DOE/EE-1205

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Final Report

Process Evaluation of the Better Buildings Neighborhood Program

Final Evaluation Volume 4

American Recovery and Reinvestment Act of 2009

June 2015

Prepared For:

U.S. Department of Energy
Office of Energy Efficiency and Renewable Energy

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Funded By:

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research into action inc

www.researchintoaction.com

PO Box 12312
Portland, OR 97212

3934 NE Martin Luther King Jr. Blvd., Suite 300
Portland, OR 97212

Phone: 503.287.9136
Fax: 503.281.7375

Contact:
Jane S. Peters, President
Jane.Peters@researchintoaction.com

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We interviewed all 41 BBNP grant recipients, as well as 6 subgrantees, and requested project documentation and other information from many of these contacts. The grantees and subgrantees had many people wanting them to explain their activities and their accomplishments during the past five years; although we were one of the many, they were overwhelmingly friendly and cooperative, usually talking with us for several hours to explain what they were doing and what their experiences had been. We anticipate future discussions will continue to illuminate the varied activities and accomplishments of BBNP, and we look forward to those discussions.

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GLOSSARY

Within the body of this report, there are several technical terms that require explanation, as their meanings are specific to energy efficiency activity.

ARRA	American Recovery and Reinvestment Act; provided funding for BBNP.
Audit	A process that obtains information on building (including home) features that affect energy use, identifies energy efficiency measures that appear to be appropriate for the building, and estimates potential annual energy savings; can be conducted on-line or by someone walking through the building. Audits culminate in an audit report describing the findings and opportunities. Also called "energy audit."
BBNP program	Refers to both the federal Better Buildings Neighborhood grant program administered by DOE and to the local programs grant recipients administered in their target markets. To avoid confusion, the text refers to DOE for the federal program and to the grantees for the local programs.
Community-based organizations (CBOs)	CBOs are organizations that focus on issues affecting their local communities and offer services benefitting those communities.
Direct install	Installation of energy efficiency measures by program representatives, typically during a building audit.
Funding Opportunity Announcement (FOA)	Issued by DOE to inform the public of the opportunity to apply for BBNP grant funding and outline the application requirements.
Free-rider	A participant who on some level may have used the program regardless of the BBNP influence. Determining free-ridership values is a large component in calculating net-to-gross ratio.
Grant	BBNP funding provided by DOE. Grant funding requires recipients to make best efforts and adhere to fraud-prevention practices but, unlike contracts, does not require the recipient to deliver a specified outcome.
Grantee	A recipient of an ARRA-funded, DOE-administered BBNP grant.
Home Performance with ENERGY STAR (HPwES)	A public-private voluntary partnership program administered by DOE in conjunction with the U.S. Environmental Protection Agency (EPA) to promote whole-home upgrades.
Interest rate buy down	Use of program funds to lower the interest rate on loans to program participants; program participants pay the lender the program-established rate and the program administrator pays the lender the incremental amount necessary to meet the lender's requirements for supporting the program.
LEED	Leadership in Energy & Environmental Design; a green building certification program that recognizes best-in-class building strategies and practices.

Leveraging	A technique to multiply gains and losses; for BBNP, leveraging refers to grantees obtaining non-DOE funds to complement their BBNP funding and increase or extend program activities.
Loan loss reserve	Money set aside to reimburse a lender for losses made on loans.
Market effects	A change in the structure of a market or the behavior of participants in a market that is reflective of an increase in the adoption of energy efficient products, services, or practices and is causally related to market intervention(s) (Eto, Prahl, and Schlegel, 1996).
MMBtu	Millions (MM = one thousand thousands) British thermal units of energy, used in this context to quantify energy savings.
Program administrator	An entity (i.e., BBNP grant recipient, utility, or energy efficiency agency) that administers energy efficiency programs by offering its target market information, supporting services, incentives, and/or financing for energy efficiency, renewable energy, and/or related outcomes, and conducts the activities necessary to deliver these offerings.
Retrofit	See “upgrade.”
Spillover savings	Energy savings from upgrades motivated by the program yet not receiving program incentives.
Subgrantee	An entity that received BBNP funding from a grantee to administer local BBNP programs.
Sweep	An outreach approach used by some grantees that attempts to reach virtually every building (including home) owner of the targeted type in the targeted neighborhood; an outreach worker that knocks on every door is engaging in a sweep.
Underserved population	Homes or businesses that typically do not participate in the energy efficiency programs offered by program administrators.
Upgrade	Change to a building (including home) that reduces its annual energy consumption, typically by increasing its energy efficiency; the change can be to the building shell (insulation, air sealing) and/or to equipment or systems (HVAC, refrigeration, hot water, appliances, thermal solar, photovoltaic, etc.). Also called “retrofit.”

PREFACE

This evaluation report is one of a suite of seven reports providing a final evaluation of the U.S. Department of Energy's (DOE) Better Buildings Neighborhood Program (BBNP). The evaluation was conducted under contract to Lawrence Berkeley National Laboratory (LBNL) as a procurement under LBNL Contract No. DE-AC02-05CH11231 with DOE.

The suite of evaluation reports comprises:

- *Evaluation of the Better Buildings Neighborhood Program* (Final Synthesis Report, Volume 1)
- *Savings and Economic Impacts of the Better Buildings Neighborhood Program* (Final Evaluation Volume 2)
- *Drivers of Success in the Better Buildings Neighborhood Program – Statistical Process Evaluation* (Final Evaluation Volume 3)
- *Process Evaluation of the Better Buildings Neighborhood Program* (Final Evaluation Volume 4)
- *Market Effects of the Better Buildings Neighborhood Program* (Final Evaluation Volume 5)
- *Spotlight on Key Program Strategies from the Better Buildings Neighborhood Program* (Final Evaluation Volume 6)

The evaluation commenced in late 2011 and concluded in mid-2015. The evaluation issued two preliminary reports:

- *Preliminary Process and Market Evaluation: Better Buildings Neighborhood Program* (December 28, 2012; appendices in a separate volume) (Research Into Action and NMR Group, 2012a, 2012b)
- *Preliminary Energy Savings Impact Evaluation: Better Buildings Neighborhood Program* (November 4, 2013) (Research Into Action, Evergreen Economics, Nexant, and NMR Group, 2013)

Four firms conducted the multi-faceted evaluation:

- Research Into Action, Inc. led the teams and process evaluation research.
- Evergreen Economics conducted the analysis of economic impacts, the billing regression analysis of program savings, and worked with Nexant to estimate program savings.
- Nexant, Inc. led the impact evaluation, conducted project measurement and verification (M&V) activities, and estimated program savings and carbon emission reductions.
- NMR Group, Inc. led the market effects assessment.

LBNL managed the evaluation; DOE supported it.

This document is *Process Evaluation of the Better Buildings Neighborhood Program*. Research Into Action was the principal author and evaluator. For the preliminary process evaluation report, NMR conducted interviews and initial analysis.

The Research Into Action team was led by Jane S. Peters and Marjorie McRae, supported by Joe Van Clock (who served as lead analyst and author), Jordan Folks, Jun Suzuki, Meghan Bean, Ryan Bliss, Mersiha McClaren, Alexandra Dunn, Hale Forster, Doré Mangan, Maria Everhart, Nathaniel Albers, and Susan Lutzenhiser. Amber Stadler and Sara Titus provided production support.

EXECUTIVE SUMMARY

The U.S. Department of Energy (DOE) administered the Better Buildings Neighborhood Program (BBNP) to support programs promoting whole building energy upgrades. BBNP distributed a total of $508 million to support efforts in hundreds of communities served by 41 grantees. DOE awarded funding of $1.4 million to $40 million per grantee through the competitive portions of the Energy Efficiency and Conservation Block Grant (EECBG) Program ($482 million from American Recovery and Reinvestment Act of 2009 [ARRA, the Recovery Act] funds) and the State Energy Program (SEP; $26 million). DOE awarded grants between May and October 2010, intended to provide funding over a three-year period ending September 30, 2013. In 2013, DOE offered an extension to programs that included a BBNP-funded financing mechanism to operate through September 30, 2014, using BBNP funds exclusively for financing.

While the federal government has issued periodic funding opportunities for energy efficiency, none has been on the scale of BBNP.

State and local governments received the grants and worked with nonprofits, building energy efficiency experts, contractor trade associations, financial institutions, utilities, and other organizations to develop community-based programs, incentives, and financing options for comprehensive energy-saving upgrades. Each of the 41 grant-funded organizations, assisted by 24 subgrantees, targeted a unique combination of residential, multifamily, commercial, industrial, and agriculture sector buildings, depending on their objectives.

This report provides the process findings from a comprehensive impact, process, and market effects evaluation of the original grantee program period, spanning fourth quarter (Q4) 2010 through third quarter (Q3) 2013. A team of four energy efficiency evaluation consulting firms conducted the evaluation – Research Into Action, Inc. (lead contractor), Evergreen Economics, Nexant, Inc., and NMR Group, Inc. – which was managed by Lawrence Berkeley National Laboratory (LBNL) and supported by DOE. Research Into Action led the process research. The study constitutes one report among a suite of six evaluation reports assessing BBNP.

EVALUATION OBJECTIVES AND METHODS

The study has two broad objectives:

- To assess the degree to which BBNP met its goals and objectives related to program processes and grantee program activity.
- To identify the most effective approaches – including program design and implementation activities – to completing building energy upgrades that support the development of a robust retrofit industry in the U.S.

This process evaluation volume has companion reports. *Drivers of Success in the Better Buildings Neighborhood Program – Statistical Process Evaluation* (Final Evaluation Volume 3) statistically identifies factors associated with successful residential upgrade programs conducted by organizations receiving BBNP grants. *Spotlight on Key Program Strategies from the Better Buildings Neighborhood Program* (Final Evaluation Volume 6) provides a detailed examination of five strategies grantees used to deliver upgrade programs.

To support the statistical investigation of effective approaches to delivering residential upgrade programs, we identified 12 diverse quantitative performance indicators, such as average MMBtu savings per project, program cost

per upgrade, and progress toward upgrade goal. We then clustered grantees into groups based on their performance on the 12 metrics using grantee-reported residential activity data (Q4 2010 to Q3 2013). The analyses yielded three groups of grantees whose average performance on the 12 metrics were consistent with an interpretation of a most successful group, an average group, and a least successful group.

We emphasize here that our analysis used the grantee success clustering only to identify programmatic elements associated with stronger performance relative to other grantees, a research objective important to the DOE BBNP team. As we note elsewhere, grantee success during the three-year evaluation period was associated with the length of time programs took to reach optimal functioning; the most successful grantees reached the optimum point in their programs six months sooner than less successful grantees. However, we did not find that grantee success was driven by prior whole home program experience. Nonetheless, were the grantee programs to continue for ten years, we would expect program achievements to be higher in later years than in the initial years as grantees gained experience in their markets and adjusted their programs accordingly.

To meet the study objectives, we collected and analyzed data from the grantees and subgrantees, program participants and nonparticipants, financial institutions working with the grantees, DOE program staff and contractors, and contractors serving participants, as well as conducting an extensive review of pertinent literature. Table ES-1 summarizes our data collection methods.

Table ES-1: Summary of Data Collection Methods

POPULATION	METHOD	COUNTS
Grantees/Subgrantees	Web Survey	38 grantees 13 subgrantees
	In-depth Interview (In-person and Phone)	40 grantees 8 subgrantees
	Leveraging Interview (Phone)	15 grantees
Participants	Web Survey	2,399
Nonparticipants	Web-Intercept Survey	2,453
Financial Institutions	In-depth Interview (Phone)	20
DOE Staff, Contractors, and Program Stakeholders	In-depth Interview (In-person and Phone)	12 DOE staff 8 support contractors 5 nongovernmental stakeholders
Program-level	Document and Database Review	41 grantees
Program-level	Pertinent Literature	More than 50 documents

Following survey data collection activities, we cleaned the data, coded all open-ended responses into close-ended codes, then analyzed the cleaned data set using descriptive, bivariate, and multivariate statistics. For in-depth interviews, we coded and analyzed the data using qualitative analysis software.

BBNP GOALS AND OBJECTIVES

DOE designed BBNP to meet the three principal ARRA goals (Table ES-2), as well as seven objectives developed by DOE staff to guide the BBNP initiative (Table ES-2). Below, we identify which of the three types of evaluation (impact, process, or market effects) provide findings relevant to our assessment of goal and objective attainment. This study addresses the goals and objectives flagged in the tables as relating to the process evaluation. For an investigation of the other goals and objectives noted in the tables, see the companion reports *Savings and Economic Impacts of the Better Buildings Neighborhood Program* (Final Evaluation Volume 2), and *Market Effects of the Better Buildings Neighborhood Program* (Final Evaluation Volume 5).

Table ES-2: ARRA Goals

GOALS	EVALUATION TYPE		
	Impact	Process	Market Effects
Create new jobs and save existing ones	✓	✓	✓
Spur economic activity and invest in long-term growth	✓	✓	✓
Provide accountability and transparency in spending BBNP funds	✓	✓	

Table ES-3: BBNP Objectives

OBJECTIVES	EVALUATION TYPE		
	Impact	Process	Market Effects
Develop sustainable energy efficiency upgrade programs		✓	✓
Upgrade more than 100,000 residential and commercial buildings to be more energy efficient	✓		
Save consumers $65 million annually on their energy bills	✓		
Achieve 15% to 30% estimated energy savings from residential energy efficiency upgrades	✓		
Reduce the cost of energy efficiency program delivery by 20% or more		✓	
Create or retain 10,000 to 30,000 jobs	✓		
Leverage $1 to $3 billion in additional resources	✓		

GOAL AND OBJECTIVE ATTAINMENT

By the end of the three-year evaluation period (Q4 2010 to Q3 2013) BBNP had met the three ARRA goals (Table ES-4). While the process evaluation investigated program outcomes related to all three goals, the numerical findings included in the table were generated by the impact evaluation, the details of which are presented in *Savings and Economic Impacts of the Better Buildings Neighborhood Program* (Final Evaluation Volume 2). The table presents, among other findings, our findings of net jobs, net economic activity, and net benefit-cost ratio. For the

economic metrics, the term "net" signifies BBNP's contribution to these outcomes above and beyond the outcomes that would have occurred had the BBNP funding been spent according to historical non-defense federal spending patterns.

By the end of the three-year evaluation period, BBNP met its two process-related BBNP-specific objectives (Table ES-5). The process findings indicate that BBNP met its objectives to spur energy efficiency upgrade activity, upgrade buildings, and fund the development of programs that expect to continue providing services at the end of the grant period.

Table ES-4: Attainment of ARRA Goals, Q4 2010 - Q3 2013

GOALS	METRICS	RESULTS	ATTAINED?
Create new jobs and save existing ones	Number of jobs created and retained	The evaluation estimated 10,191 net jobs resulted from BBNP during the 3-year evaluation period.	Yes
Spur economic activity and invest in long-term growth	Dollars of economic activity; benefit-cost ratio	BBNP spending of $445.2 million in 3 years generated more than: • $1.3 billion in net economic activity (personal income, small business income, other proprietary income, intermediate purchases) • $129.4 million in net federal, state, and local tax revenues Estimated net benefit-cost ratio: 3.0.	Yes
Provide accountability and transparency in spending BBNP funds	Evidence of accountability and transparency	Grantees receiving ARRA funding submitted ARRA expenditure reports. Grant expenditure information was available to the public on *Recovery.gov*. BBNP DOE staff developed and maintained a program tracking database for periodic grantee reporting. Staff worked with grantees to increase the quantity and quality of reported data. Grantees had access to summary data. Evaluator-verified results will be publicly available.	Yes

Table ES-5: Attainment of Process-Related BBNP Objectives

OBJECTIVES	METRICS	RESULTS	ATTAINED?	
			3-Year Verified	4-Year Unverified*
Develop sustainable energy efficiency upgrade programs	Percent of programs planning to continue after funding Evidence of continuing effects on the retrofit industry	84% of grantees reported that their programs or elements thereof would continue after the 3-year evaluation period. The evaluation found evidence of early indications of market effects, including increased: • Activity in the energy efficiency upgrade market • Adoption of energy efficient building and business practices • Marketing of energy efficiency • Availability of financing Participating contractors reported: • Changing services to be more comprehensive to adapt to BBNP (60%) • Increasing their focus on energy efficiency (46%) • Changing their standard practices in non-BBNP upgrades (34%) • Observing positive impacts on their business and the local energy efficiency market from BBNP (~50%) The Better Buildings Residential Program Solution Center and Better Buildings Residential Network continue to provide examples of replicable comprehensive approaches.	Yes	Yes
Reduce the cost of energy efficiency program delivery by 20% or more	Average program delivery cost per year ($/MMBtu)	Delivery cost for BBNP savings (program-wide $/MMBtu) fell each year of the 3-year program by 30% or more. Third-year program delivery cost was 58% lower than first-year cost.	Yes	Yes

* Our evaluation did not verify fourth-year program achievements; however, these objectives were met by Q3 2013 and so we concluded they also were met by the end of Q3 2014.

Our evaluation also demonstrated that BBNP grantee programs met many of the aspirations described in the BBNP Funding Opportunity Announcement (FOA). DOE solicited grantee applications for program approaches designed to:

- Deliver verified energy savings from a variety of projects in the local jurisdictions of the grantee, with a particular emphasis on energy efficiency improvements in existing residential, commercial, industrial, and public buildings.
- Conduct high-quality retrofits resulting in significant efficiency improvements to a large proportion of buildings within targeted neighborhoods, technology corridors, or communities.
- Produce net economic benefits in excess of program cost.

- Achieve broader market participation and greater efficiency savings from building retrofits.
- Leverage the participation and support of multiple local jurisdictions, regional planning agencies, and state energy offices.
- Form new alliances (local government, financial institutions, contractor associations, community organizations, etc.).
- Serve as pilot building retrofit programs that demonstrate the benefits of gaining economies of scale and begin to identify the most promising marketing and financing approaches.
- Serve as examples of comprehensive community-scale energy efficiency approaches that could be replicated in other communities across the country even with less or no on-going government support.

Forty-one grantees and 24 subgrantees conducted building upgrades in 34 states and one territory among communities ranging from a subsection of a single city to an entire state. Grantees upgraded residential, low-income, multifamily, commercial, public, industrial, and agricultural buildings; 31 grantees upgraded buildings in multiple sectors.

Grantees were successful in forming alliances to support their programs with utilities, public benefits organizations, financial institutions, local governments, community-based organizations, and educational institutions. With the help of their financial institution partnerships, about 90% of grantees reported using BBNP funds as loan loss reserves, revolving loan funds, and/or for interest rate buy-down approaches to increase the availability of financing. Sixteen percent of BBNP residential projects, 6% of multifamily building projects, and 5% of commercial projects received loans.

The most successful grantees conducted outreach that reached 33% of residential customers in single-family homes that had recently completed, or were anticipating completing, a home improvement project.

Half of the grantees were “starting from scratch,” designing and implementing programs in areas where no related program or pilot had been offered. Even the roughly half of grantees whose programs built on prior programs and pilots nonetheless had to create BBNP-specific teams, processes, documents, tracking systems, and other program elements. The grantees collectively reduced their cost to acquire energy savings in each subsequent year, with year-three costs less than half of their year-one costs.

Over one-third of grantees stated that their most senior staff in each of the areas of program design, implementation, green building trades, and financial institution involvement had less than four years of experience – relative newcomers to energy efficiency program administration. Thus, BBNP expanded the number of professionals with substantive energy efficiency experience.

This evaluation assesses BBNP performance over a three-year period. Were the funded local programs to continue for ten years, we would expect program achievements to be higher in later years than in the initial years as grantees gained experience.

Regarding the influence BBNP had in changing energy markets to make energy efficiency and renewable energy the options of first choice; this evaluation does not assess causality. We conclude here based on the preponderance of evidence that BBNP was one of many influences that has made a net positive contribution – a contribution above and

beyond what would have happened in the absence of the BBNP program, irrespective of the contribution's size – to transforming U.S. energy consumption markets, a transformation that is well underway according to respected national analysts. However, adequate time has not passed since the launch of the program to determine whether permanent changes have occurred in energy efficiency markets. Further, we do not rule out the competing hypothesis that some factor other than BBNP may have led to the evidence observed.

ADDITIONAL KEY FINDINGS

EVIDENCE OF PROGRAM SUSTAINABILITY

We found the following early indicators of program sustainability:

- Grantee programs, or program elements, would continue past the grant period.
- Financing for energy efficiency upgrades would continue to be offered past the grant period.

The majority of the BBNP-funded grantee programs met DOE's sustainability objective of continuing past the grant period to provide services without additional DOE grant funding; 84% of grantees reported that their programs or elements thereof would continue after the grant period ended. The most common source of support was ratepayer funding received by integrating with utility or energy agency home upgrade programs. About one-third of the grantees reported their programs would continue in an expanded form or essentially unchanged, while about half of the grantees reported one or more program elements – most commonly, financing – would continue beyond the grant period.

Of the 20 financial partners interviewed, most (75%) reported that they would continue to offer financing for energy efficiency upgrades after the BBNP grant period ended.

We examined grantee cost of saved energy ($/MMBtu) over time and found program costs decreased in each subsequent year. Delivery cost for BBNP savings (program-wide $/MMBtu) fell each year of the 3-year program by 30% or more. The third-year program delivery cost was 58% lower than the first-year cost.

EFFECTIVE DOE SUPPORT ACTIVITIES

The grantees found the account managers provided to them by DOE to be a valuable asset in helping program managers understand and satisfy grant requirements. Grantees also reported conferences and peer-to-peer learning opportunities as helpful because they could form beneficial relationships, learn from experts and each other, and troubleshoot common problems. Responding to the ARRA goal of transparency in the use of funds, account managers helped grantees meet requirements to submit ARRA expenditure reports to *Federalreporting.gov* so that BBNP expenditures could be made available to the public via *Recovery.gov*.

GRANTEE PROGRAM CONTEXT

Grantees varied widely in terms of the contracting entity, its partnerships, the roles of these multiple entities, and the communities they served. All grantees formed alliances to support their programs, including with utilities and public benefits organizations (at least 43 grantees and subgrantees), financial institutions (46), local government (33), community-based organizations (CBOs; 26), and educational institutions (11). Each grantee's market conditions,

program context, and partnerships were unique and no set of market conditions emerged as determinants of grantee success.

Bivariate analyses revealed two grantee-related factors associated with success: (1) Program with teams that had at least one highly experienced team member (15 or more years' experience) performed better than programs that did not, and (2) BBNP programs administered by local government staff did not perform as well as programs administered by other organizations.

For most grantees, launching and ramping up their program to optimal operations took a substantial portion of the grant period (on average, 9 months until launch, and an additional 14 months until optimal operations). We defined program success based on grantee achievements, and programs that accomplished more during the grant period typically mobilized – attained optimal operations – faster than programs accomplishing less (18 months compared to 24 months). Bivariate analyses indicate that ramp-up time varied significantly as a function of program success, but this relationship lacked significance in the multivariate analyses. Our analyses did not identify factors explaining ramp-up time; ramp-up time was not affected by whether a grantee's program built upon another pilot or program.

EFFECTIVE DESIGNS FOR AUDIT AND UPGRADE OFFERINGS

Multivariate analyses found that programs that offered multiple audit types (for example, on-line, walk-through, and audits that use diagnostic equipment) were more successful than those that did not, and that installing measures during the audit was associated with program success. The other audit-related factors explored in our multivariate analysis did not appear to be associated with success.

Bivariate analyses found that more successful programs were less likely to require participants to meet a savings target and instead allowed them to install a minimum number of measures or pursue comprehensive audit recommendations. More successful programs were also more likely than the less successful programs to allow participants to do more than one project (equivalently, to stage their upgrade activities). Grantees noted that staging projects was especially important for the commercial sector, where project costs were high and upgrade activities often required multiple phases to complete, although a number of grantees also thought that residential programs benefited from this approach.

Bivariate analyses also found that offering upgrade incentives (and relatively lower incentives – on the order of 25% of project costs) and conducting effective quality assurance (QA) and quality control (QC) were associated with program success.

On the whole, BBNP grantees appear to have provided high quality upgrades to their participants; residential participants rated the value of the upgrade significantly higher than did nonparticipating homeowners who had recently conducted an upgrade that included efficiency features.

MARKETING AND OUTREACH TO DRIVE DEMAND FOR UPGRADE SERVICES

Engaging credible messengers – such as respected local governmental personnel, homeowner association presidents, or CBO – in program promotion influenced individuals in those messengers' social networks to undertake upgrades. Community-based outreach activities, mailing letters to homes and businesses, and using messaging that emphasized comfort were likely to drive participation. Canvassing was rarely an effective approach. Bivariate analyses revealed that programs had greater success when they identified specific target populations within their

larger target area, and when they tailored their outreach efforts to the size of the target populations. However, limiting participation to restricted geographic areas was not an effective approach. Most grantees' that initially engaged in such geographic targeting efforts did not generate expected levels of uptake or reduce the prices of energy upgrade measures through economies of scale, except in cases where latent demand was geographically concentrated.

Multivariate analyses indicated that successful programs sought to increase contractors' sales effectiveness by offering sales training, leveraging the upgrade contractor's pivotal role in the upgrade sale. Finally, the study suggests that program administrators wanting to use a marketing contractor should look for firms with energy efficiency experience; among BBNP grantees, those using a marketing contractor appeared to have no greater success than those that did not.

WORKING WITH CONTRACTORS TO STIMULATE THE SUPPLY OF UPGRADE SERVICES

The more successful programs had relatively larger pools of eligible upgrade contractors than did less successful programs, as determined by multivariate analyses. Successful programs identified, fostered relationships with, and offered multiple types of training to large pools of contractors. Conversely, less successful programs had smaller contractor pools, offered little training, and had relatively infrequent communication with contractors. Multivariate analyses found offering contractor training was a significant predictor of program success. Bivariate analyses also revealed that successful programs were more likely than other programs to provide lists of pre-approved contractors, thereby fostering participant trust in contractors, and to allow participants to contract directly with the service provider, thereby affording flexibility. Providing financing or equipment to contractors did not appear to significantly enhance contractor participation and program outcomes.

Quality assurance and quality control mechanisms also contributed to improved quality of upgrades.

THE ROLE OF FINANCING IN GRANTEE PROGRAMS

Offering financing was associated with grantee success. These grantees employed one or more mechanisms to increase the availability and attractiveness of loans for upgrades, including: loan loss reserves ($74.6M, 27 grantees), revolving loan funds ($67.7M, 22 grantees), and interest rate buy-down approaches ($10.5M, 15 grantees). Collectively, grantees allocated about 20% of total BBNP award funding to financing.

BBNP participants received a total of $154 million in program loans; 16% of BBNP residential projects, 6% of multifamily building projects, and 5% of commercial projects received loans. About three-quarters of interviewed financial partners reported a BBNP-generated demand for energy efficiency upgrade loans.

Many of the BBNP participants that received loans reported the availability of the loan was important in their decision-making to pursue an upgrade. Consequently, it appears that although loans may appeal to a minority of participants and do not guarantee program success, attractive, program-supported financing increased uptake of energy upgrades. Well-designed financing program components attracted financial partners for upgrade programs. Partnering with greater numbers of financial partners was associated with program success in the bivariate analyses, apparently because participants were able to work with financial institutions they already had relationships with, financial institutions competed for business, and financial institutions covered different populations and/or serve different areas

RECOMMENDATIONS

We offer the following recommendations to DOE regarding opportunities to capitalize on the lessons learned from BBNP over the ARRA period:

- **Assess the longer-term outcomes of BBNP.** The three-year grant period was too short for grantees to create local or state markets where energy upgrades occur in the absence of ratepayer or taxpayer subsidies. Further, our process evaluation assessed early success, which may or may not be associated with long-term success. Given these limitations, we recommend that DOE take steps to assess the longer-term impacts of BBNP. This would require tracking the activities of programs developed as part of BBNP and evaluating their progress at points that allow for an assessment of whether BBNP achieved its intermediate and long-term goals.

- **Use BBNP as a model for providing support to other DOE grantees.** Grantee staff generally provided positive feedback on all of DOE's BBNP support activities, especially the assigned Account Manager and the grantee conferences. Given the success of these activities, we recommend that DOE and other program funders model their grantee support activities on those conducted by BBNP when developing similar programs in the future.

- **Capitalize on the infrastructure created during BBNP.** A great deal of infrastructure was created during BBNP, including the Better Buildings Residential Program Solution Center, the Better Buildings Residential Network, and data tracking and reporting tools. We recommend that DOE continue to refine and make use of this infrastructure in its efforts to support building upgrade programs, policies, and investment, as well as building upgrade activity conducted by owners and the retrofit industry.

- **Find creative ways to continue support.** While we found early indications that BBNP may have helped lead to market effects, the indicators are not proof that the market has changed or that whatever change BBNP has initiated will persist past the funding cycle. Sustained market effects for such an innovative practice (whole home or whole building upgrades) in such a short timeframe (grants lasting three years in duration) are difficult to achieve. As a result, we recommend that DOE consider providing support (technical or financial) to highly successful grantees that are continuing to offer their programs. Additional support could help realize BBNP's objective of sustained market effects in the grantee regions.

We offer the following recommendations to upgrade program administrators:

- **Consider our conclusions identifying effective upgrade program approaches.** This process evaluation report identifies success-related findings statistically associated with program characteristics generally, audits, upgrades, driving demand for upgrade services, stimulating supply of upgrade services, financing, and ongoing program funding. Because this study is unique in its scope of conducting in-depth comparative assessments of over 40 programs, we encourage program administers to consider the extent that application of our study findings might benefit their programs. While we hope our statistical findings will be useful to program administrators, also we concluded that there is no single approach, no single program feature that is a "must have," nor any that are "avoid at all costs."

- **Develop a program tailored to the unique characteristics of the locale.** It is important for program administers to: understand the experiences of the local contractor population and provide appropriate trainings; tailor messages for subpopulations likely to undergo upgrades, to provide multiple participation options; and partner with well-resourced local organizations.
- **Offer a variety of contractor training.** Training content should address program, technical and business needs – especially sales training. Look for opportunities to combine training with other program needs – such as quality control activities and obtaining feedback from contractors on program design and implementation – to build mutual communication, understanding, and respect from home upgrade professionals.
- **Recognize that programs take months to design, implement, and ramp-up to period of optimal performance.** Program goals should anticipate an initial period with little to no goal attainment.

1. INTRODUCTION

The U.S. Department of Energy (DOE) administered the Better Buildings Neighborhood Program (BBNP) to support programs promoting whole building energy upgrades. BBNP distributed a total of $508 million to support hundreds of communities served by 41 grantees. DOE awarded funding of $1.4 million to $40 million per grantee through the competitive portions of the Energy Efficiency and Conservation Block Grant (EECBG) Program ($482 million in American Recovery and Reinvestment Act [ARRA, the Recovery Act] of 2009 funds) and the State Energy Program (SEP; $26 million). DOE awarded grants between May and October 2010 intended to provide funding over a three-year period ending September 30, 2013. In 2013, 2013 DOE provided an extension to ARRA-funded grantees with ongoing financing programs to operate through September 30, 2014, using BBNP funds exclusively for financing.

State and local governments received the grants and worked with nonprofits, building energy efficiency experts, contractor trade associations, financial institutions, utilities, and other organizations to develop community-based programs, incentives, and financing options for comprehensive energy saving upgrades. Each of the 41 grant-funded organizations, assisted by 24 subgrantees, targeted a unique combination of residential, multifamily, commercial, industrial, and agriculture sector buildings, depending on their objectives.

This report provides the process findings from a comprehensive impact, process, and market effects evaluation of the original grantee program period, spanning fourth quarter (Q4) 2010 through third quarter (Q3) 2013. A team of four energy efficiency evaluation consulting firms conducted the comprehensive evaluation – Research Into Action, Inc. (lead contractor), Evergreen Economics, Nexant, Inc., and NMR Group, Inc. – which was managed by Lawrence Berkeley National Laboratory (LBNL) and supported by DOE. Research Into Action led the process research. The study constitutes one report among a suite of six evaluation reports assessing BBNP.

1.1. STUDY OVERVIEW

This study provides findings from a process evaluation of BBNP, drawing on information collected from the grantees, DOE program staff and contractors, program participants and nonparticipants, contractors serving participants, and financial institutions working with the grantees. In addition, the evaluation is informed by an extensive review of pertinent literature.

The study has two broad objectives:

- To assess the degree to which BBNP met its goals and objectives related to program processes and grantee program activity.
- To identify the most effective approaches – including program design and implementation activities – to completing building energy upgrades that support the development of a robust retrofit industry in the U.S.

This volume has two companion reports. *Drivers of Success in the Better Buildings Neighborhood Program – Statistical Process Evaluation* (Final Evaluation Volume 3) statistically identifies factors associated with successful residential upgrade programs conducted by organizations receiving BBNP grants. *Spotlight on Key Program Strategies from the Better Buildings Neighborhood Program* (Final Evaluation Volume 6) provides a detailed examination of five strategies grantees used to deliver upgrade programs. This volume reports on a bivariate analysis of BBNP data, while Volume 3 reports on a multivariate analysis of the data.

1.2. BBNP DESCRIPTION

DOE administered the BBNP to support programs promoting whole building energy upgrades. BBNP distributed over $500 million to support hundreds of communities served by 41 grantees. While the federal government has issued periodic funding opportunities for energy efficiency, none has been on the scale of BBNP.

DOE issued two competitive funding opportunity announcements (FOAs) for BBNP grants. The first, drawing on EECBG funding, was issued in October 2009. The second, drawing on SEP funding, was issued in April 2010. Awarded grants between May and October 2010 were intended to provide funding over a three-year period ending September 30, 2013. (During the grant period, DOE determined that programs that included a BBNP-funded financing mechanism could continue to operate beyond the grant period using BBNP funds exclusively for financing.)

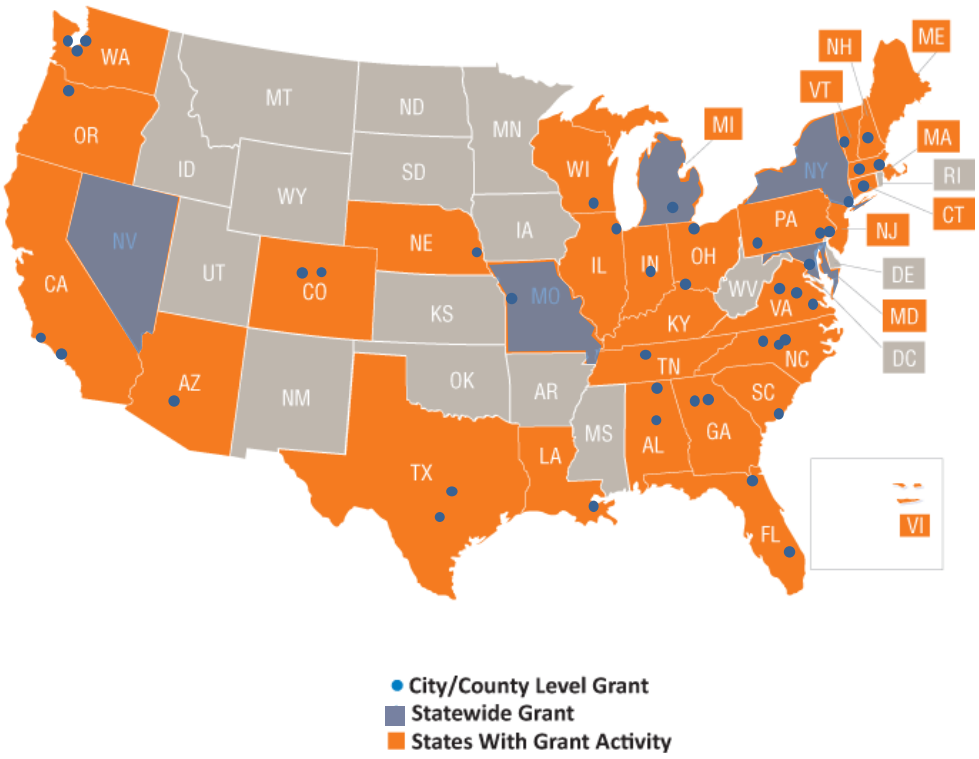
Each grant recipient proposed and implemented unique programs designed to address the energy efficiency needs, barriers, and opportunities within its jurisdiction. However, all of the recipients' programs were broadly designed around three common purposes: 1) to obtain high-quality retrofits resulting in significant energy improvements (retrofits also described as whole building or comprehensive); 2) to incorporate a viable strategy for program sustainability, which DOE defined as continuing beyond the grant period without additional federal funding; and 3) to fundamentally and permanently transform energy markets to make energy efficiency and renewable energy the options of first choice (DOE, 2009).

Through the EECBG FOA, DOE sought "innovative, 'game–changing' whole-building efficiency programs (DOE, 2009). DOE recognized that innovation is a form of experimentation and is not without risk of failure. The BBNP program at that national level was looking to identify the most effective approaches; DOE was not expecting every local BBNP-funded program to be equally, or even moderately, effective.

DOE provided BBNP grants to 41 recipients operating programs in 32 states and territories. The jurisdictions recipients served varied widely. Some recipients served only a single city or county, while others served entire states. One recipient, the Southeast Energy Efficiency Alliance (SEEA), funded sub-recipient (subgrantee) programs in five states and the U.S. Virgin Islands. The sizes of grants awarded through BBNP also varied, ranging from $1.3 million to $40 million.

Figure 1-1 shows the states with BBNP activity and illustrates whether the grant recipient represented the state or a city or county within the state. Appendix I provides tables listing the grantee awards in descending order by size and alphabetically by grantee.

Figure 1-1: BBNP Grantees by Location



1.3. BBNP GOALS AND OBJECTIVES

DOE designed BBNP to meet the three principal ARRA goals (Table 1-1), as well as seven objectives developed by DOE staff to guide the BBNP initiative (Table 1-2). Below, we identify which of the three types of evaluation (impact, process, or market effects) provide findings relevant to our assessment of goal and objective attainment. This study addresses the goals and objectives flagged in the tables as relating to the process evaluation. For an investigation of the other goals and objectives noted in the tables, see the companion reports *Savings and Economic Impacts of the Better Buildings Neighborhood Program* (Final Evaluation Volume 2), and *Market Effects of the Better Buildings Neighborhood Program* (Final Evaluation Volume 5).

Table 1-1: ARRA Goals

GOALS	EVALUATION TYPE		
	Impact	Process	Market Effects
Create new jobs and save existing ones	✓	✓	✓
Spur economic activity and invest in long-term growth	✓	✓	✓
Provide accountability and transparency in spending BBNP funds	✓	✓	

Table 1-2: BBNP Objectives

OBJECTIVES	EVALUATION TYPE		
	Impact	Process	Market Effects
Develop sustainable energy efficiency upgrade programs		✓	✓
Upgrade more than 100,000 residential and commercial buildings to be more energy efficient	✓		
Save consumers $65 million annually on their energy bills	✓		
Achieve 15% to 30% estimated energy savings from residential energy efficiency upgrades	✓		
Reduce the cost of energy efficiency program delivery by 20% or more		✓	
Create or retain 10,000 to 30,000 jobs	✓		
Leverage $1 to $3 billion in additional resources	✓		

1.4. REPORTED PROGRAM ACCOMPLISHMENTS

This section provides program accomplishments *reported* by DOE's BBNP team from data provided the grantees. **These are unverified grantee data.** This section does *not* provide verified data, such as verified gross and net energy savings, which are presented in the companion report *Savings and Economic Impacts of the Better Buildings Neighborhood Program* (Final Evaluation Volume 2).

1.4.1. REPORTED THROUGH Q3 2013 (THE EVALUATION PERIOD)

This section presents grantee-reported accomplishments from Q4 2010 through Q3 2013 (the evaluation period). DOE provided the evaluation team access to databases used by DOE for reporting purposes. These databases detailed the performance of the grantees from the time the grants were awarded in August 2010 through Q3 2013 and are based on information reported directly by each grantee through DOE's Better Buildings Neighborhood Information System (BBNIS).

All of the 41 grantees conducted whole home and/or building upgrades. Grantees reported (not verified) completing over 99,000 projects between Q4 2010 and Q3 2013, reportedly saving over 5,800,000 MMBtu annually of energy measured at the source (not site), at a reported cost of $76 per MMBtu of source energy saved (Table 1-3).[1]

[1] DOE reports total energy savings as *source* energy savings in million British thermal units (MMBtus). Source energy savings represent the sum of the savings at the facility (often referred to as *site* savings) and the savings from the energy not having to be extracted, converted, and transmitted to the facility due to the energy efficiency or renewable energy project.

Table 1-3: BBNP Reported (Unverified) Progress Q4 2010 - Q3 2013*

METRIC	REPORTED ACHIEVEMENT
Grantees with Projects	41
Projects	99,071
Spending	$449 million
Total Reported Energy Savings (Source, MMBtus)	5,852,275
$/MMBtu Saved (Source)	$76

Source: DOE- BBNIS.

* A few grantees reported projects completed prior to Q4 2010.

Grantees conducted upgrades in the residential, multifamily, commercial/industrial, and agricultural sectors (Table 1-4).[2, 3] The residential sector accounted for 75% of the projects, but only 51% of the savings. The commercial sector accounted for less than 4% of the projects, but nearly 38% of the savings.

Table 1-4: BBNP Reported (Unverified) Projects and Energy Savings Q4 2010 - Q3 2013

SECTOR	NUMBER OF PROJECTS IMPLEMENTED	PERCENT OF TOTAL PROJECTS	TOTAL SOURCE ENERGY SAVINGS (MMBtu)	PERCENT OF PORTFOLIO SAVINGS	AVERAGE SOURCE SAVINGS PER PROJECT (MMBtu)
Residential	74,184	74.9%	2,975,346	50.8%	40
Multifamily	21,178	21.4%	603,432	10.3%	29
Commercial	3,546	3.6%	2,240,970	38.3%	632
Agriculture*	163	0.2%	32,526	0.6%	200
BBNP Total	99,071	100%	5,852,275	100%	NA

Source: Source: DOE- BBNIS.

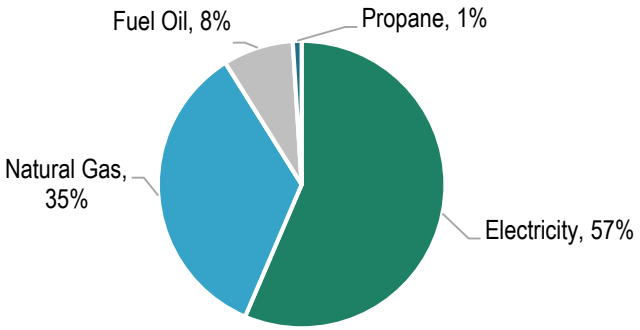
* Agriculture totals obtained from DOE email dated May 9, 2013, as they are not included in Project Level data.

2 Industrial projects were limited to 15 upgrades conducted by one grantee.

3 Table 1-4 outlines results as reported from the Project Level database. Throughout the course of the evaluation activities, DOE adjusted the reporting database to correct for errors in reported data from grantees. The information presented in this table represents reported values recorded as of September 2014.

Grantees reported savings from a number of different fuel types including electricity, natural gas, fuel oil, propane, kerosene, and wood. Electricity and natural gas savings were the most common fuel sources, comprising 91% of the overall reported source MMBtu savings (Figure 1-2).

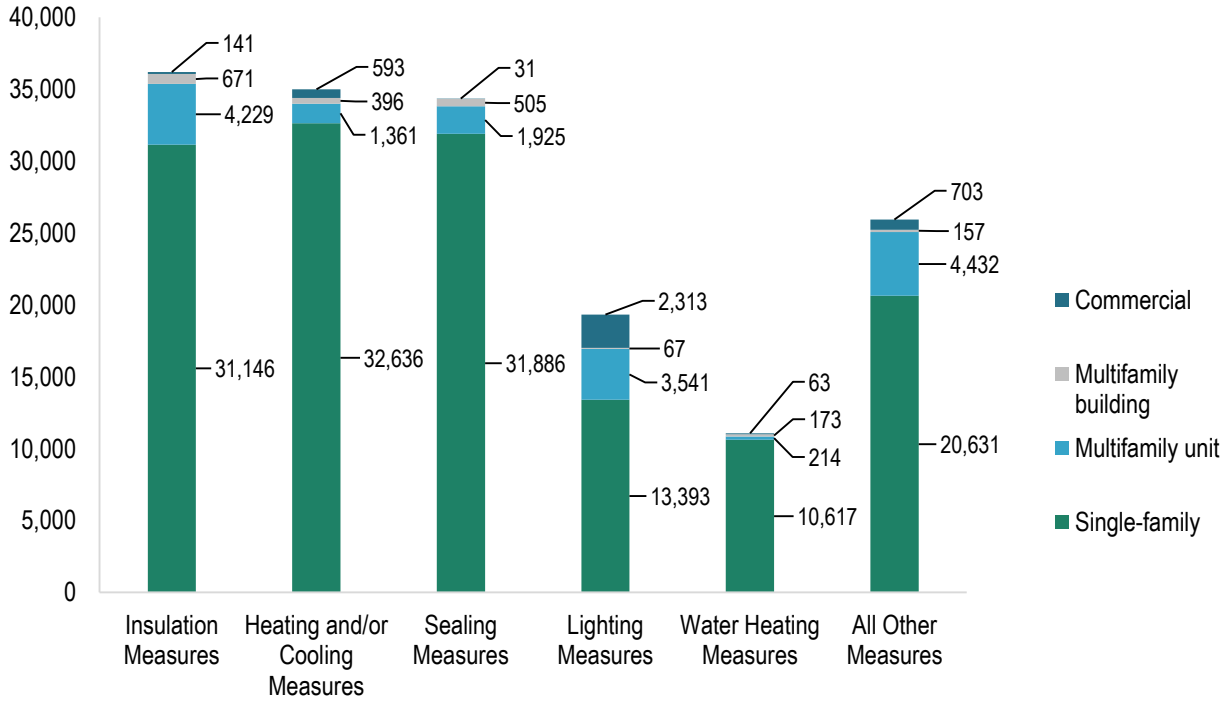
Figure 1-2: Percent of Total BBNP Reported (Unverified) MMBtu Savings by Fuel Type



Source: Source: DOE- BBNIS.

Upgrade customers most commonly installed heating and/or cooling systems, insulation, and air sealing measures; these measures comprised 91% of the overall reported source MMBtu savings and 81% of installed measures (Figure 1-3).

Figure 1-3: BBNP Reported Installed Measure Counts



Source: Source: DOE- BBNIS.

DOE's BBNP team recognized that upgrade costs preclude some customers from taking action and consequently encouraged grantees to ensure financing was available to (qualifying) prospective participants. Nearly 12,000 single-family projects received loans, about 16% of all single-family projects (Table 1-5).

Table 1-5: BBNP Reported Upgrade Projects Receiving Loans

PERFORMANCE METRIC	SINGLE-FAMILY	MULTIFAMILY		COMMERCIAL	AGRICULTURAL	TOTAL
		Unit	Building			
Count of Projects with Loans	11,987	63	50	183	0	12,283
Percentage of Projects with Loans	16%	1%	6%	5%	0%	14%

Source: Source: DOE- BBNIS.

DOE implemented BBNP with ARRA funding as part of many activities intended to stimulate economic activity. Grantees reported number of hours spent by staff and contractors conducting audits equivalent to 264 jobs (full-time equivalent, or FTE) lasting one year (under the assumption of no holidays, vacation, or leave due to illness or other factors; Table 1-6). They reported staff and contractor hours conducting upgrades equivalent to 6,000 jobs (FTEs) lasting one year. (*Savings and Economic Impacts of the Better Buildings Neighborhood Program* [Final Evaluation Volume 2] estimated through macroeconomic modeling that BBNP generated over 10,000 jobs – both direct and indirect.)

Table 1-6: BBNP Reported Audit and Retrofit Job Hours and Invoiced Cost

PERFORMANCE METRIC	SINGLE-FAMILY	MULTIFAMILY		COMMERCIAL	AGRICUL-TURAL	TOTAL
		Unit	Building			
Audit Job Hours (Count)*	331,509	42,086	13,269	160,870	2,224	549,958
Audit Job Hours Converted to Jobs (FTEs)**	159	20	6	77	1	264
Retrofit Job Hours (Count)*	2,642,845	958,850	679,435	8,195,267	4,753	12,481,150
Retrofit Job Hours Converted to Jobs (FTEs)**	1,270	461	327	3,940	2	6,000
Number of Retrofit Hours per Audit Hour	8	23	51	51	2	NA
Audit Invoiced Cost (Mean)	$316	$1,194	$2,773	$5,409	$1,172	NA
Retrofit Invoiced Cost (Mean)	$7,214	$12,656	$789,171	$303,337	$72,979	NA

Source: Source: DOE- BBNIS.

* Estimated from grantee-reported hours by imputing missing data with mean value.

** Estimated from count of hours by dividing by 2,080 hours (full-time employment for one year).

Average project costs ranged from just above $7,000 among single-family residential programs to more than $300,000 among commercial programs. Audit costs invoiced to the program averaged about $300 for single-family programs to about $5,400 for commercial audits.

1.4.2. REPORTED THROUGH Q3 2014 (THE END OF THE EXTENSION PERIOD)

In 2013, DOE provided an extension to ARRA-funded grantees with ongoing financing programs to operate through Q3 2014. By the end of this period, grantees reported cumulative spending of $508 million and conducting 115,640 upgrades. The following tables summarize BBNP accomplishments over the four-year period from program start through Q3 2014, as reported to the evaluation team by BBNP staff.[4]

Table 1-7: Summary of BBNP Reported Upgrade and Loan Accomplishments through Q3 2014

	RESIDENTIAL	COMMERCIAL*	TOTAL
Total Upgrades	115,640	3,764	119,404
Total Loans (count)	20,528	302	20,830
Total Loan Amounts ($)	$225,818,156	$27,929,303	$253,747,458

Source: DOE- staff; personal communication.

* Does not include 187 reported industrial and agricultural projects

Table 1-8: Count of BBNP Reported Residential Upgrades by Calendar Year

YEAR	ANNUAL	CUMULATIVE
2010	3,963	3,963
2011	16,779	20,742
2012	35,665	56,407
2013	44,785	101,192
2014	14,448	115,640

Source: DOE- staff; personal communication.

Table 1-9: Summary of BBNP Reported (Unverified) Energy and Bill Savings through Q3 2014

ELECTRICITY (KWH)	NATURAL GAS (THERMS)	HEATING OIL (GALLONS)	LPG (GALLONS)	TOTAL SOURCE MMBtu SAVED	TOTAL BILL SAVINGS
320,086,742	21,757,373	6,072,183	781,570	7,117,675	$86,921,898

Source: DOE- staff; personal communication.

[4] Email from D. Hoffmeyer to M. McRae and E. Vine, April 20, 2015.

1.5. METHODOLOGY

We collected and analyzed data from the grantees and subgrantees, program participants and nonparticipants, financial institutions working with the grantees, DOE program staff and contractors, and contractors serving participants, as well as conducting an extensive review of pertinent literature (Table 1-10).

Table 1-10: Summary of Data Collection Methods

POPULATION	DATA COLLECTION METHOD	COUNTS
Grantees/Subgrantees	Web Survey	38 grantees 13 subgrantees
	In-depth Interview (In-person and Phone)	40 grantees 8 subgrantees
	Leveraging Interview (Phone)	15 grantees
Participants	Web Survey	2,399
Nonparticipants	Web-Intercept Survey	2,453
Financial Institutions	In-depth Interview (Phone)	20
DOE Staff, Contractors, and Program Stakeholders	In-depth Interview (In-person and Phone)	12 DOE staff 8 support contractors 5 nongovernmental stakeholders
Program-level	Document and Database Review	41 grantees
Program-level	Pertinent Literature	More than 50 documents

1.5.1. GRANTEE DATA COLLECTION AND ANALYSIS

Grantee Web Survey

We designed and fielded a web survey for grantees to gain a deeper understanding of program structures, designs, and partnerships. We solicited the participation of all BBNP grantees and subgrantees and received completed surveys for 38 of 41 BBNP grantees and 13 of 22 subgrantees. The instrument explored the characteristics of the non-low-income residential, low-income residential and nonresidential programs each grantee/subgrantee identified as most effective. We launched the survey in April 2013 and concluded data collection in February 2014. In the interim, we contacted respondents to clarify responses and contacted non-respondents to encourage response. Appendix B elaborates on our methods and tallies of question responses and Appendix M.1 provides the instrument.

Grantee In-depth Interviews

We conducted one or two in-depth interviews with each grantee. The interviews, held with knowledgeable grantee contacts (typically the lead contact for the grant or the day-to-day program manager), typically lasted two hours. We conducted two waves of interviews: in total, we interviewed 40 of the 41 grantees; one grantee refused to be interviewed. We conducted interviews with 35 of the 41 grantees for the preliminary evaluation and 34 grantees (32 of which we had previously interviewed) and 8 subgrantees for the final evaluation. We conducted the preliminary

report interviews in the summer of 2012 and final report interviews between April 2013 and January 2014. Appendix L provides a fuller discussion of our methods, and Appendix M.4 provides the instrument.

Grantee Program Documents and Reporting

We reviewed grantee websites, grantees' Final Technical Reports, grantee-led evaluations, and DOE-prepared grantee-specific data summary reports (see *Secondary Data,* below). We reviewed DOE's program tracking data, including its Better Buildings Neighborhood Information System (BBNIS) and BBNP Salesforce data.

1.5.2. ASSESSING GRANTEE SUCCESS

A primary goal of our evaluation was to identify factors that drove or inhibited success among grantees' and subgrantees' residential upgrade programs. To support the statistical investigation of effective approaches to delivering residential upgrade programs, *Drivers of Success in the Better Buildings Neighborhood Program – Statistical Process Evaluation* (Final Evaluation Volume 3) identified 12 diverse quantitative performance indicators, such as average MMBtu savings per project, program cost per upgrade, and progress toward upgrade goal. We then clustered grantees into groups based on their performance on the 12 metrics using grantee-reported residential activity data (Q4 2010 to Q3 2013). The analyses yielded three groups of grantees whose average performance on the 12 metrics were consistent with an interpretation of a most successful group, an average group, and a least successful group.

We emphasize here that the Volume 3 analysis used the grantee success clustering only to identify programmatic elements associated with stronger performance relative to other grantees, a research objective important to the DOE BBNP team. As we note elsewhere, grantee success during the three-year evaluation period was associated with the length of time programs took to reach optimal functioning; the most successful grantees reached the optimum point in their programs six months sooner than less successful grantees. However, we did not find that grantee success was driven by prior whole home program experience. Nonetheless, were the grantee programs to continue for ten years, we would expect program achievements to be higher in later years than in the initial years as grantees gained experience in their markets and adjusted their programs accordingly.

As we report in Volume 3, using both data that grantees reported to DOE in partial fulfillment of their grant requirements and data collected by our team, we conducted a series of statistical analyses to develop a quantitative definition of grantee success that corresponds to Better Buildings Neighborhood Program's multiple program objectives and to identify program features and characteristics that predict success.

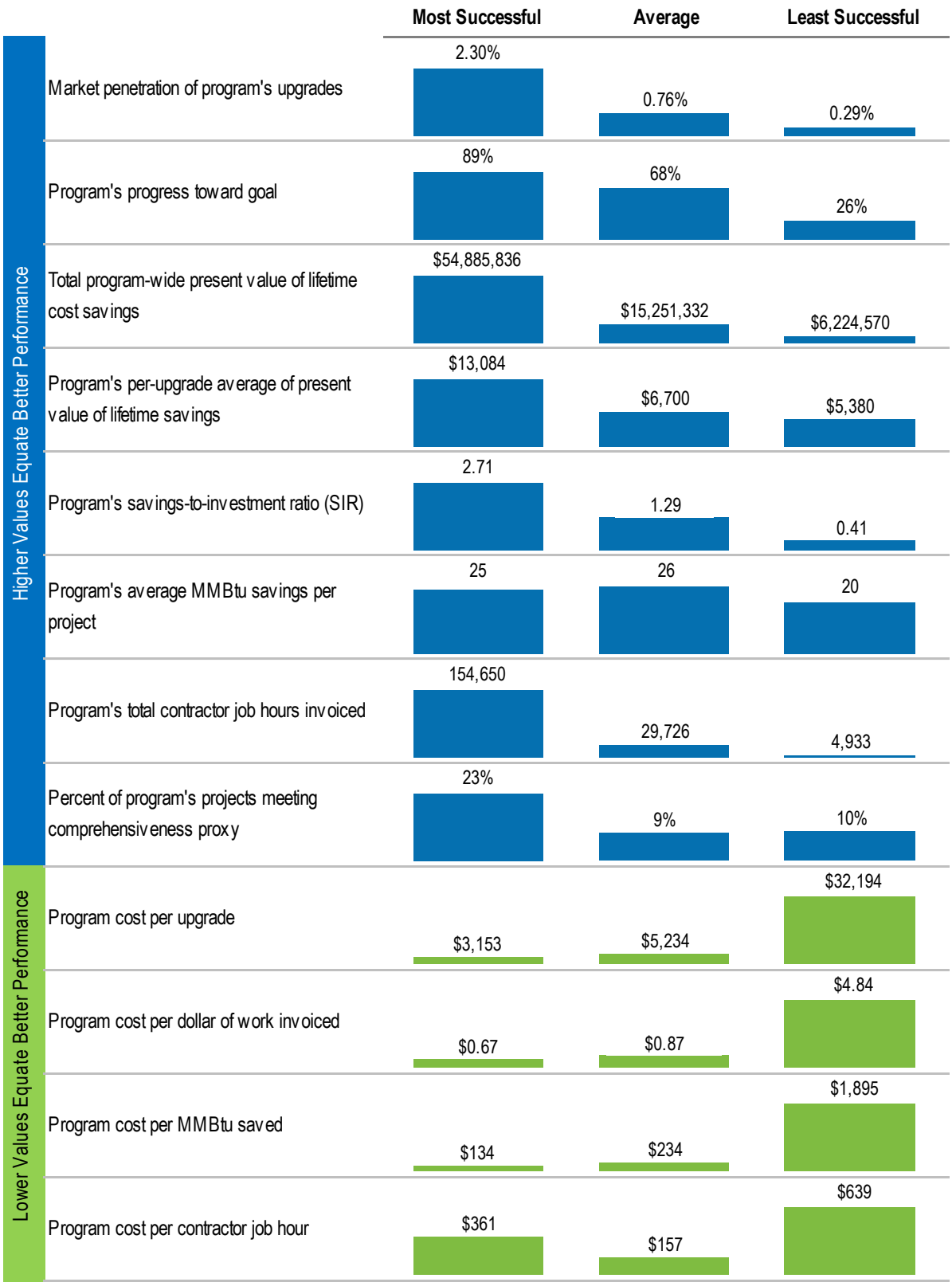
Due to the greater availability of data for residential programs compared with multifamily and commercial programs, the Volume 3 success analysis focused exclusively on residential programs. Further, if a grant recipient had subgrantees that ran separate and distinct programs in mutually exclusive regions, we collected and analyzed data from each individual subgrantee to capture the full diversity of program models, outcomes, and market characteristics. A total of 54 grantees and subgrantees with residential programs were included in these analyses.

First, we defined a broad range of potential measurements of program success based on theory and industry knowledge. From this list, we identified 12 quantitative performance metrics for which there were adequate data. We then conducted latent profile analysis (LPA) to cluster programs into groups that exhibited similar performance on the 12 performance metrics. LPA is an exploratory analytical technique, and our analyses sought to identify groups, or clusters, of grantees that differed meaningfully in their performance on 12 metrics of program success.

The LPA yielded three groups, and their average group values on the 12 performance metrics were consistent with an interpretation of a most successful cluster (n = 12), an average cluster (n = 35), and a least successful cluster (n = 7). The most successful cluster generally performed best on each of the metrics, the least successful cluster generally performed worst on the metrics, and the average cluster demonstrated mid-range metric values. Thus, the LPA revealed clusters of grantees that were more or less successful relative to one another. Figure 1-4, a copy of Figure 3-1 in Volume 3, demonstrates these tiered levels of grantee success by displaying the average cluster means for each of the 12 performance metrics.

Next, we identified grantee and program characteristics that may predict program success and compiled the corresponding data. This dataset also included exogenous variables that we deemed as critical control variables, such as weather metrics, average energy price, median income, and other variables that may affect energy use, savings, and participation rates. We used bivariate logistic regression models to explore whether any of the proposed predictor variables predicted membership in either the least successful cluster or the most successful cluster, respectively. We report the bivariate findings in this volume. Next, we ran multivariate regression models for each dependent variable (membership in the least successful cluster versus other, and membership in the most successful cluster versus other) using the independent variables identified as meaningful predictors in the aforementioned bivariate models. We report the multivariate findings in Volume 3. Findings relevant to the process evaluation will be discussed throughout this volume. For additional information on the methods used to identify the grantee success clusters, see Volume 3.

Figure 1-4: Performance Metric Cluster Means (n = 54)



1.5.3. PARTICIPANT AND NONPARTICIPANT DATA COLLECTION AND ANALYSIS

Participant Web Survey

We surveyed 2,399 individuals who participated in residential, multifamily, or commercial programs offered through 24 grantees and subgrantees. We contacted program managers and requested that they send email survey requests to participants themselves or provide us with participant contact information. Sixteen program managers sent invitations (including a link to the web-based survey) themselves, and participants from the remaining eight programs received survey invitations (with links) from us. Participants completed the survey from May 2013 to April 2014. Appendix J provides a fuller discussion of our methods and tallies of question responses, and Appendix M.2 provides the instrument.

Nonparticipant Web-Intercept Survey

We surveyed 2,453 nonparticipating single-family homeowners that were eligible for programs under 35 grantee and nine subgrantee programs. We did not collect data for grantees that did not have a single-family residential program. In order reach a confidence level of 90/10 per grantee, we aimed to collect responses from 68 nonparticipating residents who had recently conducted or planned to conduct a home improvement project within each prime grantee's total target territory, regardless of whether a grantee had subgrantee programs. Respondents were asked about grantee programs for which they were eligible based on the location of their home. To target single-family homeowners that might be in the market for upgrades, we screened contacts to reach homeowners that had either undertaken any home improvement projects in the past two years or were planning in the coming year to undertake such projects.

We used a mixed-mode approach to collect nonparticipant survey data. We used a web survey in all regions and phone surveys in some regions to meet quotas as needed. We fielded the survey during the month of October 2013. Appendix K provides a fuller discussion of our methods and tallies of question responses and Appendix M.3 provides the instrument.

1.5.4. ADDITIONAL INTERVIEW AND SURVEY DATA COLLECTION AND ANALYSIS

Financial Institution Interview

We conducted in-depth interviews averaging about 25 minutes in length with contacts at grantees' financial partners. During the in-depth interviews, we asked grantees to identify their financial partners. Grantees identified 44 financial institutions comprising credit unions, banks, community development financial institutions (CDFIs), as well as internally managed financing programs, AFC First Financial and Energy Finance Solutions, two organizations focused specifically on energy efficiency finance. We selected 20 of these financial partners for in-depth interviews, ensuring an even distribution of respondents both geographically and by financial institution type. We conducted interviews between October 2013 and January 2014. Appendix L provides a fuller discussion of our methods and Appendix M.5 provides the instrument.

DOE Staff, Contractor, and Program Stakeholder Interviews

We interviewed for the preliminary report 11 DOE staff and 4 support contractors; for the final report, we interviewed 8 DOE staff (7 of which we had previously interviewed) and 6 support contractors (2 of which we had previously interviewed). Both the preliminary and final sample sizes exceeded the samples stated in the process evaluation

work plan. We selected contacts who were *actively* involved in planning and executing Better Buildings support activities. We conducted telephone interviews with each contact lasting between 45 minutes to two hours for the preliminary and 45 to 75 minutes for the final. We completed the final evaluation interviews between late January and late April 2014. We conducted telephone interviews for the preliminary evaluation with four of six identified nongovernmental stakeholders; for the final evaluation, we interviewed in April 2014 two stakeholders, one of which we had previously interviewed. The interviews lasted between 30 minutes and one hour. Appendix L provides a fuller discussion of our methods, and Appendices M.6 to M.10 provide the instruments.

Contractor Survey

We conducted surveys with 147 contractors participating in BBNP, 446 nonparticipating contractors, and 291 energy efficiency equipment distributors in several strata of grantees: grantees with residential programs from each of three success clusters (most successful, average, least successful) and the top five commercial grantee programs (based on BTUs of savings).[5] Detailed methodology and findings are provided in the companion report *Market Effects of the Better Buildings Neighborhood Program* (Final Evaluation Volume 5).

Secondary Data

Secondary literature helped us interpret our primary research – grantee survey results, grantee interviews, and BBNIS data analysis – within the larger context of home energy remodeling knowledge. Table 1-11 identifies the sources we reviewed. We obtained grantee-specific evaluations that we identified through our interviews with grantees or that were provided to us by DOE staff. We identified relevant published literature from DOE's Residential Solutions member page that later became the Better Buildings Residential Solution Center, papers presented during Better Buildings Peer Exchanges, industry conference proceedings, and websites posting industry evaluations. These latter sources include International Energy Program Evaluation Conference (IEPEC), American Council for an Energy-Efficient Economy (ACEEE), Association of Energy Services Professionals (AESP), California Measurement Advisory Council (CALMAC) and those of program administrators including New York State Energy and Research Development Authority (NYSERDA) and Northwest Energy Efficiency Alliance (NEEA).

Table 1-11: Catalog of Secondary Literature Items Accessed

TYPE OF SECONDARY LITERATURE	NUMBER OF ITEMS
Statement of Project Objectives, Original 2010-11	42
Final Technical Reports	50 (includes some sub-grantees and two consortiums)
Grantee Websites (archived while grant was active)	63 grantees / 825 web pages
Grantee-specific Evaluations (typically conducted by consulting firms or universities)	39 (for some grantees, includes multiple reports)
Published Literature	64 (identified by our team through mid-2014)
Peer Learning Webinars or Peer Exchange Calls	45 (approximate number; notes and/or slides)

[5] See the companion volume, *Drivers of Success in the Better Buildings Neighborhood Program – Statistical Process Evaluation* (Final Evaluation Volume 3).

1.5.5. BBNIS DATA CLEANING

We had concerns about the quality of some of the grantee-reported BBNIS data, presumably due in large part to data entry errors. Data issues included missing data points, inappropriate zero ("0") values (for example, $0 invoiced cost for a project with known measure installation), and outliers. We were concerned specifically about three variables essential to our analysis of grantee relative success: residential audit invoiced cost and residential upgrade (retrofit) invoiced cost – which when summed provide the estimated project cost, and residential project MMBtu savings.

We used the following general data cleaning procedure for each variable:

1. We validated zero values using other project information in the database and replaced inappropriate values of zeros with "missing value".
2. Conversely, we validated missing values using other project information in the database and replaced with a zero value as appropriate.
3. We removed unrealistic values (for example, total invoiced cost below $100) and replaced with a missing value.[6]
4. We identified outliers using 2.5 standard deviations below or above the mean of each grantee as a cutoff and replaced with a missing value.
5. We calculated a new mean value for the variable for each grantee and replaced that grantee's missing values with a new mean, with the exception of values that had been outliers, which we left as missing.

1.6. LIMITATIONS

All of the program data we examined were reported by grantees, either to DOE, or to us through our data collection activities. None of the data are independently verified. Reporting inaccuracies and omissions may have reduced our ability to find patterns in the data and draw inferences and conclusions.

With respect to the first broad study objective, of assessing the degree to which the BBNP met its goals and objectives (other than those for energy savings and market effects), our data enabled us to provide only a qualitative assessment. Typically, we were able to count and characterize the grantees engaged in various activities and the partners, financial institutions, trade allies, and customers they engaged in their programs. We were not able to characterize the effectiveness and efficiency of grantees' activities and relationships. Thus, we had limited ability to characterize the likelihood that the gains made by the BBNP program will persist.

Our method for addressing the second broad study objective, that of identifying effective upgrade program designs and implementation approaches, was to seek patterns in grantee's program designs and approaches and to look for the preponderance of evidence regarding the effectiveness of each. Thus, we are able to assess the effectiveness of only those activities that were used by a number of grantees. We are not able to comment on the effectiveness of activities that only one or a few grantees used. For example, one grantee worked with employers to offer their employees, as an employment benefit, access to the grantee's BBNP-funded program with special terms (the

[6] BBNP DOE staff confirmed that invoiced costs lower than $100 were unlikely to constitute good estimates for use in our calculation of total project cost.

employer offered the loan; employees repayments were debited from their paychecks). The grantee's self-assessment was that this approach was highly effective. Our study, however, is unable to either 1) independently verify the effectiveness for the grantee of this approach; or 2) assess how offering this approach contributed to the grantee's level of comparative success used in our study.

While we have confidence in our methods used to identify the relative success of each grantee (see companion volume *Drivers of Success in the Better Buildings Neighborhood Program – Statistical Process Evaluation* [Final Evaluation Volume 3]), we recognize that the success of the multifaceted programs delivered through BBNP can be defined in a multitude of ways. Were we to have defined success differently, resulting in different categorizations of relative grantee success, we would no doubt reach some different inferences and conclusions about the drivers of success.

Also we note that many terms common to upgrade programs are interpreted differently by different parties, making direct comparisons across programs less definitive than one might hope. For example, although virtually all programs offered audits and comprehensive upgrades, the defining elements of audits and comprehensiveness varied across programs. Although roughly half of the programs described as offering participant support in the form of an energy coach, the function and activities of the coach role varied substantially across programs.

Finally, we note that the adage "the whole is greater than the sum of the parts" pertains to efficiency programs. Our analysis is largely confined to looking at the parts – the program elements. To draw meaningful, holistic comparisons among programs, the evaluator would need to develop a typology of program types. Such an analysis was beyond the resources of this program. We note that Washington State Energy Program (WSU EP), a subgrantee to two Washington State grantees, has conducted the initial research for such a categorization; see the reference to this work in relation to Figure 3-3 and in Appendix A.3.

2. DOE'S PROGRAM LOGIC AND ACTIVITIES

This chapter begins with a discussion of the BBNP program theory and logic. We describe DOE's program activity, with a focus on activities designed to support grantees. We integrate into this description a summary of grantees' feedback on DOE-provided support activities, including their rankings of each activity in regards to the value each activity provided to them during the grant period. We conclude with a discussion of BBNP's legacy at DOE – activities continuing after the BBNP grant period to support grantees and the broader energy efficiency community.

2.1. LOGIC MODEL OF THE BBNP PROGRAM

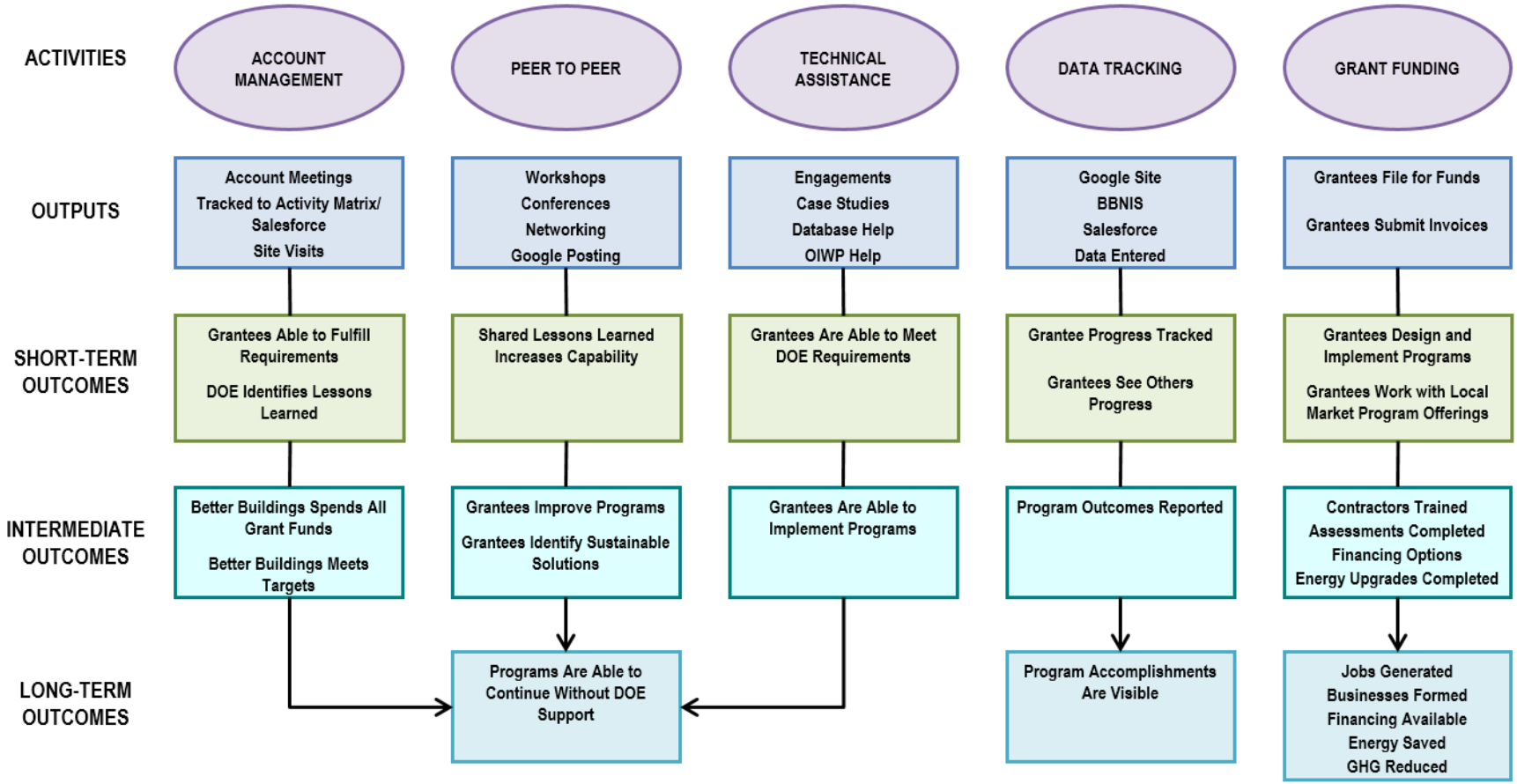
DOE's program logic for BBNP is that through federally-administered support and funding, grantees will be able to develop sustainable program models that stimulate energy upgrades, provide energy savings, and create jobs. Figure 2-1 provides the graphic depiction of the program logic for DOE's BBNP activities as identified by our process evaluation. These activities are guided by four principal components, identified by the DOE BBNP team at the outset of the program: 1) Driving demand for energy upgrades; 2) Ensuring that financial mechanisms are available to support home and business owners seeking to upgrade; 3) Ensuring that sufficient numbers of competent audit and upgrade contractors are available to meet the demand; and 4) Data tracking, reporting, and evaluation to document program accomplishments and assess effectiveness.

2.1.1. BBNP STAFFING STRUCTURE

The BBNP DOE staff included the following individuals:

- **Program Manager** – had overall responsibility for BBNP.
- **Account Managers** – managed BBNP grantees in their assigned territories; participated in site visits of grantee offices.
- **Project Officer** – ensured BBNP grantees operated within BBNP grant guidelines; conducted monitoring site visits of grantee offices.
- **Data and Evaluation Lead** – managed the BBNP grantee data reporting and data support contractors; ensured data quality met DOE needs.
- **Contractors** – provided specialized services to DOE and BBNP grantees including: database development and management, managing webinars and conferences, providing technical assistance, managing peer networks, and developing tools and services for BBNP. DOE provided technical assistance to grantees through the Office of Weatherization and Intergovernmental Programs (OWIP).

Figure 2-1: Better Buildings Neighborhood Program DOE Program Level



2.1.2. ACCOUNT MANAGEMENT ACTIVITIES

DOE assigned an Account Manager to each grantee to provide support throughout the program lifecycle, monitor progress, track output data, and collect lessons learned (short-term outcomes). Account Managers also encouraged grantees to spend all of their grant funds and ensured grantees met program-mandated targets (intermediate outcomes). In the long-term the use of Account Managers was one aspect of the BBNP design aimed at fostering the development of sustainable energy efficiency programs and improved environments for energy upgrades, both locally and nationally. There were six Account Managers – a ratio of about one manager per every seven grantees. The grantee Program Managers thought some of the Account Managers were stretched thin.

Typically, Account Managers had regular biweekly phone meetings with the grantee program administrators, engaged in email correspondence with grantee contacts as often as daily, and visited grantees as part of monitoring visits or when asked or needed. Communication between grantees and their Account Manager typically concerned requests for clarification of BBNP policy or requirements and guidance on program design or implementation (especially for grantees with less prior energy efficiency experience). The Account Managers provided guidance directly, arranged for the BBNP technical assistance providers to work with grantees, or helped grantees connect to other grantees with similar success and challenges or to technical assistance providers.

Grantees typically ranked "having an Account Manager" as the most valuable DOE support activity, although rankings varied somewhat as a function of the respective Account Manager. Grantees appreciated having "a dedicated person to turn to" who was knowledgeable about the program, supportive of their efforts to develop and deliver their programs, and willing to advocate on their behalf. Further, one grantee noted the importance of being "able to be candid and talk openly about problems without fear of retribution."

Several factors may have contributed to the lower Account Manager rankings reported by some grantees. First, during BBNP's start-up period, DOE was establishing policy and requirements and thus Account Managers were sometimes unable to provide guidance or provided direction that was later changed. Second, during BBNP's wind-down period, Account Managers moved on to other positions at DOE. Some grantees were assigned a succession of as many as three Account Managers, which undermined the relationships they had developed during the grant period. Third, some Account Managers may have worked more closely with grantees that proactively sought guidance and support, or seemed in need of additional guidance, and less closely with grantees that made fewer requests or seemed to need less support, which may have contributed to inconsistencies in the level of support that grantees received from their Account Manager.

Table 2-1 provides an overview of grantees' feedback on the value of each support activity; subsequent sections elaborate on grantees' responses.

Table 2-1: Grantees' Feedback on the Value of DOE-Provided Support Activities

SUPPORT ACTIVITY	GRANTEE FEEDBACK
Account Managers	Most valuable support activity
Workshops and conferences	Second most valuable support activity
Webinars	Third most valuable support activity
Peer exchange calls	Fourth most valuable support activity
Technical assistance	Tied for fifth most valuable support activity
On-site visits by DOE BBNP staff	Tied for fifth most valuable support activity
Google site	Sixth most valuable support activity
Google group	Least valuable support activity

2.1.3. PEER-TO-PEER ACTIVITIES

DOE provided peer-to-peer resources in the form of workshops and conferences, webinars highlighting effective approaches used by grantees, peer-sharing calls, a Google website and a Google group, and newsletters with the goal of increasing information sharing between grantees and fostering grantees' capability to launch and deliver effective programs (short-term outcomes). Peer-to-peer activities occurred throughout the BBNP grant period and generated knowledge resources so that grantees could improve their programs (intermediate outcomes) based on the experiences of others as well as themselves. As with the assigned Account Manager, this element of the program design was intended to foster the development of sustainable energy efficiency programs and improved environments for energy upgrades. The Account Managers and DOE support contractors facilitated these peer-to-peer resources, with the expectation that the networks would become self-sustaining and serve as a support network to aid grantees as they planned for the future of their programs.

Workshops and Conferences

The BBNP team hosted about a dozen workshops and conferences for grantees. In addition, as part of the DOE network, grantees were offered the opportunity to attend one of 30 regional trade shows associated with local contractor meetings across the United States, and to attend the *Better Buildings Partner Summit*, which focused on strategies for long-term promotion of upgrades within state and local communities. The BBNP workshops and conferences provided grantees with opportunities to learn about other grantees' program, learn from other grantees' experiences, and learn from experts in energy efficiency, including audit and upgrade contractors. Professional facilitators supported these sessions, captured ideas, and disseminated notes during and after events.

Grantees typically ranked the BBNP workshops and conferences as the second most valuable DOE support activity, noting the importance of developing relationships with other BBNP program administrators and learning about the opportunities and challenges faced by other programs. According to one grantee contact, "We developed a sense of community. We could see our progress."

Webinars and Peer Exchange Calls

The BBNP team publicized webinars available to grantees (including both BBNP-specific webinars and webinars offered through DOE's Technical Assistance program, DOE's Buildings America program, National Renewable Energy Laboratory [NREL], and ENERGY STAR®) and hosted regular peer exchange calls that provided grantees the opportunity to share and discuss their experiences, successes, and challenges. Grantees received invitations through email, the *Insider Blast* BBNP newsletter, and the BBNP Google site, typically for two events a week.

Each peer exchange call had a specific theme, including aspects of program design and delivery (such as marketing, financing, workforce development, and data tracking and reporting), addressing specific target markets (such as multifamily and small commercial), and working with utilities and other partners. The BBNP team led an ongoing solicitation of suggestions from grantees about topics that they would like to see covered in the peer-to-peer calls.

Grantees ranked the webinars third in value and peer exchange calls fourth in value among the DOE grantee support activities. Grantees generally reported that the peer exchange calls "had lots of valuable information," and some grantees reported that the calls were tailored to their needs and interests. As with workshops and conferences, grantees also appreciated learning about other grantees' experiences and challenges. Despite these benefits, some grantees found webinars and peer calls to be "uneven" in terms of pertinence to their needs and, in some cases, in terms of quality. As one contact noted, "The webinars are a passive learning environment, so they are less helpful. They were general and not necessarily tailored to your specific question."

Google Site and Google Group

The BBNP team established a Google group in 2010 and provided access to each grantee. In March 2011, the Google website was launched, but Google limited the number of licenses and not all grantee staff had ready access to the site. Further, the license had a unique *betterbuildingsnetwork* email address, which required each user to log in with an assigned Google email address. For some users who had their own Google account, this restriction created difficulties, as they could not have both addresses active at the same time.[7] Because of these challenges, as well as their assessments of the challenge of locating specific information on the Google website, grantees rated the Google group sixth and the Google website the least valuable DOE support activity.

2.1.4. TECHNICAL ASSISTANCE ACTIVITIES

DOE provided technical assistance to grantees through the Office of Weatherization and Intergovernmental Programs (OWIP) to ensure that grantees were able to meet DOE requirements (short-term outcome), implement effective programs (intermediate outcome), and develop sustainable programs that could continue without DOE support at the end of the grant period (long-term outcome). WIP coordinated a Technical Assistance Program (TAP) for EECBG and SEP grantees for Better Buildings and other DOE ARRA-funded efforts. The assistance was available to grantees until fall 2011.

Technical assistance and on-site visits provided by DOE staff tied for fifth place in grantees' rankings of DOE support activities. Grantees' rankings of technical assistance were the most varied of all the support activity rankings, with the highest proportions of grantees ranking it sixth, first, and "don't know, didn't use." It appears the lower rankings owe

[7] A feature that Google subsequently removed.

to several factors. First, TAP funding ran out in fall 2011. Although BBNP staff perceived that grantees had little remaining need for the assistance at that time, some grantees felt that their need for assistance had just become clear as their programs gained sufficient history to identify problems. Second, some of the early financial technical assistance focused on establishing residential PACE (Property Assessed Clean Energy) mechanisms in the grantee areas, which were unable to move forward due to legal and policy constraints. Third, some grantees had specific needs that were difficult for TAP to address, most commonly relating to the sectors other than single-family residential. Despite these challenges, some grantees felt that the technical assistance they received was very helpful and developed their own contracts with vendors once DOE no longer provided support.

Rankings of the on-site visit from the BBNP project officer on average suggested a rank of fifth, although, as with technical assistance, ratings were scattered. The majority of grantees did not offer an opinion on the usefulness of the on-site visit. One grantee contact who did find the visits to be valuable noted, "I valued the opportunity for DOE professionals to be here with us, to see us, to get to know us in our own territory, and to meet our partners, staff, and board members in person."

2.1.5. DATA TRACKING ACTIVITIES

The DOE BBNP team developed several databases, which grantees used to upload data on their project activities. DOE BBNP team members also used *SalesForce* to track their activities and communications with grantees (short-term outcome). Further, the BBNP team published dashboard summaries of the BBNIS data on the Google group website so that grantees could see the overall progress (short-term outcome). These data tracking procedures also allowed DOE to report on overall program outcomes both during and after the grant period (intermediate outcome) and, in the end, publicize the programs' accomplishments (long-term outcome).

BBNP grantees submitted a variety of required reports intended to provide the government with assurance that grant funds were expended appropriately:

- **Federal Financial Report (SF 425):** The Office of Management and Budget (OMB), part of the Executive Office of the President, requires that recipients of federal funding assistance submit the SF 425 on a quarterly basis, providing financial information such as cumulative actual federal funds, unobligated balance of federal funds, and local matching contributions.
- **Recovery Act Report:** The ARRA enabling legislation required ARRA funding recipients to report spending, job hours, and related metrics on a quarterly basis.
- **DOE Progress Report and Narrative:** DOE requires its funding recipients to report their spending and activities on a quarterly basis.
- **BBNP Program Report:** The BBNP team designed program-specific quarterly reporting requirements for the grantees.

In addition to these formal reports, the Account Managers frequently asked grantees to provide information on their programs and status. Grantees found these multiple reporting requirements burdensome and confusing. Reporting was burdensome due to both the multiplicity of reports and the large amount of data requested, especially by the BBNP Program Report. Confusion resulted from a number of factors. First, the reporting deadlines differed between reports. Second, multiple reports requested the same or similar information but definitions or reporting intervals

(within period and cumulative) differed. For example, both the ARRA Report and BBNP Program Report sought information on hours worked, but differed in the specific information sought. BBNP staff stated the difference was intentional, yet grantees did not consistently recognize the difference. Similarly, spending definitions or intervals differed among three of the reports. Third, in some cases, grantees reported that definitions of data fields were ambiguous or unclear. Further supporting the finding that the data reporting process was confusing for many grantees, the BBNP team reported compromised data quality due to missing data, incorrect data due to grantee misinterpretations, and software processing errors.

In addition to multiple and heavy reporting requirements, a number of conditions made data tracking and reporting challenging for both the grantees and the BBNP team:

1. BBNP launched rapidly, and the BBNP team rushed to develop data reporting requirements and procedures. Despite seeking feedback from consultants and grantees, the DOE BBNP team was not able to support a more in-depth development period or to assess grantees' abilities to provide complete and accurate information.

2. Given the rapid launch, the BBNP FOA did not specify the BBNP Program Report Requirements, and many grantees were unprepared for the depth and frequency of the required reports. Many of the grantees had no experience with energy program data or data reporting systems and, in some cases, lacked the staff skills or funding needed to engage in the data management activities required by DOE.

3. DOE had never before attempted data collection and quality assurance of the magnitude of the BBNP Program Report Requirements and, therefore, was unprepared for the complexity of the data collection and management activities.

4. DOE and grantees also faced many external challenges to collecting and reporting energy data. Utility companies frequently were unwilling to provide data, even with signed release forms, or would provide data only in Portable Document Format (PDF) form, not electronic datasets. In addition, some communities rely on fuel oil and solid fuel use (wood and pellets), for which usage data were unavailable.

5. During the grant period, numerous suppliers developed program database platforms, yet few were available at the outset of BBNP, and those that were available typically necessitated sizeable expenditures on consulting to tailor the platform to DOE's needs and to account for the diversity of the grantees' program designs, target markets, and reporting capabilities.

6. The DOE BBNP team also found it difficult to achieve cohesion across the diverse team needed to collect and analyze data, including BBNP Account Managers and grant managers, database development team, data analysis (and de facto quality assurance) team, and individuals contributing expertise in IT (information technology), database development, data quality assurance, building energy technologies, and energy efficiency programs.

Members of the BBNP team spent much of the last program year working with grantees to obtain missing data and correct data inaccuracies due to misinterpretations, as well as developing software tools and resolving software problems. In the companion volume, *Savings and Economic Impacts of the Better Buildings Neighborhood Program,* (Final Evaluation Volume 2), Figure 2-5 illustrates DOE's data quality assurance and processing activities.

2.1.6. GRANT FUNDING ACTIVITIES

DOE was responsible for overseeing the grantees' use of the $508.3 million in grant funds to design, develop, and implement their programs (short-term outcome). Grantees used the funds to train contractors, subsidize participants' audits and upgrades, provide incentives and financing loan pools, and pay for the staff and contractors needed to support these activities (intermediate outcomes). The long-term outcomes anticipated were that the grantees would generate jobs and financing opportunities in their local markets, save energy, and reduce greenhouse gas emissions (long-term outcomes). As reported in our preliminary process evaluation, some requirements of the grant funding proved challenging for grantees to manage, namely Davis-Bacon, historic preservation, and energy savings requirements (Research Into Action and NMR Group, 2012a).

The BBNP funds were the first time DOE had project funding that was subject to the Davis-Bacon requirements to ensure that work was paid at the prevailing wage rate. The requirement applies to all buildings, but DOE issued a waiver for residential owner-occupied homes. Thus, for BBNP, the requirements applied to commercial construction and grantees that were going to be choosing and managing the contractors doing residential projects. A solution for the residential programs was for the homeowners to choose which contractor to use and sign an agreement that the grantee will pay the contractor once the program inspector conducts a quality assurance inspection that accepts the work. Davis-Bacon did apply to commercial upgrades, and contractors needed to complete the paperwork required by the Act. Grantees reported that the requirements caused their commercial sector opportunities to mostly disappear because of increased project costs.

Historic preservation requirements also applied to the Better Buildings grantees. Each state has different requirements, so each grantee had to find out their local regulations. Some grantees worked with their city or county historic preservation staff, and at least one grantee had an architect available to do historic preservation reviews for them. By-and-large, historic preservation requirements were less of an issue for grantees than Davis-Bacon requirements.

Finally, grantees reported frustration with how savings requirements were communicated. When DOE and the grantees signed letter agreements to govern their grants, these agreements included a footnoted definition of retrofit upgrades as indicating a minimum of 15% savings.[8] However, many grant recipients reported that DOE first notified them that they needed to achieve 15% savings on each project after the programs were well underway.[9] Though prominently displayed in the grantee handbook, if a grantee did not review the handbook in January 2011, likely the first time they noticed the requirement would have been in the *Insider Blast* in March 2011. In March 2012, DOE provided guidance that the 15% could be treated as a portfolio goal, not an individual upgrade goal. Thus, grantees who chose the portfolio goal were able to report upgrades that missed the 15% target as long as they were offset by upgrades that exceed the target. While this should have alleviated some of the concerns by grantees, those who were uncomfortable with the 15% target continued to be troubled by the requirement and feared having to change their reporting once more.

8 SEP grantees had a target of 20% savings.

9 The *Insider Blast* for March 11, 2011, March 18, 2011, March 25, 2011, and April 19, 2011 – each offer guidance addressing questions about the 15%.

2.2. LOOKING FORWARD

DOE is continuing to support the energy upgrade market through its Better Buildings initiative, due, in part, to grantees' positive response to the support and resources provided during the BBNP grant period. This ongoing initiative encompasses the Better Buildings Residential Program Solution Center, Better Buildings Residential Network, Home Performance with ENERGY STAR (HPwES) public-private voluntary partnership program, and Home Energy Score tool.[10,11] The first two of these activities grew directly from DOE's BBNP program.

DOE also has taken steps to address the database issues experienced during BBNP and has developed new data tracking and reporting tools to support future upgrade programs.

2.2.1. BETTER BUILDINGS RESIDENTIAL PROGRAM SOLUTION CENTER

The BBNP team developed the Better Buildings Residential Program Solution Center, an extensive web-based library to provide free, ongoing support to the energy efficiency community.[12] The Solution Center – an enhancement and expansion of the Google Group website – provides informational handbooks and syntheses of lessons learned from BBNP grantees, HPwES, and other energy efficiency efforts. The Center provides handbooks on all aspects of program design and implementation:

- Market position and business model
- Program design and customer experience
- Marketing and outreach
- Contractor engagement and workforce development
- Financing
- Evaluation and data collection

For each of these topic areas, the Solution Center offers step-by-step guidance, tips for success, material templates, program examples, case studies, and webcasts and videos. The Center includes extensive references to relevant energy efficiency scholarship.

2.2.2. BETTER BUILDINGS RESIDENTIAL NETWORK

The Better Buildings Residential Network continues to facilitate communication between people involved in residential program by connecting more than 140 organizations, including program administrators and implementers, governmental and nongovernmental organizations, utilities, financial institutions, and other energy efficiency professionals so that they might continue to learn from each other how to accelerate the pace of home energy

10 *https://bbnp.pnnl.gov/*

11 *http://homeenergypros.lbl.gov/group/better-buildings-residential-network*

12 *http://energy.gov/eere/better-buildings-residential*

upgrades.[13] The Residential Network hosts monthly calls on topics of interest to members, as well as bimonthly peer exchange calls on the following topics:

- Commercial sector
- Data & evaluation
- Financing & revenue
- Marketing & outreach
- Multifamily/low-income housing
- Program sustainability
- Workforce

Organizers report that the audience for peer exchange calls is becoming increasingly diverse now that calls are open to the public. As a result, peer exchange calls are beginning to cover a broader range of topics, such as real estate and health.[14]

2.2.3. TOOLS FOR DATA TRACKING AND REPORTING

Guide for Benchmarking Residential Energy Efficiency Program Progress

DOE's BBNP team members responsible for data quality and reporting developed this guide (Vermont Energy Investment Corporation, 2014; due to be finalized in mid-2015) to help residential upgrade program managers:

- Develop a program benchmarking plan to facilitate comparison across programs, enabling managers to learn from other programs
- Identify metrics to measure progress toward goals and objectives and identify data sources for quantifying metrics
- Establish a baseline of performance
- Communicate program progress and success with stakeholders

The guide includes recommendations for gross program outcome metrics and normalized program progress metrics, as well as planning worksheets and examples of metrics and metric values developed from BBNP grantee data.

Building Energy Data Exchange Specifications

DOE has developed Building Energy Data Exchange Specifications (BEDES), a dictionary of terms, definitions, and field formats, to support energy efficiency program administrators, policy makers, and other stakeholders needing to

13 *http://energy.gov/eere/better-buildings-residential-network/better-buildings-residential-network*

14 Organizers of the peer exchange calls actively solicit recommendations for future call topics from participants.

track and exchange information on building characteristics and energy use.[15] It provides common terms and definitions for parties tracking, sharing, and reporting building energy efficiency information.

2.3. CONCLUSIONS

With BBNP, DOE supported its grantees unlike ever before. Grantees credit much of their success to this support. DOE appears to have listened to the feedback – both positive and negative – it received from BBNP grantees and DOE BBNP program staff. DOE is continuing much of the support BBNP offered – provision of guidance, networking – through its Better Buildings Initiative. Where BBNP fell short – data tracking and reporting – DOE is developing tools to support the next generation of building upgrade programs.

We reach the following conclusions:

1. The Account Manager role was effective in helping grantees to understand and satisfy grant requirements and to develop and implement energy programs.
2. Conferences were effective in providing grantees opportunities to learn from experts and each other, to form relationships useful to their grant activities, and to grapple with challenges in a learning environment.
3. With the establishment of the Solution Center and this program evaluation, BBNP has met its objective to document lessons learned in order to expand impact of BBNP investments.
4. Through the Solution Center, the Residential Network, and this program evaluation, BBNP has met its objective to identify and spread the most effective approaches to completing building energy upgrades.
5. Through the data tracking and reporting tools developed largely or partially in response to BBNP implementation experience, DOE is creating infrastructure necessary to support building upgrade programs, policies, and investment, as well as building upgrade activity conducted by owners and the retrofit industry.

15 *http://energy.gov/eere/buildings/building-energy-data-exchange-specification-bedes*

3. GRANTEES' PROGRAM LOGIC AND DIVERSITY

This chapter presents the general theory and logic governing the grantees' upgrade programs. The grantees' programs vary widely; this chapter discusses the context for much of that diversity and considers those factors influencing grantees' program designs and the reception that their programs received in their target markets, including the grantees' organizations, partnerships formed, funds leveraged, and characteristics of their markets.

Also we discuss associations that we found in bivariate analyses between grantees' program characteristics and grantees' relative success (most successful, average success, or least successful cluster, as described in Section 1.5.1). Our multivariate analyses of the predictors of success, presented in *Drivers of Success in the Better Buildings Neighborhood Program – Statistical Process Evaluation* (Final Evaluation Volume 3), did *not* reveal any significant predictors of membership in either the most or least successful clusters as a function of the grantee program characteristics discussed in this chapter. Any findings regarding grantee success discussed in this chapter, therefore, are descriptive, rather than predictive, findings.

The chapter draws on in-depth interviews with grantees, a web-based survey grantees completed about their program activities, and data that grantees reported to DOE on their program accomplishments, as well as a review of recent industry literature related to upgrade programs to place findings in a broader context. Appendix A provides a detailed presentation of the findings summarized in this chapter; Appendix B provides a detailed discussion of the grantee web-based survey method and findings.

3.1. LOGIC MODEL OF THE GRANTEE BBNP PROGRAMS

Figure 3-1 shows the program logic model from the grantee perspective. (For brevity, the model uses the term "consumers" for the programs' target markets – which may be residential, nonresidential, or both.) The logic model shows the *general* theory and logic of how the grantees apply the framework of the four DOE-identified principal program components (driving demand, financing, workforce development, and data tracking, reporting, and evaluation; see Chapter 2, *DOE's Program Logic and Activities*) to the programs that they operate.

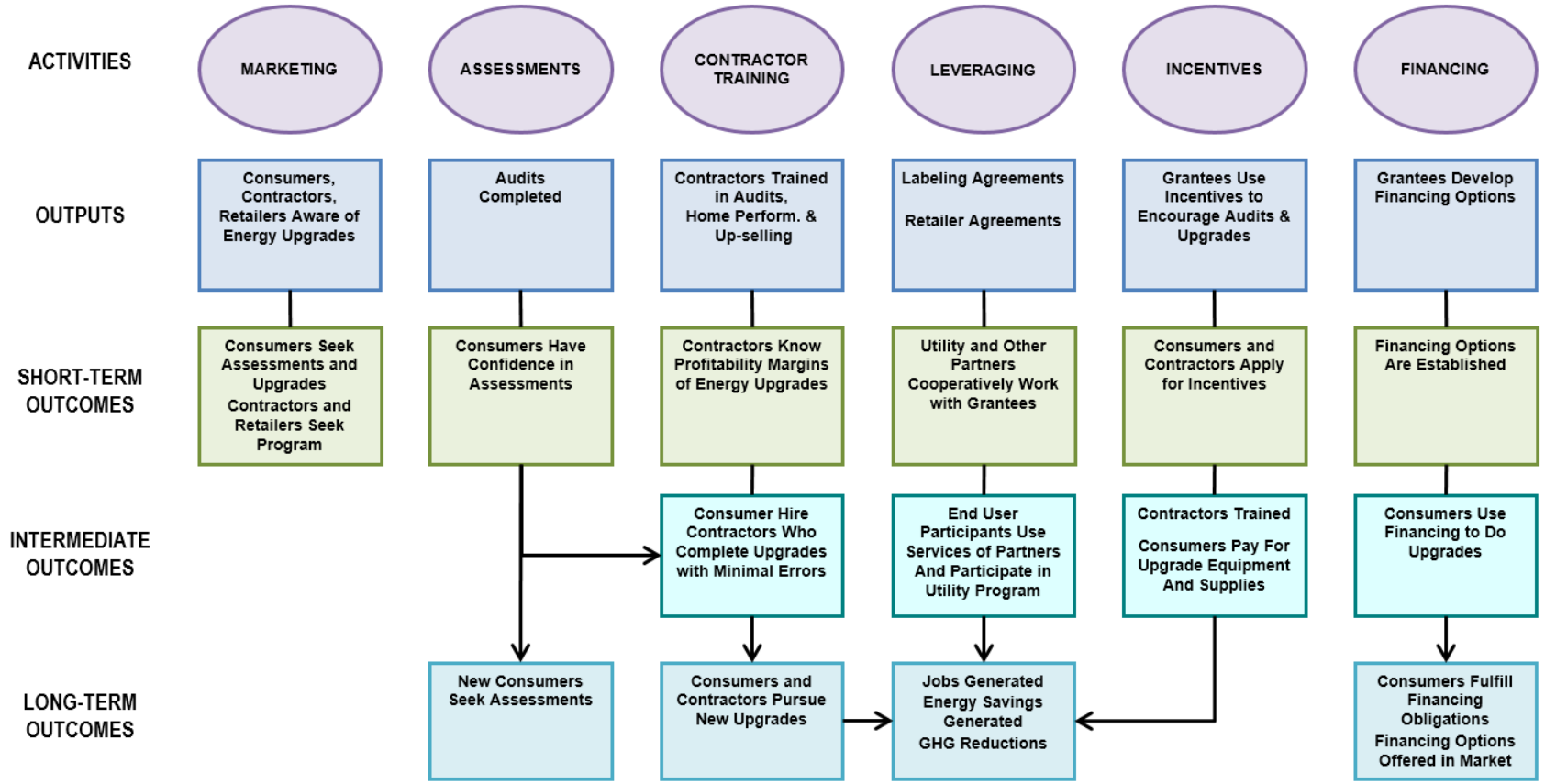
3.1.1. MARKETING ACTIVITIES

Grantees' programs engaged in a variety of marketing activities, including presentation to community groups, participant testimonials, endorsement by community leaders, and community events (see Chapter 6, *Driving Demand*). They used media such as websites, free media exposure, mass media buys, and direct mail. Marketing outputs are the counts of these activities. As a result of these marketing activities, consumers and contractors became aware of energy upgrades and engaged in the programs (short-term outcomes); participants promoted energy upgrades to others though referrals and testimonials (intermediate outcome); new energy upgrades occur, energy is saved, greenhouse gases (GHG) are reduced, and jobs are generated (long-term outcomes).

3.1.2. AUDIT ACTIVITIES

Grantees' programs used a variety of approaches to conducting audits (see Chapter 4, *Audits*). Completed audits constitute the output of these activities. As a result of these audit activities, consumers have confidence in the audit results, undertake upgrades, and save energy in their homes and businesses (short-term outcomes), increasing numbers of consumers would seek upgrade services (intermediate outcomes), leading to upgrades, energy savings, GHG reduction, and jobs (long-term outcomes).

Figure 3-1: Better Buildings Neighborhood Grantee Level



3.1.3. INCENTIVE ACTIVITIES

Grantees offered incentives of various types for audits (see Chapter 4, *Audits*), upgrades (see Chapter 5, *Upgrades*), or for contractor training (see Chapter 7, *Stimulating Supply*). Incentives paid constitute the outputs of these activities. As a result of these incentive activities, consumers and contractors complete incentivized activities (short-term outcomes), consumers and contractors increasingly value energy upgrades (intermediate outcomes), leading to upgrades, energy savings, GHG reduction, and jobs (long-term outcomes).

3.1.4. CONTRACTOR RECRUITMENT ACTIVITIES

Grantees engaged contractors, trained contractors, provided leads to contractors, and pursued other related activities (see Chapter 7, *Stimulating Supply*). As outputs of these activities, contractors understand the program requirements and are trained in upgrade services. As a result of these contractor recruitment activities, contractors participate, provide quality services, and see the potential for business revenue from energy upgrade businesses (short-term outcomes), contractors' skills improve and their revenues increase (intermediate outcomes), leading to upgrades, energy savings, GHG reduction, and the creation of jobs (long-term outcomes).

3.1.5. FINANCING ACTIVITIES

Grantees offered financing in a variety of forms (see Chapter 8, *Financing*). Financing outputs are loans accessible to potential upgrade customers. As a short-term outcome, consumers apply for financing through the program offerings. In the intermediate-term, consumers would be able to repay their loans, leading to the long-term outcome that financing for energy upgrades would continue to be accessible after the DOE BBNP support concludes.

3.1.6. LEVERAGING ACTIVITIES

Grantees' leveraging activities included setting up partnerships and agreements with utilities, financial institutions and others (see Section 3.3, *Partnerships*). Leveraging outputs are the agreements and relationships. As a result of these leveraging activities, partners work cooperatively with grantees (short-term outcomes), consumers also use partner services and participate in utility programs (intermediate outcomes), leading to upgrades, energy savings, GHG reduction, and jobs (long-term outcomes).

3.2. GRANTEE ORGANIZATION TYPE AND EXPERIENCE

Government entities administered the majority of grantee and subgrantee programs, followed by nonprofit organizations, including both longstanding and recently formed organizations (Table 3-1).

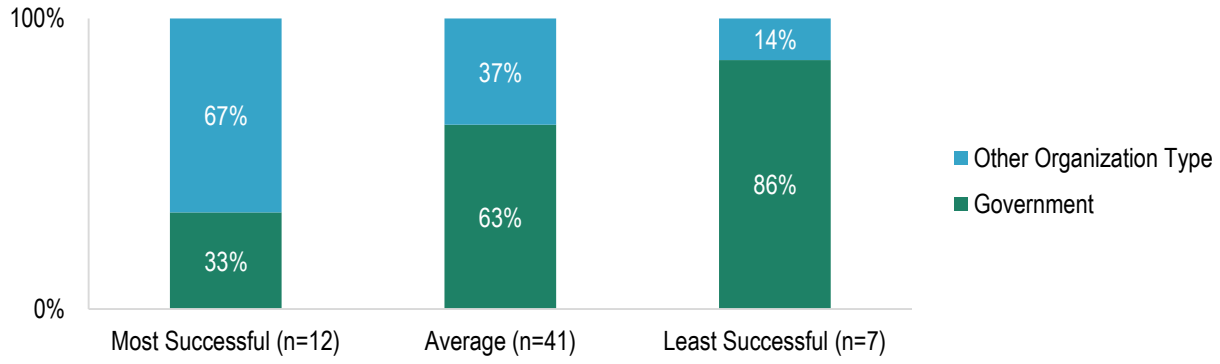
Table 3-1: Grantee Entity Type

ORGANIZATION TYPE	COUNT	PERCENT
Government	36	61%
City	*16*	*27%*
County	*10*	*17%*
State	*6*	*10%*
Regional (multi-county/multi-city)	*4*	*7%*
Nonprofit	12	20%
Public Benefits Organization	4	7%
Program Implementation Organization	4	7%
Municipal Utility	3	5%

Source: Research Into Action. Based on organizational affiliation of the program manager; program manager as identified in BBNP program tracking database or referred to us by the contact in listed in the database. Multiple organization types were involved in the delivery and administration of many grantee programs.

Programs administered by government organizations were less likely to be in the most successful cluster than programs administrated by other types of organization (Figure 3-2).[16] While in-depth interviews provided little detail on why certain organization types may be more successful than others, one grantee stated that, as a nonprofit, "we have the flexibility to make things happen way faster than any portion or part of the government, whether it be from the city to the federal." Further, industry literature suggests that governmental organizations may have limited staff with the availability or knowledge necessary to run energy efficiency programs (DOE, 2012). Future research should explore the unique challenges governmental organizations may face when offering whole home/building energy efficiency upgrade programs.

Figure 3-2: Grantee Success Grouping by Organization Type



16 Independent samples Mann-Whitney U test, $p < 0.05$.

The backgrounds of the staff members working on grantees' residential programs varied, as a function of grantee success. Grantees in the most successful cluster were significantly more likely than average and least successful grantees to have at least one staff member with 15 or more years of experience (83% versus 24%).

Over one-third of grantees stated their most senior staff in each of the areas of program design, implementation, green building trades, and financial institution involvement had less than four years' experience – relative new-comers to energy efficiency program administration. Thus, BBNP expanded the number of professionals with substantive energy efficiency management experience.

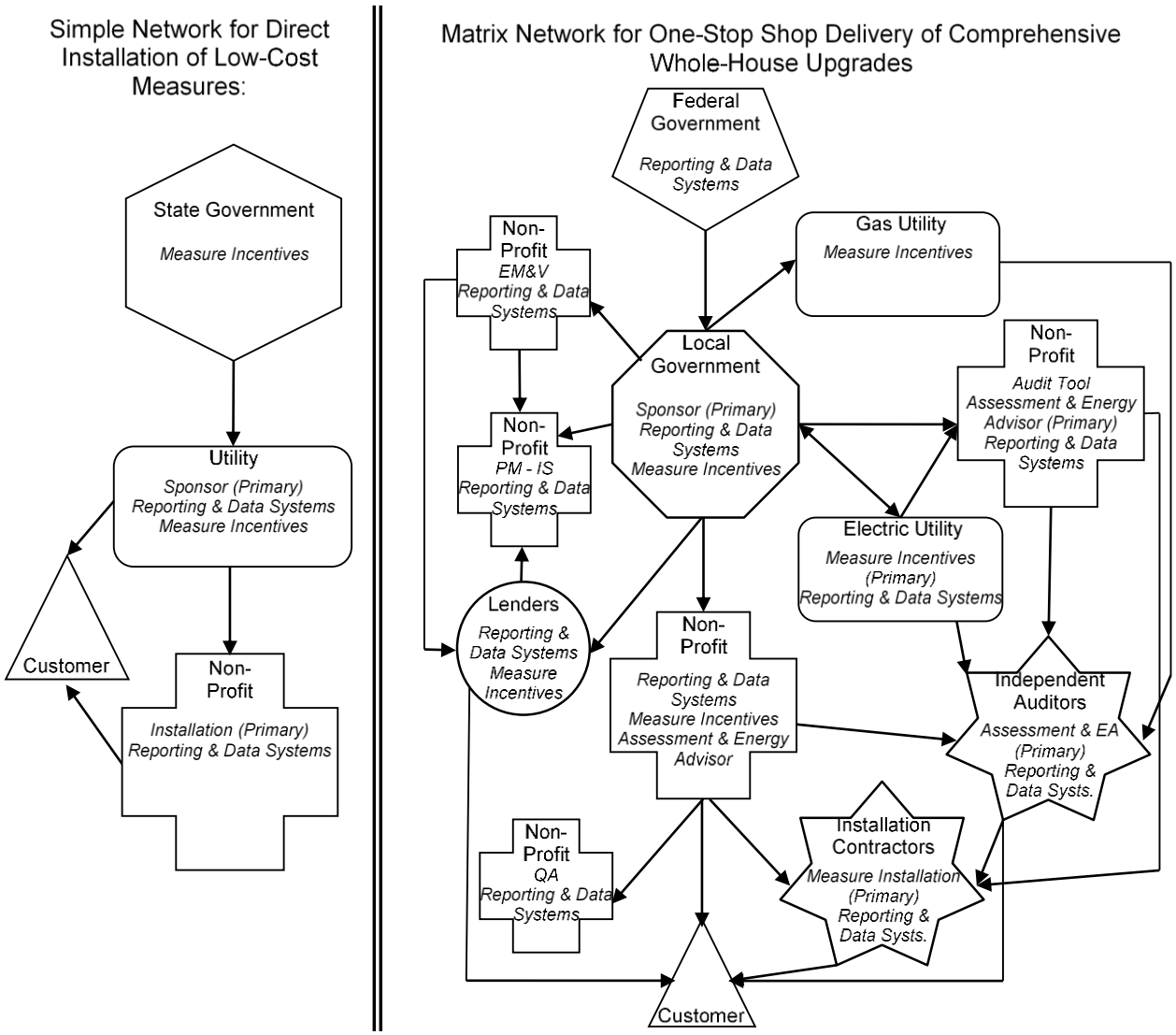
Most these new comers to efficiency program administration are in the middle of the workforce age demographic, between 35 and 50 years old. To place this BBNP accomplishment in context, that age demographic is significantly underrepresented in energy efficiency, and indeed in utility operations as a whole, in the U.S., as noted by a variety of industry observers.[17] Although older workers (Baby Boomers) are a large demographic in most industries, the middle age cohort in energy efficiency is especially small, due to what some sources attribute part to "massive hiring freezes and downsizing when the industry deregulated and focused on cost-cutting measures in the 1980s and 90s" (University of Cincinnati, 2006).

Related to BBNP's accomplishment in expanding the number of professionals with substantive energy efficiency management experience, through the funding mechanism of grants to local governments, the new comers to the efficiency industry have more varied backgrounds than the established utility workforce. Many of the grantees served relatively rural states and counties. Many of the BBNP teams were comprised of local government employees, who typically live in the municipality and collectively typically reflect the socio-economic characteristics of the local population more so than other organizations.

Multiple types of organizations played a role in the administration of many grantees' programs, and grantees varied in the structure of the relationships between these organizations. While some grantees used relatively simple delivery structures, others used complex structures that involved different types of relationships between different types of actors. Figure 3-3 provides examples of both a simple and complex delivery structure, adapted from research conducted by WSU EP on various ARRA-funded programs that operated in the State of Washington, including BBNP grantees. Appendix A.3, *Organizational Ecology – The Nature and Complexity of Partnership Models*, provides a brief summary of WSU EP's conclusions relating to the benefits and limitations of different organizational ecologies, two of which are represented in the following figure. (Abbreviations used in the table: EM&V – evaluation, measurement, and verification; PM - IS – program manager – information systems; EA – energy advisor.)

[17] The Bonneville Power Administration (BPA) noted in late 2014 that 50% of its employees is eligible for retirement in two years; the American Public Power Association issued a 2005 report addressing the large proportion – about half –of the workforce in electric and natural gas utilities that would reach retirement by 2020. The phenomenon of looming retirements has been termed the "silver tsunami." (See *Clearing Up,* April 24, 2015. No. 1694. Page 6.)

Figure 3-3: Example Program Delivery Structures



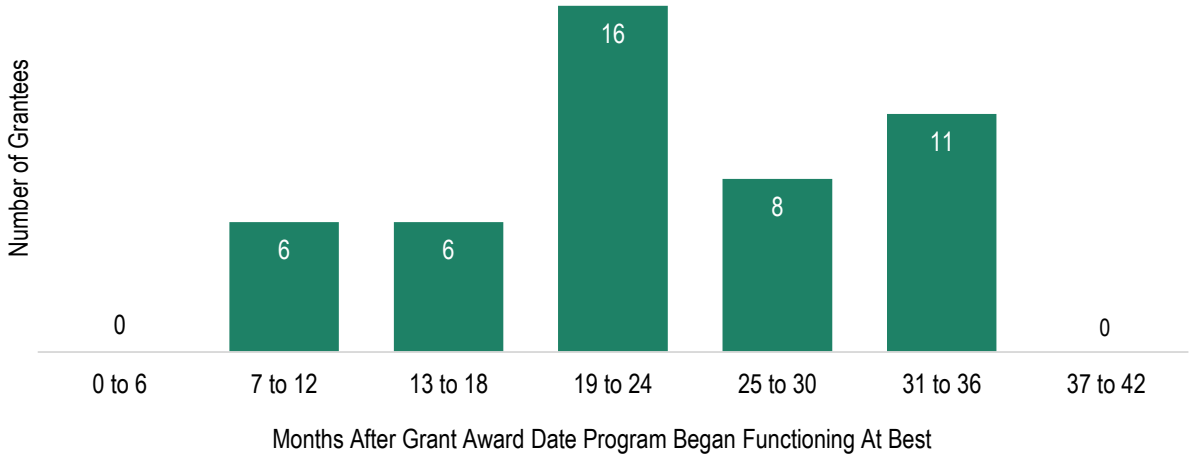
Adapted from Schueler, "Organizational Ecology: Seeing the Forest and the Trees in Community-Based Energy Efficiency Programs: An Initial Exploration."

About half (52%) of residential programs were built on the experience of a pilot or other program. Among those programs, the majority (72%) were built on a whole home program. Nonetheless, grantees whose residential programs were built on existing programs did not differ significantly from grantees who built their programs from scratch in the speed with which they were able to launch and ramp up their programs.[18]

[18] Grantees building on existing programs averaged 9.4 months from award date to program launch and 13.2 months from launch to the time the program began functioning at its best. Grantees not building on existing programs averaged 8.5 months from award date to program launch and 14.6 months from launch to the time the program began functioning at its best. These differences are not statistically significant. See Appendix B Table B-9 and Table B-10.

For many grantees, launching and ramping up their program took a substantial portion of the grant period. Grantees launched their residential programs an average of nine months after their BBNP award date, and web survey findings suggest it took programs, on average, an additional 14 months to ramp up to the period in which they were functioning at their best. As a result, the average BBNP-funded residential program did not begin functioning at its best until nearly two years (23 months) into the grant period. Ramp-up time was not affected by whether a grantee's program built upon another pilot or program. Figure 3-4 shows the distribution of the time periods required for grantee programs to begin functioning at their best.

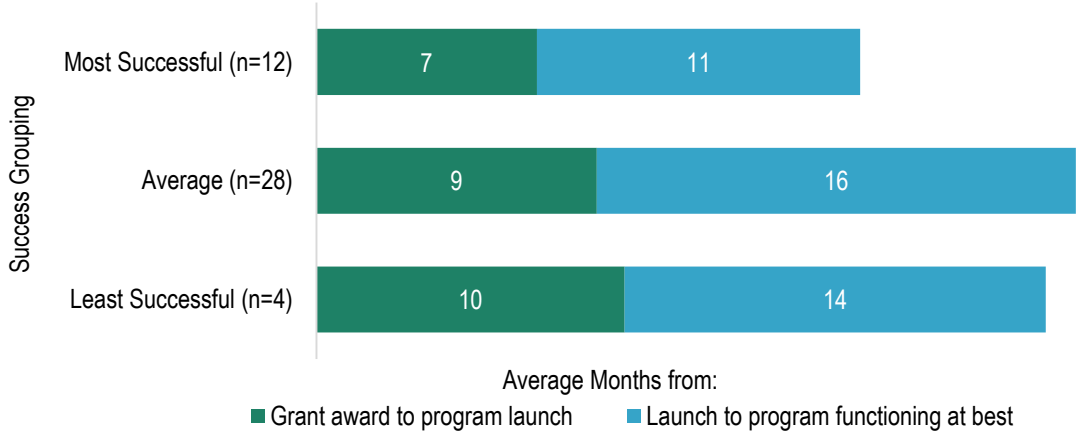
Figure 3-4: Time from Award Date to Beginning of Period in which Grantees' Residential Programs Functioned at Their Best



The time required to launch and ramp up may have impacted grantees' overall success in their residential programs. Considering both the time required to launch and ramp up their programs, grantees in the most successful group reached the point at which their programs were functioning at their best an average of approximately six months sooner than grantees in the other success groupings (Figure 3-5).

One factor that may have delayed program launch for some grantees was the Federal Housing Finance Authority's (FHFA's) decision in the summer of 2010 not to support PACE financing. In preparing their grant applications, many grantees had planned to incorporate PACE financing into their programs, and had to find other solutions when this was no longer an option. Nonetheless, even had PACE financing been available, programs would still have needed to establish the infrastructure to drive demand and stimulate supply for upgrades, in addition to the infrastructure to support PACE financing. Thus, the impact of the FHFA's decision on program ramp-up times is unclear.

Figure 3-5: Average Time Required for Program Launch and Ramp Up by Grantee Success Grouping



3.3. PARTNERSHIPS

Grantees often received leveraged funds through partnerships with utilities and state, local or regional agencies, some of which had access to other ARRA funding sources. The majority of grantees (81%) received funds outside of BBNP (and in addition to funds provided by financial institutions) to support their residential programs. Similarly, 87% of low-income and 63% of nonresidential programs received funds outside of BBNP. Grantees most often reported receiving funds from utilities, other ARRA grants, and local government agencies (Table 3-2).[19]

Table 3-2: Outside Funding Support Received for Residential Program (n = 47, multiple responses)

SOURCE OF FUNDS	COUNT	PERCENT
Utility	22	47%
Other ARRA Grants	19	40%
State, local, or regional agency	14	30%
SEP	6	13%
Foundation or nonprofit	6	13%
Other federal agency	3	6%
Federal Agencies (for example, Departments of Labor and of Housing and Urban Development)	2	4%
Did not receive funds outside BBNP	8	17%

Source: Research Into Action, Grantee Web Survey, Q3

[19] For more information on leveraged funds, see companion report: *Savings and Economic Impacts of the Better Buildings Neighborhood Program* (Final Evaluation Volume 2), Leveraged Resources.

Grantees worked with a variety of organizations in delivering their BBNP-funded programs, and related to their partners in a variety of ways. The following sections elaborate on the relationships grantees had with their various partner types.[20]

3.3.1. UTILITIES

In in-depth interviews, the 43 grantees and subgrantees that discussed partnerships with utilities most often reported drawing on utility programs for participant incentives (Table 3-3). Grantees in the most successful group more often reported that their utility partners provided participant incentives than grantees in the other success groupings. While 7 of the 11 most successful grantees that completed in-depth interviews (64%) drew on utility incentives, 15 of 43 interviewed grantees in the average and least successful groups (35%) did so.

Table 3-3: Utility Program Contributions to Grantee Programs (n = 43, multiple responses allowed)

TYPE OF SUPPORT PROVIDED BY UTILITY PROGRAM	NUMBER OF GRANTEES
Participant Incentives	22
Marketing Support	8
Audit Subsidies	8
Qualified Contractor Networks	6
Financing Products	3
Quality Assurance and Control	2

Source: Research Into Action, Grantee In-depth Interviews

Grantees perceived benefits for both their own programs and utility programs in their utility partnerships. Grantees reported utility partnerships allowed their programs to benefit from the utilities' marketing and outreach capabilities by leveraging the utility's name recognition and relationships with customers. In addition, grantees stated that coordination with existing utility programs was important in avoiding potentially negative effects of competition between programs. Grantees described a variety of ways their partnerships benefitted utility programs, including: filling "gaps" in utility program offerings, either by reaching an underserved population or supporting additional measures; helping customers navigate utility program offerings; and advocating for policies that would support energy efficiency.

Despite the mutual benefits grantees perceived in their partnerships with utilities, grantees reported challenges in both establishing and maintaining relationships with utility program administrators. Some utility program administrators were reluctant to partner with grantees, either viewing the grantees' programs as competitors or simply lacking motivation to engage in a partnership. Once they had established relationships with utility partners, grantees reported challenges stemming from the grantees' lack of control over the design and delivery of the

[20] For information on grantees' partnerships with financial institutions, see Chapter 8 of this volume.

program elements the utility programs provided. For example, grantees reported their programs lacked influence over trade allies and implementation contractors managed by their utility partners. Inconsistencies between utility data tracking systems and grantee data needs also posed challenges for grantees in their utility partnerships.

3.3.2. LOCAL GOVERNMENTS

Grantees most often used their partnerships with local governments to access federal funds these governments administered, either through federally-funded weatherization programs (Weatherization Assistance Program [WAP] and Low-income Home Energy Assistance Program [LIHEAP]) or through ARRA funding outside of BBNP. Grantees that collaborated with weatherization program administrators most often provided funding to allow these programs to serve a larger number of participants or provide a wider range of measures. Grantees reported that these partnerships were an effective way to both increase participation and achieve goals related to reaching low-income populations. Grantees reported leveraging other ARRA funds administered by local governments for a variety of purposes, including subsidizing audits, providing workforce training, and providing incentives for upgrades. Four grantees reported that their BBNP programs built on programs that had launched previously with other ARRA funding.

Local governments' relationships with business owners and property owners were valuable to some grantees. Five grantees reported drawing on local governments' existing relationships in the multifamily and commercial sectors to recruit participants to their programs.

3.3.3. NONPROFIT GROUPS

Partnerships with nonprofit groups were valuable in spreading awareness of grantees' program offerings. Grantees reported that relationships with some types of groups in particular had been valuable to their programs. These organizations included:

- **Organizations with an environmental focus:** Six grantees worked with organizations focused on environmental sustainability. Two of these grantees noted that these organizations could be particularly valuable in reaching out to populations that may be skeptical of government programs.
- **Neighborhood organizations:** Four grantees reported working with neighborhood organizations like home owners' associations and neighborhood associations. These neighborhood organization partners would inform residents of the program as the grantees began targeted outreach campaigns in those neighborhoods.
- **Business associations:** Four grantees reported working with organizations like chambers of commerce to inform businesses about the grantees' commercial program offerings.
- **Community colleges:** Four grantees reported working with local community colleges to provide training to contractors, with two of those grantees specifying that the community colleges would continue to offer curriculum focused on energy efficiency after the grant period.

3.3.4. OTHER BBNP GRANTEES

Coordinating program offerings allowed neighboring grantees to benefit from each other's marketing efforts and contractor networks. Seventeen grantees worked with other BBNP grantees whose service areas bordered or overlapped their own. In some cases, these grantees worked together to develop similar program offerings so they could more easily share contractor networks and avoid the potential for customer confusion when outreach messages from one program reached residents of another program's service area. Grantees also reported benefitting from relationships with others in other parts of the country. These grantees reported that other grantees had provided them with information and advice that had been valuable in designing and implementing their programs.

3.4. CHARACTERISTICS OF THE LOCAL UPGRADE MARKETS

Grantees described four characteristics of the areas they served that affected the ways they designed their programs and the ways their target audiences received the programs: economic conditions, climate, prevailing political attitudes, and knowledge of and experience with energy efficiency of their target audiences.

- **Economic Conditions:** As part of ARRA, BBNP funding was a response to the recession that occurred from 2007 to 2009. Nine grantees reported that local economic conditions following the recession made homeowners reluctant to invest in home improvements, including energy upgrades, particularly if doing so would require taking on debt. In addition, grantees reported that low-energy prices had posed challenges for their programs, reducing the value of energy cost savings participants would gain from upgrades, thus making cost savings a less effective selling point.

- **Climate:** Grantees suggested upgrades were easier to promote in extreme hot and cold climates, with grantees in mild climates noting that lower heating and cooling needs had the potential to limit both the comfort and cost savings benefits of upgrades.

- **Prevailing Political Attitudes:** The states in which BBNP grantees operated were, on average, more supportive of energy efficiency than states where BBNP-funded programs did not operate.[21] However, grantee experience suggests that other factors are more important than state-level policies in determining program success. Grantees operating in the same state were in different success groupings in 10 of the 17 states in which multiple BBNP grantees operated. There were no states in which multiple grantees operated and all fell into either the most or least successful groupings.

  Nonetheless, on a local level, some grantees noted that a "green-minded" target audience allowed them to broaden their outreach messages to include environmental benefits. Grantees also noted that local laws promoting energy efficiency had benefitted their programs. Other grantees stated that their programs had to overcome skepticism of government programs in promoting upgrades.

- **Knowledge of and Experience with Efficiency Programs:** While some grantees reported that prior efficiency programs had been helpful in building participants' familiarity with energy efficiency, others

[21] Based on 2014 ACEEE State Energy Efficiency Scorecard. The 32 states and one territory where grantee programs operated received an average total score of 20.76, while the 18 states, 2 territories, and the District of Columbia where grantee programs did not operate received an average total score of 14.71. This difference is statistically significant ($t = 2.32$, $p = .03$).

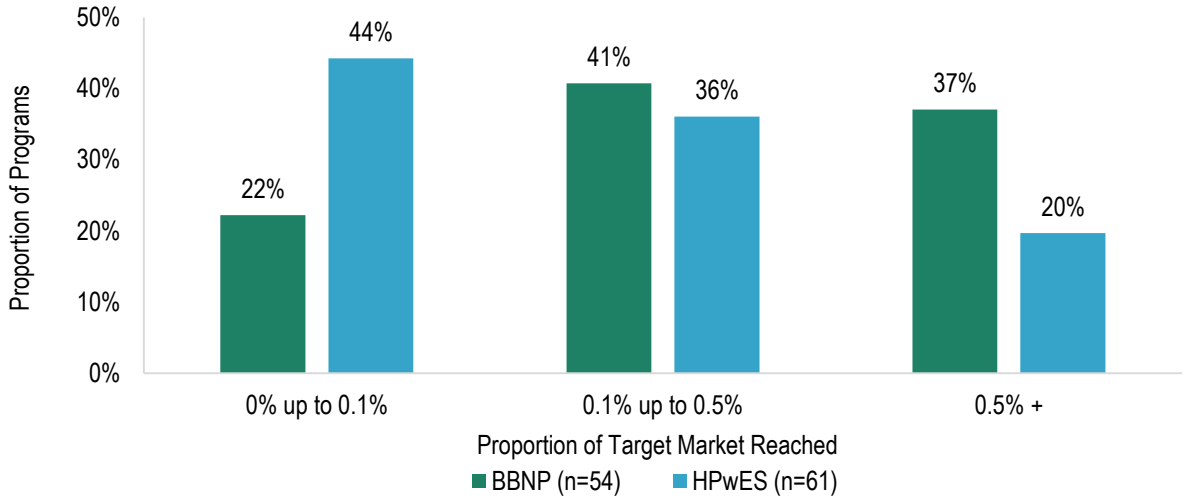
suggested past programs had not built awareness of whole building upgrades. Still other grantees noted that there were advantages to operating in areas with little experience with previous efficiency programs, since the grantee could reach an "untapped market" and maintain more control over the messages potential participants received about energy efficiency.

3.5. PROGRAM MARKET REACH

We assessed the number of residential upgrades grantees conducted with respect to the size of their target markets.[22] The resulting statistic of target market penetration does not precisely speak to the goal, which concerns what are in essence submarkets – neighborhoods within broader target markets.[23]

We compared grantee residential market penetration with the market penetration of HPwES programs during 2011 to 2013.[24] Both programs, considered at the national level, upgraded about one-quarter of one percent (0.25%) of their target markets from 2011 through 2013. When we look at the individual programs, however, the grantee programs were nearly twice as likely as the HPwES programs (37% compared to 20%) to have upgraded 0.5% or more of their target markets, as illustrated in Figure 3-6.

Figure 3-6: Comparison of BBNP and HPwES Market Penetration



22 We estimated grantee residential target market size by first identifying the geographic area (census blocks, municipalities, or entire state, as appropriate) served by the grantee, and then totaling, for those areas, the number of single-family households as estimated by the American Community Survey 2012's five-year estimate (2012 is the mid-point of the period of interest).

23 The companion report *Spotlight on Key Program Strategies from the Better Buildings Neighborhood Program* (Final Evaluation Volume 6), Chapter 4, presents an investigation of targeted outreach approaches used by six grantees; it does not address market penetration.

24 We estimated the market size of each HPwES program by obtaining the tally of completed projects by program and year (*http://www.energystar.gov/ia/home_improvement/downloads/HPwES_Table_of_Projects_Completed_14_Q3.pdf?7097-2168*). We reviewed the HPwES sponsor's published materials to identify the geographic area served (state or county). We then totaled for those areas the number of single-family households as estimated by the American Community Survey 2012's five-year estimate.

On investigation, we found that the average size of the targeted markets for both the BBNP and HPwES programs in this high penetration category (penetration of 0.5% or more) was much smaller than the average target market sizes for the other categories. Overall, BBNP target markets were about one-third the size of the HPwES target markets (Table 3-4).

Table 3-4: Average Number of Targeted Households, BBNP and HPwES

PENETRATION CATEGORY	BBNP	HPWES
0% up to 0.1%	721,963	1,978,800
0.1% up to 0.5%	823,427	1,628,534
0.5% +	89,348	789,636
All Programs	528,998	1,646,055

3.6. PROGRAM COSTS

To assess BBNP's attainment of its objective to "reduce the cost of energy efficiency program delivery by 20% or more" through grantee innovations and economies of scale, we conducted two sets of analyses.

The first analysis examined the extent to which the grantees attained cost efficiencies over the course of the program. Working from BBNIS-reported data on annual grantee expenditures (unverified) and energy savings (MMBtu) (unverified), we estimated BBNP program-wide annual costs per MMBtu. We compared costs from one year to the next, and between the last year (2013) and the first (2010/2011).[25]

Delivery costs (unverified) for BBNP savings (program-wide $/MMBtu) fell each year by 30% or more. Third-year program delivery cost was 58% lower than first year cost. Grantees gained efficiencies and economies of scale over the program period, meeting the BBNP objective of reducing program costs by 20% or more.

The second analysis attempted to benchmark grantees' residential savings costs with nation-wide averages for whole home programs. For the benchmark, we used the average cost of energy savings from whole home programs nationally as estimated by LBNL (Billingsley et al., 2014). The national average for whole home programs of cost per MMBtu saved is $91.32.[26]

This analysis is suggestive, not definitive, because of the substantial differences between grantee programs and whole home programs nationally and between their corresponding data sources.

[25] Our analysis combined 2010 and 2011 costs and savings due to the limited amount of upgrade activity in 2010.

[26] The specific cost statistics we used are not in the published report. We contacted Ian Hoffman, the principal investigator, who provided us on May 13, 2015 with whole home upgrade costs.

We encountered the following challenges to benchmarking BBNP performance:

- The benchmark data (the LBNL data) provided average costs by program type as defined by fuels served: electric-only programs ($/kWh), gas-only programs ($/therm), and combined electric and gas programs ($/MMBtu). Although the grantees typically served all fuels in the participants' homes (including fuel oil and propane), LBNL's dual fuel sample size was smaller than its samples of single-fuel programs. We used the estimates from the larger samples – the single fuel programs. We converted these LBNL-study $/kWh and $/therm values to $/MMBtu. We then combined the electric-only and gas-only $/MMBtu estimates by taking a weighted average, where the weights were the derived from electricity's share of total BBNP residential MMBtu savings.
- BBNP grantees did not report their costs by sector. We estimated grantee residential program costs by allocating grantee-reported total cost to the residential and nonresidential sectors served as described in the companion report *Drivers of Success in the Neighborhood Programs – Statistical Process Evaluation* (Final Evaluation Volume 3).[27]
- Grantees' costs per MMBtu are calculated for the evaluation period - their first three years of operation, a period during which their costs fell markedly over time. The LBNL report does not convey the program years for which cost per energy saved was calculated for each program included in the analysis.
- Grantee costs include funds allocated for financing, which the majority of grantees offered. The LBNL data do not convey the extent to which the costs of the sampled programs include financing funds (see Chapter 8, *Financing*).
- Grantees varied in the proportion of funds allocated to financing. For some grantees, the allocation to financing did not appear to be optimal; allocated funds greatly exceeded (by orders of magnitude) the loan monies demanded. These grantees could have attained greater quantities of upgrades and savings for the same quantity of expenditures – thereby lowering their cost per MMBtu saved – had the design of the program's financing component better matched funding to consumer demand.

With these caveats in mind, we present our findings comparing grantee and BBNP-overall cost for residential energy saved with the benchmarked value of $91.32 per MMBtu.

- Comparing overall program costs (Q4 2010 to Q3 2013) with the baseline:
  - Four grantees delivered energy savings at a cost less than or equal to 20% of the benchmark.
  - One grantee delivered energy savings at a cost just below the benchmark (3% lower).
  - BBNP as a whole delivered energy savings at a cost 30% higher than the benchmark.
- Comparing third-year program costs (2013) with the baseline:
  - Eight grantees delivered energy savings at a cost less than or equal to 20% of the benchmark.

[27] Volume 3, Appendix B, section B.2.3.

- Three grantees delivered energy savings at a cost somewhat below the benchmark (up to 7% lower).
- BBNP as a whole delivered energy savings at a cost 8% higher than the benchmark.

〉 Comparing three-year program costs exclusive of financing with the baseline:[28]

- Eight grantees delivered energy savings at a cost less than or equal to 20% of the benchmark.
- Five grantees delivered energy savings at a cost somewhat below or roughly equivalent to the benchmark (ranging from 17% lower to 1% higher).
- BBNP as a whole delivered energy savings at a cost 14% lower than the benchmark.

3.7. FREQUENCY FINDINGS

This section presents frequencies from the grantee web survey suggestive of characteristics that distinguish grantees in the most successful cluster from other grantees (presented in bold text).[29] We report here variables for which the pattern of results indicate a difference between the most successful grantees and average/least successful grantees (typically a difference of 15 or more percentage points), regardless of whether analyses reveal statistically significant differences between the groups. Footnotes denote any differences that are statistically significant. Because these results are from descriptive, bivariate analyses that do not control for the influence of other variables, they should be interpreted with caution. Also we present variables for which there is no apparent difference between grantees in the most successful cluster and grantees in the average/least successful clusters (not presented in bold text).

The most successful grantees were *more likely* than other grantees to:

〉 **Have at least one staff member with 15 or more years of experience** (83% of the most successful grantees compared with 24% of average/least successful)

〉 **Receive state funds** (45% of the most successful grantees compared with 30% of average/least successful grantees)

The most successful grantees were *less likely* than other grantees to:

〉 **Work with home appraisers or retailers** (33% of the most successful grantees compared with 53% of average/least successful grantees)

There was *no difference* between grantee success clusters in:

〉 Proportion that received any funding from sources other than BBNP (about 85% of all grantees) and, of those, proportion that received utility funding (about 50% of grantees that received any outside funds)

〉 Number of residential buildings targeted by the program (about 180,000 buildings, on average)

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28 Because we lacked information on residential financing funding, we adjusted residential costs by the proportion of financing expressed in relation to total costs. That is, if a grantee allocated 20% of its total funds to financing, we assumed that 20% of the grantees residential costs went to financing.

29 See Appendix B for additional findings from the grantee web survey.

- Proportion that built their program on the prior experience of a pilot or other program (54% of all grantees) and, of those, proportion of programs built off of a whole home program (70% of the grantees that built on the prior experience of a pilot or other program
- Proportion of programs that experienced delays in providing audits (40% of all grantees), upgrades (27% of all grantees), or test outs (that is, finalization of upgrades 26% of all grantees) during at least one quarter throughout the grant period

3.8. CONCLUSIONS

While grantees represented a diverse group of organizations and operated in widely varying markets, our process evaluation findings suggest that some organization and partnership types are more conducive to early program success than others. We reached the following conclusions:

Governments seeking to promote energy efficiency may benefit from shifting program management to nongovernmental organizations. Grantee programs managed by government organizations were less likely to be in the most successful cluster than programs managed by other types of organizations; this pattern may reflect a governmental entity's limited flexibility to simplify processes[30] and continually adapt programs to market conditions or a lack of staff with the knowledge and resources needed to run whole home/building efficiency programs.

Having at least one highly experienced team member may contribute to success. Grantees with at least one highly experienced staff member (15 or more years of experience) were more likely to be in the most successful cluster, suggesting that having guidance from staff highly experienced in at least one aspect of program administration can help programs address challenges and achieve success.

In a limited grant period, the ability to launch and ramp up a program quickly can contribute to a grantee's success. For many grantees, when their programs had ramped up to the point at which they were functioning best, limited time remained in the grant period. Even the most successful grantees spent an average of half the three-year grant period (18 months) launching their programs and ramping up to the time at which their programs were functioning best. Less successful grantees required, on average, six months longer (24 months). To some extent, differences in grantee success may simply reflect the ability of some programs to operate at their best longer than others – given the opportunity to operate over a longer time period, the differences in success levels might decline; for example, performance in program year five might be similar across programs. However, the factors that enable a program to launch more quickly also may contribute to its long-term success. Adequate time has not passed since BBNP launched to support an investigation of the relationship between early and long-term success.

Collaboration with existing programs, particularly in offering incentives, can contribute to success. Partnerships with utility programs offering participant incentives were more prevalent among the most successful grantees than among other grantees. Drawing on utility programs may have contributed to grantee success in several ways: first, grantees that both offered incentives using BBNP funds and drew on utility incentives may have been able to offer participants a larger total incentive or assisted a greater number participants with the same level of

[30] For example, one municipal government grantee described having to establish each participant as a vendor in its procurement system in order to issue incentive checks to participants.

incentive. Second, the utility program with which the grantee partnered may have helped to develop the energy upgrade market, establishing contractor networks and building awareness among potential participants. Third, the utility program may have cross-marketed the grantee program. Fourth, the grantee may have devoted its resources to driving participants to the utility program, through which participants conducted upgrades and received incentives.

Also we reach a noteworthy conclusion unrelated to individual program success, yet pertinent to an assessment of BBNP accomplishments. The BBNP program was implemented primarily by relative new comers to efficiency program administration. These new comers that now have program management experience are typically younger than the managers of ratepayer-funded efficiency programs and are more diverse in terms of geographic location and socio-economic characteristics.

4. AUDITS

This chapter summarizes the grantees' approaches to offering home and building energy audits and explores the challenges of providing audits to program participants.

We discuss associations we found in bivariate analyses between program elements related to audits and grantees' relative success (most successful, average success, or least successful cluster, as described in *Section 1.5.2 Assessing Grantee Success*). Our multivariate analyses of the predictors of success, presented in *Drivers of Success in the Better Buildings Neighborhood Program – Statistical Process Evaluation* (Final Evaluation Volume 3), found some audit-related variables to be significant predictors of membership in either the most or least successful clusters. The other patterns that we describe in this chapter were not found to be significant in the multivariate analyses; they are descriptive, rather than predictive, findings.

The chapter draws on in-depth interviews with grantees, a web-based survey grantees completed about their program activities, surveys of participants, and evaluations grantees conducted of their own programs. Also it draws on a review of recent industry literature related to audits to place findings in a broader context and on data grantees reported to DOE on their program accomplishments. Appendix C provides a detailed presentation of the findings summarized in this chapter; Appendix B provides a detailed discussion of the grantee web-based survey method and findings; and Appendix J provides a detailed discussion of the participant survey method and findings.

The companion report *Spotlight on Key Program Strategies from the Better Buildings Neighborhood Program* (Final Evaluation Volume 6), Chapter 2, presents a more detailed investigation of the multiple audit types offered by five grantees.

4.1. TYPES OF HOME AND BUILDING ENERGY AUDITS

Energy audits comprise two primary categories: 1) offsite audits, which typically occur online or over the phone; and 2) onsite audits. According to a recent industry report, offsite audits offer an affordable option for programs seeking to deliver audits at no or low-cost to a large number of customers (De La Chapa and Case, 2012). Offsite audits allow for quick and efficient delivery of relevant program information and recommendations with minimal program staff involvement (De La Chapa and Case, 2012). There are important drawbacks to the online audit approach, however, including that many consumers have limited depth and knowledge regarding the technical characteristics of their homes and buildings. As described in industry literature, onsite audits may include walk-through visual inspections of potential energy saving opportunities or diagnostic testing using equipment and energy modeling software to generate site-specific estimates of energy savings potential (Amann and Lowenberger, 2010). Onsite audits provide the opportunity to engage the home or building owner – an advantage that may increase the likelihood of a sale – and address the technical limitations of offsite audits (DOE, 2012). Drawbacks of onsite audits include higher delivery costs and the complexities associated with providing the home or building owner with high-quality, yet independent, advice.

Our multivariate statistical analysis of grantee success revealed that making *multiple types* of audits available to residential participants was a significant multivariate predictor of membership in the most successful grantee cluster.[31] The most successful grantees offered an average 1.8 types of audits, compared with 1.4 types among average grantees, and 0.86 among the least successful cluster.[32] Offering offsite audits in conjunction with onsite audits allows consumers to engage with the program in the way that best fits their level of interest and available resources and allows programs to screen participants and gauge interest in a relatively low-cost manner before conducting more cost- and time-intensive onsite audits.

About half of grantees prescreened audit applicants, reducing program costs for audits that do not result in upgrades. This approach did not influence grantee success.

Regardless of the type or number of audits conducted, the industry literature suggests participants benefit most from audit reports that include concrete recommendations for actions they can take to save energy, whether behavioral or measure-based. A recent evaluation report discussed how audits that provide abstract ratings or scores may be less valuable than audits that provide concrete, actionable recommendations (Ingle, A., Moezzi, M., Lutzenhiser, L., and Diamond, R., 2012). Indeed, the same study of 286 homeowners participating in an energy audit program revealed interacting with auditors and receiving specific, customized recommendations for upgrade opportunities had greater effects on participants' decisions to undertake an upgrade project than receiving results from a standardized energy report. A DOE-sponsored review of audit report formats also indicated that audit reports were most effective when they provided customers with customized recommendations in a user-friendly format that included simple graphics to help customers make sense of audit results (Newport Partners, LLC, 2012).[33]

4.2. DRIVING DEMAND

Grantees mentioned several challenges to selling audits, including market unfamiliarity with energy efficiency audits, associated costs, and low consumer trust in audit results. To address barriers, most grantees offered some level of audit subsidy, and six grantees offered free comprehensive audits to generate interest among specific target populations or the broader local community. Findings from our evaluation indicate that once participants received audits, the results played an important role in encouraging them to undertake upgrade projects. About three-quarters of multifamily/commercial participants rated the energy audit as being very important in their decision to conduct an upgrade (a rating of "7" to "10" on a scale of "0" to "10"). The energy audit played a larger role in residential participants' decision making regarding upgrades for the most successful grantees, as determined by our quantitative analysis of grantee success, compared with the least successful grantees. Eighty-three percent of participants in the most successful residential programs rated the energy audit as very important to their decision making, compared with 77% of participants in the average and least successful residential programs.[34] Our data did not reveal the

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31 See Chapter 4 of *Drivers of Success in the Better Buildings Neighborhood Program – Statistical Process Evaluation* (Final Evaluation Volume 3) for more information.

32 Grantees that offered no audits were given a value of "0" in the analysis.

33 Similarly, previous research concluded that auditors should be trained to: 1) communicate vividly; 2) personalize their recommendations to homeowners; 3) induce homeowner commitment; and 4) frame their recommendations in terms of loss avoided rather than gain to be attained (Gonzales, M. H., Aronson, E., & Costanzo, M. A., 1988).

34 Difference is statistically significant, $p < .001$.

features of the audit or audit processes that the participants judged as influential. Moreover, we did not find any statistically significant differences among grantee success clusters in the audit contracting process (specifically, whether the auditors contracted to the programs or to the customers or whether the program staff conducted the audits).[35]

4.3. AUDITORS

We compiled findings across multiple data sources to capture who delivered the audits in grantees' residential programs. Grantee success was not influenced by programs' contractual relationships with auditors, which were of three types: auditors contracted with the program (57% of residential programs), auditors contracted with the participant (53%), and auditors that were comprised of program staff (11%, multiple responses allowed).

Among three-quarters (75%) of grantees, audits were conducted by the same contractors that conducted upgrades. The remaining 25% of grantees used independent assessors or program staff, neither of which installed upgrades. About three-quarters of the most successful and average grantees allowed the same contractors to conduct audits and upgrades, compared with about half of grantees in the least successful cluster. These findings suggest that allowing participants to develop a consistent contractor relationship by using the same contractor throughout the program may be more effective than implementing a program design where customers must develop relationships and trust with separate audit and upgrade providers.

4.4. DIRECT INSTALLATION OF LOW-COST MEASURES

About one-quarter of grantees reporting on standard and low-income residential programs included direct installation of low-cost measures in their audit processes. No grantees reporting on nonresidential programs in the grantee web survey implemented a direct install approach. Offering direct installation of low-cost measures was found to be a significant multivariate predictor of success for residential programs. Seventy-five percent of grantees in the most successful cluster provided direct install options, compared with 11% of average grantees and 43% of grantees in the least successful cluster.[36] Directly installing low-cost measures during audits may help programs achieve greater savings at a relatively low cost and increase audit-to-upgrade conversion rates due to higher degrees of participant satisfaction. Indeed, grantees most commonly reported implementing a direct install approach to acquire greater energy savings and to encourage participants to conduct an upgrade once the audit was complete.

4.5. PARTICIPANT SUPPORT

A recent review of residential energy efficiency programs, including some BBNP-funded programs, found that providing participant support, through contractors or independent "energy coaches," can reduce barriers to program entry and help convince people to take action following an audit (Fuller et al., 2010). According to industry literature, contractors can provide a relatively seamless participation process for the customer, particularly if they conduct both

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35 See Appendix B for data tabulations not discussed in this chapter, specifically: audit contracting process (Table B-31), number of auditors (Table B-38), auditor prior experience (Table B-40), use of diagnostic tools (Table B-37), source of savings estimates (Table B-44), and prescreening of prospective audit customers (Table B-32).

36 See Chapter 4 of *Drivers of Success in the Better Buildings Neighborhood Program – Statistical Process Evaluation* (Final Evaluation Volume 3) for more information.

the audit and the upgrade (DOE, 2012). As reported above, about three-quarters of grantees in the most successful and average clusters allowed contractors to conduct both audits and upgrades. However, as discussed in industry literature, contractors' financial stake in the upgrade project may limit their credibility with some homeowners. Third-party energy coaches (see below), on the other hand, provide consumers with independent advice that may help maintain the credibility of audit results. This design may conflict with a contractor-driven business model, however, because contractors may view advisors as interfering in an established sales process (DOE, 2012).

Fifty-seven percent of grantees with residential programs offered some form of participant support, which typically involved *active energy coaching*, in which customers were assigned an energy coach who helped them navigate the application, audit, and upgrade processes, or *passive energy coaching*, in which programs provided additional support to participants requesting assistance. Among grantees that offered coaching, 74% offered active energy coaching, and 26% offered passive energy coaching.

Our multivariate statistical analyses, discussed in *Drivers of Success in the Better Buildings Neighborhood Program – Statistical Process Evaluation* (Final Evaluation Volume 3), revealed no evidence that providing energy coaches contributes to program success. However, grantees using energy coaches often cited benefits, suggesting energy coaches may help some programs address their unique challenges. Grantees that used active energy coaches reported that the coaches were helpful for both participants and contractors, especially during the transition from audits to upgrades. Specifically, grantees noted that active energy coaches:

- Helped customers find contractors and provided guidance on interacting with contractors;
- Educated customers on the benefits of upgrades;
- Discussed the benefits of behavior changes regarding energy use;
- Answered participants' questions or concerns about the audit; and
- Assisted customers with project management and the incentive process.

Grantees that provided passive coaching also reported that this "advanced customer support" approach was helpful to both participants and contractors. Specifically, passive coaches helped to resolve misunderstandings between customers and the contractors and explained program procedures to both groups.

4.6. ADAPTABILITY IN THE FACE OF CHALLENGES

In-depth interviews with program administrators revealed that many grantees adapted their audit programs over the course of the three-year grant period to address barriers to participation. This adaptability indicates that many grantees approached audits with a customer-centered mindset and were willing to adapt audit offerings to address challenges as they arose. This customer-centered approach is recommended in a recent review of industry literature, as there is no comprehensive model that characterizes consumer energy decision-making. Decisions to undertake efficiency upgrades vary widely across different sub-groups of homeowners due to economic, social, and cultural factors and competing priorities for household income (Sanstad, Diamond, Sanquist, and Lutzenhiser, 2010).

- Some grantees eased the requirements for comprehensive audits, added simplified audit options, or generally streamlined the audit process to address participation barriers such as time, availability, and willingness to pay. For example, one grantee changed a requirement for a comprehensive audit to a free

walk-through audit, while continuing to offer more comprehensive audits (typically using diagnostic equipment) for a fee to interested participants.

- Some grantees noted friction between contractors and energy advisors. For example, one grantee originally sent energy coaches out with the contractors during audits, but contractors felt that the presence of the energy coach disrupted their ability to develop relationships with customers. In light of this feedback, the grantee stopped sending energy coaches out on audits once they had verified that contractors were providing good "test-in" results.[37]
- Other grantees made adjustments to audit procedures to reduce high program costs associated with offering audits to participants who did not subsequently pursue upgrades. For example, some grantees stopped offering free audits to participants who had not committed to an upgrade. Two other grantees reduced the level of subsidy they offered for audits over the course of the program.

4.7. FREQUENCY FINDINGS

This section presents frequencies from the grantee web survey suggestive of characteristics that distinguish grantees in the most successful clusters from other grantees (presented in bold text).[38] We report here variables for which the pattern of results indicate a difference between the most successful grantees and average/least successful grantees (typically a difference of 15 or more percentage points), regardless of whether analyses reveal statistically significant differences between the groups. Footnotes denote any differences that are statistically significant. Because these results are from descriptive, bivariate analyses that do not control for the influence of other variables, they should be interpreted with caution. Also we present variables for which there is no apparent difference between grantees in the most successful cluster and grantees in the average/least successful clusters (not presented in bold text).

Consistent with the findings that grantees in the most successful cluster offered more types of audits than other grantees, grantees in the most successful cluster were *more likely* than other grantees to:

- **Use site-specific modeling to estimate savings for measure packages** (55% of the most successful grantees compared with 30% of average/least successful grantees)
- **Conduct walk-through audits (**55% of the most successful grantees compared with 38% of average/least successful grantees) (as a related finding, the multivariate analysis found that making *multiple types* of audits available to residential participants was a significant multivariate predictor of membership in the most successful grantee cluster)
- **Conduct direct installation of low-/no-cost measures during audits** (73% of highly successful grantees compared with 14% of average/least successful grantees) (a statistically significant difference; the multivariate analysis also found this factor significant)

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37 "Test-in" results document a home or building's energy performance prior to the upgrade. It is often followed by a "test-out" where the same audit protocol is used to assess performance changes that have occurred as the result of an upgrade.

38 See Appendix B for additional findings from the grantee web survey.

The most successful grantees were *less likely* than other grantees to:

- **Conduct prescreening of candidates for audits** (36% of the most successful grantees compared with 59% of average/least successful grantees)

There was *no difference* among grantee success clusters in:

- Proportion that used online audits (about 17% of all grantees)
- Proportion that used pre-specified energy savings (about 50% of all grantees) or used site-specific modeling to estimate per-measure savings (about 50% of all grantees)[39]
- The frequency with which their audits included: blower doors (75% of all grantees), infrared cameras (about 20% of all grantees), or CAZ (combustion appliance zone) testing (50% of all grantees); nor in the frequency with which they used all three tools in an audit (25% of all grantees)

4.8. CONCLUSIONS

Our process evaluation findings and review of relevant industry literature suggest approaches to structuring and offering audits that facilitates customer engagement, maximizes energy savings, and achieves program success. We reached the following conclusions:

Offering multiple types of audits is associated with success. Offering multiple types of audits enables participants to engage with the program in the way that best fits their level of interest and available resources. The most successful grantees offered an average 1.8 types of audits, compared with 1.4 types among average grantees, and 0.86 among the least successful cluster.[40] (See the companion report, *Spotlight on Key Program Strategies from the Better Buildings Neighborhood Program* [Final Evaluation Volume 6], Chapter 2, for an investigation of the multiple audit types offered by five grantees.)

Directly installing measures during the audit is associated with success. Seventy-five percent of grantees in the successful cluster provided direct install options, compared with 11% of average grantees and 43% of grantees in the least successful cluster.

[39] Multiple responses allowed among the options of pre-specified measures savings estimates, pre-specified measure package savings estimates, site-specific modeling of measures, and site-specific modeling of packages.

[40] Grantees that offered no audits were given a value of "0" in the analysis.

5. UPGRADES

This chapter assesses the grantees' approaches to delivering upgrades and explores the experiences of customers with upgrade projects.

We discuss associations we found in bivariate analyses between program elements related to delivering upgrades and grantees' relative success (most successful, average success, or least successful cluster, as described in Section 1.4.1*)*. Our multivariate analyses presented in *Drivers of Success in the Better Buildings Neighborhood Program – Statistical Process Evaluation* (Final Evaluation Volume 3) did *not* reveal any upgrade-related variables to be significant predictors of membership in either the most or least successful clusters. Any findings regarding grantee success discussed in this chapter are descriptive, rather than predictive, findings.

The chapter draws on in-depth interviews with grantees, a web-based survey grantees completed about their program activities, surveys of participants and nonparticipants, and evaluations grantees conducted of their own programs. Also it draws on a review of recent industry literature related to upgrades to place findings in a broader context and on data that grantees reported to DOE on their program accomplishments. Appendix D provides a detailed presentation of the findings summarized in this chapter; Appendix B provides a detailed discussion of the grantee web-based survey method and findings; Appendix J provides a detailed discussion of the participant survey method and findings; and Appendix K provides a detailed discussion of the nonparticipant survey method and findings.

The companion report, *Spotlight on Key Program Strategies from the Better Buildings Neighborhood Program* (Final Evaluation Volume 6), discusses a topic related to upgrades: Chapter 6 presents a detailed investigation of strategies used by four grantees to encourage comprehensive (deep) upgrades.

5.1. COMPREHENSIVE UPGRADES

Whole home and building upgrade programs, also termed comprehensive upgrade programs, install multiple measures, typically addressing multiple building systems. Grantees typically defined comprehensive projects as projects that save a specified amount, such as 15% or 20% or more energy savings, or projects that install the measures recommended from a comprehensive audit – an audit that assesses all building systems. Some grantees would include in their definitions projects that install measures for multiple end uses.

Grantees reported unverified energy savings of 22% for residential upgrades, 26% savings for multifamily upgrades, and 7% savings for commercial upgrades (DOE, 2014). BBNIS data do not enable us to assess whether all grantees met the 15% savings requirement, yet the data indicate that 55% of all upgrade projects had reported savings of 15% or more.[41]

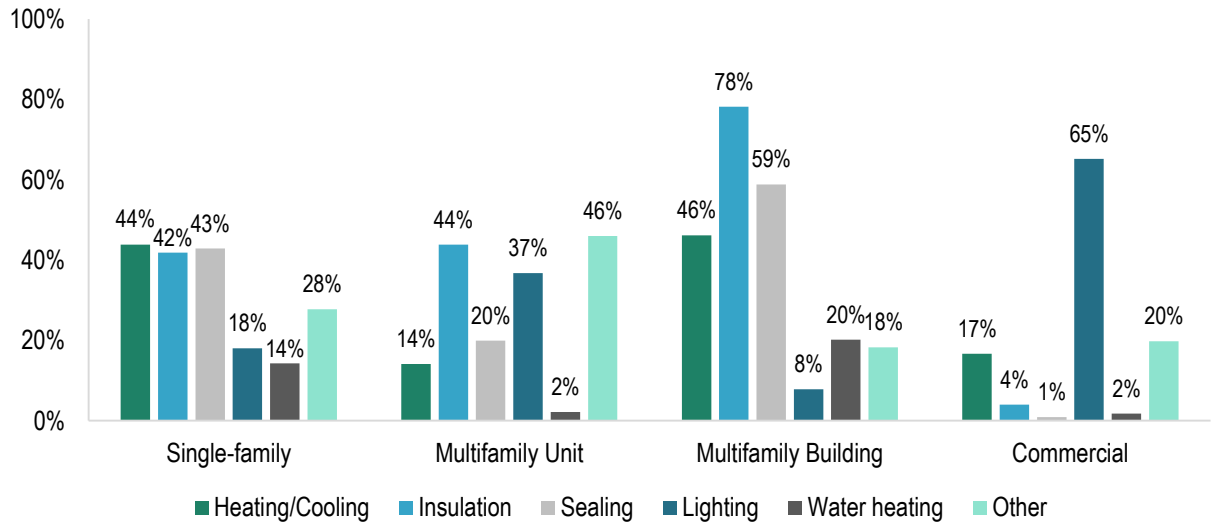
As described in the previous chapter, grantees used a variety of audit types, with no single type being associated with success. All audit types addressed all building systems.

[41] *Savings and Economic Impacts of the Better Buildings Neighborhood Program* (Final Evaluation Volume 2) presents BBNP-wide (rather than grantee-specific) verified savings estimates.

Figure 5-1 illustrates the proportion of single-family upgrades (n = 74,369), multifamily unit upgrades (n = 9,369), multifamily building upgrades (n = 858), and commercial upgrades (n = 3,547) that installed measures for heating and/or cooling, insulation, air sealing, lighting, water heating, and other measures (including appliances, refrigeration, solar PV, and all other measures).[42]

In all but the commercial sector, insulation was among the most commonly installed measures, and it was included in more than 40% of projects for residential and multifamily units and more than 75% of multifamily building projects. Air sealing and heating/cooling measures were each installed in about half of residential and multifamily building projects. The commercial sector displayed the least comprehensiveness and was comprised of largely single end use upgrade projects. Grantees installed lighting in nearly two-thirds of commercial projects; heating/cooling measures and all other measures were installed in roughly equal proportions – about one-fifth of projects.

Figure 5-1: Proportion of Projects with Measure Types



As described in *Drivers of Success in the Better Buildings Neighborhood Program – Statistical Process Evaluation* (Final Evaluation Volume 3), we developed a metric describing the proportion of grantees' projects that were comprehensive. We created a project comprehensiveness proxy metric and applied it to each project in the BBNIS project-level database. Our comprehensiveness proxy defined projects as comprehensive if they included measures from at least five measure categories, of which at least four must be core measure categories; we defined "core" as essential to the concept of a comprehensive upgrade. We mapped the 33 measures reported in the project-level database into eight core and two noncore categories.

Table 5-1 provides the categories, the number of BBNIS measures included in the category, and the category's designation as core (eight categories) or noncore (two categories). A measure category could count towards the comprehensiveness metric only once, however, even if an upgrade included multiple measures in that measure

[42] See Appendix I for measure installation tallies.

category. For example, sealing could only contribute to the measure and core measure counts once, even if an upgrade included both air sealing and duct sealing. The grantee comprehensiveness metric equaled the proportion of grantee projects satisfying this comprehensiveness definition.

Using this metric, we determined that grantees' residential portfolios ranged from 0% comprehensive projects to 96% comprehensive projects, with an average of 12% comprehensive projects. Seventy percent of grantees had residential portfolios with less than 15% comprehensive projects, according to this stringent definition of including at least five measure categories, of which four categories are core.

Table 5-1: Core and Noncore Measures Categories in the Comprehensiveness Proxy Calculation

CORE	NUMBER OF MEASURES IN CATEGORY	NONCORE	NUMBER OF MEASURES IN CATEGORY
Cooling	2	Appliance	4
Heating	6	Other	9
Heating and Cooling*	1		
Domestic Hot Water	2		
Insulation	4		
Sealing	3		
Lighting	1		
Solar PV	1		

* This category comprised the single measure heat pumps. We credited heat pumps with two core points, constituting both a core cooling measure and a core heating measure.

We found no association between grantee comprehensiveness and grantee award amount (categorized as small, medium or large, per Appendix I). However, we found a strong association between grantee success and comprehensiveness.[43] The grantees in the most successful cluster averaged 23% of projects scored comprehensive; this compares to an average for the remaining grantees of about 10%.[44]

[43] Indeed, comprehensiveness was one of 12 variables identified by our cluster analysis as significantly distinguishing grantees into three clusters. See companion volume, *Drivers of Success in the Better Buildings Neighborhood Program – Statistical Process Evaluation* (Final Evaluation Volume 3).

[44] *Drivers of Success in the Better Buildings Neighborhood Program – Statistical Process Evaluation* (Final Evaluation Volume 3).

5.2. UPGRADE PROGRAM MODELS AND INCENTIVE STRUCTURES

Information from grantees' Final Technical Reports, in-depth interviews, and programs websites revealed that grantees tended to offer one of three different incentive structures:[45]

- **Measure-based incentives:** Homeowners earn incentives based on the specific measures included in their upgrade projects (38% of grantees with residential programs);
- **Savings-based incentives:** Homeowners earn incentives that increase as the amount of energy that their upgrades are projected to save increases (24% of grantees with residential programs); or
- **Project cost-based incentives:** Homeowners receive incentives as a percent of their entire qualifying energy upgrade project cost, with an upper limit (15% of grantees with residential programs).

The approach of specified qualifying measures is simple for participants yet only ensures comprehensiveness if coupled with a required savings threshold or a requirement for multiple measure end uses. Specified measure packages combines simplicity with comprehensiveness. According to three recent evaluations, performance-based upgrades typically generate the greatest average project savings, yet can be more expensive to administer than measure-based programs and can be burdensome to homeowners due to the time required to complete projects (Wigington, 2010, pp. 2-339 – 2-354; Brook et al., 2012; GDS Associates, Inc. and Research Into Action, Inc., 2013).

About two-thirds of residential and nonresidential programs and just under half of low-income programs had energy savings threshold requirements for participation. For programs with thresholds, the average threshold was about 15% savings for all sectors (reflecting DOE guidance for grantees to save 15% on their portfolio of projects). Table 5-2 describes program threshold values.

Table 5-2: Energy Savings Threshold Customers Must Meet in Order to Participate (Among Programs that Had an Energy Savings Threshold)

	RESIDENTIAL (N = 32)	LOW-INCOME (N = 7)	NONRESIDENTIAL (N = 18)
10%	13%	14%	0%
15%	63%	43%	89%
20%	13%	29%	6%
25% and above	3%	14%	6%
Don't know	9%	0%	0%
Total	100%	100%	100%

Source: Research Into Action, Grantee Web Survey, Q30.

[45] Four percent of grantees with residential programs offered "flat" incentives to homeowners who met minimum program requirements. We were unable to determine the incentive structure used among 20% of grantees with residential programs due to a lack of detail in their Final Technical Reports and program websites.

Grantees most commonly estimated project savings from measure-specific pre-specified savings (Table 5-3).

Table 5-3: Means by Which Participant Energy Savings were Estimated (Among Programs that Included Energy Audits; Multiple Reponses Allowed)

ENERGY SAVINGS ESTIMATION METHOD	RESIDENTIAL (N = 47)	LOW-INCOME (N = 13)	NONRESIDENTIAL (N = 25)
Measures have pre-specified energy savings	49%	69%	60%
Packages of measures have pre-specified energy savings	13%	15%	20%
Site-specific modeling estimates savings of each measure[a]	51%	15%	40%
Site-specific modeling estimate savings of package	38%	15%	32%
Other	2%	15%	8%

Source: Research Into Action, Grantee Web Survey, Q22.

[a] Residential and Low-income are significantly different.

More than half of residential (57%) and nonresidential (59%) programs and 40% of low-income programs allowed participants to do more than one project. We asked grantees their reasoning, allowing them to provide more than one response. About one-third of grantees reporting for all sectors said that allowing multiple projects encourages participants to attain the maximum possible energy savings. Reducing the financial strain on residential customers was endorsed by nearly half of grantees (44%). One-third of grantees with nonresidential programs allowed multiple projects in recognition that large projects often require multiple phases or components. (BBNIS data show unverified commercial mean retrofit project costs of $303,337, in comparison with residential mean project costs of $7,214).

5.3. PROJECT COSTS AND INCENTIVE AMOUNTS

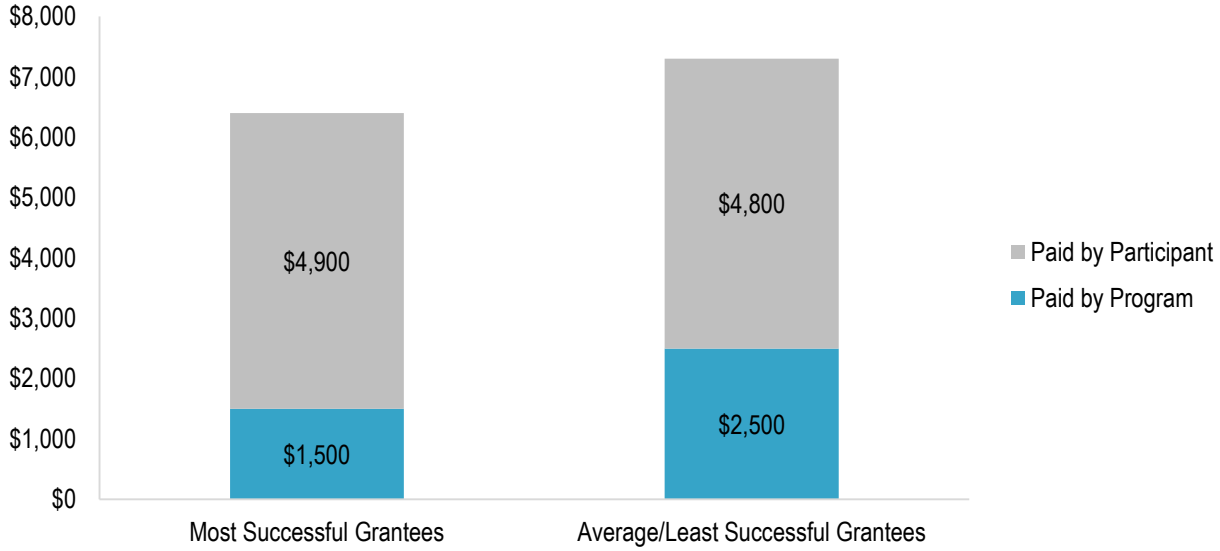
BBNIS project data indicates that single-family residential upgrades cost $7,214 on average. Grantees in the most successful cluster reported lower average upgrade costs ($6,340) than grantees in the average/least successful clusters ($7,285), although this difference was not statistically significant.

A review of energy efficiency programs found that offering incentives can be an effective tool for increasing consumer interest in efficiency upgrade programs, particularly in the early stages of the program lifecycle (Fuller et al., 2010). Importantly, however, research indicates that programs may be underestimating homeowners' willingness to pay for energy efficiency upgrades; some programs have effectively stretched their funding further than expected by lowering incentive amounts (Zimring et al., 2011). Program administrators are advised to tailor incentives to their particular target market, although it can be difficult to determine the optimal incentive amount large enough to motivate people to take action (LeBaron and Saul-Rinaldi, 2013).

On average, program administrators reported that residential participants paid 68% of upgrade costs (average incentives of 32%), and the most successful grantees reported that participants paid a relatively higher proportion of proportion of projects (77%) than average/least successful grantees (66%), corresponding to average incentives of 23% among the most successful grantees and 34% among all other grantees. We used BBNIS project cost data and grantees' reports of the average proportion of project costs paid by participants to estimate the average project costs

grantees and participants paid, as a function of grantee success. As displayed in Figure 5-2, our estimation indicates that the most successful grantees may have paid $1,000 less, on average per non-low-income residential upgrade, than all other grantees. The most successful programs were able to stretch their grant funding further by paying relatively less for every residential upgrade completed.

Figure 5-2: Estimated* Residential Upgrade Costs Paid by Programs and Participants as a Function of Grantee Success



* We derived the data for this figure using BBNIS data on average residential upgrade costs and grantee-reported estimations of the proportion of project costs typically paid by participants.

We offer a caveat to this assessment of program incentives. For about three-quarters of the programs, participants were eligible for utility incentives (see Appendix B, Table B-48); however, the data do not support an analysis of the total incentives that participants received and its relation to grantee success clustering.

5.4. QUALITY ASSURANCE AND QUALITY CONTROL

Quality assurance (QA) and quality control (QC) processes are important components of energy efficiency upgrade projects. QA provides a framework for program processes and standards and ensures that QC practices are in place and effective. QC practices ensure that upgrades meet required standards and are consistent across projects. According to a DOE report on the energy upgrade market, QA/QC increases contractor accountability, provides opportunities for contractor training, fosters customer trust and satisfaction, and helps programs assess whether they are on track to achieve their savings goals and maintain public support and funding (SEE Action Residential Retrofit Working Group, 2011).

QA for upgrades starts with the program design decision of what steps, if any, are taken to ensure that contractors conducting program upgrades meet minimum qualifications. At one end of the design spectrum, the program assigns upgrade contractors to participants, a practice most common among the grantees' low-income programs (Table 5-4). At the other end of the spectrum, program participants are free to work with any contractor. Grantees used this

approach most commonly for nonresidential programs, where customers frequently have established ongoing relationships with their suppliers, including contractors. Among residential programs, all grantees using this approach were state, county, and city governments in response to concern about potential liability were a program-endorsed contractor to perform poorly. The plurality of programs in all sectors (and the two-thirds majority of residential programs) required participants to select contractors from a pre-approved list. All of these grantees conducted basic business screening of upgrade contractors, such as review of business licenses, bonding, insurance coverage, and consumer complaint history. Many of these grantees also required Building Performance Institute (BPI) certification or related energy efficiency credentialing.[46]

Table 5-4: Manner by Which Upgrade Contractors Were Selected

CONTRACTOR SELECTION METHOD	RESIDENTIAL (N = 47)	LOW-INCOME (N = 15)	NONRESIDENTIAL (N = 27)
Program selected contractors	17%	47%	15%
Participants selected contractor from a pre-approved list	68%	47%	48%
Participant selected any contractor desired	13%	0%	33%
Other	2%	7%	4%
Total	100%	100%	100%

Source: Research Into Action's Grantee Web Survey, Q31.

Another design decision related to QA of comprehensive upgrade programs concerns whether the program requires (or prefers) participating contracting firms to be able to install both insulation and HVAC measures. Contracting firms with both capabilities (regardless of whether the capabilities are in-house or subcontracted) make it possible for participants to contract with a single firm, thus simplifying their participation activities. Grantees estimated the proportions their contracting firms who could install both insulation and HVAC, insulation only, and HVAC only. Grantee-average proportions suggest about equal proportions of these three types of contractors.[47]

Program QA continues with the training provided to contractors, a topic discussed in Chapter 7, Stimulating Supply. Anticipating the findings in that chapter, we note here that our statistical analysis of grantee success identified contractor training as a significant correlate of success.

Some BBNP grantees used their own program staff to conduct QC, some contracted third-party organizations, and others allowed upgrades contractor firms to conduct QC on their own projects. Grantees that used their own program staff as QC evaluators reported having positive interactions with both participants and contractors during field reviews. Grantees that used trained and certified third-party QC evaluators believed this approach brought credibility and trustworthiness to the upgrade process and removed potential conflicts of interest. Contracting firms who did

46 BPI provides testing and certification for home performance contractors to ensure that their skills and job performance meet rigorous professional standards.

47 See Appendix B, Table B-60.

their own QC followed the grantees' standardized procedures and then submitted QC test results to program staff, who often conducted desk reviews before releasing any remaining payment to contractors. Grantees that allowed contractors to do their own QC reported that their contractors were highly trained and well trusted by program staff.

Virtually all programs described by grantees in the web survey conducted inspections of completed projects. Grantees' residential project QC protocols typically varied by contractors' energy efficiency upgrade experience.[48] Low-income and nonresidential protocols differed little by contractor experience. On average, residential programs inspected two-thirds of projects conducted by unproven contractors and just under 40% of projects conducted by experienced contractors. Forty percent of grantees inspected all projects conducted by unproven contractors; half as many grantees inspected all projects by experienced contractors.

5.5. CUSTOMER SATISFACTION, MOTIVATION, AND BENEFITS

Surveys indicated that participants were highly satisfied with the upgrades that they received and with the contractors who conducted the upgrades. About 85% of residential and commercial/multifamily participants were highly satisfied (a rating of "7" to "10" on a scale of "0" to "10") with the changes made to their house or building and with the activities of the contractor who visited their home or building. There were no significant differences in satisfaction between participants of the most successful grantee programs and participants of average/least successful grantee programs.

About 85% of participants in both sectors reported that their upgrades provided good value for the money spent to conduct them. Further, residential participants reported that their upgrade was a better value for their money (mean rating of 7.99) than did nonparticipating homeowners who had recently conducted an upgrade that included features to make the home more energy efficient (mean rating of 7.54).[49]

Saving energy/reducing energy bills and improving comfort were the most common reasons participants (residential and nonresidential) and nonparticipants undertook their upgrades (Table 5-5). In addition, more than half of residential and nonresidential participants cited a desire to help the environment or the community, and more than half of nonresidential participants reported wanting to increase the value of their building and help tenants. Nonresidential participants and residential nonparticipants were commonly motivated by the need to replace broken equipment (about half of both groups).

[48] See Appendix B, Table B-61.

[49] Difference is statistically significant, $p < .05$.

Table 5-5: Reasons for Conducting Energy Efficiency Upgrades (Multiple Responses Allowed)

REASON FOR CONDUCTING UPGRADE	RESIDENTIAL PARTICIPANTS (N = 2,302)	RESIDENTIAL NONPARTICIPANTS (N = 1,496)	NONRESIDENTIAL PARTICIPANTS (N = 74)
Energy efficiency/energy bills	88%	76%	91%
Comfort	85%	44%	73%
Help environment/community	55%	23%	57%
Increased value of building	42%	21%	54%
Improved safety	9%	7%	15%
Replaced broken equipment	2%	47%	47%
Help tenants	Not asked	Not asked	53%
Reduced maintenance	Not asked	Not asked	34%

Upgrading respondents most frequently reported comfort and reduced bills as key benefits they experienced from their upgrades (Table 5-6).

Table 5-6: Benefits Respondents Experienced as a Result of Energy Efficiency Upgrades (Multiple Responses Allowed)

BENEFIT	RESIDENTIAL PARTICIPANTS (N = 2302)	NONRESIDENTIAL PARTICIPANTS (N = 74)	RESIDENTIAL NONPARTICIPANTS (N = 1496)
Comfort	78%	54%	36%
Energy efficiency/energy bills	60%	54%	69%
Help environment/community	51%	45%	21%
Help tenants	Not asked	43%	Not asked
Increased value of building	38%	35%	22%

5.6. FREQUENCY FINDINGS

This section presents frequencies from the grantee web survey suggestive of characteristics that distinguish grantees in the most successful clusters from other grantees (presented in bold text).[50] We report here variables for which the pattern of results indicate a difference between the most successful grantees and average/least successful grantees (typically a difference of 15 or more percentage points), regardless of whether analyses reveal statistically significant

[50] See Appendix B for additional findings from the grantee web survey.

differences between the groups. Footnotes denote any differences that are statistically significant. Because these results are from descriptive, bivariate analyses that do not control for the influence of other variables, they should be interpreted with caution. Also we present variables for which there is no apparent difference between grantees in the most successful cluster and grantees in the average/least successful clusters (not presented in bold text).

5.6.1. PROGRAM REQUIREMENTS

Grantees in the most successful cluster were *more likely* than other grantees to:

- **Allow participants to do more than one project** (75% of grantees in the most successful cluster compared with 53% of average/least successful grantees) Table 5-7 identifies the reasons grantees provided for allowing participants to do more than one project.
- **Require participants to install a certain number of measures** (42% of grantees in the most successful cluster compared with 19% of average/least successful grantees)

Table 5-7: Reasons for Allowing Participants to Do More than One Project (Among Programs that Allowed Participants to Do More than One Project; Multiple Responses Allowed)

REASON	RESIDENTIAL (N = 27)	LOW-INCOME (N = 6)	NONRESIDENTIAL (N = 16)
Reduce financial strain on customers	44%	33%	13%
Encourage maximum possible energy savings	37%	33%	38%
Maximize use of available incentives	15%	17%	6%
Large projects require multiple phases/components	0%	0%	31%
Other/unspecified	22%	50%	38%

The most successful grantees were *less likely* than other grantees to:

- **Require all projects to meet a savings threshold** (33% of the most successful grantees compared with 78% of average/least successful grantees)[51]

There was *no difference* among grantee success clusters in:

- Savings threshold requirements (16% average threshold among grantees with a savings threshold requirement)

[51] Difference is statistically significant, $p < .01$

5.6.2. PRINCIPAL DRIVERS OF UPGRADE SALES[52]

When asked to identify what they believed to be the three principal drivers of upgrade sales for their program, the most successful grantees were *more likely* than other grantees to identify the two following program elements:

- **Upgrade contractors** (67% of the most successful grantees compared with 47% of average/least successful grantees)
- **Financing** (58% of the most successful grantees compared with 18% of average/least successful grantees)[53]

Grantees in the most successful cluster were *less likely* than other grantees to identify the following among the three principal drivers of upgrade sales:

- **Program staff** (25% of the most successful grantees compared with 63% pf average/least successful grantees)[54]
- **Audit reports** (25% of the most successful grantees compared with 37% of average/least successful grantees)[55]
- **Auditors** (25% of the most successful grantees compared with 37% of average/least successful grantees)

5.6.3. UPGRADE INCENTIVES

Grantees in the most successful cluster:

- Were more likely to **provide incentives for upgrades** (100% of grantees in the most successful cluster compared with 84% of average/least successful grantees; see Table 5-8 for additional detail on the types of financial support grantees provided to their participants)[56]
- **Paid a lower proportion of project costs** (grantees in the most successful cluster paid 23% of project costs on average compared with an average of 41% of project costs among average/least successful grantees)

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52 Chapter 6, Driving Demand for Upgrade Services, discusses methods grantees used to generate interest in their programs. The current section (5.6.2) discusses grantee's views of the drivers of upgrade sales or, equivalently, conversion from audits to upgrades.

53 Difference is statistically significant, $p < .01$.

54 Difference is statistically significant, $p < .05$.

55 This finding of difference is largely driven by the responses of grantees in the least successful cluster, for which four out of five (80%) identified the audit report as among the three principal drivers, compared with 25% of the most successful grantees and 30% of average success grantees.

56 The most successful grantees more were likely to offer incentives than average/least successful grantees, but the incentives they provided tended to cover a lower proportion of project costs, as we discuss in Section 5.3 of this volume.

Table 5-8: Combinations of Financial Support Offered by Grantees and Number/Proportion of Grantees Offering Each Combination

TYPE OF FINANCIAL SUPPORT OFFERED TO PARTICIPANTS					GRANTEES OFFERING COMBINATION OF FINANCIAL SUPPORT		
Program Incentives	Utility or Partner Incentives	Financing	Direct Install	Free Upgrades	Total Number of Grantees (n = 48)	Percent of Most Successful Grantees (n = 12)	Percent of Other Grantees (n = 36)
✓	✓	✓	✓		6	33%	5%
✓	✓	✓			19	25%	43%
✓	✓	✓	✓	✓	3	17%	3%
✓		✓			6	8%	14%
	✓	✓	✓		1	8%	0%
✓		✓	✓		1	8%	0%
	✓	✓		✓	3	0%	5%
✓				✓	2	0%	5%
	✓	✓			2	0%	3%
✓	✓	✓		✓	1	0%	3%
✓	✓				1	0%	3%
✓					1	0%	3%
	✓		✓	✓	1	0%	3%
		✓			1	0%	3%
			✓		1	0%	3%

There was *no difference* among grantee success in:

- Proportion that offered additional incentives through utility or program partner (78% of all grantees)
- Proportion that referred participants to other programs offering upgrade incentives (36% of all grantees)
- Proportion that offered retailer or contractor discounts (22% of all grantees)
- Proportion that offered free upgrades (20% of all grantees)

5.7. CONCLUSIONS

Our process evaluation findings and review of relevant industry literature suggest approaches to structuring and offering upgrades that facilitates customer engagement, maximizes energy savings, and achieves program success. We reached the following conclusions:

Allowing participants to do more than one project (equivalently, to conduct upgrades in multiple stages) is associated with success. This is especially important for the nonresidential sector, where project costs are high and upgrade activities often require multiple phases to complete, although the residential programs also benefited from this approach. Grantees adopted this policy in order to encourage participants to achieve the greatest building energy savings possible (all sectors), to reduce the financial strain caused by projects (residential and low-income sectors), and because large nonresidential upgrade projects often require multiple phases and components. Average residential upgrade projects cost about $7,000; average nonresidential upgrade project costs can be as high as $800,000 (average nonresidential project costs varied with the size of the grant award; smaller grantees were unable to subsidize large retrofits). This finding is consistent with findings and recommendations from the upgrade literature (Peters and McRae, 2007; Van de Grift and Schauer, 2010).

A flexible approach to meeting project comprehensiveness goals, such as requiring participants to install a certain number of measures or pursue comprehensive audit recommendations – as opposed to requiring participants to meet a savings threshold – is associated with success. Upgrade project comprehensiveness can be attained through a number of strategies, and both grantees in the most successful cluster and less successful grantees used a variety of strategies. However, requiring all projects to meet a savings threshold is a strategy used much less frequently by the most successful grantees than by other grantees. Grantees in the most successful cluster were more likely than other grantees to promote comprehensiveness by either requiring participants to install a certain number of measures or by defining comprehensive upgrades as those informed by comprehensive audits.

Leveraging the upgrade contractor's pivotal role in the upgrade sale and supporting this process by providing upgrade contractors with sales training is associated with success. The upgrade contractor ultimately makes the sale. The most successful grantees were more likely than other grantees to recognize the upgrade contractor as one of the principal drivers of upgrade sales. Further, sales training for upgrade contractors (as well as audit contractors) is associated with success, as discussed in Chapter 6 Stimulating Supply.

Providing upgrade incentives (rebates) is associated with success. However, programs should consider offering incentives on the order of 25% of project costs, as paying a lower fraction in that range also is associated with a more successful programs. The most successful grantees paid a lower proportion of upgrade costs than other grantees, consistent with some discussions in the energy efficiency literature suggesting that homeowners are often willing to undertake greater project costs than many program administrators expect (Zimring et al., 2011).[57]

Effective programs have effective quality assurance and quality control processes. Effective QA and QC can be achieved through numerous program design and implementation decisions and follow-through. However, our data do not reveal how these processes differed, if at all, between grantees in the most successful cluster and other

[57] We note, however, that we were not able to determine the total incentives (BBNP plus utility program) participants received and so unable to draw definitive conclusions about incentive proportions.

grantees. Our in-depth interview findings indicate that QA and QC comprise multiple elements, such as decisions regarding: 1) the minimum qualifications, if any, for eligible upgrade contractors; 2) what services participating firms need to provide (comprehensive upgrades versus single-focus firms such as insulation and HVAC contractors); 3) contractor training; 4) who conducts project inspections; and 5) proportion of projects inspected. Grantees reported that strong relationships with contractors supported overall program and project quality.

6. DRIVING DEMAND FOR UPGRADE SERVICES

This chapter assesses the grantees' approaches to identifying target audiences and informing them about the upgrade opportunity, as well as identifies the messages that they used to generate interest in energy upgrades.

We discuss associations we found in bivariate analyses between program elements related to driving demand and grantees' relative success (most successful, average success, or least successful cluster, as described in Section 1.4.1). Our multivariate analyses presented in *Drivers of Success in the Better Buildings Neighborhood Program – Statistical Process Evaluation* (Final Evaluation Volume 3) did *not* reveal any significant predictors of membership in either the most or least successful clusters as a function of program elements related to driving demand for upgrades. Any findings regarding grantee success discussed in this chapter are descriptive, rather than predictive, findings.

The chapter draws on in-depth interviews with grantees, a web-based survey that grantees completed about their program activities, surveys of participants and nonparticipants, and evaluations grantees conducted of their own programs. Also it draws on a review of recent industry literature related to driving demand to place findings in a broader context and on data that grantees reported to DOE on their program accomplishments. Appendix E provides a detailed presentation of the findings summarized in this chapter; Appendix B provides a detailed discussion of the grantee web-based survey method and findings; Appendix J provides a detailed discussion of the participant survey method and findings; and Appendix K provides a detailed discussion of the nonparticipant survey method and findings.

The companion report, *Spotlight on Key Program Strategies from the Better Buildings Neighborhood Program* (Final Evaluation Volume 6), discusses two topics related to driving demand. Chapter 4 presents a detailed investigation of the targeted outreach activities conducted by six grantees and Chapter 5 presents and investigation of how seven grantees engaged community-based organizations.

6.1. DELIVERY OF PROGRAM MESSAGES

Energy efficiency programs must identify the audiences their messages and offerings will target in order to identify the most effective actors and channels to deliver those messages. This section describes findings on selecting audiences to target and delivering messages to those audiences.

6.1.1. AUDIENCE TARGETING

According to industry literature, identifying specific sub-groups to target within the broader population may benefit efficiency programs by allowing them to more efficiently reach potential participants with messages those potential participants will find relevant (Sanstad et al., 2010; Peters and McRae, 2007; Opinion Dynamics Corporation, 2014; Megdal et al., 1999; Fuller et al., 2010; Cluett and Amann, 2014). Industry sources primarily recommend that programs target home or building owners with some characteristic to increase their likelihood of participating in whole building upgrade programs, although some took a slightly different approach, seeking to identify those home or buildings owners whose buildings had the greatest potential to benefit from upgrades.

Grantees' approaches to identifying target audiences were largely consistent with these recommendations. During in-depth interviews, many grantees mentioned targeting by geographic location (15), while some grantees targeted segments they believed were most likely to participate (10), and others targeted groups that had been underserved

by existing energy efficiency programs (12). Using terminology from academic research on the diffusion of innovations, grantees discussed their efforts to target early adopters, or homeowners that would be most likely to participate. According to one of these grantees, "It is actually the early adopters that are participating most in the program. The people that are driven through the community, or helping the environment." Grantees also discussed level of education and income as factors affecting the likelihood of participation.

Grantees seeking to reach underserved populations most often targeted low- and moderate-income homeowners. Five grantees cited homeowners with incomes just above the eligibility level for federal weatherization assistance as an underserved market their programs sought to reach. According to one of these grantees, these homeowners are the "most likely to benefit group" from energy upgrade programs.

To reach their target audiences, grantees frequently focused outreach activities on specific neighborhoods or other narrow geographic areas. In targeting these areas, grantees often used a sweep approach, conducting intensive outreach within the targeted area with the goal of reaching a large proportion of the market.

Interview findings suggest that limiting program participation to residents of narrow geographic areas, as most grantees that took a geographic targeting approach did, constrained grantees' ability to achieve the volume of upgrades they sought. Grantees reported that limiting participation to targeted neighborhoods confused participants, required programs to turn away interested potential participants who lived outside of the targeted areas, and limited programs' ability to use mass marketing techniques. Half of the grantees that discussed targeting outreach to neighborhoods or other narrow geographic areas in in-depth interviews reported that they had ultimately expanded their targeted areas in order to reach a wider range of participants.

6.1.2. COMMUNICATION STRATEGIES

While participants most often reported using mass media outreach to promote their local BBNP-funded program, few noted its effectiveness.[58] Industry literature on program outreach more often recommended in-person and community-based methods for delivering messages about whole home upgrade programs than mass media advertising (sources discussing mass media advertising include Von Schrader et al., 2008 and De La Chapa and Case, 2012). Grantees' assessments of effective outreach methods were consistent with industry literature, with grantees most often citing presentations to community groups, participant testimonials, and participation in community events as effective outreach activities. The following sections provide additional detail on grantees' experience with community-based outreach approaches, canvassing, and mass media outreach.

Community-Based Outreach

Through their community-based outreach efforts, grantees primarily sought to expose potential participants to others like them who had completed upgrades. To this end, some grantees placed yard signs in front of homes that had participated in the program and others encouraged participants to host events in their homes in which their friends and neighbors could learn about energy upgrades. Grantees reported that this word of mouth information sharing

[58] One grantee elaborated that while its mass media efforts did not appear to induce much upgrade activity, he credits its mass media activities with developing the central theme, identity, and look that informed its community outreach activities. Also he noted that the program lacked the ability to track participants influenced by mass media and so did not have data by which to judge mass media effectiveness.

was an important source of information about their programs. According to one grantee, "It is not the rebate as much as neighbor-to-neighbor social norming that gets people into the program: [wanting to show that] 'my house is [more efficient] than yours,' wanting to participate in something bigger."

Canvassing

Grantees that used door-to-door canvassing as an outreach approach reported mixed results. Those that stated canvassing was not effective reported few of the homes they reached were interested in upgrades, either because the occupant did not own the home, the home was new and had limited energy savings opportunities, or the household was eligible for income-qualified direct installation programs. Grantees that described positive experiences with canvassing emphasized its utility on a small scale. For example, one grantee stated that canvassing helped to "put a face to the program, which was important" in their small target area. Another grantee stated that canvassing had helped their program identify effective program offerings, but noted it was not scalable.

Mass Media Outreach

While grantees frequently used traditional, mass outreach techniques like mass media advertising, social media, direct mail, utility bill inserts, and websites, relatively few commented on the effectiveness of these techniques during their in-depth interviews. A small number of grantees noted that, in using mass outreach, it is important to understand which sources of information members of their target audience view as credible. Other grantees stated that, while they had used mass outreach techniques, these had not been a primary focus of their programs or, instead, that mass outreach techniques had been less effective than more community-focused approaches.

Recent reports on comprehensive upgrades suggested that in-person and community-based methods were more effective than mass media outreach because of the complexity of upgrades, and these methods' greater potential to leverage social motivations to complete upgrades (KEMA, Inc., 2014; Fuller et al., 2010).

6.1.3. USE OF TRUSTED MESSENGERS

Both grantees and industry sources frequently discussed the importance of using a trusted messenger to deliver information about the program. Two broad approaches to ensuring that participants trust the information they receive from the program emerged from in-depth interviews. First, some grantees saw their own organization or other organizations involved in delivering the program as a trusted source of information in the communities they served. Second, some grantees sought to build partnerships with outside organizations to gain access to those organizations' constituents and leverage the organizations' credibility.

Grantees that reported that their organizations' reputation in the community gave credibility to their messages included both organizations with long histories in their communities and new organizations. For example, one grantee stated that, although their organization was new, simply being a nonprofit group with no financial stake in the upgrade decision gave them credibility. According to this grantee, "As a nonprofit, we have credibility…people understand that we're here in the community trying to help you do something. We're not out here to make a buck; we're not out here for some other financial gain."

In addition to relying on their own organizations' reputations, grantees discussed efforts to work with outside groups, both because these groups had the potential to serve as trusted messengers and because their constituents made up a potentially valuable group of prospective participants. One-third (33%) of grantees felt that endorsements by community leaders were the most effective outreach activities for driving upgrades. Grantees most often reported

working with neighborhood groups or business associations, although some worked with a wider range of groups. Grantees that had worked with a wide range of groups noted that groups' effectiveness as program partners varied based on factors like staff members' enthusiasm for the program and turnover among the groups' staff and volunteers.

Contractors also have the potential to serve as trusted messengers as a result of contractors' opportunity to build relationships with potential participants. According to one grantee, "The contractor, the person who does the home energy audit, that person is spending three hours in the home with the homeowner; they have the biggest opportunity [to promote the upgrade]." As a result of this opportunity to build a relationship with participants, contractors played a key role in many grantees' outreach efforts.[59]

6.2. CONTENT OF PROGRAM MESSAGES

The messages grantees used in their marketing efforts reflected grantees' assessments of the motivations and barriers that influenced participants' retrofit decisions. In the web survey, grantees most often reported using messages related to saving money, receiving incentives, and comfort (Table 6-1). Elaborating on messaging in their in-depth interview, one grantee said, "If an argument works, it's the fact that you're going to be saving money." Second to financial messages, half of grantees (50%) used comfort in their messaging to attract participants. One grantee reported using messages around comfort, health, and safety because energy costs in their area were relatively low, making cost savings messages less compelling.

Table 6-1: Marketing Messages Used Most by Program (Multiple Responses Allowed)

MESSAGE	RESIDENTIAL (N = 48)	LOW-INCOME (N = 15)	NONRESIDENTIAL (N = 27)
Financial: Any	77%	80%	70%
Savings	*56%*	*67%*	*67%*
Program incentives	*31%*	*33%*	*26%*
Comfort	50%	20%	11%
Energy savings	23%	7%	26%
Limited time offer/Act now	13%	0%	15%
Ease	13%	7%	4%
Other	19%	20%	11%
Not relevant to program	0%	20%	15%
Don't know	0%	0%	7%

[59] Chapter 7, Stimulating Supply provides additional details on the roles contractors played in program outreach.

In addition to messages addressing participants' motivations and barriers, interview respondents stated it was important for programs to frame their messages in a way that was clear and accessible to participants. For example, a program stakeholder suggested that programs should use language that is easy to understand and engaging, and a grantee suggested program messages should give potential participants a clear understanding of what to expect from the participation process.

The messages grantees used to promote energy upgrades were largely consistent with recommendations from evaluations on home energy improvement programs, which focused on developing messages to convince potentially skeptical home and building owners of the value of energy upgrades. To this end, industry sources recommended messages that build confidence in upgrade benefits, emphasize non-energy benefits, and bundle upgrades with other improvements. Industry sources also recommended that programs present clear and complete information about the costs and benefits of energy upgrades (Newport Partners, LLC, 2012; Fuller et al., 2010; GDS Associates, Inc. and Research Into Action, 2013).

6.3. ENERGY SCORES AND LABELS

Recent research on the housing market has found that homes with "green labels" like LEED,[60] ENERGY STAR,[61] and GreenPointRATED[62] sold for higher prices than similar homes without labels, although the effect varied with climate and a region's receptiveness to environmental messages (Kok and Kahn, 2012). Thirteen grantees incorporated some type of label or energy scoring system into their efforts to drive demand for energy upgrades. These grantees primarily used the Energy Performance Score (EPS)[63] (seven grantees), and the Home Energy Score (HES) DOE[64] (three grantees). Grantees suggested that, because homeowners do not widely recognize and understand home energy labels, labels are most effective as part of an in-person sales process in which contractors or other program representatives use the labels to illustrate the benefits of energy upgrades.

6.4. FREQUENCY FINDINGS

This section presents frequencies from the grantee web survey suggestive of characteristics that distinguish grantees in the most successful clusters from other grantees (presented in bold text).[65] We report here variables for which the

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60 Leadership in Energy and Environmental Design (LEED) is a third-party certification program developed by the U.S. Green Building Council that recognizes building practices contributing to responsible resource use and the promotion of renewable energy. *http://www.usgbc.org/leed*

61 ENERGY STAR is a U.S. Environmental Protection Agency program that encourages individuals and businesses to adopt energy efficient products and practices through partnerships, education, and tax incentives. *http://www.energystar.gov/*

62 GreenPointRATED is a California-based home certification program that verifies the home exceeds state energy code requirements and is both friendly to the environment and human health. *http://greenpointrated.com/*

63 Energy Performance Scores is a home energy rating system co-developed by the Earth Advantage Institute and the Energy Trust of Oregon that informs homeowners of their home's energy use by providing its estimated energy consumption, energy costs, and carbon footprint as well as providing upgrade recommendations. *http://www.earthadvantage.org/incubator/eps.html*

64 The Home Energy Score was developed by the Department of Energy to rate a home's energy efficiency. Homeowners can compare their home's efficiency with that of other homes and learn about savings generated from suggested upgrades. *http://energy.gov/eere/buildings/home-energy-score*

65 See Appendix B for additional findings from the grantee web survey.

pattern of results indicate a difference between the most successful grantees and average/least successful grantees (typically a difference of 15 or more percentage points), regardless of whether analyses reveal statistically significant differences between the groups. Footnotes denote any differences that are statistically significant. Because these results are from descriptive, bivariate analyses that do not control for the influence of other variables, they should be interpreted with caution. Also we present variables for which there is no apparent difference between grantees in the most successful cluster and grantees in the average/least successful clusters (not presented in bold text).

We begin this section with findings from the nonparticipant survey that suggests grantees in the most successful cluster were more effective in creating market awareness of their programs than were other grantees (Table 6-2).

Table 6-2: Nonparticipant Homeowners' Awareness of Local BBNP Program by Stratum

GRANTEE SUCCESS CLUSTER	PERCENT AWARE	N
Most Successful	37%	631
Average [a]	32%	1,583
Least Successful [a,b]	21%	215
Total Awareness	32%	2,429

[a] Statistically significantly lower than the most successful cluster, $p < .05$.

[b] Statistically significantly lower than the average cluster, $p < .05$.

6.4.1. PROMOTIONAL METHODS

Grantees in the most successful cluster were *more likely* than other grantees to identify the following methods of program promotion as most effective:[66,67]

- **Community outreach** (92% of the most successful grantees compared with 63% of average/least successful grantees), either **participating in community events** (67% of the most successful versus 41% average/least successful) or **making presentations to community groups** (67% of the most successful versus 51% average/least successful)
- **Mailed letters** (75% of the most successful versus 34% average/least successful)[68], **either to a named individual** (42% of the most successful versus 24% average/least successful) **or an unnamed occupant** (33% of the most successful versus 16% average/least successful)
- **Program website** (67% of the most successful versus 53% average/least successful)

66 Up to three responses allowed.

67 Generally speaking, both the most successful and the average/least successful grantees were more likely to identify the items in this list as most effective than the items listed here subsequently, suggesting that the methods associated with success are perceived as more effective regardless of their association with overall program success.

68 Difference is statistically significant, $p < .05$.

- **Case studies** (33% most successful versus 11% average/least successful)
- **Contractor sales promotions** (25% most successful versus 13% average/least successful)

Grantees in the most successful cluster were *less likely* than other grantees to identify the following methods as most effective:

- **Canvassing or community sweeps** (8% of the most successful grantees compared with 24% of average/least successful grantees)
- **Conducting outreach to trade associations** (none (0%) of the most successful grantees compared with 19% average/least successful grantees)

The proportion of grantees that identified the following methods as most effective *did not differ* as a function of grantee success:

- Participant testimonials (53% of all grantees)
- Free media exposure (52% of all grantees)
- Mass media buys (42% of all grantees)
- Visible indicator of participation, such as yard sign (28% of all grantees)
- Endorsements by community leaders (35% of all grantees)
- Events organized by the program (27% of all grantees)
- Contests (12% of all grantees)

6.4.2. PROMOTIONAL MESSAGES

The most successful grantees were *more likely* than other grantees to identify the following promotional messages as among the two messages they used most:

- **Comfort** (83% of the most successful grantees compared with 39% of average/least successful grantees)[69]
- **Limited time offer/Act now** (25% of the most successful grantees compared with 8% of average/least successful grantees)

The most successful grantees were *less likely* than other grantees to use the following messages:

- **Incentives available** (8% of the most successful grantees compared with 34% of average/least successful grantees)
- **Ability to achieve energy savings** (0% of the most successful grantees compared with 29% of average/least successful grantees)[70]

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69 Difference is statistically significant, $p < .01$.

70 Difference is statistically significant, $p < .05$.

The clusters of grantees *did not differ* in their use of the following messages:

- Bill savings (60% of all grantees)
- Ease of program upgrades (12% of all grantees)

6.4.3. USE OF MARKETING CONTRACTOR

About 70% of grantees used a marketing contractor, a finding that did not vary by grantee success. Of these grantees, about 40% rated themselves highly satisfied with the contractor; few expressed low satisfaction.

6.4.4. MARKETING METHODS BY SIZE OF TARGET POPULATION

Grantees in the most successful and average clusters targeted residential populations of similar mean size. Grantees in the last successful cluster targeted smaller populations.[71]

Grantees serving larger target populations of buildings more frequently identified as effective the following methods:

- Mass media buys
- Mailed letters to a named individual
- Visible indicator of participation
- Participant testimonials
- Contractor sales promotions
- Outreach to trade associations

Grantees serving smaller target populations more frequently identified as effective the following methods:

- Free media exposure
- Contests
- Case studies
- Canvassing and community sweeps
- Participating in community events and presentation to community groups

Methods equally endorsed as effective by grantees serving both larger and smaller target populations are:

- Website
- Events organized by the program
- Endorsements by community leaders

[71] In these analyses, size of eligible population was self-reported by program administrators in the grantee web survey.

6.5. CONCLUSIONS

Our process evaluation findings and review of relevant industry literature suggest effective approaches for driving demand for whole home/whole building energy efficiency upgrades and achieving program success. We reached the following conclusions:

Identifying specific target populations within a larger area is associated with success. Identifying specific target groups based on geography or likelihood of participating in or benefiting from the program allows programs to reach potential participants efficiently with tailored, relevant outreach messages. Despite the benefits of targeted outreach, broadly, our findings suggest that targeting very narrow geographic areas is an ineffective strategy for driving demand due to constrained volume and the potential for customer confusion.

Community-based outreach activities and letters to home and building owners can contribute to success. Grantees in the most successful cluster were more likely to report using each strategy effectively (92% and 75% of most successful grantees, respectively) than average or least successful grantees (63% and 34% of average/least successful grantees, respectively). (See the companion report, *Spotlight on Key Program Strategies from the Better Buildings Neighborhood Program* [Final Evaluation Volume 6], Chapter 4, for a detailed investigation of the targeted outreach activities conducted by six grantees, and Chapter 5 for a detailed investigation of how seven grantees engaged community-based organizations.)

Canvassing is not likely to be a contributor to success, with the possible exception of small target markets. Grantees who engaged in canvassing reported that many of the people they reached were not interested in upgrades. Further, the most successful grantees were less likely to report that canvassing was an effective strategy than average/least successful grantees (8% of the most successful grantees versus 24% of average/least successful grantees).

Promotional messages about comfort can contribute to success. Promotional messages about comfort are more effective than emphasizing incentives or energy savings, particularly in areas with low energy costs. The most successful grantees were more likely to use messages about comfort than average/least successful grantees (83% versus 39%), while average/least successful grantees were more likely to use messages about incentives (34% versus 8%) and energy savings (29% versus 0%).

Using a marketing contractor is not likely to be a contributor to success. Our results do not provide support in favor of using a marketing contractor. Most successful grantees were no more likely to use a marketing contractor than least successful grantees, and less than half of grantees who used a marketing contractor reported being highly satisfied.

Tailoring outreach efforts to the size of the target population is associated with success. Program administrators should consider the size of their target population when developing an outreach strategy. Grantees who endorsed the effectiveness of the following outreach methods tended to have larger target populations than grantees who did not: mass media, mailed letters, participant endorsement of the program, and contractor involvement. Grantees who endorsed the effectiveness of the following outreach methods tended to have smaller target populations than grantees who did not: free media exposure, contests, case studies, canvassing, and outreach to community groups.

7. STIMULATING SUPPLY OF UPGRADE SERVICES

This chapter assesses grantees' efforts and experiences in ensuring the workforce in their service area was capable of supplying upgrade services sufficient to meet demand, as well as capable of driving new demand through its marketing activities. To this end, grantees provided contractor training, set contractor eligibility requirements, and managed contractor relationships.

We discuss associations we found in bivariate analyses between program elements related to stimulating supply and grantees' relative success (most successful, average success, or least successful cluster, as described in Section 1.4.1). Our multivariate analyses of the predictors of success, presented in *Drivers of Success in the Better Buildings Neighborhood Program – Statistical Process Evaluation* (Final Evaluation Volume 3), found some supply-related variables to be significant predictors of membership in the most successful grantee cluster. The other patterns that we describe in this chapter were not found to be significant in the multivariate analyses; they are descriptive, rather than predictive, findings.

The chapter draws on in-depth interviews with grantees, a web-based that survey grantees completed about their program activities, surveys of participants, and evaluations grantees conducted of their own programs. Also it draws on a review of recent industry literature related to stimulating supply to place findings in a broader context and on data that grantees reported to DOE on their program accomplishments. Appendix F provides a detailed presentation of the findings summarized in this chapter; Appendix B provides a detailed discussion of the grantee web-based survey method and findings; and Appendix J provides a detailed discussion of the participant survey method and findings.

The companion report, *Spotlight on Key Program Strategies from the Better Buildings Neighborhood Program* (Final Evaluation Volume 6), Chapter 3, presents a detailed investigation of the contractor training conducted by four grantees.

7.1. SUPPLY OF ENERGY AUDIT AND UPGRADE CONTRACTORS

Recent evaluation reports suggest that, while in some areas contractor availability may be keeping up with demand for energy efficiency upgrades, other regions face a shortage of contractors, and contractor availability may become problematic as demand for energy efficiency services increases (Summit Blue Consulting, 2009). Findings from in-depth interviews with grantees are consistent with this assessment.

Our statistical analyses revealed that the number of upgrade contractors eligible to complete program upgrade projects was a significant predictor of membership in the most successful grantee cluster.[72] Grantees in the most successful cluster reported having an average of 77 eligible upgrade contractors, compared with an average of 30 among average grantees and an average of 32 among least successful grantees. Having a large number of firms that are eligible to complete program upgrade projects may make it easier for participants to find a qualified contractor. Further, some participants may appreciate the ability to shop around for contractors in order to find the best quote.

[72] See Chapter 4 of *Drivers of Success in the Better Buildings Neighborhood Program – Statistical Process Evaluation* (Final Evaluation Volume 3) for more information.

Some grantees mentioned starting their programs with little or no functional network of contactors knowledgeable about energy efficiency, especially contractors with the specialized skills necessary for whole building upgrades. Other grantees reported they had an already established network of contractors, which they believed enabled their programs to ramp up more quickly and smoothly than they otherwise could have, and enabled them to be more selective about the contractors they allowed to participate in their programs.

Grantee web survey results indicate that the contractors participating in most grantees' programs had participated in other energy efficiency programs. Approximately three-fourths of grantees reported that at least some their audit contractors and upgrade contractors had prior experience with energy efficiency programs (Table 7-1). Nonetheless, grantees suggested this experience may not have prepared contractors sufficiently to complete comprehensive upgrades. A minority of grantees reported that most of the audit contractors (30%) and upgrade contractors (29%) in their residential programs had a high skill level prior to program involvement. According to one grantee, "there was not good awareness among the workforce about whole home upgrades. We had to educate the [contractor] communities."

Table 7-1: Grantee Ratings of Prior Efficiency Program Experience and Skill Level of Residential Audit and Upgrade Contractors

PROPORTION	AUDIT CONTRACTORS (N = 47)		UPGRADE CONTRACTORS (N = 47)	
	Prior Program Experience	High Skill Level	Prior Program Experience	High Skill Level
Most	51%	30%	51%	29%
Some	26%	40%	23%	31%
Few	15%	21%	17%	31%
None	6%	6%	4%	4%
Don't know	2%	2%	4%	4%
Total	100%	100%	100%	100%

Percent offering each response. Source: Grantee Web Survey Q20, Q34

Despite the benefits of an experienced contractor base that grantees described, successful grantees were more likely to report difficulties with the level of experience among their contractor network than were less successful grantees (see Table 7-2). Six grantees, three of whom were in the most successful cluster, reported challenges in motivating contractors to meet program standards and approach energy efficiency more comprehensively.

Table 7-2: Percent of Grantees that Reported Challenges Related to the Level of Contractor Experience (Among Grantees that Discussed Contractors during In-Depth Interviews)

MENTIONED DURING IN-DEPTH INTERVIEWS	LEAST SUCCESSFUL GRANTEES (N = 3)	AVERAGE GRANTEES (N = 27)	MOST SUCCESSFUL GRANTEES (N = 11)
Challenges with Level of Contractor Experience	33%	17%	45%

7.2. GRANTEE PROGRAM OUTCOMES

Across grantee service areas, more than one-fourth (27%, n = 446) of the nonparticipating surveyed contractors were aware of the local BBNP program. Among the participating contractors interviewed, most (73%, n = 115) reported participating actively.[73] Active participants had most often (64%, n = 84) been active since the program began.[74]

Grantee web survey findings suggest that, while most eligible contractors actively participated, for most grantees, a few contractors conducted the majority of the upgrade work. Grantees reported that their five most active auditors and upgrade firms conducted an average of about 80% of their program's residential audits and 75% of their program's residential upgrades, respectively. Findings suggest that upgrade activity was concentrated among a few firms even for grantees with large contractor bases, with grantees with 41 or more participating contractors, on average, reporting that the five most active contractors had completed nearly two-thirds (63%) of all upgrades.

Grantees reported that their programs helped grow the supply of experienced energy audit and upgrade contractors. In in-depth interviews, 21 grantees reported that their programs contributed to growth in the number of contractors in their territory capable of providing comprehensive energy upgrades or growth in the size of contractor firms offering comprehensive upgrades to their programs. In addition to building the larger energy upgrade market, grantees noted that their energy efficiency programs have had a positive impact on individual contractors' business, for example, by helping small contractors grow their businesses.

Grantees were optimistic that their programs would have a lasting impact on the comprehensive energy upgrade market. Seven grantees reported that, because of their programs, comprehensive energy upgrades had become a more common practice for contractors. These grantees anticipated that contractors would continue to market comprehensive upgrade services after BBNP-funded programs had ended. One grantee also noted that as contractors have increased their experience with energy upgrades, they require less support from the program. In addition to increased contractor capacity to complete energy upgrades, two grantees reported that consumers were increasingly asking for energy upgrade services and qualified contractors to provide them.

7.3. CONTRACTOR MANAGEMENT

Contractors have the potential to play a key role in promoting energy upgrades in partnership with efficiency programs, but their effectiveness in doing so depends on their ability to build trusting relationships with potential participants. Industry research suggests that trust plays a critical role in homeowners' selection of contractors: in residential remodeling projects, homeowners most often use contractors they had worked with before, found through word of mouth, or with whom they had a previous personal relationship. According to one of these studies, about half of homeowners consider only one contractor when completing home remodeling projects (KEMA, Inc., 2014).

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73 The contractor survey did not take into account eligibility in the sample; therefore, estimated contractor participation is not directly comparable to grantees' estimation of active contractor participation provided in the grantee web survey.

74 At the start of survey fielding, our requisites for asking contractors this series of questions were stringent, resulting in small sample sizes. As such, some participating contractors are not included in the base. During our second round of calling, we changed the screening to include anyone confirming participation.

Once a participant has selected a contractor, grantees reported that the potential to build a trusting relationship can allow a contractor to identify a high potential customer, understand and address the customer's specific concerns, and be present when the participant makes the decision to upgrade. In managing their contractor networks, grantees sought to build contractors' skills, foster participants' trust in contractors and leverage contractors' unique position in the upgrade sale.

7.3.1. BUILDING CONTRACTOR SKILLS

To increase the availability of skilled contractors, grantees provided training for contractors working in a large majority of their residential (92%) and low-income (80%) programs. More than half (56%) of nonresidential programs also provided some type of training for contractors. While most programs offered training, those that did not were particularly likely to be in the least successful cluster, suggesting that contractor training is a necessary component of residential upgrade programs. Indeed, our statistical analyses revealed that *not* offering contractor training was a significant multivariate predictor of membership in the least successful grantee cluster.[75]

Grantees perceived difficulty in selling retrofits as a common challenge contractors faced, and many grantees sought to build contractors' sales skills through training. The majority of grantees that offered training to residential contractors reported that they offered sales training (Table 7-3). In their in-depth interviews, eight grantees specifically emphasized the importance of providing sales training for contractors in addition to technical training. These grantees suggested that an important contributor to the challenges many contractors faced in selling retrofits was the need to communicate technical building science information in a way that was approachable to home and building owners. According to one of these grantees, it was important for contractors to "eliminate the jargon, get away from building science talk. Talk more about the needs of the homeowner and the problems they have with their home."

A majority of grantees (55%) offered scholarships to support contractors receiving training from other organizations. Grantee-provided training covered a wide range of topics related to the skills and tools necessary to the success of the program or transformation of the comprehensive energy upgrade market. In in-depth interviews, grantees reported providing training on topics including software, financing, and sales, in addition to the technical skills necessary to complete a whole building energy upgrade.

[75] See Chapter 4 of *Drivers of Success in the Better Buildings Neighborhood Program – Statistical Process Evaluation* (Final Evaluation Volume 3) for more information.

Table 7-3: Types of Training Available to Upgrade and/or Audit Contractors (Among Programs that Offered Training to Contractors; Multiple Responses Allowed)

TRAINING TYPE	RESIDENTIAL (N = 44)	LOW-INCOME (N = 12)	NONRESIDENTIAL (N = 15)
Sales Training [a]	81%	50%	53%
Business Training	59%	50%	53%
Training on Program Requirements and Processes	98%	100%	93%

Percent offering each response. Source: Grantee Web Survey Q38.

[a] Residential is significantly different than low-income and nonresidential.

7.3.2. MAINTAINING COMMUNICATION WITH CONTRACTORS

Grantees suggested that programs benefit from building close relationships with contractors. In one multi-state grantee-led evaluation, evaluators noted that the partner networks the program built were a key strength to the program and that relationships between state government, implementers, and market actors "resulted in a shared sense of cause" that "should benefit future program efforts (The Cadmus Group, Inc., 2014)." Grantees noted that contractors with a strong relationship with an efficiency program may be able to interest customers seeking to replace an old or broken appliance in more comprehensive energy upgrades. (As discussed in Section 5.5, nearly half of nonparticipating homeowners that conducted upgrades that included an increase in energy efficiency were motivated by broken equipment.) Grantees stated that engaging contractors as early as possible in the program development process can be particularly beneficial. Benefits grantees cited to engaging contractors early included:

- **Identifying interested contractors**: One grantee reached out to contractors participating in an existing efficiency program to identify those interested in a deeper level of involvement in the grantee's program.
- **Developing a collaborative QA/QC process**: One grantee reported that contractor involvement helped them develop a more collaborative and discussion-oriented QA/QC process that better allowed contractors to learn from their mistakes.
- **Continual process improvement:** One grantee stated that maintaining a close relationship with contractors was important in avoiding unintended consequences of changes made as part of a continual improvement process.

Once they had engaged contractors, grantees stated that it was important to maintain ongoing communication with the contractors in their networks. In in-depth interviews, grantees described their ongoing communication with contractors as ranging from regular brown bags to monthly contractor newsletters to quarterly contractor meetings. One grantee stated that listening to the type of feedback regular contractor meetings provided was "vital to any program." About two-thirds of residential and low-income programs and about one-third of nonresidential programs held frequent, regular meetings with participating contractors (Table 7-4).

Table 7-4: Frequency of Contractor Meetings (Among Programs with Contractor Meetings)

MEETING FREQUENCY	RESIDENTIAL (N = 42)[A]	LOW-INCOME (N = 10)	NONRESIDENTIAL (N = 12)
Monthly	40%	20%	0%
Quarterly	24%	40%	33%
A few times a year	33%	40%	67%
Don't know	2%	0%	0%
Total	100%	100%	100%

Percent offering each response. Source: Q43.

[a] Residential is significantly different than nonresidential.

7.3.3. LEVERAGING CONTRACTORS' POSITION IN THE UPGRADE SALE

Most grantees recognize the important influence contractors have on customers' decisions to make comprehensive energy upgrades. More than half (56%) of grantees surveyed reported the upgrade contractor as a primary driver of upgrade sales, second only to financial incentives (90%). Additionally, during in-depth interviews, the majority (29 grantees, 67%) of grantees that discussed contractors mentioned the importance of contractors in selling an energy upgrade, including six grantees that stated that contractors are the *most* influential actor in selling upgrades. Across grantees, more than one-third (37%) of surveyed residential participants in BBNP-funded programs reported that they heard about their local BBNP energy upgrade program through a contractor, someone offering energy efficiency related products or services, or another professional source. Research on the home energy upgrade market supports the idea that contractors often play an important role in outreach (SEE Action Residential Retrofit Working Group, 2011).

This opportunity to influence customers as they make the upgrade decision may be particularly important in convincing customers who approached the contractor for other reasons, like replacing broken equipment, to make an energy upgrade. According to one grantee, "Because of the relationship that we have with our contractors that do the HVAC work, they're able to get to these guys right at the point of purchase and say, 'you really should get an ENERGY STAR unit…because you can get a rebate to offset the cost."

7.3.4. FOSTERING PARTICIPANTS' TRUST IN CONTRACTORS

Contractors ultimately need to earn a profit from the energy upgrade work they complete. As a result, grantees suggested that there is a risk that some contractors may overprice services or upsell customers to a product they do not need. In turn, this can reduce homeowners' trust in contractors, limiting their ability to support the program in promoting energy upgrades. Grantees primarily discussed three tactics for fostering participant trust in contractors and ensuring that contractors acted in ways that were consistent with programs' goals of maximizing energy savings and achieving customer satisfaction: 1) requiring contractors to meet qualification requirements; 2) providing lists of qualified contractors; and 3) conducting and promoting quality assurance testing.

Grantees used certified contractor lists to foster customers' trust in contractors and facilitate contractor selection. The majority of grantees (67%) reported that residential participants selected an upgrade contractor from a list of

pre-approved contractors; few reported that the program selects the contractor (17%), that the participant selects any contractor they choose (13%), or that audit contractors' partner with upgrade contractors (2%).[76]

In their in-depth interviews and summary reports, twenty-two grantees (including 7 of 11 successful grantees) mentioned specific requirements contractors must meet in order to complete upgrades through the program, including BPI certification and quality standards their work must meet. Thirteen grantees reported requiring contractors to be BPI-certified, and twelve mentioned helping contractors obtain this certification. Two of these grantees stated that requiring BPI certification helped to overcome participants' skepticism of program offerings, with one grantee noting that contractor certification made customers "more confident and reassured."

Grantees cited QA/QC tools as ways to mitigate conflicts between the program's efforts to maximize energy savings and best serve participants and contractors' profit motivation. According to one grantee, "programs that neglect QA for contractors do not get the same kind of results." Another stated that half of the building owners participating in their program reported that the program's third-party QA was one of the factors that convinced them to move forward with upgrades. One successful grantee described the QA/QC process as 'a mentoring opportunity, where contractors can see how their work can be improved and where a pattern might be emerging where additional training for staff could be useful.' These findings are consistent with findings from an evaluation on home energy improvement programs indicating that QA and QC requirements can build customer confidence in upgrades and trust in the work of their contractor (Fuller et al., 2010; Cluett and Amann, 2014).

7.4. FREQUENCY FINDINGS

This section presents frequencies from the grantee web survey suggestive of characteristics that distinguish grantees in the most successful clusters from other grantees (presented in bold text).[77] We report here variables for which the pattern of results indicate a difference between the most successful grantees and average/least successful grantees (typically a difference of 15 or more percentage points), regardless of whether analyses reveal statistically significant differences between the groups. Footnotes denote any differences that are statistically significant. Because these results are from descriptive, bivariate analyses that do not control for the influence of other variables, they should be interpreted with caution. Also we present variables for which there is no apparent difference between grantees in the most successful cluster and grantees in the average/least successful clusters (not presented in bold text).

7.4.1. SUPPLY OF AUDITORS

Grantees in the most successful cluster were *more likely* than other grantees to have the following characteristics regarding the supply of auditors:

- **Auditors contracted with the participant, simplifying the process of having audits completed** (64% of the most successful grantees compared with 49% of average/least successful grantees)

[76] One grantee did not provide a response.

[77] See Appendix B for additional findings from the grantee web survey.

- **More individuals were involved in conducting audits** an average of 92 individuals conducting audits among the most successful grantees, compared with an average of 15 among average/least successful grantees)[78]
- **Lower proportion of audits conducted by the top five suppliers, indicating that many contractors were involved in providing audits** (an average of 70% of audits among the most successful grantees compared with an average of 82% among average/least successful grantees)[79]
- **More highly skilled audit contractors** (45% of the most successful grantees reported "most auditors" with high skills compared with 25% of average/least successful grantees; 82% of the most successful grantees reported "most auditors: had high or moderate skills compared with 56% of average/least successful grantees)

There was *no difference* among grantee success clusters in:

- Whether they provided energy coaches to participants (57% of all grantees)

7.4.2. SUPPLY OF UPGRADE CONTRACTORS

Grantees in the most successful cluster were *more likely* than other grantees to have:

- **Larger numbers of firms conducting upgrades** (an average of 48 contractors among the most successful grantees compared with an average of 16 among average/least successful grantees)[80]
- **Less concentration of upgrades among the top five suppliers, indicating that many contractors participated in the program** (an average of 60% of projects among the most successful grantees compared with an average of 80% of projects among average/least successful grantees)[81, 82]

78 Difference is statistically significant, $p < .05$.

79 It is worth noting that there was a significant negative correlation between number of individuals involved in conducting audits and the proportion of audits conducted by the top five suppliers, suggesting an alternative hypothesis that there was *greater* concentration among the most successful grantees' top five suppliers. For example, if the top five of 92 auditors conducted 70% of jobs for successful grantees, but the top five of 15 auditors are doing 82% of jobs for less successful grantees, the market would be more concentrated for the successful grantees. Because we do not have data on the proportion of projects conducted by each active auditor, we are not able to explore this possibility further.

80 Difference is statistically significant, $p < .01$.

81 Difference is statistically significant, $p < .05$.

82 It is worth noting that there was a significant negative correlation between number of individuals involved in conducting upgrades and the proportion of upgrades conducted by the top five suppliers, suggesting an alternative hypothesis that there was *greater* concentration among the most successful grantees' top five suppliers. For example, if the top five of 48 upgrade contractors conducted 60% of jobs for successful grantees, but the top five of 16 upgrade contractors are doing 80% of jobs for less successful grantees, the market would be more concentrated for the successful grantees. Because we do not have data on the proportion of projects conducted by each active upgrade contractor, we are not able to explore this possibility further.

There is *no difference* among grantee success clusters in:

- Proportions that had upgrades conducted by contractors selected by participants from a list of program-designated eligible contractors (69% of all grantees), contractors assigned to participants (19% of all grantees), or contractors selected freely by participants (13% of all grantees)
- Proportion of upgrade contractors that offered both insulation and HVAC services (32% of all grantees)
- Proportions that rated most of their upgrade contractors as having high skills (31% of all grantees), moderate skills (28% of all grantees) and low skills (9% of all grantees)

7.4.3. CONTRACTOR TRAINING

Grantees in the most successful cluster were *more likely* than other grantees to:

- **Meet monthly with contractors** (70% versus 34%)[83]

Grantees in the most successful cluster were *less likely* than other grantees to:

- **Offer loans or financing to contractors** (none [0%] the most successful grantees compared with 21% of average/least successful grantees)
- **Provide equipment to contractors** (17% of the most successful grantees compared with 32% of average/least successful grantees)

The clusters of grantees *did not differ* in:

- Proportions that offered contractors training scholarships (60% of all grantees)
- Proportions that met at least annually with participating contractors (92% of grantees)

7.5. CONCLUSIONS

Our process evaluation findings and review of relevant industry literature suggest that there are effective approaches for cultivating a workforce that is able to meet demand for whole home/whole building efficiency upgrades and achieving program success. We reached the following conclusions:

Providing contractor training is associated with success. The least successful grantees were less likely to offer contractor training than more successful grantees (29% versus 87%). In particular, programs may benefit from offering sales training to take advantage of contractors' presence at the point of sale. (See the companion report, *Spotlight on Key Program Strategies from the Better Buildings Neighborhood Program* [Final Evaluation Volume 6], Chapter 3, for a detailed investigation of the contractor training conducted by four grantees.)

83 Difference is statistically significant, $p < .05$.

Building strong relationships with participating contractors is associated with success. Building close relationships with contractors helps to maintain contractor program engagement. An effective model for building relationships with contractors involves identifying interested contractors, developing a collaborative QA/QC process that encourages contractors to learn from their mistakes, engaging in continual process improvement, and maintaining ongoing communication with contractors.

Fostering participant trust in contractors by providing lists of pre-approved contractors and providing participant flexibility by allowing them to contract directly with the contractor is associated with success. Programs providing participants with a list of eligible contractors and allowing those contractors to contract directly with participants had greater success. We infer that these approaches provide customers with some assurance of quality (pre-approval) and choice (flexibility), which neither contractors assigned by the program, nor absence of eligibility requirements, provides. Grantees in the most successful cluster were more likely to allow auditors to contract directly with participants than average/least successful grantees (64% versus 49%).

Developing a large pool of eligible contractors and distributing work across the pool is associated with program success. The more contractors that are eligible to work with a program, the more likely participants are to be able to use a contractor with whom they already have a relationship or find a new contractor who meets their needs. Grantees in the most successful cluster reported having larger pools of eligible audit and upgrade contractors than average/least successful grantees, and they reported a lower concentration of audits and upgrades among the top five suppliers.

Providing financing or equipment to contractors does not appear to significantly enhance contractor participation and program outcomes. Less than one-third of participants offered loans or financing to contractors or provided them with equipment. Among those, grantees in the average and least successful clusters were more likely to offer these services (21% and 32%, respectively) than the most successful grantees (0% and 17%, respectively).

8. FINANCING

This chapter assesses' grantees' efforts and experiences in developing and offering financing products, and explores the challenges of providing energy efficiency financing to program participants.

We discuss associations we found in bivariate analyses between program elements related to financing and grantees' relative success (most successful, average success, or least successful cluster, as described in Section 1.4.1). Our multivariate analyses presented in *Drivers of Success in the Better Buildings Neighborhood Program – Statistical Process Evaluation* (Final Evaluation Volume 3) did *not* reveal any significant predictors of membership in either the most or least successful clusters as a function of program elements related to financing. Any findings regarding grantee success discussed in this chapter are descriptive, rather than predictive, findings.

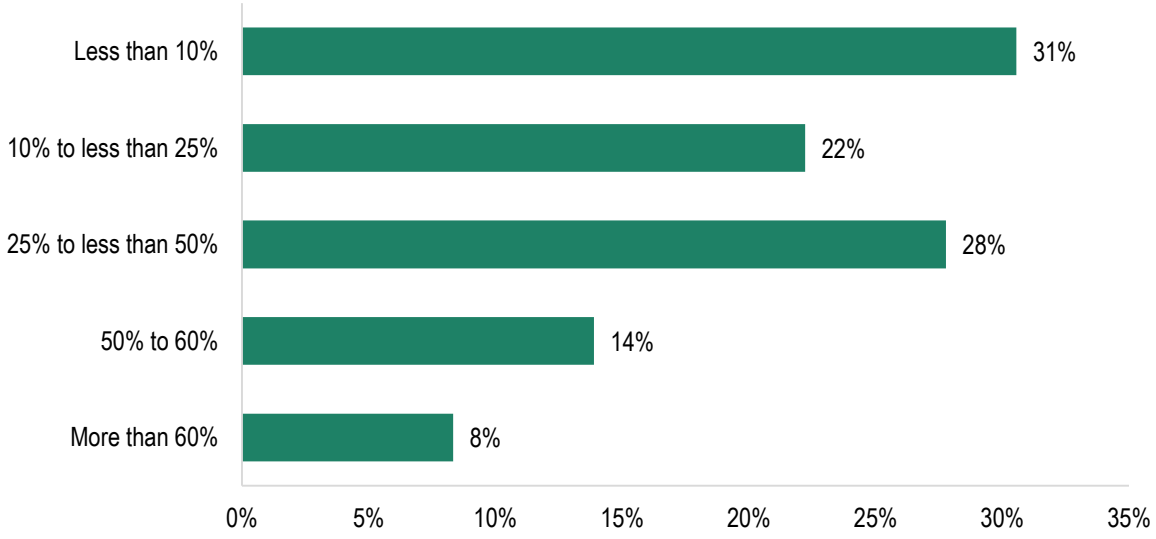
The chapter draws on in-depth interviews with grantees and their financial partners, a web-based that survey grantees completed about their program activities, surveys of participants and nonparticipants, and evaluations that grantees conducted of their own programs. Also it draws on a review of recent industry literature related to financing to place findings in a broader context and on data grantees reported to DOE on their program accomplishments. Appendix G provides a detailed presentation of the findings summarized in this chapter; Appendix B provides a detailed discussion of the grantee web-based survey method and findings; Appendix J provides a detailed discussion of the participant survey method and findings; and Appendix K provides a detailed discussion of the nonparticipant survey method and findings.

8.1. USE OF PROGRAM FUNDS

Thirty-six of the 41 prime grantees reported to DOE on the proportion of BBNP funds they used to support financing for energy efficiency retrofits. Grantees fell into three groups regarding the proportion of their overall BBNP award devoted to financing support, as illustrated in Figure 8-1. Grantees most often devoted a relatively small percentage of their overall BBNP award to financing, with about half (53%) devoting no more than 25% of their total award to financing.[84] Nonetheless, approximately one-quarter of grantees (28%) devoted between 25% and 50% of their award to financing, and another fifth (22%) used a majority of their award on financing.

[84] Funds that grantees used to support financing include funds loaned directly to participants through revolving loan funds as well as funds used to stimulate the availability or attractiveness of financing through loan loss reserve funds and interest rate buy downs.

Figure 8-1: Proportion of BBNP Grant Awards Devoted to Financing



There was no clear relationship between the proportion of BBNP funds a grantee devoted to financing and the grantee's overall success.

8.2. UPTAKE OF FINANCING

While most participants did not receive a loan, BBNP grantees overall appear to have achieved equal or higher uptake of loans for energy efficiency retrofits than previous whole home programs. For a majority of the grantees (15 of 29 grantees with project financing information included in DOE's Grantee Data Summary Report), fewer than 10% of their residential projects received loans, while a small group of grantees (4 of 29) reported that more than 80% of their projects received loans.[85]

Two evaluations grantees oversaw of their own programs found that, while financing was not important for most participants, there was a group of participants for whom it was very important. Findings from the survey of participants in BBNP-funded programs were consistent with these evaluations. Large majorities of both residential and commercial participants (73% and 86%, respectively) that used loans to pay for their upgrades gave high ratings to the role of the loan in their upgrade decisions. There was not a clear relationship between the proportion of retrofits receiving loans and grantees' success (Table 8-1). An analysis of program data reveals that the average residential upgrade cost $7,214, while the average residential loan was for $9,672, suggesting that financing was used more among customers conducting larger than average upgrades.

[85] These findings are based on figures reported in Grantee Data Summary Report documents, which DOE prepared for each prime grantee based on their reporting. These reports included data on the number of residential retrofits receiving loans for 29 grantees.

Table 8-1: Uptake of Program-Supported Financing by Grantee Success Grouping

PROPORTION OF PARTICIPANTS USING FINANCING	MOST SUCCESSFUL (N = 6)		AVERAGE (N = 19)		LEAST SUCCESSFUL (N = 4)	
	Count	Percent	Count	Percent	Count	Percent
Very few (1% to 10%)	2	33%	11	58%	2	50%
Some (11% to 50%)	3	50%	5	26%	1	25%
Most (>50%)	1	17%	3	16%	1	25%

Source: Prime grantee-level data listed in Grantee Data Summary Reports prepared by DOE.

Sixteen percent of all residential retrofit projects received loans. This rate is within the 10% to 20% range that program administrators participating in the State and Local Energy Efficiency Action Network (SEE Action) Residential Retrofit Working Group cited as typical for home energy upgrade programs that offer financing (SEE Action Residential Retrofit Working Group, 2011). Survey findings suggest that this 16% uptake is notably higher than the uptake of loans to finance energy efficiency upgrades in the absence of a program. The nonparticipant survey of homeowners who made energy upgrades outside of their local BBNP programs conducted for this evaluation found that only 7% used financing.

Although BBNP programs had an increased uptake of financing, demand for financing may not have reached a level likely to attract broad interest among financial institutions. Four financial partners reported that there was little demand for the product(s) they offered or said that demand was lower than they would have liked.[86] Two additional financial partners stated that a lack of demand for energy efficiency loans could prevent other financial institutions from offering loans for energy efficiency upgrades. The six financial partners that commented on demand for energy efficiency loans were evenly divided among credit unions, community development financial institutions, and banks.

8.3. INTEGRATION OF FINANCING INTO PROGRAM OFFERINGS

Two grantees noted that financing is most effective as a sales tool, convincing interested homeowners to move forward with energy upgrades. For example, one grantee said financing is "not designed to help build the market…but to facilitate the market." Another said, "Once [participants] are already convinced to move ahead with the upgrade, then they get excited about the loans."

These observations are consistent with industry reports that argue financing alone is unlikely to drive significant demand for energy efficiency retrofits. For example, the SEE Action Financing Solutions Working Group's *Roadmap for the Home Energy Upgrade Market* states, "The availability of attractive financing by a program, on its own…is not a silver bullet to increasing demand for home energy upgrades" (SEE Action Residential Retrofit Working

86 We interviewed financial institutions that had partnered with 20 grantees to offer energy efficiency financing products. These financial partners included 6 credit unions, 3 banks, 2 financial institutions focused specifically on energy efficiency lending, 3 CDFIs, and 6 staff members from government organizations that had supported efficiency lending. Appendix L Interview Methods, including Financing and Leveraging provides additional details.

Group, 2011). Instead, the SEE Action report and others argue that program administrators should use financing as an element of a larger program designed to drive demand and facilitate the participation process.

Grantees' experience offering energy efficiency loans supports this assessment. Financing addresses a relatively narrow range of barriers – primarily related to upfront costs – that might prevent home or business owners from completing energy upgrades. Three grantees suggested that other barriers, like the complexity of the retrofit process and skepticism of savings estimates, may be more significant for many participants. In addition, financing may not be an attractive option to participants that are reluctant to take on debt.

In coordinating their financing programs with their broader offerings, grantees described efforts to present their financing products to participants at the point of sale, when the participant was making the decision to move ahead with upgrades. To this end, grantees reported promoting financing to participants after they received audits and noted that it was important to engage with contractors about the financing offer. Grantees suggested that making financing easy for contractors to use and providing support to contractors offering financing can increase the uptake of loans.

8.4. ROLE OF FINANCING IN RETROFIT DECISIONS

Program-supported loans have the potential to support energy efficiency programs as a sales tool in one of two ways. First, by expanding access to financing through relaxed underwriting criteria, they may allow participants who would not otherwise have had access to the necessary capital to make upgrades. Second, by offering attractive interest rates, they may make energy upgrades more appealing to participants who would appreciate financing yet whose non-program financing options are less attractive. Interest rates reflect a financial institution's assessment of the risk of a loan product. Attractive interest rates can be justified for lower-risk loans, but expanded access increases the loan portfolio's risk exposure. While program monies can be used to both absorb the risk of loans (for example, through a loan loss reserve) and subsidize the interest rate to participants (through an interest rate buy-down), as discussed in Section 8.6, program administrators often must prioritize one of these objectives over the other.

In their discussions of financing during in-depth interviews, grantees most often focused on the potential for low interest financing to make energy upgrades more appealing. Grantee and financial institution contacts stated that low interest rates were necessary to generate participant interest in financing offers. As one financial partner noted, "the only way to get people interested in these [loans] is to get rates close to zero." BBNP operated during a period of low mortgage rates, and mortgage and equity loan rates are likely reference frames for consumers' upgrade decisions. In in-depth interviews, grantees reported offering interest rates for residential loans ranging from 0% to 7.5%, with half offering at least one loan product at 0% interest, and more than three-fourths offering at least one product at 4.5% interest or less.

A smaller group of grantees focused on expanding access to financing for energy efficiency upgrades. In particular, these grantees focused on middle-income populations, which they saw as particularly likely to benefit from energy efficiency financing. Grantees noted that it was less important to offer very low interest rates when targeting participants who did not have access to other financing options. According to one, "Some folks have home equity, but not our target market. We are a CDFI working with underserved communities. They don't have bankers, so they have the option of GE Financing at 14% or a credit card at 18% [to finance energy upgrades]. Our rates are competitive, about 7.5%. The bigger issue for our target market is access."

Most grantees used traditional financial metrics like participants' credit scores, income levels, and debt-to-income ratios to determine eligibility for financing. In order to reach participants that would not typically have access to attractive financing, grantees sought to set more inclusive qualification requirements based on traditional metrics and to establish alternative qualification criteria. In the grantee web survey, eight grantees reported using utility bill or mortgage payment history in addition to traditional metrics to qualify residential participants for financing.

8.5. RISK OF ENERGY EFFICIENCY LOANS

Financial institutions' assessment of the risk of energy efficiency loans influences both the attractiveness and the accessibility of the financial products available to program participants, as well as the need for programs to offer credit enhancements such as loan loss reserve funds. A recent evaluation report found that reduced likelihood of default should support a decision by lenders to offer lower interest rates, longer loan terms, or broader access to financing (Zimring, 2014b; Harcourt Brown & Carey, Inc., 2011).

Because of the cost savings associated with efficiency improvements, grantees suggested that loans for energy efficiency projects were likely to present lower risk of default than loans for other purposes. The initial performance of grantees' loan programs supports this assessment, with none of the nine grantees that cited specific default rates in their in-depth interviews citing a rate higher than 2.5% and six reporting no defaults at all. Over the BBNP grant period, the overall delinquency rate for consumer loans other than credit cards was 2.77% (FFIEC, 2014).[87] Financial partners confirmed grantees' assessment that the loans had performed as well or better than similar loan products in terms of defaults and late payments.

Despite the initial low default rates of their loan programs, three grantees reported that financial institutions typically did not recognize energy savings as a factor that would lower the risk of energy efficiency loans. Six grantees suggested that financial institutions' reluctance to value energy savings in their assessment of risk reflected a lack of available data on the default rates for efficiency loans. According to one grantee, this was "The biggest barrier in energy efficiency lending in general….Mortgage and consumer lending are highly defined markets that have well defined metrics."

8.6. USE OF PROGRAM FUNDS TO ENHANCE FINANCING PRODUCTS

Because of financial institutions' reluctance to assess the risk of energy efficiency loans differently from loans for other purposes, grantees used BBNP funding to make financing more attractive and more widely available to support energy upgrades. Table 8-2 summarizes the approaches grantees used to support financing.

87 Averages are for Q3 2010 through Q3 2013.

Table 8-2: Types of Financing Support Grantees Provided

TYPE OF FINANCING SUPPORT	SECTOR	NUMBER OF GRANTEES PROVIDING	TOTAL SPENDING
Loan Loss Reserve	Commercial (n = 19)	13	$36,704,152
	Residential (n = 30)	17	$30,154,770
	Multi-sector	3	$7,790,688
	Total (n = 36)	**27**	**$74,649,610**
Revolving Loan Fund	Commercial (n = 19)	13	$39,180,788
	Residential (n = 30)	16	$28,554,673
	Total (n = 36)	**22**	**$67,735,461**
Interest Rate Buy Down	**Total (n = 36)**	**15***	**$10,399,460**

* Reported data did not differentiate interest rate buy down spending by sector.

Loan loss reserve funds set aside an amount equal to a proportion of each loan made (frequently between 5% and 20%) to repay much of lender's losses if a loan defaults. Loan loss reserve funds were the strategy grantees most commonly used to influence financial markets (75% of grantees). A recent evaluation discussed how shifting a portion of the loan-default risk to the program, loan loss reserves may motivate lenders to offer financing on more attractive terms (Zimring et al., 2011; Zimring, 2014b). Many financial institution partners indicated that the loan loss reserve was important in their decision to offer loans for energy efficiency. In particular, financial partners noted that many energy efficiency loan products are unsecured. Loan loss reserves shift a portion of the risk of unsecured lending to the program rather than the financial institution. As one financial partner noted, "the loan loss reserve is critical for any kind of material yield on these loans, even with the few losses that we have."

Revolving loan funds are pools of capital program administrators use to fund loans directly, rather than seeking to motivate financial institutions to create special loan offerings using their own capital. Sixty-one percent of grantees used revolving loan funds, and they reported that a primary advantage is the flexibility inherent in grantee control to establish lending criteria complementary to the goals of the grantee's program. Some grantees turned to revolving loan funds after unsuccessful attempts to establish financing products that met their needs through other mechanisms.

Interest rate buy-downs are payments to compensate financial institutions for the reduced income they earn by offering loans at a lower interest rate. In order to increase the attractiveness of their financial products, fifteen grantees (42%) used interest rate buy-downs, often in tandem with loan loss reserves. Financial partners reported that buy-downs are an effective way to increase interest in financing, especially when used to reduce interest rates to zero or near zero. Unlike revolving loan funds, however, funds expended to buy down interest rates are not regenerated as loans are paid back, and financial partners reported that interest in upgrades waned when buy-down funds ran out and interest rates returned to normal.

Data from DOE's Grantee Data Summary Reports show no clear relationship between grantees' approach to supporting residential energy efficiency lending and their success at the end of the three-year grant period.

8.7. FINANCIAL PARTNERS

Despite the financial support grantees offered and the benefits to financial institutions grantees see in participation in energy efficiency lending programs, many grantees found it difficult to recruit financial institution partners. Two factors emerged as important in grantees' success in recruiting financial partners: preexisting relationships with financial institutions and the technical financing knowledge of the grantees' staff. The ability to draw on existing relationships allowed grantees with those relationships to ultimately work with, on average, a larger number of financial partners while having had to approach and court fewer financial institutions than grantees without preexisting relationships. Grantees reported that having staff members with a technical understanding of financing helped them, as one stated, "speak toe to toe with bank executives."

Grantees that faced challenges in recruiting a financial partner were less likely to be in the most successful group than those that did not face challenges. Only one of the 12 grantees that reported challenges in recruiting a financial partner in in-depth interviews was in the most successful group, while half of the six grantees that reported pre-existing relationships with a financial partner or received strong interest from new partners were among the most successful.

Interview findings indicate that partnerships with credit unions and financial institutions specifically focused on energy efficiency lending, like AFC First Financial and Energy Finance Solutions, were most effective. Grantees and financial partners stated that credit unions are more likely to be community- and mission-driven than other types of financial institutions. Thus, credit unions are more likely to value the non-financial benefits of energy efficiency lending, like helping the environment and supporting their local communities. Energy efficiency lending also may offer credit unions opportunities to provide new financial products, generate positive media exposure, and build relationships with new customers.

A slight majority of grantees worked with a single financial partner, but those that worked with multiple financial partners described a variety of benefits to doing so. These benefits included the ability to reach a wider market, as each financial partner may serve different geographic areas or customer segments; an increased likelihood that participants will be able to work with a financial institution with which they already have a relationship; and more competitive financial product offerings as financial institutions compete for customers.

Among the eight grantees in the most successful group that discussed financing in the interviews, six worked with multiple financial partners. Of course, working with multiple financial partners is no guarantee of program success; a majority of the grantees that worked with multiple financial partners were not in the most successful group, including one that was in the least successful group.

8.8. RAISING LOAN CAPITAL

One of the primary advantages financing components offer efficiency programs is the potential for financing programs to sustain themselves over time without an ongoing need for public funding. A recent evaluation reported that in addition to making new loans from the principal that borrowers repay, programs may raise capital for lending either by borrowing funds and re-lending them or by bundling existing loans to create securities for sale to secondary investors (Harcourt Brown and Carey, Inc., 2011). A study on energy efficiency financing discussed how sales of bundled loans to investors on secondary markets have the potential to increase a program's capacity to lend by providing an influx of new capital with which to fund additional loans (LBNL and Harcourt Brown & Carey, Inc., 2013).

While most grantees relied on grant funds or their financial partner's capital to make loans, eight grantees, including two in the most successful group, reported turning to investors to obtain capital for their financing products. These grantees most often (five of eight) sought to bundle loans to sell to investors on secondary markets, and four had successfully sold loan portfolios to secondary investors. Three grantees obtained capital that they then loaned to program participants from partners like banks, foundations, socially responsible investors, and faith-based groups.

Energy efficiency loans are a relatively new financial product and program administrators have not traditionally been active in financial markets. As a result, it can be challenging for securities backed by efficiency loans to obtain high enough ratings from financial ratings bureaus to make them attractive to investors. To overcome this challenge, the grantees that had sold loan portfolios to secondary investors most often (3 of 4) packaged their loans as municipal bonds, issued through an established government agency. One grantee sold its loan portfolio as a private transaction between the grantee's financial partner and another credit union.

In order to increase the appeal of energy efficiency loans, grantees offered program funds as credit enhancements to investors purchasing their loans on the secondary market. Four of the eight grantees that had turned to investors beyond their financial institution partners for capital reported offering a loan loss reserve to secondary investors to make their loan portfolios more attractive.

8.9. FREQUENCY FINDINGS

This section presents frequencies from the grantee web survey suggestive of characteristics that distinguish grantees in the most successful clusters from other grantees (presented in bold text).[88] We report here variables for which the pattern of results indicate a difference between the most successful grantees and average/least successful grantees (typically a difference of 15 or more percentage points), regardless of whether analyses reveal statistically significant differences between the groups. Footnotes denote any differences that are statistically significant. Because these results are from descriptive, bivariate analyses that do not control for the influence of other variables, they should be interpreted with caution. Also we present variables for which there is no apparent difference between grantees in the most successful cluster and grantees in the average/least successful clusters (not presented in bold text).

Grantees in the most successful cluster were *more likely* than other grantees to:

- **Offer financing** (100% of the most successful grantees compared with 84% of average/least successful grantees)
- **Have more organizations providing financing to participants** (an average of 2.3 institutions offering financing among the most successful grantees compared with an average of 1.5 institutions among average/least successful grantees)
- **Identify financing as one of three principal drivers of upgrade sales** (58% of the most successful grantees compared with 18% of average/least successful grantees

88 See Appendix B for additional findings from the grantee web survey.

There is *no difference* among grantee success clusters in:

- Average number of organizations with which they discussed financing (7 organizations on average)
- Whether they screened loan applicants for credit worthiness (66% of all grantees)

8.10. CONCLUSIONS

Financing was a principal component of BBNP's design. Our process evaluation and literature review findings suggest the approaches to offering upgrade financing. We reached the following conclusions:

Offering financing is associated with program success. All grantees in the most successful cluster offered financing, compared with five in six other grantees. More striking, grantees in the most successful cluster were significantly more likely than other grantees to identify financing as one of three principal drivers of upgrade sales. Our data do not reveal whether the grantee clusters differed in how they, their contractors, or their financial partners positioned or promoted the available financing.

Having a greater number of loan partners is associated with success. Grantees in the most successful cluster reported having more financial partners than other grantees. Well-designed financing components of upgrade programs attract financial partners for upgrade programs (both most successful and other). Grantees reported that having multiple financing institutions offering financing: 1) increased the likelihood that participants would be able to work with a financial institution with which they already worked; 2) encouraged financial institutions to offer more attractive products to compete for business; and 3) allowed for more populations or a larger geographical area to be served.

Given that most participants did not obtain loans, it is important for program administers to recognize that financial offerings do not guarantee program success; rather, all aspects of the program design contribute to success. At 16% of residential projects, uptake of grantees' loan offerings was consistent with the level of uptake typical of energy efficiency financing programs and exceeded the rate at which nonparticipants used financing to complete home improvements outside of grantee programs. While both grantees and industry literature suggested that the offer of financing alone does not drive demand for upgrades, the availability of financing can be very important in facilitating retrofits for some participants. Participants who received loans reported that their availability played an important role in the decision to make upgrades.

In most markets, program support remains necessary to make financing for energy efficiency available at terms more favorable than those offered for loans for other purposes. Financial institutions typically did not assess the risk of energy efficiency loans differently than similarly structured loans for other purposes. As a result, program support was necessary to make energy efficiency loans available either at more attractive interest rates or to a wider range of borrowers than other types of loans borrowers might use to complete upgrades. There was no clear relationship between a grantee's level of success and whether they primarily sought to offer financing on more attractive terms or primarily sought to expand access to loans to borrowers who would not otherwise qualify for a loan. Nor was there a clear association between success groupings and grantees seeking to raise loan capital from investors beyond their financial institution partners.

Proportion of grant funds devoted to financing is not associated with success. There was no clear relationship between grantees' overall program success and the proportion of grant funds devoted to financing, the proportion of a grantee's participants using loans, or a grantee's approach to supporting financing.

9. LOCAL BBNP PROGRAM SUSTAINABILITY

This chapter assesses grantee activity with respect to the following DOE goal for BBNP grantees: Develop sustainable energy efficiency upgrade programs.

The chapter draws on in-depth interviews with grantees, a web-based survey grantees completed about their program activities, and data that grantees reported to DOE on their program accomplishments. Appendix H provides a detailed presentation of the findings summarized in this chapter; Appendix B provides a detailed discussion of the grantee web-based survey method and findings.

9.1. SCOPE OF CONTINUING PROGRAMS

BBNP sought to support the development of sustainable energy efficiency upgrade programs. An analysis of grantees' Final Technical Reports and of in-depth interviews with program administrators revealed that of the 62 grantees and subgrantees, all but 10 (84%) planned to continue some program offerings after the grant period ended (Table 9-1). Thirteen grantees reported that their programs would continue relatively unchanged at the end of the BBNP grant period, and seven reported that they would be expanding their scope or geographic reach. The remaining 32 grantees reported some elements of the program offerings or infrastructure they developed during the BBNP grant period would continue. In some cases, grantees planned to continue programs under the same name but with a limited scope. In other cases, other local organizations planned to absorb and carry forward elements of a BBNP program. Grantees planning to offer some, but not all, of the program elements available during the BBNP grant period most often planned to continue offering financing products.

Table 9-1: Program Elements Continuing After BBNP, Among Grantees Reducing their Program Offerings (Multiple Responses Allowed, n = 62)

PROGRAM CONTINUATION STATUS	PROPORTION
Program not continuing	16%
Program continue relatively unchanged	21%
Program expanding	11%
Program elements continuing (multiple responses allowed below)	52%
…Financing	…34%
…Selected program(s)	…13%
…Materials (for example, educational resources for consumers)	….8%
…Marketing	….3%
…IT infrastructure	….2%
…Contractor base	….2%
…Rebates	….2%

In addition to financing being the most common continuing element of programs, most grantees indicated that financing products developed during the grant period would continue. Indeed, only one grantee reported that their financing offerings, an interest rate buy down, would end with the grant period, although four others anticipated that elements of their financing programs would phase out in the years immediately following the grant. Five grantees noted that their financing offerings would likely change in response to both the funding levels and availability of incentives after the grant period. Four other grantees anticipated that their financing offerings would generate enough revenue to support their ongoing administration.

Of the 20 financial partners interviewed, most (75%) reported that they would continue to offer financing for energy efficiency upgrades after the BBNP grant period ended. In some cases, financial institutions would continue to offer energy efficiency loan products that existed before BBNP or would be continuing the products developed with BBNP grantees. About half of the financial institutions (53%) were offering a product different from the one they offered with the grantee, however. Some were using BBNP loan products as a "blueprint" for new products developed with other partners, and others planned to combine and streamline existing loan products, including those developed with the BBNP grantee. For example, one financial partner planned to create a simplified loan product that had less restrictive qualification criteria than the loan product offered with the BBNP grantee.

9.2. FUNDING FOR CONTINUING PROGRAMS

Most grantees that planned to continue some or all of their program activities had access to the financial resources needed to do so. Relatively few reported that they would be able to fund their program through program-generated revenue, however. Twenty-seven program administrators stated during in-depth interviews that they would use post-grant funding sources to continue providing services without BBNP support, and they most often planned to turn to outside funding sources, like utility ratepayer energy efficiency funding, local governments, and other grants. Eight grantees reported plans for their programs to generate revenue on their own, but fewer than half (3 of 8) of those expressed certainty that the revenue they earned would be sufficient to support program activities (Table 9-2). In order to generate revenue to continue to fund their program offerings, grantees reported plans to charge contractors for leads generated by program marketing, to charge contractors fees for program-provided training, and to collect revenue from interest and fees associated with their programs' loans to participants.

Table 9-2: Funding Sources Supporting Post-BBNP Program Offerings (n = 27, multiple responses allowed)

FUNDING SOURCE	NUMBER OF GRANTEES
Utility/ratepayer	11
Program-generated revenue	8
Local government	6
Other grants	5
Other	6

Table 9-2, above, provides our quantitative findings for numbers of grantees using each source of ongoing program funding, to the extent we have definitive data by grantee. Table 9-3 provides a discussion of funding sources that grantees pursued in their efforts to continue program services; we identified these sources from in-depth interviews,

conference presentations and sessions, and peer exchange calls with grantees. As indicated by the right-hand column, one or more grantees had secured most of these sources by the end of the grant period. It is only for a few sources that no grantee had succeeded by the end of the grant period to secure funds. A number of grantees are continuing to creatively seek additional sources of program funding. (We report a status of "uncertain" to indicate the limits of our data.)

Table 9-3: Sources of Ongoing Program Funding Pursued by Grantees

FUNDING SOURCE	EXPLANATION	SECURED BY GRANTEES AT END OF GRANT FUNDING
Ratepayers in the jurisdiction served	Utilities and energy organizations funded by ratepayers; the most common funding source	Yes
Taxpayers in the jurisdiction served (grants and contracts)	BBNP was funded by federal taxpayers; some grantees pursued state and local tax support	Yes
Participating end users	Through a program participation fee (in addition to co-pays for products and services received)	Uncertain
Participating contractors	Through a finder's fee for promising leads or a program participation fee	Uncertain
Program administration profit margin	Program supported by profit from services other than the jurisdiction's program; for example, the whole home program administrator in State A provides for-profit third party program implementation in State B	Uncertain
Nonprofit foundation grants	Grantees applied to nonprofit foundations for grant funding for a set of activities for a limited period	Yes
Greenhouse gas emission pricing	States sell GHG emission allowances through auctions and invest the proceeds in consumer benefit programs	Yes
PACE-type financing	Lending by local government, repaid on tax bill with obligation tied to the property	Yes
Consulting profit margin	Program supported by profit from consulting services (exclusive of program administration); for example, consulting on PACE mechanisms and economic and workforce development	Yes
Loan administration profit margin	Program supported by profit from program loans; program lends money at rates higher than its cost of capital	Yes

9.3. CONCLUSIONS

From our process evaluation findings, we reach the following conclusions:

The majority of the BBNP-funded programs appear to be meeting DOE's objective of continuing past the grant period to provide services without additional DOE grant funding. About one-third of the grantees reported their programs will continue essentially unchanged or expanded in geographic scope or breadth of services; about half of the grantees reported one or more program elements – most commonly, financing – will continue beyond the grant period.

Grantees have explored, are using, and continue to explore a variety of non-DOE funding sources for their upgrade programs. Most commonly, programs are receiving ratepayer funding, most often by being incorporated into expanded utility (or energy agency) home upgrade offerings and sometimes remaining as a program implemented by the grantee as a third-party implementer to the utility or as a complement to the utility program.

Most of the grantees' financial partners (as suggested by our sample of 20) said they will continue to offer financing for energy efficiency upgrades after the BBNP grant period. About half of these financial institutions planned to continue the loan product they offered for BBNP participants, while a roughly equal proportion planned to modify the loan product in same way.

10. SUMMARY AND RECOMMENDATIONS

10.1. SUMMARY

This chapter presents the conclusions we draw from this study concerning its two broad research objectives:

- Assess the degree to which BBNP met its process-related goals and objectives.
- Identify the most effective approaches – including program design and implementation activities – to completing building energy upgrades that support the development of a robust retrofit industry in the U.S.

10.1.1. GOAL AND OBJECTIVE ATTAINMENT

By the end of the three-year evaluation period (Q4 2010 to Q3 2013) BBNP had met the three ARRA goals, as shown in Table 10-1. While the process evaluation investigated program outcomes related to all three goals, the numerical findings included in the table were generated by the impact evaluation, the details of which are presented in *Savings and Economic Impacts of the Better Buildings Neighborhood Program* (Final Evaluation Volume 2). The table presents, among other findings, our findings of net jobs, net economic activity, and net benefit-cost ratio. For the economic metrics, the term "net" signifies BBNP's contribution to these outcomes above and beyond the outcomes that would have occurred had the BBNP funding been spent according to historical non-defense federal spending patterns.

Table 10-1: Attainment of ARRA Goals, Q4 2010 - Q3 2013

GOALS	METRICS	RESULTS	ATTAINED?
Create new jobs and save existing ones	Number of jobs created and retained	The evaluation estimated 10,191 net jobs resulted from BBNP during the 3-year evaluation period.	Yes
Spur economic activity and invest in long-term growth	Dollars of economic activity; benefit-cost ratio	BBNP spending of $445.2 million in 3 years generated more than: • $1.3 billion in net economic activity (personal income, small business income, other proprietary income, intermediate purchases) • $129.4 million in net federal, state, and local tax revenues Estimated net benefit-cost ratio: 3.0.	Yes
Provide accountability and transparency in spending BBNP funds	Evidence of accountability and transparency	Grantees receiving ARRA funding submitted ARRA expenditure reports. Grant expenditure information was available to the public on *Recovery.gov*. BBNP DOE staff developed and maintained a program tracking database for periodic grantee reporting. Staff worked with grantees to increase the quantity and quality of reported data. Grantees had access to summary data. Evaluator-verified results will be publicly available.	Yes

By the end of the three-year evaluation period, BBNP met its two process-related BBNP-specific objectives (Table 10-2). The process findings indicate that BBNP met its objectives to spur energy efficiency upgrade activity,

achieve energy savings, and fund the development of programs that expect to continue providing services at the end of the grant period.

Table 10-2: Attainment of BBNP Objectives

OBJECTIVES	METRICS	RESULTS	ATTAINED?	
			3-Year Verified	4-Year Unverified*
Develop sustainable energy efficiency upgrade programs	Percent of programs planning to continue after funding Evidence of continuing effects on the retrofit industry	84% of grantees reported that their programs or elements thereof would continue after the 3-year evaluation period. The evaluation found evidence of early indications of market effects, including increased: • Activity in the energy efficiency upgrade market • Adoption of energy efficient building and business practices • Marketing of energy efficiency • Availability of financing Participating contractors reported: • Changing services to be more comprehensive to adapt to BBNP (60%) • Increasing their focus on energy efficiency (46%) • Changing their standard practices in non-BBNP upgrades (34%) • Observing positive impacts on their business and the local energy efficiency market from BBNP (~50%). The Better Buildings Residential Program Solution Center and Better Buildings Network continue to provide examples of replicable comprehensive approaches.	Yes	Yes
Upgrade more than 100,000 residential and commercial buildings to be more energy efficient	Number of upgrades	The evaluation estimated 93,876 net upgrades during the 3-year evaluation period. Grantees reported: • 99,071 upgrades for the 3-year evaluation period • 119,404 upgrades for the 4-year program period	No 94%	Yes
Reduce the cost of energy efficiency program delivery by 20% or more	Average program delivery cost per year ($/MMBtu)	Delivery cost for BBNP savings (program-wide $/MMBtu) fell each year of the 3-year program by 30% or more. Third-year program delivery cost was 58% lower than first-year cost.	Yes	Yes

The evaluation addressed financial leverage amounts only; it did not address other grantee-reported leveraged funds.

* Our evaluation did not verify fourth-year program achievements; however, these objectives were met by Q3 2013 and so we concluded they also were met by the end of Q3 2014.

Our evaluation also demonstrated that BBNP grantee programs met many of the aspirations described in the program's FOA. DOE solicited grantee applications for program approaches designed to:

- Deliver verified energy savings from a variety of projects in the local jurisdictions of the grantee, with a particular emphasis on energy efficiency improvements in existing residential, commercial, industrial, and public buildings.
- Conduct high-quality retrofits resulting in significant efficiency improvements to a large proportion of buildings within targeted neighborhoods, technology corridors or communities.
- Produce net economic benefits in excess of program cost.
- Achieve broader market participation and greater efficiency savings from building retrofits.
- Leverage the participation and support of multiple local jurisdictions, regional planning agencies, and state energy offices.
- Form new alliances (local government, financial institutions, contractor associations, community organizations, etc.).
- Serve as pilot building retrofit programs that demonstrate the benefits of gaining economies of scale and begin to identify the most promising marketing and financing approaches.
- Serve as examples of comprehensive community-scale energy efficiency approaches that could be replicated in other communities across the country even with less or no on-going government support.

Forty-one grantees and 24 subgrantees conducted building upgrades in 34 states and one territory among communities ranging from a subsection of a single city to an entire state. Grantees upgraded residential, low-income, multifamily, commercial, public, industrial, and agricultural buildings; 31 grantees upgraded buildings in multiple sectors.

Grantees were successful in forming alliances to support their programs with utilities and public benefits organizations, financial institutions, local governments, community-based organizations, and educational institutions. With the help of their financial institution partnerships, about 90% of grantees reported using BBNP funds as loan loss reserves, revolving loan funds, and/or interest rate buy-down approaches to increase the availability of financing. Sixteen percent of BBNP residential projects, 6% of multifamily building projects, and 5% of commercial projects received loans.

The most successful grantees conducted outreach that reached 33% of residential customers in single-family homes that had recently completed, or were anticipating completing, a home improvement project.

Half of the grantees were "starting from scratch," designing and implementing programs in areas where no related program or pilot had been offered. Even the roughly half of grantees whose programs built on prior programs and pilots nonetheless had to create BBNP-specific teams, processes, documents, tracking systems, and other program elements. The grantees collectively reduced their cost to acquire energy savings in each subsequent year, with year-three costs less than half of their year-one costs.

Over one-third of grantees stated that their most senior staff in each of the areas of program design, implementation, green building trades, and financial institution involvement had less than four years of experience – relative

newcomers to energy efficiency program administration. Thus, BBNP expanded the number of professionals with substantive energy efficiency professional experience.

This evaluation assesses BBNP performance over a three-year period. Were the funded local programs to continue for ten years, we would expect program achievements to be higher in later years than in the initial years as grantees modified their program design and activities in response to market experiences.

Regarding the influence BBNP had in changing energy markets to make energy efficiency and renewable energy the options of first choice, this market effects evaluation does not assess causality. We conclude here based on the preponderance of evidence that BBNP was one of many influences that has made a net positive contribution – a contribution above and beyond what would have happened in the absence of the BBNP program, even if that contribution is quite small – to transforming U.S. energy consumption markets, a transformation that is well underway according to respected national analysts. However, adequate time has not passed since the launch of the program to determine whether permanent changes have occurred in energy efficiency markets. Further, we do not rule out the competing hypothesis that some factor other than BBNP may have led to the evidence observed.

10.1.2. ADDITIONAL KEY FINDINGS

Evidence of Program Sustainability

We found the following early indicators of program sustainability:

- Grantee programs, or program elements, would continue past the grant period.
- Financing for energy efficiency upgrades would continue to be offered past the grant period.

The majority of the BBNP-funded grantee programs met DOE's sustainability objective of continuing past the grant period to provide services without additional DOE grant funding; 84% of grantees reported that their programs or elements thereof would continue after the grant period ended. The most common source of support was ratepayer funding received by integrating with utility or energy agency home upgrade programs. About one-third of the grantees reported their programs would continue in an expanded form or essentially unchanged, while about half of the grantees reported one or more program elements – most commonly, financing – would continue beyond the grant period.

Of the 20 financial partners interviewed, most (75%) reported that they would continue to offer financing for energy efficiency upgrades after the BBNP grant period ended.

We examined grantee cost of saved energy ($/MMBtu) over time and found program costs decreased in each subsequent year. Delivery cost for BBNP savings (program-wide $/MMBtu) fell each year of the 3-year program by 30% or more. The third-year program delivery cost was 58% lower than the first-year cost.

Effective DOE Support Activities

The grantees found the account managers provided to them by DOE to be a valuable asset in helping program managers understand and satisfy grant requirements. Grantees also reported conferences and peer-to-peer learning opportunities as helpful because they could form beneficial relationships, learn from experts and each other, and troubleshoot common problems. Responding to the ARRA goal of transparency in the use of funds, account

managers helped grantees meet requirements to submit ARRA expenditure reports to *Federalreporting.gov* so that BBNP expenditures could be made available to the public via *Recovery.gov*.

Grantee Program Context

Grantees varied widely in terms of the contracting entity, its partnerships, the roles of these multiple entities, and the communities they served. All grantees formed alliances to support their programs, including with utilities and public benefits organizations (at least 43 grantees and subgrantees), financial institutions (46), local government (33), community-based organizations (CBOs; 26), and educational institutions (11). Each grantee's market conditions, program context, and partnerships were unique and no set of market conditions emerged as determinants of grantee success.

Bivariate analyses revealed two grantee-related factors associated with success: (1) Program with teams that had at least one highly experienced team member (15 or more years' experience) performed better than programs that did not, and (2) BBNP programs administered by local government staff did not perform as well as programs administered by other organizations.

For most grantees, launching and ramping up their program to optimal operations took a substantial portion of the grant period (on average, 9 months until launch, and an additional 14 months until optimal operations). We defined program success based on grantee achievements, and programs that accomplished more during the grant period typically mobilized – attained optimal operations – faster than programs accomplishing less (18 months compared to 24 months). Bivariate analyses indicate that ramp-up time varied significantly as a function of program success, but this relationship lacked significance in the multivariate analyses. Our analyses did not identify factors explaining ramp-up time; ramp-up time was not affected by whether a grantee's program built upon another pilot or program.

Effective Designs for Audit and Upgrade Offerings

Multivariate analyses found that programs that offered multiple audit types (for example, on-line, walk-through, and audits that use diagnostic equipment) were more successful than those that did not, and that installing measures during the audit was associated with program success. The other audit-related factors explored in our multivariate analysis did not appear to be associated with success.

Bivariate analyses found that more successful programs were less likely to require participants to meet a savings target and instead allowed them to install a minimum number of measures or pursue comprehensive audit recommendations. More successful programs were also more likely than the less successful programs to allow participants to do more than one project (equivalently, to stage their upgrade activities). Grantees noted that staging projects was especially important for the commercial sector, where project costs were high and upgrade activities often required multiple phases to complete, although a number of grantees also thought that residential programs benefited from this approach.

Bivariate analyses also found that offering upgrade incentives (and relatively lower incentives – on the order of 25% of project costs) and conducting effective quality assurance (QA) and quality control (QC) were associated with program success.

On the whole, BBNP grantees appear to have provided high quality upgrades to their participants; residential participants rated the value of the upgrade significantly higher than did nonparticipating homeowners who had recently conducted an upgrade that included efficiency features.

Marketing and Outreach to Drive Demand for Upgrade Services

Engaging credible messengers – such as respected local governmental personnel, homeowner association presidents, or CBO – in program promotion influenced individuals in those messengers' social networks to undertake upgrades. Community-based outreach activities, mailing letters to homes and businesses, and using messaging that emphasized comfort were likely to drive participation. Canvassing was rarely an effective approach. Bivariate analyses revealed that programs had greater success when they identified specific target populations within their larger target area, and when they tailored their outreach efforts to the size of the target populations. However, limiting participation to restricted geographic areas was not an effective approach. Most grantees' that initially engaged in such geographic targeting efforts did not generate expected levels of uptake or reduce the prices of energy upgrade measures through economies of scale, except in cases where latent demand was geographically concentrated.

Multivariate analyses indicated that successful programs sought to increase contractors' sales effectiveness by offering sales training, leveraging the upgrade contractor's pivotal role in the upgrade sale. Finally, the study suggests that program administrators wanting to use a marketing contractor should look for firms with energy efficiency experience; among BBNP grantees, those using a marketing contractor appeared to have no greater success than those that did not.

Working with Contractors to Stimulate the Supply of Upgrade Services

The more successful programs had relatively larger pools of eligible upgrade contractors than did less successful programs, as determined by multivariate analyses. Successful programs identified, fostered relationships with, and offered multiple types of training to large pools of contractors. Conversely, less successful programs had smaller contractor pools, offered little training, and had relatively infrequent communication with contractors. Multivariate analyses found offering contractor training was a significant predictor of program success. Bivariate analyses also revealed that successful programs were more likely than other programs to provide lists of pre-approved contractors, thereby fostering participant trust in contractors, and to allow participants to contract directly with the service provider, thereby affording flexibility. Providing financing or equipment to contractors did not appear to significantly enhance contractor participation and program outcomes.

Quality assurance and quality control mechanisms also contributed to improved quality of upgrades.

The Role of Financing in Grantee Programs

Offering financing was associated with grantee success. These grantees employed one or more mechanisms to increase the availability and attractiveness of loans for upgrades, including: loan loss reserves ($74.6M, 27 grantees), revolving loan funds ($67.7M, 22 grantees), and interest rate buy-down approaches ($10.5M, 15 grantees). Collectively, grantees allocated about 20% of total BBNP award funding to financing.

BBNP participants received a total of $154 million in program loans; 16% of BBNP residential projects, 6% of multifamily building projects, and 5% of commercial projects received loans. About three-quarters of interviewed financial partners reported a BBNP-generated demand for energy efficiency upgrade loans.

Many of the BBNP participants that received loans reported the availability of the loan was important in their decision-making to pursue an upgrade. Consequently, it appears that although loans may appeal to a minority of participants and do not guarantee program success, attractive, program-supported financing increased uptake of energy upgrades. Well-designed financing program components attracted financial partners for upgrade programs.

Partnering with greater numbers of financial partners was associated with program success in the bivariate analyses, apparently because participants were able to work with financial institutions they already had relationships with, financial institutions competed for business, and financial institutions covered different populations and/or serve different areas

10.2. RECOMMENDATIONS

We offer the following recommendations to DOE regarding opportunities to capitalize on the lessons learned from BBNP over the ARRA period:

- **Assess the longer-term outcomes of BBNP.** The three-year grant period was too short for grantees to create local or state markets where energy upgrades occur in the absence of ratepayer or taxpayer subsidies. Further, our process evaluation assessed early success, which may or may not be associated with long-term success. Given these limitations, we recommend that DOE take steps to assess the longer-term impacts of BBNP. This would require tracking the activities of programs developed as part of BBNP and evaluating their progress at points that allow for an assessment of whether BBNP achieved its intermediate and long-term goals.
- **Use BBNP as a model for providing support to other DOE grantees.** Grantee staff generally provided positive feedback on all of DOE's BBNP support activities, especially the assigned Account Manager and the grantee conferences. Given the success of these activities, we recommend that DOE and other program funders model their grantee support activities on those conducted by BBNP when developing similar programs in the future.
- **Capitalize on the infrastructure created during BBNP.** A great deal of infrastructure was created during BBNP, including the Better Buildings Residential Program Solution Center, the Better Buildings Residential Network, and data tracking and reporting tools. We recommend that DOE continue to refine and make use of this infrastructure in its efforts to support building upgrade programs, policies, and investment, as well as building upgrade activity conducted by owners and the retrofit industry.
- **Find creative ways to continue support.** While we have found early indications that BBNP may have helped lead to market effects, the indicators are not proof that the market has changed or that whatever change BBNP has initiated will persist past the funding cycle. Sustained market effects for such an innovative practice (whole home or whole building upgrades) in such a short time frame (grants lasting three years in duration) are difficult to achieve. As a result, we recommend that DOE consider providing support (technical or financial) to highly successful grantees that are continuing to offer their programs. Additional support could help realize BBNP's objective of sustained market effects in the grantee regions.

We offer the following recommendations to upgrade program administrators:

- **Consider our conclusions identifying effective upgrade program approaches.** This process evaluation report identifies success-related findings statistically associated with program characteristics generally, audits, upgrades, driving demand for upgrade services, stimulating supply of upgrade services, financing, and ongoing program funding. Because this study is unique in its scope of conducting in-depth comparative assessments of over 40 programs, we encourage program administers to consider the extent that application of our study findings might benefit their programs. While we hope our statistical findings will be

useful to program administrators, also we concluded that there is no single approach, no single program feature that is a "must have," nor any that are "avoid at all costs."

- **Develop a program tailored to the unique characteristics of the locale.** It is important for program administers to: understand the experiences of the local contractor population and provide appropriate trainings; tailor messages for subpopulations likely to undergo upgrades; provide multiple participation options; and partner with well-resourced local organizations.
- **Offer a variety of contractor training.** Training content should address program, technical and business needs – especially sales training. Look for opportunities to combine training with other program needs – such as quality control activities and obtaining feedback from contractors on program design and implementation – to build mutual communication, understanding, and respect from home upgrade professionals.
- **Recognize that programs take months to design, implement, and ramp-up to period of optimal performance.** Program goals should anticipate an initial period with little to no goal attainment.

REFERENCES

LITERATURE CITED

Amann, J., & Lowenberger, A. (2010). Enhancing the Effectiveness of Home Energy Audits. Presented at the AESP National Conference, Tucson, AZ: Association of Energy Services Professionals.

Arizona State University Global Institute of Sustainability. (2014). *Energize Phoenix, Energy Efficiency on an Urban Scale, Year Three Report: Results*. City of Phoenix.

Baltimore Research and Pinnacle Communications. (2013). Analysis Report on STEP Participants' and Nonparticipants' Survey. Prepared for University Park, MD.

Barbose, G., Goldman, C., Hoffman, I., and Billingsley, M. (2013). *The Future of Utility Customer-Funded Energy Efficiency Programs in the United States: Projected Spending and Savings to 2025.* Berkeley, CA: Lawrence Berkeley National Laboratory. LBNL-5803E. *http://emp.lbl.gov/sites/all/files/lbnl-5803e.pdf*.

Barger, N. (2012). Ensuring Quality Work When the Work Is Hard to See: The Importance of Quality Assurance/Quality Control Protocols in Energy Efficiency Programs (pp. 2–23 – 2–35). Presented at the ACEEE Summer Study on Energy Efficiency in Buildings, Pacific Grove, CA: American Council for an Energy Efficient Economy.

Bell, C., Ferrante, A., & Hewitt, V. (2014). *Engaging Small to Mid-Size Lenders in the Market for Energy Efficiency Investment: Lessons Learned from the ACEEE Small Lender Energy Efficiency Convening (SLEEC)* (No. F1401). Washington DC: American Council for an Energy Efficient Economy.

Billingsley, M., Hoffman, I., Stuart, E., Schiller, S., Goldman, C., and LaCommare, K. (2014). *The Program Administrator Cost of Saved Energy for Utility Customer-Funded Energy Efficiency Programs*. Berkeley, CA: Lawrence Berkeley National Laboratory. LBNL-6595E. *http://emp.lbl.gov/sites/all/files/lbnl-6595e.pdf*.

Brook, M., Collopy, C., Eden, D., Ferris, T., Graillat, C., Lam, H., & Wu, J. (2012). *Comprehensive Energy Efficiency Program for Existing Buildings Scoping Report* (No. CEC-400-2012-015). Sacramento, CA: California Energy Commission, Efficiency and Renewable Energy Division.

The Cadmus Group, Inc. (2014). *Multi-State Residential Retrofit Project: Process Evaluation.* Prepared for National Association of State Energy Officials in Washington DC.

Cluett, R., & Amann, J. (2014). *Residential Deep Energy Retrofits* (No. A1401). Washington DC: American Council for an Energy Efficient Economy.

De La Chapa, C., & Case, S. (2012). *New Marketing and Engagement Strategies for Residential Efficiency Programs*. Presented at the ACEEE Summer Study on Energy Efficiency in Buildings, Pacific Grove, CA: American Council for an Energy Efficient Economy.

DeVries, C. (2014). *WHEEL: Transforming Energy Efficiency Financing*. Presented at the Energy Efficiency Financing Programs 201: Credit Enhancement Strategies.

DOE (U.S. Department of Energy). (2009). *Financial Assistance Funding Opportunity Announcement* (No. DE-FOA-0000148). Retrieved from U.S. Department of Energy website: *http://energy.gov/sites/prod/files/edg/media/DE-FOA-0000112.pdf*

DOE (U.S. Department of Energy). (2012). *Better Buildings Neighborhood Program Business Models Guide*. Washington DC.

DOE (U.S. Department of Energy). (2014). *Better Buildings Neighborhood Program Summary of Reported Data from July 1, 2010 – September 30, 2013*. Washington DC: U.S. Department of Energy. Retrieved April 28, 2015 from http://www.energy.gov/sites/prod/files/2014/09/f18/bbnp_summary_reported_data_9-15-2014.pdf

Energy Market Innovations, Inc. (2012). *California HVAC Contractor & Technician Behavior Study*. Submitted to Southern California Edison. Retrieved May 15, 2015 from http://www.calmac.org/publications/ca_hvac_behavior_study_finalreport_2012sept14_final.pdf

Eto, J., Prahl, R., & Schlegel, J. (1996). *A Scoping Study on Energy Efficiency Market Transformation by California Utility DSM Programs*. Berkeley, CA: Lawrence Berkeley National Laboratory.

FFIEC (Federal Financial Institutions Examination Council). (2014). Charge-off and Delinquency Rates on Loans and Leases at Commercial Banks. Board of Governors of the Federal Reserve System. Retrieved from http://www.federalreserve.gov/releases/chargeoff/delallsa.htm#fn1

Fuller, M., Kunkel, C., Zimring, M., Hoffman, I., Soroye, L., & Goldman, C. (2010). *Driving Demand for Home Energy Improvements: Motivating Residential Customers to Invest in Comprehensive Upgrades that Eliminate Energy Waste, Avoid High Bills, and Spur the Economy* (No. LBNL-3960E). Berkeley, CA: Environmental Energy Technologies Division, Lawrence Berkeley National Laboratory.

GDS Associates, Inc. (2012). *Evaluation of Austin Energy's Home Performance with ENERGY STAR (HPwES) Program*. Austin Energy.

GDS Associates, Inc., & Research Into Action, Inc. (2013). *Vermont Single-Family Retrofit Market Process Evaluation*. Retrieved from http://publicservice.vermont.gov/sites/psd/files/Topics/Energy_Efficiency/EVT_Performance_Eval/EVT_VGS ProcessEvaluationFinalReport2013.pdf

Gonzales, M. H., Aronson, E., & Costanzo, M. A. (1988). *Using Social Cognition and Persuasion to Promote Energy Conservation: A Quasi-Experiment*. Journal of Applied Social Psychology. 18 (12): pp. 1049-1066.

Griffin, A. (2014). *New York Green Bank: Overview & Strategy Discussion*. Presented at the ACEEE Energy Efficiency Finance Forum, Washington DC.

Harcourt Brown & Carey, Inc. (2011). *Energy Efficiency Financing in California: Needs and Gaps*. California Public Utilities Commission, Energy Division.

Ingle, A., Moezzi, M., Lutzenhiser, L., & Diamond, R. (2012). How Well Do Home Energy Audits Serve the Homeowner? Presented at the ACEEE Summer Study on Energy Efficiency in Buildings, Pacific Grove, CA: American Council for an Energy Efficient Economy.

Johnson Consulting Group. (2012). *Key Findings and Recommendations from the Process Evaluation of Clean Energy Works Oregon*. Prepared for Energy Trust of Oregon.

KEMA, Inc. (2014). *Final Report: Baseline Characterization Market Effects Study of Investor-Owned Utility Whole House Retrofit Programs in California.* Prepared for the California Public Utilities Commission. Study ID CPU0073.01.

Kok, N., & Kahn, M. (2012). *The Value of Green Labels in the California Housing Market: An Economic Analysis of the Impact of Green labeling on the Sales Price of a Home*. San Francisco, CA: San Francisco Department of the Environment and StopWaste.Org.

LBNL (Lawrence Berkeley National Laboratory), & Harcourt Brown & Carey, Inc. (2013). *Using Financing to Scale Up Energy Efficiency: Work Plan Recommendations for the SEE Action Financing Solutions Working Group*. State and Local Energy Efficiency Action Network.

LeBaron, R., & Saul-Rinaldi, K. (2013). *Bringing on the Boom and Beating the Bust: A Framework for Developing a Roadmap to a Successful Home Performance Industry*. Washington DC: National Home Performance Council.

McEwen, B. (2012). *Community Based Outreach Strategies in Residential Energy Upgrade Programs*. Cambridge, MA: Massachusetts Institute of Technology.

Megdal, L., Peters, J., Feldman, S., Maggiore, A., Stoffs, B., Jones-Patton, J., Was, L. (1999). *A Guide to Community-Based Energy Programs*. Madison, WI: Energy Center of Wisconsin.

Monroe, E, & Budd, C. (2010). *When an Energy Efficiency Program Grows by Leaps and Bounds*. Presented at the ACEEE Summer Study on Energy Efficiency in Buildings, Pacific Grove, CA: American Council for an Energy Efficient Economy.

Nadel, S., Thorne, J., Sachs, H., Prindle, B., and Elliott, R.N. (2003). Market Transformation: Substantial Progress from a Decade of Work. Washington, D.C.: American Council for an Energy-Efficient Economy.

National Renewable Energy Laboratory (NREL). (2011). Assessing and Improving the Accuracy of Energy Analysis for Residential Buildings. Report prepared for DOE's Building America Building Technologies Program. Available electronically at *http://www.osti.gov/bridge*.

Newport Partners, LLC. (2012). *Motivating Home Energy Improvements: Focus Groups for the U.S. Department of Energy*. Washington DC: U.S. Department of Energy.

NMR Group, Inc. (2012). *Process Evaluation and Market Characterization and Assessment: Green Jobs - Green New York Residential Program* (No. 9835). New York: The New York State Energy Research and Development Authority.

Opinion Dynamics Corporation. (2014). *PG&E Whole House Program: Marketing and Targeting Analysis* (No. PGE0302.05). Oakland, CA: Pacific Gas and Electric Company.

Peters, J., & McRae, M. (2007). *Lessons Learned After 30 Years of Process Evaluation*. Sacramento, CA: Behavior, Energy & Climate Change Conference.

Pitkin, J. (2014). *Residential Energy Efficiency Financing Revenue Bonds*. Presented at the ACEEE Energy Efficiency Finance Forum, Washington DC.

Research Into Action, Inc. (2010). *Lighting Program Assessment Part 2: Trade Ally Network*. Portland, OR: Prepared for the Bonneville Power Administration.

Research Into Action, Inc., Evergreen Economics, Nexant, Inc., and NMR Group, Inc. (2013). *Preliminary Energy Savings Impact Evaluation: Better Buildings Neighborhood Program*. Retrieved from U.S. Department of Energy website: http://www1.eere.energy.gov/analysis/pdfs/energy_savings_impact_bbnp_110413.pdf

Research Into Action, Inc. and NMR Group, Inc. (2012a). *Preliminary Process and Market Evaluation: Better Buildings Neighborhood Program - Final Report*. Retrieved from U.S. Department of Energy website: http://www1.eere.energy.gov/analysis/pdfs/bbnp_preliminary_process_market_eval_report_011513.pdf

Research Into Action, Inc. and NMR Group, Inc. (2012b). *Preliminary Process and Market Evaluation: Better Buildings Neighborhood Program - Final Report Appendices*. Retrieved from U.S. Department of Energy website: http://www1.eere.energy.gov/analysis/pdfs/bbnp_preliminary_process_market_eval_report_appendices_011513.pdf

Sanstad, A., Diamond, R., Sanquist, T., & Lutzenhiser, L. (2010). *U.S. Single-Family Homeowners' Decision-Making regarding Energy Retrofits: A Literature Review*. Washington D.C.: U.S. Department of Energy.

Schub, J. (2014). *Role of Green Banks and Energy Efficiency Financing*. Presented at the ACEEE Energy Efficiency Finance Forum, Washington DC.

Schueler, V. (2014). Organizational Ecology: Seeing the Forest and the Trees in Community-Based Energy Efficiency Programs: An Initial Exploration. Presented at the Behavior, Energy & Climate Change Conference, Washington DC: American Council for an Energy Efficient Economy.

SEE Action (State and Local Energy Efficiency Action Network) Financing Solutions Working Group. (2014). *Energy Efficiency Financing Program Implementation Primer* (No. DOE/EE-1020). Washington DC: U.S. Department of Energy.

SEE Action (State and Local Energy Efficiency Action Network) Residential Retrofit Working Group. (2011). *Roadmap for the Home Energy Upgrade Market*. Washington DC: U.S. Department of Energy.

Stiles, G., Matthews, L., & Spring, R. (2009). *Conception, Care and Feeding of a Lighting Trade Ally Network in Oregon.* Portland, OR: Energy Trust of Oregon.

Summit Blue Consulting. (2009). *New York Home Performance with ENERGY STAR Program Market Characterization and Market Assessment Evaluation*.

Thompson, P., Borgeson, M., Zimring, M., Goldman, C., & Kramer, C. (2014). *Selling an Energy Efficiency Loan Portfolio in Oregon: Resale of the Craft3 Loan Portfolio to Self-Help Credit Union*. Berkeley, CA: Lawrence Berkeley National Laboratory Environmental Energy Technologies Division.

University of Cincinnati (2006). *The New Energy Crisis: Power Industry in for a Jolt as About Half of Workforce Readies for Retirement.* August 7, 2006. *http://www.uc.edu/news/nr.aspx?id=4226*. Accessed May 16, 2015.

Van de Grift, S., & Schauer, L. (2010). A Hand to Hold: A Holistic Approach to Addressing Barriers in the Home Retrofit Market. Presented at the ACEEE Summer Study on Energy Efficiency in Buildings, Pacific Grove, CA: American Council for an Energy Efficient Economy.

Vermont Energy Investment Corporation. (2014). *Guide for Benchmarking Residential Energy Efficiency Program Progress*. Retrieved April 28, 2015 from *http://energy.gov/sites/prod/files/2014/11/f19/bbr_program_benchmarking_guide_draft_nov2014_0.pdf*

Von Schrader, C., Hoffmeyer, D., Plympton, P., Thomas, E., & Johnson, K. (2008). *Best Practices and Lessons Learned from EPA/DOE's Home Performance with ENERGY STAR Program* (pp. 2–370–2–374). Presented at the ACEEE Summer Study on Energy Efficiency in Buildings, Pacific Grove, CA: American Council for an Energy Efficient Economy.

Wigington, L. (2010). Staged Approaches for Deep Energy Reductions in Existing Homes (pp. 2–339 – 2–354). Presented at the ACEEE Summer Study on Energy Efficiency in Buildings, Pacific Grove, CA: American Council for an Energy Efficient Economy.

Zimring, M. (2014a). *Energy Efficiency Financing Programs 101*. Presented at the Financing Solutions for Energy Efficiency: From Policy to Practice.

Zimring, M. (2014b). *Energy Efficiency Financing Programs 201: Credit Enhancements*. Presented at the Energy Efficiency Financing Programs 201: Credit Enhancement Strategies.

Zimring, M., & Hoffman, I. (2010). *HUD PowerSaver Pilot Loan Program*. Berkeley, CA: Lawrence Berkeley National Laboratory: Environmental Energy Technologies Division.

Zimring, M., Goggio Borgeson, M., Hoffman, I., Goldman, C., Stuart, E., Todd, A., & Billingsley, M. (2011). *Delivering Energy Efficiency to Middle Income Single Family Households* (No. LBNL-5244E). Berkeley, CA: Environmental Energy Technologies Division, Lawrence Berkeley National Laboratory.

Zimring, M., Borgeson, M., Todd, A., & Goldman, C. (2013). *Getting the Biggest Bang for the Buck: Exploring the Rationales and Design Options for Energy Efficiency Financing Programs*. Berkeley, CA: U.S. Department of Energy.

Zimring, M., Leventis, Goggio Borgeson, M., Thompson, P., Hoffman, I., & Goldman, C. (2014). *Financing Energy Improvements on Utility Bills: Market Updates and Key Program Design Considerations for Policymakers and Administrators* (No. DOE/EE-1100). Berkeley, CA: State and Local Energy Efficiency Action Network.

OTHER SOURCES REVIEWED

Alliance to Save Energy. (2013a). The Evaluation, Measurement, & Verification Challenge. Retrieved from https://www.ase.org/resources/evaluation-measurement-verification-challenge

Alliance to Save Energy. (2013b). DOE Publishes Methods For Estimating Energy Efficiency Savings. Retrieved from https://www.ase.org/resources/doe-publishes-methods-estimating-energy-efficiency-savings

Alternative Energy Systems Consulting, Inc. (2013). *Performance Evaluation: Electric Energy and Demand Savings for Sacramento Neighborhood Performance Program*. Sacramento, CA: Sacramento Municipal Utility District (SMUD).

Brautigam, J., Bailey, H., & Driskell, D., et al. (2014). *Memorandum: Boulder's Energy Future Study Session* (pp. 54–161). Boulder, CO: Members of City Council.

Bushman, K., Stewart, J., Keeling, J., Sengupta, S., & Mulholland, C. (2012). *Evaluation of NWWVT's H.E.A.T. Squad* (Final Report). West Rutland, VT: NeighborWorks of Western Vermont, by The Cadmus Group.

Cadmus Energy Services Division, & Carol Mulholland et al. (2013). *SEEA Better Buildings Neighborhood Program: Interim Report* (Interim No. 1 of 3). Atlanta, GA: Southeast Energy Efficiency Alliance.

Cadmus Energy Services Division, & Laura James et al. (2013). *Better Buildings Neighborhood Program Southeast Consortium Process Evaluation Phase 2* (Process Evaluation Phase 2 No. 2 of 3). Atlanta, GA: Southeast Energy Efficiency Alliance.

Cadmus Energy Services Division, & Eric Rambo, H. Farah, N. Bodington, C. Mulholland. (2013). *Better Buildings Neighborhood Program: Southeast Consortium Impact Evaluation* (Final Impact No. 3 of 3). Atlanta, GA: Southeast Energy Efficiency Alliance.

Cadmus Energy Services Division, & Linda Dethman et al. (2014). *Multi-State Residential Retrofit Project: Process Evaluation Final*. Arlington, VA: National Association of State Energy Officials (NASEO).

Cadmus Energy Services Division, & Research Into Action, Inc. (2013a). *Process Evaluation for the Sacramento Municipal Utility District Whole Neighborhood Approach Pilot*. Los Angeles County: Bevilacqua Knight, Inc.

Cadmus Energy Services Division, & Research Into Action, Inc. (2013b). *Retrofit California Process Evaluation: Final Report*. Los Angeles County, Office of Sustainability: Bevilacqua-Knight, Inc.

Cadmus Energy Services Division, & Tyler Browne et al. (2013). *Michigan Saves Business Energy Financing Final Evaluation Report* (Submitted to Terri Schroeder, Michigan Saves Operations Manager). Lansing, MI: Michigan Saves.

Dalrymple, M., Melnick, R., & Bryck, D. (2011). *Energy Efficiency on an Urban Scale - Year One Report: From the Ground Up*. Phoenix, AZ: Arizona State University Global Institute of Sustainability.

Dalrymple, M., Melnick, R., & Bryck, D. (2012). *Energize Phoenix, Energy Efficiency on an Urban Scale - Year Two Report: Preliminary Findings*. Phoenix, AZ: Arizona State University Global Institute of Sustainability.

Dalrymple, M., Melnick, R., & Schwartz, M. (2014). *Energize Phoenix, Energy Efficiency on an Urban Scale - Year Three Report: Results*. Phoenix, AZ: Arizona State University Global Institute of Sustainability.

Donnelly, K. A., (2013, June). *Empowering Consumers to Reduce Residential Energy Waste: Designing, Implementing, and Evaluating the Connecticut Neighbor to Neighbor Energy Challenge* (Ph.D. Dissertation Submission: Engineering Systems Division). Massachusetts Institute of Technology, Cambridge, MA.

The Edison Foundation Institute for Electric Innovation. (2014). *Summary of Electric Utility Customer-Funded Energy Efficiency Savings, Expenditures, and Budgets* (Issue Brief). Retrieved from The Edison Foundation Institute for Electric Innovation website: *http://www.edisonfoundation.net/iei/Documents/InstElectricInnovation_USEESummary_2014.pdf*

Hembroff, L., Ehrlich, N., & Hardy, J. (2014). *Sweep, Neighborhood and Demographic Characteristics Associated with Program Participation* (No. 3 of 3). East Lansing, MI: Michigan State University I.P.P. & S.R. - Office for Survey Research.

Henn, J., Baltimore Research, & Pinnacle Communications. (2013c). *Report on STEP Participants' Survey* (No. 1 of 3). Town of University Park, MD: Small Town Energy Program.

Henn, J., Baltimore Research, & Pinnacle Communications. (2013b). *Report on STEP Non-Participant Survey* (No. 2 of 3). Town of University Park, MD: Small Town Energy Program.

Henn, J., Baltimore Research, & Pinnacle Communications. (2013a). *Analysis Report on STEP Participants' and Non-Participants' Surveys: Executive Summary of Findings* (No. 3 of 3). Town of University Park, MD: Small Town Energy Program.

iSpring. (2014). *EnergyWorks Residential Program Evaluation* (Final Report). Mayor's Office of Sustainability, City of Philadelphia: Mayor's Office of Sustainability, City of Philadelphia.

Johnson, K., & Johnson Consulting Group. (2012). *Key Findings and Recommendations from the Process Evaluation of Clean Energy Works Oregon* (Draft Final, includes 2 appendices). Portland, OR: Energy Trust of Oregon.

Johnston, E., Garcia, F., & Vickery, D. (2013). *Economic Impacts of Green Jobs Green New York (GJGNY) Program*. Albany, NY: ICF International, Inc. for NYSERDA.

LBNL (Lawrence Berkeley National Laboratory). (2011). *Request for Proposal* (RFP No. DY-2011-06). Retrieved from Lawrence Berkeley National Laboratory website: https://bbnp.pnnl.gov/sites/default/files/program-materials/c-692_LBNL_BBNP_Eval_RFP.pdf

Magnusson, M., Wake, C., & Johnson, C. (2013). *An Evaluation of the New Hampshire Better Buildings Program*. Concord, NH Office of Energy and Planning (OEP): Seacoast Economics and OEP.

Navigant Consulting, Jennifer Hampton, Jane Hummer, & Nicole Wobus. (2012). *EnergySmart Program Progress Review*. Boulder, CO: Boulder County EnergySmart.

Navigant Consulting, & Randy Gunn. (2013). *Impact Evaluation of the Energy Savers Program for Large Multifamily Buildings*. Chicago, IL: CNT Energy.

Opinion Dynamics Corporation, & Antje Flanders. (2013a). *Evaluation of the Efficiency Maine Trust PACE, PowerSaver, and RDI Programs: Final Evaluation Report* (No. Volume I: PACE & PowerSaver Loan Program). Augusta, ME: Efficiency Maine Trust.

Opinion Dynamics Corporation, & Antje Flanders. (2013b). *Evaluation of the Efficiency Maine Trust PACE, PowerSaver, and RDI Programs: Final Evaluation Report* (No. Volume II: Residential Direct Install Program). Augusta, ME: Efficiency Maine Trust.

Texas A&M Engineering Experiment Station: Energy Systems Laboratory. (2013). *Evaluation and Analysis of the Austin Energy 15PT Form* (Impact Evaluation No. ESL-TR-13-09-01). Austin, TX: TEES.

Vaidya, R., Barclay, D., & Grossman, P. (2012). *Process Evaluation and Market Characterization and Assessment: Green Jobs-Green New York Residential Program* (Process Evaluation and Market Characterization (9875) No. 9835). Somerville, MA: NMR Group, Inc. for NYSERDA.

Vaidya, R., & Poulin, B. (2013). *Assessment of Job Impacts of the Green Jobs - Green New York Program* (Final Report). Somerville, MA: NMR Group, Inc. for NYSERDA.

Washington State University Energy Program, & Vince Schueler. (2014). *Seattle Community Power Works: Summary Outcomes and Lessons Learned 2010-2014* (No. WSUEEP14-010). Olympia, WA: Washington State University Extension Energy Program. Retrieved from www.energy.wsu.edu

APPENDICES

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APPENDIX A. GRANTEES, PROGRAM CONTEXT, AND PROGRAM ACTIVITIES: DETAILED QUALITATIVE ANALYSIS

This appendix provides additional detail not included in the body of the report on our data collection activities and findings regarding the context in which grantee programs operated. The process evaluation team drew on three data sources – listed in Table A-1 and summarized below – to assess grantees experience with context.

- **In-Depth Interviews with Grantees:** In the spring and summer of 2013, Research Into Action staff conducted interviews with managers of 46 grantee programs.
- **Grantee Data Summary Reports:** In the winter of 2014, U.S. Department of Energy's (DOE) staff prepared Data Summary Reports summarizing the data each of the 41 prime grantees had provided to DOE in their reporting from late 2010 to the end of September 2013. Grantees had an opportunity to comment on these reports.
- **Grantee Web Survey:** In the spring and summer of 2013, Research Into Action asked grantee program managers to respond to an on-line survey in order to gather uniform data about grantees' program activities. Fifty-one grantees responded to the survey.

Table A-1: Sources of Data on Grantees' Context

DATA SOURCE	GRANTEES PROVIDING DATA ON CONTEXT
In-Depth Interviews with Grantees	46
Grantee Data Summary Reports*	41
Grantee Web Survey	51

* Data are reported at the prime grantee level

In addition to these sources of information, this chapter also incorporates findings from the preliminary process evaluation.

A.1. GRANTEE EXPERIENCE

About half (52%) of residential programs were built on the experience of a pilot or other program. Among those programs, the majority (72%) was built on a whole home program. Grantees whose residential programs were built on existing programs were not able to launch and ramp up their programs significantly faster than those who built their programs from scratch.[89]

[89] Grantees building on existing programs averaged 9.4 months from award date to program launch and 13.2 months from launch to the time the program began functioning at its best. Grantees not building on existing programs averaged 8.5 months from award date to program launch and 14.6 months from launch to the time the program began functioning at its best.

A.1.1. CHARACTERISTICS OF BETTER BUILDINGS NEIGHBORHOOD PROGRAM (BBNP) PARTICIPANTS

Interview findings suggest middle- and upper-income and education homeowners were most likely to participate in grantee programs. Fourteen grantees reported that their residential participants were most often wealthier and better educated than the average resident of their service area. Three of these grantees noted that wealthier and better educated participants were prevalent despite program decisions not to explicitly target these groups. According to one grantee, "I think we're reaching a more affluent population than we had intended to reach. We were looking to reach moderate income and above…but it ended that we've mostly seen affluent customers." Another grantee reported that they did not target wealthier participants in order to avoid being "open to criticism that we were cherry-picking where this might work."

Reaching lower income participants required additional sales strategies. In in-depth interviews, two grantees reported serving predominantly low-income areas. These grantees noted that low-income participants had strong potential to benefit from energy upgrades. According to one, "I think that upgrades are a tough sell no matter what income they are. I think that low-income is very open to anything that will save them money." To reach these low-income populations, grantees described providing in-depth participant support and making financing available to borrowers who likely would not qualify for home equity loans or other types of attractive financing.

Some programs found an un-tapped energy efficiency upgrade market in oil-heated homes. In many jurisdictions, homeowners whose primary heat source is oil have limited eligibility to participate in ratepayer-funded energy efficiency programs. Three grantees reported that these homeowners were a good match for their BBNP-funded programs, which did not have the same restrictions as ratepayer-funded programs. One grantee noted, however, that it was more difficult to collect past energy usage data on oil heated homes since homeowners may purchase oil from multiple dealers and may not fill their tanks every time they purchase oil.

A.2. BUILDING RELATIONSHIPS WITH UTILITY PROGRAM ADMINISTRATORS

Some utility program administrators were reluctant to partner with grantees, either viewing the grantees' programs as competition or simply lacking motivation to engage in a partnership. Three grantees reported that utility programs had initially viewed their programs as competition that could impact the success of their existing program offerings. Two of these grantees reported that they had gradually built cooperative relationships with the utilities operating in their territory, although both noted that this took much of the grant period to accomplish. According to one, "This has been a long effort! [It has taken] two and a half years to show [the utility] that we are not out to get them, even if we are critical, but instead to improve the industry and support the programs." One grantee also noted that the utilities operating in their jurisdiction had little motivation to support their program. According to this grantee, "The [utility] program administrators and [their implementation contractors] don't have a lot of incentive to invest a lot of time and effort into this pilot. They can, and inadvertently have, slowed it down and hobbled it considerably."

A.3. ORGANIZATIONAL ECOLOGY – THE NATURE AND COMPLEXITY OF PARTNERSHIP MODELS

Two of the Washington State BBNP grantees – the City of Seattle (Community Power Works) and Washington State Energy Program (SEP) (Repower Kitsap) – included the Washington State University Energy Program (WSU EP) on their teams. WSU EP analyzed how program outcomes varied with what it terms the organizational ecology – the

nature and complexity of program partnership models and contracting structures. WSU EP characterized four types of organizational ecologies, two of which (the simplest and the most complex) are illustrated in Figure 3-3 in Chapter 3.

WSU EP identified strengths and weaknesses associated with each organizational ecologies. We asked Vince Schueler, the lead researcher for the WSU EP BBNP team, to summarize its findings for inclusion in this report. He provided the following, with references for the interested reader:

- Two Washington State BBNP grantees included the Washington State University Energy Program (WSU EP) on their teams; the City of Seattle (Community Power Works) and Washington SEP (Repower Kitsap). WSU EP also tested eight similar community-based programs through the state-funded Washington Community Energy Efficiency Program. WSUEP has been analyzing the performance of these 10 projects since 2010.
- A key focus has been on understanding the interactions of program design and strategy with organizational ecology (the nature and complexity of the partnership models and contracting structures). WSU EP found that:
  - Programs deploying similar marketing, outreach and program delivery strategies showed large variations in ramp up rates, conversion rates and energy cost-effectiveness. Organizational ecology was as an important factor linked to these differences.
  - Four common organizational models emerged. These ranged from more straightforward models (Simple Direct, Focused Network) to very complex (Marketing-Referral and Matrix Networks). Complex organizational structures were associated with more complex home performance upgrades and projects led by government entities as they face restrictions on hiring staff directly and therefore relied on subcontracting.
  - There was no single “best model”. Each of the models had vulnerabilities and strengths. For example more complex structures were more costly to operate and maintain, slower to ramp up and more prone to communication and coordination problems. At the same time, complex structures were more resilient (less prone to failure if key contractors leave or do not perform) and better able to bring specialized expertise to projects. Simple direct and focused network provided greater quality control and more effective and less costly reporting systems but were less effective at supporting broader dissemination of training and new expertise.
  - The most effective programs aligned the organizational model and program delivery strategy with priority outcomes.
  - Organizational analysis was very useful tool for evaluation triage. Early mapping of the complex matrix network model for Community Power Work highlighted potential role confusion and reporting conflicts and lead to explicit efforts preemptively address these concerns by clarifying roles and reporting processes and simplifying contracting relationships.
- Due to the modest number of projects under study (10) and the diversity programs and models, WSU EP’s initial findings, while intriguing, are indicative rather than definitive. This is a promising area for further investigation.

Sources:

Schueler, V. (2014). "Organizational Ecology – Seeing the Forest and the Trees in Community-Based Energy Efficiency Programs: An Initial Exploration." *Washington DC, 2014 Behavior Energy and Climate Change Conference.* Available from the author, Vince Schueler, Washington State University, Extension Energy Program, SchuelerV@energy.wsu.edu.

Schueler V. (2013). "Community-Based Energy Programs in Washington: Rediscovering and Relearning the Lessons of Thirty Years of Residential Energy Efficiency Program Delivery'. *Getting it Done! Evaluation Today, Better Programs Tomorrow, Chicago, Illinois: International Energy Program Evaluation Conference http://www.iepec.org/conf-docs/conf-by-year/2013-Chicago/158.pdf#page=1*

Washington State University Energy Program. (2013). *The Community Energy Efficiency Pilot Program in Washington State.* Olympia, WA: Washington State University Energy Program (WSUEEP13-007) *http://www.energy.wsu.edu/documents/Report%20on%20the%20CEEP%20Program%20in%20WA%20State_2-8-13.pdf*

APPENDIX B. GRANTEE WEB SURVEY METHODS AND RESULTS

B.1. METHODS

We surveyed program staff from 38 BBNP grantees and 13 subgrantees for the final process evaluation (Table B-1).

Table B-1: Grantees and Subgrantees Included in the Grantee Web Survey Sample

GRANTEE	GRANTEE TYPE	PRIME GRANTEE (FOR SUBGRANTEES ONLY)
Alabama SEP	Prime	
Atlanta GA	Sub	SEEA
Austin	Prime	
Bainbridge Island	Prime	
Bedford	Prime	
Boulder County	Prime with own programs	Boulder County
Camden	Prime	
Carrboro NC	Sub	SEEA
Chapel Hill NC	Sub	SEEA
Charlotte NC	Sub	SEEA
Charlottesville VA	Sub	SEEA
Chicago	Prime	
Cincinnati	Prime	
Connecticut	Prime	
Denver	Sub	Boulder County
Eagle County	Prime	
Fayette County	Prime	
Garfield	Sub	Boulder County
Greensboro	Prime	
Huntsville AL	Sub	SEEA
Indiana	Prime	
Jacksonville FL	Sub	SEEA

Continued…

GRANTEE	GRANTEE TYPE	PRIME GRANTEE (FOR SUBGRANTEES ONLY)
Kansas City	Prime	
LA County	Prime with own programs	LA County
Lowell	Prime	
Maine	Prime	
Maine SEP	Prime	
Maryland	Prime	
Massachusetts SEP	Prime	
Michigan	Prime	
Missouri	Prime	
Nevada SEP	Prime	
New Orleans LA	Sub	SEEA
NYSERDA	Prime	
Omaha & Lincoln	Prime	
Oregon (Portland)	Prime	
Philadelphia	Prime	
Phoenix	Prime	
Rutland County (VT)	Prime	
Sacramento	Sub	LA County
San Antonio	Prime	
San Francisco	Sub	LA County
San Jose	Sub	LA County
Santa Barbara	Prime	
Seattle (WA)	Prime	
St. Lucie	Prime	
Toledo	Prime	
University Park	Prime	
Virginia SEP	Prime	
Washington SEP	Prime	
Wisconsin	Prime	

B.1.1. SAMPLING

We aimed to collect a census of all BBNP grantees and subgrantees in order to gain further insight into program offerings, designs, and partnerships. We identified, from BBNP records, the primary program representative for each grantee and subgrantee to contact with a survey request. Each of these program representatives received an email with an explanation of the survey and a web link to the web-based survey. If the individual who received the initial request did not think he or she was the appropriate program representative to complete the survey, he or she was able to forward the survey link to the better candidate at the organization. Additionally, many program representatives sought assistance from colleagues at their organization (or from outside program partners, such as their utility or partnering financial institutions) to answer questions they did not know the answers to.

B.1.2. DATA COLLECTION

We designed the survey instrument (Appendix M.1) to collect data on several aspects of BBNP programs, namely:

- Organizational capacity
- Sectors served
- Outreach activities
- Audit activities and associated policies
- Upgrades activities and associated policies
- Contractor base and contractor support
- Financing
- Participant support
- Characteristics of market served
- Partnerships
- Outcomes, goals, and objectives
- Sustainability

We designed the survey instrument in a way that allowed program representatives to report on programs (or program activities) that spanned the following sectors: (non-low-income) residential, low-income residential, and nonresidential.[90] Each question was asked up to three times; once for each sector the program representative reported on. If the grantee or subgrantee had multiple American Recovery and Reinvestment Act of 2009 (ARRA) funded programs that served a given sector, they were asked to report on the program that had garnered the most energy savings. For example, a respondent with two residential programs and a nonresidential program answered

[90] Program representatives initially reported on multifamily offerings in whatever sector they thought was appropriate, but we recoded any responses regarding multifamily programs to the residential sector for the analyses presented in this appendix.

each question twice, once in regards to the residential program that garnered the most energy savings and once in regards to their nonresidential program.

We launched the survey in April 2013 using the *Qualtrics* web application. After each survey completion, we reviewed the respondent's survey responses and followed up with the program representative via telephone or email to obtain any needed clarifications or missing answers.[91] We periodically contacted non-respondents to encourage their response. We concluded the data collection in February 2014.

B.1.3. ANALYSIS

We cleaned the data (including updating responses that were changed or clarified by follow-up conversations with program staff), coded all open-ended responses into close-ended codes, then analyzed the cleaned data set using descriptive, bivariate, and multivariate statistics.

B.2. RESULTS

This section includes the results from all questions included in the grantee web survey. We provide results for non-low-income residential, low-income residential, and nonresidential programs separately, and we note statistically significant differences between sectors throughout the appendix.[92] Table notes indicate the survey instrument question number associated with the results (0).

B.2.1. INTRODUCTORY QUESTIONS

Table B-2: Proportion of Respondents with a Program Targeting Residential, Low-Income, and Nonresidential Sectors (Multiple Responses Allowed)

SECTOR	PERCENT
Residential	94%
Low-income	29%
Nonresidential	53%

Source: Q1.

91 Some program representatives did not respond to follow-up requests or were unable to answer some of the follow-up questions.

92 Since the number of grantees with low-income offerings was particularly low, chi-square statistics comparing this group were often invalid (due to low expected values). Only statistically valid differences are presented in this appendix.

Table B-3: Sectors Targeted by Respondents

SECTORS	PERCENT
Residential only	37%
Low-income only	2%
Nonresidential only	2%
Residential & Low-Income	8%
Residential & Nonresidential	31%
Low-Income & Nonresidential	2%
Residential, Low-Income, & Nonresidential	18%
Total	100%

Source: Q1.

Table B-4: Number of Programs Serving Sector

NUMBER OF PROGRAMS	RESIDENTIAL (N = 48)	LOW-INCOME (N = 15)	NONRESIDENTIAL (N = 27)
1 program	73%	73%	67%
2 programs	10%	13%	22%
3 programs	5%	7%	11%
4 programs	6%	7%	0%
5 programs	2%	0%	0%
6 programs	4%	0%	0%
Total	100%	100%	100%

Source: Q1.

Table B-5: Approximate Proportion of Total Grantee Savings from Program Discussed in Survey

	RESIDENTIAL (N = 48) [a, b]	LOW-INCOME (N = 15) [a]	NONRESIDENTIAL (N = 27) [b]
	Mean	**Mean**	**Mean**
	60%	37%	39%
Proportion of Savings	**Percent**	**Percent**	**Percent**
25% or less	21%	47%	44%
26% to 50%	23%	13%	15%

Continued…

	RESIDENTIAL (N = 48) [a, b]	LOW-INCOME (N = 15) [a]	NONRESIDENTIAL (N = 27) [b]
51% to 75%	15%	20%	19%
76% to 100%	40%	13%	15%
Don't know	2%	7%	7%
Total	100%	100%	100%

Source: Q1.

[a] Residential and Low-Income are significantly different.

[b] Residential and Nonresidential are significantly different.

Table B-6: Approximate Proportion of Total Grantee Savings from Program Discussed in Survey (Among Respondents Who Have Programs in More Than One Sector and Did Not Provide a "Don't know" Response)

	RESIDENTIAL (N = 28)	LOW-INCOME (N = 13)	NONRESIDENTIAL (N = 24)
	Mean	**Mean**	**Mean**
	47%	37%	36%
Proportion of Savings	**Percent**	**Percent**	**Percent**
25% or less	29%	54%	50%
26% to 50%	32%	15%	17%
51% to 75%	14%	23%	21%
76% to 99%	21%	8%	13%
100%	4%	0%	0%
Total	100%	100%	100%

Source: Q1.

Table B-7: Submarkets Targeted by Program (Among Respondents with Residential and/or Low-Income Programs Who Provided Submarket Information)

SUBMARKETS TARGETED	RESIDENTIAL (N = 12)	LOW-INCOME (N = 3)
Single-family sector only	50%	67%
Multifamily sector only	8%	0%
Both single- and multifamily sectors	42%	33%
Total	100%	100%

Coded open-ended response. Source: Q1.

Table B-8: Submarkets Targeted by Program (Among Respondents with Nonresidential Programs Who Provided Submarket Information, n = 11; Multiple Responses Allowed)

SUBMARKETS TARGETED	PERCENT
Commercial sector	36%
Small commercial sector	36%
Not for profit sector	27%
Public/municipal sector	36%
Hospitals, schools, or other institutions	27%
Other	9%

Coded open-ended response. Source: Q1.

Table B-9: Years between Program Launch and Start of Period When Program Functioned at Its Best

SECTOR	MEAN YEARS	RANGE	STANDARD DEVIATION
Residential (n = 47)[a]	1.20	0 - 2.7	0.66
Low-income (n = 15)	0.92	0 - 2.2	0.70
Nonresidential (n = 27)	0.80	0 - 2.6	0.66

One residential respondent did not provide a response. Source: Q2.

[a] Residential and Nonresidential are significantly different.

Table B-10: Length of Time Program Functioned at Its Best (Years)

SECTOR	MEAN YEARS	RANGE	STANDARD DEVIATION
Residential (n = 46)	1.0	0 - 2.8	0.71
Low-income (n = 15)	1.0	0 - 3.2	0.93
Nonresidential (n = 27)	1.3	0 - 3.3	0.82

Two residential respondents did not provide a response. Source: Q2.

Table B-11: Program Received Funds Outside of BBNP

RESPONSE	RESIDENTIAL (N = 48)	LOW-INCOME (N = 15)	NONRESIDENTIAL (N = 27)
Yes	81%	87%	63%
No	17%	13%	37%
Don't know	2%	0%	0%
Total	100%	100%	100%

Source: Q3.

Table B-12: Outside Funding Sources Used (Among Programs that Received Funds Outside of BBNP; Multiple Responses Allowed)

FUNDING SOURCE	RESIDENTIAL (N = 39)	LOW-INCOME (N = 13)	NONRESIDENTIAL (N = 17)
Utility	56%	54%	47%
Other ARRA[a]	49%	15%	53%
State, local, or regional agency	36%	31%	41%
SEP	15%	8%	18%
Other federal agency	8%	8%	18%
U.S. Department of Labor	3%	0%	0%
U.S. Department of Housing and Urban Development	3%	31%	0%
Other: Foundation or nonprofit	15%	15%	12%

Coded open-ended response for "other." Source: Q3.

[a] Residential and Low-income are significantly different.

Table B-13: Program Was Built on the Experience of a Pilot or Other Program

RESPONSE	RESIDENTIAL (N = 48)	LOW-INCOME (N = 15)	NONRESIDENTIAL (N = 27)
Yes	52%	60%	44%
No	48%	40%	56%
Total	100%	100%	100%

Source: Q4.

Table B-14: Program Was Built on a Whole House/Whole Building Program (Among Programs that Were Built upon a Pilot or Other Program)

RESPONSE	RESIDENTIAL (N = 25)	LOW-INCOME (N = 9)	NONRESIDENTIAL (N = 12)
Yes	72%	78%	50%
No	28%	22%	50%
Total	100%	100%	100%

Source: Q4.

Table B-15: Most Experienced Team Member's Years of Experience in Program Design, Financial Institution Involvement, Program Implementation, Green Building/Building Trades, and Managing Federal Grants at Time of Program Launch – Residential Programs (n = 48)

	PROGRAM DESIGN	FINANCIAL INSTITUTION INVOLVEMENT	PROGRAM IMPLEMENTATION	GREEN BUILDING/ BUILDING TRADES	MANAGING FEDERAL GRANTS
	Mean	**Mean**	**Mean**	**Mean**	**Mean**
	9	8	9	11	6
Number of Years	**Percent**	**Percent**	**Percent**	**Percent**	**Percent**
0 years	15%	17%	10%	15%	21%
1 to 3 years	23%	21%	25%	10%	10%
4 to 10 years	19%	25%	25%	33%	48%
11 to 20 years	25%	23%	23%	23%	8%
More than 20 years	10%	4%	6%	8%	4%
Don't know	8%	10%	10%	10%	8%
Total	100%	100%	100%	100%	100%

Source: Q5.

Table B-16: Most Experienced Team Member's Years of Experience in Program Design, Financial Institution Involvement, Program Implementation, Green Building/Building Trades, and Managing Federal Grants at Time of Program Launch – Low-income Programs (n = 15)

	PROGRAM DESIGN	FINANCIAL INSTITUTION INVOLVEMENT	PROGRAM IMPLEMENTATION	GREEN BUILDING/ BUILDING TRADES	MANAGING FEDERAL GRANTS
	Mean	**Mean**	**Mean**	**Mean**	**Mean**
	9	9	10	11	8
Number of Years	**Percent**	**Percent**	**Percent**	**Percent**	**Percent**
0 years	20%	33%	7%	27%	27%
1 to 3 years	13%	7%	27%	13%	0%
4 to 10 years	33%	0%	20%	13%	40%
11 to 20 years	20%	40%	40%	20%	20%

Continued…

	PROGRAM DESIGN	FINANCIAL INSTITUTION INVOLVEMENT	PROGRAM IMPLEMENTATION	GREEN BUILDING/ BUILDING TRADES	MANAGING FEDERAL GRANTS
More than 20 years	7%	0%	0%	13%	7%
Don't know	7%	20%	7%	13%	7%
Total	100%	100%	100%	100%	100%

Source: Q5.

Table B-17: Most Experienced Team Member's Years of Experience in Program Design, Financial Institution Involvement, Program Implementation, Green Building/Building Trades, and Managing Federal Grants at Time of Program Launch – Nonresidential Programs (n = 27)

	PROGRAM DESIGN	FINANCIAL INSTITUTION INVOLVEMENT	PROGRAM IMPLEMENTATION	GREEN BUILDING/ BUILDING TRADES	MANAGING FEDERAL GRANTS
	Mean	**Mean**	**Mean**	**Mean**	**Mean**
	11	10	9	12	7
Number of Years	**Percent**	**Percent**	**Percent**	**Percent**	**Percent**
0 years	19%	19%	15%	11%	19%
1 to 3 years	11%	11%	11%	15%	15%
4 to 10 years	22%	22%	33%	19%	30%
11 to 20 years	26%	22%	22%	22%	15%
More than 20 years	15%	7%	8%	15%	7%
Don't know	7%	19%	11%	19%	15%
Total	100%	100%	100%	100%	100%

Source: Q5.

B.2.2. OUTREACH

Table B-18: Approximate Number of Buildings Eligible for Program

	RESIDENTIAL (N = 48)[a, b]	LOW-INCOME (N = 15)	NONRESIDENTIAL (N = 27)
	Mean	**Mean**	**Mean**
	192,982	20,729	13,515
Number of Buildings	**Percent**	**Percent**	**Percent**
Fewer than 10,000 buildings	19%	47%	41%
10,000 to 49,999 buildings	15%	7%	7%
50,000 to 99,999 buildings	15%	0%	0%
100,000 or more buildings	25%	7%	4%
Don't know	27%	40%	48%
Total	100%	100%	100%

Source: Q6.

[a] Residential and Low-income are significantly different.

[b] Residential and Nonresidential are significantly different.

Table B-19: Groups Program Worked with, Involved, or Served (Multiple Responses Allowed)

GROUPS	RESIDENTIAL (N = 48)	LOW-INCOME (N = 15)	NONRESIDENTIAL (N = 27)
Firms qualified to conduct audits	98%	80%	96%
Firms qualified to install insulation/infiltration	98%	80%	78%
Firms qualified to install equipment	96%	87%	85%
Home/building appraisers[a]	38%	13%	15%
Retailers	33%	33%	15%
Other: All	27%	33%	33%
…Community/nonprofit groups	…13%	…20%	…11%
…Utilities	…8%	…7%	…7%

Coded open-ended responses for "Other." Source: Q7.

[a] Residential and Nonresidential are significantly different.

Table B-20: Program Asked Participants How They Heard About the Program

RESPONSE	RESIDENTIAL (N = 48)	LOW-INCOME (N = 15)	NONRESIDENTIAL (N = 27)
Yes	94%	73%	78%
No	4%	20%	11%
Not relevant to program	0%	7%	0%
Don't know	2%	0%	11%
Total	100%	100%	100%

Source: Q8.

Table B-21: Most Effective Promotional Media Activities for Driving Upgrades (Up to Three Responses Allowed)

ACTIVITY	RESIDENTIAL (N = 48)	LOW-INCOME (N = 15)	NONRESIDENTIAL (N = 27)
Website[a]	56%	27%	41%
Free media exposure	54%	27%	41%
Mass media buy[b]	44%	20%	7%
Letter to named occupant	29%	27%	33%
Visible indicator of participation	25%	27%	7%
Direct mail to unnamed occupant	19%	27%	15%
Social media	6%	0%	7%
Other	15%	13%	0%
Not relevant to program	0%	13%	4%

Source: Q9.

[a] Residential and Low-income are significantly different.

[b] Residential and Nonresidential are significantly different.

Table B-22: Most Effective Outreach Activities for Driving Upgrades (Up to Three Reponses Allowed)

ACTIVITY	RESIDENTIAL (N = 48)	LOW-INCOME (N = 15)	NONRESIDENTIAL (N = 27)
Presentation to community groups	56%	40%	41%
Participant testimonials[a]	52%	40%	22%

Continued…

ACTIVITY	RESIDENTIAL (N = 48)	LOW-INCOME (N = 15)	NONRESIDENTIAL (N = 27)
Participation in community events[a]	46%	33%	22%
Endorsements by community leaders	33%	20%	26%
Events organized by program	23%	33%	19%
Canvassing/community sweeps	17%	20%	15%
Case studies	17%	0%	7%
Outreach to trade associations	15%	13%	33%
Contests	13%	7%	0%
Other	23%	13%	22%
Contractor sales	17%	7%	7%
Not relevant to program	0%	27%	7%
Don't know	2%	0%	7%

Coded open-ended responses for "Other." Source: Q10.

[a] Residential and Nonresidential are significantly different.

Table B-23: Marketing Messages Used Most by Program (Multiple Responses Allowed)

MESSAGE	RESIDENTIAL (N = 48)	LOW-INCOME (N = 15)	NONRESIDENTIAL (N = 27)
Financial: Any	77%	80%	70%
…Savings	…56%	…67%	…67%
…Program incentives	…31%	…33%	…26%
Comfort [a, b]	50%	20%	11%
Energy savings	23%	7%	26%
Limited time offer/Act now	13%	0%	15%
Ease	13%	7%	4%
Other	19%	20%	11%
Not relevant to program	0%	20%	15%
Don't know	0%	0%	7%

Coded open-ended responses. Source: Q11.

[a] Residential and Low-income are significantly different.

[b] Residential and Nonresidential are significantly different.

Table B-24: Program Used a Marketing Contractor

RESPONSE	RESIDENTIAL (N = 48)	LOW-INCOME (N = 15)	NONRESIDENTIAL (N = 27)
Yes[a, b]	71%	33%	33%
No	29%	67%	63%
Don't know	0%	0%	4%
Total	100%	100%	100%

Source: Q12.

[a] Residential and Low-income are significantly different.

[b] Residential and Nonresidential are significantly different.

Table B-25: Services Provided by Marketing Contractor (Among Programs that Used a Marketing Contractor; Multiple Responses Allowed)

SERVICE PROVIDED	RESIDENTIAL (N = 34)	LOW-INCOME (N = 5)	NONRESIDENTIAL (N = 9)
Marketing materials	59%	100%	67%
Outreach strategy & implementation	47%	40%	33%
Website & social media	24%	20%	33%
Branding	15%	0%	22%
Paid media	15%	0%	11%
Earned media	15%	40%	33%
Community events	9%	0%	11%
Market research	12%	20%	22%
Other	15%	20%	33%

Coded open-ended responses. Source: Q12.

Table B-26: Satisfaction with Marketing Contractor (Among Programs that Used a Marketing Contractor)

LEVEL OF SATISFACTION	RESIDENTIAL (N = 34)	LOW-INCOME (N = 5)	NONRESIDENTIAL (N = 9)
Most Successful	38%	40%	22%
Average	56%	60%	78%
Least successful	6%	0%	0%
Total	100%	100%	100%

Source: Q12.

Table B-27: Specific Feedback on Marketing Contractor (Among Programs that Used a Marketing Contractor; Multiple Responses Allowed)

FEEDBACK	RESIDENTIAL (N = 34)	LOW-INCOME (N = 5)	NONRESIDENTIAL (N = 8)
Positive Feedback			
Satisfied with marketing materials	24%	20%	13%
Satisfied with marketing strategy/impact	29%	20%	13%
Marketing contractor was professional/responsive	24%	0%	0%
Negative Feedback			
Dissatisfied with marketing materials	24%	20%	25%
Dissatisfied with marketing strategy/impact	9%	20%	25%
Marketing contractor lacked relevant experience	6%	0%	0%
Other	21%	40%	38%

Coded open-ended responses. One nonresidential respondent did not provide a response. Source: Q12.

Table B-28: Program Assigned Customers an Energy Coach

RESPONSE	RESIDENTIAL (N = 48)	LOW-INCOME (N = 15)	NONRESIDENTIAL (N = 27)
Yes	65%	73%	70%
No	33%	13%	19%
Don't know	2%	7%	7%
Not relevant to program	0%	7%	4%
Total	100%	100%	100%

Source: Q13.

Table B-29: Type of Energy Coach Assigned (Among Programs that Assigned Customers an Energy Coach)

TYPE OF ENERGY COACH	RESIDENTIAL (N = 31)	LOW-INCOME (N = 11)	NONRESIDENTIAL (N = 19)
Program staff	65%	82%	68%
Contractor	36%	18%	32%
Total	100%	100%	100%

Source: Q13.

B.2.3. AUDITS

Table B-30: Program Included Energy Audits

RESPONSE	RESIDENTIAL (N = 48)	LOW-INCOME (N = 15)	NONRESIDENTIAL (N = 27)
Yes	98%	87%	93%
No	2%	13%	7%
Don't know	0%	0%	0%
Total	100%	100%	100%

Source: Q14.

Table B-31: Individuals who Conducted Audits (Among Programs that Included Energy Audits; Multiple Responses Allowed)

INDIVIDUALS CONDUCTING AUDITS	RESIDENTIAL (N = 47)	LOW-INCOME (N = 13)	NONRESIDENTIAL (N = 25)
Contractors to program	57%	62%	60%
Contractors to participant	53%	31%	48%
Online audit	17%	8%	0%
Program staff	11%	23%	32%
Other	2%	0%	0%

Source: Q14.

Table B-32: Program's Audit Activities (Among Programs that Included Energy Audits; Multiple Responses Allowed)

AUDIT ACTIVITY	RESIDENTIAL (N = 47)	LOW-INCOME (N = 13)	NONRESIDENTIAL (N = 25)
Prescreening of candidates for audits	53%	77%	64%
Online audits	23%	8%	12%
Walk-through audits[a]	40%	23%	64%
Whole house/whole building audits	83%	69%	72%
Other	6%	15%	12%

Source: Q15.

[a] Residential and Low-income are significantly different.

Table B-33: Program Installed Energy Savings Measures as Part of the Audit Process (Among Programs that Included Energy Audits)

RESPONSE	RESIDENTIAL (N = 47)	LOW-INCOME (N = 13)	NONRESIDENTIAL (N = 25)
Yes	28%	23%	0%
No	72%	62%	100%
Don't know	0%	15%	0%
Total	100%	100%	100%

Source: Q16.

Table B-34: Primary Purpose of Measures Installed as Part of the Audit Process (Among Programs that Included Energy Audits)

PURPOSE	RESIDENTIAL (N = 13)	LOW-INCOME (N = 3)	NONRESIDENTIAL (N = 0)
Installed measures serve to encourage participation	31%	33%	-
Installed measures acquire significant savings	46%	67%	-
Other	23%	0%	-
Total	100%	100%	-

Source: Q16.

Table B-35: Frequency with which Diagnostic Tools (Blower Door, Infrared, CAZ Testing) Were Used during Program Audits (Among Programs that Included Energy Auditors) – Residential Programs (n = 47)

FREQUENCY	BLOWER DOOR[a, b]	INFRARED[a, b]	CAZ TESTING[b]	ALL (BLOWER DOOR, INFRARED, AND CAZ TESTING)	OTHER (N = 12)
Always	60%	15%	38%	21%	42%
Often	17%	19%	17%		25%
Sometimes	15%	49%	23%		33%
Never	2%	11%	13%		0%
Don't know	6%	6%	6%		0%
Not relevant to program	0%	0%	2%		0%
Total	100%	100%	100%		100%

Source: Q18.

[a] Residential and Low-income are significantly different.

[b] Residential and Nonresidential are significantly different.

Table B-36: Frequency with which Diagnostic Tools (Blower Door, Infrared, CAZ Testing) Were Used during Program Audits (Among Programs that Included Energy Auditors) – Low-Income Programs (n = 13)

FREQUENCY	BLOWER DOOR[a, b]	INFRARED[A]	CAZ TESTING	ALL (BLOWER DOOR, INFRARED, AND CAZ TESTING)	OTHER (N = 3)
Always	46%	0%	38%	8%	67%
Often	15%	8%	8%		33%
Sometimes	15%	31%	8%		0%
Never	15%	54%	31%		0%
Don't know	8%	8%	8%		0%
Not relevant to program	0%	0%	8%		0%
Total	100%	100%	100%		100%

Source: Q18.

[a] Residential and Low-income are significantly different.

[b] Low-income and Nonresidential are significantly different.

Table B-37: Frequency with which Diagnostic Tools (Blower Door, Infrared, CAZ Testing) Were Used during Program Audits (Among Programs that Included Energy Auditors) – Nonresidential Programs (n = 25)

FREQUENCY	BLOWER DOOR[a, b]	INFRARED[A]	CAZ TESTING[A]	ALL (BLOWER DOOR, INFRARED, AND CAZ TESTING)	OTHER (N = 4)
Always	4%	0%	12%	0%	0%
Often	4%	8%	8%		50%
Sometimes	36%	40%	24%		25%
Never	36%	32%	36%		0%
Don't know	16%	16%	16%		25%
Not relevant to program	4%	4%	4%		0%
Total	100%	100%	100%		100%

Source: Q18.

[a] Residential and Nonresidential are significantly different.

[b] Low-income and Nonresidential are significantly different.

Table B-38: Number of Individuals Eligible to Conduct Audits at Time Program Was Most Active and Number of Individuals Conducting Audits (Among Programs that Included Energy Audits)

	RESIDENTIAL (N = 47)		LOW-INCOME (N = 13)		NONRESIDENTIAL (N = 25)	
	Eligible to Conduct	Conducting	Eligible to Conduct	Conducting	Eligible to Conduct	Conducting
	Mean	**Mean**	**Mean**	**Mean**	**Mean**	**Mean**
	42	32	72	8	21	14
Number of Individuals	**Percent**	**Percent**	**Percent**	**Percent**	**Percent**	**Percent**
1 - 5 individuals	4%	17%	23%	38%	20%	32%
6 - 10 individuals	23%	26%	8%	8%	12%	4%
11 - 50 individuals	30%	28%	23%	23%	20%	24%
51 or more individuals	19%	9%	15%	0%	8%	0%
Not relevant to program	0%	0%	8%	8%	8%	8%
Don't know	23%	21%	23%	23%	32%	32%
Total	100%	100%	100%	100%	100%	100%

Source: Q19.

Table B-39: Proportion of Audits Done by Five Most Active Audit Contractors (Among Programs that Included Energy Audits)

	RESIDENTIAL (N = 47)	LOW-INCOME (N = 13)	NONRESIDENTIAL (N = 25)
	Mean	**Mean**	**Mean**
	80%	90%	83%
Proportion	**Percent**	**Percent**	**Percent**
Less than 50%	6%	0%	4%
50%-74%	21%	15%	12%
75%-99%	26%	8%	12%
100%	21%	38%	28%
Not relevant to program	0%	8%	8%
Don't know	26%	31%	36%
Total	100%	100%	100%

Source: Q19.

Table B-40: Proportion of Audit Contractors that Had Experience with Efficiency Programs Prior to Program Involvement (Among Programs that Included Energy Audits)

PROPORTION	RESIDENTIAL (N = 47)	LOW-INCOME (N = 13)	NONRESIDENTIAL (N = 25)
Most	51%	77%	64%
Some	26%	0%	12%
Few	15%	63%	16%
None	6%	0%	0%
Don't know	2%	0%	8%
Total	100%	100%	100%

Source: Q20.

Table B-41: Proportion of Audit Contractors with High, Moderate, and Low Skill Level Prior to Program Involvement (Among Programs that Included Energy Audits) – Residential Programs (n = 47)

PROPORTION	HIGH SKILL LEVEL[a]	MODERATE SKILL LEVEL[a]	LOW SKILL LEVEL[a]
Most	30%	32%	9%
Some	40%	34%	19%
Few	21%	13%	34%
None	6%	13%	30%
Don't know	2%	9%	9%
Total	100%	100%	100%

Source: Q21.

[a] Residential and Nonresidential are significantly different.

Table B-42: Proportion of Audit Contractors with High, Moderate, and Low Skill Level Prior to Program Involvement (Among Programs that Included Energy Audits) – Low-income Programs (n = 13)

PROPORTION	HIGH SKILL LEVEL	MODERATE SKILL LEVEL	LOW SKILL LEVEL
Most	38%	23%	8%
Some	23%	31%	8%
Few	38%	8%	23%
None	0%	23%	46%
Don't know	0%	15%	15%
Total	100%	100%	100%

Source: Q21.

Table B-43: Proportion of Audit Contractors with High, Moderate, and Low Skill Level Prior to Program Involvement (Among Programs that Included Energy Audits) – Nonresidential Programs

PROPORTION	HIGH SKILL LEVEL[a] (N = 25)	MODERATE SKILL LEVEL[a] (N = 24)	LOW SKILL LEVEL[a] (N = 25)
Most	60%	13%	0%
Some	16%	25%	4%
Few	8%	17%	32%
None	4%	29%	48%
Don't know	12%	17%	16%
Total	100%	100%	100%

One respondent did not provide a response for the "moderate skill level" category. Source: Q21.

[a] Residential and Nonresidential are significantly different.

Table B-44: Means by Which Participant Energy Savings were Estimated (Among Programs that Included Energy Audits; Multiple Reponses Allowed)

ENERGY SAVINGS ESTIMATION METHOD	RESIDENTIAL (N = 47)	LOW-INCOME (N = 13)	NONRESIDENTIAL (N = 25)
Measures have pre-specified energy savings	49%	69%	60%
Packages of measures have pre-specified energy savings	13%	15%	20%
Site-specific modeling estimates savings of each measure[a]	51%	15%	40%
Site-specific modeling estimate savings of package	38%	15%	32%
Other	2%	15%	8%

Source: Q22.

[a] Residential and Low-income are significantly different.

B.2.4. UPGRADES

Table B-45: Program's Upgrade Offerings (Multiple Responses Allowed)

UPGRADE OFFERING	RESIDENTIAL (N = 48)	LOW-INCOME (N = 15)	NONRESIDENTIAL (N = 27)
Free upgrades[a]	13%	80%	15%
Upgrade incentives[a]	94%	27%	85%
Referrals to programs offering incentives	35%	13%	41%
Other	0%	0%	7%

Source: Q23.

[a] Low-income and Nonresidential are significantly different.

Table B-46: Principal Drivers of Upgrade Sales (Up to Three Responses Allowed)

SALES DRIVER	RESIDENTIAL (N = 48)	LOW-INCOME (N = 15)	NONRESIDENTIAL (N = 27)
Program staff	52%	53%	48%
Assessor	33%	27%	22%
Audit report	31%	33%	48%
Upgrade contractor[a, b]	56%	13%	30%
Financial incentives	90%	60%	74%
Financing (loans)	29%	27%	26%
Other	6%	13%	15%

Source: Q24.

[a] Residential and Low-income are significantly different.

[b] Residential and Nonresidential are significantly different.

[Responses to Q25 (average upgrade cost) are omitted here; see Appendix B Better Buildings Neighborhood Information System (BBNIS) Summary Data for project costs reported to DOE]

Table B-47: Average Proportion of Upgrade Cost Paid by Participants

	RESIDENTIAL (N = 48)[a]	LOW-INCOME (N = 15)[b]	NONRESIDENTIAL (N = 27)
	Mean	**Mean**	**Mean**
	68%	16%	58%
Average Proportion	**Percent**	**Percent**	**Percent**
0%	4%	60%	11%
1-25%	0%	13%	7%
26-50%	13%	0%	15%
51-75%	40%	7%	11%
76-99%	35%	7%	22%
100%	4%	0%	11%
Don't know	4%	13%	22%
Total	100%	100%	100%

Source: Q25.

[a] Residential and Low-income are significantly different.

[b] Low-income and Nonresidential are significantly different.

Table B-48: Incentives Available to Qualifying Upgrade Participants (Multiple Responses Allowed)

INCENTIVE	RESIDENTIAL (N = 48)	LOW-INCOME (N = 15)	NONRESIDENTIAL (N = 27)
Program incentives	90%	80%	81%
Utility or program partner incentives	77%	60%	85%
Other program sources	15%	33%	19%
State tax incentives	27%	13%	11%
Discounts from retailers/contractors	23%	20%	11%
Other	4%	7%	7%
Don't know	0%	0%	4%

Source: Q26.

Table B-49: Program Allowed Participants to Do More than One Project

RESPONSE	RESIDENTIAL (N = 47)	LOW-INCOME (N = 15)	NONRESIDENTIAL (N = 27)
Yes	57%	40%	59%
No	40%	53%	33%
Don't know	2%	7%	7%
Total	100%	100%	100%

One residential respondent did not provide a response. Source: Q27.

Table B-50: Reasons for Allowing Participants to Do More than One Project (Among Programs that Allowed Participants to Do More than One Project; Multiple Responses Allowed)

REASON	RESIDENTIAL (N = 27)	LOW-INCOME (N = 6)	NONRESIDENTIAL (N = 16)
Reduce financial strain on customers[a]	44%	33%	13%
Encourage maximum possible energy savings	37%	33%	38%
Maximize use of available incentives	15%	17%	6%
Large projects require multiple phases/components	0%	0%	31%
Other/unspecified	22%	50%	38%

Coded open-ended responses. Source: Q27.

[a] Residential and Nonresidential are significantly different.

Table B-51: Proportion of Upgrade Participants Who Installed Insulation Measures (Ceiling Insulation and Other Insulation)

PROPORTION	RESIDENTIAL (N = 47)		LOW-INCOME (N = 15)		NONRESIDENTIAL (N = 27)	
	Ceiling Insulation[a]	Other Insulation[a]	Ceiling Insulation[b]	Other Insulation[b]	Ceiling Insulation	Other Insulation
0%	4%	11%	7%	13%	22%	30%
1% - 25%	11%	19%	7%	27%	22%	19%
26% - 50%	19%	28%	20%	13%	7%	11%
51% - 75%	30%	21%	20%	13%	11%	4%
76% - 99%	28%	15%	20%	13%	0%	0%
100%	2%	0%	7%	0%	0%	0%
Don't know	6%	6%	20%	20%	37%	37%
Total	100%	100%	100%	100%	100%	100%

One residential respondent did not provide responses. Source: Q28.

[a] Residential and Nonresidential are significantly different.

[b] Low-income and Nonresidential are significantly different.

Table B-52: Proportion of Upgrade Participants that Installed HVAC Measures (Infiltration Reduction and HVAC Equipment)

PROPORTION	RESIDENTIAL		LOW-INCOME		NONRESIDENTIAL	
	Infiltration Reduction[a] (n = 46)	HVAC Equipment (n = 47)	Infiltration Reduction (n = 15)	HVAC Equipment (n = 15)	Infiltration Reduction (n = 27)	HVAC Equipment (n = 27)
0%	11%	2%	20%	13%	22%	7%
1% - 25%	9%	43%	0%	27%	19%	30%
26% - 50%	13%	19%	0%	13%	0%	7%
51% - 75%	17%	17%	27%	13%	11%	7%
76% - 99%	35%	11%	13%	13%	11%	7%
100%	9%	2%	20%	0%	0%	4%
Don't know	7%	6%	20%	20%	37%	37%
Total	100%	100%	100%	100%	100%	100%

Two residential respondents did not provide a response for "infiltration reduction," and one residential respondent did not provide a response for "HVAC equipment." Source: Q28.

[a] Residential and Nonresidential are significantly different.

Table B-53: Proportion of Upgrade Participants that Installed Solar Measures (Solar Thermal and Solar PV)

PROPORTION	RESIDENTIAL (N = 47)		LOW-INCOME (N = 15)		NONRESIDENTIAL (N = 27)	
	Solar Thermal	Solar PV	Solar Thermal	Solar PV	Solar Thermal	Solar PV
0%	68%	62%	73%	67%	59%	41%
1% - 25%	26%	32%	7%	7%	4%	22%
26% - 50%	0%	0%	0%	7%	0%	0%
51% - 75%	0%	0%	0%	0%	0%	0%
76% - 99%	0%	0%	0%	0%	0%	0%
100%	0%	0%	0%	0%	0%	0%
Don't know	6%	6%	20%	20%	37%	37%
Total	100%	100%	100%	100%	100%	100%

One residential respondent did not provide responses. Source: Q28.

Table B-54: Proportion of Upgrade Participants that Installed Other Measures (CFLs, Hot Water Measures, and Thermostats)

PROPORTION	RESIDENTIAL (N = 47)			LOW-INCOME (N = 15)			NONRESIDENTIAL (N = 27)		
	CFLs	Hot Water	Thermo-stats	CFLs	Hot Water[a]	Thermo-stats	CFLs	Hot Water	Thermo-stats
0%	32%	15%	36%	33%	0%	33%	15%	33%	33%
1% - 25%	23%	68%	21%	7%	47%	20%	7%	19%	11%
26% - 50%	9%	9%	19%	20%	20%	13%	7%	7%	4%
51% - 75%	6%	0%	11%	0%	0%	13%	4%	4%	0%
76% - 99%	15%	0%	4%	0%	7%	0%	22%	0%	11%
100%	9%	2%	2%	20%	7%	0%	7%	0%	4%
Don't know	6%	6%	6%	20%	20%	20%	37%	37%	37%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%

One residential respondent did not provide responses. Source: Q28.

[a] Low-income and Nonresidential are significantly different.

Table B-55: Number of Measure Types Program Participants Were Required to Install

NUMBER OF MEASURES	RESIDENTIAL (N = 47)	LOW-INCOME (N = 15)	NONRESIDENTIAL (N = 27)
1 measure	11%	0	11%
2 measures	9%	13%	4%
3 measures	4%	7%	0%
4 measures	0%	7%	0%
Not relevant to program	77%	73%	81%
Don't know	0%	0%	4%
Total	100%	100%	100%

One residential respondent did not provide a response. Source: Q29.

Table B-56: Program Had Energy Savings Threshold Requirement for Participation

RESPONSE	RESIDENTIAL (N = 47)	LOW-INCOME (N = 15)	NONRESIDENTIAL (N = 27)
Yes	68%	47%	67%
No	32%	53%	30%
Don't know	0%	0%	4%
Total	100%	100%	100%

One residential respondent did not provide a response. Source: Q30.

Table B-57: Energy Savings Threshold Customers Must Meet in Order to Participate (Among Programs that Had an Energy Savings Threshold)

	RESIDENTIAL (N = 32)	LOW-INCOME (N = 7)	NONRESIDENTIAL (N = 18)
	Mean	**Mean**	**Mean**
	15%	17%	16%
Threshold	**Percent**	**Percent**	**Percent**
10%	13%	14%	0%
15%	63%	43%	89%
20%	13%	29%	6%
25% and above	3%	14%	6%
Don't know	9%	0%	0%
Total	100%	100%	100%

Source: Q30.

Table B-58: Manner by Which Upgrade Contractors Were Selected

CONTRACTOR SELECTION METHOD	RESIDENTIAL (N = 47)	LOW-INCOME (N = 15)	NONRESIDENTIAL (N = 27)
Program selected contractors	17%	47%	15%
Participants selected contractor from a pre-approved list	68%	47%	48%
Participant selected any contractor desired	13%	0%	33%
Other	2%	7%	4%
Total	100%	100%	100%

One residential respondent did not provide a response. Source: Q31.

Table B-59: Proportion of Upgrade Contractors that Offered Insulation/Infiltration Only, HVAC Only, or Both

	RESIDENTIAL (N = 48)		
	Insulation Only	HVAC Only	Both
	Mean	**Mean**	**Mean**
	27%	23%	32%
Proportion	**Percent**	**Percent**	**Percent**
0%	35%	38%	31%
1% - 25%	13%	21%	17%
26% - 50%	25%	17%	21%
51% - 75%	6%	6%	2%
76% - 99%	6%	4%	2%
100%	2%	2%	15%
Don't know	13%	13%	13%
Total	100%	100%	100%

Source: Q32. Small sample sizes and large proportions of "don't know" responses rendered the low-income and nonresidential distributions meaningless.

Table B-60: Proportion of Upgrades Installed by "Unproven" and "Seasoned" Contractors that Were Inspected by the Program

	RESIDENTIAL		LOW-INCOME		NONRESIDENTIAL	
	Unproven Contractors (n = 48)	Seasoned Contractorsa (n = 48)	Unproven Contractors (n = 15)	Seasoned Contractors (n = 15)	Unproven Contractors (n = 26)	Seasoned Contractors (n = 27)
	Mean	Mean	Mean	Mean	Mean	Mean
	69%	38%	80%	72%	76%	64%
Proportion	Percent	Percent	Percent	Percent	Percent	Percent
0%	0%	0%	7%	7%	0%	0%
1% - 25%	23%	48%	7%	13%	15%	27%
26% - 50%	0%	4%	0%	7%	4%	0%
51% - 75%	4%	0%	0%	0%	0%	0%
76% - 99%	2%	0%	7%	7%	0%	0%
100%	40%	21%	47%	47%	44%	38%
Don't know	31%	27%	33%	20%	37%	35%
Total	100%	100%	100%	100%	100%	100%

One nonresidential respondent did not provide a response for "seasoned contractors." Source: Q33.

[a] Residential and Nonresidential are significantly different.

Table B-61: Proportion of Upgrade Contractors that Had Prior Experience with Energy Efficiency Programs

PROPORTION	RESIDENTIAL (N = 47)	LOW-INCOME (N = 15)	NONRESIDENTIAL (N = 27)
Most	51%	53%	44%
Some	23%	20%	26%
Few	17%	20%	15%
None	4%	0%	4%
Don't know	4%	7%	11%
Total	100%	100%	100%

One residential respondent did not provide a response. Source: Q34.

Table B-62: Proportion of Upgrade Contractors with High, Moderate, and Low Skill Level Prior to Program Involvement – Residential Programs

PROPORTION	HIGH SKILL LEVEL[b] (N = 48)	MODERATE SKILL LEVEL[a, b] (N = 47)	LOW SKILL LEVEL (N = 47)
Most	29%	26%	9%
Some	31%	45%	15%
Few	31%	13%	40%
None	4%	4%	23%
Not relevant to program	0%	0%	0%
Don't know	4%	13%	13%
Total	100%	100%	100%

One respondent did not provide responses for "moderate skill level" or "low skill level." Source: Q35.

[a] Residential and Low-income are significantly different.

[b] Residential and Nonresidential are significantly different.

Table B-63: Proportion of Upgrade Contractors with High, Moderate, and Low Skill Level Prior to Program Involvement – Low-income Programs (n = 15)

PROPORTION	HIGH SKILL LEVEL	MODERATE SKILL LEVEL	LOW SKILL LEVEL
Most	53%	7%	0%
Some	7%	27%	7%
Few	27%	33%	33%
None	7%	13%	40%
Not relevant to program	0%	0%	0%
Don't know	7%	20%	20%
Total	100%	100%	100%

Source: Q35.

Table B-64: Proportion of Upgrade Contractors with High, Moderate, and Low Skill Level Prior to Program Involvement – Nonresidential Programs

PROPORTION	HIGH SKILL LEVEL (N = 27)	MODERATE SKILL LEVEL (N = 26)	LOW SKILL LEVEL (N = 26)
Most	48%	4%	4%
Some	22%	40%	12%
Few	7%	8%	12%
None	0%	20%	40%
Not relevant to program	7%	8%	8%
Don't know	15%	20%	24%
Total	100%	100%	100%

One respondent did not provide responses for "moderate skill level" or "low skill level." Source: Q35.

Table B-65: Number of Firms Eligible to Conduct Upgrades at Time Program Was Most Active and Number of Firms Conducting Upgrades

	RESIDENTIAL (N = 47)		LOW-INCOME (N = 15)		NONRESIDENTIAL (N = 27)	
	Eligible to Conduct[a]	Conducting	Eligible to Conduct	Conducting	Eligible to Conduct	Conducting
	Mean	**Mean**	**Mean**	**Mean**	**Mean**	**Mean**
	45	25	14	10	28	23
Number of Firms	**Percent**	**Percent**	**Percent**	**Percent**	**Percent**	**Percent**
1 - 10 firms	19%	36%	27%	40%	22%	33%
11 - 20 firms	15%	15%	27%	20%	11%	7%
21 - 30 firms	17%	11%	7%	7%	7%	4%
31 - 40 firms	0%	4%	0%	0%	0%	0%
41 or more firms	32%	15%	7%	0%	11%	7%
Not relevant to program	6%	6%	13%	13%	22%	22%
Don't know	11%	13%	20%	20%	26%	26%
Total	100%	100%	100%	100%	100%	100%

One residential respondent did not provide responses. Source: Q36.

[a] Residential and Low-income are significantly different.

Table B-66: Proportion of Upgrades Done by Five Most Active Upgrade Firms

	RESIDENTIAL (N = 48)	LOW-INCOME (N = 15)	NONRESIDENTIAL (N = 27)
	Mean	**Mean**	**Mean**
	75%	83%	85%
Proportion	**Percent**	**Percent**	**Percent**
Less than 50%	38%	20%	22%
50%-74%	23%	20%	4%
75%-99%	17%	27%	19%
100%	6%	13%	22%
Not relevant to program	15%	20%	33%
Don't know	2%	0%	0%
Total	100%	100%	100%

Source: Q36.

Table B-67: Program Had Quarters with Unusually Long Wait Times for Audits

QUARTER	RESIDENTIAL (N = 46)	LOW-INCOME (N = 14)	NONRESIDENTIAL (N = 26)
Yes	35%	21%	19%
No	50%	36%	42%
Not applicable to program	0%	29%	15%
Don't know	15%	13%	23%

Two residential respondents, one low-income respondent, and one nonresidential respondent did not provide responses.
Source: Q37.

Table B-68: Quarters during Which Customer Wait Times Were Unusually Long for Audits (Among Programs that Had Quarters with Unusually Long Wait Times; Multiple Responses Allowed)

QUARTER	RESIDENTIAL (N = 16)	LOW-INCOME (N = 3)	NONRESIDENTIAL (N = 5)
2010 Q3	6%	33%	40%
2010 Q4	6%	33%	20%
2011 Q1	13%	33%	20%
2011 Q2	50%	33%	20%
2011 Q3	50%	33%	20%

Continued…

QUARTER	RESIDENTIAL (N = 16)	LOW-INCOME (N = 3)	NONRESIDENTIAL (N = 5)
2011 Q4	44%	67%	40%
2012 Q1	31%	100%	20%
2012 Q2	19%	67%	20%
2012 Q3	38%	67%	20%
2012 Q4	38%	67%	20%

Source: Q37.

Table B-69: Number of Quarters with Unusually Long Wait Times for Audits (Among Programs that Had Quarters with Unusually Long Wait Times)

NUMBER OF QUARTERS	RESIDENTIAL (N = 16)	LOW-INCOME (N = 3)	NONRESIDENTIAL (N = 5)
1 quarter	31%	33%	60%
2 quarters	25%	0%	0%
3 quarters	13%	0%	20%
4 quarters	13%	0%	0%
5 quarters	0%	33%	0%
6 quarters	6%	0%	20%
7 quarters	13%	0%	0%
10 quarters	0%	33%	0%
Total	100%	100%	100%

Source: Q37.

Kruskal Wallis tests included 0's for programs that reported no quarters with unusually long wait times.

Table B-70: Program Had Quarters with Unusually Long Wait Times for Upgrades

QUARTER	RESIDENTIAL (N = 46)	LOW-INCOME (N = 14)	NONRESIDENTIAL (N = 26)
Yes	22%	21%	4%
No	60%	36%	62%
Not applicable to program	0%	29%	12%
Don't know	17%	14%	23%

Two residential respondents, one low-income respondent, and one nonresidential respondent did not provide responses.
Source: Q37.

Table B-71: Quarters for Which Customer Wait Times Were Unusually Long for Upgrades (Among Programs that Had Quarters with Unusually Long Wait Times; Multiple Responses Allowed)

QUARTER	RESIDENTIAL (N = 10)	LOW-INCOME (N = 3)	NONRESIDENTIAL (N = 1)
2010 Q3	10%	33%	0%
2010 Q4	10%	33%	0%
2011 Q1	10%	33%	0%
2011 Q2	50%	33%	0%
2011 Q3	60%	67%	0%
2011 Q4	70%	100%	0%
2012 Q1	30%	100%	0%
2012 Q2	30%	100%	0%
2012 Q3	30%	100%	0%
2012 Q4	40%	100%	100%

Source: Q37.

Table B-72: Number of Quarters with Unusually Long Wait Times for Upgrades (Among Programs that Had Quarters with Unusually Long Wait Times)

NUMBER OF QUARTERS	RESIDENTIAL (N = 10)[a]	LOW-INCOME (N = 3)	NONRESIDENTIAL (N = 1)
1 quarter	30%	0%	100%
2 quarters	10%	0%	0%
4 quarters	40%	0%	0%
5 quarters	0%	33%	0%
6 quarters	10%	33%	0%
7 quarters	10%	0%	0%
10 quarters	0%	33%	0%
Total	100%	100%	100%

Source: Q37.

Kruskal Wallis tests included 0's for programs that reported no quarters with unusually long wait times.

[a] Residential and Nonresidential are significantly different.

Table B-73: Program Had Quarters with Unusually Long Wait Times for Test Outs

QUARTER	RESIDENTIAL (N = 48)	LOW-INCOME (N = 15)	NONRESIDENTIAL (N = 27)
Yes	20%	0%	4%
No	48%	43%	50%
Not applicable to program	13%	43%	27%
Don't know	20%	14%	19%

Two residential respondents, one low-income respondent, and one nonresidential respondent did not provide a response.
Source: Q37.

Table B-74: Quarters for Which Customer Wait Times Were Unusually Long for Test Outs (Among Programs that Had Quarters with Unusually Long Wait Times; Multiple Responses Allowed)

QUARTER	RESIDENTIAL (N = 9)	LOW-INCOME (N = 0)	NONRESIDENTIAL (N = 1)
2010 Q3	11%	-	0%
2010 Q4	11%	-	0%
2011 Q1	11%	-	0%
2011 Q2	33%	-	0%
2011 Q3	33%	-	0%
2011 Q4	44%	-	0%
2012 Q1	44%	-	0%
2012 Q2	44%	-	0%
2012 Q3	33%	-	0%
2012 Q4	44%	-	100%

Source: Q37.

Table B-75: Number of Quarters with Unusually Long Wait Times for Test-Outs (Among Programs that Had Quarters with Unusually Long Wait Times)

NUMBER OF QUARTERS	RESIDENTIAL (N = 9)	LOW-INCOME (N = 0)	NONRESIDENTIAL (N = 1)
1 quarter	22%	-	100%
2 quarters	11%	-	0%
3 quarters	22%	-	0%
4 quarters	33%	-	0%

Continued…

NUMBER OF QUARTERS	RESIDENTIAL (N = 9)	LOW-INCOME (N = 0)	NONRESIDENTIAL (N = 1)
6 quarters	11%	-	0%
Total	100%	-	100%

Source: Q37.

Kruskal Wallis tests included 0's for programs that reported no quarters with unusually long wait times.

B.2.5. CONTRACTOR SUPPORT

Table B-76: Program Provided Training for Contractors

RESPONSE	RESIDENTIAL (N = 47)[a]	LOW-INCOME (N = 15)	NONRESIDENTIAL (N = 27)
Yes	94%	80%	56%
No	6%	7%	41%
Don't know	0%	13%	4%
Total	100%	100%	100%

One residential respondent did not provide a response. Source: Q38.

[a] Residential and Nonresidential are significantly different.

Table B-77: Types of Training Available to Contractors (Among Programs that Offered Training to Contractors; Multiple Responses Allowed)

TRAINING TYPE BY CONTRACTOR TYPE	RESIDENTIAL (N = 44)	LOW-INCOME (N = 12)	NONRESIDENTIAL (N = 15)
Sales Training			
Audit Contractors	71%	42%	47%
Upgrade Contractors[a]	71%	42%	27%
Business Training			
Audit Contractors	55%	33%	47%
Upgrade Contractors	48%	50%	27%
Training on Program Requirements and Processes			
Audit Contractors	87%	75%	87%
Upgrade Contractors	86%	100%	67%

Source: Q38.

[a] Residential and Nonresidential are significantly different.

Table B-78: Accredited Home-Performance or Whole Building Training Organization Offered Contractor Training in Program Area and Program Offered Scholarships or Reduced Tuition for Training (n = 51)

RESPONSE	TRAINING OFFERED IN PROGRAM AREA	PROGRAM OFFERED SCHOLARSHIPS OR REDUCED TUITION
Yes	87%	55%
No	6%	35%
Don't know	8%	10%
Total	100%	100%

Source: Q39 & Q40.

Table B-79: Dollar Amount of Scholarships (Among Programs that Offered Scholarships and Measured Scholarships in Dollar Amount; n = 14)

DOLLAR AMOUNT	PERCENT	MEAN
Under $500	7%	$1574
$501 - $1000	36%	
$1000 - $1500	21%	
$1501 - $2000	21%	
$2000 or more	14%	
Total	100%	

Source: Q40.

Table B-80: Percent of Tuition Reduced (Among Programs that Offered Reduced Tuition and Measured Reduction in Percent Amount; n = 24)

PERCENT REDUCTION	PERCENT	MEAN
1-25%	4%	77%
26-50%	33%	
51-75%	8%	
76-99%	4%	
100%	50%	
Total	100%	

Source: Q40.

Table B-81: Program Offered Diagnostic Equipment to Contractors

RESPONSE	RESIDENTIAL (N = 47)[a]	LOW-INCOME (N = 15)	NONRESIDENTIAL (N = 27)
Yes	30%	33%	4%
No	70%	60%	89%
Don't know	0%	7%	7%
Total	100%	100%	100%

One residential respondent did not provide a response. Source: Q41.

[a] Residential and Nonresidential are significantly different.

Table B-82: Manner in Which Program Provided Equipment to Contractors (Among Programs that Offered Diagnostic Equipment; Multiple Responses Allowed)

MANNER EQUIPMENT PROVIDED	RESIDENTIAL (N = 14)	LOW-INCOME (N = 5)	NONRESIDENTIAL (N = 1)
Equipment given	29%	60%	0%
Equipment loaned	71%	80%	100%
Equipment leased	21%	0%	0%

Source: Q41.

Table B-83: Program Offered Loans or Bridge Financing to Contractors

RESPONSE	RESIDENTIAL (N = 48)	LOW-INCOME (N = 15)	NONRESIDENTIAL (N = 26)
Yes	17%	20%	23%
No	81%	80%	73%
Don't know	2%	0%	4%
Total	100%	100%	100%

One nonresidential responded did not provide a response. Source: Q42.

Table B-84: Participating Contractors Met to Discuss Home Performance or Whole Building Upgrade Issues

RESPONSE	RESIDENTIAL (N = 48)	LOW-INCOME (N = 15)	NONRESIDENTIAL (N = 26)
Yes	88%	67%	46%
No	6%	13%	32%
Don't know	6%	20%	23%
Total	100%	100%	100%

One nonresidential respondent did not provide a response. Source: Q43.

Table B-85: Contractors Who Attended Meetings (Among Programs with Contractor Meetings)

ATTENDEES	RESIDENTIAL (N = 42)	LOW-INCOME (N = 10)	NONRESIDENTIAL (N = 12)
Assessors	10%	10%	33%
Upgrade contractors	10%	20%	8%
Both	81%	70%	58%
Total	100%	100%	100%

Source: Q43.

Table B-86: Source that Initiated Meetings (Among Programs with Contractor Meetings)

INITIATOR	RESIDENTIAL (N = 42)	LOW-INCOME (N = 10)	NONRESIDENTIAL (N = 12)
Program staff	95%	100%	100%
Contractors	5%	0%	0%
Total	100%	100%	100%

Source: Q43.

Table B-87: Frequency of Contractor Meetings (Among Programs with Contractor Meetings)

MEETING FREQUENCY	RESIDENTIAL (N = 42)[A]	LOW-INCOME (N = 10)	NONRESIDENTIAL (N = 12)
Monthly	40%	20%	0%
Quarterly	24%	40%	33%
A few times a year	33%	40%	67%
Don't know	2%	0%	0%
Total	100%	100%	100%

Source: Q43.

[a] Residential and Nonresidential are significantly different.

B.2.6. FINANCING

Table B-88: Number of Financial Organizations with Which Program Discussed Willingness to Offer Financing to Participants

	RESIDENTIAL (N = 46)[a, b]	LOW-INCOME (N = 13)	NONRESIDENTIAL (N = 26)
	Mean	**Mean**	**Mean**
	7	3	5
Number of Organizations	**Percent**	**Percent**	**Percent**
0 organizations	2%	33%	15%
1 - 5 organizations	59%	0%	50%
6 - 10 organizations	11%	46%	8%
11 - 15 organizations	7%	0%	4%
16 or more organizations	13%	8%	8%
Don't know	9%	8%	15%
Total	100%	100%	100%

Two residential respondents, two low-income respondents, and one nonresidential respondents did not provide a response.
Source: Q44.

[a] Residential and Low-income are significantly different.

[b] Residential and Nonresidential are significantly different.

Table B-89: Number of Organizations that Provided Financing

NUMBER OF ORGANIZATIONS	RESIDENTIAL (N = 45)[a]	LOW-INCOME (N = 14)	NONRESIDENTIAL (N = 25)
0 organizations	4%	36%	20%
1 organization	58%	29%	44%
2 organizations	13%	14%	16%
3 organizations	16%	7%	0%
4 organizations	0%	0%	8%
5 organizations	4%	0%	0%
6 or more organizations	2%	0%	0%
Don't know	2%	14%	12%
Total	100%	100%	100%

Three residential respondents, one low-income respondent, and two nonresidential respondents did not provide a response.
Source: Q44.

[a] Residential and Low-income are significantly different.

Table B-90: Number of Participating Financing Organizations with Which Program Had a Preexisting Relationship

NUMBER OF ORGANIZATIONS	RESIDENTIAL (N = 44)	LOW-INCOME (N = 14)	NONRESIDENTIAL (N = 25)
0 organizations	57%	36%	40%
1 organization	32%	29%	36%
2 organizations	7%	14%	12%
3 organizations	0%	7%	0%
Don't know	5%	14%	12%
Total	100%	100%	100%

Four residential respondents, one low-income respondent, and two nonresidential respondents did not provide a response. Source: Q44.

Table B-91: Concerns or Barriers to the Whole Home/Whole Building Upgrade Market Discussed with Organizations Approached as Potential Financing Partners (Multiple Responses Allowed)

ORGANIZATIONS' CONCERNS	RESIDENTIAL (N = 43)	LOW-INCOME (N = 12)	NONRESIDENTIAL (N = 22)
Concerns about risk: All	33%	25%	36%
Borrower ability to pay/Likelihood of default	12%	17%	14%
"Unproven" nature of energy efficiency loans	12%	0%	14%
Concerns about demand for financial products	30%	8%	32%
Concerns about structure of financial products	19%	8%	9%
Concerns about qualifying criteria for participants	12%	33%	14%
Lack of familiarity with energy efficiency loans	12%	0%	5%
Concerns about profitability	12%	8%	14%
Other	49%	8%	32%
Encountered no concerns	21%	25%	18%
Don't know	7%	8%	18
Not applicable to program	0%	25%	5%

Coded open-ended responses. Five residential, three low-income, and five nonresidential respondents did not provide a response. Source: Q45.

Table B-92: Respondents' Advice on How to Engage Financial Institutions in Lending to the Whole House/Whole Building Upgrade Market (Multiple Responses Allowed)

PROGRAMS' ADVICE	RESIDENTIAL (N = 40)	LOW-INCOME (N = 10)	NONRESIDENTIAL (N = 18)
Mitigate risk/demonstrate low risk	28%	20%	17%
Provide financial leveraging	25%	10%	17%
Demonstrate financial benefits of energy savings	18%	10%	17%
Work with local/community/nonprofit institutions	20%	0%	11%
Demonstrate/generate demand	18%	10%	11%
Simplify process	15%	0%	11%
Other	38%	30%	28%
Don't know	10%	10%	22%
Not applicable to program	0%	20%	0%

Coded open-ended responses. Eight residential, five low-income, and nine nonresidential respondents did not provide a response. Source: Q46.

Table B-93: Program Pre-screened Applicants for Credit-Worthiness

RESPONSE	RESIDENTIAL (N = 48)	LOW-INCOME (N = 15)	NONRESIDENTIAL (N = 26)
Yes	65%	40%	62%
No	29%	53%	27%
Don't know	6%	7%	12%
Total	100%	100%	100%

One nonresidential respondent did not provide a response. Source: Q47.

Table B-94: Screening Criteria Used by Program (FICO Score, Debt-to-Income Ratio, Utility Bill History, Other; Among Programs that Pre-screened Applicants for Credit-Worthiness) – Residential Programs (n = 31)

RESPONSE	FICO SCORE	DEBT-TO-INCOME RATIO[a]	UTILITY BILL HISTORY	OTHER
Yes	87%	74%	26%	19%
No	6%	19%	71%	81%
Don't know	6%	6%	3%	0%
Total	100%	100%	100%	100%

Source: Q47.

[a] Residential and Nonresidential are significantly different.

Table B-95: Screening Criteria Used by Program (FICO Score, Debt-to-Income Ratio, Utility Bill History, Other; Among Programs that Pre-screened Applicants for Credit-Worthiness) – Low-income Programs (n = 6)

RESPONSE	FICO SCORE	DEBT-TO-INCOME RATIO	UTILITY BILL HISTORY	OTHER
Yes	67%	67%	33%	17%
No	33%	33%	67%	83%
Don't know	0%	0%	0%	0%
Total	100%	100%	100%	100%

Source: Q47.

Table B-96: Screening Criteria Used by Program (FICO Score, Debt-to-Income Ratio, Utility Bill History, Other; Among Programs that Pre-screened Applicants for Credit-Worthiness) – Nonresidential Programs (n = 16)

RESPONSE	FICO SCORE	DEBT-TO-INCOME RATIO[A]	UTILITY BILL HISTORY	OTHER
Yes	25%	44%	38%	31%
No	63%	56%	63%	69%
Don't know	13%	0%	0%	0%
Total	100%	100%	100%	100%

Source: Q47.

[a] Residential and Nonresidential are significantly different.

Table B-97: FICO Score Cutoff Used (Among Programs that Used FICO Scores to Screen Applicants)

FICO SCORE	RESIDENTIAL (N = 27)	LOW-INCOME (N = 4)	NONRESIDENTIAL (N = 3)
560 - 600	15%	50%	33%
610 - 650	48%	0%	33%
660 - 700	15%	0%	0%
Don't know	22%	50%	33%
Total	100%	100%	100%

One nonresidential respondent did not provide a response. Source: Q47.

Table B-98: Debt-to-Income/Debt Service Coverage Ratio Cutoff Used (Among Programs that Used Debt-to-Income/Debt-Service Coverage Ratios to Screen Applicants)

	RESIDENTIAL (N = 23)	LOW-INCOME (N = 4)	NONRESIDENTIAL (N = 6)
Debt-to-Income Ratio			
40	4%	0%	0%
45	35%	50%	33%
50	39%	0%	0%
80	0%	25%	0%
Debt Service Coverage			
115	0%	0%	17%
125	0%	0%	17%
Don't know	22%	25%	33%
Total	100%	100%	100%

One nonresidential respondent did not provide a response. Source: Q47.

B.2.7. SUSTAINABILITY

Table B-99: Program Expected to Continue After the Grant Period

RESPONSE	RESIDENTIAL (N = 47)	LOW-INCOME (N = 15)	NONRESIDENTIAL (N = 26)
Yes	70%	47%	54%
No	9%	20%	15%
Don't know	21%	33%	31%
Total	100%	100%	100%

One residential and one nonresidential respondent did not provide responses. Source: Q49.

Table B-100: Program Needed to Attain a Critical Size Threshold In Order to Continue

RESPONSE	RESIDENTIAL (N = 47)	LOW-INCOME (N = 15)	NONRESIDENTIAL (N = 25)
Yes	26%	27%	20%
No	64%	60%	68%
Don't know	11%	13%	12%
Total	100%	100%	100%

One residential and two nonresidential respondents did not provide responses. Source: Q50.

Table B-101: Program Expected to Attain Critical Size Threshold Needed to Continue (Among Programs with a Critical Size Threshold)

RESPONSE	RESIDENTIAL (N = 12)	LOW-INCOME (N = 4)	NONRESIDENTIAL (N = 5)
Yes	83%	100%	100%
No	8%	0%	0%
Don't know	8%	0%	0%
Total	100%	100%	100%

Source: Q50.

APPENDIX C. AUDITS: DETAILED QUALITATIVE ANALYSIS

This appendix presents additional detail not included in the body of our report on our data collection activities and findings regarding the audit programs grantees offered to participants, as well as the steps grantees took to increase consumer interest in energy efficiency audits. The chapter begins with a literature review of industry knowledge related to audits, followed by findings drawn from program data and surveys of grantees and their participants.

C.1. REVIEW OF INDUSTRY KNOWLEDGE

Home and building energy audits serve as gateways into energy efficiency upgrade programs. As such, recent industry literature explores effective methods for successfully converting audits into upgrades, maintaining customer engagement, and achieving cost effectiveness.

C.1.1. BEST PRACTICES

A 2010 literature review entitled *U.S. Single-Family Homeowners' Decision-Making Regarding Energy Retrofits* indicates that there is no comprehensive model that characterizes consumer energy decision-making. Decisions to undertake efficiency upgrades vary widely across different sub-groups of homeowners due economic, social, and cultural factors and competing priorities for household income. Thus, the authors propose using a "customer-centered" approach that designs efficiency programs *around the people, not the program* (Sanstad et al., 2010).

When considering conducting an energy efficiency upgrade, participants appear to want concrete recommendations for actions they can take to save energy, whether behavioral or measure-based. Thus, audits that provide abstract ratings or scores may be less valuable than audits that provide concrete, actionable recommendations (Ingle et al., 2012). Indeed, a study of 286 homeowners participating in an energy audit program revealed that interacting with auditors and receiving specific, customized recommendations for upgrade opportunities had greater effects on participants' decisions to undertake an upgrade project than receiving the results of a standardized energy report (Ingle et al., 2012). A DOE-sponsored review of audit report formats also indicates that audit reports are most effective when they provide customers with customized recommendations in a user-friendly format that includes simple graphics to help customers make sense of audit results (Newport Partners, LLC, 2012).

C.1.2. TYPES OF HOME AND BUILDING ENERGY AUDITS

Energy audits comprise two categories: 1) offsite audits, which typically occur online or over the phone; and 2) onsite audits, which include walk-through audits and comprehensive audits (typically using diagnostic equipment). This section reviews the benefits, limitations, and practical considerations of each method. Table C-1 summarizes research documenting the advantages and limitations of offsite audits, walk-through onsite audits, and onsite audits that obtain more detailed building measurements.

Table C-1: Considerations for Energy Audit Approaches

	OFFSITE	WALK-THROUGH ONSITE	DETAILED ONSITE
Level of Rigor	Low	Moderate	High
Typical Cost	Low	Moderate	High
Information Provided to Customer	General information about efficiency opportunities	Customized information about efficiency opportunities and guidance on pursuing upgrade opportunities	Customized information about efficiency opportunities, including estimated energy savings, and guidance on pursuing upgrade opportunities
Time Required for Ramp-up	Low (Primarily delivered through software; limited staff training needed)	Moderate (Some training needed for auditors)	High (Need to develop skilled contractor base)
Annual Capacity to Complete Audits	Unlimited	Limited	Limited

C.1.3. QUALITY ASSURANCE

Some residential programs have experienced challenges meeting homeowner expectations for accurate information on the cost and savings associated with recommendations based on the results of computer modeling tools (Ingle et al., 2012; DOE, 2012; KEMA, Inc., 2014). Specifically, software-based energy analysis of existing homes tends to over predict pre-upgrade energy use and thus the resulting post-upgrade energy savings, which may contribute to customer dissatisfaction (NREL, 2011). A 2011 DOE report outlines mechanisms that may improve energy analysis methods and increase the accuracy of savings estimates, including identifying potential input or software issues using statistical analysis or input from experts, comparing aggregate results to the performance of real homes, and comparing predicted energy savings with metered data of energy use within individual homes.[93]

C.2. FINDINGS

This section documents the steps grantees took to develop and offer audit services, explores the challenges of providing energy efficiency audits to program participants, and assesses the relationship between the audit process and grantee success. We drew on the data sources listed in Table C-2 and summarized below to assess grantees' experience offering audit services.

[93] Ibid.

Table C-2: Sources of Data on Grantees' Audit Programs

DATA SOURCE	GRANTEES PROVIDING DATA ON AUDIT
In-Depth Interviews with Grantees	39
Grantee Web Survey [a]	49
BBNIS Project Database [b]	41

[a] See Appendix B for tabulated responses.

[b] See Appendix I for tabulated data.

- **In-Depth Interviews with Grantees:** In the spring and summer of 2013, we conducted interviews with administrators of 46 grantee and subgrantee programs. Thirty-nine of those grantees discussed audits during their interviews.
- **Grantee Web Survey:** From April 2013 to February 2014, we asked grantee and subgrantee program administrators to respond to a web-based survey that gathered uniform data about grantees' program activities. Fifty-one grantees responded to the survey, and of those, 49 respondents reported that their program(s) included audits.

In addition to these sources of information about grantees' experience offering energy efficiency audits, this section also incorporates findings from the survey of residential, multifamily, and commercial participants in grantee programs that occurred between May 2013 and April 2014.[94]

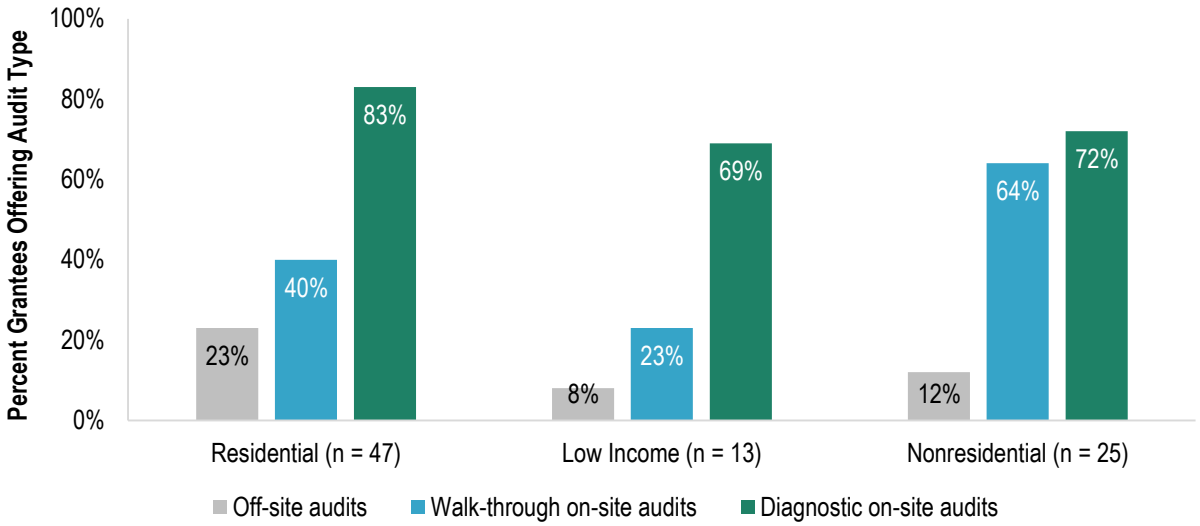
C.2.1. TYPES OF ENERGY AUDITS OFFERED

The majority of grantee programs required audits. Figure C-1 shows that grantees most typically offered comprehensive onsite audits, which served to identify and estimate costs and savings potential associated with upgrade opportunities.

Rather than thinking about audits as a single activity or product, grantees held a broader view of audits as a *process* that serves multiple functions. Specifically, audits serve as an opportunity to integrate program services, including processing applications, providing customer education and support, selling upgrades, and directly installing low-cost measures and offering financing, if applicable. Grantees also saw the audit as a staged process involving ongoing contact between program staff and participants. This section includes a summary of the specific methods grantees used to provide audits.

[94] See Appendix J for tabulated responses.

Figure C-1: Audit Types Offered Among Grantees Whose Program Included Energy Audits (Multiple Responses Allowed)



C.2.2. SCREENING APPLICANTS

Many grantees engaged in some level of participant screening to distinguish between customers truly interested in completing upgrades from those simply seeking a free audit. The screening process also helps to set realistic expectations for participants and identify program drop-outs early in the participation process and direct them to other, less comprehensive, efficiency programs (Johnson Consulting Group, 2012). Results indicate that grantees were most likely to use screening in programs aimed at low-income residential customers (77%), compared with a lower frequency among nonresidential (64%) and non-low-income residential (53%) programs. The higher rate of screening among low-income programs is likely due to the more specific eligibility requirements for participation.

Some grantees also used incremental engagement processes or participant self-screening to determine the appropriate level of service for individual participants. For example, one grantee used initial phone audits to explain the program, including customer costs, and only scheduled onsite audits with homeowners interested in moving forward. Another grantee offered a two-tiered audit process that involved an initial one-hour walk-through audit with blower door test that provided homeowners with sufficient information for deciding on next steps. This approach minimized contractor time for initial audits, and served to screen for homeowners interested in going forward with upgrades. In this grantee's view, using this tiered process meant that when contractors conducted full comprehensive audits they were working with an "80% likely lead instead of with a 15-20% lead."

APPENDIX D. UPGRADES: DETAILED QUALITATIVE ANALYSIS

This appendix presents additional findings not presented in the body of the report on our data collection activities and grantees' efforts to encourage program participants to undertake comprehensive energy efficiency upgrades and the program models they used to deliver upgrades. It begins with a literature review of relevant industry knowledge, followed by findings drawn from interviews and surveys of grantees, participants and nonparticipants, and a review of program data.

D.1. REVIEW OF INDUSTRY KNOWLEDGE

Energy efficiency upgrades are the culmination of outreach, auditing, and participant engagement efforts, and the energy savings achieved from upgrades are one of the primary means of assessing program success. As such, industry literature on upgrades focuses on effective ways to recruit participants (for example, incentives), structure upgrade offerings, evaluate completed projects, and leverage partnerships to maximize energy savings per upgrade and cost effectiveness. This section summarizes findings from literature on each topic.

D.1.1. INCENTIVES

Incentives may be most effective at increasing programs' overall energy savings when bundled with other, less tangible, program offerings. Research indicates that, when given a choice, homeowners often prefer tangible program benefits, like incentives, over less tangible benefits, like low interest rate loans (DOE, 2012; Fuller et al., 2010). By bundling less tangible energy savings opportunities with incentives, programs may encourage participants to undertake more comprehensive energy upgrades that result in higher energy savings (McEwen, 2012). For example, a program may offer both incentives for ENERGY STAR® appliances and low-interest loans or include incentives for solar panels in their comprehensive upgrade package (Fuller et al., 2010).

Incentives may be particularly effective at increasing participation among middle- and lower-income homeowners, who are less likely to undertake efficiency upgrades than higher income homeowners. Some programs have successfully increased participation among lower-income homeowners, for example, by offering tiered incentives based on participant income. Further, programs can match changing demand for energy upgrades over time by targeting incentives at middle- and lower-income homeowners as the market for higher-income homeowner becomes saturated (SEE Action Residential Retrofit Working Group, 2011; Van de Grift and Schauer, 2010; Newport Partners, LLC., 2012).

D.1.2. PROGRAM PARTNERS

Programs may be able to expand their program offerings through partnerships with community based organizations (CBOs) and governmental organizations (Brook et al., 2012; KEMA, Inc., 2014). In particular, partnerships can be useful for smaller energy efficiency programs that have limited capacity for recruiting participants or managing contractors and projects. For example, some programs have found that having an external organization responsible for the quality assurance/quality control (QA/QC) process provides participants with an additional sense of trust in the upgrade process and provides programs with additional capacity and flexibility to use their resources to grow their program (DOE, 2012; Barger, 2012).

Partnering organizations also can be helpful when potential participants face pre-upgrade health and safety issues in their homes and buildings, an important barrier in the middle- and low-income markets. In some cases, health and safety issues preclude participation in programs that either do not have the resources to address them or whose incentives or financing options do not cover non-energy upgrades. Programs may be able to overcome these barriers if local CBOs and governmental organizations subsidize the health and safety upgrades or educate homeowners on how they can address these issues themselves (Zimring et al., 2011).

Contractors also can provide services above and beyond conducting upgrades. In particular, they can serve as a resource for recruiting and engaging homeowners and can be important partners in expanding interest in a program through their existing client relationships (DOE, 2012). Customers may be more open to participating in an efficiency upgrade program if they are able to work with a contractor with whom they already have a relationship, for example, and they may be more open to increasing the scope of a project if they are encouraged to do so by a trusted contractor.

D.2. FINDINGS

This section documents the steps grantees took to develop and offer energy efficient upgrades, explores the challenges of providing energy efficiency upgrades to program participants, and assesses the relationship between the upgrades processes and grantee success, as measured by our quantitative analyses.[95] We drew on three data sources listed in Table D-1 and summarized below to assess grantees' experience offering upgrade services.

- **In-Depth Interviews with Grantees:** In the spring and summer of 2013, Research Into Action staff conducted interviews with managers of grantee and subgrantee programs.
- **Grantee Web Survey:** Between spring 2013 and spring 2014, Research Into Action asked grantee and subgrantee program managers to respond to a web-based survey in order to gather uniform data about grantees' program activities.
- **BBNIS Project Database:** DOE collected data on each upgrade project grantees reported in its BBNIS database. These data include information on project costs, incentives offered, and installed measures.

Table D-1: Sources of Data on Grantees' Upgrade Programs

DATA SOURCE	GRANTEES PROVIDING DATA ON UPGRADES
In-Depth Interviews with Grantees	46
Grantee Web Survey [a]	48
BBNIS Project Database [b]	41

[a] See Appendix B for tabulated responses.

[b] See Appendix I for tabulated data.

[95] See Chapter 4 of *Drivers of Success in the Better Buildings Neighborhood Program - Statistical Process Evaluation* (Final Evaluation Volume 3) for more information.

In addition to these sources of information about grantees' experience offering energy efficiency upgrades, this section incorporates findings from the survey of residential participants in grantee programs conducted from May 2013 to April 2014 and a survey residential nonparticipants, who live in areas served by grantee programs but made energy upgrades outside of those programs, conducted in October and November 2013.[96,97]

D.2.1. MEASURES INSTALLED

BBNIS project data indicates that the measures most commonly installed as part of single and multifamily residential upgrades were sealing, insulation, and heating measures. Commercial upgrades, on the other hand, most commonly involved lighting measures. These findings indicate that single and multifamily residential programs may have aimed to conduct more comprehensive upgrades, while commercial upgrades focused on addressing "low hanging fruit" to achieve energy savings. Table D-2 presents the proportion of projects that included each measure captured in the BBNIS project data.

Table D-2: Percent of Projects that Installed Measure Types

MEASURE	RESIDENTIAL (N = 74,369)	MULTIFAMILY (BUILDING) (N = 858)	COMMERCIAL (N = 3,547)
Sealing	43%	59%	1%
Insulation	42%	78%	4%
Heating	30%	40%	9%
Lighting	18%	8%	65%
Water Heating	14%	20%	2%
Cooling	8%	4%	6%
Heating & Cooling	6%	2%	1%
Appliances	3%	4%	1%
Solar PV	.1%	0%	.06%
Refrigeration	0%	0%	3%
Other	25%	15%	15%

D.2.2. PROJECT COSTS

Administrators of low-income programs reported that participants paid, on average, 16% of program costs, and 60% of grantees with low-income programs reported that all participants received free upgrades, indicating that programs took on the bulk of upgrade costs for low-income residential participants. Nonresidential upgrade upgrades averaged

96 See Appendix J for tabulated responses.

97 See Appendix K for tabulated responses.

$303,337, and program administrators reported that participants paid 58% of upgrade costs on average, indicating that nonresidential upgrades also were highly subsidized by grantee programs.

D.2.3. INCENTIVES

From in-depth interviews, final technical reports, and program websites, we determined that residential programs offered incentives that ranged from $250 to $9000. When asked about the development of their incentive programs during in-depth interviews, one grantee reported that they subsidized audits more heavily than upgrades because they thought audits provided a larger financial barrier than upgrades. Other grantees reported providing incentives they considered to be low to stretch their program funding across more projects. More than one-third of residential (35%) and nonresidential (41%) programs also offered referrals to programs offering incentives (such as utility programs), while less than one-fifth (13%) of low-income programs offered referrals. This may be because low-income programs were more likely to subsidize upgrades entirely.

D.2.4. PARTICIPANT SUPPORT

Interview findings suggest that providing additional support to participants, either through frequent interactions with contractors or access to program-provided "energy coaches," helped programs increase the number of completed projects and overall energy savings. Sixteen grantees described how they provided participant support throughout the upgrade process:

- Interpreting information about potential energy savings;
- Explaining return on investment;
- Explaining the multiple incentives that the participants qualified for; and
- Providing project management support and tracking progress for projects that involve multiple stages or measures.

Participant support was typically provided by program staff and/or the contractors conducting the upgrades. Four grantees reported that contractor support often led to more comprehensive upgrades than they believe would have been conducted otherwise. By explaining incentive options and return on investment to potential participants, contractors often convinced homeowners to expand the scope of their upgrades. One grantee described that contractors enjoyed helping customers with rebates:

> *The contractors got really excited about the rebates, and especially in these underserved areas where they have the municipally owned utility or co-op. Some areas had never had access to any kind of energy efficiency incentive, so [the contractors] really embraced the program.*

Although participant support could be over the phone, online, or in person, many grantees believed face-to-face interactions were essential to program success. Grantees perceived that in-person interaction between participants and program staff or contractors led to higher conversion rates from audits to upgrades and contributed to greater energy savings overall.[98]

[98] See Chapter 4, *Audits* and Chapter 7, *Stimulating Supply* for more discussion of participant support.

D.2.5. QUALITY ASSURANCE AND QUALITY CONTROL

Grantees implemented several different approaches to conducting QA/QC on upgrades. Some grantees used their own program staff to conduct QA/QC, some contracted third-party organizations, and others allowed upgrades contractors to conduct QA/QC on their own projects. The QA/QC process typically involved a combination of pre- and post-upgrade onsite reviews (that is, "field reviews"), desk reviews of completed upgrades and associated reports, and formal sign offs by participants and whomever conducted the QA/QC. Full contractor payment was often contingent on the upgrade passing QA/QC completion requirements.

In addition to confirming that upgrades met programs' requirements and standards, the QA/QC process helped ensure that contractors were adequately trained. Contractors new to energy efficiency received feedback on their work, and the QA/QC process provided programs with the opportunity to identify contractors who needed additional training. For example, one grantee's QA/QC evaluator would score contractors on different aspects of the upgrade and mentored contractors who were in need of additional guidance and training.

D.2.6. CUSTOMER SATISFACTION

Grantees found that setting proper expectations and providing good customer service were important factors in driving high participant satisfaction and avoiding conflict between participants and contractors. Grantees pointed out two factors that were key to setting and meeting participant expectations: 1) providing a dedicated staff member who would guide the customer through the process, and 2) conducting QA of completed upgrades.

APPENDIX E. DRIVING DEMAND: DETAILED QUALITATIVE ANALYSIS

This appendix presents additional detail not presented in the body of our report on our data collection activities and grantees' efforts to drive demand for energy upgrades. It begins with a literature review of industry knowledge related to marketing and outreach for whole home programs, followed by findings drawn from interviews and surveys of grantees, participants and nonparticipants, and a review of program data.

E.1. LITERATURE REVIEW

E.1.1. AUDIENCE TARGETING

Industry sources recommended four ways, listed below, for programs to identify populations for targeted outreach. These methods primarily sought to identify the home or building owners with some characteristic that made them likely to participate in whole building upgrade programs, although some took a slightly different approach, seeking to identify those with the greatest potential to benefit from programs.

- **Existing Projects:** Multiple industry sources suggested targeting homeowners who were already planning to complete some type of equipment purchase or home improvement project (Peters and McRae, 2007; Opinion Dynamics Corporation, 2014; Fuller et al., 2010; LeBaron and Saul-Rinaldi, 2013; SEE Action Residential Retrofit Working Group, 2011). These sources noted that incorporating efficiency retrofits into existing projects in this way can reduce the marginal cost of efficiency (LeBaron and Saul-Rinaldi, 2013). As a result, one called home improvements "a critical intervention point" for programs encouraging comprehensive energy upgrades (SEE Action Residential Retrofit Working Group, 2011).
- **Demographic Characteristics:** Industry sources also suggested using demographic characteristics to identify individuals likely to complete energy upgrades (Sanstad et al., 2010). Multiple sources reported that whole home upgrade program participants are typically higher income, more educated, and more likely to be white than the broader population (Opinion Dynamics Corporation, 2014; Sanstad et al., 2010; Zimring et al., 2011; Megdal et al., 1999; Fuller et al., 2010; DOE, 2012; GDS Associates and Research Into Action, 2013). The LBNL report cited above noted that these characteristics are common of innovators and early adopters generally in diffusion of innovations research (Fuller et al., 2010).
- **Environmental Concerns:** While the general public gives low ratings to their level of personal responsibility for the environment, studies found that people with intent to participate in whole home upgrade programs were more concerned with the environment (Opinion Dynamics Corporation, 2014; Summit Blue Consulting, 2009). One study further found that the combination of environmental concerns and concerns about home comfort was the strongest predictor of participation (Opinion Dynamics Corporation, 2014).
- **Savings Potential:** Industry sources suggested that programs with access to energy usage data could use it to identify and target homeowners with greater energy savings potential, and thus greater potential to benefit from retrofits (Peters and McRae, 2007; Fuller et a., 2010; DOE, 2012). Online energy self-audits are another way programs can identify the potential participants with the greatest savings potential and direct them to the most appropriate offerings (De La Chapa and Case, 2012).

One report noted that, while residence in a geographic area is one way to define targeted populations, people's social connections extend beyond their neighborhoods, to include friendships, professional networks, and involvement in community-based organizations (McEwen, 2012).

E.1.2. CONTENT OF PROGRAM MESSAGES

This section reviews findings from industry literature regarding the messages most effective in driving demand for energy upgrades. In general, industry sources recommended messages that seek to build potential participants' perceptions of the value of energy upgrades, both by increasing their confidence that the promised benefits will materialize and by linking energy performance to home value.

Building Confidence in Upgrade Value

Non-energy benefits of energy upgrades, like increases in comfort, may be more immediately apparent to participants than energy savings (LeBaron and Saul-Rinaldi, 2013). Sources recommended that programs focus on these more immediate benefits with program messages emphasizing comfort, investing in one's home, self-reliance, and being part of a larger community of upgraders (Von Schrader et al., 2008; Fuller et al., 2010). A report characterizing the market for energy efficiency financing in California suggested the long payback periods of many energy upgrades makes it particularly important for programs to promote non-energy benefits (Harcourt Brown & Carey, Inc., 2011).

Linking Upgrades to Resale Value

The potential to increase home resale values is a motivator for other types of home improvement projects, and advocates hope to apply it to efficiency upgrades as well. Industry literature suggests two strategies for integrating a home's energy performance into its resale value. First, sources suggest training realtors and appraisers on the benefits of energy upgrades so these real estate market actors will value whole home upgrades in more consistent ways (Brook et al., 2012; SEE Action Residential Retrofit Working Group, 2011). Second, multiple industry sources cite energy scores and labels as a way to increase the value of efficient homes by increasing the visibility of energy upgrades and facilitating comparison of energy performance between homes (Newport Partners, LLC., 2012; SEE Action Residential Retrofit Working Group, 2011; LeBaron and Saul-Rinaldi, 2013; GDS Associates, Inc., 2012).

E.2. FINDINGS

We documented how grantees understand peoples' motivations for doing energy related upgrades, explained their marketing and sales techniques, and described best practices for selecting a messenger to deliver the programs' message. The process evaluation drew on three data sources – listed in Table E-1 and summarized below – to asses grantees' experience in driving demand.

Table E-1: Sources of Data on Grantees' Financing Programs

DATA SOURCE	GRANTEES PROVIDING DATA ON OUTREACH
In-Depth Interviews with Grantees	44
Grantee Web Survey	51
Grantee Data Summary Reports [a]	39
Grantee-led Evaluations	17

[a] Data are reported at the prime grantee level.

- **In-Depth Interviews with Grantees:** In the spring and summer of 2013, Research Into Action staff conducted interviews with managers of 46 grantee programs. Forty-four of those grantees discussed outreach during their interviews.
- **Grantee Web Survey:** In the spring and summer of 2013, Research Into Action asked grantee program managers to respond to a web-based survey in order to gather uniform data about grantees' program activities. Fifty-one grantees responded to the survey.
- **Grantee Data Summary Reports:** In the winter of 2014, DOE staff prepared Data Summary Reports summarizing the data each of the 41 prime grantees had provided to DOE in their reporting from late 2010 to the end of September 2013. Grantees had an opportunity to comment on these reports. Thirty-nine of these reports included data on grantees' outreach activities.
- **Grantee-led Evaluations:** Over the course of the BBNP grant period, some grantees oversaw evaluations of their own program activities. Thirteen of these evaluations, covering 17 grantee programs, included findings related to energy efficiency financing.

In addition to these sources of information about grantees' experience driving demand, this section incorporates DOE staff in-depth interviews as well as findings from the survey of residential participants in grantee programs conducted from May 2013 to April 2014 and the survey of residential nonparticipants, who live in areas served by grantee programs but made energy upgrades outside of those programs, conducted in October and November 2013.

E.2.1. TARGETING OF COMMUNICATION

Several grantees discussed targeted marketing or neighborhood sweeps as techniques they used to generate interest in their programs. In addition to targeting residents of defined geographic areas, grantees described efforts to target outreach toward specific segments of the population. Grantees took two distinct approaches to identifying segments to target, with some targeting segments that had been underserved by existing energy efficiency programs, and others targeting the segments they believed were most likely to participate. The following sections elaborate on the different kinds of targeting grantees discussed.

Targeting neighborhoods

In in-depth interviews, grantees frequently discussed efforts to target neighborhoods or other narrow geographic areas in their outreach. In targeting these areas, grantees frequently used a sweep approach, conducting intensive outreach within the targeted area with the goal of reaching a large proportion of the market. Grantees reported using

a variety of methods to identify their targeted areas, including demographic data, previous efficiency program performance, and characteristics of the building stock. In conducting outreach in the targeted areas, grantees frequently reported canvassing homes or businesses and attending community events.

A majority of the grantees that reported targeting narrow geographic areas limited program participation to residents of those areas. Interview findings suggest that, for these grantees, focusing outreach efforts on narrow geographic areas constrained their ability to achieve the volume of upgrades they sought. For example, one grantee explained that, while they had achieved high participation rates with an intensive focus in a small area, they had generated more upgrades overall by focusing on larger areas. Half of the fourteen grantees that discussed targeting outreach to neighborhoods or other narrow geographic areas in in-depth interviews reported they had ultimately expanded their targeted areas in order to reach a wider range of participants.

Four grantees reported that limiting eligibility to a narrow geographic area had proven confusing to potential participants, with programs having to turn away interested homeowners who lived outside of the defined area. One grantee noted that targeting a narrow geographic area prohibited them from using traditional mass marketing techniques, since the need to deny applications from people outside the targeted area had the potential to generate negative publicity for the program. In order to avoid this type of confusion and facilitate outreach through existing neighborhood organizations, two additional grantees stated that it was important that targeted areas be consistent with natural geographic boundaries, like neighborhoods or even metropolitan areas.

Two grantees stated that it was important for targeted neighborhoods to have a strong sense of community. According to one of these grantees, “We’ve learned that’s not a viable model unless the neighborhood has a strong identity. With the Internet [and other media] we live in silos, not geographic neighborhoods. Nothing suggests the neighborhood folks are similarly predisposed.”

Targeting underserved populations

In the residential sector, grantees seeking to reach underserved populations most often targeted low and moderate-income homeowners. Five grantees cited homeowners with incomes just above the eligibility level for federal weatherization assistance as an underserved market their programs sought to reach. According to one of these grantees, these homeowners are the “most likely to benefit group” from energy upgrade programs. One grantee stated that they had developed specialized outreach strategies to reach these groups through long experience working with low-income populations. According to this grantee, “People don’t react just because you announce it. They have to be convinced, and it is hard to convince people for energy retrofits.”

In the commercial sector, grantees most often reported targeting small commercial spaces as an underserved market. These grantees reported completing upgrades in grocery stores, convenience stores, gas stations, restaurants, healthcare facilities, parking garages, and private schools. According to one grantee, “I tend to focus on markets where I think there is a need for energy efficiency projects. This is why we’ve targeted grocery and convenience stores, building owners.” This grantee noted that large businesses typically have access to capital they can use for energy upgrades and may have requirements regarding payback periods that limit the measures they will install.

Another grantee reported that they had targeted larger institutions, and stated that the timeframes that these institutions require to plan and implement projects had posed challenges for their program. According to this grantee, “These large institutions are battle ships; they do not turn on a dime. We’re taking a brand new idea to them and

showing them they're going to save money.… So a whole bunch of folks would have participated in this program if they'd had one more year of the program; we would have a really knocked it out of the park. Timing was everything."

Targeting by likelihood of participation

Rather than targeting populations that had not been served by previous efficiency programs, some grantees described efforts to identify and target groups that would be most likely to respond to their program offerings. One grantee described these targeting efforts as, "our greatest success," elaborating that, "Instead of knocking on individual doors, you identify a group of people that are predisposed and have some commonality."

Grantees identified populations they judged likely to participate in a variety of ways. Using terminology from academic research on the diffusion of innovations, two grantees described likely participants as early adopters. According to one of these grantees, "It is actually the early adopters that are participating most in the program. The people that are driven through the community, or helping the environment. We are still reaching the early adopter population."

Other grantees discussed income as a factor in likelihood of participation. According to one, "Our strategy has evolved to targeting people who want to and can afford to do this. Their success will create momentum that others will want to join in. Middle class folks that own a home and want to invest in home, community." Another grantee reported that, as BBNP grant funding ended and the program had to operate on a smaller budget, they were being more selective. This grantee stated that "those in lower income brackets who can't do a loan, we will likely spend less effort recruiting them."

E.2.2. MARKETING STRATEGIES

Participant survey findings suggest that grantees' effectively reached large groups of participants through their mass outreach efforts. Two-thirds (66%) of residential participants learned about their local BBNP-funded program through the program's mass media outreach, including mass media advertisements, the program website, and direct mail. Participants were less likely to report learning about the program from program representatives and events (36%), contractors (27%), and promotion of the program at community events (10%). In the commercial sector, participants most often heard about the local BBNP program through the program (84%) and professional sources (63%). Table E-2 lists the proportion of participants who reported learning about their local BBNP-funded program in various ways.

Table E-2: Participants' Sources of Information about Grantee Programs (Multiple Responses Allowed)

RESPONSE	RESIDENTIAL (N = 2399)	MULTIFAMILY (N = 55)	COMMERCIAL (N = 19)
Newspaper, TV, radio, advertisement, or printed publicity	36%	45%	42%
Direct mail, bill insert, email	31%	11%	16%
Contractor or someone offering energy efficiency related products or services	27%	31%	37%
Website, social media, community blog	25%	31%	16%

Continued…

RESPONSE	RESIDENTIAL (N = 2399)	MULTIFAMILY (N = 55)	COMMERCIAL (N = 19)
Family member, friend or colleague	24%	27%	16%
Program Representative	22%	29%	79%
Program Event	19%	25%	26%
Other professional sources (organizations or professional acquaintances that are not program representatives)	15%	22%	37%
Community Event	10%	15%	21%
None of these	1%	0%	0%

There were differences between the outreach methods grantees cited as most effective in the web survey (Table E-3) and the ways participants reported hearing about their local BBNP programs. In general, while participants most often reported learning about BBNP-funded programs from publicity sources, grantees more often cited program sources and community sources as effective outreach methods. For example, while participation in community events was grantees' third most frequently cited effective outreach activity, it was among participants' least commonly cited sources of awareness. Participants most often reported hearing about their local BBNP programs from mass media outreach, but grantees more often rated their websites among the most effective promotional media activities.

Table E-3: Grantee Ratings of Most Effective Outreach and Promotional Media Activities (Up to Three Responses Allowed in Each Category)

ACTIVITY	RESIDENTIAL (N = 48)	LOW-INCOME (N = 15)	NONRESIDENTIAL (N = 27)
Outreach Activities			
Presentation to community groups	56%	40%	41%
Participant testimonials	52%	40%	22%
Participation in community events	46%	33%	22%
Endorsements by community leaders	33%	20%	26%
Events organized by program	23%	33%	19%
Canvassing/community sweeps	17%	20%	15%
Case studies	17%	0%	7%
Outreach to trade associations	15%	13%	33%
Contests	13%	7%	0%

Continued…

ACTIVITY	RESIDENTIAL (N = 48)	LOW-INCOME (N = 15)	NONRESIDENTIAL (N = 27)
Other	23%	13%	22%
Contractor sales	17%	7%	7%
Not relevant to program	0%	27%	7%
Don't know	2%	0%	7%
Promotional Media Activities			
Website	56%	27%	41%
Free media exposure	54%	27%	41%
Mass media buy	44%	20%	7%
Letter to named occupant	29%	27%	33%
Visible indicator of participation	25%	27%	7%
Direct mail to unnamed occupant	19%	27%	15%
Social media	6%	0%	7%
Other	15%	13%	0%
Not relevant to program	0%	13%	4%

These findings are not necessarily contradictory. While grantees identified the outreach and promotional media activities they judged to be most effective, participants identified all of the ways they had heard about the program. Participants did not judge which information sources had been most influential in their decision to participate. As a result, while many participants heard about their local program from mass media, program participation in community events may have been more influential in their decision to participate. If that were the case, grantees' assessment that community events were more effective would be justified.

In order to provide additional insight on the effectiveness of various outreach strategies, the subsequent sections elaborate on the most commonly mentioned marketing techniques such as: traditional mass marketing, community outreach, branding strategies, the use of labeling and scorecards, and the importance of trusted messengers.

Mass Marketing Approaches

While grantees frequently reported using traditional, mass outreach techniques like mass media advertising, social media, direct mail, utility bill inserts, and websites, relatively few commented on the effectiveness of these techniques during their in-depth interviews. Two grantees noted that, while they used mass outreach techniques, these were not a primary focus of their outreach efforts. For example, one grantee reported using direct mail as a way to inform homeowners about the program before canvassers came to their neighborhood to provide additional information. Two additional grantees reported that mass outreach techniques were less effective than community-based approaches. According to one of these grantees, "We learned that spending money on traditional marketing doesn't do us any justice. Regulation and community based social marketing made the difference."

Three grantees noted that, particularly in relatively small communities, it can be important to understand which information sources people use and view as credible. One of these grantees reported that, "We used newspaper ads and ads on the local radio station and public access stations. Things that were relatively low cost that would not have worked at all [elsewhere], where they're into the internet, but were successful…where there's an older and more rural demographic." Another grantee found that community newsletters were the most effective marketing media in the area they served (Baltimore Research and Pinnacle Communications, 2013).

Eleven grantees reported using door-to-door canvassing as an outreach approach, with mixed results. Two grantees reported that few of the homes they reached through their canvassing efforts were interested in upgrades, either because the occupant did not own the home, the home was new and had limited energy savings opportunities, or the household was eligible for income-qualified direct installation programs. One grantee reported canvassing had been an effective strategy in their small target area, saying that door-to-door outreach helped to "put a face to the program, which was important." Another grantee stated that, while canvassing had helped her program identify effective program offerings, it was not scalable.

Community Based Approaches

Some grantees used competitions to leverage social motivations to encourage upgrades. Grantees described two primary approaches to these competitions, home energy makeover contests and competitions between areas, in each case with mixed results. At least two grantees implemented home energy makeover contests, publicizing the opportunity to win a free home energy upgrade and then using the winning home as a case study in ongoing publicity. A program stakeholder reported this approach had been successful for one grantee, while another grantee's program evaluation reported little uptake among the homeowners the contest generated as leads. Three other grantees reported using competitions around which town or neighborhood could save the most energy as a way to motivate participants in those areas to pursue upgrades. One of these grantees noted that this had been a successful strategy, while another reported homeowners in their area had felt that a competition was inconsistent with broad social benefits they saw in energy efficiency.

Branding Strategies

Twelve grantees discussed the importance of consistent branding. One grantee reported using the same name in several geographic regions, saying that consistency of the program name made the program recognizable across the state. "The rebates are the same, the measures are the same, and you don't know that there is one or twenty different grants and you really don't care." An evaluation of one grantee's program noted that the program's name added credibility to the program offer, both in community outreach activities and for the contractors (The Cadmus Group, 2013).

Labeling Strategies and Scorecards

Thirteen grantees incorporated some type of label or energy scoring system into their efforts to drive demand for energy upgrades. These grantees primarily used two energy labeling and scoring systems:[99]

- **Energy Performance Score (EPS):** Seven BBNP grantees provided the Earth Advantage Institute's EPS ratings to their participants. The EPS includes an estimate of the home's current energy consumption and associated carbon emissions, an estimate of energy consumption and carbon emissions were the homeowner to make the recommended improvements, and the usage of a typical home of comparable size in the grantee's service area.
- **Home Energy Score (HES):** Three grantees incorporated the HES, which DOE developed, into their BBNP programs. The HES draws on a relatively brief, walk-through audit of a home's major systems to generate a rating on a scale from one to ten, with ten representing the lowest energy use of homes of similar size. Like EPS, the HES provides an estimate of what the score would be were the homeowner to make the recommended improvements. HES also provides an estimate of annual energy cost savings likely to result from retrofits.
- **Other Labels:** Three other grantees used unique energy labeling and scoring systems, including one grantee that offered certificates for residents to document their participation in the program. These certificates allowed program participants to remain exempt from city codes requiring homes to receive an energy audit prior to sale.

Grantees suggested that, because homeowners do not widely recognize and understand home energy labels, they are most effective as part of an in-person sales process in which contractors or other program representatives can explain them to the homeowner. For example, one grantee reported that, while energy scores delivered through an online audit reached a large number of homeowners, few had gone on to make retrofits. Speculating that a more widely known score might have been more successful, this grantee said, "visitors were confused by what the score was and what it meant…The outreach team found that the…program was more successful when there was a direct, personal contact to help guide homeowners through the process."

In addition to using labels to drive demand, grantees reported using the data collected to generate energy labels to estimate energy savings resulting from upgrades and gather data on characteristics of the housing stock in their service areas.

[99] Both HES and EPS provide participants with asset ratings, assuming average values for variables influenced by the behavior of a home's occupants.

APPENDIX F. STIMULATING SUPPLY: DETAILED QUALITATIVE ANALYSIS

This appendix presents additional details not included in the body of the report on our data collection activities and findings regarding grantees' efforts and experiences in stimulating a workforce capable of supplying energy upgrades, including efforts to provide contractor training, set contractor eligibility requirements, and effectively manage contractor relationships. This chapter begins with a review of industry literature, followed by findings from the data collection activities conducted for this evaluation.

F.1. REVIEW OF INDUSTRY KNOWLEDGE

Contractors play a critical role in marketing many energy upgrade programs, since contractors may be the only actors present with the consumer as they decide whether to conduct an upgrade (Fuller et al., 2010). This section summarizes findings from the literature on contractor marketing, support, the existing workforce, and the challenges and benefits contractors can bring to energy efficiency programs.

F.1.1. BARRIERS TO CONTRACTOR MARKETING

Contractors have a great deal of potential to promote comprehensive energy upgrades, however, two main factors may prevent energy efficiency programs from taking full advantage of that potential: a limited supply of contractors and conflicting contractor motivations.

Supply of Energy Upgrade Contractors

Increasing the market penetration of energy upgrades will likely require programs to work with existing home improvement contractors. A report commissioned by the California Public Utilities Commission (CPUC) found that general home remodeling contractors and HVAC contractors complete most home improvement projects (KEMA, Inc., 2014). Dedicated energy efficiency contractors currently conduct relatively few home improvement projects.

The way homeowners typically select contractors further illustrates the importance of efficiency programs working with existing home improvement contractors. In the CPUC-funded study cited above, homeowners most often reported using contractors they had worked with before, found through word of mouth, or with whom they had a previous personal relationship. About half of participants contacted only one contractor (KEMA, Inc., 2014). Given this reliance on personal relationships, it may be difficult for new contractors offering energy efficiency services to break into the pool of contractors with whom homeowners have trusting relationships.

Some contractors, especially HVAC contractors, are starting to expand their services to offer whole home audits and measure installation (Cluett and Amann, 2014). However, the home improvement market is comprised mostly of small contractor firms, which may be at a disadvantage in offering energy upgrades (McEwen, 2012; KEMA, Inc., 2014). Large contractors are likely better able to absorb the upfront costs of entering the energy upgrade market, such as for training and equipment. Large contractors also may have the capacity to use audits as a loss leader, making up for audit labor costs with profits from measure installation work. Finally, larger businesses that operate in multiple fields may be able to draw on income from an established business area as they become established in the home energy upgrade market. Thus, large contractors may be important to a successful program, but reaching the

goal of increased market adoption of energy upgrades may require adoption by many small contractors (McEwen, 2012).

Despite the challenges small firms may face in entering the whole building energy upgrade market, studies have found that contractors are receptive to the opportunity to incorporate energy efficiency in their offerings. In one study on contractor behavior, researchers reported that while contractor awareness of whole home upgrade programs was low, reported interest in programs was high (Energy Market Innovations, Inc., 2012; NMR Group, Inc., 2012). Another study found that contractors more often had positive dispositions toward whole home or home performance concepts than negative dispositions (KEMA, Inc., 2014).

Conflicting Motivations

Because business interests are of primary importance to contractors, their actions and decision-making may not always align with the interests of efficiency programs. Contractors may focus on the measures that are easiest to sell or implement rather than taking a whole home approach (DOE, 2012). Contractors may decline to participate all together if they perceive limited customer demand for energy efficiency upgrades, since entering the home performance market involves considerable cost for the single-measure contractors that make up the majority of the home improvement market (SEE Action Residential Retrofit Working Group, 2011). Contractors also may be reluctant to participate in utility programs because of concerns over favoritism; that participation would provide greater benefits to some firms than others (Research Into Action, Inc., 2010). The sections below discuss actions programs have taken to address these divergent interests.

F.1.2. CONTRACTOR SUPPORT AND ENGAGEMENT

Contractor participation is key to program success, and contractors need to be fully engaged in a program for it to work effectively (Von Schrader et al., 2008). A review of the Home Performance with ENERGY STAR (HPwES) Program[100] found that "the most successful programs have developed contractor-centric programs."[101] For example, the same study cited the Energy Trust of Oregon as having a highly contractor-centric program by offering quality assurance; equipment and training reimbursements; a dedicated website; contractor mentoring and sales training; and a job completion incentive. A report published by the California Energy Commission stated that when programs provide this kind of support, contractors can gain skills and practical knowledge, which increases the quality of the workforce, the amount of long lasting savings, and consumer confidence (Brook et al, 2012). Providing these benefits also may encourage contractors to participate in energy efficiency programs, thus increasing the supply of experienced market actors (Von Schrader et al., 2008).

Three best practices for supporting and engaging the contractor market emerged from the literature: create and maintain good relationships with contractors, make participation easy for contractors, and provide value to contractors for their participation.

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100 The Home Performance with ENERGY STAR Program supports whole home energy upgrades through audits, recommendations to qualified contractors, and QA/QC of upgrade projects. http://www.energystar.gov/index.cfm?fuseaction=hpwes_profiles.showSplash

101 Ibid.

Maintain Communication with Contractors

Effective communication between the program and contractors is necessary to maintain positive contractor relationships. Frequent contact with contractors keeps them informed about the program, builds strong relationships and increases commitment to the program (Research Into Action, Inc., 2010). This may take the form of regularly scheduled phone calls, emails, in-person meetings, or seminars.

In particular, industry sources suggest it is important to communicate changes in the program or program staff to the contractor network (Research Into Action, Inc., 2010). In a report on the Green Jobs Green New York Residential program, evaluators stressed the importance of keeping contractors updated about program changes in a clear and timely manner (NMR Group, Inc., 2012). According to another report, "Having an easy process that allows for relationship development with contractors is a key element of successful upgrade programs" (McEwen 2012). By reaching out to contractors early and often and providing them with information about upcoming program offerings before those offerings are officially launched to customers, a program can demonstrate to contractors that they are an important partner in program delivery (Monroe and Budd, 2010).

In addition to communicating changes to the contractor network, also it is important that programs include "two-way communication" and coordination with contractors to allow their input into efficiency programs (Stiles, Matthews, and Spring, 2009). This bottom up approach can keep programs better attuned to the needs of the contractor network so the program can better support contractors.

Make Participation Easy for Contractors

An easy participation process is important for energy upgrade programs to attract high quality contractors. According to a report from Lawrence Berkeley National Laboratory, program design should take contractors into account and be consistent and streamlined (Fuller et al., 2010). A study of the Bonneville Power Administration's Trade Ally Networks listed strategies for ensuring a streamlined process:

- Maintaining a single point of contact.
- Establishing customer eligibility checks that are quick and easy.
- If possible, prequalifying or pre-approving customer segments.
- Reducing paperwork as much as possible; creating online or electronic forms for project data collection and submittal. Drop-down lists can reduce the potential for inconsistencies or errors.
- Aligning and coordinating with state energy programs or with the requirements of tax credits.
- Using prescriptive measures or approved measures whenever possible (Research Into Action, Inc., 2010).

Programs also may benefit by facilitating partnerships between contractors who cannot or do not want to perform the full scope of a whole home energy upgrade (DOE, 2012). Contractors that offer specialized services, such as HVAC installation, may partner with other firms or refer customers to contractors with other specialties with which they have a relationship.

Provide Value to Contractors for their Participation

Contractors must have a compelling business case to engage in energy efficiency programs. For smaller startup contractors, this case may be easier to make. Energy upgrade programs have been successful in aiding small startup contracting companies seeking to enter the market (Von Schrader et al., 2008). According to one report, "Home energy upgrade services offer new revenue opportunities to assist businesses operating between the start-up and growth phases of the business life cycle in generating work that can sustain them over the long-term" (DOE, 2012). Programs can offer value to contractors through training, financial incentives, and quality assurance and control (QA/QC) processes that build customer confidence in their services.

Training

Many efficiency programs provide training support or certification, which is valuable to contractors seeking to expand their market. Training and certification helps contractors differentiate themselves from others at relatively low costs. One market assessment conducted to support New York State Energy Research and Development Authority (NYSERDA's) Home Performance program found that, according to contractors, Building Performance Institute (BPI) certification can be a strong selling point for contractors to attract customers (Summit Blue Consulting, 2009). Given these benefits, programs have found contractors very interested in receiving training (Energy Market Innovations, Inc, 2012).

Program administrators have found that it is important to offer sales training in addition to building contractors' technical expertise, as contractors often play an important role in outreach (SEE Action Residential Retrofit Working Group, 2011). Apprenticeship or on the job mentoring approaches may be appropriate and may especially help new contractors, but have not yet been widely employed (Brook et al., 2012; Barger, 2012).

Nonetheless, more trained contractors is not always better. Programs may want to limit these offerings to avoid building a contractor workforce that is out of proportion with demand (Fuller et al., 2010). As a report by the California Energy Commission noted, "We know that for both contractors and trainees to benefit, workforce efforts must match marketplace needs in terms of scale, content, location, accessibility and cost; they should be well aligned with the local and regional markets they support, and the contracting industry should actively participate in assessing workforce needs so that training can focus on bridging existing skill gaps" (Brook et al., 2012). Essentially, programs need to be thoughtful and strategic about the types and amount of training they provide.

Financial Incentives

Training is not the only benefit energy upgrade programs can offer contractors. Some programs may offer direct incentives to contractors by rewarding the contractors based on project volume, target populations reached, or the comprehensiveness of upgrades completed (Fuller et al., 2010). Programs also may consider business financing for contractors. Programs may encourage comprehensiveness by offering access to lower-interest loans or larger rebates to contractors with more advanced training (SEE Action Residential Retrofit Working Group, 2011). A 2011 report by the SEE Action Residential Retrofit Working Group articulated the importance of providing financing options for contractors, saying that improved access to credit for product and service providers is necessary to create a supply of whole home contractors sufficient to carry out the number of upgrades program administrators hope to generate (SEE Action Residential Retrofit Working Group, 2011).

QA/QC Processes

QA and QC requirements both ensure contractor actions are consistent with program goals, and can provide a benefit to contractors when they are branded as 'quality installation' programs (Fuller et al., 2010; Cluett and Amann, 2014). In these cases, QA and QC requirements can build customer confidence in upgrades and trust in the work of their contractor (Fuller et al., 2010). Some evaluators recommend that programs should have a probationary or mentoring period or debarment policy as part of their quality assurance and control processes (Barger, 2012).

F.2. FINDINGS

We documented how grantees supported contractors, explored the role of contractors in driving demand, and examined the barriers and challenges associated with this role, as well as how programs supported the contractor market and stimulated the supply of qualified contractors in the comprehensive energy upgrade market. We drew from three data sources – listed in Table F-1 and summarized below – to assess grantees' experience with contractors.

Table F-1: Sources of Data on Grantees' Contractor Experiences

DATA SOURCE	GRANTEES PROVIDING DATA ON CONTRACTORS
In-Depth Interviews with Grantees	43
Grantee Web Survey	51
Grantee Data Summary Reports*	33

* Data are reported at the prime grantee level.

- **In-Depth Interviews with Grantees:** In the spring and summer of 2013, Research Into Action staff conducted interviews with managers of 46 grantee programs. Forty-three of those grantees discussed contractors during their interviews.
- **Grantee Web Survey:** In the spring and summer of 2013, Research Into Action asked grantee program managers to respond to a web-based survey in order to gather uniform data about grantees' program activities. Fifty-one grantees responded to the survey and reported on the kinds of support they did or did not offer to contractors.
- **Grantee Data Summary Reports:** In the winter of 2014, DOE staff prepared Data Summary Reports summarizing the data each of the 41 prime grantees had provided to DOE in their reporting from late 2010 to the end of September 2013. Grantees had an opportunity to comment on these reports. Thirty-three of these reports included data on grantees' experiences working with contractors and the support grantees provided to contractors.

In addition to these sources of information about grantees' experience with contractors, this section incorporates findings from grantee-led evaluations and the survey of residential participants in grantee programs conducted from May 2013 to April 2014 and the survey of residential nonparticipants, who live in areas served by grantee programs but made energy upgrades outside of those programs, conducted in October and November 2013.

F.2.1. ROLE OF CONTRACTOR IN UPGRADE MARKET

Nearly 80% of grantees (37 of 47) drew on trade ally contractors for residential audits, with most of the remaining grantees (6 of 47, 13%) using a program implementation contractor to conduct audits. Two grantees used both an implementation contractor and trade allies for audits, with the implementation contractor offering free, walk-through audits, while trade ally contractors offered more comprehensive audits (typically using diagnostic equipment). Eight programs provided online audits, although all but one of those programs also reported offering at least one in-person audit option.

At least three-quarters (35 of 47) of grantees appear to allow installers to conduct audits; the remaining 25% of grantees used a separate contractor for audits and upgrades. One grantee mentioned that they are moving towards this more integrated auditor/contractor model.

> *"If you can trust the contractors, the need for a separate auditor is not apparent. Integrating the two roles takes months/weeks out of the upgrade process. Unless there is a good relationship, the contractor has to repeat a lot of the auditor's work anyway. They won't rely on someone else's measurements because their profits are on the line. Things get sort of lost in the transition. A good auditor is a good auditor, whether working independently or with a contractor."*

Alternatively, another grantee found that with the help of an energy advocate to walk the participant through the process, having a separate assessor and contractor worked well for them.

> *"[Energy Advocates] then help the owner get an audit, understand the audit report, get contractor bids, and understand final inspection report. The auditor and contractor are market based, not program staff. A lot of homeowners get stuck after audit – I think overwhelmed. By cutting down on the number of contractors they have to choose from, we see more participation."*

F.2.2. ROLE OF CONTRACTORS IN DRIVING DEMAND

Contractors have the potential to play a key role in promoting energy upgrades. Across grantees, more than one-third (37%) of surveyed residential participants in BBNP-funded programs reported that they heard about their local BBNP energy upgrade program through a contractor, someone offering energy efficiency related products or services, or another professional source. This was significantly higher for surveyed participants in multifamily (45%) and commercial (63%) BBNP-funded programs. In one grantee-led evaluation, evaluators found that recruitment by contractors was the most common way participants entered the program (The Cadmus Group, Inc., 2013).

Most grantees recognized the important influence contractors have on customers' decisions to make comprehensive energy upgrades. More than half (56%) of grantees surveyed reported the upgrade contractor as a primary driver of upgrade sales, second only to financial incentives (90%). Additionally, during in-depth interviews, the majority (29 grantees, 67%) of grantees that discussed contractors mentioned the importance of auditors and upgrade contractors in selling an energy upgrade, including six grantees that stated that contractors are the *most* influential actor in selling upgrades.

Grantees cited three main factors that contribute to contractors' importance in the upgrade sale: contractors' ability to identify a high potential customer, contractors' presence at the point of purchase, and the amount of time contractors spend with customers. The following sections further describe these factors.

Contractors' Ability to Identify a High Potential Customer

Established contractors have existing customer relationships and processes for developing their customer base. Four grantees mentioned that contractors more often brought leads to their programs rather than relying on program-generated leads. One successful grantee's Data Summary Report mentioned that participating contractors generated 35-40% of their programs new leads for energy efficiency upgrades. In addition to generating leads, contractors also may have developed the ability to identify the customers with the greatest potential to complete an upgrade. As one grantee reported, "[Contractors] are in the best position to identify a high potential customer, identify prospects, make the sale and conduct work."

Contractors' Presence at the Point of Purchase

Contractors have a unique position as they are often the only program actors present at the time the customer makes the decision to do an energy upgrade. This opportunity to influence customers as they make the upgrade decision may be particularly important in convincing customers who approached the contractor for other reasons, like replacing broken equipment, to make an energy upgrade. If the contractors have experience with energy upgrades and are aware of the program, they can inform customers about the benefits of doing energy efficient upgrades and refer them to the program. One grantee explained it this way:

> *People's heaters go out in the winter or the AC goes out in the summer and it's an emergency. But because of the relationship that we have with our contractors that do the HVAC work, they're able to get to these guys right at the point of purchase and say, 'you really should get an ENERGY STAR unit…because you can get a rebate to offset the cost…You didn't pay any difference out of pocket, or very little, but you're going to make your money back in a heartbeat now.'*

This grantee noted that it was critical that the program have a relationship with the contractor base in order for contractors to be able to refer potential customers to the program.

Amount of Time Contractors Spend with Customers

Contractors, particularly those conducting audits, gather a great deal of information about the energy efficiency opportunities in a potential participant's home, as well as the homeowner's specific concerns. Grantees stated that this information, as well as the relationships contractors build as they work with customers, were an asset in motivating customers to make energy upgrades. Grantees (8 mentions) reported that, in selling energy efficiency upgrades, contractors draw on the audits and their experience to explain the customers' options and next steps as well as the non-energy benefits the customer may experience. Grantees also (6 mentions) reported that contractors use cost savings and incentives to sell energy upgrades. One grantee stated that the contractor that conducts the audit is the most instrumental actor in selling the upgrade, elaborating that "The person who does the home energy audit – that person is spending three hours in the home with the homeowner, [they] have the biggest opportunity."

F.2.3. LIMITATIONS TO CONTRACTOR MARKETING OF PROGRAMS

While contractors have a great deal of potential to promote comprehensive energy upgrades, a variety of factors may prevent energy efficiency programs from taking full advantage of that potential. Grantees noted that contractors may lack effective sales skills; that contractors' motivations may differ from those of the program; and, in some cases, the supply of quality contractors may be insufficient. Six grantees mentioned challenges finding contractors with specific skills.

Supply of Contractor Market

The proportion of highly skilled audit contractors (60%) and upgrade contractors (48%) was significantly higher among nonresidential programs (Table F-2). One grantee suggested that this may reflect the greater sophistication required for contractors to sell and complete projects in the nonresidential sector. According to this grantee: "It's a lot easier to hold out a shingle on the residential side. Anybody can be a handyman, but not anybody can go into a commercial building and sell their services."

Table F-2: Proportion of Audit and Upgrade Contractors with High Skill Level Prior to Program Involvement–Nonresidential Programs

PROPORTION	AUDIT CONTRACTORS [A] [B] (N = 25)	UPGRADE CONTRACTORS [B] [C] (N = 27)
Most	60%	48%
Some	16%	22%
Few	8%	7%
None	4%	0%
Not Relevant to Program	0%	7%
Don't know	12%	15%
Total	*100%*	*100%*

[a] One respondent did not provide a response for the "moderate skill level" category. Source: Q21 and Q35

[b] Residential is significantly different than nonresidential.

[c] One respondent did not provide responses for "moderate skill level" or "low skill level

Sales Skills

Grantees reported that, while some contractors may have strong technical skills, they may lack the skills necessary to sell energy upgrades effectively. As one grantee stated, "the conventional wisdom is that the contractor sells. But that has holes. The trades are a humongous resource and partner. This is what they do for a living. But they [are not good] at selling." Similarly, another grantee described a "huge disparity" between contractor firms with dedicated sales staff and those without.

Grantees suggested that an important contributor to the challenges many contractors faced in selling retrofits was the need to communicate technical building science information in a way that was approachable to home and building owners. Three grantees mentioned that the information contractors provided to customers was overwhelming and caused some customers to lose interest. According to one of these grantees, it was important for contractors to "eliminate the jargon, get away from building science talk. Talk more about the needs of the homeowner and the problems they have with their home."

As discussed further below, many grantees offered sales training to improve contractors' ability to communicate the value of energy upgrades to potential customers.

Conflicting Motivations

Grantees and the contractors in their networks both promoted energy upgrades, but their motivations for doing so differed. Grantees sought to complete upgrades in order to meet their retrofit and energy savings goals, while contractors ultimately needed to earn a profit from the upgrade work they completed. Some grantees reported challenges in aligning these differing motivations.

For example, grantees suggested that, in order to make a profit, some contractors may overprice or upsell customers a product they do not need. One successful grantee reported that, "contractors have a great knowledge base, but they have skin in the game, which can lead a homeowner into something that's not in their best interest." This grantee also noted that it was difficult to motivate contractors not already working to standards like those promoted by BPI to complete retrofits at the level of quality the program sought. In one grantee-led evaluation, evaluators reported that many contractors significantly over-estimated savings customers would achieve, and there was an incentive for them to do so because rebates were based on estimated savings (Arizona State University Global Institute of Sustainability, 2014). Other challenges grantees noted that may stem from contractors' profit motives include contractors overpricing services and failing to inform customers about program requirements and local regulations at the outset of their projects.

Some grantees anticipated that contractors' profit motives and financial stake in the upgrade decision may limit their credibility among home and building owners, with four grantees specifically mentioning distrust of contractors as a barrier that programs need to overcome. Less than half (43%) of nonparticipants who completed energy upgrades in the past year reported that contractors conducted these upgrades, while the majority (70%) reported doing the upgrades themselves.

Despite grantees' concerns about contractors' credibility, surveyed participants in BBNP-funded programs were largely satisfied with their contractors. Residential participants rated their satisfaction highly (7-10 on a scale of 0-10) for the activities of their insulation contractors (85%), equipment contractors (87%) and person who visited their home, such as an auditor (90%).

F.2.4. CONTRACTOR SUPPORT AND ENGAGEMENT

Grantees used a variety of tactics to increase the availability of skilled contractors and avoid conflicts between the interests of the program and contractors that might arise from the contractors' profit motivation. In addition, grantees described the importance of frequent communication in effectively managing a contractor network.

Contractor Awareness of Programs

Across grantee service areas, more than one-quarter (27%, n = 446) of the nonparticipating surveyed contractors were aware of the local BBNP program. A majority of contractors that were aware (55%, n = 267) participated at some point in the program, and most of those (73%, n = 115) reported participating actively. Active participants had most often (64%, n = 84) been active since the program began (Table F-3).

Table F-3: Type of Program Participation (n = 115)*

TYPE OF PARTICIPATION	COUNT	PERCENT
Actively from the beginning	54	47%
Actively but only after the program was underway	30	26%
From the beginning but not actively	12	10%
After the program was underway but not actively	9	8%
Don't know	10	9%

* At the start of survey fielding, our requisites for asking contractors this series of questions were stringent, resulting in small sample sizes. As such, some participating contractors are not included in the base. During our second round of calling, we changed the requisite to include anyone confirming participation.

Managing Competing Motivations

Grantees discussed three tactics for ensuring that contractors acted in ways that were consistent with programs' goals of maximizing energy savings and achieving customer satisfaction: requiring contractors to meet qualification requirements and providing lists of qualified contractors; conducting and promoting quality assurance testing; and making an independent energy advisor available to participants.

Contractor Certification and Qualification Requirements

Grantees used certified contractor lists to foster customers' trust in contractors and facilitate contractor selection. The majority of grantees (67%) reported that residential participants selected an upgrade contractor from a list of pre-approved contractors; few reported that the program selects the contractor (17%), that the participant selects any contractor they choose (13%), or that audit contractors partner with upgrade contractors (2%).[102] In their in-depth interviews and summary reports, twenty-two grantees (including 7 of 11 successful grantees) mentioned specific requirements contractors must meet in order to complete upgrades through the program, including BPI certification and quality standards their work must meet. Seven grantees reported maintaining a list of qualified contractors that they provided to customers. Two grantees took a more formal approach, using a request for proposal (RFP) process to select contractors eligible to work in the program.

Grantees supported contractors in obtaining the certifications necessary to be on their qualified contractor lists, and reported that these certifications helped to build participant trust. More specifically, thirteen grantees reported requiring contractors to be BPI-certified, and twelve mentioned helping contractors obtain this certification. Two of these grantees stated that requiring BPI certification helped to overcome participants' skepticism of program offerings, with one grantee noting that contractor certification made customers "more confident and reassured."

To further build participants' confidence in the contractor they select and to facilitate the selection process, three grantees pursued options for rating contractors or recommending specific contractors. One grantee developed a contractor 'scorecard' rating system based on contractors' performance and ability to meet standards. This allowed

[102] One grantee did not provide a response

the program to weed out poor performing contractors and support well performing contractors. Also it provided potential participants with a high level of transparency. Another grantee directly recommended contractors to customers. This grantee only recommended contractors that were BPI-certified and whose work they evaluated.

These types of recommendation and rating systems could potentially put a grantee's reputation at risk if a contractor they recommend performed poorly. One grantee noted that there was some concern within their organization about recommending a particular contractor because conflicts between the contractor and customer may reflect poorly on the organization and the program. As a result, this grantee was careful not to specifically recommend certain contractors. Grantees also noted that publishing contractor ratings may generate pushback from lower-rated contractors. One grantee that maintained a list of highly rated contractors noted that some contractors were upset they were not included in the list. Nonetheless, this grantee believed that the list motivated contractors to improve their performance, and that contractors that put effort into the program and were serious about home performance viewed the rating positively.

Quality Assurance and Control (QA/QC)

In in-depth interviews, 24 grantees discussed benefit of having QA/QC practices. Many grantees conducted QA on a sample of each contractor's work. Grantees typically sampled more of a given contractor's projects early in their participation in the program and less over time once the contractor had proven a high level of performance. For additional detail on grantees' QA/QC procedures, see Section 0.

Three grantees specifically cited QA/QC tools as ways to mitigate conflicts between the program's efforts to maximize energy savings and best serve participants and contractors' profit motivation. According to one of these grantees, "programs that neglect QA for contractors do not get the same kind of results." Another stated that half of the building owners participating in their program reported that the program's third-party quality assurance was one of the factors that convinced them to move forward with upgrades. One successful grantee described the process as "a mentoring opportunity, where contractors can see how their work can be improved and where a pattern might be emerging where additional training for staff could be useful."

A third grantee described efforts to help contractors manage customers in a way that would build the customers' trust in the contractors. This grantee gathered information about the customer before the audit and provided that information to the customer's contractor so the contractor could anticipate the customer's needs and questions. This grantee also provided customers with support and follow-up after the audit.

F.2.5. GRANTEES' INFLUENCE ON THE CONTRACTOR MARKET

Grantees perceived that programs have had a positive influence on the contractor market. In in-depth interviews, 21 grantees reported that their programs contributed to growth in the number of contractors capable of providing comprehensive energy upgrades to their programs, and increases in the size of contractor firms offering comprehensive upgrades. Two grantees suggested that this increase in supply of experienced contractors reflects the creation of a market for comprehensive energy upgrades that did not previously exist in their service territories. In their summary reports, two grantees, one in the most successful cluster, noted that participating contractors had to hire more professionals to meet demand. One grantee discussed the benefit of providing training to contractors by enabling them to diversify their skillset into the energy efficiency field.

In addition to building the larger energy upgrade market, grantees noted that their energy efficiency programs have had a positive impact on individual contractors' business. The benefits these grantees cited ranged from helping small contractors grow their businesses, to simply providing contractors with enough activity to remain in business. According to one grantee, "Some of these guys were struggling [due to the recession], and if I, [as program manager], come walk in the door and say, 'Hey, I think I can help you generate some more business,' I think that's helped us." Another grantee stated that, at the end of the grant period, contractors reported that they were busier than they had been in previous years. This grantee noted that some of this increase in business may reflect the economy rebounding, but also she stated that building owners are considering energy efficiency when making building upgrades more than they did in the past.

Grantees were optimistic that their programs would have a lasting impact on the comprehensive energy upgrade market. Seven grantees reported that, because of their programs, comprehensive energy upgrades had become a more common practice for contractors. These grantees anticipated that contractors would continue to market comprehensive upgrade services after BBNP-funded programs had ended. One grantee also noted that as contractors have increased their experience with energy upgrades, they require less support from the program. In addition to increased contractor capacity to complete energy upgrades, two grantees reported that consumers were increasingly asking for energy upgrade services and qualified contractors to provide them.

APPENDIX G. FINANCING: DETAILED QUALITATIVE ANALYSIS

This appendix presents additional detail not included in the body of the report on our data collection activities and findings regarding grantees' efforts to make attractive financing available to their participants. It begins with a literature review of industry knowledge related to energy efficiency financing, followed by findings drawn from interviews and surveys of grantees, their financial partners, participants and nonparticipants, and a review of program data.

G.1. REVIEW OF INDUSTRY KNOWLEDGE

Financing has the potential to benefit energy efficiency programs in two ways: first, in the short term, financing can overcome barriers associated with lack of access to funds that prevent home and building owners from making energy upgrades. Second, in the longer term, financing can create a self-sustaining mechanism of funding that effectively leverages private capital without on-going infusions of public money.

As jurisdictions around the country strategize to meet higher energy efficiency goals, program administrators are increasingly turning to financing programs as a way to attract more private capital to energy upgrades. Drawing on these efforts, industry literature tends to focus on the role of financing in making the energy upgrade sale and on encouraging financial markets to embrace financial products targeting energy efficiency. This section summarizes findings from the literature in each area.

G.1.1. ROLE OF FINANCING IN DRIVING DEMAND

By allowing program participants to pay for their energy upgrades over time with energy cost savings, financing can mitigate the upfront costs of energy upgrades. Financing products also can be structured to overcome additional barriers, such as reluctance to upgrade leased space, and commercial customers' reluctance to acquire more debt. This section examines how financing contributes to upgrade demand by overcoming these barriers.

Overcoming First Cost Barriers

Program-supported financing primarily addresses first cost barriers by allowing customers to delay payment for months or years (SEE Action Financing Solutions Working Group, 2014; Lawrence Berkeley National Laboratory, & Harcourt Brown & Carey, Inc., 2013). Access to attractive project funding options is important in overcoming financial barriers, however, other factors can play a substantial role in inhibiting widespread uptake of certain energy upgrades. For example, a baseline characterization of the whole home energy upgrade market in California stated that "We believe that lack of awareness and understanding of the [whole home/Home Performance] value proposition constitutes a more decisive barrier to participation…than consumers' financial constraints" (KEMA, Inc., 2014). This opinion is supported by a report by the National Home Performance Council, which states that a combination of high monetary and non-monetary costs (in terms of managing and coordinating contractors), long payback periods, and uncertainty that predicted energy savings will be realized limit the appeal of whole home energy upgrades (Lebaron and Saul-Rinaldi, 2013).

Because of the importance of barriers other than first cost, industry sources emphasize that program administrators should use financing as an element of a larger program designed to drive demand and facilitate the participation

process. The State and Local Energy Efficiency Action Network (SEE Action) Financing Solutions Working Group's *Roadmap for the Home Energy Upgrade Market* states, "The availability of attractive financing by a program, on its own…is not a silver bullet to increasing demand for home energy upgrades" (SEE Action Residential Retrofit Working Group, 2011).

Although both incentives and financing can help overcome first cost, incentives have historically proven more attractive to participants than financing. When forced to choose between incentives and financing, program participants typically select incentives, and programs that have achieved high volumes of loans for comprehensive upgrades typically allow participants to use both incentives and financing (GDS Associates, Inc., 2012; DOE, 2012; Zimring et al., 2014). This preference for incentives may reflect the ability of incentives to lower the overall cost of upgrades, rather than simply reducing or eliminating upfront costs (LeBaron and Saul-Rinaldi, 2013). Because of the role incentives can play in driving demand for energy upgrades, programs must strike a balance between offering incentives and relying on financing, which more heavily leverages private funds and thus may be more sustainable (Fuller et al., 2010; DOE, 2012).

While financing may not greatly increase demand for energy upgrades, it can be as effective as a sales tool to address the concerns of interested consumers. A market characterization for NYSERDA's Green Jobs-Green New York financing program found that 95% of the surveyed contractors recommended financing options to customers, and a majority speculated that the availability of financing allowed customers to complete larger upgrades. Contractors were the most common source of awareness of the program's financing offer and that 69% of participants who discussed financing with contractors rated their contractors' advice as influential in their decisions regarding how to finance their upgrades (NMR Group, Inc., 2012). By allowing contractors to offer financing directly, rather than requiring participants to contact a financial institution, programs also can streamline the participation process (DOE, 2012; Harcourt Brown & Carey, Inc., 2011).

Other Barriers

Some energy efficiency financing products, particularly those repaid on utility bills or through property tax assessments, are able to overcome other barriers. For example, one option frequently discussed, but rarely used, involves assigning repayment responsibility to the utility meter or property tax bill in such a way that the obligation can be transferred to future property owners. This may help overcome barriers associated with long payback periods that could prevent homeowners, or renters, from making upgrades if they expect to leave the property before the end of the payback period (Lawrence Berkeley National Laboratory and Harcourt Brown & Carey, Inc., 2013; Zimring et al., 2014).

Tying loans to the utility meter also may help to address building owners' reluctance to make energy upgrades if the resulting energy cost savings would primarily benefit their tenants. If the loan is tied to the tenant's meter, the building owner may be able to pass upgrade costs through to their tenants without increasing the tenants' overall monthly costs (Zimring, 2014b). Businesses also may be able to treat payments for loans repaid on their utility or property tax bills as "off balance sheet" operating expenses, rather than traditional debt, a distinction that could be beneficial to companies motivated to minimize the amount of debt their balance sheets report (Zimring, 2014b; Lawrence Berkeley National Laboratory and Harcourt Brown & Carey, Inc., 2013).

Nonetheless, a report by the SEE Action Financial Solutions Working Group points out that these potential benefits are largely untested. Potential purchasers may require that the original borrower either discount the sales price of a

property to account for a loan attached to the property or meter or pay off the loan at sale. Regarding commercial lending, businesses and their accountants ultimately must determine what constitutes operating expenses and what constitutes debt, and they may determine that, regardless of the payment structure, efficiency financing should be treated as traditional debt (Zimring, et al., 2014).

G.1.2. FINANCIAL MARKET ACCEPTANCE OF ENERGY EFFICIENCY PRODUCTS

Creating a self-sustaining market for energy efficiency financing is a long-term goal of many energy efficiency programs. For a self-sustaining market to exist, financial institutions must value energy efficiency financial products, which ultimately depends on their profitability. Two factors contribute to the profitability of energy efficiency lending for financial institutions: the financial products' risk profile and the size of the loan portfolio. Efficiency programs have taken steps to influence both factors.

Energy Efficiency Loans as Low-Risk Investments

Energy efficiency programs frequently seek to demonstrate that energy efficiency loans are low-risk and thus should be an attractive investment. Demonstrating that these loans have low default rates is particularly important for programs that seek to expand access to financing to borrowers with lower credit scores. These programs operate on the theory that borrowers making energy efficiency improvements will experience energy cost savings, increasing the income available to repay their loans and reducing the risk of default (Zimring, et al., 2013). A reduced likelihood of default, should, in turn, justify lenders offering lower interest rates, longer loan terms, or broader access to financing (Zimring, 2014b; Harcourt Brown & Carey, Inc., 2011). However, financial institutions have been reluctant to assume borrowers will have a lower default risk when designing financial products for energy efficiency (Zimring, 2014b).

A lack of standardized, historical data on the repayment of energy efficiency loans contributes to financial institutions' reluctance to treat energy efficiency loans differently from other types of financial products. Relatively few energy efficiency financing programs have been operating long enough to generate data on loan performance over a sufficient time period (Zimring et al., 2013; Thompson et al., 2014). In addition, programs differ in their data reporting, making it difficult to compile large enough sets of comparable loan performance data to draw conclusions compelling to financial institutions about the risk of energy efficiency loans (Zimring, 2014a).

Efficiency programs have used credit enhancements like loan loss reserve funds[103] to reduce lender risk. In the short term, these funds may motivate lenders to offer financing on more attractive terms or lend to borrowers who might not otherwise qualify (Zimring et al., 2011; Zimring, 2014b). One industry source estimates that loan loss reserves have the potential to lower interest rates to the consumer between three and five percent (Harcourt Brown & Carey, Inc., 2011).[104] In the longer term, by motivating financial institutions to participate in the energy efficiency lending market, credit enhancements may help financial institutions gain experience and data on the level of risk of efficiency loans (SEE Action Financing Solutions Working Group, 2014; Zimring, 2014b).

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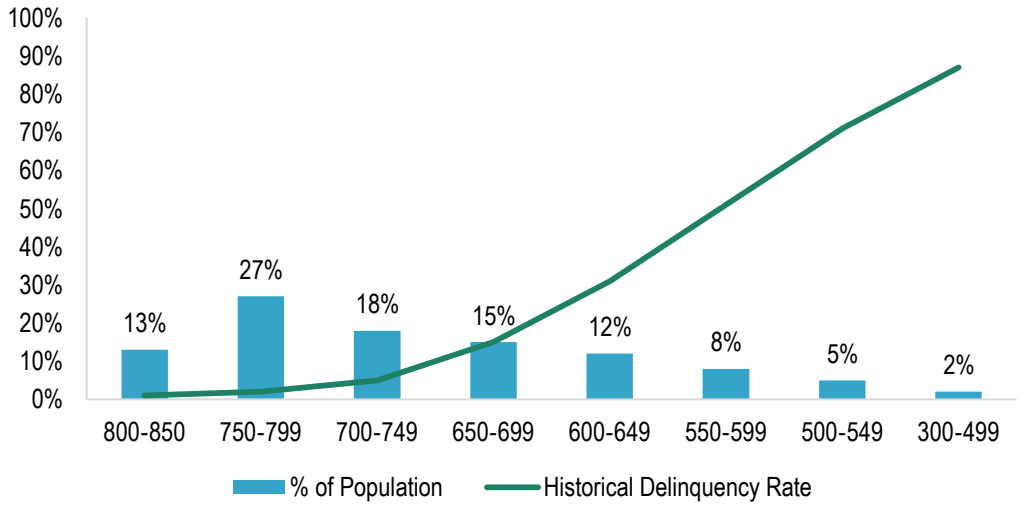
103 Loan loss reserve funds set aside an amount equal to a proportion of each loan made (frequently between 5% and 20%) to repay much of lender's losses if a loan defaults.

104 For a typical unsecured loan, this would equate to a reduction in the interest rate from approximately 13% to approximately 9%.

The assumption that energy efficiency lending reduces the risk of default is central to efficiency programs that seek to expand financing to those who might not otherwise have access. While these programs hope to achieve broad uptake of energy efficiency retrofits, they do not intend to burden participants with debts they are unable to repay (Zimring et al., 2013; Zimring et al., 2011; Harcourt Brown & Carey, Inc., 2011). Lenders look to credit scores as the primary indicator of a borrower's ability to repay a loan (Bell, Ferrante, and Hewitt, 2014). A majority of the population (58%) has FICO scores above 700, and would likely qualify for financing in the absence of subsidies. Delinquency rates increase notably, however, for borrowers with credit scores below 700 (Figure G-1).

Figure G-1: Distribution of FICO Scores and Relationship to Delinquency Rates



Adapted from Transunion, 2009, cited in Harcourt Brown & Carey, Inc. "Energy Efficiency Financing in California: Needs and Gaps." Report to The California Public Utilities Commission, Energy Division. July 8, 2011.

In addition to the borrower's credit history, the type of security associated with a loan can influence the level of risk the lender faces. Lenders may offer more favorable terms for loans that are secured by an asset the lender could repossess if the borrower fails to pay, such as a car (Zimring, 2014b). For example, the U.S. Department of Housing and Urban Development's Power Saver loan requires either a first or second lien on the borrower's home for loans above $7,500 (Zimring and Hoffman, 2010). While highly secure, requiring liens can increase the complexity and time required to qualify participants and may be less attractive to homeowners wary of attaching additional loan obligations to their homes (Zimring, 2014a; Zimring and Hoffman, 2010; Thompson et al., 2014). Thus, it may be difficult for programs to secure their loan products while maintaining a quick and simple financing qualification process, which multiple industry sources cited as a best practice (Lawrence Berkeley National Laboratory and Harcourt Brown & Carey, Inc., 2013; Von Schrader et al., 2008; LeBaron and Saul-Rinaldi, 2013; Harcourt Brown & Carey, Inc., 2011).

To facilitate the loan qualification process, efficiency programs may offer unsecured loans or financial products like on-bill loans[105] secured by the threat of disconnection (SEE Action Financing Solutions Working Group, 2014). On-bill programs have experienced low default rates, regardless of the presence of disconnection for nonpayment (Zimring et al., 2014). Although not all were familiar with the concept, small and mid-sized lenders attending a meeting convened by the American Council for an Energy Efficient Economy (ACEEE) agreed that on-bill financing products' "purported ability to act as a credit enhancement and lower default rates" could encourage them to relax underwriting standards and thus lend to a larger segment of the population (Bell et al., 2014).

Uptake of Energy Efficiency Loans

Residential energy efficiency loans are typically less than $10,000, and result in less interest income for investors than larger loans, like home mortgages.[106] These types of financial products can be profitable for financial institutions if loans can be made in high volumes. Achieving high loan volumes requires both demand for energy efficiency loans and secondary markets that can purchase the loans, providing capital to expand the financial institutions' ability to lend (Zimring et al., 2013).

Demand for Financing

Whole home programs have typically experienced relatively low uptake of their financing products, with between 10% and 20% of participants using program-sponsored financing (SEE Action Residential Retrofit Working Group, 2011).[107] Industry sources suggest two factors influence uptake of financing offerings:

- **Demographics of program participants:** Homeowners undertaking whole home retrofits tend to be affluent and are likely to have cash or access to other attractive financing options; they may not need program-supported financing (KEMA, Inc., 2014). Even middle-income households have historically conducted a majority of their home improvements without using financing (Zimring et al., 2011).
- **Economic conditions:** Economic conditions have the potential to influence uptake of energy efficiency financing offerings in two ways. First, economic conditions affect the accessibility and attractiveness of financing in general and thus the attractiveness of program-supported financing relative to participants' other options (Zimring et al., 2013). For example, uptake of program-supported financing may increase if a program is able to maintain low interest rates when interest rates for other financial products rise. Second, economic conditions influence participants' willingness to take on debt or invest in their homes. For example, following the 2009 recession, homeowners were less certain of the value of their homes and less confident in their future income and became reluctant to take on new debt (Zimring et al., 2011). This may have posed a particular challenge for ARRA programs, which sought to stimulate economic growth.

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105 On-bill financing allows home and building owners to incorporate payments on energy efficiency loans into their utility bills.

106 A 2011 review of 24 energy efficiency lending programs across the U.S. found an average residential loan amount of $9,100. Hayes et al. (2011, September 21). *What Have We Learned from Energy Efficiency Financing Programs?*

107 BBNP grantees experienced higher uptake of energy efficiency loans, averaging 25% in the residential sector.

Secondary Markets

In order to make energy efficiency loans in high volumes, financial institutions need both strong demand for the loans and the capital to meet that demand. A financial institution may use the loan principal it collects from existing borrowers to make new loans. Lenders can restore their available capital much more quickly by packaging the loans they have made to sell to investors as securities (Harcourt Brown & Carey, Inc., 2011). Sales of bundled loans to investors on secondary markets have the potential to increase a program's capacity to lend by providing an influx of new capital with which to fund additional loans (Lawrence Berkeley National Laboratory and Harcourt Brown & Carey, Inc., 2013).

Elements of a financial product's design have the potential to influence a program's ability to attract secondary market investors. Multiple industry sources noted that, in order to bundle loans into larger financial products, programs must establish standard protocols for originating and servicing the loans (SEE Action Financing Solutions Working Group, 2014; Zimring et al., 2013). Loans made based on traditional underwriting criteria (like credit scores) may be more attractive to investors than loans based on non-traditional underwriting criteria (like utility bill repayment history) (SEE Action Financing Solutions Working Group, 2014; Bell et al., 2014; Thompson et al., 2014). In weighing program design considerations, it is important for program managers to consider the urgency with which their programs will likely need to raise additional capital. Some programs may have ample lending capacity and thus may not need to prioritize designing financial product attractive to the secondary market (Zimring et al., 2013).

Recently, organizations have emerged to support energy efficiency programs interested in accessing secondary financial markets. For example, the Warehouse for Energy Efficiency Loans (WHEEL) partners with energy efficiency program administrators to purchase and package residential energy efficiency loans. WHEEL then submits the packaged loans to ratings bureaus, so the securities the loans back will have investment-grade ratings like those other financial products receive (DeVries, 2014). The states of New York and Connecticut also have recently established green banks that may play a similar role in bundling energy efficiency loans into investment-grade products as part of their larger efforts to support energy efficiency financing (Griffin, 2014; Schub, 2014). Program administrators in New York and Oregon completed the first sales of energy efficiency loans on the secondary market in 2013 and 2014 (Pitkin, 2014). These sales included credit enhancements to make the bundled loans more appealing to investors (Thompson et al., 2014).[108]

G.2. FINDINGS

This section documents the steps grantees took to develop and offer financing products, explores the challenges of providing energy efficiency financing to program participants, and assesses the relationship between the financing process and grantee success. We drew on six data sources – listed in Table G-1 and summarized below – to assess grantees' experience offering financing products.

[108] Subordinated capital is first to absorb any losses an investment portfolio sustains. Senior capital does not absorb losses until the portfolio's losses exceed the amount of subordinated capital available.

Table G-1: Sources of Data on Grantees' Financing Programs

DATA SOURCE		GRANTEES PROVIDING DATA ON FINANCING
In-Depth Interviews with Grantees		43
In-Depth Interviews with Financial Partners		20
Grantee Web Survey*		38
Grantee Data Summary Reports**	Spending Data	36
	Output Data	31
BBNIS Project Database**		31
Grantee-led Evaluations		11

* Includes grantees that reported discussing residential financing with at least one organization and reported that at least one organization offered financing to residential participants.

** Data are reported at the prime grantee level.

- **In-Depth Interviews with Grantees:** In the spring and summer of 2013, Research Into Action staff conducted interviews with managers of 46 grantee programs. Forty-three of those grantees discussed financing during their interviews.
- **In-Depth Interviews with Financial Partners:** In the fall and winter of 2013, Research Into Action staff conducted interviews with staff of 20 financial institutions that had partnered with BBNP grantees. The interviewed financial institutions were selected to represent a diversity of financial institution types and geographic regions.
- **Grantee Web Survey:** In the spring and summer of 2013, Research Into Action asked grantee program managers to respond to a web-based survey in order to gather uniform data about grantees' program activities. Fifty-one grantees responded to the survey, and of those, 38 reported both that they had approached at least one organization about offering financing to their residential participants and that at least one organization offered financing.
- **Grantee Data Summary Reports:** In the winter of 2014, DOE staff prepared Data Summary Reports summarizing the data each of the 41 prime grantees had provided to DOE in their reporting from late 2010 to the end of September 2013. Grantees had an opportunity to comment on these reports. Thirty-six of these reports included data on grantees' use of grant funds to support revolving loan funds, loan loss reserves, and interest rate buy-downs. Thirty-one of these reports included data on the outputs of grantees' financing programs, including the number of loans made and the total amount loaned.
- **BBNIS Project Database:** DOE collected data on each retrofit project grantees reported in its BBNIS database. Among the 41 prime grantees, 31 include information on whether a project received a loan and, if so, the loan amount in their reporting.
- **Grantee-led Evaluations:** Over the course of the BBNP grant period, some grantees oversaw evaluations of their own program activities. Eight of these evaluations, covering 11 grantee programs, included findings related to energy efficiency financing.

In addition to these sources of information about grantees' experience offering energy efficiency loans, this section incorporates findings from the survey of residential participants in grantee programs conducted from May 2013 to April 2014 and the survey of residential nonparticipants, who live in areas served by grantee programs but made energy upgrades outside of those programs, conducted in October and November 2013.

G.2.1. USE OF PROGRAM FUNDS TO ENHANCE FINANCING PRODUCTS

Loan Loss Reserve Funds

Loan loss reserve funds were the most common strategy grantees used to influence financial markets. Grantees reported that loan loss reserves brought capital into the energy efficiency lending market and motivated lenders to lower interest rates, use more inclusive underwriting criteria, and consider non-traditional metrics like utility bill payment history in underwriting.

Interviews with grantees' financial institution partners support the assessment that loan loss reserves helped to increase the availability and attractiveness of loans for energy efficiency retrofits. Many financial institution partners indicated that the loan loss reserve was important in their decision to offer loans for energy efficiency. In particular, respondents noted that many energy efficiency loan products are unsecured. While unsecured loans can reach a broader population, also they pose greater risk to financial institutions. Loan loss reserves shift a portion of the risk of unsecured lending to the program rather than the financial institution. As one financial partner noted, "the loan loss reserve is critical for any kind of material yield on these loans, even with the few losses that we have."

Revolving Loan Funds

A primary advantage of revolving loan funds[109] according to grantees is the flexibility inherent in grantee control to establish lending criteria complementary to the goals of the grantee's program. According to one grantee, "Because we have our own revolving loan fund, we've had the ability to establish underwriting criteria that helped expand financing to households that have, in the past, been denied by traditional lenders." Two grantees reported turning to revolving loan funds after unsuccessful attempts to establish financing products that met their needs through other mechanisms. One grantee had initially attempted to establish an interest rate buy down but found the costs prohibitive, and the other encountered lower than expected financial institution interest in partnering on a loan loss reserve.

Interest Rate Buy-Downs

Interest rate buy downs may make financing more attractive to qualified borrowers, but are unlikely to make financing for energy efficiency projects available to borrowers who would not otherwise have access. Financial partners that applied interest rate buy-downs[110] on behalf of grantees reported that buy-downs are an effective way to increase interest in financing, especially when used to reduce interest rates to zero or near zero. Interest rate buy-downs can

[109] Revolving loan funds are pools of capital program administrators use to fund loans directly, rather than seeking to motivate financial institutions to create special loan offerings using their own capital.

[110] Interest rate buy-downs are payments to compensate financial institutions for the reduced income they earn by offering loans at a lower interest rate.

be relatively easy for financial institutions to implement because they can be used with existing loan products and thus eliminate the need to train staff on a new product. Unlike loan loss reserves and revolving loan funds, however, interest rate buy-down funds are not regenerated as loans are paid back, and financial partners reported that interest in upgrades waned when buy-down funds ran out and interest rates returned to normal.

G.2.2. PROGRAM FUNDS AND GRANTEE SUCCESS

Data from Grantee Data Summary Reports show no clear relationship between grantees' approach to supporting residential energy efficiency lending and their success (Table G-2). For example, while a majority (75%) of the grantees in the least successful group reported using BBNP funds for a loan loss reserve, a majority of the most successful grantees (71%) also used BBNP funds for loan loss reserves.

Table G-2: Types of Residential Financing Support Offered by Grantee Success, Based on Spending Reported to DOE (n = 30)

TYPE OF FINANCING SUPPORT	MOST SUCCESSFUL (N = 7)		AVERAGE (N = 19)		LEAST SUCCESSFUL (N = 4)	
	Count	Percent	Count	Percent	Count	Percent
Loan Loss Reserve	5	71%	12	63%	3	75%
Revolving Loan Fund	3	43%	12	63%	1	25%
Interest Rate Buy-Down*	3	43%	10	53%	1	25%

* Interest rate buy down spending was not differentiated by sector. Data presented here are for all grantees that both devoted BBNP funds to an interest rate buy down and offered residential loans.

In contrast to the residential focus of Table G-2 (above), Table G-3 summarizes the financing support provided by grantees across all program types. Although both the residential and nonresidential programs of grantees may have included a financing option, the column "count" provides the count of unique grantees that offered the type of financing.

Table G-3: Funding Allocated to Financing, by Type of Financing Support (n = 37)

TYPE OF FINANCING SUPPORT	COUNT OF GRANTEES	FUNDING ALLOCATED ($ MILLIONS)
Loan Loss Reserve	27	$74.6
Revolving Loan Fund	22	$67.7
Interest Rate Buy-Down*	15	$10.5
Total	37	$152.8

G.2.3. PARTNERSHIPS WITH FINANCIAL INSTITUTIONS

While a few grantees had or developed the internal infrastructure needed to offer financing to participants, most grantees offered loans through partnering financial institutions.[111] Grantees faced four key program design decisions in working with financial institutions: the role the financial institution would play in program delivery; how to communicate with their financial partner; how many financial institutions to include in the program; and what types of financial institutions to pursue as partners. This section reviews grantees' experiences in each of those areas.

Role of Financial Institution Partners in Program Marketing

In in-depth interviews, eleven grantees provided details about the division of roles between their organizations and their financial partners. These grantees most often (6 of 11) reported that their financial partners' roles were directly focused on underwriting and loan servicing – processing participants' financing applications and qualifying participants for loans. Four grantees reported that their financial partners also played a role in marketing the programs' financial products. A fifth grantee reported that he regretted not requiring that his financial partner market the program as a term of its contract. There is no clear relationship between the division of roles among grantees and their financial partners and the grantees' overall success.

Communication with Financial Institution Partners

Grantees indicated that clear communication is important in maintaining effective partnerships with financial institutions. Two grantees stated that it was important to maintain regular communication with financial institution partners. One of these grantees elaborated that a close relationship with financial partners was important in anticipating the implications of program policy changes. According to this grantee, "You must have a collaborative relationship with contractors and lenders in continuous process improvement… [otherwise you will] solve problem X and create problem Y." For similar reasons, the other grantee recommended inviting financial partners to meetings with program stakeholders to discuss program design.

Grantees reported differing experiences working with financial institution partners. One grantee stated that their financial institution partner had been very responsive to their requirements and reporting needs. In contrast, two other grantees, who worked with the same financial institution, reported that it had been difficult to communicate with their financial partner, and that the financial institution's willingness to share information was limited.

Two grantees also discussed the importance of ensuring that their financial partners' branch-level staff were aware of the program and its financing options. According to one of these grantees, "We had some major trouble in the beginning. Customers would get a referral [to the financial institution] from us, and the branch staff would say, 'we don't offer that.' We had an agreement with corporate staff, but branch staff were not aware." This grantee reported training staff at each of their financial partner's branches about the program. The other grantee speculated that, with higher loan uptake, branch-level staff members' awareness of the program would likely increase.

[111] In in-depth interviews, four grantees reported they had, or had developed, the internal capacity to make loans.

Number of Financial Institution Partners

In the grantee web survey, a slight majority of grantees (26 of 48, 54%) reported that a single organization offered financing to their programs' participants. Nonetheless, in in-depth interviews, the seventeen grantees that worked with multiple financial partners described a variety of benefits to doing so. According to these grantees, working with multiple financial partners allowed them to:

- **Reach a wider market:** Three grantees that worked with multiple financial partners indicated that their partners served somewhat different markets or had different capabilities, allowing the program to increase its reach through its partnerships. For example, two of these grantees reported partnering with both a small, local credit union and a larger bank or credit union that served a broader geographic area and, in one case, offered larger loans.
- **Take advantage of existing customer relationships:** Two grantees reported that participants appreciated the opportunity to use a financial institution with which they already had a relationship, and, by working with multiple financial institutions, the program increased the likelihood participants would be able to do so.
- **Benefit from competition:** One grantee reported that partnering with multiple financial institutions had generated competition between financial partners, resulting in lower interest rates that benefited participants.

The most successful grantees most often worked with multiple financial partners. Among the eight grantees in the most successful group that discussed financing in IDIs, three-fourths (6 of 8) worked with multiple financial partners. It is important to note, however, that a majority of the grantees that worked with multiple financial partners were not in the most successful group, including one that was in the least successful group.

Types of Financial Partners

Grantees approached a wide range of financial institutions as they sought to develop financial partnerships. Interview findings indicate that partnerships with credit unions and financial institutions specifically focused on energy efficiency lending were most effective. Grantees reported challenges working with community development financial institutions (CDFIs) and large banks.

Credit Unions

Both grantees and their financial partners suggested that credit unions are a better fit as financial partners than larger banks. Five grantees indicated that their programs' interests aligned with the interests of their credit union partners, which include community support as part of their missions. Three contacts at partnering financial institutions also noted that credit unions are more likely to be community- and mission-driven, making them well-suited to offer energy efficiency loan products. These contacts elaborated that credit unions are more likely to value the non-financial benefits of energy efficiency lending, like helping the environment and supporting their local communities.

In addition to supporting their community-based missions, grantees and their financial partners stated that energy efficiency lending could represent an attractive business opportunity for credit unions. Two grantees noted that

program participation provided their credit union partners an opportunity to offer new financial products.[112] In addition, financial partners reported that credit unions see offering energy efficiency loans as a way to generate new business through positive media exposure and the opportunity to build relationships with non-members who are interested in energy efficiency financing.

Energy Efficiency Financing Organizations

Six grantees partnered with AFC First Financial or Energy Finance Solutions (EFS), both organizations focused specifically on energy efficiency lending. Three of these grantees reported turning to these efficiency-specific organizations after encountering little interest from traditional financial institutions operating in their program areas. One of these grantees advised others to "Just work with AFC because everyone else is very difficult…At the end of the day, AFC gets it far better than any other [financial institution] we communicated with." Two of the six grantees that partnered with AFC or EFS were in the most successful group; none were in the least successful group.

Community Development Financial Institutions

Like credit unions, CDFIs are mission driven, but one grantee reported that their local CDFI was not a good fit as a financing partner because it was more narrowly focused on serving low-income communities than was the program. Another grantee suggested that CDFIs may pay a higher interest rate for the capital they loan than credit unions, making it more difficult for CDFIs to offer loans at low interest rates while still covering their administrative costs.[113]

Large Banks

Grantees reported large banks were not as well suited to efficiency program partnerships as credit unions. According to two grantees, the centralized structure of many large banks makes it difficult for them to implement programs at a smaller, local level and can reduce their flexibility to coordinate with the program on marketing and other aspects of program delivery.

Characteristics of Financial Products Offered

The characteristics of the financial products grantees offered, including the underwriting criteria, interest rates, and repayment periods, impacted the extent to which those financing products supported grantees' larger program goals. This section reviews grantees' efforts to design financial products in a way that would increase uptake of energy upgrades.

Underwriting Criteria

Some grantees found that lenders' underwriting criteria made it difficult to reach moderate-income populations, a group the grantees saw as particularly likely to benefit from energy efficiency financing. Three grantees, including one that explicitly targeted moderate-income participants, reported that many of their moderate-income participants

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112 Both of these grantees were located in California, where energy efficiency policy makers have taken steps to expand and provide continued funding to support energy efficiency financing offerings.

113 Unlike banks and credit unions, many CDFIs do not take deposits. Thus, funds customers have deposited as savings, which provide a low-cost source of capital for other types of financial institution, may not be available to CDFIs.

did not qualify for financing. According to one, "It becomes more important to have financing for moderate-income households, but also we're finding that about 35% of households are denied financing. If we could figure out ways to continue to lower that percentage, I think we would be able to increase the number of projects being completed." Another grantee reported that they could not attract a financing partner that was willing to work with participants who did not typically qualify for loan products.

In order to expand access to and increase interest in financing, some grantees developed alternate loan qualification criteria. Grantees most often used traditional financial metrics like participants' credit scores, income levels, and debt-to-income ratios to determine eligibility for financing. However, for six grantees, these criteria did not represent a binary cutoff, above which participants were eligible and below which they were not. Instead, four of these grantees offered varying financial products depending on participants' credit scores. The other two grantees used typical financial metrics to evaluate participants' creditworthiness, but provided an option to allow participants to qualify based on their utility bill or mortgage payment history if they would not qualify based on traditional metrics. Two additional grantees relied exclusively on utility bill payment history to qualify participants interested in financing.

One grantee, who used traditional financial metrics, noted that it was important both to the program and to lenders to avoid expanding access to credit too broadly. According to this grantee, her program sought to "establish underwriting standards that would make sure that we weren't putting people into any more hot water than we already were, but that we would be able to afford weatherization for a much wider bracket of the population."

Interest Rates

Interest rates reflect the perceived risk associated with given financial products. Riskier products have higher interest rates. Grantees used credit enhancement tools to reduce risk to the financial institution and bring the interest rates on the financial products the grantees supported below market rates.

Eighteen grantees cited specific interest rates for their residential loans during in-depth interviews. The loan products these grantees offered ranged from 0% to 7.5% interest, with half of these grantees reporting they had offered a loan at 0% interest. All but four of the grantees reported offering at least one loan option at a rate of 4.5% or less. More than half (55%) of the financial partners in our sample reported that at least one of the loan products available to grantee program participants featured a lower interest rate than they typically offer.

Grantee and financial institution contacts noted that low interest rates generate interest in financing offers. Twelve grantees indicated that low interest rates drove uptake of their financing products, and four grantees stated that financial products must offer interest rates competitive with home equity loans in order to attract program participants. One grantee said, "If your loan program is about the same interest rate as a home equity loan, then your loan program is not of value." Financial institutions also reported making lower interest rates available to program participants to increase interest and "incentivize" the loans. As one financial partner noted, "the only way to get people interested in these [loans] is to get rates close to 0."

Repayment Period

Several grantees sought to offer long repayment periods in order to reduce participants' monthly payments to a level commensurate with their energy savings. While the literature review noted that financial institutions typically offer shorter repayment periods for loans they perceive as riskier, this does not appear to have posed significant challenges for BBNP grantees; none mentioned it as a challenge in in-depth interviews.

Instead, grantee interview findings suggest that borrowers may prefer shorter-term loans. Two grantees reported that their participants frequently repaid loans before the loan reached its full term. According to one of these grantees, on average, participants paid off ten-year loans in 4.6 years. The other grantee's program focused on promoting large, comprehensive upgrades, and originally required that all participants receive a loan. This grantee noted that their lending partners had been unhappy with the number of participants repaying loans early and thus reducing the amount of interest the financial institution would collect from that loan. This grantee stopped requiring all participants to take out a loan.

Role of Financing in Driving Demand

Interview findings suggest that the availability of financing alone is unlikely to generate broad interest in retrofits. Instead, grantees suggested that financing is more effective as a sales tool – removing obstacles that prevent individual participants from moving forward with retrofits – than as a marketing tool. One of these grantees elaborated that financing is "not designed to help build the market…but to facilitate the market." While the other said that, "once [participants] are already convinced to move ahead with the upgrade, then they get excited about the loans." A third grantee noted that framing retrofits as an investment that would be paid back through energy savings, a common strategy, was a complex message easier to communicate in a one-on-one sales situation. According to this grantee, "you have to have them face-to-face to get their attention long enough to explain this. You are overcoming a belief that 'it's not for me, I can't afford it, I don't believe the savings will be that.'…It takes a trusted source."

Grantees' comments suggest two factors limited the ability of financing to drive demand for energy upgrades. First, participants do not always see financing as an attractive option to overcome first cost barriers, particularly if they are trying to reduce their overall household debt. Second, lack of confidence in energy savings estimates and other priorities for limited household dollars often created more powerful barriers than access to capital. In in-depth interviews, four grantees stated financing may not be appealing to participants who are reluctant to take on debt. A fifth grantee noted that homeowners may prefer to make incremental improvements as their savings allow, rather than taking on debt to complete a single, large retrofit.

Three grantees stated that upfront costs are not the most significant barriers to efficiency retrofits in their service areas. Instead, these grantees cited the complexity of the retrofit process and skepticism on the part of potential participants as more important barriers. One grantee elaborated that skepticism of savings estimates undermined the framing of efficiency retrofits as investments that would be paid back by energy savings. According to this grantee, "We thought low interest loans would work, where it would pay out of savings, but it didn't happen. Folks don't understand this."

Like financing, incentives can help to overcome first cost barriers, and grantees reported that the availability of incentives drove more retrofits than the availability of loans. In the grantee web survey, less than one-third (12 of 41, 29%) of grantees that both offered financing and provided incentives or referred participants to programs that provided incentives reported that financing was a principal driver of residential upgrades, while 93% (38 of 41) reported that incentives were a principal driver of residential upgrades. This preference for incentives may reflect both participants' reluctance to take on debt and a desire to reduce the total cost, rather than avoid paying for the project upfront. Unlike financing, incentives reduce the overall cost of the retrofit to the participant. One grantee noted that, while financing was appealing to *some* subsets of participants, incentives were appealing to *all* participants.

Integration of Financing into Program Offerings

Grantees sought to integrate delivery of financing with their other program services both to ensure that participants received information about financing options when it would be most relevant and to streamline both the financing process and the overall participation process.

Promotion of Financing

Grantees reported efforts to provide participants with financing information when it would be most relevant. Three grantees promoted financing to participants after they received audits, when they were considering upgrade recommendations. These grantees stated that audits help to make the potential benefits of upgrades clear to participants. One of these grantees stated that providing a limited-time audit subsidy led to a surge in loan activity. A fourth grantee stated that energy advisors can play an important role in motivating participants to pursue financing, encouraging them to incorporate potential energy savings in their consideration of financing options.

Grantees also discussed the importance of engaging with contractors about the financing offer. Contractors have an opportunity to offer financing at the time of the upgrade sale, so making financing easy for contractors to use and providing support to contractors offering financing can increase uptake of loans. According to one grantee, "the degree to which we can train our contractors to offer a loan at the point of sale or to cross-sell or upsell is a really important piece of trying to penetrate the market in a more pervasive way."

Ease of Financing Process and Coordination with Other Program Offerings

Grantees emphasized the importance of simplicity and ease of use for participants in the financing process. Three grantees reported that a desire to create a user-friendly loan process had been one of the factors that drove the design of their financing products. Two additional grantees reported that financing was part of the "one stop shop" they offered to participants to simplify the retrofit process. According to one, "It is how you put it together. You need to make it streamlined…people are willing to put their money down…but you have to make it easy to navigate and have the value clearly present." Three other grantees reported that complicated financing processes had posed a challenge for their programs. One of these grantees, a state housing finance agency that offers various types of home buying and home improvement loans and support, reported that replicating the approval process used for other loan products for their efficiency loans had resulted in an unnecessarily complicated process.

Upgrade Measure Eligibility

Grantee interviews suggest that financing can further facilitate the retrofit process for participants by supporting measures not covered by incentives. Seven grantees indicated that their financing products were available to cover a wider range of upgrade projects than their incentives. Three of these grantees allowed participants also who completed efficiency upgrades to finance renewable energy installations. The remaining grantees indicated that non-incentivized measures financed through loans may not need to meet as stringent cost effectiveness requirements as measures receiving incentives. For example, one grantee noted that participants who completed efficiency upgrades also may be able to finance window replacements and two stated that participants could include non-energy remodeling costs in their loans, up to a set percentage of the loan amount.

Two grantees with more rigid requirements on the types of upgrades eligible for financing expressed a desire for greater flexibility in their financial products. According to one, the stringent requirements had turned away potential participants interested in efficiency but not prepared to meet the program's efficiency levels. Similarly, another

grantee noted that under their program, projects receiving financing had to meet more stringent audit and test-out requirements than projects not receiving financing and that these requirements likely turned away some potential participants.

G.2.4. RECRUITING FINANCIAL PARTNERS

Both grantees and their financial partners identified benefits for financial partners offering energy efficiency loans. Nonetheless, developing relationships with financial institutions proved to be challenging for many grantees. This section describes the benefits energy efficiency financing to financial partners and the challenges grantees faced in recruiting financial partners despite those benefits.

Perceived Benefits of Energy Efficiency Lending to Financial Partners

Grantees see participation in loan programs as beneficial to financial institutions in that they create an opportunity for the financial institutions to:

- **Broaden their product offerings.** According to one grantee, "a lot of [financial institutions] thought that [participating in the program] was a good way to do more work in their community and a new product to offer to their existing customer base."
- **Expand their customer base.** One grantee stated that program participation provided financial institutions "the opportunity to offer loans to new customers, who then might want to open accounts with them or take out future loans."
- **Leverage program-led marketing** as well as the grantee's credibility as an independent, local government organization. According to one grantee, "As a county, we can be more credible; we are not in it for our profit. Even more than the $1 million [loan loss reserve] was the county going around as an infomercial talking up these credit unions to the community for two years."
- **Improve their financial outlook.** One grantee stated that a large amount of capital in loan loss reserve funds benefits the financial position of participating financial institutions by effectively increasing their deposits.

Financial partners, including all four who worked with the most successful grantees, also cited benefits of energy efficiency financing, like supporting their community and helping the environment as motivations for offering financing for energy efficiency upgrades. As one financial partner noted, "If you are focused on residential [lending], don't expect to make a lot of money, but go into it with the mindset that you will reduce the carbon footprint, assist the community, and provide a means for the community to retrofit homes that will be easy on the budget."

Challenges in Recruiting Financial Partners

Despite the expected benefits of energy efficiency lending, many grantees found it difficult to recruit financial institution partners. Twelve grantees reported that fewer financial institutions were interested in participating in their programs than anticipated, or that financial institutions were unwilling to offer the types of financial products the programs sought. Two of these grantees changed their approach to financing as a result of this lack of interest. One initially explored offering an interest rate buy-down but ultimately decided to create a revolving loan fund. The other

had planned to use a loan loss reserve but turned to an interest rate buy-down, which was more attractive to financial institutions in its territory.

Two grantees described experiences in which financial institutions that had initially expressed interest dropped out during the negotiation process. A third grantee stated that, while financial institutions had expressed interest in the program, few had been willing to engage more deeply in a partnership. Two grantees suggested that having a champion within the financial institution can be important in establishing partnerships, but that these contacts also must have the authority to approve program participation.

Factors Facilitating Financial Partner Relationships

Financial institutions' reluctance to partner with grantees likely reflects an assessment of the profitability and risk associated with energy efficiency loans (discussed in more detail below). Nonetheless, interviews with grantees and their financial partners revealed two factors that facilitated partnerships between grantees and financial institutions: grantees' preexisting relationships with financial institutions and technical financing knowledge among the grantees' staff.

Preexisting Relationships

The grantees that did not describe challenges in recruiting financial partners in in-depth interviews most often had existing relationships with financial institutions prior to BBNP. Consistent with this finding, grantee web survey data suggest that grantees with preexisting relationships with financial institutions were able to work with a larger number of financial partners while approaching fewer financial institutions than grantees without preexisting relationships. Grantees' success in recruiting financial partners varied, with some approaching ten financial institutions or more and ultimately partnering with 10% or fewer of those they approached and others approaching between one and three financial institutions and ultimately partnering with all of them. Nonetheless, on average, grantees with preexisting financial partner relationships partnered with more than half of the financial institutions they approached, while those without pre-existing relationships partnered with slightly more than one-third. Table G-4 summarizes these findings.

Table G-4: Residential Lending Partner Recruitment by Presence of Existing Relationship with Financial Institutions

FINANCIAL PARTNER RECRUITMENT	HAD EXISTING FINANCIAL INSTITUTION RELATIONSHIP			TOTAL (N = 38)
	YES (N = 21)		NO (N = 17)	
	All	Excluding Preexisting Partners		
Mean # of Financial Institutions Approached	7.0	4.1	8.2	7.5
Mean # of Financial Institutions Offering Financing	2.0	0.7	1.5	1.8
Mean % of Financial Institutions Approached Offering Financing*	52%	28%	37%	45%

* Figures reflect the mean of the ratio of the number of financial institutions approached to the number of financial institutions offering financing for each grantee, rather than the ratio of the mean number of financial institutions approached to the mean number offering financing for all grantees.

In order to determine whether the relative ease in recruiting financial partners of grantees with preexisting financial institution relationships reflected a greater ability to appeal to financial institutions, we examined the success of these grantees in recruiting new financial partners.[114] As Table G-4 suggests, grantees with existing relationships with financial institutions were no more successful recruiting new financial partners than those without existing relationships. Instead, the greater ease with which grantees with existing financial institution relationships recruited financial partners reflects these grantees' ability to draw on their existing relationships.

A majority (65%) of contacts at partnering financial institutions reported that they or another member of their financial institution's staff had a preexisting relationship with staff at the BBNP grantee's program. Financial partners noted that these preexisting relationships made it a "no brainer" to partner with the grantee. As one financial contact stated when describing her organization's response to the opportunity to offer loans with a grantee, "We had a great response. We have a great history of working with them… There's a lot of cooperation."

Technical Financing Knowledge

Grantees with staff members that had an understanding of financing indicated that this knowledge was valuable in building relationships with financial institution partners. In in-depth interviews, six grantees reported their own staff members had financing expertise. Three of these grantees elaborated that this experience had been valuable as they established and managed financing programs. According to one, "It really helped to have [financing expertise] on staff. We could talk the talk." Another grantee reported hiring staff with financing expertise when it became clear that the program's requirements for projects receiving financing, including a comprehensive audit and test-out and the use of a program-qualified contractor, were too complex for their financial partner to manage on its own.

Two grantees whose staff members did not have financing expertise noted that the financial services industry uses specialized language and concepts, which can make it difficult for efficiency program managers unfamiliar with the industry to negotiate with potential financial partners. One grantee reported that she "could not speak toe-to-toe with bank executives." The other grantee described difficulties, "Just communicating with that industry and not being in that industry, making sure that you are real clear about what you're referring to…there's a vernacular there, so you have to be very careful that you're communicating the same thing."

Relationships with Financial Partners and Grantee Success

Grantees that faced challenges in recruiting a financial partner were less likely to be in the most successful group than those that did not face challenges. Only one of the 12 grantees that reported challenges in recruiting a financial partner was in the most successful group, while half of the six grantees that had pre-existing relationships with a financial partner or received strong interest from new partners were among the most successful.

[114] This analysis assumes that financial institutions with preexisting relationships to grantee programs approached the financial institutions with which it had partnerships, and those institutions offered financing to those programs' participants. Thus, a grantee that approached seven financial institutions but had three existing financial partners is considered to have approached four new financial institutions.

G.2.5. FINANCIAL MARKET ACCEPTANCE OF ENERGY EFFICIENCY PRODUCTS

The findings outlined in this section confirm previous research indicating that financial institutions' reluctance to offer loans for energy efficiency upgrades stems from uncertainty about the profitability of efficiency loans. Grantees cited two primary factors that could threaten the profitability of efficiency loans: perceived risk and low uptake.

Risk of Energy Efficiency Loans

Because of the cost savings associated with efficiency improvements, grantees suggested that loans for energy efficiency projects were likely to present a lower risk of default than loans for other purposes. Three grantees noted that energy savings would increase a homeowner's disposable income and thus increase their ability to make loan payments. However, these grantees stated that financial institutions may not recognize these benefits in their assessment of the risk of energy efficiency loans. According to one grantee, "even though they have had no defaults to date, [financial institutions] were still very insistent that these were unsecured loans, and that they still did not assign any value to energy efficiency work in a home."

Six grantees suggested that financial institutions' perception of the risk of efficiency loans may reflect a lack of available information on the default rates for similar loan products. One grantee stated that a lack of information on loan performance is "The biggest barrier in energy efficiency lending in general….Mortgage and consumer lending are highly defined markets that have well defined metrics."

Both grantees and financial partners reported low default rates on their loans. Among the nine grantees that cited specific default rates in their interviews, none cited a rate higher than 2.5%, and six reported no defaults at all. Four additional grantees reported low default rates without citing specific figures. Over the BBNP grant period, the overall delinquency rate for consumer loans other than credit cards was 2.77% (FFIEC, 2014).[115] Financial partners reported that energy efficiency loans tended to perform as well as or outperform similar products in terms of defaults and late payments. One financial partner said the performance of the energy efficiency loan product was "exceptional, without a doubt," and another noted that his bank was "really happy with the quality of the loans."

Uptake of Energy Efficiency Loans

Based on project-level data grantees reported to DOE, projects receiving loans were larger, on average, than projects overall in the residential, multifamily, and commercial sectors.

Table G-5: Program-wide Average Project Costs and Loan Amounts, by Sector

RESIDENTIAL PROJECT TYPE	AVERAGE PROJECT COST
Receiving Loans	$9,876
Not Receiving Loans	$6,088

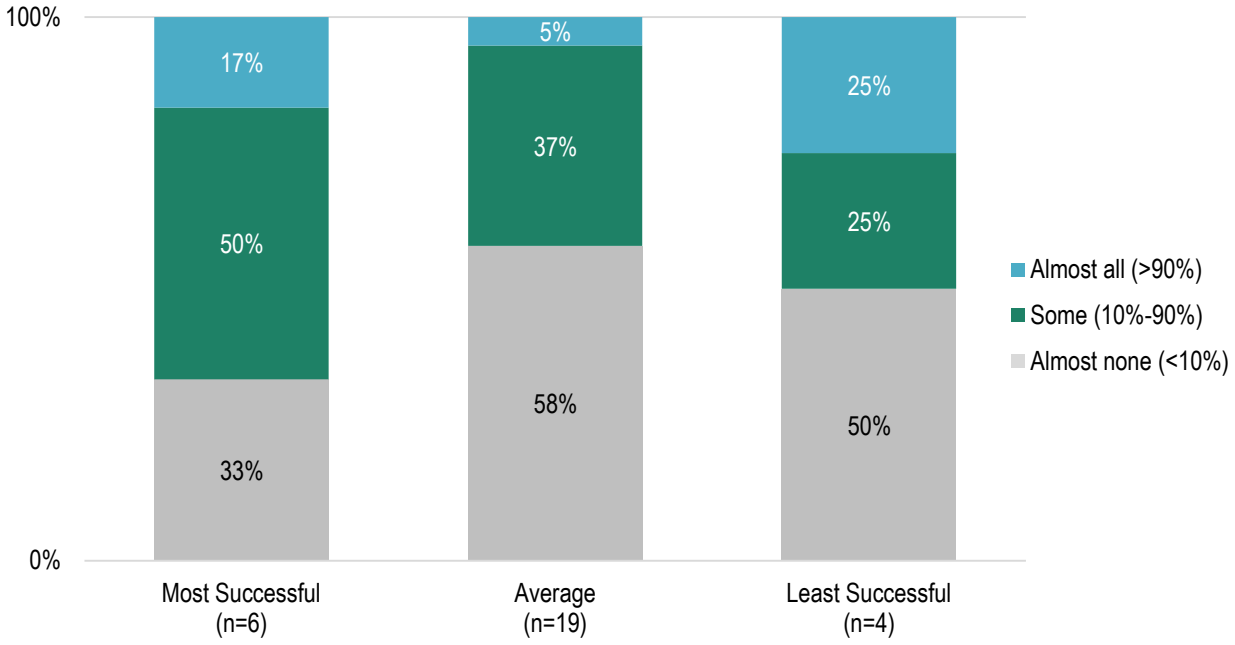
[115] Averages are for Q3 2010 through Q3 2013.

In addition to supporting larger projects, program data and grantee interviews suggest that BBNP grantees provided financing to a larger proportion of participants than had previous energy efficiency financing efforts. Nonetheless, uptake of financing fell short of some grantees' expectations and may not have reached the levels necessary to generate widespread interest in energy efficiency lending among financial institutions.

Uptake of Residential Loans

Across the 29 prime grantees that reported the number of their residential retrofits receiving loans to DOE, 16% of all residential retrofit projects received loans, although the proportions varied widely among grantees. For a majority of the grantees (15 of 29), fewer than 10% of their residential projects received loans, while a small group of grantees (4 of 29) reported that more than 80% of their projects received loans. There was no clear relationship between the proportion of retrofits receiving loans and grantees' success (Figure G-2).

Figure G-2: Proportion of Residential Upgrades Using Financing



Homeowners who made upgrades through BBNP-funded programs were more likely to use financing than those who made upgrades outside of the programs. Consistent with these findings, four grantees, including two of the most successful grantees, stated that their programs had increased uptake of financing above those of previous efficiency programs that had offered financing in their jurisdictions, although three of the four also noted that a majority of projects do not use financing.

Grantee assessments of their success in providing financing reflected differing expectations of loan volume. Two of the most successful grantees, reported that between 25% and 35% of their participants had used their financing, and expressed satisfaction with this level of uptake, noting it was greater than that of previous programs. In contrast, a third grantee, who was in the average success group, reported that 30% of participants had used their loans and cited a lack of uptake of financing products as one of the challenges their program had faced.

Uptake of Commercial Loans

The majority of the grantees with commercial loan products (12 of 19) reported a low uptake of these products. Three grantees reported that they had initially attempted to rely exclusively on loans for commercial customers, but ultimately began offering incentives in addition to loans in order to increase uptake. One of these grantees reported that only four of 215 commercial projects had received loans. According to this grantee, "Ironically, our commercial program started as a financing-only program. But we learned the business market – small business especially – was accustomed to incentives."

Grantees cited distinct characteristics of both small and large commercial customers that led to a lack of loan uptake. Five grantees stated that aversion to taking on debt made small commercial customers reluctant to pursue loans for energy efficiency retrofits. According to one of these grantees, whose commercial program largely served nonprofit organizations, "Within commercial, the biggest challenge is…no matter what the size or level of sophistication of whatever nonprofit we're working with is this propensity to reject debt under any circumstance, and any debt is bad debt." One grantee also noted that many small commercial businesses do not own their buildings and thus are reluctant to invest in improvements.

Large commercial customers' financing arrangements and project complexity made it difficult for grantees to design effective financial products for the large commercial market. Four grantees reported that large commercial customers often have existing relationships with financial institutions and access to other types of financing. Three grantees also noted that it had been difficult for their programs to accommodate the long timeframes that large commercial participants require to plan and carry out retrofits.

APPENDIX H. LOCAL BBNP PROGRAM SUSTAINABILITY

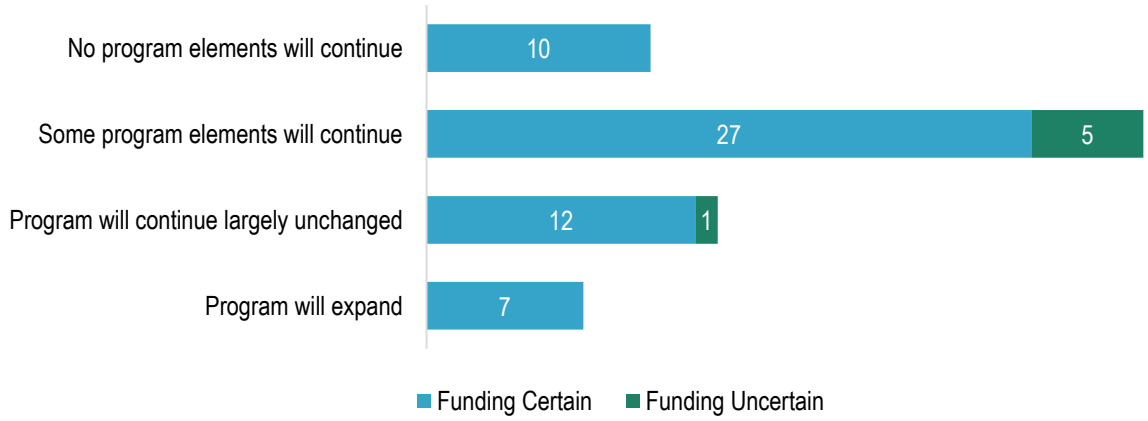
This appendix includes additional detail not included in the body of our report on our data collection activities and findings regarding the scope of program activity occurring after the BBNP grant period. In order the determine grantees' and subgrantees' plans for after the BBNP grant period, we reviewed grantees' Final Technical Reports, interview and survey responses, program websites, and grantee-led process evaluations. Results revealed considerable diversity in the breadth and organization of grantees' post-BBNP program offerings.

In in-depth interviews, only one grantee, who served a very narrow geographic territory, anticipated that their program would have saturated the market for whole building energy upgrades in their service area. The remaining grantees indicated that a role would remain for programs to continue to promote whole building energy upgrades in their service areas following the BBNP grant period. This chapter examines the funding sources grantees planned to use to continue providing program services, the scope of the services they planned to provide, and the lasting effects grantees believed their program offerings would have in facilitating future efforts to promote energy upgrades.

H.1. SCOPE OF CONTINUING PROGRAMS

After the BBNP grant period, a majority of grantees planned to continue to offer programs but with a narrower range of offerings (Figure H-1). In some cases, grantees reported that other energy efficiency programs operating in the area would absorb their continuing program elements. Approximately one-third of grantees reported that their program offerings would continue or expand following the grant period. Smaller numbers of grantees reported that their program offerings would be discontinued altogether before or once the grant period ended.

Figure H-1: Grantee Plans for BBNP-Funded Programs after Grant Period (n = 62)



As Figure H-1 suggests, at the time they submitted their Final Technical Reports to DOE (received from January to August 2014), most grantees had already secured access to the necessary resources, like funding or infrastructure to support the program, to carry out their plans following the grant period. Nonetheless, some grantees were still in the process of obtaining resources, like funding, or were hoping to secure resources in the future but had not yet taken steps to do so. Grantees reporting that their programs would continue or expand were more likely to report that they had already secured funding to carry out those plans than grantees that had not yet secured funding.

In in-depth interviews, five grantees reported that the structures of the organizations that had delivered their BBNP programs would change when the grant period ended. Two of these grantees reported that the organization that had administered their BBNP programs would no longer administer efficiency programs. Two others reported plans to partner with other program administrators to deliver programs jointly across larger jurisdictions. One grantee planned to create a nonprofit organization to carry out a more limited scope of activities, helping other municipalities implement programs similar to the programs it had implemented through BBNP.

While most of the grantees anticipated their financing programs would continue to be available following the grant period, fewer reported they would continue other program elements. Grantees most often planned to offer a smaller range of program services than they had during BBNP, such as training and support to local contractors. Three grantees reported they would offer a similar range of services as they had under BBNP, but anticipated that available funding would allow them to serve half as many or fewer participants each year. One grantee noted that, while his program's financing products will be available beyond the grant period, it will be difficult to maintain a program without funds available to devote to marketing those products and the upgrades they support.

H.2. OTHER LASTING EFFECTS

Many grantees anticipated the work they had done would continue to influence the market, even if some or all of their program offerings would not continue after the BBNP grant period. In in-depth interviews, eight grantees reported that elements of their program designs could be useful to future program administrators. Two of these grantees stated that they had "proven" that particular program models could be successful, and a third reported plans to draw on its experience to create more formal resources for other municipalities interested in implementing similar programs. Other grantees reported specific elements of their programs, like their branding or the use of thermal imaging to market retrofits, could be useful to other program administrators. Finally, one grantee reported compiling a large database of information on the performance of energy efficiency loans that could help future programs attract financial partners.

Grantees also reported that their programs' outreach and training efforts had built relationships with market actors that would continue to support a market for energy efficiency after the grant period. During interviews, grantees most often reported building these relationships with contractors conducting audits and measure installation. Two grantees noted that, while some contractors likely would not continue to market energy efficiency without program support, others had built business models around energy efficiency offerings. Other types of market actors with whom grantees reported building lasting partnerships include financial institutions and professional associations.

Two grantees reported their programs had increased awareness of energy efficiency among the populations their programs targeted. According to one of these grantees, "The market is really becoming, to our mind, very saturated with energy efficiency messaging. It seems to be making a change. I think there is an evolution in people's thinking. I do think that those changes will be sustained in the long-term."

APPENDIX I. BBNIS SUMMARY DATA

Table I-1: BBNP Recipient Grant Recipients in Decreasing Order of Grant Amounts

GRANTEE NAME	TOTAL GRANTED
NYSERDA	$40,000,000
Los Angeles County, CA	$30,000,000
State of Maine	$30,000,000
State of Michigan	$30,000,000
Boulder County, CO	$25,000,000
Chicago Metro Agency for Planning	$25,000,000
Philadelphia, PA	$25,000,000
Phoenix, AZ	$25,000,000
Kansas City, MO	$20,000,000
State of Maryland	$20,000,000
Portland, OR	$20,000,000
Seattle, WA	$20,000,000
Southeast Energy Efficiency Alliance	$20,000,000
Wisconsin Energy Efficiency Project	$20,000,000
Greater Cincinnati Energy Alliance	$17,000,000
Toledo-Lucas Co. Port Authority (OH)	$15,000,000
Austin, TX	$10,000,000
Indianapolis, IN	$10,000,000
State of New Hampshire	$10,000,000
Omaha, NE	$10,000,000
San Antonio, TX	$10,000,000
Camden, NJ	$5,000,000
Greensboro, NC	$5,000,000
Lowell, MA	$5,000,000
State of Missouri	$5,000,000
State of Nevada (SEP)	$5,000,000

Continued…

GRANTEE NAME	TOTAL GRANTED
State of Michigan (SEP)	$4,994,245
Eagle County, CO	$4,916,126
CSG, Bainbridge Island, WA	$4,884,614
State of Maine (SEP)	$4,538,571
Rutland, VT	$4,487,588
Connecticut Innovations, Inc.	$4,171,214
Fayette County, PA	$4,100,018
ADECA, AL (SEP)	$3,013,751
St. Lucie County, FL	$2,941,500
VDMME, VA (SEP)	$2,886,500
Commonwealth of MA (SEP)	$2,587,976
WDC, WA (SEP)	$2,587,500
Santa Barbara County, CA	$2,401,309
Town of University Park, MD	$1,425,000
Town of Bedford, NY	$1,267,874
Total	*$508,203,786*

Table I-2: Grant Amount and Sector Served

	GRANT AMOUNT	SECTOR SERVED (WHERE PROJECT DATA WAS REPORTED)						GRANT SIZE CATEGORY (USED AS AN ANALYTICAL VARIABLE)
	Total	SF	MF Unit	MF Building	Commercial	Industrial	Agricultural	
ADECA, AL (SEP)	$3,013,751	x						Small ($5M or less)
Austin, TX	$10,000,000	x	x					Medium (more than $5M to less than $20M)
Boulder County, CO	$25,000,000	x	x	x	X			Large ($20M or more)
Camden, NJ	$5,000,000	x			X			Small ($5M or less)
Chicago Metro Agency for Planning	$25,000,000	x	x	x	X			Large ($20M or more)
Commonwealth of MA (SEP)	$2,587,976	x						Small ($5M or less)
Connecticut Innovations, Inc.	$4,171,214	x						Small ($5M or less)
CSG, Bainbridge Island, WA	$4,884,614	x						Small ($5M or less)
Eagle County, CO	$4,916,126	x	x	x	x			Small ($5M or less)
Fayette County, PA	$4,100,018	x			x			Small ($5M or less)
Greater Cincinnati Energy Alliance	$17,000,000	x			x			Medium (more than $5M to less than $20M)
Greensboro, NC	$5,000,000	x		x	x			Small ($5M or less)
Indianapolis, IN	$10,000,000	x			x			Medium (more than $5M to less than $20M)

Continued…

	GRANT AMOUNT	SECTOR SERVED (WHERE PROJECT DATA WAS REPORTED)						GRANT SIZE CATEGORY (USED AS AN ANALYTICAL VARIABLE)
	Total	SF	MF Unit	MF Building	Commercial	Industrial	Agricultural	
Kansas City, MO	$20,000,000	x			x			Medium (more than $5M to less than $20M)
Los Angeles County, CA	$30,000,000	x		x	x			Large ($20M or more)
Lowell, MA	$5,000,000			x	x			Small ($5M or less)
NYSERDA	$40,000,000	x						Large ($20M or more)
Omaha, NE	$10,000,000	x			x			Medium (more than $5M to less than $20M)
Philadelphia, PA	$25,000,000	x		x	x			Large ($20M or more)
Phoenix, AZ	$25,000,000	x		x	x			Large ($20M or more)
Portland, OR	$20,000,000	x			x			Medium (more than $5M to less than $20M)
Rutland, VT	$4,487,588	x						Small ($5M or less)
San Antonio, TX	$10,000,000	x			x			Medium (more than $5M to less than $20M)
Santa Barbara County, CA	$2,401,309	x						Small ($5M or less)
Seattle, WA	$20,000,000	x		x	x			Medium (more than $5M to less than $20M)
Southeast Energy Efficiency Alliance	$20,000,000	x	x	x	x			Medium (more than $5M to less than $20M)
St. Lucie County, FL	$2,941,500	x						Small ($5M or less)

Continued…

	GRANT AMOUNT	SECTOR SERVED (WHERE PROJECT DATA WAS REPORTED)						GRANT SIZE CATEGORY (USED AS AN ANALYTICAL VARIABLE)
	Total	SF	MF Unit	MF Building	Commercial	Industrial	Agricultural	
State of Maine	$30,000,000	x	x	x				Large ($20M or more)
State of Maine (SEP)	$4,538,571			x				Small ($5M or less)
State of Maryland	$20,000,000	x		x	x		x	Medium (more than $5M to less than $20M)
State of Michigan	$30,000,000	x		x	x			Large ($20M or more)
State of Michigan (SEP)	$4,994,245				x			Small ($5M or less)
State of Missouri	$5,000,000	x					x	Small ($5M or less)
State of Nevada (SEP)	$5,000,000	x						Small ($5M or less)
State of New Hampshire	$10,000,000	x	x	x	x			Medium (more than $5M to less than $20M)
Toledo-Lucas Co. Port Authority (OH)	$15,000,000				x			Medium (more than $5M to less than $20M)
Town of Bedford, NY	$1,267,874	x						Small ($5M or less)
Town of University Park, MD	$1,425,000	x						Small ($5M or less)
VDMME, VA (SEP)	$2,886,500	x						Small ($5M or less)
WDC, WA (SEP)	$2,587,500	x						Small ($5M or less)
Wisconsin Energy Efficiency Project	$20,000,000	x	x	x	x	x		Medium (more than $5M to less than $20M)

The project count in Table I-3 totals 88,591, a figure that is about 89% of the 99,071 figure reported in Chapter 1. We use the latter figure (99,071) in Chapter 1 and the summary report, *Evaluation of the Better Buildings Neighborhood Program* (Final Synthesis Report, Volume 1), because there were 99,071 projects in the

BBNIS database delivered by DOE to our impact evaluation team. Subsequent to that delivery, DOE continued to clean the BBNIS data, specifically the project level data, and delivered to our process evaluation team the data we report on in this appendix.

Table I-3: Retrofit Project Count

	SF	MF UNIT	MF BUILDING	COMMERCIAL	INDUSTRIAL	AGRICULTURAL
	Count	Count	Count	Count	Count	Count
Total	74,369	9,639	858	3,547	15	163
Small ($5M or less)	7,844	14	132	184		147
Medium (more than $5M to less than $20M)	22,053	1,946	245	722	15	16
Large ($20M or more)	44,472	7,679	481	2,641		

Table I-4: Sum of Site MMBtu Savings

	SF	MF UNIT	MF BUILDING	INDUSTRIAL	COMMERCIAL	AGRICULTURAL
	Total MMBtu	Total MMBtu	Total MMBtu	Total MMBtu	Total MMBtu	Total MMBtu
Total	1,880,812	143,411	257,429	4,318	815,686	28,460
Small ($5M or less)	202,961	48	40,321		72,392	17,215
Medium (more than $5M to less than $20M)	544,627	22,582	79,817	4,318	285,348	11,245
Large ($20M or more)	1,133,224	120,781	137,291		457,946	

Table I-5: Mean Site MMBtu Savings

	SF	MF UNIT	MF BUILDING	INDUSTRIAL	COMMERCIAL	AGRICULTURAL
	Mean MMBtu	Mean MMBtu	Mean MMBtu	Mean MMBtu	Mean MMBtu	Mean MMBtu
Total	26	69	1,438	288	665	433
Small ($5M or less)	27	3	559		741	117
Medium (more than $5M to less than $20M)	26	119	1,413	288	496	750
Large ($20M or more)	23	25	1,959		941	

Table I-6: Mean Audit Job Hours

	SF	MF UNIT	MF BUILDING	COMMERCIAL	AGRICULTURAL
	Mean hours	Mean hours	Mean hours	Mean hours	Mean hours
Total	4.5	4.4	15.4	45.2	13.6
Small ($5M or less)	5.2	4.0	18.0	11.4	14.1
Medium (more than $5M to less than $20M)	4.5	2.6	7.2	59.9	8.9
Large ($20M or more)	2.9	6.3	20.9	38.4	

Table I-7: Proportion of Records with Audit Job Hours

	SF	MF UNIT	MF BUILDING	COMMERCIAL	AGRICULTURAL
	Mean hours	Mean hours	Mean hours	Mean hours	Mean hours
Total	77%	90%	39%	10%	99%
Small ($5M or less)	82%	14%	95%	14%	100%
Medium (more than $5M to less than $20M)	96%	41%	86%	30%	94%
Large ($20M or more)	100%	74%	14%	3%	

Table I-8: Sum of Reported Audit Job Hours (no correction made for missing data)

	SF	MF UNIT	MF BUILDING	COMMERCIAL	AGRICULTURAL
	Total hours	Total hours	Total hours	Total hours	Total hours
Total	255,262	37,877	5,175	16,087	2,202
Small ($5M or less)	33,056	8	2,252	302	2,068
Medium (more than $5M to less than $20M)	95,295	2,064	1,533	12,955	134
Large ($20M or more)	126,912	35,805	1,390	2,830	

Table I-9: Estimated Audit Job Hours (estimated by imputing missing data with mean value)

	SF	MF UNIT	MF BUILDING	COMMERCIAL	AGRICULTURAL
	Total hours	Total hours	Total hours	Total hours	Total hours
Total	331,509	42,086	13,269	160,870	2,224
Small ($5M or less)	40,312	57	2,371	2,157	2,068
Medium (more than $5M to less than $20M)	99,266	5,034	1,783	43,183	143
Large ($20M or more)	126,912	48,385	9,929	94,333	

Table I-10: Mean Audit Invoiced Cost

	SF	MF UNIT	MF BUILDING	COMMERCIAL	AGRICULTURAL
	Mean $	Mean $	Mean $	Mean $	Mean $
Total	$ 316	$ 1,194	$ 2,773	$ 5,409	$ 1,172
Small ($5M or less)	$ 346	$ 316	$ 2,827	$ 2,712	$ 1,091
Medium (more than $5M to less than $20M)	$ 329	$ 1,911	$ 2,824	$ 7,679	$ 1,253
Large ($20M or more)	$ 232	$ 532	$ 2,633	$ 3,944	

Table I-11: Proportion of Records with Audit Invoiced Cost

	SF	MF UNIT	MF BUILDING	COMMERCIAL	AGRICULTURAL
	Mean $	Mean $	Mean $	Mean $	Mean $
Total	98%	30%	17%	9%	94%
Small ($5M or less)	100%	43%	54%	30%	100%
Medium (more than $5M to less than $20M)	96%	1%	20%	22%	94%
Large ($20M or more)	100%	82%	6%	3%	

Table I-12: Sum of Reported Audit Invoiced Cost (no correction made for missing data)

	SF	MF UNIT	MF BUILDING	COMMERCIAL	AGRICULTURAL
	Total $	Total $	Total $	Total $	Total $
Total	$ 22,208,618	$ 3,415,007	$ 412,317	$ 1,648,671	$ 179,190
Small ($5M or less)	$ 3,146,739	$ 1,898	$ 200,482	$ 149,984	$ 160,400
Medium (more than $5M to less than $20M)	$ 6,986,023	$ 47,625	$ 138,059	$ 1,230,962	$ 18,790
Large ($20M or more)	$ 12,075,856	$ 3,365,484	$ 73,775	$ 267,725	

Table I-13: Mean Retrofit Job Hours

	SF	MF UNIT	MF BUILDING	COMMERCIAL	INDUSTRIAL	AGRICULTURAL
	Mean hours	Mean hours	Mean hours	Mean hours	Mean hours	Mean hours
Total	35.6	89.0	785.2	2,400.5	316.8	226.0
Small ($5M or less)	38.7	13.4	221.5	7,425.2		54.5
Medium (more than $5M to less than $20M)	37.4	145.7	1,567.4	568.0	316.8	397.5
Large ($20M or more)	26.1	13.4	415.2	731.5		

Table I-14: Proportion of Records with Retrofit Job Hours

	SF	MF UNIT	MF BUILDING	COMMERCIAL	INDUSTRIAL	AGRICULTURAL
	Mean hours	Mean hours	Mean hours	Mean hours	Mean hours	Mean hours
Total	99%	2%	17%	12%	100%	39%
Small ($5M or less)	76%	100%	23%	40%		98%
Medium (more than $5M to less than $20M)	100%	7%	17%	50%	100%	100%
Large ($20M or more)	100%	0%	21%	12%		

Table I-15: Sum of Reported Retrofit Job Hours (no correction made for missing data)

	SF	MF UNIT	MF BUILDING	COMMERCIAL	INDUSTRIAL	AGRICULTURAL
	Total hours	Total hours	Total hours	Total hours	Total hours	Total hours
Total	2,616,417	19,177	115,504	983,432	4,753	14,213
Small ($5M or less)	230,617	187	6,725	544,798		7,852
Medium (more than $5M to less than $20M)	883,450	18,897	66,692	205,551	4,753	6,360
Large ($20M or more)	1,502,350	93	42,087	233,083		

Table I-16: Estimated Retrofit Job Hours (estimated by imputing missing data with mean value)

	SF	MF UNIT	MF BUILDING	COMMERCIAL	INDUSTRIAL	AGRICULTURAL
	Total hours	Total hours	Total hours	Total hours	Total hours	Total hours
Total	2,642,845	958,850	679,435	8,195,267	4,753	36,444
Small ($5M or less)	303,443	187	29,239	1,361,995		8,012
Medium (more than $5M to less than $20M)	883,450	269,957	392,306	411,102	4,753	6,360
Large ($20M or more)	1,502,350	0	200,414	1,942,358		

Table I-17: Mean Retrofit Invoiced Cost

	SF	MF UNIT	MF BUILDING	COMMERCIAL	AGRICULTURAL
	Mean $	Mean $	Mean $	Mean $	Mean $
Total	$ 7,214	$ 12,656	$ 789,171	$ 303,337	$ 72,979
Small ($5M or less)	$ 7,748	$ 4,581	$ 249,525	$ 69,047	$ 13,687
Medium (more than $5M to less than $20M)	$ 7,403	$ 17,556	$ 1,196,697	$ 166,342	$ 132,270
Large ($20M or more)	$ 5,798	$ 8,814	$ 806,450	$ 811,616	

Table I-18: Proportion of Records with Retrofit Invoiced Cost

	SF	MF UNIT	MF BUILDING	COMMERCIAL	AGRICULTURAL
	Mean $	Mean $	Mean $	Mean $	Mean $
Total	93%	10%	10%	20%	34%
Small ($5M or less)	80%	100%	25%	72%	100%
Medium (more than $5M to less than $20M)	100%	6%	11%	61%	94%
Large ($20M or more)	100%	16%	7%	6%	

Table I-19: Sum of Reported Retrofit Invoiced Cost

	SF	MF UNIT	MF BUILDING	COMMERCIAL	AGRICULTURAL
	Total $	Total $	Total $	Total $	Total $
Total	$ 498,062,032	$ 12,770,090	$ 65,948,989	$ 210,914,331	$ 3,996,082
Small ($5M or less)	$ 48,333,386	$ 64,133	$ 8,335,588	$ 9,203,449	$ 2,012,031
Medium (more than $5M to less than $20M)	$ 167,692,171	$ 1,894,025	$ 32,370,102	$ 73,428,614	$ 1,984,052
Large ($20M or more)	$ 282,036,475	$ 10,811,932	$ 25,243,299	$ 128,282,268	

Table I-20: Sum of Loan Amount

	SF	MF UNIT	MF BUILDING	COMMERCIAL
	Total $	Total $	Total $	Total $
Total	$ 118,272,730	$ 467,067	$ 8,651,781	$ 26,564,869
Small ($5M or less)	$ 6,956,556			$ 2,315,006
Medium (more than $5M to less than $20M)	$ 51,037,206	$ 28,128	$ 4,220,569	$ 15,940,468
Large ($20M or more)	$ 60,278,969	$ 438,939	$ 4,431,212	$ 8,309,396

Table I-21: Mean Loan Amount

	SF	MF UNIT	MF BUILDING	COMMERCIAL
	Mean $	Mean $	Mean $	Mean $
Total	$ 9,672	$ 12,594	$ 846,972	$ 331,007
Small ($5M or less)	$ 9,970			$ 210,671
Medium (more than $5M to less than $20M)	$ 9,696	$ 28,128	$ 411,757	$ 153,193
Large ($20M or more)	$ 9,031	$ 4,827	$ 1,282,187	$ 866,244

Table I-22: Project Count with Loan

	SF	MF UNIT	MF BUILDING	COMMERCIAL
	Count	Count	Count	Count
Total	11,987	63	50	183
Small ($5M or less)	690			54
Medium (more than $5M to less than $20M)	4,827	1	19	118
Large ($20M or more)	6,470	62	31	11

Table I-23: Average Proportion of Projects with Loan*

	SF	MF UNIT	MF BUILDING	COMMERCIAL
	Mean%	Mean%	Mean%	Mean%
Total	18%	4%	14%	22%
Small ($5M or less)	18%	0%	0%	22%

Continued…

	SF	MF UNIT	MF BUILDING	COMMERCIAL
	Mean%	Mean%	Mean%	Mean%
Medium (more than $5M to less than $20M)	20%	0%	22%	20%
Large ($20M or more)	15%	11%	17%	26%

* This table presents average values across grantees (as do the other tables in this appendix that report averages). Across all residential upgrades, 16% of participants took loans, a figure reported elsewhere in this volume.

Table I-24: Installed Measure Counts - SF

	HEATING	COOLING	HEATING AND COOLING	INSULATION	LIGHTING	WATER HEATING	SEALING	APPLIANCE	SOLAR PV	OTHER
	Count	Count	Count	Count	Count	Count	Count	Count	Count	Count
Total	22,108	6,187	4,341	31,146	13,393	10,617	31,886	2,080	72	18,479
Small ($5M or less)	2,285	338	803	3,829	1,496	1,944	4,730	141	7	2,078
Medium (more than $5M to less than $20M)	6,507	4,071	3,066	14,651	4,394	2,530	15,676	1,348		5,511
Large ($20M or more)	13,316	1,778	472	12,666	7,503	6,143	11,480	591	65	10,890

Table I-25: Installed Measure Counts - MF Unit

	HEATING	COOLING	HEATING AND COOLING	INSULATION	LIGHTING	WATER HEATING	SEALING	APPLIANCE	SOLAR PV	OTHER
	Count	Count	Count	Count	Count	Count	Count	Count	Count	Count
Total	1,238	118	5	4,229	3,541	214	1,925	304	42	4,086
Small ($5M or less)						4	1			9
Medium (more than $5M to less than $20M)	269	19		1,570	1,259	3	1	20		1,762
Large ($20M or more)	969	99	5	2,659	2,282	207	1,923	284	42	2,315

Table I-26: Installed Measure Counts - MF Building

	HEATING	COOLING	HEATING AND COOLING	INSULATION	LIGHTING	WATER HEATING	SEALING	APPLIANCE	OTHER
	Count	Count	Count	Count	Count	Count	Count	Count	Count
Total	340	35	21	671	67	173	505	32	125
Small ($5M or less)	66	6	1	73	24	17		11	22
Medium (more than $5M to less than $20M)	87	20	20	177	35	50	128	13	28
Large ($20M or more)	187	9		421	8	106	377	8	75

Table I-27: Installed Measure Counts - Commercial

	HEATING	COOLING	HEATING AND COOLING	REFRIGER-ATION	INSUL-ATION	LIGHTING	WATER HEATING	SEALING	APPLI-ANCE	SOLAR PV	OTHER
	Count	Count	Count	Count	Count	Count	Count	Count	Count	Count	Count
Total	312	228	53	119	141	2,313	63	31	45	2	537
Small ($5M or less)	33	33	15	33	13	136	4		1		71
Medium (more than $5M to less than $20M)	170	63	30	37	85	546	28	4	42		111
Large ($20M or more)	109	132	8	49	43	1,631	31	27	2	2	355

Table I-28: Reported Leveraged Funds

TOTAL	AVERAGE	TOTAL
Total	$ 28,370,016	$ 753,170,655.07
Small ($5M or less)	$ 3,352,071	$ 67,041,415.23
Medium (more than $5M to less than $20M)	$ 20,425,073	$ 265,525,952.22
Large ($20M or more)	$ 52,575,411	$ 420,603,287.62

APPENDIX J. PARTICIPANT SURVEY METHODS AND RESULTS

J.1. METHODS

J.1.1. SAMPLING

We surveyed 2,399 individuals who participated in residential, multifamily, or commercial programs offered through 24 grantees and subgrantees (Table J-1). The impact and process evaluation teams both collected data from program participants, and to reduce the risk of survey fatigue, only one team contacted participants from each grantee. The impact team contacted participants from a subset of grantees first, and we attempted to collect surveys from the remaining grantees' participants.

We contacted program managers and requested that they send survey requests to participants themselves or provide us with participant contact information. Sixteen program managers sent invitations themselves, and participants from the remaining eight programs received survey invitations from the evaluation team. A small subset of program managers did not respond to our request, so we were unable to send surveys to their participants.

Table J-1: Grantees and Subgrantees Included in the Participant Sample

GRANTEE	GRANTEE TYPE	PRIME GRANTEE (SUBGRANTEES ONLY)	SOURCE OF PARTICIPATION INVITATION	INVITATIONS SENT	SURVEYS COMPLETED	RESPONSE RATE
Austin	Prime		Grantee	650	60	9%
Chicago	Prime		Grantee	395	68	17%
Cincinnati	Prime		Grantee	750	78	10%
Connecticut	Prime		Grantee	310	57	18%
Kansas City	Prime		Grantee	830	113	14%
Lowell	Prime		Evaluation team	28	4	14%
Maryland	Prime		Grantee	300	55	18%
Michigan	Prime		Evaluation team	1,100	242	22%
Nevada SEP	Prime		Grantee	148	25	17%
New Hampshire	Prime		Evaluation team	88	30	34%
NYSERDA	Prime		Evaluation team	1,352	162	12%
Omaha & Lincoln	Prime		Grantee	444	114	26%
Oregon (Portland)	Prime		Evaluation team	1,367	477	35%

Contined…

GRANTEE	GRANTEE TYPE	PRIME GRANTEE (SUBGRANTEES ONLY)	SOURCE OF PARTICIPATION INVITATION	INVITATIONS SENT	SURVEYS COMPLETED	RESPONSE RATE
Phoenix	Prime		Grantee	75	5	7%
San Antonio	Prime		Grantee	514	129	25%
Seattle (WA)	Prime		Evaluation team	461	162	35%
University Park	Prime		Grantee	227	68	30%
Washington SEP	Prime		Grantee	134	26	19%
Wisconsin	Prime		Evaluation team	1,007	398	39%
Garfield	Sub	Boulder County	Grantee	125	17	14%
Alameda County	Sub	LA County	Grantee	22	3	14%
Atlanta, GA	Sub	SEEA	Grantee	286	71	25%
Jacksonville, FL	Sub	SEEA	Evaluation team	164	18	28%
New Orleans, LA	Sub	SEEA	Grantee	67	17	25%
Total				10,844	2,399	22%

J.1.2. DATA COLLECTION

The process evaluation team designed the survey instrument (Appendix M.2) with the following goals in mind:

- Inform estimation of early indications of market effects;
- Identify program elements associated with success;
- Obtain participant feedback on the financing process;
- Identify participants' motivations for undertaking energy efficiency upgrades, and the benefits they experienced as a result of those upgrades; and
- Assess participants' perceptions of how the program influenced their decision to undertake energy efficiency upgrade activities.

The survey was conducted using the *Qualtrics* web application from May 2013 to April 2014.

J.1.3. ANALYSIS

We first cleaned the data and recoded all open-ended responses into representative numeric variables. Next, we analyzed the cleaned data set using descriptive, bivariate, and multivariate statistics.

J.2. RESULTS

This section includes the results from all questions included in the participant survey. We provide results for the residential, multifamily, and commercial sectors separately, and we note statistically significant differences between sectors throughout the appendix. Table notes indicate the survey instrument question number associated with the results (0).

One grantee conducted its own participant survey, and in order to avoid survey fatigue, we did not ask participants in this grantee's target territory questions that were redundant with the grantee's survey. When possible, we present the data from our survey and the grantee's survey in aggregate. In some instances, however, question wording varied slightly across surveys, so we created bins that encompass responses from both surveys. Table notes indicate the questions for which we created bins.

Table J-2: Proportion of Respondents by Sector (n = 2399)

RESPONSE	PERCENT
Residential	96%
Multifamily	2%
Commercial	1%
Refused	1%
Total	100%

Source: Q2. Respondents who did not provide a response were excluded from subsequent analysis.

Table J-3: Length of Time Respondent Has Owned the Upgraded Building

RESPONSE	RESIDENTIAL (N = 2302)	MULTIFAMILY (N = 55)	COMMERCIAL (N = 19)
Less than 1 year	11%	5%	11%
1 year to less than 2 years	9%	4%	8%
2 to less than 5 years	15%	7%	15%
5 to less than 10 years	19%	25%	19%
10 years or more	46%	58%	47%
Total	100%	100%	100%

Source: Q3.

Table J-4: How Respondents Heard about the Grantee's Program(s) (Multiple Responses Allowed)

RESPONSE	RESIDENTIAL (N = 2399)	MULTIFAMILY (N = 55)	COMMERCIAL (N = 19)
Program Sources (All) [a, b, c]	36%	49%	84%
Program Event	19%	25%	26%
Program Representative	22%	29%	79%
Professional Sources (All) [b]	37%	45%	63%
Contractor or someone offering energy efficiency related products or services	27%	31%	37%
Other professional sources (organizations or professional acquaintances that are not program representatives)	15%	22%	37%
Community Sources (All)	32%	35%	26%
Community Event	10%	15%	21%
Family member, friend or colleague	24%	27%	16%
Publicity Sources (All)	66%	62%	58%
Website, social media, community blog	25%	31%	16%
Newspaper, TV, radio, advertisement, or printed publicity	36%	45%	42%
Direct mail, bill insert, email	31%	11%	16%
None of these	1%	0%	0%

Coded open-ended responses for "other." Source: Q4, Q5, Q6, Q7 and grantee-conducted survey.

[a] Residential and Multifamily are significantly different, $p < .05$.

[b] Residential and Commercial are significantly different, $p < .05$.

[c] Multifamily and Commercial are significantly different, $p < .05$.

Table J-5: Main Reasons Respondents Decided to Conduct an Upgrade – Residential (n = 2302; Multiple Responses Allowed)

RESPONSE	REASON	BENEFIT
Increase energy efficiency/lower energy bills (All)	88%	60%
Lower energy bills	87%	60%
Other energy efficiency related	1%	1%
Comfort (All)	85%	78%
Greater indoor comfort when it's hot or cold out	74%	62%

Continued…

RESPONSE	REASON	BENEFIT
Fewer drafts	50%	49%
Greater indoor comfort in one room or part of house/building that was uncomfortable	49%	47%
Reduced indoor moisture problems	13%	18%
Reduced indoor allergens	10%	15%
Other comfort related	1%	1%
Help environment/community (All)	55%	51%
Doing your part to help the environment	54%	47%
Doing your part to help your community	21%	27%
Increased value of your home/building	42%	38%
Improved safety	9%	13%
Needed to replace/upgrade old/broken item	2%	2%
Program provided incentives and financing	1%	1%
Other	1%	1%
None	2%	13%

Coded open-ended responses for "other." Source: Q8.

Table J-6: Benefits that Respondents Experienced from Upgrade – Residential (n = 2302; Multiple Responses Allowed)

RESPONSE	BENEFIT
Increase energy efficiency/lower energy bills (All)	60%
Lower energy bills	60%
Other energy efficiency related	1%
Comfort (All)	78%
Greater indoor comfort when it's hot or cold out	62%
Fewer drafts	49%
Greater indoor comfort in one room or part of house/building that was uncomfortable	47%
Reduced indoor moisture problems	18%
Reduced indoor allergens	15%
Other comfort related	1%
Help environment/community (All)	51%

Continued…

RESPONSE	BENEFIT
Doing your part to help the environment	47%
Doing your part to help your community	27%
Increased value of your home/building	38%
Improved safety	13%
Needed to replace/upgrade old/broken item	2%
Program provided incentives and financing	1%
Other	1%
None	13%

Coded open-ended responses for "other." Source: Q8.

Table J-7: Percent of Respondents Experiencing a Benefit from their Upgrade, Among Respondents who Listed the Benefit a Reason for Conducting the Upgrade – Residential (n = 2302; Multiple Responses Allowed)

RESPONSE	PERCENT
Increase energy efficiency/lower energy bills (All)	61%
Lower energy bills	61%
Other energy efficiency related	58%
Comfort (All)	82%
Greater indoor comfort when it's hot or cold out	68%
Fewer drafts	67%
Greater indoor comfort in one room or part of house/building that was uncomfortable	66%
Reduced indoor moisture problems	57%
Reduced indoor allergens	55%
Other comfort related	71%
Help environment/community (All)	66%
Doing your part to help the environment	60%
Doing your part to help your community	57%
Increased value of your home/building	49%
Improved safety	56%
Needed to replace/upgrade old/broken item	98%
Program provided incentives and financing	94%

Coded open-ended responses for "other." Source: Q8.

Table J-8: Main Reasons Respondents Decided to Do an Upgrade – Multifamily and Commercial (Multiple Responses Allowed)

RESPONSE	MULTIFAMILY (N = 55)	COMMERCIAL (N = 19)
Lower energy bills	89%	95%
Greater indoor comfort when it's hot or cold out	78%	74%
Helping tenants	60%	58%
Increased value of your home/building	56%	58%
Doing your part to help the environment	51%	47%
Replaced broken equipment	47%	47%
Improved air quality	27%	32%
Reduced maintenance	25%	32%
Doing your part to help your community	16%	26%
Improved safety	15%	26%
Positive public relations	4%	16%
Increased Productivity	0%	11%
None	2%	5%

Coded open-ended responses for "other." Source: Q8.

Table J-9: Benefits that Respondents Experienced from Upgrade – Multifamily and Commercial (Multiple Responses Allowed)

RESPONSE	MULTIFAMILY (N = 55)	COMMERCIAL (N = 19)
Lower energy bills	58%	68%
Greater indoor comfort when it's hot or cold out	55%	47%
Helping tenants	49%	53%
Increased value of your home/building	33%	47%
Doing your part to help the environment	44%	42%
Replaced broken equipment	29%	37%
Improved air quality	31%	26%
Reduced maintenance	20%	37%
Doing your part to help your community	18%	26%
Improved safety	13%	37%

Continued…

RESPONSE	MULTIFAMILY (N = 55)	COMMERCIAL (N = 19)
Positive public relations	9%	21%
Increased Productivity	5%	26%
None	22%	26%

Coded open-ended responses for "other." Source: Q8.

Table J-10: Percent of Respondents Experiencing a Benefit from their Upgrade, Among Respondents who Listed the Benefit a Reason for Conducting the Upgrade (Multiple Responses Allowed)

RESPONSE	MULTIFAMILY (N = 55)	COMMERCIAL (N = 19)
Lower energy bills	61%	67%
Doing your part to help the environment	63%	43%
Greater indoor comfort when it's hot or cold out	61%	55%
Reduced maintenance	35%	64%
Increased value of your home/building	50%	44%
Replaced broken equipment	46%	67%
Helping tenants	53%	67%
Doing your part to help your community	21%	83%
Improved air quality	44%	60%
Positive public relations	38%	60%
Improved safety	50%	33%
Increased Productivity	0%	50%

Coded open-ended responses for "other." Source: Q8.

Table J-11: Reasons for Doing Upgrades at the Time Done (Multiple Responses Allowed)

RESPONSE	RESIDENTIAL (N = 2302)	MULTIFAMILY (N = 55)	COMMERCIAL (N = 19)
Good Timing (Life event, already planning/doing improvements, had resources available)	38%	42%	32%
Program-related, financial	38%	47%	58%
Program-related, non-financial	19%	18%	26%
Referral	3%	0%	0%
Comfort	14%	7%	5%

Continued…

RESPONSE	RESIDENTIAL (N = 2302)	MULTIFAMILY (N = 55)	COMMERCIAL (N = 19)
Increase energy efficiency/lower energy bills	17%	24%	16%
Help environment/community	2%	2%	5%
Other	4%	2%	0%
None/No Response	6%	0%	0%

Coded open-ended responses. Source: Q9.

Table J-12: Extent to Which Upgrade Provides a Good Value for Money Spent on a Scale of 0 (No Value) to 10 (High Value)

RESPONSE	RESIDENTIAL (N = 2275)	MULTIFAMILY (N = 54)	COMMERCIAL (N = 19)
	Mean	**Mean**	**Mean**
	8.0	8.3	8.1
Bins	**Percent**	**Percent**	**Percent**
High value (7-10)	84%	89%	84%
Moderate value (4-6)	13%	7%	16%
Low value (0-3)	4%	4%	0%
Total	100%	100%	100%

Excludes respondents that did not answer the question. Source: Q10.

Table J-13: Sources of Funding Used to Cover Cost of Upgrades (Multiple Responses Allowed)

RESPONSE	RESIDENTIAL (N = 2302)	MULTIFAMILY (N = 55)	COMMERCIAL (N = 19)
The program (example: rebate, incentive, grant, free measures)	85%	84%	95%
A loan	37%	44%	37%
Your funds	70%	78%	68%
Your utility	19%	18%	16%
A tax credit [a,b]	32%	18%	11%
Some other organization	3%	5%	5%
Choose not to answer	1%	0%	0%

Source: Q11.

[a] Residential is significantly different than multifamily, $p < .05$.

[b] Residential is significantly different than commercial, $p < .05$.

Table J-14: Program Representative Available to Provide Assistance to Respondents throughout Upgrade Process

RESPONSE	RESIDENTIAL (N = 2140)	MULTIFAMILY (N = 55)	COMMERCIAL (N = 19)
Yes	74%	78%	79%
No	17%	16%	16%
Don't Know	9%	5%	5%
Total	100%	100%	100%

Excludes respondents that did not answer the question. Source: Q12 and grantee-conducted survey.

Table J-15: Level of Satisfaction with Aspects of the Upgrade Process on a Scale of 0 (Not At All Satisfied) to 10 (Completely Satisfied) – Residential (n = 2302)

ASPECT OF THE UPGRADE PROCESS	MEAN	HIGH SATISFACTION (7-10)	MODERATE SATISFACTION (4-6)	LOW SATISFACTION (0-3)
Changes to your house or building (n = 2066)	8.4	87%	9%	3%
Activities of the insulation or air sealing contractors (n = 1992)	8.3	85%	10%	5%
Activities of equipment contractors (n = 1603)	8.5	87%	8%	4%
Activities of the person who visited your home/building (n = 2039)	8.7	90%	7%	3%
Application process (n = 2063)	8.4	84%	12%	4%
Activities of the program staff (n = 1751)	8.4	85%	10%	5%
Activities of the representative available to you (n = 1348)[a]	8.7	89%	9%	3%

Excludes respondents that did not answer the question or answered 'Not Applicable'. Source: Q13.

[a] Only asked of those that had a program representative available to them.

Table J-16: Percent of Respondents Who Provided Satisfaction Ratings above the Midpoint of the Provided Scale

ASPECT OF THE UPGRADE PROCESS	PERCENT
Change to your house or building (n = 2418)	91%
Activities of insulation and equipment contractors (n = 2385)[a]	89%
Activities of the person who visited your home/building (n = 2329)	91%
Activities of the representative available to you (n = 1796)[b]	92%

Excludes respondents that did not answer the question or answered 'Not Applicable'. Source: Q13.

[a] Average of scores for insulation or air sealing contractors and equipment contractors, combined to incorporate grantee-conducted survey.

[b] Only asked of those that had a program representative available to them.

Table J-17: Level of Satisfaction with Aspects of the Upgrade Process on a Scale of 0 (Not At All Satisfied) to 10 (Completely Satisfied) – Multifamily (n = 55)

ASPECT OF THE UPGRADE PROCESS	MEAN	HIGH SATISFACTION (7-10)	MODERATE SATISFACTION (4-6)	LOW SATISFACTION (0-3)
Change to your house or building (n = 52)	8.6	88%	12%	0%
Activities of the insulation or air sealing contractors (n = 50)	7.9	74%	22%	4%
Activities of equipment contractors (n = 46)	7.8	74%	17%	9%
Activities of the person who visited your home/building (n = 54)	8.6	85%	13%	2%
Application process (n = 54)	7.9	70%	26%	4%
Activities of the program staff (n = 49)	7.7	67%	29%	4%
Activities of the representative available to you (n = 43[a])	8.7	88%	9%	2%

Excludes respondents that did not answer the question or answered 'Not Applicable'. Source: Q13.

[a] Only asked of respondents that had a program representative available to them.

Table J-18: Level of Satisfaction with Aspects of the Upgrade Process On a Scale of 0 (Not At All Satisfied) to 10 (Completely Satisfied) – Commercial (n = 19)

ASPECT OF THE UPGRADE PROCESS	MEAN	HIGH SATISFACTION (7-10)	MODERATE SATISFACTION (4-6)	LOW SATISFACTION (0-3)
Change to your house or building (n = 17)	8.7	100%	0%	0%
Activities of the insulation or air sealing contractors (n = 10)	8.8	100%	0%	0%
Activities of equipment contractors (n = 14)	8.4	93%	7%	0%
Activities of insulation and equipment contractors (n = 17)	8.6	94%	6%	0%
Activities of the person who visited your home/building (n = 19)	8.8	95%	5%	0%
Application process (n = 19)	8.6	100%	0%	0%
Activities of the program staff (n = 19)	8.9	89%	11%	0%
Activities of the representative available to you (n = 15[a])	9.1	93%	7%	0%

Excludes respondents that did not answer the question or answered "Not Applicable." Source: Q13.

[a] Only asked of respondents that had a program representative available to them.

Table J-19: How Seriously Respondent Considered Conducting an Upgrade Before Learning About the BBNP Program on a Scale of 0 (Had Never Considered Doing an Upgrade) to 10 (Had Already Decided to do a Similar Energy Upgrade)

	RESIDENTIAL (N =2302)	MULTIFAMILY (N = 55)	COMMERCIAL (N =19)
	Mean	**Mean**	**Mean**
	6.1	5.7	6.0
Bins	**Percent**	**Percent**	**Percent**
Seriously considered (7-10)	51%	51%	47%
Somewhat considered (4-6)	30%	25%	21%
Not seriously considered (0-3)	20%	24%	32%
Total	100%	100%	100%

Excludes respondents that did not answer the question or answered 'Not Applicable'. Source: Q14.

Table J-20: When Respondents Would Have Done Upgrade, if They Had Not Participated in the Program (Among Respondents Who Were Seriously Considering Doing and Energy Upgrade Before Learning about the Program)

TIMEFRAME	RESIDENTIAL (N =809)	MULTIFAMILY (N = 20)	COMMERCIAL (N =7)
Within same year	39%	15%	43%
Within second year	15%	30%	0%
Within third year	9%	10%	0%
More than three years	7%	15%	14%
Don't Know	31%	30%	43%
Total	100%	100%	100%

Excludes respondents that did not answer the question. Source: Q15. No significant differences between sectors.

Table J-21: Influence of Program Elements on Decision to do Energy Efficient Upgrade on a Scale of 0 (No Role) to 10 (A Major Role) – Residential (n = 2302)

PROGRAM ELEMENTS THAT INFLUENCED DECISION TO CONDUCT AN UPGRADE	MEAN	HIGH INFLUENCE (7-10)	MODERATE INFLUENCE (4-6)	LOW INFLUENCE (0-3)	DON'T KNOW
Energy audit or study done to identify upgrade opportunities (n = 2212)	8.1	81%	11%	8%	1%
Salesperson or contractor (n = 1961)	5.0	42%	19%	36%	3%
Loan associated with program (n = 1705)	4.7	43%	9%	45%	3%
Financial incentive received from program (n = 2183)[a]	8.3	83%	9%	7%	1%
Financial support from source other than program (n = 1559)[b]	3.9	35%	8%	53%	3%
Technical support (n = 1792)[b]	5.1	45%	16%	34%	5%
Source you respect (n = 1790)	4.9	44%	15%	38%	3%

Excludes respondents that did not answer the question or answered 'Not Applicable'. Source: Q16.

[a] Residential is significantly difference than Multifamily.

[b] Residential is significantly difference than Commercial.

Table J-22: Influence of Program Elements on Decision to do Energy Efficient Upgrade on a Scale of 0 (No Role) to 10 (A Major Role) – Multifamily (n = 55)

PROGRAM ELEMENTS THAT INFLUENCED DECISION TO CONDUCT AN UPGRADE	MEAN	HIGH INFLUENCE (7-10)	MODERATE INFLUENCE (4-6)	LOW INFLUENCE (0-3)	DON'T KNOW
Energy Audit or Study on Upgrade (n = 54)	7.8	72%	17%	11%	0%
Salesperson or Contractor (n = 49)	4.2	31%	20%	47%	2%
Loan Associated with Program (n = 43)	5.3	49%	7%	42%	2%
Financial Incentive Received from Program (n = 54)	9.0	89%	6%	4%	2%
Financial Support from Source Other than Program (n = 38)	5.0	45%	13%	37%	5%
Technical Support (n = 47)	6.1	53%	16%	21%	9%
Source You Respect (n = 42)	6.3	55%	21%	19%	5%

Excludes respondents that did not answer the question or answered "Not Applicable." Source: Q16.

Table J-23: Influence of Program Elements on Decision to do Energy Efficient Upgrade on a Scale of 0 (No Role) to 10 (A Major Role) – Commercial (n =19)

PROGRAM ELEMENTS THAT INFLUENCED DECISION TO CONDUCT AN UPGRADE	MEAN	HIGH INFLUENCE (7-10)	MODERATE INFLUENCE (4-6)	LOW INFLUENCE (0-3)	DON'T KNOW
Energy Audit or Study on Upgrade (n = 19)	8.2	79%	21%	0%	0%
Salesperson or Contractor (n = 17)	6.2	47%	29%	24%	0%
Loan Associated with Program (n = 10)	5.7	60%	10%	30%	0%
Financial Incentive Received from Program (n = 18)	9.6	100%	0%	0%	0%
Financial Support from Source Other than Program (n = 13)	8.0	77%	8%	15%	0%
Technical Support (n = 15)	7.6	73%	13%	13%	9%
Source You Respect (n = 13)	6.7	54%	31%	15%	0%

Excludes respondents that did not answer the question or answered "Not Applicable." Source: Q16.

Table J-24: Respondent Completed Non-Energy Remodeling Work at or around the Time of Energy Upgrade

RESPONSE	RESIDENTIAL (N = 2289)	MULTIFAMILY (N = 55)	COMMERCIAL (N = 19)
Yes	33%	36%	42%
No	66%	64%	53%
Don't Know	1%	0%	5%
Total	100%	100%	100%

Excludes respondents that did not answer the question. Source: Q17_1.

Table J-25: Respondent Completed Non-Energy Remodeling Work 5 Years Prior to Energy Upgrade

RESPONSE	RESIDENTIAL (N = 2289)	MULTIFAMILY (N = 55)	COMMERCIAL (N = 19)
Yes	51%	53%	58%
No	47%	47%	37%
Don't Know	2%	0%	5%
Total	100%	100%	100%

Excludes respondents that did not answer the question. Source: Q17_2.

Table J-26: Respondents Completed Non-Energy Remodeling Work within the 5 Years Prior to Energy Upgrade

RESPONSE	RESIDENTIAL (N = 2289)	MULTIFAMILY (N = 55)	COMMERCIAL (N = 19)
Yes	57%	60%	58%
No	25%	27%	16%
Don't Know	18%	13%	26%
Total	100%	100%	100%

Excludes respondents that did not answer the question. Source: Q17_3.

Table J-27: What Respondents Would Have Done, Had They Not Participated in the Program (Multiple Responses Allowed)

RESPONSE	RESIDENTIAL (N = 2275)	MULTIFAMILY (N = 55)	COMMERCIAL (N = 18)
No action/Waited	28%	27%	39%
Gone ahead with remodel but without EE savings you got from the program	6%	9%	6%
Done some replacement	38%	33%	33%
Done upgrades /over time	14%	20%	17%
Something else	0%	0%	6%
Don't Know	14%	11%	6%

Excludes respondents that did not answer the question. Coded open-ended responses for "other." Source: Q18.

Table J-28: Respondents Replaced Equipment as Part of Upgrade

RESPONSE	RESIDENTIAL (N = 2302)	MULTIFAMILY (N = 55)	COMMERCIAL (N = 19)
Yes [a]	59%	75%	84%
No	41%	24%	16%
Don't Know	0%	2%	0%
Total	100%	100%	100%

Source: Q19.

[a] Residential responses differ significantly from both multifamily and commercial responses, $p < .05$.

Table J-29: What Respondents Would Have Done about Equipment, Had They Not Participated in the Program (Among Respondents that Installed Equipment)

RESPONSE	RESIDENTIAL (N = 1346)	MULTIFAMILY (N = 41)	COMMERCIAL (N = 16)
No action/Waited	47%	49%	63%
Done some replacement	27%	29%	19%
Done same upgrades as program	19%	17%	13%
Other	1%	0%	0%
Don't Know	7%	5%	6%

Excludes respondents that did not answer the question. Source: Q20.

Table J-30: Respondent Installed Un-incented Measures after Participating in the Program

RESPONSE	RESIDENTIAL (N = 2302)	MULTIFAMILY (N = 55)	COMMERCIAL (N = 19)
Yes	56%	49%	53%
No	43%	51%	47%
Total	100%	100%	100%

Source: Q21

Table J-31: Specific Measures that Have Been Done without Incentives (Among Respondents that Installed Energy Efficiency Measures without an Incentive; Multiple Responses Allowed)

RESPONSE	RESIDENTIAL (N = 1282)	MULTIFAMILY (N = 27)	COMMERCIAL (N = 9)
Compact fluorescent ('swirly') lights	78%	67%	78%
High efficiency refrigerator	24%	37%	33%
High efficiency dishwasher	19%	15%	11%
High efficiency clothes washer	26%	19%	0%
High efficiency clothes dryer	20%	15%	0%
High efficiency windows	22%	26%	22%
Ceiling insulation	12%	22%	11%
Wall insulation	9%	15%	11%
Floor insulation	7%	7%	0%
Other	21%	41%	44%

Source: Q22.

Table J-32: How much did the Program Influence Decisions to do an Energy Efficiency Upgrade without An Incentive on a Scale from 0 (No Influence) to 10 (A Major Influence) (Among Respondents that did and Energy Efficiency Upgrade Without and Incentive)

	RESIDENTIAL (N = 1291)	MULTIFAMILY (N = 27)	COMMERCIAL (N = 10)
	Mean	**Mean**	**Mean**
	6.4	6.5	8.4
Bins	**Percent**	**Percent**	**Percent**
High (7-10)	38%	37%	70%
Moderate (4-6)	21%	30%	10%
Low (0-3)	41%	33%	20%
Total	100%	100%	100%

Excludes respondents that did not answer the question or answered 'Not Applicable'. Source: Q23.

APPENDIX K. NONPARTICIPANT SURVEY METHODOLOGY AND SUMMARY DATA

K.1. METHODS

K.1.1. SAMPLING

We surveyed nonparticipating single-family homeowners that were eligible for programs under 35 grantee and 9 subgrantee programs (Table K-1). We did not collect data for grantees that did not have a single-family residential program. In order reach a confidence level of 90/10 per grantee, we aimed to collect responses from 68 nonparticipating residents within each prime grantee's total target territory, regardless of whether a grantee had subgrantee programs. For example, Boulder County had their own local program as well as two subgrantees: Denver and Garfield. The 68 responses collected for Boulder include nonparticipants in the Boulder, Denver, and Garfield target territories. Respondents were asked about grantee programs for which they were eligible based on the location of their home. To target single-family homeowners that might be in the market for upgrades, we screened contacts to reach homeowners that had either undertaken any home improvement projects in the past two years or were planning in the coming year to undertake such projects.

We used a mixed-mode approach to collect nonparticipant survey data. We used a web survey in all regions and phone surveys in some regions to meet quotas as needed. SSI, under contract to Research Into Action, fielded the survey during the month of October 2013.

Table K-1: Grantees and Subgrantees Included in the Nonparticipant Sample

GRANTEE	GRANTEE TYPE	PRIME GRANTEE (SUBGRANTEES ONLY)	NUMBER SURVEYED
Alabama SEP	Prime		68
Austin	Prime		68
Bainbridge Island	Prime		68
Bedford	Prime		68
Camden	Prime		68
Chicago	Prime		68
Cincinnati	Prime		68
Connecticut	Prime		68
Eagle County	Prime		68
Fayette County	Prime		68
Greensboro	Prime		68

Continued…

GRANTEE	GRANTEE TYPE	PRIME GRANTEE (SUBGRANTEES ONLY)	NUMBER SURVEYED
Indiana	Prime		68
Kansas City	Prime		68
Maine	Prime		68
Maryland	Prime		68
Massachusetts SEP	Prime		68
Michigan	Prime		68
Nevada SEP	Prime		68
New Hampshire	Prime		68
NYSERDA	Prime		68
Omaha & Lincoln	Prime		68
Oregon (Portland)	Prime		68
Philadelphia	Prime		68
Phoenix	Prime		68
Rutland County (VT)	Prime		68
San Antonio	Prime		68
Santa Barbara	Prime		68
Seattle (WA)	Prime		68
St. Lucie	Prime		73
University Park	Prime		68
Virginia SEP	Prime		68
Washington SEP	Prime		68
Wisconsin	Prime		68
Boulder County Total	Prime		68
Boulder County	Prime	Boulder County	17
Denver	Sub	Boulder County	49
Garfield	Sub	Boulder County	2
LA County Total	Prime		68
LA County	Prime	LA County	38
Alameda County	Sub	LA County	6

Continued…

GRANTEE	GRANTEE TYPE	PRIME GRANTEE (SUBGRANTEES ONLY)	NUMBER SURVEYED
Sacramento	Sub	LA County	10
San Diego	Sub	LA County	11
San Francisco	Sub	LA County	3
SEEA Total	Prime		44*
Atlanta GA	Sub	SEEA	17
Jacksonville FL	Sub	SEEA	23
New Orleans LA	Sub	SEEA	4
TOTAL			2,453

* The original sample for SEEA included residents in Charlotte, North Carolina's territory, a subgrantee of SEEA, but their responses are not included in the analyses because Charlotte never offered a single-family residential program. Additionally, five respondents were mistakenly attributed to SEEA when in fact they were in the St. Lucie grantee's territory. Therefore, fewer than 68 responses were collected for SEEA.

K.1.2. DATA COLLECTION

We designed the survey instrument (Appendix M.3) with the following goals in mind

- Assess nonparticipant awareness of local BBNP programs;
- Assess nonparticipating consumers' interest in home improvement and energy efficiency upgrade projects;
- Identify consumers' motivations for undertaking energy efficiency upgrades, and the benefits they experienced as a result of upgrades; and
- Determine influence of local BBNP programs on nonparticipants' decisions to undertake energy efficiency upgrades.

Analysis

We first cleaned the data (including recoding the conflicting responses addressed in Table K-20 and Table K-21) and recoded all open-ended responses into representative numeric variables. Then we analyzed the cleaned data set using descriptive statistics.

K.2. RESULTS

This section includes the results from all questions included in the nonparticipant survey. Table notes indicate the survey instrument question number associated with the results (Appendix M.3).

Table K-2: Respondent Age (n = 2429)

RESPONSE	PERCENT
18 to 34	15%
35 or higher	85%
Total	100%

Screened out respondents that answered 'Under 18' or 'prefer not to answer'. Source: Q1.

Table K-3: Respondent Home Type

RESPONSE	PERCENT
Single-family house	94%
Single-family attached house, such as a townhouse	5%
Duplex, triplex or fourplex	2%
Total	100%

Source: Q4. Those who answered 'Apartment or condominium with five units or more', 'Manufactured or mobile home or 'Something else' were screened out of the survey.

Table K-4: Awareness of at Least One BBNP Energy Efficiency Program (n = 2429)

RESPONSE	PERCENT AWARE	AWARE OF LEED FOR HOMES
Yes	32%	15%
No	61%	77%
Don't Know	7%	8%
Total	100%	100%

Source: Q5.

Table K-5: Awareness of at Least One BBNP Energy Efficiency Program by Prime Grantee (n = 2429)

GRANTEE	PERCENT AWARE
San Antonio	96%
Maine	75%
Austin	72%
Massachusetts SEP	56%
LA County	53%

Continued…

GRANTEE	PERCENT AWARE
Bainbridge Island	50%
Portland	50%
Rutland County (VT)	49%
Eagle County	47%
University Park	46%
NYSERDA	43%
Boulder County	40%
Kansas City	37%
Cincinnati	35%
Chicago	31%
Nevada SEP	29%
Philadelphia	29%
SEEA	27%
Washington SEP	25%
Santa Barbara	24%
St. Lucie	23%
Maryland	22%
Seattle (WA)	22%
Wisconsin	21%
Fayette County	19%
Alabama SEP	19%
Virginia SEP	18%
Phoenix	18%
New Hampshire	15%
Bedford	13%
Greensboro	13%
Indiana	13%
Omaha & Lincoln	10%
Connecticut	9%

Continued…

GRANTEE	PERCENT AWARE
Michigan	9%
Camden	7%

Source: Q5.

Table K-6: Respondent Has Done a Home Improvement Project in the Past Two Years (n = 2429)

RESPONSE	PERCENT
Yes	85%
No	15%
Don't Know	0%
Total	100%

Source: Q9.

Table K-7: Respondent Will Do a Home Improvement Project in the Next Year (n = 2429)

RESPONSE	PERCENT
Yes	68%
No	20%
Don't Know	13%
Total	100%

Source: Q10.

Table K-8: Type of Home Improvement Projects Done in the Past Two Years (Among Respondents that Have Done a Home Improvement Project in the Past Two Years; n = 2055; Multiple Responses Allowed)

TYPE OF HOME IMPROVEMENT	PERCENT
Refurbishing	66%
New appliance purchase	41%
Window or outside door replacement	29%
Bathroom remodel	25%
Kitchen remodel	18%
Property damage repair	17%
Insulation upgrades	16%

Continued…

TYPE OF HOME IMPROVEMENT	PERCENT
Multiple room remodel	10%
Basement finishing	8%
Room addition	4%
Other	20%

Source: Q11.

Table K-9: Type of Home Improvement Projects Planned in the Next Year (Among Respondents that Have Not Done a Project in the Past Two Years, But Plan to in the Next Year; n = 374; Multiple Responses Allowed)

TYPE OF HOME IMPROVEMENT	PERCENT
Refurbishing	66%
Bathroom remodel	25%
Window or outside door replacement	25%
New appliance purchase	25%
Kitchen remodel	18%
Insulation upgrades	13%
Property damage repair	11%
Basement finishing	10%
Multiple room remodel	8%
Room addition	4%
Other	3%

Source: Q12

Table K-10: Who has Conducted Energy Efficient Upgrades in the Home (n = 2429; Multiple Responses Allowed)

RESPONSE	PERCENT
You or household member	43%
No one (has not had EE upgrades done)	34%
Contractor	26%
Someone else	6%
Don't Know	5%

Source: Q13.

Table K-11: Energy Efficient Upgrades Done in the Past Year (Among Respondents that Have Had an Energy Efficient Upgrade Done; n = 1496; Multiple Responses Allowed)

TYPE OF ENERGY EFFICIENT UPGRADE	PERCENT
Lighting	59%
Appliance	40%
Consumer electronics	34%
Air sealing	33%
Thermostat	32%
Insulation	30%
Windows	28%
Showerhead or faucet aerator	28%
Hot water heater	24%
AC or cooling system	20%
Heating system or furnace	19%
Duct sealing	12%
Other	5%
Don't know	2%

Source: Q14.

Table K-12: Reasons for Energy Efficient Upgrades (Among Respondents that Have Had an Energy Efficient Upgrade Done; n = 1496; Multiple Responses Allowed)

REASONS	PERCENT
Lower energy bills	75%
Replace something that was old, broken	47%
Improved comfort	33%
Help environment	23%
Increase value of home	21%
Have something that looks more appealing	12%
Reduce moisture, mold or allergens	10%
Updated or high tech features	10%
Improved safety	7%

Continued…

REASONS	PERCENT
Better ease of use	6%
Other	2%

Source: Q15.

Table K-13: Benefits Experienced from Energy Efficient Upgrades (n = 1496; Multiple Responses Allowed)

BENEFITS	PERCENT
Lower energy bills	68%
Improved comfort	36%
Replace something that was old, broken	34%
Increase value of home	22%
Help environment	21%
Have something that looks more appealing	19%
Better ease of use	13%
Updated or high tech features	10%
Reduce moisture, mold or allergens	10%
Improved safety	8%
Other	1%

Source: Q16.

Table K-14: Percent of Respondents Who Experienced the Benefits They Hoped to Achieve When Conducting Energy Efficient Upgrades (Among Those that Have Had an Energy Efficient Upgrade Done; n = 1496; Multiple Responses Allowed)

REASONS AND BENEFITS	PERCENT
Lower energy bills	82%
Improved comfort	72%
Help environment	69%
Replace something that was old, broken	62%
Increase value of home	61%
Have something that looks more appealing	59%
Reduce moisture, mold or allergens	56%

Continued…

REASONS AND BENEFITS	PERCENT
Improved safety	52%
Better ease of use	52%
Updated or high tech features	45%
Proportion experiencing any benefit they hoped to achieve	92%

Source: Q15 and Q16.

Table K-15: Extent to Which Upgrade Provides a Good Value Relative to Money Spent (Scale of 0 (Poor Value) to 10 (High Value; Among Those that Have Had an Energy Efficient Upgrade Done; n = 1496)

RESPONSE	VALUE OF ENERGY EFFICIENT UPGRADES
	Mean
	7.5
Binned Percentages	**Percent**
High value (7-10)	75%
Moderate value (4-6)	21%
Low value (0-3)	2%
Not applicable	2%
Total	100%

Scale questions recoded into bins in order to calculate proportions that provided low, moderate, and high ratings. Source: Q17.

Table K-16: How Respondents Financed Energy Efficient Upgrades (Among Respondents that Have Had an Energy Efficient Upgrade Done; n = 1496; Multiple Responses Allowed)

TYPE OF FUNDS	PERCENT
Personal Funds	88%
Loan	7%
Tax Credit	8%
Utility Rebate	9%
Other	4%
Refused	1%

Source: Q18.

Table K-17: Energy Efficient Upgrades Planned in the Next Year (n = 2429; Multiple Responses Allowed)

TYPE OF ENERGY EFFICIENT UPGRADE	PERCENT
Lighting	28%
Air sealing	19%
Appliance	19%
Windows	15%
Insulation	14%
Consumer electronics	13%
Hot water heater	11%
Thermostat	10%
Showerhead or faucet aerator	9%
Heating system or furnace	8%
AC or cooling system	7%
Duct sealing	5%
Other	4%
Don't Know	12%
None	19%

Source: Q19.

Table K-18: Respondent Had an Audit Conducted by a Contractor (n = 2429)

RESPONSE	PERCENT
Yes	13%
No	85%
Don't Know	2%
Total	100%

Source: Q20.

Table K-19: Influence of Local Program on Decision to Conduct an Energy Efficiency Upgrade on a Scale of 0 (No Influence at All) to 10 (A Great Deal of Influence) (Among Respondents that Have Had an Energy Efficient Upgrade Done and were Aware of at Least One Local Program; n = 525)

	INFLUENCE
	Mean
	4.1
Bins	**Percent**
Little influence (0-3)	43%
Moderate influence (4-6)	29%
A lot of influence (7-10)	28%
Total	100%

Scale questions recoded into bins in order to calculate proportions that provided low, moderate, and high ratings. Source: Q21.

Table K-20: Considered Working with Local BBNP Program (Among those that Have Had an Energy Efficient Upgrade Done and Were Aware of at Least One Local Program; n = 525)

RESPONSE	PERCENT
Yes	30%
No	60%
Don't Know	10%
Total	100%

If respondent answered Q22 with "Yes – considered working with program" and answered Q23 with "Did not consider working with program" and no other response, Q22 was recoded to "No." Source: Q22.

Table K-21: Why Respondent did not Work with the Program (Among Respondents that Have Had an Energy Efficient Upgrade Done and were Aware of at Least One Local Program; n = 525)

REASON	PERCENT
Heard of program after project	20%
Did not consider	20%
Project did not qualify	19%
Did not get around to it	19%
Program was difficult to work with	8%
Heard negative comments about program	4%

Continued…

REASON	PERCENT
Other	19%
Don't know	11%
Total	100%

If a respondent answered "Yes – considered working with program" to Q22 and "Did not consider working with program" to Q23, Q22 was recoded to "No" if no other reason was given. If other reasons for not working with program were given in Q23, the respondent's "Did not consider working with program" response was removed from Q23. Source: Q23.

Table K-22: Degree to Which Local Program Influenced Decision to Conduct Future Energy Efficiency Projects on a Scale of 0 (No Influence at All) to 10 (A Great Deal of Influence) (Among Those Plan to do an Energy Efficient Upgrade and were aware of at least One Local Program; n = 525)

	INFLUENCE
	Mean
	3.8
Bins	**Percent**
Little influence (0-3)	47%
Moderate influence (4-6)	27%
A lot of influence (7-10)	26%
Total	100%

Scale questions recoded into bins in order to calculate proportions that provided low, moderate, and high ratings. Source: Q24.

Table K-23: Influence of Local Program on Decision to Conduct an Energy Efficiently Upgrade on a Scale of 0 (No Influence at All to 10) to 10 (A Great Deal of Influence) (Among Those that Have Had an Energy Efficient Upgrade Done or Plan to do an Energy Efficient Upgrade and were aware of at least One Local Program; n = 726)

	INFLUENCE
	Mean
	4
Bins	**Percent**
Little influence (0-3)	44%
Moderate influence (4-6)	29%
A lot of influence (7-10)	27%
Total	100%

Scale questions recoded into bins in order to calculate proportions that provided low, moderate, and high ratings. Combined those that have had an energy efficient upgrade done with those that plan to do an energy efficient upgrade and were aware of at least one local program Source: Q21 and Q24.

APPENDIX L. INTERVIEW METHODS: GRANTEE, DOE, AND FINANCIAL INSTITUTIONS

L.1. GRANTEE INTERVIEW METHODS

We conducted in-depth interviews with knowledgeable contacts (typically the lead contact for the grant or the day-to-day program manager) at each grantee. In total, we interviewed 40 of the 41 grantees; one grantee refused to be interviewed (see Table L-1). We conducted two waves of interviews: we conducted interviews with 35 of the 41 grantees for the preliminary evaluation and 34 grantees (32 of which we had previously interviewed) and eight subgrantees for the final evaluation. We conducted the preliminary report interviews in the summer of 2012 and the final report interviews between April 2013 and January 2014.

The grantee/subgrantee interviews ranged in depth and complexity from a two-hour interview with a single grantee representative to more than five interview hours across multiple sessions with multiple representatives for a grantee. We conducted both in-person and telephone interviews.

Our interview guide for the second wave of interviews appears in Appendix M.4 *Grantee/Subgrantee In-depth Interview Guide*. Our first wave interview guide and findings are included in *Preliminary Process and Market Evaluation: Better Buildings Neighborhood Program* (December 28, 2012; appendices in a separate volume) (Research Into Action and NMR Group, 2012a, 2012b).

We prepared for the grantee interviews by interviewing the Account Managers and by combining the available grantee information from *Salesforce*, BBNIS, grantee websites, and BBNP webinars and conferences. We designed the first wave and second wave in-depth interview guides focusing on the grantee's experiences, interpretations, and lessons learned.

Table L-1: Grantees Interviewed

GRANTEE/SUBGRANTEE	CONTRACT ROLE	FIRST WAVE INTERVIEW	SECOND WAVE INTERVIEW
Alabama SEP	Grantee	Yes	
Austin, TX	Grantee	Yes	Yes
Bainbridge Island, WA	Grantee	Yes	Yes
Bedford, NY	Grantee	Yes	Yes
Boulder County, CO	Grantee	Yes	Yes
Camden, NJ	Grantee	Yes	Yes
Carrboro	Subgrantee		Yes
Chapel Hill, NC	Subgrantee		Yes
Charlottesville, VA	Subgrantee		Yes

Continued…

GRANTEE/SUBGRANTEE	CONTRACT ROLE	FIRST WAVE INTERVIEW	SECOND WAVE INTERVIEW
Chicago, IL	Grantee	Yes	Yes
Cincinnati (GCEA)	Grantee	Yes	Yes
Connecticut	Grantee	Yes	Yes
Denver, CO	Subgrantee		Yes
Eagle County, CO	Grantee	Yes	Yes
Fayette County, PA	Grantee	Yes	Yes
Greensboro, NC	Grantee	Yes	Yes
Indianapolis, IN	Grantee	Yes	
Kansas City, MO	Grantee	Yes	Yes
LA County, CA	Grantee	Yes	Yes
Lowell, MA	Grantee	Yes	Yes
Maine	Grantee	Yes	Yes
Maine SEP	Grantee	Yes	
Maryland	Grantee	Yes	Yes
Massachusetts SEP	Grantee	Yes	
Michigan	Grantee	Yes	Yes
Michigan SEP	Grantee		Yes
Missouri	Grantee		Yes
Nevada	Grantee		[refused]
New Hampshire	Grantee	Yes	Yes
New Orleans, LA	Subgrantee		Yes
NYSERDA	Grantee	Yes	Yes
Omaha & Lincoln, NE	Grantee	Yes	Yes
Oregon (Portland)	Subgrantee		Yes
Philadelphia, PA	Grantee	Yes	Yes
Phoenix, AZ	Grantee	Yes	Yes
Portland, OR	Grantee	Yes	Yes
Rutland County, VT	Grantee	Yes	Yes
Sacramento	Subgrantee		Yes

Continued…

GRANTEE/SUBGRANTEE	CONTRACT ROLE	FIRST WAVE INTERVIEW	SECOND WAVE INTERVIEW
San Antonio, TX	Grantee	Yes	Yes
San Diego, CA	Subgrantee		Yes
Santa Barbara, CA	Grantee	Yes	Yes
Seattle, WA	Grantee	Yes	Yes
SEEA	Grantee	Yes	Yes
St. Lucie County, FL	Grantee	Yes	Yes
Toledo-Lucas Co. Port Authority (OH)	Grantee	Yes	Yes
University Park, MD	Grantee	Yes	
Virginia SEP	Grantee	Yes	
Washington SEP	Grantee	Yes	Yes
Wisconsin	Grantee	Yes	Yes
TOTAL		35	40

L.2. DOE-RELATED INTERVIEW METHODS

We interviewed DOE BBNP staff, its support contractors, and nongovernmental stakeholders of BBNP for both the preliminary and final evaluation reports.

L.2.1. DOE STAFF AND CONTRACTORS

We interviewed for the preliminary report 11 DOE staff and 4 support contractors; for the final report, we interviewed 8 DOE staff (7 of which we had previously interviewed) and 6 support contractors (2 of which we had previously interviewed). Both the preliminary and final sample sizes exceeded the samples stated in the process evaluation work plan.

We selected contacts who were *actively* involved in planning and executing Better Buildings support activities. We conducted telephone interviews with each contact lasting between 45 minutes to two hours for the preliminary and 45 to 75 minutes for the final. The interviews for the final evaluation occurred between late January and late April 2014.

The interviews with DOE staff and support contractors covered the following topics, aligning the depth of the questions to their role and responsibilities:

- Roles and responsibilities in BBNP;
- Their assessment of the program objectives, program experience, and technical assistance (questions modified based on their role);
- Drivers and barriers to program success and program sustainability;

- Issues with complying with various DOE and federal grant requirements;
- Issues with program reporting and data management;
- Perceptions of effectiveness of DOE-conducted grantee support activities, such as BBNP conferences and peer exchange networks;
- Experiences with nongovernmental stakeholders; and
- DOE's lessons learned and anticipated next steps.

L.2.2. NONGOVERNMENTAL STAKEHOLDERS

We conducted telephone interviews for the preliminary evaluation with four of six identified nongovernmental stakeholders; for the final evaluation, we interviewed two stakeholders, one of which we had previously interviewed. The interviews lasted between 30 minutes and one hour. The interviews for the final evaluation occurred in April 2014. The interviews covered the following topics, aligning the depth of the questions to their roles:

- Stakeholder involvement in BBNP
- Their assessment of the program effects on the market
- Drivers and barriers to program success and program sustainability
- Issues with complying with various DOE and federal grant requirements
- Experiences with technical assistance

L.3. FINANCIAL INSTITUTIONS

We conducted in-depth interviews averaging about 25 minutes in length with contacts at grantees' financial partners. During in-depth interviews, we asked grantees to identify their financial partners. Grantees identified 44 financial institutions. The financial institutions grantees identified included credit unions, banks, community development financial institutions (CDFIs), as well as AFC First Financial and Energy Finance Solutions, two organizations focused specifically on energy efficiency finance. In addition, while most grantees turned to outside sources to administer the financing components of their programs, some grantees had the internal infrastructure in place to administer loan programs. Thus, the financial partners grantees named included government organizations associated with the grantees that administered internally-managed financing programs.

We selected 20 of these financial partners for in-depth interviews. We sought to ensure that the selected financial partners were evenly distributed both geographically and by financial institution type. We conducted interviews between October 2013 and January 2014.

Table L-2: Distribution of Financial Partner In-Depth Interview (IDI) Respondents

FINANCIAL INSTITUTION TYPE	NORTHEAST		SOUTHEAST		CENTRAL		WEST		TOTAL	
	Total	IDI	Total	IDI	Total	IDI	Total	IDI	Total	IDI
Credit Union	--	--	3	3	6	1	8	2	17	6
Bank	2	1	--	--	1	--	3	2	6	3
Efficiency Specific	2	1	--	--	2	1	--	--	4	2
CDFI	1	1	--	--	3	2	3	--	7	3
Government	3	1	3	1	2	2	2	2	10	6
Total	8	4	6	4	13	6	16	6	44	20

APPENDIX M. DATA COLLECTION INSTRUMENTS

M.1. GRANTEE PROGRAM CHARACTERISTICS SURVEY: WEB-BASED

M.1.1. AUTHENTICATION PROMPT

Thank you for agreeing to participate in this survey of BBNP grantees and subgrantees.

Before you begin, please enter the email address that the survey invitation was originally sent to (for most, this will be your personal work email address). This email address is your login ID, which is used to retrieve the specific survey associated with your organization.

If you did not receive the original email invitation that contained the survey link, and were asked to complete the survey by a colleague, be sure to enter the email address of your colleague who first received the email invitation that contained the survey link.

If you are struggling to get past this screen, please contact Jordan Folks at jordan.folks@researchintoaction.com, or (503) 943-2131.

M.1.2. INTRODUCTION

Dear {Pipe in grantee contact name},

Thank you for helping us highlight all of your successes and contribute your experiences to the future whole building efficiency efforts of DOE and program administrators everywhere.

This survey is voluntary. Please respond for programs you directly administer. Grantees should describe grantee-administered programs and subgrantees should describe subgrantee-administered programs.

If you have any technical issues with the survey, please contact Jordan Folks, (503) 943-2131, or Jordan.Folks@researchintoaction.com.

We are conducting this evaluation on behalf of Lawrence Berkeley National Laboratory (LBNL). If you have questions about the validity of this survey please contact Edward Vine at elvine@lbl.gov or (510) 486-6047.

Click “Next” to begin the survey.

Sincerely,

Marjorie McRae, PhD

Principal, Research Into Action, Inc.

Marjorie.McRae@researchintoaction.com

(503) 287 - 9136.

M.1.3. INSTRUCTIONS

To navigate the survey pages (to go forward or back), use the “Next” and “Back” buttons at the bottom right of each page.

WARNING: Do NOT attempt to move around in the survey by using your browser's navigation arrows. To do so ejects you from the survey.

Let’s begin! Click the ‘next’ arrow to get started.

[PROGRAMMER: PLEASE AUTOMATE THE NUMBER OF ROWS IN EACH RESPONSE TABLE TO BE THE SECTORS THEY ARE REPORTING ON. DO NOT AUTOFEED THE PROGRAM NAME, JUST THE ROWS/SECTOR THE TABLES SHOW]

1. Please use the following table to identify your program that to date has achieved the most energy savings [program-total Btu] in each of these three sectors: Residential (not including a low-income only program), Low-income Residential, and Nonresidential. You will be describing these programs throughout the survey. (If you have no program serving a given sector, leave the remaining columns blank for that sector.) (When asked for a number or percentage, please enter numbers only; form will not accept words, ranges, commas, decimals, or symbols (such as %))

[PROGRAMMER: Field 1 is two buttons, "no," "yes". Field 2 is numeric. Fields 3, 4, 5 are text.]

	Do you have any programs serving this sector?	How many of your programs serve this sector? (If has varied over time, what was the largest number offered at any one time?)	Name of Program with Most Savings (this is the program your survey answers will describe)	Approximate Percentage of Total Grantee Savings this Program Comprises	If program targets one or more submarkets, please briefly describe:
Residential					
Low-income					
Nonresidential					

2. Your programs may have evolved over time in response to changing opportunities and constraints. Throughout this survey, please describe your program as it was when – in your view – it was functioning at its best. Please use the table to indicate when the program launched and the period (approximate beginning and ending date) of when it functioned at its best. If it is still functioning well, enter the current date in the 'Ending of "functioning at its best"' field, even though the program may not yet be ending. Please use the two-digit month/year format [mm/yy].

[PROGRAMMER: Only carry forward for remaining survey rows with programs per Q1. All fields are text mm/yy.]

	Program launch date (mm/yy)	Beginning of "functioning at its best" (mm/yy)	Ending of "functioning at its best" (mm/yy)
Residential			
Low-income			
Nonresidential			

3. Did your organization receive non-BBNP grants or funds that complement, extend, or benefit your BBNP program? If yes, what? (Check all that apply)

[PROGRAMMER: Field one has three buttons, "yes," "no," "don't know". Fields 2, 3, 4, 5, 6, 7, 9 have a single button, signifying endorsement. Field 9 is text.]

	Other funds received?	Other ARRA	SEP	U.S. Department of Labor	U.S. HUD	Other Federal Agency	State or local	Utility	Other (describe)
Residential									
Low-income									
Nonresidential									

4. Did your program build on the experience of a pilot or other program preceding the BBNP grant? (This includes, for example, an existing utility program you are enhancing.)

[PROGRAMMER: Fields 1, 4 have three buttons, "yes," "no," "don't know". Fields 2, 3 are text.]

	Built on prior experience?	If yes, name of program	Name of funding source (ex: utility name)	Was this a whole house/ whole building program?
Residential				
Low-income				
Nonresidential				

5. Consider the most experienced team member in each of the following categories. At time of program launch, about how many years of experience with home performance, whole building upgrades, and other relevant energy efficiency efforts did that member have? (Your best guess is fine.) (Team members include contract staff.) Please enter a number (#) for "years"; the form will not accept ranges. If you "don't know," please enter 99.

[PROGRAMMER: All fields are numeric.

	Program design (#)	Financial institution engagement or involvement (#)	Program implementation (#)	Building trades or green building (other than program implementation) (#)	Managing federal grants and funds (#)
Residential					
Low-income					
Nonresidential					

M.1.4. OUTREACH

6. What is the approximate number of buildings that are eligible for the program? (Please enter a number with commas; no abbreviations; example: enter 20,000 instead of entering 20k)

[PROGRAMMER: Field 1 is numeric. Field 2 has a single button, signifying endorsement.

	Number of eligible customers	Don't know
Residential		
Low-income		
Nonresidential		

7. In addition to residential and/or nonresidential customers, what other groups does your program work with, involve, or serve? (Check all that apply)

[PROGRAMMER: All fields (except "other") have a single button, signifying endorsement; "Other" is text]

	Firms qualified to conduct audits	Firms qualified to install insulation or infiltration measures	Firms qualified to install equipment	Retailers	Home or building appraisers	Other: describe	Not relevant to program	Don't know
Residential								
Low-income								
Nonresidential								

8. Have you asked program participants how they heard of your program?

[PROGRAMMER: All fields have a single button, signifying endorsement.]

	Yes	No	Don't know	Not relevant to program
Residential				
Low-income				
Nonresidential				

9. Please identify the program promotional media you believe were most effective in driving upgrades. **Please only check a maximum of three per row.**

[PROGRAMMER: All fields (except "other") have a single button, signifying endorsement; "Other" is text; maximum of three endorsements per row.]

	Website	Mass media buys (ex: radio, newspaper, billboards)	Social media (Facebook, Twitter, LinkedIn, etc.)	Letter to specific, named occupant	Direct mail to "occupant" or similar	Free media exposure (ex: feature story, mentions)	Visible indication of participation (ex: lawn signs, window decals, plaques)	Other: describe	Not relevant to program	Don't know
Residential										
Low-income										
Nonresidential										

10. Please identify the program outreach activities you believe were most effective in driving upgrades. **Please only check a maximum of three per row**.

[PROGRAMMER: All fields (except "other") have a single button, signifying endorsement; "Other" is text; maximum of three endorsements per row]

	Door-to-door canvassing, community sweeps	Presentation to community groups (ex: Rotary, city club, business organizations, residential associations, church, school, library)	Community events participated in by program (ex: festivals)	Program events organized by program (ex: marketing event)	Endorsements or evident support by community leader(s)	Participant testimonials	Contests	Case studies	Outreach to trade associations (ex: home builders associations)	Other: describe	Not relevant to program	Don't know
Residential												
Low-income												
Nonresidential												

11. Please write in the two marketing messages or themes your program used the most. (Perhaps you emphasized "comfort", "savings", "easy to do", "rebates available", "act now", "go green," or something else.)

[PROGRAMMER: Fields 1, 2 are text. Fields 3, 4 have a single button, signifying endorsement.]

	Message	Message	Not Relevant to Program	Don't Know
Residential				
Low-income				
Nonresidential				

12. Did you use a marketing contractor? If yes, please provide a brief description of what the marketing contractor did. Please rate your satisfaction (high, medium, low) with the marketing contractor's contribution to the program, and give a brief description of why you gave that rating.

[PROGRAMMER: Fields 1 and3 have three buttons, "yes," "no," "don't know". Field 2 is text. Field 4 has three buttons, "high," "medium," "low".]

	Used marketing contractor?	If yes, to do what?		Satisfaction with the marketing contractor's contribution to the program	Reason for satisfaction rating
Residential					
Low-income					
Nonresidential					

13. Are customers assigned an "energy coach," "energy advisor," "energy advocate," or other program representative encourage and support customers through the program processes? If yes, is the assigned representative a program staff member or contractor? In the last column, please provide any additional, brief information that would help us understand this role.

[PROGRAMMER: Field 1 has four buttons, "yes," "no," "don't know," "not relevant to program". Field 2 has two buttons, "program staff", "contractor". Field 3 is text.]

	Customers assigned a program representative?	If yes, who?	Additional detail (optional)
Residential			
Low-income			
Nonresidential			

M.1.5. AUDITS

14. Does your program include building energy assessments/audits/evaluations to identify the savings opportunities? If yes, please indicate how audits are done, selecting one or more of the options. If something else, please describe.

[PROGRAMMER: Field 1 has three buttons, "yes," "no," "don't know". Fields 2, 3, 4, 5, 6 have a single button, signifying endorsement. Field 7 is text.

	Program includes audits?	Yes – by program staff	Yes – by contractors to program	Yes – by contractors to participant	Yes – online audit	Other	Other: please describe
Residential							
Low-income							
Nonresidential							

[PROGRAMMER: If all responses to Q14) field 1 = no or don't know (field 7), go to the next section, Upgrades.]

[PROGRAMMER: ONLY PROGRAMS THAT INCLUDE AUDITS WILL APPEAR AS ITEMS FOR THE REST OF THIS SECTION (Q15-Q22)

15. Which of the following audit activities does the program engage in? (Check all that apply)

[PROGRAMMER: Fields 1, 2, 3, 4, 6 have a single button, signifying endorsement. Field 5 is text.]

	Pre-screening of candidates for audit	Online audit	Walk-through audit	Whole house/ whole building audit	Other (describe)	Don't know
Residential						
Low-income						
Nonresidential						

16. Are any energy saving measures installed as part of the audit process? If yes, please indicate the primary purpose of installing measures: indicate whether they are "sweeteners" to encourage participation in the audit or a subsequent upgrade (achieving < 15% savings), a means to acquire significant savings cost effectively, or something else? If something else, please describe.

[PROGRAMMER: Field 1 has three buttons, "yes," "no," "don't know". Field 2 has three buttons "installed measures serve to encourage participation," "installed measures acquire significant savings," "other". Field 3 is text.]

	Are measures installed in audit?	Primary purpose of installed measures	If "other" is checked, please describe
Residential			
Low-income			
Nonresidential			

17. [this question was deleted]

PROGRAMMER: IF FOR Q17, BOTH TEST-IN AND TEST-OUT = NEVER, SKIP TO Q19)

18. What diagnostic tools do the program assessors use, and about what proportion of audits are they used for (always, often, sometimes, or never)?

[PROGRAMMER: Fields 1, 3, 5 have a single button, signifying endorsement. Field 7 is text. Fields 2, 4, 6, 8 have four buttons: Always, Often, Sometimes and Never]

	Frequency of blower door use	Frequency of infrared use	Frequency of CAZ testing	Other tool used (describe)	Frequency of other tool use
Residential					
Low-income					
Nonresidential					

19. At the time the program was most active in conducting audits, about how many individuals were eligible to conduct program audit? And about how many were actually conducting audits? About what proportion of all program audits did your top five producers do? Please enter numbers (#) and percentages (%) as numbers only; form will not accept ranges or percent symbols.

[PROGRAMMER: Fields 1, 2 are formatted numeric. Fields 3, 4 have a single button, signifying endorsement.]

	Number of individuals eligible (#)	Number of individuals conducting (#)	Proportion of audits done by top five producers (%)	Not relevant to program	Don't know
Residential					
Low-income					
Nonresidential					

20. Please indicate the proportion of your audit contractors that had experience with prior efficiency programs (prior to your program launch).

[PROGRAMMER: Field 1 has four buttons: Most, Some, Few, None. Field 2 has a single button, signifying endorsement.]

	Experienced with prior efficiency programs		Don't know
Residential		[column deleted]	
Low-income		[column deleted]	
Nonresidential		[column deleted]	

21. Please indicate the proportion of your audit contractors having a generally high level of relevant skills, a medium level, or low level of relevant skills prior to your program launch, relative to your expectations for quality audits.

[PROGRAMMER: Fields 1, 2, 3 have four buttons: Most, Some, Few, None. Field 4 has a single button, signifying endorsement.]

	Generally high skill level	Moderate skill level	Low skill level	Don't know
Residential				
Low-income				
Nonresidential				

22. Which of the following describes how the assessor estimates participant energy savings? (Check all that apply)

[PROGRAMMER: Fields 1, 2, 3, 4, 6 have a single button, signifying endorsement. Field 5 is text.]

	Each type of measure has deemed (pre-specified) energy savings	Each type of package of measures has deemed (pre-specified) energy savings	The savings for each measure is estimated via site-specific energy modeling	The savings for the package of measures is estimated via site-specific energy modeling	Other (describe)	Don't know
Residential						
Low-income						
Nonresidential						

M.1.6. UPGRADES

Please continue reporting on the programs you listed at the beginning of the survey:

23. Which of the following describes your program's upgrade offerings? (Check all that apply)

[PROGRAMMER: Fields 1, 2, 3, 4, 6 have a single button, signifying endorsement. Field 5 is text.]

	Free upgrades	Upgrade incentives	Referrals to programs offering upgrade incentives	Other (describe)	Don't know
Residential					
Low-income					
Nonresidential					

24. Who or what do you think are the three principal drivers of upgrade sales? Please pick your top three choices. (Only select three per row)

[PROGRAMMER: Fields 1 –7, 9 have a single button, signifying endorsement. Field 8 is text. Maximum of three responses per row.]

	Program staff (non-assessor)	Assessor	Audit report	Upgrade contractor	Financial incentives (rebates, grants, discounts, etc.)	Financing (loans)	Other	Other (describe)	Don't know
Residential									
Low-income									
Nonresidential									

25. Approximately what is the average upgrade cost, and approximately what percentage – on average – of upgrade costs do participants pay themselves? Your best guess is fine. If free to participant, enter "0" for percentage paid by participants. (Please enter cost and percentage as numbers; form will not accept ranges, commas, decimals, or symbols (such as $ or %).

[PROGRAMMER: Field 1 is text. Field 2 is a single button, signifying endorsement.]

	Average upgrade cost ($x,xxx)	Don't know average cost	Average percentage of upgrade costs paid by participants (yy%)	Don't know average percentage
Residential				
Low-income				
Nonresidential				

26. Which of the following sources of incentives are available to qualifying upgrade participants? (Please exclude financing, which is addressed subsequently.) (Check all that apply)

[PROGRAMMER: All fields have a single button, signifying endorsement.]

	Program incentives	Utility or program partner incentives	Other program sources (ex: LIHEAP, government)	State tax incentives	Discounts from retailers or contractors receiving program incentives	Other: Describe	Don't know
Residential							
Low-income							
Nonresidential							

27. Does your program allow a home or building owner to do more than one project with the program (that is, upgrades at different times for different measures)? If yes, please briefly describe your reasoning in allowing multiple, separate projects. (Check all that apply)

[PROGRAMMER: Field 1 has three buttons, "yes," "no," "don't know". Field 2 is text.]

	Allows multiple projects?	Reasoning (describe)
Residential		
Low-income		
Nonresidential		

28. About what percentage of your upgrade participants have the following measures installed? (Your best approximation is fine. Please enter percentages only as numbers; form will not accept ranges, commas, decimals, or symbols (such as %))

[PROGRAMMER: All fields (other than field 10) are form fields Field 10 has a single button, signifying endorsement.]

	Ceiling insulation	Insulation other than ceiling	Infiltration reduction measures	HVAC equipment	CFLs	Hot water measures	Thermostats	Solar thermal	Solar PV	Don't know
Residential										
Low-income										
Nonresidential										

[PROGRAMMER: IF Q28 AND Q29 FALL ON TWO DIFFERENT PAGES OF THE SURVEY, PLEASE ALERT ME AND I WILL REPHRASE Q0]

29. How many of the measure types above does your program require participants to install? (Enter a value of 1 to 9, indicating how many of the above nine measure types participants are required to install; if no minimum requirements check "Not applicable to program") [PROGRAMMER: Field 1 is numeric text (1 to 6). Fields 2 and 3 are one button.]

	Number of measure types required	Not applicable to program	Don't know
Residential			
Low-income			
Nonresidential			

30. Do participants need to meet an energy savings threshold in order to qualify for incentives? If yes, what percent savings must be met? (Please enter percentages only as numbers; form will not accept ranges, commas, decimals, or symbols (such as %))

[PROGRAMMER: Field 1 has three buttons, "yes," "no," "don't know". Field 2 is text.]

	Savings threshold requirement?	If yes, what percent savings must be met?
Residential		
Low-income		
Nonresidential		

31. Which of the following options best describes how upgrade contractors are selected?

[PROGRAMMER: Fields 1, 2, 3, 4, 5, 7 have a single button, signifying endorsement. Field 6 is text. Maximum of one response per row.]

	Upgrades completed by program staff	Upgrades completed by contractors selected by the program	Participant selects upgrade contractor from a list of pre-approved contractors	Participant selects any contractor desired	Other	Other (describe)	Don't know
Residential							
Low-income							
Nonresidential							

32. About what proportion of upgrade contractors offer insulation/infiltration services only, HVAC services only, and offer both types of services? (Your best guess is fine; rows must sum to 100. Please enter percentages as numbers only; form will not accept ranges, commas, decimals, or symbols (such as %))
[PROGRAMMER Fields 1, 2, 3 are text (xx%). Field 4 is a single button.]

	Insulation/ infiltration only	HVAC only	Both	Don't know
Residential				
Low-income				
Nonresidential				

33. What proportion of upgrade installations by new/ "unproven" contractors does your program inspect? And what proportion does it inspect of upgrades from "seasoned" contractors with a proven track record? (Your best guess is fine. Please enter percentages as numbers only; form will not accept ranges, commas, decimals, or symbols (such as %))

[PROGRAMMER: Fields 1, 2 are text (xx%). Field 3 is a single button.]

	Post-installation inspections for upgrades by new contractors (enter percent of jobs, xx%)	Post-installation inspections for upgrades by seasoned contractors (enter percent of jobs, xx%)	Don't know
Residential			
Low-income			
Nonresidential			

34. Please indicate the proportion of your upgrade contractors that had experience with prior efficiency programs (prior to your program launch).

[PROGRAMMER: Fields 1has four buttons: Most, Some, Few, None. Field 2, 3 has a single button, signifying endorsement.]

	Experienced with prior efficiency programs	Don't know	Not relevant to program
Residential			
Low-income			
Nonresidential			

35. Please describe the proportion of your upgrade contractors having a generally high level of relevant skills, a medium level, or low level of relevant skills prior to your program launch, relative to your expectations for quality installations.

[PROGRAMMER: Fields 1, 2, 3 have four buttons: Most, Some, Few, None. Field 4 has a single button, signifying endorsement.]

	Generally high skill level	Moderate skill level	Low skill level	Don't know	Not relevant to program
Residential					
Low-income					
Nonresidential					

36. At the time the program was most active in conducting upgrades, about how many firms were eligible to conduct program upgrades? And about how many were actually conducting upgrades? About what percentage of all program upgrades did your top five producers do? (Your best guess is fine. Please enter numbers only (for all fields); form will not accept words, ranges, commas, decimals, or symbols (such as %))

[PROGRAMMER: Fields 1, 2 are formatted numeric. Fields 3, 4 have a single button, signifying endorsement.]

	Number of firms eligible (#)	Number of firms conducting (#)	Percentage of upgrades done by top five producers (%)	Not relevant to program	Don't know
Residential					
Low-income					
Nonresidential					

M.1.7. TIMING

37. After your audits were underway, were there any periods for which customer wait-times were unusually long for audits? And after your upgrades were underway, any unusually long waits for upgrades? Any for test-out (if not required, check "not applicable to program")? Check all that apply.

[PROGRAMMER: Field 1 has two buttons for Quarter 3, Quarter 4 (). Fields 2, 3 have four buttons for Quarter 1 (), Quarter 2 (, Quarter 3 (), Quarter 4 (). Fields 4, 5, 6 have a single button, signifying endorsement.]

				Unusually long audit wait times		
	2010	2011	2012	None	Not applicable to program	Don't know
Residential						
Low-income						
Nonresidential						
				Unusually long upgrade wait times		
	2010	2011	2012	None	Not applicable to program	Don't know
Residential						
Low-income						
Nonresidential						

				Unusually long test-out wait times		
	2010	2011	2012	None	Not applicable to program	Don't know
Residential						
Low-income						
Nonresidential						

M.1.8. CONTRACTOR SUPPORT

Please continue reporting on the programs you listed at the beginning of the survey:

38. Can audit and/or upgrade contractors receive training from your program? If so, what type? (Each column enables you to distinguish between audit contractors and upgrade contractors; check both if support offered to both.) (Check all training options that apply)

[PROGRAMMER: Field 1 has 3 buttons: yes, no, don't know. Fields 2, 3, 4 have two buttons, "audit contractors," and "upgrade contractors."]

	Contractors can receive training?	Sales training	Business training	Training on program requirements and processes
Residential				
Low-income				
Nonresidential				

39. Since you received your grant, have any accredited home-performance or whole building training organizations offered training in your area?

[PROGRAMMER: Field 1 has three buttons, "yes," "no," "don't know".]

	Training offered
Residential	
Low-income	
Nonresidential	

40. Does your program offer contractors scholarships or reduced tuition for training? If yes, what is the typical dollar or percentage amount offered? (Please enter dollar and percentage amounts as numbers; form will not accept ranges, commas, decimals, or symbols (such as $ or %))

[PROGRAMMER: Field 1 has 3 buttons: yes, no, don't know. Field 2 is dollar. Field 3 is percentage.]

	Scholarships or reduced tuition offered?	Dollar amount (#)	Percentage amount (#
Residential			
Low-income			
Nonresidential			

41. Does your program offer contractors diagnostic equipment? Is so, is the equipment given, loaned, or leased? (Check all that apply)

[PROGRAMMER: Field 1 has 3 buttons: yes, no, don't know. Fields 2, 3, 4 have a single button, signifying endorsement.]

	Diagnostic equipment provided	Equipment given	Equipment loaned	Equipment leased
Residential				
Low-income				
Nonresidential				

42. Does your program offer contractors loans or bridge financing?

[PROGRAMMER: Field 1 has 3 buttons: yes, no, don't know.]

	Loans/bridge financing provided
Residential	
Low-income	
Nonresidential	

43. Does someone convene a meeting (in-person, by phone or web-enabled) of the participating upgrade contractors in your area to discuss home performance or whole building upgrade issues? If yes, are these for assessors, upgrade contractors (installers), or both? Please indicate if the meetings are initiated by program staff, or initiated by contractors. About how frequently do they meet (choose best option)?

[PROGRAMMER: Field 1 has three buttons, "yes," "no," "don't know". Field 2 has 3 buttons, "assessors," "upgrade contractors," "both". Field 3 has two buttons, "program staff," "contractors." Field 4 has four buttons, "monthly," "quarterly," "a few times a year or so", "don't know".

	Meetings held?	If yes, for assessors, upgrade contractors, or both?	If yes, initiated by program staff or by contractors?	About how frequently?
Residential				
Low-income				
Nonresidential				

M.1.9. FINANCING

44. With about how many organizations did you explore their willingness to offer financing to your program's participants? About how many organizations provide participant financing in conjunction with your program? And about how many of these participating financial organizations did your organization or team members have a pre-existing relationship with? (Example for a city grantee recipient: a bank the city conducted business with prior to receiving its BBNP grant.) If you do not know the answer to any item, please enter 999. (Please enter numbers; form will not accept words, ranges, commas, decimals, or symbols)

[PROGRAMMER: Fields 1 and 3 are numeric. Fields 2, 4 have a single button, signifying endorsement.]

	Number discussed program needs with (#)	Number of providers (#)	Number with pre-existing relationship (#)
Residential			
Low-income			
Nonresidential			

45. Briefly, what concerns or barriers to lending into the whole home/ whole building upgrade market did the organizations you approached or are working with discuss with you? (Describe up to four concerns; if no concerns, enter "none" in first column.)

[PROGRAMMER: Fields 1, 2, 3, 4 are text. Field 5 has a single button, signifying endorsement.]

	Concern 1	Concern 2	Concern 3	Concern 4	Don't know
Residential					
Low-income					
Nonresidential					

46. Briefly, what advice do you have for others on how to engage financial institutions in lending to the whole home/ whole building upgrade market and stimulating demand for the loans? (Describe up to four elements; if you have no advice, enter "none" in first column. If advice doesn't vary by sector, you can enter "same" for subsequent rows.)

[PROGRAMMER: Fields 1, 2, 3, 4 are text. Field 5 has a single button, signifying endorsement.]

	Advice 1	Advice 2	Advice 3	Advice 4	Don't know
Residential					
Low-income					
Nonresidential					

47. Does your program pre-screen applicants for credit-worthiness? What do you use to determine credit-worthiness? (Check all that Apply) (Please enter numbers and percentages as numbers only; form will not accept words, ranges, commas, decimals, or symbols (such as %))

[PROGRAMMER: Field 1 has three buttons, "yes," "no," "don't know". Fields 2, 4, 6 are single button. Field 3 is #. Field 5 is %. Field 7 is text.

	Program pre-screens applicants for credit-worthiness?	FICO used?	If use FICO, enter threshold #	Debt to income ratio used?	If use debt to income ratio, enter threshold xx%	Utility bill history used?	Other (describe information source and any criterion values)
Residential							
Low-income							
Nonresidential							

48. [Somehow, the number 48 was skipped in the *Qualtrics* numbering scheme, so the numbers in the section are 49-51 in *SPSS/Qualtrics*.]

M.1.10. FINAL QUESTIONS

49. The survey answers you have provided will enable us to report descriptive statistics across the grantee programs and to associate program characteristics with a variety of program outcomes. Our final evaluation report will also showcase – such as in short case studies – programs and program features or activities that are especially innovative, creative, unique, or successful, and that others should know about. Do you have any programs or program features/activities that you think would make good case studies? Do not limit your thinking to the three programs you have described in this survey, but do identify the programs by sector.

[PROGRAMMER: Field 1 has two buttons – "yes," "no." Fields 2, 3, 4 are text.]

	Recommend as a case study?	If yes, program name	Program feature or activity (if entire program, enter "entire")	Reason recommending
Residential				
Low-income				
Nonresidential				

50. Will the program continue in any form after the grant period ends? If continuing in any form, answer "yes" even if the program name changes, the program gets folded into another program, the administering organization changes, etc. Please indicate the name and program administrator of the program going forward.

[PROGRAMMER: Field 1 has three buttons: yes, no, don't know. Fields 2, 3, 4 are text.]

	Will program continue?	If yes, program name going forward	Program administrator going forward	Other
Residential				
Low-income				
Nonresidential				

51. Does your program have a critical threshold in terms of number of upgrades or loans that it needs to attain in order to continue after the grant period? If yes, please briefly describe the threshold, and indicate whether you expect the program to attain this threshold by the end of the grant period.

[PROGRAMMER: Fields 1, 3 have three buttons: yes, no, don't know.]

	Does program have a critical size threshold?	If yes, briefly describe threshold	Do you expect program will attain the threshold by end of grant?
Residential			
Low-income			
Nonresidential			

52. Please tell us your name and phone number, in the unlikely event we want to discuss some of your answers with you. Also, please provide your email address if you were not the original recipient of the survey invitation email.

[PROGRAMMER: Fields 1, 2, 3 are text.]

Name	Phone number	Email

THAT'S ALL OF OUR QUESTIONS. THANK YOU VERY MUCH.

***PLEASE HIT THE NEXT BUTTON BELOW TO FINISH THE SURVEY AND TO SAVE YOUR RESPONSES.

M.2. PARTICIPANT CUSTOMER SURVEY: WEB-BASED

S1: Thank you very much for agreeing to participate in this voluntary survey about your energy efficiency upgrade. Your feedback will be combined with responses of other participants and will help improve energy efficiency programs across the country.

This survey is being conducted by Research Into Action, an independent research and evaluation firm.

This survey should take about 10 minutes for you to complete. Your responses are confidential; you will not be identified with your answers in our report or to others.

To navigate through the survey, use the "Next" button at the bottom of each screen.

IMPORTANT: Do NOT attempt to move around in the survey using your browser's navigation buttons. This may eject you from the survey.

If you need assistance, please contact us at *support@researchintoaction.com*.

Let's begin! Click "Next to continue."

[SHOW Q1 AND Q2 ON ONE SCREEN]

1. This survey asks about the energy efficiency upgrade done at your home or business through the following program: **Program Name.** We will refer to this simply as "the program" in our survey questions.

   If you completed an upgrade at more than one home or business location, please answer questions in this survey for the **one** most recently completed upgrade.

2. Where was your energy efficiency upgrade done? (Select one)

   () Your home (a single house, apartment, condo, etc.)
   () Your business
   () Multifamily housing units that you own or manage (whether you live there, or not)

3. At the time of your energy efficiency upgrade, about how long had you (or your organization) been at that location?

   () Less than 1 year
   () 1 year to less than 2 years
   () 2 to less than 5 years
   () 5 to less than 10 years
   () 10 years or more
   () Don't know

[SHOW Q4 & Q5 ON ONE SCREEN]

4. Please check all the ways you heard about the program, starting with possible program sources.

Program Sources:

() Program event (such as an energy fair or public booth)
() Program representative who came to your home or business
() Program representative you saw somewhere else

5. Professional Sources:

() Contractor or someone offering energy efficiency related products or services
() None of these program or professional sources

[SHOW Q6 & Q7 ON ONE SCREEN]

Please keep checking all the ways you heard about the program, continuing with possible community sources.

6. Community Sources:

() Group event (such as a club or a church)
() Someone who had used the program to improve their home or business
() Someone who knew about the program, but had not used it

7. Publicity Sources:

() Internet site (website, blog, etc.)
() Advertisement (newspaper, TV, radio, billboard, online)
() Social media (Facebook, Twitter, LinkedIn, etc.)
() Letter sent to your home or business
() Article in a newspaper or newsletter
() Lawn sign, window decal, plaque, etc.
() Bill insert (utility bill, tax bill, etc.)

7.2 Other:

() None of these community or publicity sources
() Other sources (please specify)

[IF Q2=1 (HOME), ASK Q8A-Q8C. OTHERWISE, SKIP TO Q8D]

8a. The table identifies benefits that some people get from an efficiency upgrade. Please check the *main reasons you decided* to do the energy upgrade through the program (the benefits you were hoping for).

8b. Then, check the *benefits you experienced* from your upgrade. [MULTIPLE RESPONSE; RANDOMIZE ATTRIBUTES]

8c. [SHOW ON SEPARATE SCREEN FROM Q8A/B] Now, please indicate the benefits you experienced that you value most (check up to three benefits). [MULTIPLE RESPONSE; ALLOW ONLY THREE RESPONSES.]

	(A) Main reasons you decided to do the upgrade	(B) Benefits you experienced from the upgrade	(C) [SHOW ON SECOND SCREEN; ONLY SHOW ITEMS SELECTED FROM COLUMN B. IF 3 OR FEWER BENEFITS SELECTED AT B, SKIP TO Q9.] Benefits experienced that you value most (check up to 3)
1. Lower energy bills			
2. Greater indoor comfort when it's hot or cold outside			
3. Greater comfort in one room or part of your house/building that was uncomfortable			
4. Fewer drafts			
5. Improved safety			
6. Reduced indoor allergens			
7. Reduced indoor moisture problems			
8. Increased value of your home/building			
9. Doing your part to help your community			
10. Doing your part to help the environment			
11. Other (describe): _____			

[IF Q2=2 OR 3 (BUSINESS OR MULTIFAMILY UNITS), ASK Q8D-Q8F. OTHERWISE, SKIP TO Q9]

8d. This table identifies benefits that some people get from an efficiency upgrade. Please check the *main reasons you decided* to do the energy upgrade through the program (the benefits you were hoping for).

8e. Then, check the *benefits you experienced* from your upgrade. [MULTIPLE RESPONSE; RANDOMIZE ATTRIBUTES]

8f. [SHOW ON SEPARATE SCREEN FROM Q8D/E] Now, please indicate the benefits you experienced that you value most (check up to three benefits). [MULTIPLE RESPONSE; ALLOW ONLY THREE RESPONSES.]

	(D) Main reasons you decided to do the upgrade	(E) Benefits you experienced from the upgrade	(F) [SHOW ON SECOND SCREEN; ONLY SHOW ITEMS SELECTED FROM COLUMN B. IF 3 OR FEWER BENEFITS SELECTED AT B, SKIP TO Q9.] Benefits experienced that you value most (check up to 3)
1. Lower energy bills			
2. Greater indoor comfort			
3. Improved indoor air quality			
4. Helping tenants			
5. Improved safety			
6. Reduced maintenance			
7. Replaced equipment that is broken or being phased out			
8. Increased value of your building			
9. Helping your community			
10. Helping the environment			
11. Increased workplace productivity			
12. Positive public relations for your organization			
13. Other (describe): _____			

9. Why did you do the energy efficiency upgrade at the time that you did? [TEXT BOX]

_____

10. Please rate the extent to which the upgrade provides a good value for your money. Use a 0 to 10 scale, where 0 indicates "no value," and 10 indicates "high value." [Radio buttons for scale with "0" indicating "no value" and "10" indicating "high value."]

11. Please check all of the sources used to cover the costs of the energy upgrades you received.

() The program (example: rebate, incentive, grant, free measures)
() A loan
() Your personal funds
() Your utility

() A tax credit
() Some other organization
() Choose not to answer

12. Did you have a program representative available to assist or touch base with you throughout the upgrade process? This person might have been called your energy coach or advisor or advocate.

() Yes
() No
() Don't know

[IF Q12=YES, SKIP Q13a and ask Q13b. IF Q12=ALL OTHER ANSWERS ASK Q13a THEN SKIP Q13b]

13a. Please rate your satisfaction with each of the following activities, using a 0 to 10 scale, where 0 means "not at all satisfied," and 10 means "completely satisfied." Check "NA" if you have not experienced the item.

1. The change to your house or building
2. The activities of the insulation or air sealing contractors
3. The activities of equipment contractors
4. The activities of the person who visited your home/building to identify upgrade opportunities
5. The application process
6. The activities of the [PROGRAM] staff

[ASK IF Q12=YES]

13b. Please rate your satisfaction with each of the following activities, using a 0 to 10 scale, where 0 means "not at all satisfied," and 10 means "completely satisfied." Check "NA" if you have not experienced the item.

1. The change to your house or building
2. The activities of the insulation or air sealing contractors
3. The activities of equipment contractors
4. The activities of the person who visited your home/building to identify upgrade opportunities
5. The application process
6. The activities of the [PROGRAM] staff (excluding the representative available to you)
7. The activities of the representative available to you

14. [QUESTION IS REQUIRED] Please think back to the time before you learned about the program and indicate how seriously you had considered doing an energy upgrade for your home/business similar to what you did through the program. Use a 0 to 10 scale, where 0 means you "had never considered doing an energy upgrade" and 10 means you "had already decided to do a similar energy upgrade."

[IF Q14>7, ASK Q15. OTHERWISE, SKIP.]

15. **When** would you have likely done your energy upgrade, if you had not taken part in this program?

() Within the same year (12-month period) as your actual upgrade
() Within the second year after your actual upgrade
() Within the third year after your actual upgrade

() More than three years after your actual upgrade
() Don't know

16. For each of the following items, please indicate how much of a role it played in your decision to do the upgrade you did.

Use a 0 to 10 scale, where 0 indicates it played "no role at all" and 10 indicates it played "a major role." Check "NA" if the item does not apply to your decision.

[Radio buttons for scale with "0" indicating "no role at all" and "10" indicating "a major role"] ,

1. The energy audit or study done to identify upgrade opportunities
2. A salesperson or contractor, other than an auditor
3. Any loan associated with the program
4. Any financial incentive you received from the program
5. Any financial support you received from a source other than the program
6. Any technical or other support you received from the program
7. Endorsement or discussion of the program by a source you respect, such as a neighbor or newspaper article

17. Tell us about any non-energy remodeling work to make your home/building more suitable for your activities or to improve its appearance.

a. Did you complete non-energy remodeling work at or around the time of your energy upgrade?

() Yes
() No
() Don't know

b. Did you complete non-energy remodeling work in the five years prior to your energy upgrade?

() Yes
() No
() Don't know

c. Do you think you will likely complete non-energy remodeling work in the next five years?

() Yes
() No
() Don't know

18. If you had *not* participated in this program to complete an energy upgrade, which of the following best describes what you likely would have done? Would you have …

() Not taken any upgrade action
() Gone ahead with a remodel to improve your space, but *without* any of the energy savings features you got through the program, and paid the full cost yourself
() Done a remodel with *less extensive* energy saving upgrades than you did – something that would have cost less but probably would have saved less energy -- and paid the full cost yourself
() Had the *exact same energy saving upgrades* done anyway, and paid the full cost yourself

() Or done something else (specify) _____
() Don't know

19. [QUESTION IS REQUIRED] Did you replace any equipment as part of your energy upgrade? By "equipment," we mean any item that uses energy and requires installation or set up, including furnaces, air conditioners, appliances, lighting fixtures, and so on.

() Yes
() No
() Don't know

20. [IF REPLACED EQUIPMENT (Q19=1), ASK Q20; ELSE, SKIP TO NEXT] Which of the following best describes what you likely would have done about this equipment if you had not participated in the program to complete an energy upgrade? Would you have …

() Not replaced any equipment for at least a year
() Gone ahead and replaced the equipment, but not installed the same type as you got through [PROGRAM], and paid the full cost yourself
() Had the *exact same type of equipment* installed as you got through the program, and paid the full cost yourself
() Or done something else? Please specify what: _____
() Don't know

21. [QUESTION IS REQUIRED] Since participating in this program, have you purchased and installed any energy efficiency items without an incentive from the program? (For example, compact fluorescent lights – or "swirly" lights, energy efficient appliances, insulation, efficient windows, motors, or any other efficiency items)

() Yes
() No
() Don't know

22. [IF Q21=1 (YES), ASK Q22. OTHERWISE, SKIP TO Q23] What efficiency items did you install without an incentive, which were not part of your program upgrade? Please select all that apply. [MULTIPLE RESPONSES ALLOWED. CHECKBOXES IN FIRST COLUMN; TEXT BOXES IN SECOND COLUMN]

	Items installed <u>without</u> a program incentive (Check all that apply)	Comments (Optional)
Compact fluorescent ("swirly") lights		
High efficiency refrigerator		
High efficiency dishwasher		
High efficiency clothes washer		
High efficiency clothes dryer		
High efficiency windows		
Ceiling insulation		
Wall insulation		
Floor insulation		
Other item(s), please describe: _____		

Q23. [IF Q21=1 (YES), ASK Q23. OTHERWISE, SKIP TO Q25] Even though you installed these items without program assistance, we'd like to know how much, if at all, [PROGRAM] influenced your decision to install them. Please rate the program's influence using a 0 to 10 scale, where 0 means "no influence," and 10 means "A major influence."

[Q24 intentionally skipped]

Q25. Please enter the zip code for your home or building that received the energy upgrade: [NUMBER BOX]

Q26. OPTIONAL: Finally, please let us know if there is anything else about your energy upgrade that you'd like to share. [TEXT BOX]

Thank you for taking the time to complete this survey. Please click "Submit" to finish the survey.

M.3. NONPARTICIPANT CONSUMER INTERCEPT SURVEY: WEB AND TELEPHONE

M.3.1. SUMMARY

- **Target respondent.** Adult (18+) consumers who live in BBNP program regions (Q2A-Q2C), own their own single-family home or home with 2-4 units (Q3-Q4), and have been engaged in a home improvement project over the past two years or who plan to do so in the coming year. Must be purchase decision-maker (Q7) for energy related products/services for the home who have not used a local program to do an energy efficiency upgrade in the past three years (Q6)
- **Administration.** Online (Web) in all regions, and phone (CATI) in some regions as needed to meet quotas.
- **Average interview length.** Web: 5 minutes; Phone: 8 minutes.
- **Sample size.** 2,448 total – yet we may modify this goal if our assumptions of incidence prove incorrect. See separate document for sample size by geography and method of administration.
- **Objectives.** To assess:

1. Consumer awareness of energy upgrade opportunities (comprehensive and limited measure) in their community, through their local program. **(Q5)**
2. Plans for energy upgrades in comparison to other home improvement projects they are planning. **(Q9, Q10, Q11, Q12, Q13, Q14, Q19)**
3. Perceptions of energy upgrades. **(Q15, Q16, Q17)**
4. Why consumers adopt energy efficiency measures **(Q12, Q13, Q14, Q15, Q16, Q17)**

M.3.2. FIELDING VENDOR NOTES

- Web sample should be pre-screened for adults 18 or older who are homeowners in targeted geographies. (Do not screen for single-family homeownership unless can include those in homes with up to four units.)

M.3.3. PROGRAMMER NOTES

- Programmer instructions throughout survey are in ALL CAPS.
- Target geographies and local program names are provided in a separate document.
- CATI interviewer instructions to display on screen are in **BOLD CAPS**.
- Questions are single response unless otherwise noted.
- For each multiple response question, create separate binary variables for each response option, for example, yes=1 (selected); no=0 (not selected).
- Do not display section headers on screen.
- Horizontal lines indicate screen breaks for web administration.

- All questions are required before proceeding unless logic indicates it must be skipped for an individual respondent. Therefore, a code for Refused may be needed for CATI interviews; this will terminate the interview unless otherwise specified.
- Do not allow respondents to go "back" to a prior screen unless otherwise noted.
- All terminations are immediate.

M.3.4. CATI INTERVIEWER NOTES

- Only read response option lists when instructed to do so.

M.3.5. CATI INTRODUCTION

Hello. My name is [INTERVIEWER NAME], and I'm calling on behalf of the U.S. Department of Energy. May I speak with an adult in your household for a short home energy survey?

The survey is being conducted by Research Into Action, an independent research firm. It's voluntary, and should only take about 5 to 10 minutes of your time. Your responses will be confidential.

AS NEEDED: I won't ask for your name or any information that might identify you.

AS NEEDED: If you'd like to talk to someone in charge of the study, please call Research Into Action, at (503) 287-9136, and reference the **National Home Energy Study**.

AS NEEDED: We're not selling anything; this is strictly for research purposes.

M.3.6. WEB INTRODUCTION

Welcome to our survey about home energy. This survey is being conducted by Research Into Action, an independent research firm, for the U.S. Department of Energy. It is voluntary, and should only take about 5 minutes of your time.

Your responses will be confidential. The survey doesn't ask for your name or any other information that might identify you.

If you have any questions about the survey, please contact: support@researchintoaction.com, and reference the National Home Energy Study.

M.3.7. SCREENING

Q1. First, which of the following categories includes your age?

[CATI: READ LIST; STOP ONCE RESPONDENT'S AGE IS REACHED]

1. Under 18
2. 18 to 34
3. 35 or higher
4. Prefer not to answer

[Q1 MUST EQUAL 2 OR 3 TO CONTINUE (18 OR OLDER). IF UNDER 18 OR REFUSE TO GIVE AGE, THANK AND TERMINATE]

Q2A Next, we have some questions about your home.

[DISPLAY FOR WEB / **CATI] FOR CATI, ADD INTERVIEWER NOTE READ** –: We can't identify you from this information. This just helps us to get a good mix of home locations for the survey.]

In what state is your home located?

[DISPLAY FOR WEB / **CATI] FOR CATI, ADD INTERVIEWER NOTE READ** –: If you have more than one home, please think about where you spend the most time.]

[DROP-DOWN WITH 50 STATES PLUS WASHINGTON DC, U.S. VIRGIN ISLANDS AND 'SOMEPLACE ELSE']

[MUST LIVE IN ONE OF SAMPLED STATES OR U.S. VIRGIN ISLANDS TO CONTINUE]

Q2B. [IF STATE FROM Q2A HAS PROGRAM(S) ASSOCIATED WITH COUNTIES, ASK Q2B. OTHERWISE, SKIP]

In which county is your home located?

[DISPLAY COUNTIES OF INTEREST, PLUS OPTION "SOMEWHERE ELSE") FOR STATE SELECTED AT Q2A. FOR PROGRAMS ASSOCIATED WITH COUNTIES, MUST LIVE IN QUALIFYING COUNTY TO CONTINUE. NOTE 'SOMEWHERE ELSE' IS A QUALIFYING 'COUNTY' FOR VIRGINIA]

Q2C. [IF STATE FROM Q2A HAS PROGRAM(S) ASSOCIATED WITH CITIES, ASK Q2C. OTHERWISE, SKIP]

[IF STATE IS INDIANA:] In what neighborhood is your home located?

[ALL OTHERS:] In which town or city is your home located?

[DISPLAY CITIES OF INTEREST, PLUS OPTION "SOMEWHERE ELSE", FOR STATE SELECTED AT Q2A. FOR PROGRAMS ASSOCIATED WITH CITIES, MUST LIVE IN QUALIFYING CITY TO CONTINUE]

Q3. Do you own your home, rent your home, or something else?

1. Own
2. Rent
3. Something else

[Q3 MUST EQUAL 1 (OWN HOME); OTHERWISE, THANK AND TERMINATE]

Q4. Is your home a …?

[CATI: READ LIST]

1. Single-family house
2. Single-family attached house, such as a townhouse
3. Duplex, triplex or fourplex
4. Apartment or condominium with 5 units or more
5. Manufactured or mobile home
6. Something else

[Q4 MUST = 1, 2 OR 3 (SINGLE-FAMILY HOUSE OR HOUSE WITH 2-4 UNITS); OTHERWISE, THANK AND TERMINATE]

Q5. Have you heard of any of the following programs in your area that help homeowners improve their home's energy efficiency?

[CATI: READ LIST; GET YES (1), NO (2) OR [DO NOT READ] Don't know **(3) FOR EACH]**

[CATI: IF RESPONDENT SAYS 'DON'T KNOW', RECORD AS 'DON'T KNOW'; DO NOT PROMPT FOR 'YES' OR 'NO']

[CATI: LEED IS PRONOUNCED AS A WORD ("LEED", RHYMES WITH "SPEED". DO NOT SPELL OUT]

[WEB: FORMAT IN GRID WITH PROGRAM NAMES IN ROWS AND [YES, NO, AND DON'T KNOW IN COLUMNS. RADIO BUTTONS (SINGLE RESPONSE) BY ROW]

1. [INSERT LOCAL PROGRAM NAME 1]
2. [INSERT LOCAL PROGRAM NAME 2, IF APPLICABLE]
3. [INSERT LOCAL PROGRAM NAME 3, IF APPLICABLE]
4. LEED for Homes [SHOW FOR ALL RESPONDENTS]

[IF RESPONDENT IS AWARE OF AT LEAST ONE PROGRAM OTHER THAN 'LEED FOR HOMES' (Q5 =1, 2 OR 3), ASK Q6. OTHERWISE, SKIP]

Q6. **In the past three years,** has your household received assistance from [IF MORE THAN ONE PROGRAM LISTED: any of the following programs / IF ONE PROGRAM LISTED: the following program] to improve your home's energy efficiency? This could include a home energy audit or assessment, a rebate, a loan, or anything else.

[CATI: READ LIST; GET YES (1), NO (2) OR [DO NOT READ] Don't know **(3) FOR EACH]**

[WEB: FORMAT IN GRID WITH PROGRAM NAMES IN ROWS AND YES, NO, AND DON'T KNOW IN COLUMNS. SHOW ONLY PROGRAMS RESPONDENT IS AWARE OF (Q5_1, Q5_2 OR Q5_3=1). DO NOT SHOW LEED FOR HOMES (Q5_4=1). RADIO BUTTONS (SINGLE RESPONSE) BY ROW]

[IF Q5_1 THROUGH Q5_3 = 2 OR 3 (UNAWARE OF ALL LOCAL PROGRAMS), OR Q6_1 THROUGH Q6_3=2 (AWARE OF PROGRAMS BUT DID NOT WORK WITH ANY OF THEM), QUALIFIES AS NONPARTICIPANT; CONTINUE. IF AWARE OF LEED FOR HOMES (Q5_4=1) AND NO OTHER PROGRAM AT Q5, CONTINUE. OTHERWISE, THANK AND TERMINATE]

Q7. When it comes to making decisions about your home's furnace, air conditioning, major appliances, and other energy related products, do you…?

[CATI: READ LIST]

1. Make the decisions by yourself
2. Make the decisions with others
3. Not make the decisions, but you have input
4. Not make the decisions, and don't provide input

[IF Q7=1 OR 2, CONTINUE (MAKES ENERGY RELATED PURCHASE DECISIONS). OTHERWISE, THANK AND TERMINATE ON WEB; ASK Q7A ON CATI]

[CATI] IF Q7=3 OR 4, ASK Q7A

Q7A. May I speak with the person who makes decisions about the purchase of energy related products and services in your household?

1. Yes (go back to intro, then skip to Q5 and DO NOT delete the answers from Q1-Q4)
2. No (terminate)

Q8. Do you, or does anyone in your household, currently work for pay as a home improvement contractor or installer?

1. Yes
2. No

[Q8 MUST EQUAL 2 (HOUSEHOLD DOES NOT HAVE A HOME IMPROVEMENT PROFESSIONAL); OTHERWISE, THANK AND TERMINATE]

Q9. The next questions are about home improvement projects, including anything that improves the comfort, health, safety, durability, looks, energy efficiency, or value of your home.

Examples include remodeling, painting, getting a new furnace or appliances, adding insulation, and so on. Home improvement projects **don't** have to be related to energy efficiency, but can be.

Has your household done a home improvement project **in the past two years**?

1. Yes
2. No
3. [**CATI: DO NOT READ**] Don't know / unsure

Q10. Does your household plan to do a home improvement project **in the next year**?

1. Yes
2. No
3. [**CATI: DO NOT READ**] Don't know / unsure

[Q9 OR Q10 MUST EQUAL 1 (HAS DONE OR PLANS TO DO HOME IMPROVEMENT PROJECT) TO CONTINUE. OTHERWISE, THANK AND TERMINATE]

TERMINATION MESSAGE: Thank you very much for your responses. Those are all of our questions.

M.3.8. SURVEY

Q11. [IF Q9=1 (HAS DONE PROJECT), ASK Q11, THEN GO TO Q13; OTHERWISE GO TO Q12] **In the past two years,** what home improvement projects have you done?

[USE SAME RESPONSE OPTION LIST AS Q12 BELOW]

[MULTIPLE RESPONSE]

[WEB] Please select all that apply.

[CATI: READ LIST; GET YES OR NO FOR EACH]

[**CATI: READ BEFORE THE FIRST ATTRIBUTE, AND THEN AS NEEDED**] Did you do…?

Q12. [IF Q10=1 (PLANS TO DO PROJECT IN NEXT YEAR) AND Q9=2 OR 3 (HAS NOT DONE PROJECT IN PAST TWO YEARS), ASK Q12; OTHERWISE SKIP] **In the next year,** what home improvement projects do you plan to do?

[WEB] *Please select all that apply*.

[**CATI: READ LIST; GET YES OR NO FOR EACH**]

[**CATI: READ BEFORE THE FIRST ATTRIBUTE, AND THEN AS NEEDED**] Will you do…?

[MULTIPLE RESPONSE]

1. A kitchen remodel
2. A bathroom remodel
3. A multiple room remodel
4. A room addition
5. Basement finishing
6. A window or outside door replacement
7. Property damage repair (**CATI AS NEEDED**/ WEB – DISPLAY IN PARENTHESES: including repairs due to flooding, wind damage, or vandalism)
8. Insulation upgrades
9. A new appliance purchase
10. Refurbishing, such as painting, small repairs, and so on
11. Something else (please specify) [TEXT BOX]

Q13. **In the past two years**, have any of the following people done anything that made your home more energy efficient?

[WEB] *Please select all that apply*.

[CATI: READ LIST; SELECT ALL THAT APPLY]

[MULTIPLE RESPONSE]

1. You or another member of your household
2. A contractor
3. Someone else
4. No one has done a project that made your home more energy efficient [EXCLUSIVE]
5. [**CATI: DO NOT READ**] Don't know / not sure [EXCLUSIVE]

[IF Q13=1, 2 OR 3 (DID ENERGY PROJECT), ASK Q14. OTHERWISE, SKIP TO Q19]

Q14. In the past two years, what was changed or added to your home that made it more energy efficient?

[WEB] *Please select all that apply*.

[CATI: READ LIST; GET YES OR NO FOR EACH]

[**CATI; READ FOR FIRST ATTRIBUTE, AND THEN AS NEEDED**] Have you changed or added…?

[MULTIPLE RESPONSE; RANDOMIZE OPTIONS 1-12]

1. An efficient heating system or furnace
2. An efficient air conditioning or cooling system
3. An efficient appliance such as a refrigerator, dishwasher, clothes washer or dryer
4. Efficient consumer electronics, such as a TV or computer
5. Air sealing around doors or windows
6. Duct sealing in your heating or air conditioning system
7. An efficient hot water heater
8. Efficient lighting, such as LEDs or compact fluorescents (CATI: AS NEEDED / WEB – DISPLAY IN PARENTHESES “swirly” lights)
9. A low-flow showerhead or faucet aerator
10. Energy efficient windows
11. Insulation
12. A programmable thermostat
13. Something else (please specify) [TEXT BOX] [CATI AS NEEDED: Is there anything else you changed or added in the past 2 years that I did not mention?]
14. [**CATI: DO NOT READ**] Don’t know / unsure [EXCLUSIVE]

[IF Q13=1, 2 OR 3 (DID ENERGY PROJECT), ASK Q15. OTHERWISE, SKIP TO Q19]

[PUT Q15 AND Q16 ON SAME SCREEN]

Q15. What are the **main reasons** you **initially decided** to make those changes that made your home more energy efficient?

[WEB] *Please select **up to three (3)** reasons.*

[**CATI**] I’ll read you a list; please select **up to three** reasons when I’m done.

[CATI: READ ENTIRE LIST, THEN RECORD RESPONSE(S).]

[CATI: READ BEFORE THE FIRST ATTRIBUTE, AND THEN AS NEEDED:

Did you initially want…?]

[MULTIPLE RESPONSE, RANDOMIZE ATTRIBUTES. ENFORCE MAXIMUM OF THREE RESPONSES SELECTED.]

1. To replace something that was old, broken, or unreliable

2. To have something that looked more appealing
3. Better ease of use
4. Updated or "high tech" features
5. Lower energy bills
6. To improve comfort
7. To improve safety
8. To reduce indoor moisture, mold, or allergens
9. To increase the value of your home
10. To help the environment
11. Some other reason (please specify) [TEXT BOX] [**CATI AS NEEDED**: Did you have another reason that I didn't mention?]

[IF Q13=1, 2 OR 3 (DID ENERGY PROJECT), ASK Q16. OTHERWISE, SKIP TO Q19]

Q16. Now that you have made those changes, what main benefits do you most appreciate?

[WEB] *Please select **up to three (3)** benefits.*

[CATI] I'll read you the same list as before. Please select up to three benefits when I'm done.

[CATI: READ LIST UNLESS RESPONDENT CLEARLY PROVIDES ANSWERS; THEN RECORD RESPONSE(S).]

[**CATI; READ BEFORE THE FIRST ATTRIBUTE, AND THEN AS NEEDED**: Now, do you most appreciate…?]

[MULTIPLE RESPONSE, RANDOMIZE ATTRIBUTES IN SAME ORDER AS PRIOR QUESTION. ENFORCE MAXIMUM OF THREE RESPONSES SELECTED.]

1. Replacing something that was old, broken, or unreliable
2. How it looks
3. Ease of use
4. Updated or "high tech" features
5. Lower energy bills
6. Improved comfort
7. Improved safety
8. Lower indoor moisture, mold, or allergens
9. Increased value of your home
10. Helping the environment
11. Some other benefit (please specify) [TEXT BOX]
12. **CATI: [DO NOT READ**] None – did not experience benefits [EXCLUSIVE]

[IF Q13=1, 2 OR 3 (DID ENERGY PROJECT), ASK Q17. OTHERWISE, SKIP TO Q19]

Q17. Please rate the value for your money from making your home more energy efficient.

[CATI] Use a 0 to 10 scale, where 0 means "poor value" and 10 means "high value."

[0-10 SCALE WITH RADIO BUTTONS, WITH 0 LABELED "Poor value" and 10 labeled "High value", 11= Not applicable (if **CATI: add [DO NOT READ**])]

[IF Q13=1, 2 or 3 (DID ENERGY PROJECT), ASK Q18. OTHERWISE, SKIP to Q19]

Q18. How did you cover the costs of your energy efficiency-related projects?

[WEB] *Please select all that apply.*

[CATI: READ LIST; SELECT ALL THAT APPLY]

[MULTIPLE RESPONSE; RANDOMIZE ATTRIBUTES 1-4]

1. Your personal funds, regardless of payment method (check, credit card, etc.)
2. A loan
3. A tax credit
4. A utility rebate or incentive
5. Some other way
6. [CATI: DO NOT READ] Prefer not to say [EXCLUSIVE]

[ASK ALL]

Q19. [CATI PHRASING] Please let me know if you intend to add any of the following energy related items to your home in the next year. They could be installed by a contractor, a household member, or someone else.

[WEB PHRASING] Which (if any) of the following energy related items do you intend to add to your home **in the next year**? They could be installed by a contractor, a household member, or someone else.

[WEB] *Please select all that apply.*

[CATI: READ LIST; GET YES OR NO FOR EACH]

[**CATI; READ BEFORE FIRST ATTRIBUTE, AND THEN AS NEEDED**] Are you planning to add…?

[MULTIPLE RESPONSE; RANDOMIZE ATTRIBUTES 1-12]

1. An efficient heating system or furnace
2. An efficient air conditioning or cooling system
3. An efficient appliance such as a refrigerator, dishwasher, clothes washer or dryer
4. Efficient consumer electronics, such as a TV or computer
5. Air sealing around doors or windows
6. Duct sealing in your heating or air conditioning system
7. An efficient hot water heater
8. Efficient lighting, such as LEDs or compact fluorescents (**CATI: AS NEEDED** / WEB – DISPLAY IN PARENTHESES "swirly" lights)
9. A low-flow showerhead or faucet aerator
10. Energy efficient windows
11. Insulation
12. A programmable thermostat

13. Something else (please specify) [TEXT BOX] [CATI AS NEEDED: Is there anything else you plan to do in the next year?]
14. None of these – Don't plan to add anything [EXCLUSIVE]
15. [**CATI: DO NOT READ**] Don't know / unsure [EXCLUSIVE]

Q20. Has a contractor conducted a home energy audit or assessment to tell you the best ways to save energy in your home?

1. Yes
2. No
3. Don't know / don't remember

[IF RESPONDENT IS AWARE OF AT LEAST ONE PROGRAM OTHER THAN 'LEED FOR HOMES' (Q5 =1, 2 OR 3), AND Q13=1, 2 OR 3 (DID ENERGY PROJECT), ASK Q21 – Q23. OTHERWISE, SKIP TO Q24]

[SHOW Q21-Q23 ON ONE SCREEN]

Q21. [WEB PHRASING] Earlier, you said you are aware of the following energy efficiency program(s) in your area: [DISPLAY Q5 PROGRAM NAMES, EACH ON A SEPARATE ROW, IN **BOLD** FONT]

[CATI PHRASING] Earlier, you said you are aware of the following energy efficiency program(s) in your area: [DISPLAY Q5 PROGRAM NAMES]

[CATI: READ PROGRAM NAME(S)]

How much influence, if any, would you say [IF AWARE OF ONE PROGRAM: that program/IF AWARE OF 2 OR MORE PROGRAMS: those programs] had on your decision to make your home more energy efficient?

[CATI] Use a scale from 0 to 10, where 0 is "no influence at all" and 10 is "a great deal of influence."

[0-10 SCALE WITH RADIO BUTTONS, WITH 0 LABELED "No influence at all" AND 10 labeled "A great deal of influence"]

Q22. Did you consider working with [IF AWARE OF ONE PROGRAM: that program/IF AWARE OF 2 OR MORE PROGRAMS: any of those programs] on your energy efficiency related project(s), or not?

[CATI: READ PROGRAM NAME(S) AS NEEDED]

1. Yes
2. No
3. Don't know/remember

Q23. What were your reasons for **not** working with [IF AWARE OF ONE PROGRAM: that program/IF AWARE OF 2 OR MORE PROGRAMS: any of those programs]?

[WEB] *Please select all that apply.*

[CATI: READ LIST BELOW; SELECT ALL THAT APPLY; READ PROGRAM NAMES AS NEEDED]

[MULTIPLE RESPONSE; RANDOMIZE ATTRIBUTES]

1. You heard about the program after doing your energy efficiency project(s)
2. Your project did not qualify for the program
3. You heard negative comments about the program
4. The program seemed difficult to work with
5. You didn't consider working with them
6. You didn't get around to it
7. Some other reason [NO SPECIFY]
8. [**CATI: DO NOT READ**] Don't know/ remember

[IF Q5=1, 2 OR 3 (HEARD OF PROGRAM OR PROGRAMS) AND Q13=1, 2 OR 3 (DID ENERGY PROJECT), SKIP TO CLOSE. OTHERWISE, CONTINUE]

[IF Q19=1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 OR 13(PLAN TO DO SOMETHING ENERGY EFFICIENT) AND Q13=4 OR 5) (HAVEN'T DONE SOMETHING ALREADY) AND RESPONDENT IS AWARE OF AT LEAST ONE PROGRAM OTHER THAN 'LEED FOR HOMES' (Q5 =1, 2 OR 3), ASK Q24. OTHERWISE, SKIP TO CLOSE]

Q24. [WEB PHRASING] Earlier, you said you are aware of the following energy efficiency program(s) in your area: [DISPLAY Q5 PROGRAM NAMES, EACH ON A SEPARATE ROW, IN **BOLD** FONT]

[CATI PHRASING] Earlier, you said you are aware of the following energy efficiency program(s) in your area: [DISPLAY Q5 PROGRAM NAMES]

[CATI: READ PROGRAM NAME(S)]

How much influence, if any, would you say [IF AWARE OF ONE PROGRAM: that program/IF AWARE OF 2 OR MORE PROGRAMS: any of those programs] had on your plans to add to your home in the next year to make it more energy efficient?

[CATI] Use a scale from 0 to 10, where 0 is "no influence at all" and 10 is "a great deal of influence."

[0-10 SCALE WITH RADIO BUTTONS, WITH 0 LABELED "No influence at all" AND 10 labeled "A great deal of influence"]

[FOR WEB AND CATI]

CLOSE. Thank you very much for your time and your responses. Those are all of our questions.

M.4. GRANTEE/SUBGRANTEE IN-DEPTH INTERVIEW GUIDE 2013

Interview an experienced contact! If that is not the current lead, ask for contact info for the prior lead. (Doesn't need to be the literal highest ranked, but someone with responsibility for program success)

M.4.1. COMPREHENSIVENESS

1. How does your program define comprehensiveness?

[Fodder ideas: An audit that looks at everything; X different types of measures installed; Y % savings]

   i. If "by measures" or "by savings", explore how it's defined

   b. What proportion of your upgrades are comprehensive?
   c. →Explore any differences by sector in definition/goal and in accomplishments.

2. What are the key challenges to comprehensive upgrades?

   a. →Explore any differences by sector

3. We all want comprehensive upgrades. Yet people differ as to whether the best way to reach a goal – such as x% of homes have comprehensive upgrades by 2015 – is through encouraging people to do a single, comprehensive project or a strategy that encourage people to do a little bit now, a little bit later, and to keep plugging away at it. Which approach do you think would work best in your market to? Why do you say that?

   a. →Explore any differences by sector

M.4.2. PROJECT PROCESS

4. Please *briefly* sketch for me your project process in terms of basic activities largely from the customer's perspective. I'm thinking of: awareness, indicating interest, any pre-screening, audit scheduling, audit conducted, any working with the customer before the upgrade, upgrade scheduling, update conducted, rebate application, loan application.

   a. →Explore any differences by sector

5. Please *briefly* indicate which organization does what basic role. I'm thinking of: your organization, your subgrantees, firms contracting with your organization, and firms contracting with the owner.

   a. →Explore any differences by sector

6. [If not clear, answer the following]

   a. Do you have an energy coach?

      i. [If yes] *Briefly* sketch that role.

   b. To what extent has the program changed over time? [Seeking to assess flexibility]

M.4.3. WHO OR WHAT SELLS

7. I'm interested in your views on *who* is most instrumental in selling the upgrade. I know it's a team effort, but I'd like you to identify the role that most influences the customer to do the upgrade. Would you say it's the audit contractor, (an energy coach,) program staff, an upgrade contractor, a prominent community member, a satisfied customer, or someone else?
   a. [If they pick multiple roles]
      i. If you could improve the effectiveness of only one of these roles, which would you focus on?
   b. →Explore any differences by sector
8. Similarly, *what* most sells the upgrade? Would you say it's the audit *process*, the audit report, directly installed measures, the rebate, the loan, presentations to groups, showcasing successful upgrades, or something else?
9. And do you think it's the amount of the rebate that's key, or simply that a rebate is offered?
   a. About how large a rebate ($ or %) do you think is necessary?
10. And do you think it's the interest rate or other feature of the loan, or simply that a loan is available?
   a. [If features:] What is an attractive loan?
11. And which is more important, rebate or loan?
12. →Explore any differences by sector

M.4.4. AUDITS

13. Did you offer audits to everyone requesting one or, if not, what pre-screening did you do?
14. Let's talk about the pros and cons of audits when seeking comprehensive upgrades. If you were designing a comprehensive upgrade program from scratch with no specific constraints, would you conduct audits and, if so, what would your audit approach look like?
   a. [Fodder ideas: Pre-screening, software, diagnostic tools, reporting]
15. Do you "test out"?

M.4.5. VISION, MARKET EFFECTS

16. How did your program build on existing programs or organizations, if at all? (Ex: WAP, utilities)
   a. →Identify what programs/ organizations
   b. →Explore any sector differences
   c. How did these other efforts make you program more successful?
   d. How has your program made these efforts more successful?

17. Some grantees have been more focused on accomplishing audits and upgrades – I'd call them the "get it done" kind of grantees, while other grantees have been more focused on creating the market conditions and supports that will lead to audits and upgrades – I'd call them the "working towards a vision" type. Which type best describes you?

18. What changes have occurred in your market that your program has supported or perhaps brought about? Here's your chance to justify the ARRA funding you received ☺.

    a. [Fodder ideas: increase in jobs // upgraded homes or businesses // ongoing training programs//changes in complementary programs (for example, utility, local WAP)]

19. To what extent do you think any of these changes will persist?

    a. [Fodder] Will contractors continue marketing these services? Why do you think that?
    b. [Fodder] Will consumers continue demanding these services? Why do you think that?
    c. →Explore sector differences

20. Will your programs persist in any way? [If yes:] Who will conduct, what funding, what services offered to whom?

    a. Does your program have a threshold effect for success, such that if you reached X number of retrofits of loans, the program can continue? Explain.

M.4.6. FINANCING

21. What types of lending institutions do you recommend partnering with and why?

    a. What have you learned about the barriers to getting lending institutions on board and ways to address those barriers?
    b. Can you share any lessons about communicating with lenders?

        i. [Fodder:]

            1. Are there data that lenders want to see upfront?

            2. Did you have any challenges communicating your goals and piquing their interest in them?

            3. What does it take to convince them the opportunity is worth pursuing?

    c. →Explore any sector differences

22. To what extent are credit enhancements necessary?

    a. What types of credit enhancements do you recommend and why?
    b. About what proportion of total monies do you recommend be put into credit enhancements?
    c. →Explore any sector differences

23. What have you learned about the loan products that work and don't work for your participants? I am thinking of amount of interest, whether loans are secured or not, other loan terms.
    a. →Explore any sector differences
24. [If small commercial] To what extent are small commercial customers interested in loans?
25. Has the time that it takes to get approval for the loan and close the deal been an issue for you or your participants?
    a. [Fodder:]
        i. Is there an optimal "not to exceed" amount of time?
        ii. What have you learned about how to facilitate optimal timing?
    b. →Explore any sector differences
26. Will the money you have put into credit enhancements remain with the lenders after the grant period?
    a. Will any of your lenders continue to offer financing after the grant period?
    b. →Explore any sector differences
27. What is your current default rate?
28. We will be interviewing lenders. Which of your lenders do you recommend we speak with (we will be speaking with 10 or so lenders)?
    a. Who on your team should we contact to get contact information for these organizations?

M.4.7. TARGET MARKET

29. Are you targeting any populations now that you did not identify in your grant? [If yes:] What and why?
30. What types of households (socio-economic) does your program serve most?
31. Have you used community sweeps? [If yes:]
    a. What populations have you found them to be effective with?
    b. What advice to do you for how to do sweeps, and what to avoid?
32. Does your program serve all commercial customers in your service territory, or do you target, such as by size or type?
    a. [If target:] What are the target markets?
        i. How does your program differ from a typical program serving all commercial customers?
        ii. What have been the key challenges and the lesson learned?
        iii. Any failures that you've learned from?

b. [If not target:] What have been the key challenges and lessons learned in acquiring commercial upgrades that we haven't discussed?

   i. Any failures that you've learned from?

c. What types of businesses does your program serve most?

33. Some grantees serve entire states, others serve small towns. What have been the challenges and advantages of serving your area?

34. Are you targeting any specific types of contractor?

a. [Fodder ideas: large/small, remodeler, insulator, equipment]
b. In retrospect, *should* you have targeted any specific types?
c. What have been the key challenges and lessons in engaging qualified contractors that we haven't discussed?
d. Any failures that you've learned from?
e. What training do your contractors receive in the available loan packages?
f. Are your envelope contractors equally engaged in insulation as air sealing?

35. What have been the key challenges and lessons in acquiring residential upgrades that we haven't discussed?

a. Any failures that you've learned from?
b. And what are key challenges and lessons in nonresidential upgrades that we haven't discussed?

M.4.8. ADMINISTRATION

36. What processes or tools have you developed that others might benefit from reading about? Any lessons learned in being efficient and effective? {Blurb: If we were conducting a process evaluation of just your program, we would spend a long-time understanding how you do everything. But for this evaluation of the entire BBNP, we can't do that. So what are the key things you've done that we should know about?}

M.4.9. DOE

37. Please rank order the various DOE activities in terms from most to least helpful to you and your team. The activities are:

   i. Being assigned an account manager
   ii. Onsite visit from DOE
   iii. Workshops
   iv. Webinars
   v. Peer calls
   vi. Google groups
   vii. Google website
   viii. Technical assistance providers
   ix. Anything I've missed

a. Why do you say that?

M.5. FINANCIAL INSTITUTION INTERVIEW GUIDE

M.5.1. OBJECTIVES

Our purpose is to better understand any contractual arrangements that they have made with the grantees and the extent to which any loan loss reserve funds or other mechanisms have expanded their willingness and ability to serve the upgrade market. We will ask about the terms of their residential and commercial loans. We will seek their assessment of the role of financing in stimulating upgrades and the role of BBNP in stimulating demand for their financial services (net effects).

We also seek to understand the source of any reluctance that they had in partnering with the grantees and offering loans for upgrades, the extent to which their institutions now consider upgrade loans to be a viable market, their institutions' plans to continue to finance energy efficiency upgrades, and – if they plan to continue – the role of any BBNP credit-enhancements in their decisions to continue.

Finally, we will explore what conditions or supports might be needed for more financial institutions to be willing to offer loans for upgrades.

As described below, the financial partner interviews will also inform the market assessment.

M.5.2. TARGET AUDIENCE

Financial Institutions Active in Making Loans to Upgrade Projects

M.5.3. INTERVIEW LENGTH

"Brief" (15-30 minutes?)

M.5.4. INTERVIEW GUIDE

Contact name

Contact organization:

Contact phone:

Interviewer name:

Date of interview:

Thank you for taking the time to talk with me today.

As a representative of a financial institution working with <Name of grantee/subgrantee and umbrella program>, we would like your feedback. Your responses will contribute to a national evaluation study of the Better Building Neighborhood Program (BBNP). BBNP is the Department of Energy's (DOE) program that funded <Name of grantee/subgrantee and umbrella program>.

Our study will enable DOE to assess and improve the program. We would greatly appreciate your participation in this interview, which is entirely voluntary.

DOE has contracted with independent research firm, Research Into Action, Inc. to conduct the study. Research Into Action, Inc. will keep the information private to the extent permitted by law. DOE's analysis will use only summary-level data and will not identify individual respondents, so we can assure you that your comments will remain confidential.

If you have any questions about this study, please contact Marjorie McRae, Project Manager of Research Into Action, Inc. at (503) 287-9136 or marjorie.mcrae@researchintoaction.com. Or you may contact the Project Manager at Lawrence Berkeley National Laboratory, which is directing the study for DOE. He is Edward Vine at elvine@lbl.gov (510) or 486-6047.

Ask for permission to audio record interview.

Summary of interview (write after interview complete):

INTRO. First, please describe your role in working with <Name of grantee/subgrantee and umbrella program> on loans or other types of financing for the program.

1. What financial products did you offer participants of [the grantee's program]? [PROBE IF NEEDED TO DETERMINE IF OFFERED TO COMMERCIAL AND/OR RESIDENTIAL CUSTOMERS]
    a. What are the loan terms (interest rates, fees, duration) and are these more favorable, equivalent, or less favorable than your typical home equity or business improvement loans?
    b. How do the eligibility requirements (such as credit score) compare with your typical home equity (or home improvement) or business improvement loans?
    c. Are your loans secured?
    d. Are you using different underwriting criteria for energy efficiency loans (for example, utility bill history, etc.) from other loans offered to similar borrowers?
    e. When in the underwriting process do you look at projected savings, if at all?
    f. [IF NOT CLEAR] Do you offer both residential and commercial customers loans for energy efficiency upgrades? **[IF NOT BOTH, IDENTIFY WHICH ONE]**

2. Prior to your involvement with [PROGRAM], has any of your underwriting ever considered energy savings?

[IF YES]

    a. Under what circumstances?
    b. How often?
    c. When in the underwriting process do you look at projected savings, if at all?

3. How many loans have you made with [PROGRAM] participants?

Reference BBNP reporting data.

    a. What is the average size of these loans?
    b. What proportion have late payments?
    c. How does that proportion compare with remodeling loans that are not through [PROGRAM]?

4. To date, have any of these loans missed a payment or are any in arrears?
   a. **[IF YES]** About how many or what proportion?
   b. How does this compare with your typical home equity or business improvement loans?

5. Are your customers (that you serve through [PROGRAM] typically simultaneously conducting energy upgrades and other remodeling upgrades? **[IF YES]** And do your loans typically provide for both activities?

6. From the figures you've seen, do the energy savings from upgrades cover the loan costs?

7. Do you have one or a few staff that handle all energy upgrade loan applications, or are these loans handled by all loan officers?

8. Do you have a contract with or have you received earmarked funds from [the grantee], such as funds to establish a loan loss reserve?
   a. Please briefly sketch the details for me, as to what's in place and the quantity of any funds.

9. How did it come about that your organization offers loans to participants of (the grantee's program)?

   PROBE TO DETERMINE THE FOLLOWING:

   a. Did your two organizations [the respondent and the grantee] have any interactions, business dealings, or partnerships prior to the program? **[IF YES]** What?
   b. Who (title or role) in your organization was the point of first contact, and who (title or role) from the program made the contact? Did the discussion or decision pass from these individuals to others in the two organizations?
   c. What was your organization's initial response and how did that response change over time?
   d. What factors were key in your organization's decision to offer the loans?
   e. How did your organization view the risk of such loans?
   f. Did it identify any other factors that suggested the organization might not want to offer these loans?

10. How does your organization think about loans for energy upgrades, in terms of the benefits and risks or pros and cons?
   a. What data or information are you looking for to determine if energy upgrades are appropriate for loans?
   b. What would need to change in the market for your organization to have greater interest than currently in offering loans for energy upgrades?
   c. What would need to change in the market for other financial institutions to have increased interest in offering loans for energy upgrades?
   c. What supports might need to be in place at the state or national level for your organization to have increased interest in offering loans for energy upgrades?
   d. What supports might need to be in place at the state or national level for other financial institutions to be interested in offering loans for energy upgrades?

11B. Do you think the community you lend to has undertaken more energy efficiency upgrades because of the grantee program than it would have otherwise, or not? **[IF YES, PROBE FOR RELATIVE INCREASE]**

11. Will your organization continue to offer loans for energy efficiency upgrades without the financial support currently provided by the BBNP grant?
    a. IF OFFERS MORE THAN ONE LOAN PRODUCT: Which one(s)?
    b. Why that/those?

12. Have you made any loans for energy efficiency upgrades to customers other than those who are participating in [the grantee's program]?
    a. **[IF YES]** Had you made such loans prior to the program, or only during the program period?

13. At the end of the grant period, will your organization continue to offer loans for energy efficiency upgrades? (These customers would not be participants in the grantee program.)
    a. Why or why not?
    b. Are the terms of these loans likely to change?
    c. Are you planning to promote loans for the purpose of energy efficiency upgrades? [That is, in advertising suggest to the customer that if they are planning an upgrade, they should come for a loan]

14. Do you have any other comments that might help me better understand the financial market's response to energy upgrade activity?

CLOSE. Those are all of my questions, thank you very much for your time and your insights today.

If I have any follow-up questions to help clarify anything after I've reviewed by notes, is it OK if I re-contact you via email or phone?

M.6. DOE SENIOR BBNP STAFF INTERVIEW GUIDE

M.6.1. INTRODUCTION

Thank you for setting the time aside for us to talk. To recap what I said when scheduling this call, our evaluation purpose is to assess DOE's Better Buildings Neighborhood Program. We are not assessing the performance of individuals or individual grantees. We are seeking to understand the entire BBNP effort, to support DOE in its ongoing and future initiatives.

We received your name from BBNP senior staff. There is no payment for participating in this study. Knowing that this is voluntary, we appreciate that you are willing to be interviewed. You can decline to be interviewed or stop at any time. Your input is extremely valuable, as your input will help to improve energy efficiency programs designed for saving energy. We anticipate this interview will last about 60 minutes.

This evaluation is being conducted on behalf of Lawrence Berkeley National Laboratory (LBNL). The primary contact person at LBNL is Dr. Edward Vine; he can be reached at 510-486-6047.

DOE has contracted with LBNL to manage the evaluation and LBNL contracted with the independent research team led by Research Into Action, Inc. All reporting to DOE will use only summary-level data and will not identify individual respondents or organizations; however, because there are relatively few people being interviewed, it is possible that the BBNP Program Manager or others may be able to tell which comments are yours.

We will also be taping the interview as it provides an opportunity to revisit the interviews to make sure that the interview reports are accurate. The interview reports are confidential and will only be used by the evaluation team. The research team will treat as confidential the tapes and interview notes and will destroy them when the project is completed,

Is it ok with you if we tape the interview? If you wish to convey information you do not want recorded, I will cease recording until we change subjects and you agree I can begin recording again.

[If the respondent refuses, no recording is made.]

If ok: Then let us jump right in.

M.6.2. SCRIPT

Name:

Date:

Interviewer:

Role/Title:

For our final evaluation of the BBNP program, we would like to discuss with you your views on and experiences with DOE BBNP activities, and your views on whole home and whole building upgrades.

Roles and Responsibilities

[If not known] For what period were you involved with BBNP?

What were your main activities during this time?

DOE BBNP Activities

First, let's turn to DOE activities.

1. I'd like to get your opinions about activities DOE engaged in to support the grantees. I'd like your opinions on the relative value of activities I'll mention. Please rank order the following various DOE activities in terms from most to least helpful to your grantees, in your opinion. And if rank order is too difficult, how about primary/secondary?
    a. Being assigned an account manager
    b. Onsite visit from DOE
    c. Workshops
    d. Webinars
    e. Peer calls
    f. Google groups
    g. Google website
    h. Technical assistance providers
        i. Engagements
        ii. Case studies
        iii. Database help
        iv. OIWP help
    i. Anything I've missed
2. How instrumental do you think these activities were to the achievements of grantees?
3. What areas remained the most problematic for grantees at the end of the grant period?

Data and Reporting

Let's briefly discuss BBNP data and reporting.

4. What have been the key challenges in grantee data reporting, and DOE reporting of the grantee data?
5. What will the Solution Center offer in terms of tools or guidance for data tracking and reporting?
6. Did the BBNIS and Salesforce databases each function as expected?
    a. And did parties make use of each of them as expected?
7. What are ongoing limitations in reported data that my team, as users of the data, should be aware of?

Stakeholders and Industry Associations

Let's briefly discuss stakeholders and industry associations.

8. For the preliminary report, we were given a list of stakeholders and industry associations for BBNP that included ACEEE, Alliance to Save Energy, NASEO, Efficiency First, Green for All, and BPI. Has BBNP worked with any of these groups? In what ways?

9. Are there any additional groups that might be considered stakeholders?

10. Which, if any, of these groups do you think we should consider interviewing?

    a. Any organization that I didn't mention that we should consider?

Whole House and Whole Building Upgrades

Now, let's discuss your insights into whole house and building upgrades.

11. How do you define **comprehensiveness** for an upgrade?

12. Let's talk about the pros and cons of **audits** when seeking comprehensive upgrades. I'd like to hear your opinions about what an ideal audit approach might be, or how the ideal might vary under certain market conditions.

13. What are your opinions on the importance of **financing** in whole home or building upgrade programs, or how the importance might vary with market conditions?

    a. What are the barriers to financing for a local program, and on a national scale?
    b. Is the bundling of loans an issue? (Secondary market, national level)

14. In your view, what are the **legacies of the grantees**? (I will later ask about the legacy of BBNP as a whole)

15. In your view, which grantees had the **most successful upgrade programs**? Please consider residential, low-income, and nonresidential.

    a. Can you characterize the business model or models these programs used? [If more than one model, match model with program]

16. Which grantees had the most successful financing programs?

Summary

Now for our summary questions:

17. What do you think are the key strengths of DOE's BBNP program?

18. What were the key areas that, with hindsight, time, and additional resources could have gone better?

19. What one or two challenges do you see as key to stimulating whole house and whole building upgrades?

20. What do you think is the legacy of BBNP?

21. Any final comments?

M.7. BBNP ACCOUNT MANAGERS INTERVIEW GUIDE

M.7.1. INTRODUCTION

Thank you for setting the time aside for us to talk. To recap what I said when scheduling this call, our evaluation purpose is to assess DOE's Better Buildings Neighborhood Program. We are not assessing the performance of individuals or individual grantees. We are seeking to understand the entire BBNP effort, to support DOE in its ongoing and future initiatives.

We received your name from BBNP senior staff. There is no payment for participating in this study. Knowing that this is voluntary, we appreciate that you are willing to be interviewed. You can decline to be interviewed or stop at any time. Your input is extremely valuable, as your input will help to improve energy efficiency programs designed for saving energy. We anticipate this interview will last about 20-30 minutes.

This evaluation is being conducted on behalf of Lawrence Berkeley National Laboratory (LBNL). The primary contact person at LBNL is Dr. Edward Vine; he can be reached at 510-486-6047.

DOE has contracted with LBNL to manage the evaluation and LBNL contracted with the independent research team led by Research Into Action, Inc. All reporting to DOE will use only summary-level data and will not identify individual respondents or organizations; however, because there are relatively few people being interviewed, it is possible that the BBNP Program Manager or others may be able to tell which comments are yours.

We will also be taping the interview as it provides an opportunity to revisit the interviews to make sure that the interview reports are accurate. The interview reports are confidential and will only be used by the evaluation team. The research team will treat as confidential the tapes and interview notes and will destroy them when the project is completed,

Is it ok with you if we tape the interview? If you wish to convey information you do not want recorded, I will cease recording until we change subjects and you agree I can begin recording again.

[If the respondent refuses, no recording is made.]

If ok: Then let us jump right in.

M.7.2. SCRIPT

Account Manager:

Date:

Interviewer:

Region Account Manager Serves:

For our final evaluation of the BBNP program, we would like to discuss with you your views on experiences with your grantees, their programs, and whole home/ whole building upgrades. We also want to discuss your views on and experiences with DOE BBNP activities.

Roles and Responsibilities

1. For what period did you serve as an BBNP account manager?

2. What were your main activities during this time? And if your activities have varied over the period, please let me know what you were most engaged in when. For earlier activities, a brief mention is fine. Please provide more detail for activities since summer 2012.

Whole House and Whole Building Upgrades

Let's start by discussing whole house and building upgrades, and your grantee programs.

1. How do you define **comprehensiveness** for an upgrade?
    a. Comprehensiveness can be attained by encouraging end users to do a single, comprehensive project or through a strategy to encourage people to do a little bit now, a little later, and so on. I'd like to hear your opinions as to whether one strategy is better than the other under certain market conditions, or where the efficiency community should be putting their efforts.

2. Let's talk about the pros and cons of **audits** when seeking comprehensive upgrades. I'd like to hear your opinions about what an ideal audit approach might be, or how the ideal might vary under certain market conditions.

3. What are your opinions on the importance of **financing** in whole home or building upgrade programs, or how the importance might vary with market conditions?
    a. What are the barriers to financing your grantees have encountered?

4. In your view, what are the **legacies of your grantees**? You can discuss them individually or collectively; whatever makes sense.

5. In your view, which of your grantees had the **most successful upgrade programs**? Please consider residential, low-income, and nonresidential.
    a. Can you characterize the business model or models these programs used? [If more than one model, match model with program]

6. Which grantees had the most successful **financing programs**?

7. And now a detail question: Which of your grantees had subgrantees?
    a. Did the subgrantees have any upgrade goals that you are aware of?
        i. [If yes] What are they?
    b. Do you have any performance metrics for those subgrantees? We are looking for a way to include the subgrantees in our analysis of grantee success, which requires performance metrics.

DOE BBNP Activities

Now let's turn to DOE activities.

8. What processes or tools has DOE through BBNP developed that has supported grantee activities? These can be processes or tools that were developed in time for the grantees to use, or ones that have been developed for the post-BBNP period or are under development now.

9. And among your grantees, are you aware of any processes or tools that your grantees have developed that others might benefit from? Or perhaps DOE is already building on any such tools in its work.

10. Please rank order the following various DOE activities in terms from most to least helpful to your grantees, in your opinion. And if rank order is too difficult, how about primary/secondary?

    a. Being assigned an account manager
    b. Onsite visit from DOE
    c. Workshops
    d. Webinars
    e. Peer calls
    f. Google groups
    g. Google website
    h. Technical assistance providers

        i. Engagements
        ii. Case studies
        iii. Database help
        iv. OIWP help

    i. Anything I've missed

11. Why do you say that?

12. Which of these are continuing post-BBNP?

    a. Do you agree with this approach?

13. I'd like to hear your opinions on what areas – content-wise – grantees needed the most support in? And please extrapolate to future organizations seeking to conduct whole home or building upgrades. What type of technical support or information or tools are they most likely to need?

    a. Looking backward, if DOE could have provided certain information or support earlier in the program – perhaps even out the outset of the grant period – what information or support would have been most useful?
    b. And now it's the end of the grant period. Are there any areas that grantees are still struggling with, haven't yet figured out the right approach or the right information? What still challenges grantees even after all they've been through?

14. I understand that most of the BBNP activities that DOE conducted (Question 10) are new with BBNP. That is, prior DOE grants haven't provided as much support as BBNP. Is this an accurate understanding?

    a. How instrumental do you think these activities were to the achievements of grantees?

15. What do you think DOE management has learned about whole house and whole building upgrade programs – at the program administrator level? What approaches are effective in stimulating a robust retrofit industry – perhaps it varies depending on the starting point?
    a. Have you identified any additional lessons, beyond what DOE management appears to be focused on?
16. And now, the same question but at the DOE level. What do you think DOE management has learned about what it might do to stimulate whole house and whole building upgrade programs? Anything we haven't previously discussed?
    a. And again, have you identified anything else, beyond what management appears to be focused on?

Data and Reporting

Let's briefly discuss BBNP data and reporting.

17. What have been the key challenges in grantee data reporting, and DOE reporting of the grantee data?
18. Has DOE developed any tools or definitions or other support over the course of BBNP that now are available for or provide a starting point for subsequent initiatives?
19. What are ongoing limitations in reported data that my team, as users of the data, should be aware of?
20. Please explain the differing functions of the BBNIS and Salesforce databases.
    a. Did each of these function as expected?
    b. And did parties make use of each of them as expected?
21. Are there any overlaps in the content, and if so, did that create any challenges for users?

Summary

Now for our summary questions:

22. What do you think are the key strengths of DOE's BBNP program?
23. What were the key areas that, with hindsight, time, and additional resources could have gone better?
24. What one or two challenges do you see as key to stimulating whole house and whole building upgrades?
25. What do you think is the legacy of BBNP?
26. Any final comments?

M.8. BBNP TECHNICAL ASSISTANCE PROVIDERS INTERVIEW GUIDE

M.8.1. INTRODUCTION

Thank you for setting the time aside for us to talk. To recap what I said when scheduling this call, our evaluation purpose is to assess DOE's Better Buildings Neighborhood Program. We are not assessing the performance of individuals or individual grantees. We are seeking to understand the entire BBNP effort, to support DOE in its ongoing and future initiatives.

We received your name from BBNP senior staff. There is no payment for participating in this study. Knowing that this is voluntary, we appreciate that you are willing to be interviewed. You can decline to be interviewed or stop at any time. Your input is extremely valuable, as your input will help to improve energy efficiency programs designed for saving energy. We anticipate this interview will last about 20-30 minutes.

This evaluation is being conducted on behalf of Lawrence Berkeley National Laboratory (LBNL). The primary contact person at LBNL is Dr. Edward Vine; he can be reached at 510-486-6047.

DOE has contracted with LBNL to manage the evaluation and LBNL contracted with the independent research team led by Research Into Action, Inc. All reporting to DOE will use only summary-level data and will not identify individual respondents or organizations; however, because there are relatively few people being interviewed, it is possible that the BBNP Program Manager or others may be able to tell which comments are yours.

We will also be taping the interview as it provides an opportunity to revisit the interviews to make sure that the interview reports are accurate. The interview reports are confidential and will only be used by the evaluation team. The research team will treat as confidential the tapes and interview notes and will destroy them when the project is completed.

Is it ok with you if we tape the interview? If you wish to convey information you do not want recorded, I will cease recording until we change subjects and you agree I can begin recording again.

[If the respondent refuses, no recording is made.]

If ok: Then let us jump right in.

M.8.2. SCRIPT

Roles and Responsibilities

1. [If not known] For what period were you involved with BBNP?

2. First, can you describe your role and responsibilities in the BBNP?

3. What were your main activities during this time? I'm looking for the summary description. I'll ask more detailed questions next. And if your activities have varied over the period, please let me know what you were most engaged in when. For earlier activities, a brief mention is fine. Please provide more detail for activities since summer 2012

Technical Assistance

4. Did you work one-on-one with grantees?
   a. [If yes] What format or venue? In person? Phone? Email support?
   b. [If no] How did you provide grantee support or assistance?
5. What topics or subjects did you cover?
6. What were the main challenges grantees faced?
7. Were some venues or ways of working with grantees more useful than others?
8. What do you think grantees most valued of your activities?

Savings Calculation

9. Does anyone on the BBNP team know the savings calculation methods used by each specific grantee? Who?
10. Did any of the grantees establish a set savings value for every project of a certain type, or did all grantees develop project-specific estimates based on the home or building and the measures?
    a. [If yes] Do you know how common it was to have a set savings value – common in terms of either grantees or projects overall?
11. What sources did grantees use to establish deemed saving values?
12. What difficulties did grantees encounter in calculating energy savings?
13. Did any grantees pursue savings calculations using inappropriate methods?
14. Did DOE establish any requirements for calculating savings, or provide any training or assistance in doing so?
    a. Are there any approaches that are not acceptable?
    b. Were DOE to implement a program similar to BBNP in the future, would you recommend it establish any specific software or methodological requirements? Why or why not?

BBNP Legacy, Successes, and Lessons

Now let's discuss some of the achievements and lessons of BBNP.

15. In your view, what are the legacies of the grantees? (I will later ask about the legacy of BBNP as a whole)
16. In your view, which grantees had the most successful upgrade programs? Please consider residential, low-income, and nonresidential.
    a. Can you characterize the business model or models these programs used? [If more than one model, match model with program]
17. Which grantees had the most successful financing programs?

Summary

Now for our summary questions:

18. What do you think are the key strengths of DOE's BBNP program?

19. What were the key areas that, with hindsight, time, and additional resources could have gone better?

20. What one or two challenges do you see as key to stimulating whole house and whole building upgrades?

21. What do you think is the legacy of BBNP?

22. Any final comments?

M.9. BBNP DATA MANAGEMENT INTERVIEW GUIDE

M.9.1. INTRODUCTION

Thank you for setting the time aside for us to talk. To recap what I said when scheduling this call, our evaluation purpose is to assess DOE's Better Buildings Neighborhood Program. We are not assessing the performance of individuals or individual grantees. We are seeking to understand the entire BBNP effort, to support DOE in its ongoing and future initiatives.

We received your name from BBNP senior staff. There is no payment for participating in this study. Knowing that this is voluntary, we appreciate that you are willing to be interviewed. You can decline to be interviewed or stop at any time. Your input is extremely valuable, as your input will help to improve energy efficiency programs designed for saving energy. We anticipate this interview will last about 20-30 minutes.

This evaluation is being conducted on behalf of Lawrence Berkeley National Laboratory (LBNL). The primary contact person at LBNL is Dr. Edward Vine; he can be reached at 510-486-6047.

DOE has contracted with LBNL to manage the evaluation and LBNL contracted with the independent research team led by Research Into Action, Inc. All reporting to DOE will use only summary-level data and will not identify individual respondents or organizations; however, because there are relatively few people being interviewed, it is possible that the BBNP Program Manager or others may be able to tell which comments are yours.

We will also be taping the interview as it provides an opportunity to revisit the interviews to make sure that the interview reports are accurate. The interview reports are confidential and will only be used by the evaluation team. The research team will treat as confidential the tapes and interview notes and will destroy them when the project is completed,

Is it ok with you if we tape the interview? If you wish to convey information you do not want recorded, I will cease recording until we change subjects and you agree I can begin recording again.

[If the respondent refuses, no recording is made.]

If ok: Then let us jump right in.

M.9.2. SCRIPT

Roles and Responsibilities

1. [If not known] For what period were you involved with BBNP?

2. What were your main activities during this time? And if your activities have varied over the period, please let me know what you were most engaged in when. For earlier activities, a brief mention is fine. Please provide more detail for activities since summer 2012First, can you describe your role and responsibilities in the BBNP?

3. What has been your involvement with BBNIS?

    a. Who else do you work with on BBNIS, and what is your relationship, in terms of each of your roles and interactions?

4. And what has been your involvement with Salesforce?
    a. Who else do you work with on Salesforce, and what is your relationship?

Data Management

5. Please explain the differing functions of the BBNIS and Salesforce databases.
    a. Did each of these function as expected?
    b. And did parties make use of each of them as expected?
    c. Are there any overlaps in the content, and if so, did that create any challenges for developers or users?
6. What have been the key challenges in grantee data reporting?
7. What types of data have been the hardest for them to report?
    a. Why is that, or perhaps, what types of errors are made with these data?
8. What instruction, training, resources, and support has DOE provided to grantees regarding data reporting?
9. What have been the key challenges in DOE reporting of the grantee data, if that differs?
    a. What has DOE had to do to clean the data?
    b. Have you had to do any interpolation?
    c. How do you know whether missing data means the value is unavailable to you vs the element is not applicable to their program or project?
10. Has DOE developed any tools or definitions or other support over the course of BBNP that now are available for or provide a starting point for subsequent initiatives?
11. What are ongoing limitations in reported data that my team, as users of the data, should be aware of?

Savings Calculation

12. Does anyone on the BBNP team know the savings calculation methods used by each specific grantee? Who?
13. Did any of the grantees establish a set savings value for every project of a certain type, or did all grantees develop project-specific estimates based on the home or building and the measures?
    a. [If yes] Do you know how common it was to have a set savings value – common in terms of either grantees or projects overall?
14. What sources did grantees use to establish deemed saving values?
15. What difficulties did grantees encounter in calculating energy savings?
16. Did any grantees pursue savings calculations using inappropriate methods?

17. Did DOE establish any requirements for calculating savings, or provide any training or assistance in doing so?
    a. Are there any approaches that are not acceptable?
    b. Were DOE to implement a program similar to BBNP in the future, would you recommend it establish any specific software or methodological requirements? Why or why not?

BBNP Legacy, Successes, and Lessons

Now let's discuss some of the achievements and lessons of BBNP.

18. In your view, what are the legacies of the grantees? (I will later ask about the legacy of BBNP as a whole)

19. In your view, which grantees had the most successful upgrade programs? Please consider residential, low-income, and nonresidential.
    a. Can you characterize the business model or models these programs used? [If more than one model, match model with program]

20. Which grantees had the most successful financing programs?

Summary

Now for our summary questions:

21. What do you think are the key strengths of DOE's BBNP program?

22. What were the key areas that, with hindsight, time, and additional resources could have gone better?

23. What one or two challenges do you see as key to stimulating whole house and whole building upgrades?

24. What do you think is the legacy of BBNP?

25. Any final comments?

M.10. BBNP STAKEHOLDERS INTERVIEW GUIDE

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M.10.2. SCRIPT

Name:

Date:

Interviewer:

Role/Title:

For our final evaluation of the BBNP program, we would like to discuss with you your views on and experiences with DOE BBNP activities, and your views on whole home and whole building upgrades.

Roles and Responsibilities

1. Briefly, what does your organization do, and what is your role in the organization?
2. What involvement has your organization had in BBNP – ranging from formative stages until now?
3. What has your specific role been? Has it changed over time?

Whole House and Whole Building Upgrades

4. What is your understanding of the objectives of BBNP?
5. To what extent do you think it has met its objectives?
6. What has hindered meeting its objectives?
7. What, if any, changes have you observed in the market that you might attribute to BBNP?
8. What do you think are the challenges to whole house (and whole building) comprehensive upgrades?
9. What do support contractors need to further develop the market?
10. What would you like to see from DOE going forward in terms of support for the whole house/building comprehensive upgrade market?

Summary

Now for our summary questions:

11. What do you think are the key strengths of DOE's BBNP program?
12. What were the key deficits or areas that, ideally, could have gone better?
13. What are the ongoing challenges to DOE stimulating whole house and whole building upgrades?
14. What do you think is the legacy of BBNP?
15. Any final comments?