

BEFORE
THE PUBLIC UTILITIES COMMISSION OF OHIO

In the Matter of the Application of)	
Ohio Power Company for Authority to)	Case No. 13-2385-EL-SSO
Establish a Standard Service Offer)	
Pursuant to §4928.143, Revised Code,)	
in the Form of an Electric Security Plan)	
)	
In the Matter of the Application of)	
Ohio Power Company for Approval of)	Case No. 13-2386-EL-AAM
Certain Accounting Authority)	

**DIRECT TESTIMONY OF
BRAD COPITHORNE
ON BEHALF OF
OHIO ENVIRONMENTAL COUNCIL AND ENVIRONMENTAL DEFENSE FUND**

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1 **Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.**

2 **A.** My name is Brad Copithorne. My business address is 123 Mission Street,
3 28th Floor, San Francisco, California 94105.

4 **Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?**

5 **A.** I am employed by Environmental Defense Fund (“EDF”) as Financial Policy
6 Director. I am responsible for creating new markets to provide additional,
7 lower-cost financing for energy-efficiency and distributed generation
8 projects.

9 **Q. WOULD YOU BRIEFLY DISCUSS YOUR EDUCATION AND**
10 **EXPERIENCE?**

11 **A.** I graduated from Stanford University with a Bachelor of Arts and Science in
12 Industrial Engineering and Quantitative Economics. I also have earned a
13 Master of Science in Civil and Environmental Engineering from the Stanford
14 University Atmosphere/Energy Program. I started my career in investment
15 banking and held a variety of positions with Salomon Brothers, Citibank and
16 Morgan Stanley during a 20-year career. Most recently, I worked in the
17 Menlo Park office of Morgan Stanley and was responsible for the firm’s
18 relationships with the enterprise hardware and technology supply-chain
19 industries. I started working at EDF in 2010 in clean energy finance
20 activities. I currently devote most of my activities to helping develop
21 statewide on-bill repayment programs that enable third-party capital
22 financing.

23 **Q. ON WHOSE BEHALF ARE YOU TESTIFYING?**

1 A. I am testifying on behalf of EDF and the Ohio Environmental Council
2 (“OEC”), intervenors in this case.

3 **Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?**

4 A. The purpose of my testimony is to: (1) provide a brief explanation of on-bill
5 repayment (“OBR”); and (2) recommend that Ohio Power Company (“OPC”
6 or the “Company”) adopt a commercial and industrial OBR Pilot and direct
7 the Company to periodically report back to the Commission on the
8 Company’s pilot OBR program for the Company’s commercial and industrial
9 customers.

10 **Q. PLEASE DESCRIBE THE EXHIBIT ATTACHED TO YOUR**
11 **TESTIMONY.**

12 A. Exhibit BC-1, attached to my testimony, is a report entitled *On-Bill*
13 *Financing for Energy Efficiency Improvements: A Review of Current*
14 *Program Challenges, Opportunities and Best Practices* (December 2011) by
15 the American Council for an Energy Efficient Economy. It describes the
16 financing challenges in the energy efficiency space and specifically looks at
17 how an on-bill program could help customers overcome the financing
18 challenges. The key findings of the report are as follows:

- 19 • Energy efficiency in the building sector has the potential to reduce U.S.
20 energy consumption by 23%;
- 21 • Achieving these energy savings would save consumers and businesses over
22 \$100 million on their electricity bills annually;
- 23 • These investments in energy efficiency would create new jobs;

- 1 • A key barrier to these improvements is the cost of up-front financing; and
- 2 • On-bill repayment can remove this barrier and lead to greater adoption of
- 3 energy efficiency measures.

4 **Q. ARE YOU ADVOCATING THAT THE COMPANY PURSUE**
5 **INSTITUTION OF AN ON-BILL FINANCING PROGRAM?**

6 **A.** To answer the question, I first have to distinguish between an on-bill
7 financing (“OBF”) program and an on-bill repayment (“OBR”) program.
8 OBF utilizes ratepayer or taxpayer funds to finance energy efficiency or
9 renewable generation improvements and usually places the utility in the role
10 of the underwriter. As explained below, OBR is funded entirely by private
11 investors. OBF programs are operating in many states and can produce low
12 financing rates but they are proving difficult to scale and can have poor
13 customer service. OBR programs are operating in fewer states but show
14 greater promise in terms of fostering development of a secondary market. I
15 am advocating that the Company adopt an OBR pilot program for
16 commercial and industrial customers.

17 **Q. PLEASE EXPLAIN OBR IN GREATER DETAIL.**

18 **A.** On-bill repayment can provide an opportunity for residential, commercial and
19 industrial property owners to finance energy efficiency improvements (and
20 sometimes distributed renewable energy investments) with capital provided
21 by non-utility third-party investors. Under OBR, a third-party investor, like a
22 bank, finances one or more energy efficiency or renewable energy
23 improvements for a property. The financing is repaid through the property’s

1 utility bill. The repayment obligation runs with the meter, meaning that it
2 survives transfers in ownership and occupancy, which allows for longer term
3 loans with lower interest rates. The program can work for single-family,
4 multi-family, commercial and industrial buildings.

5 **Q. WHAT DESIGN PRINCIPLES DO YOU RECOMMEND FOR THE**
6 **DEVELOPMENT OF A UTILITY OBR PROGRAM?**

7 A. The first guiding principle in designing an OBR program is that a utility
8 company should not be in a worse financial position by participating in OBR.
9 Using this principle, utilities should not be liable for OBR charges; banks
10 should share in the bill losses. It is my understanding that banks will
11 participate in an OBR program only if their payments have equal priority as
12 the utility's energy payments. We believe a program can be designed that
13 meets this requirement and reduces the utility's credit losses.

14 The second guiding principle is that the program would be bill
15 neutral. This means that energy efficiency projects would be eligible for
16 financing under this program only if the expected energy savings on the
17 customer's electric bill are greater than the monthly on-bill repayment
18 charge. The Commission's most recent technical reference manual would be
19 used to project whether the expected energy savings would exceed the
20 monthly on-bill repayment charge.

21 The third guiding principle is that the energy efficiency improvements
22 would run with the meter. In other words, the utility would disconnect
23 electric service if the customer fails to pay the monthly on-bill repayment

1 charge. In addition, the utility's tariff would require customers initiating new
2 electric service to a property covered by an on-bill repayment obligation to
3 assume the obligation to pay the monthly on-bill repayment charges from the
4 date they begin electric service for such property. This requirement will
5 result in lower financing rates than would otherwise be available. It is
6 reasonable that new customers assume an existing on-bill repayment
7 obligation because they benefit from lower electricity bills.

8 The fourth principle is that the on-bill repayment charges are treated
9 as equivalent to the utility's regulated transmission and distribution charges
10 and receive equal payment priority. This is consistent with the other
11 principles that utilities should be no worse off by adopting this program, as I
12 will discuss later in my testimony. This requirement will result in lower
13 financing rates than would otherwise be available.

14 **Q. WHAT BENEFITS WOULD AN OBR PROGRAM PROVIDE?**

15 **A.** The benefits of OBR include:

- 16 • Customer access to lower-cost capital for energy efficiency or
17 renewable energy improvements (OBR loans often come at lower
18 interest rates because of the credit enhancing impact of tying the loan
19 to the customer's utility bill);
- 20 • Acceleration of clean energy investments and emissions reductions;
- 21 • Deferral or elimination of new generation capacity and reduced use of
22 higher-cost generation for ratepayers.
- 23 • No direct costs to taxpayers or ratepayers;

- 1 • Reduced program costs through a scalable platform and standardized
- 2 processes; and
- 3 • Job creation.

4 **Q. WHAT IMPACT WOULD OBR HAVE ON THE COMPANY'S BAD**
5 **DEBT LOSSES?**

6 A. OBR should reduce the Company's bad debt losses. I have attached
7 Copithorne Exhibit 1 to demonstrate this. The exhibit demonstrates two
8 scenarios. In the first scenario, the customer makes full payment of the
9 electric bill. The Company is not harmed by the on-bill repayment program
10 because the customer has paid in full. In the second scenario, the customer
11 makes a partial payment, paying one-half of the amount due on the electric
12 bill. The Company is not harmed by the on-bill repayment program because
13 the energy efficiency project has reduced the customer's monthly electric bill
14 and the partial payment results in a smaller loss for the Company than would
15 have occurred without the energy efficiency project.

16 **Q. HAVEOEC AND EDF PROPOSED AN ON-BILL REPAYMENT**
17 **PROGRAM IN OTHER REGULATORY PROCEEDINGS?**

18 A. Yes. Most recently, during the Commission's Investigation of Ohio's Retail
19 Electric Service Market (12-3151-EL-COI), OEC requested that the
20 Commission adopt OBR to finance energy efficiency and renewable
21 electricity generation projects. However, in its recent Finding and Order the
22 Commission denied that request as outside of the scope of the Investigation,

1 but suggested that it may be included in the discussions of the Market
2 Development Working Group.

3 **Q. WHY ARE YOU RECOMMENDING AN OBR PILOT OR SIMILAR**
4 **PROGRAM FOR COMMERCIAL AND INDUSTRIAL CUSTOMERS**
5 **ONLY?**

6 **A.** In my experience, most of the key stakeholder and Company concerns arise
7 in the context of an OBR program aimed at residential customers. Many of
8 these same concerns would not be present if an OBR program were aimed
9 solely at commercial and industrial customers. A program or pilot aimed
10 solely at commercial and industrial customers would have the ancillary
11 benefit of incentivizing these customers to opt-in to the Company's EE/PDR
12 Rider. Although I am not an attorney, I understand that the Commission may
13 be able to adopt an OBR program for commercial and industrial customers
14 under existing legislation, while this may not be true for residential
15 customers.

16 **Q. HAS EDF ESTIMATED THE CLEAN AIR IMPACTS FROM OBR?**

17 **A.** Yes. On a national basis, EDF estimates that OBR could help to avoid 1,152
18 million metric tons of carbon dioxide equivalent over the course of a decade,
19 or about the equivalent of taking 288,000 cars off the road. In Ohio, EDF
20 estimates that OBR could mitigate 44.1 million metric tons of carbon dioxide
21 equivalent over the course of a decade, or roughly equal to taking 11,000 cars
22 off the road.

23 **Q. HAS EDF ESTIMATED THE JOB IMPACTS FROM OBR?**

1 **A.** Yes. On the national level, EDF estimates that expanding low-cost energy
2 efficiency financing, through programs like OBR, could boost employment
3 job-years by 615,000 nationally over the next decade (a job-year is a full-time
4 job that lasts for one year), and by 21,000 job-years in Ohio alone.

5 **Q. HAS EDF ESTIMATED THE ECONOMIC IMPACTS FROM OBR?**

6 **A.** Yes. In Ohio, EDF estimates that OBR will catalyze \$3 billion in
7 incremental clean energy investment over a decade.

8 **Q. HAVE ANY OTHER STATES IMPLEMENTED OBR PROGRAMS?**

9 **A.** Yes. California, Connecticut, and Hawaii have approved the OBR concept
10 and are in the process of implementing their programs.

11 **Q. WHAT RECOMMENDATION DO YOU MAKE REGARDING OBR?**

12 **A.** I believe that instituting a commercial and industrial OBR program in Ohio
13 would offer the Company's commercial and industrial customers another
14 option for overcoming the up-front capital hurdle to making energy
15 efficiency improvements. Offering this option to the Company's commercial
16 and industrial customers could lead to reduced opt-out and significantly
17 enhance implementation of energy efficiency measures in the State. For this
18 reason, I recommend that the Commission strongly encourage the Company
19 to develop a commercial and industrial OBR Pilot and direct the Company to
20 periodically report back to the Commission on the Company's pilot OBR
21 program for the Company's commercial and industrial customers.

22 **Q. DOES THIS CONCLUDE YOUR PRE-FILED DIRECT TESTIMONY?**

23 **A.** Yes.

**ON-BILL FINANCING FOR
ENERGY EFFICIENCY IMPROVEMENTS:**

**A REVIEW OF CURRENT PROGRAM CHALLENGES,
OPPORTUNITIES, AND BEST PRACTICES**

Catherine J. Bell, Steven Nadel, and Sara Hayes

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EXECUTIVE SUMMARY

Energy efficiency investments are a cost-effective means for decreasing energy consumption, enhancing building comfort, and reducing utility bills. McKinsey & Company estimates that cost-effective energy efficiency improvements across the building sector in the United States has the potential to reduce annual electricity consumption by over 23 percent, resulting in a reduction in electricity and natural gas bills for American consumers and businesses of over \$100 billion annually. Energy efficiency investments that reduce the overall costs of energy services have the potential to boost the overall economy and to induce and sustain jobs (ACEEE, 2011).

Despite the benefits of energy efficiency investments, high upfront costs continue to be a significant barrier to leveraging retrofits to achieve potential monetary and energy savings across the building sector. Over the past several decades, a number of innovative energy efficiency financing program designs have emerged with the intent of reducing the upfront costs for energy efficiency improvements and assisting owners in the residential and commercial building sectors in achieving maximum energy savings. On-bill financing is a financial mechanism that is in many ways uniquely positioned to reduce first-cost barriers in several building markets, some of which have traditionally been underserved by energy efficiency finance.

On-bill financing generally refers to a financial product that is serviced by, or in partnership with, a utility company for energy efficiency improvements in a building, and repaid by the building owner on his or her monthly utility bill. Programs can be tailored to the industrial, commercial, and residential sectors.

Advantages to on-bill financing include the ability to leverage a utility's unique relationship with energy customers to provide convenient access to funding for energy efficiency investments. In many cases, it allows customers to pay back part or all of the cost of their energy efficiency improvements with the money saved on their monthly utility bills. Additionally, financing can be extended to previously underserved markets, such as rental and multifamily buildings, by being structured as a service charge that follows the meter. There is also potential for traditionally credit-constrained customers to gain access to financing through modified underwriting that takes bill payment history into account. Furthermore, on-bill financing has the power to attract capital from previously untapped sources because customers tend to prioritize their utility bill payments and this is viewed by some investors as a form of security.

Currently, at least 20 states are home to utilities that have implemented or are about to implement on-bill financing programs, many of which (Illinois, Hawaii, Oregon, California, Kentucky, Georgia, South Carolina, Michigan, and New York) have legislation in place that supports or requires adoption. Additionally, a number of state utility regulators have taken action to explore the feasibility of on-bill programs.

While our research indicates that on-bill financing is indeed an attractive means for removing first-cost barriers to the adoption of energy efficiency improvements, it still faces a number of challenges to achieving widespread adoption. These challenges include upfront costs to utilities that need to modify their billing systems, a perception that utilities must function as a financial institution to participate in on-bill financing, risks of non-payment of the finance charge, handling the transfer of property, finding capital, and addressing non-utility fuels.

No two on-bill programs are exactly alike. This fact can be attributed to the diversity of utility and regulatory structures, the specific needs of different communities, and the differing state and regional legal and regulatory landscapes. Fortunately, we appear to be entering an era of experimentation, as the number of on-bill programs is growing, providing many opportunities to learn from experience. Beyond the shared characteristic of on-bill repayment, these programs varied in their sources of capital, financing product design, target market, and overall implementation strategy. There is no consistent "one-size-fits-all" approach to on-bill financing. Rather, it is an innovative collection mechanism that can be utilized in variety of ways to optimize its net benefit across a diverse array of communities.

Important considerations for augmenting and implementing on-bill programs include understanding underlying financial incentives, and applicable laws and regulations as well as how risks are distributed amongst stakeholders. Given the variety of sector and community-specific energy efficiency finance needs, as well as differing utility business models, flexibility in terms of program design is essential. Community-based organizations can also act as liaisons among numerous stakeholders. Policymakers can contribute to program expansion and success by removing legislative barriers, establishing risk-sharing mechanisms such as loan-loss reserves, improving access to capital, and providing technical assistance for regulatory compliance.

INTRODUCTION

Background

Energy efficiency investments are a cost-effective means for decreasing energy consumption, enhancing building comfort, and reducing utility bills. ACEEE estimates that cost-effective energy efficiency improvements across the building sector in the United States has the potential to reduce annual electricity consumption by over 23 percent, resulting in a reduction in electricity and natural gas bills for American consumers and businesses of over \$100 billion annually (Eldridge et al. 2010; Granade et al. 2009; EIA 2009). Energy efficiency investments that reduce the overall costs of energy services have the potential to boost the overall economy and to create and sustain jobs (ACEEE, 2011).

Despite the benefits of energy efficiency investments, high upfront installation costs continue to be a significant barrier to leveraging retrofits to achieve potential monetary and energy savings across the building sector. Over the past several decades, a number of innovative energy efficiency financing program designs have emerged with the intent of reducing the upfront costs for energy efficiency improvements and assisting owners in the residential and commercial building sectors with achieving maximum energy savings. On-bill financing is a financial mechanism that is in many ways uniquely positioned to reduce first-cost barriers in several building markets, some of which have traditionally been underserved by energy efficiency finance.

On-bill financing programs can leverage a utility's unique relationship with energy customers to provide convenient access to funding for energy efficiency investments. In some cases, they allow customers to pay back all or a part of the cost of their energy efficiency improvements with the money saved on their utility bills. In other words, the total of the monthly utility bill will decrease or remain the same across the life of the investment because the monthly energy savings are equal to or greater than the repayment charge. Financing can be extended to historically underserved markets such as rental and multifamily buildings, by being structured as a service charge that follows the meter. There is also potential for traditionally credit-constrained customers to gain access to financing through modified underwriting that takes bill payment history into account.

To date, on-bill programs have gained traction in a number of different states and have achieved varying degrees of success. Such programs have been implemented in a variety of different ways to promote their adoption depending on specific customer and stakeholder needs. We were able to identify programs administered by investor-owned utilities, cooperatives, state energy offices, community development financial institutions (CDFI's), and other third-party providers. Beyond the shared characteristic of on-bill repayment, these programs varied in their sources of capital, financing product design, target market, and overall implementation strategy. There is no consistent "one-size-fits-all" approach to on-bill financing. Rather, it is an innovative collection mechanism that can be utilized in a variety of ways to optimize its net benefit across a diverse array of communities.

What Is On-Bill Financing?

On-bill financing generally refers to a financial product that is serviced by or in partnership with a utility company for energy efficiency improvements, and repaid by the customer on his or her monthly utility bill. In some cases, energy savings are sufficient to cover the monthly payments for the financing so that the total monthly charges on utility bills are less than or equal to the pre-investment amount. Programs can be tailored to the industrial, commercial, and residential sectors.

There are numerous advantages to bundling loan repayment with other charges on utility bills. On-bill repayment mechanisms are more convenient when compared to other energy efficiency finance programs that require the program participant to continue paying the utility bill, as well as an additional bill from the financier. On-bill financing leverages the program participant's existing relationship with the utility company and can reduce some of the upfront costs, such as time and effort, of seeking out a new relationship with a financial institution. Additionally, the utility company can utilize information that it

already has from the customer to assist in its assessment of creditworthiness. On-bill financing also creates a clear link between energy use and savings, enabling a program participant to relate a reduction in energy consumption with the investments made through the loan program. Furthermore, additional financial incentives available through the utility, such as rebates, can be bundled with financing to enhance the attractiveness of efficiency improvements.

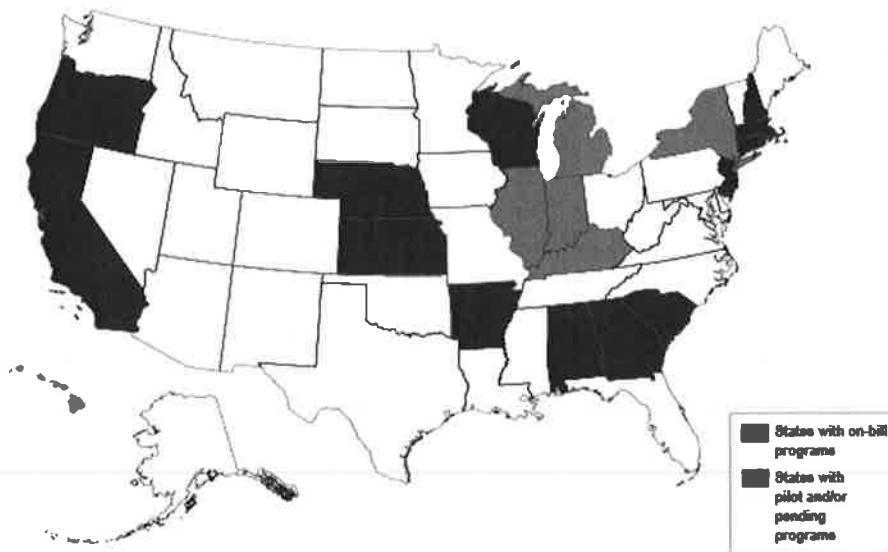
In addition, there appears to be a perception from the capital investor perspective that on-bill programs are a more secure investment than other energy efficiency loan programs since utility bill payments tend to be a high priority for customers (Byrd and Cohen 2011). Sweatman and Managan (2010) cite on-bill financing as a key to “de-risking” financing repayment streams since the attachment of the charge to an existing collection channel provides: a collection track record; an existing customer repayment relationship; security; and back-office and collection resources that are already in operation with the large number of buildings required for optimal retrofit portfolio numbers.

Another advantage to on-bill financing is that it can be structured to address issues that other financing mechanisms have not; namely, financing efficiency improvement needs in rental properties and extending an attractive financial product to individuals that do not plan to stay in their homes for very long. On-bill tariff programs (a subtype of on-bill finance programs) often link the investment and its repayment to a unit’s meter, essentially linking the product to the property and not the individual customer.

While on-bill financing is a promising means for removing first-cost barriers to energy efficiency improvements, on-bill programs face a number of barriers to achieving their full potential. In this report we look into 19 on-bill programs currently in development or underway across the U.S. We focus on barriers as well as other factors that are unique to on-bill finance including issues from a utility, consumer, and financial industry perspective. We conclude with some insights on how legislators and regulators might begin to address these issues.

THE STATE OF ON-BILL FINANCING

Figure 1. States with On-Bill Programs



Sources: Brown 2009; DSIRE 2011; Fuller 2009, Hayes et al. 2011a; LCEA 2011
 Notes: States with on-bill programs—AL, AR, CA, CT, GA, KS, MA, NE, NH, NJ, OR, RI, SC, and WI.
 States with pilot and/or pending programs—HI, IL, IN, KY, MI, and NY.

Currently, at least 20 states are home to utilities that have implemented or are about to implement on-bill financing programs, many of which (Illinois, Hawaii, Oregon, California, Kentucky, Georgia, South

Carolina, Michigan, and New York) have legislation in place that supports adoption. Additionally, a number of state utility regulators have taken action to explore the feasibility of on-bill programs.

Sources of Capital

Current sources of capital for on-bill programs are varied. Table 1 examines a variety of methods for capitalization of on-bill finance mechanisms, and lists some of their strengths and weaknesses.

Many on-bill programs received their initial capital from funds made available through the American Recovery and Reinvestment act (ARRA), and a number of forward-thinking states have set up revolving loan funds to extend the benefit of these federal funds. Yet, ARRA funds alone are insufficient in many cases to meet the market demand for affordable energy efficiency finance. Looking forward, some programs are leveraging government loan programs such as USDA's Rural Utility Service (RUS) as a stable source of capital.

In the current economic environment, capital for energy investments is limited and may only be available for program designs with the potential for substantial loan flow and low risk to investors. Innovative program designs have been able to tap into sources of capital previously unavailable to energy efficiency programs. For instance, several programs, such as the Oregon MPOWER, Oregon Clean Energy Works, and Kentucky MACED programs, which are administered by Community Development Financial Institutions (CDFI's), have been able to leverage CDFI funds as a source of capital for their projects. CDFI's offer loan products and financial services to consumers that are difficult for traditional financial institutions to serve.

Some program administrators are also exploring the potential of bundling on-bill loans with other financial products, and creating a secondary market for capital. The current perception is that on-bill loans are cost-effective, low risk, and would offer a modest return. It is possible, given appropriate risk assessment, that financial institutions could market low-risk securities comprised of bundled on-bill loans to a secondary market to augment available capital. However, there are also major barriers to tapping secondary markets such as uncertainty surrounding the behavior of energy efficiency as an asset class, uniformity of loan products, and lengthy returns on investment (Freehling 2011).

There is some perception that utility bill payments (and therefore on-bill charges) are a high priority for customers, which means the risk to investors may be lower than in other energy loan products. This belief stems from the notion that customers understand that non-payment of the bill can result in utility shut-off leading to further losses such as spoiled food and health risks inherent with lack of climate control. In fact, all of the on-bill loan programs that we examined touted a default rate ranging from 0 and 2 percent, with the exception of Southern California Edison's program in its pilot stage, which had a default rate of 6.8 percent. If investors can assume that these loans are sound investments, on-bill finance has the potential to attract more third-party capital to the market (Byrd and Cohen 2011).

Table 1. Sources of Capital for On-Bill Programs

Capital Source	Strengths	Limitations
Utility		
Ratepayer Funds	<ul style="list-style-type: none"> • Low-cost source of capital. • Accessible to utilities. 	<ul style="list-style-type: none"> • Non-payment risk lives with utility and its ratepayers. • Finite available funds impose limits to program growth and expansion.
Public		
Grants (Federal, State, Local) <i>Example: ARRA</i>	<ul style="list-style-type: none"> • Low-cost source of capital. • May be sizable. 	<ul style="list-style-type: none"> • Likely to be limited in the future. • Not always available year after year. • May impose limitations on program design.
Public Loan Funds <i>Example: USDA Rural Utility Service Loans</i>	<ul style="list-style-type: none"> • May be more sustainable compared to one-time grants. • Can assist programs in building creditworthiness. 	<ul style="list-style-type: none"> • May be perceived as risky to taxpayers.
Bond Issues	<ul style="list-style-type: none"> • Potentially low interest rates and favorable terms. • Could be tax-exempt. 	<ul style="list-style-type: none"> • Contingent upon voter approval in many cases. • OBF investments may have a long repayment period and are likely modest, which makes it difficult to correlate with bond maturity.
Revenue from Cap and Trade Programs <i>Example: Regional Greenhouse Gas Initiative</i>	<ul style="list-style-type: none"> • Innovative and possibly unbudgeted source of capital. 	<ul style="list-style-type: none"> • Programs need to be available and be lucrative.
Private		
Community Development Financial Institutions (CDFI's)	<ul style="list-style-type: none"> • OBF objectives synergistic with CDFI mission. • Can assist programs in building creditworthiness. • Can act as partners in program administration. • Can leverage relationships with other financial institutions to expand access to capital. • Prior experience with lending to underserved markets can facilitate effective risk management. 	<ul style="list-style-type: none"> • Sometimes limited resources when compared to other private sources of capital, which may make it difficult to bring programs to scale.
Local Banks and Credit Unions	<ul style="list-style-type: none"> • Experience in providing financial services to the community can improve program access and facilitate effective risk management. • Can act as partners in program administration. • Can expand access to private capital. 	<ul style="list-style-type: none"> • May have limitations with regards to lending terms (constrained by industry underwriting standards).
Large Commercial Banks and Capital Markets	<ul style="list-style-type: none"> • Potential resources for bringing programs to scale. • Opportunities for exploring the full potential of energy efficiency investments. 	<ul style="list-style-type: none"> • Current scale and diversity of on-bill programs make it difficult to determine its characteristics and value as an asset class. • May be restricted by traditional measures of creditworthiness, and could limit opportunities for underserved participation.

Credit and Financial Enhancements

In a number of states, public benefit funds and utility funds (both financed through utility rates) have stimulated the development and implementation of on-bill programs. Public benefit and utility funds can be used not only for program capital, but also as a means of minimizing risks to investors by enhancing the credit quality of the financial product. States can use these funds to create loan loss reserves or guarantees to hedge against default risk for on-bill loan programs. Additionally, these funds can be used to buy down interest rates to make on-bill programs more attractive to customers (Brown 2009).

In addition to public benefit and utility funds, other sources of funds can include state and local tax revenues and bond issues as well as funding from federal programs such as Community Development Block Grants, the State Energy Program, and special federal initiatives. In recent years the American Recovery and Reinvestment Act (ARRA) has provided an abundant source of funds to states and municipalities for energy programs.

Program Administration

Currently, on-bill programs are administered in a variety of different ways. The structure of the program depends on the utility's business model, a state's utility regulatory structure, the needs of the client base, and the source and availability of program capital. Programs can be administered by the utilities themselves, a third-party lending institution such as a community development financial institution, a branch of the state energy office, or a third-party service organization. A complete list of program administrators for the programs we profiled can be found in Appendix A.

On-Bill Loans vs. Tariffs

On-bill financing mechanisms can typically be divided into two categories: loans and tariffs. The precise definition of a loan or a tariff can vary depending on the unique laws and regulatory structures in individual states. Typically, an on-bill loan program will extend financing to an individual or company and typically is non-transferable. Thus, when a home is sold, the loan must be paid off, or in some cases, it will follow the initiating borrower. Our review of various on-bill programs indicates that loan programs are most often administered to small commercial and industrial customers. While some on-bill loan programs exist for the residential sector, they are less common. Our discussions with program administrators indicate that this is often due to consumer lending laws. Program administrators that we interviewed often cite the complexities of complying with consumer lending laws plus a lack of desire to act as a financial institution as barriers to offering loans to residential customers. Such laws vary from state to state.

A tariff can refer to any number of rates or charges imposed by a utility. On-bill tariffs are a mechanism for charging customers for energy efficiency investments or upgrades provided as a service by the utility. On-bill tariffs assign a financial obligation to a property (often by tying the service to the building's meter), allowing the receivables incurred from the investment or upgrade to transfer to subsequent owners or renters. As discussed below, in many states tariffs are not considered loans and thus are subject to different laws and regulations. In addition, tariffs address gaps in energy finance for rental customers and also allow the flexibility to match financing terms to the extended payback period for some energy efficiency improvements (Fuller 2009).

On-bill tariff programs are often similar to a Pay as You Save (PAYS) model. The Pay as You Save Model requires that financing be structured to be repaid completely through energy savings from installed measures. While many programs are designed to be "bill-neutral," meaning that utility bills should be less than or equal to what they were before efficiency measures were installed, it is not always a requirement.

On-bill tariff programs have shifted away from issuing debt, and instead have reframed their product as energy efficiency services. For instance, Blue Tree Strategies in Oregon is in the process of developing an on-bill tariff program (the MPower Program) for the multifamily residential market. In this program, multifamily building owners can enter into a ten-year energy services contract with their utility to obtain

the installation of energy efficiency measures. The owner is then responsible for repaying the tariff(s) charged to the building's meter(s) to the tenants. This charge is designed to be less than or equal to the financial savings resulting from the installed measures (Warner 2011).

On-bill tariff programs can be attractive to utilities since they often do not have to stray too far from their business model in order to implement them. The process for imposing a voluntary tariff is one that may be familiar, and the product does not necessarily have to offer debt to consumers. Such a distinction can be necessary for a municipal utility that is statutorily prohibited from lending to its ratepayers.

Target Audiences

While in theory on-bill financing could be made available across all markets of the building sector, the majority of existing programs target small businesses and homeowners. A particularly powerful opportunity exists for small business, which traditionally have limited access to capital for energy efficiency investments. Brown (2009) points out that small businesses find the following factors of on-bill financing attractive: (1) It is turnkey and simple for the small business; (2) It is linked to the credibility of a utility measurement and verification program that assures that the project will deliver the energy and cost savings it promises; and (3) It offers an immediate financial benefit. According to Brown, utility bill savings of 15 to 30 percent are "highly typical" in eligible locations and properties within this sector.

In the market for homeowners, on-bill financing can expand access to financing. Customer prioritization of the utility bill makes underserved residential markets more attractive for lenders. For example, in Indianapolis, the Indianapolis Neighborhood Housing Project (INHP), a CDFI partnering with the City of Indianapolis's on-bill program, was able to modify underwriting standards to extend finance to households that would be ineligible for other programs (Hazlett 2011).

A recent trend in on-bill programs is to target multifamily households. On-bill tariff programs are evolving to suit a number of multifamily markets and to combat well-documented issues regarding split incentives, and which party, landlord or tenant, bears default risks. Examples of how this is accomplished are seen in the discussion on the Kansas How\$mart, Kentucky How\$mart, and Oregon MPower programs below.

Legislative and Regulatory Support

Legislative support for on-bill financing appears in several forms. Several states, such as Illinois, Michigan, Hawaii, and most recently, New York have enacted legislation to facilitate the creation of pilot programs in their states (LCEA 2011). Others have received instruction from regulators to implement on-bill programs. In 2009, Illinois enacted Public Act 096-0033 (SB 1918), which mandates that utility companies provide on-bill financing options to residential customers. The act requires electric utilities with more than 100,000 consumers to offer an on-bill financing program approved by the Illinois utility commission to allow consumers to borrow funds from a third-party lender for the purchase of pre-approved energy efficiency measures and to pay back those funds over time through their electric utility bill (Illinois General Assembly 2009).

In 2009, New York State enacted the Green Jobs/Green New York Act (GJGNY), which established a revolving loan fund to finance energy efficient improvements in the residential, small business, nonprofit, and multifamily building sectors. On June 22, 2011, the New York State Legislature passed The Power NY Act of 2011 (PNY), which updated the prior bill to include a mechanism that would allow customers to repay the loans through on-bill financing (Gerrard, Fucci, and Johnson 2011).

South Carolina's on-bill financing programs are supported by Section 58-37-50 of the South Carolina Code of Laws. Section 58-37-50 passed in 2010 and allows for utilities to lend to their members (Couick 2011). The leadership of the Electric Cooperatives of South Carolina (ECSC) and other cooperatives has been pushing for federal legislation and other federal program support to make funds more readily available to cooperative on-bill programs.

Regulators have also worked to advance on-bill programs in their states. In Georgia, for example, the state energy office issued a request for proposals to extend funds to on-bill programs. States such as Kentucky and Oregon have passed regulations to allow the establishment of voluntary tariffs for on-bill financing.

In 2005, the California Public Utilities Commission (CPUC) set goals for utilizing energy efficiency as the first resource for meeting California's energy needs. In 2010, the CPUC passed D.09-09-047, which directed all of California's investor-owned utilities to utilize \$40 million in loan funds to extend on-bill loans to non-residential customers making energy efficiency improvements. This rule prompted the implementation of new on-bill programs, and enabled the expansion of existing ones (Spasaro 2011a).

PROGRAM PROFILES

Our analysis of on-bill programs is comprised of information collected through a thorough review of the existing literature including academic articles, industry papers, existing regulation and legislation, and news reports. Additionally, we complement our secondary research with information learned through conversations with four subject matter experts and 20 program administrators.

We examined 19 of 31 existing on-bill programs that we were able to identify through our research.¹ In this report we provide detailed information about prior and existing on-bill programs, and discuss their design and performance. We also highlight some of the key factors that contribute to program success, as well as some lessons learned.

It is important to note that many of these programs are relatively new or pilots, and may not have detailed performance data available yet. This makes it difficult to give reasonable estimates of the potential impact of these programs. However, we are able to note promising elements of the programs that can be improved upon, replicated, and given greater legislative and regulatory support to achieve a broader impact.

Table 2 beneath the program profiles provides a high level comparison of some key program characteristics.

On-Bill Loan Programs

New London Resource Project (1993-1995)

On-bill financing is not a "new" concept. It has been around for a number of years, only now we are starting to see it become more prevalent. An early example of an on-bill program is the New London Resource Project in Wisconsin. This program was in place from 1993-1995.

The New London Resource Project was initiated by the Public Service Commission of Wisconsin for the purposes of demand-side management to reduce the need for additional power plants. It was sponsored by the Wisconsin Public Power Company, Inc. (WPPI) and Wisconsin Gas Company. The program provided energy audits and installation of energy efficiency measures to residential, commercial, and industrial customers. At the time, on-bill financing was referred to as positive-cash flow financing, and was offered to participants.

At the conclusion of the project, participants indicated that it either met or exceeded their initial expectations. Residential energy savings from the program through 1994 were estimated to be 1.8 GWh and 93,000 therms across the life of the investments. The program reduced peak demand by 15 kW in the summer and 44 kW in the winter (McElroy & McCormick 1995).

¹ We acknowledge that other programs may currently exist or be in development.

Electric Cooperatives of South Carolina: Rural Energy Savings Program

Over the past several years, South Carolina electric cooperatives have identified a serious need for energy efficiency investment in the residential market due to the growing number of cooperative members struggling to pay their increasing energy costs, difficulties managing peak loads, and the potential need for new power plants to handle the growing demand. After assessing the economic and social costs of the current rate of energy usage, Electric Cooperatives of South Carolina (ECSC) and Central Electric Power Cooperative (Central) began to explore cost effective means of reducing the upfront costs of energy efficiency investments for their members.

In 2009, South Carolina's per capita income was \$23,688, and according to ECSC (2010), energy expenditures in these households account for 22 percent of after-tax income. A quarter of the state's cooperative customers live in manufactured homes, 35 percent of which were built before 1990 (Couick 2011).

The cooperatives were drawn to on-bill financing in part because it allowed them to leverage the cooperatives' relationships with their members to provide a convenient and trustworthy means of repayment. According to the American Customer Satisfaction Index (2011), the average cooperative in South Carolina boasts a customer satisfaction rating of 87 percent, and generally enjoys a good relationship with its customers based on trust. Since cooperative members have historically good rates of bill payment—historical data reveals that the national average for uncollectible bills is less than 0.4 percent, the cooperatives were comfortable using bill payment history to underwrite the loans.

South Carolina's on-bill financing programs are supported by Section 58-37-50 of the South Carolina Code of Laws. Section 58-37-50 passed in 2010 and allows for utilities to lend to their members (Couick 2011). South Carolina's current goals for on-bill financing are to utilize one of three strategies to apply 225,000 retrofit measures across the housing stock by 2020. The program is anticipated to impact 185,000-195,000 homes. The estimated energy savings from these retrofits are 2,668,800 MWh of electricity, and a reduction in CO₂ emissions of 2.4 million metric tons per year. Electric cooperative members living in the retrofitted homes are anticipated to save a combined total of \$270 million per year on their electricity bills (ECSC 2010). Potentially, all cooperative customers in South Carolina could benefit from the avoided costs of having to build a new power plant.

The program is currently using funds from USDA's Rural Economic Loans and Grants Program (REDLG). REDLG offers \$740,000 loans at 0 percent interest for 10 years. These loans are made to Central, which in turn lends the funds to KW Savings, a nonprofit organization that works with individual cooperatives to administer the loans to customers. KW Savings' overhead for the program pilot amounts to \$2.5 million plus donated staff time. Yet Couick maintains that the program is cost-effective since it offsets the costs associated with the potential need for additional power generation facilities to meet current demand (Couick 2011).

ECSC mines high bill complaints to identify prospective customers for the program. It looks at electricity (kW) usage per square foot to determine where there may be a need to improve energy efficiency. Loans are then initiated by customer request. The first step for obtaining a loan is for the customer to request an energy audit. If the auditor determines that there are sufficient energy savings to be gained, then the customer can select a contractor to perform the retrofit. After all energy efficiency measures are installed, a back-end audit ensures that the anticipated savings estimates still hold. The cooperatives act as collection agents for the loans. Collected funds are sent back to Central for eventual repayment to the USDA. Risk associated with inability to collect on a loan is borne by Central.

The South Carolina program is somewhat unique amongst on-bill loan programs because it is a loan program (as opposed to a tariff or service agreement) that is tied to the building's meter. This allows for flexibility for homeowners that do not wish to stay in their home for the life of the loan, and eliminates split incentive issues for tenants who bear responsibility for their utility bills. In the event that a house that received a loan is sold, the new owner is informed of, and obligated to pay, the remaining amount. If a

rental unit with a loan tied to the meter goes unoccupied, the loan is suspended, but still considered collectible, and the landlord bears no risk for repayment, unless the meter is still running (Couick 2011).

Over the life of the program, the state hopes to lend \$750 million with 20 percent in reserves to cover losses and unknowns. Interested parties are pushing for federal support through proposed legislation in both the House and Senate, which would make additional funds available through the USDA. Estimates from Coastal Carolina University claim the program will support 7,113 jobs by 2030 in areas served by electric cooperatives (ECSC 2010).

Clean Energy Works Oregon

Clean Energy Works Portland was the first on-bill repayment pilot program in Oregon. A policy framework for on-bill programs then emerged in Oregon with the 2009 passage of HB 2626, The Energy Efficiency and Sustainable Technology Act (EEAST) by the Oregon State Legislature. The legislation identified funding from an existing Small Scale Local Energy Project Loan Fund (SELP), as well as other available funds to serve as a Loan Offset Grant Fund (Energy Trust of Oregon 2010).

Clean Energy Works Portland was administered by the City of Portland. The city directed \$2.5 million (including \$1.4 million of ARRA funds) to seed a loan fund managed by Enterprise Cascadia, a regional community development financial institution (CDFI), to help 500 Portland homeowners finance weatherization of their homes. NW Natural, Portland General Electric, and Pacific Power, all investor-owned utilities, were set up to support on-bill payments. Enterprise Cascadia also received \$3.5 million from Portland Development Commission and \$2 million from Living Cities Foundation to fully fund the loan pool.

Applicants received a free energy audit and qualified for loans based on utility repayment history and a minimum credit score of 590.² All participants were required to have owned and lived in their home for at least one year. Loans are secured by participants' real property assets. The program allowed for the participants to transfer the loan for an \$850 fee if they sold the property. The median loan size was \$12,633 with a 5.99 percent interest rate and a 20 year repayment term. Energy savings minimum thresholds were set to manage program costs requiring at least 10 percent savings for basic weatherization, 20 percent for extended weatherization including wall and floor insulation, and 30 percent for extended weatherization plus installation of a furnace or heat pump. On average, project sites saved 4,249 kWh and 380 therms per year (Energy Trust of Oregon 2010).

In July 2010, the City of Portland authorized the establishment of separate non-profit organization called Clean Energy Works Oregon to take the pilot to full-scale operations and fulfill the objectives of the U.S. DOE award of \$20 million under the BetterBuildings program (competitive EECBG).

CEWO operates statewide and generally follows the Portland model. As of mid-2011, 599 loans have been issued as part of the pilot and the full program, and the program's loan portfolio is \$7,789,871. Loans are secured by participants' real property assets. Since the beginning of Clean Energy Works, only one loan has been written off, meaning the program's default rate is approximately 0.002 percent thus far (Smith and Zimmerman 2011).

According to program administrators, a critical component of the program is its ability to minimize the burden to the utility. In the Clean Energy Works model, the utility only provides a repayment service, and does not carry any financial risk. In the event a customer makes consistent late payments and appears at risk of default, the charge moves off the bill, and Enterprise Cascadia handles collections (Smith and Zimmerman 2011).

² Typically, a credit score in the mid-600s is required to qualify for a comparable loan product.

Connecticut: Small Business Energy Advantage Program, C&I Energy Efficient Loans, and Home Energy Solutions

Connecticut is home to several on-bill programs. The Connecticut Energy Efficiency Fund is a public benefits fund that was created in 1998 by the Connecticut state legislature to fund energy efficiency programs. It is comprised of public benefit funds, Class III Renewable Energy Credits, ISO-NE Forward Capacity Market Revenues, Regional Greenhouse Gas Initiatives (RGGI) and ARRA funds received which initiated in 2009 (CTEnergyInfo 2011). Additionally, utility funds are used to provide loan capital to Small Business and Municipal customers. Since it was established, Connecticut's electric companies—Connecticut Light and Power and United Illuminating—have developed and co-administered a number of on-bill programs.

In 2000, United Illuminating (UI) started an on-bill program targeting small businesses which currently offers loans between \$500 and \$100,000 to commercial and industrial customers with peak demands between 10 and 200 kW. Targeted measures include energy-efficient lighting, HVAC, and refrigeration, among others. Qualifying customers have access to a zero percent interest rate (UI 2010). The UI Small Business Energy Advantage program combines the loans with incentives that subsidize a portion (30-40 percent) of energy efficiency improvement projects. If the customer installs two or more measures, the incentives grow to 50 percent. The typical project size ranges from \$8,000 to \$12,000 and is financed over an average term of 24 to 36 months (CSBE 2011).

The UI program is operating at capacity, and has been able to shift some of its marketing funds into additional rebates and loans. A key finding from the program is that extending payback periods for loans more than doubled the number of program participants. The program uses bill payment history and does not require a credit check. Default rates are less than 1 percent of total loans. The Connecticut Energy Efficiency Fund secures the loans (Brown 2009).

Similar to UI, Connecticut Light & Power (CL&P) has administered a utility financing program since 2000. Initially the program was billed to the customer on a separate utility bill rather than on the electric bill. In 2008, CL&P began to bill the loans as an additional item on the customers' electric bill. Since its inception this program has closed over 7,000 loans valued over \$72 million. Based on 2010 actual results, this program is expected to save its average participant 20,000 kWh a year for an average life of 12.3 years (Bruno & Del Rosso 2011).

As of June 1, 2011, Connecticut's Home Energy Solutions program has offered a new residential loan program that utilizes on-bill repayment. UI requires its Home Energy Solutions customers to use on-bill repayment and CL&P offers on-bill repayment as a repayment option. The Connecticut Energy Efficiency Fund is utilized for Residential Loan program by providing loan capital, interest-rate buy-down, rebates, administrative costs and loan capital for CL&P. UI uses utility capital to make loans under this program. The program is offered to homeowners in single- or two-family homes making qualifying energy efficient improvements. Participants must select an approved contractor for a Home Energy Assessment. Loans range from \$2,000 to \$20,000 with terms extending out to 10 years (CHIF 2011).

California Investor-Owned Utilities: SoCalGas, SDG&E, and SoCal Edison On-Bill Financing

In September 2009, the California Public Utilities Commission (CPUC) directed California's investor-owned utilities to adopt on-bill financing. The two Sempra Energy utilities, San Diego Gas and Electric (SDG&E) and Southern California Gas (SoCalGas), both had programs up and running in late 2006, and their model was adopted for the other California utilities. SoCal Edison runs a similar program, and PG&E's was implemented in October of 2011 (they had an *off* bill program up until that time).

California IOU's on-bill programs are modeled after United Illuminating's (Connecticut) on-bill program, and extend loans to all business customer classes. The initial programs were started with \$40 million in ratepayer funds. Loans are a minimum of \$5,000 and can be up to \$1 million (depending on the customer

class), are issued at 0 percent interest, and are non-transferable. Additionally, loans must be coupled with rebates, which are both attractive to the customer and serve to shorten the project payback.

Spasaro (2011a) offers an example of an on-bill loan financed through the SDG&E/SoCalGas program. The loan was extended to a small restaurant to retrofit auto door closers, strip curtains, lighting, an ice machine, and a variable speed motor. The total cost of the job was \$23,000 and the restaurant was eligible for a \$3,000 rebate. The total on-bill loan amount was \$20,000 with a 3.9 year payback. The measures saved the restaurant 41,000 kWh a year, reducing electric bills \$427 a month, and the on-bill payment amount was \$416 a month. While the program is designed to be bill neutral, the outcome of this particular project was cash positive and the restaurant saved \$11 a month on its utility bill while it was repaying the loan.

As of August 2011, SDG&E/SoCalGas utilities have extended 856 loans totaling \$20,800,000, with only 7 defaults (a default rate of 0.8 percent) (Spasaro 2011b).

Southern California Edison's initial pilot program had a loan pool of around \$800,000 and extended loans to 73 customers. Of those 73, there were 5 defaults (6.8 percent) due to transfer of business ownership and deterioration of business that also led to non-payment of utility bills. Dodenhoff (2011) offers suggestions for minimizing defaults including linking on-bill financing to incentives, considering customer co-payment or down payment, monitoring business performance for commercial programs, encouraging and promoting prepayment of on-bill loans, and incorporating disconnect provisions upon loan repayment obligations.

New York: On-Bill Recovery Financing Program

In 2009, the New York state legislature enacted GJGNY legislation that established a revolving loan fund for energy efficiency improvements for residential 1-4 family dwellings (up to \$25,000), multifamily buildings (program limit \$5,000/unit or \$500,000 per building), and small businesses and not-for-profit structures (up to \$50,000) (Pitkin 2011).

Prior to this legislation, financing was available through Fannie Mae Energy Loans, though 30 percent of applications were rejected due in part to a minimum required FICO score of 640. Financing through the GJGNY platform was an attempt to lower the rate of rejection using alternative underwriting criteria. To date, the program has closed 126 loans valued at over \$1 million (Ahearn 2011).

Consumer Advocates such as the Center for Working Families (CWF) initially pushed for on-bill financing because of a concern that public benefit funds were only being extended to higher income households in the form of interest-rate buy-downs or incentives that required households to come up with their own financing. CWF saw the potential of on-bill to extend financing to low and moderate income households and to increase retrofit uptake, and lobbied to amend GJGNY with an on-bill requirement (Gelman 2011).

The Power NY Act of 2011—an extension of 2009 GJGNY legislation—was passed on June 22, 2011. The Act provides a mechanism for customers to repay loans on their utility bills (A.8510/S.5844). For the on-bill participants, each loan is secured by a mortgage on the property, and is subordinate to current or future mortgages on the property. In the event the ownership of the property is transferred prior to full repayment, the loan travels with the home, although the initial loan recipient is responsible for any arrearages at the time of sale. As is the case with many on-bill programs, utilities can be shut off in the event of non-payment. The utility bill also offers the borrower a significant set of consumer protections under New York law. The charge appearing on the monthly bill cannot be greater than one-twelfth of the project's projected annual energy savings (Pitkin 2011). Capital for the program comes from a revolving loan fund established through ratepayer funds and \$112 million representing a portion of New York's share of the proceeds from the sale of carbon allowances under the Regional Greenhouse Gas Initiative (RGGI) (Gelman 2011). Additional funds are being leveraged through the Department of Energy's BetterBuildings Fund and Qualified Energy Conservation Bonds (QECBs).

Initially, utilities were opposed to this legislation, citing the financial burden inherent in having to update their billing systems to support on-bill financing. To address this issue, the administrator of the program, the New York State Energy Research and Development Authority (NYSERDA), set aside \$500,000 in funding to defray these initial costs. Additionally, NYSERDA agreed to pay a \$100 per loan fee to a utility within 30 days of closing a loan plus a fee equal to 1 percent of the loan amount (Pitkin 2011). Utilities will also be paid for their participation by gaining credit toward mandated energy efficiency goals, which triggers incentive payments from New York's System Benefits Fund.

The legislation directed the Public Service Commission to commence developing implementation rules within 45 days of the bill's passage, and directed each utility to offer on-bill financing within 300 days. Initially, the program will be limited to 0.5 percent of each utility company's customers, but NYSERDA is directed to petition to increase this limit, and the Public Service Commission is directed to grant the increase, unless it finds negative impacts to utilities and their ratepayers result from the program (Pitkin 2011).

National Grid: Small Business and Residential Programs

National Grid has offered on-bill financing in New Hampshire, Massachusetts, and Rhode Island since 1992, and has introduced on-bill financing in New York over the past two years. Over the past three years, the programs have provided over 16,000 loans. In years prior, the program has provided approximately 4,000 to 5,000 loans on average per year. Up until recently, National Grid's program has primarily served small business customers, but it is also beginning to work with pre-approved banks that extend financing to residential customers.

Capital for the Small Business Program originally came from energy efficiency (ratepayer) funds and from shareholders. National Grid has since moved away from using shareholder funds and is in negotiations with third-party lenders to expand their available capital. Thus far, it has encountered some challenges despite offering guarantees on the loans due to a lack of familiarity on the part of large banks with this type of financing.

Financing for the Small Business Program is bundled with a 70% rebate for the installation of energy efficiency equipment. The remaining 30% of the cost of the equipment can be financed for up to 24 months. Customers are given a discount if they pay back the remainder in the first month.

Thus far, National Grid has offered over 400 loans to large commercial customers with only one default. The passage of legislation supporting on-bill financing in New York State has catalyzed National Grid's exploration of residential on-bill financing. Recently, National Grid has been working with thousands of residential customers each year through third-party banks by buying down the interest rates to 0 percent. One challenge that National Grid faces, however, is that loans offered through their current program are not designed to follow the meter. The New York legislation requires that financing follow the meter. Thus, National Grid is working to be flexible in its program design to comply with variations in legal requirements across the different states it serves (Codner, 2011).

Neighborhood Sweep Program: Indianapolis Super Bowl Legacy BetterBuildings Project

In June 2011, the city of Indianapolis, in partnership with the Indianapolis Neighborhood Housing Partnership (INHP), a CDFI, launched a finance program for residential retrofits. The project received its initial funding from a U.S. Department of Energy BetterBuildings grant. On-bill financing was included in the application for the grant, and is anticipated to be implemented to enhance customer convenience in the coming months.

The partnership with INHP was formed in an effort to leverage the financial institution's experience in servicing loan products and relationships that could augment program capital. INHP established underwriting criteria for the program based on its experience in the mortgage industry. Since, INHP initiates and services the loans, the utilities do not bear any nonpayment risk. INHP was subgranted \$3

million for a loan-loss reserve, and raised \$6 million from local banks. The goal of the program is to fund 1000 loans averaging \$6,000 prior to June 2013.

The program has encountered two major problems in setting up an on-bill repayment option: 1) retooling the utility billing system to handle on-bill repayments, and 2) figuring out how to split savings between electric and gas bills. To date, the changes to the billing system have been completed for the most part with the assistance of additional dedicated IT resources. Utilities have a stake in program success as a means to enhance their demand side management efforts. Hazlett (2011) notes that engaging utilities early in the process is critical to the success of on-bill programs.

AFC First Financial: Illinois On-Bill Programs

In 2009, the Illinois Legislature enacted legislation mandating that utility companies provide on-bill financing options for energy efficiency home improvements to residential customers. The act required electric utilities with more than 100,000 consumers to offer a Commission-approved on-bill financing program. AFC First Financial Corporation, headquartered in Allentown, Pennsylvania, was the successful respondent to the state energy office request for proposals to become the program administrator. AFC First is managing the program for on-bill projects, and is working with Covenant Bank, an Illinois community bank, who is providing \$12.5 million in permanent capital.

AFC First is working with five utilities to get programs operational. Currently, the programs are small-scale and offer financing for furnaces and ENERGY STAR® refrigerators. Loans made by AFC First are guaranteed by the utilities and all unsecured loans must be paid off on the final utility bill. Low delinquency and default rates on utility bills played a significant role in attracting AFC First to on-bill financing.

Initially, it was difficult to implement the legislation due to a debate over whether electric or natural gas utilities should collect loans for projects that result in electricity and natural gas savings. Setting up the programs has also been challenging due to prescriptive measures in the legislation that specify the amount of energy savings that need to be achieved. Utilities and AFC First have had a difficult time finding projects that meet the energy savings targets and are cost-effective (Hayes & Cohen, 2011).

On-Bill Tariff Programs

New Hampshire Electric Co-op: NHEC SmartSTART

The New Hampshire Smart Savings Through Retrofit Technologies (SmartSTART) program was started in 2002, and is offered through New Hampshire Electric Cooperative (Public Service of New Hampshire also offers a program called SmartSTART for its municipal customers). Initially, the program was called Pay as You Save (PAYS) and was designed to promote the use of CFL light bulbs with commercial and residential components. While commercial and industrial components still exist today, the residential piece was discontinued in 2003 due to administrative costs and the decrease in the cost of CFLs (Fuller 2009).

The program, as currently offered, allows its commercial and industrial customers to have energy-efficient products such as lighting upgrades, weatherization, air sealing, and insulation installed with no down payment. The cost of the improvements is repaid based on 75 percent of the estimated energy bill savings. Repayment of the loan follows the meter. Between 2004 and 2010, 27 projects were completed with a total cost of \$592,127. The average cost of projects is \$21,930. Low participation rates appear to be due in large part to the fact that the program does not typically allow customers to combine financing and incentives (Hayes et al. 2011a). The customer must choose a loan or an incentive, but not both, though some exceptions can be made. In most cases, the customers opt for a competing rebate program that offers up to 50 percent of the project cost (Snow 2011). Loan terms can be up to 5 years and the average interest rate is 5.64 percent. Currently, the program is offering a fixed rate of 5.41 percent

interest, which can vary depending on the market at closing. The average loan amount is \$10,000 (Hayes et al. 2011a).

Midwest Energy: Kansas How\$mart®

In August 2007, Midwest Energy, after consulting with the Energy Efficiency Institute regarding Pay As You Save Programs (PAYS), launched an on-bill tariff program for its residential customers (Fuller 2009). The initial pilot program served homeowners and renters in four counties in 2007, but was expanded to all of Midwest Energy's 41 county service area in 2008 (Johnson, Willoughby, and Volker 2011). The present-day program also provides commercial and industrial financing as well.

Midwest Energy has partnered with the Kansas Housing Resources Corporation (KHRC), and later with the Efficiency Kansas program, to provide investment capital at low interest rates. Both of those sources of funds have gone away, but the How\$mart® program continues. In total, approximately 350 of the 650 completed projects have utilized some low-cost source of funding. To date, 650 projects have been completed through the program. Utility project investment has totaled over \$3.7 million with customers adding another \$1.0 million to buy down project costs and pay program fees. The average program investment by the company is about \$5,700. Interest rates have varied from 0 percent to 8 percent depending on access to low-cost sources of funds. Currently, without access to low-cost money, the embedded interest rate is 5.05 percent for residential and 6.6 percent for commercial investment. The investment is not secured and there are no customer credit checks other than utility billing history. Utility service may be disconnected in the event of nonpayment (Volker 2011).

Capital for the program is first accessed through utility sources, again supplemented with low cost funding when available. From April of 2010 through July of 2011, Midwest was able to access "Efficiency Kansas" funding to buy-down interest rates. Efficiency Kansas is a program, established by the Kansas Energy Office, to encourage other utilities in the state to develop programs like How\$mart® and which funded loans through a revolving loan fund using \$37 million in ARRA funds (Efficiency Kansas 2011). The program was discontinued in July of 2011 and the funds were diverted to other projects. Prior to Efficiency Kansas, Midwest accessed some funding from the Kansas Housing Resources Corporation (Hayes et al. 2011a). Midwest Energy continues to seek other sources of low-cost funds including through the USDA's Rural Utility Service (RUS) (Volker 2011).

The How\$mart® program provides free audits to customers who complete suggested energy-efficient improvements. If the improvements are not pursued, the customer is charged \$200 for the audit. Charges on the customer's monthly bill must be less than 90 percent of estimated monthly savings. The program is marketed to customers who contact the company with billing concerns or complaints, as well as through contractors and social service agencies (Johnson, Willoughby, and Volker 2011).

Initially, the program encountered some difficulties with consumer advocates due to the threat of disconnection of utility service for non-payment. However, since the program requires bills to be lower than they were prior to the installed improvements, this argument did not impact the program's implementation. Additionally, a few alterations to legislation were required so that energy efficiency was treated as a utility service and could be supplied with a tariff (Volker 2011).

Midwest Energy estimates that energy savings from the efficiency measures are around 2,000 kWh per year for electricity projects and 260 therms per year for natural gas. The terms of the repayment are 15 years for residential projects, 10 years for commercial projects, 30 years for residential geothermal loop investments (How\$mart® GT) and 7 years for commercial lighting applications (How\$mart® Light). The participation rate for all possible program participants is 1.3 percent, after only three years of full-scale operation, which is relatively high when compared to other efficiency loan programs (Hayes et al. 2011a).

MACED: How\$martKY™

How\$martKY was inspired by the Kansas How\$mart© program. Like the Kansas program, it is an on-bill tariff program that is tied to a customer's meter. The fundamental difference between the Kansas and Kentucky programs is that Kentucky's program is administered by the Mountain Association for Community Economic Development (MACED), a CDFI.

In early 2011, MACED partnered with 4 rural cooperatives in eastern Kentucky to file a tariff with the Public Utilities Commission for an on-bill pilot program, which officially began in April 2011. The program will utilize up to \$2 million from CDFI funds and a loan from the Ford Foundation to make energy efficiency investments to improve HVAC systems and building envelopes in 200-300 homes. MACED is positioned to lend to the cooperatives, which in turn will invest in the properties and collect the tariff. Since the program's inception, 7 homes have received complete retrofits, and another 18 are in the pipeline.

The residential tariff has been approved for 2 years, and can be renewed at a later date. For the time being, MACED will only be working in the residential market because operating in the commercial market requires a separate tariff filing.

Initially, the Public Utilities Commission received a recommendation from the Attorney General's office advising them not to approve the tariff. This recommendation was handed down due to a perception that on-bill programs are all reliant on ratepayer funds. The Attorney General's office was concerned that not all utility customers would have equal access to a public benefit fund which they all paid into. It was later clarified that this concern did not apply to the MACED program, since it does not rely on ratepayer funds (Fugate 2011).

City of Portland Housing Bureau: MPower

The MPower fund is an on-bill tariff pilot designed to serve the multifamily housing market in Portland Oregon. The MPower fund's unique design allows the investor-owned utilities to pay the entire upfront cost for energy efficiency improvements in a multifamily building, and to capture those funds through a tariff that is prorated across all of the utility meters in a building.

In the MPower model, building owners enter into an energy services contract with the utility and agree to pay a voluntary energy efficiency tariff for the next 10 years. The cost of the energy efficiency services is then passed on to the tenants who benefit from the cost-saving measures and ultimately see a net reduction in their monthly utility bills (which they may split with the owner in their rental agreement).

Blue Tree Strategies illustrates this arrangement in the following example:

"In an individual unit, it looks something like this example: the fund invests \$3,000 in efficiency upgrades that produce \$300 a year in annual cost savings from energy and water efficiency. The tenants and owners, whoever pays the bill, reduce their utility bills and save \$120 per year, or \$10 per month. The remaining cost savings of \$180 per year, or \$15 per month, are captured by the fund through the tariff on the utility bill and used to repay the fund's debt service and possible investors." (Blue Tree Strategies 2011).

Over the next 3 years, the fund plans to use \$7 million from Enterprise Cascadia, the current CDFI partner with the Clean Energy Works program, to invest in 20-25 buildings. This investment is expected to generate \$750,000 in savings a year, \$420,000 of which the fund plans to collect in the on-bill tariff. The tariff will persist on the buildings bill despite changes in building ownership and tenant occupancy. A major benefit of this program design is that the charge for the investment does not affect the owner's debt position or impact the collectability of other loans outstanding (such as mortgages on the property).

ECG (Electric Cities of Georgia): On-Bill Financing

ECG is a service company for public power utilities in the state of Georgia. It was created to provide services which are not cost-effective for individual utilities, such as upgrading electric utility infrastructure, reducing costs through consolidation of resources, and improving service standards. In 2009, ECG answered an RFP from the state energy office and secured \$700,000 in funds to create an on-bill tariff program and set up a revolving loan fund. The program was started in June of 2010, and the first tariff was put in place in November of 2010 (Moore 2011).

One of the key barriers for the on-bill financing in Georgia is the fact that municipal utilities, which are owned and operated by the cities, cannot legally lend to taxpayers. So instead of providing a conventional loan, participating utilities impose a voluntary facilities improvement tariff on program participants.

Initially, 7 of ECG's member utilities were interested in the program, though only 3 went on to implement it. Utilities' chief concerns were the validity of loan loss provisions and whether or not it was worth the trouble to administer the program. Despite concerns that the customer participation would be low, all 3 participating utilities used up the initial \$700,000 fund. Today the fund is up to \$1.1 million (Moore 2011).

Due to program specifications from the state energy office, the program is offered solely to residential customers. The financing is targeted at the installation of ENERGY STAR appliances and equipment, insulation and air sealing. The maximum financing for a project is \$5,000 with 0 percent interest and a 5 year term. Individual utilities are free to set credit requirements, and all have chosen to forgo formal credit checks and use utility payment history (Moore 2011).

The program does have a formal marketing strategy, but administrators have found Lowe's Home Improvement stores, local HVAC contractors, and other approved utility contractors to be helpful partners in spreading the word. Similar programs in Georgia are administered by the Municipal Gas Authority of Georgia and Oglethorpe Power Corporation.

Table 2. Comparison of Characteristics Across Programs

Program Name	Program Characteristics																	
	Loan	Tariff	Residential	Commercial	Industrial	No money down	0% interest	Free energy audit w/ approved contractor	Back end audit	Supporting legislation	CDFI partner	Ratepayer funds	Federal funding source	Other private sector funding source	Loan-loss reserve	Revolving loan fund	Transfer with change in occupancy	Meter shut-off for non-payment
SC: Rural Energy Savings Program ^a	x		x	x		x	x	x	x	x			x			x	x	
OR: Clean Energy Works	x		x			x	x	x		x		x						
CT: Small Business Energy Advantage Program	x			x	x	x		x					x			x		x
CT: C&I Energy-Efficient Loans	x			x	x	x		x					x			x		x
CT: Home Energy Solutions	x												x			x		x
CA: Semptra On-bill Financing	x			x				x		x						x		x
CA: SoCal Edison On-bill Financing	x			x	x	x	x	x	x	x						x		
MA, NH, NY, RI: National Grid ^c	x		x	x	x	x		x	x	x				x		x		x
NY: On-bill Recovery Financing Program ^b	x		x	x			x	x		x			x					x
IL: On-bill programs	x		x				x			x								
IN: Indianapolis Super Bowl Legacy BetterBuildings Project	x		x					x	x			x						
NH: NHEC SmartStart		x	x	x	x	x	x								x		x	x
KS: HowSmart		x	x	x				x		x			x			x	x	x
KY: HowSmartKY		x	x	x				x				x					x	x
OR: MPOWER		x	x	x			x	x		x				x			x	x
GA: On-bill Financing		x	x	x			x	x					x			x	x	x

Source: Program Interviews (2011)

a. Funding comes primarily from RUS loan program, not ARRA

b. Funding comes primarily from RGGI program

c. Program offerings vary by state. Large C & I customers may incur a fee for energy audit. Loan-loss reserve is being considered.

Addressing Key Challenges

Key Barriers to Adoption

While our research indicates that on-bill financing is indeed an attractive means for removing first-cost barriers to the adoption of energy-efficient improvements, it still faces a number of challenges to widespread adoption. These challenges tend to fall into two categories—those that affect energy efficiency financing more broadly and those that are specific to on-bill finance. We discuss each in turn, but in our discussion of broad financing challenges, we emphasize how on-bill finance does or does not help address these challenges.

As mentioned earlier, Fuller (2009) provides a framework for these general challenges encountered both by on-bill financing and energy financing more broadly: limited applicability for households most in need, low participation rates, difficulty assuring that savings will exceed payments, limited support for comprehensive energy retrofits, and an inability for programs to cover their costs in some instances.

General Challenges

Low Participation Rates

Hayes et al. (2011a) found that participation rates for energy efficiency financing are generally low. In more than half of the programs for which data was available, participation rates were below 0.5 percent, meaning for the majority, less than 1 percent of customers in the targeted markets have participated thus far.

Participation for some of the on-bill programs profiled above are shown in Table 3 on the next page.

Low participation rates for on-bill programs can be due to a number of factors. Customers may perceive that improvements are costly and may not be aware of the full potential for savings. Customers that are interested in pursuing energy-efficient improvements may not know where to find contractors or be aware that financing is available. Applying for financing may be a perceived or real hassle. In some cases, creditworthiness could be a barrier to obtaining financing. In addition, many programs are new and participation has not had an opportunity to grow; some are capital constrained; and some, for varying reasons, are targeting smaller markets within a customer class.

While participation rates are generally not high, three of the on-bill financing programs have relatively high participation rates when compared to other energy efficiency loan programs in the Hayes study: United Illuminating Small Business Energy Advantage (1.5 percent participation), Kansas HowSmart (1.3 percent participation), CL&P and Small Business Energy Advantage (1 percent participation) (Hayes et al. 2011a).³ While overall participation rates are low, some programs have seen significant uptake by their target audiences. CL&P, for instance, notes that 85% of their customers who completed energy efficiency projects utilized their on-bill program. Additionally, many on-bill programs (including Electric Cities of Georgia and Rural Energy Savings Program) are fairly new and participation rates are still ramping up.

On-bill programs do have the advantage of leveraging the customer's relationship with the utility for marketing, and it may be used to shorten the application process. This is especially true for cooperatives, which tend to have very close relationships with their customers with high levels of customer satisfaction and trust (Couick 2011). Furthermore, the use of customer billing history as a proxy for creditworthiness could ensure that more customers are eligible for financing.

³ Differences in participation rates reported in the Hayes study and this study are the result of screening out components of programs that are not on-bill and updated data.

Table 3. On-Bill Program Participants⁴

Program	State	Start Date	Participation Rate for Customer Class ^a	Total Program Participants
Electric Cities of Georgia	GA	Late 2010	< 1%	119 loans
NHEC SmartSTART Program	NH	2004	<1%	27 projects
Kansas How\$mart	KS	Pilot: 2007 Full program: 2008	1.3%	627 projects
Clean Energy Works	OR	Pilot: 2009 Full program: 2010	<1%	599 loans
Small Business Energy Advantage (CL&P)	CT	2003	1.0%	6,685 loans since 2005
Small Business Energy Advantage (UI)	CT	2000	1.5%	3,903 loans
SoCal Gas and SDG&E On-Bill Financing	CA	2008	<1%	856 loans
Small Business and Residential On-Bill Programs	MA NH NY RI	1992	<1% (for the past 3 years)	16,000 loans in the past 3 years

Source: Hayes et al. (2011a), Program Interviews (2011), Program Administrators (2011), EIA (2010)

- a. This is a conservative estimate of the participation rate within a given customer class. Program goals and available capital may vary, and programs may report a different participation rate depending on methodology.

Limited Applicability for Those Most in Need

As stated above, customer creditworthiness can be a barrier to receiving financing for energy efficiency programs. However, many on-bill programs are finding ways to work around this particular issue. For starters, many of the programs profiled above use on-time utility bill payment as a proxy for creditworthiness, potentially making the program more accessible for households most in need.

On-bill programs, which assign the repayment obligation building's meter (often, tariff programs), offer innovative approaches to serving the rental market and multifamily households. Depending on their structure they can be a means to get around the well documented split incentives issue (landlords have little incentive to invest in energy efficiency since they often do not pay utility bills, and tenants have little incentive to make investments in a property that they do not own) (Mitchell and Nissen 2011). When the repayment of financing stays with the property it creates an attractive option for those who do not own their home, and those who may have plans to leave their current home in the near future.

Still tariff programs also face barriers to adoption. In some cases landlords could bear a significant risk for repayment if they cannot fill a vacancy. This is an issue that some existing programs address either by

⁴ It is important to note that many of the on-bill programs that we identify in this paper are relatively new or pilot programs, and may not have detailed data available. In many cases these programs are expected to grow in the future.

program design or through rules or legislation that mitigate risks and/or provide incentives to landlords whose tenants participate in on-bill programs.

Difficulty Assuring that Savings Will Exceed Payments

There are challenges associated with forecasting exact energy savings for energy efficiency improvements, including uncertainty surrounding future energy prices and customer behavior. With some measures (such as replacement windows), it can take quite some time before the energy savings achieved through the measure will exceed the cost of financing. Replacement windows are generally popular with residential customers, but payback periods are frequently long. This can mean that loans for such measures require longer terms, and may be less attractive to borrowers. One way that programs can and do manage this issue is to exclude certain measures from their on-bill programs if the payback period is too long. However, excluding measures can significantly decrease the overall impact of the program. Another option is to find a way to bundle efficiency measures so that savings from short payback measures help offset the costs of long payback measures. On-bill tariffs can also be used to help extend loan terms.

Alternatively, requiring customers to put some money down at the start of the investment could shorten loan terms. This option may be attractive to commercial or industrial programs where participants may really benefit from making the improvements, and might have some capital on hand to invest.

Some programs, such as the South Carolina programs provide both front and back-end audits to assure that measures have been installed appropriately and customer usage patterns are ensuring optimal savings.

Limited Support for Comprehensive Retrofits

Lack of incentive to pursue deep retrofits (retrofits with high savings, e.g. reducing energy use by 20 percent or more) is inherent to most energy-efficient loan products. While on-bill financing does not specifically address this particular issue, a number of programs do require an energy audit with an approved contractor. Home energy audits could be leveraged as an educational opportunity for the customer, and creative bundling of energy-efficient improvement products could bolster the demand for deep retrofits. It might be difficult to structure attractive loan terms for comprehensive improvements, due to longer payback periods, but offering rebates or other discounts could also provide additional incentive for deep retrofits. Also, requiring down payments or allowing for repayment to not be bill neutral may be appropriate for some programs where customers are likely to desire deep retrofits and are not easily constrained by an upfront cost.

Difficulties Covering Program Costs

As we have seen, program administrators often have a variety of means for funding on-bill programs. Large investor-owned utilities often have access to ratepayer energy efficiency funds. Smaller cooperatives may be able to partner strategically with CDFIs and local banks to reduce overhead costs. Current programs have not had widespread success in accessing private sector capital at scale. However, should existing programs demonstrate potential viability in capital markets, it is an option for the future, to reach that point, it is important for program administrators to track the performance of their financial products, and to be able to articulate to potential investors how such products perform as an asset. A next step might be to determine if there are comparable products, in terms of performance, on the market, and to document comparisons.

On-Bill Finance Challenges

Despite on-bill finance's appeal, it still faces a number of barriers to widespread adoption, and has its limits. It is not a "silver bullet" solution to all energy financing needs, and may in fact not be the optimal

solution in all cases. It may not be applicable in instances where efficiency-enabling measures cannot reasonably be paid back through energy savings in the medium term.

Major barriers to adoption include upfront costs to utilities with a need to modify their billing systems, a perception that utilities need to behave like a financial institution to participate in on-bill financing, risks of non-payment, handling transfer of property, finding capital, and addressing non-utility fuels.

Need to Modify Billing Systems

For some utilities, adding a loan payment to the bill is fairly easy, for others, much more difficult. For example, utilities in New York State were very concerned about the extensive upfront costs that they would incur overhauling their billing system so they could offer on-bill financing to customers. In response, NYSERDA established a \$500,000 fund to cover this expense for the state's utilities covered by its on-bill finance law. NYSERDA is using a U.S. Department of Energy Better Buildings Fund grant to fuel this fund. Additionally, NYSERDA has agreed to pay a \$100 per loan fee to a utility within 30 days of closing a loan plus a fee equal to 1 percent of the loan amount (Pitkin 2011).

Program implementers for the Indianapolis program have found that engaging utilities early in process is critical to identifying utility barriers to participation and their related costs.

Acting as a Financial Institution

Even in states where utilities have an incentive for participation in on-bill programs, such as energy savings targets or shareholder incentives, providing financing and acting in ways similar to a financial institution can be a major challenge.

In some states, providing financial products to the residential sector requires licensing and can have additional upfront fees (Brown 2010). For example, this is the law in California for business and consumer lending, however SDG&E/SoCalGas were able to obtain an exemption for business lending—it is not clear the exemption could be extended to consumer lending. Furthermore, utilities often lack familiarity with consumer protection laws and have finite human resources to become familiar.

Some utilities have chosen to operate tariff programs, so that they can provide a product that suits their business model better than a loan. Programs such as the MPower program, characterize their product as a service rather than a financial product. By covering the upfront costs of installation and attaching an energy efficiency service charge to a customer's bill, they avoid having to make a distinction between non-payment of the bill and non-payment of a loan. Oregon's allowance of voluntary tariffs makes this an ideal program design for the state.

Other programs seek to minimize the burden to utilities by partnering with CDFI's and other financial institutions that are experienced lenders to handle the loan product. In the case of the Indianapolis program, utilities only have to provide a repayment service to the customer, and bear none of the financial risks associated with lending.

Risks of Non-Payment

On-bill programs have historically boasted low default rates, though questions regarding who bears the risk in the event of non-payment still appear to pose a challenge. In a recent paper on a variety of energy efficiency finance programs, Hayes et al. (2011a) found that default rates range from 0-3 percent. The sample of on-bill programs is much smaller, but their default rates have tended to be less than one percent, with the exception of SoCal Edison's program, which had a 6.8 percent default rate in its pilot stage. In addition, the risk of default may be lower where utility services can be disconnected in the event of non-payment of the loan (e.g., 13 out of 16 programs profiled in Table 2). On the other hand, in New York, Vermont, and Kansas, consumer advocates have raised questions regarding the authority of utilities to disconnect in the event of non-payment (Brown 2010).

There is also a question regarding how to handle a situation where a customer pays only part but not all of their utility bill: does the bill for energy get paid first, or is the payment prorated to both energy and the loan? In New York, to address this issue, recent on-bill finance legislation provides that the energy-bill is paid first, reducing the risk to the utilities. In addition, the N.Y. legislation provides that on-bill recovery charges will survive changes in property ownership, although any arrears at the time of sale are the responsibility of the incurring customer (Pitkin 2011). In the South Carolina program, the utility is indifferent towards late payments, and repayment simply freezes (Couick 2011).

ECSC (2010) has found that in the case of on-bill, non-payment risk should in theory be very low, especially in the case of cooperatives. Cooperative consumers have a national average of less than 0.4 percent uncollectible bills. Since customer utility bills should remain the same or be reduced by on-bill financing, non-payment risk could be a very minor issue.

Additionally, credit enhancements, such as loan-loss reserves or payment guarantees, from public benefit funds are another means to spread risk of non-payment. Such enhancements can also assist programs in attracting third party private sector funding.

A key factor for the success of on-bill tariff programs targeted to renters is landlord buy-in. Landlords have few incentives to encourage their tenants to participate in on-bill programs, especially when tenants are paying the utility bills and reaping all of the benefits. In fact, landlords whose tenants take on an on-bill tariff could incur a level of risk should the tenant move and a suitable replacement is not available. Examples of how to overcome these obstacles are not currently present in the literature, though finding ways to extend benefits to landlords and minimize their exposure to risk are critical to widespread adoption of on-bill tariff programs. Oregon's MPower program is attempting to develop solutions to these issues.

In the case of the How\$mart program, a landlord can avoid having to repay investments made on a rental property by disconnecting service on a vacant property. When this occurs, Midwest Energy simply suspends repayment until a new customer moves in and accepts the charges. If the customer is not informed on his or her new lease of the repayment responsibility, then the landlord is liable for the charges for the initial term of the lease (Volker 2011).

Handling Transfer of Property

As noted in the case studies, a number of on-bill programs have provisions in place for dealing with transfer of property. Most often, the financing will follow a meter, and the burden of repayment will be assumed by the new owner or tenant. There are some questions, however, as to how best to notify a new occupant of the charge. As mentioned in the prior section, the How\$mart Kansas program requires a landlord to notify a new tenant of the charge in the initial lease. The Clean Energy Works program resolves the issue by filing a lien on the property to force notification of an obligation to the purchasing customer. Finding the ideal means to handle transfer of property depends heavily on program design.

Source of Capital

Utilities have access to capital through rates if approved by regulators. Utilities could also use their own capital, but might be reluctant to do so. As a result, many programs use third-party capital instead of rate-payer capital. It can be challenging for energy finance programs generally to attract third party sources of capital due to uncertainty regarding the return. In cases where utilities attempt to reach out to their most creditworthy customers, they can encounter difficulties in structuring loans that are attractive compared to other types of loans. The issues run deeper when programs want to extend services to those that might not be eligible for other sources of credit. On-bill has advantages over many other energy financing programs in attracting third party capital because it is perceived by the private sector as being more secure since customers tend to prioritize their utility bills. It also has the power to attract customers by leveraging their relationship with the utility.

ARRA funds continue to be a source of funding for on-bill finance programs. However, these funds were not designed to be around forever, and the fiscal climate at the Federal level is challenging. Absent these funds in the future, programs will need to find alternatives. Energy bonds and courting private sector investment are two strategies to consider (Brown 2010). South Carolina has looked to existing federal loan pools such as REDLG to sustainably fund their programs (Couick 2011). Looking forward, Zimmerman (2011) believes that states and pension funds could be a substantial addition to on-bill pools of capital.

Prior to its recent on-bill legislation, New York has established advanced underwriting standards as a means of leveraging both private and public sector funding to optimize the penetration of their on-bill programs. GJGNY legislation provides guidance for segmenting loans into two tiers. "Tier 1" loans are funded through capital markets. They are issued to highly creditworthy customers with credit scores of over 640, debt to income ratios less than 50 percent, no bankruptcy claims in the past seven years, and no outstanding collections, judgments, or tax liens greater than \$2,500. "Tier 2" loans are funded through a revolving loan fund. Creditworthiness is assessed through utility bill and mortgage payment history. Eligible customers have a debt to income ratio less than 55 percent, have not declared bankruptcy in the past 5 years, and have no outstanding collections judgments or tax liens greater than \$2,500 (Pitkin 2011).

In addition to the sources listed above, programs that partner with CDFI's can gain access to additional pools of capital such as funds in checking and savings accounts, raised through foundation grants, the Treasury's CDFI fund, and other local financial institution relationships.

Addressing Non-Utility and Differing Fuels

On-bill financing programs are very useful for financing electric and natural gas efficiency measures. There are two challenges. First, can on-bill finance be used for customers that heat their homes with non-utility fuels such as fuel oil or propane? Utilities tend to be reluctant to support efficiency investments for non-utility energy sources, and so at a minimum, sources of non-utility capital will be needed. For example, Vermont uses funds from sales of emissions allowances under a Northeast states greenhouse gas cap and trade program to fund oil- and propane-saving improvements (Coward et al. 2008). And in N.Y., fuel efficiency can be financed, but the capital comes from NYSERDA.

Second, should gas savings be financed on an electric bill and vice versa? One response is provided in the N.Y. on-bill finance legislation—the loan is placed on the electric bill unless the majority of savings are from natural gas, in which case the loan is put on the natural gas bill (Pitkin 2011).

In Illinois and Indianapolis, the implementation of on-bill financing was delayed given difficulties determining how to handle measures that result in both electric and natural gas savings. In Illinois, most programs are only offering small-scale appliance installation and are limited in scope.

PROGRAM AND POLICY RECOMMENDATIONS

Choosing a Program Design

No two on-bill programs are exactly alike. This fact can be attributed to the diversity of utility and regulatory structures, the specific needs of different communities, and the differing regional legal and regulatory landscapes. Overall this flexibility of program design extends opportunities to markets that may not have had access to financing for energy efficient improvements in the past. However, this diversity can present challenges to defining key elements inherent to successful programs for the purpose of widespread replicability. Nevertheless, it is possible to take a look at the necessary inputs to a program and break down key considerations, and to identify key elements of other programs that are applicable in a given community.

The market for energy efficiency improvements is incredibly complex due in part to the number and diversity of different stakeholders involved, and in order for an on-bill program to succeed, the economic interests of each stakeholder needs to be addressed. Stakeholders include building owners, occupants, program funders, banks, utilities, contractors and the government (Sweatman and Managan 2010). Successful on-bill programs weigh the economic interests of key stakeholders, and leverage their awareness of environmental factors to optimize outcomes.

On-bill programs may appeal to program implementers for a variety of reasons. Utilities may be interested in promoting efficiency to reduce peak loads, reduce the need for power plants, as a customer service, and to meet state-mandated or incentivized targets. CDFI's may see the provision of cost-effective energy solutions as a core component of their overall mission. Advocacy groups might seek to extend services provided through ratepayer funds to low and moderate income groups that traditionally may not have access to the funds otherwise, and as a job creation strategy. Whatever the initial draw may be, it is important for the program designer to consider how on-bill can be best implemented to reach their intended audience.

For instance, design elements from an on-bill program in an area with high rates of homeownership may not work well in a community with a lot of multifamily housing units. Furthermore, the design of a program targeting multifamily units needs to carefully consider local rental agreements to determine whether landlords or tenants bear ultimate responsibility for energy bills so that they can determine who to offer on-bill service agreements.

Frank Spasaro (2011b) highlights the following key principles for implementing on-bill programs (from a utility perspective¹) 1) Keep it simple, 2) Minimize defaults and 3) Be sure to comply with relevant lending laws.

Community-based organizations can play an important role in the implementation and administration of on-bill programs. They can assist program administrators in addressing stakeholder needs by offering their knowledge and expertise regarding the community. Also, community-based organizations often have invested time and energy gaining trust and credibility and can work to market on-bill programs to prospective customers and support customers. In New York, institutional lenders involved in developing the program have been concerned with achieving enough scale for the program to be a serious investment opportunity. Reaching that scale requires that New York create access for millions of customers who could not previously afford retrofits—and that retrofits be marketed to them by a trusted source. Community-based organizations are that trusted source, and plan to deliver thousands of retrofits over the first two years of the program. Those organizations' interest in participating is driven by the opportunity to benefit from thousands of local jobs created by the program. This is notable because most retrofit and on-bill programs have been far more focused on energy impacts; in New York, though, the twin focus on energy and economic impacts is a central strategy (Gelman 2011).

Legislative Recommendations

At the federal level, it is important to remember that on-bill programs can be implemented in a variety of ways. The best way for legislators to encourage on-bill programs and to maximize their potential impact is to determine ways to financially support the programs without being too prescriptive in terms of program design. Federal grants have been used by a number of on-bill programs to set up revolving loan funds, as well as to hedge against risks for financial loss. These funds can also be used to subsidize upfront program costs, such as the cost of retooling utility collection mechanisms to support on-bill collection.

Establishing loan loss reserves or covering on-bill programs in existing loan-loss reserves is a potential way to attract private sector capital. Loan loss reserves differ from loan guarantees by only assuming a portion of the risk—enough to make programs more attractive to investors.

A major risk to legislators attempting to promote on-bill programs is to define them too narrowly. Many on-bill programs service loans in the traditional sense, but often, programs are designed to subsidize the

upfront costs of energy efficiency investments, and are paid back as a service charge on the bill. In such cases, it is difficult to determine whether the product could technically be eligible for a traditional “loan loss” program.

Legislators can also do more to incentivize CDFI engagement in the energy efficiency finance space. Of the programs we examined, four were administered by, or in partnership with, a CDFI. CDFI's have the potential to leverage prior lending experience to mitigate risks associated with on-bill financing, and to remove some of the burdens of program administration away from utilities. Furthermore, CDFI's can broaden program access to additional sources of capital by tapping into CDFI funds and leveraging relationships with other financial institutions. Given on-bill financing's potential to penetrate low and moderate income markets; there is great potential for CDFI interest and engagement.

Many states have taken action to pass legislation that enables the proliferation of on-bill financing programs. Often, as in the case of Connecticut, California, Kansas, and Georgia, this legislation sets up a revolving loan fund or loan loss reserve from federal or ratepayer funds. Some states, such as Illinois and New York, have taken a more aggressive approach and mandated the adoption of on-bill programs. Others, such as South Carolina and Kansas have paved the way by addressing legal barriers to implementation. In Hawaii and Michigan, legislators have directed that utilities and regulators study on-bill finance options and report back to legislators so they can consider whether to take further action.

In California and Kentucky, the implementation of energy efficiency portfolio standards has been a major driver for on-bill financing programs. Energy efficiency resource standards, which are often implemented via state legislation, can serve as an incentive to reduce first-cost barriers to efficiency, and often on-bill provides a convenient mechanism for doing so.

Regulatory Recommendations

Regulators will without a doubt play crucial roles in the future of on-bill financing. One way that regulators can act to enable on-bill programs is to serve as a convener for a variety of stakeholders. Regulators often have relationships with legislators, utilities, consumer advocates, and community organizations. Often, regulators are in a unique position to bring all of these parties to the table to discuss important consideration for program design. Regulators can also work to identify barriers that need to be removed through rulemaking or legislation.

Many program administrators identified challenges associated with compliance with consumer lending laws as a barrier to implementing or expanding existing programs. Regulators can reduce the impact of this barrier by supplying technical assistance for complying with applicable consumer lending laws.

Additionally, utilities should be acknowledged for their efforts to reduce upfront costs to efficiency. Regulators can incentivize the adoption of on-bill program by extending EERS credits to utilities that implement programs.

Addressing Consumer Protection

Consumer protection is a major consideration for on-bill programs. Program administrators want to be certain that they are not imposing undue financial burdens on their customers, especially when programs are designed to serve low and moderate income households and utility shut-off is a potential consequence for non-payment of a financial product.

Yet, on-bill financing has tremendous potential to generate cost savings and improve quality of life for vulnerable consumers. In contrast, consumer protection laws can act as a barrier to implementation, especially for programs that do not have a partnership with a financial institution. Utilities do not typically have experience with consumer lending and may not be familiar with applicable laws.

At the Federal level, programs need to consider provisions in the Federal Truth in Lending Act, the Equal Credit Opportunity Act, and the Fair Credit Reporting Act. Additionally, programs need to understand and abide by state and local lending laws, as well as federal and state laws that deal with privacy and the sharing of consumer information.

This hard-to-navigate landscape of laws and regulation, coupled with stringent penalties and strong enforcement have kept some on-bill programs, such as the California IOU programs, out of the consumer lending market (Spasaro 2011b). Lawmakers, regulators, consumer advocates, and community-based organizations could assure that more consumers have access to on-bill financing by providing technical assistance and education for compliance with consumer protection laws.

CONCLUSIONS

On-bill programs have the potential to address gaps that have not been historically addressed by other energy financing mechanisms. With support from policymakers, they can do even more to provide cost and energy savings to a broad range of markets. However, on-bill programs are still generally in their infancy, and much additional work is needed to find the best ways to overcome barriers. Fortunately, we appear to be entering an era of experimentation, as the number of on-bill programs is growing, providing many opportunities to learn from experience.

It is also important to understand the limitations of on-bill financing. It is not a panacea for achieving full energy efficiency potential (Spasaro 2011; Smith and Zimmerman 2011). On-bill financing generally needs to be complemented with other program approaches such as technical assistance, contractor training, and cash incentives to reduce the amount of loan needed or buy down interest rates. In some cases, the requirement for savings to exceed monthly bill payments can be a barrier to promoting deeper retrofits. However, on-bill finance does have promise, and has strong potential to penetrate markets that would not have access to upfront capital for energy-efficiency investments.

A fundamental consideration for establishing successful on-bill program is an understanding of how financial risks are distributed. Once that understanding is achieved, taking steps to mitigate and share risks amongst key stakeholders through innovative program design and the establishment of loan loss reserves could augment program success.

Understanding applicable laws and regulations is important. Given the variety of stakeholders associated with on-bill financing, technical assistance from policymakers and community-based organizations can contribute to program expansion and success.

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APPENDIX A: CATALOGUE OF EXISTING ON-BILL FINANCING PROGRAMS⁵

Table A-1. Current Existing On-Bill Loan Programs

State	Program Name	Program Administrator	Administrator Type	Utility Type(s)
AL	ERC Loan Program	Dixie Electric Cooperative	Utility	Coop
AR	Home Improvement Loan Program	First Electric Cooperative	Utility	Coop
CA	On-bill Financing Program	SoCalGas and SDG&E	Utility	IOU
CA	On-bill Financing Program	SoCal Edison	Utility	IOU
CT	Small Business Energy Advantage	United Illuminating and Connecticut Light & Power	Utility	IOU
CT	C&I Financing Program	United Illuminating	Utility	IOU
CT	Home Energy Solutions	United Illuminating and Connecticut Light & Power	Utility	IOU
GA	On-bill Financing	ECG (Electric Cities of Georgia)	Service Company	Municipal
GA	On-bill Financing	Municipal Gas Authority of Georgia	Non-profit	Municipal
GA	On-bill Financing	Oglethorpe Power Corporation	Utility	Coop
HI	On-bill Financing	Public Benefits Fund Administrator	PUC	IOU
IL	Illinois On-Bill Programs	AFC First Financial	Energy Lender	IOU
IN	Indianapolis Super Bowl Legacy Better Buildings Project	City of Indianapolis	Government	IOU
KS	Kansas HowSmart	Midwest Energy	Utility	Coop
KY	HowSmart Kentucky	MACED	CDFI	Coop
MA	Small Business Program	National Grid	Utility	IOU
MA	Residential Program	National Grid	Utility	IOU
MI	Michigan Saves	Michigan Saves	Non-profit	Coop
MN	Shared Savings	Alliant	Utility	IOU
NH	NHEC SmartStart	New Hampshire Electric Cooperative	Utility	Coop
NH	PSNH Smartstart	Public Service of New Hampshire	Utility	Coop
NH	Small Business Program	National Grid	Utility	IOU
NH	Residential Program	National Grid	Utility	IOU
NJ	SAVEGREEN: 0% APR On-bill Repayment Option	NJNG	Utility	IOU
NY	On-bill Recovery Financing Program	NYSERDA	State Energy Agency	IOU
OR	Clean Energy Works	Clean Energy Works Oregon	Non-profit	IOU
OR	MPower	City of Portland Housing Bureau	Government	IOU
RI	Small Business Program	National Grid	Utility	IOU
RI	Residential Program	National Grid	Utility	IOU
SC	Rural Energy Savings Program	Electric Cooperatives of South Carolina	Utilities	Coop
WI	Shared Savings	Alliant	Utility	IOU

⁵ This list is may not be a complete catalogue of all existing on-bill programs.

APPENDIX B: SELECTED PROGRAM STATISTICS

Table B-1. Statistics for Selected Existing On-Bill Programs

Program	State	Start Date	End Date	Program Goals	Available Capital	Participation Rate	Total Program Participants	Value of Financing
Electric Cities of Georgia	GA	Late 2010	Ongoing	To utilize \$1.1 million by June 30, 2012	\$1.1 million	< 1%	119 loans	\$530,000 with additional \$350,000 approved
NHEC SmartStart Program	NH	2004	Ongoing	N/A	\$1 million	<1%	27 projects	\$592,000
Kansas HowSmart	KS	Pilot: 2007 Full program: 2008	Ongoing	200 projects per year	\$1 million-\$1.2 million a year	1.3%	627 projects	\$3.6 million
Clean Energy Works	OR	Pilot: 2009 Full program: 2010	Ongoing	Remodel 6000 homes for energy efficiency by end of 2013.	2011: \$12 million 2012: \$24 million 2013: \$36 million	<1%	599 loans as of mid-2011 for pilot and full program	\$7.8 million
CL&P: Small Business Energy Advantage	CT	2003	Ongoing	N/A	\$30 million	1.0%	6,685 loans since 2005	\$17.3 million
UI: Small Business Energy Advantage	CT	2000	Ongoing	348 projects in 2012	\$7.5 million	1.5%	3903 loans	\$4.1 million
Sempra On-Bill Financing	CA	2008	Ongoing	Manage defaults to less than 1.5%	\$40 million	<1%	856 loans	\$20.8 million
Small Business and Residential On-bill Programs	MA NH NY RI	1992	Ongoing	Raise \$55 million for loans for 2012	\$30-40 million energy efficiency funds, also building relationships with third party lenders	<1%	16,000 loans in the past 3 years	Approximately \$30 million over the last 3 years

Table B-2. Statistics for Selected Emerging and Pilot On-Bill Programs

Program	State	Pilot Start Date	Pilot End Date	Program Goals	Available Capital	Status
HowSmartKY	KY	April 2011	2013	200-300 homes	\$2 million	7 complete 18 in progress
NY On-bill Recovery financing Program	NY	Before April 17, 2012	After 0.5% participation reached	0.5% of each utility's customers	\$112 million	In development
MPower	OR	TBD	2014	20-25 multifamily units	\$7 million	In development
Indianapolis Super Bowl Legacy BetterBuildings Project	IN	Fall 2011	Jun-13	1000 loans	\$6 million	400 inquiries 10 have moved to closing
Illinois On-Bill Programs	IL	Summer 2011	Continuing into full scale program	Varies by utility. Compliance with 2009 legislation.	\$12.5 million from Covenant Bank	Operational
Help My House Pilot	SC	2011	2011	100 homes	\$1.5-2 million	100 loans

CERTIFICATE OF SERVICE

I hereby certify that a true copy of the foregoing has been served upon the following parties by electronic mail this 6th day of May, 2014.


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