amortization costs. ➤ Homeowners must pay off entire loan upon sale of home, and may not benefit from some measure of energy savings. ➤ Classified as debt, thus disqualifying some homeowners.

On-bill loans via utility company

A loan is provided by a utility company and the customer pays the principal and interest as a line item on the utility bill. The loan is a personal loan made to the borrower and paid back by the borrower. Examples include the on-bill loan programs offered by United Illuminating Company in Connecticut and Sempra Energy Utilities in Southern California.¹⁰

¹⁰ Brown, Matthew H. *Paying for Energy Upgrades Through Utility Bills*. Rep. Washington, DC: Alliance to Save Energy, 2009. Also: Brown, Matthew H. "On-Bill Financing: Helping Small Businesses Reduce Emissions and Energy Use While Improving Profitability," National Small Business Association, Washington, DC, September, 2009.

Table 3: On-bill Loans

<i>Advantages</i>	<i>Disadvantages</i>
<ul style="list-style-type: none"> ➤ Easy for customer/borrower to see effect of reduced energy consumption on overall bill. ➤ Can be a turnkey program for customer/borrower because it requires billing, and energy audit is accomplished through an existing mechanism and utility/customer relationship. ➤ Can easily be combined with utility rebate programs. 	<ul style="list-style-type: none"> ➤ Utilities are often reluctant to take on role of financing entity because of potential exposure to consumer lending laws and because alternations to billing systems are often complex and costly. ➤ Businesses or homeowners must pay off entire loan upon sale of home, and may not benefit from some measure of energy savings. ➤ Classified as debt, thus disqualifying some potential borrowers who cannot qualify for loans.

On-bill tariff via utility company¹¹

The financing program in this case is provided and operated by a utility company and the customer makes the payment as part of the utility bill. The financing charge is deemed to be an essential service and is part of the utility’s tariff charged to that customer. If the customer moves, the next occupant or owner takes on the payment obligation. Midwest Energy in Kansas offers this type of program.

Table 4: On-bill Tariff

<i>Advantages</i>	<i>Disadvantages</i>
<ul style="list-style-type: none"> ➤ Long term of these financing arrangements (with obligation passed from one occupant to another) allows for low monthly financing surcharges that can provide customer/borrower with an immediate financial benefit – even without rebates and subsidies. ➤ Financing charges and amortization period are typically based on the life of the efficiency measure rather than an arbitrary personal loan term. ➤ Since the financing charge is not classified as debt, lower income borrowers or those who do not have the ability to take on new debt may still take advantage of these programs. ➤ Typically tied to disconnection for failure to pay, thus provides a secure revenue stream. 	<ul style="list-style-type: none"> ➤ Require utility commission approval of a new tariff. ➤ May not be appropriate for properties that change hands and function frequently (such as a small business facility that transforms from a restaurant to a retail shop to a Laundromat) with different energy consuming equipment in each case. ➤ Because the financing program is operated and financed by a utility, it effectively removes third party lenders and their financing capital and services from the programs.

¹¹ Ibid.

Property tax or similar municipal fee-based financing

Local government provides financing for these loans, and borrowers (who are typically homeowners) pay the loan back through a surcharge to their property tax or as part of their municipal service charges (a sewer bill, for example). The local government typically places a lien on the property. When the homeowner sells the property, the loan repayment obligation is transferred to the new homeowner. This approach allows for a loan term that can be extended over many years (typically 20-years) since it is not associated with the length of time a specific homeowner stays in the home. Because of the higher transaction costs of these programs (related to property lien, dollar amount of loans, etc.) they are often more appropriate for larger loan amounts than the on-bill financing mechanisms. The programs offered in Berkeley, California and in Boulder County, Colorado are examples of this type of financing.

A variant of this mechanism is being tested in Babylon, New York and developed in two Wisconsin municipalities (Racine and Milwaukee) that would attach the payment obligation to local government charges. Unlike the property tax mechanism, this variation does not require a lien to be placed on the home. Yet the fee is attached to the home rather than the homeowner, meaning that if the homeowner moves the fee continues until the underlying financial obligation is repaid. If the homeowner fails to pay the fee, that obligation is transferred to the property tax bill, thus providing the same security as the property tax repayment mechanism but without requiring the home lien. Failure to pay the property tax bill results in foreclosure.

Table 5: Property Tax or Municipal Fee-based Financing

<i>Advantages</i>	<i>Disadvantages</i>
<ul style="list-style-type: none"> ➤ Long term of these financing arrangements (with obligation passed from one occupant to another) allows for low monthly financing charges. ➤ Because of lien placed on property (in case of property tax-based mechanism) and high priority in case of foreclosure, loans are more secure than unsecured loans referenced above, and may have a lower cost of capital as a result. ➤ Does not require proof that homeowners have equity in their home in order to qualify. ➤ Interest costs for property tax mechanism should be tax deductible in most cases for borrower. 	<ul style="list-style-type: none"> ➤ Often requires state authorizing legislation. ➤ Interest rates are fixed, but in the existing interest rate environment, may be higher than those available to homeowners who can use a home equity line of credit. ➤ Requires significant commitment on the part of local government to establish infrastructure to administer program – including loan origination and servicing, property owner qualification, staffing, etc.

Energy efficiency mortgage loan (ENERGY STAR® mortgage)

Homeowners secure a mortgage at the time that they purchase a home, or refinance a mortgage on a home that they already own in anticipation of a to-be-verified energy efficiency or solar energy investment. The costs of installing energy efficiency or solar energy equipment can be incorporated into the mortgage. Like the tariff-based and the property tax-based mechanisms, a mortgage can be for an extended period of 15-30 years, thus amortizing the costs of the energy efficiency or solar energy measures over multiple years. Rates can be either fixed or variable, depending on the mortgage terms.

Table 6: Energy Efficiency Mortgage Loan

<i>Advantages</i>	<i>Disadvantages</i>
<ul style="list-style-type: none">➤ Long term of this mortgage loan (typically 15-30 years) allows for low monthly principal and interest costs for these loans.➤ If designed with simplicity in mind, can be easily combined with an existing home refinance or home purchase mortgage.➤ Can be set up as a fixed or variable rate product, depending on borrower preferences.➤ Interest costs should be tax deductible in most cases for borrower.	<ul style="list-style-type: none">➤ Requires lender buy-in to program, and many lenders are not familiar with the market for energy efficiency or solar power.➤ Only applicable for a home purchase or home refinance; does not capture transactions outside of those areas.➤ May not be appropriate for small-scale purchases, due to the amount of paperwork and cost of mortgage financing.

D. Determining Measures That Qualify for Financing

Efficiency programs typically choose one of two paths to identify which measures they will finance, either (1) requiring an energy audit to identify cost-effective measures for each property, or (2) using a list of prescribed and qualifying measures. In some cases, such as the Pennsylvania Keystone HELP program, borrowers can choose which path they want to pursue and may qualify for a lower interest rate if they choose the audit approach.

Prescribed measures are simpler and less costly than audits to administer, but typically result in lower energy savings. An energy audit can be more effective because it takes into account the interaction of the different features of a building. For example, sealing heating or cooling ducts and installing insulation may make the overall HVAC system more efficient and therefore diminish the required size of a furnace or air conditioner. An energy audit can also identify measures that are normally not cost effective but could be cost effective if combined with other measures. Replacement of single pane with efficient ENERGY STAR® windows, combined with a smaller new furnace or air conditioner, is one such example. The disadvantage of an audit is that it takes time and money. Although the Keystone HELP program offers a lower interest rate for homes that

use an audit approach, only 10% of its loan activity comes from energy audits. The rest come from prescribed measures. Tables 7 and 8 below show samples of loan programs and the means by which they select measures to fund.

Table 7: Prescribed Measures

<i>Program</i>	<i>Prescribed Measures</i>
Keystone HELP	ENERGY STAR® rated heating, cooling, water heaters, fans thermostats, windows, doors, insulation, closed loop geothermal installations. Solid fuel furnaces (wood or coal) of 78% or better AFUE. Advanced performance HVAC installations that exceed ENERGY STAR® standards qualify for a lower interest rate.
Manitoba Hydro	Insulation, windows, doors, fans, HVAC, water heater, water efficient toilets.
BerkeleyFIRST	Solar panels and all installation costs.
ClimateSmart	Solar panels and a wide range of energy efficiency measures.

Table 8: Audit-based Approaches

<i>Program</i>	<i>Audit Approach</i>
Keystone HELP	Audit performed by Building Performance Institute (BPI) certified auditor. Qualified improvements are those that predict a minimum decrease of 25% from an original HERS index of more than 100, or a minimum decrease of 15% from a HERS index score of less than 100. Post construction audit also conducted.
Midwest Energy	Audit performed by qualified (RESNET-certified) Midwest Energy staff.
Babylon Project	Audit performed by BPI certified auditor.

E. Choosing the Target Market

A variety of factors affect the choice of whether to focus on the residential or small business market. Four primary considerations are described below.

Market characteristics: Small businesses may go out of business and the property may change hands and function; what was once a restaurant may become a hair salon or a karate studio. A home is going to continue to be a home. As a result, some loan program designs are focused on what appears to be the more stable residential sector; the Manitoba Hydro loan program is focused on the residential sector for this reason.¹²

Consumer lending laws: Every state has different consumer lending laws that influence the program design. As an example, California maintains strict consumer lending laws that have deterred one of the state’s utilities, Sempra Energy Utilities, from entering the residential market. The federal government also imposes requirements that make lenders subject to the Federal Truth in Lending Act, the Equal Credit Opportunity Act, and the Fair Credit Reporting Act, as well as licensing requirements within the State of

¹² Personal communication, Manitoba Hydro, March 2009.

California. Sempra Energy Utilities found that it would not be subject to these requirements in California if its loans were restricted to the small business sector.

Energy usage in homes is typically far lower than in most small businesses. As a result, there are higher transaction costs per unit of energy saved for residential loans.

State enabling legislation may affect ability to apply financing programs to specific sectors. In Wisconsin, for instance, enabling legislation allowed a special charge mechanism to be set up for energy efficient loans, but restricted those loans to the residential sector.

F. Interest Rates and Take-up Rates

Program interest rates vary from 0% to 8.99% and are all fixed rate programs. The highest rate program among those researched was the original version of the Pennsylvania Keystone HELP program, with an 8.99% rate. Two utility on-bill finance programs (Sempra Energy Utilities and United Illuminating) use 0% interest rates. Manitoba Hydro used an interest rate of 8.5% then 6.5% and later reduced it to 4.9%, partly as a result of a reduction in the overall cost of capital but also by buying down the interest rate by approximately 0.75%. The Babylon, New York program uses a 3% rate.

Interest rates are really only one determinant of a program's take-up rate, however, and a low interest rate does not necessarily equate to a fast take-up rate. For instance, the Keystone HELP program, which had an 8.99% interest rate for much of its first three years, is one of the more successful programs by measure of number of loans made and total value of loans (over 3,000 loans and close to \$20 million in loan value). The Manitoba Hydro program, which has the greatest loan volume of any program on the continent (with 50,000 loans worth close to \$200 million), charged an interest rate of 4.9% to 6.5% until 2006. Each of these programs tends to fund small loans of around \$5,000 - \$7,000 and is focused on quick decisions, prescribed measures and ease of use.

Sempra Energy Utilities and United Illuminating (UI) charge a 0% interest rate, yet are designed for somewhat larger loans. UI's loans range up to \$12,000. The utilities also administer the programs and, according to program administration staff, it is far simpler to operate a 0% interest rate program for small businesses than one with even a low interest rate. Businesses may also be more interest rate sensitive than a homeowner who wants to make a fast decision on a smaller investment. The UI program design has a significant take-up rate; approximately one-third of the 17,000 eligible businesses in UI's territory have taken advantage of an energy audit since its inception in 2000, with 3,400 installing efficiency measures through the on-bill program. The UI program also offers a larger rebate (combined with the 0% interest loan) for businesses that install two or more energy efficiency measures. With a 0% interest rate, the utilities are currently subsidizing these energy efficiency loan programs through their energy efficiency budgets. In the future, Sempra Energy Utilities may be able to use public benefit funds to operate its program.

Whole house retrofits may be another case in which lower, more greatly subsidized interest rates are appropriate in order to stimulate greater energy savings. The new version of the Keystone HELP program provides a subsidized interest rate of 4.99% to people who get a whole-house energy efficiency audit, in part because the program designers felt that a greater incentive was required to entice people to conduct an audit. ClimateSmart implemented a point system that gave homeowners one point for an energy audit and one point for a blower door test. Applicants choosing to do either or both of these measures would receive priority in the event that funds began to run out.

We were not able to locate a study of the relationship between interest rates and program take-up rates in the energy efficiency market; it may be that consumers are more sensitive to interest rates for larger projects with measures identified through an audit. The Sempra Energy and UI programs use an audit to identify potential energy savings, and the interest rate is one selling point for the program as a whole.

On the other hand, the Manitoba Hydro program, the initial version of the Keystone HELP program and others are more point-of-sale type programs that are meant to capture energy-efficient sales among people who have likely already decided to buy a new furnace, air conditioner or other product. Simplicity built in to the program through short applications and quick turn-around that leaves no time to do a full energy audit are both critical elements in these cases, and may be more important to consumers than a low interest rate.

G. Default Rates and Credit Quality Criteria

Default rates represent the level of write-offs, or bad loans, that a program experiences. Some programs, including all of the property tax finance based programs, are far too new to be able to offer any data on default rates. Others have ample data. Table 9 below summarizes the default rates and credit quality criteria for several of the programs.

Table 9: Default Rates and Credit Quality Criteria

<i>Program</i>	<i>Default Rate</i>	<i>Criteria Used to Assess Credit Quality</i>
Keystone HELP	1.5%	Credit score of 640 minimum. Average score is 720.
Manitoba Hydro	<1%	Current on utility bill for at least 12 months; credit score considered.
Midwest Energy	0%	Current on utility bill for 12 months.
United Illuminating	<1%	Current on utility bill. In business for at least six months.
Sempra Energy Utilities	<1%	Account in good standing with non disconnect in previous 12 months; applicant must have been a utility customer for at least 24 months with 12 months usage data at current location. Default leads to disconnection.

The programs each manage their credit risk in different ways too, often using another source of funding to provide some kind of credit support or enhancement. As an example, the Keystone HELP program maintains a 5 percent loss reserve based on the total value of any outstanding loans (\$10 million in outstanding loans would require a \$500,000 loss reserve), and is presently building that loss reserve to 10%. A combination of capital from the state's utilities and the Pennsylvania Energy Development Authority provided the capital for this loss reserve. Colorado's new loan program will rely on funding from either its Clean Energy Fund or federal funds to provide this loss reserve.

Connecticut's United Illuminating relies on funding from the state's public benefit fund to provide a guarantee to the utility for any defaults. The utility has yet to experience loan defaults in excess of 1% of its total portfolio, however.

Credit scores are usually determined in part on the basis of a FICO score. FICO scores range from 375 to 900 with a credit score of 650 or above being a very good credit history. Average credit scores typically fall between 620 and 650.

Credit scores are one of several tools that lenders can use to assess a loan application; some utilities use only bill payment history instead of FICO score as a way to measure credit quality.

(For more information, see www.mortgage-x.com).

H. Transaction Points

Financing programs should recognize that there are many reasons or events that might provoke a consumer to make an energy efficiency or renewable energy investment, and programs should be designed accordingly. Sometimes these events are emergency replacements, such as when a furnace breaks down and requires replacement in mid-winter. Other significant events include planning long-term projects such as home renovations, and the time when a person is buying a home. Each of these "transaction points" lends itself to a different kind of financial product. Table 10 illustrates several major transaction points and describes the basic characteristics that might accompany a financial product in order to convince people to make the energy efficient investment.

Table 10: Transaction Points

<i>Transaction Point</i>	<i>Characteristics of Transaction Point</i>	<i>Potential Financing Product Characteristics</i>
Emergency Equipment Replacement or small-scale energy efficiency upgrade (efficient windows, HVAC upgrade)	Speed of loan application and processing is critical. Cost of financing may be less important than simplicity, at least for residential customers.	Unsecured loans may be appropriate at smaller amounts and are often less than \$7,500. Pre-qualified measures such as a furnace or air conditioner that meets a pre-established efficiency standard. On-line or other streamlined applications for the financing are likely quite important. It appears that people at this transaction point may be less interest rate sensitive than others, in part because amounts are smaller, terms shorter and speed critical.
Major planned renovation or energy retrofit	Speed of loan application and processing is less critical than the emergency replacement scenario described above. This situation offers potential for more complex, but potentially less expensive, financing.	Secured financing as a home equity line of credit 2 nd mortgage or property tax based finance. Tax deductibility of interest costs becomes more important. Larger loans of above \$10-\$15,000. Ease of application still important.
Home Purchase	Speed still critical because a home purchase can be very fast to lock in interest rates and close on a home. Simplicity still critical.	Secured loan, more interest rate sensitive. Given high dollar value of the transaction, borrowers can be quite sensitive to interest rates – and can benefit substantially from lower rates. Tax deductibility of interest costs becomes more important. Product can be designed as an energy efficient mortgage, offering financial benefits for purchasing a home that meets pre-specified energy efficiency guidelines. An energy efficient mortgage product must fit in seamlessly with loan products and processes that lenders already offer.
Business renovation	Speed of application and processing remains critical, as does simplicity. Many small business owners have little time to consider advantages or disadvantages of energy efficiency retrofits.	Pre-packaged energy efficiency renovation through business loans – often placed on the utility bill – can be quite effective in these cases. Although such loans may require an energy efficiency audit, the financing is streamlined, often combined with a rebate, and often guaranteeing an immediate bill savings.

III. Program Profiles

The following program profiles illustrate several different new and innovative energy efficiency programs in operation around the country. They fall into different categories and markets, from emergency appliance replacements and other quick-turnaround models to more involved processes such as the energy efficiency mortgage or a property tax-based model. Table 11 summarizes the financing mechanisms described in this report with specific examples. The remainder of this section contains more detailed profiles of each program.

Table 11: Summary of Financing Mechanisms and Specific Programs

<i>Financial Assistance Type</i>	<i>Program</i>	<i>Target Customer</i>	<i>Transaction Point Opportunity</i>	<i>Source of Capital, How Secured</i>	<i>Terms/ Payment</i>	<i>Credit Quality/ Enhancements</i>
Third Party Loan	Keystone HELP; Colorado Clean Energy Finance Program	Residential	HVAC purchase/Whole House retrofit	State Treasurer	Typical loan is 5-7 year term. Rates vary 5% to 9%.	Loss reserve available to lender that backs up loans
On-Bill Loan	Manitoba Hydro	Residential	Equipment purchase	Utility	4.9%	None.
	United Illuminating; Sempra Energy Utilities	Small Business	Energy retrofit	Utility	Negotiated	In CT, state's public benefit program backs up loans.
On-Bill Tariff	Midwest Energy	Residential	Energy retrofit	Utility	180 months residential; 120 months commercial	None
Special Charge-based Financing	The Babylon Project	Residential	Energy Retrofit	Solid Waste Fund	3% interest loan; term tied to measure life	Failure to pay results in obligation on property tax bill; ultimately, foreclosure.
Property Tax Based Financing	BerkeleyFIRST	Residential	Solar PV install	Bonding + Private Investor	Up to 20 years	Failure to pay results in foreclosure; property tax has highest priority for payment.
	ClimateSmart	Residential & Small Commercial	EE Retrofits and RE installations	PAB & Municipal Revenue Bonds	15 years	
Energy Efficient Mortgage Loan	Colorado ENERGYSTAR Mortgage	Residential	Home purchase	Bank and State of Colorado	Terms set by mortgage, but with incentive rate discount.	None noted

A. Third Party Loan

Keystone Home Energy Loan Program (HELP) – State of Pennsylvania¹³

Program focus:	Energy efficiency improvements in homes. Dual focus on quick-turnaround HVAC and related improvements, as well as whole-house audits and efficiency retrofits.
Mechanism:	Personal loans paid to lender.
Source of capital:	State Treasurer with credit enhancements from the Pennsylvania Energy Development Authority and utilities. Rate buydown provided through the Pennsylvania Department of Environmental Protection.
Active Since:	2006
Notable:	Source of funding is innovative, as is structure of credit enhancements. Emphasis on simple applications and contractor recruitment is important.
Challenges:	Initial funding provided minimal resources for measurement and verification of savings.
Website:	www.keystonehelp.com

In 2006 Pennsylvania’s Treasurer capitalized an energy efficiency loan program at \$20 million over a three-year period designed to fund investments in energy efficiency. The program provided loans to cover efficient HVAC system replacements. Most of the early program focused on replacing inefficient furnaces with more efficient units with an AFUE of at least 92. Loans were capped at \$10,000 but were typically in the range of \$5,000-\$7,500, with an interest rate of 8.99%. Loans were also unsecured, meaning they followed the pattern of a typical consumer credit program that might be available through a home improvement store such as Lowe’s or Home Depot. This first round of the program sold out close to its full \$20 million allocation from the state treasury through a total of 3,500 loans within the three year program period. Based on the initial success, the Treasurer has expressed a willingness to invest additional funds in the program.

A Pennsylvania-based lender, AFC First, operates all aspects of this program. AFC recruits a network of heating, ventilation and air conditioner (HVAC) contractors and educates them about the financing program and methods that the contractors can employ to sell higher efficiency furnaces to their customers. Contractors market the program to their own network of customers and help them apply for financing. Customers can use a web site or a toll free number to apply for financing, much like they would do in a department store or home improvement store. They find out within minutes if they are approved, based on their credit scores. The program approves approximately 70 percent of its applicants for a loan.

The lender aggregates the loans and sells them on a periodic basis to the Treasurer. The lender also services the loans and guarantees them to the Treasurer. As a result, the

¹³ This section based upon personal interviews and discussions with Peter Krajsa, AFC First, the administrator of this program.

Treasurer does not look so much to the credit of individual loans as it does to the credit quality of the lending institution that guarantees the loans.

AFC First, in turn, has access to a loan loss reserve fund set at 5 percent of the total loans outstanding. The state's utilities and the Pennsylvania Energy Development Authority put up the funds for this \$1 million loan loss reserve. Three years into the program, actual losses for the program have been 1.5%.

The early results from the program were promising enough that the Pennsylvania Housing Finance Agency worked with AFC First to expand the program to issue larger, secured loans of up to \$35,000 to fund bigger renovation projects with an energy benefit.

In 2008, Pennsylvania enacted legislation known as the Pennsylvania Alternative Energy Investment Fund Act¹⁴ that provided further support to the loan program, buying down the interest rate from 8.99% to 6.99% for standard loans, 5.99% for measures with energy efficiency levels exceeding ENERGY STAR[®], and 4.99% for whole-house audits and retrofits. Approximately \$3.5 million of the subsidy is set aside to buy down loans worth \$17 million. The Act also created rebates to subsidize the purchase of simple energy efficiency measures.

The program has several notable features:

- It markets to customers through a network of qualified contractors. It also empowers those contractors to put their customers in direct contact with the lending institution, and that lending institution approves (or disapproves) customers within minutes. The financing program layers seamlessly into the existing process through which homeowners already purchase a furnace, for example.
- The program qualifies contractors and auditors at four levels:
 1. *Approved contractors* have been screened for acceptable financial and ethical practices.
 2. *Trained contractors* are screened and have completed a one-day Home Performance training program. (Sixty trainings were held throughout Pennsylvania in the past year, with funding from the Pennsylvania Department of Environmental Protection.)
 3. *Certified contractors* are screened, are certified by the Building Performance Institute (BPI), and can offer the whole-house energy efficiency services under a 4.99% loan. 48 certified contractors are in operation statewide.
 4. *Certified auditors* are approved contractors certified by both BPI and Residential Energy Services Network (RESNET) to conduct home energy audits and must have a HERS rater number, be operating under a HERS provider, or be an approved audit provider under the PA Home Energy Home Performance with ENERGY STAR program.

¹⁴ For information on the Pennsylvania Alternative Energy Investment Fund Act, see <http://www.depweb.state.pa.us/energ independent/site/default.asp>.

- It has secured funding from the Pennsylvania Treasury, which funded the program in part because it supports energy efficiency, but also because it fits into the Treasury's investment strategy. The Treasury earns a return of between 4% and 5% on the \$20 million that it invested in the program.
- It uses several different sources of capital including loan capital from the Treasurer and a loss reserve derived from capital sources that do not require a return (the Pennsylvania Energy Development Authority and the utilities). It also takes advantage of the credit enhancement derived from a loan guarantee from the lender.

As of September 2009, Keystone HELP has almost sold out its initial allocation of \$20 million and has expanded, with the state's housing authority as a partner, to a larger, secured loan program. The Pennsylvania Treasurer reports satisfaction with the program, and the model is being replicated in other states, including Colorado.

Approximately 60% of loans have supported HVAC improvements, 30% have supported windows and insulation, and 10% have supported the whole-house home performance program. The program administrator is attempting to encourage the whole-house approach through lower interest rates, but fewer than 50 certified auditors are in operation statewide.

The original program was funded entirely with capital from the State Treasurer along with credit enhancements from other sources. As a result, the program budget was quite lean. No funds for program evaluation existed, and as a result no estimates of energy savings exist. Since passage of the 2008 Act, the Keystone HELP program has had funding to conduct measurement and verification efforts.

Clean Energy Finance Program – State of Colorado¹⁵

Program focus:	Energy efficiency improvements in homes. Dual focus on quick-turnaround HVAC and related improvements, as well as whole-house audits and efficiency retrofits.
Mechanism:	Personal loans paid to lender.
Source of capital:	State Treasurer with credit enhancements from the Colorado Governor’s Energy Office. Rate buydowns also provided by the Governor’s Energy Office.
Active Since:	Not yet active; set for release in late 2009.
Notable:	Source of funding is innovative, as is structure of credit enhancements. Emphasis on simple applications and contractor recruitment is important.
Challenges:	To be determined; this is a new program in Colorado.
Website:	(Not yet available)

In 2008, Colorado Governor Bill Ritter Jr. signed S.B. 184 to enact into a law a program enabling the state to operate a program similar to Pennsylvania’s program. The law enables the Treasurer to invest up to \$10 million each year in an energy efficiency loan program.

In Colorado’s case, the State will select a fund manager and program administrator through a request for proposals. The successful bidder will have the ability to originate, service, and underwrite loans, and to recruit and manage a network of contractors. The bidder will make loans at an agreed-upon interest rate to borrowers and then sell those loans to the State Treasurer. Colorado’s program is similar in many respects to the Pennsylvania program, although it also includes an interest rate buydown for lower income borrowers.

The Colorado Treasurer agreed to fund the program initially at a \$4,000,000 level after extensive discussions about the program structure. The Treasurer’s office communicated on numerous occasions with the Pennsylvania Treasurer to discuss the program. In the end, the investment manager for the Colorado Treasurer agreed that the loan program was acceptable on the basis of three factors:

- Return: The program provides an acceptable, although not high, rate of return.
- Risk: The program appears to offer appropriate credit supports and therefore to be an acceptable risk.
- Liquidity: The program does not provide a great deal of liquidity; it would be difficult, although not impossible, to sell the loans.

Colorado’s program was about to be let out for a bid at the time of this writing, so no program results are available.

¹⁵ This section based upon personal experience of the author, who designed this program.

B. On-Bill Loan

Power Smart Residential Loan – Manitoba Hydro, Canada ¹⁶

Program focus:	Energy efficiency improvements in homes.
Mechanism:	Personal loans paid through utility bill.
Source of capital:	Utility internal capital.
Active Since:	2001; Furnace program began in 2005.
Notable:	Loan volume and total loan value is highest in North America, loan delivered through contractors and retailers.
Challenges:	Relationship with contractors and retailers is important, but difficult, to maintain especially with staff turnover at retail stores.
Website:	www.hydro.mb.ca/your_home/residential_loan.shtml

Manitoba Hydro operates a loan program for energy efficiency measures that is, by a measure of loan volume and loan value, the most successful in North America. The program has done more than \$200 million in lending, with approximately 51,000 loans issued since it began operation in 2001. Manitoba Hydro serves somewhat fewer than 500,000 customers. Program staff attributes the program's success to a streamlined loan application process and strong relationships with contractors and retailers. The loan program can also be combined with a grant available through the federal ecoENERGY program.¹⁷

The loan covers a variety of measures including insulation, ventilation, air sealing, windows and doors, lighting, water efficient toilets, furnace upgrades and solar water systems. Borrowers can take out a loan of \$500 to \$7,500 per residence. Minimum monthly payments are \$15 per month at an annual interest rate of 4.9% (recently reduced from 6.5%). This is a subsidized rate; without the subsidy it would be approximately 5.5%. The term of the loan is up to five years. If borrowers sell their house and move, they must pay off the full amount of the loan. The monthly payments appear on the utility bill.

The interest rate and loan maximum have been adjusted over the 8 years that the program has been in place. The loan first became available in March 2001 with an interest rate of 8.5% (fixed) and a loan maximum of \$5,000. The interest rate was reduced to 6.5% in September 2003, and the loan maximum was increased to \$7,500 in February 2006. In March 2009, the interest rate was further reduced to 4.9%. Default levels for the loan program are less than 1%.

Program administrators report that most people who use the program tend to be at the mid to higher-income levels. These people will typically hire a contractor who then

¹⁶ This section based heavily on personal interviews and communication with Glenn Cayer, Manitoba Hydro.

¹⁷ For information about the ecoENERGY Program, see www.ecoaction.gc.ca, and follow links to ecoENERGY Retrofit.

makes the loan program available, although the program does allow do-it-yourself installations for non-electric or gas measures. Customers fill out a one-page application and then find out whether their loan application is approved very quickly, typically within 3-5 minutes.

Manitoba Hydro maintains a strong relationship with the provincial contractors' associations, with over 90% of contractors participating in the program. Manitoba Hydro also maintains a relationship with window retailers that participate in the program. This relationship is important, yet difficult to manage because of retail staff turnover; new staff members often do not understand or know about the loan program availability. The utility has approximately 800 suppliers that currently participate in this loan program. All suppliers are trained on program procedures and their participation is governed by Supplier Participation Agreements. All electrical and gas work requires a permit and is inspected after completion of the work.

The breakdown of measures installed shown in Table 12 below.

Table 12: Measures Installed by Manitoba Hydro

<i>Measure</i>	<i>% of Total Installations</i>
Windows and Doors	51%
Heating Systems	46%
Insulation	3%

Source: Manitoba Hydro, August, 2009

Sempra Energy Utilities, California¹⁸

Program focus:	Energy efficiency improvements in small businesses. Focus on energy audits to identify measures.
Mechanism:	Business loans combined with a rebate from the utility.
Source of capital:	Utility funds, although likely transitioning to ratepayer funds.
Active Since:	2007
Notable:	On-bill loan structure allows customers to easily recognize energy cost savings. Program has focused on developing networks of educated contractors.
Challenges:	Relationships with contractors have required attention in order to maintain an efficient loan process for the customer.
Website:	http://www.socalgas.com/business/rebates/onBillFinancing.html http://www.sdge.com/business/esc/small/smallobf.shtml

Sempra Energy Utilities is a utility holding company that operates both Southern California Gas Company and San Diego Gas and Electric. Sempra Energy Utilities operates an on-bill loan program for the business sector. It defines business customers to be commercial, industrial, government and non-owner occupied multi-family buildings.

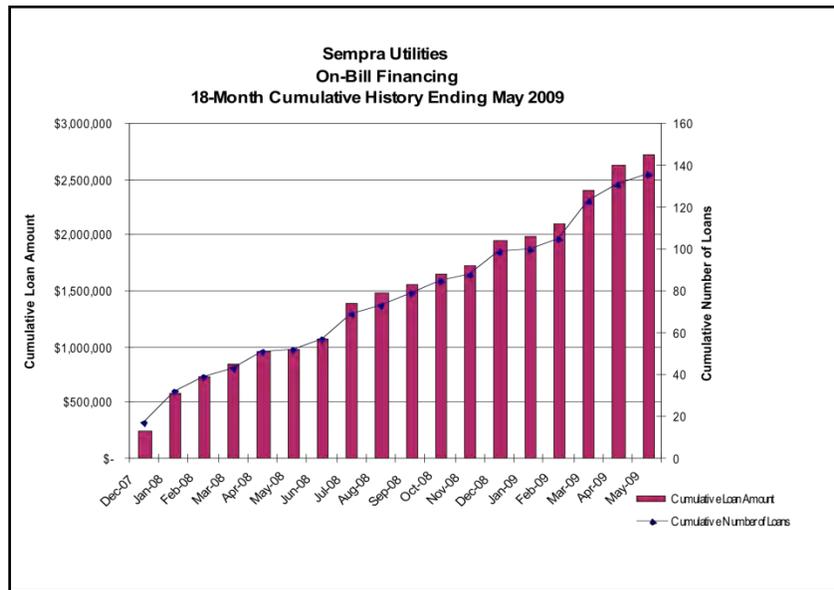
The company offers zero-interest unsecured loans that are combined with a rebate to cover energy efficiency measures. The size of the rebate depends on the specific measure and type of customer, but maximum rebates tend to range from 15-20% of project cost. The utility or vendor identifies measures through an energy efficiency audit. The combination of the rebate and the loan mean that the borrower should be able to realize immediate financial savings on the utility bill. The minimum loan amount is \$5,000; the maximum is \$100,000 for business and \$250,000 for government/institutional customers. Default on the loan can result in disconnection.

Loan terms are capped at 5 years for business customers and 10 years for government/institutional customers. To qualify for a loan, applicants must have had no disconnection notices within the previous 12 months and must have been in business for at least two years at their current location.

Loan volume has been increasing steadily since the program's inception in December 2007. As of August 2009 the company had \$3.5 million loans outstanding, with approximately the same amount at some stage in the audit/loan approval process. The company was rapidly approaching \$10 million in loans outstanding, which was the cap that the state regulatory commission had approved for the first cycle of the program. (Additional loan funds are pending approval.) Typical loan amounts on the electric side are approximately \$20,500 and on the gas side are \$34,000, with many of the gas projects tending to be more expensive, custom projects. Figure 1 below illustrates the rapid growth in loan volume since program inception in 2007.

¹⁸ This section based heavily on personal interviews and communication with Frank Spasaro and Jill McGhee, Sempra Energy Utilities.

Figure 1: Sempra Utilities 18-month Cumulative History



Source: Sempra Energy Utilities, 2009.

Default rates have been very low. Out of 11 loans to cover natural gas efficiency projects the company has experienced no defaults. Out of 154 loans on the electric side, worth \$3.2 million, the company has experience 2 defaults, with a value of less than \$50,000. The state’s public benefit fund covers any potential losses.

Sempra Energy Utilities program staff note several lessons learned from the implementation of their program:

- Be aware of relevant regulations and laws tied to consumer or business lending. Most utilities are not aware of these regulations because they are not lenders. Program staff note that it was important that they not create a program that made the utility a “bank,” as lending is not a core function of the utility.
- Pay attention to contractor relationships, as they have proven to be critical to the success of the program. The ability to realize projected energy efficiency savings depends on a quality experience between the contractor and the customer, and the utility has begun to focus significant resources on education and training for contractors.
- Address IT issues early. Updating the billing systems proved to be a challenge, as there are many details involved in assuring that an automated billing system functions properly.
- Secure top management support. Program managers found that it was far easier to address any potential problems that arose in the early stages of the program as they had the strong support of top management.

United Illuminating, Connecticut¹⁹

Program focus:	Energy efficiency improvements in small businesses for measures identified in an energy audit.
Mechanism:	Business loans paid through the utility bill.
Source of capital:	Utility funds with state public benefit funds available to cover loan defaults.
Active Since:	2000
Notable:	On bill financing combined with rebates to offer immediate financial benefits to small businesses. Relationships with contractors are well developed.
Challenges:	Continued evolution of contractor relationship. Program has been so successful that it is hitting its utility commission-determined dollar cap of \$4.5 million.
Website:	www.uinet.com/uinet/connect/UINet/Top+Navigator/Your+Business/

United Illuminating (UI), a Connecticut-based utility that serves approximately 20 percent of the state’s electric load, began an on-bill financing program in 2000. The program offers 0% interest financing for energy efficiency improvements in small businesses (defined as load of less than 150 kW). The program works both with businesses that own their premises and with leased spaces; eligibility to participate in the program is tied to the name on the utility bill and not the property owner. Approximately 60% of total installations are in leased spaces. Typical loan terms run from 24 to 36 months. UI combines the loans with a customer buydown (equivalent to a rebate) to cover 30% of lighting efficiency measures and 40% of costs for other measures. If the customer/borrower elects to install two or more measures, the customer buydown grows to 50% of the cost, thus encouraging a more comprehensive approach to efficiency investments. Typical project sizes range from \$8,000 to \$12,000. The combination of the rebate and the loan give the small business customers an immediate financial benefit.

Like other programs, UI has found that the vendor/contractor relationship is critical. UI holds quarterly meetings with the 14 contractors who are qualified to perform services under the program. UI also holds the contractors to certain metrics; large contractors must bring in business that save 1,000,000 kWh per year and small contractors must bring in business that saves at least 400,000 kWh per year. Other metrics have to do with number of leads generated, projects completed, and time to complete projects. If the contractors regularly fail to meet these metrics, UI will disqualify them and bring new contractors on. UI maintains a checklist to measure contractor performance. In the past year, UI disqualified two contractors.

Contractors will generally replace any failed equipment at no charge if it fails. UI program staff note that out of 3,400 installations, the company has received a total of only three defective batches of lamps or ballasts. Lamps and ballasts come with a three-year warranty but many of the contractors will replace them for up to five years.

¹⁹ This section based heavily on personal interviews and communication with Dennis O’Conner, United Illuminating.

United Illuminating conducts pre- and post-installation audits on a random basis to check the quality of the contractors' work. UI is also required by its utility regulators to submit a Program Savings Documentation report that includes an analysis of all end use energy efficiency savings. These two features help to ensure that the actual savings match projected savings.

Contractors sign an agreement with UI, undergo a drug and a background check, and must carry liability insurance. UI gives them temporary photo identification to provide credibility as they enter the businesses.

Interviews with contractors revealed that the on bill finance program was central to their business. All three contractors interviewed for this project indicated that the UI work accounted for most or all of their business, and supported from 12-20 employees each.

The contractors are the primary contact that the utility has with its on-bill finance customers, since they make the initial contact with the customer, perform the energy audit and install the efficiency improvements. The contractors noted five primary concerns raised by potential customers:

1. *Will they realize the forecast of energy savings?* Contractors addressed this concern by showing verified energy savings results from previous efficiency projects. These results came not only from the contractor's previous projects but from the United Illuminating's verified savings results.
2. *Will their business be a going concern in 1-2 years?* Especially in the current economic situation, this is probably the top concern that business owners raised. They would not be able to commit to a 24 month or longer loan if they did not feel they would be in business for more than a year.
3. *Will the business be in the same location in 1-2 years?* Businesses that are about to move from either leased or owned space would not want to commit to this loan.
4. *Are there actual opportunities for energy savings in the facility?* In a market in which energy efficiency programs have been operating for a number of years, businesses may have already achieved the most cost effective efficiency savings.
5. *Will they, as tenants, realize any benefit from lower energy bills if they do not pay their energy bills directly (i.e., if they are paid through their rent)?* Most business owners, even if they lease their space, pay their own energy bill. Contractors noted, however, that especially in some older, larger office spaces, the monthly rent includes the energy payment. These situations are not appropriate for the on-bill program. More than 60% of the total program works with businesses in leased space, according to the UI program administrator.

The program is one of the longest running on-bill finance programs in the country and has completed projects in nearly 5,500 small business customer locations—approximately one third of the total market—since its inception. According to the program administrator, 1,500 audits did not elect to move forward with an efficiency retrofit based on a number of factors; e.g., their lease was soon to run out, they did not qualify for the financing, or there were too many decision makers who could not come to an agreement. In some cases, language barriers and skepticism about the benefits of the efficiency program came into play.

Budget considerations drive the pace of program expansion. Utility commission regulations in place as of 2009 cap the total value of all outstanding loans at \$4.5 million. According to the program administrator, UI requested permission from the commission to increase that cap on outstanding loan value to \$7.5 million. UI expects to complete 600 installations in 2009.

Lighting upgrades dominate the list of measures that the program finances, representing fully 75% of such measures. Refrigeration makes up the bulk of the remaining measures installed. The new trends have been to install more LED lighting fixtures and variable speed drives. The program installs these measures in a wide range of facilities including convenience and liquor stores, common areas in offices, and manufacturing facilities.

Default rates have been less than 1%, and have typically been on the order of 1-3 per year. The program manages defaults by screening customers to make sure they have been in business for at least six months and have been current on their utility bill for at least five years, if they have been in business that long. 95% of the customers who apply for financing do qualify. The UI program staff also work closely with the UI credit department to identify customers who may be having trouble paying bills, and to work out payment terms.

C. On-Bill Tariff Programs²⁰

How\$mart[®] – Midwest Energy, Kansas

Program focus:	Energy efficiency improvements, primarily implemented in homes, based on audits.
Mechanism:	Surcharge on utility bill; no loan required.
Source of capital:	Utility and Kansas Housing Resources Corporation.
Active Since:	2007
Notable:	Repayment through surcharge on utility bill allows for long amortization period. Operated through contractors and utility staff.
Challenges:	Contractor relationships and notification of new owners/occupants of residences.
Website:	http://www.mwenergy.com/howsmart.aspx

Midwest Energy is a gas and electric cooperative utility with 48,000 electric and 42,000 gas customers in western Kansas. The How\$mart[®] program operates with four basic principles:

1. Typically, there is no up-front capital from the customer.
2. The utility is repaid via a surcharge on the utility bill.
3. That surcharge will be less than estimated energy savings.
4. Repayment is tied via a tariff to the location, not the customer.

Because the program operates through a tariff and is tied to the meter, the customer is not taking on new debt. It is not considered a loan, but rather a surcharge on the utility bill. That surcharge covers the repayment of project costs, plus the cost of capital and administrative costs (approximately 5% of project costs). The cost of capital is only 4%; a contribution from the Kansas Housing Resources Corporation provides 50% of project funds at 0% interest, effectively reducing the cost of capital by one-half. The program requires disclosure to the next customer by an owner/landlord, ensuring that renters and/or new owners are aware of the surcharge. The maximum term is 180 months for the residential sector and 120 months for the commercial sector, or 75% of the expected life of the measures. The company reserves the right to disconnect the customer for non-payment, although it has not yet faced this situation. Total default rates have not been calculated but Michael Volker, the program administrator for Midwest Energy, said he believes that no customers have defaulted so far.

The energy cost savings must exceed the surcharge, so in some cases the program requires the building owner to buy down the cost of the energy project in order to reduce the size of the loan. Building owners have, in the aggregate, bought down approximately 25% of total project costs as of mid-2009. This does not mean that all building owners have had to buy down the project costs, only that some have been required to do so

²⁰ Personal Interview with Mike Volker and Pat Parke, MidWest Energy, July, 2009 and Presentation to Midwest Energy Association "How\$mart[®] -- Investing in Energy Efficiency, April 29, 2009.

because of particularly long-payback projects. The program rules state that the surcharge can be no more than 90% of the energy cost savings; on average, the surcharge is 82% of the energy cost savings. In all cases, customers receive an immediate financial benefit from the program. This requirement actually helps with the default and credit management, since the customer bill after the energy efficiency installation is always lower than before the installation.

The program administrator works closely with contractors, noting that, “We have a relationship and commitment to contractors to provide ongoing training on various subjects from year to year. These training efforts are what got us in the door with contractors in the first place.” Midwest Energy offers programs to train its contractors and maintains an “easy on easy off” list of contractors, according to the program administrator. In other words, low quality work or unethical practices will result in disqualification from the program.

As of mid-2009 and after 20 months of operation, the How\$mart program had completed 139 projects with another 282 pending. The average surcharge was \$39.94 and average estimated savings was \$49.02. Average utility investment was \$4,884 per project, with a total utility investment of close to \$700,000.

One half of all the projects included thermal shell improvements in addition to air conditioners and efficient furnaces. Almost all (97%) of the installations have been residential, with 86% of those on customer owned sites and 14% on rental locations.

Challenges include:

- Projects have taken longer than expected to implement as a result of delays from both customers and contractors.
- Ensuring that the new tenant or property owner has sufficient notice of the existence of the surcharge has proven more difficult than expected.
- Customers who have received an audit but not opted in to the program have proven expensive. As a result, the program implemented a \$200 fee to people who use the audit but do not take out a loan.

D. Property and Local Government Fee-Based Financing Mechanisms

BerkeleyFIRST (Financing Initiative for Renewable and Solar Technology) – Berkeley, California²¹

Program focus:	Solar energy installations.
Mechanism:	Loan is attached to property tax bill as a special assessment that transfers with the property. Obligation is senior to primary mortgage.
Source of capital:	Private investor purchases loans
Active Since:	2009
Notable:	City formed a Sustainable Energy Special Financing District
Challenges:	The structure of the next stage beyond the 40-loan pilot, including sources of capital, will need to be addressed. The structure of energy efficiency lending (rather than only solar energy) will need to be developed.
Website:	www.cityofberkeley.info/ContentDisplay.aspx?id=26580

BerkeleyFIRST in the City of Berkeley, California, is a loan program designed, at least in its initial pilot program, to fund solar energy installations. Borrowers repay their loans over a 20-year period through an annual special assessment on their property tax bill. Property owners in Berkeley pay this additional amount on their property tax only if they volunteer to do so by opting in to the program. This special assessment obligation transfers to any new owners of property.

The City of Berkeley formed a Sustainable Energy Special Financing District in order to create this program and the special assessment that accompanies it. The district has the authority to issue up to \$80 million in bonds to support energy efficiency and renewable energy improvements. The State of California enacted AB 811 in 2009 to enable most local governments throughout the state to implement these programs.

The first stage of the program, now ongoing, is a \$1.5 million pilot program for up to 40 installations. Commercial and residential borrowers can take out loans from the City for up to \$37,500. The program set its interest rate at 3.25% over the 10-year U.S. Treasury note plus an adder for administrative costs of approximately 1%. These rates stay fixed for the duration of the financing, or up to 20 years. Typical retail interest rates to borrowers are now 7.75% on a fixed rate. Borrowers are also expected to take advantage of solar energy rebates through the California Solar Initiative.

The program qualifies borrowers based on the following criteria. The property owner:

²¹ This section based on information gathered from <http://www.cityofberkeley.info/ContentDisplay.aspx?id=26580> and personal interview with Simon Bryce, Renewable Energy Funding, July, 2009.

- has no notices of default (mortgage, property taxes, or any other type) within the past 3 years or since ownership;
- has no tax liens as the result of a failure to pay taxes in excess of \$500 within the past 3 years or since ownership;
- is on current on all property taxes over the past two years or since ownership; and
- has no current mechanic or other involuntary liens in excess of \$1000.

An example of a special tax calculation is illustrated in Table 13 below.

Table 13: Sample Special Tax Calculation

<i>Sample Tax Calculation</i>	
Solar Project Cost:	\$28,077
CSI Rebate:	\$(6,108)
City Program Cost:	\$600
Total Financed:	\$22,569
Rate:	7.77%
Annual Tax Payment:	\$2,199

Source: Gail Feldman, City of Berkeley Planning Department

This voluntary payment is attached to the property tax bill until the loan is paid off, and ranks senior to the borrower’s first mortgage in case of default; failure to pay property taxes can result in foreclosure. This element of the program is controversial in the mortgage banking community, since it places a new payment obligation above the first mortgage. But it is also important to the availability of capital; it represents a secure stream of revenue that will command a relatively low interest rate. The 20 year term and extended amortization period with these loans is also important because it spreads the cost of solar power investments over 240 separate payments. Few other fixed-rate financing mechanisms with the exception of a mortgage refinance or home equity loan offer such terms.

The program works in the following sequence:

1. Property owner receives price quotes and bids for solar electric installations. The property owner has access to several resources that help decide whether or not to make the investment, including a solar cost calculator (available at <http://rael.berkeley.edu/berkeley/calculator>).
2. Property owner applies for funding on-line and third party program administrator approves funding application. The application fee is \$25.
3. Property owner contracts with installer.
4. Property owner applies for rebates through the California Solar Initiative.
5. Property owner demonstrates compliance with the California Residential Energy Conservation Ordinance.
6. Installation must be complete within 270 days.
7. Property owner then requests payout of loan.

The program is new, so it has limited history to report related to actual installations. The 40 projects that the program will fund have a total loan value of \$1.5 million.

The program will need to resolve several challenges in the near future. First, the current stage of the program is a 40-loan pilot. The structure of the next stage, including sources of capital, will need to be addressed. Second, the current pilot program funds only solar electric installations. The structure of energy efficiency lending will need to be developed.

ClimateSmart Loan Program – Boulder County, Colorado²²

Program focus:	Greenhouse gas emissions reductions through energy efficiency and renewable energy investments by residents and businesses.
Mechanism:	Loan is attached to property tax bill as a special assessment that transfers with the property. Obligation is senior to primary mortgage.
Source of capital:	Financing provided through Municipal Bonds and Private Activity Bonds. County provides debt security. No general duns obligations.
Active Since:	First round of loans made in April 2009, and bonds sold May 2009. Second round to be made in September 2009, with bonds to be sold in October 2009. Commercial loan applications will begin in fall 2009 with a target bond sale of February or March 2010.
Notable:	Level of initial capitalization higher than other programs at \$40 million. Default rate far below 1%. County negotiated program to work through six separate utilities operating within the political boundary, and 10 municipalities opted in by ordinance.
Challenges:	If the ClimateSmart program grows significantly, it may stretch the capacity of a county government agency to process a much larger loan volume.
Website:	www.bouldercounty.org/bocc/cslp/

In the spring of 2009 Boulder County launched the ClimateSmart Loan Program, the most significantly capitalized energy efficiency finance program in the country to date, with initial loan capacity of \$40 million drawn from two types of bonding activity. The program was developed and is administered by the county’s sustainability office, and has been driven in large part by countywide emissions reduction goals.

The program is designed to encourage investments in energy efficiency and renewable energy by both residential and commercial customers throughout the county. In addition to the City of Boulder, the county includes ten municipalities and the unincorporated area, and spans the service areas of six separate utilities (both investor-owned and municipal).²³ Boulder County covers 751 square miles and had a total population of just over 282,000 in 2006.

The first round of applications included mandatory attendance at one of a series of orientation workshops held throughout the county. Approximately 1600-1700 people attended (out of an estimated 140,000 households). A total of 517 applications were received for \$9.5 million in total requests. Of these 517 applicants, 393 participated, using \$6.6 million dollars of the bonds. The number dropped due to Standard and Poor’s requirement to obtain A/A+ bond rating. Borrowers had to pay into surplus, deficiency and reserve funds (upfront costs rolled into the loan). According to Ann Livingston, the Sustainability Coordinator for Boulder County, a number of applicants dropped out of the program because of the economic crisis; some were laid off, while others were concerned that their jobs were not secure.

²² Section based on personal interview and discussion with Ann Livingston, Boulder County Sustainability Coordinator, conducted by Beth Conover and Heather Braithwaite.

²³ Xcel Energy, Longmont Power & Communication, Estes Light & Power, Poudre Valley REA, Lyons Municipal Utility & United Power (at Jefferson County border). There was only one town that opted out in the first round of funding.

Applicants were encouraged to identify and apply for funds to implement energy efficiency measures in their homes before requesting funds for renewable energy applications. In the final breakdown of loans awarded, just over 50% were for energy efficiency projects, and the remainder for renewable energy. Photovoltaic installations were the single biggest category, then exterior windows and glass doors, and then high-efficiency furnaces. Program participants signed releases to provide data from their electric and natural gas bills for the two years leading up to the proposed renovation period, thereby providing baseline data to which post-improvement bills can be compared.

Administrative costs are recovered in a variety of ways. For example, loan applications include a \$75 application fee. In addition, the County has applied for an EECBG allocation in the amount of \$70,000 for marketing and education, which will help to cover the cost of workshops, advertising and outreach. Loan origination fees were also applied. New administrative costs for the program were budgeted at approximately \$110,000 for a new county FTE in the finance division. The program is entirely administered by the county, with some contract support for loan origination during the loan application process.

The program is financed through a combination of municipal revenue bonds and private activity bonds. The County also invested about \$400,000 in reserve funds with a guaranteed rate of return.

In the initial round, the county screened applicants for preapproval, and then worked with UMB bank and Renewable Funding contractors for loan origination. All homeowners meeting program requirements are eligible for the Open Loans and some homeowners will be eligible for the Income Qualified Loans, which have a lower interest rate and associated annual assessment. Income Qualified Loans can only apply to primary residences. Homeowners who do not meet the requirements of the Income Qualified Loans are able to apply for the Open Loans, which are not subject to income restrictions.

On March 5, 2009, the Board of Commissioners set "not-to-exceed" interest rates of 6.75% for Income Qualified Loans and 8.75% for Open Loans.

Due to changing market conditions, the actual assessment rate achieved may vary, however, this "not-to-exceed" clause ensures that loans will not have an assessment rate higher than those stated above. Please note that bond rates change frequently and the actual rates may be lower depending on market conditions at the time of sale. The actual rates ended up being 5.2% and 6.68% respectively.²⁴ Up to full funding is available for proposed projects. However, property owners may put in as much private money for improvements as they like.

The program is capitalized at \$40 million, with a goal of using \$12 million for commercial applications and \$28 million for residential. The second round for loans will

²⁴ See <http://www.bouldercounty.org/bocc/cslp/cslpreqt.html>

be in September 2009, with another round possible before the end of 2009. There is a minimum loan size of \$3,000 per property and a maximum loan size of either \$50,000 or 20% of the statutory actual value of the property, whichever is less. Income Qualified Loans will be capped at \$15,000 as per federal law; however, those loans may be supplemented with open category loans, subject to the overall maximum.²⁵

Once approved, the loans are paid through the applicant's property tax bill. If it defaults, the loan must be paid before the primary mortgage, and comes in just below the general tax obligation. The county has a surplus, deficiency, and a reserve fund to cover potential losses, which helps secure the loans.

It is interesting to note that there appears to be a ripple effect to the county's offered financing. According to participants surveyed at the workshops, more people are financing energy efficiency and renewable energy improvements, whether they use this program or not. Most rebates, incentives, and investment tax credits (ITC) are not affected by this program.²⁶ The Xcel Solar Rewards program is the only program affected, as participants are not allowed to participate in both programs.²⁷

²⁵ See <http://www.bouldercounty.org/bocc/cslp/cslpreqt.html>

²⁶ Personal communication with Ann Livingston, Sustainability Coordinator for Boulder County.

²⁷ Personal communication with Ann Livingston, Sustainability Coordinator for Boulder County.

The Babylon Project – Town of Babylon, New York²⁸

Program focus:	Residential Energy Efficiency Improvements
Mechanism:	Municipal Special Charge. Program is based on a revolving loan fund with 3% interest.
Source of capital:	\$2 million pilot from Town’s Solid Waste Fund, through town code that defined carbon as a waste product from energy, thus allowing the fund to provide services to mitigate it. No additional tax or government giveaway provided. Program pays for itself with little or no cost to homeowners and taxpayers.
Active Since:	October 2008
Notable:	Creation of a new repayment mechanism not based on property tax or utility bill.
Challenges:	Contractor training and marketing are critical.
Website:	www.thebabylonproject.org

Babylon, a town of 65,000 people located on Long Island, established a new mechanism for homeowners to finance up to \$12,000 of energy efficiency improvements in 2008. The mechanism is known as a benefit assessment, much like an assessment used for municipal sewer charge, and homeowners pay a 3% interest rate. A benefit assessment can be established when a municipality provides a specific improvement on a parcel of property for a public purpose, assessing the cost of the benefit against the property. Should the property owner fail to fulfill their obligation, it is assigned to the property tax. The property tax is first on the lien list, ahead of the mortgage and substantially senior to utility bills. This benefit assessment is attached to the home, meaning that the homeowner incurs no debt; the payment obligation is viewed instead as an increase to the local government’s assessment.

Babylon classified carbon as energy waste, and therefore was able to use a \$2 million surplus from its solid waste fund to capitalize the program.

Other notable features of the program include:

- The property owner gets a home performance evaluation from a private contractor. Residents pay \$250 for the audit; the cost is included in the loan if they sign up for the program.
- All contractors are certified by the Building Performance Institute (BPI) to do the retrofits, and are trained through a Long Island Power Authority program.
- The Town assigns a benefit assessment to the property after the work is completed to cover the cost of the energy upgrades and the initial audit.
- The Town pays the contractor directly to perform the energy upgrades on the home and the property owner pays off the benefit assessment to the Town.
- The monthly repayment amount and term are based on projected energy savings.

²⁸ Based on information presented in “Launching a Municipal Residential Energy Efficiency Retrofit Program, Steve Bellone, President, The Babylon Project.

In the first year, the Town of Babylon audited 158 homes and completed energy efficiency retrofits on 98 of those. The average cost of improvements was \$7,203, with average annual energy savings to the homeowner of \$986. This yielded an average payback period of 7.8 years for these investments. Average energy savings, based on blower door tests performed after work was completed, were 28.5%.

As with several other programs, the Babylon Project staff found that contractor relationships and training are critical to the success of the program. Marketing of the program has also proven to be a challenge.

E. Home Mortgage

Homebuyers purchasing a home might be considering two homes that are similar in many respects, but one qualifies as an ENERGY STAR[®] home and the other does not. They might also be trying to identify how they could use a new mortgage to finance energy efficiency retrofits or solar investments. Some programs and lenders are offering home mortgages that include special terms for energy efficiency and/or renewable energy measures.

Colorado ENERGYSTAR[®] Mortgage – Governor’s Energy Office & the Bank of Colorado²⁹

Program focus:	Energy efficiency improvements in new homes. Potential to expand program to energy efficiency and solar energy retrofits.
Mechanism:	Personal mortgage loans.
Source of capital:	Lender provides loan capital. Governor’s Energy Office and lender match funds to pay for discount point reduction.
Active Since:	2009
Notable:	Based on a model being tested in other parts of the country and developed by Energy Programs Consortium jointly with Environmental Protection Agency.
Challenges:	Promoting program for an energy-efficient home purchase in a faltering housing market.
Website:	http://fdc.rwstools.com/content/template19/index.asp?p=fdc_SPonce-Pore&CustomContentID=13443

The Colorado Governor’s Energy Office (GEO) partnered with the Bank of Colorado in the summer of 2009 on a pilot basis to offer a new kind of energy-efficient mortgage product known as an ENERGY STAR[®] mortgage. This mortgage product is simple: a borrower receives a financial benefit for buying a home that qualifies for the ENERGY STAR[®] rating. The GEO and the Bank of Colorado agreed to split the cost of this incentive.

Other energy-efficient mortgage products have been around since the late 1980s but have never been particularly successful. These products allowed borrowers to qualify for a slightly larger loan than they otherwise would qualify for, so long as they could prove that energy efficiency measures would reduce their overall utility bills. They would prove this through a detailed energy audit. The original idea of this energy efficient mortgage was that borrowers could finance major energy efficiency investments over the life of their mortgage. A long term financing arrangement like this would mean that borrowers would pay very little more each month to cover the principal and interest, and

²⁹ Section based on personal interview and discussion with Stephen Ponce-Pore, Bank of Colorado and personal experience of the author who worked to design this program.

might see an immediate net benefit if the reduction in energy costs exceeded the incremental monthly principal and interest payments.

Few people used energy-efficient mortgages in the past, partly because the financial benefit associated with them was small for the borrower, partly because the transaction costs for the energy audit were difficult.

The GEO-Bank of Colorado pilot effort is designed to address part of this problem by providing borrowers with a financial benefit in the form of a 1 discount point reduction that can be applied to reduce the mortgage interest rate. A 1 discount point reduction is 1 percent of the total amount financed. On a \$200,000 mortgage, 1 discount point is \$2,000. A borrower can use that \$2,000 to buy down the interest rate, which might equate to a ¼ point interest rate reduction, depending on market conditions.

This pilot effort qualified as a US EPA-sponsored ENERGY STAR® mortgage as part of a pilot program developed jointly by the US EPA and the Energy Programs Consortium (www.energyprograms.org).³⁰

It is too early to provide program results at this point. The initial program was developed using federal State Energy Program (SEP) funds that applied only to new ENERGY STAR® qualified homes; therefore, a refinance and energy efficiency or solar retrofit of an existing home would not be eligible. One early finding was that new ENERGY STAR® qualified homes proved difficult for the bank and GEO to identify. The program is now being expanded to cover existing homes.

Another initially limiting factor was that the SEP funds needed to be spent within three months of the GEO giving an award to the Bank of Colorado. Since it requires nearly a month for the bank to commit funds from the time of an initial borrower inquiry, this short timeframe proved impossible to meet. An extension of time resolved this issue.

One lesson from this program is that new home markets often rely heavily on the use of captive lenders—lenders that are financially tied to the homebuilder itself. Many large homebuilders structure the sale of their home such that the use of their captive lender is much less expensive than using an outside lender. This had the effect of eliminating many potential borrowers who might be buying a home from a large ENERGY STAR® homebuilder and consequently the program unintentionally shut out some potential borrowers.

³⁰ Mark Wolfe, Matthew H. Brown, Howard Banker, “The New Energy Efficient Mortgage,” Energy Programs Consortium, Washington DC.

Conclusion

A number of conclusions can be drawn from the profiles and program reviews contained in this report.

- 1) No single mechanism will meet all financing needs. Utilities, private lenders, and local and state governments have developed a number of innovative financing programs. These programs and others can serve target markets at different transaction points. Some are streamlined and designed to provide quick access to money to buy energy-efficient appliances (furnaces or air conditioners, for example). Others are more complex, but provide access to larger amounts of money to fund a full-scale efficiency retrofit or an efficiency/solar energy installation through a second mortgage, a secured loan or a primary energy efficiency mortgage.
- 2) Instead of choosing a single loan product and hoping that it covers all energy efficiency markets, it may be appropriate to either (1) choose *one target market* (e.g., the appliance replacement market, the small business market, or the residential full efficiency audit and retrofit market) and focus a loan product and financial resources on that market; or (2) create a *portfolio of loan products* to serve different markets. An approach of developing a portfolio of loan products will serve borrowers who have differing needs, such as those buying a home, those who want to upgrade the energy efficiency of their business, or those who must replace a broken HVAC system.
- 3) There appears to be a trade-off between complexity of the loan product and take-up rates. Some loan products fund only efficiency measures identified through an energy audit as cost effective measures on a property-by-property basis. This audit, performed by trained and certified energy auditors, can identify a wide range of efficiency measures. The alternative to the audit-based approach is a more streamlined, less expensive approach based on a list of eligible prescriptive measures. The audit approach can result in greater energy savings per participant, but has more obstacles to participation and thus lower participation rates than the prescriptive approach. This point is exemplified by the Pennsylvania Keystone HELP program.
- 4) Capital sources can be as varied as the programs that support them; however, the capital sources need to match the needs of the markets that they serve. Programs use a variety of capital sources including utility capital, bond issuances, public benefit funds, bank loans, private sector investor capital or government general funds.
- 5) Loan terms can be short, from 2-5 years in the case of some small business on-bill loan programs; can be moderate, in the case of an on-bill tariff program in which loan terms are designed around the life of the efficiency measures (often as much

- as 10 years); or can be longer if the loan is tied to a property tax or a mortgage, ranging as high as 30 years in this case. Longer loan terms are common in the government market (government customers are assumed to be the most stable), while shorter terms are typical in the small business market which may tend to see high turnover.
- 6) Interest rates vary from a low of zero percent to a high of 8.99 percent (although the higher interest rate has subsequently been reduced to 6.99 percent). In some markets, such as the emergency replacement market for HVAC equipment, a highly subsidized interest rate may not be critical to program success. In other markets, such as the small business energy efficiency retrofit market or the home mortgage market, there appears to be greater sensitivity to the cost of funds. In these markets, a low or zero percent interest rate may be more important.
 - 7) Another common theme of the programs we profile is the heavy involvement of contractors, and sometimes retailers, in program delivery. Contractors have, or can build, strong relationships with their customers and are typically the first point of contact with customer/borrowers. Successful programs often empower contractors and retailers to sell the energy efficiency products (whether they be complete efficiency audits/retrofits or single efficiency measures such as a furnace replacement), and make the contractors or retailers the link to financing.
 - 8) Risk management and credit enhancement is critical. Default rates for efficiency programs have been low, typically less than one percent. These low default rates are likely a result of careful underwriting in a small number of programs and the fact that energy efficiency measures actually reduce borrowers' day to day expenses, thus making loan payments affordable. However, it is unlikely that energy efficiency lending has a long or strong enough credit history to attract a large amount of outside capital and investors without additional credit enhancements (loan loss reserves and guarantees, for instance) to secure payment.
 - 9) Some programs seek to attach loan repayment to secure payment streams such as the utility bill, municipal charges, or the property tax. Each of these repayment mechanisms provides security beyond what would be available through a simple unsecured, third party billing. However, each also faces barriers. Utility companies may not be enthusiastic about placing financing charges on their utility bill; banks and secondary market mortgage investors may object to repayment obligations tied to a property tax that take priority over the first mortgage in case of default.
 - 10) A successful financing program should support, and not be a barrier to, customer participation. Financing should remain streamlined, easy-to-access, and quick. Customers need to know that they will have access to financing, but they are not participating in a program simply because it offers good financial terms; they are striving for lower utility bills, an upgraded home or business property, and more comfortable living and working spaces.

11) Only a few financial institutions have participated in energy efficiency or renewable energy lending programs so far, and these tend to be specialty lenders or investors such as AFC First in Pennsylvania or Renewable Funding in Berkeley, California. It is notable that these specialty lenders or investors either hold on to the loans to maturity or have a specialty secondary market (such as the Pennsylvania Treasury) to which they sell loans. Likewise, relatively few utilities offer financing for energy efficiency measures or projects. Broader participation from banks, utilities, and other lenders will be needed in order to move energy efficiency financing into the mainstream.

In summary, financing for energy efficiency is more complex than rebate or grant programs. But the benefits of financing, including the potential for leverage and for low or no subsidization, provide new opportunities for overcoming barriers to the adoption of energy efficiency measures. Financing is not a panacea; rather it should be viewed as a complement to other strategies such as building energy codes, appliance efficiency standards, or utility rebate programs. We hope this paper will help those in the field understand both the challenges to and opportunities for using energy efficiency financing in a productive manner.