On-Bill Finance: From Policy to Promise to Practice[1]

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ABSTRACT

The primary objectives of this paper are to: (1) provide an updated view of national and international experience with on-bill financing programs and (2) offer state policymakers and program administrators actionable insights on key program design considerations. We reviewed 30 programs in the US and abroad and interviewed program administrators to prepare in-depth case studies on 13 of these. The paper offers a detailed characterization of key on-bill program design choices. These design elements are likely to have important impacts on a program's value to policymakers, lenders, investors, efficiency service providers and consumers. The paper finds that, over their program lifetimes, the 30 on-bill programs in this study have delivered over $1.8 billion of financing to consumers for energy improvements. Default rates over the program lifetimes ranged from zero to three percent.

Introduction

Many state policymakers and utility regulators have established aggressive energy efficiency (EE) savings targets, which will necessitate investing billions of dollars in existing buildings. Twenty states have adopted long-term, binding energy efficiency resource standards (EERS), which require utilities to achieve minimum energy efficiency savings targets that typically ramp up over extended time periods (e.g., 3-15 years), or issued regulatory decisions that require utilities to acquire "all cost effective" energy efficiency.[2] States have made the overwhelming majority of these commitments to efficiency in the last eight years, and many more states have utility-specific savings targets that are set annually.

Tax payer and utility bill-payer funding is a small fraction of the total investment needed. For example, in California, it is estimated that $70 billion of EE investment in existing buildings will be required over the next decade to achieve state policy goals—a fraction of which will be provided by utility bill payer funding (HB&C 2011). Given this challenge, some program administrators (PAs) and policymakers are exploring ways to increase their reliance on financing in order to amplify the impact of limited program monies. In this context, offering programs that enable consumers to finance energy improvements on their utility bills is receiving increasing attention from program administrators and policymakers.

This study is based on a longer report that is a product of the State Energy Efficiency Action (SEE Action) Network's Financing Solutions Working Group (see the Financing Working Group website: http://www1.eere.energy.gov/seeaction/financing_solutions.html).

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[2] Two other states have adopted broader renewable portfolio standards (RPS) or alternative energy standards under which energy efficiency is a qualifying resource.

The primary objectives of this study are: (1) to provide an updated view of national and international experience with on-bill financing programs and (2) offer state policymakers and program administrators actionable insights on key program design considerations. It also provides a summary of the evolution of on-bill program objectives.

This paper offers a detailed characterization of key on-bill program design choices. These design elements are likely to have important impacts on a program's value to policymakers, lenders, investors, energy efficiency service providers and consumers. Key program design considerations discussed in this study include:

- Disconnection and meter attachment;
- Sources of capital;
- Underwriting criteria; and
- Eligible measures.

This paper builds on previous studies of on-bill programs (e.g., Bell et al 2011; Brown and Conover 2009). We summarize results from a broader set of on-bill programs and use results to illustrate and frame key program design issues. The findings in this study come primarily from insights from a review of relevant literature, reviews of 30 on-bill programs, and detailed case studies on 13 of these programs. We selected programs based on a range of factors including achievement of significant market penetration and innovative approaches to program design. We also included a geographically diverse mix of utilities that have different ownership arrangements and regulatory oversight (e.g., rural electric cooperative, municipal utility, investor-owned utilities, power marketing authorities) as well as different entities acting as program administrators (e.g., utility, third party).

Background: What is On-Bill Financing and Its Potential Value Proposition for Energy Efficiency?

Broadly, on-bill financing involves repaying loans for energy improvements on the consumer's utility bill, often with the possibility of service disconnection as an added deterrent for non-payment. Energy improvements may include a range of technologies that customers can install on their premises: energy efficiency measures, distributed generation (e.g., solar photovoltaic, combined heat and power) and demand response (DR) enabling technologies.

A variety of barriers that lead to under-investment in energy efficiency by consumers have been cited in the literature, including the fact that EE often has "high first costs" (IEA 2008; Jaffe & Stavins 1994). While these up-front costs are often recouped over the lifetime of the efficiency measures through energy savings, some consumers lack the financial means or the willingness to use their limited existing resources to make the initial purchase of high-efficiency measures. On-bill financing is one of several forms of program-supported financing that have been deployed across the country to help consumers pay for energy improvements.[3]

On-bill financing may be a particularly promising tool for several reasons. Consumers typically have extensive experience making utility bill payments, and understand the potential threat of termination of utility services for non-payment. On-bill proponents maintain that administrators who offer on-bill financing (perhaps aided by the threat of service disconnection for non-payment) may experience lower default rates compared to financing products not repaid

[3]Examples of other common forms of program-supported financing for energy improvements include Property Assessed Clean Energy (PACE) and unsecured consumer energy efficiency loans (e.g., Keystone HELP in Pennsylvania).

on the utility bill. If on-bill financing results in lower default rates, then it may have promise in driving consumer adoption of energy improvements, by both expanding the number of consumers that can qualify for financing and delivering more attractive (e.g., lower interest rate, longer loan term) financing than would otherwise be available.

In addition, some on-bill programs have special features designed to address other barriers to EE as well, such as renter/owner split incentives, long project paybacks and balance sheet treatment of debt that lead to consumer under-investment in certain market segments.

Study Organization

In the next section, we summarize data from the 30 on-bill financing programs that were reviewed, including summary data on key program features and results. Section 2 provides a brief summary of the evolution of on-bill program objectives. Section 3 is organized around key on-bill program design considerations: whether the on-bill program allows disconnection for non-payment and whether the loan is attached to the meter, the source of capital used to fund on-bill financial products, approaches to assessing applicant creditworthiness and design choices that affect measure eligibility.

The National and International On-Bill Landscape

On-bill programs are operating or preparing to launch in at least 25 states in the US and two countries outside the US: Canada and the United Kingdom (UK). In aggregate, the 30 programs studied for this paper have delivered over $1.8 billion of financing to customers for energy improvements (see Table 1).[4]

[4] Programs include those administered by: TVA, the Town of Windsor, CA, California IOUs (OBF Pilot and On-Bill Repayment Pilot), the City of Ft. Collins, CO, Connecticut Light & Power (Residential Efficiency Financing Program and Small Business Energy Advantage (SBEA)), United Illuminating (SBEA), Georgia Environmental Finance Authority, Hawaiian Electric Company, Hawaii Energy, AFC First Financial (Illinois Energy Efficiency Loan Program), Midwest Energy, Mountain Association for Community Economic Development, KY, Holyoke Gas & Electric Department, MA, National Grid (Small Business Loan and Large C&I Loan programs), Manitoba Hydro, New Jersey Natural Gas, PSE&G, NYSERDA, Mpower, Craft3 and Clean Energy Works Oregon, Electric Co-ops of South Carolina, Department of Energy and Climate Change, UK, Alliant Energy, WI.

Table 1. Summary statistics for on-bill programs examined in the study[5]

Sector	Number of participants	Lifetime loan volume*	n =	Average size of loan	Default rates: median value and range	n =
Residential	182,324	$1.05B	20	$5,787	0.08% (0 to 3%)	15
Non-residential	50,339	$775M	7	$15,400	0.9% (0.6 to 2.9%)	7
Total	232,663	$1.83B	27	$7,867		22

*Lifetime loan volumes are in nominal dollars.

Key takeaways from our analysis include:

- Twenty-two of the 30 on-bill programs included in this study (73 percent) are primarily focused on residential customers.
- The median value for cumulative market penetration is 0.25 percent of customers for residential programs and 6.9 percent for non-residential programs. This may be partially due to longer median program operating history in the non-residential sector. The highest estimated market penetration among targeted consumers in the residential sector is 15 percent (Manitoba Hydro) and 29 percent in the non-residential sector (United Illuminating in CT).
- Five program initiatives—Tennessee Valley Authority (TVA), Manitoba Hydro, Alliant Energy Wisconsin, United Illuminating/Connecticut Light & Power, and National Grid—account for over 90 percent of on-bill activity in terms of dollars loaned and number of participants among the programs in this study.
- Default rates among the programs in this study have been quite low, ranging between zero and three percent, regardless of specific program design characteristics.

Evolution of On-Bill Programs

Since their inception in the 1980s, on-bill programs have evolved as program administrator and policymaker objectives have shifted and market needs have changed.[6] We highlight the following trends in the evolution of on-bill loan programs (and key objectives of policymakers and program administrators) over time:

Making Energy Efficiency Affordable

When the first generation of on-bill programs was launched in the 1980s, interest rates were much higher than they are today. For example, mortgage interest rates reached the upper teens before settling into the seven to 10 percent range throughout that 1990s (Board of Governors 2014). In 2013, 30-year conventional mortgage rates averaged just four percent

[5]Where n is less than 30, it is because programs either have not yet launched or have not provided sufficient data for a specific analysis.
[6] It is important to note that on-bill programs have developed at different times in various regions in response to local needs and objectives.

(Board of Governors 2014). Given high interest rates, the affordability of EE improvements—and financing to pay for them—was a key consideration for the policymakers and PAs that launched the first generation of on-bill programs. This goal was reflected in low-interest, long-term loans to reduce the burden of regular debt service costs relative to energy savings.

Expanding Access

In recent years, although interest rates have remained low, capital access has been demonstrably restricted as lenders tightened underwriting standards and consumers faced historic financial challenges.[7] In this context, some on-bill programs have been launched with the explicit intent of expanding access to capital among traditionally underserved populations (e.g., small businesses, middle income households). Policymakers and administrators have typically relied on the belief that private markets are inappropriately rationing credit for EE improvements (Zimring 2013) or the argument that on-bill has unique potential to drive improved loan repayment trends relative to off-bill financial products.

Driving Demand

Some recently launched on-bill programs include specific provisions targeting a broader range of barriers to consumer adoption of efficiency (e.g., tenant-owner split incentives, balance sheet treatment of debt, long project payback periods) in addition to offering affordable, accessible financing. In this context, consumers that already have access to low-cost conventional loan products may be driven to adopt EE because on-bill programs might be more attractive or more convenient than other financial products.

Increasing Leverage of Program Funds

The increased interest in on-bill programs is part of a broader trend among policymakers and program administrators in some states that are looking to tap into private capital in order to stretch the impact of limited program funds and encourage significant cost contributions by participating consumers. Recently, some on-bill programs have relied more heavily on private capital as utility funds for EE have become more constrained, given concerns about potential rate impacts of utility customer-funded energy efficiency programs.

Four Key Program Design Considerations

Disconnection and Meter Attachment (1)

One key to the value of on-bill financing in delivering attractive, accessible capital is the potential consequences of failing to repay the on-bill financial product. Financial products repaid on a customer's utility bill take many forms and can be divided into three categories based on whether they allow power disconnection and whether the loan is tied to the meter:

[7]In 2009, for example, 86 percent of commercial lenders tightened underwriting. See Office of Comptroller of Currency's Survey of Credit Underwriting Standards 2012: http://www.occ.gov/publications/publications-by-type/survey-credit-underwriting-practices-report/pub-survey-cred-under-2012.pdf

Line item billing (LIB). The utility bill is simply used as a tool for participants to repay financial products. In the event that a participant fails to make principal and interest payments, financing charges are typically removed from the utility bill and financial institutions are free to seek recourse unrelated to a participant's utility service based on the terms of their contract with the customer.

On-bill loan (or lease) with disconnection. On-bill loans with disconnection use the utility bill to repay loans but allow disconnection in cases of non-payment. A broad range of financial products (e.g., unsecured loans, mortgages, leases) may be re-paid on the customer's bill using the threat of utility service termination as the only source (or one of several sources) of deterrence of non-payment. In the event that a participant fails to make financing payments, utilities can typically use their normal collection protocols for utility bill delinquency, which may ultimately result in service termination.

On-bill tariff.[8] LIB and on-bill loans with disconnection are debt of the customer or property. An on-bill tariff is a debt of the utility meter. The tariff structure is similar to an on-bill loan with disconnection in that non-payment of financing charges may lead to utility service termination. Tying the debt to the utility meter is specifically designed to accomplish three key objectives: (1) automatic transfer of the tariff between customers; (2) survive foreclosure; and (3) off-balance sheet treatment for non-residential participants. In some cases, payments for on-bill loans with disconnection and on-bill tariffs are subordinated to other charges on a customer's utility bill.

Table 2 summarizes key features and differences among these three types of on-bill products.

Table 2. Key features and differences among on-bill financial products

Feature	Line Item Billing	On-Bill Loan	On-Bill Tariff
Debt of Utility Meter or Customer/Property?	Customer/Property	Customer/Property	Meter
Consequences of On-Bill Financial Product Non-Payment	No Threat of Utility Service Disconnection	Utility Service Disconnection	Utility Service Disconnection
Survives Bankruptcy/Foreclosure?	No	Unlikely	Maybe
Transferable?	Yes, with consent (if program rules allow)	Yes, with consent (if program rules allow)	Yes, automatic
Garners Off-Balance Sheet Treatment?	No	Maybe	Maybe

[8]It is important to differentiate the definition of tariff for the purposes of this study from the definition of tariff often used in utility regulatory proceedings. For the purpose of this study, a tariff is defined as a charge that is undifferentiated from any other utility bill charge. In utility regulatory proceedings, tariffs are often used by utilities and their regulators to specify the rate and terms and conditions of customer service, regardless of whether those terms and conditions involve differential treatment of an on-bill financial product from other utility bill charges.

Program Trends in Disconnection and Meter Attachment

Of the 30 programs in this study, 10 offer line-item billing, 13 offer on-bill loans and seven offer on-bill tariffs (see Figure). Nearly all on-bill volume (99 percent by dollar volume) has taken place through programs using on-bill loans or line item billing.

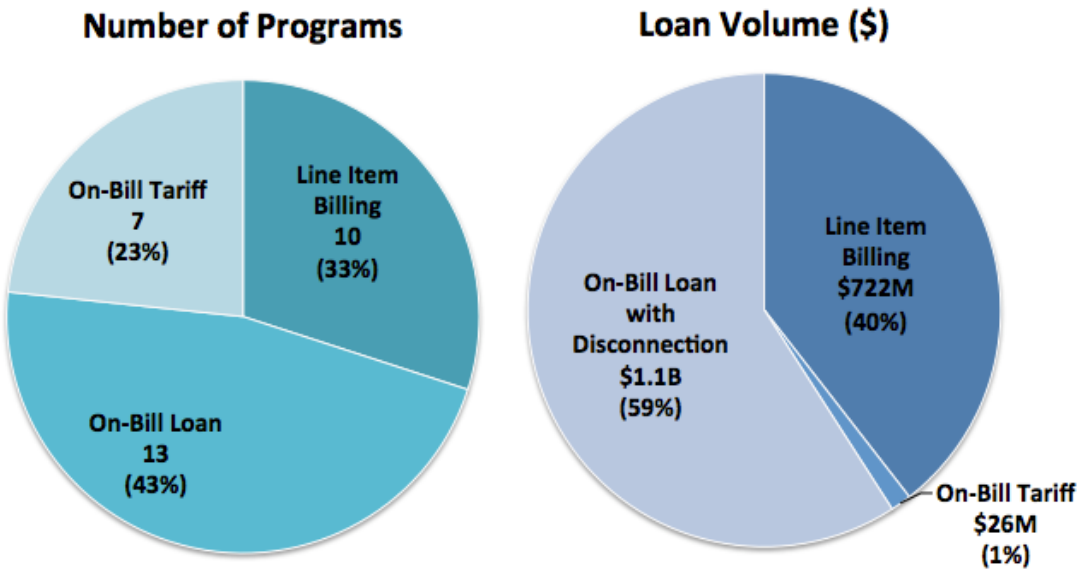

Figure 1. On-bill financing products, by number of programs and lifetime loan volume in dollars.

Discussion

In practice, the threat of utilities disconnection has uncertain benefit in terms of reducing consumer default rates. Consumers may not differentiate between the financial product charge and other utility charges, regardless of possibility of disconnection, which may result in default rates similar to general utility non-payment rates. In comparing existing on-bill programs, we found that programs allowing utility service disconnection tend to have slightly higher average participant default rates (1.69% for programs that allow disconnection vs 1.05% for those that do not). However, there are many other program characteristics, program design factors and attributes of a program's target consumer segment that contribute to default rates. Due to these other influences, we do not believe that it is appropriate to draw conclusions regarding differences in these default rates. All on-bill programs that were reviewed have experienced low default rates. This suggests that enabling consumers to repay financing on-bill, regardless of the consequences of non-payment, is a promising, low-risk approach to financing energy improvements.

However, the choice of on-bill product may have important impacts on a program's ability to overcome other barriers to customer investments in efficiency. On-bill tariffs are being hailed by some as a financing "game changer" because of their potential to deliver robust security and to overcome a range of barriers to EE adoption beyond up-front costs.[9] We find that

[9] Here security refers not to collateral in the case of non-payment but to additional deterrence of non-payment and survival of bankruptcy or foreclosure.

the tariff structure's potential remains unclear, owing to uncertainty about the value of automatic transferability (it is based on the assumption that subsequent tenants/owners will value the improvements for which they are being asked to assume the obligation to make debt payments), uncertainty about whether financial regulators or courts will treat the structure as a tariff rather than a loan (i.e., whether the tariff will survive foreclosure events) and uncertainty about whether participants will be able to account for the debt as "off-balance sheet."

Sources of Capital (2)

On-bill programs are also typically differentiated into two basic categories based on the source of capital used to fund the financial products: On-Bill Financing (OBF) and On-Bill Repayment (OBR) (See Table).[10]

Table 3. On-bill financing and on-bill repayment definitions

Program Type	Source of Capital
On-Bill Financing (OBF)	Utility Shareholder, Utility Bill-payer or Public funds (e.g., taxpayer funds, greenhouse gas auction proceeds)
On-Bill Repayment (OBR)	Private Investors (e.g., financial institutions, foundations)

We characterize OBR programs into one of three basic models to capture the range of approaches to tapping into private capital that have been pursued in the US and abroad:[11]

Program administrator acts as warehousing entity. In the warehouse model, a program administrator (PA) uses utility shareholder, utility bill-payer or public capital to initially fund financial products (e.g., loans). They then aggregate these financial products and sell them to a second investor or investors. Under the warehouse model, some PAs have pre-negotiated the terms of the sale of the pool of loans with a purchaser, while others have sought to sell these pools at "market rates" once sufficient volume has been aggregated. Of the nine programs operating OBR programs, six rely on the warehousing model. All but one program has relied on sales at pre-negotiated terms. The advantage of pre-negotiating terms of these sales is that PAs have certainty in the pricing at which they will be able to resell on-bill financial products and can structure the pricing of their financial products to ensure they are able to make these sales without incurring substantial losses.

Program administrator raises private capital up-front. In the up-front model, PAs opt to raise capital from private investors up-front, rather than initially funding financial products (e.g., loans) with utility shareholder, utility bill-payer or public capital. The PA issues a bond (or other financial contract) up-front, and investors provide capital that is then used to fund participant on-

[10]The terminology that is often used to describe and define OBF and OBR raises some definitional issues because utility shareholder capital is a form of private capital. We acknowledge that the diversity of programs and approaches does not lend itself easily to a simple typology. However, for our purposes, we use the conventional definitions on the respective sources of capital for OBF & OBR.

[11] We acknowledge that other strategies are possible but focus on these three because the "warehousing" approach is the most common form of OBR, while raising private capital up front is getting substantial attention as Hawaii prepares its implementation and the "open market" approach is being tested in Connecticut and California.

bill loans. This structure is similar to the PA as warehouse model, but immediately brings in private capital and avoids the need for an initial pool of utility shareholder, utility bill-payer, or public capital. This up-front capital raise structure provides certainty to PAs and efficiency service providers that large pools of capital are available to potential program participants. However, this approach necessitates administrator confidence that customer participation will materialize, as investors will likely require compensation for capital that they have lent—whether there is demand from customers for loans for energy improvements or not.

Open market. The third approach for sourcing private capital is the open market model in which financial institutions (FIs) underwrite individual customers and deliver the financial products and capital directly to them. Any qualified FI may participate, allowing them to leverage the utility bill for repayment of debt, as a source of security for that debt, or both. The model encourages competition, driving FIs to innovate and offer more attractive and accessible financial products. With the first two OBR models, a single entity interacts with utilities (or utilities offer the program themselves) and their billing systems for the purpose of placing financial products on the bill to collect repayment. The open market approach allows multiple FIs to interact with multiple utilities in a state. To ensure consistency and reduce potential complexity, the two states moving forward with open market OBR (CT and CA) have opted to develop centralized infrastructure that will stand in-between utilities and FIs so that all have a single, consistent set of program participation protocols and processes and a single counterparty with whom to interact. Critical considerations for those contemplating the open market OBR approach are complexity and the potential expense of building programmatic infrastructure to address this complexity. The centralized open market infrastructure may be expensive to implement. For example, in California, approximately $8M has been budgeted for infrastructure costs[12] to work with the Master Servicer for $75M of EE financing pilots (Zimring 2013). CT has not experienced high costs since much of the infrastructure was already in place. PAs face the risk that these up-front investments may not, ultimately, be justified by loan volumes.

Program Trends in Source of Capital

Of the 30 programs in this study, two-thirds are OBF and 63 percent of total program volume by number of loans has been through OBF initiatives. Historically, most on-bill programs have utilized public, bill-payer or utility capital (i.e., OBF programs). However, in recent years, we find many more examples of on-bill programs that seek to leverage private capital to fund on-bill financial products (i.e., OBR programs). Despite the increasing number of OBR programs, OBF initiatives have continued to deliver the lion's share of overall on-bill program volume. In 2012, OBF programs delivered $128M of capital to fund customer energy improvements, while OBR programs delivered just under half as much capital ($62M).

Discussion

OBF typically gives program administrators the most flexibility to define program rules to meet program objectives but may come at the expense of achieving leverage up-front. In addition, where utility shareholder capital is used (over half of OBF volume), capital is typically re-lent at lower interest rates than those earned by the utilities, and these implicit "interest-rate

[12] Costs include administration, implementation and upgrades for IT systems.

buy downs" can be expensive for utility bill-payers. While utility capital may be expensive, relying on it to fund on-bill products is one potential approach to getting around the limits to scale that on-bill programs relying on public and utility bill-payer capital face. Utilities, particularly when earning substantial returns, have the ability to raise large pools of capital to invest in these programs. However, some utilities have objected to funding on-bill programs on the basis that consumer lending is not part of their core business and/or the fear that offering these programs might subject them to regulation as financial institutions

While there are multiple pathways to tapping private capital through OBR, the warehousing model accounts for 99 percent of OBR dollar volume. In practice, the first two OBR strategies have typically relied on substantial credit enhancements to private investors, either in the form of 100 percent guarantees against default or the right to tap utility bill-payer charges. PAs that have relied on warehousing or raising up-front capital, with credit enhancements have also maintained significant flexibility in designing programs, because private investors have the alternative source of protection (e.g., guarantee). While some PAs have been reluctant to provide guarantees to private sector investors, experience to-date suggests that this may be an effective (and cost-effective) strategy for accessing large pools of low-cost capital. For example, the Tennessee Valley Authority, which has delivered over $500M in funding to residential customers through its on-bill program, provides a loan guarantee to a regional bank to fund their on-bill loans. With the guarantee, a regional bank makes low-interest loans available for program participants. TVA adds three percent to this interest rate, which has been more than sufficient to cover all of TVA's costs of administering the program, including losses from customer defaults.

Approaches to Assessing Applicant Creditworthiness (3)

Underwriting describes the metrics and criteria that financial institutions and/or PAs use to assess the creditworthiness of applicants for a financial product. The approach used may have wide-ranging impacts on program applicant transaction costs, application approval rates and, ultimately, default rates for OBF and OBR programs. We found that PAs have utilized one of four approaches in setting underwriting criteria:

Traditional. Administrators rely on traditional metrics and criteria that are used for underwriting other types of financial products. For example, in the single-family residential market, this approach often includes a minimum credit score of 640 and a maximum debt-to-income ratio (DTI) of 50 percent for unsecured loan products. *Example:* The Illinois Energy Efficiency Loan on-bill program requires households to have a minimum credit score of 640 and a maximum DTI of 50 percent.[13] The program's application decline rate is 49 percent and the default rate has been zero percent.[14]

Expanded. The same metrics as the previous approach, but the administrator relaxes the minimum or maximum criteria in order to increase the portion of target customers that can qualify for financing. *Example:* TVA offers on-bill financing to single family households with credit scores as low as 625 and approves approximately 75 percent of applications, with a default

[13]Customers with DTIs above 50 percent may qualify for loans of up to $2,500.
[14] The program has been operating for less than three years; thus, this low default rate may not be reflective of the expected lifetime default rate.

rate over 16 years of approximately three percent.[15] In practice, TVA participants' average credit score is 711, so even though lower credit quality customers are eligible for the program, the average participant is quite creditworthy by traditional standards.

Alternative. The program administrator uses alternative metrics such as a strong history of on-time utility bill repayment in lieu of traditional metrics in order to increase the portion of applicants that are approved for financing and/or reduce the cost (in terms of time and money) of the underwriting process. *Example:* Applicants to United Illuminating's Small Business Energy Advantage loan program must have been in business for at least 12 months, have had no more than four late utility bill payments in the past calendar year and have no outstanding utility balances or special payment arrangements. The program has an application decline rate of just five percent and a default rate of less than one percent.

Hybrid. The program administrator relies on a blend of alternative underwriting standards and traditional or expanded underwriting metrics. For example, in the residential market, this might mean a minimum credit score of 600 and a strong history of on-time utility bill repayment. *Example:* Craft3, a CDFI in the Pacific Northwest, uses a hybrid approach to underwriting for Clean Energy Works Oregon's (CEWO) residential on-bill program. The lender reviews credit scores (a traditional underwriting metric) as well as historical utility bill repayment. Applicants receive points if their credit scores are below 660, for current or historical utility bill delinquency and first mortgage delinquency. Applicants with five points or less are approved for financing, those with six points are given a second review, and those with more than six points are declined. The program has a decline rate of just 10 percent, and a default rate of less than one percent.

Program Trends in Choice of Underwriting Criteria

Of the 28 programs that reported underwriting criteria, only one program relies exclusively on traditional underwriting standards, three programs rely on expanded underwriting, nine programs employ hybrid underwriting criteria, and 15 programs use alternative underwriting criteria. When weighted by program loan volume, programs using hybrid underwriting approaches account for 51 percent of the on-bill volume for programs in this study, followed by programs that rely on expanded underwriting (31 percent). Programs using alternative criteria account for 18 percent of on-bill volume.

Discussion

Our comparison of existing on-bill programs yielded no clear association between a program's underwriting criteria and participant default rates. Default rates were quite low across program designs suggesting that a range of underwriting approaches may lead to low participant default rates. However, the choice of underwriting criteria does appear to influence the financing application approval rate in these programs. The one program that relies exclusively on traditional underwriting criteria rejected over eight times more applications than the median percentage of consumers rejected in programs that relied primarily on utility bill repayment history.

[15] In some cases, local distribution utilities check applicant bill repayment history.

When considering underwriting criteria, PAs must balance the desire to expand customer access to attractive capital with the need to ensure that consumers who are granted access to capital are well-positioned to make repayment. Standard underwriting criteria exists for a reason: to ensure that customers granted access to capital are willing and able to repay their loans. Thus, administrators should exercise some caution as they implement expanded, alternative and hybrid underwriting criteria.

Selecting Eligible Measures (4)

There are three key areas of consideration for PAs in selecting eligible measures for on-bill programs: (1) types of measures; (2) single measure vs. comprehensive retrofits; and (3) whether to restrict project eligibility based on its expected utility bill impacts. Selecting eligible measures necessitates balancing the objectives of driving or enabling cost-effective EE and/or renewable energy adoption with a range of other policy or programmatic goals (e.g., facilitating sufficient participation to offset up-front implementation costs, contributing to market transformation by facilitating private FI investment in EE, providing customer safeguards and creating jobs).

Types of eligible measures. The source of capital and program goals will heavily influence whether technologies beyond EE (e.g., distributed generation, demand response) may be financed on-bill—casting a broader net may help drive consumer participation. Permitting non-energy measures may also be a powerful way to drive consumer adoption, but it may raise cost-effectiveness challenges as these measures do not directly deliver energy savings. Twelve of 30 on-bill programs limited eligibility exclusively to EE improvements. Eleven programs allow renewable energy technologies, five allow non-energy measures, and four allow water efficiency measures to qualify for financing.[16]

Single-measure vs. comprehensive retrofits. Some policymakers and PAs seek to drive participants to adopt multi-measure, comprehensive energy improvements typically associated with deep energy savings. Others permit participants to finance single measures, such as boiler replacements, to balance energy saving goals with others such as the higher job creation that might come from single measure programs, which are often associated with higher levels of participation than comprehensive programs. Most on-bill programs that have achieved significant loan volume or market penetration have permitted participants to finance single-measure energy improvements and have tended not to place much emphasis on implementing multi-measure, comprehensive energy improvements. For example, Manitoba Hydro's Power Smart Residential Loan Program has funded almost $300M in efficiency improvements in single-family residences since 2001. Customers are allowed to install and finance a wide range of energy-related measures, although 95 percent of on-bill loans have been used for single-measure window, door or furnace replacements. Those programs that have successfully driven both substantial customer participation and deeper, multi-measure EE projects, have coupled on-bill eligibility with substantial financial incentives (e.g., rebates).

[16] Programs allowing renewable energy measures, non-energy measures and efficiency measures are not mutually exclusive: some allow two or more.

Utility bill impacts. Some on-bill programs have required that the expected energy savings from energy improvements offset 100 percent of project costs (including financing charges). This expectation is known as "bill neutrality." This program element has often been included as a consumer protection. However, the variance in actual energy savings versus estimates across individual participants has been substantial (i.e., expected bill neutrality may not translate into realized bill neutrality at the participant level). To the extent that participants rely on energy savings to repay financing and those savings fail to materialize, this feature may actually increase risk. Furthermore, in practice, bill neutrality requirements may have a demand-dampening effect by limiting the types of projects that can be financed on-bill. For example, program designers for the UK's Green Deal on-bill financing program included a bill neutrality requirement, known as the 'Golden Rule'. The requirement puts substantial constraints on customers' ability to finance targeted EE improvements. Program designers were aware of this challenge and anticipated that substantial incentives would be available from energy providers that would, in effect, buy down the cost of the projects to a "bill neutral" point. However, these incentives have been slow to materialize, and without them, many projects are not able to meet the Golden Rule requirement. This has been one of several important factors in the program's low early participation. On-bill programs that require bill neutrality have, on average, achieved lower historical volume than those that do not. In 2012, the average on-bill volume for the four residential programs that require bill neutrality was $1.6M compared to $11.7M for the 10 residential programs that do not. Similarly, the average 2012 on-bill volume for the three non-residential programs that require bill neutrality was $7.6M compared to $11M for the four non-residential programs that do not require bill neutrality.

Conclusions

Enabling consumers to finance energy improvements on their utility bills is one of several potentially valuable tools for expanding consumer access to attractive capital. While on-bill financing is potentially an attractive tool for increasing program leverage and mitigating the rate impacts of utility customer-funded efficiency programs, administrators can face difficult choices between allocating funds to financing or to other approaches designed to overcome a broader set of barriers to consumer investment in energy efficiency.

This study has highlighted key considerations based on recent program design innovations and discussions with PAs and policymakers across the country and internationally. As on-bill initiatives continue to attract the attention of policymakers and PAs, it will be important for stakeholders to continue to rigorously assess their efficacy in achieving programmatic goals and to share lessons learned broadly, so that we can better understand how, and for whom, these initiatives can help to deliver incremental, cost-effective energy savings, at scale.

References

Bell, C., S. Nadel & S. Hayes. 2011. *On-Bill Financing for Energy Efficiency Improvements: A Review of Current Program Challenges, Opportunities, and Best Practices*. ACEEE report number E118. American Council for an Energy-Efficient Economy. LINK

Board of Governors of the Federal Reserve System. 2014. *Data on 30-year Fixed Rate Conventional Mortgages*. Accessed April 6, 2014. LINK

Brown, M., Conover, B., Conover. 2009. *Recent Innovations in Financing for Clean Energy*. Southwest Energy Efficiency Project. LINK

Harcourt Brown and Carey: Energy and Finance (HB&C). 2011. "On-Bill Financing for Energy Efficiency: Review of Programs to Date." Prepared for the Environmental Defense Fund. LINK

International Energy Agency.(IEA) 2008. "Promoting Energy Efficiency Investments: Case studies in the residential sector." ISBN 978-92-64-04214-8. LINK

Jaffe, A. B., and R. N. Stavins. 1994. "The Energy Paradox and the Diffusion of Conservation Technology." *Resource and Energy Economics* 16, no. 2. Pp. 91–122. May 1994. LINK

Zimring, M., M.G. Borgeson and C. Goldman. 2013. "Getting the Biggest Bang for the Buck: Exploring the Rationales and Design Options for Energy Efficiency Financing Programs." Lawrence Berkeley National Laboratory, U.S. Department of Energy. LINK

State and Local Energy Efficiency Action Network. (2014). Financing Energy Improvements on Utility Bills: Market Updates and Key Program Design Considerations for Policymakers and Administrators. Prepared by: Mark Zimring, Greg Leventis, Merrian Borgeson, Peter Thompson, Ian Hoffman and Charles Goldman of Lawrence Berkeley National Laboratory. LINK