



On-Bill Repayment:

Understanding and Advocating for an On-Bill Repayment System

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I. Introduction

Sustainable and affordable financing for energy efficiency retrofits, especially in low-income communities, is an essential component to ensure that energy efficiency retrofits can be done at scale in urban and rural areas. Financing presents one of the biggest challenges to those trying to implement energy efficiency retrofit programs. This report describes on-bill repayment systems, and argues that on-bill repayment is one of the best ways to ensure that the costs of energy efficiency retrofits and associated administrative costs will be re-paid in an efficient, equitable, and simple manner.

As described later in this report, on-bill repayment is only one component of a complete energy efficiency retrofit financing strategy. In addition, financing is only one component of a comprehensive energy efficiency retrofit program, which would also address issues such as contractor quality assurance, auditing, workforce training and placement, and more.

On-bill repayment may not be the preferable choice in all circumstances, though on-bill repayment systems do overcome barriers such as 1) split financial incentives between tenants and owners, and 2) high up-front cost. For these reasons, on-bill repayment is a viable financing option that key stakeholders should seriously consider when developing or improving an energy efficiency retrofit program.

II. Barriers to Achieving Energy Efficiency At Scale

Researchers and practitioners point to 9 main barriers to achieving energy efficiency retrofits at the city-scale and beyond:

1) Limited funds in state and other public programs. Lack of capital or access to sufficient capital to fund green retrofits.ⁱ Most states do not have the funds to cover up-front capital costs for mass numbers of residential retrofits.ⁱⁱ

2) Risk aversion. Generally speaking, policy-makers and potential energy efficiency customers tend to be risk-averse, especially in today's challenging economic environment.

3) Lack of information and popular interest. There is a general lack of clear and easily accessible information regarding the environmental and financial benefits of green retrofits; Of the over 150 residential loan programs in the United States, most reach less than 0.1% of their potential customers due to poor marketing strategies and a failure to generate 'tipping point' interest in energy efficiency.ⁱⁱⁱ

4) Split (financial) incentives. Building owners generally aren't interested in investing in energy efficiency when tenants will harvest the savings in their energy bills; tenants are

reluctant to invest their own money to upgrade units they don't own, and where they may not stay long enough to recover costs.^{iv}

5) Limited tenancy or ownership. Limited tenancy or ownership may cancel out the long-term benefits of green retrofits for current owners and renters, making them less likely to agree to the disruption costs and inconveniences attributed to building retrofits.

6) Disruption Costs & Inconveniences. Disruption costs and inconveniences due to the building retrofit process may outweigh the benefits of energy efficiency retrofits, especially for people who may have limited tenancy or ownership, or people who have extenuating circumstances that require their residence or businesses to be free of construction disruptions as much as possible.

7) Complex of Policies & Programs. Regulatory policies governing energy efficiency retrofits, as well as complex financing and construction programs, may deter potential participants.

8) High up-front costs. The up-front cost of a retrofit often deters a homeowner's or tenant's investment in energy efficiency (opportunity cost), or makes it impossible for those without access to capital to personally finance energy efficiency retrofits.^v

9) Siloed approach. The successful implementation of energy efficiency retrofits demands that stakeholders act in a cross-sectoral way, which will require a shift in the siloed and specialized approaches that key stakeholders may have prioritized in the past.

III. Components of Financing

In order to overcome the barriers stated above and to better assess on-bill repayment as a repayment option, it is necessary that stakeholders develop an understanding of the many components that make up a financing strategy.

There are **5 main issues** to consider:

1) Where does the money come from?

2) How is it distributed?

3) What can it be used for?

4) How is it re-paid?

5) How are financial risks addressed?

Figure 1, below, describes “Financing Program Elements,” which are referenced in this report to discuss the various components of a comprehensive energy efficiency retrofit financing strategy.^{vi}

Figure 1: Financing Program Elements

Sources of Capital	Financing Mechanism	Collection Mechanism	Enhancements	Eligible Measures	Underwriting Criteria	Security Interests
Banks	Personal loan (secured or unsecured)	Amortized payment bill	Reduced interest rates	Energy efficiency	Debt to income ratio	Unsecured
Public benefit charge or added to rate base	Mortgage / home equity (secured to real estate)	Lease payment	Stretched underwriting criteria	Renewables	FICO score	UCC fixture filing
Utility general funds	Line of credit (secured or unsecured)	On utility bill	Guarantees & reserves	Other home improvement	Utility bill payment history	Mechanics lien
State / municipal general funds	Lease	On property tax bill	Rebates		Tax payment history	Other lien on real estate
Municipal bonds	Retail installment contract	Performance contract bills	Subsidized transaction costs		Other	Lien on other property (car, boat, etc)
Manufacturers	Special municipal tax or fee levied	Buy kWh or therms	Aggregation			Disconnection for nonpayment
Pension funds	Tariffed installation program		Environmental or carbon credits			
Housing or economic dev finance agency	Performance contract					
Settlement revolving fund	Power purchase agreement					
Other 3rd party						

Source: Fuller, Merrian. “Enabling Investments in Energy Efficiency: A Study of Programs that Eliminate First Cost Barriers for the Residential Sector.”^{vii}

Note: Figure 1 is meant to be read vertically, with each column operating independently of other columns.

Question 1 (Where does the money come from?) is addressed by the “Sources of Capital” column. These sources may include private banks, public benefits charges, utility funds, government bonds, pension funds and more.

Question 2 (How is it distributed?) is addressed by the column titled “Financing Mechanisms.” Funds can be distributed like a personal loan, a mortgage, a line of credit, a performance contract, a power purchase agreement, or more.

Question 3 (What can it be used for?) is addressed by the column titled Eligible Measures. For the purposes of this paper, these measures include energy efficiency elements, renewable energy elements, and other home improvement elements.

Question 4 (How is it repaid?) is addressed by the column titled “Collection Mechanism.” There are a variety of ways that the cost of energy efficiency retrofits can be repaid, either through traditional payments, through property taxes, through utility bills, etc. In the case of this report, we advocate that bills are repaid through utility bills for a variety of reasons that will later be addressed.

Question 5 (How are financial risks addressed?) is dealt with by the columns titled “Enhancements, Underwriting Criteria, and Security Interests?”. These three columns combined make the financing more affordable and more secure. These columns are very important since in order to better serve low-income communities and other disenfranchised communities, it is crucial that the financing is as low-cost and low risk as possible. Since this combination is often the hardest to achieve, any financing program designed to serve such communities must be tenacious and thoughtful in order to achieve this balance.

Even though these financing components columns are to be read independently for the sake of clarity, it is important to point out that financing components are often inter-related. Whatever the sources of the funds are often help to determine what those funds can be used for and what will be the financing terms associated with these funds. For example, if municipal bonds are used, then the local government may settle for a lower interest rate and a longer repayment period, but may want to require that a certain percentage of jobs created by funded projects need to be reserved for local residents.

As an example, Figure 2, on the next page describes some of the advantages and disadvantages of one of the financing components, Sources of Capital.

Figure 2: Mechanisms for Outside Capital^{viii}

Mechanisms for Outside Capital

Source/Mechanism	Advantages	Disadvantages
Market Capital: RFP or Auction by PAs	Competitive bidding	Unproven system, lots of investor outreach, higher interest rates
Market Capital: Energy Efficiency Investment Fund and Asset Trust	Proven system (used for other investments), attractive to investors (secured), moderate/low interest rates	Time needed to develop special purpose legal vehicles and details
State/Municipal Bond Offering	Proven system, flexible, cost effective, competitive bidding, lower interest rates (investor expectation for muni bonds)	Institutional hurdles, political will, time to develop, competition with other gov't bond issues
Utility Shareholder Capital	Flexible, accessible, close link to the EE/RE programs	Limited pool of capital, higher cost of capital
Program Funds (Ratepayer Funding)	Available, sustainable through surcharges	Pressure on rates and nonparticipants, drives up program costs

By Nick Schlegel, Schlegel & Assoc. The table does not include the municipal improvement district/property tax approach because it is not a mechanism to obtain outside capital per se (municipal bonding is included above).

IV. What is On-Bill Repayment?

On-bill repayment deals with Question 4 of the Financing Elements, essentially “How is the money used to fund retrofits repaid?” However, a thoughtful design of an on-bill repayment system should include considerations of all financial and non-financial energy efficiency program elements.

“On-Bill [Repayment] is a program that helps people pay for energy efficiency improvements by providing loans [or tariffs] that are paid back through payments to a utility or energy company on the monthly bill, so there is no up-front payment for the improvements. The idea is that over time you should see a savings in your energy bill. The program might also assist in finding a financing source, provide information about potential cost savings, and provide a list of certified contractors and warranties.^{ix}”

Generally speaking, the payments made through the utility bill each month should be lower than the energy savings that have been realized as a result of retrofits. This way, program participants should be paying less each month on their utility bills than they would if they had not participated in the energy efficiency retrofit program at all.

One leading model for this type of repayment structure is called the **Pay as You Save (PAYS)** system. There are 3 main components to PAYS:^x

- 1) The tariff imposed to pay for the retrofits is assigned to the meter at a location, and not to individual customers. This is also often referred to as a “meter obligation” as opposed to a “customer obligation.” This way, if a customer moves, he or she is no longer obligated to pay for the balance of the retrofits. The next customers to pay the utilities at this location will then be obligated to pay the monthly tariff through their utility bill.
- 2) The billing and payment of the tariff will occur as part of the utility bill, and the utilities will be disconnected in the case of non-payment.
- 3) There is an independent certification process that ensures retrofits elements and products are appropriate and that the energy cost savings will exceed the tariff payment on the utility bill. This is very important since without independent and thorough assessment of appropriateness of retrofit elements and energy savings, then the risk of non-payment and poor energy efficiency performance rises significantly, making the on-bill repayment system untenable.

There are other types of on-bill repayment systems that are similar to PAYS but may not follow exactly all of the 3 components. All of these on-bill repayment systems are also often referred to as **Tariffed Installation Programs (TIPs)**, referring to the “**tariff**” that is imposed on the utility bill each month to pay for the costs of the retrofits and associated costs. The reason why it is called a “tariff” instead of a “loan” is because the obligation to pay loans are usually connected to individual customers, while the obligation to pay a tariff can remain with the meter. There are currently some points of contention such as non-payment penalties that explain why not all on-bill repayment systems are called PAYS, but most on-bill repayment systems follow the general PAYS framework.

V. Benefits of On-Bill Repayment

Whether a PAYS system or another form of on-bill repayment system is adopted, there are a variety of benefits to this type of repayment system when compared with other systems. These benefits help to address most of the barriers to energy efficiency retrofits that were described at the beginning of this report.

They do not address all of the barriers since financing is only one component of a comprehensive energy efficiency program, and other program elements such as outreach and education, contractor quality assurance, and auditing need to be coordinated in order to address all of the main barriers to achieving energy efficiency retrofits at scale.

Figure 3, on the next page, shows how On-Bill Payment deals with specific program barriers:

Figure 3: Overcoming Barriers to Retrofits By Using On-Bill Repayment

Barriers to Energy Efficiency Retrofits	How On-Bill Repayment Can Help
Limited Public Funds	Since whatever funds used for the program can be leveraged and will be repaid and re-invested into additional work, then public dollars can stretch further. On-bill repayment is also flexible enough to provide opportunities for private investors to participate, leveraging these public funds.
Risk Aversion	Since the obligation to pay the tariff is attached to the meter and not individual customers, there is lower risk to the customer to participate. There are also typically no liens on the property, no new debt obligations, and for many programs, there are no credit checks. Also, since on-bill repayment systems strive to make sure that the tariff is lower than the energy savings, the customer should be paying less on the utility bill than they would without the retrofits.
Lack of Information	On-bill repayment alone does not address this barrier, but when combined with aggressive and appropriate outreach, education, auditing, and support services programming, then this barrier can be addressed.
Split Financial Incentives	This is one barrier that on-bill repayment is uniquely positioned to address since the individuals who realize the direct benefits of the retrofits are responsible to pay for the costs. Whether the landlord or tenant pays the utility bills, that person will realize monthly savings, giving him/her an incentive to participate in the program. This makes on-bill repayment systems much more attractive for programs designed to retrofit rental housing and leased commercial buildings.
Limited Tenancy or Ownership	Since the obligation to pay for the balance of the retrofits are tied to the meter and not to individuals, then there is lower risk of defaults even if the building changes owners or tenants since the new owners or tenants would be responsible to pay the tariff monthly.

<p>Disruption Costs & Inconveniences</p>	<p>This barrier cannot be addressed by any repayment mechanism alone, and must be addressed through other retrofit program elements such as quality contracting, on-time service delivery, etc.</p>
<p>Complex Policies and Programs</p>	<p>On-bill repayment is designed to be a “turn-key” program, and when coupled with enabling policies, and competent program administration, program participants should be able to navigate the program with more ease than if they just tried to go out and research rebates, financing, building code requirements, and other technical policy elements themselves.</p>
<p>High Up-Front Costs</p>	<p>Since there is usually no or very low up-front costs to on-bill repayment program participants and costs are supposed to be covered by energy savings, the costs of participating in a program are no longer prohibitive, especially in low-income communities. On-bill repayment systems are flexible enough to accommodate subsidies, rebates, and other financial incentives to reduce the costs of retrofits even more.</p>
<p>Hard to Ensure Quality Work</p>	<p>On-bill repayment generally requires a very rigorous and thorough independent certification process to make sure that retrofit elements were installed correctly and that they should realize projected energy savings. Other non-financial program components such as requirements for participating contractors to be certified in green building techniques would also help to address this barrier.</p>
<p>Siloed Approach</p>	<p>On-bill repayment does not address this barrier by itself, though it does help by allowing program participants to pay for the tariff on their utility bill which they’re already paying anyways, instead of having to pay on a separate bill. Competent program administration can ensure that different stakeholders responsible for delivering retrofit services are coordinated so that the program is essentially a “turnkey” program for participants.</p>

VI. Components of an Ideal On-Bill Repayment System (Tariff System)

Stakeholders who are interested in designing a well-functioning on-bill repayment system where program costs are repaid through tariffs placed on utility bills need to consider seven distinct components. 1) Meter Obligation, 2) Financing Terms, 3) Auditing & Eligible Measures, 4) Potential Measure Failures, 5) Marketing, Outreach, and Education, 6) Sectors Served, 7) Non-Payment Penalties, and 8) Monitoring and Verification.^{xi}

1. Meter Obligation

As stated before, for the tariff on-bill repayment system to work, the obligation to pay for the tariff must be attached to the meter and not to individual owners or tenants. In addition, this on-bill repayment arrangement must be made clear to new tenants or owners in the case of change in ownership or tenancy so that they understand the charges that will show up on their utility bills. Since they should essentially be paying less on the utility bill than they would without the retrofits, this should not make the property less attractive to buy or rent out, but would actually make it more attractive. However, concerns regarding change in tenancy and ownership and how to mitigate the potential negative effects of on-bill repayment will be discussed later in this report.

2. Financing Terms

The financing term, defined as the length of time over which payments will be spread as well as the interest rate associated with the debt, is going to be an important component. As a rule of thumb, the financing term should be shorter on average than the useful life of the retrofits installed so that people are only paying for the retrofits as long as they remain effective. However, there are cases where setting up shorter financing terms can limit the possible retrofit elements that are eligible since high-cost items may not be covered by a 5 year payment schedule and extending the terms to ten to fifteen years may make more sense to realize maximum energy savings, greenhouse gas reductions, and increased job creation opportunities due manufacturing and installation of more advanced retrofit elements.^{xii}

When considering financing terms, it is important to be thoughtful about how and when to deploy different sources of capital (private, public). In many cases, government subsidies can be leveraged alongside private investment in order to reduce interest rates and financing costs by mitigating financial risks. Some of these strategies include obtaining capital at lower-than market interest rates through bonding, using public funds to buy down interest rates, and establishing and capitalizing a loan-loss reserve to mitigate risks of default.^{xiii}

3. Auditing and Eligible Measures

While some existing on-bill repayment systems rely on energy audits to determine the best set of cost-effective retrofit elements based on eligible measures that will meet the financing terms, others use a pre-determined list of retrofit measures that are installed in a building without using an auditing process. There are pros and cons to each system. For example, the cost of audits may cause some programs to forego the process altogether. However, there are risks associated with not auditing a building since not all buildings are the same (even if they were built in a similar style in a similar period) since there are individual use and maintenance patterns that affect a building's energy performance. Thus, prescribing a one-size-fits-all package may not realize the energy savings needed to assure that the costs of retrofits will be lower than the energy savings. We recommend that an auditing process be incorporated into any on-bill repayment system to ensure appropriateness and effectiveness of retrofit elements. The costs for these audits may be covered by a variety of funding sources, such as public benefits charges.

Determining eligible retrofit measures that will be a part of an on-bill repayment system will be a challenge and will require that thorough region-specific, and weather-specific analysis is done to determine the eligible measures. Eligible measures will also vary depending on the type of building and the type of use (when the building was built, what the construction materials used were, whether the building is residential, commercial, or governmental, etc.). These measures must be analyzed based on their potential energy savings and other benefits (health benefits, water saving benefits, etc.) versus the costs of purchasing, installation, and maintenance of the retrofit measures. Generally speaking, "deeper" and more comprehensive retrofits are preferable due to their environmental, economic (energy savings and good job creation), and social benefits. To the extent that eligible retrofit elements can include as comprehensive a set of retrofits as possible while being cost-effect, then the most comprehensive set of eligible measures should be adopted.

4. Measure Failure

If a retrofit measure does not perform as it should and fails during the financing term, then the measure should be repaired at no additional cost to the program participant, though only in extreme cases should payment obligations should stop. (ASE Brown) Simply ending payments each time a retrofit measure fails will make mitigating risks and financing very difficult. However, participants should still be ensured of quality work and that there will be no hidden costs down the line. Program designers should develop commitments from contractors to participate in a warranty program where contractors ensure the quality of work and performance of measures installed and/or other create an alternative insurance system to address this issue of measure failure. This is especially important when working in low-income communities since the risks associated with these hidden costs will have a

disproportionately negative impact on those who are already struggling to pay their living costs.

5. Marketing, Outreach, and Education

Even though public marketing, outreach, and education are not necessarily part of the financial model by definition, they are the only ways to ensure that an on-bill repayment program will reach the maximum amount of potential participants. This is especially true in low-income communities and other disenfranchised communities that may not be able to access information and programs related to energy efficiency programs as easily as other communities.

Marketing, outreach, and education regarding the energy efficiency retrofit program should occur in multiple ways, and be directly related to the targeted program participants. For example, pre-certified private contractors can be one good vehicle for advertising the program since they have a vested interest in getting potential participants to sign up. Plus, contractors are generally already marketing other non-energy efficiency related services, so there is existing infrastructure there. In addition, community organizations that are knowledgeable and have gained trust from local communities are also well-positioned to market and also educate potential participants about the energy efficiency program. Since the success of these programs are based not just on the successful technical installation of retrofits, but also based on assumed behavior changes of the building tenants, an educational campaign to help potential participants understand their maintenance and behavior change responsibilities is essential to a successful and financially stable energy efficiency retrofit

6. Sectors Served

On-bill repayment systems need to be designed so that they best serve the targeted sectors that stakeholders hope to attract. These sectors can generally be categorized into three main groups, the residential, commercial, and governmental sectors. Within these groups, there are also sub-groups. For example, in the residential sector, there are single family home owners who occupy their homes, renters who occupy a single family home, renters who occupy a multi-unit apartment, homeowners who rent out their homes, etc. It is important that the concerns of each of these sectors and sub-groups be addressed in order for the on-bill repayment system to be successful. Also, laws governing financial operations of different sectors, such as consumer finance or maximum government debt obligations, can also require that an on-bill repayment system be designed a certain way in order to comply with laws in the specific sector.^{xiv} For a more detailed discussion of the challenges and opportunities of each sector served, please see Appendix 3

7. Non-Payment Penalty

There are a variety of penalties that can be imposed for non-payment or partial payment of the tariff included in utility bills. It is important to point out here that the risk of non-payment is off-set by the fact that total utility bills (including the tariff payment) should be less than if the building had not had any energy efficiency retrofits installed. Thus, the ability of the customer to pay their utilities should remain equal or better than if retrofits were not installed at all. However, the risk cannot be eliminated completely.

The main penalty that is used is disconnection of utilities. Disconnection for non-payment is problematic, especially in low-income communities where stakeholders are reluctant to place additional burdens on already stressed households who struggle to pay utility bills. Once again, these utility bills should still be lower after the retrofits than they would be had the retrofits not been installed, but non-payment of the bills is still a systemic risk. Some risk mitigation measures prior to retrofit installations include credit checks, proof of payment of utility bills for the last 12 months, and collateral offered in cases of non-payment. However, there is a very delicate balance here since things like credit checks and ability to offer collateral may prevent low-income people and other people from participating in the program even if they are able to make the monthly utility and tariff payments.^{xv}

In a program proposal called Green Jobs/Green Homes NY, the authors propose another risk mitigation strategy that is deployed after the installation of retrofits and once non-payment has occurred. In this case, if a program participant does not pay his/her utility bill or only partially pays the bill, then this will trigger a remediation process where the energy efficiency program implementer works with the participant to first figure out whether the retrofits are operating as they should and are realizing the projected energy savings, and then second to develop a “work-out” option that makes sense given the participant’s financial circumstances. This will help to reduce the risk of payment defaults. However, even with remediation measures, this non-payment risk is an inherent risk for all debt financing, so all financial responsible on-bill repayment programs should set aside money for a loan-loss reserve. This would be a reserve of funds used to pay for bills when there is non-payment, and it pools the risk across all participants. A small fee paid by all retrofit customers could insure against the losses, or money attained from Systems Benefits Charges and other re-occurring public funding streams can act as the source for this loan-loss reserve.^{xvi}

8. Monitoring and Verification (M & V)

Energy efficiency retrofits are not a new field, and in many cases, this work has been done for decades by some retrofit vendors. Thus, there is a significant track record with which to compare, predict, monitor, and evaluate the actual performance of the retrofits compared with projected performance. However, because of the many new green building technologies that have been developed recently that have less of a track record and also

because of the broader application of retrofits to a wider variety of new building types, monitoring and evaluation of retrofits are even more important now to ensure that the savings projected can actually cover the costs of retrofits in an on-bill repayment system.

Monitoring and verification (M & V) can be done in a variety of ways. The PAYS system recommends that 1) Certification agents must assure that retrofit elements installed are appropriate given the building conditions and also that the energy savings realized will more than cover the cost of the retrofit, 2) Monitoring is done through a combination of follow-up phone calls and random site visits and inspections, and 3) Program implementors, contractors, and product vendors (depending on which group is culpable) are responsible for the costs of failed inspections, not the program participants.^{xvii}

VII. What are the Program Costs Associated with On-Bill Repayment Systems?

Costs associated with implementing a successful on-bill repayment system go beyond just the costs to purchase and install retrofits, and includes a set of program and administrative costs. These program and administrative costs are used to implement the programs, to maintain necessary support systems, and to deliver “turnkey” customer service. These costs must be reliably measured and accounted for in financial assumptions for on-bill repayment systems.

Program and administration costs include one-time costs such as program design, technical data analysis software, investments in software and hardware to manage on-bill repayment billing. They also include on-going administrative costs of maintaining systems and support staff such as program coordinators and financial analysts, outreach and education personnel, and bills collection personnel.

A non-exhaustive list of what these program and administration costs entail are: loan application and eligibility review and verification, financial management of energy costs/savings calculations, banking fees and credit report fees, billing and processing of payments, customer service, monitoring and certification of energy savings by independent analysts, customer dispute resolution, and facilitation between different key partners (utilities, contractors, public agencies, community-based organizations, etc.).^{xviii} For a more detailed description of program costs, please refer to Appendix 6.

VIII. Enabling Policies for On-Bill Repayment

In order to have successful on-bill repayment systems that fund comprehensive energy efficiency retrofits, a number of enabling regulatory policies should be in place. These policies can include performance-based incentives and dis-incentives for utilities

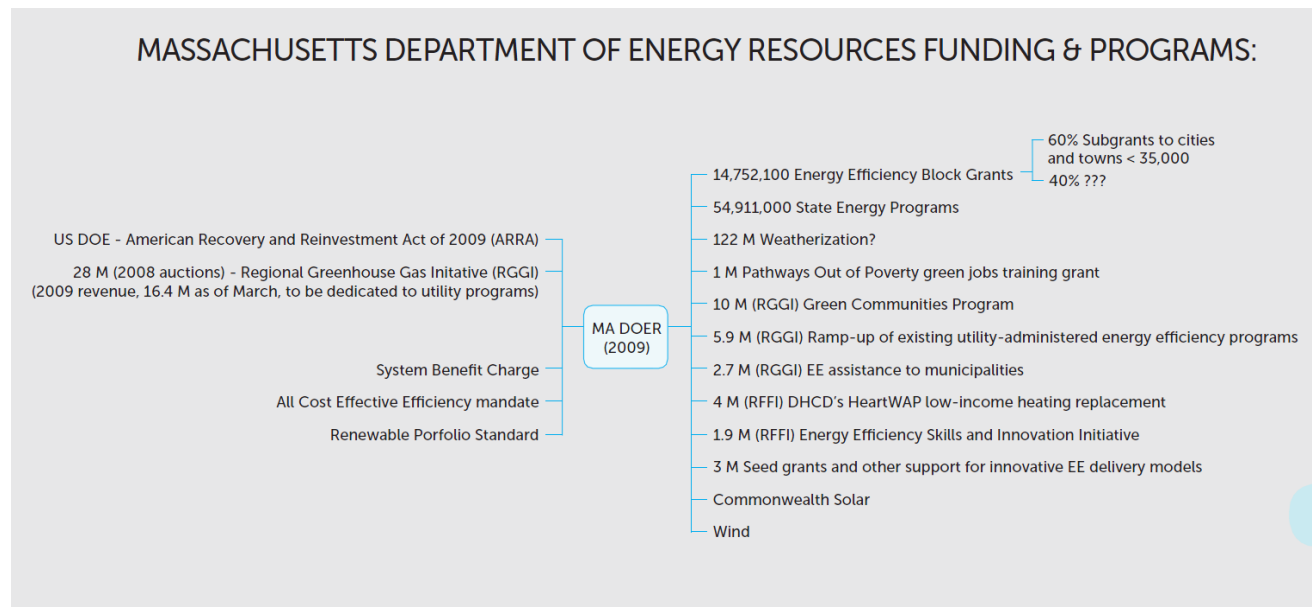
based on how successfully they can implement programs that reduce energy usage in buildings, and how significantly they can increase the ratio of renewable sources of energy in their portfolios.^{xix} Depending on whether utilities are investor-owned or publicly-owned, they may also need approval to adopt on-bill repayment systems by the state’s utility commission or a public governing board.

There are a variety of steps that state governments can take in order to remove regulatory burdens to establishing on-bill repayment systems, and also to incentivize adoption of these systems. States can provide financing for on-bill repayment systems, establish regulations that encourage energy efficiency retrofits and discourage wasteful energy usage, and provide political support generally for non-traditional strategies aimed at advancing energy efficiency retrofits.

States can also require public utility commissions (PUCs) to investigate the feasibility of on-bill repayment systems. Generally speaking, at least in the PAYS system, the PUC must also “approve the tariffs, define eligible measures and eligible participants, specify the roles and responsibilities of certified contractors, utility and customers, identify certification agent and roles,” and approve a system of utility recovery of bad debt.^{xx}

In the case of Massachusetts, there are already a number of enabling policies that mandate increased energy efficiency in buildings, as well as government revenue dedicated to energy efficiency retrofits and utility programs, such as the Regional Greenhouse Gas Initiative (RGGI) and the System Benefit Charges. See Figure 4 below.

Figure 4: Massachusetts Department of Energy Resources Funding & Programs^{xxi}



Source: Eric Mackres as part of Michaels Report

As a testimony from Community Labor United's (CLU's) own research director points out, "On-bill financing is not new to Massachusetts utilities. NSTAR and several other 18 Massachusetts utilities have successfully used on-bill financing for their small business 19 customers with low default rates and, more recently, have extended on-bill financing to 20 municipal customers. This year Massachusetts electric companies piloted residential Energy Pay and Save with a small pilot program offering on-bill financing for energy saving retrofits to residential and commercial customers, in order to comply with a Green Communities Act 2 mandate."^{xxii}

IX. Utilities Obligations & Concerns

Utility Obligations

Depending on how an on-bill repayment system is structured, the utilities may have more or less financial and legal obligations as related to the system. For example, in a system where the utilities may be providing the capital for the program (instead of a 3rd-party fund providing this capital source), as well as providing the program administration, then the utility has more financially at stake. In an on-bill repayment system where the utilities are essentially only acting as a billing service and the sources of capital and program implementation and coordination is done by a public agency, a non-profit, or a private company, then there are much lower utility obligations. Local conditions such as the financial and political strength of the local utility, enabling public policies, and strength of potential 3rd party funders and program implementers will determine how active and engaged of a role the utility company will play in an on-bill repayment system.

Utility Concerns

Billing. Some utilities may consider setting up the on-bill line item for the tariff to be problematic, possibly requiring them to drastically change their billing systems or switch to another one that can better handle on-bill repayment. Also, utilities have expressed concern about possible customer confusion about the different charges on their monthly utility bills, highlighting the need for education of customer service staff as well as potential on-bill repayment participants.

Liabilities for Non-Payment. Utilities have also expressed concerns that they may be liable for financial losses incurred due to non-payment. This means that program designers need to diligently follow steps to mitigate measures failures and provide sufficient loan-loss reserves to cover non-payment so that utilities will not have to be concerned about non-payment.

Potentially Prohibitive Finance Laws. In some states, if utilities are directly involved in financing energy efficiency, they may be required to be registered and licensed as a consumer lender and also required to follow consumer finance regulations. Thus, program designers should be well-versed in local business and consumer finance laws in order to ensure that utilities are in full compliance with local regulations.

Disconnection of Service. Utilities have also expressed concerns regarding having the disconnect service to customers who are in default, especially if they are partially paying their bills to cover the energy usage costs, but not necessarily the on-bill tariff costs. Program designers should decide whether this punitive measure of service disconnection is one that they want included in the program. If so, then there will probably be push-back from utilities who see this as an extra burden that can hurt their customer relations strategies. ^{xxiii}

X. Concerns from Potential Participants

In a focus group study conducted by Conover Brown, potential program participants highlighted a variety of advantages and disadvantages of on-bill repayment. Stakeholders interested in developing a successful on-bill repayment system should study these opinions carefully and develop ways to capitalize upon the advantages and to mitigate the problems associated with the disadvantages.

Figure 5: Reaction to On-Bill Repayment^{xxiv}

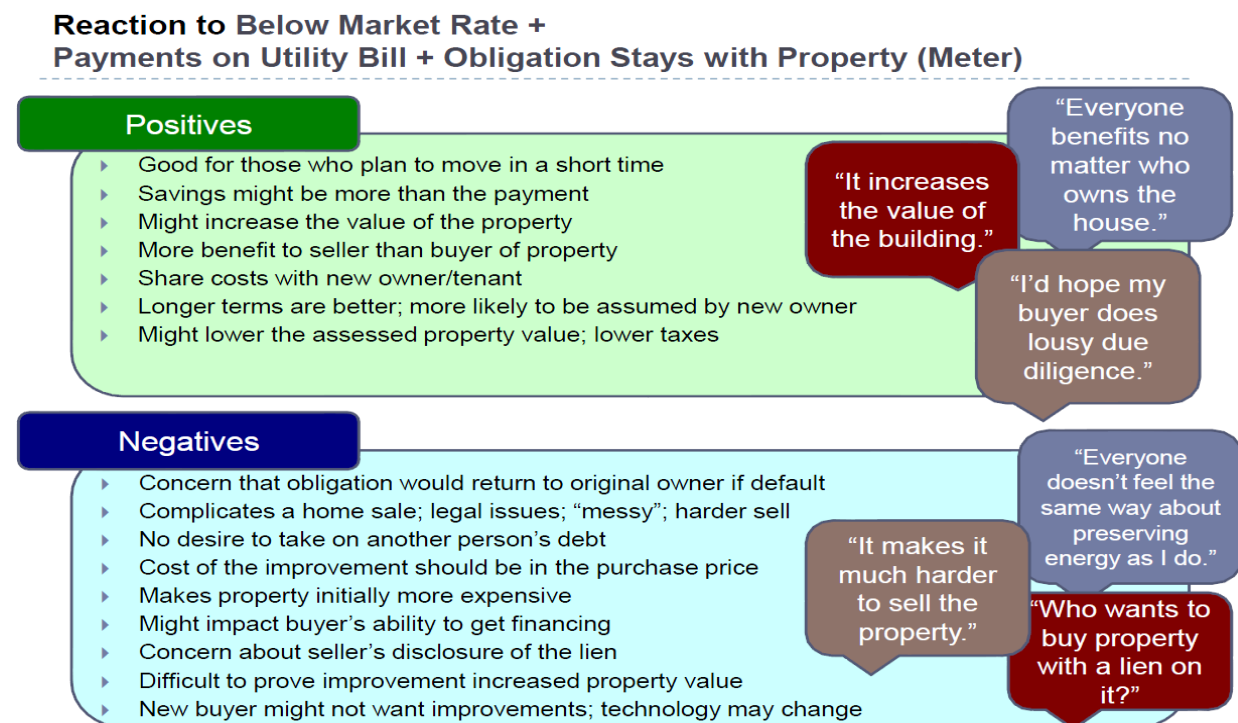


Figure 6: On-Bill Repayment (General Reactions)^{xxv}
On-Bill Financing (General Reactions)

- ▶ Participants mentioned the following in a general sense about On-Bill Financing; these perceptions are not specific to the customer or meter obligation model

<u>Advantages</u>	<u>Disadvantages</u>
<ul style="list-style-type: none"> ▶ More energy efficiency; lower utility bills ▶ Can see energy savings on bill each month ▶ No down payment ▶ No credit check; easier to qualify ▶ Lower than market rate ▶ Easy to find financing ▶ Streamlined billing; less paperwork ▶ One bill to pay; one check to write; don't have to remember to pay ▶ Constant payment amounts and rates ▶ Saves paper and time (paying bills) 	<ul style="list-style-type: none"> ▶ Forced to pay your utility bill on time or will shut off utilities ▶ Requires one large payment on the same date; not flexible ▶ No negotiation; cannot delay payments ▶ Hides true cost of item ▶ Limited choice of lenders; no ability to shop for competitive rates ▶ More accounting complexity; tax issues; depreciation ▶ Difficult to switch energy suppliers ▶ Skepticism that cost savings will equal the interest rate

Figure 7: On-Bill Meter Obligation Reactions^{xxvi}

On-Bill Meter Obligation

- ▶ The meter obligation model is more complex and garners many different opinions; several in the Residential Landlord groups claim they would not allow a tenant to enter into this type of financing arrangement

<u>Advantages</u>	<u>Disadvantages</u>
<ul style="list-style-type: none"> ▶ No loan to carry when sell or move ▶ More equitable; only pay for what you use ▶ Improvements stay with property; don't pay full price of item if move out ▶ New buyer gets benefit without paying full amount ▶ Good if planning to sell or move soon ▶ Assumable; easy to get in ▶ Doesn't impact personal credit ▶ Very attractive to renters; can leave and becomes landlord's problem 	<ul style="list-style-type: none"> ▶ More difficult to sell property; buyer might not understand ▶ New owner might not want the improvement ▶ New buyer/renter assumes loan ▶ No option to take improvement with you if move ▶ Too complex, especially for renters; difficult to explain to new tenant; complicated lease ▶ In a rental, landlord would have to be involved and would notify new tenant; full disclosure ▶ Improvement may be broken when new buyer/tenant moves in and assumes loan ▶ Would not want to be responsible for improvements landlord did not approve

XI. Conclusion

There are clearly many benefits to the on-bill repayment system. These benefits, and the barriers which they help to address, have been outlined in this report. Stakeholders should also carefully consider and strategize around each component of an “ideal” on-bill repayment system which are also outlined in this report. In addition, stakeholders need to be thoughtful, responsive, and creative in order to design comprehensive energy efficiency retrofit programs (of which on-bill repayment is one component) that meet local needs, regulations, and capacities.

There is no one-size-fits-all solution, and on-bill repayment systems vary widely with respect to how they are designed and implemented. In addition, the concerns regarding on-bill repayment that have been brought up by utility companies, potential program participants, and other key stakeholders must be directly addressed. It is important for there to be full buy-in for the on-bill repayment system and for the potential risks associated with the system to be mitigated.

In conclusion, the on-bill repayment system is one of the best ways to address the biggest barriers to achieving comprehensive energy efficiency retrofits at scale. Stakeholders interested in developing effective and comprehensive energy efficiency retrofit programs should seriously consider on-bill repayment as a viable option.

Appendix

Appendix 1: New Hampshire PAYS Program

Excerpted from Brown, Matthew. “Brief #3: Paying for Energy Upgrade Through Utility Bills.” State Energy Efficiency Policies Options & Lessons Learned: A Series of Briefs. Alliance to Save Energy. ^{xxvii}

The PAYS® programs in New Hampshire were run by the New Hampshire Electric Cooperative (NHEC), a cooperative utility, and Public Service New Hampshire (PSNH), an investor-owned utility. The PSNH proPaying for Energy Upgrades Through Utility Bills program, now called Smart\$tar, focused on financing energy efficiency improvements (energy-efficient street lighting) for a municipal government, and the NHEC program focused on electric and liquefied petroleum gas efficiency improvements such as lighting, weatherization, water saving devices and heating ventilating and air conditioning upgrades. The pilot program has now ended, and has been folded into the utilities current energy efficiency programs. This evaluation made the following conclusions:

- These programs resulted in installation of more total energy efficiency measures than would have happened in the absence of these programs. 91 percent of survey respondents said they would not have installed the new energy efficiency measures without these financing systems. Results varied somewhat, however, between the two programs.³⁸
- The electric heating program was successful in recruiting customers, but the customers also used rebates for energy efficiency that the utility offered through a separate program, so it is unclear what portion of the results can be attributed to the PAYS® program. The majority of participants required both the utility rebate and this financing system to undertake their projects.
- According to the survey conducted as a part of the evaluation, NHEC’s lighting pilot program was also successful, with 85 percent of the participants stating they would not have purchased the lighting products in the absence of the financing program. The lighting retailers interviewed for the evaluation suggested that the program generated additional business and was successful.
- Some participants noted that it was hard to distinguish between the effects that energy efficiency measures had on their bill compared to the effects of normal fluctuations.
- New Hampshire programs were successful in overcoming a number of market barriers such as the high initial costs of energy efficiency upgrades and the restrictions on municipal governments regarding long-term debt.
- There was some concern at the outset of the program that three PAYS® program requirements could pose a barrier to large-scale participation in the program. According to participant surveys, at least one of the requirements listed below presented a barrier to participating in PAYS®. This survey was conducted only after

18 months of program experience however, so there was insufficient data to present a solid conclusion.

- Sellers were required to disclose a property's participation in PAYS® to buyers, which might make a potential purchaser nervous about buying the property.
- Property owners had to maintain the equipment, which might lead to additional and unforeseen costs for the property owner.
- Non-payment would result in disconnection, just as with any other non-payment of electric bills.
- In the seven years of PAYS®, PSNH completely exhausted its allocation for the programs. Thus it can be concluded that PAYS® hit the targeted level of participation even with the above barriers and an additional twenty percent reduction in available rebates.

Evaluation of the New Hampshire pilots were generally positive and indicated that such a program would have the potential to overcome the initial cost barrier to financing energy efficiency and to provide a streamlined way to give consumers access to financing. Experiences in other states, however, may expose regional differences and allow further refinement of the concept." (ASE Brown)

Appendix 2: Midwest Energy On-Bill Tariff System

Excerpted from Brown, Matthew. "Models for Financing Clean Energy." Presentation by Conover Brown ^{xxviii}

MidWest Energy: On-Bill Tariff

- One of the more successful on-bill tariff programs, designed for the residential sector, primarily.
- A PAYS-like program; many elements are modeled after the Pay As You Save Model.
- Customers agree to make a payment on their energy bill that covers efficiency measures identified in an energy audit.
- Customers pay 4% for this financing. This is a subsidized rate that would otherwise be 8% absent a buydown from the KHRC.

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MidWest Energy: On-Bill Tariff

- This energy charge is not considered a loan.
- Any unamortized portion of the remaining balance is passed on to the next building occupant. This allows for an extended repayment period.
- Repayment term is capped at 180 months for residential and 120 months for the commercial sectors.
- Program requires that energy \$ savings must exceed financing charge, and financing charge be no larger than 90% of the energy savings.
 - In some cases, this means that the customer must make a financial contribution to bring down the size of the loan.
 - Typical projects have resulted in financing = to 82% of the energy savings.

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MidWest Energy: On-Bill Tariff

- After 20 months of operation, the program had ~450 projects completed or in the queue. Substantial interest in the program existed. It may be taken state-wide as well.
- 1/2 of projects were thermal shell improvements in addition to HVAC measures. Typical projects cost is \$4,500.
- 14% of the projects are on rental locations. Almost all are in the residential sector.

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Appendix 3: Challenges and Opportunities for Sectors Served (Energy Efficiency Retrofits)

Excerpted from “Energy Efficiency Portfolio Standard (EEPS) – Working Group VI: On-Bill Financing Final Report.” State of New York Public Service Commission. Case 07-M-0548. December 19, 2008.^{xxix}

Residential

1. Owner - Single unit
 - a. Higher implementation costs and on-going administration costs to address the presumably larger volume of participants;
 - b. May require minimum loan amount to insure cost effectiveness; and
 - c. If disconnection is a necessary component of an On-Bill Financing program, that may affect class participation, and increase administrative complexity.
2. Tenant – Single unit
 - a. Tenant may not be directly responsible for energy costs associated with heating, central air conditioning, water heating. Improvements will involve change out of appliances such as refrigerators, air conditioning units and lighting;
 - b. If disconnection is a necessary component of an On-Bill Financing program, that may affect class participation, and increases administrative complexity; and
 - c. If the tenant is responsible for energy costs associated with heating, central air conditioning and water heating, there will be a split-benefit scenario.
3. Owner – Multi unit
 - a. Building owner’s meter generally controls heating, hot water, central air conditioning. Improvements made to heating and cooling do not involve a split-benefit since energy efficiency savings are achieved on the building owner’s meter; and
 - b. Disconnection will affect all tenants in the building and thereby increase administrative complexity. For example, procedures for disconnection are extremely complex for multi-dwelling buildings and involve posting of the building and notification of each tenant regarding the disconnection of service.
4. Low Income
 - a. This group of customers will continue to receive benefits through weatherization, utility and [other public] programs programs that are specifically designed for them;
 - b. To the extent that weatherization, utility, and [other public] programs addressing low income customers continue and expand, On-Bill [Repayment] may not be the most effective tool to address low income concerns; and
 - c. Low income tenants may benefit from programs designed for multi-unit buildings.

5. Organizations operating residential facilities (*i.e.*, homeless shelters, supportive housing, assisted living, or certain residences for persons with disabilities)
 - a. Given that occupancy of these facilities is often transitory and residents may have limited resources, eligibility could be limited to facilities that pay all utilities for their residents, or will fund any measures they install through their own accounts for common areas and accept full responsibility for repayment of the obligation.

Small Commercial/Industrial

1. Energy efficiency measures generally create more significant savings in this class, and they may experience more difficulty in securing financing through traditional sources;
2. A turn-key approach that assists the customer in all aspects of project including financing will encourage participation;
3. Energy efficiency measures may not be permanent and may be specific to the business at the location (for example, lighting, refrigeration); and
4. Disconnection may severely impact the business enterprise and may result in the business vacating the premises but an increased risk of disconnection should be of minimal concern if energy efficiency savings exceed costs.

Large Commercial/Industrial

1. Energy efficiency investments for these types of customers can be very large. One or very few customers can deplete the overall funding available to either provide the loan or guarantee the loan for a third party lender. Likewise, a default of one or very few could have a severe impact on an On-Bill [Repayment] program;
2. Multi-phased or longer timeframe projects requiring progress payments (upon completion of milestone steps) will add to oversight needs and complexity; and
3. Large Commercial/Industrial customers are already targeted by ESCOs who typically provide financing and other options (shared savings, performance contracts, etc.).

Appendix 4: Challenges Current Energy Efficiency Programs Face

Even for energy efficiency programs that already do exist, large challenges still remain for them to expand their programs to scale, especially in low-income communities and other disenfranchised communities.

Excerpted from Fuller, Merrian. "Enabling Investments in Energy Efficiency: A Study of Programs that Eliminate First Cost Barriers for the Residential Sector." Efficiency Vermont. August 2008.^{xxx}

1. "Limited Applicability for Households Most in Need

It is relatively easy to provide a loan program for the 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, and poor credit; or those in rental housing. Many programs have credit requirements that include credit rating minimums and debt-to-income limits, and few programs systematically count expected energy savings as an increased 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 the tenants who pay the utility bills."

2. "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 examined 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 still 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".

3. "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. 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 positive cash flow for many improvements that would yield substantial energy savings."

4. "Limited Support for Deep 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 savings. Most programs offer terms of five to seven years. Achieving Vermont's statewide energy savings goals will require longer financing terms to reach this higher level of savings.

It is also important to note that solutions to some of these limitations may directly conflict with each other. Getting "deep" 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 costs for low- and moderate-income families. 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 "deep" 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 Vermont's energy efficiency commitment, it may cost less in the long run to do more extensive work in each home on the initial visit."

5. "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." (Fuller 2008)

Appendix 5: Why Use Financing to Fund Energy Efficiency?

Excerpted from Brown, Matthew H and Beth Conover. "Recent Innovations in Financing for Clean Energy." Southwest Efficiency Project. October 2009.^{xxxii}

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.

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.

Appendix 6: Detailed Description of on-Bill Repayment Program Costs

Excerpted from “Energy Efficiency Portfolio Standard (EEPS) – Working Group VI: On-Bill Financing Final Report.” State of New York Public Service Commission. Case 07-M-0548. December 19, 2008.^{xxxii}

“Program and Administration Costs

Significant costs will be experienced in the implementation and operation of an On-Bill Financing mechanism. Costs involve both one-time development costs and on-going administrative costs. A high level description of the types of costs that will be experienced is discussed below.

Implementation Costs

In order to implement On-Bill Financing new business processes must be developed and existing processes modified. Likewise, Information Systems such as Customer Information and Billing systems, Voice Response applications, and Web applications will need to be enhanced to support associated business processes. As a result, internal training will need to be developed and administered to communicate On-Bill Financing business processes and system changes. While not meant to be an exhaustive list, following are some areas requiring process development, system modification, and training:

- Eligibility and loan application procedures;
- Denial/Approval procedure;
- Loan installment set-up and management including payback calculations;
- Billing & Invoicing;
- Payment processing & allocation;
- Credit & Collection (Creditworthiness, Defaults, Notifications, Disconnection / Reconnection, DPA's, etc.);
- Customer Service (Inquiries, Complaints, Application of Service/Denial, etc.);
- Energy Savings Certification (i.e., Independent Certification Agent for the meter obligation model);
- Interfaces between utility and lenders; and
- Interfaces between utility and installation contractors.

Also, business processes may need to be developed depending on the source of funding to communicate information regarding the loan installment amount and transmit the payment and information regarding the payment to the lender.

Further, communications mechanisms must be established between lenders and the utility. This will probably involve the use of Electronic Data Interchange (EDI) transaction sets that will need to be modified for this purpose and the implementation of a data transfer mechanism for transmission of these transactions between parties.

Likewise, customer outreach and education to provide information regarding customer energy efficiency loan options, installment loans and payments, which will include but not be limited to new processes and enhancements to online web and automated voice response applications.

In addition to customer outreach and education, contractor outreach and education is necessary to promote the program and participate in the qualification, application and approval processes.

Costs associated with certification of independent contractors are important considerations.

Administrative Costs

- Additional Customer Service staffing to administer day to day operations of On-Bill Financing including but not limited to handling customer , lender, and contractor calls regarding energy efficiency loans administered under the on-bill repayment mechanism;
- On-going program maintenance costs based on experience gained or external factors such as changes in customer outreach and education, system modifications, and changes associated with lenders or contractors;
- Staffing to oversee the operation of the utility systems supporting the On-Bill Financing mechanism;
- Depending on the source of funding, staffing to oversee the exchange of information between utilities and lenders including the maintenance of communication interconnection and exchange of data files;
- Depending on the source of funding, banking fees associated with the transfer of payments from the utility to lenders;
- Staffing to address updates and changes needed to online and automated voice applications;
- If a meter obligation model is used, staffing to ensure that disclosure occurs and loans are properly transferred to the successor customer account;
- Transaction fees associated with required Uniform Commercial Code (UCC) filings (used to establish security interests);
- Costs associated with obtaining necessary credit reports; and
- Where certification of energy savings is required, costs associated with such certification.

Customer Service Considerations [and Costs]

The operation of On-Bill Financing will involve a variety of customer service activities. It is especially important that customers are adequately informed about the On-Bill Financing mechanism and provided with accurate and complete information in response to their inquiries, and that processing and administrative functions are carried out efficiently. The Working Group has identified a number of functions that must be performed to support On-Bill Financing:

- Call Center handling of customer requests for program information and inquiries related to billing and payment;
- Customer account management;
- Loan application and approval process;
- Program administration including set up and administration of loans, reporting, and communications with third-party entities;
- Credit and Collections;
- Marketing;
- Outreach and Education; and
- Complaint Handling/Dispute Resolution.

The complexities of On-Bill Financing will require that utilities obtain adequate levels of well-trained staff. Call center staffing also must be augmented to handle the customer inquiries related to On-Bill Financing. In addition, dedicated staffing must be assigned to handle other functions such as administration of the mechanism.

Furthermore, utility performance targets related to customer satisfaction, complaints, and call answering service levels may need to be reviewed so that they adequately reflect the impact of On- Bill Financing.” (OBR NY Report)

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