

LOW-INCOME WEATHERIZATION

STIMULUS-FUNDED PROGRAM SHINES
BUT STORM CLOUDS ARE ON THE HORIZON



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ABOUT THE AUTHOR

Charlie Harak is senior attorney on energy and utility issues at the National Consumer Law Center (NCLC), Inc. He represents consumers before regulatory agencies, legislative bodies, and other policy forums; provides legal and technical support to low-income advocates, legal services lawyers, and government officials; and leads workshops and training sessions for lawyers and advocates. He is the author of numerous publications, including *Utilities Advocacy for Low-income Households*, *Guide to the Rights of Utility Consumers*, *Up the Chimney: How HUD's Inaction Costs Taxpayers Millions and Drives Up Utility Bills for Low-Income Families*, and *Access to Utility Service* (co-author and editor). Mr. Harak is a member of the Massachusetts Energy Efficiency Advisory Council, and served as co-counsel in litigation requiring the U.S. Department of Energy to update energy efficiency standards for residential and commercial appliances. He earned his B.A. from Cornell University and his J.D. from Northeastern University, and is admitted to the Massachusetts bar.

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ABOUT THE NATIONAL CONSUMER LAW CENTER

Since 1969, the nonprofit National Consumer Law Center[®] (NCLC[®]) has used its expertise in consumer law and energy policy to work for consumer justice and economic security for low-income and other disadvantaged people, including older adults, in the United States. NCLC's expertise includes policy analysis and advocacy; consumer law and energy publications; litigation; expert witness services, and training and advice for advocates. NCLC works with nonprofit and legal services organizations, private attorneys, policymakers, and federal and state government and courts across the nation to stop exploitive practices, help financially stressed families build and retain wealth, and advance economic fairness.

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TABLE OF CONTENTS

Executive Summary	2
Introduction	4
<i>Challenges for States</i>	5
The State of Success	5
<i>Overview</i>	5
<i>Massachusetts: WAP-ARRA under the Microscope</i>	6
<i>ARRA Boosts Local Economy</i>	7
<i>ARRA Reduces Energy Bills and Improves the Health of Struggling Families</i>	11
<i>ARRA Helps Stretch Federal Fuel Assistance</i>	12
<i>Massachusetts Exceeds Its ARRA Goals</i>	14
<i>Massachusetts: A High-Quality Program with Thorough Oversight</i>	15
<i>Massachusetts Special Initiatives under ARRA</i>	17
<i>Snapshot of Results in Other States</i>	20
The Future of WAP: A National Perspective	21
<i>Federal FY13 Funding Would Decimate WAP</i>	22
Conclusion: The Need Is Still Great	23
Appendix A: Glossary	25
Endnotes	27
Charts	
1: <i>Jobs for Local Workers</i>	7
2: <i>Massachusetts Homes Weatherized Through ARRA</i>	15
3: <i>Low Income Weatherization Funds and Housing Units Weatherized in Washington State</i>	20
4: <i>National WAP Funding History 1992–2012</i>	23
Videos	
1: <i>Green jobs for Colorado veterans</i>	5
2: <i>Solar hot water comes to senior public housing in Massachusetts</i>	18

EXECUTIVE SUMMARY

On February 17, 2009, President Barack Obama signed into law the American Recovery and Reinvestment Act (ARRA),¹ commonly known as the Federal Stimulus or Recovery Act. The President and Congress were responding to a global financial crisis, the likes of which the United States had not experienced since the Great Depression of the 1930s. This report focuses on:

- The successes that the Commonwealth of Massachusetts (and other states) achieved under ARRA's provision "[t]hat \$5,000,000,000 [billion] shall be for the Weatherization Assistance Program,"² and
- The challenges that are ahead—especially the difficulty of maintaining an adequate and sustainable funding level for the program post-ARRA.

The ARRA appropriation raised two major challenges. First, ARRA imposed Davis-Bacon wage requirements³ on WAP for the first time in the program's history—the requirement that all weatherization workers be paid a "prevailing wage" reflective of wages paid for comparable work in the local job market. Second, the significant increase in funding required states to find large numbers of additional energy auditors to evaluate each home's energy needs and skilled contractors to perform the energy efficiency work, while maintaining high quality.

In most states, the early challenges were overcome and initial program goals were not only met but exceeded. Nationally, 775,000 low-income homes were weatherized as the result of the federal stimulus, exceeding the U.S. Department of Energy's goal of 593,000 homes.⁴ These improvements contribute to much more affordable energy bills for those low-income families as well as more comfortable and healthier living quarters.⁵ In addition, over 14,000 "green" jobs were created, laying the foundation for a job sector that is projected to experience substantial growth over the next decade.⁶

The additional funding provided by ARRA also provided important takeaways as to how states can run a high-quality and cost effective program.

LESSONS LEARNED from WAP-ARRA

1. **Consistent federal funding for WAP is essential.** When funding soars up and then crashes down, it is extremely difficult to attract and retain adequate numbers of contractors who will deliver high-quality services to low-income clients.
2. **State weatherization offices must provide adequate training, support, and oversight to ensure high-quality programs.** At its core, WAP is a residential rehab program that requires solid energy assessments, adequate training for weatherization workers, skilled contractors, and qualified post-installation inspections. Each state must provide the training and support needed to carry out these functions well.

3. **Weatherization funds can help test the value of new technologies in a controlled environment.** Under ARRA, DOE set aside \$90 million for competitive grants to local weatherization agencies “to install renewable energy and energy efficiency technologies that normally could not be installed in the traditional WAP program due to higher costs or other limitations,⁷ under a program called Sustainable Energy Resources for Consumers (SERC). In Massachusetts, this program yielded useful information regarding solar domestic hot water systems, aerogel superinsulation, and micro-combined heat-power systems. Investing in such pilot programs potentially expands the benefits that WAP can provide to low-income households, and the data derived from real-time use can drive further innovation.
4. **Weatherization is an all-around winner** Low-income households have an easier time paying their energy bills and live in healthier homes. The local economy receives a boost through the creation of jobs. Small businesses benefit while the national “green” economy grows more robust. Additionally, greenhouse gas emissions and pollution are reduced.

The Future of WAP

Despite WAP-ARRA’s proven successes, the program is in imminent danger. On September 28, 2012, President Obama signed into law an FY 13 Continuing Resolution (CR), Pub. L. 112-175, which appropriated only \$68 million for WAP for FY 2013. *That is a 66% reduction from the pre-ARRA level and a 95% cut from the annual spending level under ARRA.* At the CR level, states would receive, on average, only \$1 million.⁸ It is likely that some states would choose to decline the minimal federal funding offered, since they could not run a program that would deliver meaningful services to clients. Several states might choose to shut down their weatherization programs entirely.

The Weatherization Assistance Program has only reached approximately 20% of U.S. eligible low-income households. While ARRA’s \$5 billion in funding provided a much-welcome boost to the program, the roller-coaster ride from pre-ARRA funding levels of approximately \$225 million annually, to \$1.5 billion annually during ARRA, and back to a low funding level of \$68 million in FY 13 creates problems easily avoided through a more stable and adequate funding stream. Consistent and sustainable funding of WAP—at least \$300 million annually—will reduce energy costs for households with the least means but also help all households by fostering the market for high-quality weatherization materials and equipment, and skilled weatherization workers.

INTRODUCTION

On February 17, 2009, President Barack Obama signed into law the American Recovery and Reinvestment Act (ARRA),⁹ commonly known as the Federal Stimulus or Recovery Act. The President and Congress were responding to a global financial crisis, the likes of which the United States had not experienced since the Great Depression of the 1930s. Lehman Brothers filed for bankruptcy only five months previously, and there was palpable fear that the entire U.S. financial system, as well as the U.S. economy at large, was on the verge of collapse. With an estimated price tag of \$800 billion, ARRA was intended to provide a major economic stimulus by creating jobs, assisting individuals and sectors of the economy in greatest need, and, more broadly, creating demand for goods and services to offset massive declines in private sector spending and business activity.¹⁰

ARRA included scores of provisions creating new tax incentives and appropriating funding in the areas of health care, education, unemployment assistance, infrastructure, energy efficiency, housing, scientific research and others. This report focuses on:

- The successes that the Commonwealth of Massachusetts (and other states) achieved under ARRA's provision "[t]hat \$5,000,000,000 [billion] shall be for the Weatherization Assistance Program,"¹¹ and
- The challenges that are ahead—especially the difficulty of maintaining an adequate and sustainable funding level for the program post-ARRA.

The U.S. Department of Energy's (DOE) Weatherization Assistance Program was in existence for 33 years at the time ARRA was signed into law, and thus was well-established. However, its funding level was \$225 million on average for several years prior to the passage of ARRA.

Even though the ARRA funding was spread over a three-year expenditure period, with a scheduled end date of September 30, 2012, the \$5 billion still represented approximately a seven-fold increase over prior, annual appropriations. Ramping up seven-fold a program that performs renovations on homes for low-income households posed unprecedented challenges for the state agencies that receive WAP allocations from DOE; for the local agencies that take applications and provide energy efficiency services under WAP; and for the contractors who actually perform the weatherization work.

In most states—including Massachusetts—the early challenges were overcome, and initial program goals were not only met but exceeded.¹² While Massachusetts and the other states portrayed in this report perhaps represent some of the best of what ARRA accomplished across the country, these states do fairly illustrate what occurred under ARRA from coast to coast. Nationally, 775,000 low-income homes were weatherized as the result of the federal stimulus, leading to much more affordable energy bills for those families and more comfortable and healthier living quarters.¹³ By reducing energy bills in those homes, ARRA decreases the risk that low-income families will see their utility service terminated for non-payment and helps scarce fuel assistance funding reach more people.¹⁴



In addition, over 10,000 “green” jobs were created—laying the foundation for a job sector that is projected to experience substantial growth over the next decade.¹⁵ View a short video on how one Colorado business put veterans to work.¹⁶

The federal Recovery.Gov website (which tracks the distribution and spending of funds allocated by the Stimulus) reports that as of the second quarter of 2011, WAP was among the top eight out of about 200 specific ARRA-funded programs in terms of job creation. WAP supported over 14,400 full-time equivalent jobs nationally during the quarter, which was the peak production period for WAP.¹⁷

Challenges for States

From the outset, the ARRA appropriation raised two major challenges. First, ARRA imposed Davis-Bacon wage requirements¹⁸ on WAP for the first time in the program’s history—the requirement that all weatherization workers be paid a “prevailing wage” reflective of wages paid for comparable work in the local job market. Second, the significant increase in funding required states to find large numbers of additional energy auditors to evaluate each home’s energy needs and skilled contractors to perform the energy efficiency work, while maintaining high quality.

THE STATE OF SUCCESS

Overview

When WAP-ARRA was in the early phases of its launch, some news stories focused on the problems that any multi-billion dollar construction program would face (in particular, reaching production goals), especially a program that would eventually carry out rehab work in 775,000 homes spread throughout 50 states. Much of the early delay was caused by Congress imposing Davis-Bacon wage requirements on the weatherization program for the first time in its 33-year history.¹⁹ Davis-Bacon mandates that workers of public works projects receive the hourly wage and benefits that are paid to the majority of employees in that trade in that area. (See the next section for more explanation as to why the Davis-Bacon law resulted in start-up delays.)

Once state and local weatherization agencies overcame initial obstacles in launching this \$5 billion program, few journalists reported on the homes that were successfully weatherized. Following is an in-depth look at how Massachusetts ran a high quality program, followed by an overview of two states in other regions of the nation (Ohio and Washington State). The funding from WAP-ARRA enabled states and local community agencies to help hundreds of thousands of citizens by reducing their energy bills and making their homes healthier and more comfortable.

Massachusetts: WAP-ARRA under the Microscope

Challenges of Davis-Bacon law

The initial challenge that Massachusetts faced, as was the case with many states, was developing “prevailing wages”²⁰ for WAP. Until 2009, contractors who performed WAP-funded work were not required to comply with the Davis-Bacon law and therefore did not have to document that they were paying prevailing wages. Once ARRA required that WAP comply with Davis-Bacon, local agencies that deliver WAP in Massachusetts (and in many other states) realized that there were no established prevailing wage rates for the types of work performed in weatherizing homes. Moreover, while applying Davis-Bacon wage requirements ensures that workers are paid fair wages, the established prevailing wage rates for trades that might be considered comparable (e.g., carpenter, asbestos worker, etc.) were so high that weatherizing many homes would no longer be considered cost-effective—a WAP requirement—if those wage scales were used.

For several months after ARRA passed, the Davis-Bacon requirements made it impossible for many states to move forward. However, the Massachusetts Department of Housing and Community Development (DHCD), the state agency that received the federal WAP funds and oversaw the nonprofit agencies that employ weatherization contractors, worked closely with other state agencies and an array of interested stakeholders to establish new prevailing wage rates specific to the trades involved in weatherizing homes. Dave Fuller, the current WAP director at DHCD, credits Action for Boston Community Development (ABCD)—a large nonprofit agency that implements the weatherization program in Greater Boston—and the Community Action Program Legal Services, Inc. (CAPLAW) project with helping to get over the Davis-Bacon hurdle. (CAPLAW is a nonprofit agency that provides legal and other support services to community action programs around the country.) ABCD and CAPLAW held two trainings—one in Boston and one in Western Massachusetts—for all participating contractors to explain the prevailing wage requirements and how to complete the legally-mandated reporting forms. Fuller noted that ABCD “made it relatively painless for local agencies.”

It took six months from the time ARRA passed to develop workable prevailing wage rates and begin performing ARRA-funded energy efficiency work. Elliott Jacobson, vice-president for energy services at the nonprofit Action, Inc. believes, in retrospect, that “going through the process of setting prevailing wages was too long but proved useful in our state. Massachusetts had to prove that we were paying fair, prevailing wages, which we established through polls and surveys” of the actual wages being paid to weatherization workers. Even after ARRA is completed, the local WAP delivery agencies will still require their contractors to pay the same minimum wages. “We do want to pay people fairly,” Jacobson noted. John Wells, ABCD’s vice-president for real estate and energy services, adds that it’s a “good thing to prove we’re paying fair wages. Something that initially appeared as a barrier has turned into a strength.”

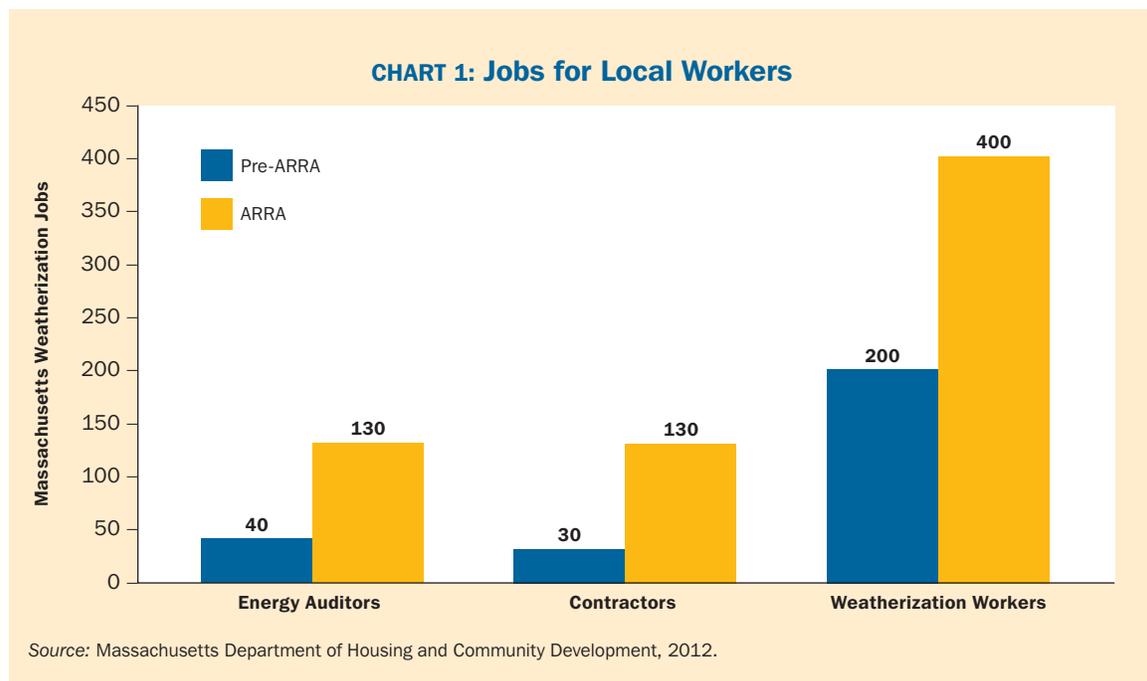
ARRA Boosts Local Economy

Training ramps up

At the time ARRA was signed into law, Massachusetts had a total of 40 energy auditors spread across the 20 local community weatherization agencies that deliver WAP services directly to low-income households.²¹ Those services include adding insulation to roofs and walls; plugging gaps where cold air can infiltrate into the home; and can include repair or replacement of inoperative heating systems.

Qualified energy auditors are essential to running a high-quality weatherization program. They perform the initial audit of the home to determine which energy efficiency measures are needed, monitor the work of contractors as the measures are installed, and are involved in post-completion inspections of the work. In brief, they ensure that the work is cost-effective and done properly. DHCD knew that the number of auditors needed to expand quickly, from the then current workforce of 40 auditors to more than 100 qualified auditors. DHCD's Dave Fuller praises the auditor workforce: "We got some really good people. Some had good training already, others we provided training, and many were BPI-certified."²² (Certification by the Building Performance Institute (BPI) is considered high-quality training by the energy efficiency industry.)

Since energy auditors in Massachusetts are direct employees of the weatherization agencies, hiring new auditors was the more manageable challenge. The greater challenge was recruiting the independent contractors who work on clients' homes, installing insulation and performing air sealing to reduce air infiltration. From the time Congress began considering passage of ARRA, now-retired DHCD Weatherization Director, Ken Rauseo,



began beating the drum that every local weatherization agency should actively solicit new contractors to join the program.

DHCD offered training and support for contractors who may have previously performed residential work but were not focused specifically on weatherization. The state agency also outlined clear pathways by which new contractors could become certified to do weatherization work.

ABCD, using its own funds, ran boot camps at a training facility it established in Mattapan, a neighborhood in Boston. The site included props and equipment—blower doors, infrared scanners, a cellulose blowing machine, and mock-ups of various exterior sidings—that allowed trainees to gain hands-on experience as weatherization workers. Montachusett Opportunity Council, another of the nonprofit local weatherization agencies like ABCD, also set up a boot camp in Fitchburg in central Massachusetts. South Middlesex Opportunity Council (SMOC) in Framingham (a city west of Boston) obtained a grant from DOE to establish a separate training location and a fourth training site was set up by the University of Massachusetts at Dartmouth in Southeastern Massachusetts. With the construction sector particularly hard hit by the financial crisis and an economy in tailspin, these training centers offered an opportunity to gain skills that would lead to jobs. Springfield Technical Community College, as the lead for other community colleges around the state, also set up training programs for energy auditors and those interested in trying to launch their own weatherization companies. At the peak, WAP-ARRA tapped into a network of 130 contractors who employed 400 individuals, an increase of almost 100 contractors and about 200 workers from the pre-ARRA levels.

A boost for local manufacturing

Weatherization work is inherently labor intensive. The WAP-ARRA funding not only created hundreds of jobs, but it also boosted the local Massachusetts economy. Much of the cellulose insulation material installed by the Massachusetts weatherization program is manufactured by National Fiber in Belchertown, Massachusetts (see sidebar on the next page), and the cellulose insulation machines that many contractors use to blow insulation into walls and cavities are made by Accu1-Direct, headquartered in Longmeadow, Massachusetts—a state without any natural gas, oil or coal resources—sends \$8 billion each year out of state for purchase of natural gas and oil used to heat people's homes. Energy efficiency investments keep more of that money in state while employing local workers.

Jobs for local workers

ARRA has helped lift up workers who were beaten down by the recession and a shrinking job market. Andrew Colburn had called shelters “home” on and off for three years, when there was no longer enough work to keep him employed as a house painter. But the nonprofit agency SMOC's “Ready Willing and Able” program allowed Colburn to get day labor jobs, and to move up as a supervisor of SMOC's Summer Youth Program. When ARRA was signed into law, SMOC—the local weatherization and fuel assistance agency in the Framingham area—expanded its weatherization workforce and offered

National Fiber: A Positive Spillover Effect



ARRA funding helped small businesses to provide good jobs with benefits for local workers.
Courtesy of National Fiber.

National Fiber is a small business, which manufactures and distributes cellulose insulation throughout the Northeast and employs 32 people from the Belchertown area (a town of about 13,000 people located in Western Massachusetts). From 1998-2008, the company grew at a robust average annual rate of 15 percent. Even after the housing market tanked, National Fiber continued to enjoy a modest average annual growth of 2 percent from 2008 through mid-year 2012.

The company's growth, in turn, reverberates throughout the local and national economy, with 83 percent of raw materials purchased locally from New England. For example, National Fiber buys 300 tons (that's 15 tractor-trailer loads) *per week* of recycled paper from newspapers in Massachusetts, Maine, and Connecticut.

If the federal Weatherization Assistance Program would end? "We are seeing a pick-up in new construction in Boston but if the program ended, it

National Fiber Materials Purchased	Source (State)
Recycled paper	Massachusetts, Maine, and Connecticut
Light mineral oil	Western Massachusetts
Mineral borate	California
Film for insulation bags	Washington State
Motors for equipment	Massachusetts
Big equipment	Iowa
<i>Source: National Fiber</i>	

would absolutely have a negative effect on our business," says owner Chris Hoch. Additionally, he likes that the program helps low-income households, those that need assistance weatherizing their homes the most. As Hoch points out, anything that helps people use less energy is a good thing. His plea: "Congress, please fund these programs consistently and adequately."

him a full-time job. Colburn says that “connecting with SMOC turned my life around. I came into SMOC four years ago, homeless and beat up. They offered me a prevailing wage job. Now I’m a crew leader.” Colburn’s newly-regained financial stability allowed him to reunite with his wife and move with her into an apartment where he has reunited with his children as well. Colburn says he is now “trying to get my construction supervisor’s license so I can move up to the next step.” ARRA succeeded at the macro level—by helping to stave off a much worse recession—and helped to transform individual lives.²³

Adding up small business successes

John Kelly’s company, Advantage Weatherization, Inc., highlights the success of Massachusetts in using ARRA funding to create jobs while delivering high-quality weatherization services to low-income households struggling to pay energy bills. Based in Brockton, Massachusetts—a city that once was home to many now-defunct shoe and leather goods manufacturers—Advantage had just 20 employees in June 2010, as

the ARRA-funded weatherization program was in its first year of operation. Two years later, Advantage employs 80 workers, many of whom had little prior work experience and who came through training programs offered by the nonprofit job-training organization Youthbuild,²⁴ the Laborers International Union, and ABCD, the state’s largest local weatherization agency. Kelly saw the weatherization program as an opportunity for young people with little experience to get into the construction industry. “Young people were able to get a job, move out of the family home, get an apartment, buy their first car, get health insurance, and open a bank account,” Kelly proudly notes. “Youthbuild was great in bringing along recruits and we hired a lot of displaced workers between the ages of 20 and 40.” Kelly’s employees include former typesetters, fishermen, printers, and at-risk youth. “This recession has been absolutely devastating,” he notes. “ARRA was a sign of hope when nothing else was happening. Without ARRA, we would have cut back our business severely.”

Kelly is also pleased that the work his company does improves tenants’ lives. Much of the housing stock that Kelly’s crews improve includes older homes with little to no insulation and drafty windows.

“Our work makes their homes less drafty and helps them reduce their heating bills,” he says. “I receive letters from grateful customers, many of them elderly, and it shows them that someone cares,” he said. Additionally, notes Kelly, the weatherization work his crews perform helps improve health by reducing mildew and mold and sealing air leaks.

ABCD’s John Wells adds, “Overall, we have had a good experience in working with Advantage. They are one of the great ARRA success stories.” By partnering with the Laborers Union and accessing its training capacity, “Advantage is able to bring resources to our larger multifamily weatherization jobs that many contractors cannot. They can bring the needed labor to the site and do jobs quickly.” Like Kelly, Wells believes that

This recession has been absolutely devastating. ARRA was a sign of hope when nothing else was happening. Without ARRA, we would have cut back our business severely.

—John Kelly,
owner, Advantage
Weatherization, Inc.

ARRA has worked in preparing unskilled people for the construction trades.

John Call, a small contractor based in Haverhill, credits ARRA with helping to put him back in business. Due to the recession, his business was down to himself and one other employee. But he had previous experience doing weatherization work, and, after contacting Action, Inc., he hired three new employees and kept his business afloat.²⁵

Once ARRA fully ramped up in Massachusetts, it employed between 300 and 400 full-time equivalent positions in Massachusetts, according to data compiled by DOE.

ARRA Reduces Energy Bills and Improves the Health of Struggling Families

Although a wonderful benefit, job creation is not the weatherization program's primary goal. Rather, Congress stated that the intent of WAP is to:

increase the energy efficiency of dwellings owned or occupied by low-income persons, reduce their total residential energy expenditures, and improve their health and safety, especially low-income persons who are particularly vulnerable such as the elderly, the handicapped and children.²⁶

Advantage's Kelly puts the program in much more human terms: "Clients let me know that ARRA shows that someone cares about them. Lots of elderly people live in very drafty homes. We've had lots of positive feedback about what ARRA has done for the people we've served."

John Wells at ABCD notes that the pocketbook savings for low-income families are a key value of WAP. But the work "also seals up loose air pockets, makes minor repairs needed to ensure that the work lasts, and installs proper dryer vents." The overall package of services makes clients' homes more livable and creates stability for them. "There are so many stories of people having to live in only two rooms to cut down on heating bills during the winter, but after weatherization they can afford to use the whole house again. That kind of stability goes a long way and gives people a sense of dignity," says Wells.

Elliott Jacobson, vice-president of energy services at Action, Inc., also takes pride in the fact that the services his agency delivers make homes more comfortable and improve client health. "Clients tell me that they haven't felt so good in years, they can have the grandchildren over without worrying they'll freeze." The advent of ARRA funding for WAP enabled the local weatherization agencies to provide a broader scope of services to each home reached because average expenditures per household increased by



Advantage Weatherization worker seals air leaks in a basement to help stop drafts.

©2012 Advantage Weatherization, Inc.

approximately \$2,000. The additional funding made it more likely that all necessary weatherization work, including related repairs and health and safety measures, would be delivered.

The data tell one story: A full-scale weatherization job will generally reduce the household's spending on energy bills by 25% to 35%. For the 30% of low-income households who heat with oil, the savings average \$700 annually.²⁷ If an old, inefficient furnace or boiler is also replaced, the total bill reduction could be 40% or more, according to ABCD's Wells.

But more important than statistics are the people who benefit from weatherization improvements. Stephanie East, a single mother of two young children, had her home in Gloucester weatherized by Action, Inc. during the summer of 2011. In addition to thanking Action for its assistance, she noted, "I had been dreading another winter in this house with our high heating costs, but now I know we'll be okay." (See sidebar on the next page for more of her story.)

An article in the *Herald News* of Fall River, Massachusetts, highlights Nancy Savitch, a disabled grandmother raising three children who bemoaned the freezing temperatures in her home before Citizens for Citizens (CFC), the local weatherization agency, made energy improvements to her home. After her home was weatherized, Savitch beamed that her "house was so toasty!" Madeleine Cormier, CFC's weatherization director, sees clients' bills go down 25% or more after weatherization. "Because of energy improvements made to their homes from the weatherization program, families can budget better and have more to spend on other basic needs, including housing, prescriptions, and food," she says.

The true value of weatherization, however, cannot be measured in energy and dollar savings alone. Kevin Granger, a disabled truck driver living in Dalton (a town in Western Massachusetts), not only saw his bills cut in half due to weatherization, he no longer has to contend with indoor temperatures that used to reach 100 degrees in the summer. Berkshire Community Action Council, which weatherized his home, replaced rotted windows, fixed cracks in the heating system, and installed a new back door, improvements made so that his house is warmer in the winter and cooler in the summer.²⁸ With 20,000 Massachusetts homes weatherized under ARRA, success stories like this abound.

ARRA Helps Stretch Federal Fuel Assistance

Moreover, while weatherization cannot replace the need for the Low Income Home Energy Assistance Program (LIHEAP),²⁹ it can mean the difference between those LIHEAP payments getting the household through the entire winter versus the family running out of heat mid-winter. For example, the maximum LIHEAP benefit for oil-heated households in Massachusetts was \$1,095 last year (the winter of 2011–2012). A

Because of energy improvements made to their homes from the weatherization program, families can budget better and have more to spend on other basic needs, including housing, prescriptions, and food.

—Madeleine Cormier,
Citizens for Citizens'
weatherization director

Helping Hand for a Grateful Family



Homeowner Stephanie East with national, state, and local weatherization officials at an event celebrating her home as the milestone for 10,000 homes weatherized in Massachusetts with federal stimulus (ARRA) funding. *Courtesy of Action, Inc.*

Stephanie East of West Gloucester, Massachusetts, realized her American dream when she purchased her home in 2010. But soon, her dream turned into a nightmare: This single mom of children aged 7 and 10 scrambled to pay unexpectedly high heating bills that first winter and then was laid off, a casualty of the Great Recession. In 2011, she was anxious about paying the upcoming winter's heating bills when a friend suggested East contact the local community action program, Action, Inc., for help. "I felt so incredibly blessed when Action, Inc. came through for us," said East.

The Gloucester-based nonprofit insulated the attic and walls of the East family's home, sealed cracks in the foundation to close up air leaks, replaced windows, and installed a programmable thermostat. "The comfort is definitely better in our home; it's warmer in the winter and cooler in the summer," says East. "Plus, neither of my children had nearly

as many colds as typical so they didn't miss as much school."

And there's more good news. East used 752 gallons of oil to heat their home that first year. This past winter? The family used just 235 gallons, a savings of nearly 70%. East says that the weatherization improvements and the addition of the programmable thermostat, which helped her to moderate her fuel use, made a big difference.

Fortunately, East is now working and will continue to reap the benefits of the weatherization improvements to her family's home for years to come. "Action, Inc. definitely helped me out at a time when I was down and out and it took off some of the burden while I was job searching," says East. "The weatherization assistance program is so incredibly important for struggling families, especially with the current economy, and for single parents, it gives the extra support that is so needed."

household living in a poorly weatherized home might have had oil bills of \$2,500 or more, requiring the family to come up with at least \$1,405 to get through the winter. For many low-income families, this is more than they can afford. But a family which receives weatherization services might see that bill drop to \$1,700, leaving a gap of only \$605. While still a substantial sum, the family is much more likely to amass the needed funds to pay this bill. Given that LIHEAP funding is never adequate to meet the overall need, weatherization plays a critical role in helping low-income families get through cold winters and paying their heating bills.

Massachusetts Exceeds Its ARRA Goals

Congress's vote to give the U.S. Department of Energy \$5 billion to spend on WAP over three years was somewhat like feeding a small mammal to a boa constrictor: It took DOE some time to fully digest the meal it was fed. Early on, the *New York Times* ran highly critical coverage of the program's slow start, noting in February 2010 that the program "has so far borne little fruit, with many of the biggest states meeting less than

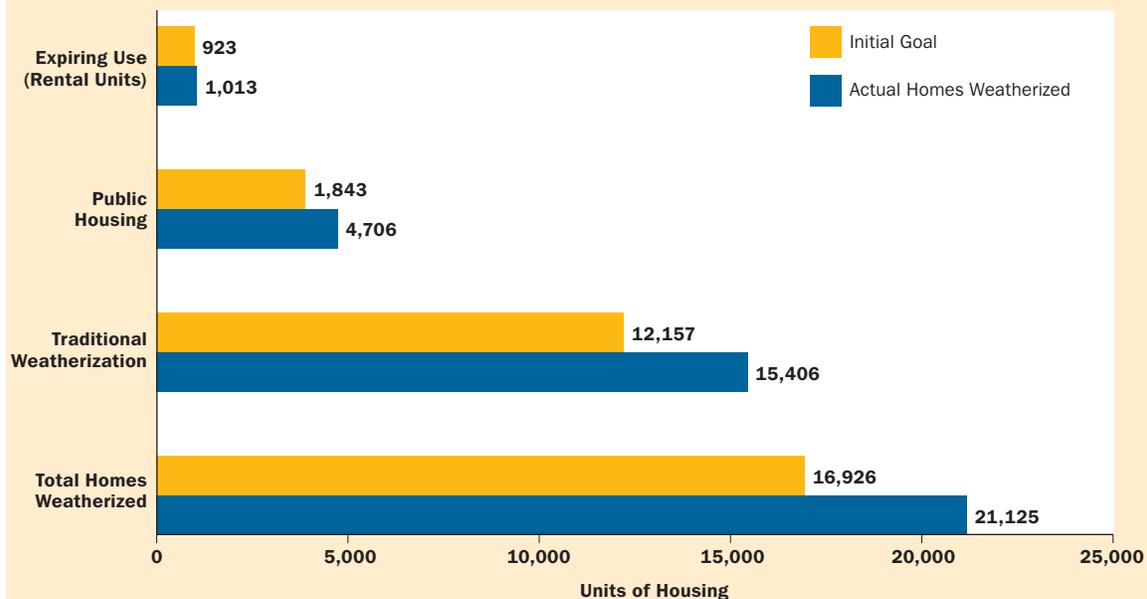
2 percent of their three-year goals to date." DOE Inspector General Gregory Friedman called the lack of progress "alarming."³⁰ And, in March 2012, the U.S. House Committee on Oversight and Government Reform chaired by Rep. Darrell Issa (R-CA) branded WAP a "stunning example of how the Obama Administration has wasted billions of taxpayer dollars in a misguided effort to achieve energy savings."³¹

But the reality runs counter to those claims. By the time of ARRA's formal closeout on September 30, 2012, Massachusetts DHCD, through local agencies, weatherized more than 21,000 units of housing, or 4,000 more than the initially-established goal of 16,900 homes. Also, by that date, DHCD spent the entire \$122 million allocated to the state under WAP-ARRA.

While the early criticism that WAP-ARRA got off to a slow start was correct, now that the program is concluded, many states, like Massachusetts, exceeded their goals.³² States surpassing their weatherization goals include California,³³ Idaho,³⁴ Indiana,³⁵ Minnesota,³⁶ Montana,³⁷ New York,³⁸ Pennsylvania,³⁹ Texas,⁴⁰ Washington,⁴¹ and Wisconsin.⁴² Other states operated ahead of schedule.⁴³ In total, the Weatherization Assistance Program, through the ARRA federal stimulus funding, made energy improvements to more than 775,000 homes, exceeding the U.S. Department of Energy's goal of 593,000 homes.⁴⁴ As of September 30, 2012, 96.75% of the funds had been spent and 20 states had spent over 99% of their funds.⁴⁵

In total, the ARRA Weatherization Assistance Program made energy improvements to more than 775,000 homes, exceeding the U.S. Department of Energy's goal of 593,000 homes.

CHART 2: Massachusetts Homes Weatherized Through ARRA



Source: Massachusetts Department of Housing and Community Development, October 2012

Massachusetts: A High-Quality Program with Thorough Oversight

Risks of ARRA

“I’m a huge fan of the weatherization program.” Somewhat surprising words from Jeffrey Simon, the so-called “Recovery Czar” in charge of ensuring that the \$7.5 billion that Massachusetts received in total under ARRA was well-spent, and that fraud, waste, and abuse were avoided. With the formal title of director of the Massachusetts Recovery and Reinvestment Office, Simon knew that WAP-ARRA was high-risk: a program that had previously spent \$5 million to \$6 million annually in the state would have to spend \$122 million in less than three years, using a network of 20 local nonprofit weatherization agencies and well over 100 mostly small contractor companies. With an extensive background in real estate development, Simon saw warning flags when he assessed WAP. He retained the consulting firm Deloitte & Touche to review risk profiles for the dozens of ARRA-funded programs in Massachusetts. Deloitte did a “deep dive” on half a dozen programs. One of the risk criteria? A large increase in funding.

Control measures to avoid fraud, waste, and abuse

Simon decided to meet directly with Ken Rauseo, then the state weatherization director at DHCD, and Rauseo's staff, to review measures that help deter and prevent fraud. DHCD provided Simon with monthly operational reports that included text descriptions and detailed data: the number of housing units completed, progress in bringing on new energy auditors and weatherization contractors, among other measures. Rauseo won over the cautious Recovery Czar. "Ken Rauseo is one of the great unsung heroes of state government," Simon declared. "He did a great job with eyes wide open" about risks posed by WAP-ARRA spending, said Simon. In turn, Rauseo saw the value of drawing on Simon's experience as a builder/developer. The "Recovery Czar" was a very hands-on overseer; he frequently visited job sites to see the work being done first-hand. Those visits taught him more than just about the quality of the work, as demonstrated by this quote by Simon from a local news article:

"When I visited the sites, there was a level of appreciation that was heartfelt by clients. Clearly, clients were getting tremendous benefits. At the Gloucester event [celebrating 10,000 homes weatherized through ARRA-WAP],⁴⁶ the client had a blanket covering the door to keep the cold out. After her home was weatherized, her bills went down by more than one-third."

The local WAP-ARRA agencies in Massachusetts were audited and monitored by DHCD, the state Inspector General, Simon's Recovery office, the federal Department of

I don't think we had one fraud issue in weatherization.

—Jeffery Simon,
director of the
Massachusetts
Recovery and
Reinvestment Office

Energy, and the federal Government Accountability Office. It often seemed that as soon as one audit was completed, the next audit or monitoring team would appear. While large amounts of administrative time were spent complying with the monitoring visits, they helped ensure that the program delivered services to clients properly and efficiently. As Simon noted, "I don't think we had one fraud issue in weatherization." And according to Action Inc.'s Elliott Jacobson, "that was due in no small part to the long history of DHCD and the local weatherization agencies working very closely together to make sure all work performed was of the highest quality, and that there were strong monitoring systems in place to detect and fix any problems that occurred."

ABCD's Wells credits the long history of Massachusetts community action programs in running WAP as a strong check against fraud.

"We have pricing for energy efficiency that is very clear and transparent and we have a contractor certification process that includes trainings and inspection," he said. "On every job, we have a clear scope of work at the outset, on-site inspection while the work is being done, and post-completion inspection at the local level. Moreover, DHCD additionally inspects about 20% of all jobs. That process remains in place post-ARRA. We also receive scrutiny from the utilities that partially fund this work, by DOE, and evaluators. There is very little opportunity for fraud, waste, or abuse."

Massachusetts Special Initiatives under ARRA

Sustainable Energy Resources for Consumers (SERC) program

Under ARRA, DOE set aside \$90 million for competitive grants to local weatherization agencies “to install renewable energy and energy efficiency technologies” that normally could not be installed in the traditional WAP program due to higher costs or other limitations,⁴⁷ under a program called Sustainable Energy Resources for Consumers (SERC). The overall goal was to test how well these technologies worked in actual buildings. Two Massachusetts community action agencies, ABCD and Action, Inc., jointly received a SERC award to support \$3 million of investments in three technologies which previously had not been deployed under the weatherization program: installing micro-combined heat and power (CHP) systems,⁴⁸ with a goal of serving 120 housing units; installing aerogel superinsulation, with a goal of 300 units; and installing solar domestic hot water (DHW) systems, with a goal of 300 or more units of low-income housing, for a total of 720 units of housing.

ABCD took the lead in overseeing the design and installation of these three technologies. For the solar DHW work, ABCD accessed \$2 million from the Massachusetts Clean Energy Center⁴⁹ and \$1 million from the SERC funding and completed a dozen projects located around the state encompassing over 500 units of housing, exceeding the initial goal. ABCD designed the solar DHW projects in-house, which reduced the up-front costs potential bidders faced in competing for the work. The end result? Contractors came in with much lower prices than were first anticipated, leading to quicker paybacks for these renewable energy investments. Many of the solar DHW solar units were installed in single-room occupancy buildings or other

Sizing Up Newer Technologies



Solar collectors for domestic hot water. *Courtesy of Sam Heppell.*

- **Aerogel superinsulation** is an extremely lightweight yet solid material comprised of air (90%) and silica. It doesn't absorb water and has tremendous insulating properties (nearly double the insulation value of the best rigid insulation boards). The major current drawback is its high cost.
- **Micro-combined heat and power (CHP)** uses an engine (which can be similar to an automobile engine) that generates useful heat—to heat domestic hot water, or simply to heat interior space—as well as electricity from a single fuel source. Because the approach produces both useful heat and electricity, it is generally more energy efficient than a traditional hot water heating system or warm-air furnace.
- **Solar Domestic Hot Water (DHW) heaters** can be used in any climate and are fueled by the sun to provide hot water for a building. A DHW system contains both solar collectors (see photo) and storage tanks. Heat is transferred from the collector to the storage unit. A conventional hot water system kicks in when not enough heat is provided by the sun, such as on cloudy days. Because the fuel (the sun) is free, it saves money and reduces greenhouse gas emissions.

Solar Shines at Boston Public Housing



Tenants and officials from ABCD and the Commonwealth of Massachusetts celebrate the installation of solar hot water at a Boston public housing complex. *Courtesy of Boston Housing Authority.*

The elderly and disabled tenants living in the Boston Housing Authority's (BHA) Amory Street development are already benefitting from the solar DHW program. At a July 25, 2012 ribbon-cutting ceremony at the 184-unit building, speakers praised the scale of the project—with 2,880 square feet of collectors, the largest solar DHW installation on any public housing building in the state—as well as the projected \$13,000 in annual energy savings, the projected reductions in greenhouse gas emissions, and the boost such projects give to the “green economy” in Massachusetts. The rooftop installation is expected to reduce energy consumption for hot water by 50% annually.⁵⁰ View a **short video** of another solar hot water celebration for elderly public housing in Woburn, Massachusetts. 

multifamily housing (see sidebar), as the much higher use of hot water per square foot made installation more cost-effective. Units were also installed in homeless shelters.

According to ABCD's John Wells, who oversaw the project, preliminary results show that “solar DHW is fairly close to cost effective” when there is a large enough demand for hot water in the building: households with teenagers and large families; large numbers of apartments in buildings; and nonprofit community buildings with swimming pools or large kitchens. As additional data is collected from the current installations, it will become clearer whether it makes sense to more widely deploy this technology.

As for the micro-CHP work, Wells notes that “we advanced deployment of this technology more than anywhere else in the country. ABCD did 15 micro-CHP projects in multifamily buildings (3 to 6 apartments) for a total of about 80 micro-CHP units,” installing an engine that generates electricity and useful heat. The aerogel superinsulation—a new, ultra-thin insulation technology—was installed in three projects involving 300 apartments to generate more data about its potential cost-effectiveness. Wells believes that the micro-CHP units will prove cost effective once enough data is collected from these installations. It appears, how-

ever, that aerogel superinsulation is not a cost-effective option. But it is valuable to gain this practical experience with superinsulation.

The SERC project in Massachusetts clearly met its production goals, (including exceeding overall production goals by serving a total of 1,168 eligible households) and generated useful data regarding which technologies are cost-effective, thus expanding the

options that WAP can offer low-income households. Because solar DHW relies on a renewable resource—the sun—and CHP utilizes natural gas much more efficiently than traditional systems, SERC is not only finding new ways to help low-income households keep their energy bills down, but it is also helping to conserve scarce energy resources and reduce greenhouse gas emissions.

Multifamily work and “expiring use” rental properties

In many states, there has been a tension in WAP between serving those living in 1 to 4 unit buildings and those living in larger multifamily buildings (5 units or more). One reason is that without WAP’s help, those living in single-family homes often have no other option for increasing their home’s energy efficiency, whereas owners of multifamily housing have access to the rental income and may receive subsidies from federal or state housing agencies. Elderly homeowners in particular often live in older single-family homes with little or no insulation and are more susceptible to hypothermia than younger people. In fact, federal law requires local WAP agencies to give priority to elders over age 60 as well as to disabled individuals and families with children.⁵¹ Moreover, because many of the smaller multifamily buildings are of construction similar to single-family homes, local WAP agencies can easily work on these buildings, yet may not have the requisite skills and experience to deal with large, central heating and hot water systems and other aspects of energy efficiency work in large multifamily buildings.

Under ARRA, the Commonwealth of Massachusetts set aside substantial funds to work specifically on these larger multifamily buildings (as did several other states), focusing on buildings owned by public housing authorities and so-called “expiring-use” properties to incentivize the owners to agree to extend the rent restrictions for a longer period of time. These latter properties are privately owned but receive various types of public subsidies which require the owner to restrict the use of the rental apartments to lower-income families, but only for a specified period of time. As that low-income use restriction winds down, the property is considered an “expiring-use” property. This requirement is especially beneficial in communities with high demand for rental housing, such as Boston.

DHCD, the Massachusetts state weatherization agency, chose ABCD to deliver the energy efficiency services under the \$6 million it set aside for expiring-use properties. One of the first projects completed was Franklin Field Apartments in Boston. Around the time ARRA was signed into law, the 200-plus unit Franklin Field building was undergoing a major renovation. ABCD assisted Franklin Field in including major energy efficiency upgrades, by using ARRA funds. Because the tenants do not pay for heat at Franklin Field, ABCD had to find other means to ensure that the benefits of this WAP investment “will accrue primarily to the low-income tenants residing in such units.”⁵² To meet that requirement, Franklin Field Apartments agreed to donate a significant portion of the annual energy savings—\$60,000—for additional tenant services and also agreed to extend the period of time during which rents charged to tenants would remain below market rates. Overall, WAP-ARRA in Massachusetts provided energy efficiency services for over 1,000 units of housing in 12 expiring-use buildings.

Snapshot of Results in Other States

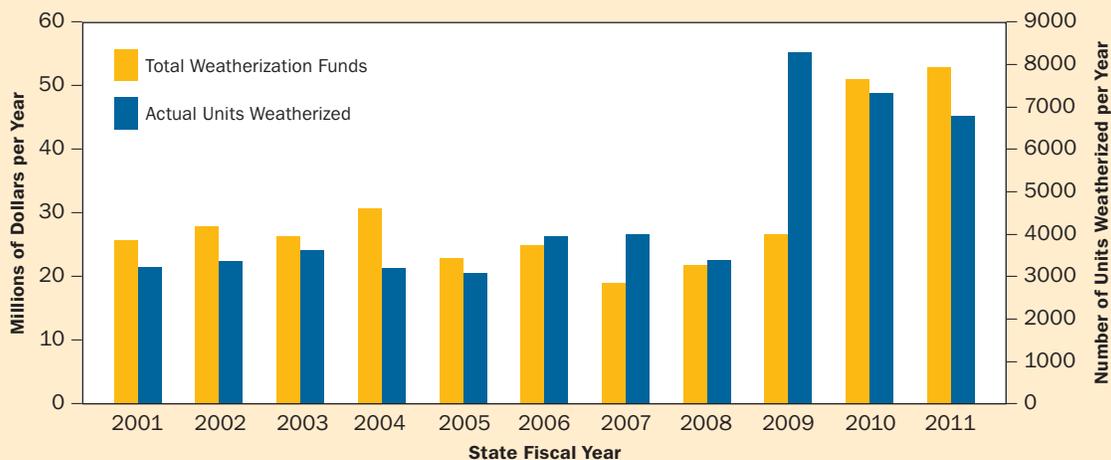
Washington⁵³

The state of Washington had an initial goal of weatherizing 6,940 units of low-income housing. Instead, the state weatherized 13,402 units of housing, exceeding its initial goal by 93%. The ARRA funds created 180 full-time jobs and supported an additional 320 jobs. Because the state surpassed its federal production goals, it received an early release of the second half of its original ARRA funds and an additional \$7 million in a competitive innovation weatherization grant. With the increased funding that ARRA made available, the state initiated a multifamily pilot project that weatherized 1,424 units in 21 multifamily buildings, a housing sector that is often underserved by government- and utility-funded energy efficiency programs.

Prior to ARRA, Washington had spent an average of \$21 million annually on weatherization, counting all state and federal sources available. Under ARRA, annual spending more than doubled to \$49.7 million.

Despite this significant ramp-up, the Washington State Auditor's Office, which closely monitored the program's expansion due to the level of funding awarded, noted that the state weatherization agency has "established a monitoring process that included many of the leading practices we identified" and that the agency had met 29 of 33 "Elements of an Effective System."

CHART 3: Low Income Weatherization Funds and Housing Units Weatherized in Washington State



Source: Washington State Department of Commerce

With ARRA funding now fully spent, Washington—like many other states—will no longer have the funds to sustain the trained workforce that was built up, and far fewer low-income homes will be weatherized each year.

Ohio

Ohio had an initial production goal of weatherizing 32,180 homes, but actual production was 25% higher: 40,180 units. The state will spend out the remainder of its allotted weatherization federal funds during Program Year 2013; only 0.4% of its ARRA funds were unspent as of March 31, 2012. While Ohio has not evaluated energy savings specifically for ARRA-funded weatherization jobs, recent evaluations by the state and by a major natural gas utility in the state show a 30% reduction in natural gas and propane heating use for weatherized homes and an average annual bill savings exceeding \$450.

ARRA also was a job creator for the state of Ohio. In anticipation of the ARRA-funded expansion, Ohio allocated more funding for its Weatherization Training Center and sent additional money to the local weatherization agencies to hire more crews and purchase needed equipment. Prior to ARRA, the employment base was 624. Under ARRA, agencies and contractors added 807 additional jobs, for a total of 1,431 jobs in the weatherization sector.

As was true in many other states, the ARRA-imposed Davis-Bacon wage standards took some time and effort to work through, especially for the mostly smaller weatherization contracting companies. But Ohio clearly succeeded in not only meeting, but exceeding its production goals.

On average, Ohio's low-income weatherized homes use 30% less heat and homeowners save \$450 annually.

THE FUTURE OF WAP: A NATIONAL PERSPECTIVE

WAP-ARRA has led to the weatherization of more than 775,000 low-income homes while employing thousands of people who now have “green jobs” skills. Despite the initial challenges of having to ramp up their efforts more than seven-fold, most states ultimately met their goals and proved that the WAP network can deliver at a much higher volume of homes than pre-ARRA. The additional funding provided by ARRA also provided important takeaways as to how states can run a high-quality and cost effective program.

LESSONS LEARNED from WAP-ARRA

1. Consistent federal funding for WAP is essential.

When funding soars up and then crashes down, it is extremely difficult to attract and retain adequate numbers of contractors who will deliver high-quality services to low-income clients.

2. State weatherization offices must provide adequate training, support, and oversight to ensure high-quality programs. At its core, WAP is a residential rehab program that requires solid energy assessments, adequate training for weatherization workers, skilled contractors, and qualified post-installation inspections. Each state must provide the training and support needed to carry out these functions well.

3. Weatherization funds can help test the value of new technologies in a controlled environment. The Sustainable Energy Resources for Consumers program in

Massachusetts yielded useful information regarding solar domestic hot water systems, aerogel superinsulation, and micro-combined heat-power systems. Investing in such pilot programs potentially expands the benefits that WAP can provide to low-income households, and the data derived from real-time use can help drive further innovation.

4. Weatherization is an all-around winner.

Low-income households have an easier time paying their energy bills and live in healthier homes. The local economy receives a boost through the creation of jobs. Small businesses benefit while the national “green” economy grows more robust. Additionally, greenhouse gas emissions and pollution are reduced.

Federal FY13 Funding Would Decimate WAP

Despite WAP-ARRA’s proven successes, the program is in imminent danger. On September 28, 2012, President Obama signed into law a Fiscal Year (FY) 13 Continuing Resolution (CR), Pub. L. 112-175, which appropriated only \$68 million for WAP for FY 2013. *That is a 66% reduction from the pre-ARRA level and a 95% cut from the annual spending level under ARRA.* According to the CR, states would receive, on average, only \$1 million. Less populated states and those states with warmer climates would receive even less money. Some states—including cold weather and high energy cost states, such as Rhode Island and Vermont—would receive barely enough money to cover core administrative staff, let alone deliver any actual weatherization services.⁵⁴ It is likely that some states would choose to decline the minimal federal funding offered, since they could not run a program that would deliver meaningful services to clients. Several states might choose to shut down their weatherization programs entirely.

The federal FY13 funding for WAP is for an average \$1 million per state, a cut of 95% from the annual spending level under ARRA and a 66% cut from pre-ARRA spending levels.

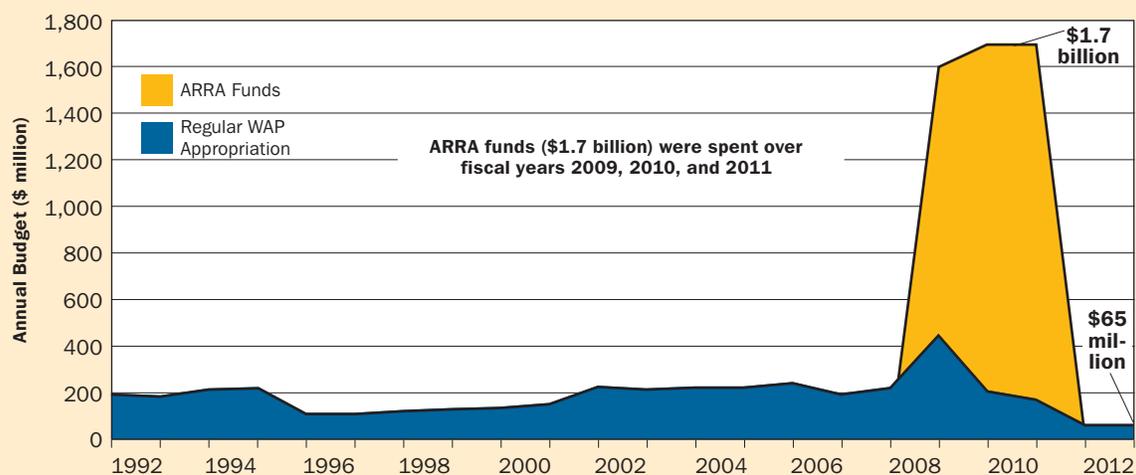
In many states, there are utility-funded programs⁵⁵ that can supplement the limited state funding that is available.⁵⁶ However, these utility-funded programs are by no means a panacea for the problem of inadequate WAP funding at the federal level. First, some states have no funding, while others have limited programs which may not serve low-income customers.⁵⁷ Further, in the absence of adequate federal funding, “It’s going to make things a lot harder to be successful,” notes ABCD’s John Wells. “Utilities are limited in the scope of what they can pay for. There are a lot of things we depend on in DOE-WAP that utilities can’t pay for from a cost-effectiveness point of view.” Repairs to the building envelope that allows the WAP work to proceed is just one example.

CONCLUSION: THE NEED IS STILL GREAT

ARRA was a proven, cost-effective success in Massachusetts and in many other states across the country, as documented in this report. That success can be maintained only with an adequate and sustained Congressional appropriation. Millions of low-income homes remain to be weatherized. Over its 35-year history, WAP has reached an estimated 8 million homes.⁵⁸ As of 2010, one-third of U.S. households had incomes at or below 200% of poverty (the general income eligibility limit for WAP).⁵⁹ With approximately 115,000,000 households in the U.S.,⁶⁰ WAP has only reached approximately 20% of U.S. eligible households. A tremendous amount of work still needs to be done.

Weatherizing these homes not only reduces the residents’ energy bills and improves the health of those living in the homes, but also helps reduce greenhouse gas emissions

CHART 4: National WAP Funding History 1992–2012*



*The first appropriation for the Weatherization Assistance Program occurred in FY 1977. The chart is abbreviated for layout purposes. Source: Congressional Research Service, “DOE Weatherization Program: A Review of Funding, Performance, and Cost-Effectiveness Studies,” January 11, 2012.

The Weatherization Assistance Program has only reached approximately 20% of U.S. eligible low-income households.

while building the “green economy.” While ARRA’s \$5 billion in funding provided a much-welcome boost to the program, the roller-coaster ride from average pre-ARRA funding of \$225 million annually, to \$1.5 billion annually during ARRA, and back to a low funding level of \$68 million in FY13 creates problems easily avoided through a more stable and adequate funding stream. A more consistent and sustainable funding level—at least \$300 million annually—is necessary to reduce energy costs for households with the least means but also to help all residential households by fostering the market for high-quality weatherization materials and equipment, and skilled weatherization workers.

APPENDIX A: GLOSSARY

Action for Boston Community Development (ABCD) An anti-poverty nonprofit that serves Boston, Massachusetts and adjacent communities.

Action, Inc. A nonprofit community action agency that serves low-income and working poor people in the Greater Cape Ann (northeast) area of Massachusetts.

American Recovery and Reinvestment Act (ARRA) The federal stimulus signed into law in February 2009 as a response to a severe economic recession in the United States.

Boston Housing Authority (BHA) The agency that oversees Boston's public housing for low- and moderate-income persons in the city.

Building Performance Institute (BPI) An organization which develops professional credentials for individuals and accreditation for contracting companies involved in delivering energy efficiency services. Many professionals in the energy efficiency industry consider BPI certification an important indicator that the auditor has had high-quality training.

Community Action Program Legal Services, Inc. (CAPLAW) A nonprofit membership organization dedicated to providing the legal, governance, and management resources necessary to sustain and strengthen the national Community Action Agency network.

Citizens for Citizens, Inc. (CFC) An anti-poverty nonprofit community action agency in Southeastern Massachusetts.

Combined Heat and Power (CHP) An efficient energy approach that generates power and heat from a single fuel source. CHP can greatly increase operational efficiency and decrease energy costs while reducing greenhouse gas emissions.

Community Action Agency Nonprofit organizations that work to strengthen low-income communities and to help low-income households achieve self-sufficiency and economic security.

Davis-Bacon Act Enacted in 1931, the Davis-Bacon Act (40 U.S.C.A. §§ 276a to 276a-5) is a federal law that governs the Minimum Wage rate to be paid to laborers and mechanics employed on federal public works projects. Its purpose is to preserve the local wage standards by establishing a "prevailing wage" and promote local employment.

Department of Energy (DOE) The federal department that oversees the Weatherization Assistance Program.

Department of Housing and Community Development (DHCD) The Massachusetts department responsible for overseeing the federal Weatherization Assistance Program funding through 24 community action agencies/nonprofits in the state.

Expiring Use Properties Multifamily properties that receive federal subsidies to provide affordable housing options to low-income families for a specific period of time before converting the units to market-rate.

Low-Income Home Energy Assistance Program (LIHEAP) A federal program that assists eligible low-income households in partial payment of heating bills. Created in 1981, the program is overseen by the United States Department of Health and Human Services (DHHS), and funded by grants appropriated from the federal government.

Montachusett Opportunity Council A community action agency serving North Central Massachusetts communities.

Solar domestic hot water (DHW) A heating system fueled by the sun and used to generate hot water for a building.

Sustainable Energy Resources for Consumers (SERC) A program that awards grants to local weatherization agencies to install weatherization materials and technologies that have promise for energy savings and benefits to customers, but which cannot currently be installed under the traditional Weatherization Assistance Program.

South Middlesex Opportunity Council (SMOC) A nonprofit community action agency in Framingham, Massachusetts.

Weatherization Assistance Program (WAP) Since 1976, this U.S. Department of Energy program has provided annual funding to states, U.S. territories, and tribal governments to improve the energy performance of dwellings of low-income families. Doing so enables low-income families to permanently reduce their energy bills by making their homes more energy efficient while improving the health and safety of homes.

END NOTES

1. Public Law No. 111-5; 123 Stat. 115.
2. Public Law 111-5, Title IV; 123 Stat. 138.
3. Section 1606 of ARRA (123 Stat. 303) mandated that “all laborers and mechanics employed by contractors and subcontractors on projects funded by [ARRA] . . . shall be paid wages at rates” equal to or higher than those set by the Secretary of Labor.
4. “WAP Recovery Act: All Grantees.” (Oct. 21, 2012), provided by Robert Scott, Director of Energy Services, National Association of State Community Services Programs. Note that the initial production goal not surprisingly turned out to be a low estimate, as the assumed average expenditure per unit was on the high side of what was needed to weatherize the average home. Because the program in fact spent less per unit than had been assumed, while still fully weatherizing most homes, the actual number of homes weatherized exceeded the initial goal.
5. For a study evaluating the health and other benefits of housing rehabilitation using green and healthy principles, see: National Center for Healthy Housing/Enterprise Community Partners, “Case Study: Creating Green and Healthy Affordable Homes for Families at Viking Terrace, Worthington, Minn.” (2010), pp. 15–20 (“There was a statistically significant decrease in the percentage of adults who reported having several specific health problems from pre-renovation (T0) to immediate post-renovation (T1), including chronic bronchitis ($p=0.025$), hay fever ($p=0.046$), sinusitis ($p=0.025$), hypertension ($p=0.083$) and asthma ($p=0.046$) (Figure 3-2).”), report available at: <http://www.practitionerresources.org/cache/documents/673/67397.pdf>. For a much larger scale study of the health benefits of weatherization, see New Zealand Energy Efficiency and Conservation Authority, “Multiple Benefits of Energy Efficiency,” PowerPoint presentation available at: <http://www.iea.org/media/workshops/2012/energyefficiency/Patterson.pdf> (in retrofitted houses, hospital admissions for respiratory conditions drop 43%; missed school days down 23%; days off work drop 39%). For a more detailed report of the New Zealand program, see Lucy Telfar Barnard, Nick Preval, Philippa Howden-Chapman et al., “The impact of retrofitted insulation and new heaters on health services utilisation and costs, pharmaceutical costs and mortality: Evaluation of Warm Up New Zealand: Heat Smart.” (Oct. 2011), available at: http://sustainablecities.org.nz/wp-content/uploads/NZIF_Health_report2.pdf. Retrofitted insulation delivered through the Warm Up New Zealand: Heat Smart Programme had a significant impact on reducing hospitalisation and pharmaceutical costs for occupants of houses that had been remediated compared to those living in matched houses in the area, who had not received insulation or heating as part of the Programme.
6. According to a study released by *McGraw-Hill Construction* in October 2011, “35% of architects, engineers and contractors report having green jobs today, representing 661,000 jobs . . . That share is expected to increase over the next three years, with 45% of all design and construction jobs being green in 2014.” Moreover, jobs for those in the construction trades—carpenters, HVAC/boilermakers, electricians, concrete/cement masons, and plumbers “are expected to see the greatest growth in green jobs.” McGraw-Hill Construction News Release, “Green-build: Growing Green Building Market Supports 661,000 Green Jobs in the U.S.—a Third of the Design and Construction Workforce—According to New McGraw-Hill Construction Study.” (Oct. 4, 2011), available at: <http://www.construction.com/about-us/press/mcgraw-hill-construction-study-green-jobs.asp>.
7. U.S. Dep’t of Energy, “SERC Grants Expand Weatherization Technologies.” DOE Weatherization and Intergovernmental Program (July 2011), available at: http://www1.eere.energy.gov/wip/pdfs/serc_factsheet.pdf.

8. For example, under the FY 2011 national WAP appropriation of \$174.3 million, Delaware, Rhode Island and Vermont were allocated, respectively, \$447,000, \$888,000, and \$981,000. See WAP Notice 11-2, "Program Year 2011 Grantee Allocations." (May 26, 2011), available at: http://www.waptac.org/data/files/website_docs/government/guidance/2011/wpn%2011-2.pdf. Were these states to receive the same percentage of the proposed CR appropriation of \$68 million, each of these states would receive between (approximately) \$150,000 and \$300,000. These sums would be barely adequate to employ a minimum of state program managers and fiscal oversight staff.
9. Public Law 111-5; 123 Stat. 115.
10. In ARRA's "Statement of Purposes," Congress included these goals: "To preserve and create jobs and promote economic recovery; To assist those most impacted by the recession; [and] . . . To stabilize State and local government budgets, in order to minimize and avoid reductions in essential services and counterproductive state and local tax increases." Pub. L. 111-5, § 3; 123 Stat. 116.
11. Pub. L. 111-5, Title IV; 123 Stat. 138.
12. WAP Recovery Act: All Grantees." (Oct. 21, 2012), provided by Robert Scott, Director of Energy Services, National Association of State Community Services Programs. Note that the initial production goal not surprisingly turned out to be a low estimate, as the assumed average expenditure per unit was on the high side of what was needed to weatherize the average home. Because the program in fact spent less per unit than had been assumed, while still fully weatherizing most homes, the actual number of homes weatherized exceeded the initial goal.
13. For a study evaluating the health and other benefits of housing rehabilitation using green and healthy principles, see: National Center for Healthy Housing/Enterprise Community Partners, "Case Study: Creating Green and Healthy Affordable Homes for Families at Viking Terrace, Worthington, Minn." (2010), pp. 15–20 ("There was a statistically significant decrease in the percentage of adults who reported having several specific health problems from pre-renovation (T0) to immediate post-renovation (T1), including chronic bronchitis (p=0.025), hay fever (p=0.046), sinusitis (p=0.025), hypertension (p=0.083) and asthma (p=0.046) (Figure 3-2)."), report available at: <http://www.practitionerresources.org/cache/documents/673/67397.pdf>. For a much larger scale study of the health benefits of weatherization, see: New Zealand Energy Efficiency and Conservation Authority, "Multiple Benefits of Energy Efficiency." PowerPoint presentation available at: <http://www.iea.org/media/workshops/2012/energyefficiency/Patterson.pdf> (in retrofitted houses, hospital admissions for respiratory conditions drop 43%; missed school days down 23%; days off work drop 39%). For a more detailed report of the New Zealand program, see Lucy Telfar Barnard, Nick Preval, Philippa Howden-Chapman et al., "The impact of retrofitted insulation and new heaters on health services utilisation and costs, pharmaceutical costs and mortality: Evaluation of Warm Up New Zealand: Heat Smart." (Oct. 2011), available at: http://www.healthyhousing.org.nz/wp-content/uploads/2012/03/NZIF_Health_report-Final.pdf (last accessed August 28, 2012) ("Retrofitted insulation delivered through the Warm Up New Zealand: Heat Smart Programme had a significant impact on reducing hospitalisation and pharmaceutical costs for occupants of houses that had been remediated compared to those living in matched houses in the area, who had not received insulation or heating as part of the Programme.").
14. The fuel assistance program, formerly known as the Low-Income Home Energy Assistance Program, is authorized by 42 United States Code §§ 8621–8630 and helps low-income households pay their energy bills. To the extent those household energy bills are reduced by weatherization investments, the limited fuel assistance funding is able to reach more households.

15. According to a study released by *McGraw-Hill Construction* in October 2011, “35% of architects, engineers and contractors report having green jobs today, representing 661,000 jobs . . . That share is expected to increase over the next three years, with 45% of all design and construction jobs being green in 2014.” Moreover, jobs for those in the construction trades—carpenters, HVAC/boilermakers, electricians, concrete/cement masons, and plumbers—are expected to see the greatest growth in green jobs.” McGraw-Hill Construction News Release, “Greenbuild: Growing Green Building Market Supports 661,000 Green Jobs in the U.S. a Third of the Design and Construction Workforce According to New McGraw-Hill Construction Study.” (Oct. 4, 2011), available at: <http://www.construction.com/about-us/press/mcgraw-hill-construction-study-green-jobs.asp>.
16. State & Local Energy Report, Success Stories of Weatherization: Veterans Green Jobs. (March 23, 2012), available at: <http://www.recovery.gov/Pages/TextView.aspx?data=jobSummaryProgram&topnumber=200&qtr=2011Q2>.
17. Recovery Accountability and Transparency Board, “Top Programs, As Reported by Recipients.” (March 31, 2012), available at: <http://www.recovery.gov/Pages/TextView.aspx?data=jobSummaryProgram&topnumber=200&qtr=2011Q2>.
18. Section 1606 of ARRA (123 Stat. 303) mandated that “all laborers and mechanics employed by contractors and subcontractors on projects funded by [ARRA] . . . shall be paid wages at rates” equal to or higher than those set by the Secretary of Labor.
19. The Government Accountability Office, in more than one report, noted the barriers that newly-imposed Davis-Bacon requirements placed in the way of moving forward with ARRA-funded projects. See, e.g. RECOVERY ACT: Project Selection and Starts Are Influenced by Certain Federal Requirements and Other Factors, GAO Report 10-383 (Feb. 2010).
20. A “prevailing wage” is defined as the hourly wage, plus usual benefits and overtime, paid to the majority of workers within a particular area. Under the Davis-Bacon law, the Department of Labor establishes prevailing wages for each trade and occupation employed in the performance of public work, and employers must pay their covered workers no less than the prevailing wage.
21. In Massachusetts, a network of 20 non-profit agencies delivers WAP to individual households: taking applications; completing home energy audits; overseeing the work of the weatherization contractors; and performing quality-control inspections.
22. BPI is the Building Performance Institute, an organization which develops professional credentials for individuals and accreditation for contracting companies involved in delivering energy efficiency services. Many in the energy efficiency industry consider BPI certification an important indicator that the auditor has had high-quality training.
23. Facts compiled from September 5, 2012 phone interview and “From Homeless to hopeful, thanks to a stim-funded job,” available at: <http://www.mass.gov/recovery/see-the-impact/faces-of-economic-recovery/a-job-a-home-and-hope.html>.
24. “In YouthBuild programs, low-income young people ages 16 to 24 work full-time for 6 to 24 months toward their GEDs or high school diplomas while learning job skills by building affordable housing in their communities.” YouthBuild, “YouthBuild USA,” available at: <https://youthbuild.org/>.
25. *Gloucester Times*, “Local house project hailed as win-win via stimulus.” (Aug. 16, 2011), available at: <http://www.gloucestertimes.com/local/x1942924022/Local-house-project-hailed-as-win-win-via-stimulus>.
26. 42 U.S.C. § 6861(b).
27. Press release, “Patrick-Murray Administration celebrates 10,000 homes weatherized through Recovery Act.” (August 16, 2011), available at: <http://www.mass.gov/recovery/10000-homes-weatherized.html>. Also see: M. Schweitzer, “Estimating the National Effects of the U.S.

Department of Energy's Weatherization Assistance Program with State-Level Data: a Meta-evaluation Using Studies from 1993 to 2005." Oak Ridge National Lab (Sept. 2005); Department of Energy, Weatherization and Intergovernmental Program, Weatherization Assistance Program ("Families receiving weatherization services see their annual energy bills reduced by an average of about \$437, depending on fuel prices"), available at: <http://www1.eere.energy.gov/wip/wap.html> (last accessed Aug. 13, 2012).

28. Andy McKeever, "Dalton Home Among 10,000 Weatherized Across State." *iBerkshires.com* (Aug. 24, 2011), available at: <http://www.iberkshires.com/story/39252/Dalton-Home-Among-10-000-Weatherized-Across-State.html> (last accessed July 18, 2012).
29. Authorized by 42 U.S.C. § 8621–8630.
30. Matthew Wald and Leslie Kaufman, "Hiring Freezes Hamper Weatherization Program." *New York Times* (Feb. 24, 2010).
31. House Committee on Oversight and Government Reform, "The Department of Energy's Weatherization Program: Taxpayer Money Spent, Taxpayer Money Lost." (March 20, 2012).
32. WAP Recovery Act: All Grantees." (Oct. 21, 2012), provided by Robert Scott, Director of Energy Services, National Association of State Community Services Programs. Note that the initial production goal not surprisingly turned out to be a low estimate, as the assumed average expenditure per unit was on the high side of what was needed to weatherize the average home. Because the program in fact spent less per unit than had been assumed, while still fully weatherizing most homes, the actual number of homes weatherized exceeded the initial goal.
33. *Redwood Times*, "Program provides low-income homes weatherization reducing energy bills." (Feb. 7, 2012).
34. Rebecca Stewart, "Recovery Act Success Story: Idaho." National Association for State Community Services Programs (Jan. 2010).
35. Mary Beth Schneider, "Weatherization goal passed: 20,185 homes got improvements with stimulus funds." *Indianapolis Star* (Oct. 27, 2011).
36. Joe Kimball, "Recovery Act weatherized 18,000 Minnesota homes." *The Minnesota Post* (Dec. 15, 2011).
37. Kristy Hessman, "Montana Beats The Cold With Weatherization." *Earthtechling.com* (Jan. 9, 2012).
38. New York Division of Housing and Community Renewal, "New York State Weatherization Program Set to Exceed Goals." (Feb. 28, 2010).
39. Athena D. Merritt, "Pa. tabs \$81M in stimulus funding for weatherization." *Philadelphia Business Journal* (August 20, 2010).
40. Becca Aaronson, "State Finds a Way to Make Weatherization Work." *New York Times* (Oct. 29, 2011).
41. Kristy Hessman, "Montana Beats The Cold With Weatherization." *Earthtechling.com* (Jan. 9, 2012).
42. Thomas Content, "More than 30,500 state homes weatherized in past three years." *JOnline.com* (Jan. 6, 2012).
43. New York State Community Action Association & New York State Weatherization Directors Association, "Stimulus Works: Weatherizing Homes and Training New Yorkers for Green Jobs." (April 7, 2010); State & Local Energy Report, "Stimulus money creating jobs in Michigan." (Fall 2010); Valdis I. Lacin, "Weatherization program ahead of schedule." *Reading Eagle* (Sept. 17, 2011); Athena D. Merritt, "Pa. tabs \$81M in stimulus funding for weatherization." *Philadelphia Business Journal* (August 20, 2010); Maddie Garrett, "Federal Weatherization Funds Hard at Work." *First 12 News* (Jan. 6, 2010); Rebecca Stewart, "Recovery Act Success Story: Idaho." National Association for State Community Services (Jan. 2010).

44. Kristy Hessman, "Washington State A Home Weatherizing Demon." *Earthechling.com* (Jan. 8, 2012); Think Progress, "The DOE weatherization assistance program: Step one on the road to an energy efficient future." (March 8, 2010).
45. U.S. Department of Energy, "WAP Recovery Act: All Grantees," (Oct. 22, 2012).
46. Press release, "Patrick-Murray Administration celebrates 10,000 homes weatherized through Recovery Act." (August 16, 2011), available at: <http://www.mass.gov/recovery/10000-homes-weatherized.html>.
47. U.S. Dep't of Energy, "SERC Grants Expand Weatherization Technologies." DOE Weatherization and Intergovernmental Program (July 2011), available at: http://www1.eere.energy.gov/wip/pdfs/serc_factsheet.pdf.
48. A micro CHP uses an engine (which can be similar to an automobile engine) that generates useful heat to heat domestic hot water, or simply to heat interior spaces as well as electricity. Because the system produces both useful heat and electricity, it is generally more efficient than, e.g., a traditional hot water heating system or warm-air furnace.
49. "Created by the Green Jobs Act of 2008, the Massachusetts Clean Energy Center (MassCEC) is dedicated to accelerating the success of clean energy technologies, companies and projects in the Commonwealth while creating high-quality jobs and long-term economic growth for the people of Massachusetts." Massachusetts Clean Energy Center, "About Mass CEC." (2012) available at: <http://www.masscec.com/index.cfm/page/About-MassCEC/pid/11193>.
50. Detailed information about all of the solar DHW projects is available at the Massachusetts Clean Energy Center website, <http://www.masscec.com/index.cfm/cdid/12223/pid/11159>.
51. 10 Code of Federal Regulations § 440.16(b).
52. 10 Code of Federal Regulations § 440.22(b)(3)(i).
53. All facts in this section were drawn from an informational memo to the Governor from the state's Department of Commerce, which administers the WAP funds in the state.
54. For example, under the FY 2011 national WAP appropriation of \$174.3 million, Delaware, Rhode Island and Vermont were allocated, respectively, \$447,000, \$888,000, and \$981,000. See WAP Notice 11-2, "Program Year 2011 Grantee Allocations." (May 26, 2011), available at: http://www.waptac.org/data/files/website_docs/government/guidance/2011/wpn%2011-2.pdf. Were these states to receive the same percentage of the proposed CR appropriation of \$68 million, each of these states would receive between (approximately) \$150,000 and \$300,000. These sums would be barely adequate to employ a minimum of state program managers and fiscal oversight staff.
55. The term "utility-funded" is used somewhat loosely here to include energy efficiency programs that are funded by a charge included on utility bills (sometimes called a "systems benefit charge"), whether or not the utility directly administers those funds or directly oversees the delivery of the energy efficiency programs. In some states, the funds may be collected through utility bills but the energy efficiency services may be delivered by some other entity: e.g., quasi-public or non-profit.
56. For a summary of state-by-state utility programs that deliver energy efficiency services to low-income households, see the LIHEAP Clearinghouse, "Public Benefits: State summaries." available at: <http://liheap.ncat.org/dereg.htm>.
57. See M. Kushler, S. Nowak, P. Witte, "A National Survey of State Policies and Practices for the Evaluation of Ratepayer-Funded Energy Efficiency Programs." American Council for an Energy-Efficient Economy (Feb. 2012), noting that Alabama, Alaska, Louisiana, Mississippi, North Dakota and West Virginia are states that have no formally-approved energy efficiency programs or did not respond to ACEEE's survey of such programs. Report available at: <http://www.aceee.org/research-report/u122>.

58. We roughly estimate the total number of units served by WAP over its history as follows:
First, the Department of Energy's own weatherization web page reports that "during the past 33 years, WAP has provided weatherization services to more than 6.4 million low-income households." Department of Energy, "Weatherization Assistance Program." (2012), available at: <http://www1.eere.energy.gov/wip/wap.html>. Assuming the "33 year" period covers from the inception of the program in 1976 through 2009, we add 1.1 million units to the 6.4 million figures from DOE, to include both units served by ARRA approximately 775,000 and units served with regular WAP funding from 2009 through 2012 approximately 300,000 for a total of 7.5 million units. While this is a very rough estimate, it is unlikely that the program has reached more than 8 million low-income homes.
59. U.S. Census Bureau, *Income, Poverty and Health Insurance in the United States: 2010*, "Table 6: People With Income Below Specified Ratios of Their Poverty Threshold by Selected Characteristics: 2010." (2010), available at: <http://www.census.gov/hhes/www/poverty/data/incpovhlth/2010/table6.pdf>.
60. U.S. Census Bureau, "State and County Quick Facts." (2012), available at <http://quickfacts.census.gov/qfd/states/00000.html>.

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Boston Headquarters:
7 Winthrop Square
Boston, MA 02110-1245
Phone: 617/542-8010
Fax: 617/542-8028
www.nclc.org

Washington Office:
1001 Connecticut Ave, NW
Suite 510
Washington, DC, 20036
Phone: 202/452-6252
Fax: 202/463-9462