Equitable Economic Energy Efficiency: Creating Good Jobs in Low-Income Efficiency Programming

By

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ABSTRACT

Energy efficiency is an important consideration in energy policy-making. So, a federal program aimed at funding "energy efficiency retrofits" for low-income households could be an important step in increasing the overall efficiency of energy use in America. If each eligible household reduces the amount of energy it currently wastes by weatherizing, the US could save 127 billion pounds of carbon dioxide. The Department of Energy's Weatherization Assistance Program, that performs energy efficiency retrofits for low-income households, has been funded by over a 20-fold increase due to Stimulus Funding (formally, the American Recovery and Reinvestment Act of 2009). This increase has caused a serious need for a labor ramp-up to meet the program implementation goals of 1 million to 2 million low-income homes weatherized per year, as compared with the previous level of 100,000 homes a year. This program will only work, however, if the necessary workers can be trained and deployed quickly. This need for labor ramp-up creates a puzzle though. The interests of expanding the weatherization effort quickly and effectively are often posed against the interest of creating quality jobs for marginalized workers. The stakeholders representing each interest—low-income energy efficiency advocates and Green Collar Job Advocates—are both working for the interests of the low-income people, creating some hope for a positive, mutually agreeable solution.

This thesis attempts to bridge this gap by documenting how the need for thousands of weatherization workers might be handled in a way that not only stimulates the national economy—the primary goal of the current national economic stimulus effort—but also provides Auditor and Installer jobs for marginalized workers in a way that leads to fruitful long-term employment. Based on my review of ramp-up and weatherization efforts in Massachusetts, I find that collaborative efforts involving existing Community Action Programs, labor unions, Utility companies, neighborhood organizations and educational institutions that prioritize training for long-term skill development may well be possible to promote energy efficiency in a way that addresses both our long-term need to reduce the burning of fossil fuel and our urgent need to stimulate the US economy and improve the economic lot of the most marginalized in US society.

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Chapter 1: Introduction

This thesis brings together many elements of low-income energy efficiency program development that are currently disparate. To clarify the various forces impacting low-income programs and their interests, this thesis will first provide an overview of these various forces in this chapter and then delve deeper into each in chapters 2-5 (descriptive), analyze the quantity and quality of jobs in the ramp-up in chapter 6 (analytic), and propose solutions in chapter 7 (prescriptive). We will start by defining energy efficiency, the problem this thesis is addressing, and discussing the landscape and players.

a. WHAT IS ENERGY EFFICIENCY?

In order to understand low-income energy efficiency, first we must define energy efficiency itself. As climate change concerns, fossil fuel scarcity, price volatility, and geographically based resource access issues due to political differences become more pressing, all sectors of US society are planning for and implementing different measures to find alternatives to a fossil fuel based society and to reduce greenhouse gas (GHG) emissions. One such measure is energy efficiency. Energy efficiency is often defined as reducing energy consumption while still providing the same energy service. It differs from energy conservation, which is a decision to reduce service levels (i.e. amount of lighting, comfort, etc.). Efficiency can be accomplished by a variety of approaches, from building retrofits for more energy efficient usage to incorporating new, more energy efficient technology to reduce use consumption. Energy efficiency is commonly referred to as *the low-hanging fruit* of reducing expensive, high-GHG producing energy consumption because of its cost effectiveness, applicability in virtually every context, and large market of potential improvements. Energy efficiency both reduces the cost of living for consumers and society more broadly while creating jobs and building the local economy because of the physical and capital labor it demands.

Furthermore, energy efficiency has a great potential to reduce dependence on dirty energy sources, such as coal, and meet energy demand in more cost effective ways than other sources, such as nuclear. A recent McKinsey study found that a $520 billion investment in energy efficiency could save the US $1.2 trillion and reduce end-use energy consumption by 9.1 quadrillion BTUs, accounting for 23% of projected demand through 2020 (Granade 2009).

Utility residential energy efficiency programs have benefit-cost ratios in the range of 2.76 and while low-income energy efficiency is not as cost effective, it is still effective. The Department of Energy states that low-income weatherization has a benefit-cost ratio of 2.10, meaning that every $1 invested nets $2.10 in energy-related benefits (DOE 2002). If each eligible low-income household reduces the amount of energy it currently wastes by weatherizing, the US could save 127 billion pounds of carbon dioxide.[1] In Chapter 2, we will explore additional, non-energy-related benefits of low-income energy efficiency, including social equity and job creation benefits. Finally, as will be discussed more later, the Stimulus funding can help the larger residential energy efficiency sector reach its potential. In order to meet the US' energy demands and address greenhouse gas concerns, we need to retrofit as many homes as possible and this funding can help train a labor force that will be a major part of this larger effort while creating an example set of retrofits that may help those who can afford retrofits on their own understand the benefits of energy efficiency.

For these reasons, there are major investments and new initiatives in the private, public, and civic sectors to meet the energy efficiency economic potential in the US.

b. PROBLEM STATEMENT AND ANALYTICAL APPROACH

Given the recent developments in national and state policy related to the security of energy supplies, price, and climate change; opportunities created by new funding; national and resident consciousness; and civic organizing, there is a greatly increased interest in energy efficiency. From multiple angles, there has been a push for more energy efficiency building retrofits across all sectors. To meet these expanded energy efficiency opportunities, there will need to be great capacity growth in the energy efficiency labor force.

The Low-Income Efficiency Program Labor Problem. Within this larger scope of needed labor, there is a defined workload for low-income weatherizing that needs a great amount of added labor. One area of central focus as the Department of Energy's Weatherization Assistance Program (DOE WAP) ramps-up is training for workers. With a pre-existing labor shortage for

[1] Using Department of Energy estimates of 34 million eligible homes with average savings of 31.2 MBtu per house (DOE 2002).

low-income weatherization, the American Recovery and Reinvestment Act of 2009 (ARRA 2009) increased funding for DOE WAP by more than 2000%: an increase that will expand the labor gap exponentially to a point of serious concern for implementation. There are a number of means by which this gap may be filled, and different combinations have different consequences for the type and quality of job created, the percentage of low-income weatherization potential that can be reached, and how quickly the work can be done.

Within the labor needs, the position with the most need is that of auditors. Auditors are the first interface with customers and do an assessment of the retrofit work that needs to be done in a house, as well as a follow-up to ensure that the contractor and his/her team did the work correctly. Auditors have a specific skill set that is not transferable or updateable from another profession, unlike most of the other position in weatherization. For the Green Collar Jobs Movement, the Installer position is also of central interest because of its potential for low-skilled entry and the number of positions.

Analytical Approach to Address the Jobs Problem. In this thesis, I will look at the market for Auditor and Installer ramp-up and analyze the quality and potential of these jobs. The Auditor position is critical for weatherization in the current implementation structure and it is also the greatest limiting factor. The Installer position is the lowest on the weatherization totem pole and attracts many marginalized workers. Integrating labor procurement analysis and job quality analysis, I will assess these positions and recommend ways that President Obama's goal of 1 million low-income homes weatherized each year can be accomplished by a workforce that is adequately paid and that can transition to good careers as Green Collar workers after the Stimulus Funding period.

There is money and support now for low-income energy efficiency, and energy efficiency generally, that has not been there in the past. The Federal Government has decided to create jobs and invest in the economy through the low-income energy efficiency program. Given this opportunity, we should aim to create good jobs that last, not just jobs to spend the Stimulus down. By taking a good jobs approach, we can create sustainable energy efficiency programming more broadly by using Stimulus funds to simultaneously train the next generation of energy

efficiency workers across sectors and weatherize low-income homes. Furthermore, applying existing green jobs criteria to the new jobs will ensure equity in the labor ramp-up, given that investments are made to prepare marginalized workers for these jobs. This public investment provides the opportunity to help improve low-income delivery, create good jobs, and maybe most importantly, transform the residential energy efficiency sector.

The goal of my work and this thesis therefore is to propose ways to translate the current low-income energy efficiency programming into *Equitable Economic Energy Efficiency* that improves low-income household performance and reduces bills; creates local economic opportunities for low-income communities and people by providing good jobs; helps stabilize the economy at large; and helps shift low-income households and the US more generally from a fossil fuel based economy to a cleaner, more efficient one. This form of Equitable Economic Energy Efficiency has the potential to address three of the most critical current global issues: the faltering, unstable economy; climate change and a potential energy crisis; and growing inequality and income gap.

c. FRAMING

This thesis addresses the topic of low-income energy efficiency in a very particular way. Given that the Stimulus has already allocated $5 billion to low-income weatherization but the money has not yet been spent, it explores how to use this money most effectively and equitably, in creating good jobs for marginalized workers and expanding the capacity to do residential energy efficiency more broadly. There are a number of other topics and research questions that are relevant but frame the issue differently. Among them are: how does this approach to creating green jobs compare to other approaches in terms of cost effectiveness or quality of jobs created and what is the cost per job created; is it positive that low-income energy efficiency is funded and administered separately from energy efficiency more broadly; how do you measure the outcome equity of who gets the jobs that are created; and of the various interests in the ramp-up, who should move in what direction? I do not spend time addressing this set of questions for two main reasons: (1) the Stimulus money has already been allocated and (2) it has not been spent yet. These questions tend toward asking if it was a good choice to fund the program so much, if

there are better options for program design, and how effective the funding was. These are critical but may be best answered in 3 years.

The larger policy question of if low-income efficiency should be treated separately could be explored now because low-income energy efficiency has been treated separately since its inception over 30 years ago, but that is a longer-term question about program design that I pose as a future research topic in the conclusion. I will say now that there are clear advantages to it being separate in terms of the level of support, as is evidenced by the history in Chapter 4, but that it does limit system planning for labor and provision. Instead, I attempt to portray the low-income weatherization space and present options for quickly creating good jobs given the current situation and issues. I do not place myself firmly in the space or take a firm stance on what perspective is correct because I believe all players must play some role and that creating a forum for discussion and collaboration is the most critical next step to using this money most effectively.

d. LOW-INCOME ENERGY EFFICIENCY POLITICAL AND LEGISLATIVE CONTEXT

General Energy Efficiency Legislation

The Federal American Recovery and Reinvestment Act of 2009 (ARRA 2009) invests heavily in energy initiatives and energy efficiency. It requires $40 billion go to energy initiatives, $16.1 billion of which are for energy efficiency retrofits across sectors and end-uses (Alliance to Save Energy 2009). Funding for energy efficiency includes specific allocations for low-income, federal buildings, the State Energy Program, high efficiency appliances, transportation, and conservation block grants.

Many states are also prioritizing energy efficiency in their energy plans. For example, Massachusetts, a leader in environmentally friendly and innovative legislation, has put energy efficiency on the forefront of its energy policy. Massachusetts passed the Green Communities Act in July 2008, mandating utilities to provide all energy efficient resources that are less expensive than the cost of supply; this means that all energy saving programming that is cheaper

per kWh than the cost of providing energy must be pursued by Utilities.[2] Because of the magnitude of this requirement, the various Utilities operating in Massachusetts are currently preparing their 3 year plans to achieve this end for the Massachusetts Division of Energy Resources (DOER). Nineteen other states have Energy Efficiency Resource Standards (EERS) that set targets for energy sourcing from energy efficiency and the proposed Waxman-Markey Bill calls for national EERS which would greatly increase energy efficiency as a energy resource, especially in states that are currently doing little energy efficiency (Eldridge et al 2009; The Breakthrough Institute 2009; American Council for an Energy-Efficient Economy 2009).

Low-Income Specific Legislation and Support

Five billion dollars of ARRA's $16.1 billion for energy efficiency will go to weatherizing modest and low-income homes through the Department of Energy Weatherization Assistance Program (DOE WAP). The Federal American Recovery and Reinvestment Act of 2009 commits $500 million for Green Job training through the Department of Labor Workforce Investment Act, with up to an additional $37.5 million from the Job Corps Center Program. Also, the Department of Housing and Urban Development (HUD) has allocated just under $4.8 billion for energy efficiency, primarily aimed at Public, Native American, and Assisted Housing (HUD 2009). Finally, there is $3.2 billion for Energy Efficiency and Conservation Block Grants (EECBG) that will allow state and local governments to aggressively implement energy efficiency programs that can go to whatever type of programs the relevant government deems appropriate. The scale of each segment alone, let alone combined, is enormous and well beyond any Utility or low-income provider's current labor capacity, as we will explore in Chapter 6 for low-income programming.

Low-Income Weatherization Program Status

Currently, low-income weatherization programs vary from state to state. Utilities play a central role in some states and none in others; similarly, the cohesion of Utility and DOE WAP programming varies state to state. Low-income provision is particular in that there are two major programs—one run by the federal government and one run by Utilities—that account for the vast

[2] The act calls for an "efficiency first policy that instructs utilities to adopt all efficiency measures before adding generation capacity."

majority of the market and that contract to the same set of agencies, local Community Action Agencies and Programs (CAAs and CAPs respectively, referred to as CAPs here forth) for program implementation.

Community Action Programs receive funding from a state agency or Utility, determine eligibility of clients, and execute the jobs from front to back. They are the major player in low-income weatherization not only in implementation, but also often times in policy setting and labor policies. In order to understand the history, current issues, and players, I focused on Massachusetts low-income programming because it is one of the most advanced and acclaimed throughout the country. It is headlined by a collection of CAPs working together under the Low-Income Energy Affordability Network (LEAN) banner that direct low-income provision. The Low-Income Energy Affordability Network's presence and leverage are unique in the US and the process to establish itself will be explored in Chapter 4.

In my interviews with LEAN staff, a major problem they have faced in the past emerged: a labor shortage. This labor shortage ranges across different work types and has always been a serious barrier to implementing low-income weatherization to its full potential. Now with more than a twenty-fold increase in funding, the labor gap will similarly explode.

Furthermore, the current recession that started in 2008 has escalated the interest in energy efficiency because of its potential for economic development along two paths—one of household bill reduction and the other of job creation. In June 2009, unemployment had increased to 9.5%, the highest level in more than a quarter-century (Department of Labor 2009). As of July 2, 2009, more than 6 million jobs had been surrendered to the recession (Goodman and Healy 2009; Goodman 2009). Weatherization has the potential to create good jobs that cannot be exported.

A number of groups have been working to fill this labor gap with different interests. A new and major player is the Green Collar Jobs Movement, composed of various groups working to create quality jobs for marginalized workers in a new clean energy economy. The Green Collar Jobs Movement aims to secure well-paying, stable jobs from across the renewable energy and energy

efficiency sectors for people traditionally marginalized from the labor force. Jobs in energy efficiency are a large part of this effort.

In sum, there are two major drivers for the increased energy efficiency labor demand and supply. They are:

1. *The workforce development driver*: namely, the interest in creating Green Collar Jobs that will be the labor supply for retrofits and create stable, well-paying career opportunities for marginalized people, and

2. *The energy efficiency and cost-reduction advocate driver*: namely, the interest in reducing greenhouse gas (GHG) emissions in a cost-effective manner by utilizing the "5th fuel" of energy efficiency. In this thesis, we are exploring a sub-segment of this second driver: improving the performance and reducing the costs of household energy systems in low-income homes.

e. METHODOLOGY AND FORMAT

I researched low-income weatherization from each of the major stakeholder perspectives. I read primary research and reports from the Green Collar Jobs Movement, its critics, low-income advocates, their critics, federal and state evaluations of programs and plans for the ramp-up, Utility companies reports, and academic and third-party articles about workforce development, energy efficiency, and economic development. I conducted interviews with representatives from each stakeholder segment about labor sourcing and low-income programming as well: from Utilities, Community Action Programs, private weatherization firms, community-based organizations and training houses, Green Collar Job advocates and weatherization experts. My case study on Massachusetts was chosen because of Massachusetts' unique joint Utility and Federal low-income provision and the presence of the Low-Income Energy Affordability Network that creates statewide low-income policy and implements on it. Finally, I interviewed various firms and organizations for mini-case studies of models for resolving the labor gap and ramping up effectively, justly, and efficiently. An Interview Summary Table is included as Appendix I to show the major trends in my interviews.

An overview of what's to come:

- **Chapter 2: The Importance of Low-Income Energy Efficiency** details the benefits of low-income energy efficiency programs, including the energy burden inequity it addresses and the various societal economic benefits it achieves.
- **Chapter 3: Analysis of National Low-Income Funding Mechanisms** presents the objectives, funding, and implementation mechanisms of the federal Weatherization Assistance Program and Utility programs, the two major low-income energy efficiency programs, and discusses how the differences affect low-income provision.
- **Chapter 4: Analysis of Low-Income Program Implementation: Massachusetts Case Study** focuses on implementation and maps low-income energy efficiency's labor task flow and procurement processes, identifying CAPs as the central lever in labor sourcing. It also tells the history of what makes Massachusetts a special case for other states to learn from with regard to low-income provision, specifically the strong presence of the Low-Income Energy Affordability Network (LEAN) that was created during Electricity Industry Restructuring and that manages and innovates low-income programming in a networked, decentralized fashion.
- **Chapter 5: The Quest for *Good* Green Jobs: The Green Collar Jobs Movement and Workforce Development** frames the labor ramp-up within good job and workforce development literature and presents the new Green Collar Jobs Movement. It also details the criteria from which the Auditor and Installer jobs are evaluated.
- **Chapter 6: Will Low-Income Efficiency Programs Create Good Green Jobs?** is the analytic chapter that describes and evaluates the Auditor and Installer jobs in depth. It presents the major issues facing the labor ramp-up and uses the criteria established in Chapter 5 to evaluate the jobs. It also provides a market sizing for low-income retrofits and the number of jobs created.
- **Chapter 7: Conclusions and Recommendations** is the prescriptive chapter that provides an overview of the whole thesis and presents recommendations to creating good, long-lasting jobs out of the Stimulus' commitment to low-income weatherization.

Chapter 2: The Importance of Low-Income Energy Efficiency

Low-income energy efficiency programs achieve many various goals in an integrated fashion. They

- Lessen the negative environmental effects of energy consumption—for example, carbon dioxide emission;
- Improve the economic well-being, housing quality, and health dimensions for low-income people who may otherwise not be able to afford it;
- And, as with most efficiency-related programming, create local jobs.

The first and last of these three factors are common among all types of energy efficiency. The differentiating factor for low-income programming is the equity dimension—lowering costs for those who need it most.

a. DIFFERENTIAL ENERGY BURDENS

The economic burden of energy costs differs consumer to consumer. For low-income consumers the energy burden[3] is a significant portion of their income. While low-income households consume 15% less energy than non-low-income households, the amount they spend on energy is a disproportionate amount of their income (Oppenheim 2007). Low-income households pay 16-26% of their income to energy bills, 4-6 times the national average, see Chart 1 below (Power 2008; DOE 2007).

[3] Energy burden is determined by dividing income by energy cost.

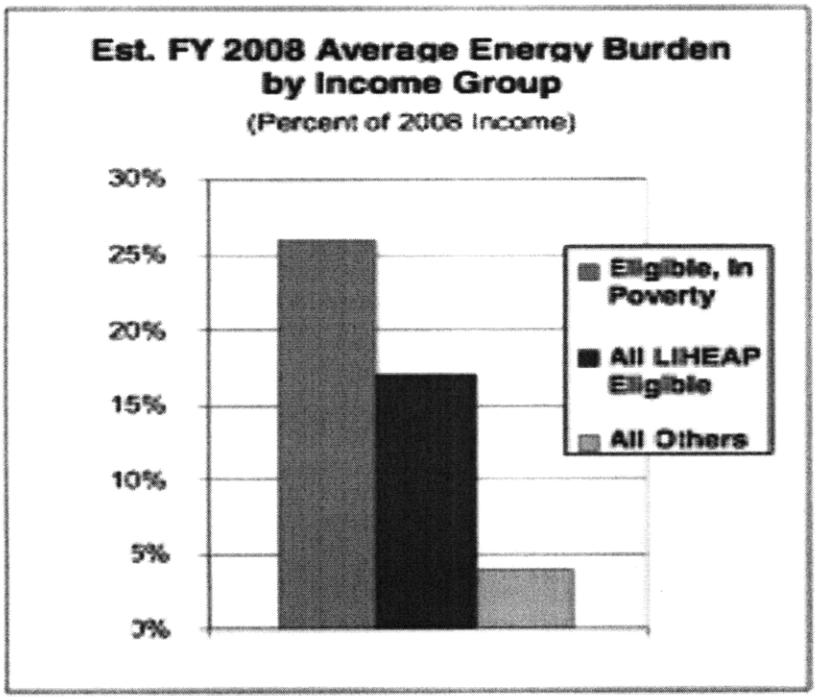

Chart 1 **Source**: Power 2008

Families in poverty have an energy burden of 25% (Power 2008). For some elderly people who live on fixed incomes, their energy bill constitutes as much as 35% of their annual income (Oppenheim and MacGregor 2008). Roughly 64% of low-income customers' energy burden goes to electricity (Baxter 1997). Furthermore, home fuel prices are rising while the median income of the lowest fifth of U.S. households has remained flat since 1998, see Chart 2 below.

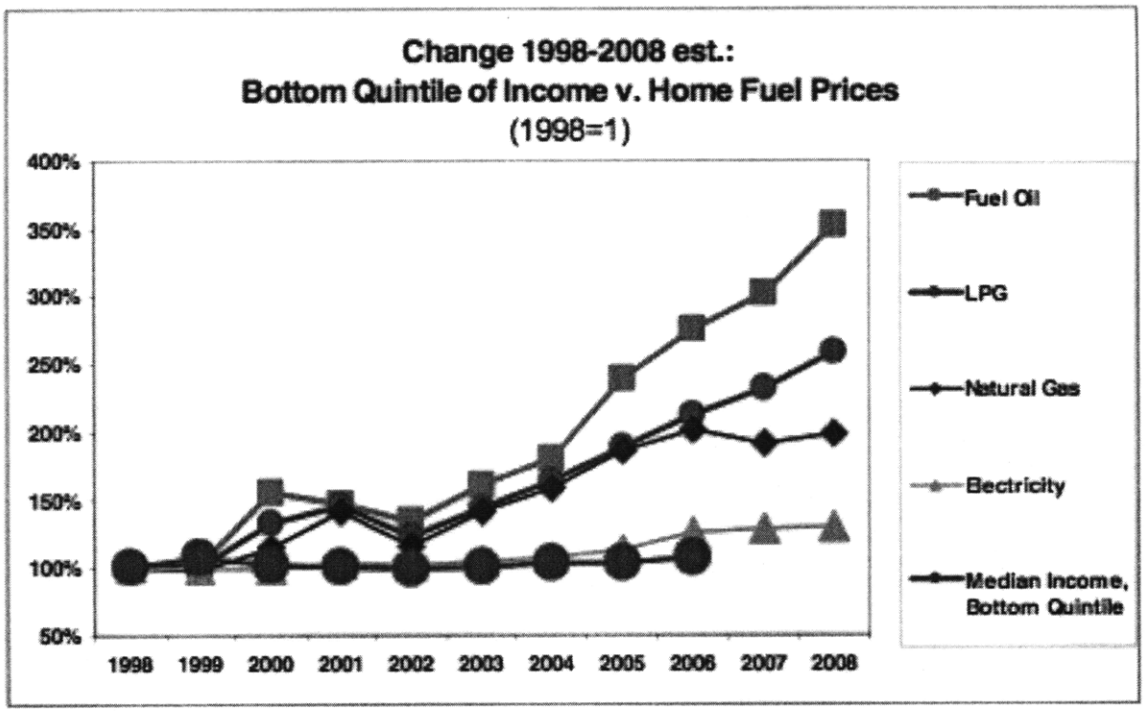

Chart 2 **Source:** Power 2008

b. WHY UTILITIES HAVE NOT FUNDED LOW-INCOME ENERGY EFFICIENCY HISTORICALLY

Distrust of low-income customers' ability and interest in paying their bills, distrust of implementing agencies (CAPs), and savings limitations based on lower consumption amount have informed Utility's decision not to invest in low-income energy efficiency programming historically. Much of this is based on misconception though. Low-income customers do not constitute the customer class with the majority of arrearages[4] (Quaid and Pigg 1991). Furthermore, low-income customers usually are not in arrearage because they do not want to pay their bills, but because they cannot pay them (Grosse 1997). Since early CAP programming, many studies have been done to prove the cost-effectiveness of low-income programming and trust for CAP programming has grown over time. Finally, in aggregate, there is a great amount of energy to be saved in the residential low-income sector and there are other societal benefits. To gain a sense of how much work there is to be done, Chart 3 depicts the amount of resources

[4] Arrearage is being overdue in payment

dedicated to bill reduction of low-income eligible houses in 2008; this includes payment assistance, not just weatherization programming.

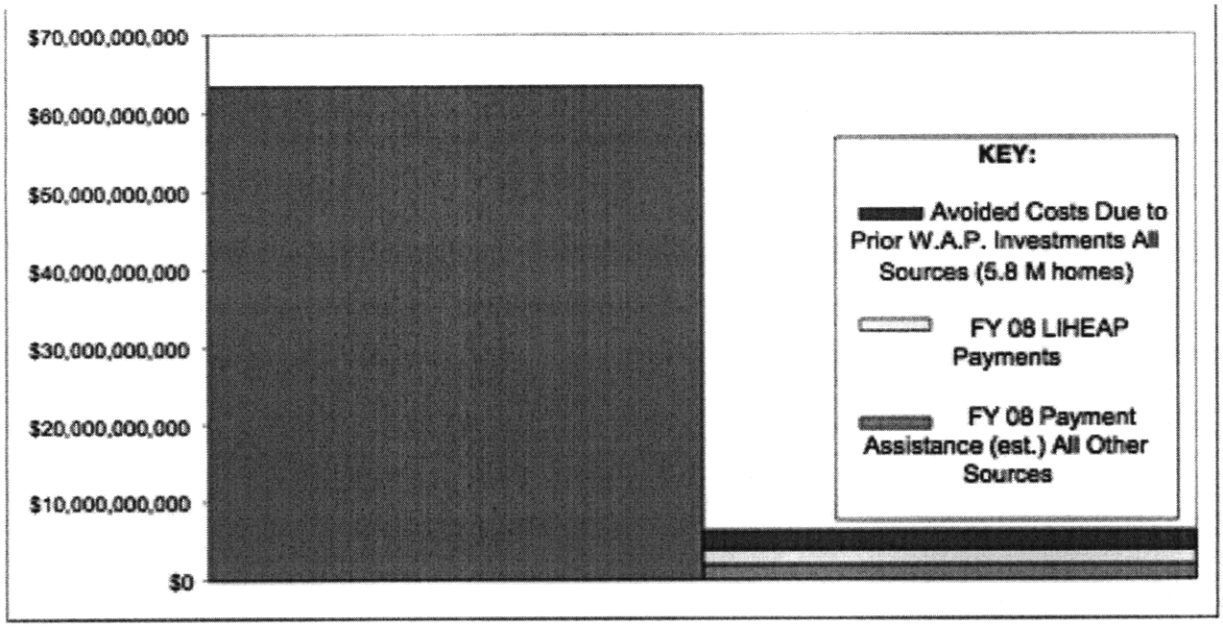

Chart 3 **Source:** Power 2008

Chart 3 depicts the $63.4 billion of low-income consumers 2008 energy bills compared to LIHEAP bill payment funds, all other forms of low-income bill credits, discounts and subsidies, and finally the avoided costs resulting from past investment in Weatherization of 5.8 million homes by DOE WAP (the green bar) (Power 2008). All three of these source combine to provide $6.3 billion in relief, just about 10% of the aggregate bill for low-income consumers. Low-income programming saves 30% energy cost on average; herein, we can see the great gap between current savings and potential savings.

c. BENEFITS OF LOW-INCOME PROGRAMS

Equity Impact

Because low-income people by definition have little to no expendable income, the effect of the savings from energy efficiency is disproportionally higher than for other customer types. For example, low-income households often cut on other basic needs, such as money spent on food and health care, to pay their energy bills. In fact, 43% of low-income clients skipped rent, food, or medicine to pay a utility bill in a recent study (University of Massachusetts Donahue Institute

2007). Herein, the savings on their energy bill from an energy efficiency program often goes to pay for other crucial needs and helps avert the "heating or eating" choice that many low-income households face.

Low-Income energy efficiency programming can save between 20-40% energy savings at the household level (Pennsylvania Weatherization Providers Task Force 2008). The Energy Information Administration's Annual Energy Outlook 2008 estimated DOE WAP savings to be between $400 and $500 per household annually. For every dollar spent, DOE WAP nets $2.10 in energy benefits and $2.72 in energy and non-energy benefits over the lifetime of the weatherized home. This indicates that low-income energy efficiency is not a waste or handout, but has a real equity and environmental impact.

Societal Economic Benefits

Low-income programming has added benefits beyond the savings to the Utilities and customers. There are also economic benefits for non-participants and society at large. Low-income programming reduces Utility costs that transfer to all consumers. Beyond the basic savings on the system, there are these potential added cost savings with low-income programming:

To Utilities and non-participant rates:

- Arrearage carrying costs
- Termination and reconnection costs
- Cost of collection and termination notices, collection calls, and related expenses
- Overhead costs associated with disputed bills and other related complaints
- Administrative costs related to managing payment plans, uncollectibles, and bad debt

To taxpayers by way of reduced tax burden to support the following social services that shut-offs increase:

- Homeless shelters
- Fire departments
- Health departments
- Police departments for decrease in theft cases

- Medicaid funds
- A rise in property values that generate real estate tax

To low-income families:

- Less frequent moving costs
- Fewer Utility disconnections
- Improved Health

To Society:

- Job creation to provide services
- More money flowing through the community because of jobs and energy savings
- Decrease in pollution
- Increase in equity (Oppenheim and MacGregor 2000; Oppenheim and MacGregor 2008).

All of these benefits have a multiplier effect in terms of their economic impact as well. For example, the energy bill savings for low-income customers puts more money in the local economy that in turn generates more jobs and spending. While there are costs—in this case less Utility revenue—they are in general less than the economic benefits. Utilities also have the benefits of getting positive publicity for low-income programming and of meeting their energy efficiency goals more broadly with public money from the federal government.

Oppenheim and MacGregor in their 2008 report for Entergy Corporation found that a $1 million investment in low-income energy efficiency creates an economic benefit of 34 times its value (Oppenheim and MacGregor 2008). This includes creating 337 jobs: three times the impact of tax breaks intended to attract the manufacturing industry. In a 2006 report for Entergy, they found that investments in low-income energy efficiency programming returns at least $7 to society at large for every $1 invested (Oppenheim and MacGregor 2006).

⇒ In sum, low-income energy efficiency programming is a valuable resource for all people in society. It saves poor people who have a disproportional energy burden money, has

various economic benefits for society at large that have multiplier effects, and also has the environmental benefits that efficiency efforts do in general.

Chapter 3: Analysis of National Low-Income Funding Mechanisms

In this chapter, we describe the two low-income energy efficiency funding mechanisms and their strengths and weaknesses. This information is useful to understanding the origins and structure of low-income programming and the current context and players involved in it. Furthermore, this information will help us develop recommendations about how to improve its operation.

The US Oil Crisis of 1973 spawned residential energy efficiency programming. Within a few years, two distinct initiatives were begun that addresses low-income efficiency.

- In 1976, Congress created the Department of Energy's Weatherization Assistance Program (DOE WAP) under Title IV of the Energy Conservation and Production Act to respond to the rise in home heating oil prices related to the crisis.
- Also in the early and mid 1970s, Utility energy efficiency programs emerged in response to the oil crisis. While both programs began at the same time, there are critical differences in their objectives and design that distinguish the programs.

a. Department of Energy's Weatherization Assistance Program (DOE WAP)

Objectives

The DOE WAP was created to reduce "the burden of energy prices on the disadvantaged" (DOE 2009). It accomplishes this goal by reducing heating and cooling costs via energy efficiency upgrades of low-income residents' homes, especially those of the elderly, people with disabilities, and people with children. The program's initial objectives were to "save energy, lower fuel bills, and improve the health and safety of dwellings occupied by low-income people" (Berry, Brown, and Kinney 1997). The American Recovery and Reinvestment Act of 2009 (ARRA) has added the goals of "reducing our energy dependence, improving the environment, and stimulating economic development in low-income communities" (DOE 2009).

Funding

Federal funds come from the DOE WAP appropriation and some additional funding comes from the Low-Income Home Energy Assistance Program (LIHEAP) block grant that is administered

by the U.S. Department of Health and Human Services (HHS). Utilities and miscellaneous other sources provide small amounts of supplemental funding (Berry, Brown, and Kinney 1997).

Implementation

While the measures funded by DOE have changed quite a bit over the years, the service provision structure has not. The program started by employing primarily emergency measures; in the 1980s more permanent home improvement measures were incorporated and in the 1990s, more advanced audits and cost-effectiveness were integrated into programming. Throughout DOE WAP's history, DOE has allocated funding to state weatherization agencies, which are typically housed in the state executive departments responsible for human services, community development, and/or economic development (MacGregor and Oppenheim 2002). These state agencies then distribute funding to local agencies to implement the measures. Of these local agencies, over 80 percent are private, non-profit Community Action Agencies (CAAs) that run Community Action Programs (CAPs) (MacGregor and Oppenheim 2002). The remaining implementers are local or county government agencies or Native American tribes (Berry, Brown, and Kinney 1997). DOE WAP programming is present in all 50 states and in the District of Columbia. The Weatherization Assistance Program works with more than 970 local agencies that cover every political jurisdiction in the country, and has averaged improving the energy efficiency in about 100,000 low-income dwellings per year in recent history.

b. UTILITY-BASED PROGRAMMING LOW-INCOME PROGRAMS

Objectives

While Utility-based energy efficiency programs began in the 1970s in response to price increases due to the oil crisis similar to DOE WAP, they grew for different reasons. One major reason was nuclear power plant cost overruns that made the cost of purchasing energy rise. This reflects a major objective difference between DOE WAP and Utility programs: Utilities' major interest was to save energy on a Utility's own system to provide a lower cost alternative to generating or purchasing power and to peak shave. Peak shaving is reducing the demand at grid-wide high usage periods so that Utilities minimize the amount of expensive, peak energy they purchase. Low-income Utility programs are a sub-set of a larger portfolio of programs designed for this cost reducing, profit maximizing based objective. Utility energy efficiency programs did not

have the social goals of health, comfort and affordability of their DOE counterpart. Over time, some other utility objectives emerged that related to low-income customers:

- Cost savings related to arrearage reduction, decreased disconnections and reconnections, lower bad debt expense;
- Public relations benefits due to helping the poor;
- Customer retention since low-income customers' bill reductions increase the chances of their bills being paid and customers staying on the system
- Satisfying regulators by conforming to legislation mandating low-income provision (MacGregor and Oppenheim 2002)

Because each Utility operates its own set of programs and each state has its own requirements, programs and specific objectives vary across Utility and state lines. Still, all Utilities are required to fulfill their state's mandate for energy efficiency programming.

Funding

Utility programs have become increasing important for low-income weatherization in the last decade with respect to their relative share of the entire low-income weatherization funding pool. Utility funding has increased while DOE WAP funding has decreased, though ARRA 2009 reverses this trend.

In the majority of states that have restructured their electric industries, funding for energy efficiency programs comes from a system benefit charge (SBC) that is levied at different rates per kWh from all customer segments or as a small percent of utility annual revenues. This charge typically was established in the state restructuring legislation and approved and mandated by the state public utility commission. Low-income funding is typically derived from a set percentage of the SBC; for example, in Massachusetts, that rate for low-income electricity energy efficiency is 10% of the entire SBC. Twenty-two states have SBCs (dsireusa.org 2009).

In states that have not restructured their electric industries, funding and program design are typically determined in rate cases, rate design cases, or separate energy conservation cases. In

total, thirty-four states spend money on electric efficiency programs while seventeen spend money on gas efficiency programs (Eldridge et al 2008).

Implementation

Implementation structure varies state by state. In most states, Utilities carry out programs themselves, though the actual work is contracted out to CAPs, other non-profits, or for-profit energy service companies (ESCOs) (MacGregor and Oppenheim 2002). The most common model is SBC funding is forwarded to the state agency that oversees DOE WAP and CAPs implement. In a few states there are other centralized mechanisms. For example, in Vermont mandated funds are collected and given to a statewide efficiency Utility that designs, administers, and implements all efficiency programs.

c. IMPLICATIONS FOR LOW-INCOME PROVISION

The two major mechanisms by which low-income residential energy efficiency measures are deployed are the DOE WAP and Utility-based programs. Program design and objectives, implemented measures, funding and eligibility criteria differ between these programs to a degree that often causes complex management issues for low-income provision. In the vast majority of cases, the local CAPs are responsible for low-income energy efficiency program implementation for both program types and must manage these differences. This can cause a strain on CAPs operational resources and make program navigation confusing and difficult for potential clients. Furthermore, as CAPs are the implementers in most cases, they must manage a complex labor-sourcing situation for multiple program types and a spectrum of work and large client base. Massachusetts' integrated Utility and Federal low-income provision system streamlines the process for CAPs and low-income clients. Its low-income network, LEAN, has a decentralized approach to low-income delivery. Both of these specific elements should be looked to for other states developing their offerings. The next chapter will concentrate on the situation in Massachusetts and set the context for exploring potential labor sourcing and provision models that can address the larger national labor sourcing shortage.

Chapter 4: Analysis of Low Income Program Implementation: Massachusetts Case Study

In this chapter, we discuss low-income energy efficiency as it is currently conducted, using Massachusetts as a case study. The detailed program structure and labor sourcing described below serves as primary information to understanding how low-income provision functions, its strengths and weaknesses, and what roles Auditors and Installers play. We will build our recommendations directly from the information in this chapter.[5]

We will discuss three major issues:

1. The place of CAP groups in creating and running low-income programming, almost as a pseudo-monopoly
2. The functions of two central weatherization jobs—auditors and installers, where they are sourced from, and how they are sourced
3. The lack of formal training or certification for installer and auditor positions

Massachusetts has a unique low-income provision structure, but it is one that is ideal for understanding the central issues to providing low-income services nationally. Massachusetts is the only state in which the WAP and Utility programs are formally rolled into one implementation mechanism. While CAPs are the primary implementers in most states, they normally administer different programs with different eligibility criteria between the WAP and Utility low-income programs. In Massachusetts, the unified implementation mechanism allows us to focus on the central provision issues without having to differentiate between subtle program differences. Furthermore, Massachusetts low-income provision is on the cutting-edge nationally, in great part because of LEAN, and herein provides an insight into challenges moving forward, not just those resulting from out-dated programming.

a. HISTORY OF MASSACHUSETTS LOW-INCOME PROVISION

Background

Beginning in 1976, the Department of Housing and Community Development (DHCD) (then the Executive Office of Community Development (EOCD)) administered the WAP program and

[5] The information in this chapter was sourced from direct interviews with LEAN staff and as well secondary materials about Massachusetts's low-income provision.

local CAPs delivered services. Weatherization Assistance Program funding was cut by 48% ($1.5 million) in 1993 and the number of implementing CAPs decreased to only twelve. Some of the CAPs that had delivered service in the past subcontracted to these twelve formal providers. Because of this cut in funding, the number of low-income homes weatherized decreased severely: from 18,000 in 1987 to 2,600 in 1993. Community Action Programs petitioned the governor to use Petroleum Violation Escrow funds (or oil overcharge funds) and a portion of LIHEAP funds for weatherization. They also requested that the regulators—the Massachusetts Department of Public Utilities (DPU, now called the Department of Telecommunications and Energy (DTE))— mandate the Utilities to provide weatherization services to their low-income customers (MacGregor and Oppenheim 2002).

Up till this time, the only energy efficiency program the Utilities offered, the Energy Conservation Services (ECS) program, did not target low-income customers, though it was piggybacked on the WAP program and implemented by CAPs. Department of Telecommunications and Energy held two phases of integrated resource planning (IRP) that planned for energy resources as a whole, including efficiency based resources. During the first phase in 1986, a CAP program administrator was present to advocate for low-income interests; though at this point, no criteria, budget or program was set for low-income efficiency. In the second phase, specific program design and implementation were formulated, but low-income interests were not present in this design stage and so low-income programs were not clearly defined in relation to residential programs at large (MacGregor and Oppenheim 2002). Furthermore, while some Utilities contracted with CAPs to deliver their residential programs, in 1992 when Utilities went out to bid for implementation, many CAPs lost their contracts (MacGregor and Oppenheim 2002).

Meanwhile, in late 1992, DHCD initiated discussions with DTE to expand coordination between WAP and Utility programs. Furthermore, DHCD wanted DTE to mandate that the Utilities deliver low-income services using Utility funds by contracting with CAPs. There were many reasons for this collaboration and coordination and many barriers to overcome.[6] MacGregor and Oppenheim report that DHCD Staff said that DTE thought the CAPs just wanted funds from the

[6] See MacGregor and Oppenheim 2002, page 38 for a complete list.

Utilities to replace the lost federal DOE funds. They also report that some CAP administrators thought the Utility programs were inadequate for low-income households and were reluctant to coordinate with the Utilities. Finally, the Utilities were reluctant to allow the CAPs to implement their services and focus on low-income customers because the (1) CAP service territories and those of the Utilities did not align; (2) some Utilities did not believe CAPs achieved energy savings and thought their federal funding guarantee nullified their interest to provide high quality service; (3) Utilities did not want to give up control of their programs; (4) some believed Utilities harbored resentment toward low-income customers from the 1970s oil crisis when low-income customers had trouble paying their bills; and (5) Utilities did not want to have to verify customer income and eligibility (MacGregor and Oppenheim 2002).[7] At this time, CAPs also began providing evaluations of their programs and demonstrating their savings and effectiveness.

In 1994, the Massachusetts Electric Company (now part of National Grid USA) created the first Utility low-income specific program, the Appliance Management Program (AMP), by contracting with the CAPs in its service territory. This was an important step for low-income programming and resulted from persistent CAP advocacy, as well as Utilities building trust for CAP programming.

Restructuring

In 1995, DTE initiated proceedings to investigate restructuring the electricity industry in Massachusetts. These proceedings began an important moment for low-income provision. The Department of Energy Resources (DOER) convened "Electric Industry Restructuring Roundtables." The Department of Housing and Community Development used part of its DOE grant to pay for a part-time position to stay informed on the issues, as well as for experts and counsel. Their funds enabled CAPs to organize and represent their interests at the Roundtables. The network that formed as a result of the Roundtables ultimately became the Low-income Energy Affordability Network (LEAN), the major player in low-income provision policy and implementation in Massachusetts to this day (MacGregor and Oppenheim 2002).

[7] For example, one Utility may have to contract with 5 or more CAPs to cover all of its eligible customers.

Beyond being the space for LEAN's formation, the principles that emerged during the Roundtables were critical to low-income energy efficiency and weatherization programs' success. In December 1996, DTE issued the Electric Industry Restructuring order (D.P.U. 96-100) in which DTE ordered each of the electric companies to develop 5-year energy efficiency plans with a "proposal for the company to coordinate delivery of Energy Efficiency services to Low-income Customers with the local WAP agencies and other appropriate entities that serve the low-income population in the company's service territory" (MacGregor and Oppenheim 2002). During the restructuring process, many events transpired that strengthened LEAN and low-income energy efficiency's presence in the Electric Industry Restructuring Act of 1997. Immediately after the signing of the Act in late 1997, two of the three large electric companies started negotiating with LEAN for low-income service provision and in 2000, the third did. By 2002, all but one of the natural gas companies were also coordinating low-income efficiency programs through LEAN.

b. IMPLICATIONS OF THE MASSACHUSETTS CASE FOR LOW-INCOME PROVISION

While Utility low-income programs differ Utility to Utility in their specifics, and the basic elements were covered in chapter 3, there are fundamental elements that are present in Massachusetts, some of which are unique to the state. Most notably, programs are coordinated by LEAN to ensure consistent, comprehensive service; they are piggybacked onto the WAP; and evaluations are conducted by the Utilities (MacGregor and Oppenheim 2002). The major take-away is that through a long, evolving process of first fighting for low-income Utility programming and then coordinating the Utility offerings with the WAP program they run, CAPs have established strong low-income programs in Massachusetts through both federal and Utility funding, play the most significant low-income advocacy role, have and are the central implementers and policy setters of the vast majority of low-income weatherization services.

This history is significant because it reveals the roots of many aspects that define the low-income weatherization space. The work to align the various programmatic, logistical and interest differences shows why Massachusetts' provision is unique, as well as many of the barriers to having unified provision. For the purposes of this thesis, more importantly, it reveals the territorial nature of low-income provision.

CAPs have clear ownership of low-income provision because historically low-income interests were otherwise ignored. For this same reason, they believe they are the only ones who can provide these services adequately and have built a monopoly over provision. Similarly, LEAN that CAP advocates created played a vital role in securing low-income provision and now are one of the central decision-makers for how low-income programming is provided. Because of this history, their strong advocacy efforts, and the quality of their services provision, low-income service has been dominated by just the CAPs, and LEAN as a network, and has a complex and potentially stifling structure. Still, LEAN's design as a network with decentralized implementation but centralized advocacy and policy-setting is one that other states should look to in order to strengthen low-income delivery and make system-wide improvements.

c. CURRENT PROVISION STRUCTURE

Low-Income Program Map

Energy efficiency programming spans both gas and electric Utilities and companies. We are not focusing on the distinction for this thesis because the weatherization services are primarily run through electric Utilities and have an impact on both gas and electric bills.[8] In Massachusetts, there are 7 major gas companies and 4 major electric across the state, as well as 41 municipal light companies that total 10% of coverage (Ledgerwood 2008). There are 23 CAPs across the state to administer low-income programming. The electric programs low-income benefit/cost ratio was 2.9 from 2003-2005 (LIHEAP Clearinghouse 2008).

Funding from the Utility SBC is combined with federal WAP funding and a unified set of measures are performed in eligible households.[9] Low-income weatherization prioritizes high-use households, the elderly and those with young children. Because high usage is highly correlated with high arrearages, efficiency programs are coordinated with arrearage management programs. This coordination is an added attraction for Utilities as well.

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[8] Because energy consumptive elements operate as a system in a house, one energy efficiency measure affects other elements and other efficiency measures. For example, when windows are replaced and insulation is added to the shell of a house, the requirements for the AC and heating units are affected as well.

[9] Including attic and/or wall insulation, blower door directed air sealing, heating system repairs.

As mentioned in the national scan, Massachusetts' electric market restructuring created a 2.5 mills (0.0025 cents) per kWh charge for every electric customer, 10% of which goes specifically to a low-income electric conservation fund.[10] In FY 2007, this amounted to $15 million for low-income electric efficiency programs. Utilities keep 10% of this money for administrative tasks related to low-income programming. They also receive 7-8% of total energy efficiency funding if their energy efficiency goals are reached as an incentive. In Massachusetts, Regional Greenhouse Gas Initiative (RGGI), Forward Capacity market, and Renewable Energy Trust funding are also added to the efficiency funding pool, though there is no specific set-aside for low-income programming.

For a sense of what the ARRA 2009 funding will mean to current provision on a local scale, Massachusetts will receive $122 million for WAP in 2009 in addition to an expansion in Utility funding given the Green Communities Act. There is also an additional $55 million for State Energy Programs that could be used for low-income work.

Because of the non-uniform provision areas for Utility companies and Community Action Programs' multi-town provision, CAPs may have multiple contracts at one time with various gas and electric companies. The contract lays out the specifics of what measures the CAP should perform and how much they will be reimbursed for each measure. The Utility provides 25% funding up front and then CAPs submit reports for reimbursement for the remaining 75%.

From a client's perspective, delivery is seamless with regard to these working parts and various funding streams. The CAP works out where to draw funding from based on the auditor's assessment of what work needs to be done, the cost effectiveness test, and measure and cost limits.

Provision Task Flow

There is a series of tasks and jobs created by this process that make up the flow for a CAP to implement weatherization services. First, low-income clients must be identified. Because of the joint provision structure in Massachusetts, eligibility for all low-income weatherization services

[10] There is also 20% dedicated to low-income gas conservation.

is determined by those who qualify for the Low Income Home Energy Assistance Program (LIHEAP), also known as Fuel Assistance.[11] Weatherization Program Officers use the Fuel Assistance list as the source to call eligible households and offer weatherization services. Alternatively, potential clients can contact the DHCD, their local CAP directly or the Energy Bucks advertisement program to determine eligibility for weatherization and sign up for services by joining the Fuel Assistance program. If a potential client responds that they want services, via any of these channels, their local CAP sends an auditor to evaluate the housing unit and determine the work that needs to be done. The auditor reports their findings to the local CAP which then sends a contractor to perform the necessary services. The contractor is responsible for hiring necessary workers and completing the work; one such position is the installer position that will be discussed below. The auditor assess the work as it is being done and then goes back to ensure that the work was completed properly and at a satisfactory level when the work is complete. The Department of Housing and Community Development checks the quality and appropriateness of work at randomly to ensure quality control. Figure 1 depicts the labor task flow for low-income weatherization.

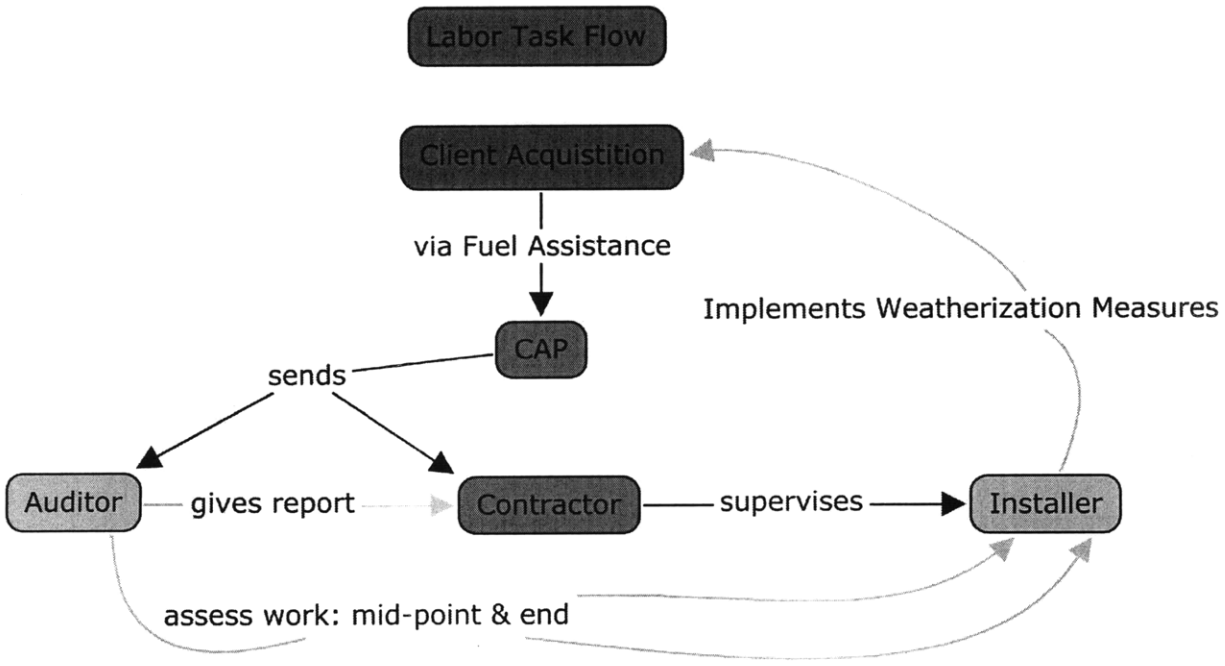

Figure 1 (Ledgerwood 2009 for information)

[11] Fuel Assistance is a federal program to help low income families pay for their heating during the winter. In MA, it is administered by the Department of Housing and Community Development (DHCD), as the weatherization programs are.

There are 50 to 70 contractors that do weatherization and insulation work statewide in Massachusetts. During and before the Comprehensive Employment and Training Act (CETA), which will be discussed in detail in the next chapter, many of these programs operated in house. When the labor moved into a contractor model, many of the people who were trained and worked in house started their own businesses as contractors (Wells 2009). For CAPs, the contractor model was more efficient and cost effective.

d. AUDITOR AND INSTALLER POSITION, LABOR SOURCING, AND TRAINING

What do Auditors and Installers do?

An auditor assesses the scope of the weatherization work to be done, communicates this to the local CAP and assess the quality and accuracy of the work while it is being implemented as well as once the weatherization services have been performed.

Auditors are the entry point for weatherization services, but perform little to no installations themselves. They have no supervisory or management responsibilities and have a skill set that allows them to assess a building's performance but not any hard skills for affecting the building's performance.

A recent job posting for an auditor position from a CAP group in Salem, Oregon:

The Weatherization Auditor performs energy audits on low-income client homes to determine weatherization measures and home repairs necessary to improve heating efficiency and correct situations threatening safety or health. Participate in contracting with private firms for necessary improvements. Advise the client of the weatherization measures to be done. Weatherization services include weather stripping of doors and windows, floor, wall and ceiling insulation, duct insulation and sealing, water heater insulation, possible replacement of refrigerators, provide energy education and information on health and safety. $15.13-$15.90 per hour, plus benefits (Mid-Willamette Valley Community Action Agency 2009)

A recent job posting for a CAP installer position in Hanford, California:

WEATHERIZATION WORKER I: SALARY

$11.43-14.24/HR
Performs minor home repair such as roof/wall patching, window/door, weather stripping, showerheads, attic/duct insulation, caulking & water heater blanket installation. Must possess a high school diploma or GED w/ 1 yr weatherization/construction exp, familiar w/ tools & equip utilized
(Kings Community Action Organization 2009)

Installers are somewhat the opposite end of the spectrum. In most cases, these jobs require the lowest level of skill and provide the lowest quality job, but they implement the insulation and other weatherization services. Their job is to do as the crew chief

orders; this tends to be the "dirty" work—ranging from installing attic insulation on hot summer days to crawling through nooks and crannies of houses to seal an air leak.

For a full DOE WAP list of auditor and installer core competencies, refer to Appendix II.

Auditor and Installer Labor Sourcing

The exact labor sourcing flow differs depending on the type of building, but we will focus on 1-4 unit buildings because these make up the majority of building types nationally for low-income weatherization and because CAPs control most of the labor sourcing in these units. In larger units, CAPs subcontract out the auditor position and some of the more specialized work.

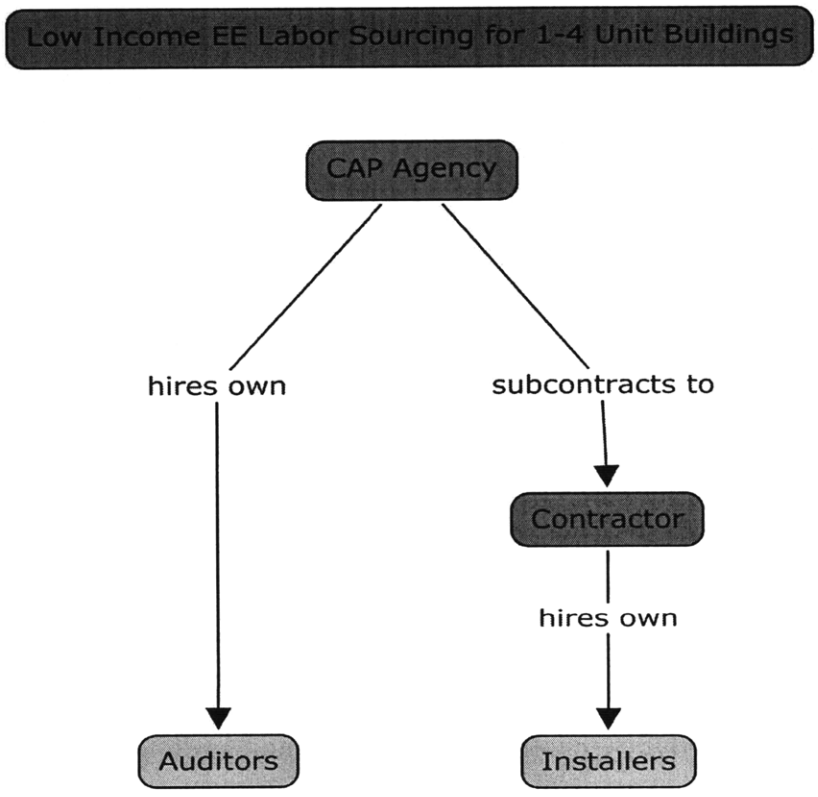

Figure 2 (Ledgerwood 2009 for information)

As is evident in Figure 2, CAPs directly hire auditors while contractors, who in turn are hired by CAPs, hire installers. In order to be an eligible contractor for CAPs, contractors must pass a field test, show their work on a house, be recommended by the local CAP to the Department of

Housing and Community Development (DHCD) and then formally hired by DHCD. After this they are added to the CAP's rotating list of contractors.

Training

Training varies depending on the position, but a commonality is the informality and lack of standards across weatherization positions. This next section will discuss the various training routes for each position from both an Industry Perspective and a Green Collar Jobs Perspective. The Industry Perspective reflects the Weatherization Profession's training approach and opportunities while the Green Collar Jobs Perspective reflects the community and non-profits' approach and issues, especially for marginalized workers.

Industry perspective

For auditors, there are nationally recognized training programs including those offered by the Building Performance Institute (BPI)—the most widely recognized training nationally, Saturn Online, and Affordable Comfort, Inc. (ACI) to name a few. These programs and trainings prepare workers for the various weatherization positions and give credibility to their skills, but none are required or accepted as the standard at scale.

For installers, there are no such programs and instead, experience as laborers or in the work is valued and determines qualification on a firm-by-firm basis.

In Massachusetts, there are no requirements of certification and no formal standardization of qualifications. Contractors determine whom they want as installers and CAPs determine whom they want as auditors. The Department of Housing and Community Development has a 5-person staff that provides some training for new auditors, but it is not formalized and very much hands-on and as necessary. For example, to prepare for the ramp-up, the 23 Massachusetts CAPs have hired 29 new auditors in addition to the existing 50, about half of who have limited experience (Ledgerwood 2009). The Department of Housing and Community Development will assist in preparing these 13 less experienced hires for their weatherization work.

There are also a few avenues that have been created for temporary training as well as for long-term training in Massachusetts. For the short-term contractor needs, CAPs and Conservation Services Group (CSG), the largest weatherization service firm in the country that holds 80% of the Massachusetts Weatherization market, have partnered to create temporary training centers in Fitchburg and Holyoke that the Utilities are funding. Again, this is for contractors, not auditors or installers. For the long-term, the Massachusetts Green Jobs Act of 2008 created the Massachusetts Clean Energy Center to accelerate job growth and economic development in the Commonwealth's green economy (Massachusetts Clean Energy Center 2009). The Clean Energy Center's Request for Proposals (RFP) to create 3 comprehensive training sites across the state was due in late May 2009. This RFP calls for an entity that uses Community Colleges and Vocational schools as centers for green job training and hopes to be operational by January 1, 2010.

As for certification requirements, there is an underlying tension between BPI and DHCD. Conservation Services Group and many private firms support BPI while DHCD, who determines regulations around low-income weatherization and currently ensures quality control, has its own requirements for auditors aside from BPI. There are discussions about requiring a modified version of the BPI training that incorporates DHCD requirements. Even so, one CAP program manager did not expect such a certification to be required for another 2-3 years because the priority now is to get work done and such requirements would slow it further.

Green Collar Jobs Perspective

The aforementioned trainings are the industry recognized trainings that specifically prepare workers to get hired or improve their current skill set. They can be considered trainings for those who are 1-step away from being hired or already have a job and are adding more skills and qualifications to their repertoire.

As will be discussed in more detail in the next chapter, there are many advocates who believe jobs in the emerging "green" economy, including those of auditors and installers, will provide great opportunities for people who are currently marginalized from the labor force. Marginalization can take place because of having a criminal record, low education levels,

coming from an impoverished community, racial discrimination, etc. and for this reason, the Green Collar Jobs advocates are working to prepare these workers to be good candidates for emerging green jobs. This approach often includes a level of "pre" or "pre-pre" training to put marginalized workers on the same playing field as those currently vying for green jobs.

With regard to the auditor and installer positions, many of these trainings are preparing people for work in weatherization. These trainings cover fundamental soft skills, including proper dress, behavior, etc.; basic math and literacy, as well as occasionally financial and environmental literacy; and hard skill introductions, including understanding building systems, heating, etc. Many candidates may have to complete 1 or 2 of these trainings before considering the above-mentioned industry trainings.

⇒ This chapter has focused on low-income provision in Massachusetts as a presenting case for how labor sourcing takes place. We discussed how CAPs run low-income programs, almost as a pseudo-monopoly; where auditors and installers are sourced from and how they fit into weatherization; and the lack of formal certification for these positions. Moving forward, we will recommend how to improve the labor sourcing and positions of Auditors and Installers and the role of certification.

Chapter 5: The Quest for *Good* Green Jobs: The Green Collar Jobs Movement and Workforce Development

In this chapter, we introduce the workforce development perspective to our understanding of low-income energy efficiency via the Green Collar Jobs Movement. The Green Collar Jobs Movement is at the forefront of ensuring that jobs in the new, greener economy are good jobs and therefore it helps us understanding how Low-Income Weatherization jobs currently rate and how they may improve. We will define a Green Collar Job, discuss the Movement's history, current state, and relevant good job literature. From this, we establish criteria for evaluating the Auditor and Installer positions that we will use in Chapter 6 to evaluate these positions.

The Green Collar Jobs movement has had a brief history as compared with DOE WAP and Utility programs, but has grown incredibly strong and recognizable in this short amount of time. It's current incarnation, headlined by a number of recently formed organizations and alliances, generally calls for well-paying, stable manual-labor jobs for marginalized communities and workers in a new green, clean energy economy. While there are subtle differences from one group to another, this thesis will discuss the movement generally, and address how its interests specifically relate to the low-income weatherization Auditor and Installer positions.

a. WHAT QUALIFIES AS A GREEN COLLAR JOB?

There are two central approaches to answering this question: first, by determining the type of jobs that qualify as green collar jobs and second, by determining what characteristics make a job a Green Collar Job. We will be focusing on the latter—what makes a job a Green Collar Job—since we are focusing on specific jobs, the Auditor and Installer positions in low-income weatherization. Many reports discuss the former question and are easily accessible online.

Different reports, organizations and authors define a Green Collar Job slightly differently. We will use one of the first definitions and then extrapolate to get at the core concept. From the first report on Green Collar Jobs—Pinderhughes' 2007 report "Green Collar Jobs: An Analysis of the Capacity of Green Business to Provide High Quality Jobs for Men and Women with Barriers to Employment:"

> *Green collar jobs* are blue-collar jobs in green businesses – that is, manual labor jobs in businesses whose products and services directly improve environmental quality. Green collar jobs represent an important new category of work force opportunities because they are relatively high quality jobs, with relatively low barriers to entry, in sectors that are poised for dramatic growth. The combination of these three features means that cultivating green collar jobs for people with barriers to employment can be an effective strategy to provide low-income men and women with access to good jobs - jobs that provide workers with meaningful, community serving work, living wages, benefits, and advancement opportunities. (page 3, Pinderhughes 2007)

Green Collar Jobs' critical characteristics are that they are manual labor jobs that improve environmental quality and are "good" with relatively low barriers to entry. In Pinderhughes definition, "good" is determined by the work helping "community," providing living wages and benefits, and leading to advancement opportunities.

In short, they are career jobs that pay well, are relatively easy to enter for people with barriers to entering the workforce, and benefit people, environmentally and otherwise.

b. BRIEF HISTORY

The three major national organizations convening and leading the Green Collar Jobs movement in the United States, followed by their year of founding in parentheses, are the Apollo Alliance (2004), the Blue-Green Alliance (2006), and Green for All (2007). These organizations represent labor, environmental, and community interests. While green jobs generally refer to any jobs in the new clean energy economy, "green collar jobs" are green jobs for marginalized, low-income, and working class people that generally involve manual labor and create "pathways out of poverty" (Apollo Alliance and Green for All 2008).

The concept of a green collar job and the term itself was created in 1999 when Sightline (then Northwest Environment Watch) published "Green-Collar Jobs" (Murray 2008). "Green-Collar Jobs" by Alan Durning focused on the rural Northwest's changing economy from resource extraction industries to green-collar jobs. The book focused on a specific context and at the time seemed to speak just to that segment. In 2004, Raquel Rivera Pinderhughes, a professor at San Francisco State University's Urban Studies Department, started using the term. The term began taking hold in 2006 when Pinderhughes published "Green Collar Jobs: Work Force Opportunities in the Growing Green Economy" in the Journal of Race, Poverty and the Environment. Since 2006, the term has gained popular support by the Green Collar Job affiliated organizations, the media, and throughout the government.

c. CURRENT STATE OF THE MOVEMENT

The movement that started less than 5 years ago with a specific focus on jobs in the new green economy and less than 3 years ago in specific name has growth incredibly in a short amount of time. There are hundreds of organizations that are in some way affiliated with the movement. Starting from the top, there are 3 successful national organizations dedicated to Green Collar Jobs that are closely affiliated with other large and powerful environmental, labor, political and community organizations—including the Center for American Progress, the Natural Resource Defense Council, SEIU, the Sierra Club, and the Workforce Alliance among others. These organizations research the prospects for Green Collar Jobs, publish reports, advocate for legislative support, and build linkages and capacity on the ground.

As a result of their work, national, state, and local legislation has been passed for Green Collar Jobs. At the federal level, The Green Jobs Act (H.R. 2847), passed as part of the 2007 Energy Bill (H.R. 3221); it allocates $125 million a year for green job training, $25 million of which will be dedicated to "pathways out of poverty" specific training (Jones 2007). "Pathways out of poverty" training is money specifically for marginalized people and workers. Furthermore, ARRA 2009 allocates $500 million for research, labor exchanges and job training projects for careers in energy efficiency and renewable energy industries, as well as up to $37.5 million for Job Corps Centers, which may including Green Job Training (Alliance to Save Energy 2009).

Massachusetts and Washington State both passed Green Jobs specific legislation in 2008 and a number of local governments have Green Job pledges and programs.

Finally, there is a broad set of community-based and local organizations and institutions dedicated to Green Job and even Green Collar Job specific development. These range from environmental and community-based local groups to Community Colleges and new municipal or statewide alliances. There are also a large number of organizations trying to build Green Collar Job Training into their larger mission. These two groups broadly work on actually creating the jobs through winning local support, advocating for legislation, providing the actual training, or playing an intermediary role of linking potential workers with employers.

d. WORKFORCE DEVELOPMENT HISTORY AND GOOD JOB LITERATURE

The concept of creating "good" jobs for people with barriers to employment is tied to a much larger literature and history of public and private initiatives, which are helpful in putting this recent Green Collar Jobs movement in context. There are also lessons that transfer and will help inform our analysis of the low-income Auditor and Installer positions.

History and Shift to Poverty and Supply-Side Solutions

While the literature and initiatives are extensive and span from early, small workforce programs beginning with the Fitzgerald Act of 1937, the large shift that defines the current state of workforce development programs took place in the 1960s with the War on Poverty. Prior to the War on Poverty, the major public workforce development initiative was the Manpower Development and Training Act (MDTA) that passed in 1962. In this period, the focus was on structural unemployment programs and revitalizing distressed areas (Weir 1993). The War on Poverty shifted the focus of workforce development to addressing unemployment as a labor supply issue and injected the notion of a cycle of poverty. It shifted from a full labor market analysis—including demand and supply sides—to focusing on individual problems, poverty, and youth (Weir 1993). The charter legislation, The Economic Opportunity Act of 1964, emphasized "employment readiness" for young people.

Community Action Programs (CAPs)

The second major implication of the 1964 Economic Opportunity Act was the creation of local Community Action Agencies or Community Action Programs (CAPs) to implement War on Poverty programs. These are the same organizations that now implement the vast majority of low-income weatherization programming, so their origins and structure are critical to understand how they approach the labor issue of weatherization work and the weatherization program more broadly.

Community Action Programs became the de facto implementer of the new poverty programs because their advocates took advantage of a policy-making impasse and because the federal government was looking for an innovative approach to implementing programs. Specifically, the Council of Economic Advisors (CEA), the agenda setters for the new poverty programs, and the Budget Bureau favored CAPs because they were efficient, low-cost, and provided a clear organizational structure. The President's Committee on Juvenile Delinquency (PCJD), a body that had been working on youth delinquency, was interested because they saw CAPs as an anti-institutional means that could alter urban bureaucracies (Weir 1993). In fact, CAPs were such a new approach, with some ambiguity, to address such a large program that James L. Sundquist of Brookings Institution writes, "rarely has so sweeping a commitment been made to an institution so little tested and so little understood as the community action agency" (Sundquist 1968, page 151).

CAP Struggles and Larger Labor Market Implications

Community Action Programs quickly became separate institutions for the poor, particularly poor black people, and could not carry out many tasks they took on. Their particular focus was to implement employment policy. The Concentrated Employment Program (CEP) began in 1967 to bring the various manpower programs together under one roof and involve private employers onsite. Because CEP did not add expenditures, CAPs struggled to build organizational ties, new program coordination, and connections with the business community in addition to their regular work (Weir 1993). Furthermore, CAPs were created and began to implement too quickly for a sufficient organizational form to be structured (Weir 1993). Programs were very fragmented, with different timelines, requirements, etc. People being trained in the programs did receive stipends while in training under CEP.

Because of political differences and territorial inclinations, the various stakeholders and players in unemployment and poverty policy did not unite to affect structural labor market issues. Vocational institutions, the Department of Labor's U.S. Employment Service, CAPs, the Manpower Administration, and the private sector played disintegrated roles without a comprehensive strategy. Furthermore, CAPs and the War on Poverty were positioned as Black programs linked to the Civil Rights Movement. This racial and justice ideological position worked to gain support for the programs and provide an avenue for Black leaders to run the programs, provide services for their constituents, and challenge local power structures—an accomplishment in its own right—but it also strengthened the analysis of poverty as solely a social problem, as opposed to a social and economic one. Even the positive role that CAPs played as political machines for disenfranchised Blacks became neutralized as non-profits were forbidden to engage in partisan or political advocacy; herein, CAPs became social service agencies.

In the late 1960s, the federal government as well as segments of the Civil Rights Movement, including the Poor People's Campaign, fought for public employment positions for the urban poor. Because of the War on Poverty framework, as well as diminished public finances due to Vietnam War expenditures, none of these more structural initiatives were adopted. Instead, in 1968, President Johnson began the Job Opportunities in the Business Sector (JOBS) program wherein the private sector would pledge jobs for the unemployed and in return, the private sector would be reimbursed training costs. This program shifted the budget burden away from the expenditure-stripped federal government. By 1970, the program was a huge failure and JOBS funding had to be reallocated. It failed according to Weir because the jobs were targeted at the low end of the labor market and "neither business nor organized labor had a stake" in them (Weir 1993, page 93).

In the end, without connection to the larger labor market, poor people—especially Black American poor people—were left with a modest set of social services and training programs that amounted to "de facto income maintenance programs" (Weir 1993, page 94). Black organizations fought hard to maintain these programs, as this was all that existed to attempt to

equalize social and economic inequities, and were isolated in advocating for unpopular programs.

In sum, the War on Poverty divided labor market policy into two realms: one of economic policy and one of poverty policy. This fragmented approach set the stage for supply side job generation detached from demand drivers and is a critical concern as new green job creation is developed.

The History Since the War on Poverty

In 1973, the Comprehensive Employment and Training Act (CETA) took over. Instead of funding streaming to CAPs, it went directly to Governors and then to Mayors. Community Action Programs still provided service, but now had designated service delivery areas (SDAs). These areas still dictate where low-income people go to get their weatherization service. The Comprehensive Employment and Training Act continued providing stipends for trainees and also linked those who finished the training with public services jobs for 12 to 24 months, either in public agencies or with private not-for-profits. One industry CETA trained for was weatherization. Many of the contractors providing services today were trained in the CETA program and employed at CAPs as Auditors, Installers, etc. (Wells 2009).

President Reagan replaced CETA with the Job Training Partnership Act (JTPA) of 1983, to improve the employment status of disadvantaged young adults, dislocated workers, and other individuals with barriers to employment (Child Trends 2004). The Job Training Partnership Act replaced the public service employment component of CETA with Private Industry Councils (PICs) that informed what kind of training was necessary. The Job Training Partnership Act took away stipends from trainees and also stopped training for the weatherization industry. Instead, the private sector began being used for WAP labor sourcing (Ledgerwood 2008).

The most recent legislation, the Workforce Investment Act (WIA) repealed JTPA in 1998 even though it maintained PICs, though calling them Workforce Investment Boards (WIBs). It also introduced individual training accounts. Instead of money flowing to agencies for a number of slots, individuals get a voucher that they can use at whatever agency they want. While this creates a one-stop entry point, it is difficult for agencies to plan for the number of participants

they will get. The Workforce Investment Act shifted the focus of workforce development from training-centric to work first. The ratio of money into training has declined while outreach and placement has increased.

In sum, legislation and initiatives of the last 5 years have moved away from solely the supply-side framework to addressing unemployment and poverty, but the roots of training programs are from a non-integrated, supply-side approach. This is invaluable to remember as we discuss how to build good jobs and a qualified labor force into the future.

Project QUEST Case Analysis:

Paul Osterman and Brenda A. Lautsch's evaluation of Project QUEST for The Ford Foundation provides a number of insights into variables that make a training program well suited to creating "good" jobs. We will identify these variables for the training program and then extrapolate lessons to take forward. Both the training program components and lessons learned will help inform our analysis and recommendations for the low-income Auditor and Installer positions.

Project QUEST is a job-training program in San Antonio, Texas that Osterman and Lautsch call "innovative" for a number of reasons. The central factors are that Project QUEST

- Trains participants for nearly 6 times the amount of time the average JTPA program does, creating deeper skill development and a stronger comparative advantage for participants in the marketplace
- Provides personal, financial, and professional support throughout and after training, investing heavily in participants and ensuring their success
- Maintains close ties to community organizations and local businesses, so that its training is driven by market demand and feeds back into community improvement
- Creates institutional change in San Antonio, affecting the employer community, community college system, and community involvement (Osterman and Lautsch 1996)

e. SYNTHESIS OF FINDINGS

Previous workforce development efforts and the Green Collar Jobs Movement reveal many aspects of what makes a good job and how to adequately prepare a workforce. These lessons inform the criteria we use below to evaluate the Auditor and Installer low-income weatherization positions in Chapter 6. A summary of these lessons follows.

From the history of workforce creation programs, our analysis reveals the following lessons:

1. Focus on training and placement, not just supply side (training)
2. Create a lasting relationship between the private sector, demand drivers, and training

3. Community Action Programs played a critical role in implementing poverty policy nationally when the bureaucratic capacity did not exist
4. A purely identity based approach to job creation, without explicit emphasis on structural labor market issues, has limits to creating long-lasting opportunities
5. Low-end job programs do not work because neither industry nor labor have a vested interest in these jobs

From Project QUEST, the critical lessons we learned for training programs:

1. Heavy investment and support in participants to ensure participants ability to complete the program
2. Cooperation with relevant institutions to ensure proper training is institutionalized
3. Market connections that ensure quick hiring of program graduates
4. Deep training for career ladder jobs, those with promotion ability
5. Connection to community organizations for recruitment and to ensure participants' communities benefit as well as individuals

f. CRITERIA FOR EVALUATION OF JOBS AND TRAINING

⇒ The above synthesis informs the major criteria that will help us determine if Auditor and Installer jobs are good as they are currently constructed. Combining our analysis from Project QUEST, the history of workforce development, and the current Green Collar Jobs movement, our criteria for evaluating the Auditor and Installer positions and their sourcing are:

- ✓ Ease of Entry for marginalized people and workers
- ✓ Transparency of Entry: how people are hired and by what criteria
- ✓ Equality of Entry: that people are hired based on qualifications
- ✓ Jobs develop the local economy, especially of the areas where work is done
- ✓ Living Wage pay and benefits
- ✓ Dignity of the work, in helping the environment and the communities of workers or in need
- ✓ Stability and tenure of employment

For Labor training, our criteria are:

- ✓ Comprehensive Market Analysis, not training without understanding of demand
- ✓ Connections to Employers and Jobs
- ✓ Support for trainees, including personal, financial, and hard skills during and after training
- ✓ Deep Training that provides a comparative advantage for workers OR Entry Level Training that leads to a career ladder
- ✓ Institutional Effect that ensures longevity of approach and training and ensures local community benefit

Chapter 6: Will Low-Income Efficiency Programs Create *Good Green Jobs*?

In this chapter, we undertake two major tasks:

1. *Estimating the market size* for low-income energy efficiency programming and required labor capacity for the current ramp-up
2. *Analyzing the quality* of Auditor and Installer weatherization positions using the criteria we established in the last chapter

This chapter is the analytic chapter that explains the problem this thesis addresses: that Auditor and Installer positions are not good jobs for marginalized workers. Our analysis will take three forms: first, an analysis of the gap in labor; second, a synthesis of issues facing the current labor ramp-up; and finally, the analysis of the quality of Auditor and Installer jobs. The final chapter will propose solutions to the problem described in this chapter.

a. LOW-INCOME ENERGY EFFICIENCY POTENTIAL

Most energy efficiency assessments and plans discuss technical, economic, and feasible potential for a certain site or context. Technical potential refers to all possible energy efficiency savings in a particular context. For example, taking the small scale of a single family house, the technical potential would include all energy efficiency measures that can be done in that house, regardless of price, effectiveness, or adoption plausibility. The economic potential narrows the technical potential by incorporating an economic cost effectiveness measure. This means that of all the possible energy efficiency measures, the economic potential would include only those measures that are cost effective. Cost effective standards vary program to program, Utility to Utility, etc. but for a given context the economic potential provides a standard of what measures are cost effective. Finally, the feasible potential incorporates a measure for what are the plausible and likely measures to actually be adopted. In the case of a single family house, while the economic potential may include measures with payback periods of 10 years or those for seemingly obscure end-uses, the feasible potential refers to the measures that it is likely a home-owner will actually pay for or have implemented.

In the case of low-income provision, the technical, economic and feasible potential take on different meanings. Both DOE WAP and Utility-based programming incorporate an economic

standard by which measures are evaluated. Since most to all standard program measures are freely installed, the feasibility criteria become less relevant as clients will generally accept anything that is free and will save them money. While these considerations are important in program design, they are not as critical for understanding labor sourcing. What is critical is an understanding of the entire market of housing that is low-income eligible, the market share that has already been serviced, and the labor capacity necessary to fulfill the market needs.

b. LOW-INCOME ELIGIBLE MARKET SIZE

Estimating the low-income market size is important to understanding the scale of the labor demand for low-income residential energy efficiency services. There are a number of measurement challenges in assessing the market, but a back-of-the-envelope measurement will suffice to understand the labor scale we are considering. Two methods will be employed: the Department of Energy has an estimate for the number of houses eligible for weatherization that will be back-checked against a population and household size rough estimate.

The Department of Energy estimates that there are 34 million homes that are eligible for weatherization funds (Department of Energy 2006). Since DOE WAP eligibility requirements tend to be as strict, and in most cases more strict, than those of Utilities and state programs, this should safely be a low-ball estimate. In order to back-check it, we will estimate the population based on census income data and see how it compares to the DOE estimate.

Weatherization Assistance Program eligibility is generally determined by a multiplier of the Federal Poverty Line (FPL). The American Recovery and Reinvestment Act 2009 raised the FPL income eligibility from 150% to 200% of the FPL (Environmental Protection Agency 2009).[12] In order to back-check the number of eligible households, we will take the 2009 FPL levels and the average US family size based on the US census and cross-reference this against the income populations based on the 2006 American Community Survey. The average US family size is 3.14 and the 2009 FPL for a family of 3 is $18,310. Given that families at 200% of FPL are eligible for DOE WAP, this means that all households with incomes of $36,620 or less are eligible.

[12] Some states use a percentage of the average median income as an indicator too.

Based on the census, this amounts to around 42.4 million households.[13] The Department of Energy has served 6.2 million low-income families from all funding sources since 1976 (DOE 2009). This gives us a net 36.2 million households to serve. The 2.2 million household differential between the DOE estimate and ours can be attributed to a combination of households reached through Utility-based programs and estimate margin of error.[14] Herein, we have determined the DOE's estimate of 34 million households is reasonable.

c. LABOR CAPACITY AND REQUIRED LABOR ESTIMATE

The thirty-four million households to be served demonstrate a clearly sizeable market, but what does this mean for the labor necessary to fulfill this amount of work? In order to evaluate the quality of new green jobs in energy efficiency and analyze a strategic, equitable, and sufficient strategy to ensuring efficiency work gets done, we must understand how many and what kind of jobs this market requires. We will present the current network capacity for WAP, as well as a potential trajectory for ramping up the labor force to spend the newly allocated WAP funding and for reaching President Obama's goal of weatherizing 1 million homes per year.

There are four large categories of job functions associated with the weatherization program: programmatic, auditors, weatherization worker, and quality control. We are defining programmatic to include intake and outreach, local managers and clerical, state staff or contractors, trainers, and DOE HQ and field staff; auditors to be of this one function; weatherization worker to include contractors and their crews; and quality control to include inspectors for quality control and quality control monitors. Currently, there are 3,197 programmatic workers in the WAP provider network, with local managers and clerical the highest at 1,800 and intake and outreach second at 1,000. There are 900 auditors. There are 7,850 weatherization workers, 5,700 of which are installers. Lastly, there are 1,700 quality control workers, split almost evenly between monitors and inspectors. In total, there are 13,647 weatherization workers in the network who can service approximately 150,000 households a year (Weatherization Assistance Program Technical Assistance Center 2009).

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[13] This is adding all households earning below $34,999 and 10% of the $35,000-$49,999 category to account for the additional $1,500 (to get to all households at or below $36,000) as we assumed an even distribution within this category.

[14] For reference, Massachusetts' low-income utility providers, the Low-Income Affordability Network (LEAN), weatherized 3000 households last year.

DOE's estimate for how they will ramp up to reach the goal of weatherizing 1 million homes per year is depicted in Chart 4 below. For a larger version, visit waptac.org.

Weatherization Assistance Program Expansion Plan
Funding and Outcome Metrics of Ramp-up Strategy to 1 Million Home Capacity

Program Needs		Current Network Capacity	End of 2009 Network Capacity	End of 2010 Network Capacity	End of 2011 Network Capacity	TOTALS	How Long Until Ready (per person or item)
Production Capacity		**150,000**	**350,000**	**650,000**	**1,000,000**		
Production Goal			**245,000**	**455,000**	**700,000**	**1,400,000**	Estimated 70% Actual Production
Intake/Outreach Positions		1,000	1,800	2,700	3,800	**2,800**	1-2 mo.
Audits/Inspection		900	1,200	1,700	2,550	**1,650**	6-8 mo.
Inspectors for Q.C.		800	1,000	1,400	1,850	**1,050**	2-4 mo.
Crews Including Contractors	# Crews	2,150	3,500	6,500	10,000		1-2 mo. (hire, equip)
	# Crew Members	5,700	7,000	13,000	20,000	**14,300**	2-4 mo.
	# Crew Chiefs	2,150	3,500	6,500	10,000	**7,850**	2 mo. (after crews)
Local Managers/Clerical		1,800	2,200	2,875	3,750	**1,950**	Managers: 6-12 mo. Clerical: 2 mo.
QC Monitors/Field Staff		900	1,075	1,450	1,950	**1,050**	Monitors: 6-8 mos.
Trainers		100	250	425	700	**600**	4-6 mo.
State Staff (or Contractors)		280	325	400	575	**295**	4-6 mo.
DOE Staff - HQ/Field		17	25	37	45	**28**	Will depend on hiring practices
		Current Jobs				**Added Jobs**	
Total Direct Jobs Added		**13,647**				**31,573**	Total new direct jobs created
Training Centers/Locations		10	35	60	70		6-9 mo.
# of Local Agencies		900	1000	1,100	1,200		6-9 mo. (system set up, hires)
Equipment/Vehicle Per Crew			$78,300,000	$174,000,000	$203,000,000		Investments in Field Crews
$58,000 Needed to Oufit and Train							
		Avg Cost Per Home				**Total**	
TOTAL FUNDING REQUIRED		$4,900	**$1,200,500,000**	**$2,229,500,000**	**$3,430,000,000**	**$6,860,000,000**	**Economic Stimulus Funding**

Chart 4 **Source**: waptac.org

The total increase in jobs given the WAP ramp-up and stimulus funding is estimated at 31,573.

Of the jobs with the most demand to achieving President Obama's goal of weatherizing 1 million low-income homes a year, the auditor position is often mentioned as one of the most critical and with the largest supply and demand gap. A second job of central importance that requires the most new hires is the installer position. Furthermore, both of these positions are central focuses of the Green Collar Job Movement.

Auditor Focus: The Need

Auditors are often mentioned as the position with the most critical need as they require a specific skill set that is not easily derived from an existing profession (such as insulation installers, roof specialists, etc.). Weatherization Assistance Program Managers and Directors have stated the clear need for auditors. The Pennsylvania Weatherization Providers Network conducted an extensive survey in late 2008 that found one of the main challenges facing weatherization expansion is the lack of an experienced pool of workers and inadequate training capacity. Specifically, the survey found that "finding qualified individuals with basic foundation of skills is time consuming, especially at energy auditor level" (Pennsylvania Weatherization Providers Network 2008, pg. 4).

Furthermore, it found that "getting timely training will be biggest obstacle" but that it is difficult to hire new staff because the duration of funding is uncertain (Pennsylvania Weatherization Providers Network 2008, pg. 4). Of concern to Green Collar Job advocates, the survey also found that CAP programs plan to train and hire temporary weatherization workers, as this is often what they do when they receive extra funds. The potential for limiting, temporary jobs being created from ARRA 2009 funding, especially for the auditor position is great.

There is a recognized goal of economic development and job creation in ARRA 2009's funding of the WAP program. Community Action Programs themselves acknowledge this is imperative, but qualify it by adding that funds need to be spent with as small a start-up time as possible (Pennsylvania Weatherization Providers Task Force 2008).

Auditor Focus: The Gap

Currently, Auditors account for 6.6% of the total weatherization workforce. They are expected to increase to 8.1% of the total workforce by the end of 2011, when the projected capacity to weatherize will increase to 1 million homes per year. *Given this estimate, 1,650 additional auditors must be trained for low-income weatherization alone to reach President Obama's goal. Three hundred auditor positions will be added by the end of 2009, an additional 500 in 2010, and 850 more in 2011.* As indicated on the chart, typical training time is 6-8 months.

Referring back to our presenting case of ABCD in chapter 4, they are planning 10-20% growth for the next three years and a doubling in production (Wells 2009). The jobs, as we can extrapolate from the above estimate, are in the 100s not the 1000s. For Auditors, ABCD will hire 20 auditors in 2009 and another 18 after that, adding 38 to the existing 55 to reach their desired capacity given ARRA 2009 (Ledgerwood 2009).

Installer Focus: The Need and Gap

Installers have not been as focused on from the standpoint of CAPs for two major reasons. First, CAPs in most places do not hire installers themselves; they subcontract out this work to contractors who hire the installers. Second, the installer position is primarily a laborer position that does not require advanced training and its skill set overlaps with that of other tradesmen significantly.

Still, the installer position is the one with the highest quantity of spots needed. One thousand three hundred installers will be needed by the end of 2009, another 6,000 in 2010, and another 7,000 in 2011. *A total of 14,300 installers will be hired to meet President Obama's goal of 1 million weatherized homes per year.*

d. ISSUES IN REACHING TRAINING POTENTIAL: QUALITY OF JOB

While the labor ramp-up is not as extensive as ARRA 2009 funding level may imply, there are still a number of issues to be addressed in reaching this training potential. Before delving into those issues, there are two major policy changes ushered in by ARRA 2009 that change the nature of low-income weatherization and the ramp-up. First, ARRA 2009 changed the per house limit for weatherization services from $2500 to $6500. This allows for deeper work to be done in low-income homes while changing the number of homes that can be reached with the $5 billion set aside for DOE WAP. Second, ARRA 2009 allows for training and technical assistance to account for up to 20% of funding, up from the previous 10% limit.

Davis-Bacon and Prevailing Wage

The Davis-Bacon Act of 1931 mandates that prevailing wage must be paid on all public works projects. Davis-Bacon is especially pertinent with regard to installers. Because installers

currently get paid in the range of $12-13/hour, a living wage—that Davis-Bacon may create—would multiply this amount up to 3 fold. This would significantly affect the cost of labor, the composition of contracting firms, the number of houses weatherized, and the cost-effectiveness of measures. Herein, Davis-Bacon's applicability to installers will significantly affect what type of work DOE WAP does and how. It would also delay the implementation process by an additional 3-6 months because contractors will have to go through the bidding process to determine the cost of each measure again. It may also affect the wage of auditors who earn in the $10-15 range—which many do. Finally, when ARRA 2009's funding ends, wages will most probably revert to their current rates, changing the nature of jobs and the whole process again.

The major upside of the Davis-Bacon legislation is that it demands a living wage for all weatherization workers and can make the work better across the board. It also has the potential to transform the industry in the long term.

Currently, Department of Labor and Department of Energy staff are meeting to rule on how Davis-Bacon applies to weatherization workers. The majority of funding from ARRA 2009 has not and will not be dispersed until a ruling is made.

An affirmative Davis-Bacon ruling would change the quality of pay for weatherization jobs significantly and the overall quality of the job. It would also potentially increase the focus of training people for weatherization even more while potentially decreasing demand for such workers, as they would become more expensive to firms and fewer measures would be cost effective.

Unionization

Workers in the weatherization industry are currently not unionized. Because of this, their wages differ significantly place-to-place and employer-to-employer. They are also not afforded the privileges of training and work stability that unions often offer. There are various reasons that residential weatherization workers, the group that low-income weatherization workers are a subset of, are not unionized, as well as many challenges to unionizing them. These include:

- The diverse grouping of Weatherization's specializations that cut across traditional union structures and organizing
- The instability of Weatherization work. Weatherization tends to wax and wane with political will and energy costs. Herein, the current boom created by the Obama administration and rising fossil fuel prices may be gone in 3 years.
- The residential sector is not as profitable as commercial weatherization, nor does it have the same economies of scale
- For the Laborers Union, which weatherization workers would fit the best within, there are requirements for reading and math level and having no criminal record that some current workers may not meet and many potential Green Collar Workers would not
- The Union equivalent wage is much more than the current wages for weatherization workers. For example, in New York, a weatherization workers at the Union equivalent would make $60/hour, around a 4 times increase from the current average wage. This would change the cost effectiveness of different energy efficiency measures and programming.
- Unions have a strong political history that includes exclusion along racial and other identity lines that creates apprehension for some Green Collar Workers to join
- There are no current Weatherization Unions so there is no model to adopt
(Ladan 2009; Schmitt 2009; Shogren 2009; Thompson 2009)

While the lack of unionization is a serious impediment for many to consider these jobs as targets for green collar workers, such as the Blue Green Alliance, others see the lack of unionization as an opportunity. Weatherization's non-unionization potentially creates opportunities for workers who would otherwise not have them. These jobs can herein provide jobs for those with little to no opportunities or be first step jobs for those with promotion aspirations.

Unionization is generally considered a positive step for green collar job advocates because of the added stability, training opportunities, and quality of the job it provides, but it can also be viewed as a limitation for getting the most marginalized workers into weatherization positions.

Certification

We discussed certification some in chapter 4 regarding Massachusetts. There is currently no requirement for certification for auditors of installers for low-income programming. Many states have discussed requiring BPI or another certification program, including the possibility of state-run ones, for all low-income weatherization workers, but no formal plans have been accepted. One major reason is the desire for a quick ramp-up and certification will require delays in training and hiring workers.

A second aspect of the certification discussion is how it corresponds to the possibility of unionization. Neither is mutually exclusive, but they have clear overlap. If weatherization workers were unionized at scale, the certification process would be somewhat moot as there would be standards for workers and training opportunities through the union.

Certification can be viewed as a step to improving the quality and stability of low-income weatherization jobs. Localized certification also provides an avenue for geographically specific training, local workforce development, and non-monopolized service provision. This may be an intermediate standardization that does not bring the potential exclusivity of union membership. Herein, certification can be viewed as a positive policy for marginalized workers, especially with the further development of "pre" and "pre-pre" training programs that developed them for current training programs.

Purpose of Job

The discussions around certification and unionization raise the central question of what is the desired "type" of job for weatherization. Should weatherization positions be stable, "good" jobs or should they continue to be "bad" jobs and be converted into opportunities for the most marginalized workers? Different job advocates argue for different "types," but either way, stability, living wages, and paths for opportunity are crucial. Here, the training programs preparing people for these jobs become very relevant. From green collar job advocates, are there sufficient "pre" and "pre-pre" training programs that will make marginalized workers viable candidates for these positions? Will the timing for these "pre" and "pre-pre" training programs give marginalized workers the ability to compete for ARRA 2009 related jobs? Can these jobs,

or training for them, help workers get other jobs that are better later down the road if the quality of these jobs themselves are not improved?

There questions are difficult to answer, but given the variability in answers, the safest bet is to focus on making these jobs better and enabling marginalized workers to qualify for them.

e. ISSUES IN REACHING TRAINING POTENTIAL: PROGRAMMATIC

Speed, Duration, and Amount of Funding

The focus of CAP managers is to do as much low-income efficiency as quickly and effectively as possible. Given the 20-fold increase in federal funding and President Obama's goal of 1 million homes per year, serious ramp-up is necessary for CAPs. While there are some challenges being worked out, CAPs have begun the hiring and growth processes. The American Recovery and Reinvestment Act of 2009's DOE WAP funding of $5 billion was initially slated for a 1-year disbursement; now, it has been extended to a 3-year disbursement. This coupled with the increase in average funding per house makes the funding reach less houses per year, but still requires a huge increase in labor. It also both attracts more labor to DOE WAP work—as there is more money and work to be done on each house—and extends the length of demand for jobs, though potentially decreasing the number of jobs needed per year.

How to fill labor slots is not the only major labor concern regarding the ramp-up; what will happen with these positions and people during the ramp-down is also a serious consideration during the ramp-up. The expansion in programming is directly related to ARRA 2009 funding, and as stated above, weatherization funding is instable. A well-structured labor-training program will take into account not only current labor demand but the long-term prospect of the positions it is training for. Similarly, CAP agencies should also have this in mind—specifically with regard to duration of funding and positions. If positions have clear career tracks then the stability of the first job itself becomes less important and the career trajectory becomes more important.

Training: Who

One of the biggest questions facing the ramp-up is how the required training will take place: including by whom and inclusive of what. First, we will tackle the "who." There are a number of

entities that currently train and could train. As mentioned in chapter 4, the large national private training houses for auditors are the Building Performance Institute (BPI), Saturn Online, and Affordable Comfort, Inc. (ACI). These are the most recognized training programs. There are also private specific skill building training houses such as Oil Heat trainings that CAPs may send auditors to. In the private "market," there are a growing number of non-profit and community-based organizations that are training youth, marginalized labor, and others for auditor and installer positions.

In the public sector, training varies quite a bit location to location. On the most local level, CAPs tend to use private training houses or state programs to refine their auditors' skill set. Many states have state-based training programs. State courses tend to be infrequent and the quality and depth of training varies, but are offered to CAP workers for free. In Massachusetts, the Department of Housing and Community Development offer a 1-day training for auditors for instance. A sub-set of these state trainings as well as some other regionally based public and non-profit training houses are recognized as national providers for public low-income weatherization. There are 11 such organizations, one of which is the Weatherization Training Center of Pennsylvania College of Technology and based in Williamsport, PA. Many Pennsylvania CAPs felt this was a strong training and wished it would be offered in more locations and more often (Pennsylvania Weatherization Providers Network 2008). Others believe training should be fully decentralized so each CAP can use funds as they see fit to train. While a decentralized model can provide training as necessary and be a more fluid supply and demand generator herein, the major concern is that decentralization will lead to a lack of quality control and transparency.

The last player that is positioned to play a major role moving forward are 2-year higher education programs, namely Community Colleges and Vocational Schools. Some Community Colleges have begun weatherization based training, including specific training for auditors and installers, and many states are considered folding future training into larger Community College programs. Massachusetts for instance released a Request for Proposals for future weatherization training to be based out of Community Colleges. While it will be managed by the State's Clean Energy Center, Community Colleges will be the formal training ground.

There are herein 5 major avenues through which training could happen for DOE WAP:

1. External links to the CAP network—in the form of Community Colleges, Community Organizations, etc.
2. Subgranttes—wherein each CAP is responsible for training through the private market and on the job training
3. The Federal Weatherization Training Centers—centralized basic training with on the job refinement
4. The Federal Weatherization Training Centers create more regional channels or state offices ramp-up their trainings—decentralized but standardized with on the job refinement
5. One that is not covered above, Vendors training workers on their specific products with on the job refinement

Each of these avenues has advantages and disadvantages for green collar job opportunities. The external, private training provides an opportunity with those without jobs or connections to prepare for jobs or build on their skills. It can be costly though and without standardization for DOE WAP work, does not guarantee or even give an explicit advantage for trainees unless CAP groups guarantee hiring from these programs. The public trainings are free for auditors working with CAPs and will eventually be for contractors, who are accepted on the CAP list, but they are primarily for people who already are in the work; herein, they do not offer much of an entry opportunity. Community Colleges provide a good space for basic skills development that is wrapped in wrap-around and basic educational elements, both positive traits for marginalized workers. As States' are moving in this direction for training, Community Colleges also can provide the authenticity and credentials necessary for them to be worth the cost of enrolling. Lastly, there is room for overlap. For instance, a Community College or public training site can partner with BPI for a "BPI-approved" training coupled with the other skills they offer. One federally approved DOE WAP training site, the Southwest Building Science Training Center in Phoenix, Arizona has BPI certification courses. Such a combination of Community Colleges with private certification or community-organizations could be the future of training where comprehensive skill development can take place. If some models were developed in this mold,

their curriculum could be shared across Community Colleges regionally to ensure a linked supply and demand workforce development model.

For installers, there is little to no articulated training program. There are contractor-training programs similar to those mentioned for auditors above: in the public and private sectors. Occasionally, installers will attend these trainings, but this is not common. People are mostly given a chance if they have construction, laborer, or carpenter experience and can build out their skills in specific trainings their contractors provide for them. Because the installer position is more of an entry-level position, there are few articulated programs outside of the community-based ones for the position. Community-based training can provide a first opportunity, but they need to be linked to employers and further training to be effective, as will be discussed more below.

Training: How

How the training will be done is an equally large and central question. We will break this issue into two segments: (1) what the content of the training could include and (2) how the training is structured with regard to the larger labor market.

1) Content. Some aspects relating to the content of training have been mentioned: specifically the need for career tracks and "pre" and "pre-pre" training for marginalized workers. For the ramp-up to provide good opportunities for marginalized workers, these are critical, but they are currently missing from any of the training routes used for weatherization work. The current training is very exclusive and primarily used once people are already employed because of previous skills and experience. Secondly, there is little to no career track planning, and very few opportunities for diversification of skills as weatherization workers are not part of a union that could provide such opportunities.

For the first aspect, the exclusivity of training, community-based groups have been working to prepare marginalized people for jobs—incorporating wrap-around soft skills and education. This is important as these skills can provide basic job readiness that is applicable across industries. For the second aspect, there is no articulated path through auditor or installer jobs for promotion.

Some community-based organizations have a "map" where their training lies under the formal jobs and other training, but there is no sector in energy efficiency and especially in low-income weatherization where the "pre" or "pre-pre" trainings guaranteed certain promotion or have demonstrated it.

2) Labor Market Structure. This is where the CAPs have a great opportunity. Because of their position as the employer of auditors and the employer of contractors who hire installers, they have leverage on what training matters, who gets hired, and how the labor market is structured. While training is currently simply supply based—people elect to enter the weatherization field via private and public training programs—CAPs, as employers with social justice and service missions based in low-income communities, can ensure that demand is connected with supply and that the jobs provided are of high quality and/or provide a career trajectory. In the general labor market, good job training programs connect supply with demand, or trainees with employers. Community Action Programs can play this role. This is especially important, as the ramp-up in low-income programming is not as large as funding may indicate. There are not that many positions and they are not high quality jobs. Herein, how the jobs are constructed, hired for, and their career potential are of critical importance to the people who fill them, especially marginalized people who's only other "opportunities" may be illicit and dangerous.

Auditors and Installer Specific Job Dynamics

While some sections above have distinguished between auditor and installer positions, some discuss training and the job market generally. In this section, we will delve into some of the distinct aspect of each position and they are relevant for Green Collar Jobs. There are three major distinctions: (1) Ease of Entry, (2) Transferability of Skills, and (3) Quality of Job.

1) Ease of Entry. There is no clear "easier" to enter of the two positions. Auditors require more expertise and certain personality based qualities. Installers are hired through more informal networks. Both have barriers because of these elements, as well as enabling factors. It is possible to train to be a qualified auditor and because of the skills necessary, there is less supply. It is also possible to have little training and be considered for an installer job if a potential candidate demonstrates a good work ethic, basic job readiness, and some basic knowledge of the work, but

many people can show these traits. Herein, ease of entry depends on the local market, firms, and training opportunities more than the positions themselves.

2) Transferability of Skills. Installers have a clear set of jobs that prepare them—construction, laborer, or carpentry. This is a reversible trend as well. Installers develop a skill set that is transferable to other industries and jobs. Auditors, on the other hand, have a skill set that is very specific to being auditors. They do not possess construction related skills and can only assess the performance of a residential house. This also means it is harder to transfer from another profession into an auditor position. For low-income auditors, they are trained on an even more specific set of assessment tools. While these are limiting in some ways—using a checklist and doing basic heating assessment—they tend to be at least transferable to the private residential weatherization market.

3) Quality of Job. Installers are the bottom rung of weatherization in terms of job quality. They are paid the least, ranging from $10-14 per hour, often are not afforded benefits, and do the dirtiest work. They are also highly replaceable because their skill set is not highly refined. Auditors are one step up from installers. In low-income weatherization, they have a specific skill set, but their pay is highly variable and can be very low as well. Their pay ranges from $11 per hour to salaries between $35,000-40,000 per year with benefits. Each CAP determines their pay. Their work is specialized so it affords them some job security, but given the current ramp-up, many of the new auditor jobs will probably be cut in coming years. If private sector residential weatherization becomes a booming sector, as many believe it will be, then there will be opportunities to transition into other auditor positions. This is not guaranteed though.

Innovation in Programming

One other issue of relevance is how the measures and program structure affect the quality of jobs and efficiency effectiveness. Because low-income programming at both the federal and Utility level is heavily legislated, adaptation and evolution are not easily undertaken. Still, there may be opportunities for low-income weatherization to be more streamlined so that work is more effective and job quality is improved. Some of these will be discussed in the conclusion. There may also be externally based innovation that can reach low-income households, put people from

low-income communities to work, and further develop their skills. Some of these will also be discussed and the Final Report from Harvey Michaels' Spring 2009 Energy Efficiency Practicum details one such innovative program.

f. FINAL ANALYSIS: THE POTENTIAL OF LOW-INCOME WEATHERIZATION FOR GREEN COLLAR JOBS

⇒ Up to this point, we have discussed how low-income weatherization operates, the green collar jobs movement, and issues in ramping-up. Now we will pull this information together for a final analysis of the low-income weatherization program as job creator.

While there is potential for Auditor and Installer positions to provide green collar job opportunities, in their current structure the jobs these positions offer are not suited for Green Collar Workers, nor are "good" jobs generally. We refer back to the criteria from Chapter 5 to guide our analysis:

The good jobs criteria we are using are:

- ✓ Ease of Entry for marginalized people and workers
- ✓ Transparency of Entry: how people are hired and by what criteria
- ✓ Equality of Entry: that people are hired based on qualifications
- ✓ Jobs develop the local economy, especially of the areas where work is done
- ✓ Living Wage pay and benefits
- ✓ Dignity of the work, in helping the environment and the communities of workers or in need
- ✓ Stability and tenure of employment

For Labor training, our criteria are:

- ✓ Comprehensive Market Analysis, not training without understanding of demand
- ✓ Connections to Employers and Jobs
- ✓ Support for trainees, including personal, financial, and hard skills during and

after training

- ✓ Deep Training that provides a comparative advantage for workers OR Entry Level Training that leads to a career ladder
- ✓ Institutional Effect that ensures longevity of approach and training and ensures local community benefit

The one criterion that current job structure meets is that the jobs have an inherent dignity in their positive influence on limiting environmental degradation, energy usage, and in helping local communities.

Other than this, the jobs do not meet any of the other criteria. Clearly, there are a number of reasons these jobs are not good or appropriate for marginalized people and workers:

1. Skill is required for entry: Auditors have a refined skill set and installers need some construction, laborer, or carpenter experience in general. There are some opportunities that will take hard workers without training, but these are few and far between, especially in this high unemployment environment. The lack of certification may create an illusion of ease-of-entry, but in practice, potential employees need a job or resources to have experience that will get them hired.
2. No guarantee of demand: Because weatherization is such an instable industry, the high ramp-up for low-income weatherization does not ensure future employment. In fact, it may just be overtraining and inflating supply so that the job wages and structure can stay as they are. The disconnection between the supply and demand sides of the labor market causes this uncertainty. Furthermore, the lack of certification or standardization adds more insecurity to these positions.
3. No career trajectory or trainee support: Without unionization, a clear path for promotion, or skills that clearly build for other opportunities, weatherization workers may be in dead-end jobs, especially if labor supply is expanded

beyond demand. The lack of wrap-around skills and other advancement training in current training incarnations further limits the career development of weatherization workers. Finally, there is little to no personal or financial support in the industry standard training programs. While community organizations are providing this in the "pre" and "pre-pre" training, it does not continue into the more developed hard skill training, limiting marginalized people's ability to participate successfully.

4. Variable and low pay: Installers are consistently paid a low wage without benefits to do a low-skill, dirty job. Auditors have a range from low pay to a living wage, and herein are not guaranteed a good wage. Davis-Bacon may increase the wages for installers and make auditor wages more stable, but even so, this will only apply to ARRA 2009 funding and is not permanent.
5. Number of Opportunities: The number of opportunities for auditors in particular is lower than the popular conception. Many organizations and advocacy groups are acting based on popular conception and not actual projections. For installers, there are a greater number of openings, but these positions have a defined set of other jobs that workers can transfer from. With the current high unemployment rate, many people are transferring and limiting the opportunity for marginalized people to use the installer position are an entry point.
6. Structure of Opportunities: The labor market is not structured to recruit or reward marginalized workers. Community Action Programs do not necessarily have a vision or plan for whom they hire. Because there is little connection between CAPs as employers and community-based training programs as suppliers, CAPs use the general market for their labor pool. Neither local hiring nor hiring in line with organizational mission are incorporated into CAP labor procurement. In fact, hiring for both positions is highly informal and not transparent—either decided by individual CAPs or individual contractor firms. There is no institutional structure for training and hiring so there is also no direct community benefit in the labor sourcing structure.

Community Action Programs are prioritizing getting the work done, not having an articulated vision for it being a local workforce economic driver along with the environmental and economic benefits for weatherization clients.

Chapter 7: Conclusion and Recommendations

"Starting from scratch, you'd probably come up with something else"

-CAP Program Manager, 2009

This final chapter serves as a conclusion, with recommendations for addressing the labor-sourcing problem in the low-income energy efficiency ramp-up, and as a stand-alone chapter. The purpose of this chapter is to bring the entire thesis together in abbreviated form and provide solutions to the problem described. What follows is a summary of findings from the previous chapters, conclusions from this work, possible solutions to the stated problem, my recommendation, and finally a list of follow-up research.

a. SUMMARY OF FINDINGS

Our description of current low-income residential energy efficiency programming has revealed a number of factors that illuminate the current context of the space. Central findings include:

- Benefits. Low-income energy efficiency has a number of benefits to poor people and society at large: including equity benefits of saving poor people with a disproportionate energy burden money, societal economic benefits with multiplier effects, and the traditional environmental benefits.
- Energy Efficiency programming was birthed during the 1970s Oil Crisis. Low-income programming at the federal level began around this time while Utility programs developed much slower and later. There are at least 34 million homes that are eligible for low-income energy efficiency services.
- Community Action Agencies and Programs (CAAs and CAPs)
    - Were created during the first large-scale federal workforce program through the 1964 Economic Opportunity Act of the War on Poverty. They operated as job supply creation agencies and implementers.
    - Were limited in their operation model: they only provided supply-side training—not an integrated full labor market approach; they did not have close relationships to employers; and the low-end jobs they created did not work because neither labor nor industry was invested in them.

- Advocated for the development of low-income energy efficiency programming locally and are the main implementers of the programming and pseudo-monopolies for service provision.
- Control hiring for low-income auditors and approve the contractors that hire installers; still, there are no clear avenues for entering the low-income weatherization industry or standard training programs.

- The recent Green Collar Jobs Movement advocates for marginalized people to get good jobs in the new greener economy, including jobs in energy efficiency. Many organizations are building the capacity of marginalized people to work in energy efficiency as auditors and installers.
- From Project QUEST's job training model, the history of workforce development, and the current Green Collar Jobs Movement, we created criteria to evaluate weatherization jobs for marginalized workers, including: ease of entry, transparency of entry, equality of entry, jobs that develop the local economy, living wage pay and benefits, dignity of work, and stability and tenure of employment. We also created criteria for labor training, including: comprehensive market analysis, connections to employers and jobs, support for trainees, deep training that provides comparative advantage, and institutional effect.

b. CONCLUSIONS

The purpose of this thesis is to evaluate the Green Collar Job potential and labor sourcing of current low-income programming in order to improve the quality of jobs created by the ramp-up in low-income energy efficiency.

CAPs are at the Center. We have learned that the low-income energy efficiency terrain has a long and complex political history that brings together low-income advocates, Utility companies, environmental advocates, the War on Poverty, and workforce development programming. Recently, community-based and social justice organizations have also entered this space. At the center of all these stakeholders are Community Action Programs. Community Action Programs play a powerful role in the labor procurement process and determination of job function and practices. Their history as a core element of the War on Poverty and a political space for

marginalized people in the US coupled with their role as a historic supply-side training house makes them a ripe site for informed, strategic workforce and economic development.

CAPs Current Approach Does Not Produce Quality Jobs and Training for Marginalized Workers. While most CAPs are currently more social service oriented than social justice, there is potential for them to learn from the past miscues in job training we discussed in chapter 5 and take advantage of the current moment. Among the lessons is that a comprehensive market approach is critical for the Green Collar Jobs Movement as well as public and private trainers. During the War on Poverty, supply side training for marginalized youth and workers was focused on to the detriment of both. Those trained were placed in low-end jobs that did not have career tracks for the most part and that neither industry nor labor was invested in. Community Action Programs were the implementer because no other bureaucratic capacity existed and because of the rush to start the program, they did not transform labor policy but rather played into existing bureaucracy and labor problems. The guaranteed public sector jobs were criticized for being corrupt and the private sector partnerships did not amount to guaranteed placement. The current situation with low-income weatherization ramp-up is reminiscent of these same labor market dynamics.

The *Bad Job* Problem. Currently, there are a number of reasons low-income weatherization positions are not well suited for marginalized workers; including a non-formalized, difficult path to entry, no guarantee of stability in the industry or career tracks, variable and low pay, fewer opportunities than are popularly conceived, and structural limitations in the labor sourcing process. The critical gap is that CAPs treat low-income weatherization as a program to implement and not a source of addressing deeper equity and environmental problems. There are a number of ways that this dynamic can be altered that can also improve the efficiency of service provision.

c. POTENTIAL SOLUTIONS TO THE BAD JOB PROBLEM

This section lays out a number of possible solutions to the "bad" job problem of the auditor and installer positions in low-income weatherization work. It is organized in categories of Training, Job Quality, and Partnerships. It also indicates the agent who the recommendation is for. When

"CAPs" is listed, this includes the various CAPs across the nation, the multiple federal associations that govern low-income weatherization and CAPs, and the Community Action Partnership, the national organization representing 1,000 CAPs locally. In the section that follows, I will analyze the full list of recommendations and present my specific recommendation.

1. IMPROVE TRAINING

In Chapter 6 we analyzed low-income energy efficiency labor procurement and found that skill is required for entry, there is no guarantee of demand, there is no clear career trajectory or trainee support, and that opportunities and hiring are not transparent. In short, training and hiring is highly informal and does not guarantee a good job placement. This is a huge disadvantage for marginalized workers. We also discovered in Chapters 3 and 4 that low-income provision is highly territorial and that there is a gap in goals between CAPs and Green Collar Jobs advocates, though overlap in their interest in helping the poor. The Interview Summary Table in Appendix I reiterates this finding.

To improve training and close the gap in goals, two shifts must take place: (i) training programs must at least assess demand for the positions they are training for. A more developed approach would be to (ii) create local partnerships between community development organizations, training houses, and CAPs to train and hire auditors with a comprehensive labor market approach.

(i) Training programs must at least assess demand for the positions they are training for. **[For Training Houses/Community Colleges, Community Organizations, CAPs, and Contractors]**

The most fundamental aspect of training a labor force in a way that creates good, stable jobs is to ensure that people will have opportunities to get employed. Currently, there is a lot of excitement about the opportunity that the new greener economy holds for marginalized workers and people. A major concern is that all the organizations and entities rushing to take advantage of this opportunity as doing so without an assessment of what jobs people will transfer into or how

many there are. Community Action Program staff as well as Green Collar Job training experts spoke to this concern of overestimating the demand and oversupplying the labor force. Furthermore, some CAP groups in the Pennsylvania Weatherization Network stated that they traditionally have hired for temporary workers when needed only to let them go after funding shifted.

The ideal solution is a direct linkage between training houses, including Community Organizations and Community Colleges, and employers, including CAPs and Contractors, where jobs are guaranteed for those who satisfactorily complete certain training. When this is not possible, training houses of all types must at least assess the demand for the labor they are preparing.

Strategic Concepts in Organizing and Policy Education (SCOPE) Case Example:

SCOPE, a Los Angeles based community organizing non-profit, has directed their Green Collar Jobs Campaign to address the labor market fragmentation. Instead of dedicating their resources to solely training, they first campaigned the City of Los Angeles for policy that required all city building would be retrofitted. Because there is a city owned Utility in LA, it would fund the work and they would secure state and federal dollar to match, creating a city retrofit fund managed by the Department of Public Works. This same fund would provide money for the "pre" training and apprenticeship program that they are working with local Community Colleges and Unions to develop. Their goal was to secure good, stable, public jobs first and then begin training for these jobs (Ito 2009).

While SCOPE's approach does not apply across the board, or for low-income weatherization as the jobs are already "created," their analysis and campaign strategy informs us of the concerns of training detached from allocated positions. It also shows that focusing on demand side policy first can ensure good, stable jobs are created. The equivalent shift of community organizations and training houses working with CAPs is necessary and will be discussed in more detail in part ii.

Challenges

The major challenge is for training houses to shift their focus from training only and for CAPs to involve the training houses in their long-term planning. On both ends, the rush to ramp-up is the major inhibiting factor.

(ii) Create local partnerships between community development organizations, training houses, and CAPs to train and hire auditors with a comprehensive labor market approach. **[For State Departments managing low-income programming, the Department of Energy, CAPs,**

Community Organizations, and Training Houses/Community Colleges, and for Utilities companies to advocate and fund such collaboration]

As CAPs are structured to service certain geographic areas, there is room for a natural linkage with local NGOs that are working with marginalized populations and doing workforce development. This, in essence, would serve as the training-employer linkage that is so critical to comprehensive labor market development. Furthermore, it would expand the means by which CAPs achieve their overall mission of reducing poverty and helping the poor. Potentially, CAPs could work locally with NGOs and Community Colleges to create a comprehensive training program that has wrap-around skill development, is institutionalized, and guarantees placement. This configuration would also inform the training houses of actual demand so as to not over-saturate the market with supply of labor and train people for jobs that do not exist. It could also source labor from the local communities where people are performing the weatherization work. While CAP auditor positions and low-income installer positions are not "good" as currently stand, they have historically been a good entry into other jobs and sectors of the building energy efficiency industry, if not oversupplied (Millhone 2009).

There are a number of CAPs that also run youth development programs, many of which are part of the YouthBuild USA network. YouthBuild is a non-profit youth development organization located in cities and towns throughout the USA where youth earn their GED or high school diploma while learning jobs skills related to affordable housing. A number of YouthBuild programs have begun training young people on weatherization—auditing to installing. Furthermore, many YouthBuilds are sponsored by local CAPs. There is a clear opportunity for young people trained in weatherization at these local YouthBuild sites to work at the CAP in their local community.

The training would ideally include soft skill development; financial and environmental literacy; basic literacy and math trainings; and hard skill development. Herein, even if workers did not want to stay in the profession or the ramp-down negatively affected their job security and the private sector was not hiring, they would have other skills that would make them strong candidates for further employment. For this to happen, community organizations could provide

the "pre" and "pre-pre" components coupled with Community Colleges' harder skill development, informed by CAP needs. The Pinderhughes model, developed by Raquel Pinderhughes, incorporates many of the "pre" skill elements with core skills that can arm candidates with transferable knowledge, such as financial and environmental literacy. This combined with a clear connection to hard skill training and a concrete job would make training accessible and a valuable investment for potential employees. The American Recovery and Reinvestment Act of 2009 calls for such workforce and economic development and should be leaned on to push the CAPs in this direction. Beyond federal and state governments and good job advocates, Utilities have an interest in ensuring they will have the necessary workforce to perform the government mandated energy efficiency retrofits that are becoming more and more common.

On the community training side, there are a number of examples where community organizations have partnered with various private sector firms to establish similar comprehensive labor programs at a small scale. Two highlighted on Green for All's website are those of LA CAUSA YouthBuild and the Alliance for Affordable Energy in New Orleans, Louisiana (greenforall.org 2009). These programs are excellent examples of training marginalized people for low-income weatherization work and then partnering with employers to implement. There are no examples of such a partnership with a CAP though. Community Action Programs should look to these examples for inspiration and guidance.

For installer positions, a similar configuration would work, though CAPs do not have full control over hires. They would have to express their preference to contractors who are vying for their work and hire accordingly. This is more challenging as contractor missions are not necessarily in line with "helping the poor" but in a competitive marketplace, it could incentivize some firms.

Challenges

The major challenges in such a partnership are that it will slow the ramp-up time and cost more per worker, both affecting program delivery. Currently, ramp-up has slowed over the Davis-Bacon ruling and the time to reach 1 million homes has been extended to 3 years. This allows some room for innovative and deeply affective training structures. As for cost, there has to be

some trade-off in making jobs good ones. This recommendation does not necessarily increase cost to CAPs or contractors, but in better preparing a workforce, the ability for workers to move to other opportunities or demand higher wages increases which eventually could affect CAPs and contractors. Community Action Agencies in Pennsylvania noted this as a concern in the ramp-up survey (Pennsylvania Weatherization Providers Network 2008). They also noted the concern that required certification alone would double the cost of auditors. A guaranteed hiring via Community Colleges, utilizing Green Jobs funding out of national legislation and ARRA 2009 could avert these costs from CAPs. The large advantage for CAPs, beyond fulfilling their missions, would be having a stable workforce and training mechanism. In developing this mechanism, future ramp-ups and ramp-downs will not be as problematic as the current one.

The first step would be a pilot run where the progress, speed, and costs could be measured. If successful, this pilot could serve as a model for other CAP agencies and shared through the national and regional CAP networks, as well as the Green Collar Job networks.

2. IMPROVE JOB QUALITY

Beyond a lack of proper training for Auditor and Installer positions, the positions themselves are bad. As we analyzed in Chapter 6, work is not guaranteed or stable, there is no career trajectory, pay is variable and low in general, and there are less opportunities for Auditors than is generally conceived.

There are two major approaches to improving job quality: (i) reconfigure the positions to be better paying, more stable jobs and more effective in efficiency delivery (ii) stabilize current jobs, making them better via unionization and career development.

(i) Reconfigure the positions to be better paying, more stable jobs and more effective in efficiency delivery. **[For CAPs, Training houses, DOE, State Offices]**

The three-weatherization implementation jobs are: auditor, contractor, and installer. Contractors tend to be small business owners with management and long-term work experience. To adapt

their position for marginalized, entry level people would be to fundamentally alter the labor market. Auditor and installer jobs have a potential for grouping that could make service delivery more efficient and create a better job. Currently, entry into installer positions is open if you can make an impression on an employer and auditor positions require prior experience or skill of some kind. While there was an expectation when ARRA 2009 was first announced that it would be very difficult to hire enough auditors, this depends on location. In Massachusetts there has not been a great deal of competition while elsewhere there are numerous job postings[15] (Ledgerwood 2009).

In the current implementation stream, auditors visit each site 3 times—in the beginning to assess, in the middle to evaluate measures, and at the end to ensure the work was completed properly. The amount of time consumed by these visits varies with the distance traveled, but it is significant. Community Action Program auditors average 6 full houses per week, inclusive of all three visits (Ledgerwood 2009). For comparison, Conservation Service Group (CSG), a non-profit that performs weatherization in the private market and subcontracts for the public market, average 5 audits per day as one-time visits, more than 4 times the audit speed as CAPs (Rao 2009). The critique of CSG's model is that they assess many houses but that a very small percentage of people who get audits get follow-up weatherization work. To address this concern, Next Step Living, a new business in the residential weatherization private market, has created a 3-step model for implementation. Next Step Living's first visit, Step 1, is the corner-piece of their model; they send an auditor and installer on the first visit to assess weatherization measures and do first-level installations, including air sealing, some insulation, etc. This guarantees some energy saving measures are installed immediately and minimizes the number of necessary visitations. Next Step Living completes 9 Step-1 audits and first-level installs per week. While this is still just over a third of CSG's, there is actual work completed to every house visited.

The low-income market is drastically different from the private market in that funding is guaranteed for clients and the actual weatherization services do not need to be sold. This makes CSG and Next Step Living's models not entirely applicable, but both models have lessons for

[15] I did a recent search on jobs.myspace.com and got 206 returns for "weatherization" jobs. This search only includes some of the CAP vacancies.

low-income weatherization. First, CSG's quick audit process is much more efficient than low-income's multiple visits and travel time. Second, the combination audit and delivery of Next Step Living reveals that the work can be combined and streamlined in this respect. The Pennsylvania Weatherization Providers Network Survey for ramp-up had a similar suggestion: "subcontract both audit and measure installation at the same residence to private firms. This would allow one-day service in many cases and reduce the number of times a residence must be visited" (Pennsylvania Weatherization Providers Network 2008, pg. 17). I would recommend that instead of combining and subcontracting services, developing a market for combination auditor and installer positions for low-income weatherization programs that are housed in CAPs. This would accomplish a number of goals:

- The integrated, full market collaborative training program suggested in recommendation 1 could be used for training these positions
- CAPs could source labor locally and control wages across both position types
- Wages for installer positions would be improved when combined with auditor positions
- The career potential for these positions would increase significantly as more robust skill development and specific roles would be developed and the competition to hire such "Installitors[16]" with both skill sets would be high
- The work would be more efficient as fewer visits would be required and work would be completed in fewer days, reducing transaction costs to CAPs and clients

Challenges

This adaptation of implementation positions has a number of significant challenges, as the type of change is quite fundamental to the labor and implementation process. It would require significant organization of CAPs, training houses, and the government. At scale, it would essentially eliminate the low-income weatherization segment from private contractor's market. Though some CAPs would probably subcontract in this model given contextual limitations and all CAPs could still use contractor crew chiefs to manage the combined assessment and implementation process. Furthermore, current low-income auditors and installers would have to be retrained for this new position.

[16] "Installitors" are a temporary name for the job that combine the installer and auditor positions.

In combining the auditor and installer position, one concern is verification of the work will not take place. Auditors currently check that the work is proceeding correctly mid-way through and at the end of the work based on their initial assessment. If the auditor and installers are combined, there is clearly a lack of third party objectivity and the potential for conflict of interest in evaluating the work. In practice, auditors check on the work depending on their trust of the contractor doing the work; herein, the initial trust and quality control is essentially the quality control. This initial assessment will continue through CAP quality control as well as the random DHCD evaluations. In the beginning of implementing the combined approach, DHCD would have to increase their random evaluations to ensure the quality of work more consistently.

Per House Cost Differential Calculations:[1]

Current System:

-Auditor: 1 person, 1.2 days (9.6 hours, 2 hours of which is the initial audit)
-$18.03/hour
→ 9.6 hours * $18.03/hour = $173.09

-3 Installers and 1 Crew Chief: 4-person team, 2.5 days (20 hours to implement)
-Chief @ $17.50/hour, Installers @ $12.50/hour
→ 20 hours ($17.50/hour + 3 people * $12.50/hour) = $1100

→ TOTAL: **$1273** (labor cost)

Combined System:

-3 Installer + Auditor (Installitors as defined above) and 1 Crew Chief: 4-person team, 2.75 days (22 hours: standard 20 implementation hours + 2 hours for auditing: 1.5 for assessment and 0.5 for final evaluation) This cuts 7.6 hours of auditor travel and middle visit.
-Chief @ $17.50/hour, Installitors @ $17/hour
→ 22 hours ($17.50/hour + 3 people * $17/hour) = $1507

→ TOTAL: **$1507** (labor cost)

Analysis
The cost difference is $1507-$1273 = $234 more per house.

President Obama has set a goal of 1 million homes and funded WAP with $5 Billion. At $6500/home, this equals 769,231 houses, stretched over 3 years = an average of 256,410 houses/year.

If we add in the additional $234/house, the $5 billion, @ 6734/home equals 742,500 houses, stretched over 3 years = an average of 247,500 houses/year.

The final difference is 8,910 houses/year nationally funded, but in a system that makes 3 bad jobs into good paying, better skilled jobs with career potential and saves 7.6 hours of labor per house, potentially spending more of the ARRA 2009 money quickly and in an equitable fashion.

Cost may increase for this implementation model given the increase in average wage because installers will be earning more, but this depends on the time saved with the more efficient delivery and the decrease of not using contractors. While we do not have detailed, good data on costs, we can do a back-of-the-envelope conservative calculation to estimate cost differential. For this and its consequences, see box.

The largest challenge is getting the political support to adapt the implementation flow so fundamentally. Community Action Programs would need to support housing a larger staff and managing the larger process. Many, especially in the Pennsylvania network, have expressed this interest, but nationally, different CAPs are in drastically different places with regard to the ramp-up. In the least, state agencies responsible for running the low-income programming could run a few pilots that partner with local training institutions to test the cost, efficiency, and run-time differentials. Regardless of the scale, each CAP would need to project long term labor needs and not over supply the market for the immediate demand. One benefit is that these combo positions would be very attract to private market firms and the transfer to the private sector may be easier for such a position.

(ii) Stabilize current jobs, making them better via unionization and career development. **[For Unions, Contractors, and CAPs]**

A less dramatic adaptation to improving the job quality of installers specifically and for weatherization workers more generally is to develop career trajectories and work toward unionization. First, career trajectories: a model to develop installers into auditors is difficult in low-income weatherization work because installers work for contractors while auditors work for CAPs. An agreement or incentive system similar to that proposed in recommendation 1 would have to be created for contractors to teach installers fundamental building technology on the job so that they could be promoted to auditor eventually. Community Action Program Auditor mentoring or training opportunities could also be opened to installers. In the private market, Next Step Living's model includes developing Installation Aides into quality assurance positions and eventually auditors. Next Step Living hires their Installation Aides from craigslist.org or other

inclusive posting sites and aims to fill future vacancies internally. This promotion model is more complex in the low-income segment, but it could be used as a temporary fix for the bad quality of installer positions and potential auditor over-ramp-up by slowing the immediate auditor hires and arming them with multiple skill bases.

Another possibility is to prepare installers for the construction trades given their core implementation work. As the US economy picks up and real estate development grows again, there will be need for construction workers. In this current construction lull, the ramp-up of installers could prepare the next construction workforce if executed properly. This means that informal learning should be erred against. Instead, clear training or hands-on learning experience should be structured into the positions. Contractors should see this as an opportunity to diversify their market into new construction.

For auditors, the question is about transferability of skills. Developing construction or installation skills clearly provides diverse opportunities for future work, but if these training opportunities are not rolled into the position or CAPs do not enter the installation or construction business, there is no clear path to acquire them.

Second, for all weatherization positions, and especially auditors and installers, unionization would stabilize the sector as well as provide future opportunities for career development. Laborers International Union of North America (LiUNA) partnered with the Garden State Alliance for a New Economy (GANE) to offer union-trained green construction jobs to untrained local residents while weatherizing 30 low-income elderly homes (Green For All 2009). While this is not a formal weatherization union position, it reveals one avenue for entry workers to do weatherization work and have the advantages of union training, stability, wages, etc. Since this initial training, LiUNA has developed full, accredited training programs for Weatherization Installers, Weatherization Supervisors, and Auditors based on the DOE WAP guidelines and requirements. Laborers International Union of North America partners with community organizations to provide the wrap-around skills that many marginalized and entry workers need as well. It has over 70 established training centers throughout the US and Canada and offers over 300 accredited training modules in construction, environmental, safety, and supervision skills.

While this centralized Union-based training is a great resource and one that offers some of the advantages of Unionization, such as access to additional training, it is not a Union for weatherization workers and does not offer the full stability, organizing power, and resources of a Union.

The current instability of weatherization, as well as the factors mentioned in Chapter 6, have made initiatives to form a weatherization union difficult to implement, but a union in New Jersey, Local 10, is in the process of accomplishing this, adding weatherization workers into the local Laborers Union (Pinderhughes 2009). Their efforts are recent and have not been documented, but the progression of them, as well as the challenges they face, will be critical in understanding how unionization may take place for weatherization workers.

Other approaches to quickening the process of Weatherization Unionization include building community and union partnerships, like the Blue-Green Alliance and LiUNA, which can demonstrate the added power and base that Weatherization workers could provide to unions, or offering unions access to otherwise non-accessible funding, such as money from the Green Jobs Act or the WAP program. Both of these approaches necessitate an organization of Weatherization workers or those advocating for them, for example CAPs, to leverage their power with unions. A final option is to create a new Residential Weatherization Union that can create its own by-laws and avert the many challenges in joining an existing union. The start-up time, cost, and processing are clearly high in this scenario, but it can be a back-up to the current Unions not shifting.

Challenges

The challenges for developing more articulated career tracks are listed above, and the underlying factor is shifting inertia and current processes, especially for contractors and CAPs. While less information exists, the same is true for unionization. Unions have a long history of exclusive practices and many trades unions have requirements for membership that exclude marginalized people, including 12th grade reading level, non-criminal record, and GED requirements.

3. LOOK TO EXTERNAL PARTNERS FOR DELIVERY

Community Action Programs have a pseudo-monopoly on low-income weatherization service delivery. They have many advantages, including community trust, being low-income advocates with no-profit interest, and being able to leverage their trust and power for certain innovation, even though they are steeped in bureaucracy. In this sense, they present a double-edged sword for low-income provision; the regulation they fought for mandates provision for the poor, but their bureaucratic position also slows innovation. CAPs have and continue to do overall excellent work and are committed to low-income households, and there are opportunities outside of their delivery and capacity for weatherization. To reach this external potential:

(i) Utilize community capacity and trust via Utility or Public Sector support to train and implement certain measures. **[For Community Organizations, Municipal Governments, Utilities, CAPs]**

The American Recovery and Reinvestment Act of 2009 allocates funding for multiple energy efficiency initiatives beyond the DOE WAP, many of which give discretion to state and local governments as to how the money should be spent. Furthermore, Utility funding for energy efficiency is growing in most states. Given these funding sources, there are opportunities for low-income weatherization to take place outside of WAP.

One such set of initiatives falls under the Green Collar Job Rubric as community organizations are working to develop an articulated system for training marginalized workers across all sectors in energy efficiency, including low-income provision. The American Federation of Labor and Congress of Industrial Organizations (AFL-CIO) has collaborated with multiple partners to create the Emerald Cities Project. The Emerald Cities Project selects target cities to launch comprehensive energy efficient initiatives across the country, focusing on labor development, building the local community, and democratizing the urban economy (United Association 2009). In Massachusetts, the Green Justice Coalition is part of this initiative and is also building its own statewide coalition to create good jobs in the green economy, including low-income energy efficiency. These initiatives, while outside CAP low-income weatherization, aim to develop marginalized workers and people to weatherize all segments, including low-income housing.

Their connection with labor, grassroots community organizations and people, as well as training institutions, including Community Colleges, make them an alternative model to building a labor force using community capacity and building additional capacity. Such a labor force could operate independently or potentially fill WAP gaps in the future.

Another approach that similarly utilizes current community capacity while building additional capacity is to create a bidding system for innovative delivery outside of the WAP program. One Pennsylvania CAP group suggested a similar approach to achieving deeper, wider penetration: "DCED should issue an RFP for innovative pilot programs capable of developing higher savings" (Pennsylvania Weatherization Providers Network 2008, pg. 24). A recent group of MIT Graduate students I worked with adapted this approach to not only create deeper programs, but also to utilize existing community capacity and create additional local capacity via workforce and economic development. The basic model is that municipalities compose a list of qualified community organizations that get their community constituents to pledge a certain energy savings. Organizations are awarded for the number of committed pledges they acquire and measured savings. These organizations then create a plan to rollout the energy efficiency work, reaching edges of the low-income market that otherwise may not be reached. In such a non-structured approach, community organizations can both take advantage of particular skill sets of constituents in weatherizing in their own communities and develop necessary capacities based on demand from pledges. For a full explanation of the program, see MIT's NSTAR Practicum Final Report for the proposal.

Challenges

External low-income programming has two major challenges: (1) the CAPs' monopoly and political power and (2) how such programs will integrate with the existing low-income programs. The strategy around developing these programs should be to work with CAPs existing delivery to partner and to learn from the over 30 years of expertise CAPs have developed. Secondly, as a supply-side only training approach creates non-fluid market dynamics, a multi-player provision model without an integrated plan can create a similar oversupply of certain positions or work.

d. FINAL, COMPOSITE RECOMMENDATION

While there are a few possible pathways to improving the labor sourcing and quality of jobs for low-income weatherization, not all are possible at once nor do they all integrate well. I recommend a multi-faceted approach to shifting the quality and labor sourcing for low-income weatherization, including:

- 1.ii: Collaborative planning for pipeline training programs between community organizations, Community Colleges, Union Training Sites, and CAPs
- 2.ii: Stabilize the positions via articulated career path development and eventual unionization
- 3.i: Enable community organizations and other external agents to utilize their capacity and build additional skills with access to low-income funding

Ideally, these pieces would be integrated so that 1.ii and 2.ii could combine for an extensive training to employment program ending with union membership and 3.i could co-exist outside of the professional weatherization industry and provide an entry-point outside of the training programs. The beginning of Union-based Weatherization training, as reflected by LiUNA's presence in the space, is a good step in the Unions being centrally involved. It allows for Union centralized training to substitute for Community College training when appropriate and vice versa.

With so many players with different interests, it is critical that a stakeholder who has influence on all players and understands the importance of the moment brokers the collaboration. For instance, State Agencies, such as DHCD in Massachusetts, could bring CAPs and jobs groups to the table in order ensure good jobs that last and can do high quality efficiency are created through the Stimulus. If the federal government is serious about making the WAP Stimulus dollars do the most they can, the Assistant Secretary of Energy could ensure this is prioritized at the federal level. If good jobs are not created, the Department of Labor and community groups will not be satisfied and the funding will not create long-term, career jobs that can help in doing efficiency work in other sectors. In this vein, Utility companies should also advocate for such collaboration so that they have the workforces necessary to perform the government mandated energy efficiency retrofits that are becoming more and more common. Nineteen states have

Energy Efficiency Resource Standards (EERS) and three have pending legislation, and the potential for a federally mandated standard is great (American Council for an Energy-Efficient Economy 2009). Clearly, Utilities have the need in many states for weatherization workers, and this need will only grow.

This combination of recommendations would ensure that the labor gap is filled quickly and with good jobs via local, established channels, but also so that an over-supply of labor is not created and people will not be left with no jobs post ARRA 2009. Furthermore, it would enable non-CAP stakeholders to play a significant role in training as well as with external low-income energy efficiency provision.

My concerns with 2.i is that while it would fundamentally shift the jobs to be better, in the current economy and need to spend quickly, it would take far too long in start-up time. Recommendation 1.i is the most basic recommendation for planning training and its essential components are integrated into 1.ii.

e. FACTORS NOT ADDRESSED AND FUTURE RESEARCH

This thesis has discussed one specific element of the low-income weatherization ramp-up from one specific perspective. There are a few other perspectives and research projects that would be valuable to further inform low-income weatherization programming. Some possible topics and issues not addressed in this thesis are:

Extension of this Research

- What are the programmatic adaptations that could make low-income weatherization programming more self-sufficient? Could the program shift from handout services to a no-to-low interest loan payback structure so that changes in funding did not make provision capacity and these jobs instable? This configuration could mirror that of Energy Service Performance Contracting (ESPC) that pays up front for energy services with a loan and guarantees the energy savings will pay off the loan over a certain time. Herein, clients still save on the bill but the program has self-sufficient funding. Potentially, the

loan repayment could be a portion of actual cost so that most of the savings go to the low-income clients.

- What are the penetration ratios and challenges for low-income renters and multi-family units? How would reaching a higher ratio of these segments affect labor demand and the long-term prospects of weatherization jobs? What tools in the low-income space are effective in effectively expanding the market to this segment?

Data Based Research

- Quantification of the number of organizations and entities doing auditor and installer training, the number of people being trained, the characteristics of who is hired (familial or relational connections, race, educational background, etc.), and the number of jobs across sectors in weatherization.
- In-depth wage analysis of the different weatherization roles as they relate to geographic area, productivity, employee skill, experience, and background.

Future Looking

- What will the effect of potential Climate Change bills that require a Cap and Trade or Carbon Tax be on Weatherization demand and funding? Will the proceeds fund more Green Collar Jobs or low-income weatherization programs?
- How will Energy Efficiency savings be verified so that they can be counted for credits in a national Cap and Trade system? What jobs would this create and what are the potential of these jobs?
- Will low-income programming fit into the larger municipal, state, or federal energy efficiency plans? Will low-income programming be integrated into approaches like that of Emerald Cities that plan for labor and implementation at scale? If so, what will the effect on low-income programming be?
- How will technology affect the roles played in weatherization? Will digital devices eventually be able to perform Audits and eliminate the need for Auditors?
- Is there a future for grouped sustainability programming? For instance, will energy efficiency be required before any solar or renewable install takes place? What effect

would this have on labor demand? How feasible is such a policy and what would be the potential structures for it?

f. CONCLUSION

The renewed and unprecedented investment in low-income energy efficiency will offer many savings opportunities for low-income people via energy bill reductions. There is great potential for this opportunity to also offer low-income people and marginalized workers quality workforce opportunities that not only provide CAPs with a clear process to source their labor, but also satisfy their mission in a deeper, more long-lasting way and help supply labor for the larger efficiency industry for the long-term. As the Auditor and Installer positions currently stand, they provide bad job opportunities for any workers and a heightened risk for marginalized workers. By creating clear training and career paths and collaborating with existing community partners, CAPs can revolutionize low-income energy efficiency and exponentially increase its benefits to low-income people and he efficiency industry as a whole.

Appendix I: Interview Summary Table

The table below summarizes the findings of my interviews. I have created three broad categories that I divided the people I interviewed into: Green Job Advocate, Industry, and Low-Income Provider, followed by the number of interviews in that category. Some fall into multiple categories and I have included their responses in each applicable category. The seven variables I have included are, interest in: a Pro-Poor agenda, Collaboration, changing Training to be more inclusive and provide pathways for long-term employment, creating Good Jobs, providing External Delivery mechanisms for low-income energy efficiency, having a Fast Ramp-up to retrofit, and having the deepest retrofits and Most savings from Energy Efficiency. I have also rated the overall responses for each group as High, Medium, Low, and Not Applicable (n/a). While I did not ask for such a rating in my interviews, clear trends emerged from the responses.

	Green Jobs Adv. (9)	**Industry (5)**	**Low-Income Prov. (6)**
Pro-Poor	High	Medium/Low	High
Collaboration	High	Medium	Low
Training	High	n/a	Low/Medium
Good Jobs	High	n/a	Low/Medium
External Del.	High	Medium/Low	Low
Fast Ramp-up	Medium/High	n/a	High
Most EE	Medium/Low	n/a	High

Appendix II: DOE WAP Auditor and Installer Core Competencies (Source: waptac.org)

INSTALLER

The following competencies are required by workers that install weatherization measures.

- ***Prerequisites***
  - Possess *Safe Work Practices* competencies
- ***Air Sealing***
  - Possess a working knowledge of:
    - Proper materials selection based on location of leakage areas
    - Minimum ventilation rates.
  - Demonstrate the ability to:
    - Use the blower door to locate leakage sites within the building
    - Seal attic and floor bypasses at penetrations for plumbing, electrical wiring, flue vents, ducts; dropped soffits, and balloon-framed walls;
    - Seal typical bypasses in kneewalls and finished attic spaces;
    - Seal basement band joists;
    - Properly apply caulk and spray foam insulation;
    - Identify, select, and install weatherstripping on doors, windows, and attic hatches;
    - Cut glass, replace broken window panes, and apply glazing compound;
    - Repair plaster and sheetrock (drywall); and
    - Modify or install mechanical ventilation to ensure acceptable indoor air quality for post-air-sealing conditions.
- ***Duct Sealing***
  - Demonstrate the ability to:
    - Properly seal duct connections with mastic and fiberglass mesh tape or other approved material; and
    - Repair or modify duct systems as specified in a work order.
- ***Insulation***
  - Possess a working knowledge of:
    - Properties and appropriate application of different insulation materials; and
    - Potential hazards of insulating around knob-and-tube wiring.
  - Demonstrate the ability to:
    - Install blown and batt attic insulation;
    - Access closed wall cavities and properly install dense-packed cellulose wall insulation including removing and replacing siding;
    - Install blown insulation and batt insulation in a floor;
    - Install water heater installation blankets;
    - Install insulation on ducts, hydronic distribution pipes, and domestic hot water pipes; and
    - Safely operate and properly maintain insulation blowing machines and generators.
- ***Base-Load Measures***
  - Demonstrate the ability to:
    - Replace incandescent light bulbs with compact fluorescent lamps while maintaining or improving lighting levels; and
    - Install low-flow showerheads and faucet aerators;
      - Assess the existing condition of plumbing pipes and faucets that may prohibit these measures.

AUDITOR

- ***Prerequisites***
  - Possess *Safe Work Practices, Installer,* and *Crew Chief* competencies.
  - Possess a working knowledge of building science principles.
- ***Inspection and Measurement***
  - Possess a working knowledge of:
    - Air and heat flow in buildings;
    - Factors that affect building heat loss;
    - Construction features and critical junction points of common housing types;
    - Insulation R-values;
    - Different insulation materials and installation techniques;
    - Various air-sealing techniques and appropriate materials;
    - Causes of and remedies for existing and potential moisture problems;
    - Causes of and remedies for other existing and potential indoor air quality problems;
    - Residential mechanical ventilation systems;
    - Minimum ventilation rates/building tightness limits based on the appropriate ASHRAE 62 standard; and
    - Electric base-load usage.
  - Demonstrate the ability to:
    - Measure the dimensions of floors, walls, ceilings, windows, and doors, and compute surface areas;
    - Compute the volume of conditioned space of a building;
    - Define the thermal envelope of a building;
    - Assess the effectiveness of existing insulation and the effective R-values; and
    - Analyze utility bills including breaking out base-load usage from heating and cooling usage.
- ***Diagnostic Testing***
  - Blower door
    - Possess a working knowledge of:
      - Principles of air movement and how they relate to building heat loss;
      - Typical air leakage problems in common housing types; and
      - Minimum ventilation rates.
    - Demonstrate the ability to:
      - Set up a blower door;
      - Prepare a building for a blower door test; and
      - Take blower door reading and interpret results.
  - Zone pressure diagnostics
    - Possess a working knowledge of:
      - The air barrier of a building and the importance of aligning it with the thermal barrier; and
      - Primary and intermediate zones of a house.
    - Demonstrate the ability to:
      - Conduct zone pressure diagnostics and interpret results;
      - Determine the location and effectiveness of the air barrier of a house; and
  - Duct testing

- Possess a working knowledge of:
  - Problems associated with different types of duct leakage.
- Demonstrate the ability to:
  - Determine dominant duct leakage; and
  - Conduct pressure tests. Potential tests include:
    - Pressure pan
    - Duct Blaster
    - Delta-Q
  - Seal duct leaks with appropriate materials and good workmanship.
  - Measure room pressure imbalances in houses with forced-air systems.

◆ Steam and hot water distribution system testing
- Possess a working knowledge of:
  - The components of typical steam and hot water distribution systems and the characteristics of their proper operation.
- Demonstrate the ability to:
  - Test air vents, steam traps, thermostatic radiator valves, and hot water zone valves; and
  - Estimate the energy impacts of existing overheating problems.

◆ Base-load systems
- Demonstrate the ability to:
  - Meter electrical devices to determine their annual energy consumption.

- ***Combustion Appliance Safety***

◆ Possess a working knowledge of:
- CO action levels;
- Common code requirements related to:
  - Vent system sizing, materials, clearances, and installation;
  - Safety shut-off devices;
  - Gas line sizing; and
  - Combustion air;
- Causes of and remedies to common vent system problems.

◆ Demonstrate the ability to:
- Measure the CO level in ambient air;
- Measure the CO level of vented and unvented combustion appliances;
- Measure the CO levels of gas- or propane-fired cook stoves (oven and burners);
- Understand the difference between as-measured and air-free CO readings;
- Detect and natural gas, propane, and fuel oil leaks;
- Conduct a worst-case draft test of a combustion appliance zone;
- Measure the CAZ to assure sufficient volume for combustion air;
- Clock a gas meter to determine the actual input of a gas-fired combustion appliance;
- Conduct basic temperature-rise and static-pressure-drop tests on forced-air furnaces;
- Measure the steady-state efficiency of a vented combustion appliance; and
- Assess the potential inadequacy of supply and return plenum and duct sizes for forced-air systems.

- ***Measure Selection***
  - Possess a working knowledge of:
    - What materials are allowed to be installed based on 10 CFR 440 Appendix A;
    - The regulatory and policy requirements for selecting weatherization measures using DOE-approved energy audit software or priority lists; and
    - The interaction between typical weatherization measures (e.g., the impact of air-sealing and insulation measures on the potential savings of heating efficiency improvements).
  - Demonstrate the ability to:
    - Use a DOE-approved energy audit to input accurate building data and recommend appropriate, cost-effective weatherization measures;
    - If required, use a DOE-approved priority list to select appropriate, cost-effective weatherization measures;
    - Prioritize air-sealing efforts;
    - Estimate the heating and/or cooling load of a dwelling to ensure proper equipment sizing if the heating or cooling system is to be replaced;
    - Select the proper CFL to replace an incandescent lamp while maintaining or improving lighting levels; and
    - Meter an existing refrigerator or locate its DOE tested usage in a database to estimate annual energy consumption.
- ***Work Scope Development***
  - Demonstrate the ability to:
    - Accurately estimate the type and quantity of materials required to cost-effectively weatherize an eligible dwelling unit; and
    - Prepare clearly written work orders for work crews or contractors.

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