

GREEN WORKFORCE DEVELOPMENT FOR THE COMMERCIAL/INDUSTRIAL SECTOR

NYSERDA currently offers a number of technical and professional development training programs for the Commercial/Industrial sector. Offerings are organized into four categories: 1) Labor Unions/Trade Training, 2) Professional Certification Training, 3) Accredited College/University Curriculum and Continuing Education, and 4) Career Development and Professional Training.

LABOR UNIONS / TRADE TRAINING

At the request of the Service Employees International Union (SEIU) Local 32 BJ and International Union of Operating Engineers (IUOE) Local 94, NYSERDA has assisted with the development and delivery of green building/ sustainability training for over 75,000 members of Local 32 BJ and over 3,000 members of Local 94, respectively. Kuba Brown, Business Manager and President of Local 94, recognizes that improving the technical abilities and mechanical/electrical skills sets is needed to address problems such as air quality, environmental control, electrical power systems and building monitoring and management systems is necessary to meet the increasing demand of the Real Estate industry. Through program accreditation, and a cooperative study alliance with the Building Owners and Manager's Institute (BOMI), graduates of Local 94's Training Center are eligible to receive BOMI certification as Systems Maintenance Technician (SMT), and Systems Maintenance Administrator (SMA). The Green Building Training described below has been incorporated into the required certification courses for Local 32 BJ, and Local 94 participants may be eligible to be certified by Building Performance Institute (BPI) as an Energy Efficient Building Operator (EEBO).

Green Building Cleaning and Maintenance Training

Audience: SEIU Local 32 BJ membership

Course Type: Instructor-Lead

Duration: 6-8:30PM, once per week for 11 weeks

Description: This 11 week certification consists of a series of courses covering green building management and maintenance practices, and has been running for two years. It includes a field trip to a green building and energy audit tour.

Certification: SEIU certification

Green Building O&M and Energy/Water Efficiency Training

Audience: IUOE Local 94 Operating Engineers membership

Course Type: Instructor-Lead

Duration: 3-hour sessions; scheduled for 2008

Description: This seminar series includes five introductory three-hour modules for any level of building operators; six higher level classes to bring participants into advanced areas of current practice in addition to future technologies that could be retrofitted into existing buildings, and one "green building" site visit. Topics cover high performance building management practices, energy efficient operation of existing and new equipment, "green" management and maintenance practices, water use reduction measures, and application of the USGBC Leadership in Energy and Environmental Design (LEED) process for existing commercial buildings.

Certification: Energy Efficient Building Operator (EEBO) Independent third-party certification through the Building Performance Institute (BPI), a national organization dedicated to identifying advanced building performance knowledge in the trades through written and field testing.

Unitary HVAC Advanced Diagnostics Training & Train-the-Trainer

Audience: IUOE Local 94 Operating Engineers membership

Course Type: Instructor-Lead

Duration: 3-day seminar; scheduled for 2008

Description: This 3-day seminar covers concepts in the application of advanced diagnostics for air- and water-source unitary HVAC systems.

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PROFESSIONAL CERTIFICATION PROGRAMS

Third-party certification through such organizations as the Building Performance Institute (BPI), Northwest Energy Efficiency Council, NYSDEC, NYSDOH, and other entities helps to leverage existing training curriculum, more quickly deploy training within the State, and reinforce quality training standards. NYSERDA's approach to building a strong infrastructure of trained professionals is to work with industry-based, non-profit credentialing organizations and target trade groups to assess competency, develop and deploy custom training solutions, and provide certificates of excellence to participants that achieve performance standards.

Building Performance Institute (BPI) – BPI works with the building performance industry stakeholders to ensure that the professional bar for excellence in building performance contracting is established and maintained by creating and regularly updating technical requirements. BPI measures the knowledge, skills and competency of individuals, and evaluates the organizations impacting building performance through an integrated certification, accreditation and quality assurance program designed to support the building performance contracting industry. NYSERDA is working with Local 94 Operating Engineers to submit Green Building Training to BPI for Energy Efficient Building Operator (EEBO) certification.

Building Operator Certification (BOC) – Competency-based training and certification licensed from the Northeast Energy Efficiency Council is designed to improve energy efficiency of commercial buildings. NYSERDA has offered BOC training to building operators in the K-12 schools sector and facility directors of New York State facilities since 2002. The Program was marketed to the schools sector in collaboration with the Superintendents of Buildings and Grounds Association.

Two advanced Building Operator Certification program courses will be offered in 2008. These courses are a multi-day training progression with tests at the conclusion of each day/topic. To maintain certification, attendees must complete on-going training each year.

Water Operator Certification Program New York State has a water treatment operator certification program for community water systems that treat their water supplies. There are six grades of certification, based on the size and complexity of the water systems. Each operator is required by NYSDOH to meet certain education, training, and experience requirements to be certified. NYSERDA has coordinated with NYSDOH to help integrate energy efficiency and energy operations into the certification program through development of program content and a Train-the-Trainer initiative.

Wastewater Treatment Operator Certification Program Certification in New York State is mandatory for individuals to be qualified as a chief operator or assistant/shift operator of a Wastewater Treatment Plant for the purpose of meeting the requirements of its State Pollutant Discharge Elimination System Permit (SPDES). NYSERDA has coordinated with the NYSDEC to help integrate energy efficiency and energy operations into the certification program through development of program content and a Train-the-Trainer initiative.

National Council on Qualifications for the Lighting Professions. The National Council on Qualifications for the Lighting Professions (NCQLP) is a non-profit organization founded to preserve and protect the well-being of the public through effective and efficient lighting practice. Through a peer-review process, the NCQLP establishes the education, experience, and examination requirements

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for baseline certification across the lighting professions. Those who successfully complete the NCQLP Lighting Certification Examination are entitled to use the appellation, LC (Lighting Certified), after their name for professional purposes. NYSERDA supports the NCQLP as a member of the council and with a seat on the Board of Directors. NYSERDA also underwrites a portion of the exam costs for lighting professionals who take the exam and are participants in the Small Commercial Lighting Program.

School Facilities Management Institute (SFMI) Certified Facility Director Training. The NYS Association for Superintendents of School Buildings and Grounds, Inc. established the School Facilities Management Institute (SFMI) as a non-profit organization for the purpose of providing education and training programs for school facilities management. Educational programs are offered to Directors of School Facilities, their key staff and others interested in pursuing a career in this field. NYSERDA provides continuing education training courses to support certification renewal as required every 5 years.

North American Technician Excellence (NATE) Certification Program. NATE is the nationwide certification program for HVACR technicians working in the residential and light commercial market supported by the entire industry across all levels, contractors, manufacturers, wholesalers/distributors, educators, engineers, and technicians. NATE is a voluntary program supported by organizations such as the Air Conditioning Contractors of America (ACCA). With membership of over 4,000 air conditioning contractors, ACCA has worked with the Consortium for Energy Efficiency (CEE), NYSERDA, and a broad collation of industry stakeholders to develop the ANSI/ACCA S QI-2007 HVAC Quality Installation Specification. NYSERDA plans to support this voluntary standard and NATE certification through further collaboration with community colleges and technical training centers via the Business Partners: Building Performance and HVAC Program.

ACCREDITED COLLEGE/UNIVERSITY PROGRAMS & CONTINUING EDUCATION

To address the immediate shortage of trained professionals in the real estate industry, increase market awareness, and expand technical skills in building performance, NYSERDA has funded the CUNY Building Performance Laboratory (CUNY BPL) to conduct research and development in building performance, support student internships in building science, and develop continuing education and standard curriculum in energy efficiency and building performance. CUNY has leveraged NYSERDA funding by coordinating with other internal and external funding sources to develop technical curriculum in energy efficiency and building performance.

Introduction to High Performance Green Buildings. Taught Spring 2007 at CUNY's Murphy Institute for Labor Education. A 15-week academic course, success of which was the basis for IUOE Local 94 seeking support from NYSERDA to offer its own Green Buildings course, now being provided by SWA. Course development and pilot was supported by a grant from US EPA.

Energy Services and Technology (EST) Program at Bronx Community College (BCC).

Development of a new Associate-level degree program that includes an automotive track and a buildings track. CUNY BPL provided support for the design of the buildings track program, including a new sequence of seven courses. Development of this program has been supported by a grant to BCC from the National Science Foundation.

EST Courses at the School of Professional Studies (SPS) To accelerate offering of credit-bearing EST courses, approval was obtained to teach two of the BCC-EST program's courses on a pilot basis. Building Systems – 1 was taught Fall semester 2007 and Principles of Energy Management is presently

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being taught in the Spring semester 2008. As the SPS serves a working adult audience, the courses were structured to have a practical focus on system operations.

EST at BCC: Development of Continuing Education modules. Two core courses from the program, Building Systems -1 and Principles of Energy Management, have been broken down into shorter Continuing Education formats. The content of these two courses has been reviewed with the national Building Operator Certification (BOC) program and approved as equivalent to their Level-1 training and will fulfill the requirements for that certification.

Sustainability Program at the Newman Real Estate Institute (NREI), Zicklin School of Business, Baruch College. The CUNY BPL has provided technical support to NREI in creating a Sustainability Program within its existing Certificate program. A first course was offered (Fall 2007) after obtaining NYS approval for it to carry Real Estate Broker Continuing Education Units. An enlarged set of “Sustainability” offerings is shown in NREI’s spring program brochure. In addition to collaborating in program and course development, NREI has asked CUNY BPL to provide content for a Sustainability section of its website, intended to serve as a significant source of technical information on high-performance building operations.

Masters Program in High-Performance Building Engineering. At the request of the Dean of Engineering at City College (CCNY), drafted a Masters sequence of existing and proposed new courses. New courses and program are pending coordination with development of other sustainability programming at CCNY.

Graduate Seminar in the Department of Earth and Environmental Sciences at the Graduate Center. Supporting Professor Yehuda Klein, director of the E&ES PhD Program in developing a Spring 2008 graduate seminar to examine issues of power system development utilizing MARKAL modeling. This first-time offering is expected to become a regular part of the curriculum as the basis of on-going student and faculty project investigations.

Internships CUNY BPL’s internship pilot has been very successful, in terms both of employer demand and student experience. Intern work has primarily focused on building performance evaluation, involving field testing and measurements, modeling, energy data management, analysis and reporting. CUNY is seeking to significantly expand this program and has prepared a draft funding proposal. Interns have also been involved in preparing information for the CUNY BPL Stakeholder Consortium (carbon market research) and independently funded research on potential impacts of Codes and Standards and on O&M Productivity Management.

CUNY BPL Curriculum

- **“Introduction to High Performance Green Buildings”.** Fully detailed 15 week course syllabus with readings, website references, presentation slides, assignments, exam. Covers “Green Building Theory”, “Systems” and “Practices”, using the “Triple Bottom Line” as a framework to consider the value proposition of buildings and operations management. Could be broken down into 3 five-week modules.
- **“Building Systems – 1”.** Fully detailed 15 week course syllabus with text readings, assignments, presentation slides, exam. *Emphasis is on practical understanding of equipment types, system configurations, functions, dynamics, control and adjustment for operational efficiencies.*
 - Ready to be offered as 3 five-week modules for Continuing Ed:
 - (a) HVAC Equipment & Systems
 - (b) HVAC Calculations
 - (c) Electrical Systems

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- **“Principles of Energy Management”**. Fully detailed 15 week course syllabus with text readings. Presentation slides, practical exercises, exams under development. *Emphasis is on data utilization in an organizational context to create verifiable energy reductions through systematic plant and operating improvements.*
 - Ready to be offered as 3 five-week modules for Continuing Ed:
 - (a) Energy Data and Information
 - (b) Energy Auditing
 - (c) The Energy Management Organization.

CAREER DEVELOPMENT AND PROFESSIONAL TRAINING

To help address the needs of architects, engineering firms, and other technical providers in the energy and buildings industry, NYSERDA offers training for sales and technical professionals involved in the procurement, sale, installation, and maintenance of renewable and energy efficient technologies. Public action to mitigate climate change, reduce carbon emissions, curb use of fossil fuels, and increase use of renewable energy technologies requires trained professionals to design, install and maintain these new technology systems. According to the National Association of Energy Services Companies, investments in the training of building maintenance workers, superintendents, and engineers could improve the operations of sophisticated heating and cooling systems by as much as 10 percent. These small improvements would save millions of dollars in energy costs each year in large public, industrial, and commercial buildings.

Continued professional training is needed to support professionals already in the workforce, to increase awareness of new technologies, and support the development of marketable skills sets in a wide variety of employment settings. Expanded technical skills in commercial building systems that affect energy use (heating, cooling, lighting, and ventilation) and tenant comfort (temperature, air quality and illumination) is necessary to support the changing needs of the industry. As a registered provider under the American Institute of Architects Continuing Education System (AIA/CES), NYSERDA administers CEU credit for courses as described below.

Green Building/Sustainability

Developing Local Government Sustainability Initiatives (New 2008)

Audience: Local government officials, planners, and citizen's task force groups.

Duration: Full day

Description: Learn successful approaches to be used by local government officials to develop and implement local government sustainability initiatives.

The Art of Conducting Charrettes

Audience: Architects, Engineers, Designers

Course Type: Instructor-Lead

Duration: Full day

Description: Introduction to green building charrette delivery.

Continuing Education Credits: Health, Safety, & Welfare under the AIA/CES (7 for a full day)

USGBC LEED® Training Sessions

Audience: Architects, Engineers, Designers, Facilities staff

Course Type: Instructor-Lead

Duration: Full day

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Description: NYSERDA sponsors these full day events for individuals familiar with LEED and green building principles. Session is helpful for individuals preparing to work on a LEED project or take a LEED Accredited Professional exam.

Continuing Education Credits: Health, Safety, & Welfare under the AIA/CES (7 for a full day)

Building Aid, NY-CHPS and Public School Construction Projects Training Series

Audience: Facilities operators, buildings and grounds, business officials, superintendents, board members, and the design community.

Course Type: Instructor-Lead

Duration: Full day, 7 locations in NYS

Partnership: New York SED

Description: This comprehensive training program will first address building aid and prepare attendees to secure and properly use facility funding. High Performance Schools, NY-CHPS Certification and Green Guidelines will also be covered. Participants will receive tools to facilitate the design of learning environments that are resource efficient, healthy, comfortable, well lit, and contain the amenities needed for a safe, quality education. Training offered 2008.

Introduction to the Cities for Climate Protection Protocol, Mayor's Climate Protection Agreement.

Audience: Local government.

Course Type: Instructor-Lead

Duration: Full day

Description: This training provides participants with toolkit and guidelines for implementing sustainability plans within their city.

High Performance School Design Online Training Program

Audience: Architects, Engineers, Designers

Course Type: Online

Duration: 1 hour per module

Description: This Program provides CEUs to both Architects and Engineers for their professional licenses for free. The series of 28 course modules is based on the Collaborative for High Performance Schools (CHPS) Design Guidelines. NYSERDA has been discussing the expansion of this training offering in 2009 in partnership with the National-CHPS organization.

Continuing Education Credits: Health, Safety, & Welfare under the AIA/CES (1 per course module)

CUNY Building Performance Laboratory Webinars

Audience: Architects, Engineers, Designers, Building owners/managers, Facilities operators

Course Type: Online with option for Custom Instructor-Lead session; CEU credit

Duration: 1- 3 hour per webinar

Partnership: Building Owners and Managers Association (BOMA)

Description: CUNY BPL coordinates webinars in energy efficiency and building performance, customized for New York State. Webinars available through various trade and professional associations are augmented with New York State-specific information with instructor-lead question and answer sessions.

Continuing Education Credits: available according to sponsor.

Technical Training

Introduction to Life Cycle Assessment

Audience: Architects, Engineers, Designers

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Course Type: Instructor Lead

Duration: Full day

Description: This NYSERDA sponsored event provides information regarding life cycle assessment of commercial and industrial equipment.

Data Center Technical Assessment Skills Training.

Audience: NYSERDA FlexTech contractors and service providers

Course Type: Instructor-Lead

Duration: full day session; sessions throughout the state (3 upstate and 2 in NYC). The first one begins March 25, 2008 in Albany.

Description: Assess energy efficiency and retro-commissioning opportunities within data centers.

Small Commercial Lighting Program - Effective, Energy-Efficient Lighting

Audience: Designers

Course Type: Instructor-Lead

Duration: 3 hour session

Description: Learn practical lighting design fundamentals, lighting quality, types of energy efficient lighting and luminaries currently available in the market.

Continuing Education Credits: (1) CEU offered for AIA, PDH, and NCQLP (LC).

Energy Efficiency at Municipal Water and Wastewater Treatment Plants

Audience: Engineers, Municipal Water and Wastewater Treatment Operators and Circuit Riders, Enforcement Personnel and elected officials

Course Type: Instructor-Lead

Duration: Full day and Part Day available

Description: An overview of energy efficiency issues and opportunities in small and medium sized water and wastewater facilities; teaching how to identify and discuss opportunities for energy savings with utility staff and elected officials to implement successful projects.

How to Optimize Compressed Air Systems Workshop

Audience: Manufacturing Engineers, Energy Engineers, Plant Engineers, Plant Managers, Production Managers and Maintenance Supervisors.

Course Type: Instructor-Lead

Duration: Full day

Description: The workshop provides an understanding of the influence of compressed air efficiency on production costs and explains how to evaluate potential energy savings.

Energy Efficiency Training Series

Audience: Energy Consultants, Engineers, Architects, Facility Operators

Course Type: Instructor-Lead

Duration: 4 hrs or 8 hrs sessions

Description: This training program will target energy training for professionals on various topics including: ASHRAE training, benefits of retro-commissioning, primary pumping opportunities, understanding the day-ahead energy market and how to participate, gas efficiency opportunities, etc. Trainings will be offered at different locations across the State. Topics will be formatted to match the audience. Continuing education credits will be offered when possible.

School Facilities Management Institute (SFMI) Training.

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Audience: Facilities operators, buildings and grounds, business officials, superintendents, board members, and the design community.

Course Type: Instructor-Lead

Duration: 1-8 hour sessions

Partnership: Superintendent of Buildings and Grounds Association.

Description: Modules scheduled pursuant to an annual market survey to determine topics of interest for school facilities operators. This has including lighting, motors and drives, boilers, etc.

Boiler Efficiency Training.

Audience: Facilities operators

Course Type: Instructor-Lead

Duration: full day session

Partnership: Boiler Efficiency Institute.

Description: Learn practical concepts in boiler efficiency best practices.

Heating Systems Best Practices

Audience: Medium-sized businesses, facilities operators

Course Type: Instructor-Lead

Duration: full day seminar

Partnership: Boiler Efficiency Institute.

Description: Provides valuable information to help institutional buildings reduce natural gas use.

Steam Plant Improvement Workshop

Audience: Large industrial, commercial, and institutional facilities, facility operators

Course Type: Instructor-Lead

Duration: Two day workshop

Partnership: Boiler Efficiency Institute.

Description: Improve the participant's ability to recognize cost-savings measures in a steam plant and then implement the necessary changes to realize these savings.

GREEN WORKFORCE FUTURE PROGRAM EXPANSION

There is a need to accelerate the deployment of training resources to provide the existing workforce with the training, skills, and experience necessary to meet emerging job opportunities. Future funding should align and expand existing accredited curriculum and certification programs by collaborating with labor unions, local governments, academic institutions, and professional associations focused on workforce training.

- **Collaborate with Trade Unions** – Enhance existing union certification programs around the areas of high performance, sustainable, green technologies. Work with the Apollo Alliance and the Consortium for Worker Education (CWE), both labor union-based organizations that promote the development of a green workforce, to develop pathways from communities to jobs for untrained workers. Collaborate with third-party organizations such as the USGBC, and the Building Performance Institute (BPI) to further leverage green building brand recognition within union certification programs.
 - Green Building Cleaning and Maintenance Training (SEIU Local 32 BJ)
 - Green Building O&M and Energy/Water Efficiency Training (IUOE Local 94)
- **Expand Certification Training Programs** - Collaborate with NYS Department of Labor, State agencies, and third-party organizations such as the Building Performance Institute (BPI), Northwest Energy Efficiency Council, NCQLP, SFMI, NATE, and other entities to leverage

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existing training curriculum, more quickly deploy training within the State, and reinforce quality training standards. Add an energy efficiency component to existing certification programs and expand training to new technologies. Develop training for multiple levels (basic, intermediate, advanced) addressing operator skills and advanced technical skills for engineering firms. Include principles in quality design and installation for unitary HVAC, geothermal heat pumps, lighting technologies, and building automation and monitoring.

- Water Operator Certification Program (NYSDOH)
 - Wastewater Treatment Operator Certification Program (NYSDEC)
 - Building Operator Certification (Northwest Energy Efficiency Council)
 - Lighting Certification Program (NCQLP)
 - Certified Director of Facilities (SFMI)
 - North American Technician Excellence Certification Program (NATE)
- **Support EE/RE Concepts in Accredited Academic Programs** - Provide technical expertise for New York's universities, community colleges, and other accredited educational institutions to augment existing curriculum with concepts in energy efficiency technologies (metering, building performance and monitoring systems, geothermal, combined heat and power, etc.). Establish new curriculum, continuing education programs, and online webinars in the areas of sustainability and energy efficiency.
 - **Fund Internship Programs** – Collaborate with universities, community colleges, and BOCES Programs to implement Student Internship Programs and other On-the-Job Training Programs in partnership with the public and private sector. Funding will be required to purchase energy efficiency equipment, building performance measurement tools, energy modeling software, program coordinator staff support, etc.
 - **Expand Career Development and Professional Training Programs** – Add training development and delivery elements to all C/I deployment and Market Transformation programs. Leverage existing NYSERDA Quality Installation Certification Programs to provide maintenance and operation training for trade professionals on renewable technologies (small wind, solar thermal, biomass, and anaerobic digestion systems) and energy efficiency technologies (geothermal heat pumps, unitary HVAC).