AC 2011-46: SOLAR WORKFORCE DEVELOPMENT IN THE MIDWEST

Bill Hutzel, Purdue University, West Lafayette

Bill Hutzel is an Associate Professor in the Mechanical Engineering Technology Department at Purdue University. He manages the Applied Energy Laboratory that is used for teaching and applied research into High Performance Buildings.

Tehri Parker, Midwest Renewable Energy Association

Tehri Parker is the Executive Director of the Midwest Renewable Energy Association (MREA). Tehri has served as a member of the Focus on Energy renewable energy coordinating committee, an advisory group that developed Wisconsin's statewide renewable energy incentive and training programs. She is also on the Milwaukee Shines Solar City Advisory Committee, and the Principle Investigator for a regional solar instructor training initiative funded by the U.S. Department of Energy. Tehri is an Adjunct Faculty member and Honorary Associate at University of Wisconsin-Stevens Point. She has a Ph.D in Education from the University of Minnesota.

Solar Workforce Development in the Midwest

Abstract

Even in a difficult economy, "green jobs" is one sector of the workforce that is poised for rapid growth. Both homeowners and businesses are recognizing that energy efficiency and renewable energy are economically viable, good for the environment, and a necessary part of long term energy policy in the United States. As work in this area accelerates, one potential problem is a lack of personnel with training and expertise to work in these areas. To address this concern with respect to solar energy, the U.S. Department of Energy launched an aggressive project in 2010 to create and deliver a nationally normed model curriculum for solar thermal and solar photovoltaic workforce training. The goal is to accelerate market adoption of solar technologies by ensuring that high-quality installations are standard and to create sustainable jobs within the solar installation industry. This paper documents efforts to develop and deliver appropriate solar workforce training in the Midwest.

Nationwide Solar Workforce Training

The Solar Foundation, a non-profit advocacy group for the solar industry, completed its first national solar jobs census in 2010. The report indicates that there are 93,000 people who spend at least 50% of their time supporting solar related work in the United States, but the area is poised for rapid growth. Over the next 12 months, 50% of solar firms expect to add jobs. This will increase the overall solar employment to 120,000 people, an annual growth rate of over 25%. That is particularly significant for a troubled U.S. economy whose overall growth is expected to be around 2% over that same time period.[1]

Although solar jobs can be found in every state, regional hotspots do exist. Most solar jobs are located in the West, probably because of the sunny locale and the availability of financial incentives. California is home to roughly 30% of all solar companies in the U.S. The Northeast has the second most solar jobs, which is also made possible through incentives by states like New York, Vermont, and others. However, even regions like the Midwest are starting to show signs of solar job growth. Michigan is one state where the national solar jobs census showed large numbers of solar jobs. Wisconsin is another Midwestern state that supports a robust and growing solar industry. It is not surprising that solar industries do well in areas where financial incentives exist, either through a renewable portfolio standard, direct incentives to consumers, or policy measures like Feed-In-Tariffs.

The U.S. Department of Energy Solar Technologies Program does not seek job growth directly; instead it promotes the commercialization of solar technologies by addressing non-technical issues that act as barriers. Market transformation efforts are underway is to identify and remediate a variety of shortcomings that inhibit wider adoption of solar technologies. Examples of current bottlenecks include consumer awareness, codes and standards, and limited educational opportunities.[2] Education is viewed as a key shortcoming and a number of initiatives are underway to provide training for experienced professionals, entry level jobseekers, code officials, and educators.

The Nationwide Solar Instructor Training Network was launched by the U.S. Department of Energy in 2010 with $10 million in American Recovery and Reinvestment Act Funds to address the challenges that educational institutions are facing in developing the training programs that meet the needs of the growing solar industry. The problems include a lack of highly qualified instructors, laboratory training facilities, and a nationally normed curriculum. There is also an expressed need for sharing best practices in the design and installation of solar photovoltaic and solar thermal systems because the technology is changing so rapidly.[3]

Figure 1 shows the ring-like structure of this nationwide effort to train solar instructors. The National Administrator is the Interstate Renewable Energy Council (IREC), which has a long involvement in the solar field and administers solar credentialing programs through the North American Board of Certified Energy Practitioners (NABCEP). IREC's role on this project is to convene solar experts and educators who will contribute to the development and dissemination of a nationally normed model curriculum for a variety of solar technologies.

Figure 1. An administrator leads the implementation of a nationally normed solar curriculum.

The second tier of Figure 1 is the Regional Resource & Training Providers who were specifically selected because of their existing infrastructure for solar education. These experienced organizations disseminate best practices and regionally specific training information to universities, community colleges, union chapters, and workforce development organizations who want to update or create new training programs. The ultimate goal is to provide infrastructure, in the form of both teaching materials and laboratory equipment, so that the local educational institutions shown in Figure 1 can train a highly qualified solar installation workforce.

Figure 2 is a map of the United States that identifies the 8 regions for the Nationwide Solar Instructor Training Network along with the lead organization in each region.[3] All 50 states are represented and an effort was made to place states with a similar solar profile in the same region. Most of the selections for regional leaders are not surprising. The Florida Solar Energy Center, which is a well-established leader in solar education and research, is coordinating training efforts for the Southeast region of the country.

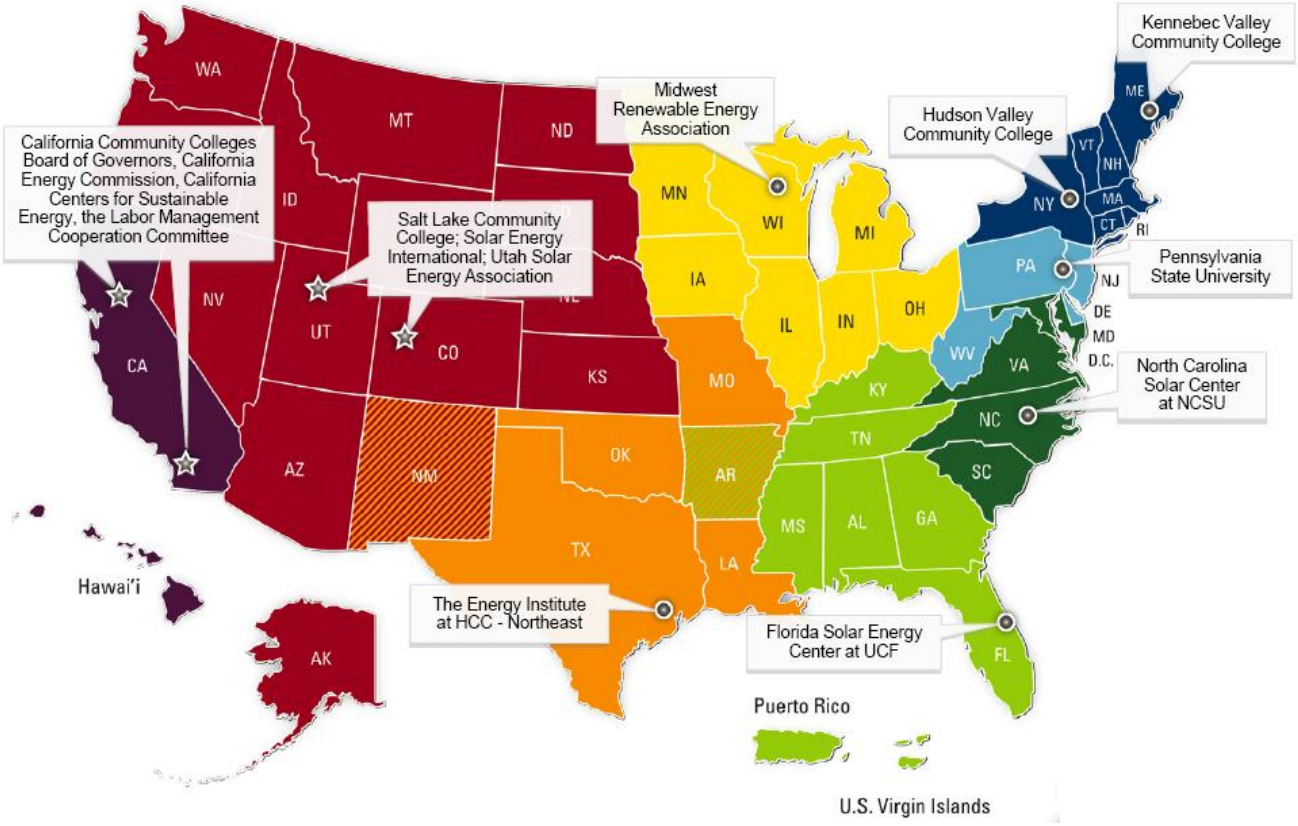

Figure 2. The U.S. has 8 regions for solar workforce training.

Each region of the country has leeway in terms of structuring their efforts to develop and disseminate solar training expertise to local educational institutions. An internet-based training program might make sense because of the geographic spread of the Rocky Mountain region, which stretches from Kansas to Washington state. The Southern Mid-Atlantic region may elect more traditional training formats because it only encompasses a geographically compact are in Virginia and the Carolinas.

The remainder of this paper documents early efforts to develop, deliver, and evaluate solar training programs in Minnesota, Wisconsin, Iowa, Illinois, Indiana, Michigan, and Ohio. This Midwestern solar instructor training effort is being led by the Midwest Renewable Energy Association (MREA) of Custer, WI. A diverse coalition has been formed so that each state in the region has representation. It is a unique strength of the Midwest region that community colleges, non-profit organizations, universities, and industry partners are working as partners to build solar training capacity. Each group brings its own viewpoint and perspective that enhances the overall capabilities of the team.

Midwestern Solar Workforce Training

The Midwest Solar Workforce Training Network (MSTN) has accomplished quite a bit in its first year of existence. The first key deliverable was the creation of a website that is used as a platform for sharing information about the project. http://www.midwestsolartraining.org/ is a hub for information about educational opportunities and all things solar in the Midwest. A home on the Internet is not is not particularly significant, but the wiki environment that has been created for sharing and developing new information is innovative and very effective.

The MSTN wiki is an open-use knowledge management system that is designed to encourage collaboration and discussion. It hosts information that is frequently updated, revised, and peer-reviewed. The wiki exists to develop course materials, teaching modules, and share solar network training resources. Working in conjunction with the wiki is a content manager, called Gallery, which hosts images, PowerPoint's, and course resources. While Gallery serves as a resource library, the wiki serves as a book. The book evolves as the courses and teaching modules sections are developed and refined.

The wiki environment is particularly helpful in the Midwest region. Even though the states are connected geographically, there is significant disparity in the quantity and level of sophistication of solar training that is available. The open web framework allows novice solar educators the ability to access regionally specific training materials that have been developed and tested over time. The concept also tests the limits of intellectual property in terms of how much information "competing" instructors are willing to share with each other.

Another key deliverable in the 1st year of the project was hands on training for solar instructors from all Midwestern states. The training was adapted from a curriculum that already existed at the MREA for students pursing certification as NABCEP solar thermal or solar photovoltaic installers. Figure 3 shows the hands-on component of one weeklong course, where solar instructors worked to install full scale solar thermal systems. They were also trained on the wiki used for curriculum sharing. Four weeklong training sessions were delivered, two for solar photovoltaics and two for solar thermal systems. 48 instructors were trained in the first year.

Figure 3. Instructor training includes hands-on installations of solar thermal systems.

Another accomplishment for the MSTN was the creation of a solar workforce advisory group for each state. The purpose of these groups is to advise MSTN on the solar workforce needs for each state. Figure 4 shows the diverse advisory group created for one Midwestern state. Representatives from community colleges (educators) and workforce organizations directly involved in training solar installers was important for getting firsthand information on the status of current training efforts. Solar installers and venture capitalists pursuing new projects in the state provided insight into employment opportunities for those trained by the program. Finally, representatives from state government provided a perspective on solar activities and incentives across the state.

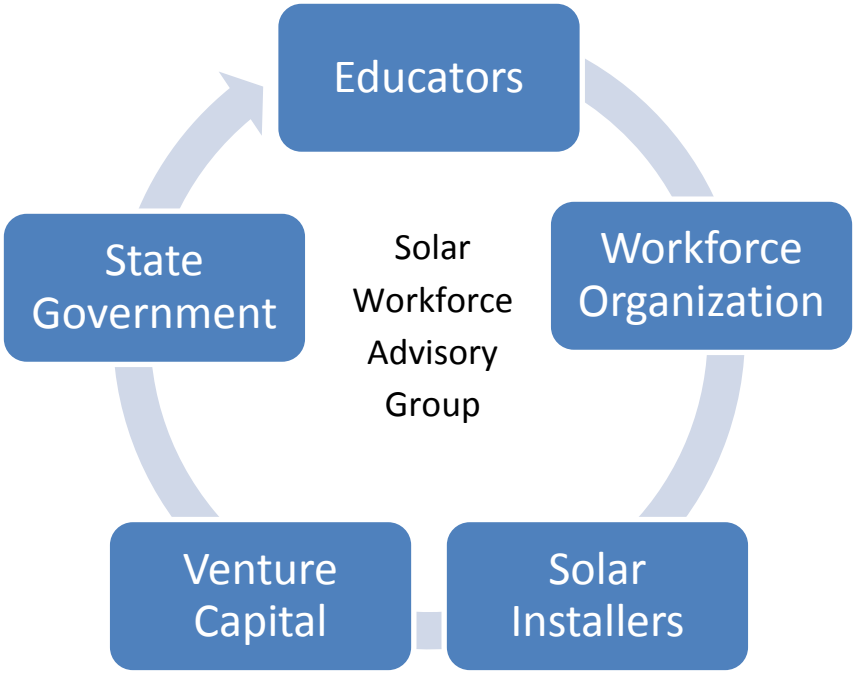

Figure 4. A diverse solar workforce advisory group was created.

Future Work

Now that the Midwest region has created the basic framework for developing and delivering solar workforce training, there is an opportunity for longer term strategic planning. It has been recognized that not all states need the same type of solar training. For example, it is expected that small Feed-In-Tariffs that have been implemented in one state may create a demand for more solar photovoltaic training as opposed to solar thermal.

Another issue is the quantity of training. There is a keen awareness of the need for solar workforce training that leads to jobs. There is no point in offering instructor training and developing teaching laboratories unless there is a demand for graduates who want to work in the solar industry. Thus, an effort is underway to quantify market demand and define solar training programs that make sense on a state-by-state basis.

The quality of instructional laboratories is also being carefully considered. Figure 3 clearly shows that significant infrastructure is needed for offering the full-scale training experience needed for students whose ultimate goal is NABCEP certification. The laboratory environment for solar thermal training requires a training roof with adequate safety infrastructure as well as the ability to sweat copper pipes or install flexible tubing. The pre-packaged educational training units that are available commercially and found at many community colleges are simply not adequate for the level of training that is needed.

This development work is expensive, so funding is being leveraged wherever possible to maximize the impact. Some states have access to substantial green jobs funding through the U.S. Department of Labor (DoL). That funding is typically intended for displaced workers from steel, auto, and other industries that were hurt by the economic downturn. Resources from the solar workforce project are being used to train instructors who go on to re-train workers participating in the DoL grants.

Conclusion

A nationwide solar workforce training project has completed the first year of what is envisioned as a nationwide five year effort to remove bottlenecks for emerging jobs in the renewable energy sector. Preliminary indications are that the program will be successful. In other words, we hope to demonstrate improvements in the quantity and quality of a trained solar workforce who will prosper in emerging green jobs. The goal is to accelerate market adoption of solar technologies by ensuring that high-quality installations are standard and to create sustainable jobs within the solar installation industry.

Acknowledgment

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