

Residential Energy Efficiency Financing: Insights and Lessons Learned from the Better Buildings Neighborhood Program

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ABSTRACT

Through the Better Buildings Neighborhood Program (BBNP), the U.S. Department of Energy (DOE) invested more than \$500 million (including more than \$100 million loaned for home energy efficiency upgrades) in more than 40 residential and commercial energy efficiency programs nationwide. Program partners also leveraged private capital and tested new financing approaches, including alternative underwriting criteria, on-bill financing or on-bill repayment, and unsecured lending products.

The BBNP partnerships were designed to significantly leverage other sources of funds, including utilities, state and local government, other federal funds, and private capital from financial institutions. These investments resulted in the development and implementation of home energy efficiency financing programs that incorporate a variety of funding structures, implemented at geographic scales ranging from small rural towns to entire states.

This paper describes the impact and outcomes of the BBNP in delivering home energy efficiency upgrades, the role of financing in facilitating comprehensive home energy upgrades, and program design options for leveraging private capital. In addition, this paper analyzes and describes attributes of successful residential energy efficiency financing programs to help program administrators make informed decisions about the role financing can play in scaling up their home energy efficiency programs.

Introduction

The Better Buildings Neighborhood Program (BBNP) launched in June 2010 through an investment of more than \$500 million from the American Recovery and Reinvestment Act (ARRA). The program provided substantial grants (ranging from \$1.2 million to \$40 million) to 41 competitively selected state and local governments and nonprofit organizations. The program's partners are state and local governments and nonprofit organizations that work with building energy efficiency experts, financial institutions, utilities, trades, and other organizations to develop and test scalable approaches to increasing upgrades to residential and commercial buildings.

The goals of the program were to develop, test, and refine innovative approaches that enable large-scale investments in energy efficiency, expand the building improvement industry, test program delivery business models, and create jobs. Between June 2010 and December 2013, the program produced more than 100,000 upgrades to single-family homes, multifamily homes, and commercial buildings, as reported by BBNP partners. A national process and impact evaluation of the program is in progress with results expected in 2015.

Enabling access to capital and leveraging private funds were important goals of DOE's investment through BBNP. DOE expected programs to develop approaches that highly leveraged DOE funds (on a 5:1 basis), and identify ways to attract public and private investment from

multiple sources to support investments in energy efficiency. Many BBNP partners (31) established partnerships with one or more lenders and financial institutions to make capital available for energy efficiency financing. This paper describes the approaches taken by BBNP partners, financing program impacts, and lessons learned for future residential energy efficiency financing initiatives. This paper also analyzes project and loan data reported by partners, as well as results of the programs' designs as documented in quarterly and final reports submitted to DOE.

Program Design: Residential Financing Investments

Many studies and policy recommendations regarding the residential energy efficiency market have recognized the role and importance of financing in scaling up home energy efficiency upgrades to achieve the substantial investment needed to make the nation's housing stock more energy efficient (Hayes, Nadel, Granda, Hottel, 2011; Borgeson, Zimring and Goldman, 2012). BBNP partners leveraged more than \$445 million in total capital available for lending (private and other non-BBNP funds), with more than \$166 million loaned for residential, multifamily, commercial, and a few agricultural and industrial projects. BBNP partners invested approximately \$153 million in residential and commercial financing programs using a variety of financing approaches. Figure 1 illustrates the breakdown of BBNP financing mechanisms and a summary of the percent of total upgrades reported that used loans.

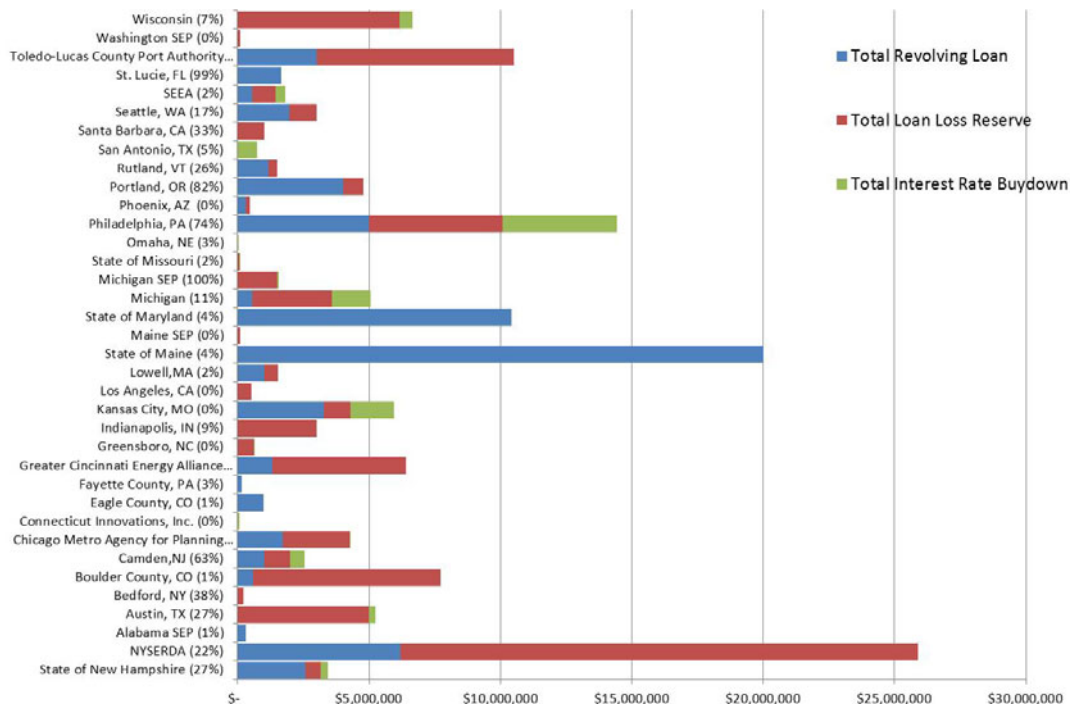


Figure 1. Total BBNP financing investment and percent loans of total upgrades by individual BBNP recipient, cumulative for June 1, 2010 through September 30, 2013.

Single-family and multifamily households nationwide took more than \$140 million in loans. Figure 2 shows the geographic distribution of residential building lending activity by state

Alternative Underwriting Approaches

Several programs explored alternative underwriting methods to offer homeowners loans. These alternative approaches or criteria can help borrowers who lack of access to affordable financing participate in the energy efficiency upgrade market.⁴ (Traditional underwriting methodologies to establish borrowers' creditworthiness include relying on credit history related to credit cards, installment loans, mortgages, and similar borrowing methods as reported on their credit score.) Programs allowed loans for applicants with higher than usual debt-to-income ratios, as many homeowners were unable to qualify for loans because of high debt levels. Programs also allowed lower FICO[®] credit scores. Specific examples of alternative underwriting approaches are described below.

- Craft3, a nonprofit Community Development Financial Institution (CDFI) lender in Portland, Oregon, sponsored loans under the Clean Energy Works Oregon program, based on homeowners' utility bill payment history and other factors (*e.g.*, absence of bankruptcies, liens, judgments).⁵ Homeowners pay off loans via the utility billing system. Craft3 made more than \$25 million in loans, with a default rate of less than 1 percent.
- NYSERDA developed a secondary underwriting tier (known as Tier 2) for homeowners with high debt-to-income ratios but who otherwise had the ability to make payments on a loan because of the reductions in their energy bills. As of December 2013, NYSERDA approved more than 674 Tier 2 loans, valued at \$4.3 million. The overall approval rate for loans (Tier 1 and Tier 2) was 69 percent, with 31 percent of applicants denied. The default rate for Tier 2 loans was slightly higher, but still within acceptable ranges for unsecured loan products (NYSERDA 2014).

Attractive Loan Terms

Another important attribute of program financing is the attractive loan terms. Longer repayment terms (up to 20 years, which also allows for payback of energy efficiency savings to cover loan costs) and low interest rates, typically below 4.99 percent, may have motivated more applicants to apply. BBNP partners who had initially tested higher interest rates showed poor uptake, but experienced significant increases in loan volume when they lowered interest rates (Michigan Saves, 2014). The mean interest rate of loans made as part of BBNP was 3.8 percent and the median was 3.9 percent. This suggests that while monthly payment and other factors are important, many homeowners are quite sensitive to the economics of interest rates as it relates to their decision to take out a loan.

Alternatively, some BBNP partners used a programmatic approach to generate interest even though loans had interest rates over 5 percent. The distribution of loan interest rates reported by BBNP partners show an increase in the number of loans in the 6 percent to 6.99 percent range, largely made up of Philadelphia upgrade projects. Philadelphia and other programs utilized fast loan approvals to increase interest in financing.

⁴ FICO, or the Fair Isaac Corporation, is a company that provides credit-scoring models to help financial services companies assess consumers' creditworthiness.

⁵ A CDFI is a type of nonprofit lender certified by the Community Development Financial Institutions Fund (CDFI Fund) at the U.S. Department of the Treasury. CDFI lenders provide financial products and services to economically disadvantaged individuals and communities throughout the U.S.

Analysis of BBNP Data

The data collected are from 2010 through September 30, 2013, and include a large variety of metrics for each project including:

- BBNP partner program data of dollars expended, leveraged, total estimated energy and cost savings, and job hours worked
- Loan product data of originating lender, credit enhancements, loan types, capital source, underwriting criteria, and loan terms
- Upgrade project data such as building characteristics, audit cost, estimated energy and cost savings, installed measures and associated estimated energy and cost savings
- Loan amount and terms associated with each upgrade.

Most BBNP partners reported loan activity consistently each quarter. Other partners may have not reported all loans due to reporting difficulties, inability to obtain the information, time lag associated with receiving loan data or in launching a loan program. Analysis of collected data along with anecdotal information from the partners over the three-year program period provides insight into what worked and what did not. Below are several charts and graphs that illustrate loan activity during that time and the impact on primary metrics.

Residential Home Upgrades

Figure 3 shows the number of single-family home upgrades by BBNP partners and the percent of loans made. BBNP partners completed more than 70,000 single family home upgrades (as of 9/30/13) with over 12,000 single family homes financed through loans (16.6%).

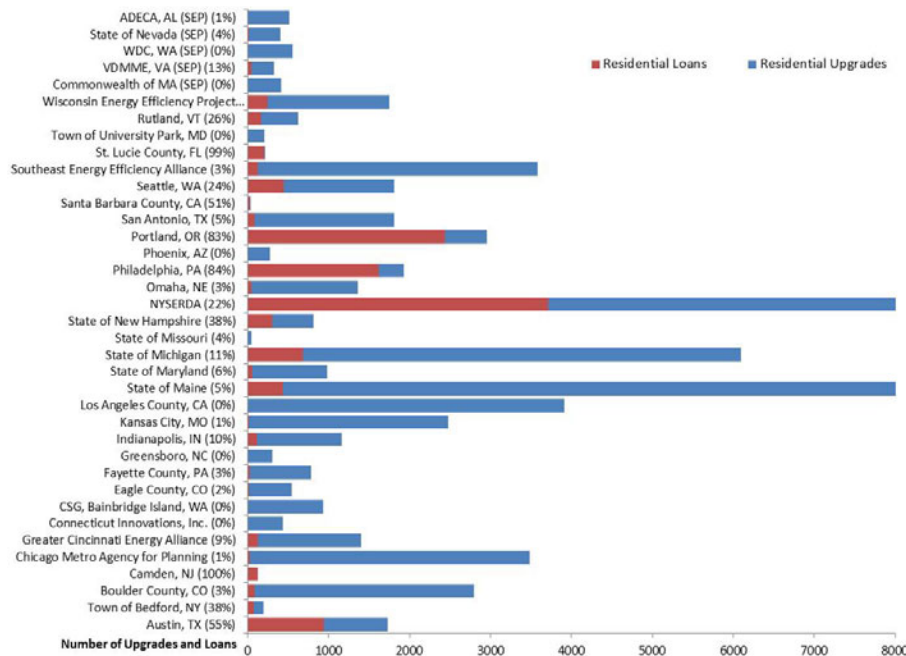


Figure 3. Number of single-family home upgrades and loans by BBNP partner, reported June 1, 2010 through September 30, 2013.

Consumer Investment and Loan Volume

Loan amounts ranged from \$480 to \$60,250. The median amount in the distribution was \$9,021 and the average amount was \$10,191. Figure 4 illustrates the distribution of the loan amounts for single-family homes. Almost 40 loans were for more than \$30,000, three of which included solar photovoltaic system upgrades between \$30,000 and \$40,000.⁶

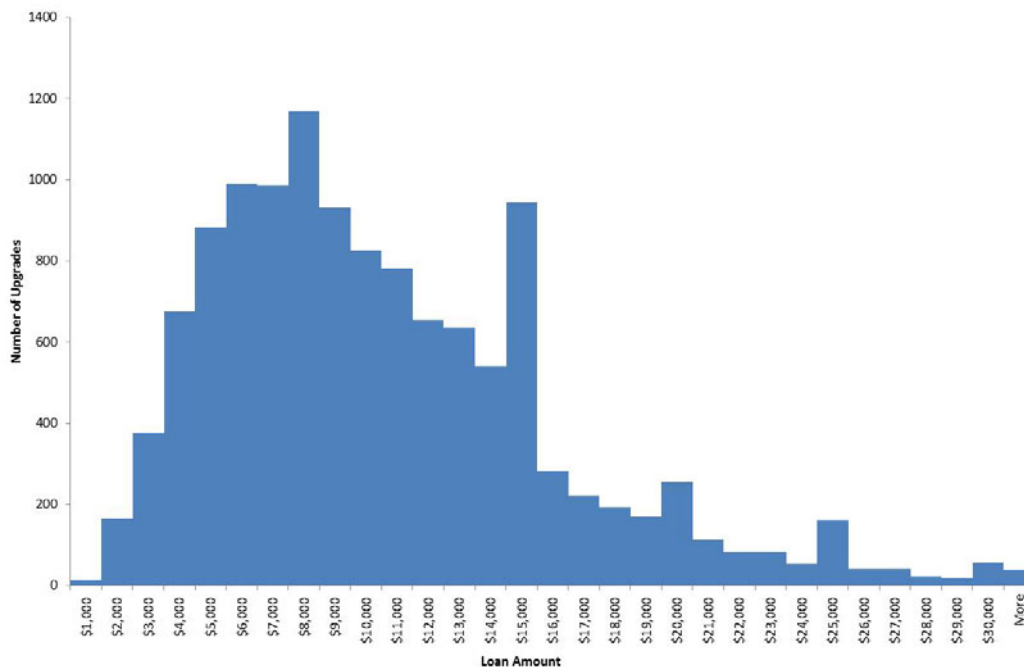


Figure 4. Distribution of single-family home loan amounts reported June 1, 2010 through September 30, 2013.

The BBNP data show that homeowners across a wide range of income levels, particularly middle-income households, are interested in financing. Figure 5 illustrates the frequency of annual income for loans taken. The average income level of homeowners with closed loans was \$85,880, and the average FICO score were 750.⁷ Because most programs utilized credit score as qualifying criteria, the loan pool is limited primarily to households with good to excellent credit. Many programs had high decline rates for applicants because of either low credit scores, high debt-to-income ratios, or a combination thereof. There are still significant barriers to overcome in order to reach wider income demographics, particularly low- and moderate-income households, whom would benefit from lowering their energy costs through a home energy efficiency upgrade.

⁶ 39 projects or 0.3 percent of loan amounts were more than \$30,000. A single program included 305 projects with loan amounts between \$14,000 and \$15,000. Another program had 82 projects with loan amounts between \$19,000 and \$20,000. Finally, an additional program had 101 projects with loan amounts between \$24,000 and \$25,000.

⁷ FICO and income information was not available for all programs because of lender privacy restrictions regarding release of homeowner data.

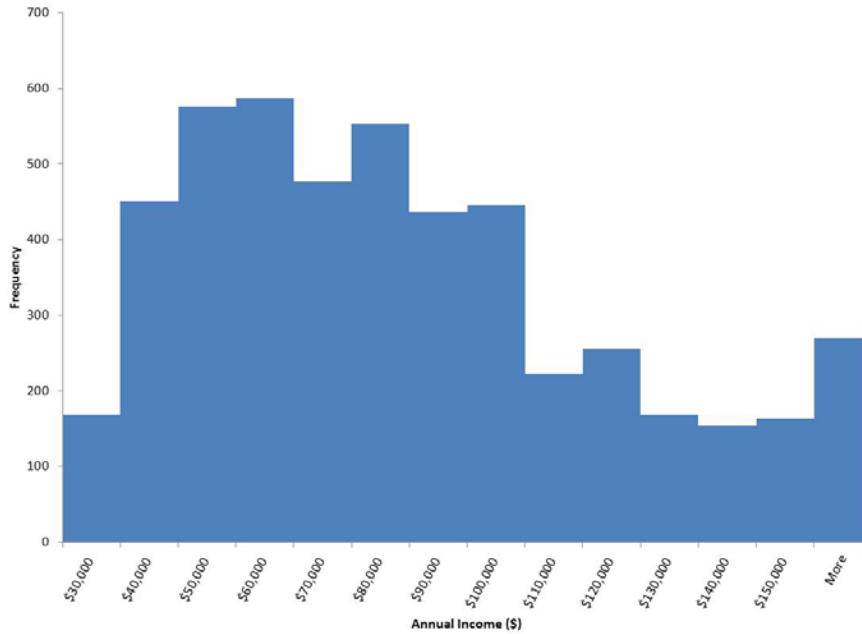


Figure 5. Distribution of income levels reported of approved loans for residential single-family buildings.⁸

The average project cost for home upgrades with loans was \$11,805, more than twice the average cost of non-loan projects of \$5,381.⁹ The estimated source energy savings for home upgrades with loans was 54 MMBTU (million British thermal units); upgrades without a loan are estimated to be 40 MMBTU.¹⁰

Lessons Learned

The financing investments made through BBNP provided important insights about the ability of energy efficiency programs to attract and leverage private capital, integrate financing with programs, and effectively generate loan volume to enable home upgrades to a range of household income levels.

Program Design

The most successful BBNP financing programs offered interest rates and loan terms that are favorable to or below market interest rates. Interest rates for most BBNP financing programs ranged from 0 percent to 7 percent, with some programs offering reduced rates to encourage whole house projects (Maryland, Philadelphia). The most common financing approaches were:

⁸ Just over 300 income amounts reported are below \$25,000 and not shown due to low data quality. (These may have been reported as monthly rather than annual income.)

⁹ The average project cost for home upgrades excludes reported costs below \$200 to remove projects that only include direct install measures.

¹⁰ Estimated energy savings are reported by BBNP partners and not per an evaluation. Projects with zero reported savings are not included.

- credit enhancements, in the form of loan loss reserves¹¹
- direct capitalization of revolving loan programs
- interest rate buydowns.

Credit enhancements allowed programs to offer more flexible underwriting criteria, reduced interest rates, and the ability to offer unsecured loans (no requirement to secure the loan by placing a lien on the property). This also allowed for faster loan approvals. Revolving loan funds allowed programs to start lending quickly and have an ongoing revenue stream through interest earned on loans. Operating an in-house revolving loan fund also provided programs with greater flexibility regarding underwriting terms, interest rates, and loan terms.

Attributes of programs with high loan volumes included fast loan approvals (*e.g.*, Philadelphia, Michigan, and Clean Energy Works Oregon), competitive interest rates along with rebates (*e.g.*, Efficiency Maine), and effective integration of the loan product with program marketing, contractors and outreach activities (Lawrence Berkeley National Laboratories [LBNL], 2012). For example, Austin Energy, Clean Energy Works Oregon, and Michigan found that low interest rates, combined with a rebate offer, significantly increased upgrade activity and loan volume.¹²

Programs that struggled with generating demand for loans typically had loan application processes with longer approval timeframes, higher interest rates, or complex loan eligibility requirements such as stipulations on the types of eligible measures or cost-effectiveness criteria that limited eligible measures for financing. The economic downturn also affected loan demand; many homeowners were averse to taking out additional debt or were unable to qualify for loans because of high debt-to-income ratios, low credit scores, or a combination thereof.

Despite having a compelling product, many BBNP partners also found it challenging (or infeasible) to successfully integrate their financing programs with existing, utility-sponsored home energy efficiency programs. Regulated utilities were concerned about the lack of recognition for avoided costs by state public utility commissions, differing eligibility rules and requirements, and lengthy utility approval requirements that delayed projects. Cost-effectiveness tests that limited eligible measures under utility incentive programs were another significant barrier for several programs. Offering an integrated program with utility-sponsored energy efficiency programs, such as with MASS Save Heat Loan, can offer multiple benefits for home upgrade programs, including ease of use for the contractor, reduced program costs, and greater convenience for the homeowner and contractor. Program administrators must ensure they understand the utility energy efficiency environment to design the program to be compatible with it (or address modifications).

Limited-time offers and special incentives, such as 0 percent loan rates or 6-month-no payment specials, were a strong driver of loan participation (*e.g.*, Austin and Philadelphia). Programs that actively evaluated their loan program offers and made adjustments, such as lowering interest rates or streamlining loan approval and payment procedures, had higher loan volume as a result.

¹¹ Credit enhancements were used by programs to allow unsecured loans at lower interest rates than comparable loan products, allow homeowners with low credit scores or high debt-to-income ratios to qualify for loans, and to extend loan term length beyond standard practices for unsecured lending.

¹² Program activities were documented by DOE through case studies, grantee profiles, and interviews with program staff. For more information, see the BBNP partner profiles at: <http://energy.gov/eere/better-buildings-neighborhood-program/better-buildings-neighborhood-program-partners>.

Integration with contractors was another important factor. Contractors preferred to receive payment directly from the lender (either as two-party checks payable to the homeowner and contractor or payment assigned by the homeowner).

Working with Lenders and Financial Institutions

Energy efficiency lending primarily attracts small-to medium-size lenders, such as community banks, credit unions, CDFIs, and specialized energy efficiency lenders. A few programs were unable to identify a local financial institution with which to partner. Concerns included lack of market demand for home upgrades, and the additional regulatory requirements associated with ARRA funding.

Financing can also help energy efficiency programs reach low-to moderate-income homeowners, such as those that do not qualify for weatherization assistance. The program also helped make energy upgrades more affordable by working with community-based leaders, credit unions, and state and local housing authorities to create specific loan products; combining with incentives (including income-qualified incentives); reducing interest rates; and with other financial assistance (*e.g.*, minor repaid grants).

On-bill financing and repayment shows promise as a method for supporting residential energy efficiency financing. For example, Craft3 used on-bill repayment, which established borrower repayment history and allowed Craft3 to utilize more flexible underwriting criteria, such as lower credit scores. Significant credit enhancements, however, were still required to support the loan portfolio sale. In New York, NYSERDA worked with utilities to implement legislatively mandated on-bill financing programs statewide. Since 2012, these programs have made \$15.9 million in on-bill loans to nearly 1,500 households (including 377 assisted Home Performance with ENERGY STAR loans for low- and moderate-income households) in New York (NYSERDA, 2013). For some utilities, however, such as in New Hampshire, on-bill financing posed administrative and regulatory challenges (*e.g.*, separation of utility payments from loan repayment, and handling partial payments or late payments that require adjustment of utility billing account data) that prevented it from becoming a permanent component of their program (New Hampshire Office of Energy and Planning, 2014). The loans made through these on-bill pilots will help inform future program design and approaches to securitizing on-bill financing products.

Underwriting Procedures and Secondary Markets

Some BBNP partners allowed higher debt-to-income levels or lower FICO scores, predicated on energy savings offsetting loan repayment costs and thereby lowering default rates. While the loan portfolios have only been in a place for a few years, BBNP partners that used alternative underwriting have reported loan default rates below 1 percent of the total residential loan portfolio. However, most programs are in the early stages of loan repayment and most defaults occur after the second or third year of repayment (Zimring *et al.*, 2011; ACEEE, 2014).

The ability to recapitalize loan funds via the secondary market is an important consideration for energy efficiency financing programs. Secondary markets seek standardized loan products, with a demonstrated multi-year history of loan performance data.

The majority of energy efficiency finance programs have not established a sufficient track record for sale into traditional secondary markets (Pitkin, 2013). Two BBNP partners, however, were able to sell their loan portfolios to secondary market investors. Each used a

tailored approach, which included a state revolving fund loan guarantee (NYSERDA) and partnership with a mission-driven investor (Craft3, Oregon). Standardizing underwriting terms, accumulating data on loan performance and loan characteristics, and developing options for securitizing energy efficiency loans are important to developing and attracting large-scale secondary market investments (Zimring *et al.*, 2011). In addition, programs such as the Warehouse for Home Energy Efficiency Loans in Pennsylvania, Kentucky Home Performance, the HERO program in California, and Kilowatt Financial are establishing standardized loan products with the ability to aggregate loans at sufficient volume (*i.e.*, \$100 million or more) to sell into the secondary market (Bloomberg, 2014; SEE Action, 2014).

Conclusions

Markets for home energy upgrades continue to grow, using a variety of lending approaches and capital sources, including both public funds and private capital. Over the three-year grant period, BBNP partners tried a variety of innovative approaches, enabled more than \$445 million in private capital, and originated in excess of \$100 million in loans just in single-family home energy upgrades. The BBNP partners successfully completed nearly \$75 million in residential secondary market sales of loan portfolios that will recapitalize loan funds in New York, Oregon, and Pennsylvania.

The financing programs established through BBNP demonstrate that financing can play an important role in scaling up energy efficiency. For example, by addressing the first-cost barrier that has stymied other energy efficiency programs, BBNP enabled deeper energy savings through more comprehensive work scopes. The design of the financing program, however, and its effective integration with home energy efficiency, utility and evaluation activities is critical to success. Some BBNP programs failed to generate loan volume because they did not approach energy efficiency financing and home upgrade programs in an integrated manner. Furthermore, program administrators also must consider which markets they seek to serve, and address specific needs within that region, such as offering loan products accessible to low- or moderate-income households.

Important characteristics of energy efficiency financing programs in successful BBNP programs offer the following lessons learned for energy efficiency programs:

- Offer financing with strong marketing that focuses on messages relevant to the program's geographic area and demographic (*e.g.*, comfort, energy savings, heating or cooling, health), delivery, and quality assurance mechanisms
- Engage lending partners early, and fully integrate the loan product offering into the home upgrade program
- Streamline the financing process with easy loan applications, quick approvals, and timely payments to contractors
- Offer competitive interest rates and terms, with emphasis on monthly payment
- Work closely with contractors so they can communicate financing program options and benefits to homeowners
- Design financing activities to meet the needs of your target audience and fill gaps in the market

The BBNP data collected indicate that the use of financing for home upgrades resulted in:

1. higher average project costs and more comprehensive home upgrades
2. higher average estimated energy savings per home
3. consumer investment by a wide range of income levels, including homeowners with median household incomes of \$75,000 or less.¹³

Further analysis of the data will help determine whether homeowners used other financing options (*e.g.*, home equity loans, line of credit), whether the impact of financing resulted in greater energy savings relative to other approaches (*e.g.*, rebate only), and the impact on overall program costs.

This indicates that financing – if carefully designed and implemented – can be an effective mechanism of an overall home upgrade program to overcome the first-cost barrier. Before initiating a financing program, program administrators need to assess their market, identify their program’s goals and objectives, and evaluate the readiness of the program to deliver the demand that the financing options intend to support.

Program administrators may want to develop certain program components first, such as workforce training, program delivery and quality assurance, before introducing financing as part of their program. Financing alone should not be offered as a replacement for other home upgrade programs and services, such as contractor training and quality assurance, marketing, and utility incentives designed to lower the net cost of completing home upgrades. Evidence from BBNP programs suggests financing alone without good program design has limited effectiveness and is not likely to have significant impact in the marketplace.

The financing programs established by BBNP partners provide important insights and data on the role of financing in driving demand for home energy upgrades. Programs made important strides in testing a variety of loan products, underwriting criteria, and delivery models. The initial market tests of loan sales to the secondary market illustrate the need for developing standardized lending products and measuring loan performance over time to develop energy loan products that can be aggregated and sold into secondary markets. The experiences of BBNP partners can inform energy efficiency upgrade programs interested in offering financing as they develop and implement their own financing programs.

¹³ The program did not collect income demographic data from households that did not take out loans.

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