

Energy Storage Workforce Development

**Training Needs Assessment, Training Inventory,
and Workforce Development Investments**

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1 Energy Storage Workforce Needs Assessment

As outlined in the New York State Energy Storage Roadmap Recommendations and the Public Service Commission's Order Establishing Energy Storage Goal and Deployment Policy (Case 18-E-0130), the New York State Energy Research and Development Authority (NYSERDA) worked with the NYS Department of Labor, Empire State Development Corporation, and training partners, including SUNY, CUNY, labor unions, manufacturers and other stakeholders to gather information to develop this Energy Storage Workforce Development – Training Needs Assessment, Training Inventory, and Workforce Development Investments report. Through an industry partnership approach, NYSERDA completed the following tasks:

- Inventoried specific worker skills that will be required by businesses throughout the energy storage supply chain
- Mapped required skills to existing training resources and the labor pool to identify gaps and shortages
- Worked with stakeholders to develop a blueprint that will ensure a talent pipeline of workers with the necessary skills
- Identified gaps in training infrastructure and capacity in areas such as curriculum, trained trainers, training equipment, job placement initiatives, on-the-job training, internships, apprenticeships, career pathway training, certifications, etc.
- Identified plans to support disadvantaged workers, including youth (18-24), displaced and dislocated workers, women, minorities, and veterans

This report outlines findings and recommendations resulting from this stakeholder effort.

In summary, there are a significant number of energy storage training opportunities currently available in the State, and NYSERDA has several programs in place to provide funding to expand existing training, develop new training offerings and content/curriculum, and support the hiring of interns and new workers to support the energy storage industry. The energy storage and workforce development programs described in Section 3 allow NYSERDA to meet market-driven needs for training, provide direct support for hiring and training workers, and send signals to the market to initiate training activities on an as-needed basis. At this time, NYSERDA has the resources necessary to serve anticipated training needs for energy storage over the next three to five years. Based on stakeholder input, it is anticipated that market demand for energy storage training will increase in 2020/2021, particularly for design, installation and operation, and maintenance practitioners.

NYSERDA staff will continue to engage with stakeholders to assess skills gaps and training needs over time; facilitate partnerships between training providers and businesses throughout the supply chain, including manufacturers; continue to promote relevant funding opportunities; and assess gaps that may require new funding opportunities.

1.1 Worker Categories

The emerging and growing energy storage industry involves workers with different roles, responsibilities, skills, and areas of expertise to design, develop, manufacture, specify, sell, install, maintain, repair, and inspect energy storage systems. To develop plans for addressing training gaps impacting the growth of the energy storage industry in the State, NYSEDA assessed the specific training needs and existing training resources for the following categories of energy storage workers:

1. Engineering and Technical Professionals
2. Business and Finance Professionals
3. Skilled Trades
4. Local Officials
5. Building Operators

Different areas of expertise are applicable to the different worker categories, and the Workforce Needs and Training Matrix (Appendix A) indicates the training needs applicable to each group.

1.2 Energy Storage Workforce Needs

Industry stakeholder input identified key themes of workforce needs throughout the energy storage industry spanning technical topics, hands-on trade and manufacturing skills, energy storage business matters, and regulatory processes. Safety related to energy storage systems is also of paramount concern for those that manufacture, design, install, operate, inspect, and otherwise deal with physical battery infrastructure. NYSEDA categorized the range of workforce needs impacting different workers groups into the following items:

Technical Workforce Needs

1. Fundamental knowledge of energy storage technology and applications
2. Energy storage technical skills among industry participants
3. Energy storage technical skills among students and researchers
4. Power engineering degree programs and graduates
5. Electrician / technician training on energy storage technologies and applications

Financial / Business-related Workforce Needs

1. Knowledge of commercial readiness of energy storage products
2. Expertise related to rate classes, interconnection process, and financial modeling of storage systems
3. Information on zoning regulations and permitting processes

Manufacturing-specific Workforce Needs

1. Advanced manufacturing skills for energy storage products
2. Expertise in battery pack and battery system design, engineering, and production

Other Workforce Needs

1. Safety training
2. Inspection training
3. First responder training

These needs are mapped against the applicable worker categories, the existing training resources, and NYSERDA's proposed Action Items in Appendix A. The order of the needs listed does not represent a prioritization of these needs or categories. NYSERDA will apply input from the market and industry stakeholders about the specific training needs and timing of workforce development support through 2024/2025. The overall priority is focused on long-term talent pipeline development, incorporating energy storage-related expertise into degree programs, skilled trades programs, and continuing education resources for a variety of professionals.

2 Training Inventory

A variety of energy storage training resources are available in New York State, and training providers are positioned to scale up training efforts and/or add new training content as industry needs mature. Some of the key training resources are discussed in the following sections, and the complete inventory of existing training resources identified is included in Appendix A. Information contained in this document, such as web page addresses, is current at the time of publication.

Professional Associations

Professional associations are a trusted source of information, training resources, and industry updates for their respective members and the industry at large. The New York Battery and Energy Storage Technology Consortium (NY-BEST) offers a range of training materials, online and in-person training events, and conferences related to energy storage. They frequently add additional content based on input from industry stakeholders. Likewise, the Institute of Electrical and Electronics Engineers (IEEE) Power & Energy Society offers advanced training on grid and energy storage topics for power engineers working in the field. The National Fire Protection Association (NFPA) offers training resources on battery energy storage systems for first responders.

Colleges and Universities

At least 12 four-year colleges and universities in New York State offer energy storage programs, concentrations, and/or degrees. At least eight universities offer electrical engineering programs that cover grid power engineering. Currently, some community colleges incorporate basic energy storage concepts into renewable energy programs, but these offerings are limited in depth of content. Current NYSERDA training initiatives provide funding to develop new energy storage training programs and curriculum.

As energy storage incorporates multiple disciplines, energy storage degrees and programs, at the university level, are offered through various departments at different schools (e.g., chemistry, physics, energy systems). Research universities with labs and testing and product development centers connected to the industry form hubs of energy storage expertise across the State.

University electrical engineering programs that offer power system specialties are an important contributor to the industry. As stakeholders noted, electrical engineers with expertise in power and grid systems are in demand and in short supply. Existing programs across the State could increase in capacity and continuously update their program content related to energy storage and grid systems to meet this market need.

Technician Training Organizations

Energy storage developers typically engage technicians with utility experience, as general electricians often have limited experience with high voltage systems. Historically, there has not been extensive dedicated training specifically for energy storage topics for electricians and technicians. The Energy

Storage and Microgrid Training and Certification (ESAM-TAC) program, seeking to fill this gap, covers a comprehensive package of topics for electricians working on energy storage projects. That training is expected to be offered at International Brotherhood of Electrical Workers (IBEW) training centers across the state starting in 2020.

Stakeholders indicated that technicians for the energy storage manufacturing sector are in demand. Some manufacturers developed in-house training programs to meet specific needs, as machinist programs and community colleges and trade schools are generally not tailored for the energy storage industry.

NYSERDA Resources

Through online resources, direct technical assistance, and in-person training, NYSERDA provides educational, training, and workforce development support for developers and contractors, local officials, code officials, first responders, and other groups through its Energy Storage and Clean Energy Siting programs.

3 NYSERDA Workforce Training Programs

NYSERDA's workforce development programs offer a range of options for supporting the workforce development and training needs identified by energy storage industry stakeholders. The current workforce development Program Opportunity Notices (PONs) were designed to cover training related to energy storage and a variety of other clean energy technologies and can be modified at any time. Additional PONs can be issued to meet market needs not currently addressed. NYSERDA is also assembling a team of qualified training providers through a Request for Qualifications (RFQL) to meet any unique, time sensitive, or critical gap-related top training. Energy storage is a targeted technology area under the RFQL. Additionally, NYSERDA will continue to build on the current directory of resources and training materials offered by the Energy Storage and Clean Energy Siting Teams.

Key NYSERDA activities to support energy storage workforce training includes the following:

PON 3981 – Energy Efficiency and Clean Technology Training

NYSERDA will fund projects for training organizations to develop new curriculum and deliver training and hands-on experience to ensure new and existing workers have the skills businesses need to work in the energy storage industry. A minimum of \$4 million is currently available and it is anticipated that additional funds will be made available through this PON. This funding opportunity is flexible to support a variety of training activities and topics applicable for different types of workers discussed in this assessment. Professional associations, colleges and universities, technician training organizations, and other educational institutions and training providers can use these funds to begin or expand energy storage training to meet industry needs.

The goal of the PON is to develop training that continues after the completion of the NYSERDA funded effort. Sustainable training models are key to scaling up the State's clean energy training infrastructure. Eligible activities under this PON include curriculum development/updates, train-the-trainer programs, the establishment of properly equipped training labs, and other components that allow training organizations to launch robust training programs designed to extend beyond the term of the NYSERDA funding. Training organizations are encouraged to collaborate with industry partners to establish clear connections between training content and business/market needs. Two examples of energy storage projects that NYSERDA is funding under this program are as follows:

- Curriculum development support, training delivery, and equipment for a new energy storage and microgrid training program offered at New York City College of Technology. The program will train 20 entry-level workers plus and an additional 100–120 existing workers (electricians, installers and building operations staff) through 2023.
- Equipment purchase for the IBEW to offer a condensed version of the ESAMTAC program at 10 IBEW/Joint Apprenticeship Training Committee training centers throughout the State. The IBEW will train 120 members/electricians during the project period and it is anticipated that an additional 1,000 members will be trained at the 10 training centers trainees within three years after the project is completed.

Request for Qualifications (RFQL) 4145 – Clean Energy Training Services

NYSERDA is selecting qualified training providers to deliver training, develop curriculum and/or training tools, and provide market expertise related to clean energy workforce development and training. This PON offers NYSERDA flexibility, agility, and a mechanism to fund specific training activities needed to support the State's progress toward its energy storage goals. NYSERDA will deploy organizations approved through this RFQL to deliver a wide range of workforce development activities on an as-needed basis to meet the needs of the industry. The first group of training providers have applied, and NYSERDA will be accepting applications on a rolling basis to grow this pool of training organization resources.

Example activities NYSERDA will consider funding through this format include the following:

- Continuing education unit (CEU) / professional development hour (PDH) opportunities such as "CEU bootcamps" to encourage participation in training and expand the technical content available to engineering and technical professionals
- Train-the-trainer sessions to bring the ESAM-TAC program to additional training organizations in New York State
- Training initiatives to support battery storage manufacturing activities, including skills development for battery storage manufacturing technicians and specialty knowledge gaps related to battery module/pack development

Hiring Support and Training Programs

Through PON 3982 – On-the-Job Training, NYSERDA is helping clean energy businesses, including those in the energy storage industry, reduce the financial risk of hiring and training new workers. The Clean Energy Internship Program (PON 4000) helps prepare the next generation of clean energy workers by funding internships for college students and recent graduates to perform meaningful work, gain real world industry experience, and support business activities.

Support for Local Officials

NYSERDA will continue and expand workshops and training resources for local officials (outlined in Appendix A). This will include transitioning this training material to an online platform for increased scale and accessibility and/or other expansion plans coordinated by the Clean Energy Siting Team. NYSERDA will also continue to work with New York City agencies and local partners to inform development of policies and procedures for deploying energy storage in New York City, and NYSERDA will assess the need for the development and deployment of additional instructional materials and training resources specific to that jurisdiction.

Market Collaboration Support

NYSERDA will facilitate communication and connections between research and academic institutions and industry in support of workforce development collaboration. These communications and relationships between industry and technical training institutions establish a link between training content and available jobs. This ensures curriculum matches industry needs and avoids specialized

training of new workers before they are needed at scale. Additionally, NYSERDA will continue to serve as a resource for businesses, current workers, and potential entrants to the energy storage industry by making connections of available training resources to appropriate audiences.

Supporting Disadvantaged Workers

NYSERDA supports the participation of disadvantaged populations in the energy storage workforce through funding premiums offered through the PON 3981: Energy Efficiency and Clean Technology Training program as well as prioritized participation in the PON 3982: On-the-Job Training Program. PON 3981 encourages applicants to include dedicated support for training and job placement of priority disadvantaged populations in proposed projects, and NYSERDA awards scoring credit in the selection and award process for those that do so. Through the On-the-Job Training Program, NYSERDA provides funding to cost share a new hire's wage at small companies for a 50% longer period than the standard offering if the worker is from a priority population. NYSERDA only supports new workers at large companies through the On-the-Job Training program if those companies are hiring individuals from priority populations. Priority populations include veterans, Native Americans, individuals with disabilities, low-income individuals, unemployed power plant workers, previously incarcerated individuals, and youth participating in designated work preparedness programs. Future programming efforts will continue and build upon opportunities to include disadvantaged and underserved individuals in workforce development initiatives and job placement opportunities.

Continue Stakeholder Engagement for Workforce Initiatives

As the energy storage market continues to mature, NYSERDA will maintain engagement with key businesses, industry organizations, and training providers to collect updated feedback on training needs. This feedback will also allow NYSERDA to monitor the appropriate timing and scale for workforce development support interventions. NYSERDA will convene a round table stakeholder discussion at the NY-BEST capture the Energy Conference and Expo in April 2020 and will hold periodic conference calls and/or other meetings to solicit updates and suggestions on workforce and training topics. Additionally, NYSERDA will maintain and update the training resources inventory every six months for the next two years as a resource for the market. NYSERDA will advertise and promote existing funding opportunities to appropriate groups to ensure that available funding is applied to meet critical market needs and revise and/or add funding opportunities as appropriate.

Appendix A. Workforce Needs and Training Matrix

To access the standalone Workforce Needs and Training Matrix, please click on the word document icon.



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rix.docx

Appendix B. Contributing Stakeholders

The following organizations provided input for the training needs assessment, training inventory, and workforce development blueprint:

Industry

- Borrego Solar
- Bren-Tronics
- Charge CCCV (Imperium3)
- E. ON
- Enel X
- GI Energy
- Green Machine
- Key Capture Energy
- Lockheed Martin
- MCC SunGEEL
- NEC Energy Services
- O'Brien & Gere Engineers
- Plug Power
- Raymond Corporation
- Stem
- TRC

Educators / Trainers

- Alfred State College of Technology
- American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)
- Capital Region BOCES
- Hudson Valley Community College
- International Brotherhood of Electrical Workers (IBEW)
- Mohawk Valley Community College
- New York City College of Technology (CUNY City Tech)
- Northland Workforce Training Center
- Rensselaer Polytechnic Institute
- Rochester Institute of Technology
- SUNY Binghamton
- State University of New York (SUNY)
- SUNY Polytechnic Institute
- Syracuse University

Other

- NY-BEST
- NYS Department of Labor
- New York Association of Training & Employment Professionals (NYATEP)
- NYS Empire State Development
- Three Rivers Development Corp.
- Eastman Business Park – BEST Test & Commercialization Center



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