October 17, 2008

Jaclyn Brilling, Secretary
New York State Public Service Commission
3 Empire State Plaza
Albany, NY 12223

RE: Case 07-M-0548 Energy Efficiency Portfolio Standard
Dear Secretary Brilling:

Attached please find the original and five copies of the final report of Working Group VII, Workforce Development and Training as part of the Energy Efficiency Portfolio Standard, Case 07-M-0548.

In addition, this report will be filed electronically with the EEPS list serv.

Sincerely,

Carlene Pacholczak, DPS, Co-Convenor
Adele Ferranti, NYSERDA, Co-Convenor
Anthony Joseph, NYSDOL, Co-Convenor

cc: EEPS list serv

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 (EEPS)

Submitted
10-17-2008

CONTENTS

RECOMMENDATIONS

The following presents the six recommendations of Working Group VII – Workforce Development and Training, established under Case 07-M-0548 -- Proceeding on the Motion of the Commission Regarding an Energy Efficiency Portfolio Standard (EEPS). The support/oppose voting of the active Working Group participants for each recommendation is listed with the recommendation.

1. Approve and fund the New York State Energy Research & Development Authority (NYSERDA) 90-day proposal submitted under the EEPS and ensure that systems to track the metrics (e.g., number of people trained, practitioners certified, number of trainees hired, etc.) and the results of the EEPS funded activities are developed and implemented.

   The proposal identifies the actions necessary to immediately and significantly ramp-up and expand the technical training, and where appropriate the certifications, necessary to successfully meet the "15 x 15" goal of the EEPS. The proposal would also increase the availability of curriculum and programs for energy efficiency coursework at technical schools, training organizations, and two- and four-year educational institutions in New York State. The NYSERDA proposal targets employed and emerging workers and requests approximately $16.3 million over three years (approximately $5.4 million per year for three years) for program costs, not including administration and evaluation costs. The proposal also includes approximately $11.0 million in leveraged resources by the New York State Department of Labor.

   Support – ACENY; AEA; Alfred State College; Central Hudson; Con Ed; CSG; CUNY; CWF; Earth Kind Energy; National Grid; NYC EDC; NYECC; NYSEG/RGE; NYSERDA; NYSDOL; Siemens; WDINY.

2. Develop and provide energy efficiency skills training to low income populations (e.g., basic skills training, technical training, career ladders and on-the-job training) with total funding of $6.0 million ($2.0 million per year for three years). This funding is in **addition to** NYSERDA's 90-day proposal, and should be contingent upon developing proper metrics to track initiatives, outcomes and success.

   This recommendation recognizes that the demand for labor to successfully implement the EEPS will require sourcing and developing pre-certification skills of low income populations, and aligns with Governor Paterson's "pathway out of poverty" priority under his Renewable Energy Task Force and his Environmental Justice Interagency Task Force.

   Support – ACENY; AEA; Alfred State College; Central Hudson; Con Ed; CSG; CUNY; CWF; Earth Kind Energy; National Grid; NYECC; NYSEG/RGE; NYSERDA; NYSDOL; Siemens; WDINY.

   Abstain – NYCEDC.

3. Workforce development and training under the EEPS should be addressed through a statewide strategy (similar to program marketing, outreach and education) in order to: 1) ensure that training facilities are available across the State; 2) capitalize on economies of scale; 3) leverage resources across state agencies and training organizations; 4) coordinate and guide the activities of distributed training providers, where appropriate; 5) better leverage federal funding; and 6) avoid duplication/redundancy. In addition, a statewide strategy will allow flexibility to concentrate on certain regions of the State, target certain skill sets, address market conditions, and address EEPS program needs.

   It is important to note that this is not a recommendation to centralize training efforts, but rather to implement a statewide strategy to facilitate training in the same manner across the State.

   Support – ACENY; AEA; Alfred State College; Central Hudson; Con Ed; CSG; CUNY; CWF; Earth Kind Energy; National Grid; NYCEDC; NYECC; NYSEG/RGE; NYSERDA; NYSDOL; Siemens; WDINY.

4. An assessment of the contribution of workforce development and training activities to energy savings should be included in program evaluation, measurement and verification, where appropriate, for all programs funded by the EEPS.

   a. The evaluations should assess the impacts of workforce development and training on energy performance and operation, over the life of the systems and measures funded through the EEPS.

      Support – ACENY; AEA; Alfred State College; Central Hudson; CSG; CUNY; CWF; Earth Kind Energy; National Grid; NYCEDC; NYECC; NYSERDA; NYSDOL; Siemens; WDINY.

      Oppose – NYSEG/RGE.

   b. The evaluations should assess the degree to which the "low bid" process may cause the use of unskilled workers, and result in inferior work quality.

      The low bid process causes contractors (including good contractors) to undercut expenses to regain lost revenue and protect profit. The concern is that some contractors undercut expenses by hiring "disposable" unqualified labor at lower wages than qualified workers. Such hiring practices undermine performance of the work, as well as efforts to create a skilled workforce.

      Support – ACENY; AEA; Alfred State College; Central Hudson; CSG; CWF; National Grid; NYECC; NYSERDA; NYSDOL; Siemens.

      Oppose – Con Ed; NYSEG/RGE.

      Abstain – CUNY; NYCEDC; WDINY.

5. Contractors, system designers, and building operators should be able to demonstrate that they have the technical knowledge and skills to properly design and install systems and measures to manufacturer specifications and industry "best practices" to maximize performance. Similarly, end users should be able to demonstrate that they have the knowledge and skills to operate and maintain systems to maximize operating life. Training, and where applicable certification, should be an integral part of program design and implementation.

   Support – ACENY; AEA; Alfred State College; Con Ed; CSG; CUNY; CWF; Earth Kind Energy; National Grid; NYC EDC; NYECC; NYSDOL; NYSERDA; NYSDOL; Siemens; WDINY.

   Oppose – Central Hudson; NYSEG/RGE.

6. New York State's Job Exchange (NYSJE) should be enhanced to facilitate representation, posting and classification of the jobs necessary to support the EEPS throughout the State.

   NYSJE serves as the States' public labor exchange website. Job seekers/employers can use the site to find/post job openings by category and location. The website is also utilized by the Workforce New York One-Stop System to assist with job matching services. (http://www.americasjobexchange.com/ny#)

   Support – ACENY; AEA; Alfred State College; Central Hudson; Con Ed; CSG; CWF; Earth Kind Energy; National Grid; NYCEDC; NYECC; NYSEG/RGE; NYSERDA; NYSDOL; Siemens; WDINY.

   Abstain – CUNY.

EXECUTIVE SUMMARY

Workforce development and training is a critical path issue because a skilled workforce is the foundation upon which all Energy Efficiency Portfolio Standard (EEPS) programs will be built. Based on related research and participant experience, Working Group VII – Workforce Development and Training concluded that the loss in energy performance of efficiency measures due to an unskilled workforce poses a significant risk to the State's ability to achieve EEPS goals. Studies suggest that the lost savings opportunity could amount to approximately 20%.

Therefore, Working Group VII has developed the proposed EEPS workforce development and training strategy presented in this report to address the issue. The strategy is comprised of eight key elements (list below), and six recommendations to support implementation of the elements.

- Comprehensive Training Initiatives
- Promoting National Certifications and Standards
- Career Pathways
- Engaging Disadvantaged Communities
- Internships and Apprenticeships
- Professional Development and Continuing Education
- Marketing
- Evaluation, Measurement and Verification

The Working Group recommends $22.3 million in EEPS funding over the three-year period 2009-2011 to support implementation of the proposed EEPS workforce development and training strategy (about 2.2% of overall EEPS funding for the period). The funding is comprised of:

- $16.3 million to implement the New York State Energy Research and Development Authority (NYSERDA) workforce development and training proposal submitted in their 90-day filing under this proceeding.[i] The NYSERDA proposal was prepared to align with and support the Working Group's proposal.
- $6.0 million recommended by the Working Group to partner/leverage workforce development and training activities of State Agencies and community based organizations to strengthen the State's ability to draw upon the State's potential labor supply in economically and environmentally disadvantaged communities. This additional funding recognizes Governor Paterson's priority to create opportunity for individuals in economically and environmentally disadvantaged communities to work in jobs that pay family sustaining wages – articulated in the Governor's Renewable Energy Task Force and the Governor's Environmental Justice Interagency Task Force.

An additional $11.0 million in New York State Department of Labor resources would be leveraged against the $22.3 million in EEPS funding over the three-year period 2009-2011. Thus, the financial resources for the Working Group's EEPS workforce development and training strategy are approximately $33.3 million.

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[i] The amount shown does not include the budget for administration, and Measurement, Verification and Evaluation (MV&E), included in NYSERDA's 90 day filing. The total budget including these is $20 million.

BACKGROUND

Energy Efficiency Portfolio Standard Order

On June 23, 2008 the New York State Public Service Commission (Commission) issued an order establishing the Energy Efficiency Portfolio Standard (EEPS). The EEPS Order adopted the goal of reducing electricity usage by 15% of forecasted levels statewide by 2015. The Order also established interim targets for natural gas usage through 2011. To accomplish this goal, the Commission authorized the electric and natural gas utilities and the New York State Energy and Research Development Authority (NYSERDA) to submit proposals for energy efficiency programs to meet this goal.

The first phase of program proposals or "fast track" programs includes the following: Expansion of the Compact Fluorescent Lighting Program; Expansion of Low-Income Empower Program; Residential New Construction Program; Commercial Flex Tech and Flex Tech Industrial Process Programs; Energy Star HVAC; Small Commercial Direct Installation Program and Residential High Efficiency Gas Equipment Program. The second phase will be an additional set of efficiency programs to be determined by the Commission based on proposals submitted under the "90 Day filings" by NYSERDA and the utilities, pursuant to the June 23, 2008 Order.

Workforce Development and Training Working Gronp

The Commission identified workforce development and training as one of the goals of the EEPS, stating "working toward and ultimately attaining this aggressive goal will ... create clean energy jobs for New Yorkers.[1]" It became apparent that the workforce demands required by the energy efficiency programs to be implemented in the near term would not be able to be fulfilled by the current workforce. Workforce development and training, once a long-term issue for the Commission to examine, became an immediate matter to be addressed.

On July 3, 2008, Administrative Law Judges Eleanor Stein and Rudy Stegemoeller issued a Procedural Ruling Concerning EEPS Design Issues. In the Ruling, the Judges noted that many issues remain -- some of which are directly related to the implementation of the EEPS Order and some other policy issues that do not require expedited resolution. The Judges defined several items as critical path issues, and established working groups to discuss and provide recommendations to the Commission on these remaining issues. Workforce development and training was identified as a critical path issue because "a trained workforce is essential to ensure New York has the capacity to implement and sustain the state's energy efficiency initiatives."[2]

Working Group VII – Workforce Development and Training was charged with examining rapid development and expansion of the energy efficiency workforce including apprenticeship programs, higher education curricula, and related measures. The Judges asked the group to look at existing NYSERDA programs and other state efforts in this field and provide recommendations for programs to the Commission by October 17, 2008.

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[1] Case 07-M-0548, Order Establishing Energy Efficiency Portfolio Standard and Approving Programs, issued June 23, 2008, page 2.

[2] Case 07-M-0548, Procedural Ruling Concerning EEPS Design Issues, issued July 3, 2008, page 4.

Work Plan of the Working Group

In developing the Workforce Development and Training work plan; the Working Group gave special attention to addressing the following topics.

- Barriers / bottlenecks that prevent the market from producing the requisite workforce development activities necessary to achieve the goals of the EEPS.
- Justification for why public funds, specifically EEPS funds, should be used to mitigate market barriers.
- Evaluation, measurement and verification of the benefits of public investment in workforce development to support the EEPS.

The Working Group met weekly, primarily via conference call, and held two in-person meetings with video conferencing from New York City. The Working Group also convened two topic-specific meetings to address: budget justification; and the need for an emerging worker labor supply (i.e., workers from economically and environmentally disadvantaged communities). ***Appendix A*** provides a listing of the Working Group VII Participants.

The Working Group set an aggressive work plan to meet the charge set by the Judges. Elements of the work plan include:

- Survey and review the existing energy efficiency training programs, focusing on initiatives of NYSERDA and other state efforts;
- Identify proven best practices and assess expansion needs to meet the "fast track" programs approved by the Commission;
- Conduct a labor market assessment to identify the labor supply and labor demand necessary to deploy the EEPS programs;
- Address how workforce development programs should be funded and determine an appropriate level of funding needed to meet the Commission's goals; and
- Identify a set of recommendations to be submitted to the Judges by October 17, 2008.

As part of this effort, the Working Group researched other sources of workforce development and training funding to leverage EEPS funding (e.g., state and federal workforce development programs). The Working Group also reviewed and commented on a "straw" workforce development and training proposal drafted by NYSERDA. This proposal was the basis for the NYSERDA 90-day filing, and many of the comments of the Working Group were included in the filing.

FUNDING REQUEST / BUDGET

The Working Group recommends $22.3 million in EEPS funding over the three-year period 2009-2011, to implement the proposed EEPS workforce development and training strategy (about 2.2% of overall EEPS funding for the period), as follows.

- $16.3 million over three years to implement the NYSERDA workforce development proposal submitted in their 90-day filing under this proceeding. ***Appendix B*** provides a copy of the Workforce Development section of the NYSERDA filing.

NYSERDA's 90-day filing requests $16,255,050 for the 2009-2011 period (approximately $5.4 million per year) and proposes the implementation of key workforce development and training activities addressed by the Working Group for the State's existing and emerging workforce.

- $6.0 million to partner/leverage workforce development and training activities of State Agencies and community based organizations to strengthen the State's ability to draw upon the State's potential labor supply in economically and environmentally disadvantaged communities. This additional funding recognizes that:
    - A priority of Governor Paterson is to create opportunity for individuals in economically and environmentally disadvantaged communities to work in jobs that pay family sustaining wages. This priority is articulated in the Governor's Renewable Energy Task Force and the Governor's Environmental Justice Interagency Task Force.
    - This funding would significantly expand NYSERDA's effort to address basic skills training in their 90-day proposal. The Working Group determined that the funding request for workforce development in the NYSERDA 90-day filing needed to be supplemented to adequately address this element.

Furthermore, the Working Group's strategy leverages an additional $11.0 million in New York State Department of Labor (NYSDOL) resources to help achieve the objectives of the EEPS. These resources will be used to help identify, screen, train, recruit and place trained workers in jobs, as well as to develop and support career pathways to strengthen the State's ability to draw upon the potential labor supply (workers) in the State's economically and environmentally disadvantaged communities.

Therefore, the Working Group's proposed workforce development and training strategy represents a financial package of about $33.3 million over the three-year period 2009-2011.

Justification

Justification for the proposed budget is based on an assessment of the following two factors, each of which is discussed in greater detail.

- Impact of Workforce Development Investment on Productivity.
- Barriers / Bottlenecks to a Skilled Workforce.

Impact of Workforce Development Investment on Productivity

Workforce development and training is primarily intended to improve productivity (quality of production output) by improving the knowledge, skills and abilities of the workforce. Thus, investments in workforce development are easily justified, when the cost of inferior work quality attributable to an unskilled workforce is greater than the workforce development investment needed to remediate the associated skills gap.

The positive effect of workforce development and training on labor productivity in the United States (and elsewhere) has been conclusively documented in the literature. Historically, productivity growth in firms, industries, and the general economy occurred as a result of technical change embodying both technology and skilled labor. Therefore, overall workforce development investments to address skill shortages in the energy efficiency labor market will

significantly contribute toward achieving the goals of the EEPS and minimize the inefficient use of public resources .

The cost effectiveness of the recommended budget is clearly illustrated by the American Council for an Energy Efficiency Economy (ACEEE) study (Neme, Proctor and Nadel, 1999) which assessed the impact of workforce development on the proper installation of air conditioning and heat pump equipment. The study found that training increased equipment performance by approximately 24% in existing homes and up to 35% in new construction. Several other studies report similar impacts of training on performance.

Such findings suggest that an unskilled workforce poses a significant potential risk of compromising the State's ability to achieve EEPS goals. If one assumes that about 20% of the performance (energy savings) of measures is attributable to the ability of the workforce to properly analyze, design, install, and maintain systems, the absence of a trained workforce could reduce the potential energy savings from the ratepayer investment for the EEPS (more than $330 million a year) by a similar amount.

Barriers / Bottlenecks to a Skilled Workforce

The degree to which the State's workforce is sufficiently skilled is dependent upon the labor market for the energy efficiency sector, and barriers to training the labor market.

Labor Market Assessment

The analysis/information presented in Table 1 illustrates that there will be labor shortages in a majority of the occupations in the energy efficiency sector (i.e., those with a "very favorable" outlook). This is in part attributable to reluctance by many high school graduates to enter "blue collar" occupations, and an aging workforce.

It should also be noted that the demand for skilled workers necessary to implement the EEPS will likely compound this market condition, as other sectors compete for experienced workers in these occupations. Such skilled labor shortages tend to raise costs and adversely affect product quality; further suggesting the importance of worker training in the energy efficiency sector.

The labor supply to meet this demand will be derived from three sources:

- Employed Workers;
- Experience Unemployed Workers (receiving Unemployment Insurance benefits); and
- Emerging Workers (students and disconnected youth and adults).

The readily available labor supply to meet the labor demand of the EEPS would come from employed workers of commercial and industrial businesses that implement energy efficiency measures, as well as the State's experienced unemployed workers. While this labor supply possess a wide range of knowledge, skills and abilities, this capacity is not sufficient to support successful implementation of the EEPS. Thus, these workers will require training to become proficient in the knowledge, skills and abilities for employment in the energy efficiency sector.

The shortfall in readily available labor supply will require the labor market to draw upon emerging workers, particularly youth and adults in economically and environmentally disadvantaged communities; who will also require training to become proficient in the knowledge, skills and abilities for employment in the energy efficiency sector.

Table 1 illustrates the following.

- Typical occupations likely to comprise labor demand (jobs) represented by the EEPS; the staffing pattern for a typical business in the energy efficiency sector (% of jobs in the occupation); and the market outlook for employment in the occupations.[3] Note that, the majority of the occupations have a "very favorable" outlook (i.e., there will be high competing demand for the occupation with other sectors).
- The labor demand (staffing needs) represented by the $330 million per year investment of the EEPS; estimated at 17,160 jobs per year (or 51,480 jobs over three years).[4]
- The State's Experienced Unemployed Worker capacity for each of the occupations, and the surplus/shortage for each occupation based upon the estimated labor demand.[5]

Table 1 – Labor Market Outlook for Occupations in the Energy Efficiency Sector

Occupational Title	Staffing Pattern	Staffing Needs	Idle Capacity	Surplus / (Shortage)	Occupational Outlook
Construction Managers	3%	480	210	(270)	Very Favorable
Cost Estimators	4%	654	125	(529)	Very Favorable
Training and Development Specialists	1%	188	269	81	Very Favorable
Accountants and Auditors	2%	285	1,303	1,018	Very Favorable
Computer Software Engineers, Applications	4%	729	221	(508)	Very Favorable
Civil Engineers	2%	282	41	(241)	Favorable
Electrical Engineers	1%	108	112	4	Favorable
Electrical and Electronics Drafters	1%	219	24	(195)	Least Favorable
Sales Representatives, Wholesale and Manufacturing	3%	548	608	60	Very Favorable
First-Line Supervisors - Office and Administrative Support	1%	221	0	(221)	Very Favorable
Bookkeeping, Accounting, and Auditing Clerks	2%	360	2,728	2,368	Very Favorable
Receptionists and Information Clerks	1%	190	3,903	3,713	Very Favorable
Dispatchers, Except Police, Fire, and Ambulance	1%	127	289	162	Favorable
Executive Secretaries and Administrative Assistants	4%	705	4,417	3,712	Very Favorable
Office Clerks, General	2%	288	4,331	4,043	Very Favorable
First-Line Supervisors/Managers of Construction Trades	5%	883	459	(424)	Very Favorable
Construction Laborers	7%	1,277	2,582	1,305	Very Favorable
Operating Engineers and Equipment Operators	4%	666	419	(247)	Very Favorable
Electricians	16%	2,778	753	(2,025)	Very Favorable
Plumbers, Pipefitters, and Steamfitters	11%	1,961	696	(1,265)	Very Favorable
Sheet Metal Workers	4%	672	153	(519)	Very Favorable
Helpers--Pipelayers, Plumbers, Pipefitters, and Steamfitters	2%	380	108	(272)	Very Favorable
First-Line Supervisors - Mechanics, Installers, and Repairers	2%	398	444	46	Very Favorable
Security and Fire Alarm Systems Installers	1%	255	0	(255)	Very Favorable
HVAC and Refrigeration Mechanics and Installers	10%	1,777	469	(1,308)	Very Favorable
Maintenance and Repair Workers, General	1%	124	1,966	1,842	Very Favorable
Truck Drivers, Heavy and Tractor-Trailer	1%	89	1,856	1,767	Very Favorable
Laborers and Freight, Stock, and Material Movers, Hand	1%	236	5,091	4,855	Favorable
New York State Total	**98%**	**17,160**			

[3] Based upon preliminary analysis of Standard Occupation Classifications (SOC) in New York State's energy efficiency sector by the NYS Department of Labor for the Governor's Renewable Energy Task Force.

[4] This estimate is based upon US Department of Energy (USDOE) research which estimates that its weatherization program represents approximately 52 jobs for every $1 million it has invested in energy efficiency ("Improving Economies of Low-Income Communities" 2008).

[5] Based upon analysis of Unemployment Insurance claimant information by the NYS Department of Labor.

Barriers to Training

Barriers to training include the following.

- The cost of training – be it at the expense of the worker and/or the business that hires the individual.
- The wage subsidy paid by the business, attributable to lower productivity of the worker during training.
- Lost opportunity costs or wages to workers while completing training.
- The availability of training infrastructure to support training (curriculum and schools).
- The cost attributable to properly equipping the worker with the requisite tools necessary for the job.
- The lack of basic skills training (prerequisites) to prepare workers for technical training.

These barriers can be addressed through the following actions.

- Ensure that there are training centers and partners across the state.
- Provide tuition reimbursement and financial assistance for training and purchasing equipment for students that successfully complete training and certification.
- Develop in-the-field training opportunities or training facilities that provide hands-on training.
- Provide training pathways for national or independent certification where appropriate.
- Offer internships and apprenticeships to minimize employer risks and costs.

WORKFORCE DEVELOPMENT STRATEGY – KEY ELEMENTS

The Working Group's EEPS workforce development and training strategy is comprised of eight key elements necessary to achieve the goals of the EEPS. These elements are listed below and briefly described in the remainder of this section.

1. Comprehensive Training Initiatives
2. Promoting National Certifications and Standards
3. Career Pathways
4. Engaging Disadvantaged Communities
5. Internships and Apprenticeships
6. Professional Development and Continuing Education
7. Marketing
8. Evaluation, Measurement and Verification

It is important to note that these elements align with the workforce development proposal in the NYSERDA 90-day filing, attached to this report as ***Appendix B***.

In identifying these elements, the Working Group took into consideration: expansion of proven best practices across existing energy efficiency training programs by NYSERDA and other state

efforts to meet the "fast track" programs approved by the Commission; the labor market skills necessary to deploy the EEPS programs; and workforce development needs identified in the utility 90-day filings.

Appendix C provides an overview of existing Workforce Development and Training Programs by NYSERDA and other state government entities. NYSERDA has an established set of energy efficiency training programs for all sectors across the State. This set of training programs provides an excellent foundation for a systematic and expeditious expansion of training opportunities needed to fulfill the goals of the EEPS.

Appendix D provides an overview of the Workforce Training Needs of Utility 90-day Filings. Utility training initiatives focus primarily on program related training, however some utilities identify technical training in their 90-day filings. Other utilities specifically reference training supported through NYSERDA programs and certifications supported through the Building Performance Institute and Building Operator Training.

Comprehensive Training Initiatives

A comprehensive training agenda must be established for New York State, which supports energy efficiency programs already approved by the New York State Department of Public Service (NYSDPS), while building in the flexibility to support additional approved programs.

- NYSERDA is an administrative entity that does not directly provide training, but has a long history of administering funding to support energy efficiency related training programs. Therefore, NYSERDA will be expected to administer open solicitations to training providers to support projects and partnerships that respond to the workforce development and training needs of the EEPS. It is anticipated that this solicitation will enable NYSERDA to partner with new training organizations, address new training needs, and respond to changes in market conditions.
- NYSERDA would work closely with parties on the Working Group and all EEPS program implementers to identify opportunities to expand training and administer training programs and initiatives where appropriate.

Promoting National Certifications and Standards

The level of quality installation, operation, and maintenance of energy efficiency measures needed to support the EEPS will need to be achieved through training and certification programs. Many of these programs require written and field performance tests to assure quality of the performance capability of industry professionals. Many EEPS-funded programs will require that individuals are able to demonstrate a specific competency level, and will require minimum levels of quality assurance to ensure that installed measures perform as expected.

- NYSERDA works, and will continue to work, with other parties to determine areas where training and certification is needed, and consider training and certification strategies that facilitate required levels of quality assurance without limiting the number of available workers supporting new programs.
- The cost of pursuing training and certification is a significant barrier to expanding the base of qualified professionals. Cost sharing for training and certification will be provided to encourage a greater number of practitioners to participate. NYSERDA will collaborate with professors and other professional trainers interested in pursuing

certification or accreditation to quickly establish trainers (train-the-trainer programs) to support specific EEPS programs.

- NYSERDA will collaborate with NYSDOL and other entities to assess existing practitioner certifications and develop new certifications as needed. For example, NYSERDA has identified the need for development of two new certifications to support high efficiency buildings for new construction and energy auditing: Quality Building Modeler; and Quality Energy Auditor.

Career Pathways

The Workforce New York One-Stop System will be used to target workers to participate in the training and certification programs. The programs administered by NYSDOL through the One-Stop System largely provide skills development and occupational training services to individuals to meet the demand of businesses. NYSDOL has identified renewable energy and energy efficiency as priority sectors, and has begun directing resources to address workforce skills gaps in these sectors.

- Up to $9 million in One-Stop resources would be directed at serving this sector over the next three years, with an additional $2 million directed to address specific workforce development needs associated with implementing EEPS related workforce training initiatives. This represents $11 million in leveraged NYSDOL funds.
- NYSDOL, in collaboration with the New York State's Division of Housing and Community Renewal (DHCR), Office of Temporary Disability Assistance (OTDA), Office of Children and Family Services (OCFS) and NYSERDA will work with local workforce investment areas (funded under the Workforce Investment Act) to develop practitioner level training initiatives. Potential trainees will be screened for skill proficiency and interest, and then assessed for program readiness (including math ability, knowledge of basic carpentry, etc.). Strong candidates would be recruited and provided training through the Center for Energy Efficiency and Building Sciences (CEEBS).
- Under administration of NYSDOL, The Workforce New York One-Stop System would provide training in the basic skills necessary for entry-level employment in the energy efficiency sector, and as a beginning for a career pathway to higher skilled employment. This training will be developed to assist individuals with limited energy efficiency experience or training get the basic skills support needed to obtain entry level positions, as well as providing basic efficiency training to skilled practitioners such as carpenters, electricians, window installers, heating and air conditioning technicians.

Engaging Disadvantaged Communities

A priority of Governor Paterson is to create opportunity for individuals in economically and environmentally disadvantaged communities to work in jobs that pay family sustaining wages. This priority is articulated in the Governor's Renewable Energy Task Force as well as the Governor's Environmental Justice Interagency Task Force; on which several Working Group parties are also represented, including the three co-convener agencies (NYSERDA, NYSDPS and NYSDOL).

Thus, there was a clear understanding and support by the Working Group to align the EEPS workforce development strategy with the Governor's priority; deeming training and job

placement for residents in economically and environmentally disadvantaged communities relevant and necessary.

- EEPS target reductions from dense urban settings are in many cases economically and environmentally disadvantaged communities. The individuals in these communities represent an emerging worker capacity (i.e., supply of labor) that will be needed to achieve the EEPS goals.
- The individuals in economically and environmentally disadvantaged communities are in many cases disconnected from the workforce. The wages these individuals earn through the jobs created by advancing the goals of the EEPS (labor demand) represent a significant source of economic development in their communities.[6]

The Governor's Renewable Energy Task Force also established four subcommittee areas to identify specific barriers that must be overcome, as well as areas in which New York has begun to develop effective strategies for meeting these goals. One of the subcommittees is Energy Efficiency, which focuses on the efficiency of electric, natural gas and oil. The work of this subcommittee has also been considered in developing this element.

In addition, the Governor's Renewable Energy Task Force directed NYSDOL ... "To immediately undertake an inventory of existing workforce training programs and streamline such efforts to utilize existing resources in the most optimal manner ... with collaboration from NYSERDA, NYSED, SUNY, CUNY and other appropriate entities." This directive has facilitated positive collaboration on workforce development among the following New York State agencies: Department of Environmental Conservation; Department of Labor; Department of Public Service; Division of Housing and Community Renewal; Dormitory Authority; Empire State Development Corporation; Energy Research and Development Authority; Office of Children and Family Services; and Office of Temporary Disability Assistance. The collaboration also includes SUNY, CUNY, New York City Economic Development Corporation (NYCEDC), the Center for Energy Efficiency and Building Science (CEEBS), advocacy organizations, community-based organizations and the Workforce New York One-Stop System. This collaboration has also expanded into the Governor's Environmental Justice Task Force.

While NYSERDA's 90-day filing includes a workforce development initiative to engage disadvantaged communities, the September 23, 2008 deadline for the 90-day filings did not afford the Working Group sufficient time to fully address this issue through the NYSERDA filing. Thus, the Working Group viewed NYSERDA's filing as a "place holder" for this element; and it subsequently convened a special meeting to specifically address this element, which was followed by considerable input from members.

The Working Group determined that the most effective method for investing EEPS projects in economically and environmentally disadvantaged communities is to use EEPS funds as leverage to ramp-up State agency and community based organization initiatives that market and recruit residents for training and employment in energy efficiency projects in these communities. The

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[6] The economic development occurs through what economists call the economic "multiplier effect" which describes the phenomenon whereby earnings and spending circulates in local economies. The US Department of Energy estimates conservatively an economic multiplier of three from investment in energy efficiency in local low-income communities.

Working Group also determined that NYSERDA's workforce development funding request needed to be supplemented to adequately address this element. Therefore, the Working Group recommends that $6 million in additional funding (beyond that requested in NYSERDA's 90-day filing) be used as leverage to support State energy efficiency workforce development initiatives targeted at economically and environmentally disadvantaged communities.

Internships and Apprenticeships

On-the-job training must be supported through significant expansion of internship and apprenticeship programs. NYSERDA would work with NYSDOL, colleges, universities, community colleges, BOCES, trade organizations, labor unions, energy service companies, and others within the energy efficiency industry and private sector. Internship and apprenticeship programs provide emerging workers in the energy efficiency labor market the opportunity to work with experienced energy professionals, and obtain "real life" experience. Internships serve as a job-placement mechanism to give energy firms and private-sector businesses the opportunity to hire experienced and trained workers who can quickly help the organizations be more productive and effective.

Professional Development and Continuing Education

Continued professional training is needed to support those already in the workforce, increase awareness of new technologies, and support the development of marketable skill sets in a wide variety of new technologies. Expanded technical skills in building systems that affect energy use (heating, cooling, lighting and ventilation) and tenant comfort (temperature, air quality and illumination) are necessary.

This element aligns with the NYSERDA proposal, where NYSERDA would continue to administer Continuing Education Units (CEU) credit for courses in high performance design, effective lighting, green building operations and maintenance, classes taught at CEEBS learning centers, and other energy efficiency (and renewable energy) technologies. Curriculum development for courses offered through the Association of Energy Engineers (AEE), American Institute of Architects (AIA), Building Owners and Managers Association (BOMA)/Building Owners and Managers Institute (BOMI), Building Performance Institute (BPI), and others will further expand career development efforts.

Marketing

Marketing efforts for workforce training must be significantly ramped up to promote workforce training initiatives and opportunities. NYSDPS, NYSDOL, NYSERDA and other entities will work closely to market the EEPS training programs and will use a multi-media approach. A comprehensive workforce training and education web portal will be developed to serve as a central location for information on all residential and commercial training programs and job opportunities within the State. The portal will link to resources offered through the www.GetEnergySmart.org website to recruit students, market training programs, market partnerships with colleges, universities and private companies participating in the internship and apprenticeship programs, and coordinate with entities such as the NYCEDC to educate consumers about the benefits of working with nationally certified contractors and other trained providers.

Evaluation, Measurement and Verification

Workforce development activities identified in this document are expected to have a positive effect on the level of energy savings achieved through complementary incentive programs offered by various program administrators. Ascertaining the exact amount of energy savings attributable to workforce development will likely be difficult, but it is expected that energy savings from workforce development can be captured through impact evaluations conducted on complementary incentive programs. Specifically, questions could be added to participating and non-participating market actor surveys to assess the effect of education, training and professional development on the level of savings they achieve on projects both within (participants only) and outside of (both participants and non-participants) the incentive programs. Process and market evaluation studies should also be undertaken to assess awareness of training, participant perceptions of and satisfaction with training, barriers to participation, and penetration of target markets.[7]

[7] An example of process and market evaluation activities appropriate for workforce development can be found in: NYSERDA, Energy Efficiency Portfolio Standard Program Administrator Proposal, Case 07-M-0548, September 22, 2008.

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Aghazadeh, Seyed-Mahmoud. "Re-examining the training side of productivity improvement: evidence from service sector." International Journal of Productivity and Performance Management Vol. 56 No. 8 (2007), pp. 744-757, Emerald Group Publishing Limited.

This paper reviews past and current research on productivity problems and how they can be alleviated through appropriate training. The article presents the results of experiments on two firms, a grocery store chain (Wegmans) and an outsourcing provider (ClientLogic) to show how specific training techniques increase worker productivity. The paper emphasizes that on-the-job training is especially important in organizations characterized by continuous change in technology and competition. Specifically, on-the-job training that is firm specific, rather than general training is a better investment as more specific training increases the firm's marginal benefit.

"Analysis of Job Creation in PlaNYC Final Report." The Louis Berger Group, Inc. New York, New York. Mar. 2008.

Apollo Alliance, Green for All, Centers for American Progress and Center on Wisconsin Strategy. *Green Collar Jobs in America's Cities: Building Pathways out of Poverty and Careers in the Clean Energy Economy*, 2008.

Associated Press. "Report: 4.2 million new environmentally-friendly 'green' jobs possible." Daily News. Oct. 1st, 2008. New York Daily News. Oct. 3, 2008. http://www.nydailynews.com/money/2008/10/01/2008-10-01_report_42_million_new_environmentallyfri.html

Ballot, Gerard, Fathi FakhFakh, and Erol Tymaz. "Firms' Human Capital, R &D and Performance: A Study on French and Swedish Firms." Labour Economics, No. 8 (2001), pp. 442-462.

This study stresses the effects of intangible assets, namely R&D and human capital. The purpose of the study is to present empirical evidence relating to the effects of these intangible assets on firms' performance, with an emphasis on firm-sponsored training expenditures. The data is from comparative panels of firms in France and Sweden. The results point to training capital as a significant factor of production; however, there are significant differences between rates of return to training of various groups of employees, with the training of managers having a significantly higher effect on productivity than non-manager training.

Bartel, Ann. "Productivity Gains from the Implementation of Employee Training Programs." Industrial Relations, Vol. 33, No. 4 (October 1994) pp. 421-445.

Bartel's study uses data to measure the impact of formal training programs on labor productivity. Her major finding, is that businesses that were operating below their expected labor productivity levels in 1983 implemented new employee training programs after 1983 that resulted in significantly larger increases in labor productivity growth between 1983 and 1986.

Bench, Ingo, Scott Pigg, and Marge Anderson. "How Much is that Training Program Worth? Quantifying the Value of Training and other 'Fuzzy' Educational Events." American Council for an Energy-Efficient Economy. 2006.

This study looked to put a cost/benefit ratio on training events. The study was conducted by surveying the attendants of the 2005 Better Buildings: Better Business conference. The conference is held by the Energy Center of Wisconsin and has taken place annually since 1999. The conference primary objective is to improve energy efficiency in Wisconsin homes.

The authors found that contractors who responded showed improvements in their daily activities to increase Energy Efficiency (EE) in the homes they worked at. The affects on the total number of homes each contractor performed the improvements on was estimated over a 20 year period. Estimates put total energy savings between $400,000 and $2 million, making the cost/benefit ratio of the conference between 1.1 to1 and 5.3 to 1.

Black, Sandra E. and Lisa M. Lynch. "How to Compete: The Impact of Workplace Practices and Information Technology on Productivity." The Review of Economics and Statistics, Vol. 83, No. 3 (Aug., 2001), pp. 434-445.

This study uses data from a nationally representative sample of businesses to examine the impact of workplace practices, information technology, and human capital investments on productivity. Along with concluding that human resource practices such as joint decision making and incentive based compensation increases higher productivity in unionized plants, the study finds that plant productivity in businesses with more-educated workers or greater computer usage by non-managerial employees results in higher productivity.

Bezdek Roger. *Renewable Energy and Energy Efficiency: Economic Drivers for the 21st Century,* Management Information Services, Inc. 2007.

"Changes in the Composition of Labor For BLS Multifactor Productivity Measures, 2006." Bureau of Labor Statistics Multifactor Productivity (March 23, 2008). http://www.bls.gov/mfp/mprlabor.pdf

This file, published by the Bureau of Labor Statistics, details how the composition of labor in the U.S. has changed, including education levels of the workforce, and trends relating economic recession/expansion with labor composition.

Drearden, Lorraine, Howard Reed, and John Van Reenan. "The Impact of Training on Productivity and Wages: Evidence from British Panel Data." CEP Discussion Paper, No. 674 (Feb, 2005).

This article examines the impact of private sector training on productivity, over a long period of time (1983-1996). The data set aggregates individual level data on training and establishment data on productivity and investment. The data analysis concludes that there is an effect of training on value added per head in the UK. An increase of one percentage point in the proportion of employees trained is associated with a .6% increase in productivity and a .3% increase in wages.

Effects of a Transition to a Hydrogen Economy on Employment in the United States: Report to Congress. United States Department of Energy. July 2008.

Eilert, Pat, Charles Segerstrom, Gary Fernstrom, et al. "Standards Education and Training as a Resource Program." 2008 American Council for an Energy Efficiency Economy Summer Study on Energy Efficiency in Buildings (2008), pp. 8-51 – 8-62.

This paper presents an overview of the California SE&T (Standards Education and Training) program theory, linking the activities to increases in the compliance rate and associated energy savings. The authors find that while education is valuable, is it less effective than proper enforcement of codes and standards, and works best in tandem with proper enforcement. They expect a savings of 51 GWh through 2011.

Hojo, Masakazu. "An Indirect Effect of Education on Growth." Economics Letters 80 (2003) pp. 31–34.

This paper argues that increases in education improve a country's productivity, and productivity causes higher rates of economic growth. This means that education is an indirect cause of economic growth, which contrasts with previous studies claiming no effect. It uses empirical analysis.

"Improving Economies of Low-Income Communities." Energy Efficiency and Renewable Energy. July 8, 2008. United States Department of Energy. Sept. 25, 2008. http://apps1.eere.energy.gov/weatherization/improving.cfm

Katipamula, Srinivas and Michael R. Brambley. "Transforming the Practices of Building Operation and Maintenance Professionals: A Washington State Pilot Program." 2008 American Council for an Energy Efficiency Economy Summer Study on Energy Efficiency in Buildings (2008), pp. 4-151 – 4-167.

This paper summarizes a three-part program underway in Washington State aimed at subsectors of the commercial buildings industry. The program components focus on: 1) retuning of equipment in large commercial buildings (>100,000 sf), 2) testing of a smart monitoring and diagnostic technology for packaged air conditioners and heat pumps on small commercial buildings (generally <50,000 sf), and 3) influencing the education and training of currently practicing and future HVAC technicians and building operators through outreach and curriculum development. Regarding the retuning of equipment in large commercial buildings, Katipamula et al. observe that while re-tuning would be beneficial in every building observed, and participants are enthusiastic about the benefits of the program, they are reluctant to make changes for fear that the buildings' occupants will be dissatisfied. While the final results of the program are not yet available, the authors believe that savings will be greater than 5% of the total energy use.

LaLonde, R. "Education: Skill Training." International Encyclopedia of the Social & Behavioral Sciences, (2001), pp. 4243-4249.

This article outlines basic arguments for the supply and demand for labor. There is both an incentive for workers to increase their skills, and employers to increase the skills of their workers if the benefits outweigh the costs. The article also argues that in a labor market where vocational skills can be easily transferred from one employer to another, there might be a disincentive for firms to invest in vocational training. This merits policies that require the public sector to play a role in private training decisions as the imperfect market causes an underinvestment in training.

Neme, Chris, John Proctor and Steven Nadel. Energy Savings Potential From Addressing Residential Air Conditioner and Heat Pump Installation Problems. Washington: American Council for an Energy-Efficient Economy, 1999.

Rulison, Larry. "Verizon falls short installing FiOS." The Times Union Sept. 26, 2008: C1.

Tannenbaum, Bobbi, Robert Wirtshafter and Deborah Laurel. "Training: Design for Lasting Change." American Council for an Energy-Efficient Economy. 2006

The paper notes that numerous best practices exist in the areas of equipment installation and operation, as well as energy efficiency program design, implementation and design. This paper discusses best practices for adult energy education and training. It also identifies barriers to their implementation. Both are discussed relative to three areas: marketing, training and evaluation.

To gain the desired results, the authors did case studies of six energy workshops conducted in California that were not meeting their objectives. They combined that with telephone interviews of adult education and training providers and produced a number or best practices. They then held a "train the trainers" workshop to communicate these best practices as well as identify barriers to their implementation.

The best practices identified were used by some of the California Energy Centers researched for this paper. The Centers are now meeting their goals and providing improved course offerings based on the best practices implemented.

APPENDIX A – WORKING GROUP PARTICIPANTS

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APPENDIX B – NYSERDA WORKFORCE DEVELOPMENT 90-DAY FILING

2. WORKFORCE DEVELOPMENT

2.1. PROGRAM DESCRIPTION

The aggressive goals of the EEPS will benefit from a readily-available pool of qualified workers to install, operate, and maintain energy efficiency measures. This workforce can minimize barriers to program implementation are minimized and further ensure that sustained, long-term energy savings gained through the EEPS programs are realized. An energy efficiency training network has begun to address this need; however the consensus of the Workforce Development Working Group (convened by the Department of Public Service) and the Governor's Renewable Energy Task Force is that efforts must be rapidly expanded to adequately fulfill the EEPS requirements.

The energy efficiency industry is facing with a shortage of competent and certified workers across the job spectrum. There is limited access to on-the-job training opportunities and accredited training facilities to provide initial and continuing education courses in energy systems and efficiency practices. Workers, particularly those just entering the field, often lack the financial resources to pursue the training and certification opportunities needed to move along the training continuum that provides the assurance of the ability to earn a living wage through participation in the energy efficiency job market. Discussions at Working Group meetings suggest that, while market forces will begin to address the need for qualified workers as the demand grows, the goals of the EEPS require some level of interim initiative. Resources to develop the infrastructure and encourage larger numbers of candidates are needed immediately to "jump start" these efforts so they coincide with the ramp up of efficiency programs.

NYSERDA has joined with the New York State Department of Labor (DOL) to develop this comprehensive workforce development (WFD) proposal that will enable the strategic expansion of a qualified energy efficiency workforce, drawing from existing workers, emerging workers, and underemployed or idle workers, that will be trained and deployed to help meet the EEPS goals.

At approximately $5.4 million per year (about 1.5% of overall EEPS funding), this Program budget is approximately $16,255,050 for the 2009-2011 period. This level of investment to support workforce development strategies will leverage an additional $11 million of funding being provided by the DOL that will help identify, screen, recruit, and place trained workers in jobs that follow clear career pathways and will strengthen the ability to develop and retain these workers in New York State. The potential workforce need created by the EEPS can be illustrated by U.S. DOE research which estimates that 52 jobs are created for every $1 million invested in weatherization programs. While only illustrative, this result would extrapolate to the creation of a skilled workforce of approximately 17,000 jobs per year to support a $330 million annual investment in energy efficiency.

There is a distinction between program the training outlined under the utility EEPS proposals and the Workforce Development training now proposed. Utilities participating on the DPS Workforce Development Working Group have expressed that the Program Marketing and Trade Ally component of their program proposals represent only a minimum level of programmatic and trade ally training necessary to support program implementation.

Comprehensive Training Initiatives. This proposal seeks to establish a comprehensive training agenda for New York State, supporting energy efficiency programs already approved by DPS, while building in the flexibility to support additional approved programs. In addition to the strategies described below, NYSERDA will issue an open solicitation through which projects and partnerships that respond to specific market needs will be supported.

NYSERDA will work closely with all EEPS program implementers and the DPS Workforce Development Working Group to identify opportunities to expand training and provide training subsidies where appropriate. NYSERDA plans to immediately:

- Expand the Hudson Valley Community College (HVCC) Center for Energy Efficiency and Building Science (CEEBS) training network which currently comprises 10 learning centers by adding several more training locations - especially in New York City, and develop additional training courses and curriculum;
- Work closely with partners such as the City University of New York, Lighting Research Center (LRC), and others to expand the commercial and industrial efficiency training for contractors, providers, architects and engineers, building operators, and facility managers;
- Develop and launeh on-line courses and distance learning offered through training partnerships with colleges and universities and other third-party providers;
- Collaborate with the U.S. EPA and other partners to deploy "train-the-trainer" programs to support statewide building performance benchmarking, and new residential energy efficiency tcchnology-based training; and
- Work with manufacturers to develop supplemental curriculum to enhance existing customer training programs, and emphasize energy efficiency, quality installation, and efficient operations and maintenance practices.

Internships and Apprenticeships. On-the-job training will be supported through a significant expansion of internship and apprenticeship programs. NYSERDA will work with colleges, universities, community colleges, labor unions, energy service companies, and others to promote internships within the energy efficiency industry and private sector.[9] These internship and apprenticeship programs give newcomers to the energy efficiency job market the opportunity to work with experienced energy professionals, and obtain "real life" experience. Internships serve as a job-placement mechanism giving energy firms and private-sector businesses the opportunity to hire experienced and trained workers who can quickly help the organizations be more productive and effective.

NYSERDA will build on its work with NYSDOL and the Workforce Development Institute to develop and implement new internships, apprenticeships, and job placement initiatives, particularly through the New York State Apprenticeship program. This program is a national training system administered by NYSDOL that combines paid on-the-job learning and related technical and theoretical instruction in a skilled occupation.

Professional Development and Continuing Education. Continued professional training is needed to support those already in the workforce, inerease awareness of new technologies, and support the development of marketable skill sets in a wide variety of new technologies. Expanded technical skills in building systems that affect energy use (heating, cooling, lighting, and ventilation) and tenant comfort (temperature, air quality and illumination) are necessary. As a registered provider under the American Institute of Architects Continuing Education System, NYSERDA administers Continuing Education Units (CEU) credit for courses in high performance design, effective lighting, green building operations and maintenance, classes taught at CEEBS learning centers, and other energy efficiency (and renewable

[9] For example, NYSERDA has funded the development of the CUNY Building Performance Laboratory internship program to support the development of a skilled workforee for the building performance sector. Students learn to tailor technical solutions to individual buildings and equipment, determine and document optimum building and energy-system performance, monitor ongoing operations, and analyze data to maintain optimum building and systems performance.

energy) technologies. To further expand career development efforts, NYSERDA will support curriculum development for courses offered through AEE, AIA, BOMA/BOMI, and others, and is working with the Practicing Engineers Institute (PIE) to secure CEUs for the classes currently taught at CEEBS learning centers.

Promoting National Certifications and Standards. The workforce development initiatives described in this proposal will promote a standard level of competency to achieve the level of quality installation, operation, and maintenance of energy efficiency measures likely needed to support EEPS. Certification programs requiring written and field performance tests ensure quality assurance of the performance capability of industry professionals. Many EEPS-funded programs will require that individuals are able to demonstrate a specific competency level and will require minimum levels of quality assurance to ensure that installed measures perform as expected. NYSERDA will work with the DPS Workforce Development Working Group and other parties to determine the areas where certification is needed, and consider certification strategies that facilitate required levels of quality assurance without limiting the number of available workers supporting new programs. The cost of pursuing certification is a significant barrier to expanding the base of qualified professionals that pursue standard certification. Cost-sharing for training and certification will be provided to encourage a greater number of practitioners to participate.[10] NYSERDA will collaborate with professors and other professional trainers interested in pursuing certification or accreditation to quickly establish trainers to support specific EEPS programs.[11]

NYSERDA will work with the DPS Workforce Development Working Group and others to evaluate existing certifications and develop new certifications as needed. NYSERDA will collaborate with the NYC Office of Long Term Planning and Sustainability, and other entities around the State to evaluate and determine certification needs that support green and energy efficiency policy objectives. For example, NYSERDA has identified the need for development of two new certifications: Quality Building Modeler and Quality Energy Auditor to support high efficiency buildings for new construction and energy auditing, respectively.

Career Pathways in Energy Efficiency. The EEPS provides a unique opportunity to align the activities designed to achieve energy efficiency targets, with the mission of DOL to provide opportunities for New York's existing and emerging workforce, as well as the unemployed and underemployed workers. In particular, NYSDOL's One-Stop Workforce Development System will be used to target workers to participate in the training and certification programs defined in this proposal.[12]

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[10] Examples include BPI certification, Association Energy Engineers (AEE) Certified Energy Manager, NCQLP Lighting Certification, USGBC Leadership in Energy and Environmental Design Accredited Professional (LEED AP), North American Technician Excellence (NATE) HVAC certification, and National Association Energy Service Companies (NAESCO) certifications in HVAC and building envelope.

[11] For example, USGBC LEED Accredited Professional training is currently being cost-shared for students and educators in a pilot with Rensselaer Polytechnic Institute (RPI) and will be expanded under this proposal to a network of colleges and universities that have strong building science and engineering programs. Trained students will be placed on internships with contractors, technical assistance providers, and customers working with NYSERDA to implement new construction projects. Another example of effective train-the-trainer efforts to promote national standards in building science for building operators has been NYSERDA's sponsorship of CUNY as an approved provider for Building Operator Certification (BOC) training developed by the Northwest Energy Efficiency Council. As an approved provider, CUNY is able to reach out to local government staff, trade unions, and commercial building owners and managers to deliver BOC training for building operators.

[12] The DOL System currently includes: 33 Local Workforce Investment Areas aligned with the State's 10 economic development regions. Each area is overseen by a Local Workforce Investment Board; 79 One-Stop Centers; a customer base of over 600,000 individuals a year (about 7% of the State's workforce) possessing a wide range of

The programs administered by DOL through the One-Stop System largely provide skills development and occupational training services to individuals to meet the demand of businesses. DOL has identified renewable energy, energy efficiency and weatherization, as a priority, and directs resources to address these sectors. Up to $9 million in One-Stop resources would be directed at serving this sector over the next three years, with an additional $2 million directed to address specific workforce development needs associated with implementing EEPS workforce training initiatives.

DOL, in collaboration the New York State Division of Housing and Community Renewal and NYSERDA, will work with Local Workforce Investment Areas to develop entry level training initiatives. Potential trainees will be screened for skill, proficiency and interest, and then assessed for program readiness (including math ability, knowledge of basic carpentry, etc.). Strong candidates would be recruited and provided training at CEEBS, with the goal of producing 1,000 certified Bachelor of Arts degrees over a three-year period. At the same time, the One-Stop Workforce Development System would provide training in the entry level skills necessary for entry level employment in the energy efficiency sector, and as a beginning for a career pathway to higher skilled employment. This training will be developed to assist individuals with limited energy efficiency experience or training get the basic skills support needed to obtain entry level positions, as well as providing basic efficiency training to skilled practitioners such as carpenters, electricians, window installers, heating and air conditioning technicians.

2.2. DEMAND REDUCTION AND SYSTEM BENEFITS.

Workforce development and training will ensure systems are designed, operated and maintained properly and will contribute to the EEPS program impacts as designed and estimated. As indicated in several studies and reports, there is a significant potential to increase energy savings with training that addresses proper system sizing, installation, and proper matching of components.[13]

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oecupational skills across most industries in the state; a statewide web-based inventory of training programs to enhance and develop occupational skills of the State's workforce (encompassing 1,329 training locations and 13,033 training courses); and the New York State Apprenticeship Program, a national training system that combines paid on-the-job learning and related technical and theoretical instruction in a skilled occupation.

[13] As early as 1999, program evaluators examining the energy savings potential assoeiated with proper installation of energy effieiency equipment have assoeiated quality installation praetices and training with greater operating effieiency and performanee. The US EPA commissioned a report (Neme, Proctor, and Nadel, 1999) looking at the *"Energy Savings Potential From Addressing Residential Air Conditioner and Heat Pump Installation Problems"*. The report demonstrated that equipment installed by properly-trained HVAC teehnieians eould save an average of 24 percent of energy use in existing homes and 35 pereent in new construction. The report also states that the manner in which equipment is installed may have a much greater impact on actual operating efficiency that whether or not it has a high-effieiency rating. Further, Neme, Proctor and Nadel point out that studies conducted in 10 different states or regions of the U.S. have found that the average air eonditioner or heat pump is oversized by about 50% and nearly one ton of capacity compared to properly-sized systems.

A TXU Electric Delivery Study (Stockard, Audet, Zarnikau, 2007) of installation praetiees of air conditioner installers between the years 2004-2006 demonstrates that signifieant savings ean be obtained by promoting better installation and sizing praetiees. This report quantifies the impacts training has on proper duct sealing, attributing deemed energy savings of 17,129 MWh and 11.6 MW in demand savings with proper sealing techniques in 126,500 installations.

A report commissioned by the New York City Mayor's Energy Conservation Steering notes that quality assurance at installation and at regular intervals facilitates the sustainability in savings of energy efficieney measures. The report asserts that training of existing and newly-hired maintenanee and faeility management personnel on how to recognize and address energy-related equipment and maintenance needs is necessary and that training should address topics such as energy consumption monitoring, and proper operation and maintenance of particular pieces of equipment.

2.3. MARKET SEGMENT NEED

Collaboration with the New York City Office of Long Term Planning and Sustainability and the New York City Economic Development Council has identified a great need to support benchmarking and audit and retrofit legislation.[14] That legislation will affect over 9,000 multifamily buildings representing over 1.4 billion square feet, and 2,100 commercial buildings representing over 600 million square feet. There will be a substantial impact the energy efficiency community in New York City and has the potential to establish a replicable model for enactment throughout New York State.

Expansion of low-income and weatherization programs will require thousands of new practitioners. New programs aimed at increasing the efficiency of new and existing homes and multifamily buildings will require training for new contractors, continuing education for existing contractors, training for building operators, training for code officials and home energy raters.

2.4. COORDINATION

NYSERDA works closely with the Governor's Task Force on Renewable Energy and its Green Jobs initiatives, the DPS Working Group on Workforce Development and many others in identifying workforce training needs and developing the workforce training infrastructure needed to meet these needs.

NYSERDA leveraged millions of dollars in training partner co-funding. Current energy efficiency training partners include Onondaga-Cortland-Madison County BOCES, Broome Community College, Erie Community College, Bronx Community College, Fulton-Montgomery Community College, the Association for Energy Affordability, Westchester Community College, Onondaga Community College, and SUNY Canton. The existing residential energy efficiency training supported by NYSERDA takes place at educational institutions that have quality building trades programs and utilizes existing technical instructional staff to deliver the energy efficiency classes. This arrangement also provides the opportunity for matriculated students to take advantage of these classes. For example, NYSERDA is working with the Center for Sustainable Energy at Bronx Community College to provide a hub for energy efficiency training activities in the metro-New York area using the City University of New York system as a training platform. The training activities will include not only the delivery of energy efficiency training, but also instructor development activities to increase the number of qualified energy efficiency instructors in the region.

NYSERDA also established a partnership with the New York State Weatherization Directors' Association (NYSWDA). Many technicians working for weatherization agencies enroll in NYSERDA-funded energy efficiency classes. This partnership ensures that efforts are not duplicated and that resources are leveraged. It also provides an opportunity for other building technicians to improve their skills at NYSWDA's training facility that includes a classroom, heating lab, and laboratory house. The LRC, headquartered at RPI, provides technical instruction to contractors in the Multifamily Partner Program as well as contractors in NYSERDA commercial programs. Erie Community College (ECC) has applied to have BPI-recognized energy efficiency classes approved at the DOL's One-Stop Center at ECC. If approved, students enrolling in energy efficiency classes will have access to tuition support and job placement assistance.

2.5. CO-BENEFITS

Economic development is a significant co-benefit of new investment in workforce development. For example, some participating contractors in the Home Performance with ENERGY STAR® Program have grown their businesses significantly, adding both technicians and office staff. Also, a large number of

[14] Proposed Local Law Int. No. 476-A to amend Chapter One of Title 27 the administrative code of the City of New York, in relation to benchmarking the energy and water efficiency of buildings.

BPI-certified technicians support NYSERDA's low-income programs, such as Assisted Home Performance with ENERGY STAR and EmPower New York[SM], as they require certified technicians. In particular, EmPower New York[SM], has seen a large increase in demand for its services and more certified technicians are needed to accommodate the demand.

Training centers have realized economic development benefits as they attract new students to participate in new workforce training and certification programs, and several institutions have reported waiting lists for their training and continuing education initiatives. BPI, located in New York, has seen significant growth as it develops new certifications and certifies more practitioners.

2.6. PORTFOLIO BALANCE

All programs, regardless of program administrator or source of funding, will benefit from an expanding and qualified workforce. This component is necessary to achieve a complete program portfolio and the level of funding requested (1.5% of total EEPS funds) is appropriate.

NYSERDA will continue to work with its training and business partners to ensure a balanced portfolio of training across all sectors. In areas where there is a need for additional training areas, NYSERDA can use the annual solicitation to meet those needs. Tuition and certification reimbursements can be adjusted to ensure that the portfolio of training options is balaneed to meet the needs of the EEPS. Finally, marketing strategies, placement, and frequency can be adjusted as needed.

2.7. DEPTH OF SAVINGS

Properly trained technicians specify higher efficiency equipment, promote efficiency standards, maximize operations and equipment performance, and facilitate long-term accruals of energy savings. With proper training, practitioners will be better prepared to properly design, install, operate and maintain energy efficieney measures to help ensure that that energy savings are realized. By properly training practitioners how to design, build, or evaluate the "whole building", opportunities will be identified and measures recommended or implemented to improve the performance of the entire home, building, or facility as opposed to looking at single measures. Without proper training, these savings will be lost.

2.8. UNDERSERVED MARKETS

NYSERDA's workforce development plan will address issues of social and environmental justice, in that the jobs created by advancing the goals of the EEPS will clear career pathways out of poverty for low-income individuals and communities of color, from low-skill entry level positions into family-sustaining wage positions.

NYSERDA is working closely with DOL, New York City Economic Development Corporation (NYCEDC), CEEBS, the Association for Energy Affordability and others to ensure that training is available to dislocated workers as well as disadvantaged adults and youths. NYSERDA will also align its programs with the DOL's One-Stop System Workforce Development System to build upon the success of this program in targeting underserved populations. Market needs will be better assessed when the Commission approves the full portfolio of Fast Traek Proposals.

2.9. COMMITMENT

Using its existing workforce development programs as a foundation, NYSERDA will ramp up its expanded workforce development programs immediately upon approval and expects to continue these activities through 2011. It is anticipated that the number of students will increase over the entire three-year period and that the need for a trained qualified workforce to meet EPS goals will continue to drive training for existing contractors. The expanded energy efficiency programs will ereate a need for more trained building trades' technicians providing strong job opportunities for those students and workers seeking to enter the energy conservation field. This emerging workforce will provide large numbers of students seeking quality energy effieiency training. Based on the infrastructure developed for its existing

workforce development programs, NYSERDA will quickly and appropriately respond to meet increased student demand for this technical training.

2.10. CUSTOMER OUTREACH

NYSERDA marketing efforts for workforce training will be significantly ramped up to promote workforce training initiatives and opportunities. NYSERDA will work closely with its partners, such as DPS Staff, the Department of Labor, and others, to market the EEPS training programs and will be a multi-media approach.

A comprehensive workforce training and education web portal will be developed to serve as a central location for information on all residential and commercial training programs and job opportunities within the State. The portal will link to resources offered through the www.GetEnergySmart.org website to recruit students, market training programs, market partnerships with colleges, universities and private companies participating in the internship and apprenticeship programs, and coordinate with entities such as the NYC EDC to educate consumers about the benefits of working with nationally certified contractors and other trained providers.

NYSERDA plans to coordinate with New York City's marketing and customer outreach efforts underway associated with its plaNYC to address energy efficiency workforce issues. The Mayor's Office of Long Term Planning and Sustainability, NYC & Company and the Economic Development Corporation's Energy Policy Department will work with NYSERDA to incorporate workforce issues in their ongoing energy efficiency campaign.

2.11. COLLABORATIVE APPROACH

NYSERDA works closely with the members of the Governor's Renewable Energy Task Force and the EEPS Workforce Development Working Group and relied on their input in developing this Program. Representatives of the EEPS Workforce Working Group have provided information on training needs, available resources, job placement, student population issues, and funding needs. NYSERDA is a Co-Convener of the EEPS Workforce Working Group.[15]

2.12. FUEL INTEGRATION

Much of the training for this Program supports a comprehensive, whole- building approach. As students learn to identify and address energy conservation opportunities for both electric and gas utilities, benefits accrue across customer classes and fuel sources.

2.13. TRANSPARENCY

Training evaluation reports, including attendee lists, training schedules, instructor performance evaluations, and other supporting data are available for public review and accessible to other program administrators.

2.14. PROCUREMENT

Workforce development tasks described in this proposal will primarily be implemented by third-party providers that are competitively procured by NYSERDA. New training programs and initiatives that meet new or changing EEPS needs will also be competitively procured.

2.15. BUDGET.

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[15] The EEPS Working Group VII members are: the New York State Department of Labor, SUNY Alfred, New York State Department of Public Service, Hudson Valley Community College, Association for Energy Affordability, New York Energy Consumers Council, investor-owned utilities, Siemens, ACE-NY, Conservation Services Group, New York City Economic Development Corporation, and NYSERDA.

The table below shows the projected Workforce Development Program budget for 2009-2011.

Table V-1. Workforce Development: Budget (Projected) 2009-2011

EEPS	2009	2010	2011	Total
Workforce Development	$6,176,919	$5,526,717	$4,551,414	$16,255,050

	2009	2010	2011	Total
Marketing	710,619	635,817	523,614	1,870,050
Implementer	1,857,411	1,661,894	1,368,619	4,887,924
Incentives	3,537,069	3,164,746	2,606,261	9,308,076

2.16. EVALUATION.

Evaluation Goals: Evaluation goals related to this effort include conducting a joint process and market study to assess awareness of trainings, perceptions of trainings by training participants as well as employers, program penetration, number of jobs created, satisfaction and barriers to participation. An impact evaluation is not planned with evaluation funds set aside for this program, but energy savings impacts resulting from work force training efforts can be examined through evaluations conducted on the associated end-use programs (e.g., Home Performance, Multifamily Performance, etc).

Brief Overview of the Evaluation Approach: The evaluation approach presented in this section was designed based on NYSERDA's current plans for the design and implementation of the Workforce Development Program, and in the absence of complete knowledge about final evaluation protocols, and potential funding set-asides and plans for overarching evaluation projects that would serve the needs of all EEPS program administrators. Thus, these plans have been prepared in order to afford NYSERDA and its independent contractors flexibility to adapt the evaluation approaches that best suit the program as implemented once a greater understanding is in place regarding final evaluation protocols and funding. NYSERDA's estimated evaluation budget for this program includes a set-aside for developing a full evaluation plan, an effort that will involve DPS Staff and the EEPS Evaluation Advisory Group.

Evaluation Budget: NYSERDA expects the evaluation budget for the Work Force Development Program to be approximately equal to 5% of the program funding level, less yet-to-be determined funds set aside for Statewide studies and other overarching costs borne by program administrators. As the Work Force Development Program is not expected to separately count direct energy savings, evaluation funding will be designed to account for the specific needs of the program, and allocated roughly equally to process and market evaluation. Should funding be provided by the NYS Department of Labor, discussions should determine what portion, if any, will be allocated to evaluation. If funds are added for evaluation, they could be used to supplement the proposed activities presented in this plan.

Evaluation Schedule: Process evaluation is expected to occur during each year that the program is operating. During 2009 and 2010, NYSERDA's independent evaluation contractors will work with NYSERDA evaluation and program staff to develop post-training survey questions for assessing curriculum usefulness and effectiveness for each training program funded by NYSERDA. These surveys will be implemented at the close of each training effort. The evaluation will likely also involve phone interviews with a sample of training participants each year to assess response to the training and assess the level of learning. In 2011, NYSERDA's independent evaluation contractors will conduct a full

evaluation of the training effort, including interviews with program staff, trainers, and surveys of a sample of participants and their employers regarding their post-training experience.

Market evaluation is expected to occur in 2009 and again in 2011. In 2009, NYSERDA's independent evaluation contractors will conduct an initial assessment of market needs among energy efficiency services industry employers exploring topics related to staffing needs, required skillsets, availability of skilled labor, and anticipated evolution of the marketplace. In 2011, a follow-up study is expected to assess the degree to which the training efforts have affected the market needs of energy efficiency services industry employers examining time-series trends in the data collected during the first year evaluation effort as well as additional researchable issues identified by earlier evaluation work.

Table 0-2. Workforce Development: Evaluation Schedule

Evaluation Element	Expected Completion		
	2009	2010	2011
Process Evaluation	X	X	X
Market Evaluation	X		X

Measurement and Verification and Net-to-Gross: Impact evaluations are not planned for this program. Energy savings impacts resulting from work force training efforts can be assessed through evaluations conducted on the associated end-use programs (e.g., Home Performance, Multifamily Performance, etc). Interviews with market actors who participated in the workforce development training and with those who did not can be used to estimate energy savings impacts due to these efforts.

Process and Market Evaluation. Evaluations of work force training efforts should be grounded in Kirkpatrick's four levels of evaluation for assessing training effectiveness[16]. The four levels address response of the trainee to the training, assessing what was learned, assessing performance in the workplace and estimating the effects of the training on the work place. Addressing these four levels requires both process and market evaluation activities such as surveys and interviews with program implementation staff, NYSERDA program staff, trainers, participating and nonparticipating technicians, and aetual and potential employers in the market place and broadly examining the market response to the efforts.

The planned evaluation efforts will assess awareness and knowledge of NYSERDA and other related training efforts in New York, perceptions of the NYSERDA-funded training effectiveness and usefulness, recruitment vs. certification rates, and partieipant and employer satisfaction. A key eomponent of the efforts will be to assess the first year for each training effort and provide feedback to the trainers on student response to the curriculum. As each training effort matures, the evaluation efforts will shift toward examining market response to the training, exploring topics related to employer staffing needs, availability of skilled labor, and anticipated evolution of the marketplace.

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[16] Kirkpatrick. D. *Techniques for Evaluating Training Programs.* Journal for the American Society of Training Directors, 13. 21-26, (1959b).

The breadth of impact anticipated from workforce training requires a variety of data collection efforts. Sampling strategies will be developed for each training activity to ensure that sufficient feedback is provided such that the program curriculum can evolve effectively. Timing is also critical in that input should be provided to trainers as soon as possible after training efforts are initiated so trainers can improve their curricula based on initial market feedback and also develop a mindset founded on the concept of continual improvement. As the workforce training effort grows, sampling of participants and targeted employers can be conducted at the 90/10 confidence/precision level. Information will be collected from market actor surveys and interviews by NYSERDA's independent evaluation contractors. Data analysis will be conducted by NYSERDA's evaluation contractors following established protocols.

The process evaluation will be conducted at a modest level for 2009 and 2010 to provide on-going feedback regarding the curriculum and training effort implementation and associated participant response. A full scale process evaluation will be completed in 2011. A baseline market study with energy efficiency services industry employers will be conducted in 2009 with a follow-up study conducted in 2011 to examine the effects of the training efforts on the energy efficiency services industry needs and examine longitudinal trends in the baseline parameter measurements.

Evaluation Plan Variations. Given the level of uncertainty regarding final evaluation protocols, statewide studies to be conducted by all program administrators, and funding levels needed to support overarching evaluation studies and activities, the evaluation plan presented in this section should be viewed as scalable and flexible. With reduced funds, NYSERDA would likely reduce the number of evaluation cycles. With enhanced funds, the market assessment anticipated for this project could be conducted at a much broader level to include traditional, non-energy efficiency services industry employers (e.g., architects, engineers, contractors, unions, etc.), but such a study would require statewide participation.

APPENDIX C -- EXISTING WORKFORCE DEVELOPMENT PROGRAMS

NYSERDA has taken a lead role in providing workforce training programs in the State's energy sector. NYSERDA currently implements workforce training programs to support product development, manufacturing, distribution and sales, installation, operations and maintenance, and performance monitoring of energy efficiency products and systems (also renewable energy, not addressed in this plan). NYSERDA partners with many organizations throughout the State to promote development of technical workforce capabilities for technicians and professionals involved in the procurement, sales, design, installation and maintenance of EE technologies.

For example, NYSERDA is working with Hudson Valley Community College (HVCC) to implement energy efficiency workforce training initiatives. The Center for Energy Efficiency and Building Science (CEEBS), headquartered at HVCC, develops and delivers energy efficiency and building science training across New York State. The training, which is recognized by the Building Performance Institute (BPI), provides building science instruction to building technicians, architects, engineers, and other building professionals.

HVCC's curriculum is available to other training entities through licensing agreements with NYSERDA, which owns the curriculum. Thus far, ten licensing agreements have been signed, with four currently in negotiation. Schools, energy service providers, private industry and public entities have taken advantage of using this curriculum, saving them time and funds, and giving them the ability to get training programs underway immediately.

HVCC is currently partnering with ten other CEEBS Learning Centers including Onondaga-Cortland-Madison County BOCES, Broome Community College, Erie Community College, Bronx Community College, Fulton-Montgomery Community College, the Association for Energy Affordability (AEA), Westchester Community College, Onondaga Community College, and SUNY Canton. NYSERDA will increase the number of learning centers as appropriate to meet student demand as part of its EPS effort.

NYSERDA has also provided support to the City University of New York (CUNY) to provide Building Operator Certification (BOC) training. This is a competency-based training and certification licensed from the Northeast Energy Efficiency Council. CUNY is an eligible BOC training provider. This partnership is designed to provide local training access to New York City participants involved in improving the operational efficiency of commercial buildings, and will expand from previous NYSERDA effort to sponsor BOC training for schools and institutional facility directors since 2002.

NYSERDA has considerable experience leveraging technical training developed by subject matter experts to quickly bring training to increased number of participants in New York State. Through competitive solicitations, NYSERDA has selected providers to develop and deliver technical training for manufacturers, distributors, and contractors in the commercial sector. Examples of these efforts include; 25-courses for High Performance School Design Online Training, instructor-lead retro-commissioning training, optimizing compressed air-systems, boiler efficiency training, and energy efficient lighting design. In addition, NYSERDA has sponsored a portion of tuition costs for technical training or certification examination costs for program participants, such as NYSERDA-sponsored ASHRAE Workshop on Improving Data Center Efficiency, and the National Council on Qualifications for the Lighting Professions (NCQLP) certification exam for participants in the Small Commercial Lighting Program.

NYSERDA currently assists in the development of technology-based training for trade unions in New York State, such as Unitary HVAC Advanced Diagnostics Training & Train-the-Trainer, Green Building Maintenance Training, and Green Building Operations Energy and Water Efficiency Training. Green Building curriculum is based on standards established by the Building Performance Institute (BPI) and the U.S. Green Buildings Council (USGBC) LEED® (Leadership in Energy and Environmental Design) Green Building Rating System.™ NYSERDA is also developing a new partnership with the USGBC, the Contractors' Association of Greater New York (CAGNY), and trade unions to develop a series of green building skills curricula specifically for contractors, trades, and building managers. The overall goal is to increase the knowledge of green building methods and the use of sustainable energy-efficient materials and practices in new construction, renovation projects, and ongoing building maintenance for the commercial and residential markets. Curriculum will include foundations of green and energy efficient buildings, facility management and operations, construction management, commissioning, MEP trade-specific skills, envelope and interior trade-specific skills.

Other NYS agencies and local entities provide EE and RE training programs, though not as numerous and comprehensive as NYSERDA's. For example, the NY Power Authority provides LEED training to staff and participants in their programs, and Comprehensive Energy Management training to all of their engineers. LIPA has leveraged NYSERDA's effort with HVCC to have them provide training for the LIPA Home Performance with Energy Star and Energy Star Labeled Homes Programs.

These existing efforts provide a good foundation for expanding to meet the EEPS goals.

APPENDIX D – WORKFORCE DEVELOPMENT: UTILITY 90-DAY FILINGS

The following provides a review of utility workforce programs submitted to the New York State Public Service Commission on September 23, 2008 – under this proceeding.

Central Hudson Gas & Electric (CHG&E)

Addresses accomplishing residential HVAC program objectives by providing proper training, education and incentives to contractors for quality installations of such energy HVAC efficient equipment.

Con Edison

Addresses Education and Training to obtain superior quality from its staff and contractors and states that Con Ed will work to provide appropriate training to support all functions of its programs from responding to program inquiries to the installation of complex heating and cooling equipment. Con Edison will provide on-going training throughout the Programs' period of delivery.

Identified the following specific areas where education and training will be critical to supporting a robust, successful program.

Contractor Education – Con Edison will provide training to its selected administrative and implementation contractors, providing both classroom-style training and written and electronic materials. Educational topics may include, but will not be limited to, advanced energy efficiency equipment installation and best practices, program protocols and guidelines, quality assurance requirements, delivery approach, monitoring protocols and reporting requirements.

The Company will continue to work with NYSERDA, New York City and other interested parties in the State to identify areas where collaboration can increase program and budgetary efficiency (e.g., delivery protocols, marketing and training). Con Edison intends to continue these beneficial discussions to foster productive efficiency strategies and develop new program opportunities.

Program Cost Components – include Program Development and Administration and costs to administer Con Ed's energy efficiency programs, which include "certain staff training".

Program Marketing and Trade Ally Activities – include activities associated with energy efficiency training and education of the trade ally community. This community includes, but is not limited to heating contractors, weatherization contractors, efficiency equipment and product installers and C&I auditors. Trade Allies may also include community groups and trade associations. This cost category also includes vendor recruitment, training and coordination costs (e.g., quality installation training).

Residential Direct Installation Program – Con Edison will provide training for its selected vendors with respect to necessary business processes, administrative procedures, roles and responsibilities, quality assurance protocols, budgets, reporting and timelines and will provide ongoing facilitation and oversight throughout the program delivery period.

Con Edison also will recruit and pre-qualify installation contractors to deliver high efficiency equipment installation services. Installation contractors that participate in the program ("pooled

contractors") on behalf of their customers will be required to complete an application and pre-screening process and will be trained in technology applications and installation best practices.

New York State Electric & Gas (NYSEG)

An initial meeting between NYSERDA and all utility program administrators was held and several opportunities for complementary programming were identified. These included reinforcement of NYSERDA's utilization of Building Performance Institute ("BPI") certified contractors in the Companies' HVAC programs, mutual program referrals for residential and non-residential programs, the potential development of additional increased training opportunities, and some level of data sharing. Once again, discussions of these and similar opportunities are planned to continue, and any specific changes to take advantage of joint opportunities will be phased in over time.

NYSEG's Residential Energy Star® HVAC Program - Quality installation measures that are consistent with BPI training will be encouraged. These quality installation measures will include proper sizing, proper airflow over evaporator coils and proper charging of the refrigerant. Periodic trade ally meetings and training sessions will be held to maintain a high level of awareness concerning the program and to recognize positive results.

Orange & Rockland (O&R)

O&R expects superior quality for its staff and contractors and will work to provide appropriate training to support all functions of its programs from responding to program inquiries to the installation of complex custom design systems. O&R will provide on-going training throughout the entire period of program delivery. O&R has identified the following specific areas where education and training will be critical to the success of the Programs.

Contractor Education - While O&R will provide training to its selected program contractors on its suite of program offerings, contractors will be encouraged to take advantage of NYSERDA's subsidized Building Performance Institute Training Program. The more contractors that are BPI certified in the O&R service territory, the more opportunity there will be for the installation of energy efficient equipment.

Program Marketing and Trade Ally - Trade Ally includes all activities associated with energy efficiency training and education of the trade ally community, which includes, but is not limited to: heating contractors, weatherization contractors, efficiency equipment and product installers, residential and C&L auditors, residential and C&L builders and developers.

Program Administration and Delivery - The O&R Existing Homes Program third party vendor will provide a single point of contact for any O&R customers wishing to explore efficiency retrofit options, and schedule audits and receive direct installation services. To ensure the highest quality installation and appropriate diagnostic testing, the program will require all work to be done or supervised by technicians who have received certification from the Building Performance Institute (BPI) or a comparable credentialing organization. The third party vendor will provide O&R and its customers with "turn-key" services that include: development of BPI certified DI contractor infrastructure and development and implementation of DI contractor training programs.

Market Barriers - Successful programs directly address each of these barriers through a combination of strategies designed to build consumer confidence in both the measure selection and installer selection process and to minimize participation costs. These activities may include

technical assistance and training of contractors on energy efficient existing homes' installation practices.

Evaluation of Residential HVAC Program - The Program will highlight the significance of Building Performance Institute (BPI) certification training offered by NYSERDA and encourage local contractors to become BPI certified.

National Grid

Keyspan

Target End Uses, Recommended Technologies, and Financial Incentives – Work must be performed by BPI-certified contractors in order to be eligible for an incentive. National Grid will encourage these contractors to receive training and their BPI-certification so they can offer the higher incentive to their customers.

Program Marketing and Trade Ally – Trade Ally includes all activity associated with energy efficiency training/education of the trade ally community which includes but is not limited to: heating contractors, weatherization contractors, efficiency equipment/products installers, residential and C&I auditors, residential and C&I builders and developers.

Upstate

Program Administration and Delivery – This program will be delivered and administered by the Company through its in-house technical and account management staff, supplemented by outside contractors and will provide participants with financial incentives, technical assistance, training, and commissioning.

Target Marketing Approach – Through the Energy Initiative Program, the Company will also actively support regional and national market transformation initiatives. One such initiative is the Compressed Air Challenge that supports better practices with compressed air systems and equipment. Another initiative is Building Operator Certification that trains and certifies facility personnel in energy and resource efficient operation of building systems at two levels: (1) Level 1 - Building Systems and Maintenance; and (2) Level II - Equipment Troubleshooting and Maintenance.