

## **Successes from Rebuild America's Housing Partnerships**

*Mark P. Ternes, Oak Ridge National Laboratory  
Jim Cavallo, Argonne National Laboratory  
Cara Applegate, D&R International, Ltd.*

### **ABSTRACT**

The U.S. Department of Energy's Rebuild America Program is partnering with public and private housing organizations throughout the nation to make building improvements and provide solutions to housing needs while saving energy and reducing utility costs. This paper describes the partnership development, technical assistance, and other types of support Rebuild America offers that encourages housing organizations to form Rebuild America partnerships. Successful partnerships are highlighted that demonstrate the wide-range of projects Rebuild America partners are performing, with a detailed description of four notable case studies.

### **Introduction**

The U.S. Department of Energy's (DOE's) Rebuild America Program facilitates community partnerships in improving their buildings through energy efficiency (see the Internet site at [www.eren.doe.gov/buildings/rebuild](http://www.eren.doe.gov/buildings/rebuild)). Participation is voluntary. When communities, businesses, and housing agencies form Rebuild America partnerships with each other and DOE, they tailor their programs to local needs and choose which buildings to renovate, how much energy to save, and the best technologies to use. Rebuild America lets partnerships select the best ways to improve their communities. Rebuild America supports partnerships with technical and business experts, resource materials, and a national network of peers who are working on the same issues and developing innovative solutions.

In addition to improving building quality and saving energy and money, Rebuild America projects create jobs, promote economic growth, and protect the environment. Making buildings more energy efficient can create new jobs in local economies. Money spent on energy efficiency usually stays in the community and rolls over several times, which creates more jobs. Partnerships have also discovered that energy efficiency goes hand-in-hand with economic efficiency. Consuming energy to run buildings is a significant source of pollution, so using less of it makes our air and water cleaner.

Rebuild America focuses on six different market sectors: colleges and universities, kindergarten through twelfth-grade schools, state governments, local governments, commercial buildings, and housing. Each of these sectors represents a particular customer group that has similar or related characteristics, has common needs, and responds to the same motivation. Housing is one of these groups because improved housing is often a part of community redevelopment plans and is a focal point of community efforts. This paper examines the activities and successes that Rebuild America has achieved in housing since the inception of the program in 1996.

## Residential Market Sector

Seventy-seven Rebuild America partnerships are active in efforts to make energy efficiency and other improvements in housing (see Table 1). The diversity of these partnerships is great — from state partnerships like Rebuild Ohio that are drawing together housing authorities within the state with local banks, utilities, and local governments to small, local, affordable housing organizations like Knox Housing Partnership that is renovating 140 units of substandard rental housing into quality housing for home ownership by partnering with over 15 organizations.

Public housing represents the primary type of housing being addressed by Rebuild America partnerships. Twenty-eight partnerships are working with 36 public housing authorities to address the needs within public housing (see Table 2). Activities have ranged from performing energy audits on buildings, as done under the Rebuild Nebraska and Rebuild Texas partnerships, to implementing performance contracts as done by the Boston Housing Authority under the Rebuild Boston Partnership and the Chicago Housing Authority. Increasingly, Rebuild America is assisting Indian Tribes with their housing and other needs.

As has been found in other market sectors within Rebuild America, energy efficiency and reduced utility costs by themselves do not motivate building owners to action. Issues that are important in housing that can include an energy component in the solution include:

- Where can I get funds to make needed capital improvements?
- How can I decrease time and money spent on emergency repairs and other maintenance?
- How can I increase housing quality?
- How can I reduce occupant complaints?

In the public housing sector, additional issues that provide motivation for action include:

- Can I provide development or employment opportunities for residents?
- How do I get energy audits done to meet mandated requirements?
- What should I do with audit findings?
- Can I benefit from utility restructuring?
- How do I use my utility use information to set utility allowances and plan capital improvement projects?

## Types of Rebuild America Assistance

Rebuild America helps housing partnerships improve energy efficiency while meeting their individual needs in a number of ways. First and foremost, Rebuild America representatives and the Rebuild America supporting infrastructure of DOE Regional Offices and DOE national laboratories helps partnerships **establish working relations** with not just DOE, but also with local, state, and national organizations. Rebuild America connects partnerships to the work and assistance offered by other DOE programs and provides an information dissemination network for current DOE programs with related activities. Usually, though, solutions to a partner's problems can be found locally within a community. For example, Rebuild America energy inspections of housing units at the Atlanta Housing Authority identified maintenance deficiencies as a primary source of high energy bills and poor resident comfort. As a result, the Atlanta Housing Authority teamed with its local utility to obtain basic- through advanced-level training for more than 200 maintenance staff on plumbing, electrical, and heating and cooling equipment.

**Table 1. Rebuild America Residential Market Sector Partnerships**

Affiliated Tribes of Northwest Indians (WA)	Rebuild Cedar Falls
Atlanta Housing Authority (GA)	Rebuild Colorado
Building Owners and Managers Association of Atlanta (GA)	Rebuild Des Moines (IA)
Chicago Housing Authority (IL)	Rebuild District of Columbia Housing Authority (DC)
Christmas in April (NV)	Rebuild Hawaii Island (HA)
City of Cuyahoga Falls (OH)	Rebuild Iowa
City of Davis (CA)	Rebuild Kentucky
City of Los Angeles (CA)	Rebuild Kewanee (IL)
City of Richland (WA)	Rebuild Little Rock (AR)
City of Santa Monica (CA)	Rebuild Nash & Edgecombe Counties (NC)
City of Saint Paul/Minneapolis (MN)	Rebuild Nebraska
City of Waterloo (IA)	Rebuild Nevada
City of West Haven (CT)	Rebuild New York's Communities (NY)
Energy Outreach Center	Rebuild Niagara Frontier (NY)
E-Three	Rebuild Ohio
Fallon Paiute - Shoshone Tribes (NV)	Rebuild Pittsburgh (PA)
Harbor Energy Initiative (MD)	Rebuild Roanoke-Chowan (NC)
Havasupai Nation (AZ)	Rebuild Salisbury (NC)
Harmony Project (SC)	Rebuild Santa Fe (NM)
Housing Authority of Baltimore City (MD)	Rebuild Texas
Illinois Housing Development Authority (IHDA) Energy Efficiency Partnership (IL)	Rebuild Toledo Energy Collaborative (OH)
Knox Housing Partnership (TN)	Reenergize East Bay Consortium (CA)
Knoxville's Community Development Corporation (TN)	Renaissance Station Condo Association (NJ)
Laurinburg Housing Authority (NC)	Richmond Better Housing Coalition (VA)
Lower Brule Sioux Tribe (SD)	Rockford Housing Authority (IL)
Lucas Metropolitan Housing Authority (OH)	Rosebud Sioux Tribe (SD)
MidEast Regional Housing Authority (NC)	Sacramento Municipal Utility District (CA)
NC Dept of Commerce – Energy Division	Seattle City Light (WA)
Nevada Power	Sierra Assisted Living Foundation (NV)
Newark Housing Authority (NJ)	Southwestern Community Services
Portland Partners for Energy Efficiency (OR)	Stark Metropolitan Housing Authority (OH)
Rebuild Arizona	State of Vermont
Rebuild Arkansas	State of Wisconsin
Rebuild Asheville (NC)	Superintendents Club of New York (NY)
Rebuild Austin (TX)	Territory of Guam
Rebuild Boston Energy Initiative (MA)	Town of Cheshire (CT)
Rebuild California	Town of Fairfield (CT)
	Town of Westbrook (CT)
	Yavapai-Apache Nation (AZ)
	Yes, Inc. (DL)





**Table 2. Rebuild America Public and Indian Housing Authority Partners**

**PUBLIC HOUSING AUTHORITIES**

Atlanta Housing Authority (GA)  
Chicago Housing Authority (IL)  
City of Los Angeles — The Housing Authority of the City of Los Angeles (CA)  
City of West Haven — West Haven Housing Authority (CT)  
Housing Authority of Baltimore City (MD)  
Knoxville’s Community Development Corporation (TN)  
Laurinburg Housing Authority (NC)  
Lucas Metropolitan Housing Authority (OH)  
MidEast Regional Housing Authority (NC)  
Newark Housing Authority (NJ)  
Rebuild Asheville — Asheville Housing Authority (NC)  
Rebuild Boston Energy Initiative — Boston Housing Authority (MA)  
Rebuild California — Housing Authority of the City of Los Angeles  
Rebuild District of Columbia Housing Authority (DC)  
Rebuild Hawaii Island —Housing and Community Development Corporation of Hawaii (HA)  
Rebuild Kentucky — Mountain Association for Community Economic Development  
Rebuild Kewanee — Henry County Housing Authority (IL)  
Rebuild Little Rock — Little Rock Housing Authority (AR)  
Rebuild Nash & Edgecombe Counties — Rocky Mountain Public Housing Authority (NC)  
Rebuild Nebraska — Chadron Housing Authority, Stromsburg Housing Authority, Tilden  
Housing Authority, Hooper Housing Authority, Lincoln Housing Authority, Albion Housing  
Authority, and Omaha Housing Authority  
Rebuild Pittsburgh — Pittsburgh Housing Authority (PA)  
Rebuild Salisbury — Salisbury Public Housing Authority (NC)  
Rebuild Texas — Housing Authority of the City of Houston, Dallas Housing Authority, Cross Plains  
Housing Authority, and Denison Housing Authority  
Rebuild Toledo Energy Collaborative — Toledo Housing Authority (OH)  
Rockford Housing Authority (IL)  
Stark Metropolitan Housing Authority (OH)  
State of Wisconsin — Shawano County Housing Authority  
Town of Cheshire — Cheshire Housing Authority (CT)

**INDIAN TRIBES**

Affiliated Tribes of Northwest Indians (WA)  
Fallon Paiute - Shoshone Tribes (NV)  
Havasupai Nation (AZ)  
Lower Brule Sioux Tribe (SD)  
Rosebud Sioux Tribe (SD)  
Yavapai-Apache Nation (AZ)

Rebuild America offers **technical information** to its housing partnerships through Rebuild America's Business Partners and its network of representatives and national laboratories. Information and training is provided to individual partnerships, as was done in training chief engineers at the Chicago Housing Authority on energy-efficient boiler plant operations. Training is provided as well to national audiences, as was done in two workshops provided to public housing authorities on implementing performance contracts following U.S. Department of Housing and Urban Development (HUD) public housing regulations. Rebuild America has also supported the development of specific information guides, such as the Energy-Efficient Ventilation for Apartment Buildings guide (Diamond, Feustel, and Matson) and Your Energy Savings: A Resident's Handbook (Knight 1998). These are applicable to residential buildings and are made available to partners and others.

At times, Rebuild America provides **direct technical assistance** to partnerships on a case-by-case basis. Four such cases exemplify the breadth of assistance provided:

- Energy audits were performed for the Renaissance Station Condominium Association in New Brunswick, New Jersey, to identify energy measures to include in future renovations, and the Havasupai Native American Tribe in Supai, Arizona to plan future energy projects.
- Building plans were reviewed and energy improvements were recommended for new affordable housing being built by the Richmond Better Housing Coalition in Richmond, Virginia.
- Investigations were performed for Rebuild Wisconsin in Milwaukee to verify that blower door testing does not create an indoor health hazard by disturbing lead dust and making it airborne.
- Site audits and evaluations of savings potential were provided to the Boston Housing Authority under the Rebuild Boston partnership to implement a multi-million dollar performance contract to improve their heating systems while reducing energy costs.

Rebuild America **organizes meetings to allow information exchanges** to occur at both the national and regional level. Rebuild America's National Forum draws hundreds of people from partnerships across the nation to learn of new developments, exchange ideas, and discuss different approaches to partnership development and organization. Regional peer exchange meetings allow partnerships to help one another on selected issues and to learn new ideas in the process.

Finally, Rebuild America **documents successful partnerships in case studies** to guide other partnerships yet to be developed. The Baltimore Housing Authority learned of a successful resident training program developed by the Chicago Housing Authority and felt that a variant of it would provide a solution to their training needs before new utility allowances could be implemented. From this successful Chicago experience, a new Rebuild America partnership was formed.

## **Examples of Successful Partnerships**

A more detailed discussion of several previously identified Rebuild America partnerships is provided in this section to exemplify the power of community partnerships and to more clearly show the workings of a Rebuild America partnership. Because the residential sector is so broad, different residential partnerships have achieved success in different ways.

## Chicago Housing Authority

The Chicago Housing Authority (CHA) is the nation's second largest public housing authority. It provides 40,000 units of housing for 110,000 residents, a population that could make it the fourth largest city in Illinois. The priorities that CHA identified for its Rebuild America partnership include reducing wasteful energy use, creating resident employment opportunities, improving resident comfort and health, and reducing opportunities for vandalism associated with energy systems on housing authority property. Through a Rebuild America partnership, it found novel ways to provide solutions by leveraging the talent of college students, the greater Chicago low-income community, and the opportunities offered because the housing authority is a municipal provider of power and water services.

Much of CHA's energy savings have been accomplished through the use of an energy performance contract. The housing authority signed a \$15 million contract with EUA Citizens, an energy service company located in Boston, Massachusetts. The annual utility cost savings from the agreement is expected to be over \$2 million. The savings will come from the installation of 11,000 energy efficient refrigerators and 24,000 high-efficient lighting fixtures along with a major retrofit of the boiler and water systems of five housing developments. Under the performance contracting rules of HUD, the majority of the savings amortize the cost of the improvements, with CHA and EUA able to share the residual savings for up to 12 years; after that time, the continuing savings go to the federal budget.

The savings from the installation of the energy efficient refrigerators has been greater than expected. With the assistance of the DOE national laboratories, researchers found that CHA's old refrigerators were using an average of 976 kWh per year. These refrigerators were replaced with energy efficient refrigerators that used an average of 480 kWh per year. The savings of 496 kWh per year per refrigerator totaled up to an annual cost savings of \$570,000 in electricity bills. In addition to the energy savings, CHA was able to take advantage of a bulk purchase program for appliances created by DOE and the Consortium for Energy Efficiency. The bulk purchase price for the energy efficient refrigerators reduced the cost to slightly under the price that CHA would have paid if it had purchased less efficient models.

The savings that CHA will be realizing on its boiler and water system retrofit is augmented by operation savings that the housing authority is currently capturing as a result of training that was given to its engineering staff by experts at the DOE national laboratories. Immediately following the winter heating season of 1997, the CHA Rebuild America partnership organized a workshop on preventive maintenance, operations efficiencies, and boiler water treatments. The engineers from CHA's central heating plants attended presentations and took tours of model heating plants during a two-day workshop. During the next heating season, an estimated 5 to 6 percent energy savings was reported as a result of operations improvements.

CHA's goals extend beyond saving energy. In an innovative program, CHA and Rebuild America have explored ways to create resident training programs that capture conservation opportunities in the tenant's apartments. DOE and CHA worked with the Renacer Westside Community Network to offer a training workshop for residents to learn how to weatherize the units in the Cabrini and Dearborn Homes developments. The residents learned about basic building science and received training on air sealing, installing water heater jackets, repairing dripping faucets and constantly running toilets, cleaning furnace air filters and air ducts, and motivating other residents to reduce wasteful practices, like leaving lights on in empty rooms. The team of residents that passed the workshop was then mentored for the first few weeks as they began installing the conservation measures in about 300 townhouses within their development. It is estimated that the savings from these measures was between 3 and 4 percent of average

energy use, and the measures have improved the comfort and healthfulness of the housing units. Moreover, the resident team organized a non-profit corporation called the Home Energy Savings Corporation following the mentorship period and has found weatherization projects outside of the public housing sector, particularly the State of Illinois low-income weatherization assistance program.

In still another aspect of the CHA Rebuild America partnership, the housing authority teamed up with Auburn University's Industrial Design Department through DOE's Residential Energy Efficiency Program and challenged students to develop an innovative, vandal-resistant lighting fixture. The challenge led to several interesting designs. One of several concepts was chosen and produced for commercial application. The lighting fixture uses two compact fluorescent bulbs that cut energy use to less than one-quarter the electricity used in the old fixtures. Even more important to CHA, the new fixtures are difficult to vandalize and are expected to reduce maintenance on common area lighting by 90 percent, while keeping the lights on in corridors that would otherwise be unsafe after nightfall.

## **Rebuild Ohio**

Rebuild Ohio is a state partnership that has allied itself with several public housing authorities and institutions from the other five market sectors within Rebuild America. Stark Metropolitan Housing Authority (SMHA) is one of the public housing authorities that is part of the Rebuild Ohio partnership. SMHA is a progressive housing authority that has implemented several energy conservation projects using private sector financing under HUD's energy incentives program and has a history of bringing sound, technical management to its utility programs. Rather than using a performance contract, SMHA elected to perform the design and contractual work in-house and use HUD's add-on subsidy method to repay the debt. Under the add-on subsidy method, HUD increases the annual operating subsidy provided to SMHA for up to 12 years to cover the cost of the outstanding debt provided that the resulting energy savings are greater than or equal to the loan payment. Over the first four years, SMHA effectively retains 150 percent of the first year savings; all other cost savings revert to the federal budget.

One project Rebuild Ohio has assisted SMHA on is the conversion of 89 efficiency apartments into one-bedroom units. SMHA has brought together six funding sources to finance the \$6.4 million renovation, including the local utility, state funds allocated to improving outdoor air quality, and HUD modernization funds. The project will improve the marketability of the apartment units while reducing energy costs at the same time. Rebuild Ohio helped perform the energy audits and helped SMHA secure the state funding for this project.

Because of SMHA's interest in energy, they began to talk with other housing authorities in the state about energy issues and coordinated two meetings of public housing energy managers. This activity culminated in a two-day, statewide workshop on Energy Opportunities in Public Housing sponsored by SMHA, Rebuild Ohio, and First Energy (the local utility). Performance contracting and utility deregulation were two of the technical topics discussed, as was how to build partnerships that benefit the entire community. This workshop and Rebuild Ohio's role in it exemplifies the type and expansion of partnerships that Rebuild America can foster.

## **Knox Housing Partnership, Inc.**

Knox Housing Partnership, Inc. (KHP) is a private, charitable corporation facilitating affordable housing for low-income residents of Knoxville and Knox County, Tennessee. KHP has teamed with Knoxville's Housing Development Corporation (KHDC) to undertake a joint

housing revitalization project involving 146 single-family detached homes that will revitalize two inner-city neighborhoods. The goal of the \$6.8 million project is to bring renters into home ownership by providing a pool of quality, affordable housing and assisting families in obtaining below-market rate financing. More than two-thirds of the revitalized homes are being sold to the existing renters or other low-income buyers. The remainder of the houses are being made available for continued rental to current clients to avoid displacing those who cannot afford to or do not wish to move into home ownership.

The redevelopment project became a possibility in April 1998 when the estate of Florence Monday offered to sell the houses to KHDC, a subsidiary of Knoxville's Community Development Corporation (KCDC), for \$2,920,000 (\$20,000 each). KCDC and KHP estimated that construction financing for rehabilitating the 1945-vintage, 800 square-foot, two-bedroom houses would average \$20,000 to \$25,000 for each house.

The homes were purchased and construction is being financed through a low-interest (7%) acquisition/construction loan made available by eight local banks that was written-down to 5% by the East Tennessee Foundation's Affordable Housing Trust Fund. The City of Knoxville provided a grant of \$303,000 through their HOME program to subsidize the acquisition and construction costs and provided additional financial assistance through its Rental Rehab Program. A construction manager was funded using a \$25,000 grant from the Affordable Housing Demonstration Fund, a locally controlled Housing Trust Fund.

Additional partnerships were brought together to help prospective homeowners obtain affordable financing and qualify for home loans. The same consortium of eight banks are providing loan monies using their Community Reinvestment Act financing. Purchase assistance up to \$25,000 per low-income home buyer is being provided by over \$1 million in grants from HUD's HOPE 3, HOME, and HOUSE programs and a \$50,000 grant from the Neighborhood Reinvestment Corporation. The Neighborhood Reinvestment Corporation is a national nonprofit and was created in 1978 by an act of Congress to revitalize America's older, distressed communities by establishing and supporting a national network of local, nonprofit organizations. With these partnerships established, almost every renter interested in buying a renovated housing unit should be able to qualify for a loan.

Other partnerships providing necessary contributions to this cooperative effort include:

- A \$75,000 grant from the Monday family for neighborhood beautification
- Landscaping and design assistance from the East Tennessee Design Center, a local non-profit organization
- Home ownership education, housing counseling, and assistance in obtaining mortgages provided by KHP
- Assistance in developing neighborhood organizations from the Center for Neighborhood Development, a local non-profit organization
- Support for community meetings and communication among residents from the Morningside Homeowners Association, the local homeowners association for the neighborhood

Rebuild America, through one of the DOE national laboratories, contributed to the partnership by assisting KHP to keep total housing costs (rent or mortgage plus utilities) the same after rehabilitation as before through energy efficiency improvements that reduce utility bills. Reductions in the energy bills from their current average value of \$1176 per year were needed to help offset an anticipated increase in house payment. The average rent is currently \$260-325 per month depending on where the house is located, when the lease was originally signed, and other factors. Mortgage payments are expected to be about \$270-430 per month for the renovated houses depending on the financing packages and subsidies received, a significant

difference from their current rent for low-income families (see Table 3). With lower energy costs and only a small increase in total housing payments, it is more likely that a low-income family can secure financing to purchase one of the houses.

Improvements being made during the rehabilitation include new roofs, vinyl siding, electrical wiring, plumbing, carpeting, flooring, kitchen cabinetry, kitchen and bathroom fixtures, interior wallboard repair or replacement, and interior painting. The energy-efficiency improvements that are expected to dramatically reduce utility costs, as well as make homes more comfortable and durable, include installing all new windows to replace leaky and broken single-pane models; insulating the walls and floors and adding insulation to the ceiling; replacing existing electric baseboard and wall-mounted units with central gas-pack heating systems; and reducing infiltration from average present values of 2000-3000 cfm<sup>50</sup> by closing off unused fireplace chimneys, repairing major holes, and sealing off major attic bypasses.

Rebuild America encouraged KHP to purchase energy-efficient windows. KHP was able to purchase energy-efficient, double-pane, low-E, argon-filled, vinyl windows with an overall whole-window U-value of 0.32 for the same cost as conventional double-pane windows by standardizing size, buying in large quantities, and negotiating with competing manufacturers. Rebuild America was also instrumental in convincing KHP to include exterior wall insulation as part of its insulation package. Other Rebuild America assistance included performing sizing calculations for the new heating and cooling equipment and emphasizing the importance of tight ducts, additional air sealing work, and complete insulation coverage.

Rebuild America estimated a potential average energy savings of about \$400 per year from the package of energy-efficiency measures described. This savings occurs with the additional benefit of central air conditioning being provided to every home, whereas before most homes had no air conditioning. As seen in Table 3, this savings reduces total monthly housing costs in some homes after rehabilitation and keeps it within \$75 in others.

**Table 3. Monthly Housing Costs Before and After KHP Rehabilitations**

	Before rehabilitation	After rehabilitation
Rent/mortgage	\$260 - 325	\$270 - 430
Energy costs	\$100	\$66
Total housing costs	\$360 - 425	\$336 - 496

One partnership that was explored for this project was to obtain installation of attic and floor insulation by the Knoxville-Knox County Community Action Committee through the Weatherization Assistance Program. Although not possible for this project, such participation in the future would free limited construction funds to be spent on other energy-efficiency measures such as improved house and duct sealing.

This partnership exemplifies a small, non-public housing agency bringing together a multitude of community partners to make a much needed revitalization project viable. Energy efficiency, although important, is just one driver within this partnership. This project shows that

- Incorporating energy-efficiency measures into overall rehabilitation program costs for low-income housing increases the potential pool of low-income buyers while promoting energy efficiency.

- Housing quality improvements achieved in concert with efficiency improvements are an important part of any housing revitalization effort.
- The success of special home buying programs that include energy-efficiency enhancements depends on the ability to establish effective public-private partnerships. Without the involvement of private lenders, federal agencies, foundations, and housing coalitions, the “comprehensive funding packages” necessary to support both home ownership and greater energy efficiency may not be achieved.

### **Superintendent’s Club of New York**

Another interesting example of a non-public housing Rebuild America partnership is the Superintendent’s Club of New York (Super’s Club). This partnership brings together maintenance personnel of multifamily buildings from all five boroughs of New York City. The goals of the Super’s Club are to provide its members with a chance to exchange ideas, share technical information, act as a networking association, and offer an opportunity for the club members to professionalize their services. The original idea of the Super’s Club came from Richard Koral, a faculty member of the New York City Technical College and director of the College’s Apartment Housing Institute. Professor Koral has been a guru of energy efficiency in multifamily buildings for many years. At monthly meetings, the club hears presentations on such issues as boiler maintenance, locksmithing, and lighting, many of which have little to do with energy.

Recently the Super’s Club provided an important service to all of New York. During the first two months of 2000, the price of fuel oil rocketed up to more than twice last summer’s price. The Super’s Club, Rebuild America, and the state of New York organized a workshop on conservation strategies that would help building owners and managers cope with the high cost of fuel oil. The workshop brought together experts on boiler systems with state officials knowledgeable about sources of financing for retrofits. Greg Davoren of the DOE Boston Regional Office spoke at the workshop as did staff from two DOE national laboratories.

Richard Koral and the Super’s Club now want to help others recreate what they have started in New York. Contacts have been made with the Building Owners and Managers Association of Atlanta (BOMA-ATL), another Rebuild America Partner. Interestingly, BOMA-ATL has just started to organize an "Engineers Club" for the building engineers and maintenance professionals of their membership to provide training and networking opportunities for them. BOMA-ATL has developed an energy training course as part of this effort. This demonstrates how two Rebuild America partners are now sharing ideas and working together to reach a common goal.

### **Future Directions**

Rebuild America will first and foremost continue to support its existing residential partnerships, making sure they are on track to implementing action plans and achieving measurable energy savings. Rebuild America will continue to support the use of performance contracting and alternative financing options not only in public housing, but also in non-public housing as has been done by Rebuild America’s Illinois Housing Development Authority Energy Efficiency Partnership (Burger and Jensen 1998). Rebuild America will also continue to work closely with the National Association of Housing and Redevelopment Officials (NAHRO), an important Rebuild America strategic partner for the public and assisted housing sector. Rebuild

America will work with NAHRO to publish articles on energy approaches and success stories in their monthly journal, and provide training on energy measures at their summer and annual meetings.

In a new initiative, Rebuild America and DOE will once again collaborate with HUD to promote energy efficiency in public housing, building upon the successful DOE-HUD partnership that occurred between 1990 and 1995 (Brinch, Ternes, and Myers 1996). One goal of this second collaboration will be to form 20 to 30 new Rebuild America partnerships with public housing authorities over the next two years that can utilize Rebuild America's assistance to improve energy efficiency and address community needs. Emphasis will be placed on forming partnerships that can work more closely with local agencies of the DOE Weatherization Assistance Program, serve as a demonstration site for new DOE technologies, and implement energy projects using HUD's energy incentives. A second goal will be for Rebuild America to support HUD in conducting a series of joint energy workshops by providing speakers and case study examples.

## Conclusions

Rebuild America has been active in forming a diverse set of partnerships within the residential sector. Although the greatest number of partnerships are involved with public housing, Rebuild America has been successful in working with non-public housing groups as well. Energy savings and building improvements have been achieved in a number of the Rebuild America partnerships, which now serve as case studies for others. Rebuild America and its partners have also been successful in disseminating information to housing organizations on a variety of topics such as design improvements, resident education, energy system maintenance, and audit results which is likely leading to energy savings that are more difficult to quantify.

One key to success that has been demonstrated by many Rebuild America partnerships is gaining the active participation of local organizations. When the expertise of local partners is brought together in a single project, success can and usually does occur. Other keys are to recognize the benefits of energy efficiency early in a project and commit to making energy improvements from the project's inception.

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