Training director Jeff Spies, of AEE Solar, gives classes online and on the road on how to launch and grow a solar business.

Training Day:

Getting into the Solar Game

By **Jerry Sena**

It's a little before 9 o'clock one recent Monday morning in Mesa, Ariz., and Bob-O Schultze and Kris Sutton are doing a last minute prop check. Schultze and Sutton are the principle performers today in one of the hottest road shows currently touring the country. As instructors with SEI (Solar Energy International), the nation's oldest and largest Solar PV training school, they'll kick off their week-long advanced PV system install and design course this morning and plough through a mountain of material straight on to Friday afternoon. The rigorous course covers a broad range of topics, from quantum physics to fuses.

SEI instructor Kris Sutton talks with a student at a training conference in Mesa, Ariz.

Their class comes primarily from the surrounding states of Utah, Colorado, and New Mexico, with a fair number located in the host state, Arizona. But as Schultze and Sutton listen to introductions from the 30-plus students packed into this Marriott Courtyard meeting room they begin to hear from representatives from Ohio, Tennessee, Florida, Costa Rica, New Hampshire, Washington and Alaska as well.

Fully a third identify themselves as electrical contractors. Another third are general building, plumbing and HVAC contractors. They've all come to learn what they need to know to pass the challenging test required to join the ranks of the North American Board of Certified Energy Practitioners (NABCEP). Many if not all states require solar installers to be licensed like others in the building trade, and the certification process has been in place for years, but not all states require it. The certification is not required to install solar systems but it is essential because many states and cities are requiring at least one NABCEP-certified integrator be on staff before a company can make use of the generous tax incentives and rebates that have helped make solar affordable to millions masses of home and business owners.

With the homebuilding industry crashing spectacularly and the solar industry poised to receive hundreds of millions in federal and state funding through President Barack Obama's recently signed economic stimulus package, many electrical contractors are rushing, along with their brethren in the general building trades, to add solar to their tool bags.

The demand for solar installations has grown 40-50 percent each of the past three years and the hunger for system designers and installers has far outpaced the supply of qualified workers to fill the gap. Solar veterans say the best candidates with experience in the building trades – particularly electrical and HVAC journeymen – bring the best skill set by far to the burgeoning solar market.

Jeff Spies heads up the training division at AEE Solar, one of the biggest and oldest solar wholesalers in the business. Built over 30 years, their network of thousands of dealers has all been carefully screened and many have taken and passed these SEI classes to nail down their AEE Solar dealership. Spies said the solar boom has drawn a wide variety of newcomers with no knowledge of basic electrical circuits, little experience working on a roof, and an apparent belief that the solar business is just the latest and greatest stop on the Fast Cash Express.

"They are the most likely to fail," Spies said. "Contractors – electrical contractors in particular – are an excellent fit because the field requires a lot of training, but we're seeing a lot of roofing, HVAC and general building contractors as well."

Even experienced electricians confront a learning curve in the transition from traditional AC power circuits (Cont'd on page 16)

Jeff Spies (left) AEE Solar's director of training answers hundreds of questions a week from people inquiring how to get into the solar trade.

to the hybrid DC-AC layouts common to today's modern solar systems, which convert the DC power from the sunlight and the PV modules into AC power that can be fed seamlessly right into the wider utility grid.

The solar modules used most often in residential and commercial roof installations produce around 200 watts each with a typical residential system generating around 2.5 kW overall. Solar modules can reach out and shock anyone who forgets that photovoltaic cells are generating a current anytime the sun's rays strike them. There's no way to switch them off so the circuit is live as soon as you plug them in. Potentials of 400 to 600 volts DC are not unusual on the PV side of the inverter.

As the founder and executive director of SEI, Johnny Weiss is keeping a keen eye on how the solar training infrastructure will react to the coming boom. The nonprofit has for years been offering training courses in all areas of renewable energy, including solar. SEI is the country's largest solar training program and Weiss notes that most of the 600 NABCEP-certified installers/integrators in the nation today passed through its courses.

Weiss is leaning against a table at the edge of the class this Monday morning watching as Schultze and Sutton hand off lesson points like a couple of seasoned vaudevillians. The pair uses a lot of laughter to keep things light, but the most consistently repeated message by far is safety. Weiss wants all his students to understand that putting solar modules on roofs is serious business.

"Don't underestimate the importance of what you're doing up there," Weiss warns. "People get sued over roofs everyday. Once you put those panels up there, you own that roof."

Now that the world is beating a path to their door, those who shape the future of the solar industry will have to act quickly to avoid being overwhelmed. An earlier solar boom during the energy crisis of the mid-1970s fizzled when the industry couldn't provide enough quality products. Nor could the young industry provide much expertise as many of the entrepreneurs had little or no experience with the products they were selling. That solar wave consisted almost entirely of solar hot water systems, many of which ended up leaking, breaking down, or not working at all. (Cont'd on page 18)

SEI founder and executive director Johnny Weiss talks training with one of the 450 exhibitors, AEE Solar dealers or staff who attended three-day training and trade conference in Mesa, Ariz. this February.

The experience soured many in the public to solar and damaged the industry's image for years.

Today's PV solar market wears a much different face. It brings with it substantial advances in power control electronics that draw more efficiency than ever from the much more efficient PV modules on the roof. And unlike the old days when solar electricity meant DC only, today's solar homes can use the same house wiring and AC appliances as a home on the traditional electricity grid. Homeowners can even sell any excess electricity they generate back to the utility at retail prices. These "grid-tied" solar homes make up more than 90 percent of new roof-top installations.

The technology is clearly ready to meet the challenge of this latest solar boom. But Weiss, who's seen SEI move steadily onward during the solar industry's good times and its bad, is concerned that some things will have to change if the industry is going find a way to train enough qualified, knowledgeable, installers and designers to meet the demand.

Weiss pointed to the absence of standardized training and certification in the industry as an eventual hurdle to a successful future.

"Anybody can go up and put a bunch of panels on a roof," Weiss said. "There's no law against it. There's really only one national certification, and it's NABCEP. But every state is free to start its own certification program. Municipalities could start their own. California has requirements that are different from Oregon. It's a bit of a mess right now."

Not such a wise path to follow, Weiss said, especially at a time when the industry is growing from state to state and the bureaucratic messes that would certainly follow installers trying to decipher regulations in multiple jurisdictions could have a slowing effect on the industry's growth.

"I think there's too much work to be done between the states," Weiss said. "Why should the rules be different in this state? Why should we create all these infrastructures?"

Rick Kuhn is on a mission not all that different from Weiss'. Kuhn co-directs the Silicon Valley Solar Industry-driven Regional Collaborative from his post at De Anza College, a community college in California's Silicon Valley. The collaboration with several other Silicon Valley community colleges is seeking to develop a standardized curriculum that can be used statewide and help provide the infrastructure for training the thousands of solar industry workers the state will need over the next few years. The class – which Kuhn said is essentially the same class held several times a week at three different colleges – currently has a demand running at two and three times the rate of available seats. Kuhn said he isn't expecting an increase in funding to accommodate the demand. He said California community colleges turned out thousands of computer techs and IT specialists during the dot com boom of the late 1990s only to turn them loose into a bleak and fast-shrinking job market.

"It's a supply and demand issue," he said. "We're always trying to make sure there are enough jobs to go to all the graduates."

The ongoing economic crisis and credit freeze have slowed the otherwise meteoric growth of the solar industry, but many believe it's a temporary condition likely to be reversed by federal subsidies for renewable energy contained in the president's stimulus package. A survey of San Francisco Bay Area solar businesses with more than five employees, published in 2008 by the California Community Colleges Chancellor's Office, found that employers are expecting a 56 percent increase in the need for PV installers and designers in the coming year. At the same time, 75 percent of the respondents said they expected that finding qualified workers to fill those positions would be "difficult" or "very difficult." It's hard to say exactly how many community colleges are providing PV solar classes as there's no single authority to oversee the standards. Private schools abound, but as Weiss warns, not all are reputable. Tuition can range from under $1,000 for a week-long course to $3,000 and up. Check out their websites and talk to some former students if possible before investing in the class. ❑

For more information on solar training and how to get it, visit some of the following websites:

- AEE Solar
  offers dealer training workshops
  www.aeesolar.com/training
- NABCEP.org
  offers solar installer certification,
  www.nabcep.org
- NPCP-IBEW
  offers solar installer training,
  www.npcpsolar.com
- NECA Chapters
  offer solar-electric installer training,
  www.necanet.org/about/chapters
- Solar Living Institute
  offers solar workshops,
  www.solarliving.org
- Solar Energy International
  offers solar workshops,
  www.solarenergy.org