

Effectiveness of a National Photovoltaics Education Program for Architects and Engineers



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NSS+NEES

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Partners in Program



Building Codes
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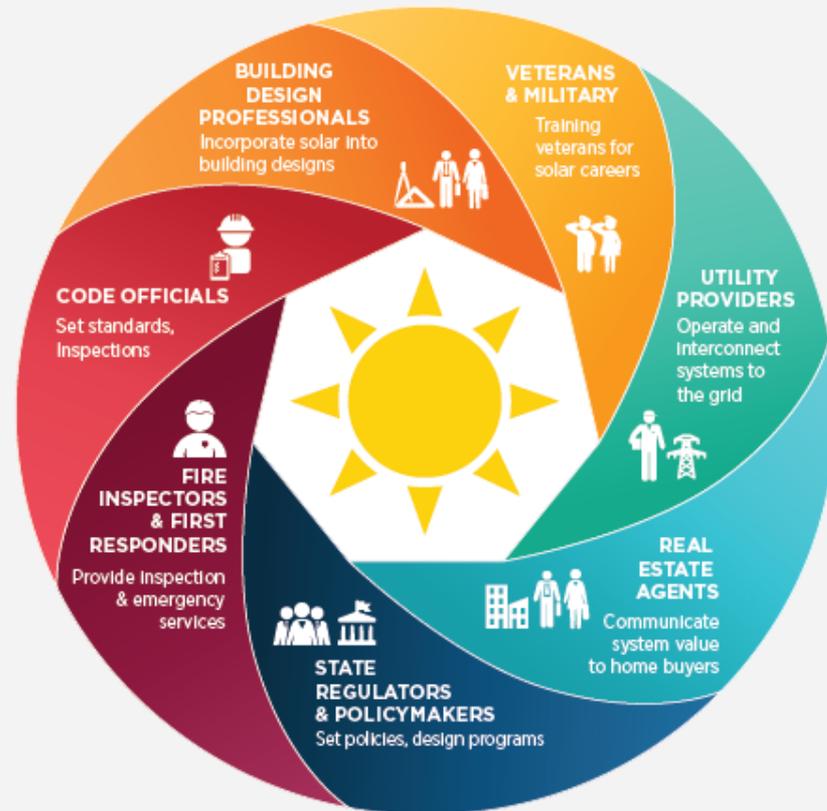
The American
Institute
of Architects



Solar Training & Education for Professionals (STEP)

Innovative training programs for the solar workforce

#SunShot



energy.gov/sunshot



Mission

The Solar Training and Education for Professionals (STEP) program's mission is to reduce soft costs by addressing gaps in solar knowledge, both within the solar workforce and in professions that play a crucial role in solar deployment. The goal of the STEP program training is to provide targeted training to design professionals, architects and engineers, to give design professionals the tools they need to promote solar PV into their earliest conversations with their clients, and to incorporate solar into their designs

Curriculum Development

- Subject Matter Experts: architects, engineers, PV companies, Extension faculty
- Representing all areas of the country
- Shortlisted to 8 approved trainers



Peter Ewers, AIA, LEED AP BD+C

Peter has 30 years of experience designing residential and commercial projects and has been a licensed architect for 26 years. In 1998, he founded Ewers Architecture with the mission to create beautiful architecture that respects the natural environment. Maximized energy efficiency, minimized environmental impacts, passive solar design, and roofs optimized for solar panels are part of all Ewers Architecture designs. Peter has spoken at solar and design conferences as an advocate for sustainability.



Michael E. Goldschmidt, AIA, LEED AP BD+C

Michael is a licensed architect and an Associate Teaching Professor in the Department of Architectural Studies at the University of Missouri. He coordinates and teaches many of the undergraduate classes in the department's technology sequence, including coursework in sustainable building technologies and energy efficient buildings. Michael has over 30 years of professional architectural practice experience including sustainable designs for residential and commercial buildings.



Dan Lepinski, PE

Dan has been involved in solar energy as a professional design engineer for more than 45 years. He is an active member of the Solar America Board for Codes and Standards and the Electric Power Research Institute "Smart Grid" Development Committee. In 2016, Dan was selected by the state of Texas as the most qualified subject matter expert in solar energy and tasked with conducting 20 solar energy educational workshops for Texas policymakers, code officials, and others.



Ted Redmond, RA

As a registered architect, Ted has over 23 years of experience leading planning efforts for local governments. Ted's practice focuses on net zero and high performance building consulting including solar PV feasibility assessments, building and site optimization and conceptual solar PV design. As a sustainability consultant, Ted has an expertise in building and product life cycle assessments and in delivering energy and climate Inventories and Reduction Action Plans.



Alice Sung, AIA, LEED AP BD+C, ISSP-SA

Alice is the principal and founder of Greenbank Associates, a green building and sustainability consultancy dedicated to climate change action to scale. As a licensed architect with over 25 years of experience, Alice has facilitated the greening of dozens of public, private, and educational facilities, including LEED Platinum, and one of the first K-12 urban school campuses designed to be Grid Neutral/Zero Net Energy. A longtime member of the AIA, USGBC, the International Society of Sustainability Professionals (ISSP), she has served on the Energy, Climate, Water, Integration and Innovation Subcommittees of the Collaborative for High Performance Schools (CHPS) State and National Technical Advisory Groups.

Delivery of the Program

- 22 Cities across the US
- 8-hour full day workshop
- Each module has quizzes and exercises
- PV101: Solar PV Training for Design Professionals

Learning Objectives

- Explain basic technical information and the economical, ecological and community benefits of solar photovoltaics (PV)
- Act in a leadership capacity to increase solar PV deployment in your community and in your practice
- Make an actionable connection between policy objectives for solar deployment and AIA sustainability and 2030 goals
- Increase services to clients with reliable information on solar costs, benefits and available incentives

Curriculum - Eight Modules

1. Introduction
2. Basic Technical Information
3. Architectural Integration
4. State of the Market
5. Utility Connections, Safety and Code Issues
6. Financing Options
7. Putting it all Together
8. Emerging Technologies and Benefits

Survey of Participants

- Participants completed a pre-workshop and post-workshop evaluation that consisted of thirteen technical questions related to the information presented in the program in all modules
- Pre-workshop survey information was also collected about the profession of the trainee (architect, engineer, etc.), information regarding their general knowledge and use of PV, and their current motivation for incorporating PV into their projects.

Survey of Participants

Three months after attending the workshop, participants were asked additional questions regarding their increased knowledge and incorporation of PV systems into their designs:

- Q1. Have you pursued any additional knowledge or training about solar energy design since you attended our STEP Into the Sun: Solar Training for Design Professionals course?
- Q2. Have you talked to your colleagues about the benefits of incorporating solar into your work?
- Q3. Have you looked at the resources and tools that you learned about during the training?
- Q4. As a result of the training you attended, have you talked to your clients and/or consultants about how PV can be incorporated into projects?
- Q5. As a result of the training you attended, have you incorporated solar into any of your projects?

Results – Pre and Post Workshop n=360

- Improvement in the knowledge of PV systems in all eight modules
- In the pre-workshop survey of the thirteen technical questions, less than half of the participants answered correctly in twelve of the thirteen answers
- In the post-workshop survey, nine of thirteen questions were answered correctly by more than half of the participants

Results – 3-Month Survey n=190

For this analysis, nine states were chosen as they represented locations of high participation in the workshops, and five or more participants completing a three-month follow-up survey

The states included in this evaluation included New Jersey, Massachusetts, Alabama, Kentucky, Illinois, Tennessee, Pennsylvania, North Carolina, and Texas.

Results – 3-Month Survey n=190

For analyzing the effectiveness of the training, the three-month survey data was divided into three groups based on a grade of A/B, C/D, or F:

- states with little or no incentives and/or policies encouraging solar (F)
- states with little to moderate incentives and/or policies encouraging solar (C/D)
- States with moderate to significant incentives and/or policies encouraging solar (A/B).

Results – 3-Month Survey n=190

In the training locations in states receiving a grade of “F” (little to no state incentives and policies encouraging solar – Alabama and Kentucky):

- 42% of participants have pursued additional knowledge on PV
- 81% of participants have discussed the benefits of photovoltaics with their colleagues
- 68% of participants have used the resources presented in the training
- More than half of the participants (52%) in this category have discussed incorporating photovoltaics in their projects with clients
- 23% incorporating photovoltaics into their current projects

Results – 3-Month Survey n=190

In the training locations receiving a grade of “D” or “C” (little to moderate state incentives and policies encouraging solar – Illinois, Tennessee, Pennsylvania, North Carolina, and Texas):

- 54% of participants have pursued additional knowledge on PV
- 93% of participants have discussed the benefits of photovoltaics with their colleagues
- 75% of participants have used the resources presented in the training
- 60% of the participants in this category have discussed incorporating photovoltaics in their projects with clients
- 28% incorporating photovoltaics into their current projects

Results – 3-Month Survey n=190

In the training locations receiving a grade of “A” (moderate to significant incentives and policies encouraging solar – New Jersey, New Mexico and Massachusetts):

- 33% of participants have pursued additional knowledge on PV
- 89% of participants have discussed the benefits of photovoltaics with their colleagues
- 56% of participants have used the resources presented in the training
- 63% of the participants in this category have discussed incorporating photovoltaics in their projects with clients
- 22% incorporating photovoltaics into their current projects

Limitations of the Study

- Did not look specifically at the size of the design firm and the actual number of projects where PV is either discussed or incorporated into the design
- Large firms with many projects in a particular location might affect the accuracy of the survey data
- Some smaller firms may not have had many projects added to their workload in the short period between the workshop and the three-month survey.
- An additional survey after one to two years might increase the percentages of projects where PV is incorporated.

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