



Green Jobs/Green Homes New York



Expanding home energy efficiency and creating good jobs
in a clean energy economy.

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Preface

Over nearly three decades of environmental justice organizing, communities have built local leadership to fight for open space, brownfield remediation, clean air, green energy and urban forestry—not only as environmental issues, but as fundamental components of economic fairness and democracy. The new drive for energy efficiency, reanimated and brought to national attention by the imminent threat of climate change, is an unprecedented chance to expand on this work by uniting communities, labor, environmental advocates, state agencies, and many others to develop environmental and economic justice in New York State.

The burden of energy-inefficient housing falls heavily on middle- and lower-income New Yorkers, many of whom live in older homes and can't afford the upfront costs to make them more efficient. Energy use can be lowered with simple measures such as adding insulation, replacing appliances, and upgrading heating systems. These fixes quickly pay for themselves in lower utility bills, and dramatically reduce energy cost burdens on cash-squeezed households. They also are important tools for countering local impacts of climate change and improving environmental quality.

Frustratingly, the potential of energy efficiency to support economic and environmental justice has remained untapped. The benefits of efficiency and incentives now go largely to homeowners with access to capital—those who have cash or can get a bank loan for some or all of the costs.

The program presented in this paper, Green Jobs/Green Homes NY, fills in what we've lacked: a large-scale plan to make retrofits affordable to New Yorkers who don't have access to sufficient capital. But the imperative for using residential retrofits to give all New Yorkers a chance to save on energy costs goes beyond funding. Energy efficiency represents a major capital undertaking, but must also engage communities to participate in planning and reaping the benefits of this publicly led investment in jobs, affordable housing, and environmental stewardship.

Green Jobs/Green Homes NY is a comprehensive approach that connects those dots. It provides the framework for ensuring mass retrofits are implemented through a community lens, adding value to ongoing local work toward economic and environmental equity. Building on and linking unions' and community groups' existing job training—and

shaping the expanding retrofit industry with decent wages and benefits—can provide direct economic gain to whole communities (not just owners or occupants of retrofitted housing) by bringing many thousands of much-needed, good-paying jobs and career paths to local residents.

Green Jobs/Green Homes NY critically establishes dynamic, new relationships among policymakers, labor, and communities around the state in a shared effort to foster a fair green economy. Climate change and economic upheaval both demand that we transform our economy from the bottom up, starting now. Our decision-makers don't have to start from scratch: Here is a primer on how to get it done. We are hopeful, excited, and ready to seize this chance together.

James Melius, Administrator, New York State Laborers' Health & Safety Fund

Elizabeth C. Yeampierre, Esq, President, New York City Environmental Justice Alliance

Introduction

If billions of dollars were lying unclaimed on the sidewalk, why wouldn't someone pick them up? Such a question has long puzzled observers of America's energy economy who understand how much money we collectively squander through the widespread inefficient use of energy.

At an annual cost to consumers of \$400 billion, the energy used in U.S. buildings accounts for nearly 40 percent of total U.S. energy consumption and greenhouse gas emissions: more than transportation or industry. Buildings are also grossly energy inefficient. Common fixes—better caulking, more efficient lighting, heating, cooling, and other measures—could cost-effectively cut building energy use in half, with the value of lifetime energy savings exceeding the cost of materials installation and maintenance. Along with gains to consumers and climate, this would raise buildings' values and increase the comfort and productivity of buildings' inhabitants. Retrofits also generate significant employment, most of which, by necessity, is local.

Given the many benefits to climate, community, income, and employment, one might think that retrofits would be widespread, even routine. In fact, they've touched only a tiny share of the America's 300 billion square feet of building space. Part of the reason is that energy savings are as widely distributed as buildings themselves. While their whole is very large, their parts, for individual property owners, are often small. Even where significant savings are available (and what's insignificant for an investment banker may be very significant for a middle-income family), an array of barriers—lack of public knowledge, lack of capital or reliable contractors, the hassle and disruption of physically altering a building and more—hampers energy efficiency retrofits. Individual homeowners and building owners are not investing in greening. Nor are municipalities, states, or the federal government leading the massive move toward retrofits at the scale we need, which is most urgent now for economic, employment, and environmental reasons.

That may be beginning to change. The public is worried about climate change and energy dependence. Falling incomes and financial collapse have restored frugality's good name. Not only is "green" fashionable, but many people are looking for ways to lessen their own environmental impact. Labor unions and community groups recognize the opportunity for good jobs and community development. Steady progress in efficiency technologies and markets that value demand reduction are changing the economics for investors. And

the Obama administration is taking real leadership on the issue: It has made building energy efficiency a national priority, and made a down payment of tens of billions of dollars in public support for it in the recent American Recovery and Reinvestment Act and its 2010 budget.

Still broadly lacking, however, are operational plans to bring building efficiency to real scale and economic sustainability. Energy efficiency must be supported by policy that will attract private, not just public capital. Programs must be attractive to investors, not just consumers. And plans must attract contractors and workers to supply quality local labor, not just create demand.

Stepping into this gap, Green Homes/Green Jobs NY proposes a multibillion-dollar investment in home-energy efficiency—though importantly, the terms of this deal could easily be extended to commercial properties—that would be spurred by public investment but largely paid for by the private parties who benefit. What is inestimably valuable about the report is that it outlines the details of precisely how this would be done, how it would start and scale, who would bear the risk, what verifiable returns—in carbon reductions and money—are likely to be, and how to ensure that this plan is not just financially sound but “high road” in its attention to equity and public accountability, not just environmental gain.

In short, this paper is a very considerable achievement. We’d strongly encourage anybody involved in energy efficiency efforts—whether you represent capital, labor, community, government, or consumers—to read on.

Joel Rogers, Director, Center on Wisconsin Strategy and the Center for State Innovation
Bracken Hendricks, Senior Fellow, Center for American Progress

Executive summary

Over the next two years, federal stimulus funding will pour into state energy-efficiency programs and prompt a massive ramp-up of existing capacity. These investments offer a historic opportunity to develop green policy infrastructure at the state and local levels that can be sustained after the stimulus dollars are spent. Those states that have already established energy-efficiency infrastructure and possess a coherent plan to implement expansion will be best positioned to lead this national moment.

Green Jobs/Green Homes NY is such a plan: a policy roadmap for New York State to achieve mass-scale energy-efficiency improvements—or retrofits—of 1 million housing units over the next five years. The program will:

- **Combat climate change** by reducing home energy consumption by 30 percent to 40 percent. This reduction will avoid the need for new power plants and cut residential energy use—which is responsible for about 40 percent of New York’s greenhouse gas emissions.
- **Create 60,000 green job-years** directly related to the expansion of retrofit work and another 60,000 job-years indirectly through additional economic activity.
- **Save New York households more than \$1 billion annually** through reduced home energy use and energy bill savings, with consumer protections to maximize benefits of lowered housing costs.
- **Leverage \$5 billion in private investments to pay for retrofits** through the creation of an innovative financing model to secure third-party investments.

Green Jobs/Green Homes NY will be the largest residential retrofit program ever initiated in the United States and can serve as a model for the nation.

How the program works

Green Jobs/Green Homes NY will make retrofits available to owners of any type of housing in New York State and at any level of income provided that owners are utility customers in good standing and live in targeted geographic areas. The program can also be made available to renters of single-family homes who own the utility meter account and have sole physical control of the housing unit.

Navigating the Green Jobs/Green Homes NY program as a homeowner

A homeowner or building owner wants to make their home more energy efficient. What happens next?

| | |
|--------|---|
| Step 1 | The homeowner or building owner calls the agency housing the program and is screened for eligibility. If eligible, the program sends out an energy auditor for a nominal fee. |
| Step 2 | The auditor tests the structure to determine what retrofits will make it significantly more energy efficient, and directly installs some low-cost measures such as caulking and faucet aerators. Based on the tests, the auditor proposes retrofit options that save enough on the owner's energy bills to pay for the cost of the retrofit within 8 to 10 years. In multi-family buildings, some relatively low-cost measures are included because they benefit the tenants or the environment—such as green roofs—regardless of whether they yield significant on-bill savings. |
| Step 3 | The owner is provided with a certified contractor, or may choose their own. The contractor performs the work and guarantees the performance of the improvements. |
| Step 4 | Green Jobs/Green Homes NY pays the contractor with funds from a Residential Retrofit Investment Fund, or RRIF, created with private investments. In one- to four-unit homes, the RRIF pays all up-front contracting costs. In larger multifamily buildings, the owner may be required to contribute 10 percent of contracting costs unless hardship is established. |
| Step 5 | The retrofit should reduce the owner's energy bill by 20 percent to 40 percent. After the work is completed, the owner keeps 20 percent of the projected energy savings and the utility collects the remaining 80 percent and returns it to the RRIF until investors are repaid. Owners keep all savings after the retrofit cost is repaid. If the homeowner moves they must secure agreement from the new owner to take over the repayment obligation. |

At the state level, Green Jobs/Green Homes NY presents an implementation framework to coordinate the many resources needed to make the program a success. This is an enormous task to be undertaken at the same time that the state is increasing the capacity of other energy-efficiency and weatherization programs. It will require organizing the cooperation of utilities and the Public Service Commission to support the program, building upon existing state agency infrastructure to meet the new scale of administrative and management needs, and identifying sources of off-budget state funding to support program development and expansion.

Removing barriers to scale

Science-based residential retrofits deliver many benefits, but key barriers have kept other state and local energy-efficiency initiatives at a relatively small scale:

- **Up-front capital costs of retrofits** have limited the reach of state programs and priced out many individual home and building owners.
- **The lack of a coordinated green workforce development pipeline** has hampered the availability of trained and certified workers to meet the expansion of retrofit demand.
- **Contractors have been reluctant to expand their work capacity** since demand for residential retrofits is scattered. And contractors' investments in training workers are often lost as workers move on due in part to low-sector wages and poor career mobility.

- **Homeowners have been hard to engage**—even those with access to capital—and often view greening as a “boutique” or marginal project.
- **Building owners face a disincentive to implementing energy-efficiency measures** in cases where both tenants and owners pay some energy bills, because part of the return on owners’ energy investments goes to tenants.

The Green Jobs/Green Homes NY policy blueprint is designed to overcome these challenges, which guides the following recommendations.

Recommendations

- **Create a Residential Retrofit Investment Fund, or RRIF, to leverage private capital to pay for retrofits** and use utility bills to recoup investments. With “on-bill recovery,” utility bills for retrofitted homes will include a line item that returns a portion of energy savings to investors until retrofit costs are repaid over a 10-year period. The remaining savings stay with the owner.
- **Target small geographic areas for defined numbers of initial retrofits** so that contractors can understand and respond to demand, bundle retrofit projects in many homes for economies of scale, and develop local capacity.
- **Convene a statewide Workforce Planning Panel to reorganize existing workforce development resources to support green jobs.** This collaborative body will guide best-value contracting rules, establish clear pathways to training and jobs for underemployed and displaced workers, and seed the labor-management-community partnerships that form the cornerstone of the Green Jobs/Green Homes NY workforce proposal. Stakeholders will include constituency-based community groups who can integrate recruitment of trainees with other outreach on energy efficiency, community-based work readiness programs, union training programs, contractors engaged or interested in home performance work, and others.
- **Use a state role in enacting the RRIF to lift wages, create “pathways out of poverty,” and support union jobs.** This will also ensure that all contractors who receive payment through the RRIF abide by wage standards, commit to training and hiring targets from economically marginalized communities, and leverage intensive apprenticeship participation on large-scale retrofits.
- **Ensure accountability from legislation through development and implementation by establishing a Stakeholder Accountability Board,** which will be responsible for convening appointed representation from community groups, unions, contractors, utilities, state agencies, and others. The first task of this board must be to set equitable criteria for

targeting retrofits to communities that need them and are prepared to engage deeply to leverage their benefits. Subsequent tasks include monitoring the program and problem-solving to ensure good outcomes.

- **Provide consumer protections to ensure that the full benefits of retrofits**, including lowered housing costs, reach targeted communities. These include warranties on retrofit work, special supports for lower-income participants, and rent protections for rental units where operating costs have been reduced by retrofits.
- **Develop a community outreach structure to mobilize participation in the program.** This will be primarily accomplished by developing regional networks of local constituency-based groups to educate and organize locally around retrofits, building partnerships with labor and business, linking community members to green jobs training infrastructure, and pre-enrolling homeowners and building owners for retrofits in target neighborhoods.

Making it happen

To achieve many of these recommendations, the New York State legislature and governor should pass comprehensive legislation during the 2009 legislative session to enact the following key elements of the Green Jobs/Green Homes NY:

- Authorize the program.
- Create the Residential Retrofit Investment Fund.
- Leverage funds from renewable state sources such as the System Benefits Charge and Regional Greenhouse Gas Initiative to draw down billions in private investment. These funds should also support auditing, administrative, workforce development, and other noncontracting costs, and federal stimulus dollars will also be used to seed the program.
- Authorize “on-bill recovery.”
- Ensure the repayment obligation “stays with the meter” if the property is transferred.
- Provide for necessary consumer protections.
- Create strong best-value contracting rules that support direct links between community groups, training and labor organizations, and contractors.
- Set good wages for work under the program, as well as certification and quality training standards that provide career pathways for retrofit workers.
- Provide supports for firms to expand.
- Create planning and implementation mechanisms to assist the program.

Overview

The United States in 2009 is poised to make critical changes in our relationship to energy: how we produce it, how we buy it, how we use it, and how we design infrastructure around it. The Obama administration's clear intent to focus federal resources on reducing energy imports, lowering energy costs, minimizing our carbon footprint, and creating green jobs has already generated a frenzy of planning by actors from state government and issue advocates to small contractors and local workforce training organizations. Federal stimulus funding will expand state energy-efficiency programming, job training, and "pathways out of poverty," and relief for homeowners' costs of fuel and weatherization. In short, states that can accomplish this work are positioned to benefit enormously from federal investments in energy, jobs, and housing.

New York is already well placed, alone with only a few other states in having developed organizational infrastructure for planning and delivering energy-efficiency programs, and having achieved success in serving several hundred thousand homes over the last three decades. Existing New York programs have performed retrofits that yield impressive energy savings; local governments are enacting "green up" efforts; and New York is moving forward on an extremely aggressive goal of reducing electricity use by 45 percent below forecasted levels by 2015 through reduced energy use and increased renewable energy production—its "45x15."¹ Under the umbrella of the Energy Efficiency Portfolio Standard proceeding, utilities have spent the last year identifying their needs and concerns around on-bill recovery of retrofit costs, and the New York State Energy Research and Development Authority and others have identified funding and infrastructure needs for developing the highly skilled end of the retrofit workforce.

Green Jobs/Green Homes NY fills in the final missing piece—a plan to build on existing infrastructure, to orchestrate the resources needed to bring energy-efficiency programs to the scale where they can literally reach every home. Green Jobs/Green Homes is a blueprint for massively scaling up energy-efficiency programming, removing cost and participation barriers, and ordering the process of workforce development and contracting.

It will:

- Save an average of 30 percent to 40 percent of energy use in each participating home for a savings of about \$1 billion per year.
- Directly create nearly 60,000 job-years (and indirectly create an additional 60,000) yielding more than 14,000 long-term jobs in retrofits.
- Significantly reduce the state's carbon footprint and help avoid the need for new power plants.

Under the umbrella of the Green Jobs/Green Homes NY coalition, community-based workforce groups and many unionized trades have begun planning for expanded workforce and training opportunities. Costs, labor needs, and other needed program data have been identified; detailed implementation issues are being worked out even as this paper is published. And an enormous amount of resource coordination—the most difficult hurdle in planning policy that reaches so many critical stakeholders—has been achieved.

In the current federal push for energy change, Green Jobs/Green Homes NY provides New York State with a critical advantage: a program that can serve as a model for national replication by establishing high work standards, good jobs, clear access to economic and environmental benefits for low-income communities, and drivers for a scalable, equitable green economy. New York State should seize this opportunity to benefit from unprecedented federal energy investment, and to lead the development of green pathways to real shared prosperity.

The emerging green economy: Why we must act now for energy efficiency and jobs

The convergence in New York of high energy cost burdens and ongoing job losses has created intense demand from policymakers for solutions to spur economic growth and help lower home energy costs. Among policy experts, large-scale energy efficiency projects are viewed as a critical opportunity for managing our energy supply, addressing climate change, and creating green jobs. It is a matter of immediate public policy to determine whether and how New York can act to reduce residential energy inefficiency, and who benefits from the emerging green economy.

Other state initiatives are building momentum for a comprehensive energy efficiency solution. New York has set the goal of 45 percent electricity reduction below forecasted levels by 2015 (“45 by 15”).² The Public Service Commission, which regulates the state's utilities, has initiated an Energy Efficiency Portfolio Standard, or EEPS, process to implement “45 by 15,” determine goals for the reduction of natural gas usage, and shape the development and funding of programs that will contribute to reduced energy consumption in all types of buildings. The Green Jobs/Green Homes NY project has designed a policy blueprint to ramp up New York's energy-efficiency programs developed in partnership between leading environmental, labor, workforce development, affordable housing, and community development stakeholders.

The project is an unprecedented statewide initiative to perform energy-efficiency improvements or “retrofits” on 1 million homes in five years. The program, designed to reduce energy costs and carbon emissions while creating good, career-making jobs, also is designed to be workable in a budget deficit year. The strategy proposes using Regional Greenhouse Gas Initiative auction funds to cover program administration costs, along with an innovative financing model that leverages private investment to provide the estimated \$5.5 billion in up-front retrofit costs by securing these funds with future energy bill savings. Green Jobs/Green Homes NY would be the largest residential retrofit program ever initiated in the United States, and should serve as a model for the nation.

Energy waste and CO2 emissions from residential buildings

Energy use for residential and commercial purposes, which is overwhelmingly expended by buildings and their uses, accounts for 51 percent of New York’s net energy consumption. More than half of that (53 percent) is in residential structures,³ which is more than housing in almost all other states. A full 40 percent of our carbon-based greenhouse gas emissions are also created by home energy use: Twenty-one percent just from generating electric power for our homes, and 19 percent from using energy within our homes.⁴ In fact, New York ranks *fourth* in the country for total residential energy consumption.⁵ Beyond consumer use of electricity for luxury appliances and the heating and cooling of large living spaces, much of the waste results from the fact that our homes leak energy. New York’s housing is particularly wasteful: It’s overwhelmingly old—although newer housing is inefficient, too—often poorly maintained because of owners’ lack of resources, and outfitted with inefficient heating systems.

High energy cost burdens and a contracting economy

New York currently pays more for energy than any other state in the nation. At the household level, the average price of electricity has increased almost 14 percent since January 2007,⁶ particularly squeezing budgets for New York’s families. Recession and job loss in New York State have added exponentially to these burdens. In the first half of 2008, the real median wage dropped 1.5 percent, and unemployment reached 20 percent in some metro areas.⁷ State Comptroller Thomas DiNapoli has predicted that more than 200,000 jobs will be lost by October 2009.⁸ As jobs are lost, household income is diverted away from such long-term investments as energy-efficiency housing repairs, depriving the state of both the economic benefits of energy efficiency and the crucial environmental benefits. Investment in housing and energy infrastructure is all the more important under these circumstances, but requires an infusion of outside funding. Households may not be in a position to do “deficit spending” to support this work, but other actors, facilitated by state and federal support, can fund energy efficiency as a sound investment.

“The cheapest, greenest power is the power never generated—the power we don’t make, transmit, or buy because we no longer need it.”

Underinvestment in energy-efficiency solutions

Increased energy efficiency is an essential first step in managing our energy supply, addressing climate change, and creating green jobs. So if residential energy-efficiency initiatives deliver so many benefits, why hasn't New York brought these efforts to scale yet?

The New York State Energy Research and Development Authority, or NYSERDA, programs currently perform energy-efficiency improvements, or “retrofits,” on 14,000 homes per year, and the New York State Division of Housing and Community Renewal, or DHCR, through federal weatherization assistance grants and its statewide network of local service providers, upgrades about 12,000 units. While New York's programs are much more far-reaching than those of most other states, a vastly scaled-up effort is needed to retrofit the majority of New York's 7 million homes to meaningfully reduce energy use and spur economic growth. There are a number of key barriers that have stood in the way of moving energy efficiency to scale:

- **Up-front cost to owners**—The up-front cost of a residential retrofit often deters a homeowner's investment in energy efficiency or makes it impossible for those without access to capital.
- **Split incentives**—Building owners generally aren't interested in investing in energy efficiency when tenants will harvest the savings in their energy bills; tenants are reluctant to invest their own money to upgrade units they don't own, and where they may not stay long enough to recover costs.
- **Limited funds in state and other public programs**—Most states do not have the funds to cover up-front capital costs for mass numbers of residential retrofits.
- **Lack of workforce**—A large-scale retrofit program requires an expansion of the workforce and contractor pool trained and certified in energy-efficiency work.
- **Lack of information and popular interest**—Of the more than 150 residential loan programs in the United States, most reach less than 0.1 percent of their potential customers due to poor marketing strategies and a failure to generate “tipping point” interest in energy efficiency.⁹

Green Jobs/Green Homes NY aims to develop an energy-efficiency program that overcomes these challenges.¹⁰

Green Jobs/Green Homes NY: Solutions for scaling up efficiency retrofits

Green Jobs/Green Homes NY outlines the needed elements for a state program to perform 1 million green residential retrofits in five years, and to fully capitalize on the opportunity for significant public benefits such as the creation of tens of thousands of family-sustaining jobs.

Residential retrofit measures

Deep reductions in home energy use can be achieved with retrofits such as weatherized walls and ceilings, energy-efficient heat and hot water systems, and energy-saving appliances and light bulbs. These measures save enough on energy bills that they quickly pay for themselves: Some measures (such as compact fluorescent light bulbs) pay back within months, and others (heating system replacements, for example) within about 15 years. By combining such measures, a fairly comprehensive package of retrofits can pay for itself within eight to 10 years. Existing programs of the New York State Energy Research and Development Authority, although limited by funding and other resource constraints, achieve these levels of success.

The Green Jobs/Green Homes NY model removes long-standing barriers to moving energy-efficiency programs in New York to scale:

Providing investment capital to fund retrofits

For homeowners, the need to provide up-front capital or have access to credit is eliminated under Green Jobs/Green Homes NY. Private capital, held in a newly created state-backed Residential Retrofit Investment Fund, or RRIF, will cover the up-front costs of retrofits. Investments in the fund will be repaid to private investors at competitive interest rates through “on-bill recovery” of retrofit contracting costs: Following the retrofit, utility companies will include a monthly charge on retrofitted customers’ bills (less than the average monthly savings) and return savings to the investment fund until costs are recovered. This financing mechanism can galvanize private investments in energy efficiency far beyond state budget constraints.

Identifying renewable funding for soft costs

Green Jobs/Green Homes NY policy design removes another critical barrier: cost to the state of incentives and grants needed to get home- and building-owners participating in energy-efficiency programs. While New York faces a 2009-10 budget deficit that limits funding for new initiatives, the Regional Greenhouse Gas Initiative, or RGGI, carbon auctions will generate new revenue that can be put toward program administration, providing an expected \$21.2 million in funding in the first year.¹¹ The auditor services portion of this program performed by utility companies—for Year 1, estimated at \$50.4 million—initially can be funded through the System Benefits Charge.¹²

The costs of contracting for the performance of retrofits, estimated at \$5.5 billion over five years, will be paid for with private capital from the retrofit investment fund. Costs of ramping up workforce development and training programs can be paid for through the reorganization and reallocation of federal, state, and other private and local workforce development funds.

Overcoming “split incentives”

Since retrofits are calculated to benefit the owner, and are paid back on the owner’s utility bills, much of the split incentive problem is moot. But Green Jobs/Green Homes NY also leverages the power of this funding stream to require that landlords benefiting from the program also perform relatively low-cost measures that benefit others—whether tenants (through measures that reduce their bills) or larger communities (through measures that benefit the local environment, such as green roofs.) While this does not resolve issues for tenants who pay all energy bills in their unit, it takes a significant bite out of this long-standing problem.

Growing the workforce

Green Jobs/Green Homes NY also allows the ramp-up of residential retrofitting to be paired with workforce policies that both rationalize a fractured retrofit market and provide community benefit standards. The expansion of the workforce and contractor pool needed to perform retrofits at scale will require the state to reorganize existing workforce development programs to support green job skills, expand training and certification systems so that retrofit jobs have clear pathways for career advancement and entry points from other sectors where jobs have been lost, and ensure retrofit funds support “work that pays” with family-sustaining wage standards.

Using community-level “market transformation” strategies to increase public demand

Finally, Green Jobs/Green Homes NY rests on a community-level implementation structure, meaning that community groups who already have access to home- and building-owners, displaced workers, and local information structures will be enlisted to support the steep ramp-up of participation in energy efficiency, from home retrofits to green jobs. This community focus also is intended to ensure that retrofits are deployed, and jobs allocated, to support the equity goals and ongoing work of local neighborhood groups.

What's in it for New York?

The energy efficiency and trained workforce generated by Green Jobs/Green Homes NY will provide savings and economic growth for decades to come. Homeowners will receive an average upgrade to their homes of about \$5,500, and save 30 percent to 40 percent on energy (\$600 to \$1,200 per year on costs, or about \$1 billion per year statewide) after the 10-year payback period. Before the payback period is complete, homeowners will be pocketing about 20 percent of that savings.

In the immediate term, the million retrofits in Green Jobs/Green Homes NY will provide an estimated 60,000 job-years in retrofits; at least 5,700 job-years in worker training; and an estimated 120,000 job-years through the multiplier effect (jobs created by the expansion of the retrofit industry). These job-years translate to long-term employment for about 28,000 people in New York State—and the promise of new energy industry development as the state becomes a national leader in the field.¹³

In the long term, Green Jobs/Green Homes NY will add an average of 20,000 net jobs annually to the state's economy, and contribute significantly and increasingly to the state's "avoided energy use" resources, as it diverts consumer dollars from energy costs to efficient, more job-intensive uses. The program also will add an estimated annual \$1.5 billion to New York's gross state product, or GSP.

Net impacts on New York State from Green Jobs/Green Homes NY

Effects include increased employment and gross state product

| Net impacts on NYS | 2010 | 2012 | 2014 | 2020 | 2030 | Annual avg. |
|----------------------------------|-------|--------|--------|--------|--------|-------------|
| Employment (actual) | 2,600 | 11,620 | 26,430 | 16,370 | 35,960 | 20,479 |
| Gross state product (million \$) | 210 | 950 | 2,050 | 1,130 | 2,950 | 1,570 |

(See "Macroeconomic Impacts of Green Jobs/Green Homes NY", P. 119)

Green Jobs/Green Homes NY: The policy proposal

There's little mystery involved in retrofitting buildings for energy efficiency. The building science is long proven. State and utility-run programs have been in and out of fashion but are familiar administrative challenges. And more and more, as fuel costs rise, homeowners understand the value of paying a little now to lower their costs in the long run.

So why are homes still huge energy guzzlers, to the detriment of our security, our incomes, and our planet? The answer is that such programs have never achieved significant scale and because they are not designed to overcome significant market barriers. The history of energy-efficiency programs is one of painstaking effort and retail, individual—and therefore expensive—successes. The challenge of Green Jobs/Green Homes is to design a retrofit program of massive scale and reasonable cost that has a measurable impact at the individual and aggregate level.

Getting to scale: Preparing for the challenges

Green Jobs/Green Homes NY is a framework for accomplishing 1 million residential retrofits in five years. This is an enormous challenge—to be undertaken at the same time that the state is increasing the capacity of other energy-efficiency and weatherization programs—that requires establishing a complex public-private finance mechanism that can raise first millions and then billions of investment dollars; coordinating the cooperation of utilities and the Public Service Commission so that New York State System Benefits Charge funds can successfully flow through the program; building upon existing program infrastructure to meet the new scale of administrative and management needs; creating enough market confidence to allow contracting firms to expand and job training organizations to increase their capacity; orchestrating contracts to allow businesses to achieve economies of scale; and building enough community-level engagement to generate a large number of new customers for energy-efficiency programs.

Other new state and federal initiatives will support the move to expand funding and capacity for energy efficiency. NYSERDA and DHCR's Weatherization Assistance Program, or WAP, together currently retrofit 26,000 units annually, with both receiving or anticipating significant funding boosts. The System Benefits Charge is projected to increase to \$350 million in 2010. At the federal level, New York's WAP funding has been increased to \$504 million through 2010 largely by economic recovery legislation,¹⁴ with which DHCR will set out to retrofit more than 80,000 units (including 48,000 currently on its waiting list, and an additional 32,000 of the estimated 1 million remaining eligible units in the state) and grow the weatherization workforce over the next two years.¹⁵ Funding in 2009 for the Low Income Home Energy Assistance Program, or LIHEAP, has nearly doubled over prior years' levels.¹⁶ In addition, carbon auctions under the Regional Greenhouse Gas Initiative have created an expanding pool of off-budget state funds intended to fund energy-efficiency programming.

Green Jobs/Green Homes NY presents an implementation framework to coordinate the many resources needed to overcome challenges to retrofit expansion on a mass scale. Strategizing for incremental growth over five years, this blueprint sets a target of 35,000 retrofits of individual housing units in the first year, more than doubling recent years' statewide demand for energy-efficiency contracting. As market transformation and workforce development strategies bear fruit, Green Jobs/Green Homes NY goals again double each year, tapering off in the final year of the program.¹⁷

In light of DHCR’s simultaneous ramp-up of weatherization projects and workforce, it may make sense to coordinate the two programs to complement each other’s capacities. This would mean that Green Jobs/Green Homes NY may need to adopt a more modest goal of 20,000 units in Year 1 and 40,000 units in Year 2, and be prepared to expand dramatically in Year 3 as WAP ramps down. This coordination is particularly important since WAP will likely need to more than triple its workforce to accomplish its weatherization goals, but will not be able to provide continuous employment for those workers when WAP funding declines after 2010.

The factors that must be in place to meet Year 1 goals are discussed in greater detail in the sections below. An overview follows of how Green Jobs/Green Homes NY proposes to address implementation challenges.

Coordinating the launch of a mass-scale program

Launching Green Jobs/Green Homes NY requires that customers, workers, community-level supports, and program infrastructure all come online at essentially the same moment. Each actor must be well informed about the program: Customers must be fairly extensively educated about what will be done to their homes, and their expectations managed about energy savings and cost savings. Contractors must understand and be well prepared to deliver on their responsibilities under the program. Materials also must be available, as well as other contracting resources—and all at a scale that can be rapidly increased as the program ramps up.

Adding to the difficulty of this coordination task is the novelty of the scale and approach of the program. Although NYSERDA may well be leading the program and, along with some of its central contractors, has plenty of relevant experience, Green Jobs/Green Homes NY requires new forms of engagement with community partners, new emphasis on contract volume, an intensified focus on data collection and analysis, and a scale at which NYSERDA simply does not have a track record.

As an approach to rationalizing market growth while piloting the program, Green Jobs/Green Homes NY proposes a graduated five-year ramp-up of retrofits in New York, beginning with 35,000 units in Year 1. It further divides each year’s goals among a limited number of geographic target areas, in part to allow local development of a workforce, concentrated marketing, and other local economies of scale.¹⁸ (In Year 1, for example, Green Jobs/Green Homes NY might locate 35 target areas for 1,000 units each, of which seven would include larger multifamily buildings.¹⁹ Smaller groups of 250 to 1,000 units might be allowed for more rural target areas.)

Retrofits for each year of program, broken down by size of homes

Retrofits would target one- to four-unit homes as well as multifamily buildings

| | Y1 | Y2 | Y3 | Y4 | Y5 |
|------------------------------|--------|--------|---------|---------|---------|
| Total units | 35,000 | 70,000 | 160,000 | 350,000 | 385,000 |
| One-family houses | 17,954 | 35,908 | 82,076 | 179,541 | 197,495 |
| Two-family houses | 2,223 | 4,446 | 10,163 | 22,231 | 24,454 |
| Three- to Four-family houses | 948 | 1,895 | 4,332 | 9,475 | 10,423 |
| Multifamily buildings | 263 | 525 | 1,200 | 2,625 | 2,888 |
| Total structures | 21,387 | 42,774 | 97,770 | 213,872 | 235,259 |

Funding and financing Green Jobs/Green Homes NY

Funding and financing the program demands that a somewhat complex layering of funding be secured from distinct public and private funding streams. The costs of program administration—management of retrofit contractors, marketing and performance evaluation, etc.—can potentially be covered from a number of off-budget public funding streams. The costs of contracting—performing retrofits on 1 million homes over five years—can potentially be covered by a combination of private and public institutional investment pooled in a Residential Retrofit Investment Fund initiated by the state.

First-year administrative costs are estimated at \$21.2 million. Green Jobs/Green Homes NY proposes that program administration costs will be funded by RGGI dollars. RGGI funds are currently allocated by the governor and NYSERDA, with input from an advisory board. Various efforts also are underway to move RGGI dollars onto the state budget, in which case they would be allocated by the New York State legislature. Securing RGGI funds for Year 1 and beyond will therefore require ongoing advocacy to gain the commitment from all three actors to use a portion of these funds towards Green Jobs/Green Homes NY.

First-year energy audit costs are estimated at a maximum of \$50.4 million. Green Jobs/Green Homes NY proposes that audits be funded by System Benefits Charge dollars and recognized as utility company investments in energy efficiency. SBC funds are governed by the Public Service Commission, whose members are appointed by, but independent of, the governor and also are subject to the New York State legislature. Although SBC funds have historically been used by NYSERDA, the PSC's current Energy Efficiency Portfolio Proceeding, or EEPS, is in the process of allocating them directly to utilities to conduct their own energy-efficiency programming.

While the PSC is poised to expand SBC funds, and to add a gas customer fund to the existing electric fund, these dollars are not yet in place. Green Jobs/Green Homes NY presumes the cooperation of utilities and the Public Service Commission, and anticipates that legislation may be needed to delineate the roles of utilities, the Public Service Commission, and System Benefits Charge funds in the program.

Raising private capital for retrofits

First-year contracting costs are estimated at \$192 million, which Green Jobs/Green Homes NY plans to raise through the establishment of a Residential Retrofit Investment Fund, a private investment vehicle to finance all up-front contracting costs of retrofits outside of audits and initial low-cost measures.

Establishing the RRIF likely will require the state legislature to authorize the creation of the fund and define its relationship to state energy programming and funding. It also will

Number of retrofits for each year of the program and percent increases in retrofits compared to prior years

Program proposes a graduated five-year ramp-up of retrofits beginning with 35,000 in the first year

| Year | Units | Compared to prior year |
|-------|-----------|------------------------|
| Y1 | 35,000 | 134.6% |
| Y2 | 70,000 | 200.0% |
| Y3 | 160,000 | 228.6% |
| Y4 | 350,000 | 218.8% |
| Y5 | 385,000 | 110.0% |
| Total | 1,000,000 | 3846.2% |

require the creation of a loan loss reserve, or LLR, fund, a pool of available funds that serve as security for investors against excessive defaults that would threaten expected returns. Green Jobs/Green Homes NY anticipates the LLR will be partially populated with SBC dollars and other sources that may include New York Power Authority (or NYPA) funds, federal funds, and/or private foundation dollars. Accessing NYPA or other governmental sources of credit enhancement funding would likely require additional legislative action. Finally, Green Jobs/Green Homes NY must establish the “on-bill” repayment mechanism, in which utilities add a monthly line item to retrofit customers’ bills to pay off the costs of contracting. This will require the cooperation of the Public Service Commission and utility companies in authorizing a Tariffed Installation Program, or TIP.

After the RRIF is established, additional implementation challenges must be addressed to bring the fund to scale, including raising risk capital in the current credit-strapped market and gathering sufficient data on loan performance to establish an investment-grade rating. Green Jobs/Green Homes NY yearly goals present an attainable level of risk capital needed for start-up and provide a pilot year to gather strong data for rating the investment.

Linking workforce development to real demand

Bringing online the contractors and workers to perform retrofits requires another feat of coordination. New York’s retrofit contracting capacity is unlikely to expand simply in response to demand. In fact, existing retrofit contractors around the state—interviewed in the process of drafting this proposal—report that they would have difficulty doubling their work volume, not because of resource problems in buying additional equipment or managing more teams, but because of a shortage of workers who are both skilled and, on a more personal level, “work-ready.”²⁰ Creating capacity to carry out the work of Green Jobs/Green Homes NY and other expanding programs, and to ensure that a significant portion of those jobs go to local communities, will require a dramatic increase in the number of workers available to existing contractors, new entry of firms into home-performance contracting, and increased training capacity.

Some help is on the way for the labor shortage: NYSERDA, the New York State Department of Labor, and other parties to the state’s Energy Efficiency Portfolio Standard proceeding are working to allocate significant new funding for training and Building Performance Institute, or BPI, certification.²¹ Community-level employment programs, including Sustainable South Bronx, STRIVE, and others, and union-affiliated training programs including the Consortium for Worker Education, are adding workers who possess both basic green/construction skills and “work-readiness.” The shrinking economy also will add significant numbers of skilled workers to the available labor pool.

However, major challenges lie in ensuring that training is driven by real contractor need, scheduled to produce workers in time for demand, and linked to jobs. Contracting also must be well coordinated to ensure that work is consistently available to workers in each

Data note: Green Jobs/Green Homes NY projections assume that 85 percent of units served by the program will be in one- to four-unit houses, and 15 percent will be units in multifamily buildings.

locality. Given that workforce expansion is a matter of incentivizing and coordinating a wide range of private, nonprofit, and public actors, it will require a great deal of organizing beyond simple policymaking.

An additional challenge lies in predicting future demand. Although the Green Jobs/Green Homes NY blueprint presents an incremental plan for ramping up capacity, circumstances (such as persistently tight credit markets) may dictate that the program remain relatively small for longer than anticipated. Contractors may be able to function at “holding” levels, but workforce training groups cannot. Many will need to be assured of steady demand for new workers in order to develop capacity to train *any* new workers. For this reason, staging the demand for workers will be of critical importance.

All of these elements depend on the ability of the Green Jobs/Green Homes NY campaign to coordinate a wide array of policymakers, administrators, and advocates. The political climate is positive: Governor David Paterson’s recently expanded commitment to reducing the state’s emissions (“45x15”), the commitment of RGGI auction funds to efficiency programming, and the movement toward completion of the EEPS case indicate strong public will to invest in a fundamental shift in how we use our energy. Additionally, Green Jobs/Green Homes NY is by far the most cost-effective use of any dollars for which it may have to compete with other potential uses.

But major challenges remain in juggling the domains of the PSC, NYSERDA, the state legislature, and the governor, as well local communities and customers. These actors will be critical for establishing the TIP contracting mechanism, giving utilities the right to use service shut-off as a payment backstop for the TIP, linking the lead agency to the investment fund, providing access to SBC dollars as a lag fund, and other functions.

These challenges, potential solutions, and expectations for how they will likely affect the development of Green Jobs/Green Homes NY over time are explored within the policy sections below.

Program operations

Green Jobs/Green Homes NY will make retrofits available to owners of any type of housing in New York State, at any level of income, provided that owners are utility customers in good standing and live in targeted geographic areas. The program also can be made available to renters of single-family homes who own the utility meter account and have sole physical control of the housing unit.

These retrofits will be available to home- and building-owners at no up-front cost (except for a nominal, waivable audit cost), enabling all residential structures to participate regardless of cash flow or access to capital. However, the program will distinguish between one- to four-unit houses and larger multifamily buildings: Multifamily building owners will be asked to contribute up to 10 percent of contracting costs, with the provision that costs can be waived through a simple procedure for establishing hardship.

Administration

New York State has energy-efficiency program infrastructure in places at NYSERDA, and although adding new mass-scale programming will require substantial changes at the agency, NYSERDA should likely lead Green Jobs/Green Homes NY. If NYSERDA is indeed the lead agency, then in order not to exclude Long Island and municipal utility ratepayers, both the Long Island Power Authority, or LIPA, and the New York Power Authority, or NYPA, also will need to maintain a parallel program, according to identical standards established in conjunction with NYSERDA.²²

Given the innovative financing structure needed to reach Green Jobs/Green Homes NY's scale, some additional functions and collaborations are needed. The main players are the lead agency, their program implementer(s), community-based organizations, local utilities (in coordination with the Public Service Commission), and the RRIF. To ensure accountability for this sensitive program, operations should be transparent and overseen by a Stakeholder Accountability board.

The lead agency will run all aspects of the program, contracting out (as NYSERDA does now) the administration functions to one or more program implementers. The program implementer will work intensively with community groups to recruit customers, and he or she also will field calls from customers, set up energy audits, and manage retrofit contracting.

The program implementer will organize contractors to perform audits and retrofits *on behalf* of the local utility, under a Tariffed Installation Program²³ in which all qualifying customers of the utility will be entitled to participate. Contracts for work will be agreed between the customer and the utility, and the program implementer will serve as a manager of the work. The lead agency will set parameters for work performed under Green Jobs/Green Homes NY, including allowable measures, and methods for assessing payback of retrofit packages. The RRIF will pay the contracting hard costs of the TIP.

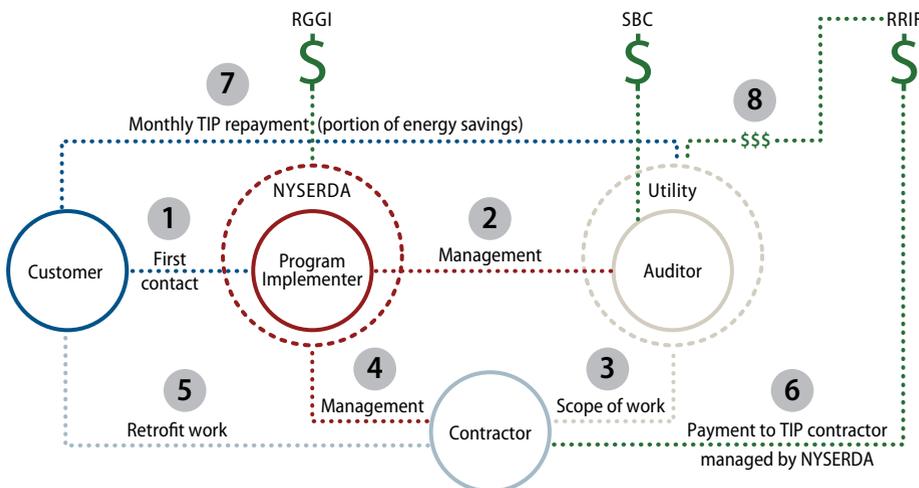
The program implementer will ideally be funded by Regional Greenhouse Gas Initiative dollars for administrative/program costs. The Residential Retrofit Investment Fund will pay for TIP hard costs when invoiced by the program implementer. The program will access System Benefits Charge dollars to fund audits and some other costs, and the utility will be responsible for remitting repayment of retrofit costs to the RRIF. These funding roles are detailed in “How Do We Pay For It?”

Program implementers

The lead agency will be responsible for contracting with one or more firms to perform a program implementation function. Audits, contracting, and quality assurance will be coordinated by program implementers. One or more of the implementers will manage multifamily units, and another will manage all other housing types, including the one- to four-unit homes that likely will make up the bulk of the program’s customers. The program implementers will assist in marketing the program; field all contacts from potential and existing customers; coordinate audits and contracting on behalf of utilities; recruit and vet energy-efficiency contractors; provide quality assurance; perform measurement

How Green Jobs/Green Homes NY would work

Customers access retrofit funding and installation from several sources, coordinated by the program implementer



and verification, or M&V, and troubleshooting; control payment to contractors for work performed; be responsible for retrofit performance guarantees; subcontract recycling; and manage revenue collection from retrofit waste streams.

Community-based organizations

In each community, local organizations with existing constituencies will perform a critical function as opinion leaders and connectors, operating culturally relevant enrollment campaigns and supporting the development of energy savings, employment, and overall economic impact in target areas. These may include neighborhood associations, faith groups, or other organizations that have regular contact with significant numbers of community members. Organizations will be charged with recruiting homeowners and building owners to the program, popularizing energy-efficiency information (“energy and environmental literacy”), helping guide community members into the green workforce, and supporting the development of both the workforce and energy-efficiency programming.

Utilities

Utilities will be an integral part of the program. They will help interpret energy use data to identify target areas and needs; provide the contracting framework for the Residential Retrofit Fund-funded Tariffed Installation Program; collect retrofit repayments from customers and return them to the fund.²⁴ Utilities will receive credit toward energy-efficiency targets for audits (standard installation of low-cost weatherization measures will be a component of the audit visit), for each retrofit contract secured, and for their other contributions to the operation of the program.²⁵

Utilities also will contribute data for customer audits, helping the program identify high-use existing homes through an analysis of consumption history, preferably for two years prior to initial marketing.²⁶

The Residential Retrofit Investment Fund

The RRIF will be established as a limited liability corporation to facilitate the flow of capital from private investors to pay for residential energy-efficient retrofit measures. The RRIF will borrow from these investors, and use the funds to pay contractors for work performed under the Tariffed Installation Program. The obligation to repay the costs will be assigned to the meter. The RRIF will leverage System Benefits Charge dollars and/or other renewable sources as a guarantee/lag fund. Homeowners or building owners will be obligated to repay these costs; upon sale or transfer of ownership of a building the outstanding obligation will pass to the new owner.²⁷

The Stakeholder Accountability Board

A formal Stakeholder Accountability Board including representatives from all of the above participating entities should be organized and supported by the lead agency. This board should convene during the initial implementation process to provide broad oversight for project standards, equitable selection criteria for target communities, and other program functions for which transparency and accountability are essential to the success of the program.

Finding and signing up customers for the program

Retrofits are not to be means-tested, but are targeted to geographic areas facing environmental and economic burdens. Criteria for selecting target areas include:

- High energy cost burdens, where the cost of energy is high enough in relation to income that it impairs households' ability to obtain energy or other essential needs (requiring an index of energy costs, other costs of living, and income). Customers who do not qualify for existing grant-funded weatherization programs—those with incomes too high for the means-tested programs and too low for energy affordability—as well as those who are eligible but face unduly long waits for funding, are appropriate audiences for this program.
- The geographic concentration of high emissions (CO₂ and other pollutants) and high levels of air, water, and soil pollution.
- Housing that is energy-inefficient through disrepair or lack of capital for upgrades/improvements. As noted above, utility data can identify areas of higher-than-average residential energy consumption.
- High unemployment, where access to training for work in emerging industries has been severely limited.
- Advance soft commitment to retrofitting by homeowners and/or building owners, as indicated by pre-enrollment.

Neighborhoods with similar housing construction also can be a focus. Targeting similar or identical housing reduces the cost of energy analysis and auditing, since many of the inputs and measurements will be easily replicable. This will save both customers and the program money and make the entire program more cost-effective. Grouping these projects also will allow contractors to make multiunit sales, improving their cash flow and the certainty of their business.

In Year 1, it may also make sense to target communities that are also well served by existing contracting firms—especially firms that are explicitly willing to ramp up their business in response to Green Jobs/Green Homes NY opportunities—and by proven construction-oriented workforce training programs.

The process of recruiting, evaluating, and selecting communities should be transparent, public, and supported by the program's Stakeholder Accountability Board.²⁸

Once communities are located, the broad historical experience of stakeholders in energy efficiency—including utilities, state agencies, contractors, community advocates, and others—begs us to “think outside the box” for marketing strategies. The task of providing new, often hard-to-digest information to many hundreds of households in each area—and parlaying that information into household action—requires that Green Jobs/Green Homes NY leverage *all* available networks.

Since Green Jobs/Green Homes NY is voluntary, but needs a high volume of takers, widespread marketing to and education of the state's homeowners will be key to massive adoption of the program's services. Particularly in communities where the need for energy efficiency is greatest, and resources most limited, high barriers to information and trust are likely to exist. Homeowners will have to be properly prepared for the costs, the payback terms, and the entry by auditors and contractors into their homes. They also will have to be well informed about the immediate and long-term savings associated with the program. Marketing and education also will stress the job-creation dimensions of the program and emphasize the training that will be available to New York State residents at many entry points into the workforce.

Some stakeholders already are engaged in marketing, and their efforts should be supported. These include NYSERDA's cooperative marketing (contractor advertising that promotes contractors' services and energy-saving credentials, such as use of the ENERGY STAR logo, and NYSERDA's funding opportunities), NYSERDA's own advertising campaigns, which combine energy-efficiency education with program information, and utilities' direct mail to customers.²⁹

Program marketing will be carried out in coordination with a public education campaign that includes visible support from the governor and from recognized energy experts. This public relations effort must be designed to provide customers with assurance that trusted experts (public officials and technical leaders) support and endorse this effort. The key is to project expertise, not celebrity—although having both is an advantage.

The local concentration of Green Jobs/Green Homes NY also offers some more direct marketing routes tailored to local needs. Utilities, for instance, will need to review the energy-use patterns of individual customers in targeted areas, and identify customers for specific outreach by mail or other means. Direct mailings should be sent from local government, explaining the availability of the program and the push to engage local homeowners. Finally, and most important, retrofits will be marketed through community organizations that are trusted opinion leaders, that have the capacity to provide hands-on and verbal education and outreach to community members, and whose embrace of a new practice or program can be transmitted to individual households in the area. These com-

bined approaches can leverage strong (and unprecedented) community engagement. In the experience of Houston’s Power to the People efficiency program, for instance, neighborhoods saturated with mailed government notification about the program, door-knocking visits and a locally-sponsored block party event have produced 40 to 80 percent participation rates.³⁰ [insert source] Community implementation is critical to New York’s ability to scale up energy efficiency, and is therefore outlined in further detail in the section “Developing the Workforce and Other Critical Resources.

The local concentration of Green Jobs/Green Homes NY also offers some more direct marketing routes tailored to local needs. Utilities, for instance, will need to review the energy-use patterns of individual customers in targeted areas, and identify customers for specific outreach by mail or other means. Direct mailings should be sent from local government, explaining the availability of the program and the push to engage local homeowners; in the experience of Vermont Gas, customers who received a simple but official notification signed by a known, accountable person were dramatically more likely to sign up for the program than others who received more generic notices. Finally, and most important, retrofits will be marketed through community organizations that are trusted opinion leaders, that have the capacity to provide hands-on and verbal education and outreach to community members, and whose embrace of a new practice or program can be transmitted to individual households in the area. Community implementation is critical to New York’s ability to scale up energy efficiency, and is therefore outlined in further detail in the section “Developing the Workforce and Other Critical Resources.”

Contracting

Contracting services are central to energy-efficiency programming: The quality of audits, work, and post-contracting (test-out audits, warranty services, etc.) affect how much energy is saved in each home, household funds available to repay contracting costs, and program uptake as customers and their communities gauge whether or not retrofits are worthwhile.

To support quality and minimize problems with retrofits, Green Jobs/Green Homes NY will create standards for audit measurements, contractor selection, installation of retrofit measures, contractors’ performance guarantees (assurance that the installed measure will perform as efficiently as expected), and warranty/remediation obligations. Contractors will be held to high standards of “good public citizenship,” including compliance with codes and labor laws as well as any additional commitments to hiring, quality of work, and warranting services.

Audits will consist of a standard set of measurements and testing all available savings opportunities. It will be paid at a fixed price that includes education and discussion with the homeowner, and a short post-audit consultation with the installation contractor, if that contractor is different from the auditor. Work scopes for retrofits will be drawn up by auditors using calculations from home modeling software, and include an estimated cost based on location-specific surveys of costs for similar work, which is essential for determining the customer’s 10-year

payback. Contractors will agree to perform work within a reasonable range of the estimate and to meet or exceed any program wage requirements.³¹ After installation, auditors will provide a “test-out” audit, which will either confirm that energy-efficiency goals have been reached or that a problem has occurred in installation and must be remedied before the retrofit is complete. Quality assurance contractors will revisit retrofitted homes to check the quality of the initial audit (in particular, to verify that no relevant measurements were omitted from the audit) as well as the quality of installation.³² If audits are found to have been significantly deficient, the initial auditor will be penalized according to terms established by the lead agency.

One of the jobs of the program implementer is to recruit and qualify a network of contractors to implement the work recommended by the auditors. Contractors may join the program by two means:

1. Contractors will be able to bid on blocks of work in a particular area—each block consisting of 25 units—by providing cost estimates and agreeing to program standards for installation quality and cost controls, sustainable materials procurement, and wage and hiring practices. Although customers ultimately choose their own contractors, successful bidders will be “with the program,” and their services will be offered to customers at the time of audit until they have been contracted on the number of units in their contract.³³ Contractors may seek as many blocks of work as are available.
2. Contractors who are recruited by customers may perform work under the program as long as they have the required certifications and agree to perform the work within a reasonable range of the auditor’s cost estimate. Contractors also will have to agree to perform work within the scope and cost parameters of the program.

Contractors entering by either channel must be highly accountable for the performance of the measures they install. They must agree to follow program technical requirements, meet clearly established standards for customer service, work with existing building maintenance staff where applicable, allow the program implementer to do quality assurance inspections, and correct problems discovered through the QA process.

A full overview of audit standards, contracting patterns, and responsible actors is provided in Appendix A.

Coordination with other retrofit and repair programs

The Green Jobs/Green Homes NY program will not conflict with the ongoing work of the Weatherization Assistance Program, NYSERDA, LIPA, or other energy-efficiency programs. In general, WAP and NYSERDA or LIPA programs, which provide incentive grants even as they require some up-front investment, will be more attractive to eligible owners than a Green Jobs/Green Homes NY program requiring full repayment. The recently expanded NYSERDA program “EmPower NY” serves low-income tenants with energy saving measures *without*

requiring investment by owners or tenants. These programs face funding limitations and serve limited populations, but each is an important access point for residential retrofits for those who can use them. Green Jobs/Green Homes NY is intended to serve owners who cannot or prefer not to use these programs. Participation in Green Jobs/Green Homes NY will not require that owners waive their ability to use other programs at another time or even at the same time as long as co-participation does not result in layering (“doubling up”) of incentives. For instance, it may make sense for Green Jobs/Green Homes NY to combine efforts with other efficiency programs that provide rebates to customers, but still require up-front capital investments to cover the additional cost of retrofits. In those cases, only the capital expended by the owner (not the rebate amount) would be financed under the program.

Such coordination with the Weatherization Assistance Program could be especially important. Although increased WAP funding should eliminate the program’s waiting list, there will remain an estimated 1 million New York households at or below 60 percent of Area Median Income who are unreached as WAP reaches its funding limits. Rather than defer cost-saving retrofits on these units until WAP funding is available, Green Jobs/Green Homes NY might usefully coordinate with DHCR and the Department of Energy. The program might retrofit those homes and start homeowners off on the on-bill repayment system, with the understanding that DHCR would step in later when new WAP dollars became available to pay off (or rebate) the low-income homeowner’s retrofit obligation. Coordination of this sort might require that the state apply for a federal waiver, but suggests that coordination of programs can help the state meet a wider range of needs.

Labels for buildings that have performed energy-efficiency work (ENERGY STAR buildings, etc.) will be available to participants in the same manner as they are in other programs.

Energy-efficiency work within the confines of Green Jobs/Green Homes NY will not deliver adequate returns to homes that are in overall poor condition or require significant abatement of lead paint, asbestos, etc. These homes may be screened out at the first contact with program staff, or may be identified during in-home audits. At either point, rather than simply declining service to these households, Green Jobs/Green Homes NY will provide direct linkages to state and federal programs, including the Weatherization Assistance Program, that can fund basic repairs, hazard abatement, or weatherization without needing to achieve specific returns on investment.

While current support for these functions is not sufficient to New York State’s need, emerging policy may set the stage for more complete support. Some stimulus proposals have included an environmental/green jobs bond act (or use of federal stimulus dollars) to add funding for lead abatement in conjunction with the replacement of lead-tainted windowpanes in LIHEAP-eligible homes.

All funds for contracting are generated through a revolving Residential Retrofit Fund, as well as possible costs of capital, and are detailed in “How Do We Pay For It?”

The retrofit process

Green Jobs/Green Homes NY retrofits will be initiated by homeowners or building owners. Interested customers will call a toll-free phone number to request an energy assessment, reaching a call center managed by the program implementer. The program implementer will first screen the caller to assess whether he or she should be referred to a program—such as WAP—that provides more favorable financing terms or a home repair program that can help resolve problems that will allow retrofits to be more cost-effective.³⁴ If no referral is made, the program implementer will arrange for a home/building audit, during which the structure’s energy use and opportunities for savings will be assessed, and low-cost measures such as air sealing and low-flow showerheads installed. (Owners will be charged a nominal fee for the audit: \$25 per unit in the structure, up to \$1,500. For those who can’t pay, the audit fee will be waivable.)

The audit will determine what retrofits can save enough on energy *use* to reduce *bills* enough to pay for themselves within 10 years, taking into account the program’s goal of leaving 20 percent of the savings in the owner’s pocket, with interest factored into the repayment amount, etc.

In one- to four-unit homes, the audit will take into account only utility bill savings—meaning that retrofit costs must be recoverable through utility bill savings within the 10-year period. This restriction is key to the program’s ability to provide funding without establishing the homeowner’s creditworthiness (If the program is adapted to incorporate savings on non-utility energy bills, like heating oil, alternative means of establishing creditworthiness may be needed).

In multifamily buildings, the audit will take into account total energy costs and savings, including heating oil, when assessing the project payback.

In cases where useful measures cost too much to allow for the owner to keep 20 percent of the savings, the owner can still contract the retrofit if he or she is willing to accept a smaller split. As long as expected savings cover the full amount of the monthly repayment amortized over 10 years, the program can provide service to interested owners.³⁵

In addition to maximizing the energy-efficiency capacity of the program and including customers who may be starting with below-average utility bills, this flexibility will allow

the program immediately to support more oil efficiency in one- to four-unit homes than would otherwise be possible.

If the owner agrees to move forward with the retrofit, the auditor provides a contract between the customer and the utility for a Tariffed Installation Program, meaning that the utility (through the program implementer) will provide the retrofit contracting at no up-front cost to the customer, and the customer will accept a monthly repayment obligation on the utility bill.

Following the contractor's installation of retrofit measures, the program implementer will dispatch the auditor to retest the house for improved energy efficiency. Any problems will be corrected by the contractor before the project is deemed complete. The program implementer also will provide spot checks on contracting throughout the program on 15 to 20 percent of units, and troubleshooting throughout the payback period. The program implementer also will support both contractors' fulfillment of warranty obligations, and customers in their responsibility for maintaining the installed equipment.

The retrofit installation is a benefit attached to the utility meter. If the meter changes hands before the repayment schedule is over, the new meter-holder takes over the obligation (and must be fully apprised of the terms.) If the property is sold, the meter and retrofit obligation are transferred at sale. If an owner-occupier of a property moves out and brings in a renter who takes over the meter, the new meter-holder is again obligated. In cases where the owner ceases to use the meter, but is not ready to transfer it (in time between vacancy and reoccupancy), he or she may apply for a temporary suspension of the retrofit obligation. "Following the meter" raises two important issues: how disclosure and transfer are managed, and how dormant and delinquent meters are managed. These are addressed in following sections on consumer protections and finance mechanisms.

Retrofit measures

Retrofits that are cost-effective, and that are proven to have relatively fast energy savings returns (pay for themselves by reducing estimated energy bills within the payback guideline), will be available. (A preliminary list of retrofit measures is in Appendix B.) Customers who wish to buy down the cost of projects with a longer payback, so that the amount to be financed meets the payback guideline, will be able to do so. As described above, some retrofits that do not provide returns but yield important environmental benefits at low cost also are included. The program focuses on a broad but reasonable menu of proven retrofits to streamline implementation, leverage bulk purchasing power to lower prices of materials, and spur the development of New York State green manufacturing.

Projects will generally produce savings of 25 percent to 45 percent of heating and cooling use. The program will be restricted to those projects that will save at least 20 percent of heating and cooling use to avoid flooding the system with marginal projects.

One- to four-unit houses

In one- to four-unit homes, NYSERDA’s Home Performance with ENERGY STAR, or HPwES, has established lists of eligible measures for energy-efficiency retrofits that derive from a whole-house approach to building science. These include—but are not limited to—air sealing, insulation, upgrading or replacing heating and hot water systems, solar thermal, and in some cases, fuel switching.

NYSERDA’s HPwES uses technical standards to clearly define these measures. Green Jobs/Green Homes NY will adopt those measures and standards. The program also will review new technology and periodically update the eligible measures list.

Multifamily buildings

Buildings’ overall energy use will be assessed and compared to buildings of similar energy type and building volume. Those buildings that are within a prescribed range of the benchmarked energy usage (to be determined by the lead agency) will be entered into the “basic

tier” of the program. Those that use more energy than similar buildings will be entered into the “comprehensive tier.”

Basic-tier buildings will receive retrofits according to a prescriptive menu of appropriate measures, defined by the lead agency, which may include upgrades, energy management system installation, distribution system maintenance, stack effect mitigation, health and safety measures, and others.

Comprehensive-tier buildings will receive measures providing an eight- to 10-year payback or better. These may include heat and hot water system upgrades, lighting upgrades, energy management system installation, distribution system maintenance, stack effect mitigation, health and safety measures, and others. (Again, these may include measures whose payback is primarily in oil savings.) In limited cases, retrofits might include window replacements. Nonpaying measures may include appliance replacement, lighting upgrades, green roof installation, or others.

Energy management systems will be universally installed as a component of multifamily retrofit packages. These are computerized systems that monitor and efficiently regulate heating and electricity usage throughout buildings. This will make it much more efficient for program implementers and existing building maintenance staff to do post-construction monitoring of buildings, often avoiding the need for onsite inspection.

Audit and contracting costs

Audit costs, funded through utilities with System Benefits Charge dollars in the initial years of the program, are approximately \$600/unit in one- to four-unit buildings, and \$400/unit in multifamily buildings.³⁶ Based on experience in NYSERDA’s Home Performance with ENERGY STAR program, Year 1 audits in one- to four-unit buildings may cost \$47.5 million (for 52,800 audits of 1.5 units each, to produce 21,125 house contracts). In multifamily buildings, audits will likely cost about \$2.9 million (roughly 360 audits of varying intensity, in buildings averaging 20 units, to produce 260 contracts). Total System Benefits Charge funding for audits in Year 1, then, would be approximately \$50.4 million.

However, Green Jobs/Green Homes NY may have significantly higher rates of audits-to-contracts, since HPwES requires that owners provide up-front investment while Green Jobs/Green Homes NY does not. If this is the case, audit costs will be less than \$50.4 million.³⁷

Contracting hard costs are estimated at \$5,508 for units in one- to four-unit structures, and \$3,500 to \$4,000 in multifamily buildings. Given projected Green Jobs/Green Homes NY activities, Year 1 contracting costs are about \$192.4 million. Over the five-year program, total contracting costs are estimated at \$5.5 billion.

Number of retrofits for each year of the program, contracting costs for retrofitting, and third-party funding

Program shoots for 1 million retrofits in five years with total contracting costs estimated at \$5.5 billion

| | # of units retrofitted | Increase above prior year | Contracting costs | Third-party investment targets |
|--------|------------------------|---------------------------|-------------------|--------------------------------|
| Year 1 | 35,000 | 134.6% | \$192,780,000 | \$300,000,000 |
| Year 2 | 70,000 | 100.0% | \$385,560,000 | \$600,000,000 |
| Year 3 | 160,000 | 128.6% | \$881,280,000 | \$900,000,000 |
| Year 4 | 350,000 | 118.8% | \$1,927,800,000 | \$1,350,000,000 |
| Year 5 | 385,000 | 10.0% | \$2,120,580,000 | \$2,025,000,000 |
| | 1,000,000 | | \$5,508,000,000 | |

Setting expectations about energy bill returns

Individual results will vary a great deal depending in part on conditions of the building beyond the energy-savings measures and in part on consumer behavior. So the contractor will guarantee that the measures installed perform properly but only assure reductions in energy use within a margin of error. Absolute reductions in energy *bills* will depend on the per-unit cost of energy, whether residents begin using new energy equipment, and whether customer usage of existing equipment changes (e.g. retirement, job loss, or childbirth means customers spend more time at home). (Further detail on performance guarantees, warranties, and remedies is included in the consumer protections section of this document.) Reductions in utility bills will be dependent on which fuels are affected by retrofits, and which utility bill is the vehicle for on-bill recovery.³⁸

The projections from engineering calculations need to be adjusted for changes that come from changes in the behavior of the people who live in the buildings treated under the program. On the one hand, people who have new energy-efficient appliances installed, or who insulate their homes, are motivated to get results and may reduce the amount of energy they use with the new appliances—shutting off the lights more frequently, lowering thermostats, and so on. However, there are “snap-back” effects. These occur when people change their behavior to take advantage of the new comfort of the building—for example, by opening up rooms that used to be kept cold in the winter or raising the

thermostat because the newly efficient systems work so much better than the older system they replaced. These snap-back effects have been widely observed in low-income weatherization programs and utility-based energy efficiency programs and need to be taken into account in this program through modified savings projections.

Contractors will guarantee that their installations of insulation, lighting, or HVAC equipment will function according to manufacturer's specifications and will include maintenance contracts to ensure that the equipment continues to function properly. Contractors will supplement the manufacturer's guarantee (usually one year on parts and labor) with a maintenance contract for the duration of the repayment period. For mechanical systems (heating and cooling systems, hot water tanks, and appliances), these maintenance contracts will include repair provisions and periodic maintenance, as appropriate for the appliance in question. The price of building shell (air sealing, insulation) work will include one inspection during the repayment period to ensure that the insulation and air-sealing measures continue to function and have not been compromised by damage to the building or remodeling that might create new leakage paths or displace some of the insulation. Contractors also will work in conjunction with existing building maintenance staff where applicable to coordinate maintenance and energy-efficiency reporting requirements.

Because customers can and will continue to buy new appliances (plasma televisions, whirlpool baths, and sound systems, to name a few popular items), it is difficult to predict "plug load" electrical savings, other than to state the estimated kilowatt per month of a particular appliance in normal operation. Energy used for heating and cooling the building and for heating hot water can be more closely modeled and provides the basis for more reliable predictions.

Procurement standards: Quality, safety, sustainability, and cost-effectiveness

Standards for procurement of materials used in retrofit are crucial for ensuring that retrofits perform as expected (and provide the savings needed to support payback)—and that energy-efficiency program work itself meets standards of energy efficiency and sustainability. Green Jobs/Green Homes NY will require that materials used in retrofits meet two sets of standards: high-quality indicators used by manufacturers of each type of material, and standards for lifecycle sustainability. Procurement standards are listed in Appendix C.

State-led bulk purchase

Bulk purchase of commonly used retrofit materials will be employed to lower contracting costs, support certainty of demand for local/regional manufacturers, and support the development of a supply stream that meets quality and sustainability standards including efficient and nontoxic materials production processes.³⁹

Materials will be purchased according to sustainability standards, and also will be used to support New York State manufacturers and suppliers. To the extent that materials locally manufactured in and around New York State are available, and that competitive prices can be negotiated, Green Jobs/Green Homes NY will prioritize purchase of those materials to further economic and environmental goals.

The practice of bulk purchase and redistribution to contractors also can be used to create supply hubs in economically distressed areas of New York State. The lead agency will work with relevant state agencies to establish infrastructure for bulk purchase and contractor supply.

Consumer protections

Participants in the Green Jobs/Green Homes NY program—homeowners, building owners, and any affected renters—must be protected against negative or unintended effects of the program.

How do we make sure retrofits result in savings?

Retrofits will be designed, using scientific standards, to provide a minimum of 20 percent savings on home heating bills—and typically 30 percent to 40 percent—depending upon customer behavior. Correct audit/benchmarking and installation, and proper functioning of equipment, will be confirmed during the test-out audit. According to experience under existing programs, nonperformance is overwhelmingly noted during these processes, or failing that, within the first one to three months of operation. Green Jobs/Green Homes NY will provide remediation services accordingly.

However, incorrect operations of energy equipment (particularly in complex multifamily building systems) can drastically affect savings, and small residential user behavior frequently changes after a retrofit, cutting energy savings short.

Since payback calculations are based on expected savings, and the goal is to provide a net reduction in utility bills even during the payback period, program participants need some assurance of savings, as well as support for successful operations and maintenance of equipment.

Likewise, contractors need standards in order to avoid a “race to the bottom” of lowest-cost materials and work practices, and to guarantee a portion of the energy savings.

The following measures are essential components of quality assurance and measurement, protecting both consumers and contractors:

- Use of well-trained, certified crews supervised by experienced workers with knowledge of building science and systems, in accordance with NYSERDA’s BPI requirements.
- Use of standard, field-tested materials for retrofits.
- Good baseline information about customers’ total energy usage verified with utility data, and about the energy usage of specific home systems, such as water heaters.
- Support for best practices in operations and maintenance through Energy Management Systems, particularly in multifamily buildings that lack access to a certified Energy Efficiency Building Operations Specialist.

Where savings fail to materialize, the program will clearly define paths of recourse and responsibility for the maintenance of installed equipment.

Measurement and verification

Green Jobs/Green Homes NY will include intensive measurement and verification, or M&V practices.

- The lead agency will collect data on the costs of projects and materials, and on the performance of individual components of a retrofit package, where available. (For instance, in homes where a 95 percent efficient furnace has been installed, the program will assess the efficiency of the furnace as well as the house as a whole.) This information will be analyzed by region in the state to adjust for local costs and weather.
- The program will additionally evaluate annual utility bill data for each customer, in each year of the program, to track overall changes in energy consumption.
- The program will track and periodically evaluate outcomes of work by each firm that performs Green Jobs/Green Homes NY retrofits on 25 units or more in a given year.
- Measurement and verification data, including data on contractor performance but purged of information that would identify customers, will be publicly available and posted on the Internet. Customer-specific data will be made readily available to individual customers on request.
- The lead agency will make modifications to the program as suggested by the data analysis; that is, expectations of energy and bill savings used in audits will be adjusted according to real program outcomes.

In all retrofitted structures, the durability of savings will be verified by reviewing the customer's heating and electric bills (including any nonutility bills) one year after installation. This billing analysis will be done by the program M&V department and will include a process for sending contractors back to improve homes that are not performing as expected. Although the payback terms for individual customers will not be reworked based on bills savings, the program implementer will periodically adjust program-wide savings projections on the basis of confirmed results of the program itself. This will result in more accurate energy savings projections over the span of the program.

In multifamily buildings, the program implementer will continue to perform annual reviews of utility data and nonutility fuel bills during the 10-year payback period. (Energy Management Systems data can dramatically reduce the resources needed to perform this review.)

During the initial years of the program, additional M&V will be needed to establish the true performance of investments in the Residential Retrofit Investment Fund, in order to increase

the dollar-for-dollar capacity of public funds to leverage private investment. This includes the collection and processing of data including project cost breakdowns, performance of individual installed measures, utility bill tracking, utility bill payment tracking, and other research.

Protecting against utility shut-offs during on-bill recovery

New York State’s Home Energy Fair Practices Act, or HEFPA, outlines the circumstances under which utility customers’ service may be shut off. When retrofit cost recovery charges are added to utility bills, customers will be provided with the additional right to assert defenses to payment of efficiency charges based on failure, theft, removal, or other qualifying problem. HEFPA, in combination with this addition, is generally adequate for protecting consumers whose bills carry on-bill recovery charges in combination with other protections including performance guarantees; payback levels below expected savings and payback periods shorter than the life of equipment; and owner responsibility for equipment maintenance.

Recognizing that utility shut-off is a particularly critical issue for lower-income ratepayers, Green Jobs/Green Homes NY’s financing mechanism triggers extra remediation measures for customers who are in danger of shut-off because they have not paid a portion of their retrofit obligation. For lower-income customers,⁴⁰ imminent shut-off triggers a remediation contact from the program implementer. If the measure is performing adequately, the program implementer works with the homeowner and looks at utility data to determine whether energy bills are high, and whether cost issues can be resolved by the program. If the measure is not performing, and cannot be made to perform adequately within one month, the customer’s obligation is removed from his or her utility bill, and relegated to the Retrofit Fund’s loan loss reserve. If the retrofit is exited from the program within four months of installation, the program implementer will refund prior retrofit obligation payments. If the retrofit is exited later than four months after installation, the customer may request a refund for the prior two months’ payments. If the customer is still in arrears following the refund, the utility will be required to extend to the customer a HEFPA-style workout option for an additional two months.

Protecting rent affordability as we improve New York’s housing

Retrofits are intended to improve housing affordability by lowering costs and upgrading systems. But as retrofits add value to buildings, to maintain affordability to renters, retrofitted units must be protected against upgrade-related rent increases.

Existing renter protection language from federal Weatherization Assistance Programs will be adapted and extended for the Green Jobs/Green Homes NY program, and will apply to all tenants regardless of rent-regulation status. Owners of rent-regulated buildings will specifically be precluded from applying Major Capital Improvements rent increases for retrofits performed under the program. Owners of nonregulated buildings will be precluded more generally from rent increases related to the retrofit improvements and/or fuel costs unless demonstrably higher.

Owners of rental properties also will be required to sign binding agreements that they will not use or allow retrofit work to be used to dislodge or displace tenants (by requiring that they vacate apartments, and then not allowing them to return), nor for gathering evidence about the activities or habits of the tenants, including activities that may constitute violations of lease terms or housing subsidy rules.

These renter protections should be reviewed, and where possible, strengthened as the Green Jobs/Green Homes NY program is further developed.

Disclosure to subsequent owners

The existing New York State Energy Law requires that heating and cooling costs be disclosed to home purchasers upon request, and this program will extend that protection by requiring disclosure of retrofit repayment obligations attached to the meter address any time the meter is transferred whether at sale or for any other reason.

Anecdotally, energy disclosure requirements often are bypassed. To be effective, this disclosure requirement will need carefully constructed legislative language, and may be supported by administrative safeguards. These might include spot checks and penalties to mortgage lenders or other agents when disclosure forms are missing from sale documents. Alternatively, utilities might request disclosure forms signed by the new meter holder as a condition of closing out the former owner's account.

Administrative costs

Historically, NYSERDA program models estimate program management costs at 9 percent of program (contracting) costs. Newer program estimates offered in the course of the Energy Efficiency Portfolio Standard proceeding use an 11 percent administrative cost figure. This figure includes administration and operational costs, contractor recruitment, advertising, etc. Green Jobs/Green Homes NY calculations use this standard. A portion of this funding will be directed to the lead agency, to build on existing administrative functions and to contract the program implementer; a significant portion will be directed to each target area for community-supported outreach, contract management, quality assurance, and other functions. In Year 1, to retrofit 35,000 homes, this administrative cost is \$21.2 million. Over the five-year program, the standard M&V cost is approximately \$450 million. An additional \$1.5 million per year, until the investment vehicle can be rated, should be allocated for the intensive measures needed to establish investment performance.

Administrative costs will ideally be drawn from Regional Greenhouse Gas Initiative funds, as discussed in the “How Do We Pay For It?” section.

How do we pay for it?

The central financial element of Green Jobs/Green Homes NY is an off-budget structure that taps private capital to supply the billions of dollars needed to pay for contracting costs of residential retrofits—and that can be repaid by users as they save on home energy bills (the “program”). The program’s Residential Retrofit Investment Fund (the “fund”) is a market-rate investment vehicle from which the program will draw funds to pay contractors for installing retrofit measures. Repayment methods, default considerations, credit enhancements, etc., are described below. Capital Operations Structure and 20-year cash flows for the fund are detailed in Appendices E and F.

Additional sources of funds and cost offsets also are detailed in this section.

Residential Retrofit Investment Fund credit structure

The fund will be established as an LLC to facilitate the flow of capital from individuals and financial institutions (“lenders”) to pay for residential energy-efficient retrofit measures. Alternatively, it is possible that an existing public benefit corporation could be used in this role. The fund will borrow from lenders to pay contractors for work and equipment installed in residential dwellings. Homeowners will execute 10-year agreements (the “repayment contracts”) that obligate them to pay a monthly charge that will cover both the cost of the fund’s borrowing and a small administrative override. The charge will appear as a line item on the homeowner’s utility bill (hence the “on-bill” tag for this structure) and will be in an amount less than the projected cost savings from the retrofit, so the net result to the homeowner will be a reduction in utility charges and an improved dwelling. The repayment contracts will extend this obligation to any successor owner of the property and will require the homeowner to repay any unpaid obligations under the repayment contract if he or she moves out and sells the home.

The nature of the repayment contracts is a critical element in the fund’s credit structure. These contracts will be designed as Tariffed Installation Programs. “TIPs” are directives from the Public Service Commission to utilities authorizing them to undertake certain activities and get reimbursement from online billings on the utilities’ bills. To ensure that the program has a strong underpinning, there should be legislation that directs the PSC to authorize utilities to participate. It is essential that the repayment contracts be: a) legally authorized and binding on the homeowner and b) obligate any successor owner of a property.

The fund will be supported by two credit-enhancement features. The first is a loan loss reserve, which will likely need to be established, based on fund performance at 5 percent of the funds drawn from lenders' commitments. In the case of homeowner nonpayment or partial payment of utility bills, the fund will be authorized to draw monies from the loan loss reserve in order to remit the full amount of scheduled payments to the lenders. The loan loss reserve will be funded by the utilities, federal bailout funds, federal stimulus funds, foundation funds, and/or other socially interested sources.⁴¹ When customers catch up on their payments, the loan loss reserve will be reimbursed. If nonpayment is determined to be the result of faulty retrofit installation or performance and the problem cannot be remedied, the unpaid principal of the retrofit will be taken from the loan loss reserve and paid to the lenders as an acceleration of principal.

A second credit enhancement structure might be established to be activated only if there are insufficient monies in the loan loss reserve. If this should happen, the fund could be authorized to tap the monthly flow of SBC (or other renewable revenue streams) funds to make up any shortfall in remittances pursuant to the repayment contracts. To the extent that there are no shortfalls to cover, funds will flow through to other energy conservation uses as they do now. This "pass through" structure mimics the flow of mortgage recording tax surcharges that support the State of New York Mortgage Agency Mortgage Insurance Fund, and thus it is familiar to public finance participants in NYS. It allows the stream of revenues to be used twice: once for supporting the program's borrowings and once (assuming that no withdrawals are required to meet the monthly scheduled payments) for the energy-related purposes now in place. SBC revenues that can be used for this purpose may be capped at a specified level.

These program features will provide the fund with a strong underlying credit structure and one that the rating agencies are familiar with in other formats. In today's chaotic markets, where many municipal and corporate entities are entirely precluded from borrowing, it is impossible to predict whether the program will be successful in raising the required funds. There is, however, every reason to believe that when the markets stabilize, a well-structured, rated entity such as the fund will be able to access the capital markets for a raise of the size contemplated in this policy blueprint. There is even some evidence that this credit easing is already beginning to happen.⁴²

Preliminary discussions with bond counsel indicate that a program such as ours would not qualify for tax-exempt financing because the immediate beneficiaries (the homeowners) are private parties. Discussions continue, however, and it may be possible to structure the financings so that tax-exempt bonds are a possibility.⁴³ In any event, it is reasonable to assume that the taxable markets, including such lenders as banks, pension funds, insurance companies, and individuals will be interested in holding the fund's debt.

The retrofits are self-financing only with respect to direct contracting costs. Costs for program administration, energy audits, and other management expenses overload the financing model. If all such costs were repaid from energy savings, financing terms would

have to extend to 15 or 20 years. (At the same time, the energy savings created by retrofits can cover some relatively low-cost “nonpaying” measures, including retrofits such as green roofs that provide important environmental benefits but don’t reduce homeowners’ utility bills. Homeowners desiring to contribute to the greening aspects of the program could agree to having these “extras” included in the retrofit even though this would somewhat reduce their share of the savings benefits.)

To support program costs that aren’t contract related, the Green Jobs/Green Homes NY program combines several funding sources, all of which are renewable and independent of New York State’s budget. Administrative costs of the program will be funded with RGGI dollars. The cost of the initial audits that precede contracting will be paid by utilities using SBC dollars. Proposals for funding from these streams, including mechanisms allowing these funds to simultaneously serve both Green Jobs/Green Homes NY and other programs, are explained elsewhere in this white paper.

Attracting capital: Investor considerations

To raise billions of dollars the program will have to access the private capital markets, most likely with a variety of financial structures such as fixed and variable rate debt, bonds and privately placed debt instruments, etc. To access the capital markets at this level and for this type of credit will require a rating from one or two of the nationally recognized rating agencies.

The rating agencies and other market participants will want to see, among other program elements:

- Strong support from the PSC directing participating utilities to include the monthly on-bill payments in homeowners’ monthly charges.
- Appropriate legal opinion (or, if required, legislation or PSC regulation) as to the validity of TIP-based repayment contracts “running with the meter” so that they are binding on subsequent purchasers of the property.
- Training and certification elements in place that can develop enough capacity to accomplish the program’s goals and that are properly supported by all participants.
- Analytic support for the sizing of the loan loss reserve, including data on normal shut-offs, customer delinquencies, “move out lags,” on-bill experience in other locations, and retrofit experience with respect to energy savings and successful installation.
- History of and legislative commitment to the SBC and RGGI programs.

The unique nature of the program will require a broad-based investor education effort and will benefit greatly from a pilot phase with a modest funding target. Demand and implementation questions will be in the forefront of investors’ minds, and the program

will need well-analyzed and supported responses to both. A successful initial phase will help on both counts.

During the pilot phase, risk capital commitments from a few actors—likely socially interested funds, foundations, and even possibly public sources—can play a critical role in launching the program. And “next capital” commitments from public and labor pension funds that are contingent on the first year’s performance will be important for leveraging commitments from banks and other more traditional lenders.

It is critical that high-quality and professional execution be hallmarks of the program. The program implementer must be an organization that has proven experience in performing both energy audits and retrofit oversight. Job training and certification likewise should be handled by credible, experienced entities in conjunction with standards and needs defined by the contractors performing the work. Fund management must be in the hands of an organization with credibility in both the capital markets and the public sector, supported by appropriate governance and communication with state and other stakeholders. In filling these and other roles necessary to get the program on its feet, appropriate selection procedures will have to be followed.

Transparency, too, will be a critical component of the program. Investors will require a real-time flow of accurate information with respect to program operations and achievements. Increasingly this type of communication is executed on the Internet, where participants can access data relative to their respective roles in the enterprise. Such data would include:

- A library of all program documents—contracts, agreements, etc.
- Up-to-date compilations of programmatic data—number of retrofits completed, size, location, projected savings, etc.
- Monthly financial statements, quarterly summary reports, and annual audits.
- By investor, size of commitment, size of draws, and debt service projections.
- Number of nonpayments characterized by type (e.g., retrofit-related or not, performing retrofit or nonperforming, length of nonpayment period).

Typically, investors in taxable securities such as proposed here fall into several groups:

- Life insurance companies.
- Individuals, either directly or through bond funds.
- Pension funds.
- Banks.
- For investments in programs of this nature, we can add the array of mission-driven or “impact” investors to the list, particularly those that have targeted “green” initiatives to invest in.

As described elsewhere, retrofit needs, costs, and schedules will be determined by existing organizations with a history of expertise in these areas.

Nonpayment and the loan loss reserve

The utilities will pursue their normal collection procedures to recoup delinquent retrofit payments from customers. If nonpayment persists, the utilities will have the ability to shut off delivery of electricity and gas in accordance with their procedures as approved by the PSC.

The loan loss reserve will cover shortfalls due to nonpayment of the scheduled on-bill obligations. Shortfalls may occur as a result of the following:

- **Nonpayment.** Ordinary nonpayment of utility bills occurs infrequently, but it does occur. Data suggests that somewhere between 2.5 percent and 3 percent of homeowners default on their utility bills. Most of the time, these delinquencies are made up and the loan loss reserve will cover the shortfalls until they are caught up. At that time, the loan loss reserve will be reimbursed. Sometimes the shortfalls result in turnoffs. In these cases, the loan loss reserve will cover the losses.
- **Nonpayment due to installation of retrofit.** If the on-bill obligation is not paid because the homeowner thinks that the retrofit is not functioning properly, the loan loss reserve will cover the shortfall until the retrofit question is resolved. If the retrofit is determined after inspection to have been properly installed, the obligations will become due and payable and the loan loss reserve will be reimbursed. If the retrofit is determined to have been improperly installed and it cannot be remedied, the loan loss reserve will cover the shortfall in withheld payments and additionally will cover the unpaid principal of the retrofit (and the homeowner will be relieved of his or her repayment obligation).
- **Nonpayment due to move-outs.** If the homeowner moves out of the house and turns off the electric or gas utility, the obligation to pay the on-bill charge does not end. It is anticipated, however, that collection will be at best difficult in this circumstance. The loan loss reserve will cover the resulting shortfall until the house is sold and the original homeowner brings his or her account up to date by paying the accrued shortfalls. This category also includes the result of move-outs due to fire or other hazards.

Prior retrofit program experience and utility bill default data offer some basis for anticipating Green Jobs/Green Homes NY default rates. Since most customers' repayments will be designed to leave customers with 20 percent of savings, post-retrofit utility bills will be lower than they would have been without the retrofit, even if utility prices decline. For this reason, simple defaults should not be any higher than they are in general for utility bills among the types of customers served by the program.

Nearly all programs that have financed retrofits and recovered costs through a line item on bills are either too new to have established clear default rates or too dissimilar to be relevant, but two utility-run residential retrofit programs offer experience that supports these expectations. Alabama Power, which does not use utility shut-off as a payment incentive, has experienced a 3 percent default rate over the last 15 years to 20 years. And Manitoba Hydro in Canada, which quickly moves to shut-off after 90 days of nonpayment, has experienced a 0.2 percent default rate since 2001.⁴⁴

Some unknown factors remain, and should be supported by increasing the size of the loan loss reserve above anticipated needs—for instance, customers whose repayments are set at more than 80 percent of expected savings may pose a higher risk of default if prices drop, and such properties might be less appealing at sale than similar unretrofitted properties.

For low-income customers, utilities and program implementers must take extra measures to determine whether retrofits are performing as intended before utilities may implement shut-off. Utilities must request and await additional inspections and remediation efforts by program implementers, and a final determination of whether the retrofit should be removed from the program. If the retrofit is determined to be nonperforming within the first four months of installation, utilities must credit back to the bill any retrofit payments made by the customer, including interest. This refund is covered by the loan loss reserve. For a low-income customer, if the retrofit is determined to be nonperforming after the first four months of installation, utilities must credit back to the bill any retrofit payments made by the customer in the prior two months. This refund is also covered by the loan loss reserve.

Initial phase

An initial phase, represented by Year 1 implementation goals, will provide the fund with an opportunity to test the proposed credit structure and operate the program outside of the public markets during the current market uncertainty. The pilot credit structure, described below, represents conservative structuring necessary to attract initial stage investors. Year 1 program experience will confirm the technology and allow program administrators to confirm or deny whether nonpayment frequency aligns with expectations based on prior utility and TIP experience.

Following the pilot phase, ramp-up is highly dependent on the public markets and the availability of large amounts of capital. Even as the public markets take time to settle, the pilot period will provide an opportunity to establish the program's operational credibility, and it will provide needed data on loan performance. The credit structure for the pilot period must be sufficiently conservative so that it attracts initial stage investors. Less stringent credit supports, based in part on the information gleaned from the pilot, may be warranted as the program proceeds.

As outlined in the Year 1 proposal, the pilot phase would plan to perform 35,000 retrofits at a contracting cost of about \$192.4 million.

Program sensitivities

Appendix F shows the sensitivities of the program to various elements—cost of capital, percentage of energy savings retained by homeowner, homeowner’s historic energy usage, the repayment term, and gross annual energy cost savings.

The analysis indicates that the program design is sensitive to changes in any of the variables, but is most vulnerable to shifts in the size of the homeowner’s historic energy costs. The more the homeowner spent in prior years on energy, the greater the program’s positive impact on his or her bottom line. Likewise, the more of the savings we can allocate to the homeowner (as opposed to using for debt service), the more attractive the program appears. Relative to variations in the other inputs, the program design seems somewhat insensitive to changes in cost of capital.

Other mechanics of program

Key assumptions for on-bill recovery

- Utilities are conduits for repayment to the fund. The obligation to pass homeowners’ debt service payments to the fund is not a corporate obligation, but the utilities are responsible for the mechanics of the repayment. Inability to collect does not necessarily relieve the utility from meeting this obligation. In the event of routine homeowner nonpayment, the fund is responsible for accessing Loan Loss Reserve funds. Utilities are responsible for identifying uncollectibles—nonpayments due to program faults—so that the fund may draw from its loan loss reserve.
- Nonpayment by low-income customers triggers the utilities’ responsibility to offer the homeowners access to extended Green Jobs/Green Homes NY troubleshooting and recourse mechanisms, and to satisfy the program’s standards for low-income issue resolution before implementing shut-off.
- Partial utility bill payments by the customer are applied first to energy payments, second to retrofit payments. This allows the program to use the loan loss reserve to cover retrofit-related lags or losses, and alleviates the burden of uncollected retrofit debt on utilities.

Ensuring that repayment obligations stay with the meter

To make the repayment obligation stay with the meter, rules are likely needed in three places:

1. The legislation that creates the program and establishes either the RRIF itself or the relationship between the RRIF and the program must make the customer's agreement a condition of a customer's ability to use RRIF funds through the program. The customer must agree to include "staying with the meter" as covenant at sale or lease of the property that transfers the meter account to the lessee.
2. The RRIF must include in its rules—whether created by the legislature or other entity—the customer's agreement to the above as a condition of draw.
3. The utility TIP—the standard contract that has to be approved by the PSC before implementation—must include the above.

Procedure for drawing on the retrofit fund

Certificate from program implementer containing:

- Copy of retrofit contract including contractor, scope of work, and contractor guarantee/warranty (could be warranted to by program implementer and original kept by program implementer).
- Copy of homeowner's on-bill contract.
- Certification from utility of homeowner's good standing (as defined by the credit committee and subject to the approval of fund rules finalized by the credit committee).
- Evidence that homeowner is not currently delinquent on mortgage(s) associated with the property (prior month's mortgage statement(s)).
- Contractor certification from regulator/trainer (could be warranted to by PI and original kept by PI).
- Retrofit specifications including measures undertaken, projected savings, applicable manufacturer warranties, if applicable (could be warranted to by program implementer and original kept by program implementer).
- Evidence of homeowner's utility bill history and calculation of projected monthly debt service payment and of retained savings.
- Program implementer contract in good standing (no breach outstanding).
- Evidence of loan loss reserve being funded to required level including amounts allocable to proposed draw.

Preliminary program terms for pilot period

| | |
|--------------------------------------|--|
| Initial commitment size..... | \$200,000,000 |
| Length of initial facility term..... | Minimum 18-month origination period (subject to truncation if draws exceed projections) |
| Syndicate size..... | Maximum five participants |
| Ratings..... | None |
| Loan loss reserve..... | Initial: 10 percent of draws to date net of principal repayments |
| Source of loan loss reserve..... | System Benefits Charge |
| Swing line..... | \$20,000,000 |
| Swing line sweep schedule..... | Quarterly or when draws exceed \$20 million in any quarter |
| Swing line administrator..... | Syndicate administrator (lead senior lender) |
| Unused proceeds fee..... | One-half of 1 percent annually |
| Interest rate..... | 10-year Treasury plus [2.5 percent] annually |
| Term of draws..... | 10 years maximum |

Terms for long-term period

| | |
|--------------------------------------|---|
| Initial commitment size..... | \$1,000,000,000 |
| Length of initial facility term..... | Minimum four-year origination period (subject to truncation if draws exceed projections) |
| Syndicate size..... | No maximum |
| Ratings..... | Yes |
| Loan loss reserve..... | Initial: to be negotiated with rating agencies Ongoing: same |
| Source of loan loss reserve..... | System Benefits Charge |
| Swing line..... | \$50,000,000 |
| Swing line sweep schedule..... | Quarterly or when draws exceed \$50 million in any quarter |
| Swing line administrator..... | Syndicate administrator (lead senior lender) |
| Unused proceeds fee..... | One-half of 1 percent annually |
| Interest rate..... | 10-year Treasury plus [2 percent] annually |
| Term of draws..... | 10 years maximum |

Work flow

When the program initiates energy-efficiency work with a consumer, a number of activities commence. Each will entail costs that will be covered by the indicated funding sources:

- Program call center handles the consumer's call and schedules an energy audit (staffing and back office costs: Admin/RGGI).

- The program implementer dispatches an audit contractor by agreement with the local utility. The audit includes the following (paid for by the utility with SBC funds):
 - Performing an energy assessment and creating a retrofit plan.
 - Installing basic air-sealing measures and, where appropriate, faucet and showerhead aerators.
 - Signing the customer up for a retrofit and establishing the retained savings level at a given percentage of the total projected savings for a term of ten years.
 - Establishing an overall debt service requirement to repay costs of the retrofit plus a small administrative override.
- The homeowner selects a contractor who reviews the work scope in the audit. The contractor makes a bid on the work and presents it to the program implementer for approval (processing costs: Admin/RGGI).
- The contractor performs the retrofit work and the auditor returns to perform a test-out audit pursuant to which the contractor makes any needed adjustments. Contractor, homeowner and auditor sign off on completion (audit costs: Utility/SBC).
- The program implementer notifies the utility that work has been completed and presents an invoice for contracting work to fund (processing costs: Admin/RGGI).
- Fund draws on credit agreement with lenders and disburses monies to the program implementer, who then pays the contractor (payment: Contracting/Fund; processing: Admin/RGGI).
- The fund will notify the respective utility to add the appropriate on-bill charge to the homeowner's bill. This charge will be calculated so that the homeowner keeps 20 percent of the projected reduction in utility costs and the remainder covers the repayment obligation. (One- to four-unit residences will be eligible only for retrofits that finance themselves through utility savings; oil savings will not be included in the program until separate structures are established for disbursement and repayment and are duly rated.) A debt service schedule will be established such that each draw plus interest will be repaid within 10 years.
- The program implementer performs measurement and verification tasks (Admin/RGGI).
- The utility remits debt service portion of on-bill payment plus administrative override to the fund each month (Admin/RGGI).
- In the event of partial, missed, or suspended (during dormancy) retrofit payments by the customer, the utility draws from the SBC to make up the difference (Utility/SBC).

Audit and loan loss reserve funding: System Benefits Charge

Funds pooled via the System Benefits Charge—the aggregate of a small charge placed on the utility bill of most of New York State’s electricity customers—should provide an important source of funding for the Green Jobs/Green Homes NY initiative.⁴⁵ The Public Service Commission’s website describes the SBC as follows:⁴⁶

In 1996, the New York State Public Service Commission called for the establishment of a System Benefits Charge to fund public policy initiatives not expected to be adequately addressed by New York’s competitive electricity markets. In 1998, the PSC specified SBC funding levels for three years and the framework for energy programs targeting efficiency measures, research and development, and the low-income sector. The SBC was renewed for a five-year period in 2001 with increased funding and additional focus on programs designed to achieve peak load reductions. In December 2005, the PSC extended the SBC program for an additional five-year period (July 1, 2006, through June 30, 2011) with an annual funding level of \$175 million. The previous SBC funding level was approximately \$150 million annually.

The SBC program portfolio has been primarily administered by the New York State Energy Research and Development Authority. The SBC programs are designed to serve the diverse needs of New York energy consumers from residential homeowners and tenants to manufacturing plants and commercial office buildings.

The SBC is the primary source of funding for New York’s energy-efficiency programming, although it is currently limited to electric efficiency projects. The SBC fund is expected to increase to \$350 million annually as a result of the current Energy Efficiency Portfolio Standard process, which sets targets for reducing the state’s electric demand. Current proceedings at the Public Service Commission are intended to elicit plans from utilities, NYSERDA, and others for spending the increased funds.

Historically, SBC funds have been used to fund direct costs and incentivize individual retrofits, not to leverage private investment in a larger pool of retrofit funds. Program designs emerging in the EEPS process continue this approach: Most recently, for instance, the Public Service Commission authorized utilities to provide \$400 to \$600 rebates for the installation of efficient residential heating and cooling equipment.⁴⁷ (The total cost of this equipment is about \$4,000.)

As the fund grows—and as the state and others seek to drive demand for energy efficiency beyond the capacity of the SBC to provide incentive funding—SBC dollars should be turned in part to support programming that reaches a larger customer base and leverages a much larger scale of private investment. The \$10 million invested in the RRIF loan loss reserve, for instance, would leverage \$200 million in contracting funds—which, in very simple terms, is about double the resources leveraged by the rebate above even before acknowledging that the \$10 million will likely be returned to the SBC fund unused.

The credit structure of the RRIF also allows the program to provide these dollars for retrofits to households without access to capital, including households not eligible for grant funding under the Weatherization Assistance Program. RRIF's capacity to serve these customers is contingent on the specifics of its structure and legislatively secured relationships between the state, utilities, program administrator, contractor, and property owner.⁴⁸ Green Jobs/Green Homes NY does not replace the incentive programs historically funded by the SBC, but it offers the opportunity to dramatically expand the capacity of that fund to achieve the state's energy goals.

SBC dollars can be used well and effectively to support Green Jobs/Green Homes NY by providing a credit enhancement in the form of loan loss reserve funds. And in their more traditional role they can pay for home energy audits and the minor energy-efficiency improvements that accompany the audits.

Administrative/program funding: Regional Greenhouse Gas Initiative

The bulk of the cost of implementing the Green Jobs/Green Homes NY initiative will be raised through private capital. However, costs will be associated with program administration and developing the large workforce needed to begin performing the residential retrofits. Investing RGGI auction revenue to jumpstart this unprecedented, large-scale energy-efficiency initiative should be a top priority for the state.

Direct monetary incentives to encourage efficiency are a simple and time-tested mechanism by which to reshape the state's energy mix and infrastructure. However, without a sufficient workforce to carry out such projects, on-the-ground implementation will be hindered. Investing RGGI revenues to fast-track the Green Jobs/Green Homes NY program will accelerate reductions in electricity demand, thereby reducing pollution from power plants.

Regulations requiring that regional climate plan funds are spent on energy-efficiency investments are actually consistent with the goal of ensuring the RGGI's financial viability.⁴⁹ In advocating for the RGGI, supporters argued that even if electric rates rise slightly as part of the program's implementation, electric bills would likely fall for most consumers because auction-generated funds would be invested in energy efficiency.

The Massachusetts Division of Energy Resources, on behalf of the RGGI State Working Group, estimated that doubling energy-efficiency spending would reduce annual household utility bills by \$66 in 2015 and by \$109 in 2021. These savings will be essential to low-income consumers. Increased energy-efficiency investment also will reduce the need to build new sources of power generation, further lowering electric bills as well as reducing carbon emissions.

While some have speculated that RGGI funds could be tapped to close gaps in the state budget,⁵⁰ Governor Paterson has publicly committed to spending this money as the regulations intend: on energy efficiency and clean energy.⁵¹ And in January 2009, an Early Action Plan approved by the New York State Energy Research and Development Authority set forth NYSERDA's initial priorities for how the first \$42 million in auction proceeds would be spent.⁵² This included \$15.3 million for "residential heating efficiency" and \$2.1 million for "workforce development."

Unfortunately, as of late January 2009 one regulated power generator has sued New York State over the RGGI program. The suit challenges the legal authority of the state to create this cap-and-trade system without state legislation, as well as the legality of entering into a multistate compact without congressional approval.⁵³ It is unclear how the pending litigation will affect the disbursement of auction proceeds, if at all.

Offsets

RGGI's "eligible CO2 emissions offset projects"⁵⁴ offer a separate source of potential revenues for the residential retrofit fund itself. The draft regulations provide that "reduction or avoidance of CO2 emissions from natural gas, oil, or propane end-use combustion due to end-use energy efficiency... are eligible for the award of CO2 offset allowances."⁵⁵ Retrofits installed via the Green Jobs/Green Homes NY program will result in end-use energy efficiency. So it follows that investment in the Residential Retrofit Fund by power generators would make those generators eligible for offsets pursuant to the RGGI regulations.⁵⁶

Through the installation of retrofits, the Green Jobs/Green Homes NY program may be eligible to receive CO2 offset allowances that can then be sold to CO2 budget units in order to meet their compliance obligations under RGGI. CO2 offset allowances likely will track the price of the RGGI allowances auctioned. The first of these auctions was held in late September 2008 and yielded a price of \$3.07 per CO2 allowance. The second auction was held on December 17 and allowances were sold for \$3.38, raising approximately \$106.5 million in proceeds across the 10 RGGI states.⁵⁷

A benefit of tapping this RGGI source of funding may be that after meeting the eligibility criteria and making the relevant determinations, an offset project may receive up to an initial 10-year allocation of offset allowances, which should help in the financing and the cost-effectiveness of the program.⁵⁸ However, the Green Jobs/Green Homes NY program will need to meet the "additionality"⁵⁹ and eligibility requirements set out in the New York State Department of Environmental Conservation's RGGI rule prior to participating in this new market.

Other potential funding sources

Federal stimulus funding to New York State

At the time of this writing, Congress has recently approved, and the president signed into law, an unprecedented economic stimulus package known as the American Recovery and Reinvestment Act. A news release issued by the office of New York State Governor David A. Paterson details how the national stimulus legislation—providing for \$789 billion—will benefit New York State.⁶⁰ The governor’s office estimates that “of the \$463 billion in spending” the remaining \$326 billion is provided for in tax cuts—“\$374 billion is for programs that directly impact [New York] State.” It further notes that New York is expected to receive \$24.6 billion in direct funding.

Relevant to Green Jobs/Green Homes NY, the federal legislation “includes \$16.8 billion for energy efficiency and renewable energy projects and technologies,” including for New York, “\$126 million through the State Energy Program and \$31 million in alternative energy block grants.” The release also noted that New York is expected to receive \$404 million for weatherizing low-income households.

Infrastructure and energy stimulus funding nationwide and in New York State

Includes weatherization, Energy Efficiency and Conservation Block Grant, State Energy Program, and the Workforce Investment Act

| Program | Federal | NYS |
|--|-----------------|---------------|
| Weatherization | \$5,000,000,000 | \$404,000,000 |
| Energy Efficiency and Conservation Block Grant | \$3,200,000,000 | \$31,000,000 |
| State Energy Program | \$3,100,000,000 | \$126,000,000 |
| Workforce Investment Act ⁶² | \$3,950,000,000 | \$174,000,000 |

(Adapted from Governor Paterson news release, February 14, 2009)

It’s often a challenge for governments to find the financial resources to fund much-needed energy- efficiency projects. But the federal stimulus poses an unfamiliar challenge for New York: how to ensure that a workable energy-efficiency program can be put in place—at scale—to receive the available funds. In general, channeling these funds into the state’s existing energy-efficiency programs will significantly aid the ramping-up process needed for the Green Jobs/Green Homes NY program to succeed.

However, how effectively these funds are put to use is a matter of great import. Governor Paterson has shown he understands this by creating a cabinet made up of agency heads and top gubernatorial staff to manage the projects financed through these federal funds. The governor’s cabinet is designed to “ensure federal dollars reach critical projects and put people to work as quickly as possible.”⁶¹ Advocates of the Green Jobs/Green Homes NY initiative are putting forth the program as a viable blueprint for how the state can ramp up its residential energy-efficiency work and help satisfy these state objectives.

Qualified Energy Conservation Bonds

The economic recovery package also increases the bond limit for the Qualified Energy Conservation Bond program from \$800 million to \$3.2 billion. The recently created QECBs allow state and local governments to obtain the capital for qualified energy conservation projects by issuing tax credit bonds to private investors seeking a tax credit. QECBs will support state and local programs that address the prohibitive up-front costs for building retrofits. An amendment initiated by Senators Russ Feingold (D-WI) and Debbie Stabenow (D-MI) ensures that energy-efficiency retrofits in private buildings are eligible for the QECB program.

A New York State Environmental/Energy Bond Act

Many of the organizations involved in the creation and implementation of this Green Jobs/Green Homes NY initiative also are advocating for passage of a Clean Water, Clean Air, and Green Jobs Bond Act of 2009.⁶³ Voter-approved bond proceeds would be utilized for environmental projects that make long-term improvements to New York State's environmental infrastructure and natural resources, energy efficiency, public health protection, and economic development—above and beyond those paid for by the Environmental Protection Fund, System Benefits Charges, Regional Greenhouse Gas Initiative proceeds, or other sources of state funding.

This bond act initiative would seek to raise \$5 billion, \$1 billion of which would go toward investments in energy efficiency, including residential needs. Bond act funds may be eligible to benefit the Green Jobs/Green Homes NY initiative in a number of useful ways, among them:

- Populate the residential retrofit fund, providing capital for contracting costs and freeing up the credit structure to allow for additional energy-efficiency improvements per customer.
- Create a loan loss reserve—a funding pool to cover defaulting utility customers.
- Leverage an investment guarantee for risk-averse, third-party investors.
- Cover part of the administrative costs of the program. The Center for Working Families is researching possible uses of this potential funding source and has joined the coalition exploring the feasibility of passing a bond act in 2009.

Tax incentives to owners

While tax incentives will not directly channel funding into Green Jobs/Green Homes NY, they are an important tool for incentivizing and expanding access to retrofits under the program. Homeowners who expect tax rebates or credits for

retrofit measures will be more likely to value the opportunity to install retrofits at no up-front cost. They also will be more likely to accept smaller savings/repayment splits, which will mean that the program may be able to perform deeper (more expensive) retrofits than if no tax incentives were available. And the program may reach customers who would not otherwise have participated.

NYSERDA and Utility Residential Rebate Programs

The Public Service Commission, through the EEPS proceedings, is in the process of approving fast-track programs for NYSERDA and utilities to provide rebates for installed energy-efficient measures. (PSC staff has recommended residential HVAC rebates of \$400 or \$600 for central heating and cooling equipment, and ENERGY STAR thermostat incentives of \$25.)⁶⁴ Although Green Jobs/Green Homes NY is not intended to replace utility or NYSERDA programs, these rebates will not reach owners without access to funds to cover up-front installation costs. Combining these rebates with Green Jobs/Green Homes NY financing may extend the reach of both programs. These rebates also can help Green Jobs/Green Homes NY reach customers for whom retrofits would not be self-financing within eight to 10 years without rebates.

Note: Funding for workforce development is discussed in the workforce development section.

Limits and potential shifts in funding streams

The funding sources identified above will shift over time. SBC and RGGI funds will grow, but demands on those streams also may grow. Stimulus funds are available only for a limited period, but we can invest them in credit enhancements that make the same dollars perform over many subsequent years. Similarly, new funding streams may become available that can support retrofit or administration costs, loan loss reserves, or other needs.

Green Jobs/Green Homes NY legislation should build in the opportunity to periodically restructure funding sources and to evaluate whether the program should proceed with the ramp-up schedule or maintain level investments for a year. While maintaining minimum investment levels from year to year is critical to establishing and rationalizing the retrofit market, the program's expansion can be paused if funding becomes constrained.

Developing the resources for mass-scale retrofits: Labor, contractors, and community access to jobs

Total retrofit jobs created for each year of the program

Program increases workers added each year for a total of 14,240

| Year | Workers added |
|-------|---------------|
| Y1 | 2,868 |
| Y2 | 2,868 |
| Y3 | 3,687 |
| Y4 | 4,379 |
| Y5 | 438 |
| Total | 14,240 |

Job creation by sector

Program creates jobs in marketing and administration, energy and performance assessments, contracting, program management, and job training

| Sector | Y1 |
|------------------------------------|-------|
| Marketing and administration | 694 |
| Energy and performance assessments | 577 |
| Contracting | 1,152 |
| Program management | 172 |
| Job training | 273 |
| Total | 2,868 |

Green Jobs/Green Homes NY will directly create more than 14,000 retrofit-related, long-term, full-time careers across New York and an additional 60,000 job-years through multiplier and linkage effects over the entire five-year period. Retrofit jobs are mostly similar to existing blue-collar jobs in housing rehabilitation and construction, with additional skills and accountability for the energy-saving performance of installed work, and some additional jobs in engineering and building science. (A detailed map of the retrofit sector is provided in Appendix D, and job projections for Green Jobs/Green Homes NY are detailed in Appendix E.)

These jobs should be defined as good jobs with family-sustaining wages and benefits: They will provide secure work for existing workers and career-building pathways out of poverty for new workers. Retrofits performed in economically distressed communities should employ people in those communities, and build on local efforts to develop and maintain an economically stable workforce.

The building and labor trades currently possess many of the skills required to perform retrofit work. But questions about which craft jurisdictions cover retrofit work and whether wages for small residential projects can be structured to attract union labor leave uncertainty about which unionized trades, if any, will be willing to provide retrofit labor. To the extent that existing skilled workers are not available for retrofit projects, Green Jobs/Green Homes NY will require that new workers be trained. Moreover, even among highly skilled workers, there may be the need for additional training in skills specific to renovation work based in building science.

Similarly, there are many contractors who currently employ relevant skilled workers, but relatively few who perform retrofit work. Green Jobs/Green Homes NY will need to support and advocate for general contractors to “cross over” to retrofit work and for existing home performance contractors to grow their volume of work, in part by connecting them to pools of skilled workers and removing other barriers that have hampered their expansion.

The need to expand the home performance contractor base—not just the pool of workers who are willing and able to do residential retrofit work—is enormous. The Building Performance Institute, which certifies the contractors who perform retrofits in New York

State programs, reports that it currently has just 250 to 300 accredited contracting firms in New York State and about 1,000 certified individuals. As of December 2007 there were 144 participating contractors identified in NYSERDA's HPwES program database. Most of these were small contractors: Only 5 percent completed 100 projects or more in 2007, with 80 percent of contractors completing less than 50 projects a year.⁶⁵ The federal Weatherization Assistance Program, administered by the New York State Division of Housing and Community Renewal, relies on a network of 64 subgrantees that provide program services in each of the state's 62 counties. Subgrantees provide energy conservation services through their own trained crews and by subcontracting work to local contractors.⁶⁶ The local availability of contractors differs enormously across the state. In New York City, for instance, only about 10 BPI-certified contractors perform the bulk of NYSERDA work.

Labor-management partnerships

Historically, labor-management partnerships have provided two important functions:

1. A forum in which management can coordinate with workers, and problem-solve to improve productivity or reach other goals.
2. A vehicle for employers to pool training funds, coordinate apprenticeships, among other things, in concert with labor groups.

In Green Jobs/Green Homes NY, this concept is expanded to include community-based organizations representing vulnerable workers. It is also a tool for supporting the development of new firms, who might otherwise lack the resources to locate or train quality workers.

This contractor base currently accomplishes approximately 26,000 retrofits on New York homes each year, across NYSERDA and DHCR programs. In its first year alone, Green Jobs/Green Homes NY proposes to retrofit 35,000 units in a total of 21,400 structures,⁶⁷ which constitutes a 134 percent increase in this work. These Year 1 goals will create approximately 2,870 new jobs in auditing, retrofitting, program administration, and marketing. Program targets will require the retrofit workforce to double again in Years 2, 3, and 4 (see Appendix E: Green Jobs/Green Homes NY job projections), but these jobs can be realized only if firms are prepared to claim and coordinate work and to deploy workers.⁶⁸

It is essential to get existing and new home performance contractors on board and to develop a scalable contracting model for home retrofit work. The mechanisms for this—which include rationalizing retrofit training, work, and contracting patterns—are the same mechanisms that can leverage training standards, labor standards, equitable entry of dislocated and unemployed worker populations into the retrofit workforce, and access to lifetime careers.

The Workforce Planning Panel: A precursor to labor-management-community partnerships

Labor-management partnerships are ubiquitous in unionized trades and a proven vehicle for meeting the needs described above. Such a partnership will be essential for coordinating the equitable and rational development of a retrofit workforce.

To set the stage, Green Homes/Green Jobs NY implementation requires decisive coordinated action by the New York State legislature; by state agencies including NYSDOL, NYSERDA, the Office of Temporary and Disability Assistance, DHCR, the Public Service Commission, and any lead agency; and by unionized labor, workforce and small business development (including local Workforce Investment Boards, Manufacturing Extension Partnerships, and Small Business Development Centers), and community groups.

More than 150 organizations have been involved in developing the Green Jobs/Green Homes NY proposal, and the collaborative will continue to work on aligning the resources needed to make the program a success. However, a more formal state-supported planning body is essential. This must include, at minimum, the New York State Department of Labor, community groups,⁶⁹ and representatives from relevant unionized trades to serve as the voice for the workforce, NYSERDA, and the lead agency for energy savings and training standards and associated companies for business interests.

Green Jobs/Green Homes NY policy will establish a Workforce Planning Panel, comprising stakeholders in retrofit workforce and contracting development. The panel will seek to coordinate training resources among its members, including unionized labor, community groups, state agencies, and others. The panel also will evaluate and adapt contracting rules, including local hiring and W/MBE contracting, to help organize the landscape of retrofit demand.

While this policy blueprint necessarily stops short of prescribing the specifics of a workforce development program design (since the relationships between community, training, labor, and business/contracting actors are not yet fully forged), the Workforce Planning Panel will bring together these diverse stakeholders as Green Jobs/Green Homes NY is rolled out and implemented. Its role will be to orchestrate the landscape of workforce development and contracting to support the following Green Jobs/Green Homes NY program strategies:

- **Organize the expansion of demand for retrofit work:** Currently, residential retrofit work is piecemeal and geographically scattered. Green Jobs/Green Homes NY will concentrate demand in geographic target areas, along with workforce development and contracting support resources, to rationalize the industry. The Workforce Planning Panel will be the venue for much of the coordination among agencies, firms, and training groups in target areas, and it will assist in the development of workable contracting rules that achieve goals for equitable local economic development and achieving mass contracting scale.
- **Organize contractors and workforce sources to expand the retrofit industry:** The universe of contractors—those who already do retrofits and those who have historically preferred higher-margin projects but may now be amenable to smaller projects—must be engaged to perform the emerging work. They should use good administrative and labor practices, in part through industry-wide training infrastructure and other coordinated supports. Similarly, workforce sources from unionized labor to community workforce development groups must be coordinated to provide a relevant, consistently trained labor pool.

Organizing demand benefits vulnerable workers

Currently, energy-efficiency work is done by contractors working across counties or larger territories, in house-by-house projects. This keeps larger contractors out of the field, since the work is too small and piecemeal for their scale. It also presents barriers to employment for workers coming out of unemployment or poverty: distance to work poses critical problems for workers without steady access to transportation, child care, and other job supports.

In 2007, PUSH Buffalo and the Steelworkers' Union piloted a community internship program in weatherization. Unemployed Buffalonians interned with union workers on a project to weatherize homes in their neighborhood, and were then offered paid work as apprentices. But as apprentices, they were hired on jobs in other places around western New York state. Lacking access to cars, travel funds, child care, and other needs, they had to turn down the jobs.

Green Jobs/Green Homes NY aggregates work into substantial multiunit contracts that also serve to concentrate jobs locally. This approach lends itself to the growth of highly connected workforce development and training systems, a stream of reliable jobs that serve to expand the capacity of small contractors and draw larger contractors into the mix, and preserves consumer choice and competition.

- **Make sure that green jobs are “good jobs”:** If the green economy is to serve as a vehicle for replacing the types of work that supported the expansion of the middle class, then the green jobs that form the basis of that economy must provide workers with family-sustaining wages and benefits and offer clear avenues for ongoing skills development and career advancement. Green Jobs/Green Homes NY will establish program-wide wages that are family-sustaining, prevailing wages on large contracts, and scaled-up apprenticeship and nonapprenticeship labor-management training opportunities and job advancement.⁷⁰
- **Strengthen systems to support quality work:** The quality of work performed is paramount to the success of the Green Jobs/Green Homes NY financing strategy—the expected rate of return to investors and estimates of how long energy savings will take to pay for the up-front costs of retrofits all rest on the assumption that retrofits are performed well and function as expected. Green Jobs/Green Homes NY will expand upon existing labor and contracting standards to support quality controls in the retrofit delivery system.
- **Ensure work opportunities reach economically distressed communities:** Green Jobs/Green Homes NY builds meaningful on-ramps to retrofit work by linking recruitment, training, and certification to pre-apprenticeship, apprenticeship, and other job opportunities for marginalized workers and by providing continued supports as vulnerable workers advance their careers. Disconnected youth—in particular, youth and young adults aged 17 to 24 enrolled in GED and/or workforce development programs—must be connected to the hard-skills training and apprenticeship opportunities that will prepare them for green jobs. To support these opportunities, Green Jobs/Green Homes NY will need to include legislative language on issues including wage standards, best value and women/minority-owned business enterprise contracting, and local and minority hiring.
- **Formalize the coordination of stakeholders and resources:** The retrofit market will need to be coordinated in the long term by labor-management-community partnerships made up of many if not all stakeholders engaged in the Workforce Planning Panel. Green Jobs/Green Homes NY will need to formalize such a permanent, sustainable system for aligning the needs of workers, contractors, and their communities in the emerging green economy. Other resources external to the program, such as relationships between other state agencies and green training programs, also should be leveraged by Green Jobs/Green Homes with the help of the Workforce Planning Panel.

Organizing demand: Targeting and bundling retrofit jobs

Currently, most residential retrofit work in New York is performed by contractors working across counties or larger jurisdictions on house-by-house projects. Multifamily buildings are retrofitted by just a few main contractors who also work across large territories. The

piecemeal nature of the work deters small contractors from growing, and keeps larger contractors out of the field because house-by-house projects are too small.

Targeting initial investments in retrofit work in New York by specific, limited geographic regions will concentrate demand with the purpose of spurring the growth of energy-efficiency contractors and workers.

Green Jobs/Green Homes NY will aggregate work into substantial multiunit contracts that concentrate jobs locally. Bundled retrofit work will help shift the market from small job after small job to a large-bid market capable of supporting the growth of smaller contractors and the participation of larger high-road contractors, both to perform work and to serve as contract managers who can mentor smaller firms.

In Green Jobs/Green Homes NY Year 1, for example, 35 areas will be targeted for 1,000 retrofits each (or 250 to 1,000 for rural areas), including seven areas with a focus on multi-family buildings. Contractor X can bid for contract blocks of a minimum of 25 units each and a maximum of 400 units. So even though homeowners ultimately will choose their own contractor, the program will offer Contractor X's services to homeowners until he or she reaches the allotted number of units. Contractors who perform well can be allocated right-of-refusal to extend their contract to additional same-size bundles of retrofits in current or subsequent years. This structure allows contractors to anticipate demand, and it also incentivizes contractors to perform quality retrofits.⁷¹

Targeting and bundling retrofit jobs can support contracting in additional ways:

- Facilitating the development of specialized subcontracting companies where the market is weak. For example, few companies recycle and resell the component parts of appliances, but Green Jobs/Green Homes NY will create sufficient work, subcontractable in bulk, to support business growth in this area.
- Spreading jobs out more evenly throughout the year for individual firms, which avoids “slack-and-slam” cycles that result in seasonal worker layoffs during periods of lower utility use and lower interest in retrofits.
- Ordering materials in bulk with local and/or secondary materials sourcing and shared shipping, which contributes both to cost-effectiveness and sustainable business practices.

Organizing contractors and workforce sources

Organizing contractors

Contracting resources for Green Jobs/Green Homes NY can likely be drawn from three sources:

- Existing and new home performance contractors.
- Existing small contractors who do not currently perform retrofits because they have not invested in certification or adopted the home performance accountability model.
- Existing large contractors who do not currently perform retrofits because such projects are too small or low margin.

An additional source—contingent on the availability of funding—may be oil heat retailer/servicers.

Each of these will need to be actively recruited to expand their work in retrofits, and barriers to their prior participation or expansion will need to be solved. At the same time, contractors will need to understand and engage with the “triple bottom-line” requirements of Green Jobs/Green Homes NY including local and minority hiring, accountability for retrofit cost parameters, and performance requirements. The jobs created by the program should also be good jobs with family-sustaining wages, appropriate training support, and opportunities for career advancement.⁷² The Green Jobs/Green Homes NY coalition will actively seek the precommitment of contractors of all sizes to engage in work created by retrofit legislation. Locating and involving appropriate W/MBEs will be an important part of this process.

Many barriers must be addressed by coordinating contractor organizing efforts with unionized trades and community workforce development groups. These barriers include sourcing qualified workers and making labor costs consistent across projects.

For smaller contractors, major barriers are related to finding and/or training qualified workers. Residential energy-efficiency and home repair contractors are generally small businesses that may struggle to maintain workflow and a well-trained crew. Workers often are transient across firms, and there is no guarantee that enough work will be available to provide full employment to workers at all times. Training is disjointed and offered only to the most advanced and loyal workers. There is no hiring pool and any investment made in an individual worker can be easily lost by the fragmentation of the market. Business owners often cannot afford insurance and benefit packages for their workforce and may keep only a few workers on the payroll full time.

Larger-market contractors have worked with unions to solve these problems by creating systems of portable wages and benefits, Community Benefit Agreements that standardize equitable hiring practices, and joint investment in training that allows industry-wide qual-

ity standards and simplifies hiring and retention of skilled workers. The Green Jobs/Green Homes NY Workforce Planning Panel will support the addition of these systems to the retrofit contracting market. The program itself will use its capacity as a funding stream to augment the amount of project funding historically available for labor costs so that small contractors are not unduly cost-burdened by participating in these shared structures.

Since retrofit firms require skilled workers as project supervisors in order to expand—as well as skilled installers of insulation, HVAC, and other equipment—linkages to unionized trades where these workers are in good supply and where effective training modules already exist will be a critical means for supporting contractor growth. Additionally, smaller contractors will be aided by access to apprentices who can perform supervised work at lower costs.

It is important to note that these relationships between small-home performance contractors and unionized trades generally do not yet exist. Facilitating them will be a major task of Green Jobs/Green Homes NY implementation, but early conversations with contractors and trades indicate that both are prepared to lay the groundwork for a shared ramp-up of the green economy.

Large contractors, by contrast, are not yet likely to have considered entering the residential retrofit industry. However, the recession and the disappearance of new construction projects suggest that these contractors could be encouraged to “come over” to retrofits. In addition to the strategy of aggregating contract blocks to create economies of scale, recruitment of these firms will benefit enormously from the cooperation of unions with whom they already have agreements.

Additional barriers to market entry and expansion can be lowered by creating direct linkages with Manufacturing Extension Programs and Small Business Development Centers, which can both support smaller contractors’ ability to manage larger projects. These supports are important for ensuring that W/MBEs and small/family businesses have access to the new pool of retrofit contracts. And by facilitating access for these existing firms they will increase the efficiency of retrofit investments in creating jobs in the very near term.

Organizing workforce sources

As the landscape of green jobs develops, both trainees and existing workers—many of whom are increasingly short of employment—are available to perform emerging jobs. The main concerns in putting these workers to work are:

- Ensuring that existing skilled workers are “upskilled” if necessary and put to work, that new workers are trained as needed, and that a glut of “extra” workers is not generated by training programs that are disconnected from the real work flow.

- Ensuring that training is performed consistently and to quality standards set by contractors and industry needs.
- Ensuring access to training for marginalized communities.

Construction skills training programs connected to contracting—largely jointly administered registered programs located in the unionized trades—should set the standard for apprenticeships and labor-management training programs in Green Jobs/Green Homes NY. Community-level pre-apprenticeship programs should coordinate directly with apprenticeship and labor-management training programs to set curricula and training standards, to understand current demand for pre-apprentices, and to share higher training slots equitably.

Apprenticeship and labor-management training programs must coordinate with contractors to understand demand—including the location of demand and the need for workers to support local hiring requirements—and to calibrate curricula to produce workers with the needed skills. This can initially be accomplished through the Workforce Planning Panel, and it will ultimately be the function of labor-management-community partnerships.

Finally, unions representing workers who are skilled in areas of BPI certification—including insulators, HVAC, and stationary and operating engineers, among others—should create direct paths to BPI certification for their members to ensure that contractors’ growing need for certified/supervisory workers can be met by existing workers requiring minimal investment.

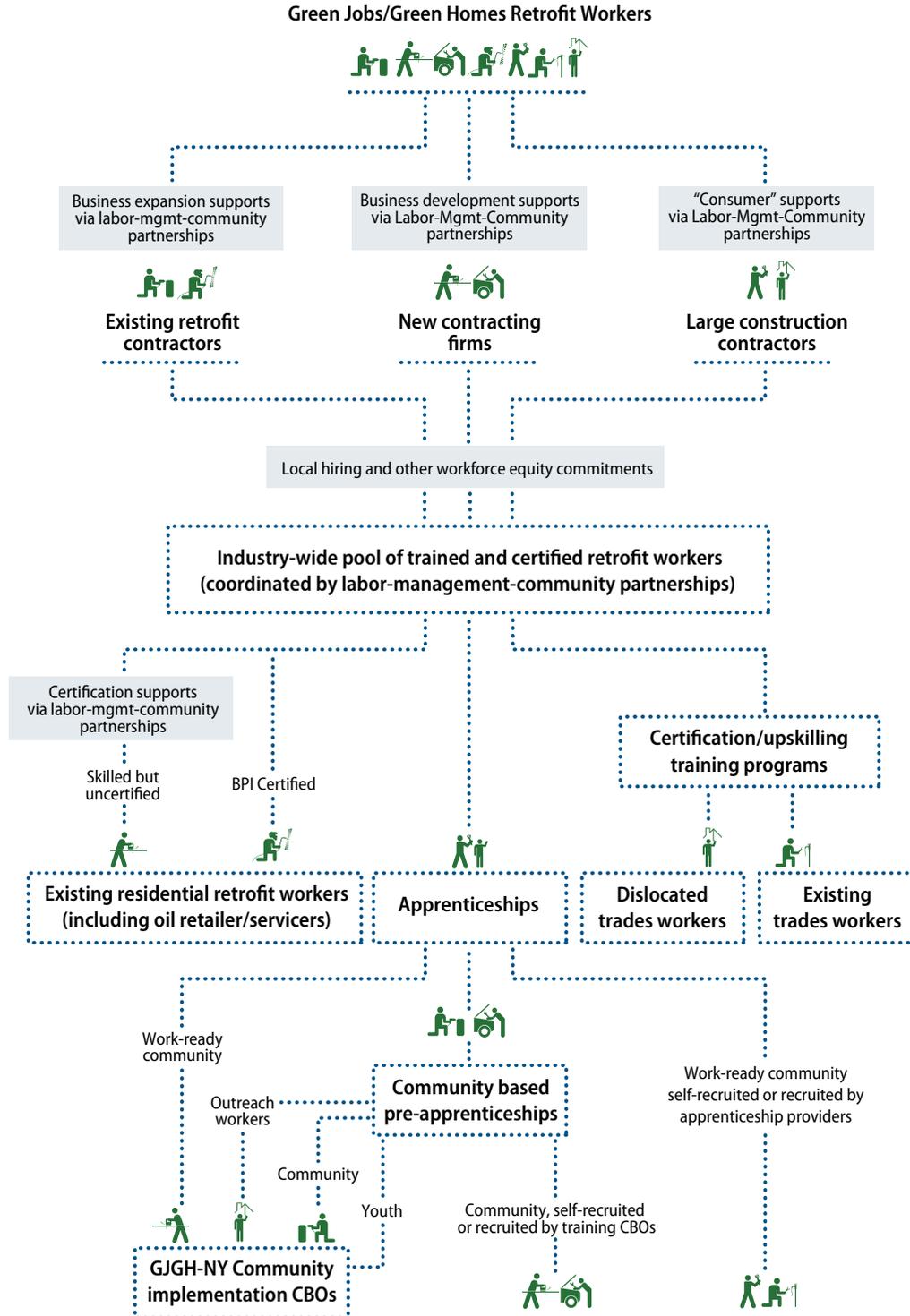
Ensuring good jobs: Setting wage standards

Residential retrofits historically have been contracted outside of the commercial construction industry. The work itself has been nonunion and often low-wage. Although Green Jobs/Green Homes NY is designed to raise wages, residential retrofit work has generally been done on a small-scale and low-margin model that would be difficult to perform at the wages that prevail in many places around New York State. (In other areas of New York, prevailing wages for some titles are set too low to be “family-sustaining,” and are therefore not a useful standard for Green Jobs/Green Homes NY.)

Additionally, to incorporate prevailing wages, the cross-skilled nature of retrofitting would require attention to jurisdictional issues within the unionized building trades whose tasks are more strictly defined. (Retrofit work may include some plumbing, insulating, carpentry, electrical, and sheet metal/HVAC work, in many cases without reaching the skill level of unionized trades). Much of the work of Green Jobs/Green Homes NY, even aggregated for larger contracts, may not yet support retrofit wages that match prevailing wages for new construction.⁷³

Organizing sources of Green Jobs/Green Homes New York retrofit workers

As jobs become available, both trainees and existing workers will be available to perform emerging jobs



Organizing contractors to engage with trade-sponsored apprenticeships and labor-management training, and coordinating among contractors to prevent “races to the bottom,” will support good wages for retrofit workers. Further, project costs for Green Jobs/Green Homes NY have been adjusted upward to reflect at least a 15 percent increase over historical retrofit wages. At the outset of the program, additional means also must be established in legislation. Possibilities include:

- Setting minimum, family-sustaining, program-wide wages or a wage algorithm tied to the cost of living and established region by region.⁷⁴ (These program wages might then become the basis for establishing or improving prevailing wages where they are currently too low.)
- Establishing wage floors by requiring that contractors affiliate with NYSDOL-certified apprenticeship and/or labor-management training programs.⁷⁵ Green Jobs/Green Homes NY would set a yearly ramp-up of participation requirements based on assessments of current training capacity in target areas.
- Establishing partnerships between community-based organizations engaged in outreach, recruitment, and basic skills development and jointly administered recognized apprenticeships and labor-management training programs that utilize pre-apprenticeship programs and provide pathways to lifetime careers.
- Adopting thresholds for contract size, so that larger contracts (for instance, in buildings or building complexes over 50,000 square feet) trigger requirements for prevailing wages.
- Requiring weatherization contractors to join an employers’ association.

Some of the energy-efficiency work enabled by Green Jobs/Green Homes NY will, however, essentially be commercial-scale work. These larger retrofit projects (which will increase as municipalities such as New York City mandate energy-efficiency measures in large buildings) present an important opportunity to support sector wages.

Green Jobs/Green Homes NY will recognize as commercial building contracts retrofits of residential buildings at or above 50,000 square feet as well as aggregated units in building complexes of over 50,000 square feet. The program will require extensive apprentice participation on any such projects funded through the program from the outset. At this scale, the multiple construction skills needed on a retrofit crew can be provided by the large contractors and skilled tradespeople who currently perform commercial renovation work, and through whom apprenticeship positions can quickly be established.

Strengthening systems to support quality work: Expanding certifications and training

Since the returns on retrofit work depend on the performance of installed measures, measures must be installed consistently and to high standards. Homeowners and lenders rely on contractors to assure these standards and the resulting pressure on contractors defines hiring practices in home performance firms.

Linking retrofit work to further opportunities in trades: The case of Laborers' Local 10

In early 2009, the Laborers' Eastern Region chartered Laborers' Local 10 in an effort to organize the small residential construction industry. Market conditions required a collective bargaining agreement at significantly lower wages and benefits than the commercial local chapter, Laborers' Local 79.

A similar strategy was employed in 1996, when the Laborers set out to organize the asbestos abatement industry in New York City. Local 78 was chartered with a modest initial collective bargaining agreement and few members. By organizing the whole market, the union has grown and obtained good increases in wage and benefits.

Local 10 works with employers to raise standards and productivity, which creates sustainable careers in construction for local residents and supports the scalability of residential retrofits. New members are to be offered a wide array of training curricula and certifications by the Laborers' Training Fund, including new technology and construction techniques, giving those members marketable skills in other parts of the industry.

The absence of these standards also is a serious impediment to workforce development. Many contractors report that they presume limited competency in their new hires, and they expect to provide training and fairly intensive oversight. High turnover and the cost and effort of breaking in a new worker mean that some contractors are simply not interested in growing their workforces—or their businesses—in the current environment.⁷⁶

The landscape of training also is uneven. Some workers are trained by product manufacturers, and only in the use of specific materials and specific tools. Training for higher-level skills and certification, such as BPI training, is largely classroom time intended for those who already possess skills and experience. And some basic hands-on energy-efficiency skills are not needed for BPI certification. A variety of organizations from universities

to community-based training organizations offer training in a variety of skills, and in the absence of industry-wide certification, those programs provide certificates of their own. Unions provide excellent training and reskilling that yields workers with skills central to energy-efficiency work. But this training may not provide the needed context—the energy-efficiency framework or proficiency in skills outside of their trade—that workers need to perform retrofit projects. Some unions currently have green training curricula for apprenticeships or other jointly administered programs and for journeypeople, and others are moving quickly to develop them.

The Green Jobs/Green Homes NY implementation campaign will work with contractors, the New York State Department of Labor, and other stakeholders to:

- Review apprenticeships, other labor-management training programs and pre-apprenticeships, and support any appropriate adjustments related to energy-efficiency work, incorporating certifications already established by NYSERDA and the Building Performance Institute with common protocols for employment, hiring, and promotion.
- Chart direct paths from retrofit work into higher-skilled and/or higher-paid trades (see sidebar).
- Consider adjusting apprenticeships to permit a higher ratio of apprentice to journey-level retrofit workers to encourage rapid intake and aggressive training for the workforce.
- Support retrofit-related pre-apprenticeship and internships with the new NYSDOL “work readiness” credential and other related skill certifications.
- Support the training and BPI certification in various skill certifications of construction trades workers.
- Support the training and BPI certification (as Energy Efficient Building Operators) of current building maintenance workers who will be working with contractors as buildings enter the program and energy-efficiency reporting is required.
- Establish industry-wide certifications that recognize upskilling, cross-skilling, and experience to recognize elements of value added to energy-efficiency workers. Educational classes (in building science or community marketing strategies, for example), upgrades to skills (training and competency in equipment), cross-skilling (adding basic competency in a new trade) and experience (hours-on-job) will entitle workers to industry recognition.
- Provide staged remedial academic training to coincide with career advancement. Academic brush-up training should not be limited to barrier-removal programs, but should be available to workers who need to develop math or other skills in order to advance. This allows for the advancement of workers who have gained valuable skills in entry-level jobs that posed minimal initial requirements.

Making it real: “Local jobs for distressed communities”

Creating real access to local jobs, and truly linking retrofits to equitable economic development of communities, depends on core actions:

1. Awarding preference to contractors based on the extent to which they commit to minimum standards of hiring from local populations, training programs and community-based organizations.
2. Designing training pathways, particularly in Labor-Management training, that produce local workers from the target populations defined in contracting preferences.
3. Engaging (and in fact contracting with) community-based organizations to recruit trainees and new workers; and to develop pathways to retrofit training that build on their existing work.

Reaching distressed communities: Establishing mechanisms for targeted hiring and training and ongoing worker supports

Weatherization can and should reliably provide substantial numbers of local jobs in distressed communities. It also should increase opportunities for low-income people, minorities, women, youth, and formerly incarcerated people as both workers and contractors. And those jobs should have entry points not only through training programs, but also through community-based organizations—those that are engaged directly in environmental issues as well as those working on social, economic, and other equity issues. These jobs should build on the work of local community organizations and create sustainable jobs, in part by serving as training and testing grounds for entry-level workers to explore and pursue lifetime careers in higher-skilled trades through job-linked labor-management training and early career work. Community-based pre-apprenticeships will be an important asset for labor-management partnerships seeking to connect with community members.

Training and hiring requirements—along with the engagement of community organizations and the minimization of barriers to accessing training and jobs—are the centerpiece of the Green Jobs/Green Homes NY strategy for making work opportunities accessible to economically distressed communities. The legislation creating Green Jobs/Green Home NY should enshrine increasing levels of program preference for contractors through Best Value Contracting or Community Benefit Agreement rules. These preferences should be in line with the minimum proportion of workers contractors will hire from local populations of low-income people, minorities, women, youth, and formerly incarcerated people. Similar preferences will be given for hiring from labor-management and community-based training programs.⁷⁷ Contractors who are women and/or minority-owned businesses also

should receive both “best-value” advantages and concerted support—coordinated by the Workforce Planning Panel—for meeting the standards set by the program.

Training coordinated by labor-management-community partnerships should target recruitment to produce workers who can be hired by contractors seeking to meet the above criteria. Community-based organizations that provide pre-apprenticeship training are best situated to recruit, assess, and prepare these workers. And labor-management-community partnerships should include specific agreements to set aside apprenticeship/training slots for trainees from community-based programs.

Such access to union-based training is an important component of the opportunity afforded to target hiring populations by Green Jobs/Green Homes NY. Those who pursue the opportunities of the program will receive the benefits of work experience in addition to the potential benefits of union membership, whether they seek advanced training or not.

Complementary strategies such as providing wraparound services and minimizing bureaucratic burdens also are essential for making such requirements meaningful.

The Green Jobs/Green Homes NY implementation campaign will work with the New York State Department of Labor and other stakeholders to:

- Add community representation to Workforce Investment Boards.⁷⁸
- Minimize bureaucratic burdens associated with certification and training. Certifications will be available with minimal transaction costs—including “costs” of obtaining information about the availability of certifications, travel, time, and paperwork—to make sure vulnerable workers are given true access.
- Support community organizations (also with minimal transaction costs) to recruit local workers for training and certification, and “follow workers up the ladder” of career advancement.
- Make apprenticeships and other formal training vehicles flexible enough to accommodate vulnerable workers. This may mean that the time allowed to complete classroom and on-the-job hours might be extended, that apprentices might suspend their training for a year or more and then reenter at the same level, or other accommodations.
- Make certification and training available without regard to documentation of immigration or work status where possible.⁷⁹
- Minimize and clearly define the requirements for documentation of immigration/work status.⁸⁰

Formalizing the coordination of stakeholders and external resources

Even as retrofit work is organized around clearer career paths, and access to training is systematized, remaining barriers must be removed to make certain that green jobs—and retrofit jobs in particular—reach disenfranchised workers and contribute to economic equity.

- **Establish ongoing labor-management-community partnerships**

The groundwork laid by the Workforce Planning Panel will need to be parlayed into permanent coordinating bodies so that retrofits and workforce demand can be well coordinated beyond the five years planned under Green Jobs/Green Homes NY.

Much of the training programming currently available to prepare new workers for retrofit jobs—including cross-skilled and/or entry-level construction and green roofing—is now provided by community workforce development organizations.⁸¹ Some of these are construction training programs, while a few, such as Sustainable South Bronx, provide training that leads to specific green skill certifications. The New York State Department of Labor should support community groups that already perform this training and work with employers and apprenticeship and labor-management training programs. By doing so it will make sure that apprenticeships reach target populations of these groups (at-risk youth, formerly incarcerated people, and low-income women, for example.)

The panel itself should determine the appropriate means for organizing labor-management-community structures.

- **“Green up” existing workforce development/barrier removal programs**

Potential workers will need to be equipped with specific skills in math, English, building science, computers, and workplace readiness to enter the training infrastructure. Further, individuals will need a basic understanding of construction jobs and of energy efficiency as a work model. Historically, each of these needs has been served separately.

The New York State Department of Labor and the Office of Temporary and Disability Assistance should encourage existing providers of adult education to tailor green jobs skills to GED, pre-GED, and ESL students.

Workforce development and internship programs that combine soft skills and green skills must be available. These should include academic courses in relevant areas—such as math and spatial logic—and should provide wraparound services for participants. Training should link basic credentials and certifications directly to requirements for the work. Two such credentials might be the Work Readiness Credential⁸² and the USGBC-NY Foundation of Building Green.⁸³

- **Strengthen high-level training infrastructure and link to apprenticeship and other union training programs**

NYSERDA has established certifications and performance measures for auditing and weatherization contracting. Currently this training is hosted by 10 training providers statewide, with nine at community colleges and one at a nonprofit business that offers industry training through its business association.⁸⁴ The Center for Energy Efficiency and Building Science, or CEEBS, is being established at the Hudson Valley Community College as a statewide center for training and skill certification.

More certification training will need to be offered in more locations. Using the current network of providers in a train-the-trainers program, the energy-efficiency certificate training can be expanded to training centers and colleges that have capacity to expand delivery even further.

Presently, there is a set 36-hour training module on consecutive weekdays. Weeknight and weekend options should be available. NYSERDA can easily establish licensing agreements for its curriculum and certifications to this broader network of providers so certificate-based training can be offered readily to workers across the state. In the process of this expansion, curricula should be tailored to local building types. Green Jobs/Green Homes NY should periodically review and update those curricula to fit the program model.

Green Jobs/Green Homes NY will benefit from plans, under the Energy Efficiency Portfolio Standard, to expand NYSERDA's contractor training and certification in New York State community colleges headed by Hudson Valley Community College. But supplemental work is needed in several areas, including HVCC/BPI curriculum expansion, "move over" training for workers displaced from similar jobs, the greening of barrier-removal (or pre-employment) programs, and wraparound services for low-income people entering the workforce.⁸⁵ Additionally, direct linkages and coordination must be established between the retrofit-related trainings coordinated by New York State and the training infrastructure of apprenticeship or union-based nonapprenticeship training and unionized trades. This will prevent these trainings from working at cross-purposes.

Finally, in the current NYSERDA training model, up-front cost and delayed reimbursement of training has been a barrier for contractors. Training should be publicly funded for participants in workforce development programs and also to workers in firms that commit to program participation.

Expanding the pool of supervisory workers also should be understood as a means of expanding contractors' capacity to hire and train entry-level workers.

- **Add green milestones to existing NYS workforce development programs**

Performance measures are a large part of the current publicly funded programs for these populations. The initiative should work with milestones that give agencies credit

for each step on the career ladder for the target populations. Specifically, this includes increased literacy level, enrolling and maintaining enrollment, linking clients to supportive services in the community, attaining industry certifications, employment, and retention. Additional milestones can be added that will articulate specific features of this comprehensive model, including internships with community education projects and a functional understanding of climate change, energy management, and the foundations of green building.⁸⁶

Community-based organizations often share constituencies with One-Stop Centers, and these centers should become part of the “greening” of state support systems. NYSDOL should work with CBOs to monitor and advise One-Stop centers’ progress in linking unemployed community members to green training and jobs. And CBOs should work with HRA to ensure that people on public assistance can satisfy job-search requirements by entering green training programs.

- **Connect the work of community outreach to advanced opportunities in the industry**
Community-based organizations can undertake energy-efficiency and retrofitting education campaigns that can be used as internship opportunities for high school-aged youth, as entry-level jobs for new workers, and as nexus points for experienced community workers to enter the energy-efficiency arena. These workers can be trained on the details of climate change, environmental policy, and the role of energy-efficiency measures in achieving community goals. They can learn about the job opportunities in this arena and some may opt to apply for work as apprentices or pursue higher education in related fields. As part of pre-employment education, participants could obtain some of the skills and certifications needed under apprenticeship standards, thereby giving them the advantage of completing some apprenticeship requirements before they are employed.

Workforce costs and funding

Expected costs

Given the uncertainty about how many existing workers will be available to perform retrofits, training costs are difficult to estimate. A critical first task of the Workforce Planning Panel will be to coordinate among training organizations at the community and apprentice level and with contractors to establish clear paths and demand for trainees.

Direct training funding needed to *generate* the entire Year 1 workforce except for workers at the engineer level—only *if* no existing workers were available to perform work—would be estimated at about \$8.4 million. This estimate is derived from a simple assumption that the program would need to add 1,059 lower-credentialed workers and 911 higher-credentialed workers. High-level or certification training costs about \$7,000 to \$8,000 per worker, and lower-level credentialing costs about \$1,500 per worker. (Slightly higher costs for worker training are estimated by STRIVE, whose participants are cross-trained on

construction, green, and hazmat skills through a union-based training program ending in a stipended internship. These higher-level credentialing slots cost \$8,335 per participant.)

Wherever new workers are trained, individualized support services related to trainees' personal needs ("wraparound services") also must be funded. This is particularly needed both during and after training because training programs specifically recruit trainees from distressed communities with barriers to employment. Green Jobs/Green Homes NY estimates costs for wraparound services at \$450 per student per 10-week training period, based on the experience of Sustainable South Bronx. Estimating a retention rate of about 70 percent during training (meaning that training organizations would initially have to recruit about 40 percent more trainees than the number needed to fill jobs), that one-third of lower-level trainees would arrive at the workforce needing wraparound support, and that 20 percent of those workers might need to re-access support at least once during their first year, the funding need for wraparound services might be \$265,000 to \$270,000.⁸⁷

That brings the total costs for training all of the construction and lower-level (nonengineer) audit workers needed for Year 1 goals to about \$8.7 million. But accessing trained workers and jointly administered training funds will dramatically reduce this cost. Similarly, the migration of WAP workers into Green Jobs/Green Homes NY after 2010 will offset training needs.

Potential sources of funding

New York State sources

New York State currently has access both to its own relevant stimulus dollars and to competitive grant opportunities. For the purposes of ensuring that adequate funding is available for the critical task of Green Jobs/Green Homes NY workforce development, the state should not rely on grant applications, but should instead be prepared to dedicate funds from its Energy and Conservation Block Grant, its State Energy Program, and other sources under the state's direct control.

Weatherization Assistance Program spending on workforce training, which totals more than \$100 million over the next two years, also should be coordinated with Green Jobs/Green Homes NY. This is so that WAP-trained workers can access, and become a resource for, Green Jobs/Green Homes NY as WAP allocations decrease.

These stimulus-era funds should be made available to establish a system that can operate using funding from nonstimulus streams, including SBC and RGGI, to ensure sustainability. Competitive stimulus grant applications can be well used to supplement and/or supplant dedicated dollars as they are funded.

The state also should be prepared to leverage the new \$500 million in Workforce Investment Act, or WIA funding allocated by the American Recovery and Reinvestment Act for implementation of the Green Jobs Act. Federal WIA dollars come to the state through its Department of Labor. These funds are dispersed through NYSDOL grants, local One-Stop Centers, and Workforce Investment Boards.

Local One-Stop Centers have Individual Training Grants to assign to job-seekers and workers needing credentials to move ahead. The ITGs can be used for industry certifications and alleviate the financial burden of the individual employers to pay for this training. Designing the industry certifications to meet the ITG regulations will not be difficult and in fact is already being put into place through at least one of the State University of New York's community colleges.

The Department of Labor has designated jobs in the energy sector as one of three high-demand industries to support workforce development, knowing that it is an industry that is certain to have employment in the coming years. This will allow the agency to target this sector for grant-giving going forward. Recently NYSDOL has identified \$11 million, over three years, that it plans to assign to this sector.⁸⁸

Additionally, WIA apprenticeship funding, which was once restricted to administrative support for apprenticeships, now can be used to fund labor-management training and pre-apprenticeship programs with educational materials and equipment. Given the need to scale up retrofit-relevant training, a concerted effort should be made to harness apprenticeship funds for these new uses.

NYSDOL, in partnership with the Office of Temporary and Disability Assistance, recently identified several grants for career pathways. These grants and others like them will allow the basic workforce development skills and basic education to be funded under general services of workforce development. These programs need to be funded and designed to allow for basic skill development and supportive services—both over time and as needed. A potential complication can arise when grants require milestones of job placement sooner than individuals can be fully independent and successful in the workforce. These programs need to be funded and designed to allow for basic skill development as needed. Wage subsidy programs, by offsetting the costs of new workers, can serve to mitigate the dual challenges of placing people into jobs who have remaining barriers and establishing a ready workforce for companies. While receiving a subsidy for certain employees, a cooperating company can access an array of social services for its new worker(s), allowing workforce growth with a temporary employee assistance program.⁸⁹ Referring individuals to the companies performing this work must mean that the industry gets ready and able workers. Companies will not and should not be providing social services to employees, as well as coaching and supporting them to work well while the business must operate effectively on its own.

NYSERDA currently reimburses 75 percent to 100 percent of BPI training and exam costs to the employer who sponsors the individual after he or she passes a BPI certification exam and performs work. The costs can be up to \$5,000 per individual depending on the certifications. On a small scale, this arrangement may be manageable for businesses. However, to greatly increase the availability of BPI-certified workers, NYSERDA should work with contractors to bundle those costs, bring down the cost, or identify other sources for the training.

The Public Service Commission and its Energy Efficiency Portfolio Standard have identified resources to go toward training through the System Benefits Charge. As they identified the same training needs reported here, they are preparing to assign \$16 million for a three-year period.⁹⁰

Further, the Empire State Economic Development Corporation supports the development of small businesses. Its support will be useful for this endeavor as small businesses will need to grow and new ones will need to start up.

And there are many state agencies that can be involved with supporting this initiative. Each one has a stake in Green Jobs/Green Homes NY and can likely to steer to it some programmatic resources. These include:

- Department of Labor.
- NYSERDA.
- Long Island Power Authority.
- Office of Temporary and Disability Assistance.
- Department of Housing and Community Renewal.
- Economic Development Corporation.
- Regional Greenhouse Gas Initiative.
- Public Service Commission.
- Department of Education.

Federal sources

Federal pools of stimulus dollars for green workforce funding should be leveraged as they become available. These include both competitive grants and agency-administered funds for which disbursement regulations will be developed in the coming months.

The Small Business Administration, like ESDC, can provide small business support for the emerging energy-efficiency industry, including manufacturers as well as contractors.

Community sources

Employers and workers can be organized to contribute to training funds, in keeping with the current model of labor-management funded apprenticeships. NYSDOL dollars spent to encourage such organizing will reduce costs to the state, generate solid and renewable training infrastructure, and draw down additional resources.

Finally, many community groups have expressed interest in supporting this work through programming for which foundation grants and other private funding can be identified.

Community-level implementation

Getting people into the program—and retrofitters into homes—is absolutely critical to the success of Green Jobs/Green Homes NY. Without a well-crafted community-based plan, the program will simply not be able to recruit customers at the needed volume. Further details of marketing and targeting will be the subject of an intensive planning process during the start-up phase of the project, drawing on the expertise of community groups, contractors, state agencies, and other stakeholders.

Funding

All functions of community implementation must be adequately funded through multi-year contracts so that community groups can design outreach and job pathways that support the larger equity goals on which they work. This is also so that these groups can build the trust and longevity needed to deeply engage their communities in a new set of ideas and practices around energy efficiency.

Year 1 funding for this work should be set at \$2 million and allocated to community groups in amounts up to \$50,000 per group and per 1,000-unit target area, with funding extending for at least an additional 18 months beyond the targeting period. Funding should support the development of partnerships among workforce organizations and other community groups in support of applications to have retrofits targeted to that community. And it also should support local outreach to residential property owners on energy-efficiency, pre-enrollment of participants in Green Jobs/Green Homes NY, and other local-level implementation functions.

This level of funding is adequate only to the limited work of Green Jobs/Green Homes NY, and it ideally should be dramatically supplemented by community funding for other green-ing and green jobs program investments in the interest of deep market transformation.

Marketing: Getting people into the program

Existing market transformation programs have not yet succeeded in popularizing energy-efficiency practice among homeowners—but scaling up demands that we achieve this

change. Traditionally, information campaigns have taken the form of print and mail campaigns by state agencies and, at the community level, outreach from energy-efficiency contractors.

Green Jobs/Green Homes NY shifts much of the work of marketing and enrollment to community-based organizations that already are trusted opinion leaders and sources of support in other aspects of community life, including housing, economic and social advocacy, and spiritual/religious community.⁹¹

Under Green Jobs/Green Homes NY, the lead agency will contract community-based groups to organize around the physical improvement of housing, housing affordability, and equitable community development. Organized communities will be invited to make the case for designation as a target area for retrofits, and will be supported and/or incentivized to develop outreach strategies that result in deep local energy savings. Methods might include outreach teams, engaging youth and schools in propagating energy and environmental literacy, devising education plans, establishing “model retrofits” for community members to view, and otherwise encouraging enrollment in Green Jobs/Green Homes NY. Paying these interns and entry-level workers will serve to catalyze and deepen communities’ economic stake in energy-efficiency. Incentives for varying levels of success will be built into such contracts.

Program experience supports this approach. For instance:

The City of Houston targets a neighborhood and sends a letter to every household; this effort results in an approximate sign-up rate of 10 percent of the residents. Then the city connects with community leaders, the corresponding city council member, church groups, neighborhood associations, and others to get the word out. These community groups organize volunteers to do “block walks,” where they go door to door, talking to their neighbors about the program. They follow that with a block party featuring food and music to attract more participants. These techniques are relatively inexpensive because they rely on volunteer support, but they have resulted in 40 percent to 80 percent participation rates, depending on the neighborhood.⁹²

Community-based marketing also should support the capacity of Green Jobs/Green Homes NY to connect interested residents to a range of programs for which they might be eligible, including grant-based weatherization assistance. Such connections, made through a locally based group rather than a program hotline, will increase the likelihood that harder-to-reach homeowners—who are most in need of reaping the economic benefits of greening programs—will have support from known, trusted sources to overcome initial barriers to access.

Targeting

Prior to establishing target areas, a larger set of community groups also will be supported to organize neighborhoods to request targeting by pre-enrolling owners, identifying firms interested in expanding their green work and employment, and making a case based on program criteria (high-energy cost burdens due to inefficient housing, environmental burdens, and unemployment, for example). This will be a significant help to Green Jobs/Green Homes NY's aim of generating more certain local demand for retrofits and local employment. It also may encourage more entry into the program by building owners as tenants become interested in the program, and it should generally allow the program to become a lever for community-led revitalization of housing and neighborhoods.

Selection of target neighborhoods will be strongly advised by a NYSERDA advisory panel consisting of representatives from organizations working on issues of energy policy; labor; community workforce development; housing preservation; environmental, racial, and economic justice; and representatives from upstate and downstate New York, as well as rural and urban areas.

In areas targeted for multifamily retrofits, the first-year focus will be low- and moderate-income buildings owned by community-based agencies. These buildings do not generate a sufficient cash flow to carry debt and not-for-profit owners generally lack access to capital. In many instances, this lack of capital bars them from participating in NYSERDA's MPP program. Even those eligible for both the federal Weatherization Assistance Program and MPP need to make a capital outlay before receiving the MPP incentives.

Endnotes

- 1 New York State's "15x15" Clean Energy Strategy was announced in 2007 by then-Governor Spitzer and then-Lieutenant Governor Paterson. Text of speech available at <http://www.ny.gov/governor/keydocs/CleanEnergySpeech-final.pdf>. The goal was increased to "45 x 15" by Governor Paterson in his January 2009 "State of the State" address, available at http://www.state.ny.us/governor/press/press_0107091.html.
- 2 News releases by Governor David A. Paterson, available at http://www.ny.gov/governor/keydocs/speech_0107091.html.
- 3 NYSERDA, "NYS Energy Fast Facts, 2007," available at http://www.nysesda.org/energy_information/fastfacts.pdf (Accessed April 25, 2009)
- 4 U.S. Department of Environmental Protection, "State CO2 Emissions from fossil fuel combustion, 1990-2005," available at http://www.epa.gov/climatechange/emissions/downloads/CO2FFC_2005.pdf; U.S. Energy Information Administration, "New York Household Electricity Use by End Use," available at http://www.eia.doe.gov/emeu/repus/enduse/er01_ny_tab1.html; and emails/data from David Gardner, Project Engineer, New York State Department of Environmental Conservation, Office of Climate Change, February 2, 2009.
- 5 U.S. Energy Information Administration State Energy Data System (SEDS), "Energy Consumption by Sector, Ranked by State, 2005," available at www.eia.doe.gov/emeu/states/sep_sum/plain_html/rank_use.html; "Energy Consumption by Source and Total Consumption per Capita, Ranked by State, 2005," available at www.eia.doe.gov/emeu/states/sep_sum/plain_html/rank_use_per_cap.html; "New York State Energy Profile," http://tonto.eia.doe.gov/state/state_energy_profiles.cfm?sid=NY.
- 6 U.S. Energy Information Administration, "Average Retail Price of Electricity to Ultimate Customers: Total by End-Use Sector," available at http://www.eia.doe.gov/cneaf/electricity/epm/table5_3.html.
- 7 Fiscal Policy Institute, "New York's Rising Unemployment—The Other Crisis in Albany," August 28, 2008, available at http://fiscalpolicy.org/FPI_Release_Job-LossesRise_August2008.pdf.
- 8 Office of the State Comptroller, "The Security Industry in New York City," November 2008, available at <http://osc.state.ny.us/osdc/rpt7-2009.pdf>.
- 9 California Institute for Energy and Environment, "Enabling Investments in Energy Efficiency," September 15, 2008, available at http://www.ucop.edu/ciee/energyeff/documents/CA_ResiFinancing.pdf.
- 10 An additional barrier to meeting efficiency goals (rather than a barrier to uptake of existing programs) is the long-standing focus of energy-efficiency programs on electricity and natural gas. Virtually all non-low-income efforts to incentivize efficiency in New York State are funded by the System Benefits Charge, a small levy on utility customers' bills, and are therefore not available for efficiency projects that primarily save oil or other non-utility fuels. About one-third of New York's owner-occupied households, and one-third of its renter-occupied households, are heated by oil. State programs are just beginning to address this issue, allocating new funding streams to oil-specific retrofits. This blueprint establishes a framework in which funding and support for oil retrofits can be further developed and scaled up. See "Oil-Heated Homes," P. X.
- 11 The Regional Greenhouse Gas Initiative (RGGI) is a carbon "cap and trade" program, intended to reduce greenhouse gas emissions, in which New York and surrounding states will limit the volume of carbon emissions that can be produced by power generators, and auction off emissions rights. Auction proceeds are to be allocated to projects that reduce energy consumption and emissions, and develop clean energy technology. As of the third carbon auction on March 18, 2009, the New York program had accumulated \$88 million in revenues; auction proceeds available at http://www.rggi.org/states/auction_proceeds.
- 12 The System Benefits Charge is a small surcharge on the monthly bill of customers over investor-owned utilities in New York State. (Customers of the Long Island Power Authority pay a similar surcharge under the Authority's "Clean Energy Initiative.") The collected funds are used to support New York State's energy-efficiency programming for customers in the territories from whom the charge is collected; data available at <http://www.dps.state.ny.us/sbc.htm>.
- 13 For details on job creation by skill and by year, see Appendix E: Job Projections.
- 14 New York State Economic Recovery and Reinvestment Cabinet, "NY Works: New York State Information Related to the American Recovery and Reinvestment Act of 2009," available at <http://www.economicrecovery.ny.gov/DirectAid/aidnewyork.htm>.
- 15 ARRA expanded the reach of WAP in many states by raising the income eligibility limit to 200 percent of poverty level. New York's WAP program, however, already used an income limit of 60 percent of Area Median Income—which itself exceeds 200 percent of poverty level. Because New York already served these households, ARRA's directive did not increase the number of eligible households in New York State.
- 16 Low Income Home Energy Assistance Program, "President Signs FY09 CR with \$5.1 Billion in LIHEAP Funding," September 30, 2008, available at <http://www.liheap.org>.
- 17 Green Jobs/Green Homes NY does not call for a small-scale pilot per se, and in fact relies on scale to operate. First-year implementation goals, though, act as local pilots. Additionally, the program can be sustained at Year 1 scale for multiple years in the event that financing capital, workforce or other resources are too severely constrained to let the program move forward. Discussion of an "extended pilot" scenario is offered in "How Do We Pay For It?"
- 18 For detail on "triple bottom-line" economic, environmental and social selection criteria for target areas, see "Targeting Retrofits," P. 88.
- 19 According to the mix of housing units in New York State, this would yield approximately 21,125 one- to four-family homes (605 per area), and 260 apartment buildings with an average of 20 units (37 per area). Forty-seven percent of housing units are in single-family homes, an additional 17 percent are in two- to four-unit houses, 12 percent are in five- to 20-unit buildings, and 13 percent are in buildings with 20 or more units. These are estimates; actual participation ultimately will depend on the decision by a building owner to undertake the retrofits recommended. However, given that rental buildings are operated as businesses and likely have better access to investment capital than smaller structures, Green Jobs/Green Homes NY data projections assume that 85 percent of units served by the program will be in one- to four-unit houses, and 15 percent will be units in multifamily buildings.
- 20 More detail on these interviews is presented in the "Developing the workforce and other critical resources" section.
- 21 BPI certification is the standard currently required for energy-efficiency projects performed with NYSERDA programs.
- 22 Residential customers of NYPAs municipal utilities often pay so little for electricity and gas that retrofits cannot be financed by their energy savings. However, NYPA is willing to establish a parallel audit and contracting system in conjunction with Green Jobs/Green Homes NY, and repay its customers' monthly retrofit obligations with NYPA funds—forgoing the need to collect monthly installments from customers.
- 23 Tariffed Installation Program (TIP): A TIP is a service contract offered by utilities to their customers, the terms of which must be approved by the Public Service

Commission. Under a TIP, a utility installs energy-related measures in a building where service is provided by its meter. Rather than billing the customer directly for the installation, the utility recovers costs by adding a small service charge to the customer's monthly bill for a fixed period.

- 24 These financing structures are detailed in the "How Do We Pay For It?" section.
- 25 Energy-efficiency targets for utilities are currently under consideration by the Public Service Commission, and will be important to efforts to expand efficiency programming.
- 26 The release of individual customer utility data may raise privacy concerns, which can be resolved either through contractual arrangements or through analysis by neighborhood, such as average results for Zip Plus 4 districts.
- 27 Specifics of the RRF's operations and credit structure are in "How Do We Pay For It?" and Appendices F and G.
- 28 While this white paper does not propose a specific target selection process, stakeholders from community representatives, including grassroots constituency-based groups, advocacy groups, and local government should be jointly consulted, and a clear equitable process inscribed in any rules or legislation establishing the Green Jobs/Green Homes NY program.
- 29 The program expects that participating contractors will market the program to their traditional customers, through organized word-of-mouth campaigns and through the printed or broadcast media. The program will require that contractors fairly and accurately represent the program, its sponsorship and benefits. In return, contractors will be eligible for co-op marketing—that is, a subsidy for their marketing costs of 50 percent, up to \$150,000, based on the volume of contracts they secure for the program.
- 30 Enabling Investments in Energy Efficiency, A study of energy efficiency programs that reduce first-cost barriers in the residential sector, Prepared by Merrian Fuller Energy & Resources Group, UC Berkeley for CIEE Financing Team, Edward Vine, Project Manager, California Institute for Energy and Environment, Oakland, CA, September 15, 2008.
- 31 NYSERDA's Home Performance with ENERGY STAR program has established a pattern for contractor participation in a residential retrofit program, including a training delivered through a network of community colleges and BPI certification. This program will build off that pattern but will open participation to larger numbers of contractors by redefining their roles. The new program, preferably through an agreement with the electric and gas utilities, will provide home assessments and sales directly to homeowners, without requiring involvement of contractors in this first phase of work. This means that a specialized staff of home energy auditors will have to be recruited and trained. Thus, contractors who simply want to insulate houses or install efficient furnaces and boilers to program standards can do so without incurring the administrative or paperwork burdens associated with auditing.

It is crucial that the lead agency with oversight of these contractors has clear authority to set qualification requirements for these contractors and enforce them with a clear, simple, fair process. The qualifications must include a requirement to meet program standards in terms of quality installation, customer service, and performance guarantees. The program should make sure that the training infrastructure, including training courses and certification testing, is amply developed and widely available. With a large-scale program, these elements are essential to delivering technical quality and customer satisfaction.

For those contractors who choose to deliver home assessments, their work will be subject to a higher level of program implementer inspections. The existing base of Home Performance contractors will be automatically eligible to deliver these, following a briefing on the details of the new system and agreement to separate their audit business from their installation business. Other contractors who join the program will be eligible to deliver these home assessments following a several-day training and qualification test.

- 32 This mechanism is designed to ensure that contractor-auditors whose primary business is providing installation of specific work (such as HVAC upgrades or insulation) are not motivated to short-cut audits to cover only those measures, or steer customers toward their installation services.
- 33 Program experience indicates that customers overwhelmingly accept an energy-efficiency program's offer to locate a contractor who can perform appropriate work at appropriate cost, rather than seeking out a contractor with their own resources.
- 34 This screening will assess whether the caller represents a household at 60 percent of AMI or below, or a building where the majority of renters are at 60 percent of AMI or below. The screening also will include a verbal "walk-through" of

the unit to assess whether serious home repairs are needed before a retrofit can be useful, whether the caller is eligible for HOME funds, lead abatement funds, or other grants; and whether any other available programs might be more beneficial. Referrals will involve connecting the caller directly to the appropriate agency, if possible; if not, callers will be given full information including phone numbers, Web addresses, hours of operation, how to access supports such as translation of information about the service, and any other information needed to maximize access to the service.

- 35 The 80/20 split between repayments and savings retained by the owner is intended to be an incentive for owners to make their buildings energy-efficient. (In homes with average utility bills or higher, and where a retrofit will reduce energy use by about 35 percent, the 80/20 split is generally possible. In homes with lower bills, or where less energy will be saved, 80 percent of monthly savings may not be enough to repay the obligation within 10 years.) Some owners will not be interested in efficiency without such incentives—but others may be motivated by the chance to increase their indoor comfort, make improvements to their property and increase its resale value, and save on non-utility fuel bills. If fully appraised owners are interested in using their entire energy bill savings over 10 years to fund a Green Jobs/Green Homes NY retrofit, there is no programmatic reason to disallow such contracts.
- 36 Spreadsheet audits in the "Basic" tier of the Green Jobs/Green Homes NY multi-family program should lower average per-unit audit costs.
- 37 Alternatives to funding all audits with SBC dollars are under consideration: Possibilities include lowering the cost of capital and/or contracting (contracting costs can be lowered with direct rebates for installed measures, or by other means) and rolling a portion of audit costs into the customer's repayment amount.
- 38 Oil billing is being explored as an avenue for on-bill recovery, and could be used in combination with electric/gas on-bill recovery. But the mechanism may in fact be limited to electric/gas bills. In that case, retrofits affecting oil consumption might reduce total household costs but present higher gas/electric bills.
- 39 Further criteria for sustainable materials are described in Appendix C.
- 40 For the purposes of this program, lower-income is defined as AMI or below.
- 41 In Massachusetts, a similar, smaller-scale program funds its loan loss reserve with an overcapitalization of retrofit costs, meaning that homeowners pay a spread of XX% over their true costs. This approach is not ideal in New York for several reasons. Making retrofits more expensive for owners will tend to filter out owners who have access to any cheaper capital, meaning that Green Jobs/Green Homes NY retrofits will be increasingly concentrated among owners who can least afford the added cost. This also may increase the risk of defaults. Additionally, the repayment model is fairly sensitive to costs of capital, and small increases may significantly reduce the number of projects that can be funded under the program.
- 42 See, for instance, "Bond Market in Winter Thaw," *The Wall Street Journal*, February 9, 2009, available at <http://online.wsj.com/article/SB123422878893265915.html>.
- 43 Possible means include using LIPA, NYPA and SBC dollars to fund the loan loss reserve, so that losses are shared across all ratepayers.
- 44 As reported in "Final Report of Working Group VI" to the State of New York Public Service Commission Case 07-M-0548 – Proceeding on Motion of the Commission Regarding an Energy Efficiency Portfolio Standard (EEPS) on December 19, 2008: Alabama Power, a utility serving 1.4 million customers, provides on-bill financing to residential property owners who have been in good standing with the utility for 12 months, and who meet credit criteria set by the utility (rather than by a bank). The program finances costs from \$1,500-to-\$25,000, attributes partial payments to energy costs first and retrofit obligations second, and charges a substantial interest rate that increases for customers with less favorable credit scores. Manitoba Hydro, a utility serving about 780,000 customers, provides on-bill financing to customers with good payment histories or acceptable credit scores. The program finances up to \$7,500 in retrofits at 6.5 percent interest, provides some rebates, and requires repayment in five years.
- 45 The Long Island Power Authority has an equivalent to the SBC charge used to fund its Efficiency Long Island program (see http://www.lipower.org/newscenter/pr/2008/050808_eli.html), which also may provide a source of funding for the GJ/GH program. Oil customers currently do not have an SBC charge on their bills.
- 46 More information on the System Benefits Charge can be found on the New York State Public Service Commission's website, <http://www.dps.state.ny.us/sbc.htm>.

- 47 State of New York Public Service Commission, Order Approving “Fast Track” Utility-Administered Electric Energy Efficiency Programs with Modifications, issued and effective January 16, 2009, available at [http://www3.dps.state.ny.us/pscweb/WebFileRoom.nsf/Web/D3FC1ESA708F86A852575400068C67B/\\$File/301_08e1003etal.pdf?OpenElement](http://www3.dps.state.ny.us/pscweb/WebFileRoom.nsf/Web/D3FC1ESA708F86A852575400068C67B/$File/301_08e1003etal.pdf?OpenElement).
- 48 An active and dedicated working group of parties to the EEPS proceeding was charged with investigating an on-bill financing program that would allow utilities to raise third-party capital to finance investments, but did not achieve agreement among utilities and other stakeholders. However, that stakeholder discussion, and the final report produced by the working group, provided important guidance to the establishment of the RRIF structure. State of New York Public Service Commission Case 07-M-0548 – Proceeding on Motion of the Commission Regarding an Energy Efficiency Portfolio Standard (EEPS); Working Group VI – On-Bill Financing; Final Report, December 19, 2008, available at http://www.dps.state.ny.us/07M0548/workgroups/WGVI-On_Bill_Financing_Final_Report.pdf.
- 49 The CO2 Allowance Auction Program regulations state that “The proceeds of the CO2 Allowance Auctions will be used by [NYSERDA] to promote and implement programs for energy efficiency, renewable or non-carbon emitting technologies, and innovative carbon emissions abatement technologies with significant carbon reduction potential.” 21 NYCRR Part 507.4(d) (Adopted Version; effective October 8, 2008) (emphasis added).
- 50 A recent *New York Times* editorial raised concern about the “real danger that auction proceeds will be diverted to state budgets rather than used to accelerate the transition to a clean-energy economy.” The *Times*’ Editorial Board noted that “New York, in particular, has a history of playing fast and loose with the public’s money...” *New York Times* editorial, 9/25/08. <http://www.nytimes.com/2008/09/25/opinion/25thu2.html>
- 51 Timothy Gardner, “First U.S. greenhouse cap-and-trade market opens,” Reuters, September 26, 2008, available at <http://www.reuters.com/article/environment-News/idUSTRE48091C20080925>. (Quoting Governor Paterson, “There are times when governor types have raided income revenues for other purposes; he said, and certainly this would be an economic condition that would create that temptation: But he said he was sure New York’s proceeds would be spent in the right place, because helping consumers pay power bills and potential jobs created by clean energy are integral to the state’s economy.”)
- 52 NYSEDA Early Action Plan (For the Incorporation into the Operating Plan for the Disposition of New York’s Proceeds from the Regional Greenhouse Gas Initiative Auction), January 2009, on file at the Center for Working Families. NYSEDA’s website—as of February 23—does not mention this document, but notes that “The final version of the Operating Plan will be presented to NYSEDA’s Board for review and approval in the Spring of 2009.”
- 53 Kate Galbraith, “Lawsuit Filed in Northeast Carbon Trading Scheme,” *The New York Times*, Green Inc. blog, January 29, 2009, available at <http://greeninc.blogs.nytimes.com/2009/01/29/lawsuit-filed-against-northeast-carbon-trading-scheme>.
- 54 Part 242, Pre-proposal of New York’s Rule to implement the Regional Greenhouse Gas Initiative (RGGI) in the State, December 12, 2006.
- 55 *Ibid.* at 242-10.3(a)(1)(iv). “Reduction or avoidance of CO2 emissions from natural gas, oil, or propane end-use combustion due to end-use energy efficiency”: Offset projects that reduce CO2 emissions by reducing on-site combustion of natural gas, oil, or propane for end-use in an existing or new commercial or residential building by improving the energy efficiency of fuel usage and/or the energy-efficient delivery of energy services may qualify for the award of CO2 emissions offset allowances under this Subpart, provided they meet the requirements of this subdivision. Eligible new buildings are limited to new buildings that are designed to replace an existing building on the offset project site, or new buildings designed to be zero net energy buildings.
- 56 242-10.3(d)(3) provides: “CO₂ offset allowances shall not be awarded to an offset project that receives funding or other incentives from any system benefit fund, or funds or other incentives provided through the energy efficiency and clean energy technology account allocation required pursuant to subdivision 242-5.3(a).” This sub-section would not limit the ability of power generators investing in Residential Retrofit Fund to claim an offset so long as any investment by power generators into the Residential Retrofit Fund is not deemed to be an investment into the Green Jobs/Green Homes NY initiative as a whole. Green Jobs/Green Homes NY must be considered an initiative made up of several projects. In other words, the administration and workforce development costs funded by RGGI, and the audits funded via the system benefit fund, must be considered separate projects from the Residential Retrofit fund for the purpose of this sub-section.
- 57 See Regional Greenhouse Gas Initiative press release at http://rggi.org/docs/Auction_2_Release_Final_08_12_19b.pdf.
- 58 *Ibid.* at 242-10.3(e)(1).
- 59 *Ibid.* at 242-10.3(d)(1). “CO₂ offset allowances shall not be awarded to an offset project or CO₂ emissions credit retirement that is required pursuant to any local, state or federal law, regulation, or administrative or judicial order.”
- 60 The Governor’s February 14 release can be found at http://www.ny.gov/governor/press/press_0214091.html. (We note that most estimates place stimulus spending at \$787 billion.)
- 61 See Footnote 2.
- 62 While not highlighted as part of the energy-related funding package, the Workforce Investment Act is slated to receive a boost of \$3.95 billion, with \$174 million for New York State. Federal dollars from WIA have been identified as a plausible source of funding for GJGH workforce development in New York State.
- 63 A two-step process is needed in order for these funds to be raised: 1) State legislation must be passed by August 2009 in order to place a bond act question on the ballot; 2) A majority of New York State voters must subsequently approve the issuance of bonds on Election Day 2009.
- 64 State of New York Public Service Commission, Order Approving “Fast Track” Utility-Administered Electric Energy Efficiency Programs with Modifications,.
- 65 NYSEDA, “New York Energy SMART Program Evaluation and Status Report Year Ending December 31, 2007,” March 2008, available at http://www.nyserda.org/Energy_Information/evaluation.asp.
- 66 New York State Division of Housing and Community Renewal, from <http://www.dhcr.state.ny.us/Publications/WeatherizationPlan08/wsp08.pdf>.
- 67 These would include about 18,000 single-family homes, 2,200 two-family homes, 1,000 three- to four-family homes, and 260 multifamily buildings.
- 68 As noted in the Program Design section, it may make sense to set lower goals for years during which stimulus funding is flowing directly into New York State. A Year 1 goal of 20,000 units, rather than 35,000, would proportionally lower job estimates by 57 percent.
- 69 Community groups that already run retrofit-related workforce development programs (whether work-readiness with a construction or “green” component, or hands-on training) should be central players in the partnership, to ensure that job pathways are designed according to methods proven to provide access for marginalized workers. Similarly, community organizations that currently provide apprentice-like training, certification and/or job-placement in Green Jobs/Green Homes NY-related work should have a strong role with NYSDDL and employers in establishing apprenticeship rules for new retrofit titles. Community groups that do not yet perform this work but want to enter the field can, like new businesses, be mentored within the partnership.
- 70 In New York City and other locations around New York State, some labor-management training is conducted via certification courses rather than apprenticeships. This training model is used by unions, including SEIU 32BJ (Property Services) and Laborers’ Local 10 (Residential Retrofit Workers) representing workers who must possess a wide array of skills rather than a high level of skill in a single area; and whose work is not currently apprenticeshipable.
- 71 Homeowners would be allowed to select their own contractors, but this would not necessarily prevent the program implementer from allocating contract bundles to higher-performing firms. The program experience of VGS shows that, given a choice between soliciting bids or being assigned a contractor by the program, 95 percent of customers opted for the program-assigned contractor. [CITE]
- 72 Appendix I provides one set of job quality standards, the AFL’s Standards for Green AND Good Jobs.
- 73 The use of federal stimulus (American Recovery and Reinvestment Act) funds for Green Jobs/Green Homes NY will carry with it the requirement that prevailing wages be paid where applicable. Questions about what wages, if any, prevail for the work of single or aggregated residential retrofits remain open at the time of publication. If no wage yet prevails for retrofit work, minimum program wages can be used as the basis for a NYSDDL survey to establish a family-sustaining prevailing wage.
- 74 Green Jobs/Green Homes NY can require that contractors meet wage standards on Green Jobs/Green Homes NY contracts, using contracting rules that include “responsible contractor” language that establishes sustainable wage calcula-

- tions by region, or uses the HUD prevailing wage. ("Lowest responsible bidder" language that makes no specific statement about wages has proven insufficient; unclear evaluation criteria and difficult enforcement have historically compromised the integrity of such contracts.)
- 75 All apprenticeships are run through employers, whether those employers are union or non-union contractors. The NYS DOL certifies apprenticeship programs based on standards of training, classroom time and on-the-job experience. Apprentice wages are standardized in relation to wages for fully skilled workers in the trade.
 - 76 Interviews with NYS employers, October 28 and 29, 2008.
 - 77 Supporting policy language for local and first source hiring requirements is available from the Partnership for Working Families, www.communitybenefits.org.
 - 78 Workforce Investment Boards (WIBs) help define training opportunities in localities across the state. One of three areas of focus with which WIBs are currently charged is "green jobs." Economically marginalized communities, for whom Green Jobs/Green Homes NY are intended to provide new training, work and advancement opportunities, should be represented on WIBs.
 - 79 This protection should be explicit in outreach materials, to avoid discouraging undocumented workers from entering training.
 - 80 To prevent discrimination against immigrant workers, and create an environment in which workers are encouraged to seek skills and advancement, the training and certification process should require the minimum necessary documentation. Any requirements for documentation should be posted and understood by administrators, as should information about what documents are *not* to be requested from program participants.
 - 81 Much existing residential retrofit work is not currently unionized, and also crosses trade craft and skill jurisdictions; the extensive array of union-based apprenticeships does not currently train residential retrofit workers.
 - 82 See work readiness credential at <http://www.workreadiness.com/index.html>.
 - 83 See USGBC-NY for curriculum and certification development at <http://www.usgbcny.org/initiatives/skills-training.html>.
 - 84 A list of training providers is available on NYSEDA's website, <http://www.getenergysmart.org/training.aspx>.
 - 85 Green jobs as "pathways out of poverty" are Governor Paterson's stated priority under his Renewable Energy and Environmental Justice Interagency Task Forces.
 - 86 As being developed by USGBC-NY green construction skills foundation certification course.
 - 87 Filling 1059 lower-level job slots with *brand new workers* would require initially recruiting 1,483 trainees. If 33 percent of these required wraparound support (494) and 20 percent of these accessed supports for a second time (99), total wraparound funding needs would be $592 \times \$450 = \$266,400$.
 - 88 "Working Group VII—Workforce Development and Training Report to the Public Service Commission: Case 07-M-0548—Proceeding on the Motion of the Commission Regarding an Energy Efficiency Portfolio Standard (EES);" October 17, 2008, and http://www.dps.state.ny.us/07M0548/workgroups/WGVII_summary.pdf.
 - 89 Request for Proposals, New York State Office of Temporary and Disability Center for Employment and Economic Supports Assistance, August 6, 2008, available at <http://www.otda.state.ny.us/main/cgo/RFP/CareerPathwaysRFP.pdf>.
 - 90 Working Group VII—Workforce Development and Training Report to the Public Service Commission, Case 07-M-0548, October 17, 2008.
 - 91 The same set of organizations serve as points of access for jobs and training, and for community engagement in program development, as discussed in "Developing the Workforce and Other Needed Resources."
 - 92 "Enabling Investments in Energy Efficiency," September 2008.

Appendices

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Appendix A: Program operations

Unified screening for all energy-efficiency programs

The program implementer first screens the caller to determine whether he or she is a good candidate for this program or should consider using another program.

The program implementer should determine:

- Whether the caller has capital readily available to invest in incentivized energy efficiency.
- If the caller is seeking retrofits not covered by Green Jobs/Green Homes NY.
- If the caller is not located in a target area (and should use other NYSERDA, NYPA, or LIPA programs).
- Whether the caller is eligible for grant-funded programs (and should consider the Weatherization Assistance Program).
- Whether barriers to using incentivized or grant-funded programs mean that the caller should instead use Green Jobs/Green Homes NY to access retrofits.

Green Jobs/Green Homes NY phone assessment and intake

If the caller is a good candidate for Green Jobs/Green Homes NY, the call center talks to the person and determine the appropriate services to offer—an online audit such as the one now offered by NYSERDA, an information packet, and/or an appointment for an in-home audit.

If an in-home or building audit is appropriate, the program implementer arranges a date when an auditor will visit. The program implementer also determines whether the homeowner or building owner must pay the program's nominal charge for an audit (\$25 per unit in the structure but capped at \$1,500, intended to discourage nonserious requests) or whether he or she can be exempted as a low-income person, a senior citizen, a person with disabilities, or other exempt owner.

For multifamily building owners, the program implementer explains the required 10 percent capital contribution and determines whether that contribution can be waived due to hardship, lack of access to capital, or another reason.

One- to four-unit houses: In-home audit and retrofit proposal

The in-home audit is managed by the program implementer and funded through the local utility, or directly by the System Benefits Fund. Regardless of which contractor performs the audit, the audit and its report are conducted in accordance with statewide standards established by the lead agency.

The Green Jobs/Green Homes NY audit uses a “first contact maximization” approach to retrofitting, in which a two-person team performs testing in addition to directly installing some universal low-cost measures.

The home testing is comprehensive and fuel-neutral in keeping with the whole-house philosophy. It uses a standard set of measurements of all house components that relate to the efficiency of the home, including utility data on the home’s energy consumption over the prior year, a blower-door test, tests to locate routes of air infiltration, appliance tests, and any available house typology and water flow measurements to identify areas of energy waste and potential savings achievable through retrofits.¹

These tests will highlight existing safety issues—knob and tube wiring, combustion issues such as backdrafting, pre-existing mold and moisture, or other easily recognized indoor air quality problems. Corrections either will roll into the scope of work—if the scope continues to be cost-effective with the corrections included—or the homeowner will agree to make such corrections prior to continuing with the program.² The program implementer should be prepared to refer owners of such properties to other programs that may support repair costs.

Direct-install measures during the audit consist of basic air-sealing and, where appropriate, faucet aerators and low-flow showerheads.³ Descriptions of these measures are provided in Appendix G, “Job mapping: Defining the retrofit sector.”

Using program-approved modeling software,⁴ the auditor produces a work scope that includes rough prices for cost-effective energy-saving investments. The auditor presents packages of retrofits for the owner’s choice: one containing all cost-effective measures with about an 8- to 10-year payback or better,⁵ and another smaller package of retrofits with a shorter payback that achieves no less than 75 percent of the energy savings offered by the full package—if it is possible to create such a package for the home.

The audit is designed to give the homeowner an actionable plan for energy-efficiency improvements. This plan will include a scope of work that will reduce energy use and meet the program cost-effectiveness guidelines, prices for those parts of the project that are standard, and a connection to one or more contractors who can perform the recommended work at the predicted price. The auditor will work with the homeowner to solicit proposals for complex jobs that cannot be priced immediately from a standard pricing

table. These custom-priced measures will have to meet the payback guideline, or the homeowner may elect to pay immediately for a portion of the cost of a measure to reduce the remaining amount so that it meets the guideline. (Installation contractors who agree to complete the work scope will finalize the prices and confirm with the auditor the projected savings. The installation contractor will then be responsible for any cost overruns and for correcting any problems that emerge during or as a result of the project through normal contracting law).

Multifamily buildings: Tiered audits and retrofit standards

In multifamily buildings—as in houses—regardless of which contractor performs the audit, the audit and its report are conducted in accordance with statewide standards established by the lead agency.

The first task for auditors of multifamily buildings (building analysts) will be to benchmark buildings using a simple comparison of energy usage and building volume.⁶ This will be to establish two tiers of audits and retrofits: basic (for buildings with lower energy usage) and comprehensive (for buildings with higher than an agreed-to benchmark).

Those buildings with lower energy usage enter the basic tier of the program, and are subject to a prescriptive menu of efficiency measures with known energy savings. The auditing process will consist of basic spreadsheet analysis in order to easily assess what savings will be most cost-effective.

Buildings with higher energy usage will enter the comprehensive tier of the program. Computer-modeled audits will be performed in order to assess opportunities for deeper energy savings.

For either type of building, the audit will determine which measures cost less than \$3,500 (over 30 units) or \$4,000 (under 30 units) per apartment, and provide an 8- to 10-year payback or better.⁷ The audit also will determine which measures costing *more* than \$3,500 to \$4,000 a unit can be performed with an 8- to 10-year payback in the event that the program can provide a higher level of investment without jeopardizing program targets.

Green Jobs/Green Homes NY authorization will require the maximum level of retrofit within these parameters, unless the owner can demonstrate inability to maintain a particular measure.

Sustainability measures and nonpaying measures in one- to four-unit buildings and multifamily buildings

During the audit and with the customer's consent (and tenant's permission to access renter-occupied units), the auditor installs simple low-cost measures, including faucet aerators and low-flow showerheads—where these will reduce verified water flow (reducing hot water consumption)—and compact fluorescent bulbs. If the homeowner signs up for additional retrofits, the cost of these measures is rolled into their retrofit package. If not, the cost of the measures is rolled into the cost of the utility-provided audit.

Audits in rental buildings of more than two units also will evaluate some measures that do not reliably produce energy bill savings, but benefit either renters or communities and cost little enough that they can be subsidized with savings from other measures. These might include whole or partial green roofs or appliance replacements.⁸ If such measures are reasonable and do not extend project payback beyond the 8- to 10-year limit, they will be required elements of the retrofit package. (Nonenergy savings generated by such retrofits—for example, reductions in water bills or property taxes—will simply stay with the customer).

Allocating collected audit fees

When an audit does not result in a contract, any audit fees that have been collected are remitted by the lead agency to the audit funding stream. When an audit does result in a contract for retrofit work, any collected fees are remitted to the utility and applied to the customer's repayment obligation.

Signing up the customer

When the customer settles on a retrofit package, the auditor presents an agreement between the utility and the customer for a Tariffed Installation Project, or TIP. The utility agrees to provide the contracting work through the program implementer, and the customer authorizes the scope of work and agrees to pay back contracting costs within reasonable range of the auditor's estimate, including interest and other cost-of-capital or servicing fees. The customer agrees to make monthly payments on his or her utility bill of a fixed amount that is approximately 80 percent of expected monthly savings.⁹

The customer also agrees to allow the utility to monitor post-retrofit energy consumption data and share it with the program implementer. This is done for the purpose of flagging problems with the retrofit's performance and providing further service to resolve such issues.

The auditor carefully explains possible variations in cost savings due to shifting fuel prices and changes in household behavior as well as the program's performance guarantees and procedure for trouble-shooting retrofits that do not seem to be working properly.

Making audits work for energy efficiency

A successful retrofit program must be designed so that audits are objective, but also so that the auditor has an incentive to encourage customers to follow through on energy-efficiency investments. In practice, the program must incentivize the auditor on the basis of investments undertaken by their customers, but the auditor should be independent of the contractors providing the installation services or efficient equipment.

In Green Jobs/Green Homes NY, utilities are incentivized to parlay audits into retrofit contracts in order to receive a full complement of Energy Efficiency Portfolio Standard energy-efficiency credits. Utilities themselves should also provide financial incentives to their auditors when contracts are made.

Securing the work contract

The auditor offers to provide the customer with a contractor who will do the work for the price given by the auditor or provide a list of area contractors affiliated with the program who may bid on the work. Customers may choose contractors not yet affiliated with the program to bid on the work as long as they possess the appropriate skill certifications, are able to perform the work within the appropriate cost range determined by the audit, and agree to allow projects to be subject to program quality approval. Beyond that first project, contractors have to agree to become affiliated with the program to be eligible for program funding.

The contractor makes a final offer and signs off on the installation agreement and the terms of Green Jobs/Green Homes NY project work (including the contractor's acceptance of the oversight of the program implementer on behalf of the utility). The program implementer then secures the customer's signature approving the choice of contractor and work may commence.

Installation and verification for one- to four-family houses

The contractor (and/or the subcontractors) installs the prescribed measures. Contractors will be required to commission their installations—that is, to perform an appropriate series of tests to ensure that any installation has been completed to program standards. This will include testing for combustion safety following installation of new furnaces or

boilers and following installation of insulation and air sealing. This will confirm that flues, where needed, are working, and that all devices have proper air flow and, for AC and heat pumps, proper charge.

The program auditor inspects the work and either approves it or requires correction. This inspection program may involve sampling rather than inspection of all participating homes, but should cover no less than 30 percent of homes for new contractors and 15 percent for contractors who have established a history of sound work specifically within Green Jobs/Green Homes NY. Customer and auditor, where present, accept installation and authorize payment to the contractor.

Installation, verification, and early monitoring for multifamily buildings

In multifamily buildings, the contractor installs the prescribed measures; the program auditor inspects the work and either approves it or requires correction. Each project must be verified in this way. Upon verification, the customer and auditor accept installation and authorize an initial 90 percent to 95 percent payment to the contractor. Five to 10 percent of the payment (retainage) is withheld for no more than three months until the program implementer can confirm both the quality of the installation and its effective operation.¹⁰ In addition to retainage, the program implementer can withhold payment for other program work performed by the contractor until problems are resolved.

The program implementer conducts follow-up monitoring to confirm that work meets expectations both during and after installation. Energy usage is checked through bill analysis three months into the first heating or cooling season. Following the third month's reading, the balance is paid to the contractor.

Payment and cost recovery

The utility authorizes the program implementer, using Residential Retrofit Fund dollars, to pay the contractor upon receipt of the certificate of completion signed by the homeowner and the contractor. The program may withhold partial payment pending resolution of quality assurance issues that emerge in the course of the test-out audit. The utility then initiates repayment through the utility TIP system.

Quality assurance

Third-party quality assurance is critical for customer and investor confidence in the program. Home Performance with ENERGY STAR has an established system for onsite inspections of a sample of installations either during or shortly after installation. This should be supplemented with systematic tracking of energy-savings results through meter

readings of all treated homes. Utility companies will provide consumption data for all participants for the duration of the loan repayment schedule. (Similar arrangements may be made with oil dealers for their participating customers). In multifamily buildings with energy management systems, readings may substitute for utility data. All such data should be made easily accessible to the customer as well as program staff—and, in aggregate versions, to the public as an accountability measure.

Readings deviating significantly from energy savings projections will trigger onsite inspections and action plans to correct any deficiencies in installations that are discovered. This monitoring and response system will be a new approach that will raise some administrative costs but dramatically increase program impact.

There will be three categories for failure to achieve projected energy savings: owner failure to maintain; malfunction of installed measures; and errors or oversights (including information not previously available) in the audit, energy savings projection, or inspections.

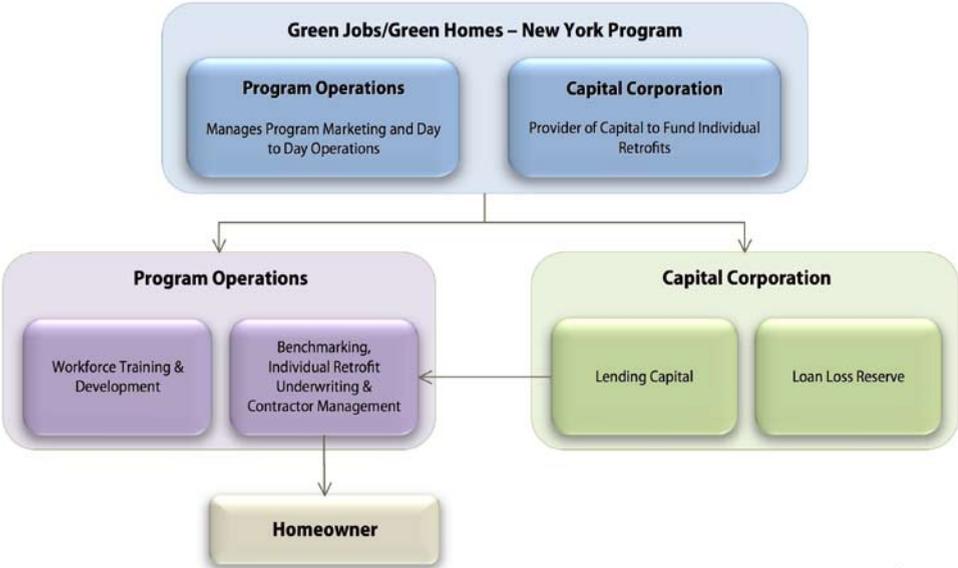
When a potential nonperforming retrofit is identified, the program implementer arranges a follow-up visit to retest installed measures. If testing determines that measures have been properly maintained but are not performing, the program implementer arranges for remediation through contractor warranties. If measures are performing but have not been maintained or if changes in customer behavior have resulted in reduced savings, the program will explain the test results and provide informational materials to the owner about household practices that can reduce energy use.

In the case of clear owner failure to perform maintenance on installed measures, the retrofit will be exited from the program—meaning that program supports and performance guarantees will no longer apply to the building—unless the owner brings all measures fully back online. The owner’s obligation for repayment will be unchanged.

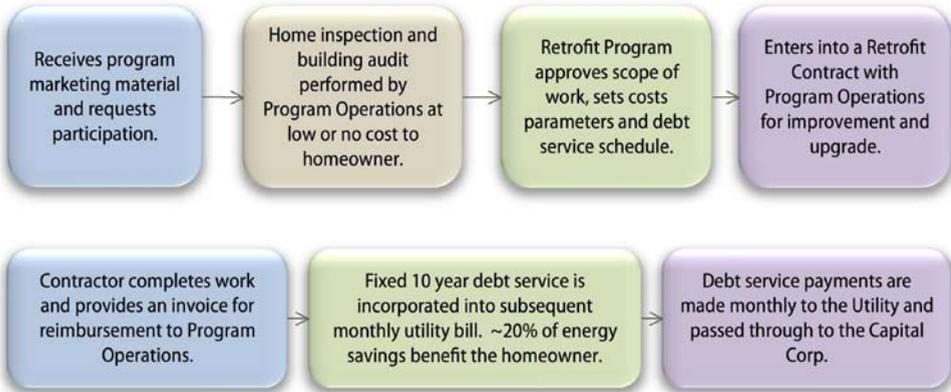
However, in the case of clear avoidable errors in audit measurements, the owner will be relieved of a portion of his or her repayment obligation, commensurate to the lack of energy savings.¹¹ The responsible auditor should be penalized to discourage poor-quality auditing work.

Appendix B. Program operations charts

Program Structure



Homeowner Structure



Appendix C. What are retrofit measures under the program?

One-to four-unit houses

In one- to four-unit homes, NYSERDA's Home Performance with ENERGY STAR has established lists of eligible measures for energy-efficiency retrofits that derive from a whole-house approach to building science. NYSERDA's HPwES uses technical standards to clearly define these measures. This program will adopt those measures and standards.

Project costs will average \$5,500 per unit (\$5,000 to \$20,000 per structure), ranging from \$3,500 in multifamily buildings to \$7,500 or more in one- to four-unit homes.¹² Projected savings will include 25 percent to 45 percent of heating and cooling use. Projects should be restricted to those that will save at least 20 percent of heating and cooling use to avoid flooding the system with marginal projects.

These retrofits will be allowable at the inception of the program:

- Adding attic or wall insulation.
- Sealing air leaks in the attic and basement and closing interior chaseways and openings.
- Replacing existing inefficient furnaces, boilers, and air conditioners with properly sized ENERGY STAR-qualified equipment.
- Replacing incandescent lighting with efficient compact fluorescent lamps or other efficient lamps.
- Sealing warm-air or air-conditioning ducts in unconditioned spaces.
- Replacing existing hot water tanks with ENERGY STAR-rated hot-water tanks.
- Replacing and properly recycling existing appliances—particularly refrigerators, freezers, and dryers with ENERGY STAR-rated replacements.
- Adding solar thermal hot water.
- Adding space and water heating equipment upgrades that are cost-effective and reduce carbon emissions.¹³
- Customer-initiated measures: An auditor, homeowner, or contractor working with a homeowner may propose a new measure or treatment for approval by the program administrator. Any such proposal will be reviewed for feasibility and cost-effectiveness by the program and allowed or disallowed. The program will review projected savings on the basis of industry standard calculations or, if appropriate, by engineering review of the proposed measure or treatment. The purpose of the review is to determine if

the proposed measure is safe and likely to be effective enough to be covered by the program loan fund. Customers are free to install whatever devices they choose as long as the devices meet the appropriate New York State and local codes. But access to the program's loan fund is limited to measures and treatments that are known to produce measurable savings in a safe and cost-effective manner.

In the event that a case-by-case review process is not feasible, the program should conduct a technology review semi-annually, including in the review any new measures proposed by Green Jobs/Green Homes NY customers.

Multifamily buildings

Basic-tier buildings will receive retrofits according to a prescriptive menu of appropriate measures that are defined by the lead agency. These may include upgrades, energy management system installation, distribution system maintenance, stack effect mitigation, health and safety measures, and others.

Comprehensive-tier buildings will receive measures providing an 8- to 10-year payback or better. These may include heat and hot water system upgrades, lighting upgrades, energy management system installation, distribution system maintenance, stack effect mitigation, health and safety measures, and others. In limited cases, retrofits might include window replacements. Nonpaying measures may include appliance replacement, lighting upgrades, green roof installation, or others.

Ideally, Green Jobs/Green Homes NY will fund retrofits at more than \$4,000 per unit, allowing building owners to maximize energy reductions and use faster-payback measures to subsidize longer-payback measures. However, given the possibility that Green Jobs/Green Homes NY third-party funds may be limited at first, the lead agency will be given scope to determine whether higher funding levels make sense.

Energy management systems will be universally installed as a component of multifamily retrofit packages. These are computerized systems that monitor and efficiently regulate heating and electricity usage throughout buildings. This will make it much more efficient for program implementers to do post-construction monitoring of buildings, often avoiding the need for onsite inspection.

Oil retrofits

In New York State, 33.6 percent of homes are heated with oil.¹⁴ Reaching those homes with public funding and supports for retrofits has been difficult, since public programs have generally been funded through the electric System Benefits Charge, or SBC. New

developments at the New York State Public Service Commission will add a gas SBC, and the Early Action Plan for RGGI funds will provide limited funding for oil efficiency for the first time. Still, oil customers are still vastly underserved. Neither is the utility model of vendor billing feasible for retrofit repayments: Oil is distributed by a vast network of small businesses that regularly add and remove customers (and whose customers value the ability to switch vendors as prices fluctuate), instead of by large utility companies that maintain relatively fixed relationships with customers. In this environment, funding and scaling-up oil-heat retrofits has remained difficult.

Green Jobs/Green Homes NY allows some oil retrofits in multifamily buildings—but more important, it establishes a new funding environment by using non-SBC dollars to pay for contracting. This creates a new opportunity to organize public support for oil efficiency. While conversations with oil stakeholders are still in the early stages, a possible model for Green Jobs/Green Homes NY oil retrofits could be as follows:

Oil-heated buildings

Under the auspices of the Green Jobs/Green Homes NY program implementer, a pool of Building Performance Institute-certified, fuel-neutral auditors is made available to perform audits. These audits may be funded by an oil industry-created body. These auditors can assess buildings in which the primary fuel likely to be affected by retrofits—meaning the primary fuel whose costs are paid by the building owner—is oil.

The auditors perform full fuel-neutral assessments and produce work scopes that may include reductions in oil, electricity, and/or gas. Contracting is arranged in exactly the same manner as described above and can be performed by a single contractor, except that the contract and payment streams are split: Electric/gas work is contracted as a utility TIP and oil work is contracted under the auspices of the oil industry retrofit body. That body has the right to draw down contracting dollars from the retrofit fund, and like the utility, it assumes responsibility for collecting the installation cost from the building owner and repaying the fund.¹⁵ Collection from customers is accomplished with a separate monthly bill backed by a mechanic's lien or other legal mechanism. Monthly billing obligations must be disclosed and are transferred at sale to the new owner, as with electric/gas retrofit obligations.

Given the high concentration of oil-heated rental buildings in New York City and Long Island and oil-heated one- to four-unit unit homes between Downstate New York and the Capital Region, it may be reasonable to establish a housing type-specific oil-heat focus in some Green Jobs/Green Homes NY target areas. This will allow contractors to understand fuel-specific demand and help rationalize outreach efforts.

Dual-fuel buildings

Buildings in which gas is the primary fuel but oil provides backup heat on particularly cold days historically have not been eligible for System Benefits Charge-funded retrofit programs. Although audits in those buildings often have been fundable, contracting costs have not. Green Jobs/Green Homes NY's new funding stream should solve this problem.

Solar thermal hot water systems¹⁶

Hot water is responsible for an average of 13 percent of home energy use,¹⁷ and solar thermal systems save 50 percent to 70 percent of that usage, or 6.5 percent to 9 percent of home energy use.

Although solar thermal systems have not been installed aggressively through New York's existing energy-efficiency programs, NYSERDA estimates that 15 percent of New York housing units can use the technology successfully to dramatically lower energy consumption. In NYSERDA's proposals to the Energy Efficiency Portfolio Standard proceeding of the New York State Public Service Commission, the agency has included a goal of 3,000 installed solar thermal collectors per year (in multifamily buildings) for the next three years.

Green Jobs/Green Homes NY should establish yearly goals—increased annually—for the installation of solar thermal systems. Year 1 might begin at 5 percent of structures served (yielding 1,069 solar thermal systems), and increase to 15 percent by Year 5. Since solar thermal is most cost-effective in homes heated by oil, audits may be less likely to find good candidates until oil retrofits become available. Solar thermal cost efficacy should improve in later years of the program as uptake increases and contractors develop efficiencies in their own work.

Appendix D. Sustainable procurement standards under the program

Manufacturing quality

Manufacturer standards exist for most retrofit-related materials and are sufficient for distinguishing between high-performing and lesser materials. Using these scales, Green Jobs/Green Homes NY should specify minimum standards for materials used in the program.

Green Jobs/Green Homes NY should specify ENERGY STAR-listed or other approved products and materials for all uses where they are listed. All materials used in the Green Jobs/Green Homes NY program should meet or exceed the standards listed in 10 CFR Part 440 Appendix A: “Standards for Weatherization Materials” and U.S. Department of Housing and Urban Development Minimum Property Standards.

Sustainable Industries Network

Draft Criteria for “Green Products” (selected)

Provided by the New York Industrial Retention Network or NYIRN, convener of the Sustainable Industries Network.

ENVIRONMENTAL

- Process–energy efficient
- Process–water efficient
- Product materials–nontoxic, sustainable, recycled content (recognized standard, e.g. Green Seal)
- Product use–energy efficient (recognized standard, e.g. ENERGY STAR)
- Product use–water efficient
- Product end–recyclable

LOCATION

- Site selection–dense area
- Brownfield remediation
- Leadership in Energy and Environmental Design Building
- Transportation–products, supplies
- Transportation–employee commute

Sustainability and environmental safety

Standards for manufacturing sustainability are in development by the National Network for Sustainable Industries (convened by the New York Industrial Retention Network). Green Jobs/Green Homes NY should begin by requiring the use of cost-effective materials that most closely meet these standards, and the lead agency should periodically review and republish criteria for the selection of materials.

Lesson from the field

Not all materials are created equal. For instance, solar thermal installers report that solid-manufactured panels (those cast in one piece) are durable, but panels manufactured by welding tubes to a based structure tend to develop breaks within a few years. Repairing tube breaks is not cost-effective. In essence, the lower-quality solar thermal panels do not provide the security of returns needed for a self-paying installation. Similar consideration should be given to other retrofit materials and equipment.

As an overarching practice, the program should assess and avoid hazardous chemicals—materials and products that are hazardous in any stage of their lifecycle. And it should seek to utilize the safest materials and products. If the lead agency determines that a safe alternative does not exist, it should direct research and development to create and bring to market the safer substances as guided by the widely accepted Twelve Principles of Green Chemistry.¹⁸

Likewise, Green Jobs/Green Homes NY manufacturing quality standards should consider the potential impacts on materials' safety resulting from increased pressure on supply chains. Off-gassing and other time-lapse processes associated with new materials—which may have new impacts due to higher volumes of production and faster delivery schedules—should be accounted for in considerations of materials' safety and environmental impact.

Support for developing these standards and improving the safety of available products can be accessed through the Pollution Prevention Institute at Rochester Institute of Technology, among other organizations.

Secondary materials

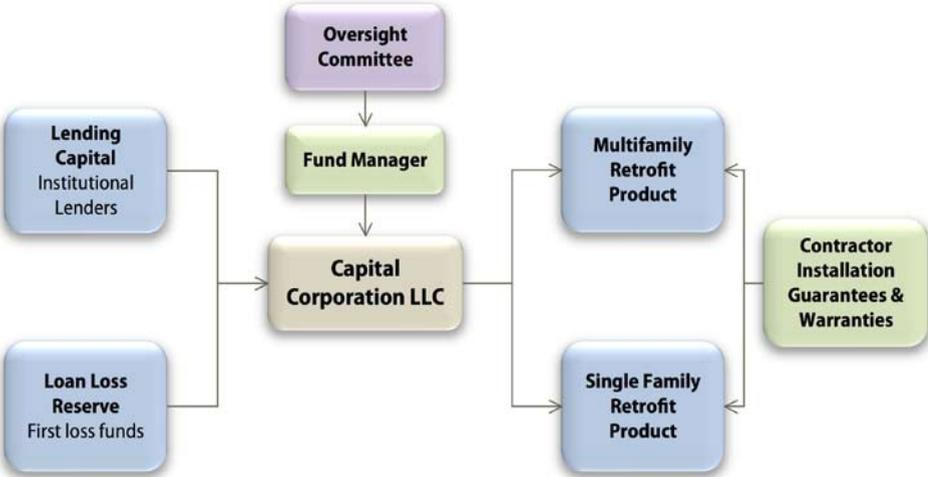
Where available, Green Jobs/Green Homes NY should use secondary materials. Available materials include sheetrock from recycled gypsum, cellulose insulation from recycled paper, and cotton insulation from recycled denim.

Procurement of such materials should be supported by the Empire State Development Corporation and should focus on secondary materials derived regionally in and around New York State.

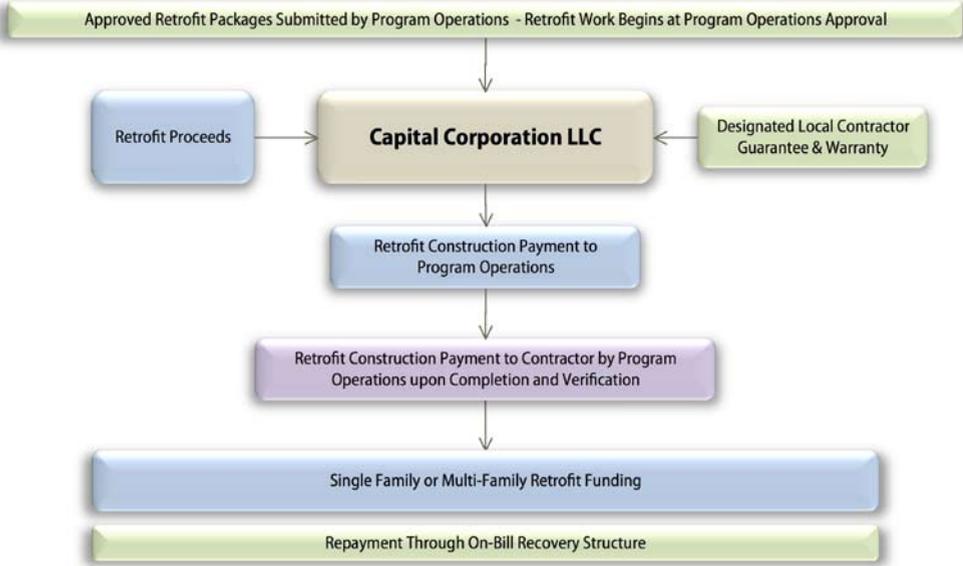
Waste-matching to support the development of regionally based firms producing retrofit materials from recycling streams can be facilitated by New York's Regional Technology Development Centers and other industrial technical assistance organizations.

Appendix E. Capital operations structure

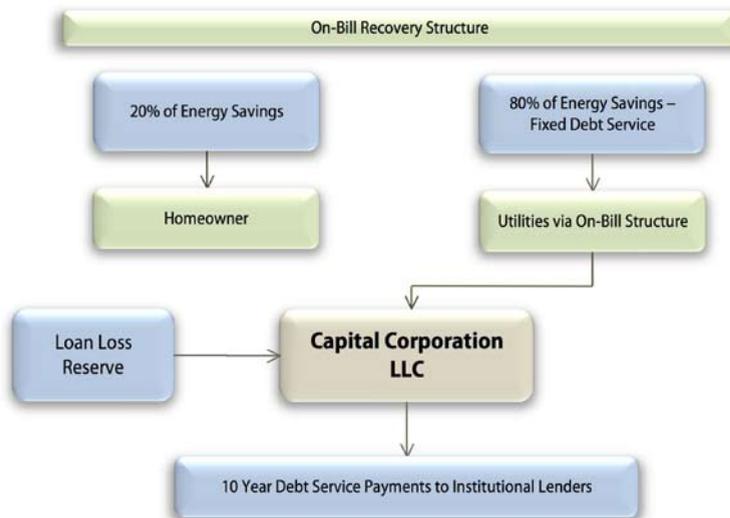
Capital Corporation Structure



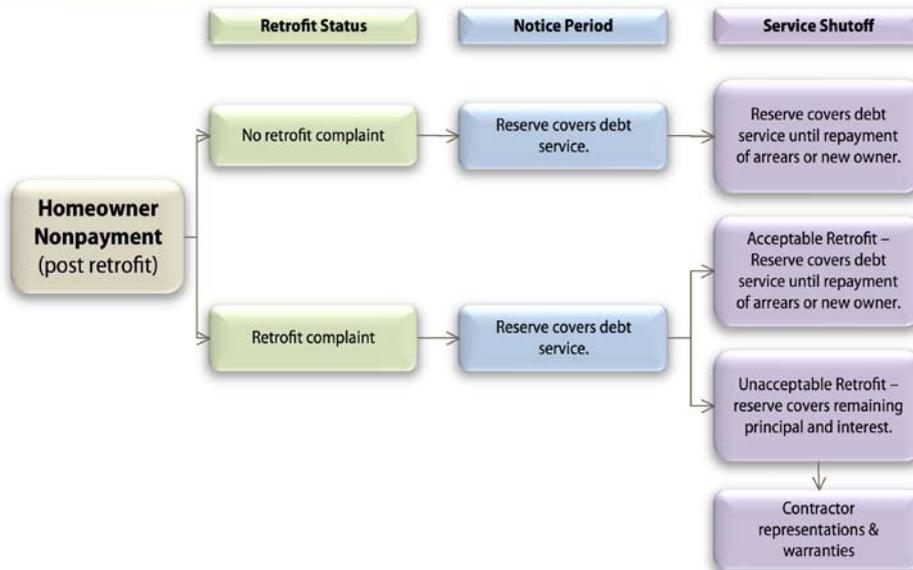
Capital Operations Flow of Funds Structure



Capital Operations Flow of Funds Structure (continued)



Loan Loss Reserve Nonpayment Structure



Appendix F. Residential Retrofit Investment Fund sensitivity analyses

Residential Retrofit Fund Structure - Green Jobs/Green Homes NY

Sensitivity Analyses

Single Family Assumptions

Prior Year Annual Utility Bill \$ 2,700

Institutional Cost of Capital and Gross Annual Savings on Repayment Period - (20% Retained Homeowner Savings)

| Institutional Cost of Capital* | Gross Annual Savings (% Payback) | | | |
|--------------------------------|----------------------------------|-----|-----|------|
| | 40% | 35% | 30% | 25% |
| 5.00% | 9 | 11 | 13 | 17 |
| 5.50% | 9 | 11 | 14 | 18 |
| 6.00% | 10 | 12 | 14 | 19 |
| 6.50% | 10 | 12 | 15 | #N/A |
| 7.00% | 10 | 12 | 16 | #N/A |

Institutional Cost of Capital and Retained Homeowner Savings on Repayment Period - (30% Gross Annual Savings)

| Institutional Cost of Capital* | Retained Homeowner Savings | | | |
|--------------------------------|----------------------------|-----|-----|------|
| | 15% | 20% | 25% | 30% |
| 5.00% | 12 | 13 | 14 | 16 |
| 5.50% | 13 | 14 | 15 | 17 |
| 6.00% | 13 | 14 | 16 | 18 |
| 6.50% | 14 | 15 | 17 | 19 |
| 7.00% | 14 | 16 | 18 | #N/A |

Gross Annual Savings and Retained Homeowner Savings on Repayment Period - (5% Cost of Capital*)

| Annual Savings (% Payback) | Retained Homeowner Savings | | | |
|----------------------------|----------------------------|-----|-----|------|
| | 15% | 20% | 25% | 30% |
| 40.00% | 9 | 9 | 10 | 11 |
| 35.00% | 10 | 11 | 12 | 13 |
| 30.00% | 12 | 13 | 14 | 16 |
| 25.00% | 16 | 17 | 19 | #N/A |

*Cost of Capital to Homeowner includes a 25 bps administration fee

Residential Retrofit Fund Structure - Green Jobs/Green Homes NY

Sensitivity Analyses

Single Family Assumptions

Prior Year Annual Utility Bill \$ 3,000

Institutional Cost of Capital and Gross Annual Savings on Repayment Period - (20% Retained Homeowner Savings)

| Institutional Cost of Capital* | Gross Annual Savings (% Payback) | | | |
|--------------------------------|----------------------------------|-----|-----|-----|
| | 40% | 35% | 30% | 25% |
| 5.00% | 8 | 9 | 11 | 15 |
| 5.50% | 8 | 10 | 12 | 15 |
| 6.00% | 8 | 10 | 12 | 16 |
| 6.50% | 9 | 10 | 13 | 17 |
| 7.00% | 9 | 11 | 13 | 18 |

Institutional Cost of Capital and Retained Homeowner Savings on Repayment Period - (30% Gross Annual Savings)

| Institutional Cost of Capital* | Retained Homeowner Savings | | | |
|--------------------------------|----------------------------|-----|-----|-----|
| | 15% | 20% | 25% | 30% |
| 5.00% | 11 | 11 | 13 | 14 |
| 5.50% | 11 | 12 | 13 | 14 |
| 6.00% | 11 | 12 | 14 | 15 |
| 6.50% | 12 | 13 | 14 | 16 |
| 7.00% | 12 | 13 | 15 | 17 |

Gross Annual Savings and Retained Homeowner Savings on Repayment Period - (5% Cost of Capital*)

| Annual Savings (% Payback) | Retained Homeowner Savings | | | |
|----------------------------|----------------------------|-----|-----|-----|
| | 15% | 20% | 25% | 30% |
| 40.00% | 8 | 8 | 9 | 9 |
| 35.00% | 9 | 9 | 10 | 11 |
| 30.00% | 11 | 11 | 13 | 14 |
| 25.00% | 14 | 15 | 16 | 18 |

*Cost of Capital to Homeowner includes a 25 bps administration fee

Residential Retrofit Fund Structure - Green Jobs/Green Homes NY

Sensitivity Analyses

Single Family Assumptions

Prior Year Annual Utility Bill \$ 3,300

Institutional Cost of Capital and Gross Annual Savings on Repayment Period - (20% Retained Homeowner Savings)

| Institutional Cost of Capital* | Gross Annual Savings (% Payback) | | | |
|--------------------------------|----------------------------------|-----|-----|-----|
| | 40% | 35% | 30% | 25% |
| 5.00% | 7 | 8 | 10 | 13 |
| 5.50% | 7 | 9 | 11 | 13 |
| 6.00% | 8 | 9 | 11 | 14 |
| 6.50% | 8 | 9 | 11 | 15 |
| 7.00% | 8 | 9 | 12 | 15 |

Institutional Cost of Capital and Retained Homeowner Savings on Repayment Period - (30% Gross Annual Savings)

| Institutional Cost of Capital* | Retained Homeowner Savings | | | |
|--------------------------------|----------------------------|-----|-----|-----|
| | 15% | 20% | 25% | 30% |
| 5.00% | 9 | 10 | 11 | 12 |
| 5.50% | 10 | 11 | 11 | 13 |
| 6.00% | 10 | 11 | 12 | 13 |
| 6.50% | 10 | 11 | 12 | 14 |
| 7.00% | 11 | 12 | 13 | 14 |

Gross Annual Savings and Retained Homeowner Savings on Repayment Period - (5% Cost of Capital*)

| Annual Savings (% Payback) | Retained Homeowner Savings | | | |
|----------------------------|----------------------------|-----|-----|-----|
| | 15% | 20% | 25% | 30% |
| 40.00% | 7 | 7 | 8 | 8 |
| 35.00% | 8 | 8 | 9 | 10 |
| 30.00% | 9 | 10 | 11 | 12 |
| 25.00% | 12 | 13 | 14 | 16 |

*Cost of Capital to Homeowner includes a 25 bps administration fee

Residential Retrofit Fund Structure- Green Jobs/Green Homes NY

Sensitivity Analyses

Single Family Assumptions

Prior Year Annual Utility Bill \$ 3,600

Institutional Cost of Capital and Gross Annual Savings on Repayment Period - (20% Retained Homeowner Savings)

| Institutional Cost of Capital* | Gross Annual Savings (% Payback) | | | |
|--------------------------------|----------------------------------|-----|-----|-----|
| | 40% | 35% | 30% | 25% |
| 5.00% | 7 | 8 | 9 | 11 |
| 5.50% | 7 | 8 | 9 | 12 |
| 6.00% | 7 | 8 | 10 | 12 |
| 6.50% | 7 | 8 | 10 | 13 |
| 7.00% | 7 | 8 | 10 | 13 |

Institutional Cost of Capital and Retained Homeowner Savings on Repayment Period - (30% Gross Annual Savings)

| Institutional Cost of Capital* | Retained Homeowner Savings | | | |
|--------------------------------|----------------------------|-----|-----|-----|
| | 15% | 20% | 25% | 30% |
| 5.00% | 9 | 9 | 10 | 11 |
| 5.50% | 9 | 9 | 10 | 11 |
| 6.00% | 9 | 10 | 11 | 12 |
| 6.50% | 9 | 10 | 11 | 12 |
| 7.00% | 9 | 10 | 11 | 12 |

Gross Annual Savings and Retained Homeowner Savings on Repayment Period - (5% Cost of Capital*)

| Annual Savings (% Payback) | Retained Homeowner Savings | | | |
|----------------------------|----------------------------|-----|-----|-----|
| | 15% | 20% | 25% | 30% |
| 40.00% | 6 | 7 | 7 | 8 |
| 35.00% | 7 | 8 | 8 | 9 |
| 30.00% | 9 | 9 | 10 | 11 |
| 25.00% | 11 | 11 | 13 | 14 |

*Cost of Capital to Homeowner includes a 25 bps administration fee

Appendix G. Job mapping: Defining the retrofit sector

Retrofit work is similar to the existing blue-collar work of construction and home repair service, but it differs in important ways. Retrofit (home performance) contracting is conducted on a “test-in, test-out” basis, meaning that the home’s energy consumption is tested before work is performed and again afterward to ensure that needed changes have been accomplished. Retrofit crews must have a basic understanding of the house as a system in order to perform work in any single skill area. In the same vein, retrofits (like other home repair work) require a mix of specialists and cross-trained workers who can perform small tasks across a variety of trades as they arise in the course of the main project. For instance, an insulation crew may discover a leaky pipe while insulating a wall. A well-rounded worker would need to be trained to recognize and repair minor leaks, as well as to recognize when a highly skilled plumber is needed. This set of needs distinguishes retrofits from traditional renovation work and also from the current work modes of trades organized by job title.

Existing contractors for NYSERDA and the Weatherization Assistance Program have developed a pool of workers with these skills, but the program will need many more workers and some existing workers will need to add to their skills. Existing home repair and construction workers possess many relevant skills as well, but energy-efficiency contracting is performed differently enough that those workers will need significant retraining in order to perform this work.

The New York State Department of Labor recently conducted a labor market outlook study for occupations in the energy-efficiency sector. Construction-related titles account for slightly more than 50 percent of anticipated jobs in the industry. Supervisors and back-office workers are a substantial part of the sector as well.¹⁹The NYSDOL study identified the following workforce needs and Green Jobs/Green Homes NY research has identified related titles:

Energy and performance assessments

- **Energy audit and needs assessment**
 - Community-based educators/home assessment providers
 - House auditors
 - Multifamily building analysts
- **Computer modeling**
 - Engineers
 - Building analysis assistants
- **Quality assurance**
 - Auditors, building analysts, engineers as above)
- **Reporting and measuring program achievements**
 - (Auditors, building analysts, engineers as above)
 - Multifamily building maintenance staff
 - Program implementation staff

Contracting

- **Weatherization field work**
 - Site/crew managers
 - Air-sealing and insulation workers
 - General cross-skilled home-repair workers
 - Weatherization helpers
- **Electrical and plumbing upgrades**
 - Solar thermal cross-skilled crews
 - Plumbers and/or cross-skilled workers
 - Electricians and/or cross-skilled workers
- **HVAC retrofit and replacement**
 - HVAC technicians
 - Cross-skilled workers and helpers

- **Green roofs**
 - Project managers
 - Landscapers and horticulturists
 - Roofers/installers
- **Removal, recycling, and deconstruction**
 - Site coordinators
 - Drivers
 - General laborers
 - Sorters
- **Environmental safety and remediation**
 - Lead, mold, and asbestos remediators

Marketing and administration

- **Community education and outreach**
 - CBO-based program organizers
 - Outreach workers
- **Telemarketing**
 - Coordinators
 - Phone reps
- **Sales and customer response**
 - Coordinators
 - Program reps
- **Contract management and paperwork**
 - Contract managers
 - Program implementation staff

Appendix H. Job projections

Methodology

This appendix shows projected numbers of workers needed to perform Green Jobs/Green Homes NY retrofits in Year 1, assuming the program retrofits 1,000 units divided evenly across 35 target areas. Numbers were calculated jointly by existing home performance contractors and residential efficiency program implementers in conjunction with Green Jobs/Green Homes NY policy developers.

Contractors and program implementers estimated workers needed to manage, perform, and assure quality of audits and retrofits during the course of one year in a single target area of 1,000 units in one- to four-unit structures, or 37 medium-sized multifamily buildings.

Figure 1, “Workers Added,” translates the number of job-years in Green Jobs/Green Homes NY into the number of permanent jobs created under the program: Workers added in any given year of the program are assumed to continue working in subsequent years of the program.

Figure 2, “Job Years,” uses simple multiplication of Year 1 figures to project job numbers in subsequent years of Green Jobs/Green Homes NY based on the number of units targeted in each year of the program. The resulting total shows job years—one year’s employment for one worker—created by Green Jobs/Green Homes NY.

Job projections

Mark Dyen, Conservation Services Group
Rick Cherry, Community Environmental Center
Steve Cowell, Conservation Services Group
Emmaia Gelman, Center for Working Families
David Hepinstall, Association for Energy Affordability
Ron Kamen, EarthKind Energy
Rebecca Lurie, Consortium for Worker Education

Year 1 Staffing - 35,000 Units Over 35 Target Areas

| | Houses (21,125)* | Multifamily buildings (260)* |
|---|---------------------|---------------------------------|
| Marketing and administration | | |
| Community education and outreach (community-based organizations, youth etc.) | | |
| | | 14 |
| Highly trained | 17 | |
| Trained | 175 | |
| Apprentice/Intern | 350 | |
| Telemarketing <i>Most calls are incoming</i> | 5 | |
| Contract management and paperwork <i>Contract management job projections assume that contracts consist of bundles of 25 units, yielding 40 contracts per target area.</i> | | |
| Trained | 35 | 14 |
| Entry-level | 70 | 14 |
| Energy and performance assessments | | |
| Energy audit and needs assessment and quality control <i>Audits will use a two-person crew. One person will perform blower door testing while the other interviews the homeowner. Next, one person will walk through and perform testing throughout the house while the other performs air-sealing. Calculations: One crew of two people performs seven audits per week. 52,800 audits are required to produce 21,125 contracts. Each crew performs 330 audits per year (47 weeks.) 160 crews of 2 people, plus 80 apprentices employed on larger jobs, are needed to provide audits.</i> | | |
| Certified <i>One- to four-units: auditor, air-sealer</i> | 160 | 21 |
| Trained <i>Multifamily buildings: benchmarking/energy bill analysis, spreadsheet auditors</i> | 160 | 21 |
| Apprentice | 80 | 21 |
| Quality assurance (Program implementer <i>One to four-units: 30 percent of homes, two per day; Multifamily buildings: 100 percent of buildings</i>) | | |
| | 35 | 7 |
| Reporting and measuring program achievements <i>3 percent inspection rate of contract jobs; 1 percent of audit-only air-sealing; three to four inspections per day</i> | | |
| | 70 | |
| Statisticians/outcome analysts | 2 | |
| Contracting | | |
| Weatherization field work <i>This work includes air sealing, pipe-wrap, compact fluorescent light-bulb installation, installing more efficient showerheads, and immediate installation measures and low-cost items</i> | | |
| Certified | 106 | |
| Trained | | 14 |
| Apprentice | 35 | 28 |
| Electrical/lighting upgrades, occasional plumbing | | |
| Certified | 10 | 14 |
| Trained | | 14 |
| Apprentice | 10 | 14 |
| HVAC (heating system for multifamily buildings) retrofit and replacement (this includes other trades such as plumbing) <i>HVAC replacement will likely affect 33 percent of the units. Two people will perform one installation per day.</i> | | |
| Certified | 20 | 14 |
| Trained | 50 | 14 |
| Apprentice | | 28 |
| Heating controls and Energy Management Systems (multifamily buildings) | | |
| Certified | | 11 |
| Trained | | 11 |
| Apprentice | | 11 |

| | Houses (cont'd) | Multifamily buildings (cont'd) |
|---|--------------------|-----------------------------------|
| Green roofing | | |
| Certified | | 7 |
| Trained | | 14 |
| Apprentice | | 14 |
| Insulation (one- to four-unit homes) <i>Insulation work will be performed in 80 percent of the homes and use a three- to four-person crew for one day</i> | | |
| Certified | | |
| Trained | 64 | |
| Apprentice | 190 | |
| Roof insulation (multifamily buildings) | | |
| Highly trained | | 14 |
| Trained | | 14 |
| Apprentice | | 14 |
| Windows (multifamily buildings) | | |
| Highly trained | | 28 |
| Trained | | 28 |
| Apprentice | | 28 |
| Appliance installation and recycling, other removal <i>Appliance-related work will employ installers, warehouse workers, and truck drivers</i> | | |
| Highly trained | | 7 |
| Trained | | 14 |
| Apprentice | | 21 |
| Removal, recycling, and deconstruction | | |
| Trained | 35 | |
| Entry-level | 35 | |
| Construction/site management | | |
| Trained | 88 | 14 |
| Upkeep/maintenance of measures (postconstruction) | | |
| Certified | 35 | |
| Trained | 35 | 7 |
| Apprentice | 35 | 7 |
| Program management | | |
| Materials development, project tracking, contractor recruitment <i>(NYSERDA currently employs 40 people to complete 5,000 one- to four-family units a year, NYSERDA's Multifamily Performance Program maintains 22 program staff for 2,000 buildings in the program's pipeline)</i> | | |
| Certified | 10 | 4 |
| Trained | 100 | 4 |
| Entry-level | 50 | 4 |
| Training | | |
| Classroom instructors | 70 | 14 |
| Fieldwork coordinators | 35 | 14 |
| Social/support workers | 35 | |
| Employment developers | 35 | |
| Administrators | 35 | |
| Recruitment/outreach | 35 | |

* Assumption: 35 target areas of approximately 1,000 units each, including seven target areas that each include approximately 37 multifamily buildings.

Workers Added

| Year | All Years | | |
|-------------------|-----------|-------|--------|
| Year 1 | 2,312 | 556 | |
| Year 2 | 2,312 | 556 | |
| Year 3 | 2,973 | 715 | |
| Year 4 | 3,530 | 849 | |
| Year 5 | 353 | 85 | |
| Permanent workers | 11,480 | 2,761 | 14,240 |

Job Years Added

| Year | All Years | | |
|--------|-----------|--------|--------|
| Year 1 | 2,312 | 556 | |
| Year 2 | 4,624 | 1,112 | |
| Year 3 | 7,597 | 1,827 | |
| Year 4 | 11,127 | 2,676 | |
| Year 5 | 22,606 | 5,436 | |
| Total | 48,265 | 11,607 | 59,872 |

| | |
|-----------------------------|-----------------|
| Contracting costs: | \$5,508,000,000 |
| Administration/audit costs: | \$2,045,000,000 |
| Total costs: | \$7,553,000,000 |
| Jobs per \$million: | 8 |

Solar Thermal Heat/Hot Water:

Solar thermal installations are not included in the above calculations, but will generate substantial jobs. In Green Jobs/Green Homes NY solar thermal retrofits, installation may create additional jobs or may substitute for HVAC jobs. Solar thermal arrays typically consist of 2 collectors for a single unit, and require two workers for two days. Year 1 goals call for only 5% of units to receive solar thermal treatment, which would generate 70 jobs in that year. Overall program goals call for 15% penetration, which would generate a total of around 3000 jobs.

| | Units retrofitted | Increase over prior year | Number of multifamily buildings retrofitted |
|---------------------------------------|-------------------|--------------------------|---|
| Year 1 | 35,000 | 134.6% | 5,200 |
| Year 2 | 70,000 | 200.0% | 10,400 |
| Year 3 | 160,000 | 228.6% | 11,886 |
| Year 4 | 350,000 | 218.8% | 11,375 |
| Year 5 | 385,000 | 110.0% | 5,720 |
| | 1,000,000 | | 44,581 |
| Y1 total one- to four-unit structures | | | 21,125 |
| Y1 total multifamily structures | | | 260 |

Appendix I. AFL-CIO principles for good green jobs

Standards for green and good jobs

Monies from the American Recovery and Reinvestment Act will soon be moving out across the country. But there will be no recovery for the real economy of this country—the economy in which families work and live—unless those monies are spent in ways that keep these families’ needs firmly in mind and create a foundation for their future.

That means that standards need to be attached to all programs at all levels deriving from these ARRA monies. The AFL-CIO Working for America Institute and its Center for Green Jobs call on “conveyors” of ARRA funds to establish partnerships that include labor, community groups, environmentalists, and other stakeholders to amplify the application of the following standards for release of these monies:

- Jobs created by the act should be good, enduring, family-sustaining jobs.
- Employer recipients of these monies should be good public citizens with a proven commitment to being good stewards of public dollars.
- Training and education programs that claim to help workers and future workers qualify for these jobs should be quality ones that 1) offer workers credentials that have truly portable and stackable currency in the rapidly changing job market; 2) have a record of achieving quality job placements; and 3) prepare current and future workers with the education and skills to continuously improve energy and environmental practices.
- Jobs and training programs supported by the act should provide affirmative outreach to communities of color and to other disadvantaged job seekers.
- The multiplier effect of the act’s investments should accrue to businesses that employ people right here in the United States.
- Funds from the act, to the extent possible, should lower overall greenhouse gas emissions and create positive environmental returns.

We have, below, specific recommendations for each of the above standards. It is not intended to be an exhaustive list. People of goodwill who intend to use the ARRA to help create both economically and environmentally sustainable jobs in this country will have other recommendations for turning these standards into requirements for the outlay of these funds.

Some examples of applications of these proposed standards

Jobs created by the act should be good, family-sustaining jobs.

- Neutrality in any union organizing campaign.
- Comprehensive Davis-Bacon Act prevailing wage coverage applied to all facets of federal construction assistance.
- Family-sustaining wage levels, health care, and retirement security benefit requirements for all jobs.
- Use of "Community Workforce Agreements" that are legally enforceable agreements between all stakeholders in public development projects including contractors, labor unions, and community group.

Employer recipients of these monies should be good public citizens with a proven commitment to being good stewards of public dollars.

- A record of compliance with federal laws including prevailing wage laws, OSHA, MSHA, antidiscrimination/harassment and environmental protection laws.
- Compliance extended to subcontractors.

Training and education programs that claim to help workers qualify for these jobs should be quality ones that 1) offer workers credentials that have truly portable and stackable currency in the rapidly changing job market; 2) have a record of achieving quality job placements; and 3) provide the skills to enable workers to continuously improve energy and environmental practices.

- Pre-apprenticeship programs in construction with true promise of placement in construction careers rather than temporary jobs.
- Bona fide Joint Apprenticeship and Training Committee, or JATC apprenticeship programs in construction and apprenticeship utilization standards.
- Joint labor-management training partnerships in other industries.
- High-road career and technical education in K-12 systems and greater investment in vocational schools and community colleges that collaborate with trade union training programs.

Jobs and training programs supported by the act should provide affirmative outreach to communities of color and to other disadvantaged job seekers.

- Support new and existing quality programs to prepare disadvantaged job seekers to participate in bona fide JATC apprenticeship programs.
- Support programs to recruit and place job-seekers from disadvantaged communities into appropriate training programs.
- Support programs that better connect disadvantaged job seekers to quality job openings as they become available.

The multiplier effect of the act's investments should accrue to businesses that employ people right here in the United States.

- Manufactured goods and materials purchased should be made in America.
- Products must have a domestic content of 85 percent to qualify as U.S. made.
- Transparency about waivers and exceptions to any of these standards.
- Ban project segmentation that keeps projects under thresholds that will trigger these standards.

Funds from the act, to the extent possible, should lower overall greenhouse gas emissions and create positive environmental returns.

- Take into consideration the full carbon footprint of transport.
- Take into consideration the air pollution contributions of production of goods and materials.
- Where applicable the projects should lower our dependence on foreign oil and create demand for domestically developed and generated energy and manufactured products.
- Lower and/or eliminate impacts on local water systems.
- To the extent necessary, users of funds should anticipate and invest in infrastructure projects that mitigate the impacts of climate change.

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Appendix J. New York statewide economic impact assessment

Assessing the economic impacts of the New York Green Jobs/ Green Homes Residential Retrofit Program

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American Council for an Energy-Efficient Economy Washington, D.C.
A final report to the Center for Working Families, New York, N.Y. February 14, 2009

Introduction

The Center for Working Families and others have developed a Green Jobs/Green Homes action plan to significantly but cost-effectively improve the energy efficiency of 1,000,000 residential dwellings in New York State. The intent is to complete this work over the five-year period 2010 through 2014. As it is now envisioned, each of the 1 million households under this plan would invest in a variety of energy-efficiency measures or home improvements. These investments are estimated to average about \$5,500 per residence and would reduce home energy costs by an average of 35 percent. Given current data on typical home bills for natural gas, electric, and/or fuel oil bills in New York State, this would yield a savings of about \$1,100 per home, a portion of which would appear as direct savings on utility bills.²⁰

The savings anticipated by this program would come in two ways. The first is improvements in the building itself, such as more insulation in floors, walls, and ceilings, better doors and windows, and higher-efficiency heating and cooling systems. The second is more energy-efficient appliances, ranging from refrigerators and clothes washers to improved lighting and smaller consumer appliances. The anticipated energy bill savings are sufficiently strong so that if the households were to borrow the money at 6 percent interest to pay for the efficiency upgrades over a 10-year period, the net savings are likely to be on the order of \$350 per year.²¹ After the repayment of the 10-year loan, however, the net savings would return to the full \$1,100 annually (depending on the change of energy prices over that period of time).

While the long-term result for the individual households appears to be quite positive, the specific question addressed in this analysis is whether the Green Jobs/Green Homes eco-

conomic stimulus package might positively impact the creation of new jobs within the state of New York. In other words, is the net energy bill savings sufficiently large to strengthen the state's overall economy?

The good news here is that there are two early clues as to how the proposal might potentially impact New York State. The first clue is whether the changed patterns of energy consumption are cost-effective over time. That is, if we can reasonably conclude that the financial benefits outweigh the costs over the time horizon of this study, then we might expect to see a modest net positive impact within the state in spite of other factors currently exerting downward pressure on the state's economy. The second clue is whether the labor and value-added intensities associated with the changed spending patterns are greater or smaller than the same intensities as in the "business as usual" world. For example, if a dollar's worth of spending contributes to a slightly greater level of employment in the Green Jobs/Green Homes proposal compared to the business-as-usual case, then we might expect to see a small net increase in jobs within the state's economy. Similarly, if the changed spending and investment patterns produces a slightly larger boost to the state's value-added benefits (as measured by the gross state product or GSP), then we might expect to see a positive impact there as well.

As we will see in the brief discussion that follows, it turns out that the coalition proposal will likely support a modest net positive impact on both jobs and the overall economic activity within the state. In the balance of this report we present the major economic assumptions as they shape the changed investment patterns. We then discuss how those changed investments, together with the changed annual spending on program costs and energy bills, might generate the net positive economic benefits to which we allude.

The methodological approach

The macroeconomic assessment that we review in this report is based on a three-step sequential process. First, we draw on available information to construct reasonable estimates of the investments and program expenditures that would be needed to upgrade the 1,000,000 homes envisioned by this proposal. Second, we then design a set of financial flows that follow the changed investment and spending patterns. Here, for example, we are looking to explore how the borrowing of money might impact the overall cost to households. Finally, we map the investments, financial impacts, and the changed set of energy expenditures into an input-output modeling framework based on the set of economic accounts for New York State. With this information in hand, we then undertake a set of calibration or diagnostic reviews to check both the logic and the internal consistency of the analytical results.

Table 1 summarizes critical changes in revenue flows for the key program years. It also shows the average annual impact over the period 2010 through 2030. All the values shown

in the table are expressed in constant 2006 dollars (which is the baseyear of the economic model we used to evaluate the larger macroeconomic impacts of the Green Jobs/Green Homes stimulus package described elsewhere in this report). Calculations are based on the five-year graduated ramp-up strategy defined in the Green Jobs/Green Homes NY program proposal.

Spending to drive energy bill savings (in millions of 2006 dollars)

Energy savings substantially increase after first year.

| | 2010 | 2012 | 2014 | 2020 | 2030 | Annual avg. |
|---------------------|-------|-------|---------|---------|----------|-------------|
| Total program costs | \$90 | \$424 | \$650 | \$0 | \$0 | \$105 |
| Total investments | \$193 | \$881 | \$2,121 | \$1,069 | \$1,696 | \$1,197 |
| Annual loan payment | \$26 | \$198 | \$748 | \$1,501 | \$1,889 | \$1,188 |
| Energy bill savings | \$19 | \$203 | \$885 | \$2,129 | \$4,831 | \$2,220 |
| Net annual cost | \$97 | \$420 | \$514 | \$-628 | \$-2,943 | \$-928 |

As we can see in the table, the program costs (including administration, audits, and some low-cost contracting measures) necessary to drive the immediate efficiency upgrades in the million homes start slowly at \$90 million in 2010 and rise to \$650 million by 2014. These efforts drive productive investments to make the desired improvements to 1 million homes in the stimulus years 2010 through 2014. The assumed hard contracting investments in 2010 are \$193 million increasing to just over \$2.1 billion by 2014, which is the last year of the Green Job/Green Homes program projection.

Note, however, that we also suggest ongoing residential efficiency upgrades in the years that follow the stimulus package. There are several reasons for this. First, with a newly trained workforce and new businesses created under the stimulus package, it is likely that the market will continue to evolve and new work will be contracted with this momentum established. Second, ongoing concerns about energy prices and especially growing concerns about climate change are likely to further maintain this momentum. For this analysis we assume that in 2015, the first year following the Green Jobs/Green Homes program effort, the market will tighten to 40 percent of the investment activity in 2014. And absent another specific stimulus (whether a jump in energy prices or new policies to address global climate change), the investments will rebound to only 80 percent of the 2014 program impacts by 2030 (the last year of our analysis).

Our working financial assumption is that most households will borrow the money needed for the efficiency improvements over a 10-year period at a 6 percent interest rate. Hence, the actual payments made by households on an annual basis start at \$26 million in 2010, rise to an estimated \$748 million by 2014, and average between \$1.5 billion and \$1.9 billion over the period 2015 to 2030. The energy bill savings meanwhile are projected to start small at \$12 million in 2010 and peak in 2030 at just over \$3 billion. From an economy-

wide perspective there are net costs of \$97 million in 2010 that grow to a significant net savings (shown in Table 1 as a negative cost) of just over \$2.9 billion.

We can generate a more “time-independent” impact by examining the average program costs and benefits over the years 2010 through 2030. With that perspective in mind, the average annual program expenditure is just about \$105 million, which drives an annual Green Jobs/Green Homes upgrade investment of nearly \$1.2 billion per year. The actual payments for the money borrowed also are on the order of \$1.2 billion. However, the energy bill savings are estimated to be close to \$2.2 billion while the net economy-wide impact is an average annual savings of just over \$900 million.

In short, it appears that the Green Jobs/Green Homes stimulus package is generally shown to be cost-effective. The question to be asked from this point, then, is how that magnitude of program spending and resulting set of efficiency investments might compare in terms of the larger financial impacts on the economy?

Exploring the macroeconomic impacts

To this point we have the prospect of small but net savings for New York households. But the question still remains: What are the larger impacts on the state’s economy? We’ve already hinted that we might expect to find a net positive benefit from an alternative investment strategy because the new pattern of spending tends to support economic sectors that have a greater level of employment per dollar of revenue as well as a higher return on value added as those expenditures might support an expanded GSP. Table 2 is evidence of why this outcome is more than likely.

Key job sector impact coefficients.

“Jobs” are total number of jobs supported for a given sector for every \$1 million in revenue received by that sector and “value added” is the contribution to gross state product per \$1 of revenue received by that sector.

| | Jobs | Value added |
|---------------------------|------|-------------|
| Construction | 13.6 | 1.06 |
| Electricity | 3.6 | 1.00 |
| Natural gas and petroleum | 5.3 | 0.81 |
| Finance | 8.3 | 1.19 |
| Government programs | 15.4 | 1.37 |
| All other sectors | 12.6 | 1.09 |

Note: Jobs are total (direct and indirect) jobs supported in a given sector for every \$1 million of revenue received by that sector. Value added is the contribution to gross state product per \$1 of revenue received by that sector. All values are specifically for New York State. They are based on the actual 2006 economic accounts provided by the Minnesota Implan Group (see <http://www.implan.com>).

In Table 2 above, we show two sets of economic impact coefficients. The first is the total number of jobs directly and indirectly supported by the economy as a whole, and within it six different major economic sectors within New York State. For example, revenues received by the different energy sectors support only 3.6 to 5.3 jobs per million of spending. For the economy as a whole, \$1 million in spending supports 12.6 jobs. The second is the rate of value-added contribution that is supported by spending for each of the major sectors. Here the data show each dollar spent on energy contributes from about 81 cents to \$1 of value-added benefit while the economy-wide average contributes at the rate of \$1.09 for each dollar spent on other sectors within the state.

With the information highlighted in these first two tables, we can evaluate how the changed investment and spending patterns might impact New York as a whole. These net results are summarized in Table 3.

Net economic impacts in New York State.

Employment projections and contribution to gross state product.

| | 2010 | 2012 | 2014 | 2020 | 2030 | Annual avg. |
|----------------------------------|-------|--------|--------|--------|--------|-------------|
| Employment (actual) | 2,600 | 11,620 | 26,430 | 16,370 | 35,960 | 20,479 |
| Gross state product (million \$) | 210 | 950 | 2,050 | 1,130 | 2,950 | 1,570 |

As it turns out, the logic of economic theory is confirmed by the results shown above. Net employment impacts during all years of the analysis, although small (on the order of 0.1 percent of current employment levels within the state), is significant—averaging a net gain of just over 20,000 net jobs over the 2010-2030 time horizon. A similar story is suggested for contributions to New York’s gross state product, again on the order of 0.1 percent of current economic activity but showing an average annual net benefit of nearly \$1.6 billion. These net gains should be understood in the context that absent a stimulus such as Green Jobs/Green Homes NY, the state is poised to experience net losses in both employment and GSP.²²The coalition proposal both replaces lost productivity and adds new productivity.

One further note on the macroeconomic impacts reported here. Because the energy-efficiency investments generate a robust level of savings, the net gain in jobs and economic activity are relatively insensitive to higher-interest rates that might be paid for consumer loans. For example, if the interest rates on a 10-year loan increased from 6 percent annually as assumed here to as much as 10 percent, the consumer would continue to save on the order of \$200 per year even after making the annual loan payments. Similarly, if the energy bill savings were even \$200 less than anticipated here—whether the lesser savings were due to lower-starting utility bills or to smaller energy impact of retrofits—the net gain in jobs and economic activity still would be significantly positive.

Appendices endnotes

- 1 The “fuel neutrality” of audits is essential to the integrity of Green Jobs/Green Homes NY retrofits, meaning that auditors must identify all appropriate savings in all fuels. The program must ensure that utilities or other energy marketers do not use the programs’ various mechanisms to expand their sales of their energy product. Auditors or energy marketers found to be engaged in such prohibited practices must be disqualified from further Green Jobs/Green Homes NY work.
- 2 Assessment of housing code violations is outside the purview of energy-efficiency auditors and contractors. To the extent that health and safety issues and fuel set-up touch on many of the same issues as housing code, Green Jobs/Green Homes NY will require that they be resolved. Similarly, home assessments must not be used by landlords to gather information about tenants; this protection is detailed in the Consumer Protections section.
- 3 These in-audit measures should provide utilities with credit toward their energy-efficiency targets under NYS EEPS guidelines.
- 4 NYSERDA is moving toward allowing several software packages that meet common standards, so this program will not be tied to a particular software package.
- 5 Auditors use the payback period to determine which measures are eligible for the program, but the actual amount paid back by customers will be lower than their expected savings. Therefore, retrofits that will be paid back within 10 years must actually have a shorter payback period of about eight years. The actual payback period allowed by the program will depend on the terms under which lenders will invest in the Residential Retrofit Fund. These considerations are discussed in detail in “How Do We Pay For It?”
- 6 One of the major problems that must be addressed throughout the energy-efficiency industry is the inaccessibility of energy-use data by auditors. The state should mandate the creation of a centralized information-sharing system that would provide auditors with energy-billing information for individual buildings.
- 7 The relevant costs and energy-savings associated with efficiency work on multifamily buildings can be determined using the aggregated experience of auditors working throughout the state. Analysis by Community Environmental Center suggests that for buildings with more than 30 units, a per-unit cost of approximately \$3,500 is an appropriate predictor of the costs associated with implementing energy-efficiency measures (the costs referenced do not include the costs of building assessment). With this level of fund-commitment, CEC predicts that average annual paybacks will approach 11 percent of total installation costs, corresponding to less than a 10-year payback of efficiency measures. For multifamily buildings with less than 30 units the per-unit costs have been significantly higher, averaging more than \$5,500. However, a \$4,000-per-unit cap still would allow measures providing at least 11 percent annual returns on the initial investment. (The research sample used to determine these results consisted of audits performed as part of NYSERDA’s Assisted Multifamily Program. The sample size for all-unit buildings consisted of 50 randomly selected audits from throughout the state. For buildings with less than 30 units, only 18 relevant audits were located and included.)
- 8 Some such retrofits might benefit both landlords and tenants. For instance, where an owner pays electric bills but a tenant pays water bills, replacing the tenant’s water-using appliances would qualify as a “tenant-benefiting retrofit,” while also reducing the landlord’s utility bills.
- 9 Discussion of payback levels and “cushions” is presented in “Expected Returns.” Cost of capital and servicing fees are presented in “How Do We Pay For It?”
- 10 The program implementer should have some flexibility in determining retainage levels, to allow the program to cultivate and work with smaller contractors for whom cash flow delays are a serious impediment to business.
- 11 This loss will be accounted for in the “non-performance default” calculations of the financing model.
- 12 These project costs are derived from data on existing programs, the expected array of includable measures, and initial investigation into wages paid by contractors. Wages vary widely among firms, indicating that current standard contracting costs can sometimes support better wages than are actually paid. However, Green Jobs/Green Homes NY should expand firms’ capacity to pay good wages by increasing standard contracting costs. Assuming a 15 percent increase in the portion of contracting cost dedicated to wages, and assuming that about half of current contracting costs pay for labor, we added 7.5 percent to project cost estimates.
- 13 Oil and propane heat customers, although not eligible for utility TIP retrofits, may be able to participate in the program under an agreement to be worked out with oil retailers.
- 14 U.S. Census Bureau, 2005-2007 American Community Survey.
- 15 In order to parallel the TIP lending structure, the oil industry body would have to be backed by some form of guarantee fund, and the retrofit fund itself might need to be partitioned into an oil-supporting fund and an electric/gas-supporting fund. These logistics are important, but are not insurmountable barriers.
- 16 Solar thermal systems consist of panel-like arrays of bars filled with liquid that collects solar heat, and transfers that heat into a home’s hot water supply.
- 17 US Dept. of Energy residential Energy Consumption Survey Data, 2001.
- 18 The Twelve Principles of Green Chemistry, which guide the use of chemicals and processes to minimize environmental impact, were published by Paul Anastas and John Warner in *Green Chemistry: Theory and Practice* (Oxford University Press: New York, 1998). More information on the principles and green chemistry is available at <http://www.epa.gov/greenchemistry/pubs/principles.html>.
- 19 Working Group VII—Workforce Development and Training Report to the Public Service Commission, Case 07-M-0548, October 17, 2008.
- 20 Editor’s note: Average home energy bill assumptions assume 10 percent of homes are heated with oil, with the balance using a combination of electricity and natural gas. For the 2008-2009 heating season, the data suggest that pay \$3,800 to \$4,800 in home energy bills, based on 2/09 EIA data for oil heat, and NYS DPS data on non-heat gas and electric costs. Gas-heated homes appear to pay \$2,500 to \$3,500 in home energy bills, also based on 2/09 EIA data for gas heat, and NYS DPS data on non-heat gas and electric costs. See EIA: <http://www.eia.doe.gov/emeu/steo/pub/wf-table.pdf> and NYS DPS: http://www.dps.state.ny.us/typical_bills/util_elec_res_bills_Jan_2008.pdf. Note that a savings of \$1,100 on total home energy bills, through a \$5,500 investment, reflects 2008-2009 utility and oil cost data, and factors into “typical” home energy expenditure the annual expenditures of the one-third of New York households heated by oil fuel (source for prevalence of oil-heated units in NYS: U.S. Census Bureau, 2005-2007 American Community Survey). Calculating payback from utility bill savings alone yields a longer cost recovery period, which Green Jobs/Green Homes NY allows at eight to 10 years. Homes powered solely by utility fuels show lower typical bills and likely will show smaller (but still self-financing) total savings. Similarly, as utility prices vary, savings and payback periods will shift. Lower utility bills effectively shrink the range of costs-of-funds within which the program is effective. (For details, see Appendix F: Residential Retrofit Investment Fund sensitivity analysis). Regardless of how the program operates, as long as productive investments are used to upgrade the overall energy efficiency of households within the state of New York, the net jobs and macroeconomic benefits described later in this appendix are likely to continue.
- 21 Editor’s note: Financial model sensitivity analysis (Appendix F above) indicates that the effectiveness of savings is not particularly sensitive to the cost of capital—that even at 5 percent or 7 percent, net savings are relatively stable.
- 22 NYS Department of Budget, “New York State Economic Forecast, Final Midyear Update for 2008-2009.” (2009).

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