

Assuring Quality Installations

*Certification ensures system performance —
and promotes consumer acceptance.*

By Pete Sheehan

When it comes to selecting a qualified, reputable professional to install their solar photovoltaic (PV) system, consumers have a valuable tool: certification. Just as with health care service providers and automotive technicians, certification for installers of solar power-generating systems demonstrates that a professional has achieved high standards and is dedicated to a code of ethics and continual learning.

By the end of 2004, 143 solar professionals had earned the Solar PV Installer Certification from the North American Board of Certified Energy Practitioners (NABCEP). In operation for just a year

and a half, NABCEP's certification program is based on industry-developed requirements and a four-hour exam. It is the only certification program of its type in the renewable energy industry. Though no guarantee of quality, certification is evidence that the successful applicant has met recognized standards and is bound to ethical conduct.

Installer certification's greatest value, however, may be for the industry. By ensuring system performance and customer satisfaction, certification plays a key role in promoting consumer acceptance of renewable energy equipment and technology.

Gauging Installer Expertise

By definition, certification is a *voluntary* process usually managed by a nonprofit association like NABCEP. Licensing, by contrast, is a mandatory process managed by the government for entrance and practice in a given trade. Certification means that an installer has demonstrated necessary skills, knowledge and ability typically required of a practitioner to competently install, maintain and troubleshoot a photovoltaic system.

NABCEP was created by a broad group of PV industry stakeholders in the knowledge that certification of PV installers would lead to better system performance and higher consumer acceptance of solar technology. Certification is a two-step process. First, the education, work experience and installed PV systems of candidates approved to sit for the exam are thoroughly evaluated and validated. Then NABCEP assesses the candidate's relevant knowledge through the NABCEP examination.

The foundation of a certification program for any trade is a task analysis — a thorough description of what the job entails, under what working conditions and involving what tools. The NABCEP Task Analysis is becoming the core PV industry reference for educators and trainers as the installation standards document.

According to Todd Stafford, director of training for the training arm of the International Brotherhood of Electrical Workers, "We base our training programs upon the NABCEP Task Analysis because it reflects actual job conditions and tasks that are realistic." Stafford adds, "Our journeymen must be prepared for a future in which solar electricity is mainstream."

NABCEP's PV Technical Committee updates the task analysis every three years to reflect developments in the National Electrical Code (also updated every three years) and in PV technology.



NABCEP-certified installer Bob-O Schultze pauses after completing installation of the inverters and DC disconnects on this PV system. Correct sizing of the system is a critical ability listed in the NABCEP Task Analysis.

BOBO SCHULTZE

Supporting Growing Markets

More than proof of an installer's skills and knowledge, certification signals that a solar professional has earned the industry-recognized stamp of approval from an independent party.

"The certification makes it easier for our customers to know that they are dealing with individuals who have the appropriate experience," explains NABCEP-certified installer Walt Ratterman.

Market growth trends suggest that industry demand for qualified PV installers is set to explode. Worldwide shipments of PV modules increased by 32 percent in 2003. To a large extent, the U.S. market is being driven by aggressive state subsidies for PV systems.

According to Jane Weissman, a NABCEP board member and executive director of the Interstate Renewable Energy Council, 15 states are collecting from utility customers system benefit funds to promote renewable energy and other services. Eighteen states have established standards requiring their largest utilities to provide a certain percentage of their retail electricity sales from renewable sources. Says Weissman, "As more states approve renewable energy portfolio standards, including those that carve out certain percentages for solar electricity, the PV industry must respond by further developing and maintaining a qualified work force."

As more states offer incentives to spur PV system adoption, many recognize the importance of certification in identifying qualified installers, ensuring system performance and promoting consumer acceptance of solar technology. Ohio requires that PV systems be installed by a NABCEP-certified installer, and Wisconsin provides additional incentives for those systems installed by one.

In an effort to promote solar technology in its state, the New York State Energy Research and Development Authority (NYSERDA) highlights NABCEP-certified installers on its list of eligible installers. NYSERDA also worked with NABCEP to develop a marketing kit available free to participating certified installers to use in differentiating themselves from other installers. NABCEP-certified installers have installed a large portion of the PV systems deployed in NYSERDA's PV incentive program, resulting in millions of dollars in sales for installers.

For NYSERDA, working with certified installers is just good business. According to NYSERDA President Peter Smith, "If a PV installer is NABCEP-certified, we are confident that a safe, quality and reliable installation will be performed, our system benefit funds will be well-spent and consumers will be satisfied with PV system performance."

The credibility conferred by certification drives PV installers with varying levels of education, training and work experience to seek it. "In my company literature, I stress to the consumer that the job will be done right the first time. My customers should expect nothing less from a certified installer," says NABCEP board member and certified installer Bob-O Schultze.

For those with little or no PV-installation experience, NABCEP's



JOANNE HOOSE

NABCEP-certified installer Jeff Wolfe, right, and assistant Andy Olson survey PV modules that had just been mounted to the roof in an installation in Saratoga Springs, N.Y. Both are wearing safety harnesses as required under OSHA guidelines.

Entry-Level Certificate program will be offered at several community colleges and vocational trade schools this fall. Successful students will receive a certificate of achievement demonstrating to potential employers that they possess baseline knowledge in PV system operation.

Keeping Up with Advances

Certification doesn't end when an installer has proven to have the requisite skills for PV installation and maintenance. To keep up with the latest technologies, regulations and other business issues, NABCEP-certified installers are required to recertify every three years. Each certified installer is required to perform at least one PV installation per year and take 18 credit hours of continuing education. Six of those hours must be devoted to the National Electric Code.

Installers must have up-to-date expertise in order to install systems in accordance with specifications. Cultivating a nationwide force of certified, professional installers is perhaps the most important thing the industry can do to consistently meet customer expectations for high-quality solar PV systems. ●

Pete Sheehan is executive director of NABCEP. Access the NABCEP Candidate Handbook in the "Resources" section at the NABCEP website, www.nabcep.org, or contact Sheehan at psheehan@nabcep.org.

"As more states approve renewable energy portfolio standards, the PV industry must respond by further developing and maintaining a qualified work force."

— Jane Weissman, International Renewable Energy Council

Assuring Quality Training

ISP accreditation sets the benchmark as renewable energy courses proliferate.

By Jane Weissman

Leo Bedard's students at the Upper Cape Cod Regional Technical School, overlooking Cape Cod Canal, are learning a new trade — renewable energy (RE). In partnership with Cape Cod Community College, the high school is installing solar thermal, photovoltaic (PV) and biodiesel-processing systems on campus. Equipment used by the high school students during the day is used by college students later in the afternoons and evenings.

In Raleigh, the North Carolina Solar Center at North Carolina State University launched the Renewable Energy Technologies Diploma late last year, with 25 students enrolling for the first week of a three-week program. Students need to complete 120 contact hours of required and elective courses.

As educational providers of all types offer more programs, how do potential students know that they will be taught the skills needed to be successful?

The University of California at Berkeley has introduced a PV course that is cross-listed between the University's Energy and Resources Group and the Department of Materials Science. As Professor Dan Kammen notes, "We were fairly stunned to get a turnout for this new graduate course of over 50 students, which is quite unheard of for a graduate engineering offering."

And in the Southern Tier of upstate New York, 65 people turned up at an open house at a Cattaraugus-Allegany Board of Cooperative Educational Services (BOCES) campus to hear about upcoming RE training. BOCES, which provides career and continuing education programs, is partnering with Alfred State College to offer an integrated cross-curriculum within the energy and building fields.

From high schools to universities and from community colleges to the building trades, renewable energy courses and practitioner training programs across the country are seeing a surge of interest and participation. As educational providers of all types offer more programs, how do potential students know that they will be taught the skills and knowledge they will need to do a good job? Do the facilities include the right equipment and hardware for training? Are there procedures that ensure safety and safe practices? Are the programs managed in a fiscally responsible way? Are the teachers qualified?

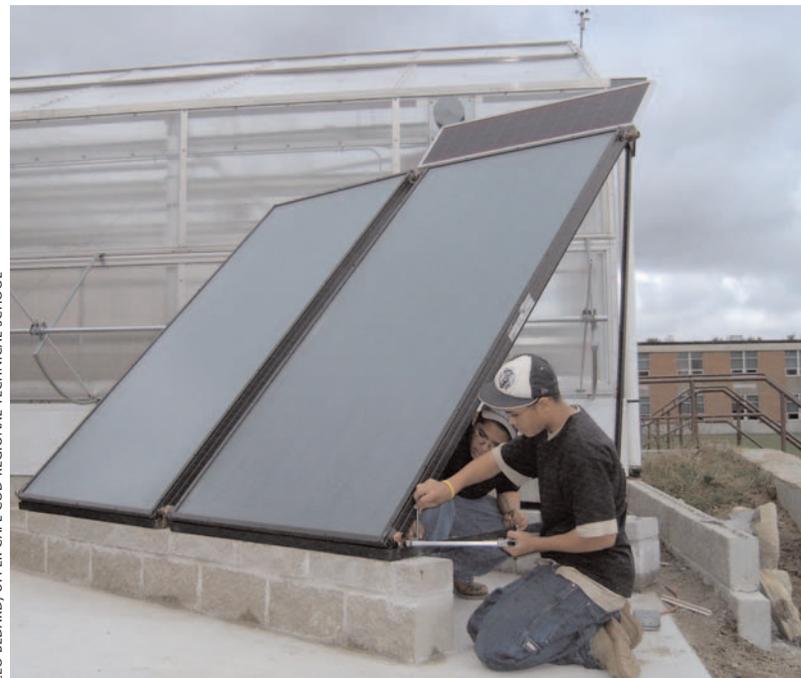
As more people seek to enter the growing RE field and course offerings grow, these questions are increasingly critical. But one

nonprofit organization created to improve the quality of RE products and the quality of workforce development for jobs in this field is filling the gap. The Institute for Sustainable Power (ISP) has created an international framework of standards and metrics to ensure the legitimacy of what's being taught and by whom.

Creating a Standard

Founded in 1996 to meet the financial community's need for an objective, industry-recognized credential it could use to evaluate risk for RE loans or project financing, the ISP responded with accreditation and certification programs. As an independent external reviewer of RE training programs, continuing education courses and trainers, ISP offers training programs and instructors the opportunity to achieve accredited or certified status. The ISP mark is a signal to students, employers, government officials and funding sources that the curriculum, student services and trainers meet recognized standards for quality assurance, quality improvement and fiscal stability.

Rather than being a credential with an indefinite status after initial achievement, the ISP quality assessment is ongoing. The application and audit process is on a five-year cycle with annual reviews.



Plumbing students install solar panels at Upper Cape Cod Regional Technical School in Bourne, Mass.

Since fall 2004, the Interstate Renewable Energy Council (IREC) has taken on the outreach and management of the ISP application and audit process for North America. Candidates for one of five ISP recognitions first complete an application detailing how they meet the requirements of the ISPQ Accreditation/Certification Standard. Desk and site audits are the next steps for training programs and master trainer status. For continuing-education accreditation and instructor certification, a desk audit is usually sufficient. Finally, the ISP Awards Committee makes the determination to grant status or not based on the auditor's report and scrutiny of the candidate's material.

ISP's standard, Draft International Standard ISPQ DIS 01021, is the only measurement available specifically to RE training programs and instructors. ISP has developed this standard in alignment with accepted international quality standards as set out by the International Organization for Standardization. The ISP standard specifies requirements that ensure training bodies operate in a consistent, comparable and reliable manner. ISP created these draft standards following the American National Standards Institute "cardinal principles" of consensus, due process and openness. Subject matter experts and industry stakeholders participated in the ISP development process.

Advancing The Market

Today the ISP offers five recognition programs:

1. Accredited Training Program,
2. Accredited Continuing Education,
3. Certified Independent Master Trainer,
4. Certified Affiliated Master Trainer, and
5. Certified Instructor.

One pioneering state in RE, New York, is building a sustainable workforce by committing \$1 million to develop six ISP-accredited training and continuing-education programs across the state. The state also is providing support for New York instructors to obtain ISP certification. ISP standards have been critical for creating a seamless approach to training in the state. According to Adele Ferranti, senior program manager at the New York State Energy Research and Development Authority, ISP's accreditation and certification program "is essential as NYSERDA is working with dozens of partners across New York to develop high-quality training programs for PV practitioners."

Johnny Weiss, executive director at Solar Energy International (SEI), sees real market value in the ISP recognition. "By establishing standards for PV training organizations, ISP has made a significant contribution to mainstreaming photovoltaic technology," he says. SEI was one of the first training organizations to be accredited by ISP.

As RE technologies and products advance, so, too, must the quality of our training programs. Only by assuring quality and confidence in our training programs can we ensure the quality of the products and installations — and ultimately, the future of the RE market. ●

Jane Weissman is executive director of the Interstate Renewable Energy Council. For more information about ISP accreditation and certification programs, contact Weissman at jane@irecusa.org. To download the ISP application forms and the ISPQ Candidate Handbook, go to www.ispq.org. Check the IREC website at www.irecusa.org for the renewable energy course catalog.



LYRA RAKUSIN, NORTH CAROLINA SOLAR CENTER

Students at North Carolina Solar Center's Renewable Energy Technologies Diploma Course lift modules in a mock rooftop photovoltaic installation.



LYRA RAKUSIN, NORTH CAROLINA SOLAR CENTER

North Carolina Solar Center's students connect the final wires in a mock rooftop PV installation.