ORNL/CON-490

AN EXAMINATION OF REBUILD AMERICA PARTNERSHIP ACCOMPLISHMENTS AND THE FACTORS INFLUENCING THEM

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INTRODUCTION

The Rebuild America program was established in 1994 to accelerate the adoption of energy efficiency measures and practices in existing public facilities, commercial buildings, and multifamily housing units. More recently, the program has expanded to include new construction as well. The program encourages the formation of partnerships involving state and local governments, private businesses, and other organizations to help identify and solve problems related to energy use in buildings. Rebuild America does not directly fund actual building improvements. Instead, it provides the Rebuild Partners with the technical tools and assistance they need to plan and implement building projects and stimulates other entities to make substantial investments in energy efficiency. At the request of the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy, staff at Oak Ridge National Laboratory studied the Rebuild America program for the purpose of identifying key factors associated with successful operations.

METHODS

Substantial amounts of data were collected directly from Rebuild America partnerships concerning the results achieved by each of their individual projects, both committed and completed. In addition, data were collected from secondary sources on a limited number of factors describing partnership setting and characteristics. By combining these two data sets, we were able to perform statistical analyses testing the potential relationship between each partnership characteristic and each of four key results measures.

The influences on successful partnership performance also were determined in another way, which allowed a broader examination of potentially important factors. Telephone interviews were conducted with representatives from 61 high-performing Rebuild America partnerships throughout the United States. The respondents were asked to identify the most important factors influencing good performance and the types of Rebuild America products, services, and support that were most useful to their partnership. In addition to having substantial geographic variation, the sample of partnerships also engaged in projects in all five sectors served by the Rebuild program—colleges and universities; commercial buildings; K-12 schools; local and state government; and public and multi-family housing—in roughly the same proportion as for the entire set of Rebuild America projects nationwide.

FINDINGS

Two hundred fifty-eight partnerships provided data on the results achieved by a total of 899 Rebuild America projects (about three-fifths of them "committed" and two-fifths completed) undertaken since the partnerships were formed. For all completed projects combined, the responding partnerships reported over half a billion square feet of floor space improvements, over 9 trillion source BTUs of annual energy savings, over $130 million per year of cost savings, and more than $600 million in energy efficiency investments. When committed projects were added to those that had already been completed, the combined results reported by all responding partnerships were between two and three times the size of those achieved by completed projects alone. Specifically, floor space improvements totaled over one billion square feet, annual energy and cost savings amounted to approximately 27 trillion source BTUs and $300 million, respectively, and the energy efficiency investment exceeded $1.5 billion.

According to the U.S. Department of Energy's recent *Rebuild America 2002* report, every federal dollar spent on the Rebuild program from its inception through the end of 2002 generated $9.38 of energy-efficiency investment and $18.43 in cumulative energy cost savings over time. In addition, the current study shows that each dollar of program funding has resulted in nearly 8 square feet of floor space improvements, $1.95 in annual cost savings, and annual energy savings of 0.134 million source BTUs from completed projects. For completed *plus* committed projects, each dollar of program funding is associated with over 16 square feet of floor space improvements, $4.41 in annual cost savings, 0.396 million source BTUs of annual energy savings, and $22.35 in energy efficiency investment.

It should be noted that all of the numbers reported above almost certainly undercount actual results because many Rebuild partnerships did not report their projects' accomplishments. In addition, the annual energy and cost savings reported here are for a single year only and can be expected to continue well into the future.

The greatest number of projects took place in the local and state government sector, followed by K-12 schools, commercial buildings, colleges/universities, and public/multi-family housing. Completed projects involving K-12 schools were far ahead of all the other sectors in terms of the median achievements for all results measures. For all projects (completed plus committed), K-12 schools reported the largest median values for the number of square feet renovated and energy efficiency investment, while colleges/universities led the way in terms of annual energy and cost savings.

Combined outcomes for all projects taken together depend on the number of projects carried out and the results achieved by each. The reported values were highest in K-12 schools for floor space improvements and in the local and state government sector for all other results measures. This applied both to completed projects and to all projects (completed plus committed).

From the limited statistical analysis allowed by the available data, we found that partnership age and number of projects per partnership were both positively related to all the results measures that we tested, by themselves *and* in the presence of each other. This means that those partnerships that had been in existence the longest and had the greatest number of projects tended to have the largest area of floor space improvements and the greatest annual cost savings. Average office rent also was positively related to three of the four results measures tested, indicating that accomplishments were greatest in areas with higher property values. However, this latter finding is more questionable, because the number of respondents with the data necessary to run this analysis was quite small and was probably not representative of the entire population of Rebuild partnerships.

The factors most frequently mentioned by the interviewed partnership representatives as influencing good partnership performance were: general assistance from the Rebuild America representative; open communications among all partners; existence of a "champion" for the partnership; support from the relevant city or state government; effective marketing to attract new partners; strong community interest; quick return on investment; interaction with other community organizations; and continuity of funding. The types of Rebuild America resources that were most frequently mentioned as being most helpful were: tailored assistance from a Rebuild America representative; general technical support; workshops and training sessions; assistance with networking; peer exchanges and interactions; access to staff and resources at national laboratories; help with marketing the benefits of Rebuild America; educational materials; the Rebuild America website; links to national information sources; and financial support. In addition, many respondents commented on the importance of two particular subject areas addressed by those resources: potential energy-saving actions/opportunities and the savings potential of various actions.

The above-mentioned responses regarding the factors related to good performance and the most useful resources provided by the program indicate that Rebuild America is working as intended. In other words, the technical information, assistance, training, and peer exchanges provided through the community partnership structure lead to the increased use of energy-efficient technologies in targeted buildings.

We suggest the following possible activities for sustaining and building upon the past successes of the Rebuild America program:

- Keep providing individualized assistance, technical support, and training to partnerships, in a timely manner;
- Have the most effective Rebuild America representatives provide training on key topics to other state and regional Rebuild representatives;
- Ensure that sufficient informational materials are available regarding those sectors that are most frequently served and have yielded the greatest results;
- Facilitate peer-to-peer exchanges among Rebuild America partners;

- Encourage active partnerships to stay in operation and take on additional projects;
- Encourage partnerships to report their activities; and
- Contact partnerships that are slow to complete projects—and possibly non-reporting partnerships as well—to determine their needs for program assistance.

1. INTRODUCTION

Under the sponsorship of the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy, staff at Oak Ridge National Laboratory (ORNL) studied the Rebuild America program for the purpose of identifying key factors associated with successful operations. This involved examining selected characteristics of the partnerships that participate in the Rebuild program, documenting the results they achieve, and searching for the most important influences on those results.

BACKGROUND

The Rebuild America program was established by the U.S. Department of Energy in 1994 to accelerate the adoption of energy efficiency measures and practices in existing public facilities, commercial buildings, and multifamily housing units (U.S. Department of Energy 2001). More recently, the program has expanded to include new construction as well. The program encourages the formation of partnerships involving state and local governments, private businesses, and other organizations to help identify and solve problems related to energy use in buildings. Rebuild America does not directly fund actual building improvements. Instead, it provides the Rebuild partners with the technical tools and assistance (e.g., handbooks, workshops, referrals to experts) necessary to plan and execute energy-efficient building projects that make use of innovative technologies and approaches (U.S. Department of Energy 1996). Each partnership chooses target buildings, establishes energy savings goals, seeks financing, and decides how to implement their project or projects (Powers 2000). Through these actions, a variety of entities (e.g., public housing authorities, private sector building owners) are stimulated to invest in energy efficiency.

As of early autumn 2002, there were 475 Rebuild America partnerships in existence. Using the data on partnership location provided by the Rebuild America website (U.S. Department of Energy 2002a), Figure 1 was developed to illustrate how the partnerships are distributed across the states. As shown in that figure, most states and territories contain a relatively small number of partnerships. Nearly half of the states (24) have only 1-5 partnerships operating within their borders, and over two-thirds (36) are home to 10 or fewer partnerships. On the other end of the scale, nearly one-tenth of the states and territories (5) have more than 25 Rebuild America partnerships. Those states with the highest number of partnerships are—in descending order—California, Texas, Idaho, Connecticut, and Ohio.

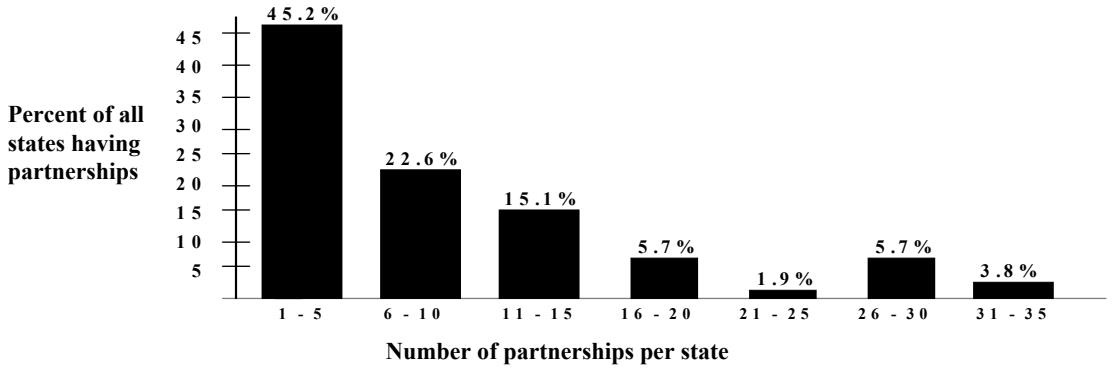

Fig. 1. Distribution of partnerships per state.

The term "program logic" refers to the intended process by which a program achieves its objectives. For Rebuild America, a simplified version of the program logic is as follows. Through the formation of community partnerships (and the establishment of business and strategic partners), key actors in the institutional, commercial, and multi-family residential building sectors are brought together and important information on energy-efficient products and techniques is disseminated to the relevant parties. Assistance and training from technical experts are provided to the parties needing it, and help with key decisions is provided through peer exchanges of information and advice. Through this process, appropriate projects are identified, financing is arranged, resources are invested, and technical issues are resolved. This in turn leads to the increased use of energy-efficient technologies, the increased availability of relevant products, and the accelerated adoption of energy-efficient measures and practices. Ultimately, the building improvements carried out under the program result in energy and cost savings for program participants and environmental benefits for the larger society.

SCOPE OF REPORT

Subsequent chapters of this report discuss the research methods employed in the ORNL study and the key findings of that effort. Chapter 2 presents the methods used, focusing on the collection of descriptive data, the statistical analysis of potential relationships between partnership characteristics and results, and the direct solicitation of information from partnership representatives on the factors that influence performance. In Chapter 3, we describe selected partnership characteristics and provide a detailed description of the key results achieved, both by partnership and by market sector. Chapter 4 discusses what this study shows about the factors influencing good partnership

performance and about the most useful products and services provided by the Rebuild America program. Finally, Chapter 5 summarizes the key findings reported earlier and reflects on their implications.

2. METHODS

The research plan for this project called for ORNL staff to collect data directly from Rebuild America partnerships on relevant organizational and contextual characteristics and on key project accomplishments and to gather additional data from secondary sources on other important partnership attributes. These data would then be used to perform a quantitative analysis designed to identify relationships between important partnership features and the results achieved. To supplement any findings that might result from the statistical analysis, a substantial number of telephone interviews were conducted with representatives of partnerships from all over the country; the respondents were asked to describe what they believed to be the most important factors influencing good performance by a partnership and the most useful products and services provided by the Rebuild America program. Each of the broad methodological areas described above is discussed in more detail in the following sections.

COLLECTION OF DESCRIPTIVE DATA ON PARTNERSHIP CHARACTERISTICS AND PROJECT RESULTS

ORNL staff developed a data collection instrument to elicit information directly from Rebuild America partnerships on about a dozen key factors related to community setting, supporting resources, and partnership composition, priorities, and dynamics. This instrument (called the "Partnership Description") was posted on the Rebuild America website in October 2002 and partnership representatives were contacted and asked to provide the requested information. Unfortunately, only nine partnerships provided the requested data, and this number of responses was far too low to allow the type of statistical analysis that had originally been planned[1].

As part of the online data collection effort discussed above, the partnerships also were asked to provide information on the results achieved by each of their individual projects, both committed and completed. The questions on project results represented a continuation of a periodic reporting exercise that had been conducted for several years. The following results data were requested for each project undertaken since the partnership was formed: (1) number of square feet of floor space improvements; (2) annual energy savings (in million source BTUs) resulting from the actions taken; (3) annual cost savings (in dollars) associated with those actions; and (4) energy efficiency investment (in dollars) induced by the program. At a minimum,

[1] Not only was the number of respondents too low for the planned analysis, but it was considered highly unlikely that those nine partnerships were representative of the entire population of Rebuild America participants.

respondents were required to provide data on square feet renovated, annual cost savings, *or* energy efficiency investment, with any missing values calculated by Rebuild America based on the data provided. As of early March 2003, 258 Rebuild America partnerships had reported results data on 899 projects—369 completed and 530 committed. From this data set, we were able to create two new variables: the number of projects completed by each partnership and the number of all projects (completed plus committed) associated with each partnership.

Information on a limited number of factors describing partnership settings and characteristics was gathered from secondary data sources. Partnership age was calculated for all 475 partnerships that were in existence as of early autumn 2002, using information provided on the Rebuild America website (U.S. Department of Energy 2002a) regarding when each partnership joined the program. Data on the number of heating and cooling degree days was available from the National Oceanic and Atmospheric Administration for 473 of the partnerships. In about two-thirds of the cases, those data were available for the city in which the partnership was headquartered or for a nearby municipality (National Climatic Data Center 2002a and 2002b). In the remaining instances, state-level information was used because that was the best available (National Climatic Data Center 1993a and 1993b). Average energy cost data were gathered for 469 partnerships from the U.S. Energy Information Administration's *State Energy Price and Expenditure Report 1999* (November 2001). Those data describe average energy cost[2] for the state in which the partnership is located, but not for the specific county or municipality. Finally, data on the average rent paid for office space was obtained from a private sector real estate research company (Reis, Inc. 2002) for 50 major metropolitan regions covering 102 of the Rebuild partnerships.

The collection of secondary data and the new variables on number of projects per partnership, in conjunction with the primary data on project results, allowed us to perform statistical analyses aimed at discovering relationships between selected factors and partnership accomplishments. However, the scope of this analysis was much more limited than it would have been if an adequate number of partnerships had provided the requested Partnership Description data.

ANALYSIS OF POTENTIAL RELATIONSHIPS BETWEEN PARTNERSHIP CHARACTERISTICS AND RESULTS

In the design stage of this study, a set of hypotheses was developed showing all the potential relationships to be tested between partnership characteristics and results. Later, after seeing the large number of single-project partnerships, we added a new hypothesis regarding the effect of the number of projects on partnership performance. As noted above, a substantial number of partnerships provided primary data on the results

[2]The average cost reported here represents a weighted average of all energy-consuming sectors.

achieved by their project efforts. However, only a few partnerships provided the detailed information requested by the Partnership Description instrument. Accordingly, we were able to test only the following six hypotheses, which utilize the project results data and information on partnership characteristics that were available from secondary sources:

- Age of Partnership is positively related to performance;
- Number of heating degree days in local area (or state) is related to performance;
- Number of cooling degree days in local area (or state) is related to performance;
- Average energy cost in state is positively related to performance;
- Average asking rent for office space in local area is related to performance; and
- Number of projects per partnership is positively related to performance.

Partnership performance was represented by four separate results measures: (1) completed square feet of floor space improvements; (2) completed plus committed square feet of floor space improvements; (3) annual completed cost savings; and (4) annual completed plus committed cost savings. These variables were chosen for study because improved square footage and cost savings are the results that are most commonly reported by responding partnerships. And because *all* the results measures are highly correlated with each other, it was considered unnecessary to use each individual measure in the analysis. Results for completed projects were separated from the results associated with all projects (completed plus committed) to allow a more thorough testing of each hypothesized relationship.

Simple regression analysis was used to test the potential relationship between each partnership characteristic (the independent variable) and each of the results measures described above (the dependent variable). In other words, a regression analysis was run to see how partnership age was related to completed square feet renovated, and separate analyses were run to see how that same independent variable was related to total square feet, completed cost savings, and total cost savings. The same procedure was repeated for each of the other independent variables. For five of the six characteristics tested, data from over 250 partnerships were used in each analysis. However, for the tests involving average office rent, only 48 partnerships had non-missing values for both the independent and dependent variables required to run the statistical analysis.

Multiple regression analyses also were run to see how each dependent variable was related to the combined set of independent variables that were found to be significant via simple regression. However, those multiple regression results are only considered reliable when the number of partnerships with non-missing values for the entire set of independent variables remains relatively high. If the data set used in the analysis becomes too small, it cannot be considered representative of the entire population of Rebuild America partnerships, and the nature and strength of any relationships indicated by those analyses are likely to be misleading. In such instances, the multiple regression results are not reported here.

TELEPHONE INTERVIEWS WITH PARTNERSHIP REPRESENTATIVES

Telephone interviews were conducted with representatives from 61 Rebuild America partnerships throughout the United States. Because a major focus of the interviews was on identifying the key factors associated with good performance, it followed that the partnerships selected for this study should all be high performers. Using results data provided by 258 partnerships, ORNL staff compiled a list of those reporting the largest amount of floor space (completed and committed together) that had been improved under the program. This set of high achieving partnerships served as our sampling frame (i.e., the set of subjects from which we selected the sample).

The Rebuild America program provides services to buildings in five different sectors: colleges and universities; commercial buildings; K-12 schools; local and state government; and public and multi-family housing (U.S. Department of Energy 2002b). To ensure a representative sample, we made sure that the proportion of projects in each sector was approximately the same for the sample of partnerships that we selected as for the entire set of Rebuild America projects nationwide. We also took care to achieve a good geographic mix. Once the prospective sample partnerships were identified, they were divided into six separate sets—one for each Rebuild America region—and the appropriate list was sent to each Rebuild America regional team leader for his or her review. The team leaders examined the lists, suggested deletions and additions as necessary, and provided contact names and telephone numbers for the partnerships contained in the final lists.

The final sample contained 83 partnerships, and interviews were completed with 61 of them. Of those 61 partnerships, 25 conducted projects in the local and state government market sector, 19 in the K-12 schools sector, 15 in the commercial buildings sector, 13 in the college and university sector, and 12 in the public and multi-family housing sector. The combined number of projects exceeds the number of partnerships interviewed because some partnerships conducted projects in multiple sectors.

A set of open-ended questions was developed for the interviews.[3] Several of the questions were designed to collect background data on the partnerships and how they operated. For the purposes of this study, the key questions asked respondents to identify the most important factors influencing good performance and the types of Rebuild America products, services, and support that were most useful to their partnership. The typical interview took 20 to 45 minutes to complete, and all of them were performed between October 2002 and February 2003.

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[3] These open-ended questions were substantially different than the more tightly-structured items used in the online data collection effort and, for the most part, they covered different topics. The data collected through the interviews, which came from a non-random sample of highly successful partnerships, were not used in the statistical analyses discussed previously.

3. DESCRIPTION OF PARTNERSHIP CHARACTERISTICS AND RESULTS

This chapter presents descriptive data on several relevant characteristics of Rebuild America partnerships and on the key results achieved by those partnerships. In addition, program results are disaggregated by market sector (e.g., K-12 schools, commercial buildings) and the achievements of the various market sectors are compared.

PARTNERSHIP CHARACTERISTICS

As noted earlier, ORNL staff collected data from secondary sources for a statistical analysis designed to uncover relationships between the magnitude of the results achieved by Rebuild America partnerships and selected characteristics of those partnerships and the environment in which they operate. The characteristics examined were: partnership age; number of heating and cooling degree days in the area served by the partnership; average energy cost; and average office rent. In addition, the number of projects per partnership was calculated from the project-level data provided by 258 partnerships. Each of these topics is discussed separately below. The secondary data presented here were collected in early autumn of 2002, at which time there were 475 partnerships participating in the Rebuild America program. The information on number of projects per partnership comes from a data set that was current as of early March 2003.

Partnership Age

The age of each of the 475 partnerships—as of October 1, 2002—was determined based on the date that it joined the Rebuild America program. The age of the partnerships ranged from O.1 to 7.4 years, with a median age (i.e., half the partnerships were younger and half were older) of 2.75 years. The interquartile range (i.e., the "middle half" of the respondents, falling between the 25th and 75th percentiles) was 1.4 to 4.6 years (Table 1).

Heating and Cooling Degree Days

The number of heating degree days in the areas served by the various partnerships ranged from a minimum of 0 in the Virgin Islands and Hawaii to a maximum of 10,470.0 in Alaska, with a median value of 4634.0. The interquartile range was 2663.3 to 5960.8. Cooling degree days ranged from 3.0 in Alaska to 5,256.7 in the Virgin Islands, with the median (998.0) falling toward the lower end of the scale and an interquartile range of 714.0 to 1801.2.

Table 1. Selected characteristics of Rebuild America partnerships

	Number of partnerships for which data are available	Minimum value	Maximum value	Median value	Interquartile range
Partnership age[a]	475	0.11	7.42	2.75	1.39 - 4.59
Heating degree days[b]	473	0	10,470.00	4634.0	2663.3 - 5960.8
Cooling degree days[b]	473	3.00	5,256.70	998.0	714.0 - 1801.2
Average energy cost[c] ($ per million site BTUs)	469	5.77	13.23	8.63	7.64 - 9.89
Average office rent[d] ($ per square foot per year)	102	15.13	46.80	22.71	19.56 - 26.92
Number of completed projects per partnership[e]	258	0	19	1	0-1
Number of completed plus committed projects per partnership[f]	258	1	41	1	1-3

[a] Age of partnership as of 10/01/02, based on "Date Joined" as listed on Rebuild America Website.

[b] Heating and cooling degree day data provided by National Oceanic and Atmosphere Administration (NOAA).

[c] Average energy cost data for states, provided by the Energy Information Administration (EIA).

[d] Average office rent data, provided only for partnerships located in major metropolitan regions.

[e] Number of projects reported by responding partnerships as being completed.

[f] Number of all projects (completed plus committed) reported by responding partnerships.

Average Energy Cost

Information on average state-level energy costs was available for 469 partnerships. According to the available data, average energy costs ranged from $5.77 to $13.23 per million site BTUs. The median value was $8.63 and there was a fairly tight interquartile range ($7.64 to $9.89).

Average Rent for Office Space

Data on the average rent for office space were available for only 102 of the 475 partnerships[4]. For those partnerships, average office rents ranged from $15.13 to $46.80 per square foot per year. The median was $22.71, placing it near the low end of the continuum, and the interquartile range was $19.56 to $26.92.

Number of Projects per Partnership

Two hundred fifty-eight partnerships supplied data on their number of projects. The minimum number of projects *completed* per partnership was zero, and the maximum was 19. The median value was 1, and the interquartile range was extremely narrow (0 to 1). Over 41% of the responding partnerships had not yet completed any projects, and another 34% had completed only one. An additional 10% of the partnerships had completed two projects, with 8% reporting 3-5 completed projects. Only 6% of the partnerships had completed 6 or more projects. A statistical analysis revealed that the number of completed projects was significantly positively correlated with the age of the partnership ($r = 0.1944$; $p = .002$). This means that partnerships that had been in existence longer tended to have completed a greater number of projects.

For all projects (completed plus committed), the minimum number was 1 per partnership and the maximum was 41. The median value was 1 and the interquartile range was 1-3. Nearly 52% of the partnerships had only a single project, almost 17% had two projects, and another 10% had 3 projects. Over 7% of the partnerships reported having 4 or 5 projects. A little more than 6% of the partnerships had 6-10 projects, and about 5% reported having 11-20 projects. That leaves a very small number of partnerships (less than 3%) with more than 20 partnerships each (Figure 2). The number of completed plus committed projects was not significantly correlated with partnership age. Since the number of completed projects was found to increase with partnership age, this finding indicates that the number of *committed* projects did not increase significantly over time.

[4] The available data covered only 50 major metropolitan regions, in which 102 Rebuild America partnerships were located.

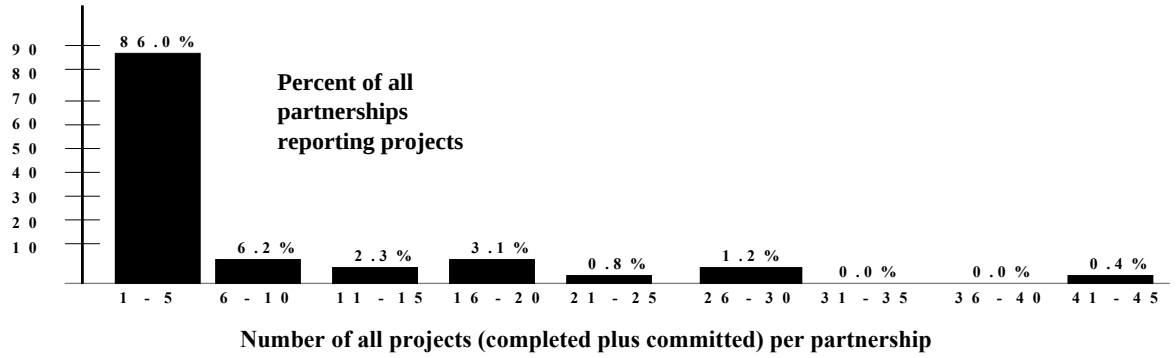

Fig. 2. Distribution of completed plus committed projects per partnership.

PARTNERSHIP RESULTS

As of early 2003, 258 partnerships had provided data to the program sponsors on the results achieved by their Rebuild America projects. It is important to note that over 200 partnerships did not respond to the request to report their project accomplishments, meaning that the numbers presented below almost certainly undercount actual results. Among them, the 258 responding partnerships supplied information on 899 separate projects undertaken since the partnerships were formed. Each project reported by a partnership was described as either "committed" or "completed." "Committed" projects can be in various stages of planning or implementation short of total completion.

Information was provided on four different results for each project: the size of the improved area (in square feet); annual energy savings achieved or anticipated (in million source BTUs); annual cost savings (in dollars); and energy efficiency investment (also in dollars). For each partnership having multiple projects, the project-specific information provided was summed to give a single number for each type of result (e.g., total committed square feet for that partnership, total completed energy efficiency investment for that partnership). The findings for each results measure are discussed separately below. Median values are reported for all partnerships as well as for the subset of partnerships that had been in existence for at least two years. That subset of more mature partnerships excludes many of those that had not yet had time to bring their projects to completion. Results also are reported for all partnerships combined, and those numbers are consistent with the findings contained in the U.S. Department of Energy's recent *Rebuild America 2002* report (2003), which documents the program's accomplishments.[5]

[5] Any differences between the numbers reported here and those given in the Department of Energy report tend to be relatively small and are due to the fact that this document is based on slightly newer data.

Floor Space Improvements

The number of completed square feet of floor space improvements ranged from zero to over 100 million per partnership (Table 2). The median area of completed floor space improvements (which is greater than the values reported by half of the partnerships and less than the values reported by the other half) was slightly less than 24,000 square feet[6] per partnership. However, when those partnerships that had been in existence for less than two years were removed from the data set, the median value jumped to almost 85,000 square feet per partnership, indicating that it takes a certain amount of time for new partnerships to start completing their planned projects. The interquartile range (covering the 25th to 75th percentiles) extended from zero to 722,200 square feet. Approximately 45 percent of the partnerships (116 out of 258) had zero square feet of floor space improvements completed at the time they reported their results. At the other extreme, there were a few partnerships that completed projects covering millions of square feet, but those were relatively uncommon. The combined completed floor space improvements for all reporting partnerships, as shown in Table 3, was over half a billion.

The area of floor space improvements for completed plus committed projects ranged from zero to nearly 115 million square feet per partnership, with a median value of approximately 580,000 square feet for the entire set of partnerships and 830,000 square feet for those partnerships that had been in existence for at least two years (Table 2). These median value are much higher than for the completed area because many partnerships have significant amounts of committed floor space improvements as part of ongoing projects. The interquartile range was 86,000 to 2.2 million square feet, once again substantially higher than for completed projects alone. The combined number of total square feet (committed plus completed) for all responding partnerships was slightly over one billion (Table 3).

Energy Savings

As shown in Table 2, the annual energy savings associated with completed projects ranged from zero to over two trillion source BTUs per partnership, with a median value of 345 million source BTUs. For partnerships that were at least two years old, the median value almost tripled, to 992 million source BTUs. The interquartile range extended from zero to just under nine billion source BTUs. As with square footage, approximately 45 percent of the partnerships reported zero savings for completed projects, while a few

[6] Because a few partnerships reported extremely large numbers for this results measure (and the other results measures as well), medians are used here as a more accurate measure of central tendency than means. The mean number of completed square feet of floor space improvements, for example, is over two million, which is well outside the interquartile range and is clearly skewed.

Table 2. Rebuild America program results, by partnership

	Number of partnerships reporting outcomes	Minimum value	Maximum value	Interquartile range	Median value	Median value for partnerships at least two years old (N = 178)
Floor space improvements (square feet)						
Completed	258	0	104,985,290	0 - 722,200	23,674	84,500
Completed plus committed	258	0	114,565,463	86,000 - 2,200,000	580,263	830,165
Annual energy savings (million source BTUs)						
Completed	258	0	2,002,721	0 - 8,919	345	992
Completed plus committed	258	0	4,507,141	1,720 - 41,904	11,520	13,694
Annual cost savings ($)						
Completed	258	0	20,650,033	0 - 183,600	3,729	15,459
Completed plus committed	258	0	24,847,054	24,049 - 535,500	145,866	258,935
Energy efficiency investment ($)						
Completed	258	0	117,004,081	0 - 792,449	17,175	107,221
Completed plus committed	258	0	179,030,667	106,878 - 3,434,601	809,780	1,236,144

Table 3. Combined results for all partnerships providing data

Floor space improvements (square feet)	Combined total results
Completed	528,290,864
Completed plus committed	1,097,454,870
Annual energy savings (million source BTUs)	
Completed	9,096,515
Completed plus committed	26,984,032
Annual cost savings ($)	
Completed	132,947,399
Completed plus committed	300,642,672
Energy efficiency investment ($)	
Completed	605,189,919
Completed plus committed	1,522,019,622

partnerships had achieved extremely high savings. Altogether, the responding partnerships reported combined annual energy savings of over nine trillion source BTUs from their completed projects (Table 3). These annual energy savings—as well as the energy and cost savings discussed below—are expected to continue for many years.

Annual energy savings achieved by completed plus committed projects ranged from zero to 4.5 trillion source BTUs per partnership, with a median value of approximately 11.5 billion source BTUs for the full set of for partnerships and 13.7 billion BTUs for those partnerships that were at least two years old (Table 2). As with floor space improvements, the median is much higher than for completed savings due to the substantial savings associated with committed projects. The interquartile range extended from slightly less than two billion source BTUs to nearly 42 billion source BTUs annually. Again, this is substantially higher than for completed projects alone. As Table 3 shows, the combined amount of energy savings reported for all projects (completed plus committed) totaled nearly 27 trillion source BTUs per year.

Cost Savings

Table 2 shows that the annual cost savings for completed projects ranged from zero to over $20 million per partnership. The median value for completed savings was slightly less than $4,000 per partnership for the entire data set but over $15,000 for partnerships that had been formed at least two years previously. The interquartile range extended from zero to nearly $184,000. Once more, about 45 percent of the partnerships reported zero savings from completed projects, in contrast to a few partnerships that achieved enormous cost savings. As a group, the responding partnerships reported combined cost savings of almost $133 million annually from their completed projects (Table 3).

Annual cost savings for completed plus committed projects ranged from zero to nearly $25 million, with a median value of almost $146,000 for the entire set of responding partnerships and almost $260,000 for the subset of more mature partnerships (Table 2). Again, the median value is much higher than for completed savings because of the substantial savings contributed by committed projects. The interquartile range ran from a little less than $25,000 to slightly more than $535,000. For all projects combined, completed plus committed cost savings totaled over $300 million annually (Table 3).

Energy Efficiency Investment

While the Rebuild America program does not directly fund building improvements, it does stimulate other entities (e.g., school districts, state and local government agencies, private sector building owners and mangers) to make substantial investments in energy efficiency. The energy efficiency investment for completed projects ranged from zero to approximately $117 million per partnership, with a median value of just over $17,000 for the full data set and $107,000 for the subset of partnerships that had been in existence for at least two years (Table 2). The interquartile range was zero to almost $800,000. As with all the other results measures, roughly 45 percent of the partnerships reported zero investment for completed projects. Table 3 shows that the combined energy efficiency investment associated with all completed projects amounted to over $600 million.

The energy efficiency investment for all projects (completed plus committed) ranged from zero to almost $180 million per partnership, with a median value of over $800,000 for all partnerships and more than $1.2 million for the subset of older partnerships (Table 2). As always, this median value is substantially higher than for completed projects alone because of the substantial investment in committed projects. The interquartile range ran from almost $107,000 to over $3.4 million. The total energy efficiency investment for all completed and committed projects combined amounted to over $1.5 billion (Table 3).

RESULTS BY MARKET SECTOR

As noted above, data were provided by the responding partnerships on 899 separate projects, 369 of which were described as "completed" and 530 of which were classified as "committed." The market sector addressed by each project was specified. In the following sections, the number of projects, their median results,[6] and the combined results are compared for the five different sectors served by the Rebuild program.

Number of Projects

Figure 3 shows how the reported projects were distributed among the five market sectors. There were more projects involving local and state government buildings than any other type of structure, with this sector accounted for slightly more than two-fifths of the completed projects and over one-third of *all* projects (completed plus committed). There also was substantial activity in K-12 schools, where more than one-fifth of the completed projects and about the same proportion of all projects (completed plus committed) took place. Slightly less than one-fifth of all projects (completed plus committed) and about one-seventh of the completed projects involved commercial buildings. Roughly one-eighth of the projects took place in the colleges and universities sector, and a slightly smaller proportion of the projects involved public and multi-family housing. Although there was less activity in these last two areas than in the others, the responding partnerships still demonstrated considerable interest in them.

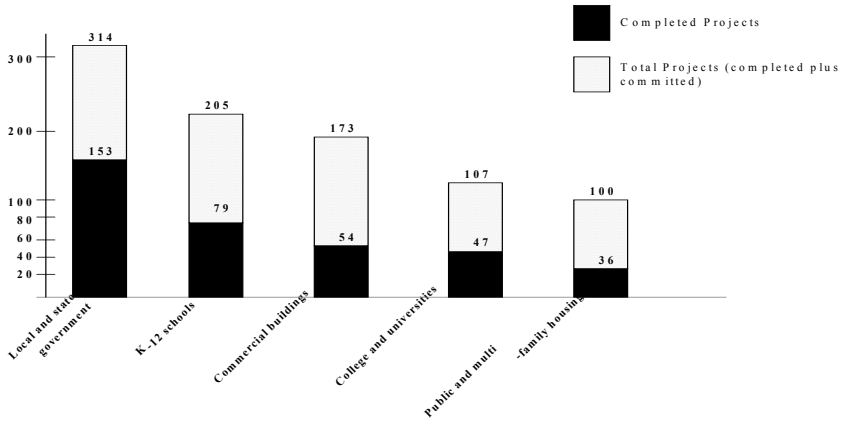

Figure 3. Number of Rebuild America projects by market sector.

[6]The median values for completed projects tend to be substantially higher than for partnerships. This is because partnerships typically only reported a project as completed if there were non-zero values for the results measures. However, when we compiled the partnerships data base, we recorded zero completed results values for projects that were reported as committed but not yet complete, and this had the effect of deflating the median values.

Median Project Results

As shown in Table 4, completed projects involving K-12 schools led all the other sectors in terms of the median area of floor space improvements (249,000 square feet), annual energy savings (4.5 billion source BTUs), annual cost savings (nearly $48,000), and energy efficiency investment (just over $240,000). In fact, for all of those measures, the numbers reported for the K-12 schools sector were at least twice those for the next-
The median values for completed projects tend to be substantially higher than for partnerships. closest sector. For completed floor space improvements and energy savings, the second highest median values were found in colleges and universities, followed by commercial buildings, local and state government, and public and multi-family housing, in that order. The order of the sectors ranked second to fifth differs somewhat for completed cost savings and energy efficiency investment.

For all projects (completed plus committed), the K-12 schools sector still reported larger median values for the number of square feet renovated (approximately 225,000) and energy efficiency investment (nearly $300,000) than any other sector. For both of those measures, colleges and universities had the second-highest median values, followed by local and state government, public and multi-family housing, and commercial buildings. For both energy and cost savings, the largest median values were found in college and university buildings (5.2 billion source BTUs and nearly $53,000 annually), followed by K-12 schools, local and state government, public and multi-family housing, and commercial buildings.

Combined Project Results

The accomplishments of all projects combined are dependent on the number of projects carried out and the magnitude of the results achieved by each one. For that reason, it makes sense that those sectors with the most projects would tend to have high combined numbers, as would those sectors where the median results are greatest. As shown in Table 5, the highest combined value for completed floor space improvements (over 187 million square feet) is in the K-12 schools sector and the greatest combined values for completed energy savings (4.6 trillion source BTUs annually), cost savings (nearly $44 million per year), and energy efficiency investment (over $230 million) are all in the local and state government sector. It should also be noted that a few exceptionally high values can dramatically raise the combined value of a project result, even if the median value is relatively low.

For *all* projects (completed plus committed), the rank order of the sectors for each results measure is largely the same as for completed projects (Table 5). The few differences between completed projects and completed plus committed projects in the relative ranking of the sectors can largely be explained by the achievement of extremely large results by a small number of partnerships (e.g., exceptional completed plus committed energy savings by one partnership in the colleges and universities sector).

Table 4. Median project results, by market sector

	K - 12 schools	College and universities	Commercial buildings	Local and state government	Public and multi-family housing	All sectors combined
Floor space improvements (square feet)						
Completed	249,000	122,450	99,368	73,000	44,720	111,078
Completed plus committed	225,231	214,565	11,000	82,408	50,700	97,641
Annual energy savings (million source BTUs)						
Completed	4,505	2,194	1,325	1,162	976	1,810
Completed plus committed	4,240	5,201	263	1,526	1,074	1,846
Annual cost savings ($)						
Completed	47,831	22,700	23,301	12,747	22,242	23,549
Completed plus committed	47,700	52,883	3,150	20,600	20,067	23,816
Energy efficiency investment ($)						
Completed	240,630	65,000	84,010	87,230	90,468	103,986
Completed plus committed	299,000	162,450	13,825	118,419	80,593	108,354

Table 5. Combined project results, by market sector

	K - 12 schools	Local and state government	Commercial buildings	College and universities	Public and multi-family housing
Floor space improvements (square feet)					
Completed	187,239,731	145,564,662	122,407,378	44,448,418	28,630,675
Completed plus committed	332,635,973	320,244,835	240,832,203	126,017,067	77,724,792
Annual energy savings (million source BTUs)					
Completed	1,896,164	4,647,197	1,331,765	598,976	622,413
Completed plus committed	4,500,334	8,559,125	4,279,699	7,715,497	1,929,377
Annual cost savings ($)					
Completed	35,549,939	43,658,408	17,924,328	10,850,713	24,964,011
Completed plus committed	74,368,775	105,426,763	48,891,207	36,204,986	35,750,941
Energy efficiency investment ($)					
Completed	183,018,958	230,366,779	108,872,657	37,268,052	45,663,473
Completed plus committed	368,967,744	478,978,861	286,665,966	245,894,726	141,512,325

4. INFLUENCES ON PARTNERSHIP PERFORMANCE

The search for factors that influence partnership performance involved two distinct efforts: (1) performing a quantitative analysis of the relationships between key results and those characteristics of the partnerships and their environment for which good information was available; and (2) soliciting opinion data from partnership representatives regarding the factors related to good performance and the most useful products and services provided by the Rebuild America program. The key findings from those efforts are reported in separate sections, below.

STATISTICALLY SIGNIFICANT RELATIONSHIPS BETWEEN SELECTED PARTNERSHIP CHARACTERISTICS AND RESULTS

A statistical analysis was performed to test possible relationships between selected partnership characteristics and key results[7]. Three of the six characteristics tested—age of partnership, average office rent, and number of projects per partnership—were found to have statistically significant relationships with all or most of the results measures used in the analysis, and these are discussed in more detail below. For the other three characteristics—heating degree days, cooling degree days, and average energy cost—no significant relationship with the results measures were found.

Age of Partnership

Table 6 shows that partnership age was positively related to all the results measures analyzed: completed square feet of floor space improvements; completed plus committed floor space improvements; completed cost savings, and completed plus committed cost savings. This means that all of those results tended to be greater for partnerships that had been in existence for longer periods of time, which makes sense because older partnerships have had more time to initiate and complete energy-saving projects and to gather the resources and expertise necessary for high performance. For all of the results measures, the relationship with partnership age was *highly* significant ($p < .0001$), meaning that it is extremely likely that this relationship applies to the entire population of Rebuild America partnerships and not just to those that provided data for

[7] As described in Chapter 2, a simple regression analysis was run for each partnership characteristic (the independent variable) with each of the key results measures (the dependent variable). Multiple regression analyses also were run for each dependent variable with the combined set of independent variables found to be significant via simple regression.

Table 6. Relationships between partnership age and four key results measures[a]

Results measure (dependent variable)	Degrees of freedom	Parameter estimate for independent variable: partnership age	p-value	R-square
Completed floor space improvements	257	1,280,592	<.0001	0.0693
Completed plus committed floor space improvements	257	2,001,081	<.0001	0.0813
Completed cost savings	257	262,408	<.0001	0.0622
Completed plus committed cost savings	257	483,381	<.0001	0.0803

[a]Based on simple regression analysis using partnership age as the independent variable.

this study. However, the relatively small R-Square values (ranging from 0.0622 to 0.0813) show that the age of partnership, by itself, accounted for less than one-twelfth of the variance in partnership results[8].

Average Office Rent

Average office rent was found to be positively related to three of the four results measures analyzed: completed plus committed floor space improvements; completed cost savings; and completed plus committed cost savings (Table 7). In other words, there tended to be greater achievement in those three results areas for partnerships located where the average office rent is relatively high. However, this finding should be treated with considerable caution because data were available for both average office rent *and* results for only 48 partnerships. Those respondents represent only about one-tenth of all Rebuild partnerships and all were located in major metropolitan areas, so the finding might not be applicable to the rest of the nation. Accordingly, it is prudent to say that the data suggest a possible relationship between partnership results and average office rent, but this study does not establish that definitively.

If there is an actual relationship between average office rent and partnership results, there are a few possible explanations for it. One possibility is that there is a greater incentive to take actions that save money on energy costs in areas where rents are

[8] The R-Square value indicates the amount of the variance in the dependent variable that is accounted for by the independent variable tested. Where R-Square is 0.08, for example, 8% of the variance is explained by the independent variable in question.

Table 7. Relationships between average office rent and four key results measures[a]

Results measure (dependent variable)	Degrees of freedom	Parameter estimate for independent variable: average office rent	p-value	R-square
Completed floor space improvements	47	90,643	NOT SIG. (0.268)	0.0266
Completed plus committed floor space improvements	47	478,491	0.021	0.1102
Completed cost savings	47	118,464	0.025	0.1045
Completed plus committed cost savings	47	258,559	0.002	0.1911

[a]Based on simple regression analysis using average office rent as the independent variable.

higher, because the felt need to control expenses is likely to be substantial. In this case, real estate expenses would actually be a causal factor influencing the number and type of Rebuild America actions that are taken. An alternative (non-causal) explanation is that there's more building space available to retrofit in the largest urban areas, where rents tend to be higher.

Number of Projects per Partnership

As shown in Table 8, there was a significant positive relationship between the number of projects per partnership and all four results measures that were analyzed. In other words, partnerships with more projects tended to achieve greater results, as hypothesized. It should be noted that two different sets of results measures were used in this analysis. When the independent variable being tested was the number of projects *completed*, completed floor space improvements and cost savings were used as the dependent variables. When the independent variable was *all* projects (completed plus committed), the dependent variables were completed plus committed floor space improvements and cost savings. The R-Square values shown in Table 8 indicate that the number of projects, by itself, accounted for between 5 and 11 percent of the variance in partnership results.

Age of Partnership and Number of Projects per Partnership Combined

Of the three significant independent variables discussed above, two of them—age of partnership and number of projects per partnership—had non-missing values for enough partnerships to indicate that their inclusion in a multiple regression analysis was

Table 8. Relationships between number of projects per partnership and four key results measures[a]

Results measure (dependent variable)	Degrees of freedom	Parameter estimate for independent variable: number of projects per partnership	p-value	R-square
Completed floor space improvements	257	1,011,373	<.0001	0.0743
Completed plus committed floor space improvements	257	836,249	<.0001	0.1122
Completed cost savings	257	182,985	.0002	0.0520
Completed plus committed cost savings	257	183,577	<.0001	0.0915

[a]Based on simple regression using number of projects per partnership as the independent variable. Number of *completed* projects is used in the analysis when the dependent variables are completed floor space improvements and cost savings. Number of *completed plus committed* projects is used when the dependent variables are completed plus committed floor space improvements and cost savings.

likely to yield reliable results.[9] Table 9 shows that both of the independent variables remained significantly related to all four results measures in the presence of each other. This indicates that the effect of partnership age on performance was due to more than just an increase in the number of projects that might occur over time. Each factor—age and number of projects—exerted its own influence on program results and the amount of the variance accounted for by these two items in combination was substantially greater than for either one by itself. The strongest relationship found through this analysis was between the two independent variables and completed plus committed floor space improvements. In that case, partnership age and number of projects per partnership, in combination, accounted for nearly one-fifth of the observed variance in the results measure.

PARTNERSHIP-REPORTED FACTORS RELATED TO GOOD PERFORMANCE

Telephone interviews were conducted with representatives of 61 Rebuild America Partnerships. Among other things, the interviewees were asked to describe what they

[9]For the third significant independent variable—average office rent—data were available for only 48 partnerships and it was feared that the findings resulting from a multiple regression analysis containing this variable would be non-representative and misleading.

Table 9. Relationships between partnership age, number of projects per partnership, and four key results measures[a]

Results measure (dependent variable)	Independent variable	Degrees of freedom	Parameter estimate	p-value	R-Square[b]
Completed floor space improvements	partnership age	257	1,063,055	.0003	0.1202
	number of completed projects per partnership		853,783	.0002	
Completed plus committed floor space improvements	partnership age	257	1,948,960	<.0001	0.1893
	number of completed plus committed projects per partnership		820,590	<.0001	
Completed cost savings	partnership age	257	224,255	.0005	0.0958
	number of completed projects per partnership		149,741	.0023	
Completed plus committed cost savings	partnership age	257	471,962	<.0001	0.1680
	number of completed plus committed projects per partnership		179,785	<.0001	

[a]Based on multiple regression analysis using partnership age and number of projects per partnership as the independent variables.

[b]The R-Square value describes the amount of variance in the dependent variable that is explained by the two independent variables combined.

believed to be the most important factors influencing good performance by a partnership. Although the question was posed in an open-ended fashion, without any suggested responses or prompts, there was still a substantial amount of agreement among the respondents. The following items were mentioned by at least 10 interviewees as being very important to partnership success: general assistance from the Rebuild America representative; open communications among all partners; existence of a "champion" for the partnership; support from the relevant city or state government; effective marketing to attract new partners; strong community interest; quick return on investment; interaction with other community organizations; and continuity of funding. Each of these items is described in more detail below, and a listing of key factors mentioned by five or more respondents is presented in Table 10.

General Assistance from Rebuild America Representative

Almost half of those interviewed (29 respondents) stated that the general assistance and access to information provided by their Rebuild America representative[10] was very important to the success of their program. Of the total number of respondents, 8 specified that help was provided by a Rebuild America regional representative, 7 said that help was provided by a Rebuild America state representative, 3 noted that help was provided by the Regional Team Leader, and 11 did not specify the Rebuild representative providing the assistance. A number of respondents mentioned that their representative responded very promptly to requests for help. Many of those interviewed revealed that they had close relationships with their representatives, and several noted that their representative always provided reliable assistance, regardless of the magnitude of the request. One respondent mentioned that when he asked for help, his representative would often pay him a personal visit the following day.

Open Communications Among All Partners

Similarly, almost half of the respondents (26) stressed the importance of open and active channels of communication among all participants. Sharing resources and relationship building were mentioned by some respondents as two positive outcomes of effective communication between partners. One interviewee stated that "active and dynamic relationships between partners" was very important. Other respondents noted the importance of good communication as a tool for evaluating and measuring progress by their many partners and projects. Another respondent said that good communication "provided an environment of cooperation and togetherness."

[10] A Rebuild America representative is a person affiliated with the Rebuild program who is responsible for helping individual partnerships identify their needs, access available resources, and obtain expert assistance.

Table 10. Key factors influencing good performance, as reported by partnership representatives

Key Factor	No. of Responses
General assistance/support from Rebuild America representative	29
Open, active channels of communication among all partners within the partnership	26
Existence of a "champion" for the partnership	19
Support and involvement from relevant political entity (city or state)	19
Effective sales and marketing efforts of the partnership to recruit partners ("selling the program"/ recruitment)	15
Community with strong interest in energy efficiency and the environment	13
See payback/show a quick return on investment	12
Interaction/collaboration with other community leaders and organizations at all levels	11
Continuity of funding	10
Ability to work together/teamwork/cooperation/flexibility among all partners within the partnership	7
Strategic coalition of partners	7
Follow through, one-on-one support, and "hand-holding" from the partnership to its partners	7
Effective program evaluations ("have we achieved our goals?")	7
Rapid provision of needed assistance	6
Reliable information on energy-saving opportunities	6
Concentration of efforts in small area to emphasize results	6
Relationship building/patience/trust	6
Peer to peer exchanges	5
Continue to expand the partnership/keep it dynamic	5
Long-term partners with sustained involvement	5
Well-designed project plan with achievable goals	5

Existence of a "Champion"

Thirty percent of those interviewed (19 respondents) believed that the existence of a "champion" (a strong leader and advocate for energy efficiency activities within the partnership) is important to program success. Respondents used words like dedicated, committed, and passionate to describe their champions. A few respondents described the right champion as "key to program success" and someone who "really cares." An important role of the champion, according to one interviewee, is to keep the program "alive and dynamic." Almost all of these respondents stressed the critical nature of the *right* champion and were very specific about the high standards and characteristics that individual must possess.

Support from City or State Government

Nineteen of those interviewed revealed that support and funding from city or state government were very important to the success of their program. In some cases it was essential, with one respondent describing it as critical to their existence. Many of the respondents expressed having "strong coalitions" with the agencies supporting them. Others noted that having support from the city or state government provided continuity for their programs and helped generate additional support from other organizations and the community. One respondent said that their state energy office was crucial in helping them "knock down barriers."

Effective Marketing to Attract New Partners

One-fourth of the respondents (15) described marketing as an important function of their partnership. Many described this marketing function as "selling the program" or "getting people on board." One marketing strategy revealed by several of those interviewed was to "lead by example" and to "show results." For example, some government offices took the lead by implementing retrofit measures in all their facilities to serve as a community example. Others started with small target areas to show the community and business leaders prompt results.

Strong Community Interest

Thirteen interviewees stated that the interest and support they received from their community was an important determinant of partnership success. Many respondents described their communities as environmentally conscientious and supportive of energy-saving efforts. One respondent said that their community had a "strong commitment to its environment." Several other respondents said that involved citizens helped them with "word-of-mouth" marketing and "grass-root" initiatives, which were important to the partnership's success.

Quick Return on Investment

A quick return on investment was seen as an important factor of success by many respondents (12). Some respondents mentioned that when partners were involved in projects with timely results, they were more likely to continue with new projects, as well as help recruit new partners. In several cases, partnerships carefully chose projects that would show more immediate results as a strategy to recruit partners and add projects. One respondent noted the importance of trust and support from partners and the community and said that showing a quick return on investment helped achieve that.

Interaction with Other Community Organizations

Interaction with other community organizations was cited as an important factor influencing good performance by many of those interviewed (11 respondents). These respondents noted the importance of developing a network of people and organizations within their community. According to them, some of the benefits of such networks are teamwork, strategic relationships, publicity, and coalition building. Several respondents mentioned that it was important to communicate and be involved with many different groups, such as citizen organizations, business owners and elected officials.

Continuity of Funding

Ten of those interviewed contended that continuity of funding was very important to a successful partnership. Several respondents mentioned that when their initial funding was exhausted, their program ended. Those respondents expressed gratitude for the funding they did receive, but revealed feelings of frustration and disappointment when they were unable to continue their efforts. The same respondents also expressed the desire for more funding opportunities through the Rebuild America program.

Other Responses

The following factors were spontaneously mentioned as being important by between five and seven respondents: the ability to work together as a team with cooperation and flexibility among all partners; the strategic coalition of long-term partners; follow through, one-on-one support, and "hand-holding" from the partnership to its partners; effective program evaluations; rapid provision of needed assistance; reliable information on energy-saving opportunities; concentration of efforts in small areas to emphasize results; relationship building with patience and trust; peer to peer exchanges; continuing to expand the partnership and keep it dynamic; long-term partners with sustained involvement; and a well-designed project plan with achievable goals.

USEFUL PRODUCTS AND SERVICES

As with the factors influencing good performance, there was substantial agreement among those interviewed concerning the kinds of assistance that they found to be most helpful. The following items were spontaneously mentioned by 10 or more respondents: tailored assistance from Rebuild America representative; general technical support; workshops and training sessions; assistance with networking; peer exchanges and interactions; access to staff and resources at national laboratories; help with marketing the benefits of Rebuild America; educational materials; Rebuild America website; links to national information sources; and financial support. Each of these is discussed below, and all responses given by five or more interviewees are shown in Table 11. In addition, there were a couple of frequently mentioned subjects addressed by

Table 11. Most useful types of resources provided by Rebuild America, as reported by partnership representatives

Type of Resource	No. of Responses
Individualized (tailored) assistance from Rebuild America employee or contractor	45
General technical support	26
Workshops/training sessions	25
Assistance with networking	18
Peer exchanges and interactions	16
Access to staff and resources at national laboratories	16
Help with marketing the benefits of Rebuild America	13
Educational materials	12
Websites	11
Links to national information sources	10
Financial support	10
Access to conferences	8
RBA's "legitimizing their efforts"/RBA reputation/helping "sell the program"	8
Technical experts as guest speakers	7
Help with obtaining needed services	6
"Partner Update" newsletter	6

several different types of assistance (e.g., general technical support and peer exchanges both addressed the topic of potential energy-saving actions and opportunities) and these too are discussed.

Tailored Assistance from Rebuild Representative

Three-fourths of those interviewed (45 respondents) said that receiving individualized assistance tailored to their partnership's specific needs was very helpful to them. Many respondents mentioned their representative by name and revealed that a strong working and personal relationship had developed between them. It was common for interviewees to emphasize the dedication and commitment of their Rebuild America representative and to note the quality of the customer service provided and its timeliness. Specific types of tailored assistance mentioned by the respondents were technical advice, help with networking, providing answers to questions, help with research, and on-site visits. In one case, for example, the Rebuild America representative helped custom design an educational CD on engineering management for a partnership.

General Technical Support

Almost half of those interviewed (26 respondents) stated that the general technical support they received was very useful. It was also important to the respondents that the assistance was provided free of charge. Many respondents mentioned that the access to experts and technical information provided to them was very valuable. One respondent said that "we receive very targeted, high-level support." Specific types of support mentioned include help with: establishing procurement requirements when hiring contractors; understanding and preparing performance contracts; identifying financial aids and resources; conducting energy audits; reviewing architectural plans; understanding and applying specific types of retrofit measures; and obtaining information on alternative energy sources.

Workshops/Training Sessions

Workshops and training sessions were reported as very beneficial by almost half (25) of those interviewed. The educational benefits of the workshops and training sessions were mentioned by many of those respondents. Respondents also specified a number of ways in which Rebuild America provided assistance with workshops and training sessions, including: sending expert speakers; providing help with design and implementation; and hosting events.

Assistance with Networking

Of those interviewed, thirty percent (18 respondents) said that the networking opportunities provided were very important. These respondents cited many avenues available for networking through the Rebuild America program, such as contacting their

representative, connecting with other partnerships, accessing the website, or attending the National Conference. All noted the importance of sharing information and utilizing other partnerships and projects as models. One respondent described the importance of networking as the "crucial link between those who have information and those who need it."

Peer Exchanges and Interactions

Close to thirty percent of interviewees (16 respondents) stated that the ability for partnerships to participate in peer reviews and exchanges was very beneficial. Respondents noted that it served as a modeling tool and provided them with additional information resources. One respondent described peer exchanges as "great forums" for communication. They also were seen by some respondents as a way to build coalitions.

Access to Staff and Resources at National Laboratories

Similarly, about thirty percent of those interviewed (16 respondents) mentioned that the link to national laboratories was a very useful service provided by the Rebuild America program, with some noting that these services were customized to their needs. One respondent described a situation in which he called his Rebuild America representative to get help with a specific problem and his representative checked all the labs in the United States associated with the Rebuild America program to see which was best suited to his particular need. The same respondent further described this service as a "great network of experts." Support with technical issues was mentioned by many respondents as the most utilized service from the labs. Others mentioned that they utilized the labs to conduct particular studies for them. One interviewee stated that the "technical assistance, the expertise, and the availability and breadth of knowledge provided by the labs was invaluable."

Help with Marketing the Benefits of Rebuild America

Thirteen of those interviewed mentioned that help with marketing and promoting the benefits of participation in the Rebuild America program was important. In one case, a respondent mentioned that his Rebuild America representative helped teach sales and marketing to his staff through training seminars. Another respondent mentioned that her partnership continued marketing efforts with Rebuild America's assistance even after their project had ended, to maintain community interest. This same respondent also mentioned the importance of promoting Rebuild America's association with the U.S. Department of Energy. According to this respondent, businesses were more likely to participate when they knew it was a nationally recognized program. Another respondent said that, for small towns, "national recognition fosters credibility."

Educational Materials

Twelve of those interviewed specified that the educational materials provided by the Rebuild America program were useful. One respondent stated that the "three key components of the Rebuild network were support, peer review, and education." Respondents also expressed the importance of the volume and variety of materials available to them. Several respondents noted that the booklets and information provided to them on Energy Smart Schools were very useful.

Rebuild America Website

The Rebuild America website was cited as a useful resource by eleven of those interviewed. Accessing of forms, technical assistance, email contacts, and other internet links were mentioned as services utilized on the website. Also, the *Flash Report*, an online newsletter highlighting partnership news and publicizing events, was noted as being very informative.

Links to National Information Sources

Ten interviewees stated that the links to national information sources were an important feature of the Rebuild America program. Of those, some specified the national laboratories, Rebuild America Strategic and Business Partners, and experts in particular fields as sources of information utilized. Others mentioned using these resources to obtain needed services or to assist in a hiring search for a contractor. One respondent described the link to national information sources as a "critical feature of the Rebuild America program."

Financial Support

Many of those interviewed (10 respondents) stated that financial support from the Rebuild America program was very important to their efforts. In a few cases it was the sole reason the partnerships existed. Other respondents referred to the importance of financial aid in general but did not specifically mention monies available from the Rebuild America program. These respondents also mentioned a variety of services provided at no charge by the Rebuild America program, such as travel subsidies, aid with workshops and seminars, access to national information resources, and educational materials. It was not uncommon for respondents to characterize these services as "vital to their programs." One respondent revealed that the grant he received from the Rebuild America program helped him get his state agency's support to implement the program. Another interviewee described how important it was to receive information on various funding opportunities and resources. She also mentioned that her Rebuild America representative helped her obtain "non-biased critiques of different funding products."

Other Types of Resources

The following items were spontaneously mentioned as being useful by between six and eight respondents: access to conferences; Rebuild America "legitimizing their efforts" and helping them "sell the program;" technical experts as guest speakers; help with obtaining needed services; and the *Partner Update* newsletter.

Cross-Cutting Subject Areas

In addition to the useful Rebuild America resources described above, many respondents commented on the importance of two particular subject areas addressed by those resources: potential energy-saving actions and opportunities (11 respondents); and the savings potential of various actions (10 respondents). Several types of potential energy-saving actions and opportunities were mentioned, including: assistance with downtown revitalization projects; aid in conducting a needs assessment for a school district; and help with identifying and prioritizing projects. Regarding the savings potential of various actions, a few respondents mentioned bench marking and modeling approaches as two methods used to help identify savings. One partnership representative stated that Rebuild America was helping him by putting together a resource book on high performing energy-efficient schools. Another respondent noted that one of the most important services she had obtained from Rebuild America was information and tools on how to evaluate cost savings.

5. SUMMARY AND CONCLUSIONS

In this chapter, we summarize the key findings reported previously and discuss their implications for the Rebuild America program.

KEY FINDINGS

Two hundred fifty-eight partnerships provided data on the results achieved by a total of 899 Rebuild America projects undertaken since the partnerships were formed. About three-fifths of those projects were classified as "committed" and two-fifths were "completed." Most partnerships were responsible for only a single project, and the majority of those with multiple projects had five or fewer. While there were a few very large projects, nearly all of the reported activity was of a much more moderate size.

The median value for the floor space improvements completed per partnership was a little less than 24,000 square feet for the full set of partnerships and almost 85,000 square feet for those partnerships that had been in existence for at least two years. For completed plus committed projects, the median number for the entire set of partnerships was approximately 580,000 square feet per partnership. For annual energy savings from completed projects, the median value was 345 million source BTUs per partnership for the entire data set and 992 million source BTUs for partnerships that were at least two years old. In contrast, the median value for annual energy savings for all projects (completed plus committed) was about 11.5 *billion* source BTUs per partnership. Median annual cost savings from completed projects were slightly less than $4,000 per partnership for the full set of partnerships and over $15,000 for those partnerships that had been formed at least two year previously. For committed and completed projects together, the median value for annual cost savings jumped to almost $146,000 per partnership. The median energy efficiency investment was just over $17,000 per partnership for the full set of completed projects and $107,000 for the subset of partnerships that had been in existence two years or longer. For completed plus committed projects, the median investment was over $800,000 per partnership. Clearly, the median value for each results measure for completed projects was higher for the subset of more mature partnerships. And for *all* projects (completed plus committed), the median values were much higher than for completed projects alone. This is largely because it takes new partnerships some time to start completing their planned projects and because many partnerships anticipate substantial accomplishments from their committed activities.

In combination, the responding partnerships reported over half a billion square feet of floor space improvements, over 9 trillion source BTUs of annual energy savings, over $130 million of annual cost savings, and more than $600 million in energy efficiency investments for all completed projects. For *all* projects (completed plus committed), the combined results were between two and three times the size of those

achieved by completed projects alone. Specifically, slightly over one billion square feet of space was renovated, nearly 27 trillion source BTUs and over $300 million were saved annually, and more than $1.5 billion was invested in energy efficiency efforts. The actual results achieved by the Rebuild America program are almost certainly greater than those described here because over 200 partnerships did not report their projects' accomplishments. In addition, the reported annual energy and cost savings are expected to continue for many years.

According to the U.S. Department of Energy's recent *Rebuild America 2002* report (2003), every federal dollar spent on the Rebuild program from its inception through the end of 2002 generated $9.38 of energy-efficiency investment and $18.43 in cumulative energy cost savings over time. In addition, the current study shows that each dollar of program funding has resulted in nearly 8 square feet of floor space improvements, $1.95 in annual cost savings, and 0.134 million source BTUs in annual energy savings from completed projects. For *all* projects (completed plus committed) each dollar of program funding is associated with over 16 square feet of floor space improvements, $4.41 in annual cost savings, 0.396 million source BTUs in annual energy savings, and $22.35 in energy efficiency investment. As noted above, these numbers almost certainly undercount actual accomplishments because many Rebuild partnerships did not report their project results. Also, the annual energy and cost savings reported here are for a single year only, and can be expected to continue well into the future.

The greatest number of projects took place in the local and state government sector, followed by K-12 schools, commercial buildings, colleges/universities, and public/multi-family housing. Completed projects involving K-12 schools were far ahead of all the other sectors in terms of the median achievements for all results measures. For all projects (completed plus committed), K-12 schools reported the largest median values for floor space improvements and energy efficiency investment, while colleges/ universities led the way in terms of total annual energy and cost savings. Accomplishments for all projects combined, which depend on the number of projects carried out and the results achieved by each, were highest in K-12 schools for floor space improvements and in the local and state government sector for all other results measures.

Because of the very limited response to our request for primary data on partnership context and characteristics, we could test only a few hypotheses, primarily involving data that were available from secondary sources. From that limited statistical analysis, we found that partnership age and the number of projects per partnership were both positively related to all the results measures that we tested, by themselves *and* in the presence of each other. This means that those partnerships that had been in existence the longest and had the greatest number of projects tended to have improved the greatest number of square feet and achieved the greatest annual cost savings. Average office rent also was positively related to three of the four results measures tested (completed plus committed floor space improvements, completed cost savings, and completed plus committed cost savings), indicating that accomplishments were greatest in areas with

higher property values. However, this finding should be treated as only suggesting a possible relationship and not clearly establishing it, since the number of respondents with the data necessary to run this analysis was quite small and probably not representative of the entire population of Rebuild partnerships.

Representatives of 61 Rebuild America partnerships were directly asked for their opinions on the most important influences on partnership performance and the most useful types of resources provided by the program. The factors most frequently mentioned as influencing good partnership performance were: general assistance from the Rebuild America representative; open communications among all partners; existence of a "champion" for the partnership; support from the relevant city or state government; effective marketing to attract new partners; strong community interest; quick return on investment; interaction with other community organizations; and continuity of funding.

The types of Rebuild America resources that were most frequently mentioned as being most helpful were: tailored assistance from a Rebuild America representative; general technical support; workshops and training sessions; assistance with networking; peer exchanges and interactions; access to staff and resources at national laboratories; help with marketing the benefits of Rebuild America; educational materials; Rebuild America website; links to national information sources; and financial support. In addition, many respondents commented on the importance of two particular subject areas addressed by those resources: potential energy-saving actions/opportunities and the savings potential of various actions.

CONCLUDING DISCUSSION

The description of combined results presented above shows that the Rebuild America program has completed very substantial floor space improvements in public facilities, commercial buildings, and multifamily housing units, which are associated with abundant—and cost-effective—annual energy and cost savings and a considerable investment in energy-efficient projects. And the results from *committed* projects are expected to be even greater than those achieved to date.

Not surprisingly, observed results tended to be greatest for those partnerships that had been in existence the longest and had the greatest number of projects. This makes sense because such partnerships have had the largest number of opportunities to achieve results as well as the most time to establish the necessary organizational and financial relationships, acquire needed resources and expertise, and implement effective energy-saving projects. Furthermore, it should be noted that many of the factors reported by partnerships as being related to good performance (e.g., assistance from a program representative, communication among partners, interaction with other community organizations) and the resources identified as being most useful (e.g., technical support, workshops and training sessions, assistance with networking, educational materials) are

very consistent with the "program logic" for Rebuild America presented in the introductory chapter. That logic model asserts that the technical information, assistance, training, and peer exchanges provided through the community partnership structure lead to the increased use of energy-efficient technologies.

Clearly, the Rebuild program has been successful in encouraging the adoption of energy efficiency measures and practices in targeted buildings, and the effects of the program are sure to continue, both from projects that have been initiated to date and from new projects that are likely to be implemented in the future.

Based on the previously-discussed findings, we suggest the following possible activities for sustaining and building upon the past successes of the Rebuild America program:

- Keep providing individualized assistance, technical support, and training to partnerships, in a timely manner;
- Provide training on key topics to state and regional Rebuild representatives, so that they can best serve the partnerships. Important topics for training include: information on energy-savings opportunities and techniques; procedures for marketing the program and recruiting partners; methods for establishing and maintaining good communications among partners and with other community organizations; and the development of project plans and goals.
- Have the most effective Rebuild America representatives provide the above-mentioned training for the other representatives;
- Ensure that sufficient informational materials are available regarding those sectors that are most frequently served and have yielded the greatest results (i.e., local/state government, K-12 schools, commercial buildings);
- Facilitate peer-to-peer exchanges among Rebuild America partners;
- Encourage active partnerships to stay in operation, because the number of completed projects and all results measures tend to increase with time;
- Encourage partnerships to take on additional projects, because this is associated with greater results and sustains program efforts;
- Encourage partnerships to report their activities, to allow more complete tracking of results; and, finally,
- Contact partnerships that report no completed projects after three years to see if there are any readily-available resources that Rebuild America could provide to allow them to move to project completion. Such contact could also be used to determine if a partnership has become dormant and might need *less* active support and assistance. Resources permitting, the same type of contact could be made with those partnerships that have never reported project results.

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