

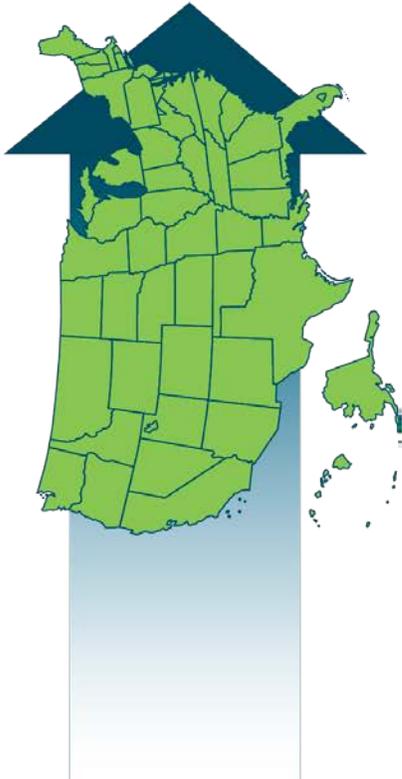
SEE Action

STATE & LOCAL ENERGY EFFICIENCY ACTION NETWORK

Financing Energy Improvements on Utility Bills: Market Updates and Key Program Design Considerations for Policymakers and Administrators

Financing Solutions Working Group

May 2014



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Executive Summary

Many state policymakers and utility regulators have established aggressive energy efficiency (EE) savings targets that will necessitate investing billions of dollars in existing buildings over the next decade. These efficiency improvements will provide a range of benefits, both public and private, that far exceed the initial investment cost.

Typically, program administrators rely on utility bill-payer or taxpayer funds to achieve EE policy goals by incenting consumers to invest in energy efficiency measures and strategies. These funds are limited, necessitating significant levels of private investment as savings goals increase over time. 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 the state's policy goals—only a fraction of which will be provided by utility bill-payer funding (HB&C 2011).

Given this challenge, some EE program administrators and policymakers are exploring ways to increase their reliance on financing with the aim of amplifying the impact of limited program monies. In this context, offering programs that enable consumers to finance energy efficiency improvements on their utility bills are receiving increasing attention. The primary objectives of this report are: (1) to provide an updated review and analysis of existing on-bill programs and (2) to offer actionable insights on key program design issues for consideration by state policymakers, utility regulators and program administrators.

The Rationale for On-Bill Programs

A variety of barriers lead consumers to under-invest in energy efficiency, including the fact that some energy efficiency investments have “high first costs” compared to conventional measures (IEA 2008; Jaffe and 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 existing resources to make the initial purchase of high-efficiency measures. On-bill programs are one of several forms of program-supported financing that have been deployed across the country to help consumers pay for energy-related improvements.¹

Broadly, on-bill programs involve repaying financing for energy-related improvements on the consumer's utility bill. Energy improvements may include a range of technologies that consumers can install on their premises: energy efficiency measures, distributed generation (e.g., solar photovoltaic, combined heat and power), and demand response (DR) technologies.

On-bill programs may be promising for several reasons. First, consumers typically have extensive experience making utility bill payments; it is already a routine part of their lives. It is also conceptually attractive to make an investment where the energy savings that result are reflected in the same bill as the payments on the loan that funded the investment. Second, proponents of on-bill programs argue that program administrators offering on-bill loans (perhaps aided by the threat of service disconnection for non-payment) may experience lower default rates compared to financing that is extended through instruments that are not repaid on the utility bill. If on-bill loan programs result in lower default rates, then program administrators may be able to offer more attractive financing (e.g., lower interest rate, longer loan term) than would otherwise be available. This could expand the number of consumers that can qualify for, or may be interested in, financing energy-related improvements.² Third, some on-bill programs also include features that are designed to address other barriers to efficiency, such as renter/owner split incentives, long project paybacks, and balance sheet treatment of debt, which lead to under-investment in certain market segments.

¹Examples of other common forms of program-supported financing for energy improvements include [Property Assessed Clean Energy](#) and unsecured consumer energy efficiency loans (e.g., [Keystone Home Energy Loan Program or HELP](#) in Pennsylvania).

²This assumes that other costs such as origination expenses, servicing costs, and collection expenses are also comparable or better and that sufficient consumer adoption occurs to justify investing in business systems to support the delivery of on-bill products to the market.



On-Bill Program Objectives

Since their inception in the 1980s, on-bill programs have evolved as program administrator and policymaker objectives and market needs have changed. We highlight the following trends in the evolution of on-bill programs objectives:

1. **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.³ Given high interest rates, the affordability of EE improvements—and financing to pay for them—was a key consideration for policymakers and program administrators initially.
2. **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.⁴ 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).
3. **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 loans might be more attractive or more convenient than other financial products.
4. **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, encourage significant cost contributions by participating consumers and mitigate rate impacts.

Scope and Limitations of this Report

This report reviews 30 existing on-bill programs and offers a detailed characterization of 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 participants. Design considerations discussed in this report include:

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

It is important to note that we do not address the question of whether policymakers and program administrators should launch or continue operating on-bill loan programs. The answer to that question will be context-specific.

³Data from Board of Governors of the Federal Reserve System Historical Data on 30-year fixed rate conventional mortgages: <http://www.federalreserve.gov/releases/h15/data.htm> (Accessed April 6, 2014).

⁴See Office of Comptroller of Currency's Survey of Credit Underwriting Standards 2012. In 2009, for example, 86 percent of commercial lenders tightened underwriting trends: <http://www.occ.gov/publications/publications-by-type/survey-credit-underwriting-practices-report/pub-survey-cred-under-2012.pdf>.

Based on LBNL research (Fuller et al 2010; Zimring et al 2011; Zimring et al 2013) and other studies, the up-front costs of energy improvements may be a hurdle for some consumers; however, financial products already exist in the private marketplace that enable many consumers to overcome this barrier. Allowing consumers to finance energy improvements on their utility bills is just one of several potentially valuable tools (e.g., mortgages, unsecured loans, leases, Property Assessed Clean Energy, etc.) for expanding access to capital.

Administrators also face difficult choices between allocating funds to financing or to other approaches designed to overcome other barriers to energy efficiency investments (e.g., rebates to participating consumers, technical assistance, or upstream incentives to energy services providers or retailers). Thus, robust assessments of financing’s role in reducing energy use in buildings are necessary to help policymakers and program administrators make better choices about how to allocate limited resources to achieve energy efficiency at scale. We address key areas of uncertainty regarding what energy efficiency financing programs can reasonably be expected to achieve, and for whom, in *Getting the Biggest Bang for the Buck: Exploring the Rationales and Design Options for Energy Efficiency Financing Programs* (Zimring et al 2013).

Overview of Existing Programs

As of January 2014, on-bill programs are operating or preparing to launch in the United States in at least 25 states, as well as in Canada and the United Kingdom. In aggregate, the 30 programs reviewed for this study have delivered over \$1.8 billion of financing to consumers for energy improvements (see Table ES - 1).

Table ES - 1. Summary statistics for surveyed on-bill programs⁵

Sector	Number of participants	Lifetime Loan Volume (nominal \$)	n =	Average Size of Loan	Median value and range of default rates	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 ⁶	\$7,867		22 ⁷

On-bill programs offered by five administrators—Tennessee Valley Authority (TVA), Manitoba Hydro (MH), Alliant Energy Wisconsin, United Illuminating/Connecticut Light & Power (CT SBEA), and National Grid (NG)—account for over 90 percent of on-bill activity for programs included in this study in terms of both dollars loaned and number of participants (see Figure ES - 1).⁸

Table ES - 2 provides an overview of key design features (e.g., target sector, maximum loan term, disconnection and meter attachment, source of capital, and eligible measures) and results (e.g., 2012 and lifetime loan volume, default rates) of these five on-bill programs.

Twenty-two of the 30 programs (73 percent) targeted residential consumers and generated about 78 percent of overall financial product volume by number of loans to consumers and 58 percent of volume based on dollars originated.

⁵ Throughout this report, where sample size for summary statistics is less than 30, it is because programs either have not yet launched or have not provided sufficient data for a specific analysis.

⁶ Three programs discussed in this report (California’s emerging on-bill pilots, Hawaii’s emerging on-bill pilot and Oregon’s just-launched MPower pilot) are not included in the summary statistics because data was not available as of December 2013.

⁷ Default rates are not included either because programs have yet to launch (2), or have less than one year of data (5), or failed to provide this information (1).

⁸ Two of these initiatives include multiple programs. For example, Manitoba Hydro’s financing initiative includes four programs and the Connecticut Small Business Energy Advantage (CT SBEA) includes programs operated by CL&P and United Illuminating.

The average loan size is \$5,787 for the 20 residential programs that provided this information. For on-bill programs that target single-family consumers, average loan size ranges from \$525 to \$16,810. In contrast, average loan size is \$800k for property owners participating in PSE&G's Multi-Family Housing Program. For the three nonresidential programs that target small business consumers, the average loan size over the program lifetime ranged from about \$2,200 to \$8,000. Average loan size ranged between about \$7,800 to \$127,000 for the four other nonresidential programs that allow large commercial/industrial consumers to participate.

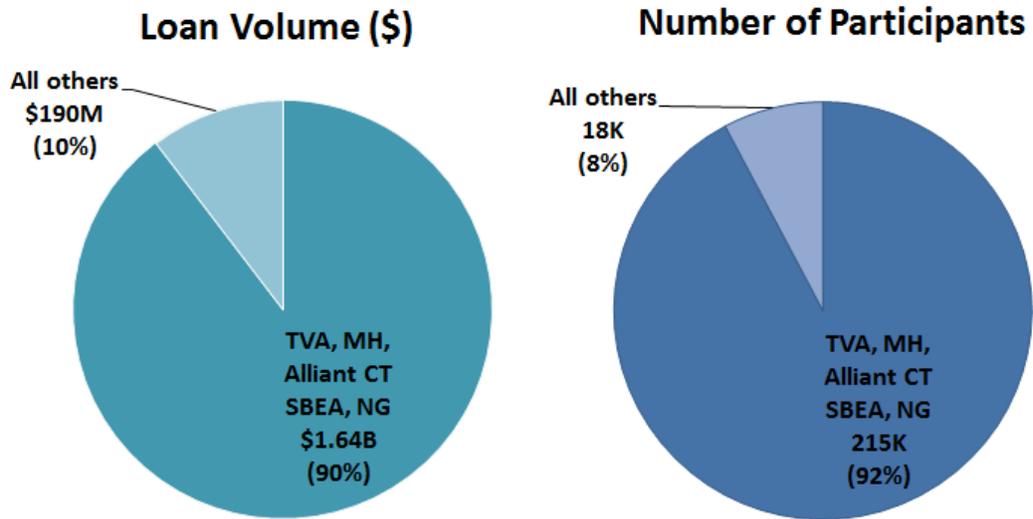


Figure ES - 1. Share of on-bill program volume by cumulative dollars loaned (left) and by number of participants (right)

Table ES - 2. Five programs from the five largest on-bill initiatives: Design features and results

	TVA	Manitoba Hydro	Alliant Energy	United Illuminating	National Grid
Target Sector	Res	Res	Non-Res	Non-Res	Non-Res
Lifetime Volume	\$500M	\$290M	\$524M	\$39M	\$44M
2012 Volume	\$45M	\$29M	\$393K	\$4M	\$22M
Interest Rate	6%-8%	4.8%	0%-3%	0%	0%
Max Loan Term	3 or 10 years	Up to 15 years	5 years	Up to 4 years	2 years
Default Rate	3%	0.48%	2.68%	0.9%	2.9%
Disconnection and Meter Attachment	On-Bill Loan w/ disconnection	On-Bill Loan w/ disconnection	Line Item Billing	Line Item Billing	Line Item Billing
Source of Capital⁹	OBR (warehouse w/TVA guarantee)	OBF (public monies)	OBF (utility monies w/interest rate buydown)	OBF (mix of utility monies w/interest rate buydown & utility bill-payer monies)	OBF (utility bill-payer monies)
Underwriting	Expanded	Hybrid	Hybrid	Alternative	Alternative
Eligible Measures	EE (mostly heat pumps)	EE	EE & RE	EE & Water Efficiency	EE

The average default rate over the program lifetime ranged from 0 to 3 percent for 16 residential programs that provided this information, and 0.57 percent to 2.90 percent for seven nonresidential programs. These default rates are low compared to common types of unsecured consumer lending, which may range from mid-single digits to low double-digits.

The next four sections describe some of the primary design considerations for on-bill programs.

Disconnection and Meter Attachment

There are several ways in which on-bill financial products can be unique from other standard financial products in addition to the fact that payments are made through the utility bill. Two key design questions are (1) whether nonpayment can lead to the disconnection of energy service; and (2) whether the charge is paid off when the building occupants change, or is attached to the meter (and is paid by the subsequent occupants). We divide these design considerations into three types of programs observed in the field:

- Line Item Billing (LIB)—no disconnection, no meter attachment.** The utility bill is simply used as a tool for participating consumers to make payments. In the event that a participant fails to make principal and interest payments, financing charges are typically written off or removed from the utility bill, and

⁹See “Sources of Capital” section of Executive Summary for more information on the various sources of capital used to fund on-bill programs. Broadly, we define On-Bill Financing programs as those funded by public, utility bill-payer or utility shareholder capital and On-Bill Repayment programs as those funded by non-utility, private investors.



capital providers are free to seek recourse unrelated to a participant’s utility service based on the terms of their contract with the consumers.

- **On-Bill Loan (or Lease) with Disconnection—disconnection allowed, no meter attachment.** On-bill loans with disconnection rights are treated as debt of the consumer. A broad range of financial products (e.g., unsecured loans, leases) may be re-paid on the consumer’s bill and the threat of utility service termination may act as an inducement for the consumer to repay the loan. In the event that a participating consumer fails to make financing payments, utilities typically use their normal collection protocols for utility bill delinquency, which may ultimately result in service termination.¹⁰
- **On-Bill Tariff—disconnection allowed, meter attached.**¹¹ An on-bill tariff is a charge that is associated with the utility meter rather than a debt of the consumer or property. 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. However, tying the charge to the utility meter is specifically designed to accomplish three key objectives: (1) automatic transfer of the tariff between consumers; (2) survival in foreclosure of a first mortgage on the property; and (3) off-balance sheet treatment for non-residential participants. This structure is a relatively recent innovation and is being hailed by some as a “game changer” because of its potential to deliver robust security and overcome a range of barriers to EE beyond up-front costs. However, uncertainty remains about the extent to which the structure will effectively achieve the three objectives described above—and what impacts a tariff will have on consumer adoption.

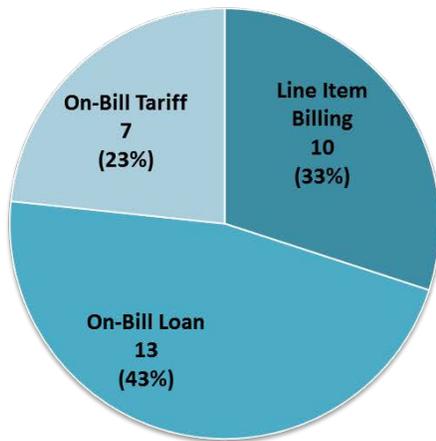
Of the 30 programs in this report, 10 offer line-item billing, 13 offer on-bill loans with disconnection, and seven offer on-bill tariffs (see Figure ES - 2). Nearly all on-bill financing (99 percent by dollar amount, and 77 percent by number of programs) has taken place through programs using line item billing or on-bill loans with disconnection (though on-bill tariffs are relatively new, and could expand in coming years).

In practice, the threat of disconnection of energy service has an uncertain benefit in reducing consumer default rates relative to financial products that lack this threat in the case of nonpayment. Consumers may not differentiate between the financial product charge and other utility charges, even if they have different consequences for nonpayment, which may result in default rates similar to historic utility nonpayment rates. Default rates were quite low for all three program types (i.e., most programs had a default rate of less than one percent).

¹⁰ In some cases, on-bill loan payments are subordinated to other charges on a consumer’s utility bill. See “On-Bill Financing Charge Payment Priority” section for more information on protocols should on-bill participants make partial payments of their utility bills.

¹¹ It is important to differentiate the definition of tariff for the purposes of this report from the definition of tariff often used in utility regulatory proceedings. For the purpose of this report, 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 consumer service, regardless of whether those terms and conditions involve differential treatment of an on-bill financial product from other utility bill charges.

Number of Programs



Loan Volume (\$)

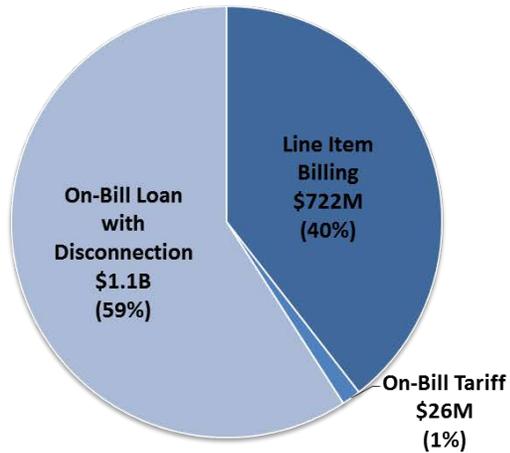


Figure ES - 2. On-bill loan products, by number of programs (left) and lifetime loan volume in dollars (right)¹²

Sources of Capital

In addition to the features described in the last section, we differentiate programs based on the capital source used to fund on-bill programs: **On-Bill Financing (OBF)** and **On-Bill Repayment (OBR)** (see Table ES - 3 for definitions). Of the 30 programs examined in this report, two-thirds of them are OBF programs and these OBF programs account for about two-thirds of the completed number of loans.

Table ES - 3. On-bill financing and on-bill repayment: Source of capital

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

We sub-divide OBR programs into one of three basic models, though other models are possible as well:¹³

- Program Administrator Acts as Warehousing Entity.** In the warehouse model, a program administrator uses utility shareholder, utility bill-payer and/or public capital to initially fund financial products (e.g., loans) in Phase One. They then aggregate these loans and sell them to a second investor or investors in Phase Two (see Figure ES - 3), often providing a credit enhancement to support the sale.

¹² Alliant’s Shared Savings Wisconsin and PSE&G’s Multi-family Housing Program have large average loan sizes (PSE&G’s average loan was over \$1M and Alliant’s was more than \$43K in 2012) that cause a significant difference between the percentage volume done by number of loans and the percentage volume done by dollar amount of loans.

¹³ We acknowledge that other strategies are possible but focus on these three because the “warehousing” approach is common among OBR programs included in this study, 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. Another model is for a utility to work with a single private capital provider, as is the case for Clean Energy Works of Oregon’s on-bill product offering, which uses capital from Craft3.

2. **Program Administrator Raises Private Capital Up-front.** In the up-front model, program administrators opt to raise capital from private investors up-front, rather than initially funding loans with utility shareholder, utility bill-payer, or public capital (see Figure ES - 4). In Phase 1, the program administrator issues a bond (or other financial contract) and investors provide capital that is then used to fund participant on-bill loans in Phase 2. This structure is very similar to the program administrator 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.

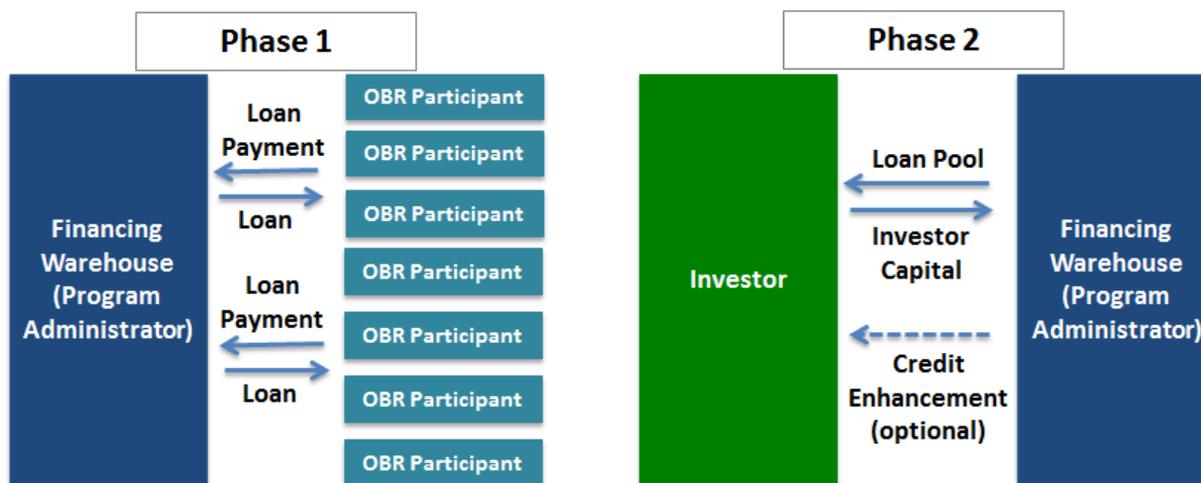


Figure ES - 3. Illustrative example of the role of a program administrator in aggregating OBR financial products before re-selling them to investors

3. **Open Market.** The third approach for sourcing private capital is the open market or “open source” model, in which one or more financial institutions underwrite individual consumers and deliver the financial products directly to them. Any qualified financial institution may participate, allowing them to use the utility bill for repayment. This model avoids utility involvement in capital provision and encourages competition, driving financial institutions to innovate and to offer more attractive (e.g., lower interest rate, longer term) and more accessible products. With the first two OBR models, there is a single entity interacting with utilities (or utilities offering the program themselves). The open market approach means that multiple financial institutions could be interacting with multiple utilities in a state (see Figure ES - 5), which may necessitate additional infrastructure to coordinate activities.

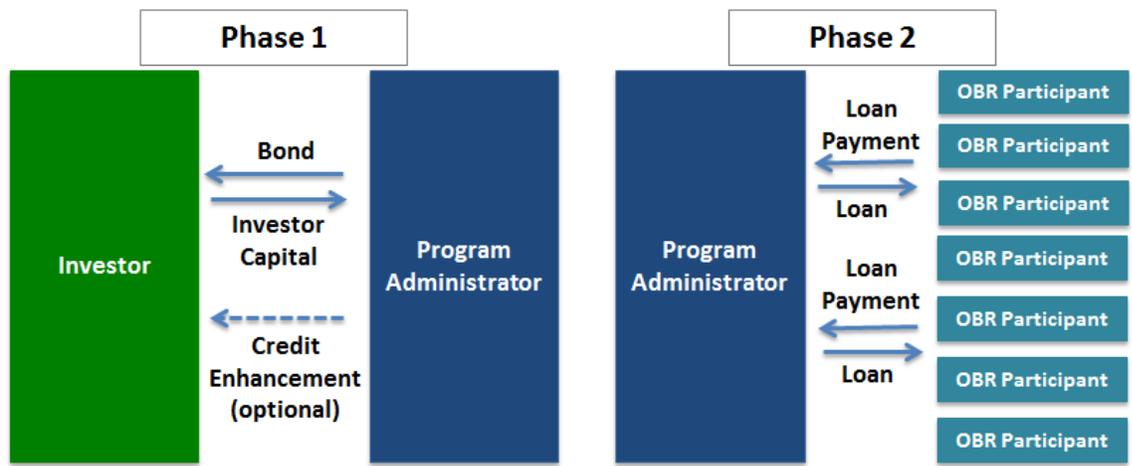


Figure ES - 4. Illustrative example of raising capital up-front

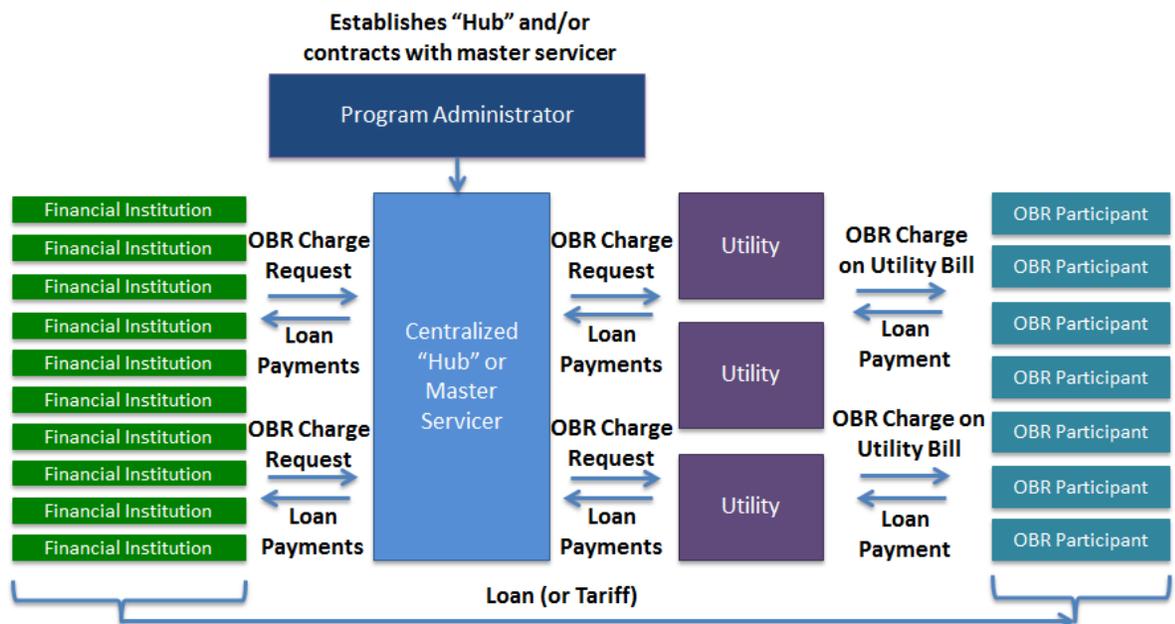


Figure ES - 5. Open Market-OBR. A centralized “hub” or master servicer can be used to streamline open-market OBR transactions between utilities and financial institutions

The majority of on-bill programs in this report are OBF initiatives, and OBF initiatives have delivered the lion’s share of overall on-bill program volume. However, in recent years, there has been a significant movement towards OBR by program administrators. Only one of the 12 programs launched prior to 2009 utilized OBR. Of the 16 programs launched since 2009, seven are OBR programs.¹⁴ Six of the nine on-bill programs that feature OBR rely on the

¹⁴ Only 28 programs are counted because two programs are under development.



program administrator warehouse model and these programs account for 99 percent of the total loan volume from programs that utilize OBR. Nonetheless, OBF programs continue to drive a significant majority of program volume. In 2012, OBF programs in this study delivered \$128M of capital to fund consumer energy improvements, while OBR programs delivered about \$62M in on-bill loans.

A program administrator's choice of capital source and mechanism for tapping into that capital source are often closely tied to the policy goals driving on-bill program operations. These choices will influence the cost of capital, the flexibility of the program, the volume of capital available, the accessibility of the program, and other factors—all of which may have substantial impacts on program success. Considerations for selecting a capital source are discussed in greater detail in section 4.

Assessing Consumer Creditworthiness

Underwriting describes the process and criteria that financial institutions and/or program administrators use to assess eligibility for financing, including the creditworthiness of applicants or suitability of the property for a financial product. The approach used may have significant impacts on program applicant transaction costs, application approval rates, and default rates for on-bill loan programs. Program administrators and financial institutions have taken a range of approaches to setting underwriting criteria that we group into four categories:

- **Traditional Underwriting Standards.** Administrators rely on traditional metrics 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 consumer loan products.
- **Expanded Underwriting Standards.** The administrator relies on traditional underwriting metrics but relaxes the minimum standards for applicant approval in order to increase the number of target consumers that can qualify for financing. In the single-family residential market, this might mean a minimum credit score of 600 and a maximum DTI of 70 percent.
- **Alternative Underwriting Standards.** 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 number of applicants that are approved for financing and/or reduce the cost of the underwriting process (e.g., less time and money).
- **Hybrid Underwriting Standards.** The program administrator relies on a blend of alternative underwriting standards and traditional or expanded underwriting metrics. For example, in the single family residential market, this might mean a minimum credit score of 600 and a strong history of on-time utility bill repayment.

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 (see Figure ES - 6). When weighted by program loan volume, programs using hybrid underwriting approaches account for 51 percent of the on-bill loan volume, followed by programs that rely on expanded underwriting (31 percent).

In comparing among existing on-bill programs, we found 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. For example, the one program that relies exclusively on traditional underwriting criteria rejected over eight times more applications than the median percentage rejected in programs that relied primarily on utility bill payment history (see Table ES - 4).

Those administrators that rely on private capital to fund their on-bill programs also need to consider the potential impact of using non-traditional underwriting standards on their ability to attract (and the cost of attracting) private

capital providers to the program. While repayment trends in on-bill programs have been quite strong, those programs that have successfully leveraged private capital have also provided robust credit enhancements (e.g., a loan loss reserve or guarantee that reduces the risk of poor repayment performance to private capital providers). Investors may be reluctant to accept (or require a discount for) loans not underwritten using standard metrics.

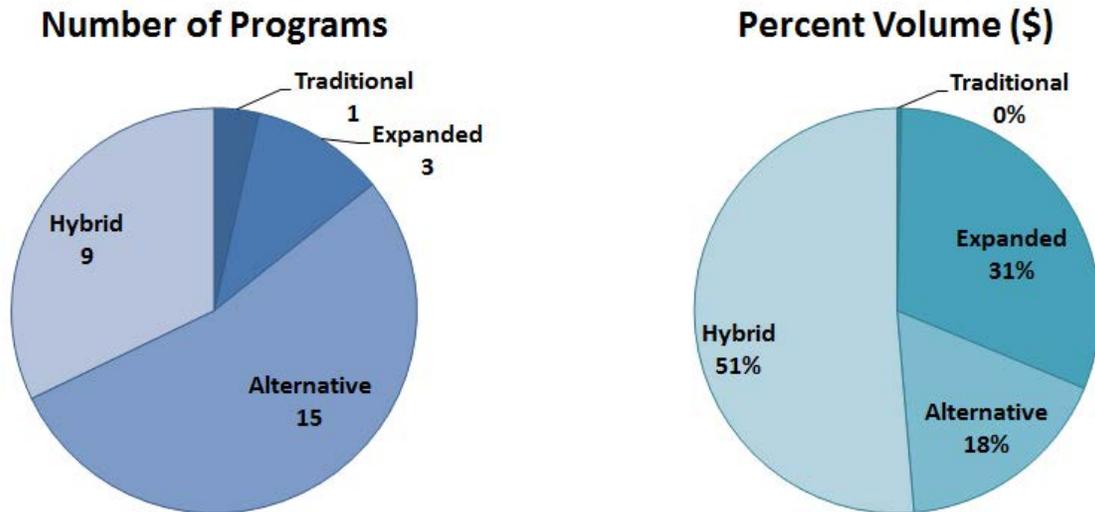


Figure ES - 6. Underwriting criteria used in on-bill programs: number of programs (left) and dollar volume (right)

For those programs seeking to rely primarily on utility billing history, and that intend to tap private capital without substantial credit enhancement, the tariff structure might provide benefits that allow investors and rating agencies to look to utility billing performance trends as comparables rather than consumer lending or other similar products.

Table ES - 4. Application decline rates and participant default rates for Residential and Non-Residential on-bill programs

Residential On-Bill Programs		
Underwriting Criteria (n=21)	Median and Range of Application Decline Rates (n=15)	Median and Range of Participant Default Rates (n=15)
Traditional Underwriting (n=1)	49%	0%
Expanded Underwriting (n=3)	25% (n=1)	3% (n=1)
Hybrid Underwriting (n=8)	4%-33% (median 10%)	0%-0.9% (n=7)
Alternative Underwriting (n=9)	2%-25% (median 6%) (n=5)	0%-0.9% (n=6)
Non-Residential On-Bill Programs		
Underwriting Criteria (n=7)	Median and Range of Application Decline Rates (n=6)	Median and Range of Participant Default Rates (n=7)
Traditional Underwriting (n=0)	NA	NA
Expanded Underwriting (n=0)	NA	NA
Hybrid Underwriting (n=1)	10%	2.68%
Alternative Underwriting (n=6)	0%-25% (median 6%) (n=5)	0.57%-2.9%

Selecting Eligible Measures

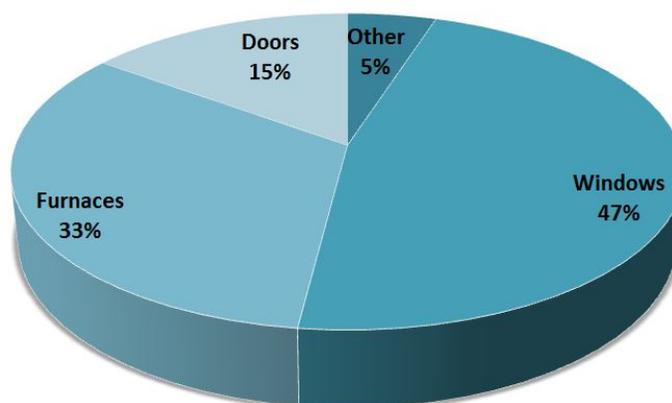
Selecting eligible measures requires program administrators (often following guidance from state regulators) to balance multiple objectives: enabling (or driving demand for) cost-effective energy efficiency, encourage adoption of distributed renewable technologies, and facilitate other program design or policy goals (e.g., contributing to market transformation by facilitating private financial institution investment in energy efficiency, creating jobs, and providing consumer safeguards). Three key areas of consideration for program administrators in selecting eligible measures for on-bill programs are: (1) types of measures; (2) single measure vs. comprehensive retrofits; and (3) whether to restrict project eligibility based on expected utility bill impacts.

1. **Types Of Eligible Measures.** The source of capital and program goals will heavily influence whether technologies beyond EE (e.g., distributed generation and demand response) may be financed on-bill—casting a broader net may help to drive consumer participation. In addition, some programs permit certain non-energy measures that address health and safety issues to be included as part of a retrofit package, which may be an important demand driver for certain market segments. However, including non-energy measures may raise cost-effectiveness challenges as these measures don't directly deliver energy savings. Twelve of 30 on-bill programs included in this report limited eligibility to EE improvements. Eleven programs allow renewable energy technologies, five allow non-energy measures, and four allow water efficiency measures to qualify for loan financing.¹⁵
2. **Single-Measure vs. Comprehensive Retrofits.** Programs that have achieved significant market penetration have typically allowed participants to finance single-measure improvements or have coupled on-bill eligibility with substantial financial incentives for multi-measure improvements. For example, Manitoba Hydro's Power Smart Residential Loan Program has funded almost \$300M in efficiency improvements in single family residences since 2001. Consumers are allowed to install and finance a wide range of energy-related measures—94 percent of on-bill loans have been used for single-measure window, door or furnace replacements (see Figure ES - 7).

¹⁵ Programs allowing RE, NEMs and water efficiency measures are not mutually exclusive: some allow one or more.

3. **Bill Impacts.** Some on-bill programs require “bill neutrality”—i.e., over the loan term, expected energy savings from efficiency improvements cover the loan repayment cost. On-bill programs that require bill neutrality have, on average, achieved lower historical volume than those that do not. In 2012, the average residential on-bill volume for the four programs that required bill neutrality was \$1.6M compared to \$11.7M for the 10 programs that do not require bill neutrality (see Figure ES - 8). The average 2012 non-residential on-bill volume for the three programs that required bill neutrality was \$7.6M compared to \$11M for the four programs that do not require bill neutrality. These results suggest that, in practice, requiring “bill neutrality” as a design element may actually have a demand-dampening effect by limiting the types of projects that can be financed on-bill.

Measures Financed in Manitoba Hydro's Power Smart Residential Loan Program



Note: “Other” includes multi-measure improvements. All other improvements involve only a single measure

Figure ES - 7. Manitoba Hydro Power Smart Residential Loan Program financed projects, 2001-2013 (by number of projects)¹⁶

Bill neutrality has been put forward as a consumer protection; however loan performance of bill-neutral and non-bill neutral programs has not been significantly different. Moreover, bill neutrality requirements may be a barrier to consumers taking on projects that achieve deeper savings. Thus, requiring bill neutrality offers uncertain potential as a consumer protection and driver of consumer EE adoption.

¹⁶Other includes projects that funded more than one type of energy improvement.

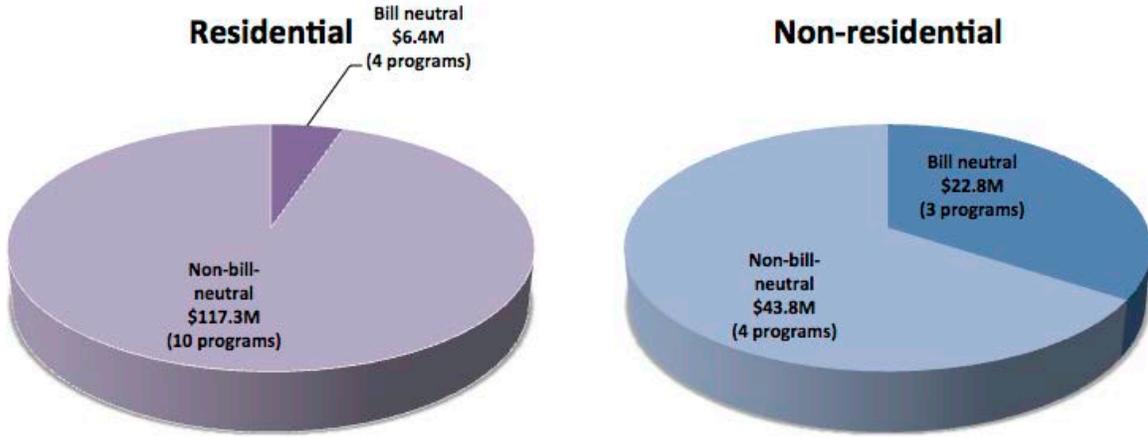


Figure ES - 8. Comparison of 2012 on-bill loan volume for programs that do or do not require bill neutrality



Conclusion

This report reviews 30 existing on-bill programs and explores key on-bill program design considerations for policymakers and program administrators. We organize our analysis of program design considerations around several issues: (1) the use of disconnection and meter attachment; (2) the source of capital; (3) assessing consumer creditworthiness; and (4) measure eligibility. Our findings include:

- **Disconnection and Meter Attachment.** In comparing existing on-bill programs, we found that programs allowing utility service disconnection tend to have slightly higher participant default rates (1.69% for programs that allow disconnection, 1.05% for those that don't). 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 it is appropriate to draw conclusions regarding differences in these default rates. All on-bill programs reviewed in this report have experienced low default rates. The overall low default rates suggest that enabling consumers to repay financing on-bill, regardless of the consequences of non-payment, may be a promising approach to delivering widespread consumer access to attractive capital at low risk.
- **Source of Capital.** Historically, on-bill programs have utilized public, utility bill-payer, or shareholder capital to fund loans. However, in recent years, we find more examples of on-bill programs that leverage private capital. We identified multiple pathways to tapping into private investor monies and found that the choice of a pathway may have significant impacts on program administration costs, risks and flexibility in program design. Additionally, while some program administrators have been reluctant to provide guarantees against losses to private sector on-bill investors, experience to date suggests that this credit enhancement strategy is worth consideration. Credit enhancements may be an effective way to access pools of low-cost private capital, at low risk to utility bill-payers, while maintaining program flexibility.
- **Assessing Consumer Creditworthiness.** Our analysis of existing on-bill programs did not yield an obvious association between a program's underwriting criteria and participant default rates, suggesting that a range of underwriting approaches—including those that rely primarily on utility bill repayment history—may be effective in identifying creditworthy applicants. However, the choice of underwriting criteria is an important design issue for program administrators because it appears to significantly influence on-bill program application approval rates. The one program that relies on traditional underwriting criteria rejects at about eight times as many applications compared to the median rejection rate of on-bill loan programs that rely primarily on utility bill repayment history.
- **Measure Eligibility.** On-bill programs that have achieved significant uptake in their target market have typically taken one of two approaches: (1) allow consumers to finance almost any “energy-related” improvements with particular focus on single measures (e.g., high-efficiency equipment, windows); or (2) access to on-bill lending is coupled with robust financial incentives (e.g., rebates). The former approach raises questions about the extent to which these initiatives lead to comprehensive retrofits or significantly transform existing efficiency services markets, while the latter approach may raise questions about the cost-effectiveness (and/or potential rate impacts) of these programs. We also found that programs requiring “bill neutrality” have often struggled to achieve significant market penetration and do not appear to have significantly fewer defaults.

Enabling consumers to finance energy improvements on their utility bills is one of several potentially valuable tools for expanding access to attractive capital, and it should be considered within the suite of options to encourage the adoption of energy efficiency. As on-bill initiatives continue to attract attention, it will be important for policymakers, administrators, and 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,¹⁷ these initiatives can help to deliver incremental, cost-effective energy savings at scale.

¹⁷ For more information around our understanding of what EE financing can be reasonably expected to achieve, and for whom, see [“Getting the Biggest Bang for the Buck: Exploring the Rationales and Design Options for Energy Efficiency Financing Programs”](#) (Zimring et al 2013).

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