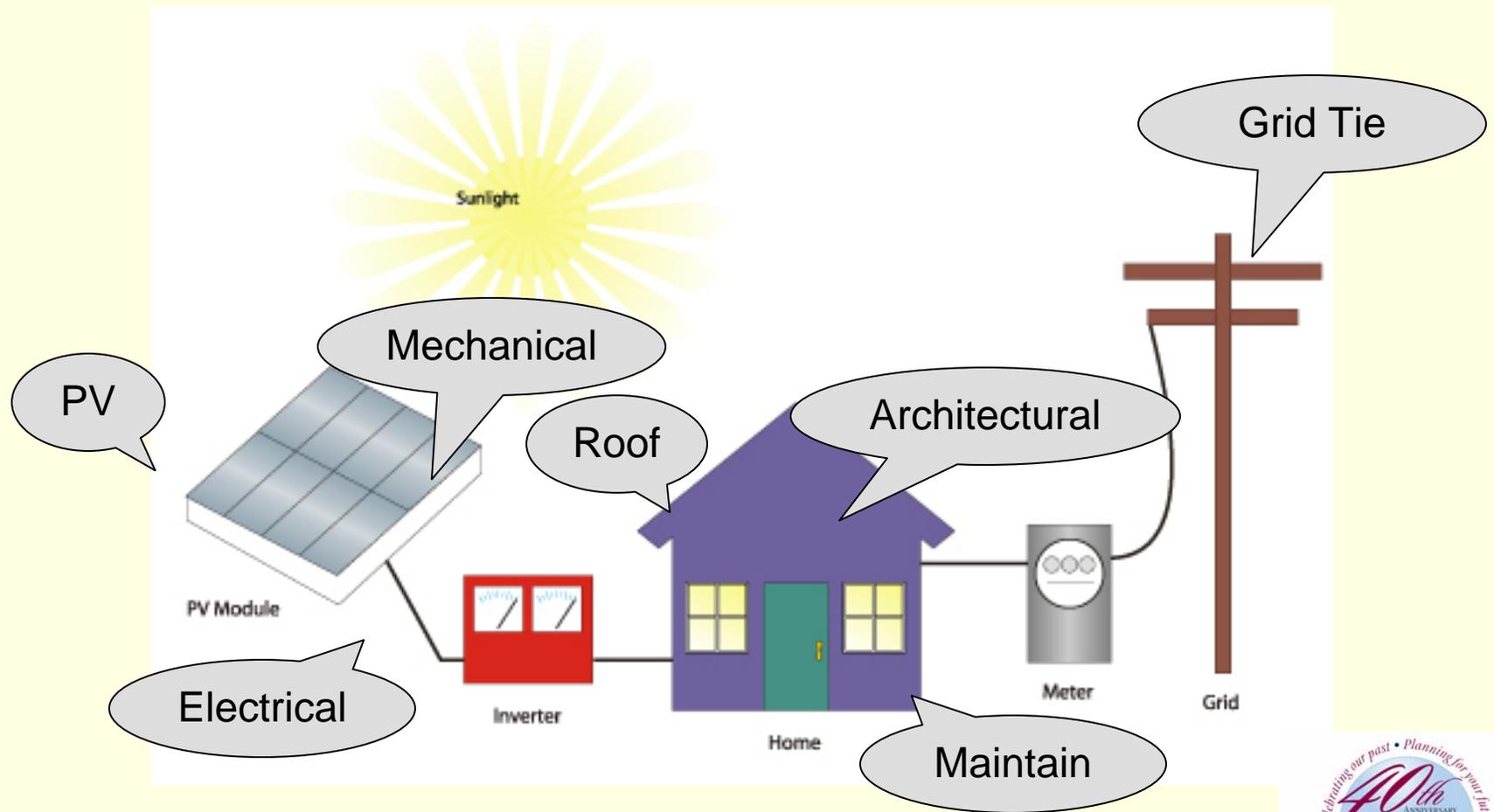


Installer Training & Certification NABCEP

Allan M. Gentry
Cleveland State CC

PV Installation



Why Train & Certify

- Voluntary process
- Recognize those meeting certain predetermined standards or qualifications
- Provide a measure of protection to the public; a credential for judging the competency of practitioners
- Provide practitioners with a way to distinguish themselves from their competition
- Potentially improving quality; improve the public perception of the occupation, helping increase the industry's prominence.

North American Board of Certified Energy Practitioners (NABCEP)

- A volunteer board of renewable energy stakeholder representatives;
 - Solar industry
 - NABCEP certificants
 - Renewable energy organizations
 - State policy makers
 - Educational institutions
 - Trades.
- Members chosen based on experience and involvement in the solar energy industry.
- Mission--to support, and work with, the renewable energy and energy efficiency industries, professionals, and stakeholders; to develop and implement quality credentialing and certification programs for practitioners.
- Goal is to develop voluntary national certification programs that will:
 - Promote renewable energy;
 - Provide value to practitioners;
 - Promote worker safety and skill; and
 - Promote consumer confidence

Certifications Available

- Entry Level Certificate
- PV Installer
- Solar Thermal Installer

Certifications in Development

- Small Wind Energy Systems Installer Certification

How Do Certifications Develop?

- Task Analysis / Job Analysis
 - Knowledge
 - Skills
 - Abilities
- Targeted for
 - Installing
 - Maintaining
 - Troubleshooting

Entry Level Installer

- Achieved basic knowledge
- Comprehension and application of key terms and concepts of photovoltaic system operations
- Demonstrate passing an industry-designed exam based on learning objectives
- Employment opportunities enhanced by starting with an understanding of the basic terms and operational aspects of a PV system
- Certificate by itself does not qualify an individual to install PV systems

Entry Level Installer

- PV Markets and Applications
- Safety Basics
- Electricity Basics
- Solar Energy Fundamentals
- PV Module Fundamentals
- System Components
- PV System Sizing
- PV System Electrical Design
- PV System Mechanical Design
- Performance Analysis and Troubleshooting

Entry Level Installer Process

- Successfully complete a course (or courses) offered by an educational provider who is registered with NABCEP
- Pass the NABCEP-issued exam
 - Exam Time/Length: 2 hours
 - Sixty (60) multiple choice questions.
 - Items Provided: exam is NOT an open book exam
 - Only material provided will be any formulas necessary to answer questions
 - Formulas will be provided in the Exam Booklet by NABCEP
 - Candidates are permitted to bring calculators to the exam.

PV Installer

- Basic Requirements

1. Be at least 18 years of age
2. Meet prerequisites of related experience and/or education
3. Complete an application form documenting requirements
4. Sign a code of ethics
5. Pay applicable fees
6. Pass a written exam

PV Installer



Prerequisites / Education Requirements

- 1) Four (4) years of experience installing PV; **OR**
- 2) Two (2) years of experience installing PV systems in addition to completion of a board-recognized training program; **OR**
- 3) Be an existing licensed contractor in good standing in solar or electrical-construction related areas with one (1) year of experience installing PV systems; **OR**
- 4) Four (4) years of electrical-construction related experience working for a licensed contractor, including one (1) year of experience installing PV systems; **OR**
- 5) Three (3) years experience in a U.S. Dept. of Labor approved electrical-construction trade apprentice program, including one (1) year of experience installing PV systems; **OR**
- 6) Two-year electrical-construction related, or electrical engineering technology, or renewable energy technology/technician degree from an educational institution plus one (1) year of experience installing PV systems; **OR**
- 7) Four-year construction related or engineering degree from an educational institution, including one (1) year experience installing PV systems

PV Installer

■ Application

- Read - Candidate Information Handbook for NABCEP Solar PV Installer Certification
- Review the entry options; best fits your personal background, experience, and training
- Review the application form; prepare the documentation
- Fill out the application / attach documentation
- Sign – include fees
- Package reviewed; notified if approved to sit for exam / 8 weeks
- PV Exam Schedule Form / exam fee
- Receive Admission Slip for the exam site

PV Installer – Code of Ethics



- Deal with all clients, consumers, and other professionals and professional organizations fairly and in a timely manner
- Provide safe and quality services to clients and consumers
- Respect and promote the rights of clients and consumers by offering only professional services that he/she is qualified to perform, and by adequately informing clients and consumers about nature of proposed services, including any relevant concerns or risks;
- Maintain the confidentiality and privacy of all client and consumer information;
- Avoid conduct which may cause a conflict with client or others;
- Engage in moral and ethical business practices, including accurate and truthful representations concerning professional information and system performance expectations;
- Be truthful with regard to research sources, findings, and related professional activities;
- Maintain accurate and complete business and professional records;
- Respect the intellectual property and contributions of others;
- Further the professionalism of renewable energy industry services; and,
- Behave in a courteous and professional manner when communicating with NABCEP representatives

PV Installer Exam

- Written examination
- 60 multiple-choice questions
- Based on supplied scenarios and situations
 - various calculations
 - knowledge of the relevant National Electrical Code sections
 - knowledge of safety practices
 - PV-system assessments
 - installation requirements
 - customer interaction issues

PV Installer Exam

- Fifteen test items - general knowledge
- 45 items - candidate's ability to apply PV information to six different scenarios
- Scenarios are problem-based situations; address real-life decision-making tasks a candidate might face installing an actual PV system.
- Each item is matched to the corresponding task on the Task Analysis in a test matrix.
- NABCEP supplies
 - A clean and current copy of the National Electrical Code (NEC)
 - An approved calculator
 - Pencils for the exam.
 - Candidates will have four hours to complete the examination.

PV Installer Tasks

- WORKING SAFELY WITH PHOTOVOLTAIC SYSTEMS
- CONDUCTING A SITE ASSESSMENT
- SELECTING A SYSTEM DESIGN
- ADAPTING THE MECHANICAL DESIGN
- ADAPTING THE ELECTRICAL DESIGN
- INSTALLING SUBSYSTEMS AND COMPONENTS AT THE SITE
- PERFORMING A SYSTEM CHECKOUT AND INSPECTION
- MAINTAINING AND TROUBLESHOOTING A SYSTEM

Certification / Recertification

- Initial certification - 3 years
- Recertification
 - Install 3 systems over 3 year period
 - 18 contact hours of continuing education
 - 6 hours - latest version of the National Electrical Code, including Article 690 and other sections relevant to the installation of PV systems;
 - 6 hours - technical PV related to the most recent version of the NABCEP PV Installer Task Analysis or complementary standards relevant to photovoltaic installation and technology;
 - 6 hours of instruction related to PV or renewable energy that may be technical or non-technical
 - College or university
 - Apprenticeship programs
 - Approved by state contractor licensing boards
 - Offered by a training program accredited by the Institute for Sustainable Power or similar accrediting body
 - Seminars or workshops
 - Approved providers

Verification

■ Installations

- Description of work performed
- System size and components
- Level of their responsibility on the jobsite
- Number of full-time equivalent workers supervised
- Any other pertinent inform / photos

■ Education

- Transcript, grade report, or verification form
- Certificates or letter / statement of completion

Benefits of Certification

■ Installers:

- Identity as professionals, instilling consumer confidence in their work
- Validates training and gaining experience
- Mobility as the market moves from state to state
- Distinguish skills and experience in the field

■ Consumers:

- Provides a means to identify qualified installers, promoting confidence in the work performed
- Preserves consumer choice, maintaining access to both certified and uncertified installers

Resources Available

- Entry Level Certificate Provider
 - Appalachian State University
 - Cleveland State Community College
 - North Carolina Solar Center
- PV Installers
 - Steve Johnson – Antioch, TN
 - Thomas Tripp – Chattanooga, TN