Evaluating the Market Effects of the Better Buildings Neighborhood Program

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ABSTRACT

For energy efficiency programs that seek to change the market beyond the direct impacts of program-supported projects, it is important to measure market-level impacts. This study provides evidence of early indicators of market effects of the Better Buildings Neighborhood Program (BBNP) sponsored by the U.S. Department of Energy (DOE) and provides insights into ways to measure market effects.

In 2010 BBNP provided three-year funding to 41 grantees in 32 states and territories that implemented individual programs that sought to increase the overall energy efficiency of existing residential and nonresidential facilities. A central purpose of BBNP grants was to fund programs to transform local energy and retrofit markets. Key elements of BBNP included training and workforce development, financing and other incentives, and marketing and outreach. This evaluation focused on several early indicators of local market effects of BBNP, including, but not limited to, activity in energy-efficiency upgrade market, adoption of energy-efficient building practices, sales of high-efficiency equipment and products, and availability of trained contractors.

This evaluation found evidence of early market effects across a wide range of indicators. Our findings indicate that BBNP was successful in stimulating some program activity and in eliciting market change at the utility level and among financial institutions. However, BBNP does not appear to have been successful at creating local markets where efficiency occurs in the absence of subsidies, probably because most grantees had not yet developed the market presence to continue self-sustaining programs without financial support.

Introduction

Beginning in 2010, the U.S. Department of Energy (DOE) administered the Better Buildings Neighborhood Program (BBNP) to support programs promoting whole-building energy upgrades. The program provided three-year grants totaling approximately $508 million funded by the American Recovery and Reinvestment Act (ARRA) of 2009. 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 targeted their own combination of residential, multifamily, commercial, industrial, and agriculture sector buildings, depending on their objectives. Figure 1 shows the states with BBNP activity and illustrates whether the grantee program focused on a city or county within the state or the entire state.[1]

This paper presents the results of a study seeking to identify indications that the BBNP may have had an effect on the local building improvement markets in which the program operated between Q4 2010 through Q3 2013. We define the building improvement market as the demand and supply of equipment and

[1] Some grantees funded BBNP programs through subgrantees, which administered local BBNP programs.

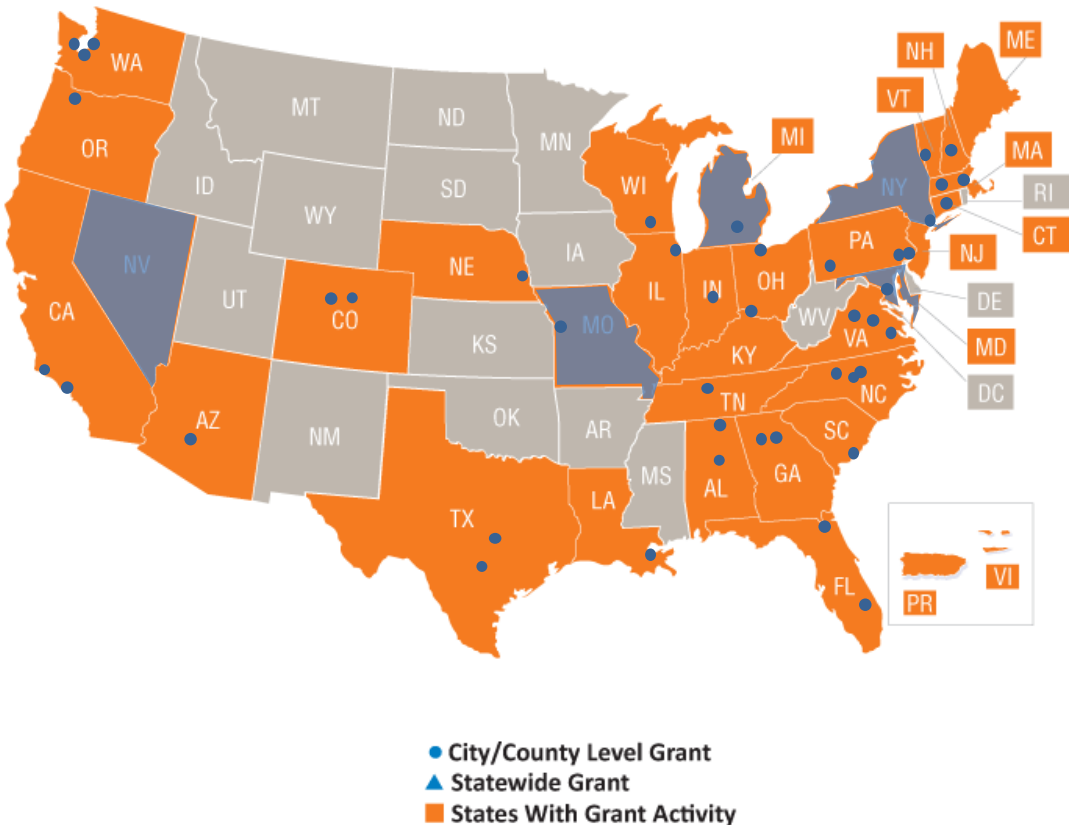

Figure 1. BBNP Grantees by location

services related to replacing, expanding, or enhancing components of the building energy end-use systems and envelope.

A market effect is "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, & Schlegel, 1996)." This study explores the market for energy-efficient products, services, or practices to assess changes in the market or in market actors' behavior resulting from BBNP activities, particularly the business practices of energy upgrade contractors and distributors.

Energy Efficiency Upgrade Market

A central purpose of BBNP grants was to fund programs to transform local energy and retrofit markets. Nationwide, the home improvement and repair market, which includes the energy efficiency upgrade market, represents a substantial portion of the U.S. economy, affecting millions of housing units and representing hundreds of billions of dollars in economic activity annually. For example, the Joint Center for Housing Studies (JCHS) of Harvard University found that, even during the Great Recession, the home improvement and repair market represented 2.8% of gross domestic product (GDP). During the 2007 to 2012 time period, spending on the home improvement and repair market ranged from a peak of $326 billion in expenditures in 2007 to a low of $275 billion in 2011 (JCHS 2011; JCHS 2013). The JCHS studies found spending on building envelope replacement parts (siding, windows, and doors), as well as spending on systems upgrades (HVAC systems), grew by nearly 3% from 2007 to 2011, largely due to the demand for energy efficiency upgrades.[2] Further, in 2011, the JCHS found that nearly 25% of householders who

[2] The 2011 JCHS study found that the composition of homeowner expenditures changed during the 2007 to 2011 period. The

undertook home improvements indicated that improving energy efficiency was a goal of the project (which is equal to over 5 million households) (JCHS 2011).

The American Housing Survey (AHS) of the U.S. Census Bureau also collects data on the number of households undertaking an energy efficiency project of some kind. Echoing the findings of the JCHS studies, the 2011 AHS found that 10,355,000 housing units in the U.S. – or 9% of occupied housing units – undertook an energy efficiency project of some kind in 2010 and 2011 (U.S. Census 2013).[3]

Finally, according to McGraw-Hill Construction data, since 2005, the green share of new single-family residential construction has grown from 2% of the market in 2005 to 23% in 2013, while the percentage of remodelers who reported more than 60% of their projects included green building activity increased from 8% of remodelers in 2011 to 16% in 2013 (McGraw-Hill Construction 2014).

If BBNP results in early market changes in the grantees' local energy and retrofit markets, it could have wide-ranging impacts on the large number of retrofits that take place in those local markets.

Indicators of BBNP Market Effects

Key elements of BBNP activities in the energy upgrade market included training and workforce development, financing and other incentives, and marketing and outreach. We examined whether BBNP activities resulted in several key outcomes in the local energy efficiency upgrade markets in which the BBNP was active:

- Increased demand for whole-house, whole-building efficiency upgrades
- Increased marketing of energy efficiency in general, and whole-house, whole-building efficiency upgrades specifically
- Increased adoption of energy-efficient building practices by contractors
- Increased availability and sales of high-efficiency equipment, products, and services
- Increased focus on energy efficiency by contractors and distributors
- Increased numbers of highly trained contractors who take a whole-house approach to upgrades
- Increased availability of financing for energy efficiency upgrades

Methods

Our analysis relies primarily on phone surveys with energy upgrade contractors and equipment distributors,[4] and also draws upon data from in-depth interviews with contractors, a secondary data analysis of changes in contractor association memberships and certifications issued by credentialing organizations, intercept interviews with participant and nonparticipant homeowners, and in-depth interviews with grantees and financial institutions. Table 1 summarizes our data collection methods.

Our survey of contractors and distributors focused on those grantees with community-based programs (i.e., programs administered at the community, city, or county level) and excluded statewide programs (such as New York [NYSERDA] or Maine) as well as grantees with large numbers of subgrantees operating multiple unique programs. We excluded statewide programs because of the difficulty of isolating indicators

share of spending on discretionary projects, such as kitchen and bath remodels and room additions and alterations declined by about three percentage points while spending on exterior replacement projects and system upgrades increased by almost exactly the same amount (JCHS 2011)

[3] The American Housing Survey asks about energy efficiency projects completed over the past two years.

[4] Equipment distributors are an important part of the energy-efficiency upgrade market. They are primarily engaged in the wholesale distribution of equipment and supplies, such as heating and air conditioning equipment and supplies and building envelope materials. They serve as an intermediary between manufacturers and contractors.

of market effects influenced by BBNP from the market effects of larger, previously existing programs, while data for individual subgrantees are not available and preclude the selection of subgrantees. We selected 25 grantee programs based on a stratified sample of high and medium residential program success, determined using latent profile analysis,[5] as well as a stratum of the top five commercial programs.

Table 1. Summary of Data Collection Methods

Population	**Method**	**Counts**
Participating contractors	CATI Survey	22 grantees (25 grantee programs); 147 respondents
Nonparticipating contractors	CATI Survey	22 grantees (25 grantee programs); 446 respondents
Distributors	CATI Survey	22 grantees (25 grantee programs); 291 respondents
Participating contractors	In-depth Interview (phone)	10 interviewees
Participant homeowners	Web survey	24 grantees; 2,399 respondents
Nonparticipant homeowners	Web intercept survey	41 grantees, 2,429 respondents
Financial institutions	In-depth Interview (phone)	20 financial partners
Grantees	In-depth Interview (in-person and phone)	40 grantees & 8 subgrantees
Contractor association memberships and certifications	Database reviews	Five contractor associations and certification organizations

Table 2 presents the 22 grantees and 25 grantee programs included in the contractor and distributor survey samples.

Table 2. Grantees Included in the BBNP Market Effects Survey

Austin, TX	Boulder County, CO*
Chicago Metro Agency for Planning	Connecticut Innovations, Inc.
CSG, Bainbridge Island, WA	Eagle County, CO
Fayette County, PA	Greater Cincinnati Energy Alliance
Greensboro, NC	Indianapolis, IN
Kansas City, MO	Omaha, NE
Philadelphia, PA	Phoenix, AZ
Portland, OR	Rutland, VT
San Antonio, TX	Seattle, WA*
State of Michigan*	State of New Hampshire
Toledo-Lucas Co. Port Authority (OH)	Wisconsin Energy Efficiency Project

*Selected grantees for both their residential and commercial programs

We compiled lists of participating contractors obtained from data requests that we placed with the 22 grantees and from the grantees' websites. For nonparticipating contractors and distributors, we identified a geographic region for each grantee from which we drew the sample. We used Standard Industrial Classification (SIC) codes to identify residential and commercial contractors and energy equipment distributors from a purchased list (InfoUSA). We supplemented the purchased list with publicly availably membership lists from the Building Performance Institute (BPI). Nonparticipating contractor and distributor survey respondents were randomly selected from these lists.

[5] We defined 12 numerical success metrics corresponding to the program's multi-faceted objectives and estimated their values for each local residential BBNP program. We conducted latent profile analysis (LPA) to cluster programs into groups with similar performance on the 12 indicators. LPA revealed programs clustered into three groups; their average group values on the 12 metrics were consistent with an interpretation of a high success group, a medium success group, and a low success group for residential programs.

Initial Indicators of BBNP Market Effects

For our analysis of the early indicators of market effects of BBNP we first attempted to determine whether a given outcome (early indicator of a market change) has occurred, then examined whether the data source (i.e., contractors, distributors, partnering financial institutions) linked the change to BBNP. In other words, we examined the links to the program to determine whether the indicators associated with those links point to program influence on the early indicator of market change or a market effect.

Our analysis focuses on examining the early indicators of market effects across all of the sampled grantees while also comparing for differences between the two residential strata (i.e., high and medium success strata) and the commercial strata. Overall, across all strata, we found evidence of multiple indicators from multiple data sources of early indications of market effects influenced by BBNP. There are relatively few statistically significant differences between the residential and commercial strata and most of the differences suggest somewhat higher levels of market effects for the residential grantees for a very limited number of indicators. Because there are few differences among the strata, we present most of the results for all of the grantees sampled and a limited number of results by strata.

Energy Efficiency Upgrade Market Activity

One of the key expected market effects outcomes of BBNP is expanded retrofit activity by consumers and contractors. We assessed the impact of BBNP by asking contractors to rate the impact of BBNP on their business and the marketplace and the counterfactual, by asking contractors to quantify the number of upgrades they would have completed in the absence of BBNP.

We asked contractors to assess if the BBNP grantee had had an effect on their business and the market for energy-efficiency upgrades and if it would have an effect in the next two years. Contractors were asked to agree or disagree with the following four statements using an 11-point scale, where zero is "strongly disagree" and 10 is "strongly agree":

- There is more business for your company than there would have been without the program
- There is more business in general in the marketplace than there would have been without the program
- In the next two years, there will be more business for your company than there would have been without the program
- In the next two years, there will be more business in general in the marketplace than there would have been without the program

Figure 2 illustrates the percentages of respondents who strongly agreed (a rating of seven or higher) with each specific statement about the effects of BBNP on their business and the market. BBNP appears to have had a positive impact on participating contractors and the marketplace in general (according to participating contractors), and there is some evidence of spillover among nonparticipating contractors.

Impact of BBNP on Number of Contractor Upgrades. In addition to asking contractors to assess the impact of BBNP on their business and the marketplace, we asked contractors to quantify the number of upgrades that they would have completed in the absence of BBNP. We attempted to isolate the impact of BBNP by first asking contractors about their awareness of and participation with other energy efficiency programs, such as utility-sponsored programs, the Energy Efficiency and Conservation Block Grant (EECBG) program, State Energy Program (SEP), or Weatherization Assistance Program (WAP). Afterwards, we asked the contractors to isolate the influence of BBNP by quantifying the number of upgrades that they would have completed in the absence of BBNP.

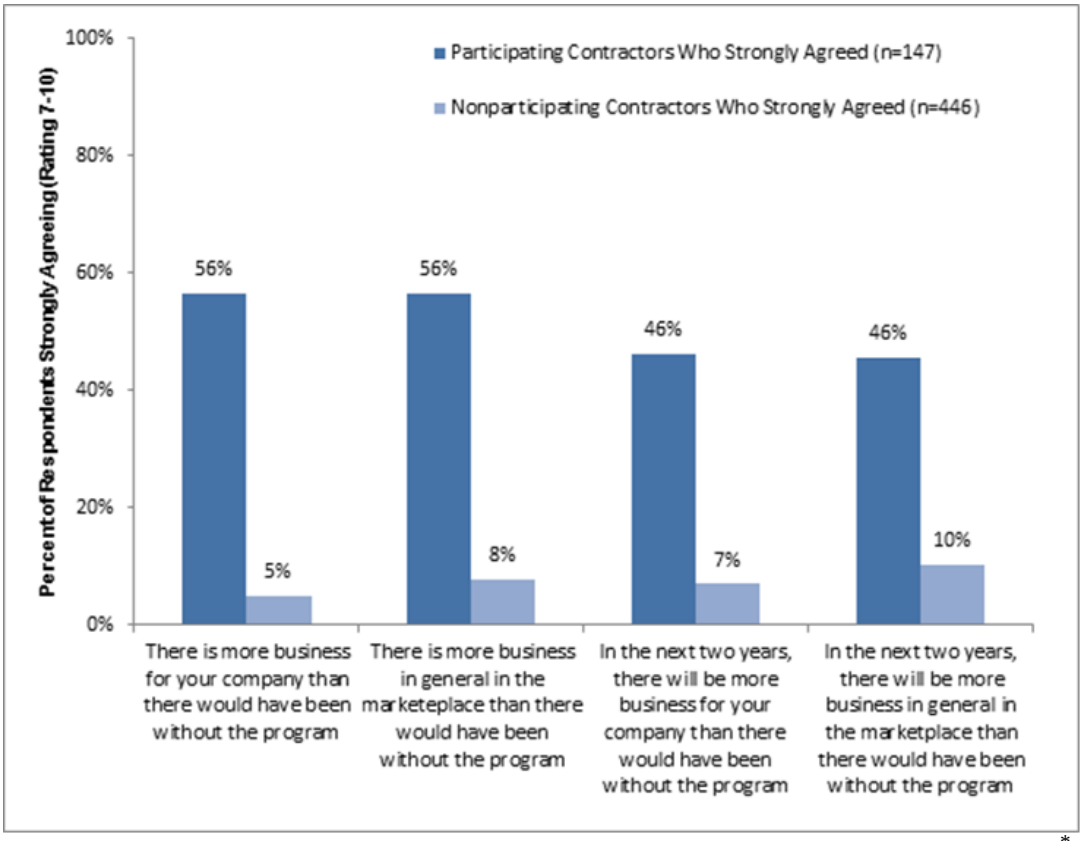

Figure 2. Contractor Assessment of the Effect of BBNP on the Market for Energy Efficiency*

*Contractors were asked to agree or disagree with the following four statements using an 11-point scale, where zero is "strongly disagree" and 10 is "strongly agree"

Table 3 reports our estimates of the total net number of upgrades that would have been completed in the absence of the 25 sampled BBNP grantee programs. Overall, respondents estimated 23,215 net upgrades influenced by BBNP, compared to 16,840 BBNP-supported upgrades (upgrades participating in the BBNP program), with the 90% confidence interval of 12,906 to 34,365 upgrades. We estimate a NTG ratio of 1.38 (23,215 divided by 16,840), with the 90% confidence interval around the ratio ranging from a NTG of 1.34 to 1.42. This means that, for the sampled 25 BBNP grantees, we are relatively confident that contractors are estimating spillover into the upgrade markets served by the grantees.

The residential grantees account for the bulk of the net upgrades and have a NTG of 1.21, whereas the top five commercial stratum had a vastly higher NTG ratio of 5.28. It is important to note that the high NTG for the commercial stratum should be interpreted very cautiously. The estimate is based on a relatively small sample of five grantees with 29 participating contractors and 98 nonparticipating contractors. Further, the high NTG ratio is strongly influenced by the contractors from a single grantee; if respondents representing this grantee are excluded from the analysis, the NTG drops to 1.2

Table 3. Net Upgrades Influenced by BBNP and NTG Estimate

Population	BBNP-Supported Upgrades	Net BBNP Upgrades	NTG	90% Confidence Interval, BBNP-Supported Upgrades*		90% Confidence Interval, Net BBNP Upgrades*	
				Low	High	Low	High
Residential Grantees	16,158	18,832	1.21	9,657	22,659	10,136	29,708
Commercial	682	3,600	5.28	0	1,501	0	7,342
Total	16,840	23,215	1.38	9,657	24,160	12,906	34,365

* The 90% confidence interval was based on the mean values of BBNP supported upgrades and net BBNP upgrades.

Negative Impacts of BBNP

Three percent of contractors (15 of 593), including 4% of participating contractors (six of 147), reported during the CATI survey that they would have completed more upgrades from 2010 to 2013 without BBNP. Our in-depth interviews examined why some contractors reported negative program effects. Half or out interviewees (five of ten) reported that BBNP hurt their businesses because of the increased competition it generated in their territory. They described dynamics such as BBNP unevenly promoting certain contractors over others, competing contractors using subcontractors to get around BBNP rules (such as prevailing wages), BBNP drawing contractors to come from other geographic areas, and nonparticipating contractors leveraging program opportunities.

Marketing of Energy Efficiency by Contractors

Sixty percent of participating contractors and 36% of nonparticipating contractors indicated that their marketing of energy efficiency and energy-efficient features had increased since 2010 (Table 4). Participating contractors who had increased their energy efficiency marketing represented 60% of net BBNP upgrades. In addition, 29% of participating contractors reported that BBNP had strongly influenced their increased marketing. In addition, 32% of all participating contractors and 12% of all nonparticipating contractors reported that the number of upgrades that they completed had increased because of changes to their marketing.

Table 4. Marketing of Energy Efficiency by Contractors

	Participating Contractors, Percent of Respondents (n = 147)	Nonparticipating Contractors, Percent of Respondents (n = 446)
Increased marketing of energy efficiency and energy-efficient features.	60%	36%
High degree of BBNP influence on increase in marketing (7 or higher, 0 to 10 scale)*	29%	3%
Number of upgrades increased because of changes to marketing	32%	12%

*Contractors were asked to assess the influence of the BBNP using 11-point scale in which zero meant "no influence at all" and ten meant "a great deal of influence.

Energy-efficient Building Practices

Adoption of energy-efficient products, services, or practices by contractors in regions with BBNP grantees is another indicator of potential market effects. More than a third of participating contractors reported changing their standard practices to be more energy efficient in both BBNP-supported (41%) and non-BBNP (34%) upgrades, while 41% of nonparticipating contractors reported changing their standards practices to be more energy efficient (Table 5).[6] Twenty to thirty percent of participating contractors (depending on the measure) reported making changes to measure-specific practices important to whole house projects, while 26% to 41% of nonparticipating contractors (depending on the measure) made changes to measure-specific practices. The difference in any measure-level change between participating (29%) and nonparticipating (26%) contractors was not statistically significant, though the differences in changes to building envelope and lighting practices were statistically significant. One possible explanation of this is that nonparticipating contractors may have followed less energy-efficient practices in these areas at the beginning of the BBNP time period.

We asked contractors who were aware of BBNP and who had indicated they had made changes to their standard practices since 2010 how influential BBNP was in changing their standard practices for non-BBNP upgrades.[7] Contractors used an 11-point scale in which zero meant "no influence at all" and ten meant

[6] The difference in changes in standard practices between participating and nonparticipating contractors was not statistically significant

[7] All participating contractors were aware of BBNP while 27% of nonparticipating contractors were aware of BBNP.

"a great deal of influence." Based on the population of all surveyed participating contractors, fifteen percent of participating contractors reported BBNP represented a great deal of importance (rating seven or higher) in changing standard practices (Table 5). A small percentage of all of the nonparticipating contractors (3%) gave ratings of seven or higher.

Table 5. Changes in Building Practices by Contractors

Energy-efficient Practices or Type of Equipment	BBNP-supported Upgrades		Non-BBNP Supported Upgrades			
	n	Percent of Participating Contractors	N	Percent of Participating Contractors	n	Percent of Nonparticipating Contractors
Standard Practices	130	41%	131	34%	445	41%
Building Envelope	88	25%	88	24%	233	36%
HVAC and Water Heating	88	26%	88	27%	284	35%
Ductwork	82	24%	82	24%	243	27%
Lighting	61	30%	61	23%	189	41%
Any Measure-Level Changes	125	29%	125	21%	403	26%
High degree of BBNP influence on changes in practices (7 or higher, 0 to 10 scale)*	NA		147	15%	437	3%

*Contractors who were aware of BBNP were asked to assess the influence of the BBNP using 11-point scale in which zero meant "no influence at all" and ten meant "a great deal of influence.

Sales of High-Efficiency Equipment and Materials

Another indicator of BBNP market effects is the level of sales of high-efficiency equipment and materials. If BBNP results in increased demand for energy efficiency upgrades and adoption of energy-efficient building practices, an expected market effect is increased sales of high-efficiency equipment reported by distributors after the program ended or beyond the increase due to program participants. We asked distributors if BBNP had a positive or negative effect on sales of building envelope materials and services, HVAC and water heating equipment, lighting equipment, and refrigeration equipment. Notable percentages of distributors of residential equipment indicated that the program had a positive impact on their sales of residential equipment, ranging from 17% to 20% of distributors for each equipment type (Table 6). Smaller percentages of commercial equipment distributors noted positive impacts, ranging from 0% to 19% of distributors.

If distributors said the program had a positive impact on sales, we asked them to rate the level of BBNP's positive influence on their sales using a scale of zero to ten, where zero means "no influence at all" and ten means "a great deal of influence." Smaller percentages of both residential and commercial equipment distributors indicated the BBNP had a great deal of influence (ratings of seven to ten) on their sales, ranging from 5% to 8% of distributors of residential equipment and 2% to 13% of distributors of commercial equipment (Table 6).

Table 6. BBNP Impact on Distributor Sales by Equipment Type and Sector

Equipment Type	n	Distributors Reporting Positive Impact of BBNP		Distributors Rating High Degree of BBNP Influence (7 or higher, 0 to 10 scale)*	
		Percent	Count	Percent	Count
Residential					
Building envelope materials	44	20%	9	5%	2
HVAC and water heating systems	200	18%	36	7%	13
Lighting equipment	18	17%	3	6%	1
Other products or services	25	20%	5	8%	5
Commercial					

Building envelope materials	13	15%	2	8%	1
HVAC and water heating systems	61	16%	10	2%	1
Lighting equipment	9	0%	-	-	-
Other products or services	8	13%	1	13%	1
Residential and Commercial					
Refrigeration equipment	63	19%	12	0%	0

*Distributers were asked to assess the influence of the BBNP using 11-point scale in which zero meant "no influence at all" and ten meant "a great deal of influence.

Business Practices

We sought to learn whether BBNP had changed contractor and distributor business practices by increasing their business' focus on energy efficiency.

Contractor Business Practices. We asked participating contractors whether they had changed specific business practices in order to adapt to BBNP. Overall, 72% of participating contractors said they had made a change to their business practice because of BBNP (Table 7). Sixty percent of participating contractors reported that their services had become more comprehensive to adapt to BBNP, 51% reported that they had begun partnerships with other firms or contractors to adapt to the program, and 46% reported that they had shifted their business to focus more on energy efficiency to adapt to the program.

Table 7. Changes to Contractor Business Practice Due to BBNP

Business Practice Change	Participating Contractors (n=134)
Services became more comprehensive to adapt to BBNP	60%
Business began to partner with other firms or other contractors to adapt to BBNP	51%
Business practices changed to focus more on energy efficiency to adapt to BBNP	46%
Made one or more change	72%

During the in-depth interviews, participating contractors provided more details as to how BBNP had affected their business practices. One contractor described how BBNP had influenced his decision to include a varied portfolio of energy efficiency offerings, including customer financing. He indicated that these changes, along with his BBNP certification, contributed to increasing sales. He provided one example:

> *We're doing a job this week that [is valued at] $33,000. It's all new windows for the house, we're taking out the [homeowner's] chimney; we're doing the whole nine yards. [The homeowner] is incentivized by three things: 1) our vertical integration, which came about because of the program, 2) the available cheap capital, the loan to do the job—our knowledge of that came about through the program, and 3) the certification that we have within the program.*

Another contractor explained that, because of BBNP, her company was more focused on energy efficiency and provided customers with more comprehensive assistance than they had provided prior to BBNP:

> *If we get a call from someone who says, 'We want insulation,' and we start to talk to them about the home's existing construction—home as a system, etc.—we can bring them along to understand the air sealing part and then have them understand why we want to address it fully.*

Distributor Business Practices. Smaller, yet notable, percentages of distributors changed their business practices due to BBNP. Overall, 16% of distributors said they had made a change to their business practice because of BBNP (Table 8). Eight percent of distributors reported they had shifted their business to focus more on energy efficiency to adapt to BBNP, 12% agreed their services had become more

comprehensive to adapt to the program, and 10% said they had begun partnerships with other firms to adapt to the program.

Table 8. Changes to Distributor Business Practice Due to BBNP

Business Practice Change	Percent of Distributors (n=291)
Changed to focus more on energy efficiency to adapt to BBNP	8%
Services became more comprehensive to adapt to BBNP	12%
Business began to partner with other firms to adapt to BBNP	10%
Made one or more change	16%

Impacts of Training on Practices and Availability of Trained Contractors

A key element of many BBNP grantee programs was training for contractors. Our study found evidence that BBNP training affected the quality and comprehensiveness of energy efficiency upgrades, but mixed evidence that BBNP increased the number of trained contactors.

Nearly one-half of participating contractors reported that BBNP training increased the number of energy-efficient upgrades, the quality of the upgrades, and the comprehensiveness or depth of the upgrades since 2010 (Table 9). In addition, larger percentages of contractors from the residential grantee programs reported effects of BBNP training on the number and comprehensiveness of upgrades compared to contractors from commercial grantee programs.

Table 9. Impact of BBNP Training on Elements of Upgrade Market

BBNP Training Increased Element Since 2010*	Participating Contractors, Percent of Respondents (n = 147)	Nonparticipating Contractors, Percent of Respondents (n = 437)
Number of energy-efficient upgrades	46%	2%
Quality of energy-efficient upgrades	45%	2%
Comprehensiveness of energy-efficient upgrades	44%	2%

*Percentages represent contractors that indicated BBNP training had increased the element "a lot" or "a little."

In terms of affecting the availability of contractors in the grantee regions, nearly nine in ten participating contractors (86%) and more than two-thirds of nonparticipating contractors (68%) reported that the number of contractors trained in energy-efficient building practices had increased since 2010 (Table 10). Slightly more than two-fifths of participating contractors (42%) and a small percentage of nonparticipating contractors (6%) indicated that BBNP training had had a high degree of influence on that increase.

Table 10. Impact of BBNP Training on Number of Trained Contractors

BBNP Training Increased Element Since 2010*	Participating Contractors, Percent of Respondents (n = 147)	Nonparticipating Contractors, Percent of Respondents (n = 446)
Number of trained contractors has increased since 2010	86%	68%
BBNP training had high degree of influence on increased number of trained contractors (7 or higher, 0 to 10 scale)*	42%	6%

*Contractors were asked to assess the influence of the BBNP using 11-point scale in which zero meant "no influence at all" and ten meant "a great deal of influence.

However, analysis of contractor membership and training organizations did not find evidence of a greater increase in trained contractors in grantee regions compared to non-grantee regions. Our analysis included data from the following five organizations: Home Energy Pros (HEP), National Association of Home Builders (NAHB), North American Technician Excellence (NATE), Building Performance Institute (BPI), and Efficiency First. While all five organizations experienced growth in memberships and certifications between January of 2011 and June of 2013, we found that the growth rate in grantee areas was

lower than in non-grantee areas for each organization. In contrast with the contractor surveys, this analysis does not suggest that BBNP affected the market of contractors trained and certified in energy-efficient building practices.

Availability of Financing for Energy Efficiency Upgrades

Thirty-six of the 41 grantees used BBNP funds to support financing for energy efficiency retrofits. Across grantees, 18% of residential retrofit projects received loans, which is in 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 (SEEAction, 2011). In interviews with grantees and partnering financial institutions, grantees indicated that most financing products developed during the BBNP grant period would continue, and about three-quarters of financial partners reported a BBNP-generated demand for energy efficiency upgrade loans.

End-User Awareness of BBNP

About one-third (32%) of surveyed nonparticipants in the home improvement market (single-family homes) were aware of at least one BBNP energy efficiency program in their area. Participant survey findings suggest that grantees reached large groups of participants through their mass outreach efforts, as two-thirds (66%) of residential participants learned about their local BBNP-funded program through the program's mass media outreach efforts, like mass media advertisements, the program website, and direct mail.

Persistence of BBNP Grantee Programs

A primary goal of the BBNP program was 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 (16%) planned to continue some program offerings after the grant period ended. Specifically, 32 (52%) grantees reported that 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. Thirteen grantees (21%) reported that their programs would continue relatively unchanged at the end of the BBNP grant period, and seven (11%) reported that they would be expanding their scope or geographic reach. 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.

In addition, all but one of the grantees indicated that their financing products developed during the BBNP grant period would continue, while 75% of the 20 financial partners interviewed reported that they would continue to offer financing for energy efficiency upgrades after the BBNP grant period has ended.

Conclusions

We found early indications that BBNP may have helped lead to local market effects. We emphasize that these indicators only suggest that BBNP has initiated market change; they are not proof that the market has changed or that whatever change BBNP has initiated will persist past the funding cycle. Such conclusions require research conducted several years after this study.

Across multiple indicators and from multiple data sources we found evidence of early indications of market effects influenced by BBNP (Table 11). Examples of indicators include increased activity in the energy efficiency upgrade market, increased adoption of energy-efficient building and business practices as well as sales of energy-efficient equipment, increased marketing of energy efficiency, increased availability

of financing, high levels of consumer awareness of BBNP, and mixed evidence of increases in trained contractors.

Table 11. Summary of Indicators of BBNP Market Effects

Indicators of BBNP Market Effects	Evidence of Early Indications of BBNP Market Effects
Increased demand for whole-house, whole-building efficiency upgrades	Yes
Increased marketing of energy efficiency	Yes
Increased adoption of energy-efficient building practices by contractors	Yes
Increased availability and sales of high-efficiency equipment, products, and services	Yes
Increased focus on energy efficiency by contractors and distributors	Yes
Increased numbers of highly trained contractors who take a whole-house approach to upgrades	Mixed evidence
Increased availability of financing for energy efficiency upgrades	Yes
End user awareness of local BBNP program	Yes

In summary, there is evidence across a wide range of indicators of early market effects, but the effects appear to be concentrated largely among a subset of participating contractors and much smaller percentages of the nonparticipating contractors and distributors. Further, our findings indicate that BBNP was successful in stimulating program activity and in eliciting market change at the utility level and among financial institutions. BBNP does not appear to have been successful at creating local markets where efficiency occurs in the absence of subsidies, however, as most grantees had not yet developed the market presence to continue self-sustaining programs without financial support.

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