

ENABLING INVESTMENTS IN ENERGY EFFICIENCY

A study of energy efficiency programs that
reduce first-cost barriers in the residential sector

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Executive Summary

Energy efficiency has a vital role to play in addressing our daily resource needs and creating a vibrant future for our society. At the household level, electricity and fuel prices are rising, squeezing budgets especially for the poorest families. On a macro level, energy efficiency is repeatedly pointed to as the obvious first step in managing our energy supply and addressing climate change. Energy efficiency has also been highlighted as a vital opportunity for job creation in a new “green” economy.

An important arena for the transformation to a more energy efficient economy is in the residential building sector, which accounts for 30% of non-transportation energy use¹, 32% of electricity use², and 6% of greenhouse gas (GHG) emissions³ in California. Energy codes for new construction and incentive-based programs to voluntarily exceed code requirements have been effective tools to increase energy efficiency levels in new construction. However, improving the efficiency of our existing building stock is perhaps more important; buildings have many-decade lifetimes and today’s existing buildings will continue to be a majority of all buildings in 2050. Without a focused effort to reduce energy demand in existing buildings, it may be virtually impossible to meet GHG reduction targets or other goals, such as the California Public Utilities Commission’s goals to reduce energy use in existing homes by 40% and install low-energy heating and cooling systems in 50% of new and existing homes by 2020.⁴

Despite the tremendous potential for reducing energy consumption in the building sector, energy efficiency programs have often met with disappointing results. There are several barriers to improving the energy efficiency of homes. In fact, over the last 30 years there has been a contentious debate over why consumers and businesses forego “cost-effective” energy efficient products and practices, and what role public policy and enabling programs (such as financing programs) should play in influencing these decisions. Barriers to improving the efficiency of homes include:

- **Transaction costs** – The time and effort required to get enough information to make a decision, apply for financing, and arrange for the work to be done may simply not be perceived as worth the return in energy savings.
- **Lack of information** – Many customers do not know how to implement energy efficiency measures or understand and have confidence in the benefits of a project.
- **Uncertainty of energy savings** – On *average*, a set of measures might produce a predictable level of savings, but savings can never be perfectly predicted for an individual home.
- **Split incentives** – Split incentives occur when the decision-maker does not receive many of the benefits of a measure. An example is the case of rental property owners who lack incentives to invest in building efficiency upgrades because it is the tenant who pays the utility bill.
- **Initial capital investment** – The first cost of a project may deter investment, either because the resident does not have access to capital or they choose to make higher-priority investments.

This study reviews 18 residential efficiency financing programs in the U.S. and Canada with an emphasis on residential on-bill financing (OBF) programs to better understand the potential for addressing what is

¹ EIA 2005

² California Public Utilities Commission. *California Long Term Energy Efficiency Strategic Plan* (2008)

³ California Air Resources Board: 2004 Greenhouse Gas Inventory

⁴ California Public Utilities Commission. *California Long Term Energy Efficiency Strategic Plan* (2008)

often perceived to be one of the most important barriers –first cost. A description and analysis of each program can be found in Appendix A. This research revealed several limitations of these programs including: limited applicability of the programs to households most in need, low participation rates, difficulty assuring that savings will exceed payments, limited support for comprehensive energy retrofits, the inability of most programs to cover their costs, and issues particular to OBF programs.

Limited Applicability of Programs for Households Most in Need

It is relatively easy to provide a loan program for those who are educated, motivated, and credit-worthy – but these are exactly the people who are least in need of financing. There has been little success in addressing the financial barriers faced by those most in need of financing, including those with the highest energy cost burdens as a percentage of income, low or fixed incomes, poor credit, and those in rental housing. Many programs have credit requirements that include credit rating minimums and debt-to-income limits, and few programs systematically recognize expected energy savings as increasing the ability to pay. Many programs are also not available to rental properties, and those that are available usually do not successfully address the split incentives between rental property owners who make the investment and tenants who pay the utility bills. OBF programs face the same barriers in this area as traditional financing programs, unless the repayment is attached to the meter (as opposed to an individual tenant) which could *potentially* make a program more accessible both to renters and individuals with low credit scores but good bill repayment history.

Low Participation Rates

Despite the 150+ loan programs for residential energy efficiency in the United States, only a tiny fraction of the population has been reached. Most of the programs reached less than 0.1% of their “potential” customers in 2007, implying that in many cases their impact is marginal at best. Of course, many people have used traditional funding sources, or can pay for improvements up front, but the number of program participants is surprisingly small. Programs that have higher participation rates tend to have networks of engaged and informed contractors who use the financing program as a sales tool. OBF programs did not have noticeably higher participation rates, but there are still so few OBF programs that this could not be accurately assessed.

Difficulty Assuring That Savings Will Exceed Payments

Assuring that the measures financed will actually have a positive cash flow (i.e., savings are greater than loan payments each month) is critical. While this is especially true for low- and moderate-income people, it is essential that energy efficiency is not an additional burden for this population. Currently, most programs do not offer a rigorous assessment of expected savings or any guarantee for vulnerable populations, and the average loan term of five to seven years is often not long enough to achieve a positive cash flow for many improvements that would yield substantial energy savings. Most programs also do not offer any rigorous measurement and verification for the installed measures, therefore little is known about the actual impact.

Limited Support for Comprehensive Energy Retrofits

While basic weatherization and lighting might save 5% to 15% of energy use, more extensive retrofits might save 20% to 50% and usually will last much longer. However, these measures also often have longer payback periods and require financing with a term of 10 to 20 years to match the savings. Most programs offer terms of five to seven years. Longer financing terms are needed to reach this higher level of savings.

Inability of Programs to Cover Their Costs

Expecting programs to be self-supporting typically results in highly limited applicability and impact. Most of the higher-volume programs reviewed are likely serving participants who have higher incomes and access to other (albeit less attractive) sources of funding. It appears that financing alone might not be enough, especially to reach low- and moderate-income families. Most programs, particularly those with wider participation, offer additional subsidies in the form of free or low-cost “handholding,” cash rebates, or interest rate buy-downs to attract customers. They also provide guarantees to the provider of loan capital.

Additional Issues Particular to Residential On-bill Financing Programs

There are additional concerns that pertain to residential on-bill financing (OBF) programs. First, changing the billing system to allow for on-bill financing appears to be difficult for some utilities. Second, repayment allocation (i.e., who gets paid first) is an issue when customers partially pay their bills. When using a third-party source of capital for the OBF program, the utility usually covers the gas or electric charge first, increasing the risk to the lender. Third, using OBF for improvements that save non-utility fuels, such as heating oil, may be confusing for a customer who has an electricity-only utility bill (this is less of an issue in California where most utilities provide gas and electricity). Finally, the commitment of the utility to the OBF program is critical. OBF is very difficult to maintain if the utility is not completely committed, because the payments have to run through their systems. Utilities’ concerns need to be thoroughly addressed before they are required by regulatory bodies to offer financing programs.

While most of the programs examined are variations of conventional consumer loans provided by utilities or government agencies, particular attention is given to several innovative options that have the potential to address some of the limitations described above. Two of these add the repayment charges to the utility bill or the property tax bill, respectively:

- **Tariffed Installation Program (TIP)** – TIPs use a utility’s billing system to collect a charge that has been attached to the meter as a special tariff to repay the cost of energy improvements. Because the payment is tied to the meter, not the homeowner, TIPs allow for the current occupant to move, with the next occupant responsible for repayment. Typically, the monthly charge must be less than the expected savings from the efficiency improvements and charged for a term less than the life of the efficiency measures being financed.
- **Clean Energy Municipal Financing (CEMF)** – CEMF uses a special municipal tax to fund energy improvements. The municipality provides funding for the program through the issuance of a bond that is repaid through a line item on the property tax bills of participating property owners. If the property is sold prior to the end of the repayment term of 20 years, the new owner takes over the remaining special tax payments as part of their property’s annual tax bill.

There are also two other mortgage financing mechanisms that address key limitations of many existing energy loan programs:

- **Energy Efficiency Refinancing** – An energy efficiency refinancing program would promote refinancing of homes with new mortgages specifically designed to include major energy improvements. A particular application of this mechanism would be for moderate-income homeowners who could benefit from restructuring their current higher-interest mortgages and

other high interest debt. In these cases, energy savings could allow those with high debt burdens to both consolidate their debt at lower rates and lower their energy bills.

- **Energy Improvement Mortgage (EIM)** – An EIM allows a new home buyer to get additional financing rolled into the mortgage to cover the cost of energy improvements. With higher energy prices and the potential development of time-of-sale energy rating disclosures or efficiency requirements, such a product may merit reconsideration.

Conclusions

Eliminating the first cost of energy investments is an important tool to address the barriers to improving the energy efficiency of existing homes. Once an individual is interested in making energy improvements, financing can make the investment possible and affordable. However, as shown in the cases analyzed for this study, existing financing programs have some important limitations. Some of these issues may be addressed by public funding, using alternative credit qualifications, lengthening the repayment term, allowing the transfer of repayment obligation with tenancy, and/or increasing the effectiveness of outreach. Several conclusions follow from these findings:

- Financing is one of many important tools to overcome barriers to implementing improvements in energy efficiency. It is valuable, but not sufficient on its own.
- Conventional energy efficiency loan programs cannot address much of the need without significant public support.
- New mechanisms are being developed to address key barriers. While these innovations hold great promise, they currently have limited to no experience.

It is also important to note that solutions to some of these limitations may directly conflict with each other. Getting comprehensive energy savings may make it more difficult to assure that financing payments will be less than savings for every project, increasing the risk of not reducing overall costs. Without public support to protect low- and moderate-income families from the uncertainty of actual energy savings, it may make sense to install only the measures that have the quickest paybacks, or – even better for society as a whole – find a way to guarantee savings for vulnerable populations so that more extensive measures can be done. Another possible conflict is between saving the most energy per dollar spent and getting comprehensive savings. Implementing only the measures with the fastest paybacks maximizes savings per dollar spent in the short term. However, if we have bolder energy-saving goals, such as those outlined in California’s *Energy Efficiency Strategic Plan*, it may cost less in the long run to do more extensive work in each home on the initial visit. It is also important to note that few programs do measurement and verification for the installed improvements. As a result, little is known about the actual impact. This information would enable a more rigorous assessment of best practices.

Recommendations for California

- **Make a statewide conventional financing product available in California.** Unlike many other states, most California residents do not have access to a conventional financing product targeted at energy efficiency improvements. California could easily create a simple statewide program similar to that of Pennsylvania’s and offer state funds (with interest) and a reserve fund to keep rates low. Like Pennsylvania, this could be offered through a network of contractors, possibly in partnership with Viewtech Financial Services, which is already operating a loan program in

California, or the California Building Performance Contractors Association⁵ (CBPCA). This will not address the limitations mentioned above, but it will get the ball rolling and encourage more people to invest in energy efficiency.

- **Additional support for the development & implementation of new innovative financing mechanisms.** Three mechanisms are of particular interest:
 - A Clean Energy Municipal Financing program that uses property tax payment history as a proxy for credit and allows repayment responsibility to transfer with property ownership, as is currently being pursued in Berkeley and Palm Desert.
 - An on-bill Tariffed Installation Program that uses utility bill payment history as a proxy for credit and is accessible to rental properties.
 - A mortgage refinancing program that works closely with low- and moderate- income households to make efficiency improvements and reduce their total debt burden.
- **Expand and strengthen California's network of energy improvement contractors,** and make them a sales force for financing. This has already begun through the California Building Performance Contractors Association (CBPCA), which offers Building Performance Institute⁶ trainings, but more funding is needed to train contractors and crew members, and to help develop the capacity of the existing businesses in this market so that they can serve more customers.
- **Experiment with new messages and new messengers to promote financing.** Financing reduces first cost so that those without access to capital can choose to make energy efficiency improvements. But before people sign up for financing, they must want to make efficiency improvements. There is a lot of room to try creative new ways of informing and engaging people. There is evidence that more direct, grassroots outreach through groups that people already know and trust is important to increase participation. There may also be ways to tap into traditional marketing expertise and create sophisticated campaigns that target key market segments.
- **If statewide time-of-sale energy efficiency requirements are adopted, support the development of new Energy Improvement Mortgage products.** More than loan programs will be needed to meet the state's targets. Implementing time-of-sale energy performance disclosure and time-of-sale energy requirements are options for increasing the efficiency of California's residential buildings. Energy Improvement Mortgages may be useful to enable efficiency improvements if these policies are implemented.

All parts of society must be engaged in the effort to reduce energy consumption and protect vulnerable populations from rising energy costs. It is important to remember that this problem will not be solved simply by offering low- or no-interest loans. California is well-positioned to address the energy issues it faces and become a model for the rest of the world; success lies in understanding the potential and limitations of tools such as financing, and figuring out the right set of policies and programs to meet our goals.

⁵ More information about CBPCA available here: www.cbPCA.org

⁶ The Building Performance Institute (BPI) offers nationally-recognized training, certification, accreditation, and quality-assurance programs. BPI is the standard recommended by the EPA's Home Performance with Energy Star program. More information here: www.bpi.org