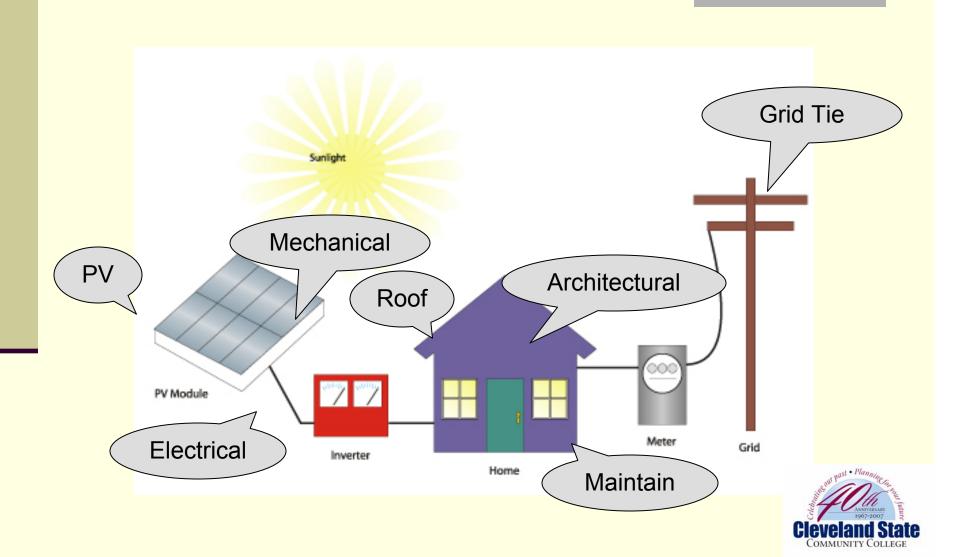
# Installer Training & Certification NABCEP

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### **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 <u>NOT</u> 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



### Cleveland State

### 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

