Qualified Professionals Working Group
Presents

Qualified Persons and Renewable Energy Systems

Outline

Purpose

This document is intended to provide an overview of concepts and terminology regarding personnel qualifications for the renewable energy industry and the code officials who ensure projects are built in accordance with applicable codes and standards, and to direct interested stakeholders to applicable resources and training. It is an exploratory guide for those working in or adjacent to the industry and is not intended to be an all-inclusive reference on the topic. All resources are provided as a courtesy.

Other sources of information are available and may serve the same purpose as the resources listed here. The primary objectives of identifying qualified persons are to reduce injuries and fatalities, improve worker safety, increase public safety, and improve workmanship. Qualified and competent persons boost the professionalism of industry workers, helping to meet system performance expectations, satisfy consumers, and protect industry reputation.

Who is a Qualified Person?

The renewable energy industry continues to grow each year. National standards, model codes, interconnection policies, local zoning ordinances, and other regulations are constantly being updated to address renewable energy systems. Technologies also continue to evolve, particularly as clean energy equipment becomes more interconnected and networked. With such growth and evolving requirements comes the need for individuals to become better qualified to perform jobs in the industry.

What constitutes a qualified person depends on various factors such as the jurisdiction, organization, and applicable codes and standards.

National Fire Protection Association (NFPA®) 70® National Electrical Code® (NEC®) defines a *qualified person* as “one who has skills and knowledge related to the construction and operation of the electrical equipment and installations and has received safety training to recognize and avoid the hazards involved.”[1]

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[1] *2020 NEC,* Article 100 Definition of *Qualified Person*

Similarly, NFPA 70E(R) Standard for Electrical Safety in the Workplace(R) defines a *qualified person* as "one who has demonstrated skills and knowledge related to the construction and operation of electrical equipment and installations and has received safety training to identify the hazards and reduce the associated risk."[2]

Occupational Safety and Health Administration (OSHA) regulations define *qualified* to mean "one who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated [an] ability to solve or resolve problems relating to the subject matter, the work, or the project."[3]

Who is a Competent Person?

A qualified person is not necessarily competent to perform a specific task. Competence is a measure of proven knowledge, skills, and ability. Many OSHA regulations, standards, and directives use the term *competent person*. For instance, OSHA Safety and Health Regulations for Construction (CFR 1926 Subpart C) requires that employers maintain accident prevention programs to ensure workplace safety and that "frequent and regular inspections of job sites, materials, and equipment are made by competent persons designated by the employers."[4]

OSHA defines a *competent person* as "one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them."[5]

By way of training and experience, a competent person is knowledgeable of applicable standards, capable of identifying workplace hazards relating to specific operations, and authorized to take corrective action. A competent person is appointed by the employer to perform specified duties. When an employer approves or assigns someone to be at a specific location or perform specific duties they are subsequently identified as an *authorized* or *designated person*. Some standards add specific requirements that a competent person must meet. For example, the standard for Fall Protection Systems Criteria and Practices, states that an individual designated as a safety monitor "shall be competent to recognize fall hazards."[6]

More information and resources, including a guide to OSHA standards, training requirements, and premade slideshows covering a wide variety of hazards, can be found at www.osha.gov/competentperson/resources.

Who is Licensed?

A licensee is any business, organization, or individual that has been granted legal permission by another entity to engage in an activity, which would otherwise be prohibited. The permission, or license, can be given on an express or implied basis. A government agency grants permission to engage in a profession, trade, or occupation by certifying that licensees have a minimal competency to uphold public safety, health, and welfare.

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[2] *2021 NFPA 70E,* Article 100 Definition of *Qualified Person*
[3] Code of Federal Regulations (CFR) Title 29 Section 1926.32(m)
[4] 29 CFR 1926.20(b)(2)
[5] 29 CFR 1926.32(f)
[6] 29 CFR 1926.502

States and localities have different licensing requirements for certain types of work. Licensing requirements typically include documenting relevant education and experience, paying applicable fees, and passing an examination. Ongoing requirements once licensed include continuing education, maintaining quality and safety, and paying recurring fees. Many jurisdictions also require business and trade licenses that may include proof of financial stability and an understanding of business laws and consumer protection statutes. Separate licenses may be required to operate a business, perform contracting for a particular trade, and conduct sales of equipment and services. Some jurisdictions have reciprocity whereby license holders from other jurisdictions can meet some or all of the requirements for licensure. When reciprocity is available, it is important to understand what specific requirements are met by holding a license from another jurisdiction and to follow all processes—including applications, fee payments and ongoing requirements—to obtain and maintain the license in each jurisdiction. The Interstate Renewable Energy Council (IREC) maintains a directory of licensing requirements by state for installing solar at https://irecusa.org/solar-licensing-database/.

There are important differences between licenses authorizing individuals to perform work and licenses for companies or contractors to conduct business. An individual license authorizes the performance of work for a qualified contractor. A contractor license gives authorization to contract with customers. While most agencies put the burden on contractors to ensure all workers are qualified, some also have license requirements for each individual working for the contractor, such as the California Electrician Certification Program. Responsibility and liability ultimately rests with the license holder, with an individual being responsible to the contractor, and a contractor being responsible to the customer and the licensing authority.

Licenses typically require demonstration of education and experience, including certifications, training, and on-the-job experience. An individual will often progress through a training period, such as a college degree program or registered apprenticeship program, and multiple years of hands-on work experience under a license holder to become a journeyperson. A journeyperson is recognized for proficiency in the occupation and the ability to perform work without direct supervision. Many jurisdictions also recognize Master-level licenses, which typically confer the ability to train apprentices. Journeyperson status, or sometimes Master-level status, is typically needed to qualify for a contractor or trade license.

Certificates, Certifications, and Training

The education and training needed to become qualified, competent, and licensed is often documented by certificates and certifications. To recognize if someone is qualified and competent to perform a task, it is important to understand the differences between certificates and certifications. Individuals earn certificates by completing training. Certifications recognize a person's competence on an ongoing basis through examination and continuing education or experience. Licenses and certifications typically prescribe training options that must be completed before sitting for an examination. Some jurisdictions have certification requirements for workers to perform certain types of work. In California, all electrical work by a C-10 Electrical Contractor must be completed by state-certified electricians or their apprentices. Most jurisdictions expect licensed contractors to determine if a worker is qualified and competent. Certificates and certifications can help contractors identify which workers and subcontractors are qualified and competent to perform various job duties.

Certificates recognize completion of training at some point and do not have continuing education requirements. Certificates can be earned by completing a single course from a product manufacturer, a multi-semester occupational certificate program from an accredited college, or a multi-year U.S. Department of Labor Registered Apprenticeship Program through an employer or labor union. When

choosing training certificates to demonstrate qualification or competence, it is important to understand who issued the certificate, the scope of the training, any required assessments, and alignment with requirements for certification or licensure.

Certification recognizes competence and usually requires education and experience to qualify, pass an examination, and maintain certification through continuing education or examination on a regular basis. Licensing authorities may use training and certification as a qualification to obtain a license, but the certificate or certification on its own typically does not convey legal authorization to perform work. Certification programs are often voluntary. Individuals use them to distinguish themselves for employers or potential customers who, in turn, may also use them as preferred qualifications.

Employers or government entities often determine qualification requirements to perform a job. The requirements may vary by jurisdiction or organization. The following list includes certification and training programs to help individuals become better qualified in the industry.

Disclaimer: *SEAC does not endorse any of the listed programs, trainings, or other resources. Nor does SEAC guarantee that participation in any programs or trainings will ensure that a person becomes qualified. The list is for information only. It is not intended to be comprehensive.*

Resources

A. Certification Programs and Related Training

Many organizations offer professional certifications related to inspection, plan review, construction crafts, and clean energy.

International Association of Electrical Inspectors
IAEI is a nonprofit professional trade association that is committed to improving electrical safety in the electrical industry. IAEI participates heavily in the code-making process for the NEC(R). The association offers many certifications including for electrical inspectors, code officials, and certification programs to show basic proficiency with the NEC(R). IAEI also provides an extensive directory of online, on-site, and on-demand training to meet certification eligibility and continuing education requirements. www.iaei.org

International Code Council
ICC develops model codes including the International Residential Code, International Building Code, International Energy Code, and International Fire Code. ICC also offers many options for training and professional certifications for contractors and code officials, including structural, electrical, mechanical, and plumbing options for residential and commercial applications.
www.iccsafe.org/membership/pro-development-and-training

International Association of Plumbing & Mechanical Officials
IAPMO offers professional credentialing services through certification and license testing programs. The IAPMO certification program includes certifications for plumbing and mechanical inspectors and plans examiners. In addition, IAPMO provides journeyperson and master license testing for plumbing and mechanical installers in certain states.
www.iapmo.org/certification-testing

National Fire Protection Association
NFPA develops many model codes and standards, including the NEC(R). NFPA offers many options for electrical training and professional certifications for contractors and code officials, including options for electrical safety workers, fire inspector, and plans examiners.
www.nfpa.org/Training-and-Events

North American Board of Certified Energy Practitioners
NABCEP is a nonprofit certification body for renewable energy professionals. NABCEP Board Certifications are available for a variety of occupations within the industry. While best known for the PV Installation Professional certification, NABCEP also offers certifications for those who focus on aspects of sales, design, and installation work, including PV Design Specialist, PV Installation Specialist, PV Commissioning and Maintenance Specialist, PV Technical Sales Professional, PV System Inspector, and Solar Thermal Installer certifications. Each certification has several ways to qualify based on education and experience. Three associate credentials recognize knowledge about the fundamental application, design, installation, and operating principles of photovoltaic (PV), solar heating or small wind energy systems. NABCEP does not deliver training. It organizes an annual conference and has an extensive course catalog of training that meets certification eligibility and continuing education requirements.
www.nabcep.org

UL Solutions
UL Solutions is a worldwide organization dedicated to safety science and training. UL Solutions offers testing, inspection, and certification services, together with software products and advisory offerings that support product innovation and business growth. The UL Certified PV System Installer Certification program is designed to offer individuals an opportunity to differentiate themselves with a credential focused on the critical knowledge and skills of the occupation. Open to qualified electricians, the goal of the PV system installer certification is to improve the safety and performance of PV systems through a more qualified workforce. UL also maintains an extensive catalog of training on equipment standards, building inspection, and related topics.
www.ul.com/services/personnel-certification-individual-competency
https://www.ul.com/services/learning-and-development
www.ul.com/events/on-demand-webinars

National Center for Construction Education and Research
NCCER is an international nonprofit organization that offers training, assessments, and certifications in over 70 craft areas to build a safe, productive, and sustainable workforce for the construction industry. Through standardized curriculum, instructor certification, and organizational accreditation, NCCER ensures that education and testing meet the needs of the industry, support learner goals, and follow rigorous standards.
https://www.nccer.org

B. Training

Many providers offer education and training in a kaleidoscope of formats, topic areas, and durations. Education and training is an ongoing process. While a certification, degree, or apprenticeship may be required to qualify for a particular certification or license, continuous education keeps learners current with technology and regulatory changes. Various courses and programs are typically required, along with continuing education, stackable certifications, and certificates, to ensure competency.

High Schools / Vocational Schools

Many individuals begin career education and trades training in high school. The basic education prepares learners to enter many different career pathways. A high school diploma or equivalent is typically required to enter a union, trade school, or college. Vocational training is also widely available and commonly taught within the secondary school system. Many high schools have multi-year construction trade training programs that align with state license requirements. While the majority of secondary school vocational training occurs within comprehensive high schools, some school systems offer regional vocational schools that students from multiple high schools attend part of the day, and some districts have dedicated vocational schools where students attend full time. High schools with career and technical education, whether a comprehensive school or a dedicated vocational school, may also offer adult and continuing education opportunities during evenings and other times outside of the normal school calendar to support ongoing education and professional development opportunities.

Unions and Trade Schools

Labor unions, trade schools, and merit shop associations provide training in the construction trades, typically in combination with on-the-job training (OJT) in a formal apprenticeship program. Licensure may be obtainable solely through OJT experience working under a qualified contractor or master of a particular trade, but classroom instruction is typically needed to learn fundamental principles and theories that are applied in the field. Renewable energy projects regularly involve multiple trades, including electrical, roofing, carpentry, metal working, plumbing, construction labor, and equipment operation. Each trade usually takes three to five years of work experience and related instruction to reach journeyperson status, with another two years or more to become a master.

Employer Training

Employers are ultimately responsible for ensuring workers are qualified and competent. As such, employers routinely support in-house training for employees. Apprenticeship programs are composed of structured OJT under the supervision and mentorship of a journeyperson and classroom instruction at a college, trade school, or local union. Employers must also train workers on safety, company policies and procedures. The tools and equipment used by the employer also impact the training required for workers to be competent. Employers may have their own training staff or sponsor external training providers to deliver in-house education. It is highly recommended that employers maintain records of the training provided to employees even if not required for license or certification purposes.

Colleges, Universities, and Private Training Institutions

Colleges, universities, and private training institutions are another group of starting points for the educational journey. Most colleges and universities offer an array of options including occupational certificate programs, two- and four-year degrees, advanced master's and doctorate programs, as well as continuing education and professional development courses. Professional occupations, such as engineering, typically require a degree. Occupational certificates are designed to prepare individuals for technician roles. IREC maintains a directory of college, university, and private training programs that offer solar courses and programs at irecusa.org/programs/solar-ready-vets/solar-career-pathways.

Professional and Industry Associations

Professional and industry trade associations are an excellent way to keep up to date with the latest developments in any occupation. One of the primary reasons to join an association is to access education and training resources. Many formats and topics are available such as webinars, workshops, and conferences. Many associations also produce trade journals and publish conference proceedings that reflect the latest developments.

Manufacturers
Manufacturers of products, equipment, and tools often provide the best training on how to properly use their goods. Building codes regularly point to manufacturer's instructions for installation guidelines. Manufacturers have a vested interest in ensuring that people who are installing or using their equipment are properly trained. Manufacturers may provide training at their facilities. They also regularly offer training through conferences, virtual learning platforms, distributors, and OJT with employers.

C. Renewable Energy Training Resources

American Solar Energy Society (ASES) is a non-profit membership association that advocates for sustainable living and 100% renewable energy. The organization shares information, hosts events, and produces resources to expand the use of renewable energy. ASES is the American section of the International Solar Energy Society. The organization also has many state and local chapter affiliates ases.org/our-community/chapters. ases.org

Florida Solar Energy Center (FSEC) is Florida's premier energy research and education institution. Administered by the University of Central Florida, FSEC was created by the Florida Legislature in 1975 to advance research, development, and education in solar energy. FSEC's focus includes renewable energy, energy efficiency, and sustainable transportation research, demonstration, and education. energyresearch.ucf.edu

HeatSpring is an organization that provides online and in-person education and training related to solar, energy storage systems, and other renewable energy technologies. www.heatspring.com

International Association of Electrical Inspectors (IAEI) provides online and in-person education and training related to solar PV, energy storage systems, and other renewable energy technologies. IAEI also offers a variety of courses related to general electrical requirements of the NEC(R). www.iaei.org

InterSolar organizes solar and energy storage expos and conferences. The conferences include in person education and training for various renewable energy technologies. www.intersolar.us

Interstate Renewable Energy Council (IREC) is a nonprofit organization working to advance a 100% clean energy future through workforce development strategies, local initiatives, and regulatory engagement. IREC offers a variety of free online training and other resources for code officials and clean energy professionals, accredits clean energy training programs, certifies instructors, and maintains a directory of solar training programs. irecusa.org & cleanenergytraining.org

Midwest Renewable Energy Association (MREA) is a nonprofit educational organization that provides online and in-person education and training related to solar PV systems. www.midwestrenew.org

Mike Holt Enterprises is a company that provides educational material and training for electrical systems, including solar PV. www.mikeholt.com

North America's Building Trades Unions (NABTU) is a labor organization representing more than 3 million skilled craft professionals in the United States and Canada. NABTU is composed of fourteen national and international unions and over 330 provincial, state and local building and construction trades councils. NABTU maintains a directory of union locals that provide apprenticeship training in the construction trades. nabtu.org

North American Board of Certified Energy Practitioners (NABCEP) is a nonprofit organization that provides a database of available online and in-person training courses for renewable energy systems. NABCEP also organizes educational conferences. www.nabcep.org

RE+ Events is the management company behind North America's largest clean energy event, RE+ (formerly Solar Power International (SPI), Energy Storage International (ESI) & Smart Energy Week) along with a portfolio of regional events throughout the US and abroad. The Solar Energy Industries Association and the Smart Electric Power Association formed RE+ to benefit their research, education, and advocacy activities. www.re-plus.com

Solairgen is an educational organization that provides online and in-person education and training related to solar PV systems. solairgen.com

Solar Energy International is a nonprofit educational organization that provides online and in-person education and training related to solar and other renewable energy technologies. www.solarenergy.org

Solar Energy Industries Association (SEIA) is the national trade association for the solar and solar + storage industries in the United States. With over 1000 member companies from all sectors of the industry, SEIA offers a variety of education and training opportunities and resources for members and non-members alike. seia.org

State and Regional Trade Associations exist in most areas of the United States. Approximately half the states have associations affiliated with the national Solar Energy Industries Association www.seia.org/official-state-affiliates, while others operate independently, including:

California Solar and Storage Association calssa.org
Carolinas Clean Energy Business Association carolinasceba.com
Maine Renewable Energy Association www.renewablemaine.org
Texas Solar Power Association txsolarpower.org

Tonex is a consulting firm that offers training, seminars, and workshops for various renewable energy systems and equipment. www.tonex.com

UL Solutions offers a variety of online training courses related to renewable energy. www.ul.com/events/on-demand-webinars & https://www.ul.com/services/learning-and-development

West Coast Code Consultants (WC^3) is a code consulting firm that offers online and in-person electrical training courses, including courses specific to clean energy topics. www.pathlms.com/wc3-academy

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