

THE GREEN JUSTICE SOLUTION:

**A WIN-WIN PLAN TO PREVENT CLIMATE CRISIS
AND JUMPSTART AN EQUITABLE AND SUSTAINABLE
ECONOMIC RECOVERY**



Green Justice Coalition Mission



We are a broad-based partnership of community groups, labor unions, environmental organizations and other allied organizations united in support of a sustainable, equitable, and clean energy economy in the Boston region. We are dedicated to ensuring that our region's growing green economy will create quality jobs, local workforce development opportunities and healthier and safer communities. In particular lower-income communities and communities of color have been overburdened by our unsustainable economy; therefore, we want to ensure that these communities are at the forefront of the growing green, sustainable economy. Through research, policy recommendations and organizing we will demonstrate that a socially-just, environmentally-sustainable, and economically-prosperous future is attainable.

Green Justice Coalition's Steering Committee:

The Green Justice is led by a steering committee with representatives from all of our sectors.

- Alternatives for Community & Environment
- Association of Community Organizations for Reform Now
- Boston Climate Action Network
- Chelsea Collaborative
- Clean Water Action
- Dudley Street Neighborhood Initiative
- MassCOSH
- New England Council of Carpenters
- Painters & Allied Trades DC35
- Project RIGHT

Current Green Justice Coalition Members:

- Adaptive Environments
- Boston Workers Alliance
- Boston Youth Environmental Network
- Chinese Progressive Association
- Greenport
- Green Roundtable
- Home Energy Efficiency Team
- Massachusetts Energy
- Massachusetts Green Jobs Coalition
- Massachusetts Interfaith Climate Action Network
- SEIU Local 615
- Sheet Metal Workers Local 17
- Urban Ecology Institute
- Urban Massachusetts Green Alliance
- YouthBuild Boston

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Community Labor United

Community Labor United (CLU) is a coalition of community and labor organizations that run joint campaigns to counteract the growing gap between rich and poor, while highlighting the connections between jobs and community issues. Our mission is to protect and promote the interests of working class communities in the Greater Boston region. CLU unites many of the strongest community organizations and unions in our region to drive forward policies that promote quality jobs, secure health care, affordable housing, job access, and environmental justice for the area's low and moderate-income people. Through collaborative research, leadership development and organizing, CLU unites our organizations and communities around a common vision and plan of action.

CLU carries out two types of research: campaign research that helps to frame and support our campaigns, and policy research on other issues of concern to working class communities in our region. In 2006, we published *The Hourglass Challenge: Creating a More Equitable Economy for Greater Boston*, which examines a range of policy and organizing opportunities for stemming this region's rapidly growing economic and racial inequality. In 2008, we published *Earnings, Poverty and Income Inequality in the City of Boston* in addition to this report, *The Green Justice Solution: A Win-Win Plan to Prevent Climate Crisis and Jumpstart an Equitable and Sustainable Economic Recovery*. *The NonProfit City: The Impact of Boston's Teaching Hospitals on Our Community* will be forthcoming later this month.

Table of Contents

Introduction	The Green Justice Solution: A Win-Win Plan to Address Climate Crisis and Jumpstart an Equitable and Sustainable Economic Recovery	2
Chapter 1	The Context, Need and Prospects — Why Green, Why Now?	8
Chapter 2	The Energy Efficiency Opportunity: Making Energy Efficiency the Cornerstone of Greater Boston’s Energy Strategy	16
Chapter 3	The Existing Massachusetts Energy Efficiency Delivery Landscape & Systems	24
Chapter 4	The Potential for Expanding Energy Efficiency Jobs in Our Region	39
Chapter 5	Maximizing the Energy Efficiency Opportunity through a Policy Agenda Rooted in Equity	52
Endnotes		59
Glossary of Terms		63
Appendix A	Boston Green Justice Coalition VISION & PRINCIPLES	66
Appendix B	A Declaration of Energy Empowerment	68
Appendix C	City of Boston and Boston Metro Region as part of MA	69
Appendix D	2005 Energy Efficiency Costs & Benefits Broken Out by Utility for NSTAR and National Grid	70
Appendix E	Labor Content in Energy Efficiency Retrofits	71
Appendix F	Massachusetts Saving Energy Summary	72
Appendix G	Massachusetts Incentives for Renewables and Efficiency Available to Eastern MA Residential Customers	73
Appendix H	ESCOs Serving the Northeast Region	76



INTRODUCTION

THE GREEN JUSTICE SOLUTION: A Win-Win Plan to Address Climate Crisis and Jumpstart an Equitable and Sustainable Economic Recovery

The green wave can lower energy costs, put people back to work, and jumpstart our sinking economy. It is the best chance for all of us to bridge the growing race, class and geographical gaps that divide us.

A Green Wave is Coming . . .

Our airwaves are flooded with talk about *green*: ‘green economy,’ ‘green jobs,’ ‘green buildings,’ ‘green products,’ and more recently, ‘green recovery’ and ‘green new deal.’ Global warming is forcing us to go green, and the “green revolution” is predicted to be as dramatic as the Industrial Revolution. To prevent floods, disease, economic and environmental disruption, we must transform the economy and stabilize the climate. We need to act forcefully, we need to act soon, and we need to act together: communities, political leaders, congregations, environmentalists, businesses and unions.

Today’s fluctuating energy prices and declining economy highlight green investments as an *opportunity* as well as a challenge. The challenge is to conserve energy, switch from fossil fuels to renewable energy sources, and lower greenhouse gas emissions quickly enough to keep flood waters from swamping Boston. The opportunity is even greater. The green wave can lower energy costs, put people back to work, and jumpstart our sinking economy.

Finally, the Green Justice Coalition sees an additional, even longer-term opportunity in this green wave: an opportunity to rebalance our regional economy, to make Greater Boston more economically as well as environmentally sustainable. We strongly believe that joining an equity agenda to this green transition will allow us to more equitably share the benefits and costs of growth. We believe that this is our best chance in a generation for poor communities and communities of

color to build wealth, health, and potential. It is the best chance for all of us to bridge the growing race, class and geographical gaps that divide us.

Chapter 1 will examine in more detail the threat that the climate crisis poses to our environment, economy and health and how Boston and Massachusetts are moving strong climate action initiatives and legislation to address this threat. It will also examine how national proposals to include green work in a federally-funded economic recovery package could help us turn the climate challenge into an opportunity to build an equitable and sustainable green economy.

The Energy Efficiency Opportunity: a Dozen Reasons to Embrace This Strategy

We need an energy strategy that is tailored to our region — Greater Boston’s densely-populated communities, our aging buildings, our temperature highs and lows, our dependence on imported fuel, our particular economy and workforce. We need a practical and cost-effective strategy that we can implement with technology we already have. And, we need a strategy that we can move today.

The Green Justice Coalition will call attention to such a strategy. **Massachusetts and Boston have the opportunity to make a ‘win-win’ investment by increasing energy efficiency and building weatherization work on a very large scale.** Mayor Menino and Governor Patrick have

advanced strong climate action initiatives with policies that will support a major expansion of energy efficiency work. We are building on a strong foundation of energy efficiency programs and resources — including ratepayer-funded utility programs and energy services companies as well as recent energy alliance initiatives. We also start with a growing green economy. In 2006, Greater Boston ranked 5th highest among the Top Ten Metropolitan Areas for Green Jobs, with one in every thirty-eight of the country's green jobs currently located in the region. Most, however, were located outside the City of Boston.¹ Further, a strong network of environmental and environmental justice advocates are already educating the public and building support for far-reaching but feasible solutions in our region.

Greatly expanding the energy efficiency retrofitting of area homes and commercial buildings is a proven strategy that can benefit our communities and our economy in a dozen different ways. Energy efficiency retrofitting:

1. **Reduces GHG emissions**, with the potential to shrink Greater Boston's carbon footprint more quickly than any other strategy;
2. **Saves money for consumers by reducing heating costs**, helping residents stay in their homes and helping businesses stay competitive;
3. **Makes our energy system less expensive to operate** by cutting demand and reducing the need for expensive new power plants and other 'peak demand' sources;
4. **Has a higher return on investment and shorter payback period** than any other clean energy investment;
5. **Keeps money in the local economy** rather than using it to pay for imported fuels;
6. **Improves air quality in our homes and communities**, reducing asthma and other respiratory diseases;

7. **Builds on our Commonwealth's strong and diverse network** of energy efficiency programs and resources;
8. **Reduces unemployment and turns around our economy** by producing more jobs — more quickly — than most other investments, green or not;
9. **Produces many jobs with modest training requirements** that our local training and education networks can prepare un- and under-employed residents to move into relatively quickly;
10. **Creates local jobs** that cannot be outsourced;
11. **Creates "green-collar" jobs** that pay good wages, offer career opportunities and are accessible to local residents;
12. **Repairs our fragile regional economy** by reviving our industrial and construction sector, opening up those jobs to local residents and rebuilding a middle class.

We must start thinking of energy efficiency as the cheapest form of energy. Energy efficiency is more than twice as cheap as today's energy sources and three times as cheap as new power plants.² As an economic and environmental strategy, it makes sense to invest in the cheapest energy first. Energy efficiency is only the first step; we are still moving in the wrong direction with our houses, electronics and cars driving energy demand and GHG emissions upwards. But by improving energy efficiency first, we can generate the savings to pay for other more expensive investments in renewable energy and advanced technologies.

Chapter 2 will present the science and economics behind the Energy Efficiency Opportunity.

Chapter 3 will provide an overview of the existing Massachusetts energy efficiency systems, funding, and potential for diversification and dramatic expansion.

Energy efficiency cuts energy use through measures like insulating buildings. It is the cheapest form of energy, more than twice as cheap as today's energy sources and three times as cheap as new power plants.

WHERE WILL THE MONEY COME FROM?

An Energy Alliance is a government-sponsored non-profit organization designed to reduce the use of electricity, natural gas, and heating oil citywide. The Energy Alliance raises capital which it then lends to businesses and housing owners for efficiency and clean energy projects. The nonprofit contracts the auditing and efficiency work to ESCOs (energy service companies).

A national green recovery could be accomplished for \$50 to \$100 billion. Investing just under \$1 billion of Massachusetts' share in energy efficiency retrofitting would create more than 16,500 jobs.

Regional Greenhouse Gas Initiative (RGGI) auctions provide funds to invest in energy efficiency, as do this year's increased federal funds for low-income weatherization. Utility regulation has created and increased financial incentives to invest in efficiency. New public-private Energy Alliances will also increase available financing, as will a growing realization among private investors that energy efficiency has a high and proven return on investment. And more dramatic investments in energy efficiency are on the horizon. On November 18, a broad group of citizens called for a state commitment to a \$1 billion "Massachusetts Energy Empowerment Revolution Fund" that could retrofit 400,000 homes and create 10,000 new green-collar jobs within two years.³

At a national level, economists, policymakers and advocates are enthusiastic about the opportunity that green recovery presents to both address climate crisis and to stimulate our slumping economy. President-elect Obama has proposed to help create five million jobs over ten years by investing in clean energy. On November 21st, he announced an Economic Recovery Plan that will create 2.5 million jobs in the next two years including clean energy jobs. His plan mirrors one from The Apollo Alliance, Green for All and the Center for American Progress (CAP), whose director, John Podesta, coordinates President-elect Obama's transition team.⁴

Apollo, Green for All and CAP have proposed legislation to stimulate the U.S. economy through federal investments in energy efficiency and green-collar jobs. Apollo estimates that a broad green recovery could be accomplished for \$50-\$100 billion — much less than the \$700 billion financial rescue program — with much greater

impact than more traditional stimulus packages. A green stimulus package would create four times more jobs than investing in the oil industry and significantly more jobs than would be created through individual tax rebates. A green recovery would significantly reduce unemployment, and create opportunities for better paying jobs. Massachusetts' share of a national \$100 billion program would be approximately \$2.3 billion, which would create 42,500 jobs statewide. Investing just under \$1 billion of this (39%) in energy efficiency retrofitting would create more than 16,500 jobs.⁵

The Green Economy, Green Jobs and Prospects for Growth

Investing in energy efficiency will directly create jobs in three areas:

- ◆ Energy Efficiency Upgrades – Auditing/Assessment and Construction
- ◆ Efficient Building Operations and Maintenance
- ◆ Energy Management⁶

Job creation estimates for the building audits and retrofit construction range from 6.5 to 11 jobs per \$1 million invested in energy efficiency building retrofits, depending on the type of building, amount of work, and region of the country. For residential retrofits, every \$1 million invested generates 11 on-site jobs plus as many as 5 indirect support jobs.⁷ Finally, retrofits also create jobs in manufacturing energy efficient products.

Energy efficiency building retrofitting varies by type and age of building, but a typical 1-family residential retrofit usually includes:

Type of Work	Purpose	Estimated Percentage of Total Retrofit Construction Labor
Insulation	adding or replacing insulation (including insulating pipes);	54%
Electrical	replacing lighting fixtures and light bulbs, installing light sensors and thermostat controls, replacing appliances	20%
HVAC / Plumbing	replacing heating and cooling systems and improving indoor air circulation systems (including duct work, blowers, and fans) and replacing toilets and faucets to minimize water use;	15%
Windows and Doors and Air Sealing	replacing windows with insulated glass and caulking around windows and replacing doors and adding sweeps to minimize heating and cooling loss	11%

Larger building upgrades may also include installation of renewable energy systems (solar photovoltaic power, solar heating, and geothermal systems) or new roofs (green, solar or cool).

In addition, every retrofit starts and ends with auditing and quality control — assessing building energy use, recommending cost-effective upgrades and ensuring that installation was effective. However, labor estimates for auditing work are not yet available.⁸¹

Occupations that will benefit from new job opportunities due to growth in energy efficiency retrofits include:

- ◆ *Energy Auditors / diagnosticians*
- ◆ *Electricians*
- ◆ *Heating/Air Conditioning Installers & Technicians and Plumbers*
- ◆ *Carpenters & Carpenters Helpers*
- ◆ *Roofers*
- ◆ *Laborers*
- ◆ *Glazers*
- ◆ *Insulation workers*
- ◆ *Industrial Truck Drivers*
- ◆ *Construction Managers*
- ◆ *Building Inspectors*
- ◆ *Building Operations and Maintenance workers*

Although most of the direct on-site jobs are construction jobs, a number of new energy auditor jobs will also be created. Many require only modest training, making them accessible to residents without college degrees. Of the permanent retrofitting jobs that will be created, almost one-third will be entry-level, almost two-thirds will be skilled or semi-skilled and only one in fourteen will be supervisory. This broad mix of jobs creates opportunities for energy efficiency workers to move up a career ladder into union apprenticeships that offer long-term, high-wage careers in a skilled trade.

By growing the energy efficiency sector, we hope to create both good jobs and to build pathways into these jobs for young people and others who were left behind by other economic development waves. A green economy must be built on equity, and in order to build equity into Boston's energy efficiency opportunity, we must address barriers to job access faced by many low-income residents and communities. There is a need for what activist and author Van Jones calls 'green pathways out of poverty' to connect people in lower-income communities and communities of color

Retrofitting means replacing furnaces, weatherizing, insulating, or doing whatever is needed to make existing buildings energy efficient.

An energy audit assesses how much energy a building uses and evaluates what measures can be taken to improve efficiency. It is often the first step to making a building more efficient.

with new opportunities.¹ This includes community-based education and training opportunities, mentoring and supports.

Chapter 4 will provide an overview of Massachusetts current green economy and will examine in greater depth the job opportunities that a significant expansion of investment in the energy efficiency sector could present. We will also consider what is needed to ensure that green jobs become green collar jobs; good jobs that are accessible to local un- and underemployed residents.

Chapter 5 will share our Coalition's belief that, with a strategic partnership between community, labor, policymakers, environmentalists, faith-based groups and progressive business, greatly expanded investment in energy efficiency could generate good jobs that inspire young people to hope for a secure future and could lift families out of poverty. At the same time, this strategic partnership would save energy costs, and reduce GHG emissions. We will also share our understanding that a commitment to equity is central to making the most of Greater Boston's energy efficiency opportunity.

... We can Ride the Green Wave and Make a Difference in Boston.

We have all the necessary ingredients in the Boston region to create a green economy that meets the needs of our communities. The political will is strong and growing. At the same time, public policy and resources are starting to come on line. Community, labor, and environmental partnerships have formed, and we are hopeful that our political leaders will join with us. Green industry already has a foothold in the region. We have the opportunity to join all these elements into a powerful model for community-driven green development. But, we must organize and strengthen our partnerships. If we fail to do so, the green wave will simply wash over us and leave us behind. The time is now. We cannot afford to miss this remarkable opportunity.

PRINCIPLES OF THE GREEN JUSTICE COALITION

The Green Justice Coalition is founded on the following principles:

- ◆ We all have a right to a decent quality of life and healthy environment, but not at the expense of others or future generations.
- ◆ We all have a right to an equal voice regarding how public resources are used to go green and to know the outcomes of these public investments.
- ◆ We must protect those who are currently most vulnerable.
- ◆ Those who have contributed more to the problem need to contribute more to address past injustices, while those who have paid the price are owed a greater share of new green resources and opportunities.
- ◆ Green Justice requires that there be meaningful access to green jobs and other economic opportunities for residents of communities of color and other low-income communities. Meaningful access includes appropriate education, training and support, as well as priority hiring for local projects.
- ◆ Green jobs must be safe jobs, with decent pay and benefits that can support families. Where possible, green jobs should be union jobs or, at least, pay the prevailing wage. Workers who will be negatively impacted by green development have a right to a just transition.
- ◆ Green Justice supports, not only green jobs, but also opportunities for individual and community ownership and production among communities of color and other low-income communities.

OUR VISION

We aim to build:

- ◆ A partnership of community groups, labor unions, and others dedicated to green justice.
- ◆ Policies for local hiring, job quality standards, and training programs for green jobs.
- ◆ Educational programs to expand awareness of and participation in the green economy.
- ◆ Green job training programs specifically designed to support people in our communities.
- ◆ Local youth and residents trained and hired into green jobs who can support their families and thereby keep young people safe from street violence.
- ◆ New locally and community-owned green ventures that provide quality jobs, produce green goods and services, and benefit from local procurement policies.
- ◆ Community and union voices with equal representation at public decision making tables on the green economy.
- ◆ Community access to green products and services to promote healthier lives and lower the cost of living, especially energy bills.
- ◆ Cleanup and conversion of contaminated and abandoned sites in our communities into green economic and environmental assets, while assuring high safety standards for clean up and conversion.



CHAPTER 1

The Context, Need and Prospects — Why Green, Why Now?

This report will advocate that substantial short and long-term investments in increasing energy efficiency are the most immediately feasible strategies for the Greater Boston region. Additionally, these investments carry the greatest potential returns for our climate, employment, our regional economy, and our communities.

Climate Crisis: A Threat to Our Environment, Economy & Health

Global warming and climate crisis are terms that describe an on-going man-made disaster. More than 80 percent of American climate scientists believe that human activity contributes to global warming.² When we burn oil, gas and coal to heat and light our homes, run our businesses and power our vehicles, we release carbon dioxide and other gases into the atmosphere. These are called “greenhouse gases” (GHGs) because they trap an unnatural amount of heat in the Earth’s atmosphere.³ As a result, the earth’s temperature has been slowly rising.

The United Nations’ Intergovernmental Panel on Climate Change (IPCC) has reported that today’s adults have already felt the average temperature rise more than a full degree Fahrenheit (F) during their lifetimes. Furthermore,, that we can expect the average temperature to rise yet another full degree by 2020. IPCC predicts that by the end of the century, unless we successfully reduce global warming pollution, the temperature could increase by more than 7°F. Measurable climate changes have already occurred. For example, the ten

warmest years on record in our region have all occurred since 1990. Unfortunately, it is still unclear whether the climate changes we have already triggered can be reversed.

Although scientists still debate the likely pace of global warming, they agree that climate changes will intensify if we continue to burn fossil fuels and emit greenhouse gases at current rates. If we, as a global community, do not begin to change our heating, cooling, transportation and other fuel habits on a very broad scale — thereby reducing or reversing the growth of greenhouse gas emissions — then we and our children can expect to face even higher temperatures, resulting in increased floods, disease and economic disruption. According to the US Environmental Protection Agency, if our present fossil fuel use continues unchanged by 2100:

- ◆ Massachusetts’ temperatures could increase by 4°F in winter and spring and about 5°F in summer and fall;
- ◆ Precipitation will increase by about 10% in spring and summer, 15% in fall, and 20-60% in winter;
- ◆ Heat-related deaths during a typical summer could increase 50% beginning as early as 2050;
- ◆ Concentrations of ozone, a major component of smog, will increase by 4%, leading to rising incidences of asthma and other respiratory illnesses;
- ◆ Sea level rise could flood low-lying property, erode beaches, contaminate drinking water, and destroy low-lying roads, causeways, and bridges. In addition, sea level rise could increase the vulnerability of coastal areas to

Fossil fuels like coal, oil, and gas are forms of highly concentrated carbon. When burned, they release carbon dioxide and other “greenhouse gases” that trap heat in the atmosphere. Over 85% of our energy demands are met by burning fossil fuels.

- storms and associated flooding;
- ◆ Boston’s sea level is already rising by 11 inches per century, and this rate is likely to double, rising another 22 inches by 2100, leaving parts of today’s Boston underwater.

The Good News: We Can Meet this Challenge

There is a broad and growing consensus of individuals, groups and government officials that believes we can avoid these serious threats to our future by using technologies and resources we already have, at a cost we can afford. To limit global warming and stabilize the climate, humans must reduce our use of fossil fuels. Fortunately, there are two proven strategies for reaching this goal. We can:

- 1) **Increase overall energy efficiency** by increasing the energy efficiency of our buildings and communities, transportation systems, power plants and other infrastructure to limit the amount of energy that needs to be generated; and
- 2) **Increase renewable energy** by replacing greenhouse gas emitting fossil fuels with renewable sources of energy such as wind, solar and geothermal.

In terms of cost, the IPCC has estimated that “stabilizing the concentration of greenhouse gases in the atmosphere at levels that will limit long-term temperature rise to a few degrees will slow the rate of global economic growth by only about a tenth of a percent per year.” In contrast, a climate crisis of the magnitude described above is projected to reduce economic activity from 5 to 20%.⁴

The Growing Political Will and Motivation to Address Climate Change

Meeting the climate challenge is much more a problem of strengthening political will and motivation, than it is an economic or technological puzzle. Despite the U.S. government’s refusal to join the 174 countries that have accepted the 1997 Kyoto Protocol challenge to reduce greenhouse gas levels by 2012, there is clear evidence that Americans are committed to climate protection. As early as 2005, 86% of Americans disagreed with the official US government policy and believed that the US should join other nations in their commitment to limiting greenhouse gas pollution.⁵ Across the country, a wide range of constituencies have become active supporters of mandatory climate policies, including religious communities, students, environmental justice groups, labor unions and green business groups.⁶

Reflecting this broad and growing sentiment, the National Governors’ Association has been urging Congress to adopt a national energy and electricity plan that would expand the alternative fuels standard, enhance transportation fuel efficiency, extend the renewable energy tax credit, boost energy efficiency and conservation, and increase funds to promote advanced technologies.⁷ Although many bills have been introduced, the first successful federal green legislation, the Green Jobs Act of 2007, was signed into law in December 2007. Even though the Green Jobs Act does not establish emission standards or address the Kyoto challenge, it does set forth a national investment in renewable energy that proponents believe could create more than three million jobs over the next ten years.

Across the country, environmental activism has pushed an increasing number of cities and states to adopt



Slowing and stabilizing greenhouse gas emissions will cut economic growth only about a tenth of a percent. A global climate crisis will cut economic growth 5% to 20%.

Energy efficiency and renewable energy are opportunities to cut energy costs, put people back to work and jumpstart our sinking economy.

policies aimed at reducing global warming pollution. To date, 902 US cities, including 28 in Massachusetts and 7 in Greater Boston, have signed the 2005 US Mayors' Climate Protection Agreement to reduce their greenhouse gas emissions by at least 7% below 1990 levels by 2012.⁸ In addition, 26 states and the District of Columbia have passed Renewable Electricity Standards mandating that a specific percentage of electricity come from renewable sources such as wind or solar power.⁹ Generally, state-enacted climate policies have three goals: to control greenhouse gas emissions from cars; to limit pollution from electricity generation; and to institute comprehensive state energy efficiency and renewable energy plans.¹⁰ Massachusetts' and Boston's leading role in adopting green policies and initiatives is described in greater detail below.

A Critical Moment: Recession Creates New Urgency for Investment in Green Recovery

This year, the declining US economy has focused new attention on energy efficiency and renewable energy investments as not only *necessities* to avert climate crisis, but also as *opportunities* to respond to energy cost increases, put people back to work and jumpstart our sinking national economy. Both major parties' presidential candidates spoke in favor of green jobs, reflecting a May 2008 Harris poll reporting that two-thirds of U.S. adults believe it is important that the next President of the United States initiates strong action to address climate change soon after taking office.¹¹ More recently, a November 2008 post-election poll found that a majority of Americans say that given the current economic crisis, now is the time to address climate change, because investing in clean energy will create millions of new jobs and rebuild the economy. "The public thinks there's not a minute to waste," said Steve

Cochran, national climate campaign director at the Environmental Defense Fund.¹²

This popular momentum in clean energy investment as both an environmental and economic priority builds on the work of an emerging network that has coalesced around a shared green recovery agenda. Initiatives by *The Apollo Alliance*, the *Center for American Progress* and *Green for All* have brought together a range of movements and constituencies to collectively advocate for a green recovery agenda: anti-poverty and civil rights activists, environmentalists and environmental justice organizers, inter-faith groups, labor unions and sustainable businesses.

The Apollo Alliance, Green for All, the Corps Network, the Center for American Progress (whose director, John Podesta, coordinates President-Elect Obama's transition) and other partners have put forth a specific proposal to stimulate the U.S. economy through the specific federal investments. This proposal, *Apollo Manufacturing, Energy Efficiency, and Green Jobs Recovery Act*, calls for \$10.25 billion in federal investments in energy efficiency and green-collar jobs, including a mix of funding for existing and new programs.

Bringing It Home: Massachusetts and Greater Boston Respond to the Challenge

The Boston region is well positioned to effectively utilize potential new federal support for a green recovery. Both Boston Mayor Thomas Menino and Massachusetts Governor Deval Patrick have earned their reputations as national leaders in the efforts to fight climate crisis and to create green jobs. Both leaders have invested significantly in policies and infrastructure that are prerequisites for a

The Potential Impact of a Green Recovery Plan

Apollo estimates that the return on the relatively modest \$10.25 billion investment called for in this Act would be \$1.2 billion in residential and commercial energy savings; substantial reductions in oil and energy use that would cut global warming pollution; 553,000 jobs, including 50,000 on-site construction jobs and 120,000 on-site manufacturing jobs; training and paid volunteer service opportunities for 295,000 young adults and seniors; and \$60.8 billion in industry revenue.

Apollo estimates that a broader green stimulus and recovery could be accomplished for \$50 billion to \$100 billion — still a small cost relative to the \$700 billion financial rescue program. Moreover, it would have a much longer-lasting impact than more traditional stimulus packages.¹³ The Center for American Progress and the Political Economy Research Institute (PERI) at the University of Massachusetts examined the potential impact of a \$100 billion national investment in six clean energy and energy efficiency sectors: 1) Retrofitting buildings to increase energy efficiency; 2) Expanding mass transit and freight rail; 3) Constructing “smart” electrical grid transmission systems; 4) Expanding wind power; 5) Expanding solar power; and, 5) Manufacturing advanced biofuels.

PERI determined that this type of green recovery and infrastructure investment program would create:

- ◆ Two million new jobs nationwide over two years — nearly four times more jobs than spending the same amount of money within the oil industry and 300,000 more jobs than a similar amount of spending directed toward household consumption in the form of a tax rebate.
- ◆ Triple the number of good jobs — those paying at least \$16 dollars an hour — than would result from spending the same amount of money within the oil industry.
- ◆ A lower unemployment rate, falling from 5.7 percent in July 2008 to 4.4 percent after the investment occurred.

Massachusetts’ share of a national \$100 billion program would be approximately \$2.3 billion, and would create about 42,500 jobs. The number and types of jobs that could be created in our region through specific types of green investments are discussed in Chapter 3 of this report.¹⁴

In addition to reducing greenhouse gases and putting people to work, advocates of a ‘green New Deal’ argue that investing in clean energy will have a wide range of other economic, political and social benefits. It will:

- ◆ Stabilize energy markets;
- ◆ Provide an avenue for safe investments with a proven return;
- ◆ Stabilize financial markets by channeling more money into the real economy instead of speculation;
- ◆ Increase political and economic security by reducing US dependence on foreign oil;
- ◆ Reduce the US trade deficit;
- ◆ Cut energy costs for US businesses and make them more competitive;
- ◆ Help make housing more affordable by cutting homeowners’ and tenants’ energy costs;
- ◆ Help balance state and city budgets by making their buildings more energy efficient, reducing operating costs;
- ◆ Make communities cleaner and healthier, with fewer cases of asthma and other respiratory diseases.¹⁵

Support for investing in an economic recovery package that would include green jobs and clean energy is growing among experts in a number of fields. In November, 375 American economists, including 3 Nobel Laureates, sent a letter urging Congress to move quickly and decisively to pass a new \$300-\$400 billion a year economic stimulus package that includes “support for green projects.”¹⁶ In October, the U.S. Conference of Mayors issued a report celebrating the economic benefits of a green economy. In November, the United Nations called on world leaders to “start building a Green New Deal” as a route out of the global financial crisis; and on December 1st they launched a multi-sector Green Economy Initiative.¹⁷

Nationally, as the new administration moves into power, we are at last receiving a national-level response to our appeals for federal investment in a green recovery, as both an economic and environmental remedy. President-Elect Barack Obama pledged to help create five million jobs over ten years by investing \$150 billion to stimulate private investments in clean energy and energy efficiency. The two-year Economic Recovery Plan he announced on November 21st will create 2.5 million new jobs, including clean energy jobs. Congressional leaders have stated that they will work with the President-Elect to have green new deal legislation that includes investments in green jobs and clean energy ready by Inauguration Day.¹⁸

The LEED Green Building Rating System is the national benchmark for energy-efficient buildings, whether old or new. LEED standards also cover water use, bike/pedestrian access, non-toxic building materials, and indoor environmental quality.

large-scale move to green. This section summarizes Massachusetts' and Boston's green initiatives. Energy efficiency efforts are discussed in greater detail in Chapter 3.

Greening Boston: Boston's Ambitious Climate Action Program

Boston is at the forefront of the municipal movement towards sustainability. Mayor Menino committed early to major initiatives to reduce greenhouse gas emissions, increase energy efficiency, and create green jobs for local residents. In 2005, Mayor Menino joined other members of the U.S. Conference of Mayors in unanimously adopting the U.S. Mayors Climate Protection Agreement. The mayors agreed that their cities would "strive to meet or exceed Kyoto Protocol targets," reducing Greenhouse Gas (GHG) emissions 7% below 1990 levels by 2012. Boston has developed a green agenda that includes a variety of efforts, including greening municipal buildings and operations; integrating green requirements for private sector construction through its regulatory and permitting authority; and creating other green incentives and opportunities.

In April 2007, Mayor Menino issued an executive order establishing climate action goals for Boston, including reducing emissions of greenhouse gases by 80% by 2050. The executive order set broad policy guidelines for reaching the 2050 goal both in municipal operations and in the entire city. The order also established the Mayor's Community Climate Action Task Force to advise the Mayor on the City's plans, including his stated commitment to address the "economic and workforce development opportunities associated with climate action and the clean technology sector."

Boston's Climate Action Plan identi-

fied five targets for greening: 1) Buildings and other structures; 2) Energy sources; 3) Transportation; 4) Waste management; and, 5) Land use and other actions.¹⁹

Other pioneering Boston green programs include:

- ◆ *Green Building Requirements:* In January 2007, Boston became the first major U.S. city to require that all development projects over 50,000 square feet meet the US Green Building Council's LEED (Leadership in Energy and Environmental Design) standards.
- ◆ *Solar Boston:* In June 2007, the City of Boston became one of thirteen inaugural Solar America Cities under the Solar America Initiative of the U.S. Department of Energy (DOE). As a Solar American City participant, the City launched Solar Boston, a half-million-dollar program to encourage widespread adoption of solar energy in Boston. As part of Solar Boston, the City has mapped the solar potential of every roof in the city and made this information available online.
- ◆ *Energy Alliance:* In December 2007, the Mayor announced his plan to develop the Boston Energy Alliance (BEA), a public-private partnership that will implement \$300-500 million of energy efficiency improvements over the next five to seven years. Boston plans to follow the lead of the City of Cambridge, which worked with the Kendall Foundation to launch the Cambridge Energy Alliance as the first wide-scale private energy efficiency initiative in the country. The Boston and Cambridge energy initiatives are possible because of a New England-specific rule requiring the electric grid manager to provide incentives to cities that reduce energy demand on a large scale.

- ◆ *Boston Green Collar Job Partnership:* Also in December 2007, Mayor Menino announced a \$250,000 job training initiative to prepare young Boston residents for green job opportunities in a variety of sectors. The first grant was awarded in November to train thirty workers in energy efficiency facilities maintenance as the City's first green-collar jobs program.
- ◆ *Other Green Plans and Potential Opportunities:* The City has also committed to aggressive green space plans that will grow and plant 100,000 new trees in the city. The City is exploring opportunities for green manufacturing and a green-zoned downtown district at Government Center and identifying resources for energy efficiency upgrades to municipal buildings.
- ◆ *Winter Heating Crisis:* In anticipation of a very cold winter with high fuel prices that will make it difficult for many residents to heat their homes, the City has committed to partnering with the state and with community networks to increase resources for weatherization.

Other Initiatives in The Greater Boston Region

Spurred on by rising heating costs, shrinking budgets and demonstrated cost savings, many Boston area cities and towns are working to improve energy efficiency in municipal buildings and operations. Changes in state procurement requirements in the past few years have made it more feasible for city governments to contract with Energy Service Companies (ESCOs) to carry out building audits, do air sealing and other building retrofits, and replace aging HVAC, lighting and other equipment. Somerville, Newton and Belmont are among the cities that have contracted with ESCOs to

carry out this work. Performance contracting allows cities to carry out the retrofit work at no extra cost, since the ESCOs arrange third-party financing that is paid back through energy cost savings.

As mentioned above, Cambridge has expanded the scope of its efforts beyond municipal buildings to establish the nation's first Energy Alliance, a private/public partnership that will encourage private commercial and residential investment in energy efficiency. The Cambridge Energy Alliance (CEA) hopes to invest over \$100 million in the next five years in order to substantially cut citywide natural gas, heating oil, water and electric usage by involving a majority of the city's energy users from all sectors, including resident, businesses and institutions.²⁰ Boston and Massachusetts are now considering the feasibility of adopting a similar Energy Alliance model. Municipal energy efficiency programs and Energy Alliance opportunities will be discussed further in subsequent chapters.

Energy Service Companies (ESCOs) analyze buildings' energy inefficiencies, such as leaks or old furnaces; design energy-efficient solutions; and make the changes to the building. ESCOs that work for commercial property owners often also maintain new equipment and finance the improvements, paying themselves out of the energy savings on the companies' utility bills.

Many reports use "green job" and "green-collar job" to mean the same thing: a good job in energy efficiency, alternative or renewable fuels, or alternative transportation. For us, a green-collar job is that and more. It is a blue-collar job that requires less than a BA while it offers family sustaining wages, safe working conditions, and chances for advancement. Green-collar jobs should also provide benefits, paid sick leave, reasonable schedules, organizing rights, and at least some job security. A green-collar job is a pathway out of poverty.

Massachusetts' Comprehensive 2008 Energy Reforms

Massachusetts' political leaders want an expanding green economy to be a major vehicle for driving the Commonwealth's economic growth. Governor Deval Patrick made energy policy a priority in his first two years in office. In 2008, he signed into law seven new pieces of green legislation, including the Green Communities Act, (SB 2768). Environment Northeast, an environmental research and advocacy organization serving the northeastern United States and Eastern Canada, developed the policy blueprint for the Green Communities Act. They described it as the result of "coordinated efforts amongst environmental and consumer advocates, lawmakers and other stakeholders to identify and advance policies that will help the state reach its GHG emissions targets while strengthening the economy."²¹

This law has: reformed the state's energy policy; realigned the Commonwealth's power generation, utility and financing systems; and established the infrastructure for a dramatic expansion of investment in both energy efficiency programs and renewable energy. It also identified millions of dollars in revenue streams to be directed to these efforts. The Green Community Act's major provisions include:

- ◆ *Least-cost Procurement* rules requiring that electric and natural gas utilities invest in all energy efficiency measures and demand resources that are cost effective, or less expensive than new energy supply;
- ◆ A "Green Communities" certification and funding pool for municipalities to expand their energy efficiency programs;
- ◆ An *On-Bill Financing Pilot* that requires utilities to pilot a 'pay and save' program for on-bill financing of energy efficiency retrofits;
- ◆ *Energy Efficiency and Renewable Energy Advisory Councils* that provide new oversight councils with authority and stakeholder representation;
- ◆ A *Renewable Portfolio Standard* increase that will require utilities to obtain 15% of their power from renewables by 2020;
- ◆ *Long-term Renewable Energy contracting* procedures;
- ◆ *Combined Heat and Power* measures encouraging the development of high-efficiency combined heat and power;
- ◆ *The Regional Greenhouse Gas Initiative (RGGI)*, the country's first 'cap and trade' auction of carbon allowances;
- ◆ *The RGGI Revenue Stream to fund energy efficiency program* with at least 80% of RGGI auction revenues allocated to these investments.²²

The first RGGI auction was held in October 2008 and generated \$13.3 million. \$7.8 million, or almost 60% of these proceeds, will be allocated to expand energy efficiency programs. A second RGGI auction is scheduled for December, with a projected three to four additional auctions each year.

Other 2008 Massachusetts Green Legislation

Together with the Green Communities Act, the following laws lay the groundwork for Massachusetts to reduce its greenhouse gas emissions enough to avert serious climate crisis.

The Global Warming Act requires the state to develop programs and policies to reduce greenhouse gas emissions 10% and 25% below 1990 levels by 2020 and 80% by 2050. It also gives the Governor the authority to regulate emissions, a goal that Environment Northeast called "challenging but achievable."

The Green Jobs Act, which was significantly influenced by the efforts of community and environmental advocates, established a Clean Energy Technology Center and allocated funding to support green job training programs and investments in clean energy research and development.

Utility Decoupling: In response to strong environmental and consumer advocacy, the Massachusetts Department of Public Utilities (DPU) this year passed an order that will align utility, consumer and environmental incentives by fully decoupling gas and electric utility revenues from sales by 2012, removing any financial disincentive for utility companies to encourage energy efficiency.²³

2009 will see continued attention to greening Massachusetts, as policymakers and advocates work to implement the legislation described above. State leaders are also actively exploring options for developing a state-wide energy alliance.

Riding the Green Wave

Greater Boston and the Commonwealth of Massachusetts are particularly rich in the assets necessary to generate a deep and lasting green recovery. Governor Patrick, Mayor Menino and other policymakers have been leaders at the local and national level, advancing strong climate action initiatives and leading by example. They have put in place most of the legislative frameworks we will need to successfully launch, expand and support effective green programs. Environmental advocates and environmental justice organizers in

our region have made great progress in educating the public about the climate crisis, and in building support for far-reaching but feasible solutions. We are building future green campaigns on a firm foundation.

In the next chapter, Community Labor United and the Green Justice coalition will focus on energy efficiency and building retrofit or weatherization as a strategy for meeting our region's challenging greenhouse gas reduction and other energy conservation goals.

RGGI (the Regional Greenhouse Gas Initiative) is a compact of ten eastern states to cut their greenhouse gas (GHG) emissions using a cap-and-trade system. A cap-and-trade program limits GHG emissions and then allows electricity generators to buy, sell, and trade them. Proceeds from the auction go to fund energy efficiency and renewable energy projects. The total cap will gradually decrease to 90% of its original level.



CHAPTER 2

The Energy Efficiency Opportunity: Making Energy Efficiency the Cornerstone of Greater Boston's Energy Strategy

We need to act forcefully; we need to act soon; and we need to act together – communities, political leaders, businesses and unions.

The Climate Challenge We Face

The scientific and popular discussion of climate change has shifted. It is no longer a debate about *whether* the environmental changes we see today are taking us on a path towards crisis, but rather an intense dialogue about *what* our communities, our city, state and country, can do to reduce our greenhouse gas (GHG) emissions and avert crisis. It is clear that to avoid further global warming, to prevent the floods, disease, economic and environmental disruption that will accompany further global warming, we need to act forcefully; we need to act soon; and we need to act together — communities, political leaders, businesses and unions.

The challenge can seem overwhelming. Experts tell us that, in 2000, total emissions from the northeast United States included 345 million metric tons of carbon dioxide (CO₂), and in the last few years (2005-2008), greenhouse gas emissions rose 3% — faster even than climate crisis models had predicted.²⁴ We are moving steadily in the wrong direction.

Meanwhile, the New England states and Eastern Canadian provinces adopted goals that reflect expert opinion on how deeply we need to cut GHG emissions in order to "constrain global warming to the lowest rate feasible in order to limit severe disruption to national ecosystems that may be caused by climate change". These goals require that we:

- ◆ Reduce greenhouse gas emissions to 10% below 1990 levels in 2020

- ◆ Reduce greenhouse gas emissions by 75-85% by 2050²⁵

In 2008, Massachusetts responded by passing *The Global Warming Act*, which requires the state to develop programs and policies that meet or exceed these goals.²⁶

2008 Energy Costs Gave Massachusetts a Wake-Up Call

Rising energy costs have provided further motivation to take up the climate challenge. This past summer, Massachusetts received a brief but nasty taste of the coming high-cost energy future with unprecedented oil prices. A gallon of gasoline cost more than \$4, and home heating oil rose to \$4.71 a gallon. Researchers, policymakers and consumer advocates predicted a dramatic crisis, a "snowy Katrina," as residents struggled to pay to heat their homes throughout the winter. A University of Massachusetts Donahue Institute report entitled *Heat Rising* projects that the average Massachusetts household heating bill would top \$3,000 in 2009, and that Massachusetts residents who heat their homes with natural gas or oil could end up paying nearly 30 percent more than they did in 2007, a total of \$1 billion more statewide.²⁷ Although natural gas customers are also expected to see increases of about 15%, the most dramatic cost increases are predicted to fall on residents who heat with oil — who are disproportionately low-income.

Given this summer's record energy costs, the Donahue Institute determined that:

- ◆ Conservatively, at least 163,224 low and low-to-moderate-income

households in Massachusetts will experience difficulty paying their heating oil bills in 2009;

- ◆ More than two-thirds of the burdened households — over 100,000 households — will experience *severe* difficulty paying their oil heat bills.
- ◆ Most of these *severely burdened* households are headed by senior citizens over the age of 60.

The report also analyzed the gap between available heat assistance resources and projected need. It found that almost half of the households that will likely need assistance will have incomes too high to qualify for federal Low Income Home Energy Assistance Program (LIHEAP), the primary source of relief for low-income Massachusetts households that depend on heating oil. At the funding levels then projected, federal LIHEAP funds would have covered the needs of only one-quarter of the oil-heated Massachusetts households that were expected to need help with heating oil bills in 2009.²⁸ Another Donahue Institute study, this one conducted with the Boston Redevelopment Authority and the UMass Lowell Institute for Sustainable Production, found that businesses as well as households are struggling with high energy costs. More than 60 percent of Boston's small businesses surveyed reported that rising energy costs are the most significant financial challenge they face, worse even than rising health care costs.²⁹

Policymakers quickly responded to the alarm. In Boston, Mayor Menino launched a "Food & Fuel Campaign" to bring together government, businesses and nonprofit organizations to support residents. He also announced a series of sustainable business initiatives to address business concerns over rising energy costs and transportation issues.³⁰ On the state level, in July, Governor Patrick convened a Winter Energy Costs Task Force to make rec-

ommendations on how to deal with the crisis.

By the end of October, Governor Patrick, Senate President Therese Murray and House Speaker Salvatore DiMasi endorsed the Winter Energy Costs Task Force recommendations to expand residents' eligibility for federal fuel assistance. State officials also successfully lobbied to have the state's federal LIHEAP home heating assistance allocation nearly doubled to \$212 million, in order to help an additional 55,000 Massachusetts families heat their homes this winter.³¹ Recognizing that heating assistance would not address the longer-term problem, the Task Force advocated for increased investment in energy efficiency and weatherization to reduce energy use and to help residents save money on fuel costs. To this end, Gov. Patrick directed that a total of \$7.8 Million, or almost 60%, of the \$13.3 million in proceeds from the first RGGI auction, be allocated to energy efficiency programs.

The Energy Cost Threat Continues to Loom Over Our Future

Low wages, increased unemployment, and rising food and transportation prices will leave many Massachusetts families struggling to pay heating costs this winter. However, the 'snowy Katrina' crisis probably will not be as wide or deep as predicted this year, since oil prices have fallen back to last year's levels or below.³²

Nonetheless, the long-term heating cost crisis is not over. Overall, the trend since 2000 has been for New England fuel prices to rise. This is expected to continue or accelerate as long as our current patterns of use stay the same. Massachusetts Attorney General Martha Coakley's office reported that the state's electricity prices have risen an average of 49 per-

Businesses as well as households are struggling with high energy costs. More than 60 percent of Boston's small businesses surveyed reported that rising energy costs are the most significant financial challenge they face, worse even than rising health care costs.

We need to find an energy strategy that will both reduce greenhouse gas emissions and cut energy costs. Increasing energy efficiency and building weatherization on a very large scale is exactly the strategy we need.

cent over the past five years. Environment Northeast estimates that, together, gas and electric costs have risen 150% in the past five to seven years and 24% since the winter of 2004-2005.³³ Natural gas prices rose from \$17.03 in May 2007 to \$21.01 in August 2008. The average price of

heating oil has more than doubled in the past five years and more than tripled in the past ten years. Massachusetts' electricity and gas price rates are above the national average, while heating oil prices fall just below the average.

Energy efficiency is almost 70% cheaper than supply.

Massachusetts and U.S. Average Heating Fuel Prices		
Electricity Type	Massachusetts	U.S. Average
Residential	17.97 cents/kWh	12.10 cents/kWh
Commercial	17.14 cents/kWh	11.07 cents/kWh
Industrial	14.98 cents	7.61 cents/kWh
Residential Natural Gas	\$21.01/thousand cu ft	\$19.62/thousand cu
Heating Oil	\$2.57-\$2.63 /gallon	\$2.71/gallon

Period: Electricity and Natural Gas prices are as of August 2008. Source: U.S. Energy Information Administration State Profile, available at http://tonto.eia.doe.gov/state/state_energy_profiles.cfm?sid=MA. Heating Oil is as of November 24, 2008. Source: <http://tonto.eia.doe.gov/oog/info/twip/twip.asp>.

Scientists and economists agree that, unless energy production and consumption changes significantly, oil, electricity and natural gas prices will remain high between now and 2030.³⁴ High prices will result from dwindling fossil fuel supplies and higher extraction costs, as well as increasing demand from China, India and other countries.

The Energy Efficiency Opportunity: A Win-Win strategy

The energy picture in 2008 has shocked many Massachusetts residents and leaders into the realization that we need to find an energy strategy that will both reduce greenhouse gas emissions and cut energy costs. In addition, we understand that we need a strategy which is tailored for our region and takes into account Greater Boston's densely-populated communities, our aging buildings, our temperature highs and lows, our particular

economy and workforce. Last, we need a practical and cost-effective strategy which we can implement with technology we already have; one that we can move on today. **The Green Justice Coalition believes that increasing energy efficiency and building weatherization on a very large scale is exactly the strategy we need.**

With Mayor Menino and Governor Patrick already advancing strong climate action initiatives that include policies that will support a major expansion of energy efficiency work, we are building on a strong foundation of proven energy efficiency programs and resources.

Greatly expanding the energy efficiency retrofitting of area homes and commercial buildings is a proven strategy which can benefit our communities and our economy in a dozen different ways. We will examine its employment-creation potential for Greater Boston in Chapter 3

A Dozen Reasons to Embrace the Energy Efficiency Strategy

Energy efficiency retrofitting:

1. **Reduces GHG emissions**, with the potential to shrink Greater Boston's carbon footprint more quickly than any other strategy;
2. **Saves money for consumers by reducing heating costs**, helping residents stay in their homes and helping businesses stay competitive;
3. **Makes our energy system less expensive to operate** by cutting demand and reducing the need for expensive new power plants and other peak demand sources;
4. **Has a higher return on investment and shorter pay-back period** than any other clean energy investment;
5. **Keeps money in the local economy** rather than using it to pay for imported fuels;
6. **Improves air quality in our homes and communities**, reducing asthma and other respiratory diseases;
7. **Builds on our Commonwealth's strong network** of energy efficiency programs and resources;
8. **Reduces unemployment and turns around our economy** by producing more jobs — more quickly — than most other investments, green or not;
9. **Produces many jobs with modest training requirements** so our local training and education networks can move relatively quickly to prepare unemployed and underemployed residents for a quick transition into these jobs;
10. **Creates local jobs** that cannot be outsourced;
11. **Creates green-collar jobs** that pay good wages, offer career opportunities and are accessible to local residents;
12. **Repairs our fragile regional economy** by reviving our industrial and construction sector, opening those jobs up to local residents and rebuilding a middle class.³⁵

We need to start thinking of energy efficiency measures as the cheapest form of energy resource. Efficiency is almost 70% cheaper than supply: energy efficiency measures for buildings cost about 3¢ per kilowatt hour (3¢/kWh), while our energy supply costs 10¢/ kWh. Creating additional energy supplies by building new power plants costs even more. As a result, investing in energy efficiency makes more environmental and economic sense than paying more than three times as much to create more expensive new energy.

Although energy efficiency retrofitting is not a cure-all, it is a large part of the solution for our region. As such, it is a critical place to start. In order to reduce global warming and prevent long-term climate crisis, we need to combine energy efficiency work with major changes in energy production and consumption patterns throughout our society, including transportation, power generation, food and industry. Overall, our larger houses, fancier appliances and electronics, and big cars are still driving energy demand, energy consumption and GHG emissions upwards. If we do nothing, US electricity demand alone is projected to increase 40 percent between 2005 and 2030.³⁶

Below, we will provide an overview of the energy, emissions and cost reduction potential of what we call Greater Boston's "Energy Efficiency Opportunity." We will examine the following:

- ◆ The **science and economics** behind energy efficiency work;
- ◆ The **existing Massachusetts energy efficiency network** which can be built upon or diversified, with a **cost / benefit analyses** of past and projected investment in energy efficiency;
- ◆ The **Massachusetts policy reforms and ISO New England's demand response policies** which are re-aligning energy incentives to make a dramatic expansion of energy efficiency work not only possible but mandatory;³⁷
- ◆ The **current need and future potential** for expanded energy efficiency programs.

The Science and Economics Behind this Energy Efficiency Opportunity

A large proportion of Greater Boston's GHG emissions come from buildings, accordingly the solution needs to start there

Northeast Environment reports that the built environment is responsible for 48% of U.S. energy use. The Cambridge Energy Alliance found that over 80% of that city's GHG emissions result from building energy use.³⁸ The City of Boston found that three-quarters of the city's annual 300,000 tons of municipal CO_{2e} emissions come from buildings, particularly their heating and cooling.³⁹ A landmark study of cost-effective strategies for reducing U.S. GHG emissions, conducted by McKinsey and Company found that GHG emissions associated with buildings and appliances are growing faster than any other U.S. energy consumption sector. U.S. buildings' emissions (both direct emissions from buildings and indirect emissions from generating the power to heat and light buildings) are projected to rise from 33% of all GHG emissions in 2005 to 37% in 2030.⁴⁰ Unless we fix these buildings by insulating, air sealing, replacing lighting and heating systems and other retrofit measures, we will not be able to reduce energy demand or contain costs, even if we do shift to renewable energy sources.

The International Energy Agency (IEA) calculates that we could save 25% of worldwide global energy usage by retrofitting existing buildings. This is equivalent to the energy used globally for transport (26%). Retrofitting existing structures can eliminate the need for 3,200 700MW power plants.⁴¹

Unless we fix buildings by insulating, air sealing, replacing lighting and heating systems and other retrofit measures, we will not be able to reduce energy demand or contain costs.

Improving energy efficiency in buildings and appliances offers the least expensive way to reduce GHG emissions

In 2007, the Massachusetts Executive Office of Environmental Affairs conducted a thorough analysis of the performance of the Commonwealth's 2002 through 2005 energy programs, and concluded that energy efficiency is the cheapest electricity resource. In fact, energy efficiency became cheaper from 2003 to 2005.⁴² The cost to achieve energy savings dropped 15% over the three-year period, from 3.8 cents to 3.2 cents per kWh. In comparison, over the same period, the cost to produce electricity increased by 61% to 8.9 cents per kWh. Environment Northeast noted that, in Massachusetts, we spend approximately \$6 billion per year on energy supplies that costs 10 cents/kWh, while only investing approximately \$125 million per year in 3.2 cents/kWh efficiency programs.

In assessing strategies for reducing U.S. GHG emissions, McKinsey and Company found that

the United States could reduce GHG emissions in 2030 by 3.0 to 4.5 gigatons of CO_{2e} using tested approaches and emerging technologies. These reductions would involve pursuing a wide array of abatement options available at marginal costs of less than \$50 per ton, with the average net cost to the economy being far lower if the nation can capture sizeable gains from energy efficiency.⁴³

The following chart shows five sectors that offer significant clusters of abatement potential (the potential to stop the growth of or even reduce emissions), with each abatement strategy costing under \$50 per ton. Of these, improving energy efficiency in buildings and appliances was by far the least expensive option nationwide, and particularly so in the northeastern

United States due to our population and building density. The McKinley analysis offered a ‘low-range,’ ‘mid-range,’ and ‘high-range’ case for each

projection. This chart shows the mid-range potential abatement (potential to cut emissions) for each sector.⁴⁴

Potential Abatement by Sector 2030, Northeast Region U.S.

Opportunities for less than \$50/ton CO₂e. Mid-case range, 2030
Total reduction: 330 megatons CO₂e.

Sector	Percentage of the CO ₂ e. megatons reduced each year
Agriculture and Forestry	5
Transport	19
Industry and Waste	21
Buildings & Appliances	30
Power	25
Total reduction	330 megatons (100%)

By 2030, investing in energy efficiency improvements in commercial and residential buildings (including appliances) could deliver almost one-third of the potential emissions reduction in our region, assuming New England meets a mid-range GHG reduction goal of reducing 330 megatons a year of CO₂e.

Improving energy efficiency in buildings and appliance is by far the least expensive option nationwide.

Energy efficiency is not only the least expensive emission reduction strategy, it also saves money over its lifetime

The McKinsey and Company study found that “energy efficiency improvements in commercial and residential buildings (including appliances) comprise the largest cluster of what it calls “negative cost abatement opportunities.” In other words, investing in energy efficiency would generate positive economic returns over the investments’ lifetime — these investments would not only pay for themselves but also generate an additional return. Most elements of building and appliance energy upgrades fall into this category. The only exception is the upgrading of some types of HVAC equipment.⁴⁵

Improving energy efficiency in the building, appliances and industrial sectors could offset 85 percent of the projected incremental demand for electricity by 2030, largely negating the need for incremental coal-fired power plants

McKinsey projected “the massive deployment of energy efficiency resources and technologies assumed in the mid-range case would offset a substantial portion of the projected 40-percent increase in electricity demand between 2005 and 2030.” In this manner, expanding energy efficiency investment not only pays for itself but also contains overall energy systems costs. Because rising demand necessitates expensive investments in expanding the grid and building new power plants, reducing increased consumption will reduce or even eliminate the cost of building additional capacity. Environment Northeast

By 2024, the estimated cost of wholesale electricity will be seven or eight times higher if we do not invest in energy efficiency programs than the cost will be if we expand efficiency programs.

Every year we delay producing or retrofitting energy efficient commercial buildings, houses, motor vehicles and so forth, the less cost effective they become.

Light Emitting Diodes (LEDs) are highly efficient light sources, typically using 30–60 milliwatts of electrical power.

projects that “by 2024, the estimated cost of wholesale electricity will be seven or eight times higher if we do not invest in energy efficiency programs than the cost will be if we expand efficiency programs.”⁴⁶

These opportunities are time-sensitive and returns decline with delay

McKinsey found that “many of the most economically attractive energy abatement options are “time perishable: every year we delay producing or retrofitting energy efficient commercial buildings, houses, motor vehicles and so forth, the more negative cost options we lose.” Energy efficiency improvements will only forestall the need to build new power plants and thereby reduce overall energy systems costs if they are carried out in the short term, before rising demand overtakes existing system capacity. Energy efficiency investments are thus a cornerstone of an effective US emissions reduction strategy. “Pursuing energy efficiency and negative cost options quickly . . . would effectively ‘buy time’ for the nation to develop and deploy the technologies for future low-power carbon production and transport.”⁴⁷

Most building energy efficiency improvements use existing technology

Although emerging technologies will increase the potential energy and emissions reductions and will increase the potential financial return from investing in commercial and residential building energy efficiency improvements, we do not have to wait for such new technologies. Seventy percent of the projected emissions and energy use reductions from these improvements (500 megatons) are available to us before 2020, using current technologies.⁴⁸

Returns on the component activities in building and appliance efficiency retrofit or upgrades are high overall

The McKinsey analysis broke out the relative potential energy efficiency improvements by area. Improving lighting efficiency by installing compact fluorescent lighting (CFLs) and Light Emitting Diodes (LED) is the one of the most cost-effective ways to reduce GHGs, “since lighting today accounts for 19 percent of the emissions associated with buildings.” It also produces documented cost savings of \$87 for every ton of carbon dioxide emissions reduced, and has the potential to reduce between 70 and 75 percent of lighting-related emissions. Improved electronic equipment and building shell improvements such as better insulation, air sealing and roofing, also produce high rates of reduction in emissions and energy use with significant cost savings in both residential and commercial buildings.

Abatement Options : Building and Appliances Cluster

Options less than \$50/ton CO₂e

mid-range case 2030

	Savings 2005 real \$/ton CO ₂ e	Potential Megatons CO ₂ e reduced	Description of Opportunity
Lighting	87	240	-Substitution of advanced lighting technologies, e.g CFLs and LEDs, for inefficient lighting
Electronic Equipment	93	120	-Increased in-use efficiency and reduced standby losses in PCs, office equipment, televisions, audio systems and similar devices.
HVAC equipment	45	100	-More efficient HVAC equipment in initial installation and retrofits. -Performance tuning for existing systems
Combined heat and power	36	70	-Increased penetration in large office buildings, hospitals and universities
Building shell	42	60	-Improved new building shells and building retrofits in residential and commercial buildings, e.g., better insulation, air tightening, reflective roof coatings
Residential water heaters	8	50	-Improved efficiencies and switch to alternative fuel technologies e.g., tankless and natural gas
Other		70	-Building controls -Residential and commercial appliances -Commercial water heaters -Fuel switching in residential and commercial heating Source: McKinsey analysis, p. 36

Source: McKinsey analysis, p. 36

In residential buildings, increased attic insulation and air sealing will offer the biggest opportunity and could improve heating performance by nearly 30 percent. Installing more efficient residential hot water systems, which consume about 13 percent of the energy used in homes, presents another large opportunity for savings.

In commercial buildings, installing and properly maintaining programmable thermostats and energy management systems (including advanced insulation, air sealing, reflective roof coatings) may improve heating and cooling efficiency by an additional 15-20 percent.

McKinsey's analysis of the scope of residential and commercial building energy efficiency improvements included both new homes and older commercial and residential buildings. The analysis noted that new homes had the most potential cost savings in faster-growing regions, while retrofits have more potential in slower growing regions, regions with older building stock and colder regions, such as Massachusetts.

Private investors have also discovered the return on investment potential of retrofits

JP Morgan Chase explained what drives their investment in retrofitting:

Green retrofits to existing buildings can be done profitably: JP Morgan Chase estimates that existing buildings which have been retrofitted green enjoy a 3% higher occupancy, a 7.5% higher valuation and use 25%-30% less energy than their non-retrofitted counterparts.⁴⁹

In Chapter 3, we will offer an overview of the system of energy efficiency programs that currently operate in Massachusetts and Greater Boston, their funding and their results.



Over the next 10 years, energy efficiency from already-implemented efficiency measures will save Massachusetts consumers an estimated \$5 billion.

CHAPTER 3

The Existing Massachusetts Energy Efficiency Delivery Landscape & Systems

Massachusetts and Greater Boston enjoy a tremendous opportunity to build on existing energy efficiency programs that are already performing energy audits and building retrofits, while also increasing public demand for these services. We will present an overview of those systems, how they are funded, how they operate, and what results we have seen. Although the present system offers an excellent foundation on which to build, there is substantial room to change and re-prioritize offerings as we expand energy efficiency opportunities. Massachusetts' 2008 green legislation has already set many of these changes into motion.

In Eastern Massachusetts, building retrofits are largely carried out through three different, but very much intertwined, delivery systems:

1. A **utility-based network** funded by utility ratepayers through a mandatory 'system benefit' charge on utility bills, which has separate residential, commercial and industrial components;
2. A **low-income energy network** (LEAN) that is funded by federal Low Income Heating Energy Assistance Program (LIHEAP) as well as through the 'systems benefit' charge;
3. A number of large and small **energy services companies** (ESCOs), primarily for-profit (with one nonprofit serving the residential sector) that contract with utility companies, municipalities, universities, schools, hospitals and other large institutions to carry out audits and building retrofits.

In the past two years, public-private

energy alliances have emerged as a fourth model for delivering energy efficiency retrofits. The Cambridge Energy Alliance (CEA) has established a city-sponsored nonprofit organization to market and carry out energy efficiency and conservation work in residential, commercial and institutional buildings via a network of designated ESCO providers. Some version of this model may be adopted by other municipalities or by the Commonwealth of Massachusetts.

All four of these delivery systems are connected with and draw resources from the ratepayer funded system described below.

Massachusetts Ratepayer Energy Efficiency Networks

Since 1998, Massachusetts has had an energy efficiency network that is primarily operated through the electric and gas utility companies and is funded through two sources: 1) a mandatory charge to ratepayers; and 2) participant financing for specific products and measures. This network includes a low-income residential weatherization program in which ratepayer funding is supplemented by federal and state funds at no cost to participants.⁵⁰ The network makes energy efficiency audits, rebates and retrofit financing available to commercial, industrial and residential customers, nonprofit organizations, schools and other institutions. Ratepayers pay for a large part of the energy efficiency activities carried out under these networks, but not all.

Overall, Massachusetts utility programs invest about \$125 million each year in ratepayer funds though rebates

and incentives, with a total savings to customers exceeding \$500 million. The efficiency programs deliver energy savings at about 3.2 cents/kWh while existing energy supply costs customers about 10 cents /kWh. In addition, these energy efficiency investments lower wholesale power supply costs for all customers. Electric efficiency upgrades made during 2003-2005 are expected to save each participating residential customer an average of \$170 over the 13-year average life of the upgrade.⁵¹ Over the next 10 years, energy efficiency from already-implemented efficiency measures will save Massachusetts consumers an estimated \$5 billion.⁵²

In a comprehensive review of its 2002-2005 programs, the Executive Office of Environmental Affairs found that each dollar invested in electric efficiency will create an estimated \$2.84 in benefits over the life of the installed measure, the equivalent of a 184% return on investment. Environment Northeast calculated that when the slightly higher return for gas efficiency programs is included, more than \$3 is saved for every dollar invested by utilities and customers in Massachusetts energy efficiency programs.⁵³

The Massachusetts Department of Energy Resources (DOER) estimates that investments made in electric efficiency by these programs over the years 2003-2005 will reduce cumulative power plant emissions over their lifetime, including:

- ◆ More than 4,300 tons of nitrous oxides;
- ◆ More than 16,000 tons of sulfur dioxide;
- ◆ Almost 9 million tons of carbon dioxide.

In addition, DOER reports that these energy efficiency investments contain the annual growth in electricity use by approximately one third over what it

would be otherwise. They also reduce peak demands for electricity in the summer and winter. DOER estimates that the lifetime economic impacts of the efficiency investments made during 2003-2005 are likely to create over 11,000 job years, will increase Personal Disposable Income by \$650 million, and will add almost \$1.4 billion to the Gross State Product.⁵⁴ In addition, DOER's review found that across all sectors, towards the end of this three-year period, customer demand for energy efficiency services began to exceed programs' ability to meet that demand. Indeed, there is significant capacity for expansion of this system, which will be discussed in greater detail below.

Public Benefit Funded - Utility-Based Networks

Massachusetts' 1997 Electric Industry Restructuring Act established a public benefit fund called the System Benefit Charge (SBC). It is financed through a mandatory charge of \$0.0025 per kilowatt-hour (2.5 mills/kWh) purchased, which is paid by all electric customers. The rate has not changed since 2001. The SBC generates an average of \$124 million annually, a total of \$1.09 billion from its inception in 1998 through 2006, with a projected total of \$1.71 billion through the end of 2012. The SBC funding underwrites energy efficiency and renewable energy investments, which are jointly administered by the local utility companies and overseen by DOER.⁵⁵

The July 2008 Green Communities Act created new program and oversight requirements for both the energy efficiency and the renewable energy funds. Utility companies must now purchase all available energy efficiency improvements that cost less than the amount needed to generate power. This requirement will lead to a significant expansion of energy efficiency investment. The Act also au-

More than \$3 is saved for every dollar invested by utilities and customers in Massachusetts energy programs.

Efficiency investments made during 2003-2005 will add almost \$1.4 billion to the Gross State Product over their lifetime.

thorizes the DOER to approve and fund natural gas energy efficiency programs. Further, all electricity and gas utility companies will be required to submit plans and reports for their energy efficiency programs to a newly established Energy Efficiency Advisory Council that includes a broad range of stakeholders.⁵⁶ Massachusetts' 2008 green legislation also created additional funding streams for energy efficiency investments. These include funds generated through cap-and-trade pollution-control programs, like the Regional Greenhouse Gas Initiative (RGGI) and the NOx Allowance Trading Program, as well as resources under the Forward Capacity Market program administered by ISO-NE.⁵⁷

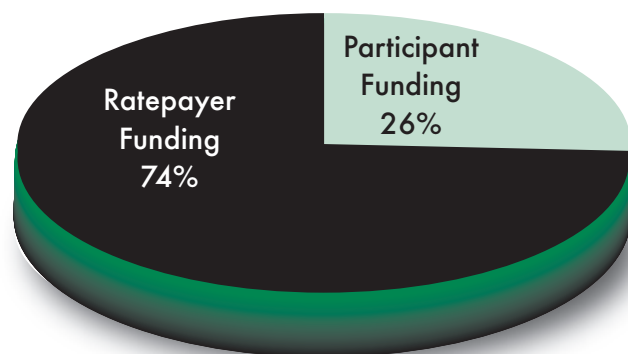
The Systems Benefit Charge (SBC) energy efficiency funds can be used for a variety of energy efficiency programs, including demand-side management (DSM) programs to reduce peak or overall consumption. Funds generated by ratepayers in each utility “customer class” — residential, commercial, industrial, low-income and institutional — must be allocated to programs serving consumers in that

category in proportion to their contributions to the funds. Also, “at least 10% of the amount expended for electric energy efficiency programs and at least 20% of the amount expended for gas energy efficiency programs must be spent on comprehensive low-income residential DSM and education programs.”⁵⁸

Ratepayer Costs and Participant-Financed Costs in Utility System Energy Efficiency Programs

The full costs of the energy efficiency investments that are generated through the utility networks are tracked by DOER in two ways — 1) *Ratepayer Costs*, which are those paid through the Systems Benefit Charge (SBC); and 2) *Participant Costs*, which are primarily paid directly, by customers, but sometimes come from other sources. Although these costs vary by sector and project type, overall, ratepayers pay about three-quarters of energy efficiency program costs (\$372 million) and participants pay about one-quarter (\$132 million).⁵⁹

Overall Cost Shares for Energy Efficiency Improvements through the Utility-Based Systems, All Sectors, 2002-2005

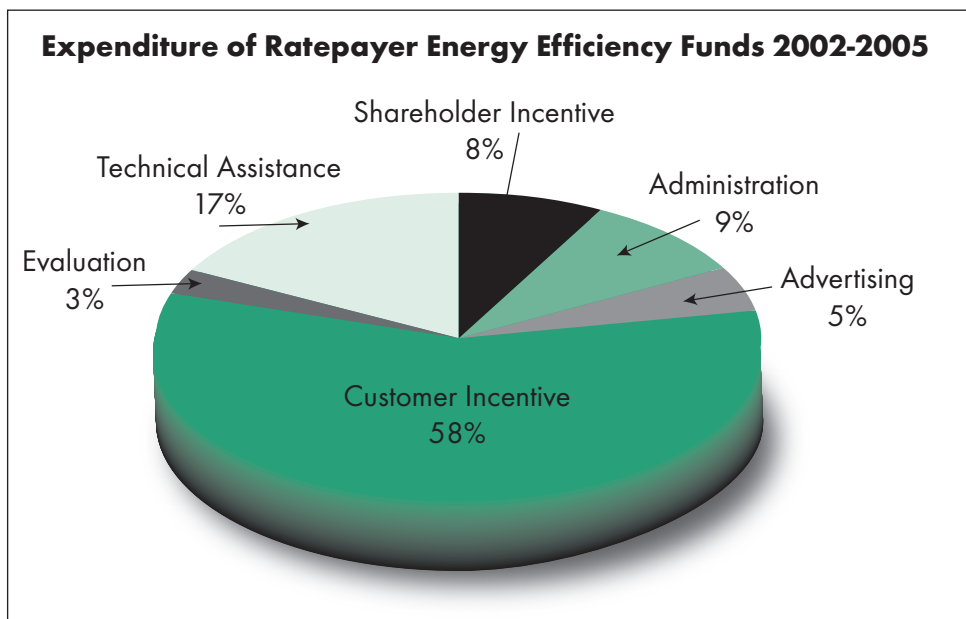


- ◆ Customer incentives for energy-efficient equipment typically provided about 60% of project costs, with participating customers paying the balance. In special cases, such as small business programs, incentives contributed 80% of project costs. Incentives covered 100% of project costs for some municipal projects.
- ◆ In the Commercial Retrofit program, customers paid 40% of the project cost and New Construction customers typically paid 25-50 % of the cost difference between 'standard' and 'energy-efficient' equipment. Some programs, such as Commercial Lighting, require a larger commercial contribution than others.
- ◆ Low-income customers pay nothing since the costs of their retrofits and installations are paid for by federal and state weatherization funding.⁶⁰

Cost Breakout for Ratepayer Funds

Ratepayer funds can be used to pay for a range of energy efficiency measures including energy audits and rebates designed to encourage the replacement of inefficient equipment, as well as consumer education campaigns designed to stimulate demand for energy efficiency retrofitting and increase awareness of the need for energy conservation. Most of the ratepayer funding for these programs pays for two things: 1) customer incentives; and 2) contracted services with energy auditors, energy services companies (ESCOs) and trades workers who install insulation, HVAC systems and other retrofits in customer homes and businesses. The utility-based programs negotiate rates for these contracted services, usually through a competitive bid process. In 2002-2005, DOER reported that utility companies kept an average of only 17% of the funds collected from ratepayers for efficiency and paid out 83% through contracts, rebates and other incentives.

Allowable expenditures of ratepayer funds fall into six categories, as shown in the following chart.



Source: Commonwealth of Massachusetts, Department of Energy Resources, 2007

Within these parameters, the types of energy efficiency activities that ratepayer money underwrites vary by sector. Residential sector energy efficiency programs invest primarily in advertising campaigns and rebates to encourage customers to buy ENERGY STAR® lights and appliances. Low-income residential energy efficiency programs invest primarily in retrofit measures that help residents lower their energy bills. Energy efficiency programs that serve the Commercial & Industrial sectors invest primarily in new construction and major building renovations.

Massachusetts Private/Public Utility-Based Program Networks for Each Sector

For each sector (or customer class), a single ratepayer funded energy efficiency program coordinates energy efficiency offerings across all of the electric and natural gas utilities statewide. For most residential customers, this is the MassSAVE network. Low-income residential customers are served by a separate network called the Low-Income Energy Affordability Network or LEAN. There are separate networks for New Construction and for Commercial and Industrial energy efficiency programs, but this report will not analyze them in depth.

Coordination, Staffing and Sub-Contracting

Usually, a single energy services company (ESCO) coordinates the audits and quality control for each network. ESCOs bid on these contracts every three to five years. As coordinator, for each property or project the ESCO carries out energy audits to identify electric, gas, oil and efficiency measures (and in some cases also renewable energy options). They also supervise the installation of retrofit measures. In addition, the designated ESCO takes calls from interested customers,

inspects installations, regulates quality control and provides some training. Each program compiles a list of qualified vendors with whom the ESCO or participating customers can contract for specific retrofit installations and services (i.e. insulation, air sealing, heating and cooling, electrical work, window replacement). Each program negotiates a set of standardized rates for payments to subcontracted vendors for these various services.

Although very few workers on smaller residential retrofit contracts are union members, some of the larger commercial, industrial and municipal retrofit work is done by union contractors. For example, energy services experts and contractors interviewed by Community Labor United (CLU) said they carried out industrial insulation work with union workers, but did not know of any union insulators working on small or medium residential projects. Larger residential projects, such as elderly and public housing, often involve some building trades unions, but even then, not all of the retrofit work is carried out by union trades workers. Municipal energy management contracts are required to be prevailing wage projects, which increases union contractors' opportunity to bid successfully on these contracts. CLU will continue to research the type, number and union status of jobs in all retrofit sectors.

Massachusetts Private/Public Utility-Based Programs for Each Sector

Sector / Customer Class	Program Name	Audit Coordinator	Program Services	Typical Retrofits*
Residential Energy Efficiency	<p>MassSAVE www.MassSAVE.com</p> <p>The Energy WISE program is specifically targeted at condominiums and multifamily facilities.</p>	Conservation Services Group (CSG)	<ul style="list-style-type: none"> - Educational materials - In-home energy audits - Incentives for the installation of energy-saving measures. - Rebates for high-efficiency equipment and ENERGY STAR products - Installations by fully licensed and insured contractors - Quality Inspections - Multifamily customers receive a one-time rebate of \$3 per therm of estimated first-year savings, up to 50% or \$100,000. 	<p>Upgrades: heating and cooling systems, water heaters, windows, attic, wall and heating pipe/duct insulation, lighting, refrigerators, thermostats, low flow showerheads, weatherization, and air sealing.</p> <p>Rebates: heating systems, water heaters, windows, thermostats, central AC, heat pumps</p>
Low Income Residential Energy Efficiency	<p>Low Income Energy Affordability Network (LEAN)</p> <p>Information at: http://www.energy-bucks.com</p>	This network is offered through CAP agencies, including ABCD and TriCAP.	Oil or electric heated homes can receive retrofit improvements of up to \$2750 and those with gas heat can receive retrofits of up to \$4500.	<p>Upgrades: heating and cooling systems, water heaters, windows, attic, wall and heating pipe/duct insulation, lighting, refrigerators, thermostats, low flow showerheads, weatherization, and air sealing. Wind and solar installed on some multifamily projects.</p> <p>Free Replacement: inefficient lighting, refrigerators, washing machines</p>
New Construction Energy Efficiency	<p>Mass Energy Star Homes serves both single-family and multi-family homes that meet energy efficiency qualifications</p> <p>http://www.massenergystarhomes.com/index.htm</p>	Honeywell	Offers monetary incentives to homebuilders who construct homes that achieve various levels of energy efficiency requirements. Incentives range from \$325-\$1250 for a single family; \$225-\$1150 for a multifamily	Offers cost-savings, incentives and rebates on all the types of systems, appliances and products described above, as well as access to renewable energy options.
Commercial Energy Efficiency	<p>Commonwealth Energy Resource Teams (CERT) help businesses analyze needs and leverage utility programs</p> <p>Small Business Energy Efficiency Program (National Grid)</p>	Not clear	<p>Commercial, industrial, and multifamily customers receive a one-time rebate of \$3 per therm of estimated first-year savings, up to 50% of the project costs or \$100,000 per project.</p> <p>National Grid offers a free energy audit and recommended energy efficiency improvements. Utility will pay 80% of the cost of the installation of energy efficient equipment and a zero interest two year loan to pay the remaining 20%.</p> <p>Also offers 50% incentives to cover costs of custom installations.</p>	<p>Eligible equipment includes: lighting upgrades, energy efficient time clocks, photo cells for outdoor lighting, occupancy sensors, programmable thermostats, and walk-in coolers.</p> <p>Eligible custom equipment includes: specialized HVAC upgrades, motors and newer technologies.</p>

* depending on specific need and cost effectiveness

Landlords have little incentive to invest in energy upgrades when they are not the ones paying the utility bills or reaping the direct energy cost savings.

MassSAVE Residential Program

The residential MassSAVE program operates through eight regional electric and gas utility programs. Residential customers served by municipal utilities go through a different network. Customers who heat their homes with electricity or natural gas have more program options than customers who use heating oil.

Electric Providers for the Greater Boston Region

NStar provides electricity to the City of Boston and most surrounding cities and towns. National Grid provides electricity to a few communities north and south of Boston. Two towns (Wellesley and Belmont) are served by municipal utilities.

Gas Providers for the Greater Boston Region

Boston, Cambridge and Somerville are served by NStar and National Grid. The rest of the region is served by National Grid.

Eligibility, Issues and Options

Greater Boston residents who own or rent in one to four-family buildings are eligible to participate in the MassSAVE energy efficiency program as long as they pay a metered utility bill from NStar or National Grid. Tenants can participate in energy audits without landlord approval, but need the property owner's permission to carry out any retrofits. This requirement can be a major obstacle to tenants' ability to access energy cost savings, since tenants have no guarantee that they will be able to remain in a property long enough to have their investment in insulation or a new water heater pay for itself. Similarly, landlords have little incentive to invest in energy upgrades when they are not the ones paying the utility bills or reaping the direct energy cost savings.

Audits & Retrofit Recommendations

Home energy use audits (also called 'assessments'), where an energy expert evaluates your home's energy performance and provides options to increase efficiency, are completely free. Audit participants can also receive energy saving products, such as compact fluorescent light bulbs. Audits identify areas where efficiency can be improved, suggest which improvements will produce the greatest reduction in energy use and which will begin generating energy savings in the shortest period of time. This is known as the "payback period," which varies on different improvements from 1-3 years for lighting replacements to over 20 years for some types of windows.⁶¹ MassSAVE typically recommends retrofit measures that have a payback period of less than 6 years. The life cycle of various building systems — mechanical, heating, roof, appliances, etc. — is another important factor in determining which retrofits will be cost-effective. Residential retrofits typically include: installation of attic and wall insulation, weather stripping, air sealing and heating systems repairs, replacement of inefficient lighting and light bulbs. These improvements typically save 25 to 35 percent on winter heating bills.

Residents who receive free audits are not obliged to implement any of the recommended retrofits. In fact, a company that does Massachusetts residential audits estimates that only about 25% of the residences on which they perform audits each year decide to insulate (the most frequent upgrade beyond installing compact fluorescent lighting (CFLs)).⁶²

Incentives

The range of monetary incentives that are available to homeowners at a given time is a major factor in decisions regarding which retrofit measures merit investment. Discounts, rebates and tax credits can substan-

tially lower the cost of improvements. The MassSAVE program pays residential customers 50% of the cost (up to \$1,500) for improvements in insulation and air sealing. Incentives are also available to replace inefficient lighting, refrigerators and heating systems. Rebates of \$1,000 are available after installation of new boilers and furnaces, \$300 on tankless water heater installation, \$50 on programmable thermostats and \$10 per new window. To be eligible for incentives, participating homeowners and tenants must contract with an installer from an approved list. An overview of rebates and incentives available to residential National Grid and NStar customers can be found in Appendix H.

Financing and Access

Finding the money to pay for recommended energy efficiency upgrades is a barrier for many people. As described above, overall participants in energy efficiency programs finance about ¼ of the cost of the improvements they make through this program. Some participants in the utility-operated networks can qualify for low-interest financing through participating lenders after receiving an energy assessment. Establishing low-interest loan pools and making this type of financing widely available and easy to access for residential and commercial retrofits is a primary goal of the Cambridge Energy Alliance and other similar initiatives. Through the Massachusetts Technology Collaborative, the Commonwealth makes financing help available for solar and wind renewable energy installations chosen by some homeowners and businesses.⁶³

We are concerned that MassSAVE's financing options — the consumer pays, or in some instances has access to low-interest loans — will neglect many low and moderate-income residents, who might not have good

enough credit to qualify for commercial financing but who might also be unable to access low-income weatherization dollars. We have learned from the foreclosure crisis that it is probably not wise to ask low- and moderate-income homeowners to take on additional debt, even if that debt will lead to long-term savings in the way retrofits will. There are even more barriers to access for low-income tenants than for homeowners, including the question of 'split incentives,' which makes it less likely that building owners will invest in retrofit measures when it is tenants who will capture those savings. Similarly, tenants cannot be sure that they will be staying in a rental property long enough to capture the savings on retrofits they pay for themselves. MassSAVE does not yet address either the financing or tenant/landlord 'split incentive' barrier to access.

There are as yet no provisions in MassSAVE for a system-wide 'pay as you save' option that is already in place in New Hampshire and several other states. This option would greatly expand consumer access to energy efficiency retrofits, regardless of their credit score or finances. The pay as you save system, also known as 'on-bill financing,' provides up-front financing to allow customers to pay for retrofitting without requiring them to take out low-interest loans. It would allow residents (or businesses) to repay the retrofit costs through a charge on their utility bill.⁶⁴ The Green Communities Act requires the utilities to pilot one very small on-bill financing program during the next few years, but there are as yet no mandates or plans to require on-bill financing.

We are concerned that MassSAVE's financing options will neglect many low and moderate-income residents

A "pay as you save" or "on-bill financing" option would greatly expand consumers' access to energy efficiency retrofits, regardless of their credit score or finances.

Low-Income Affordable Energy Network (LEAN)

Massachusetts residential gas and electric customers (both homeowners and renters) who would otherwise go through the MassSAVE program, but who have limited incomes are eligible for free retrofit services that are offered through the network of 21 local community action agencies that also coordinate fuel assistance programs. In Boston, Brookline and Newton, Action for Boston Community Development coordinates fuel assistance programs. In Greater Boston, these agencies include TriCAP (serving Malden, Medford and Everett), CAAS (serving Somerville) and the City of Cambridge Department of Human Services. Eligibility is the same as for fuel assistance, which until recently covered all those whose incomes fell below 200% of poverty, an amount that varies by family size but in which in 2008 was \$42,400 for a family of four.⁶⁵ This fall, Congress authorized the state to increase fuel assistance and weatherization eligibility to 75 percent of state median income. A Massachusetts family of four could earn up to \$53,608 and still be eligible.⁶⁶

These programs, which are often called ‘weatherization,’ offer residential audits and retrofit improvements to eligible residents at no cost to those individuals. Those with oil or electric heat can receive improvements of up to \$2,750 and those with gas heat can receive retrofits of up to \$4,500. Audits and retrofits are funded by a combination of SBC ratepayer funding, federal Low Income Heating Assistance Program (LIHEAP) funding and additional state funding. A federally funded program known as Heartwap will help homeowners receiving fuel assistance to repair or replace their heating systems when they break down. Customers whose lighting fixtures and refrigerators are inefficient can also have those replaced for free.

The LEAN network coordinates delivery of all these program services and performs quality control to ensure high quality, cost-effectiveness and convenience for low-income residents.⁶⁷ Includes:

- ◆ Comprehensive energy audit, including consumer education
- ◆ Weatherization (wall, attic, floor, and pipe and duct insulation) and air sealing (caulking, weatherstripping, door and window hardware, window parting beads, stops)
- ◆ Programmable thermostats
- ◆ Water heater blankets
- ◆ Blower door analysis
- ◆ Tune-up, repair and replacement of faulty heating systems
- ◆ Low-flow showerheads and faucet aerators
- ◆ Minor building repairs, including glass replacement and adjustment of window meeting rails
- ◆ Replacement of inefficient appliances, including refrigerators and clothes washers
- ◆ Installation of compact fluorescent lamps (CFLs)
- ◆ Replacement of all incandescent light bulbs with CFLs provided by a Citizens Energy / CITGO program
- ◆ Health and safety measures such as wire inspection, ventilation, lead;
- ◆ Additional multifamily-building-specific measures such as common area lighting fixtures and HVAC motors and controls, particularly in publicly funded housing
- ◆ Renewable energy photovoltaic, windmill, solar hot water programs are being piloted on some larger residential LEAN projects

LEAN Volume & Expansion this Year

Participating agency staff report that in 2007, statewide LEAN carried out \$30-\$40 million in combined programs, weatherizing an estimated 4,000-5,000 homes statewide, including about 400 in the City of Boston. They replaced at least 2,000 heating systems. In October, the U.S. Congress passed legislation that would almost double federal LIHEAP and Weatherization Assistance Program (WAP). As a result, Massachusetts' federal weatherization assistance funding will increase by 75% from \$150,118,849 in 2008 to \$236,459,066 in FY 2009.⁶⁸

State funding for energy efficiency programs overall, and specifically for low-income weatherization, will also increase this year. In October, Governor Patrick directed that \$7.8 million, almost 60% of the proceeds, be allocated to energy efficiency programs. This will include \$3.5 million for 2008 utility-administered energy efficiency programs, increasing by 50% the \$7 million the Department of Public Utilities will allocate for the state's electric and natural gas utility operated programs. An additional \$4.3 million will go to other efficiency and conservation measures, a large percentage of it to help low-income households replace old or broken heating systems through the state's HEAT program.

Beyond the Ratepayer-Funded Utility-Operated Energy Efficiency Systems: The Emerging Energy Alliance Model and ESCO Performance Contracting

Cambridge Energy Alliance

The Cambridge Energy Alliance (CEA) is a city-sponsored nonprofit organization that is creating a program to significantly reduce energy and water use in Cambridge, Massachusetts, at no cost to city or state taxpayers beyond what ratepayers already pay. According to CEA, the new program is designed to “complement and amplify the existing [utility] energy efficiency measures.”⁶⁹ It operates on essentially the same model as MassSAVE (described above), but expands that model to include a concentrated community education and marketing campaign, as well as expedited access to low-cost financing to pay for interested participants' retrofit and renewable energy measures. CEA has been organizing loan pools from a number of private investors, and can arrange financing for a term of up to ten years so that participants' loan repayments are the same as or less than projected annual energy bill savings. CEA has attempted to arrange for 'on bill financing' that allows customers to finance their energy efficiency retrofits directly from utility bill savings. They expect to pilot this effort in 2009, even though utilities have not yet agreed to make on-bill financing universally available to CEA participants.⁷⁰

Although the Energy Alliance model has great potential, the Green Justice Coalition is concerned that the Cambridge initiative has paid inadequate attention to equity issues that would turn CEA into a vehicle for good green jobs as well as green energy. On the positive side, the CEA has required that its ESCO contractors agree to prioritize hiring local resi-

The Green Justice Coalition is concerned that the Cambridge initiative has paid inadequate attention to equity issues that would turn the Cambridge Energy Alliance into a vehicle for good green jobs as well as green energy.

There is as yet no recruitment, training and hiring system that would create a realistic pathway into these jobs for local residents, particularly for those facing barriers to employment.

Union members have been working in many fewer retrofit occupations than they could.

Involving a broader mix of stakeholders in program planning and governance is an important step in addressing these equity and access issues.

dents. However, there is as yet no recruitment, training and hiring system that would create a realistic pathway into these jobs for local residents, particularly for those facing barriers to employment. Further, the segmentation of CEA's work by sector decreases the chances that the amount of retrofit work will reach threshold levels for local hiring requirements to apply. We do not yet have sufficient data, but it does not appear that, to date, ESCOs in their region have been hiring substantial numbers of city residents or have been partnering with small urban businesses. In addition, the contracts that CEA signed with ESCOs failed to include job quality language to ensure that the jobs created would be good jobs with sustainable wages, benefits, access career opportunities and union membership. We do know that, to date, union members have been working in only specific retrofit sectors (e.g. municipal) and in many fewer retrofit occupations than they could.

We are also concerned that although the loan pool mechanism CEA has developed will create some additional access for low-and moderate-income residents, the many residents who have credit problems will not be able to qualify for CEA loans. We know that CEA has made strong efforts to institute on-bill financing, and that it plans to pilot an on-bill finance option in 2009. We are also excited to hear that the CEA is introducing a 'green lease' to begin to address the tenant/landlord 'split incentive' issues discussed above. Finally, we believe that involving a broader mix of stakeholders in program planning and governance than has happened to date in Cambridge is an important step in addressing these equity and access issues. And, we have considerable hope that, as happened in Cambridge and other energy alliance models that emerge, CEA will prioritize addressing good jobs and local hiring, access and other similar equity concerns.

Energy Service Companies (ESCOs) and Performance Contracting

Energy Services Companies, or ESCOs, are a final important piece of Greater Boston's energy efficiency delivery system; one that has been introduced but not yet adequately presented. An ESCO is "a company that signs, builds and installs systems to improve long-run energy efficiency and maintenance costs in aging buildings, or new construction."⁷¹ In our region, energy services companies play multiple roles in the energy efficiency system. As described above, energy services companies contract with the utility company networks such as MassSAVE and LEAN and with the Cambridge Energy Alliance to serve as 'general contractors' for their various programs. Different ESCOs hold contracts for providing utility-based services in the small residential, multifamily, new construction and small business sectors. ESCOs bid competitively on these contracts every three to five years. Cambridge Energy Alliances has contracts with five different ESCOs to serve its four sectors.⁷²

For the past thirty years, ESCOs have been the primary vehicle for marketing energy efficiency products and services to government agencies, large institutions such as universities and hospitals, and utilities. While the institutional sector — universities, school and hospital — still makes up the largest part of their business, ESCOs are increasingly being hired to green municipal, commercial and industrial buildings. Typically, ESCOs carry out all the same kinds of activities in these larger projects as they do in the utility-based programs — energy audits and installation of more efficient lighting, HVAC systems, insulation, windows and water conservation measures. Larger projects also include measures to reduce energy use in industry-specific equipment and processes.

ESCOs first appeared in the late 1970s in response to the oil crisis and high energy prices. As of 2006, ESCOs were a \$3.6 billion industry, up 20% from 2004. In Massachusetts, a 2007 study found that ESCOs supply almost 6,300 jobs, or 44% of all clean energy jobs. A survey of more than 300 firms projected 25% job growth for energy efficiency firms over the next year.⁷³ A 2007 analysis reports that 13 main companies accounting for 75% of the industry's activity dominate the ESCO industry. Further, utility companies or building equipment manufacturers own over 65% of ESCOs.⁷⁴ ESCOs are often privately held companies or subsidiaries of larger corporations such as Honeywell, ConEdison, Siemens or Johnson Controls. Conservation Services Group is the only nonprofit ESCO working in this region. For a list of ESCOs serving the northeast region, see Appendix I.

Performance Contracting

ESCOs typically carry out an energy audit of a facility, and then enter into a 'performance contract' to provide the prescribed products and services. A performance-based contract (PBC) is a specialized version of a 'design-build' contract, in which one organization oversees both the design and construction of a building. With a PBC, the utility savings realized from installing or upgrading equipment are used to pay off the costs of the retrofits over a specified period of time. In 1992, the federal government authorized government agencies to enter into partnerships with ESCOs, and as of 2006, 19 different federal agencies have implemented more than 400 projects in 46 different states in partnership with ESCOs.⁷⁵ In the past few years, an increasing number of states, counties and municipal governments have also entered into performance contracts. In late 2006, Massachusetts became the 31st state to authorize cities and town to enter into

these contracts for the purchase, installation and maintenance of energy conservation equipment for municipal buildings.⁷⁶

Profit Sources

Energy Services Companies (ESCOs) make their profit from two intertwined sources: the fee that they charge to provide to provide energy auditing and energy upgrade products and services to homeowners and businesses (the remedy that the ESCO has itself diagnosed for particular energy efficiency problems); and a portion of the energy savings that result from these products and services. Although performance-based energy contracts vary, there are two main types, differentiated by which party assumes the financing risk. In both cases, the ESCO's fee is incorporated into the project financing, along with the project's equipment and labor cost and the costs of debt servicing.

1. In *shared savings* contracts, the customer hires an ESCO to perform energy retrofits and the ESCO borrows money from a third-party financier to pay for the project. The customer then pays the ESCO a portion of their energy savings over the life of the contract, and the ESCO is responsible for paying the costs of debt service. If the energy upgrades fail to generate enough energy savings to meet the finance payments, the customer must make up the difference. If savings exceed projections, the customer and the ESCO share any surplus savings for the life of the contract.⁷⁷
2. In *guaranteed savings* contracts, the customer hires an ESCO to perform energy retrofits, and that customer borrows money from a third-party financier. In this case, it is the customer who pays the debt service out of the energy savings generated by the retrofits. If

Utility companies or building equipment manufacturers own over 65% of ESCOs. ESCOs are often privately held companies or subsidiaries of larger corporations such as Honeywell, ConEdison, Siemens or Johnson Controls.

the retrofits do not produce the ‘guaranteed’ amount of energy savings, the ESCO will pay the customer the difference, enabling them to meet their debt payments. If the retrofits result in greater savings than the amount guaranteed in the contract, the customer keeps the extra savings.⁷⁸

Most ESCO contracts have an overall average payback period of 6 to 10 years. Energy cost savings from retrofit projects range from 25 to 50% of total energy costs, depending on the building condition, energy sources and usage. Typically, for buildings of the same age and condition, larger institutional retrofits produce a higher percentage of savings than do smaller business and residential retrofits.

The costs and benefits of various types of ESCO contracts and fee structures need more research to identify which contract elements lead to the most equitable return for participating residents and businesses.

Urgent Need and Projected Future Potential for Energy Efficiency Program Expansion

Facing the threat of a serious heating winter heating emergency, this summer and fall, advocates and policy-makers worked to identify ways to expand energy efficiency resources to address the large unmet need for weatherization programs in Massachusetts and Greater Boston. Although no precise estimates of unmet weatherization needs were developed, LEAN advocates noted that they consistently have more demand than they can meet for scarce subsidized energy efficiency retrofits. Further, only of a quarter of the home audits MassSAVE carries out result in retrofits, even though improvements are indicated for virtually all of them. We also know that that more than one-third of all Massachusetts homes, 1 billion

of them, are heated by oil, and that these are generally older homes with inefficient heating systems and often located in low-income urban neighborhoods.⁷⁹

Governor Patrick and legislative leaders adopted recommendations from a Winter Energy Costs Task Force for additional state investment in energy efficiency and weatherization. The task force approved a \$5.9 million (19 percent) expansion of residential efficiency investments in the fourth quarter of 2008 by expanding MassSAVE electric and natural gas utility energy efficiency programs. \$3 million of the \$13.3 million generated by the first Regional Greenhouse Gas Initiative RGGI allowance auction has been set aside to pay for this expansion, and a second auction is scheduled for December 17. The Governor also approved the allocation of an additional \$4 million from the auction to replace low-income households’ old and broken heating systems.

In 2009, the Commonwealth plans to *double* investment in energy efficiency programs. Utility companies have been instructed to incorporate this expansion in plans they submit to the Department of Public Utilities. The expansion should be paid for in part by the proceeds of RGGI auctions. Additional proposals have been offered, including a plan to launch a \$1 Billion state revolving fund for energy efficiency programs, possibly funded in part by pension funds, to pay up to \$5,000 per house to retrofit 200,000 homes a year; and another to establish a state Energy Alliance.

Massachusetts and ISO New England Policies Will Drive Even Greater Expansion

The McKinsey and Company study analyzed why most energy efficiency savings are not yet being captured and suggested that “strong policy support and private sector innovation will be needed to address fundamental market barriers. Policy supports might consist of standards, mandates, and/or incentives to promote carbon efficient buildings, appliances and vehicles.”⁸⁰

Massachusetts’ green policy reforms and ISO New England’s demand response policies, which pay for ‘negawatts’ or conserved energy, have established a set of policy standards, mandates and incentives that are realigning energy incentives to make more energy efficiency work not only possible but mandatory.⁸¹ The 2008 green legislation addressed the components that Environment Northeast identified as necessary for this transition:

- ◆ **Reforming utility planning and procurement so that utilities are required to procure all energy efficiency and conservation resources that are available at or below the price bid for conventional supply or capacity.** As a general rule, future capacity and energy needs must be accomplished at the least cost to the economy and environment.⁸²
- ◆ **Establishing minimum investment levels for energy efficiency programs,** within both a new agency division dedicated to energy efficiency and a new oversight board that includes consumer and environmental stakeholders.
- ◆ **Aligning utility revenue incentives with promotion of efficiency** by decoupling revenues

from sales through the adoption of a full sales adjustment clause. (The present formula sends the wrong economic signal to the utilities)

- ◆ **Investing in the increased energy efficiency of public buildings and operations.** The Green Communities Act will direct funding and technical assistance to municipalities to expand this kind of public sector greening.

With the electric and gas utilities mandated to invest in all energy efficiency resources that are cost effective — or cheaper than new energy supply — the question, then is: how big might these potential energy efficiency investments be? This question has not yet been answered, but we know that it will be large. Sam Krasnow of Environment Northeast reported that by carrying out a study of Energy Efficiency Technical Potential or an ‘Opportunity Strategy’ study, our neighboring state of Rhode Island estimated that they could quintuple their investment in energy efficiency. By doing so, the cost of energy efficiency measures would rise less than 1 cent per kWh — it would still be under 4 cents per kWh. Energy supply still costs 10 cents per kWh.⁸³ In doubling its ratepayer and state investments in energy efficiency this coming year, Massachusetts will be tapping just a fraction of its enormous potential to capture all the savings that are possible from energy efficiency investment.

Making It Happen: Taking advantage of this Unprecedented Opportunity

In the last two chapters, we demonstrated that the Greater Boston region has an opportunity to make a ‘win-win’ investment in increasing energy efficiency building weatherization on a very large scale. This is not only the most cost-effective investment we can make to reduce greenhouse gas emissions and climate crisis; it is also an opportunity to address the heating cost crisis long-term and help people stay in their homes, and an opportunity to put residents to work in jobs that cannot be easily outsourced. Energy efficiency savings also free up funds and buy time to invest in more expensive renewable energy solutions. The science and the economics of energy efficiency create an unprecedented opportunity. The green legislation that Massachusetts passed in 2008 sets the stage for a major expansion of energy efficiency work. Further, we are starting with a strong network of energy efficiency programs and resources that can be built upon to become even stronger and more efficient.

One set of challenges we face is administrative: making all the parts and players in a very complex program funding and delivery system act in concert to take advantage of this opportunity. Another set of challenges revolves around image: in our high-tech, brainy region, this simpler solution does not seem as enticing to many as those complex solutions brewing in MIT labs. Yet another set of challenges involves making the most of this opportunity: putting into place the policies that will promote the growth of good green jobs for local residents, as well as priority access for low-income communities to energy efficiency resources. Chapter 4 will provide an overview of Massachusetts’ current ‘green economy’ and will ex-

amine in greater depth the job opportunities that a significant expansion of investment in the energy efficiency sector could present. We will also consider what is needed to ensure that green jobs become ‘green collar’, good jobs that are accessible to local un- and underemployed residents.

Energy efficiency savings free up funds and buy time to invest in more expensive renewable energy solutions.

CHAPTER 4

The Potential for Expanding Energy Efficiency Jobs in Our Region

In this chapter, we will provide an overview of Massachusetts' current green economy and will examine in greater depth the job opportunities that a significant expansion of investment in the energy efficiency sector could present.

The Green Economy, Green Jobs & Prospects for Growth

An October 2008 study produced by the US Conference of Mayors and the Mayors' Climate Protection Center defined the "Green Economy" as "that part of economic activity which is devoted to the reduction of fossil fuels, the increase of energy efficiency, and the curtailment of greenhouse gas emissions."⁸⁴ They also found that changes in the U.S. economy that will be necessary to reduce energy consumption and GHG emissions will drive the growth of large numbers of green jobs — which we will consider here to be jobs whose primary activity addresses fossil fuel reduction, energy efficiency and GHG emissions reduction — potentially making it the fastest growing sector of the U.S. economy. The study finds that if the country undertakes a national effort to cut energy use and emissions by 35% by 2030, 4.2 million new green jobs will be created, providing the country with a 10% new job growth over the next thirty years.

Green-Collar Jobs/Green Jobs This term refers to family-supporting jobs that contribute significantly to preserving or enhancing environmental quality. Defined more by industry than occupation, they reside primarily in the sectors that make up the clean energy economy — efficiency, renewables, alternative transportation, and fuels. Most green-collar jobs are and will be middle-skill jobs requiring more than high school, but less than a four-year degree. . . publicly funded workforce development projects should promote green-collar jobs accessible to those with less than a BA. These jobs represent the bulk of employer demand and range from entry-level to high-wage jobs in a multitude of industries. Within these industries, green-collar work includes building, construction, assembly, installation, operation, maintenance, transportation, and manufacturing. Because the bulk of green collar jobs would involve transitioning existing infrastructure to greater sustainability, they cannot easily be outsourced.⁸⁵

The US Mayors' report calculated the growth prospects for green jobs as the US makes a transition to cleaner and more efficient energy. Given the best available assumptions for "the future of increased energy efficiency for residential and commercial buildings" among other green job growth sectors, it predicts a job growth of 81,000 residential and commercial retrofitting jobs by 2018 and predicts job growth will continue at that level through 2038.⁸⁶

The same report found that most current green jobs are located in metropolitan areas. Boston was ranked 5th highest among the Top Ten Metropolitan Areas for Green Jobs in 2006, with 1 in every 38 of the country's green jobs currently located in Greater Boston, despite the fact that most are located outside the city of Boston.⁸⁷ If growth projections are realized, by 2030, the Boston region will have an even larger proportion of the nation's green jobs — close to 1 in every 5. The US Mayor's report projected that all green jobs in the metro Boston area (including but not limited to energy efficiency jobs) will grow from 19,799 in 2006 to 156,660 by 2030. This projection for growth is supported by other research that found the clean energy sector — including renewable energy and energy efficiency — has become the tenth largest and fastest growing industry cluster in Massachusetts.⁸⁸

Current and potential Green Jobs :⁸⁹

	Existing 2006 Green Jobs		Projected Green Jobs 2028-2030	
	# of jobs	% of US total	# of jobs	% of US total
Boston-Cambridge-Quincy MA-NH Metro (MSA)	19,799	2.6%	156,660	4.5%
US Total	751,051	100%	3,481,000*	100%

* The US projection is through 2028, while the Boston region projection is through 2030

Rising energy costs and growing public awareness could increase demand for residential retrofitting ten-fold in the next two years. The rate at which jobs will be created will depend on public and private investments in energy efficiency programs.

Energy Efficiency has Enormous Job Growth Potential

Although the US Mayor's study was not able to break out jobs by sector for each metro region, and we have not yet been able to finalize regional job projections, we do have some estimates for the number of existing energy efficiency jobs statewide. A 2006 study by the Massachusetts Technology Collaborative found that, in 2006, energy efficiency firms supplied almost 6,300 jobs in Massachusetts, or 44% of all clean energy sector jobs.⁹⁰ A 2007 state report on the outcome and impact of Massachusetts utility ratepayer-funded efficiency programs found that from 2003 to 2005, these programs directly employed 4,374 workers and created over 11,000 full-time job-years.⁹¹ They noted that energy efficiency programs stimulate the local economy in other ways as well. For example, lower electricity costs give consumers more income to spend and also allow businesses to expand hiring.

Projections for Expansion of Energy Efficiency Jobs

A 2007 survey of more than 300 clean energy firms projected 25% growth for energy efficiency firms over the next year.⁹² This translates into an estimated growth of 1,575 new energy efficiency jobs statewide, about two-thirds of which will be in construction. This prediction does not

take into account the much larger increases that will be driven by the 2008 Massachusetts green legislation, increased federal investment in low-income weatherization, and predicted green pieces of an early 2009 federal stimulus bill. In addition, the city of Cambridge and perhaps others will be attempting to implement a hundreds of millions of dollars in energy efficiency improvements over the next five to seven years through energy alliance initiatives. The Commonwealth could also potentially launch a state energy initiative to increase investment in energy efficiency. A recent study from the Political Economy Research Institute at the University of Massachusetts, carried out in conjunction with the Center for American Progress, estimated that a total investment of \$2.4 billion nationally through a green recovery program would direct just under \$1 billion (\$939 million), or about 40% of the total investment, to energy efficient building retrofits.⁹³

All of these initiatives have the potential to dramatically increase demand for commercial and residential building energy efficiency services and products. The City of Boston has predicted that an investment of \$300-\$500 million in retrofit work through a Boston Energy Alliance would create 2,500 new jobs. Experts interviewed for this report have estimated that even without a federal stimulus

investment or energy alliances, or changes in state legislation, rising energy costs and growing public awareness could increase demand for residential retrofiting ten-fold in the next two years.⁹⁴ The full job creation potential and the rate at which jobs are created will, then, depend on the scope of our public and private investments in expanding existing energy efficiency programs and in creating new ones.

Estimating the Number of Jobs That Could Be Created

There are several ways to estimate how many jobs will be created by new investments in building retrofits. For example, the U.S. Mayor's report examined job creation potential per kilowatt hour of energy saved (1 gigawatt is 1 million kilo watts).⁹⁵ This report will focus on the most frequently used method — projections of jobs likely to be created per dollar invested.

Job creation estimates for building audits and retrofit construction range from 6.5 to 11 jobs per \$1 million invested in energy efficiency building retrofits. And, more sources lean to the higher end of jobs created. Additional building and operations job creation and retention numbers vary widely, depending on the type of building. A 2004 Apollo Alliance paper counted roughly ten jobs per \$1 million invested in high-performance buildings. A recent study by the Center On Wisconsin Strategy (COWS) and the University of Florida's Powell Center for Construction and Environment found that every \$1 million invested in efficiency retrofits generates eight to eleven on-site jobs, plus additional indirect support jobs.⁹⁶

National models for estimating job creation rates on typical Energy Service Performance Contracting (ESPC) projections are lower, showing that a typical \$10 million ESPC project di-

rectly creates about 65 jobs: 20 ESCO jobs (technical, engineering and management) and 40 subcontracted jobs (labor and trades). Additional manufacturing jobs are created through the equipment purchased for the retrofits.⁹⁷

The PERI/CAP project that issued the study cited above is working to break out its state estimates more finely. In the meantime, we can make a rough projection that the investment of \$939 million 'green recovery' dollars in energy efficiency building retrofits would generate approximately 16,587 jobs statewide. Given that the Greater Boston region makes up about 70% of the Commonwealth's population and labor force and the city of Boston makes up about 9%, we can estimate that of these 16,587 jobs:

- ◆ At least 11,610 would be in the Boston-Quincy MA-NH metro region
- ◆ At least 1,490 would be in the City of Boston.⁹⁸

Beyond job creation estimates based on jobs-per-dollar invested or jobs-per-kilowatt hour saved, there is a need to develop job projection data that is grounded in the experience, based on the labor content of recent residential and commercial retrofit projects in Greater Boston.

What Type of Jobs Will Investment in Energy Efficiency Create?

The New York City-based group Urban Agenda has provided a strong framework for analyzing jobs in the energy efficiency retrofit sector. This sector is likely to be the largest source of new green collar jobs in both the Boston and New York regions. Urban Agenda identifies three strategies for increasing energy efficiency in existing buildings, each of which has its own green collar job opportunities — that is, good jobs that pay family sustaining wages, often require less than

The investment of \$939 million "green recovery" dollars in energy efficiency building retrofits would generate approximately 16,587 jobs statewide. At least 1,490 would be in the City of Boston.

The vast majority of new jobs that will be created in energy efficiency building retrofits are not a new type of specialized work.

a four-year college degree, and offer opportunities for union members. The three strategies are:

1. Energy Efficiency Upgrades – in three stages: Auditing/Assessment; Pre-Construction; Construction
2. Efficient Building Operations
3. Energy Management (ESCOs and beyond)⁹⁹

Urban Agenda reports that while energy efficiency projects and jobs are diverse — both residential and commercial, and of all sizes — “in general, increasing efficiency in existing buildings involves some or all of the following types of workers:

- Engineers;
- Designers;
- Building trades and construction professionals;
- Building maintenance and operations staff;
- IT (information technology) specialists.”¹⁰⁰

Increasing demand for energy efficiency retrofitting can be expected to generate new employment opportunities that include: direct employment in occupations working on buildings, and indirect employment in occupations supporting the building work. We include here only energy efficiency retrofit work on existing buildings, and not new construction.

Analysts agree that the vast majority of new jobs that will be created in energy efficiency building retrofits are in existing fields and are not a new type of specialized work. The U.S. Mayors’ report emphasized this point:

many of the workers required to complete the renovation work and installations of efficiency upgrades fall under the classifications of the traditional construction trades that comprise this category. . . . We should not expect to see a new indus-

try populated by a new breed of ‘green construction workers.’¹⁰¹

Both this report and the PERI/CAP report note that similar types of contractors are bidding and working on both green and conventional construction jobs. They project that contractors and construction workers will generally adapt to the growing demand for energy efficiency building retrofit by learning new skills and incorporating new technologies and materials. Building auditing, however, “is a relatively new field with emerging titles, qualifications, and career pathways.”¹⁰²

Energy efficiency building retrofitting varies by type and age of building, but the work usually includes:

- ◆ Auditing: assessing building energy use and recommending cost-effective upgrades;
- ◆ HVAC: replacing heating and cooling systems and improving indoor air circulation systems (including duct work, blowers, and fans);
- ◆ Electrical: replacing lighting fixtures and light bulbs, installing light sensors and thermostat controls;
- ◆ Insulation and air sealing: adding or replacing insulation (including insulating pipes);
- ◆ Windows and Doors: replacing windows with insulated glass, caulking around windows, replacing doors, and adding sweeps to minimize heating and cooling loss;
- ◆ Plumbing: replacing toilets and faucets to minimize water use;
- ◆ Other: replacing appliances with Energy Star energy efficient appliances.¹⁰³

In larger buildings, upgrades may also include:

- Installing renewable energy systems (solar photovoltaic power, solar heating, and geothermal systems)
- Installing new roofs (including green roofs, solar roofs or cool roofs)

These workers will be employed in a complex web of direct, contract and sub-contracted work for construction firms, utilities and energy services companies.

The chart below was created by researchers at COWS and the University of Florida using a model that breaks out *directly-created* jobs by type and level. It examines the types of jobs created from a \$1 million investment in energy efficiency retrofitting. The first chart reports what proportions of different type of labor go into a 'typical' single family residential retrofit. It is important to remember that this will vary not only by region and type of building, but also by what kinds of installations our local retrofits

prioritize. The second chart shows what percentage of the jobs created in this sample retrofit would be entry-level, skilled and supervisory. More examples are available in Appendix E and also from COWS.

Of the 11 full-time, year-round jobs that a \$1 million investment would create, almost one-third would be entry-level, almost two-thirds would be skilled or semi-skilled and only one in fourteen would be supervisory.

Indirect Job Growth: Occupations of those INDIRECTLY employed in supporting building retrofits include engineers, researchers and consultants, accountants, lawyers, office clerks, human resource managers, cashiers, and retail sales people. The US Mayors' report projects that for every two direct jobs that are created, one indirect job in engineering, legal, research and consulting will be created. In addition, increased demand for green retrofitting work will also stimulate demand for green building materials, creating additional opportunities for new jobs in these manufacturing industries.¹⁰⁵

Labor Content in energy efficiency retrofits¹⁰⁴

Example 1: Single family residential

Investment ratio (derived from ECW reports)

Insulation	54.2%
HVAC/plumbing	15.0%
Air sealing	10.8%
Appliances /CFLs	20.0%

Job-years from \$1 million investment

	Supervisor	Skilled/semi-skilled	Entry level	Total
Lighting	0.2	1.4	0.7	2.3
HVAC	0.5	4.5	2	7
Building Envelope	0.1	1	0.5	1.6
Total	0.8	6.9	3.2	11.0

The occupations that will see DIRECT on-site new job opportunities from growth in energy efficiency retrofits include:

- ◆ Energy Auditors / Diagnosticians
- ◆ Electricians
- ◆ Heating/Air Conditioning Installers & technicians
- ◆ Carpenters & Carpenters Helpers
- ◆ Construction Equipment Operators
- ◆ Plumbers
- ◆ Roofers
- ◆ Laborers
- ◆ Glaziers
- ◆ Insulation Workers
- ◆ Industrial Truck Drivers
- ◆ Construction Managers
- ◆ Building Inspectors

From Green Jobs to “Green Collar Jobs”: Making Energy Efficiency Jobs GOOD Jobs & Providing Opportunities Local Residents

The energy efficiency job opportunities that we foresee for the Greater Boston region can address a serious and growing need for good jobs that will allow residents to meet the high cost of living in this region. The Greater Boston region has become a place with intense concentrations of poverty and equally dramatic concentrations of wealth. In 2007, the City of Boston had the third largest wealth gap among the largest 50 US cities, and our distribution of income is growing more unequal every year. The city’s highest income households (the top 20%) claimed more than half of Boston’s total income (56%), and this share is increasing, up from 54% last year. The lowest income households received a small 2% sliver of the income pie, the same proportion as last year.

In 2007, the last year of an economic upswing, one out of five Boston individuals and one in three families con-

tinued to live below the federal poverty threshold -- a number that has grown worse with the 2008 economic crisis. Almost twice that many or 38% of Boston residents live in economic hardship, defined as 200% of poverty.¹⁰⁶ Residents of Latino, Asian and African-American heritage are much more likely to live in poverty than White residents. The city of Boston’s poverty rates continue to be much higher than other parts of the Greater Boston region:

Low-wage jobs are growing much faster than good jobs in our region. This has resulted in high rates of poverty, and homelessness among Low-wage jobs are growing much faster than good jobs in our region. This has resulted in high rates of poverty, and homelessness among people who work. Almost half of all adults living in poverty worked full or part-time jobs in 2007. Even though unemployment in the Greater Boston region was 4.6% in October 2008, which falls below the statewide average, Boston’s unemployment rate is 5.0% and Chelsea’s is 6.7%. And within Boston, unemployment is still uneven across neighborhoods and ethnic groups: unemployment in the

Geography	Poverty Rate (for individuals)*	Child Poverty Rate (related)*
City of Boston	20.4%	30.9%
Suffolk County	19.7%	29.0%
Boston-Quincy MA Metropolitan Division	11.3%	14.3%
Boston-Cambridge -Quincy MA/NH Metropolitan Statistical Area	9.2%	11.1%
Middlesex County	6.8%	7.7%
Commonwealth of Massachusetts	9.9%	12.6%

Source: Community Labor United, “Earnings, Poverty and Income Inequality in the City of Boston, August 2008. Data show 2007 poverty rates reported by the US Census American Community Survey

Roxbury neighborhood is 60% higher than the city average. Among young people in Boston, a majority of whom are African American, Latino or Asian American, unemployment rates are among the highest in the nation and climbing, even for those who have successfully completed high school. Only 40% of non-college-enrolled high school graduates from the class of 2005-2006 were employed a year later, 10% fewer than the class of 1999-2000.¹⁰⁷

What Makes a Green Collar Job a Good Job?

Job creation in the energy efficiency sector can expand our economy, and it can help rebalance our region's economy. If this work is regulated with progressive policies it could ensure the creation of living wage jobs with benefits, career ladders and pathways that connect people in lower-income communities and communities of color with new careers. Work in this sector could create jobs that will help our communities become sustainable by drawing in the young people, people of color and lower-income residents who have been left behind by other kinds of economic development.

Our region has a greatly diminished base of blue-collar manufacturing and construction jobs. These jobs have traditionally been jobs that paid living wages with family-sustaining benefits. They also had apprenticeship programs and other structured training opportunities. By enacting job standards and training opportunities, energy efficiency jobs could become good jobs, green collar jobs, which pay family-sustaining wages and offer benefits and training opportunities. We include in this not only auditing and construction jobs, but also building operations and maintenance jobs that will necessarily go green, as well as manufacturing jobs that could be created to provide products for retro-

fitting. In addition to ensuring that these jobs pay good wages, benefits and offer training opportunities, it is important to ensure that these jobs protect the health and safety of the workers and the communities in which they operate.



Elements of Green Collar Jobs

Green For All, a national organization dedicated to building an inclusive green economy strong enough to lift people out of poverty, outlines a number of elements that belong to a 'green collar job.'

- 1) Green collar jobs are good jobs that regrow the middle class. Like blue-collar jobs, green collar jobs pay family wages and provide opportunities for advancement along a career track of increasing skills and wages.
- 2) Green collar jobs provide pathways out of poverty. Most green collar jobs are middle-skill jobs requiring more education than high school, but less than a four-year degree -- and are well within reach for lower-skilled and low-income workers as long as they have access to effective training programs and appropriate supports.
- 3) Green collar jobs tend to be local jobs. Much of the work we have to do to green our economy involves transforming the places that we live and work and the way we get around. These jobs are difficult or impossible to offshore.
- 4) And by the way ... green collar jobs save Planet Earth. The 'green' in green collar is about preserving and enhancing environmental quality.¹⁰⁶

The coming year will be critical. Investment could easily generate primarily 'low road' jobs with low wages, few benefits and few training opportunities.

We seek to establish living wage jobs with benefits, career ladders and pathways that connect people in lower-income communities of color with new careers.

As we will discuss below and in Chapter 4, the new green economy will not simply spring to life, nor will its jobs automatically be good jobs that create opportunity for all. Greening with equity -- or Green Justice -- is not guaranteed. Indeed, our communities and workers run the risk of being left behind in the shift towards sustainability. If millions or even billions of dollars of public and public money are invested in energy efficiency retrofits in our region, they will generate thousands of new jobs and the coming year will be a critical year in developing the policy to regulate this expanding industry. This investment could easily generate primarily 'low road' jobs with low wages, few benefits and few training opportunities. Many energy efficiency jobs are the type of construction work that could easily fuel the misclassification of workers and the underground economy. Other workers could be hurt by the transition to green practices and a green economy, and a 'just transition' for these workers must be part of any green-collar jobs agenda.

We are advocating an equity or 'opportunity' agenda that joins together the broadening of opportunity with energy efficiency investments and green policies. With our 'opportunity agenda,' we seek to establish progressive policies to ensure the creation of healthy and safe jobs. These must be living wage jobs with benefits, career ladders and pathways that connect people in lower-income communities and communities of color with new careers, and provide just transitions for all affected workers. We must build equity into the energy efficiency opportunity, and we must address barriers to access that many lower-income residents and communities will face, including training, supports and career pathways.

This overview shows us that there are a substantial number of energy efficiency jobs that will be created that

have modest training requirements for entry. Jobs as laborers, insulators and air sealers require only short-term training that is largely offered as on-the-job training. Currently, much of this training is provided to existing contractors by materials and equipment manufacturers, and via existing construction apprenticeship programs. In Boston, a new program at Roxbury Community College and one at JFY Networks has begun to offer additional training opportunities to those who wish to enter the field.ⁱ There is as yet no local training program for energy auditors, although some efforts are underway to replicate the building analyst training and certification programs established in New York City by the Building Performance Institute.ⁱⁱ Labor management apprenticeship programs also offer the longer-term training required to enter other trades such as carpentry, plumbing, electrical, HVAC and sheet metal work that grow through energy efficiency investment.

The mix of less and more-skilled work involved in building retrofits is ideal for building career ladders. This potential is magnified by coordination between career opportunities in the residential and commercial sectors, working on small as well as large buildings. Urban Agenda notes that

Upgrades of smaller buildings, like 1–4 family homes, use basic techniques closely related to the skill sets many construction workers possess. . . . As a result, smaller building retrofits offer promising job opportunities for entry-level construction workers, and on-ramps to the growing efficiency industry.¹¹³

Community Labor United (CLU) has been examining the mix of union and non-union work in different types of retrofit fields, and across residential, commercial, industrial, institutional and municipal retrofit work on large and small buildings. Although we do

Jobs to Watch

The COWS 2008 *Greener Pathways* report identified Jobs to Watch. These are jobs that are projected to grow rapidly nationwide as the demand for energy efficiency retrofit work increases. They offered a 'Jobs at a Glance' chart that lists wage ranges and training requirements for these jobs. The chart below adapts the COWS information to include Massachusetts/Boston job projections and wage information.

General training requirements are defined as:

M = Moderate-term on-the-job training: Requires from one to twelve months of training, which typically occurs at the workplace.

L = Long-term on-the-job training: Requires more than one year of on-the-job training, or combined work experience and classroom instruction, and may include apprenticeships of up to five years.¹¹⁰

Occupation	Average Annual Wage for Full-Time Workers*	Average Hourly Wage all workers *	Massachusetts Prevailing Wage, Hourly **	Type of Training Required
Construction Laborers	\$49,410	\$23.75	\$41.85	M
Insulation workers; floor, ceiling and wall	\$37,330	\$17.95	\$50.63	M
Cement masons & concrete finishers	\$49,830	\$23.96	\$59.16	M
Hazardous materials removal workers	\$36,020	\$17.32	\$40.80	M
Carpenters	\$53,820	\$25.87	\$49.07	L
Plumbers, pipefitters & steamfitters	\$63,380	\$30.47	[\$57.50]	L
Electricians	\$63,380	\$28.75	[\$58.57]	L
Sheet metal workers	\$55,810	\$26.83	\$53.39	L
Heating, air conditioning & refrigeration mechanics & installers	\$53,450	\$25.70	[\$57.85]	L
Glaziers	\$40,960	\$19.69	\$50.06	L

Data sources: US Bureau of Labor Statistics May 2007 Metropolitan and Nonmetropolitan Area Occupational Employment and Wage Estimates, Boston-Cambridge-Quincy, MA NECTA Division. Occupational growth projections are from the Massachusetts Department of Labor and Workforce Development, Commonwealth of Massachusetts Employment Projections, MA Employment by Occupation and Education and Training, Current and Projected, 2014, pp. 15-16. Available at: http://lmi2.detma.org/lmi/pdf/MEP_by_occupation. Occupational training requirements are from the Bureau of Labor Statistics as analyzed by COWS in *Greener Pathways*.

* NOTE: wages reported in the second and third columns are for the entire workforce in our region, including union and non-union, part-time and full-time workers. Overall wages are much lower than Greater Boston union or prevailing wages for these occupations, since prevailing wages reflect negotiated union contract rates. The wages also reflect a mix of entry level and more senior workers.

** Prevailing wages are established by the Commonwealth of MA Department of Labor Division of Occupational Safety under the provisions of Mass. General Law, Chapter 149, Sections 26 to 27H. Wages reported here are for the City of Boston as of May 2007.

[] prevailing wages in brackets reflect outdated information and need to be updated to actual May 2007 prevailing wages. In most cases corrected wage rates will be slightly higher than those reported here, which are for 2006 rates.

not yet have definitive findings, we do know that:

- ◆ Very little residential retrofit work is carried out by union trades workers, and most of that is on larger projects;
- ◆ Commercial and institutional retrofit work have a small union presence, but that presence varies widely by the type of work and occupation;
- ◆ Municipal energy services contracts in Massachusetts should have a larger union presence since there is a prevailing wage requirement for retrofit work performed under these contracts.

CLU is also investigating the extent to which local residency hiring requirements have been enforced or local residents have been getting hired on commercial and residential energy efficiency projects. Indications are that very few Boston and other urban residents, including people of color, are among the existing energy efficiency workforce. We are also investigating options for local and community-owned businesses to take part in the new energy efficiency opportunities, including the feasibility of establishing a community and worker-owned energy services cooperative in Boston.

We share the COWS/Apollo Alliance's optimism about the potential for creating effective partnerships among community groups, labor unions, educators and policymakers:

Very few Boston and other urban residents, including people of color, are among the existing energy efficiency workforce.

The dual promise of environmental health and community prosperity can only be answered by green jobs and green job training at scale. But we should not start from scratch. The most efficient and effective way to prepare a green-collar workforce is to build on the existing foundation of state and local workforce development systems. More time should be spent embedding green skills training within current curricula, and less energy inventing new programs.

Beyond skills training, green jobs initiatives must address access and upward mobility. To help workers advance from unemployment, disconnection, or dead-end poverty-wage work into family-sustaining green jobs, states need to build and support career pathways. These pathways are not new ones, necessarily, but greener one — developed in collaboration with employers, workforce agencies, community organizations, labor unions, and community and technical colleges.

The Green Justice Coalition is supporting efforts to promote coordination among community groups, labor unions, workforce development providers and local employers, as they create and feed into accessible career ladders and good jobs in energy efficiency retrofit work. An example of the kinds of career ladders we would like to see was offered by Strategic Concepts in Organizing and Policy Education's (SCOPE) April 2008 publication *A Greener Future for Los Angeles: Principles to Ensure an Equitable Green Economy*.¹¹⁴

EXAMPLES OF GREEN CAREER LADDERS IN THE CONSTRUCTION & PUBLIC SECTORS

**GREEN BUILDING TRADES
WORKER**

Green Skills upgrade training
Union-based Training Programs:
Green industry-specific skills training

JOURNEYMAN

APPRENTICESHIP TRAINING
Union-based Training Programs:
Specialty trades training

APPRENTICE

Basic Skills Pre-Apprenticeship Training
Community colleges: Basic Math, English,
Training Readiness, Support Services.
Career Counseling. Early Exposure to job
Sites, Safety Training, Benefits Specialists to
Maintain Public Benefit income during Training

**GREEN PUBLIC SECTOR
WORKER**

Green Skills upgrade training
Union-based Training Programs:
Green industry-specific skills training

PERMANENT CITY WORKER

ON-THE-JOB-TRAINING
Joint Labor-Management Program
Basic skills support services career
counseling prep for civil service exam

VOCATIONAL WORKER

On-The-Job Training
Joint labor-management program. Immediate
employment, union membership and benefits,
support services, mentorship, case management,
integrated classroom training for basic skills
upgrade

UNEMPLOYED

Beyond Audits and Retrofits: Supporting Other Energy Efficiency Jobs

While this report has focused on identifying the job opportunities that will be created by expanding investment in Greater Boston's energy efficiency building retrofitting, it is important to examine other key energy efficiency jobs and the need to support the development of those as 'good jobs.'

Supporting Efforts to Upgrade Building Operations Jobs

After auditing and construction work involved in building retrofits is completed, building operations is critical for getting the maximum energy efficiency value from the retrofits. Improved building operations and maintenance can deliver between 5% and 20% lower annual utility bills and these improvements can be achieved at costs that are paid back in less than two years.¹¹⁵

Like retrofitting work, green building operations work is not inherently new work. Urban Agenda identified a need to familiarize facilities maintenance staff with new energy efficient systems and products, but concluded that "energy-efficient building operation is grounded in the existing knowledge base of building maintenance and operations personnel.¹¹⁶ New training will be required, but it should be developed and led by unions and workers already in this field. Environment Northeast recommends that in order for energy efficient operations and maintenance to be widely practiced, plans should be developed to bring such training "to facilities managers in 100% of publicly owned or operated buildings by the year 2010 and 50% of all privately owned or operated commercial, institutional or industrial buildings by 2010."¹¹⁷

Building on the years of work by SEIU Local 615, Boston's building services unions, to ensure building maintenance work is safe and fairly paid, new green skills requirements and training needs will create additional opportunities for many building operations jobs to increase wages and to add career ladders that reflect the additional skills needed for energy efficiency maintenance. There is currently the risk that green policies applied without consideration of the consequences for building maintenance and operations workers will imperil long-term efforts to improve job quality, wages and benefits. For example, building operations schedules that limit nighttime lighting are not a step forward if contractors use them to block progress towards janitorial jobs becoming full-time jobs with benefits.

Energy Efficiency Retrofits with Longer Pay-Back Periods that Support Renewable Energy Installations

Although the building retrofits that have the shortest payback periods focus on lighting and the building shell, retrofitting also creates opportunities for deeper energy efficiency upgrades such as installing solar photovoltaics, wind and geothermal sources of renewable energy, particularly on multifamily residences, schools and larger businesses. State and federal tax credits for these installations have made them more affordable and reduced the payback period required. With tax credits attached to its installation, solar hot water installation is rapidly becoming an affordable option for 1-4 unit homes as well. Dorchester-based IBEW Local 103 is a local and national leader in training its workforce to carry out solar and wind-based renewable energy installations.

Making this Opportunity All it Can Be

In the next chapter, we will describe why our commitment to equity, our ‘opportunity agenda’ is so critical to making the most of Greater Boston’s energy efficiency opportunity. We will present our case for partnership: our belief that, with a strategic partnership between community, labor, policymakers, environmentalists, faith-based groups and progressive business, greatly expanded investment in energy efficiency could generate good jobs that could inspire young people to hope for a secure future. This work could also lift families out of poverty, while saving energy costs and reducing GHG emissions.

CONCLUSION

MAXIMIZING THE ENERGY EFFICIENCY OPPORTUNITY THROUGH A POLICY AGENDA ROOTED IN EQUITY

A Bottom Line for Success: Building Community Capacity and Ownership for Greening in Boston and Beyond

Across the country, enthusiasm has also been growing over the green economy's potential for advancing environmental and economic justice. The Green Justice Coalition believes that equity must be part of truly sustainable solutions to the climate crisis. This chapter will discuss why energy efficiency investments and green policies must address historic injustices as well as broaden opportunities for those who have been left behind.¹¹⁸ In addition, the chapter will detail examples of how other cities and regions are advancing a green justice agenda in five key policy areas.

The Green Justice Solution is a Win-Win Partnership to make this opportunity all that it can be for our communities and our region. Together we can:

1. **Expand public and private investment in energy efficiency** to protect the planet, to make our communities healthier, and to keep residents in their homes;
2. **Jumpstart an economic recovery** by ensuring a fair share of the green jobs are accessible to un- and underemployed residents in our communities, and by targeting a good portion of energy efficiency programs and resources to the communities that have born the largest environmental and economic burdens;

3. **Repair our increasingly unequal regional economy with an agenda rooted in equity**, enacting standards that make new and existing green jobs into good jobs that can sustain families and communities, with livable wages and career pathways including accessible and effective green training.

In addition to the moral imperative, prioritizing lower-income communities and communities of color in the green transition is also a pragmatic bottom line for success. To avoid the dramatic climate, health and economic consequences triggered by continued global warming, carbon emissions must be reduced by at least 10%-25% by 2020, and 80% by 2050.¹¹⁹ To conserve energy on this scale, climate change efforts must reach deep into our communities and broadly engage a majority of residents and workers. Small pockets of greening cannot meet these goals, however smart or dedicated the proponents.

We must start from the question: "What does it take for a community to develop the capacity to green its own economy and environment?" Although the public sector and businesses have major roles to play in creating new energy and efficiency opportunities, greening our communities also requires strong involvement from families, neighborhoods, congregations and unions.

Equity must be part of truly sustainable solutions to the climate crisis.

Why Must Equity Be At the Core of Any Climate Change Agenda?

Because we're all in this together.

Scientists agree that to stop and then reverse global warming, the United States must cut its current fossil fuel consumption/GHG emissions by 80% in less than fifty years. The challenge of an 80% reduction is unimaginably huge. Everyone in our society, every household and community, will have to participate in reaching that goal. If working class communities and communities of color, which are now the majority of Boston's population, do not receive the resources and support they need to green their own communities, we will miss our goal by a very wide margin. As a result, all of us, we and our children, will suffer the consequences.

Because the 'green transition' will fix structural flaws in our regional economy.

The erosion of manufacturing jobs over the past several decades has taken the center out of our regional economy and left it permanently fragile. Our recessions are deep, our recoveries are weak, and our 'two Americas' job market increasingly fails to provide employment for many new job seekers. Any major public investment must confront our economy's structural weaknesses and implement policies that fix them. A green transition that includes equity at its core can jumpstart the creation of new jobs and industries that will permanently strengthen the economy. This will benefit all workers, investors and businesses in the region.

Because we're not all equally responsible for the current climate crisis.

While we all contribute in some way to environmental destruction and climate change, the wealthy contribute more than the poor and working classes. The average suburban house-

hold in Greater Boston buys 85% more gas and uses 20% more electricity than city households.

Because lower-income communities and communities of color have been paying a higher price.

Historically, lower-income communities and communities of color have borne the brunt of our economy's unsustainable environmental practices, while benefiting the least from the vast wealth generated. A 2005 study found that Massachusetts' minority populations "live each day with substantially greater risk of exposure to environmental health hazards than white communities." A Massachusetts resident of color is 39 times more likely than a white person to live an environmentally-burdened community.¹²⁰ More than two-thirds of Boston's solid waste facilities are in Roxbury and Dorchester, two of the city's most diverse and lowest income neighborhoods. Roxbury residents also suffer from high concentrations of diesel pollution and the highest asthma hospitalization rates in Massachusetts. Low-income families also pay a higher proportion of their income for energy than higher income families do.¹²¹

Because inequality is at its highest level in decades, and growing.

This city and region have become a place with intense concentrations of poverty and equally dramatic concentrations of wealth. In 2007, the City of Boston was the third most unequal among the 50 largest US cities, and it is daily growing more unequal. The city's highest income households claimed more than half of Boston's total income (56%), while the lowest income households received a meager 2% sliver. Even before the current recession, one in five Boston families and one in three children lived in extreme poverty. Latino, Asian and African-American residents are much more likely to live in poverty than



Without strong advocacy and organizing, energy efficiency investment could easily generate primarily 'low road' jobs. In contrast, with our partnerships we can build a green road to high job quality, high safety standards, and opportunities for union membership.

White residents, and City residents are twice as likely to live in poverty as others in the region. Low-wage jobs are growing much faster than good jobs in Greater Boston, resulting in widespread poverty and homelessness. Almost half of all adults living in poverty worked full or part-time jobs in 2007.¹²² And, unemployment rates for Boston's young people are among the highest in the nation and climbing, even for high school graduates.¹²³

Because our communities haven't always benefited from growth and development, poor people and people of color must lead the Green Wave

Lower income communities and communities of color must lead the way towards a green, sustainable future, because we have no other choice. Our communities and working class people in general, run the risk of being left behind in the shift towards sustainability. We cannot expect that those who have benefited so much from the current system will fix the problems in a way that will benefit us. Despite tremendous odds, our communities have resisted environmental injustices and pioneered innovative local solutions with very few resources. This gives us hope for finding a green justice solution to address the interconnected economic, environmental and social crises that people suffer from every day. Greening with equity is not guaranteed, but there is hope that the Green Justice partnerships we forge here will help us take our place at the tables where decisions about the green economy are being made. We believe that these partnerships will help us optimize our communities' access to energy efficiency programs, information, resources, and business opportunities.

Because we will have to work to make new green jobs good jobs

If millions or even billions of dollars of public and private money are in-

vested in energy efficiency retrofits in our region, this will generate thousands of new jobs. If so, the coming year will be critical in developing the policy to regulate this expanding industry. The jobs this generates, however, will not automatically be good jobs. Without strong advocacy and organizing, energy efficiency investment could easily generate primarily 'low road' jobs — with low wages, few benefits and few training opportunities. "Green" industries such as recycling have already taken the low road, keeping employees in low-paying, hazardous, dead-end jobs. Many energy efficiency jobs could follow the same low road to misclassification and the underground economy. In contrast, with our partnerships we can build a green road to high job quality, high safety standards, and opportunities for union membership.

Expanding the Partnership to Policymakers and Green Business

The Green Justice Coalition has brought together many different communities and sectors to educate each other regarding what is at stake in the transition to a greener economy, and what we need to do to realize the historic opportunity of energy efficiency. We are reaching out, further, to public officials in Boston and surrounding municipalities, and to the state administration and the legislature. We are also reaching out to utility companies, energy services companies, clean energy leaders and other green businesses. We are inviting policymakers and the green sector to join with us to help make resources available to support our communities as they build their ownership and their capacity to be at the front of this green transition. We believe that these partnerships will generate a range of successful policies and programs, as we expand our collective capacity to make a successful green transition here.

Five Elements of an Equitable and Sustainable Green Policy Agenda

To conclude this report, we will offer a broad outline of the kinds of policies that we see as critical to maximizing the Energy Efficiency Opportunity. We see this as both a strategy to protect our region and the rest of the planet from climate crisis as well as a prudent long-term strategy to rebuild our economy in a sustainable way. We will not attempt to set forth a comprehensive policy proposal since we know that the best solutions will grow out of our expanded partnerships. Our equity policy agenda outlines the types of initiatives we need to implement in order to create safe, high-wage jobs with benefits and access to union membership. These must be policies rooted in equity ensure the development of community training programs, mentoring and other support systems that are critical to build ‘green pathways out of poverty.’¹²⁴ In coming months, the Green Justice Coalition will convene meetings of leaders from all of our coalition sectors to discuss each of these elements with state and city policy makers to see which will be the best fit for our constituents and our region.

Our Green Justice Coalition is not alone in working to advance an equitable green policy agenda. Our coalition members bring to the table the wisdom and experience of a broad range of social movements, including environmental justice, labor, community, and workforce development. In addition, the Green Justice Coalition has been working with — and is now part of — the national Apollo Alliance. The Apollo Alliance has five-year track record of building coalitions of business, labor, environmental, and community leaders to work together to catalyze a clean energy revolution in America as dramatic as the successful Apollo space program that put a man on the moon in fewer than ten years.

With the Green Justice Coalition now a part of the Apollo Alliance, Apollo coalitions are working in ten states and five cities to promote policy change. Apollo brings a wealth of policy experience and knowledge. It has helped gain approval for:

- ◆ Renewable energy standards in Oregon, Washington, Colorado, Hawaii, and Wisconsin;
- ◆ Renewable fuels standards in Washington and Oregon;
- ◆ Appliance efficiency standards in Washington, Oregon and Vermont;
- ◆ Building retrofit programs in New York City, Los Angeles, Colorado, and Milwaukee;
- ◆ Climate change legislation in California and Vermont;
- ◆ New clean energy funds and/or tax credits in Oregon, Washington, Colorado, Wisconsin and New York City;
- ◆ Green collar job training programs in Oakland, San Francisco and Los Angeles.¹²⁵

For each of the five broad elements in our green policy agenda, we will offer a few examples of efforts in other cities that have made exciting progress and can inspire us.

We need to enact and implement strong policies in the following areas:

1. Include community voices in planning and oversight of energy efficiency investments and programs. The Green Justice Coalition believes that a broad constituency of those affected by green policies and the green economy must be meaningfully represented on the committees, task forces and other state and municipal policy bodies that are creating and implementing policies on our region’s energy efficiency opportunities. We are already in the classrooms where green job skills are taught; on the job site building, retrofitting and maintaining green buildings; in church basements teaching our neighbors how to conserve energy; and we hope to be in the conference rooms where green policy and business decisions are being made.

- ◆ *In Los Angeles, Apollo Alliance, convened by SCOPE, has helped to establish a city task force comprised of key City Council members, city departments and Apollo Alliance representatives to analyze audit data and make recommendations for an “LA City Green Retrofit Jobs Program.”¹²⁶*
- ◆ *In New York City, Apollo Alliance convened by Urban Agenda, is an active participant in the Campaign for New York’s Future. The Campaign is a coalition of civic, business, environmental, labor, community and public health organizations that support the goals and strategic direction of PlaNYC 2030, that city’s official climate action plan.*

2. Develop public and private sector energy efficiency strategies that address the needs of lower-income communities, residents and workers. These must be strategies that offer access to energy efficiency resources so that we can build our capacity to participate in greening our own communities and benefit from that greening. These strategies must include policies that: a) facilitate investment in affordable, widely available residential retrofitting measures to save residents money on energy; b) create equitable financing mechanisms for these programs; and, c) maximize the number of good jobs created and the number of these jobs that go to local residents.

- ◆ *New York City Apollo Alliance is working to win green building inspection policies that require large residential*

and commercial building owners to have energy audits every ten years and to carry out recommended retrofits, similar to fire and public health inspections.

- ◆ Apollo Alliance and the City of Milwaukee are developing an innovative program to improve the efficiency of the city's building stock that will be piloted in 2009. Milwaukee Energy Efficiency (Me2) will allow building owners and occupants to pay for the cost of improvements as a charge on their municipal services bill or utility bill, on a schedule that allows them immediate savings. If a participating building owner or occupant leaves the property before repayment is complete, the remaining obligation can go to the next owner or occupant as he or she benefits from reduced energy costs. The program will create thousands of good jobs and will fill them locally.¹²⁷
- ◆ Los Angeles Apollo Alliance has partnered with municipal leaders to pass a comprehensive Green Municipal Building retrofit program that will green existing city-owned properties citywide, also revitalizing facilities and parks in underserved communities, creating 2,000 new jobs.

3. Enact policies that promote local hiring and procurement to ensure that energy efficiency jobs and other economic opportunities will benefit our communities. First Source and other local hiring programs establish clear pathways offering access for people from lower-income communities and communities of color into new or improved careers in energy in auditing, building retrofit construction and building maintenance and operations. Policies that encourage or require local procurement will create opportunities for new local and community-owned green ventures that provide quality jobs to local residents.

- ◆ In California, the Port of Oakland's eight-year old Maritime and Aviation Project brings together strong local hiring policies, including measures to train and employ a diverse workforce, with a well organized system to implement those policies in a \$1.2 billion modernization of the airport and maritime port that incorporates strong energy efficiency measures.
- ◆ The City of East Palo Alto, CA first established local hiring requirements for a major development project in 1996. In 2000 those requirements were codified in a city ordinance that covers all redevelopment that receives more than \$50,000 in city subsidy. The ordinance applies both to construction and permanent jobs and places hundreds of residents a year.¹²⁸

4. Initiate and fund training and certification programs to link lower-income community members with the skills,

supports and other preparation they will need to get and succeed in energy efficiency jobs. This must include nearby community-based training programs that understand the needs and potential of community members.

- ◆ In New York City, the International Union of Operating Engineers (IUOE) Local 94 is integrating energy efficiency into its in-house training. It has also encouraged its members to participate in courses covering the fundamentals of efficient building operations through CUNY's Building Performance Lab. As part of its joint labor-management funded Training Program, SEIU 32BJ, the building service workers union 32BJ partnered with NY-SERDA to offer courses in efficient green maintenance to hundreds of its members.¹²⁹ Right here in Boston, the International Brotherhood of Electrical Workers (IBEW Local 103) has developed training courses in renewable solar and wind energy installations that hundreds of its members have completed. Members have even installed photovoltaic panels and a wind turbine on the roof of the local's Dorchester training facility.¹³⁰
- ◆ To create a pipeline of 2,000 trained public and private sector workers in green building construction, maintenance, landscaping and manufacturing, Los Angeles Apollo has outlined model green career paths. A sketch is included in Chapter 3 of this report. LA Apollo initiated a Green Career Ladder Training Program as a member of the Los Angeles Infrastructure and Sustainable Jobs Collaborative, convened by the Los Angeles Trade-Technical College.¹³¹

5. Enact job quality standards and other measures that will ensure that the jobs created in the expanding energy efficiency sector will be good jobs with wages and benefits that will allow residents to stay in the region. Standards will also ensure that these jobs are safe jobs, and jobs with career paths and opportunities to become union members.

Job quality standards establish criteria for wages, health-care benefits, and/or hours of work and help ensure that industries move to the 'high road,' rather than driving wages down and keeping workers in poverty. Many job standards are market-based, tied to median wages in the region, industry or occupation, with a living wage floor that ensures against poverty-level wages. Most states and many cities now attach job quality standards to economic development incentives and subsidies. They do so on the understanding that stimulating job growth does not lead to economic development if it undercuts living standards or grows the ranks of the working poor.¹³² Effective job standards policies include: prevailing wage requirements; living wage ordinances; apprentice utilization ratios and certain kinds of certification requirements.

- ◆ *Apollo energy efficiency and retrofit campaigns in Milwaukee, New York and Los Angeles are working to win job quality standards that include project labor agreements (PLAs) and prevailing wage requirements on public sector work.*
- ◆ *Apollo affiliates in these cities are also working to attach wage standards (as well as green standards) to all public incentives and subsidies. They are working to negotiate neutrality agreements for private energy efficiency initiatives, which would allow private sector workers freely to choose whether or not to be represented by unions.¹³³*

We include union membership on the list of strategies for ensuring that jobs are well paid, well trained and safe, because unions offer a viable and proven ‘pathway out of poverty.’ Many studies have documented the ‘union advantage’: the fact that unionized workers in all sectors earn higher wages than non-union workers doing the same jobs, and union members are much more likely to have access to health benefits and pensions. These union financial advantages have been proven to be even larger for groups that have historically been paid less, including: low-wage workers, African-Americans, Latinos and women workers of all ethnicities. In a 2008 series of studies, the Center for Economic and Policy Research found that even after controlling for age and educational differences between union and non-union members:

- ◆ Across the U.S., unionization raises the wages of the lowest-wage worker (in the lowest 10% of earners) by almost 21%, and raises the wages of middle-income workers almost 14%. The union advantage for workers at all incomes averages 12%. Just under 14% of US workers are union members.
- ◆ In Massachusetts, unionization raises the wages of the lowest-wage workers just under 13%, the wages of middle-income workers 8.4% and all workers an average of 7.3%. The Massachusetts union wage differential is smaller than the national. The smaller differential could be due to many factors, including greater access for very low-income workers to subsidized health insurance and other social supports.

- ◆ Unionization raises the wages of African American workers, male and female, an average of 12 percent — about \$2.00 per hour — relative to similar Black workers who were not in unions. African-American workers who were in unions were 16 percentage points more likely to have employer-provided health insurance and 19 percentage points more likely to have a pension plan than similar non-union workers.
- ◆ On average, unionization raised Latino and Latina workers’ wages by 17.6 percent – about \$2.60 per hour – compared to non-union Latino/a workers with similar characteristics. Latino/a union workers were about 26 percentage points more likely to have employer-provided health insurance, and about 27 percentage points more likely to be in an employer-provided pension.
- ◆ On average, unionization raised wages for women of all ethnicities by 11.2 percent – about \$2.00 per hour – compared to non-union women with similar characteristics. Among women workers, those in unions were about 19 percentage points more likely to have employer-provided health insurance and about 25 percentage points more likely to have an employer-provided pension. For the average woman, joining a union has a much larger effect on her probability of having health insurance (an 18.8 percentage-point increase) than finishing a four-year college degree would (an 8.4 percentage-point increase).¹³⁴

Future Green Justice Coalition publications will contain more details on the specifics of policies in these five key areas that we will be working to implement in our region.

Moving Forward Together

Rooted in a strategic partnership between communities, labor, policymakers, environmentalists, faith-based groups and green business, is the understanding that an expanded investment in energy efficiency will generate good jobs, lift families out of poverty and offer young people hope for a secure future, at the same time it save energy costs and reduces GHG emissions.

Of course, we recognize that investing in energy efficiency is not a cure-all,

but we believe it is a critical place to start. In addition to greening, we need to invest in wages and infrastructure for our seriously underfunded education, childcare and human services systems, jobs that are filled primarily by women.¹³⁵ But by expanding public and private investment in energy efficiency, we can start to repair our increasingly unequal regional economy with an aggressive equity agenda. Together, we can create standards that make new and existing green jobs into good jobs that can sustain families and

communities with livable wages and career pathways that begin with accessible and effective green training. Together, we can ensure that the majority of green jobs go to the un- and underemployed residents in our communities, to help stabilize our neighborhoods and keep families in their homes. And together, we can direct a fair share of the energy efficiency programs and resources into rebuilding the communities that have borne the largest environmental and economic burdens.

ENDNOTES

¹ The United States Conference of Mayors and Global Insight, *U.S. Metro Economic: Current and Potential Green Jobs in the U.S. Economy*, Lexington, MA, October 2008, p.5.

² Energy efficiency is almost 70% cheaper than supply: energy efficiency measures for buildings cost about 3¢/kWh, while our energy supply costs 10¢/kWh. Building new power plants to expand energy supplies costs even more. Building new power plants to expand energy supplies costs even more. Environment Northeast, *Massachusetts Energy Efficiency Program Benefits*, p. 1. Available at:

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³ The *Declaration of Energy Empowerment for the Commonwealth of Massachusetts* event was co-sponsored by a broad coalition of environmental, community, labor, business and interfaith groups. More information is available at: <http://energyempowerment.wordpress.com/>.

⁴ Apollo Alliance, *The New Apollo Program: An Economic Strategy for American Prosperity*, October 1, 2008. Available at <http://apolloalliance.org/apollo-14/the-full-report/>. All of these strategies repeat the call sounded by environmental justice activist Van Jones, presented in his book *The Green Collar Economy: How One Solution Can Fix Our Two Biggest Problems*, Harper Collins, New York: October 2008.

⁵ Pollin, Robert et al, *Green Recovery: A Program to Create Good Jobs and Start Building a Low-Carbon Economy*. Amherst: 2008, pp. 2-3; p. 27. Also Pollin, Robert and Jeannette Wicks-Lim, *Job Opportunities for the Green Economy*, Amherst: 2008. Pollin, Robert, "How to End the Recession," *The Nation*, November 24, 2008.

⁶ Jack Dafoe and Urban Agenda for the NYC Apollo Alliance, *Growing Green Collar Jobs: Energy Efficiency*, New York: 2007, p.2.

⁷ White, Sarah and Jason Walsh, Center on Wisconsin Strategy, *Greener Pathways: Jobs and Workforce Development in the Clean Energy Economy*, 2008, pp. 19-21.

⁸ Categories of work are from Dafoe, op cit. p. 11. Labor percentages are from White and Walsh, op cit., based on data from Wisconsin energy efficiency retrofits. Other experts estimate that we will create 1.5 to 2.5 new jobs for every million kilowatt hours we save through energy efficiency improvements. See: The United States Conference of Mayors and Global Insight, op cit, pp.14-15.

¹ Van Jones 2008, op cit.

² S. Robert Lichter, Ph.D, Statistical Assessment Service (STATS) at George Mason University, April 24, 2008. Available at:

http://stats.org/stories/2008/global_warming_survey_apr23_08.html. Major Findings include: 97% percent of the climate scientists surveyed believe "global average temperatures have increased" during the past century. 84% say they personally believe human-induced warming is occurring, and 74% agree that "currently available scientific evidence" substantiates its occurrence. Only 5% believe that that human activity does not contribute to greenhouse warming; the rest are unsure.

³ Fossil fuels are the largest contributors of greenhouse gases, but they are exacerbated by deforestation, agriculture and land-use changes.

<http://www.wecansolveit.org/content/pages/60/>

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⁴ International Panel on Climate Change (IPCC), *Climate Change 2007: Synthesis Report*, p. 69, and International Panel on Climate Change (IPCC), Fourth Assessment Report, Working Group II: New York: 2007, pp.361-372. See also the discussion on the website

<http://www.wecansolveit.org/content/pages/60/>

⁵ PIPA-Knowledge Networks Climate Change Poll, July 5, 2005, available at <http://www.worldpublicopinion.org/pipa/articles/btenvironmentra/79.php?nid=&id=&pnt=79&lb=bte>.

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⁷ National Governor's Association, *Securing a Clean Energy Future, A Call to Action*, Washington, D.C.: 2008, pp.9-17. See also National Governors' Association Policy Position NR-18, Comprehensive National Energy and Electricity Policy, July 17, 2008, available at: <http://www.nga.org/portal/site/nga/me-nuitem.8358ec82f5b198d18a278110501010a0/?vgnextoid=2a2b9e>.

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⁹ Ryan Wiser and Galen Barbose, *Renewable Portfolio Standards in the United States. A Status Report Through 2007*. Lawrence Berkeley National Labs, Berkeley: 2008. Available at

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¹⁰ US Climate Action Network, *Turning the Tide*, op cit, pp. 5-9.

¹¹ Presidential Climate Action Project and Harris Interactive, April 22, 2008. http://www.harrisinteractive.com/news/newsletters/clientnews/2008_ClimateProject.pdf

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<http://apolloalliance.org/apollo-14/the-full-report/>.

¹⁴ Pollin, Robert et al, *Green Recovery*, op cit., pp. 2-3; p. 27.

¹⁵ See Pollin, Robert, "How to End the Recession," *The Nation*, November 24, 2008. Jones, Van, "Working Together for A Green New Deal," *The Nation*, October 29, 2008. Sood, Sumedha, "Fighting Poverty with a New Green Economy," *The Nation*, October 17, 2008.

¹⁶ The letter was organized by the Center for Economic and Policy Research (CEPR) and can be found at: http://www.cepr.net/documents/publications/Economists_letter_2008_11_19.pdf.

¹⁷ US Conference of Mayors and Global Insight, *U.S. Metro Economies: Current and Potential Green Jobs in the U.S. Metro Economies*, Massachusetts: October 2008. United Nations Environment Program, *Green Jobs: Towards Sustainable Work in a Low-Carbon World*. Washington D.C.: September 2008. Green Economy Initiative launch is reported at:

http://www.unep.ch/etb/events/2008_Launch-GreenEconomyDec1_3.php.

¹⁸ Kranish, Michael, "A vow to jolt the economy," *The Boston Globe*, November 25, 2008. Jackie Calmes and Jeff Zeleny, "Obama vows swift stimulus package," *The New York Times*, November 23, 2008.

¹⁹ City of Boston: *Climate change: Boston's Climate Action Change Summary*. Boston: 2008, p. 4.

²⁰ The Cambridge Energy Alliance's stated goal is to cut electricity usage by 10% annually and demand at peak times by 15%. More information can be found at www.cambridgeenergyalliance.org.

²¹ Environment Northeast, *Massachusetts Energy Reform* at <http://www.environment.org/projects/open/pid/321/history/show>.

²² Environment Northeast, *Massachusetts 2008 Energy Reform Bill Summary* June 25, 2008. Available online at: http://www.environment.org/public/resources/pdf/ENE_MA_2008_Energy_Act_Summary_062508.pdf.

²³ The Massachusetts Department of Public Utilities' (DPU), *Department of Public Utilities Final Order, Docket 07-50(MA Decoupling Order)* was issued July 16, 2008.

²⁴ McKinsey and Company for the Conference Board: *Reducing U.S. Greenhouse Gas Emission: how much and at what cost?* December 2007. In this landmark study, McKinsey and Company worked with leading companies, industry experts, academics and environmental NGOs to develop a detailed consistent fact base estimating cost or potentials of different options to reduce or prevent GHG within the United States over a 25-year period. The team analyzed more than 250 options encompassing efficiency gains, shifts to lower carbon energy sources, and expanded carbon sinks. 2005-2008 energy increase rates cited by Sen. John Kerry in his speech at the Energy Empowerment Revolution, 11/25/08, Boston, MA

²⁵ Stoddard, Michael and Derek K. Murrow for Environment Northeast, 2006, op cit, pp. 5-8.

²⁶ The Global Warming Act requires the Commonwealth to reduce greenhouse gas emissions by between 10% and 25% below 1990 levels by 2020 and 80% by 2050, to avoid the dramatic climate, health and economic consequences that would be triggered by continued global warming.

²⁷ Sherman, Robin et al, *HEAT RISES: The Growing Burden of Residential Heating Costs on Massachusetts*

Households, The Donahue Institute, University of Massachusetts, Lowell: July 31, 2008. Ailworth, Erin, "Report warns that average 2009 oil bill for Mass. household could top \$3,000," *Boston Globe*, August 4, 2008. Senator John Kerry is said to have coined the term 'snowy Katrina,' which has been widely used to describe the magnitude of the predicted home heat disaster.

²⁸ Sherman et al, op cit.

²⁹ The survey was commissioned by The Lowell Center for Sustainable Production at the University of Massachusetts Lowell, and designed and conducted by the UMass Donahue Institute for the Boston Redevelopment Agency 11/12/08.

³⁰ Mayor Menino's October 14, 2008 announcement to the Newmarket Business Association's Annual Meeting.

³¹ Commonwealth of Massachusetts, *Winter Energy Cost Task Force Report*, October 2008. Ailworth, Erin, "US fuel assistance in Mass. doubled to aid 55,000 more," *Boston Globe*, October 31, 2008.

³² Residents who had to purchase oil or lock-in fuel prices in the summer and early fall will also be paying very high prices.

³³ Environment Northeast 2007, op cit. AG Coakley quoted in Ailworth, Erin, "Clean, cheap energy on agenda," *Boston Globe*, September 18, 2008

³⁴ U.S. Department of Energy, *Annual Energy Outlook 2008*, Washington, D.C.: June 2008, pp. 4-6. Available at: <http://www.eia.doe.gov/oiaf/aeol/>. A local advocate, Larry Chretien, executive director of the nonprofit Massachusetts Energy Consumers Alliance, offered this view when asked by the Boston Globe to comment on an offer from Dominion Energy to lock in electricity rates: "in the long run, our organization thinks that energy prices are going to be high." Ailworth, E, "Utility offers a 3-year lock on electricity rate," *Boston Globe*, October 30, 2008.

³⁵ Environment New England 2006, op cit, pp. 15-20.

³⁶ McKinsey et al, op cit, p. 24.

³⁷ ISO New England is a regional transmission organization (RTO) serving Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island and Vermont, a not-for-profit organization that manages the electricity demands of the region's economy and people. ISO New England has instituted 'Demand Response' programs that compensate large electricity users for reducing consumption when market prices are high or demand is high and system reliability is at risk. This has also created the opportunity for New England states and municipalities to develop systems to reduce demand and to aggregate the resulting energy savings. See: http://www.iso-ne.com/genrtion_resrcs/dr/index.html,

³⁸ A presentation to the National Building Museum by Rob Pratt, Senior Vice-President, Henry P. Kendall Foundation: "Cambridge Energy Alliance: A Community Response to a Changing Climate," June 19, 2008. Available at: http://apps1.eere.energy.gov/buildings/publications/pdfs/corporate/ns/bm_presentation_61908.pdf

³⁹ CO₂e, OR 'carbon dioxide equivalent,' is a standardized measure of GHG. McKinsey reports that emissions are measured in metric tons per year, ie millions of tons (megatons) or billions of tons (gigatons). McKinsey op cit, p.ix. National building emission statistics are from Environment Northeast 2006, op cit. Boston municipal statistics are from the City of Boston Climate Action Plan, 2007, op cit.

⁴⁰ McKinsey et al, op cit, pp. 7-10.

⁴¹ Energy Efficiency Updates for IEA Countries 29 November

2004 • http://www.iea.org/textbase/newsletters/eneff/effi_updates_all.pdf

⁴² Commonwealth of Massachusetts, Department of Energy Resources (DOER), *Massachusetts Saving Electricity: A Summary of the Performance of Electric Efficiency Programs Funded by Ratepayers Between 2003 and 2005*. Executive Office of Energy and Environmental Affairs Massachusetts Division of Energy Resources, April 2, 2007.

⁴³ McKinsey et al, op cit, pp. xii-xiv.

⁴⁴ McKinley et al, op cit, p. 22.

⁴⁵ McKinley et al, op cit, p. 34.

⁴⁶ McKinley et al, op cit, p. xiv-xvi. Environment Northeast 2007, op cit.

⁴⁷ McKinley et al, op cit, p. 69; p. 21.

⁴⁸ McKinley et al, op cit, p. 19.

⁴⁹ Galley Eco Capital, Part 3: JP Morgan Chase Talks Green Real Estate Investing, part of a Special Series on the Green Building Finance and Investment Forum, New York: November 17, 2008. It can be found at <http://www.galleyecocapital.com/tag/jp-morgan-chase/>.

⁵⁰ Prior to 1997, Massachusetts electric utilities provided energy efficiency programs beginning in the late 1980's under regulatory orders set by the DTE (formerly DPU) and a stakeholder settlement process. Reported in Commonwealth of Massachusetts Department Of Energy Resources (DOER), *Massachusetts Saving Electricity: A Summary of the Performance of Electric Efficiency Programs Funded by Ratepayers Between 2003 and 2005*. Executive Office of Energy and Environmental Affairs Massachusetts Division of Energy Resources. Boston: April 2, 2007

⁵¹ Commonwealth of Massachusetts Department Of Energy Resources (DOER), op cit, p.8 Chart 5: 2003 - 2005 Lifetime Bill Savings by Customer Class.

⁵² Environment Northeast, *Massachusetts Energy Efficiency Benefits*, 2008. Available at: http://www.env-ne.org/public/resources/pdf/ENE_MA_existing_EE_programs_w_tables.pdf.

⁵³ Environment Northeast 2008, op cit.

⁵⁴ Commonwealth of Massachusetts DOER, op cit.

⁵⁵ DSIRE Review: Massachusetts Incentives for Renewables and Efficiency, Energy Efficiency Fund, Public Benefits Fund, 07/11/2008, available at: http://www.dsireusa.org/library/includes/incentive2.cfm?Incentive_Code=MA11R&state=MA&CurrentPageID=1&RE=1&EE=1

⁵⁶ More details of these changes are provided in a review by Environment Northeast, *Massachusetts 2008 Energy Bill Summary: An Act Relative to Green Communities*, Senate Bill No. 2768. June 25, 2008.

Available at: http://www.env-ne.org/public/resources/pdf/MA_Energy_Bill_Summary.pdf

⁵⁷ DSIRE review and Environment Northeast, op cit.

⁵⁸ DSIRE review and Environment Northeast, op cit.

⁵⁹ Commonwealth of MA DOER op cit, Chart 8, p. 10

⁶⁰ Commonwealth of MA DOER op cit, pp. 9-10.

⁶¹ the *Savings to Investment Ratio (SIR)*. The SIR calculates which measures will produce the greatest energy savings and be paid back in the shortest period.

⁶¹ Laurie Kerr, Senior Policy Advisor at the Office of Long Term Planning and Sustainability, quoted in Dafoe and Urban Agenda, op cit, p. 14.

⁶² Interview conducted by CLU researcher Mary Jo Connelly with energy services company officer in October 2008.

⁶³ Information on the Commonwealth Solar and Small Renewables projects are available at: <http://www.masstech.org/cleanenergy/cando/financing.htm>.

⁶⁴ More information on Pay as You Save and other on-bill financing mechanisms can be found at www.paysamerica.org, a Vermont nonprofit that has promoted this model across the country. Another version is being included in the Apollo Alliance energy efficiency program in Milwaukee, Wisconsin. More information on this is available at: <http://www.cows.org/me2/PAYS.pdf>.

⁶⁵ Information from interviews with Mary Jo Connelly in September - October 2008 with local weatherization officials, as well as program materials from ABCD which are available at <http://www.boston-abcd.org/programs/FuelAssistance.html>, Note: income eligibility is likely to be increased to 60% of area median income.

⁶⁶ See eligibility income for other size families at LI-HEAP program clearinghouse, US Department of Health and Human Services, <http://www.liheapch.acf.hhs.gov/profiles/povertytables/FY2009/masmi.htm>.

⁶⁷ American Council for an Energy Efficient Economy. *Special Case Study: Multi-Party Collaborative. Massachusetts Low Income Affordability Network*, 2004. Available at <http://www.aceee.org/utility/ngbestprac/malean.pdf>.

⁶⁸ Massachusetts LIHEAP fuel assistance funding for FY 2009 will include: a Block Grant of \$162,915,645 and Emergency contingency funds of \$50,498,727

⁶⁹ For more details, see CEA website at:

<http://www.cambridgeenergyalliance.org/team.htm>

⁶⁹ www.naesco.org, National Association of Energy Services Companies, cited in Gehrke, Amanda, *Public-Private Partnerships in Energy Efficiency: An ESCO Industry Primer*. UCLA School of Urban Planning, June 2007. Prepared for SCOPE.

⁷⁰ Ibid.

⁷¹ www.naesco.org, National Association of Energy Services Companies, cited in Gehrke, Amanda, *Public-Private Partnerships in Energy Efficiency: An ESCO Industry Primer*. UCLA School of Urban Planning, June 2007. Prepared for SCOPE.

⁷² The five are: Conservation Services Group, Rise Engineering, AMERESCO, ConEdison Solutions, and DMJM Harris. See details at: <http://www.cambridgeenergyalliance.org/team.htm>

⁷³ Massachusetts Technology Collaborative, *Massachusetts Clean Energy Industry Census, August 2007*.

⁷⁴ Goldman, Charles A., Nicole C. Hopper, and Julie G. Osborne. "Review of US ESCO Industry Market Trends: an Empirical Analysis of Project Data." *Energy Policy* 33 (2005): 387-405. Cited in Gehrke, op cit, p. 2.

⁷⁵ SuperESPC - Just the Facts. US Department of Energy, 2006. Cited in Gehrke, op cit, p. 3.

⁷⁶ Massachusetts Municipal Association, Bill would provide for reducing energy costs, November 21, 2005, www.mma.org.

⁷⁷ Gehrke op cit, pages 4-5

⁷⁸ Gehrke op cit, pages 4-5

⁷⁹ Sherman et al, *Heat Rises*, op cit, p. 8

⁸⁰ McKinsey, op cit, p. xvi.

⁸¹ ISO New England is a regional transmission organization (RTO) serving Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island and Vermont, a not-for-profit organization that manages the electricity demands of the region's economy and people. ISO New England has instituted 'Demand Response' programs that compensate large electricity users for reducing consumption when market prices are high or demand is high and system reliability is at risk. This has also created the opportunity for New England states and municipalities to develop systems to reduce demand and to aggregate the resulting energy savings. See: [60 THE GREEN JUSTICE SOLUTION](http://www.iso-</p></div><div data-bbox=)

ne.com/genrtion_resrcs/dr/index.html, A negawatt is **A measure of the avoided use or the conservation of a unit of energy.** Coined by author and scientist **Amory Lovins**, the term has been around for quite a long time. When energy efficiency measures are implemented in existing structures, energy consumption is reduced. This reduction can be measured in negawatts—negative watts.

⁸² The July 2008 Green Communities Act requires that: “Electric distribution utilities increase investments in energy efficiency and demand side resource programs for all customers by: mandating investment in all demand side resources that are cost-effective or cheaper than supply;” Natural gas distribution utilities are also required to increase their investment in energy efficiency programs for all customers to ensure that all cost-effective energy efficiency is captured.

⁸³ Rhode Islands spends \$15M a year on energy efficiency programs that cost 3.2 cents a kWh. In a state with six times the population of Rhode Island, Massachusetts spends 8-10 times this amount each year. From conversation with Samuel P. Krasnow, Policy Advocate and Attorney, Environment Northeast, November 26, 2008.

⁸⁴ In 2005, U.S. Conference of Mayors unanimously adopted the **U.S. Mayors Climate Protection Agreement**. The mayors agreed that their cities would “strive to meet or exceed **Kyoto Protocol** targets, reducing Greenhouse Gas (GHG) emissions seven percent below 1990 levels by 2012. The report cited here is: The United States Conference of Mayors and Global Insight, *U.S. Metro Economic: Current and Potential Green Jobs in the U.S. Economy*, Lexington, MA, October 2008, pp.2-5.

⁸⁵ White and Walsh, op cit, p. 6.

⁸⁶ U.S. Mayors op cit, p. 5.

⁸⁷ While the national-level green job projections for three decades into the future (2018, 2028 and 2038), the Metro region projections were for 2030 only. U.S. Mayors op cit, p. 5.

⁸⁸ Peter, Tom A. “States Vie to Attract Clean Tech Industries” *Christian Science Monitor*, April 11, 2008.

⁸⁹ Projections by metro area assume the current distribution of jobs and industries, which of course will change as these industries develop. U.S. Mayors op cit.

⁹⁰ Massachusetts Technology Collaborative, *Massachusetts Clean Energy Industry Census*, op cit. Many of the Massachusetts firms in the energy efficiency sub-sector entered the industry in the late 1970s and early 1980s, while the renewable energy sector is much younger.

⁹¹ Commonwealth of Massachusetts. DOER, op cit p.1.

⁹² Massachusetts Technology Collaborative, *Clean Energy Census*, op cit. p.13.

⁹³ Pollin, Robert et al, *Green Recovery: Impact on Massachusetts*, Amherst: 2008, pp. 3-4. Massachusetts’s green infrastructure investment allocations: Massachusetts’s job estimates are based on this distribution of an overall \$2.4 billion in green public- and private-sector investments. These investment figures are meant to be broadly illustrative of investment possibilities in order to estimate job creation across sectors. Individual states could adjust their overall green stimulus budget to reflect different conditions or public policy priorities.

- Energy efficient building retrofits: \$939 million.
- Mass transit and freight rail: \$469 million.
- Smart grid: \$235 million.
- Wind power, solar power, and advanced biofuels: \$704 million.

In the full national *Green Recovery* study, PERI reported using the following Methodology to create these estimates: “When we consider the green economic recovery program on a state-by-state basis, we have to make some assumptions as to what share of the \$100 billion should be allocated to each state. There is no obvious formula as to how this should best be done. . . . We recognize that there are reasonable arguments in behalf of both a GDP-share and a population-based allocation of funds. As such, what we have done is to combine both approaches. We have calculated what the allocation of investment should be under both the GDP- and population-based approaches, and taken the midpoint of these two calculations as our figure for each state’s allocation of the \$100 billion for the overall green stimulus program.” Pollin et al, *Green Recovery*, op cit. pp. 25-26.

⁹⁴ Interviews with energy service company executives carried out by Mary Jo Connelly September – October 2008. Names withheld by request.

⁹⁵ The US Mayor’s study found that efforts to increase energy efficiency by retrofitting residential and commercial buildings are a critical part of any effort to decrease energy consumption and emissions.

These efforts have great potential to generate new jobs based on the large number of kilowatt hours that building retrofits can save. The study projected that reducing current annual energy consumption levels of residential and commercial buildings by 35% over the next 30 years will result in US energy savings of 32,000 million kilowatt-hours (or 32,000 giga-watt hours) each year, about half in residential and half in commercial.⁹⁵ Achieving these annual energy efficiency goals by retrofitting a small percentage of buildings each year will require nearly 81,000 energy efficiency Jobs each year, approximately 36,000 in the residential sector and 45,000 in commercial. (These projections do not include potential new green construction.)⁹⁵ That works out roughly to 2.5 jobs created for every giga-watt saved, slightly higher than a New York State Energy Research and Development Authority (NYSERDA) estimate that for every giga-Watt hour saved, the agency’s programs create or retain 1.5 jobs.⁹⁵ See US Mayors, op cit, pp. 9-10, p. 15.

⁹⁶ White and Walsh, op cit, pp. 19-21.

⁹⁷ The Federal Performance Contracting Coalition, as cited in Gehrke, op cit, p. 20.

⁹⁸ This calculates that roughly if 39% of the \$2.4 Billion federal green recovery investment would also generate roughly 39% of the 42,530 new jobs that PERI projects would be created overall by this investment. NOTE: the Boston Metro calculation is complicated by the fact that the Boston-Quincy-MA-NH Metropolitan region includes parts of New Hampshire, and that New Hampshire’s portion of a federal green jobs recovery investment is NOT included in the PERI Massachusetts figures used here.

⁹⁹ Dafoe and Urban Agenda op cit, p.8.

¹⁰⁰ Dafoe and Urban Agenda op cit, p. 10.

¹⁰¹ US Mayors, op cit, p. 10.

¹⁰² Dafoe and Urban Agenda, op cit, p. 23.

¹⁰³ Dafoe and Urban Agenda, op cit, p. 11

¹⁰⁴ White and Walsh, op cit, p. 16.

¹⁰⁵ US Mayors’ op cit, p. 16.

¹⁰⁶ Community Labor United, *Earnings, Poverty and Inequality in the City of Boston*, August 2008. Another measure of ‘economic distress’ was developed and reported by Michael Zweig et al, in *Economic Stimulus and Economically Distressed Workers*, New York: Center for Study of Working Class Life, September 29, 2008, p. 4. They define ‘economic distressed’ households as those that pay more than 30%

of their income to live in housing that costs in bottom quarter for units of that size. By this measure, 26.4% of households in the Greater Boston region are in economic distress.

¹⁰⁷ Khatiwada, Ishwar et al, *The Employment Status of Class of 2005 Boston Public High School Graduates at the Time of the 2006 Followup Survey and Comparisons With Class of 2005 High School Graduates from Across the Nation’s Central Cities*, Northeastern University Center for Labor Market Studies, Boston: June 2007, p. 5.

¹⁰⁸ Excerpted from *Green for All, What is a Green-Collar Job?* At <http://www.greenforall.org/green-collar-jobs>.

¹⁰⁹ White and Walsh, op cit. p. 3

¹¹⁰ White and Walsh, op cit, p. 16.

¹¹¹ In September 2008, Roxbury Community College (RCC) launched two year-long pilot certificate programs: one in energy conservation and efficiency, and another in alternative and renewable energy, part of RCC’s Workforce Development program. A description of the Roxbury Community College program can be found at: Dednah, Alexandra, “Roxbury Community College Turns a New Leaf,” *Weekly Dig*, Boston: September 2008. Available at:

<http://www.weeklydig.com/news-opinions/news-us/200809/roxbury-community-college-turns-new-leaf>. JFYNetworks is a “workforce development organization that targets career changers, immigrants, and the underemployed.” It operates a 14-week environmental technology training program that trains participants for a variety of ‘green jobs.’ A description of the Jobs for Youth Program can be found at: Jones, Vanessa E., “Donning a green collar,” *Boston Globe*, July 4, 2008.

¹¹² NYSERDA has developed or partnered with training and certification programs for auditors. Urban Agenda reports that “To audit a 1-4 family or multifamily building project receiving NYSERDA funds, auditors need to be certified as Building Analyst or Multifamily Building Analyst, respectively, by the Building Performance Institute.” Dafoe and Urban Agenda, op cit, p. 11.

¹¹³ Dafoe and Urban Agenda, op cit, p. 16.

¹¹⁴ SCOPE, *A Greener Future for Los Angeles: Principles to Ensure and Equitable Green Economy*, Los Angeles: April 2008, p. 3.

¹¹⁵ Environment Northeast, 2006, op cit. p. 25.

¹¹⁶ Dafoe and Urban Agenda, op cit, p. 23.

¹¹⁷ Environment Northeast 2006 op cit. p. 25.

¹¹⁸ White and Walsh, op cit. p. 3. For more information on the Green Jobs movement, see the publications and websites of Green for All at

<http://www.greenforall.org>; Apollo Alliance at <http://apolloalliance.org/>; Urban Agenda NYC at <http://www.urbanagenda.org/nycapollo.htm>; SCOPE Los Angeles at <http://www.scopela.org/article.php?id=140>; EJ Net at <http://www.ejnet.org/ej/>.

¹¹⁹ Stoddard, Michael and Derek K. Murrow, op cit,

pp. 5-8.

¹²⁰ Faber, Danny and Eric Krieg, “Unequal Exposure to Ecological Hazards 2005, Northeastern University, Boston: 2005. Available online at: http://www.barrfoundation.org/usr_doc/Unequal-exposurefullreport2005.pdf.

¹²¹ Greenstein, Bob, Sharon Parrott, and Arloc Sherman, “Designing Climate-Change Legislation That Shields Low-Income Households from Increased Poverty and Hardship,” *Center on Budget and Policy Priorities*, Revised May 9, 2008. Available at <http://www.cbpp.org/10-25-07climate.pdf>.

¹²² Community Labor United, *Earnings, Poverty and Inequality in the City of Boston*, August 2008.

¹²³ Khatiwada, Ishwar et al, *The Employment Status of*

Class of 2005 Boston Public High School Graduates at the Time of the 2006 Follow-up Survey and Comparisons With Class of 2005 High School Graduates from Across the Nation's Central Cities, Northeastern University Center for Labor Market Studies, Boston: June 2007, p. 5.

¹²⁴ Van Jones 2008, op cit.

¹²⁵ Apollo Alliance website, The First Years, at <http://www.apolloalliance.org/about.php#2>

¹²⁶ For more information see Los Angeles Apollo Agenda at the website for SCOPE LA: <http://www.scopela.org/article.php?list=type&type=35>. Also *A Greener Future for Los Angeles*, op cit. Los Angeles Apollo's 2008 Goals to WIN policies to launch a Green Jobs Initiative include:

A city ordinance to establish the Green Building Retrofit Program and a Project Labor Agreement; Initial funding for implementation of Phase I of the Green Building Retrofit Program; and Train 50 inner-city residents through the Green Career Ladder Training Program and place graduates in union apprenticeship programs and green jobs.

¹²⁷ The Me2 program will incorporate on-bill financing modeled on Pay As You Save™ Programs already operating in New Hampshire, Kansas and Hawaii. This system “uses capital from some source, here called the “bank,” to provide loans for small energy customers to implement EE retrofits with no cash upfront. Assessments of cost-effective improvements, contracting for the improvements themselves, and measurement and verification of work performed are handled by some entity – a government agency, a for-profit or non-profit firm, etc. – here called E2. Customers repay the bank via a charge on the bill from their energy utility.” More details can be found at:

http://www.cows.org/collab_projects_detail.asp?id=54.

¹²⁸ Mulligan-Hansel, Kathleen and the Partnership for Working Families, *Making Development Work for Local Residents: Local Hire Programs and Implementation Strategies That Serve Low-Income Communities*, Los Angeles: 2008. Available at: <http://www.communitybenefits.org/downloads/Making%20Development%20Work%20for%20Local%20Residents.pdf>.

¹²⁹ Cited in Dafoe and Urban Agenda, op cit., p. 22.

¹³⁰ See IBEW L103's website for more information: <https://www.ibew103.com/search/node/training>.

¹³¹ More details in SCOPE, *A Greener Future for Los Angeles: Principles to Assure an Equitable Green Economy*, Los Angeles: April 2008.

¹³² A description of job quality standards can be found in a recent publication by Good Jobs First, an organization that has taken the lead nationally in advocating for policies that create and sustain high quality ‘high road’ jobs. Good Jobs First, together with the AFL-CIO, Change to Win, Green for All, the National Employment Law Project, and the Partnership for Working Families, *Uncle Sam's Rusty Toolkit, How ProveState and Local Reforms Can Make Federal Economic Development Programs Better for Taxpayers, Workers and the Environment*, Washington, D.C.: November 2008. The report can be found at:

<http://www.goodjobsfirst.org/pdf/toolkit.pdf>

¹³³ See: Din, Carla, *Best Practice Standards and Public Subsidies*, Apollo Alliance, 2008 and Good Jobs First, *Uncle Sam's Rusty Toolbelt*, op cit.

¹³⁴ This research shows calculates the wage premium based on hourly wages 2003-2007. Schmitt, John. *The Union Advantage for Low Wage Workers*, Center for Economic and Policy Research, Washington, D.C.: May 2008. Schmitt, John. *Unions and Upward Mobility for Women Workers*, Center for Economic and Policy Research, Washington, D.C.: 2008. Schmitt, John, *Unions and Mobility for Latino Workers*, Center for Economic and Policy Research, Washington, D.C.: 2008.

¹³⁵ Albelda, Randy, “The Macho Stimulus Plan ,” *Boston Globe*, 11/28/08.

GLOSSARY OF TERMS

Definitions for the following terms used in this report were excerpted from a number of recent reports by Apollo Alliance and others in the Green Jobs movement, and are credited to those publications (*in parenthesis after each definition*) using the following notation:

AA/GFA – Apollo Alliance & Green for All: *Green Collar Jobs in America's Cities*, 2008
COWS — White, Sarah and Jason Walsh, Center on Wisconsin Strategy, *Greener Pathways: Jobs and Workforce Development in the Clean Energy Economy*, Milwaukee: 2008, AA/NAP – Apollo Alliance *New Apollo Program*, Los Angeles, 2008
SCOPE — SCOPE: *A Greener Future for Los Angeles*, Los Angeles: 2008
UAGCJ – Jack Dafoe for Urban Agenda *Growing Green Collar Jobs, Energy Efficiency*, New York: 2008.
UML – University of Massachusetts, Lowell: *Clean Tech, an Agenda for a Health Economy*, Lowell: 2007

Barriers to Employment

Barrier to employment are challenges that green job programs need to address to create meaningful pathways out of poverty. Common barriers to employment include: lack of legal documentation to work, substance abuse and dependency, Limited English proficiency, lack of a high school diploma or equivalent, geographic distance from quality jobs, lack of basic academic skills, and felony records. Less tangible barriers include lack of connection points to formal or informal networks for job referrals.” (SCOPE)

Building Performance Institute (BPI)

BPI was founded in 1993 to create “a resource for independent, third-party verification of worker skills in the weatherization industry and building trades.” Their original mission has expanded, and today BPI certifies individuals and accredits organizations in auditing, efficient building operation, efficient heating system design, and related areas. Working closely with the New York State Energy Research and Development Authority (NY-SERDA), the Association for Energy Affordability (AEA), and community colleges across the state, BPI approves curricula for training programs, writes the certification tests, and provides quality assurance and technical standards assistance to high performance building programs. Note: there is as yet no similar institute in Massachusetts. (UAGCJ)

Career Pathways

Green job training should be developed in a career pathways framework. This strategy pro-

vides steppingstones through short-term, occupationally contextualized training programs that help workers at any level gain skills and advance in a high-wage, high-growth industry. At the same time, pathways increase the supply of trained workers for industries important to regional economic success. In a typical pathways program, community or technical colleges work with employers to figure out what skills workers need, then break up traditional curricula into smaller, manageable sets of courses, leading to an entry-level job or job-advancement. Good pathways offer more than guideposts: workers and students may need career coaching and case management; links to community services, like child care and transportation; and more accessible training, like night and weekend classes at job sites or community centers. As a system, a pathways approach targets demand in regional labor markets, linking employers, incumbent and prospective workers, community organizations, educational institutions, and workforce agencies. Every pathway begins with a partnership. (COWS)

Combined Heat and Power (CHP)

Waste heat from power plants and industrial facilities is used to produce electricity and thermal energy that normally is cheaper than the energy otherwise purchased. A variety of industrial waste streams can be recycled into useful heat and power, as can many industrial processes. Conventional power plants can be converted so their waste heat is captured and used for heating homes and businesses close to the plant. All together, existing untapped CHP resources could generate up to 492,000 gigawatts (1 million kilowatts) of carbon-free power — as well as thousands of new green-collar jobs building, installing, and maintaining CHP systems. (NAP)

Demand Response

Demand Response means neutralizing spikes in demand by strategically reducing power consumption. Utilities and government agencies often run demand response programs that pay large power consumers for reducing their demand during peak demand periods. Demand response methods can be highly technical, or as simple as turning off lights and office machines. Whatever the method, these programs are an effective way of reducing stress on the electrical grid, encouraging businesses to save money, and obviating the need for additional power generation. (UAGCJ)

Distributed Generation (DG)

A cost-effective way to reduce strain on the grid is through deployment of distributed generation. Distributed generation refers to any system that generates electricity at, or close to, the place it will be used. These systems usually remain connected to the existing grid. This allows facilities using DG to access supplemental

or backup power from the grid. It also opens up exciting possibilities like *Net Metering*—selling power generated on-site back to the utility. DG can be more efficient than other forms of electricity generation because it reduces “line loss.” Line loss is the electricity lost as heat and electro-magnetic energy when power travels longer distances. DG helps relieve stress on the grid by removing electrical load from transmission lines. And it can be a cleaner source of energy. Solar photovoltaic (PV) panels, Combined Heat and Power systems (known as CHP or cogeneration), and small wind turbines, are just a few examples of distributed generation systems. (UAGCJ)

Energy Conservation

Like efficiency, conservation relates to the demand side, but conserving energy simply means using less. Turning down the heat in a house during the winter is a conservation measure, while installing a furnace that produces more heat per unit of fuel is an efficiency measure. (COWS)

Energy Efficiency

Energy efficiency typically refers to reductions in energy demand by, say, insulating houses or developing cars that get more miles per gallon. Such measures raise the ratio of benefit to cost—economic or environmental. (COWS)

Energy Efficiency and Conservation Block Grant Program

Proposed by the U.S. Conference of Mayors and included in the 2007 Energy Bill, this program will allocate funds to state and local governments to reduce fossil fuel emissions and energy use, and achieve greater energy efficiency in construction, transportation and other sectors. Grants can be used for building and home energy conservation programs, energy audits, fuel conservation programs, planning and zoning to promote energy efficiency, and renewable energy installations on government buildings. Congress authorized the program at \$2 billion per year but, at the time we went to print, had still not appropriated the funds. (NAP)

Energy Star

Energy Star is a joint program of the U.S. Environmental Protection Agency (EPA) and the U.S. Department of Energy (DOE). It certifies appliances as energy-efficient (the Energy Star label), provides energy-efficiency planning tools to businesses, and assists local companies and organizations in improving the energy efficiency of the building stock. (UAGCJ)

Environmental Justice (EJ)

Environmental justice is the fair treatment and meaningful involvement of all people, regardless of background or status, in the development, implementation, and enforcement of

environmental laws, regulations, and policies. The environmental justice movement responds to the reality that power plants, landfills and other environmental hazards are often sited in low-income communities and communities of color without their participation in the decision-making process. Environmental justice has also come to mean the equitable distribution of the benefits of the green economy: green collar jobs, community reinvestment, and clean technology. (UAGCJ)

Good Jobs

Good jobs pay more than a poverty wage, or more than about \$10 an hour, offer benefits, at least health-care and ideally pensions, paid sick leave, safe working conditions, reasonable schedules, organizing rights, and a modicum of job security. And because low-road economic practice condemns a substantial number of Americans not just to short-term, low-wage jobs, but also to long-term poverty traps, a good job is one with an accessible pathway to advancement. If we focus only on environmental content, to the exclusion of job quality, we risk affirming day laborers installing solar panels without job security or proper training, minimum wage workers toiling in a clean tech manufacturing facility without healthcare or the right to organize, and youth pushing brooms at a green building site without training or opportunity for advancement. (COWS)

Green-Collar Jobs

Refers to family-supporting jobs that contribute significantly to preserving or enhancing environmental quality. Defined more by industry than occupation, they reside primarily in the sectors that make up the clean energy economy—efficiency, renewables, alternative transportation, and fuels. Most green-collar jobs are and will be middle-skill jobs requiring more than high school, but less than a four-year degree. . . publicly funded workforce development projects should promote green-collar jobs accessible to those with less than a BA. These jobs represent the bulk of employer demand and range from entry-level to high-wage jobs in a multitude of industries. Within these industries, green-collar work includes building, construction, assembly, installation, operation, maintenance, transportation, and manufacturing. Because the bulk of green collar jobs in would involve transitioning existing infrastructure to greater sustainability, they cannot easily be outsourced. (COWS)

Green building

Refers to a structure that is generally environmentally friendly in a variety of ways, including its use of energy. In the United States, the best-known standards for assessing whether a building is green are called **LEED**, for Leadership in Energy and Environmental Design. (COWS)

Green generation

Shifts from conventional (e.g., coal and oil) to renewable (e.g., wind and solar) supply-side measures are generally considered separately from energy efficiency, which is demand-related. Analysts are increasingly calling for policies that exploit the synergies between renewables and efficiency, rather than pursuing them along separate tracks. (COWS)

Green Jobs Act of 2007, *The Energy Efficiency and Renewable Energy Workforce Training Program*

The federal Green Jobs Act (GJA) of 2007 targets funds for pathways out of poverty programs to individuals in families with income of less than 200 percent of the poverty threshold (as determined by the Census Bureau), or a self-sufficiency standard for the local area. The GJA gives priority to applicants who can leverage additional public and private resources. Thus, public-private partnerships in cities that have already launched their own green jobs initiatives will be better positioned to compete for these federal funds. (AA/GFA)

Green Jobs Corps

A Green Job Corps combines job readiness, skills education, and career counseling for people who may not be in a position to succeed in traditional vocational training programs. The Green Jobs Corps is a concept pioneered by members of the Oakland Apollo Alliance and inspired by the success of Chicago's Green-Corps, as well as numerous apprenticeship preparation and jobs readiness programs in other fields.

A Green Jobs Corps brings economic, environmental and social equity goals together in one program, by: providing green employment pathways for people to move from poverty to economic self-sufficiency; educating young people and other community members about environmental issues and the green economy; meeting green-collar workforce demand with the local workers most in need of good jobs; and connecting qualified participants to career training and advanced education opportunities. (AA/GFA)

LEED Certification (Green Buildings)

Established by the nonprofit U.S. Green Buildings Council, Leadership in Energy and Environmental Design (LEED) Green Building Rating System™ is the nationally accepted benchmark for the design, construction, and operation of high-performance green buildings. Standards cover both new construction and existing buildings, and residential, office, retail, school, and healthcare uses. LEED standards address energy use along with a host of other qualities, including the toxicity of building materials, bike/pedestrian access, and storm water controls. LEED promotes a whole-building approach and focuses on building performance in five key areas: sustainable

site development, water savings, energy efficiency, materials selection, and indoor environmental quality. (UML)

Peak Demand

Peak demand is the period in time when demand for electric power is at its highest. At this point, the electricity distribution grid is most stressed and prone to technical failure. Peak demand usually occurs on hot summer days. The combination of excessive electricity demand, and an aging network of power lines and substations is one factor behind large-scale service disruptions. (UAGCJ)

Retro-Commissioning: Commissioning involves the assessment, testing, and balancing of building systems and controls after installation in a new building. Systems are commissioned to maximize efficiency, to meet design parameters, and to ensure that controls are working optimally. Heating, ventilation, and air-conditioning (HVAC) systems are good candidates for commissioning because they are energy-intensive and operated by complex controls. Retro-Commissioning is the term used to describe the testing and balancing of both older systems and newly installed systems in an existing building. Building systems require periodic monitoring and assessment to maintain peak energy efficiency. Retro-commissioning is closely related to a building's general operation and maintenance. For example, if a building's staff caulks windows, the heat loss characteristics of the building may change, necessitating adjustments to the heating system to ensure efficient operation. Retro-commissioning can lead to average energy savings of 5 percent to 15 percent, and pay-backs of less than two years. Both commissioning and retro-commissioning are most cost-effective for large facilities with energy-intensive systems because the energy savings resulting from small adjustments can be enormous. (UAGCJ)

Sectors/Clusters

The sector is an organizing concept for workforce development, while clusters pertain to economic development. In workforce terms, a sector strategy targets a specific industry, like manufacturing or construction, linking education and training to the demand in a regional labor market. In economic development terms, an industry cluster is a geographically and functionally related group of companies, typically with shared or complementary expertise, services, resources, suppliers, and labor. Information technology in Silicon Valley is perhaps the most famous; notable new examples are the emergent Clean Tech clusters in California, the Northeast, and the Midwest. Cluster strategies build on a region's native strengths—education, infrastructure, and natural resources—rather than trying to retain or attract individual firms. By promoting cluster

development, states can propel entrepreneurs and workers into “virtuous circles” of competition, expansion, and innovation. (COWS)

Weatherization

Weatherization reduces a building’s heating and cooling needs by protecting it from the elements. The term is now commonly used as shorthand for the Department of Energy (DOE) National Weatherization Assistance Program (WAP). WAP reduces energy costs for low-income residents by improving the energy efficiency of their homes while protecting their health and safety. Non-income-eligible landlords contribute a percentage of the project cost when the units of income-eligible tenants are weatherized.

(UAGCJ)

Workforce Intermediaries

Workforce partnerships rely on workforce intermediaries. Intermediaries have in-depth knowledge of the targeted industry and bring everyone in a regional economy to the table: labor, business, education, government, and community. They might be established labor market institutions, like a local workforce investment board, or innovative public-private enterprises like a regional training partnership. They can troubleshoot labor exchange, align post-secondary curricula with industry demand, broker or provide worker training, and leverage new sources of funding. (COWS)

APPENDIX A:

Boston Green Justice Coalition

VISION & PRINCIPLES

A Green Wave is coming.

Global warming is forcing those who control the economy to go green. This transition will be as dramatic as the start of the Industrial Revolution 200 years ago. We need to wean ourselves off of the un-renewable fossil fuels (oil, coal, gas) that have powered businesses and enabled our modern lifestyles. The bad news is that the climate is already warmer and wreaking havoc. The good news is that we have no choice but to transform the economy to stabilize the climate. This green wave is a tremendous opportunity not only to change our impact on the environment, but to more equitably share the benefits and costs of the economy. We believe that this change is our best chance to provide the wealth, health, and opportunities needed for the growing numbers of our most underserved people in Boston and across the globe.

We're not all equally responsible for the current climate crisis.

While we all contribute in some way to environmental destruction and climate change, there are vast and significant differences between how much people contribute to and benefit from these practices. The rich across the world and those of us in more wealthy nations consume far greater than our fair share of natural resources and emit the lion's share of greenhouse gases. The US has less than 5% of the world's population, but we use more than 25% of the world's fossil fuels. But even in the US, there are significant differences between the wealthy and the poor and working classes. For example, the average suburban household in Greater Boston buys 85% more gas and uses 20% more electricity than city households. Moreover, it is the world's wealthy that have benefited the most from unsustainable economic practices. Six of the ten largest corporations in the world (by gross revenue) in 2007 were oil companies; another three were auto companies. In 2007, Exxon-Mobil had the greatest profit of any corporation on Earth.

Low income communities and communities of color have paid the price.

Low income communities and communities of color (locally and globally) have borne the brunt of the economy's environmental destruction. Oil refineries, toxic waste sites, and trash dumps are more likely to be placed in low income communities and communities of color than wealthier areas. In Boston, communities of color like Roxbury suffer from high concen-

trations of diesel pollution and the highest asthma hospitalization rates in Massachusetts. In Chelsea, a working class community with many new immigrants, residents recently fought off a proposed diesel-fueled power plant that was to be located across from the city's only elementary school. In New Orleans, we witnessed the unequal impacts of climate change, as Hurricane Katrina devastated the more vulnerable poor and working class neighborhoods. Moreover, these same communities that host the filthiest components of the fossil fuel economy receive the smallest share of the vast wealth it generates. Unemployment in Roxbury is 60% higher than the rest of the city of Boston

Poor people and people of color must lead the Green Wave to ensure sustainability with justice.

We believe that low income communities and communities of color must lead the way towards a green, sustainable future – because we have no other choice. These communities have been most exploited by the current economy in terms of environmental health impacts and economic status. Even some green jobs can be low-paying and hazardous to workers, such as working at recycling facilities or cleaning green buildings. Despite tremendous odds, our communities have resisted environmental injustices and pioneered innovative local solutions with very little resources. We cannot trust those who have benefited so much from the current system to fix the problems in a way that will benefit us. We must lead the way ourselves. We need to take control over the renewable energy sources and clean technology of the future. Green development is the only sure pathway to pull people out of poverty, create more healthy living conditions, and build safe streets in our neighborhoods. In short, it gives hope for us to address the interconnected economic, environmental and social crises that people suffer from every day.

We can ride the wave and make a difference in Boston.

We have all the necessary ingredients in Boston to create a green economy that meets the needs of our communities. The political will and leadership is growing, while public policy and resources are starting to come on line. Community, labor, and environmental partnerships have formed. Green industry already has a foothold in the region. We have the opportunity to connect all these elements into a powerful model for community-driven green development. But we must organize and build alliances. If we don't, the green wave will simply wash over us and leave us behind. The time is now. We cannot afford to miss this opportunity.

Principles of Green Justice

The Boston Green Justice Coalition is founded on the following principles:

- We all have a right to a decent quality of life and healthy environment, but not at the expense of others or future generations.
- We all have a right to an equal voice on how public resources are used to go green and to know the outcomes of these public investments.
- We must protect those who are currently most vulnerable.
- Those who have contributed more to the problem need to contribute more to address past injustices, while those who have paid the price are owed a greater share of new green resources and opportunities.
- Green Justice requires that there be meaningful access to green jobs and other economic opportunities for residents of communities of color and other low income communities. Meaningful access includes appropriate education, training and support, as well as priority hiring for local projects.
- Green jobs must be safe jobs, with decent pay and benefits that can support families. Where possible, green jobs should be union jobs or at least pay the prevailing wage. Workers who will be negatively impacted by green development have a right to a just transition.
- Green justice supports not only green jobs but also opportunities for individual and community ownership and production among communities of color and other low income communities.

Our Vision

Here is a glimpse of what we are trying to build:

- A partnership of community groups, labor unions, and others dedicated to green justice.
- Policies for local hiring, job quality standards, and training programs for green jobs.
- Educational programs to expand awareness of and participation in the green economy.
- Green job training programs specifically designed to support people in our communities.
- Local youth and residents trained and hired into green jobs that can support their families and keep young people safe

from street violence.

- New locally and community-owned green ventures that provide quality jobs, produce green goods and services, and benefit from 'local procurement' policies.
- Community and union voices with equal representation at public decision making tables on the green economy.
- Community access to green products and services to promote healthier lives and lower the cost of living, especially energy bills.
- Cleanup and conversion of contaminated and abandoned sites in our communities into green economic and environmental assets, while assuring high safety standards for clean up and conversion.

The Boston Green Justice Coalition

MISSION

We are creating a partnership of community groups, labor unions, environmental organizations and other allied organizations to build a broad-based constituency in support of a sustainable, equitable, and clean energy economy in the Boston region. We are dedicated to ensuring that our region's growing green economy will create quality jobs, local workforce development opportunities and create healthier and safer communities. In particular low-income communities and communities of color have been overburdened by our unsustainable economy therefore we want to ensure that these communities are at the forefront of the growing green, sustainable economy. Through research, policy recommendations and organizing we will demonstrate that a socially-just, environmentally-sustainable, and economically-prosperous future is attainable.

POLICY Focus

We will begin our campaign work in Boston strengthening and influencing Boston's development of wide-scale energy efficiency work. This work will examine and shape both Boston's plans to achieve higher municipal energy efficiency of city owned properties and vehicles and Boston's plans to expand private energy efficiency through the development of the Boston Energy Alliance. In the coming months the Coalition will shape detailed policy recommendations that include the following elements:

1. High job quality standards with career paths;
2. Local hiring opportunities linking people from low-income communities and communities of color with these energy efficiency jobs (energy auditing, green building construction retrofit, maintenance, landscaping and manufacturing);

3. Strong training programs that link low-income community members with the training needed to acquire and carryout these jobs;
4. Low-income communities at the forefront of the energy efficiency work so that the people who could most benefit from energy savings realize them early on;
5. Stakeholders – community, labor, and environmentalists – directly involved in the oversight of Boston's energy efficiency work;
6. Financing mechanisms that maximize energy savings for local residents and supports funding the job training programs needed to ensure low-income communities and communities of color are being trained for the energy efficiency jobs.

Our Coalition

We are an emerging coalition of community organizations, labor unions, environmental organizations and other allied organizations.

The coalition includes a wide array of organizations that meet regularly and are responsible for shaping the campaign's policy focus and planning the campaign's strategies and activities. The coalition is headed up by a Steering Committee of base-building community organizations representing low-income communities and communities of color. The Steering Committee is further supported by representatives from other sectors (unions, environmental organizations, workforce development organizations among others) who are willing to play a leadership role organizing other groups in their sectors behind this work. The Steering Committee meets in between Coalition meetings, plans the meeting agendas and plays a leadership role in the campaign work. Community Labor United convenes and staffs the Coalition work.

Green Justice Coalition Steering

Committee: *Alternatives for Community & Environment/ACE*

ACORN

Boston Climate Action Network (BCAN)

Chelsea Collaborative

Clean Water Action

Dudley Street Neighborhood Initiative (DSNI)

MassCOSH

New England Council of Carpenters

Painters & Allied Trades DC35

Project RIGHT

For more information, contact:

Community Labor United, 8 Beacon Street, 2nd Floor Boston, MA
02108 617-723-2639

www.massclu.org

APPENDIX B:

A Declaration of Energy Empowerment for the Commonwealth of Massachusetts at Faneuil Hall in the City of Boston November 25, 2008

I. OUR RIGHTS AND RESPONSIBILITIES

As citizens of the most prosperous and technologically advanced nation in the history of the world, we have the following rights and responsibilities:

- We have the **right** to warm homes in wintertime.
- We have the **responsibility** to use only our share of energy and leave enough for the rest of the world and for future generations.
- We have the **right** to choose clean, renewable energy.
- We have the **responsibility** to lead the nation in a profound energy transformation.
- We have the **right** to an economy based on sustainable principles for all our citizens that will enrich our society, protect our environment, improve our homes, and provide for the general welfare of our commonwealth.
- We have the **responsibility** to create new jobs with fair wages that will transform our energy economy as rapidly as possible.
- We have a **right** to expect the utilities, oil companies, and energy service companies that serve us to be part of the solution, and to emphasize efficiency and modernity in exchange for a fair return.
- We have a **responsibility** to work together for the mutual benefit of all and to come together, with government, to identify and support the most vulnerable among us.
- We have a **right** to justice; to have impacts and benefits distributed across our Commonwealth, with geographic, economic, and racial equity.

These rights and responsibilities empower and require us as citizens to change our systems for providing and using energy as swiftly and as deeply as possible in order to secure the irrevocable and sustainable prosperity necessary to the health and welfare of us all.

II. THE PRESENT DANGER AND OPPORTUNITY

We have gathered because we find ourselves at a moment of fearful opportunity requiring profound — indeed revolutionary — commitment to new action.

Though many problems remain to be solved, the hard work of our predecessors and our fellow citizens has taught us how to make cleaner energy, how to stop the leakage of heat from our homes, and how to live sustainably. Yet to date we have failed to apply this precious knowledge at the necessary scale and speed. We are now experiencing a crisis of many dimensions. The cost of energy this winter will leave many of us and of our friends unable to heat our homes adequately. We welcome the important programs that provide fuel assistance to those who are most in need. We also believe that we must act urgently to prevent those dollars from being wasted forever on expensive fuels running through obsolete systems in leaky buildings. Poor and middle class families must not be held hostage year after year to old technologies and to narrowly defined economic interests.

The economic failures of the last years are now pushing more and more middle class families into precarious circumstances. Energy costs now regularly compete with basic needs for shelter, food, transportation, education, and medical care. The continued waste of energy will lead inexorably to more dangerous debt, more bankruptcies, more foreclosures, and more homelessness. As many as 500,000 Massachusetts households — one in five — are at risk.

Moreover, some of the earlier technologies which created the modern world are now threatening our ability to maintain civilization as we know it. Our national profligacy and inattention has contributed to emerging dangers which, as always, will impose the heaviest burden on those least able to bear it.

As in other moments of our national history, this confluence of threatening events — erratic energy prices, economic upheaval, slow innovation, unchecked self-interest, and environmental degradation — can also offer us the historic opportunity to unite for action. The problems we face — and the solutions those problems require — are interdependent. The right thing to do has become not only possible, but desirable and attainable.

But we must declare our rights and embrace our responsibilities with one voice. We must act boldly in the present to safeguard our future.

III. THE RESPONSE OF GOVERNMENT AND OTHER PARTIES

We applaud the Administration's convening of a task force to develop recommendations to

the current crisis. The provision of more fuel assistance and energy efficiency dollars are welcome. The improved information services and emergency preparations are vital. We pledge to support the roll-out and implementation of these provisions through our individual and collective actions.

These proposals, however, need to be implemented immediately. We do not have the comfort of time. We will suffer if there is additional delay.

Moreover, we call on every branch of government and every network of citizens to recognize that every change we make must be made for the long-term. Our old problems require new thinking. Those who have become comfortable with the methods and markets of the past must seize the economic opportunities of innovation and entrepreneurship, or step aside. Building on the important legislation passed by the legislature and approved by the governor this past summer, we must accelerate and intensify the depth and breadth of fundamental change. Our duty must be to solve the problems of this winter and the problems of winters to come.

IV. OUR CALL IN THE MOMENT

Therefore, as citizens of the Commonwealth, we call on our leaders and on members from all sectors of society to embark on a revolution in our technology, economy, environment, and security that will protect this state and all its inhabitants from the ravages of the cold winds of winter and recession and secure the future for our children and our planet.

Our goals, as matter of urgency and justice, must be:

1. **the updating of every building and home** to reduce or eliminate heat waste everywhere in the Commonwealth of Massachusetts
2. **the establishment of a "Massachusetts Energy Revolution Fund"** large enough to pay for efficiency improvements in at least 200,000 homes a year
3. **the creation of 10,000 new green jobs** through the retrofitting of old structures and the building of new ones, through the implementation of current technologies and the invention of new ideas, within two years
4. **the rapid development of our educational system and workforce** — from high school and vocational schools to universities and apprenticeship programs — through the sharing of best practice information through the Internet and other methods and the provision of loan assistance to create knowledgeable workers and consumers of the future

5. **the full participation by all market segments**, using all the tools available, recognizing there is no one solution which will work in areas rural, urban and suburban
6. **the rescue of the most vulnerable among us**, through the banding together of all parties, including religious organizations, community groups, municipalities, and community leaders as a matter of fundamental decency and economic necessity

Mindful that we are privileged to live in the

seat of American liberty, where the dreams of a few became of the challenge of many and finally the reality for all, we dedicate ourselves to the achievement of this vision. It cannot be deferred to some distant future, but must be obtained in “the fierce urgency of now.” To fail to seize this opportunity would be as wasteful of our tomorrows as our buildings are today.

Under a new American president, in a new American era, we welcome the tasks that are uniquely ours in this moment of history. The problems we face are deep and systemic and

will not be fixed with faint hearts or weak steps. They can be resolved only with the full measure of brilliance and devotion that has been our common heritage and - if we can summon the courage – will this day become our common destiny.

It is our duty to act. And it is this duty, not with fear but with joy, that we fully and freely accept.

APPENDIX C:

Greater Boston (Boston-Quincy MSA) and the City of Boston in relation to The Commonwealth of Massachusetts

	City of Boston		Boston-Quincy MSA		Commonwealth of MA	
	#	%	#	%	#	%
Population	613,117	9.5%	4,633,717	71.8%	6,449,755	100%
	580,054	9.3%	4,503,452	72.1%	6,244,824	100%
Number of households	229,787	9.4%	1,684,749	68.8%	2,449,133	100%
In poverty	118,125	20.4%	401,206	8.9%	621,286	9.9%
Median Household Income	\$50,476		\$68,792		\$62,365	
Less than HS diploma	49,958	15.8%	201,731	63.8%	316,330	100%
HS Graduate	83,251	9.2%	606,847	67.2%	903,607	100%
Housing Units	254,599	9.4%	1,864,064	68.5%	2,722,323	100%
Labor Force	304,272	8.9%	2,483,684	72.5%	3,423,500	100%
Unemployment	16,694	8.9%	123,622	66%	187,300	100%
Unemployment Rate 9/008	5.5%		5.0%		5.5%	

Data Source: 2007 ACS, US Census Bureau & MA DETMA . Compiled by Mary Jo Connelly, Community Labor United

APPENDIX D:

005 COSTS & BENEFITS BROKEN OUT BY UTILITY

For the 2 Major Boston-Area Utilities, as reported by Environment Northeast*

Company	Sector	UTILITY COSTS	CUSTOMER COSTS	TOTAL RESOURCE COSTS	TOTAL RESOURCE BENEFIT	Cost/ Benefit Ratio	Annual Energy Saving	LIFETIME ENERGY SAVINGS
Nat'l Grid								
	Res.	\$19.96M	\$7.86 M	\$27.82 M	\$83.68 M	3.0:1	116.2K	833.2K
	Low Inc	\$9.25M	\$60.6K	\$9.31M	\$34.59M	3.7:1	8.2K	134.3K
	Comm/ Indust	\$24.98M	\$9.92M	\$34.9M	\$90.12M	2.6:1	74.8K	1,170K
	Total	\$54.19M	\$17.84M	\$72.03M	\$208,39M	2.9:1	199.1K	2,137.8K
NSTAR								
	Res.	\$12.93 M	\$4.98M	\$17.91M	\$51.73M	2.9:1	73K	493.9K
	Low Inc	\$4.98M	\$0	\$4.98M	\$19.46M	3.9:1	7.3K	122.7K
	Comm/ Indust	\$34.0M	\$11.9M	\$45.9M	\$161.0M	3.5:1	120.6K	1.68M
	Total	\$51.92M	\$16.89M	\$68.80M	\$232.2M	3.4:1	201K	2.3M
% of Statewide Total								
	Res.	85%	91%					
	Low Inc	85%						
	Comm/ Indust	86%	88%					
	Total	85%						

Pollution reduction:

Equivalent Lifetime Emissions Avoided

Company	Sector	SO2 Tons	NO2 Tons	CO2 Tons
Nat'l Grid				
	Res.	846	225	459.1K
	Low Inc	136	36	74K
	Comm/Indust	1,188	316	644.9K
	Total	2,170	577	1,177.9K
NSTAR				
	Res.	501	133	272.1K
	Low Inc	125	33	67.6K
	Comm/Indust	1,706	454	926.3K
	Total	2,332	620	1,266K

* in Massachusetts Energy Efficiency Program Benefits, 2008. NOTE: These results represent more than a Boston area total, since National Grid and NSTAR, in addition to being the Boston region's providers, also provide power to other regions of Massachusetts.

APPENDIX E:

Labor Content in Energy Efficiency Retrofits

Job-years from \$1 million investment (UF/COWS model)

	Supervisor	Skilled/semi-killed	Entry level	Total
Insulation	0.5	4.6	2.1	7.2
HVAC/plumbing	0.1	1.1	0.5	1.7
Air sealing	0.1	0.7	0.3	1.1
Appliances /CFLs	0	0.2	0.1	0.3
Total	0.7	6.6	3	10.4

Example 2: Health Care facility

Investment ratio (derived from published findings on ESCO reports)

Lighting	21.1%
HVAC	62.9%
Building Envelope	16.0%

Job-years from \$1 million investment (UF/COWS model)

	Supervisor	Skilled/semi-killed	Entry level	Total
Lighting	0.2	1.4	0.7	2.3
HVAC	0.5	4.5	2	7
Building Envelope	0.1	1	0.5	1.6
Total	0.8	6.9	3.2	11.0

Other investment ratios available: K-12 school, University, Office

Source: COWS /University of Florida model, communication with researchers. Also cited in White, Sarah and Jason White, Green Pathways, University of Wisconsin Center On Wisconsin Strategy, 2008.

APPENDIX F:

Commonwealth of Massachusetts
Massachusetts Saving Electricity:
A Summary of the Performance of Electric Efficiency Programs Funded by Ratepayers
Between 2003 and 2005
Executive Office of Energy and Environmental Affairs Massachusetts Division of Energy Resources
April 2, 2007

April 2, 2007 Highlights of 2003-2005 Ratepayer-Funded Electric Efficiency Programs

This report provides an overview of the performance of ratepayer-funded electric energy efficiency investments made during the years 2003 through 2005.

- **Efficiency is the cheapest electricity resource** and it became cheaper from 2003-2005. The cost to achieve energy savings dropped 15% over the three year period, from 3.8 cents to 3.2 cents per kWh. In comparison, the cost to produce electricity over the period *increased* by 61% to 8.9 cents per kWh.
- **Each dollar invested in electric efficiency will create an estimated \$2.84 in benefits over the life of the installed measures, the equivalent of a 184% return on investment.**
- **For an investment of \$371 million in ratepayer funds over the three year period, the cumulative lifetime bill savings to all participating customers will amount to approximately \$1.2 billion.**
- **For investments of \$48 million over the three year period that improved the efficiency of low-income households, those households are projected to avoid some \$140 million in electricity costs over the lifetime of the installed measures.**
- A 216 MW reduction in demand for summer peak power produced \$19.5 million in wholesale price savings by reducing the amount of wholesale power needed to meet overall demand during the most expensive hours of the year.
- **Investments made in electric efficiency by these programs over the years 2003-2005 will reduce cumulative power plant emissions over their lifetime, including**
 - More than 4,300 tons of nitrous oxides
 - More than 16,000 tons of sulfur dioxide; and
 - Almost 9 million tons of carbon dioxide
- More efficient lighting will contribute over 54% of the total electricity savings achieved over the life of these investments; 23% of the electricity savings will come from heating, ventilation and air conditioning improvements.
- **Incentives for energy-efficient equipment typically provided about 60% of project costs, with participating customers paying the balance. In some special cases, such as small business programs, incentives contributed 80% of project costs, while for some municipal projects; incentives covered 100% of project costs.**
- **The lifetime economic impacts of the efficiency investments made during these three years will stimulate over 11,000 job years, increase personal Disposable Income by \$650 million and will add almost \$1.4 billion to the Gross State Product.**

APPENDIX G:

Massachusetts Incentives for Renewables and Efficiency Available to Eastern MA Residential Customers

Source: DSIRE Database of Incentives for Renewables and Energy Efficiency

full Listing available at: <http://www.dsireusa.org/library/includes/maphomeowner.cfm?State=MA&CurrentPageId=1&RE=1&EE=1>

Massachusetts Incentives for Renewables and Efficiency

National Grid – Residential (Electric) Energy Efficiency Incentive Programs

Last DSIRE Review: 07/22/2008

Incentive Type:	Utility Rebate Program
Eligible Efficiency Technologies:	Refrigerators/Freezers, Lighting, Furnaces, Heat pumps, Air conditioners, Duct/Air sealing, Building Insulation, Comprehensive Measures/Whole Building
Applicable Sectors:	Residential, Multi-Family Residential
Incentive Amount:	MassSAVE: 50% of project cost Lighting rebates: \$2-\$20/fixture Central AC/Air Source Heat Pump: \$300 ECM motor installed in gas furnace: \$400
Maximum Incentive:	MassSAVE: \$1,500
Website:	http://www.thinksmartthinkgreen.com

Summary:

National Grid offers a variety of energy efficiency incentives for residential customers.

The National Grid New Construction program offers incentives and technical support to help their customers who are building an Energy Star certified home. In addition, the Energy Star Rebate program offers various rebates to National Grid's residential customers for the purchase and/or installation of certain Energy Star certified equipment. Eligible equipment includes lights, washers, room air conditioners, refrigerators, central air conditioners, heat pumps, and ECM motors installed in gas furnaces. Rebates range from \$2 to \$300. Some rebates are given at the time of purchase while others require a mail-in application. The program website above lists the specific requirements for the different rebates available.

The Massachusetts MassSAVE Program pays residential customers 50% of the cost (up to \$1,500) for improvements in insulation, air sealing, and other measures. Incentives are also available to replace inefficient lighting, refrigerators and heating systems.

Energy Wise is a program designed for condominiums and multifamily facilities to improve their energy efficiency. National Grid provides a free energy analysis, lighting system upgrades, and other electric efficiency measures. If the facility is electrically heated, it may also qualify for insulation and air sealing. Installation of some energy efficiency measures requires a customer co-payment.

Massachusetts Incentives for Renewables and Efficiency

National Grid – Residential (Gas) Energy Efficiency Programs

Last DSIRE Review: 07/22/2008

Incentive Type:	Utility Rebate Program
Eligible Efficiency Technologies:	Equipment Insulation, Water Heaters, Furnaces, Boilers, Programmable Thermostats, Caulking/Weather-stripping, Duct/Air sealing, Building Insulation, Windows
Applicable Sectors:	Residential, Multi-Family Residential
Incentive Amount:	Rebates: Vary by technology Weatherization Program: 20% of costs
Maximum Incentive:	Weatherization Program: Up to \$750
Website:	http://www.thinksmarthinkgreen.com

Summary:

National Grid offers a number of programs to encourage energy efficiency amongst its residential customers.

National Grid's High Efficiency Heating Rebates are offered to any residential heating customer in Massachusetts, New Hampshire, Rhode Island and Metro New York. Eligible technologies include boilers and furnaces. Rebates of up to \$1,000 are available, depending on equipment type. All equipment must meet certain energy standards provided on the website. Applications are to be completed and sent in after equipment installation. The application form is available on the program's website.

National Grid also offers \$10 rebates to residential heating customers for every ENERGY STAR® replacement window with a U-factor of .35 or less installed in their home, and \$50 rebates are available for the purchase and installation of programmable thermostats. In addition, National Grid offers a rebate of up to \$300 for energy efficient on-demand tankless water heaters and high efficiency in-direct water heaters. Applications for all of these rebates can be found off the program website above or at the individual program websites.

National Grid Residential Weatherization Program is for heating customers in New England. The program provides a rebate covering 20% of the cost, up to \$750, for various weatherization measures, including: attic, wall, basement, crawl space, rim joist, and heating system duct insulation; attic ventilation; and air infiltration and ductwork leakage testing and sealing. Work must be completed by a National Grid approved contractor.

Massachusetts Incentives for Renewables and Efficiency

National Grid - Solar Thermal Rebate Program

Last DSIRE Review: 11/24/2008

Incentive Type:	Utility Rebate Program
Eligible Renewable/Other Technologies:	Solar Water Heat, Solar Space Heat, Solar Thermal Process Heat
Applicable Sectors:	Commercial, Industrial, Residential, Multi-Family Residential, (National Grid Customers Only)
Incentive Amount:	Residential: 15% of project cost; Commercial/Multi-family: \$3/therm based on estimated first-year savings
Maximum Incentive:	Residential: \$1,500; Commercial/Multi-family: \$100,000 per project, up to 50% of project costs
Website:	http://www.thinksmarthinkgreen.com

Summary:

National Grid provides funding support to residential, commercial, industrial, and multifamily customers who install solar thermal technologies. Recommended solar thermal applications include solar hot water heating, and in some cases solar space heating or high temperature process applications. Eligibility requirements are in place to ensure quality installation of solar thermal systems.

Residential customers: National Grid customers with eligible SHW systems can apply for a rebate of 15% off project costs up to a maximum of rebate of \$1,500 for solar water heating systems. This rebate requires that participating customers share their water heating usage data for a period of 12 months in order to receive funding. National Grid works directly with residential solar installers, who submit rebate applications on behalf of the customer.

Commercial & Industrial, and Multi-family customers: National Grid requires a free energy audit to interested participants to identify appropriate solar thermal technologies as well as estimated natural gas savings. Commercial, industrial, and multifamily customers receive a one-time rebate of \$3 per therm of estimated first-year savings, up to 50% of the project costs or \$100,000 per project.

Funding is limited. For further information please visit the program website or contact National Grid using the information below.

Massachusetts Incentives for Renewables and Efficiency

NSTAR - Residential Energy Efficiency Programs

Last DSIRE Review: 07/29/2008

Incentive Type:	Utility Rebate Program
Eligible Efficiency Technologies:	Water Heaters, Lighting, Furnaces, Boilers, Heat pumps, Air conditioners, Programmable Thermostats, Duct/Air sealing, Building Insulation, Comprehensive Measures/Whole Building
Applicable Sectors:	Residential, Installer/Contractor, Low-Income Residential
Incentive Amount:	Central A/C: \$300-\$500, varies by efficiency level Central A/C downsizing: \$150 Room A/C: \$30 Lighting Fixtures: \$10-\$15 Programmable Clock Thermostat: \$25 Furnaces: \$100/\$400 (varies according to efficiency rating) Boilers: \$200-\$1000 Indirect and On-Demand Water Heater: \$300
Maximum Incentive:	Up to \$1500 for weatherization measures Up to \$2000 for Low-Income energy efficiency measures
Equipment Requirements:	Equipment must be Energy Star qualified HVAC: SEER 14/EER = 11.5 to 11.99 HVAC downsizing: SEER 13.0 or greater On-demand Water Heaters: EF of 0.82 or higher with an electronic ignition
Installation Requirements:	Equipment must be installed by a licensed heating or plumbing contractor at the customer's address listed on the GasNetworks Rebate Form.
Expiration Date:	Equipment purchases and installations must be made between September 1, 2007 and April 30, 2009. Rebate form must be filled out completely, signed and accompanied by dated receipts, and received by GasNetworks by July 31, 2009.
Project Review/Certification:	Prior to honoring any rebate, GasNetworks reserves the right to conduct an on-site verification that equipment has been installed and is in operation.
Website:	http://www.nstaronline.com/residential/energy_efficiency/gas_programs/Default.asp?

Summary:

NStar offers several energy efficiency rebate programs for both electric and gas customers. Rebates are limited to residential and small business customers and are offered in conjunction with Gas Networks. Eligible equipment available for rebates includes:

- Energy Star Lighting Fixtures
- Energy Star Air Conditioning Units
- Air Source Heat Pumps
- Water Heaters
- Programmable Thermostats
- Boilers/Furnaces

For gas customers interested in adding wall insulation, attic insulation or air sealing to their homes, NSTAR offers a weatherization rebate for up to \$1,500 for such upgrades. In addition, electric customers who qualify for low-income assistance are eligible to receive up to \$2000 for energy efficiency measures to be installed in their homes.

More information, including equipment requirements and applications may be found on the website listed above.

APPENDIX H:

ESCOs Serving the Northeast Region (reported by NAESCO, the National Association of Energy Services Companies)

ESCO Providers

Company	Location	Phone Number
AMERESCO	Framingham, MA	508/661-2200
Burns & McDonnell	Kansas City, MO	816/822-4367
Chevron Energy Solutions	Overland Park, KS	913/748-8700
ConEdison Solutions	White Plains, NY	914/286-7085
Custom Energy Services, L.L.C.	Overland Park, KS	913/888-8050
Dalkia Facilities Services, LLC	Houston, TX	281/985-5558
Direct Energy	Irving, TX	469/789-9920
DMJM Harris	New York, NY	212/973-3009
EPS Capital Corp.	Doylestown, PA	215/230-9871
Honeywell International Inc.	St. Clair, MI	810/326-0642
Johnson Controls Inc	Milwaukee, WI	414/524-7331
NORESCO	Westborough, MA	888/NORESCO
Pepco Energy Services, Inc.	Arlington, VA	703/253-1750
Siemens Building Technologies	Buffalo Grove, IL	847/941-5461
TAC Energy Solutions	Carrollton, TX	972/323-1111
The EnergySolve Companies	Somerset, NJ	732/748-4200
Trane	St. Paul, MN	605/692-4663
Water & Energy Savings Corporation	St. Pete Beach, FL	727/363-7000
Wendel Energy Services	Amherst, NY	716/688-0766

**Note: This list is not complete. For example, Conservation Services Group, of Westborough MA, is the largest provider of residential retrofit services. It is also the only nonprofit ESCO operating in Massachusetts.*

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Roxan McKinnon, *Executive Director, City Life/Vida Urbana*
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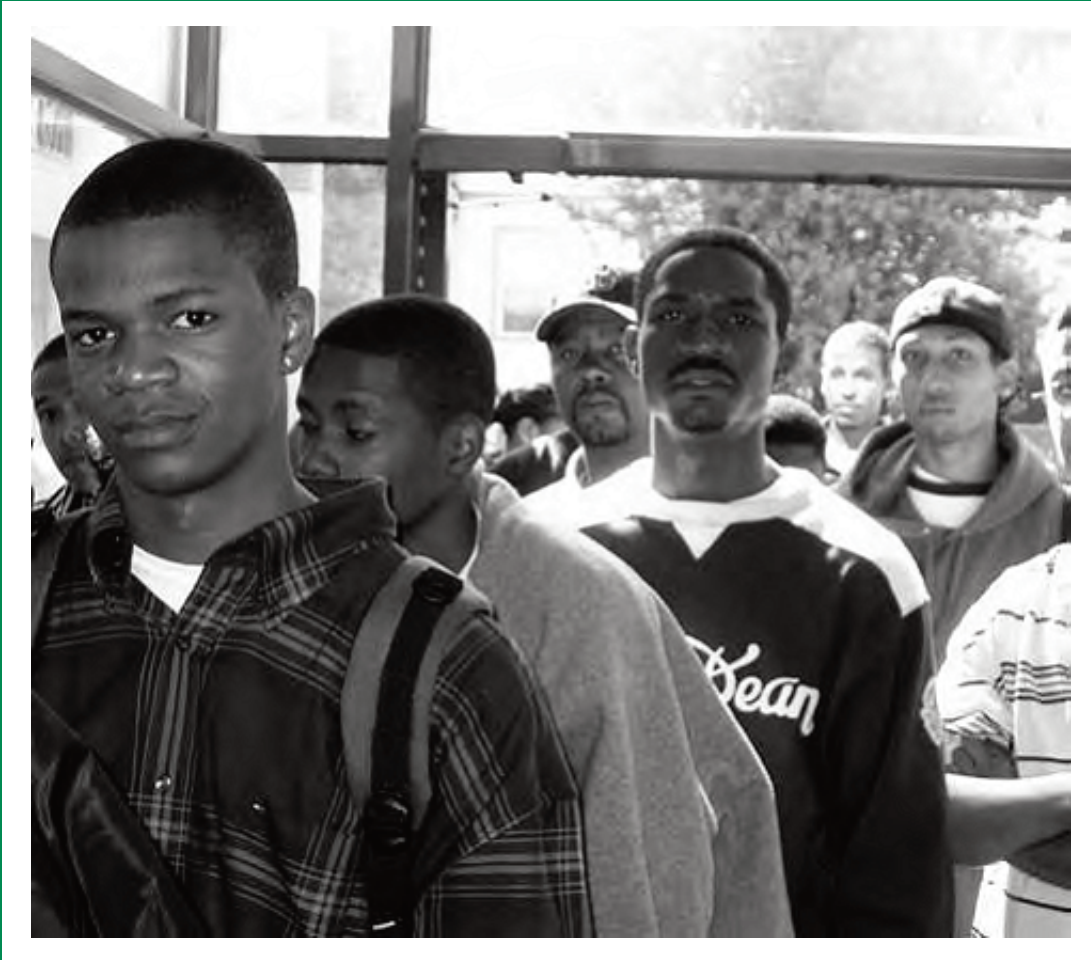
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