

Preparing a Modern US Energy Workforce



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Presentation to:
IEA Expert's Group on Priority Setting and Evaluation
Workshop on Developments in Energy Education: Reducing
Boundaries
9-10 May 2012

Overview

“Competing in the new energy economy will require our country to harness all of our resources, including American ingenuity.”

- Steven Chu, US Secretary of Energy

The Department of Energy recognizes that as the energy market grows it will require:

- Innovative technologies both clean and conventional
- The best minds, with specific technological skills
- A diversity of ideas and perspectives

In response, the Department of Energy will:

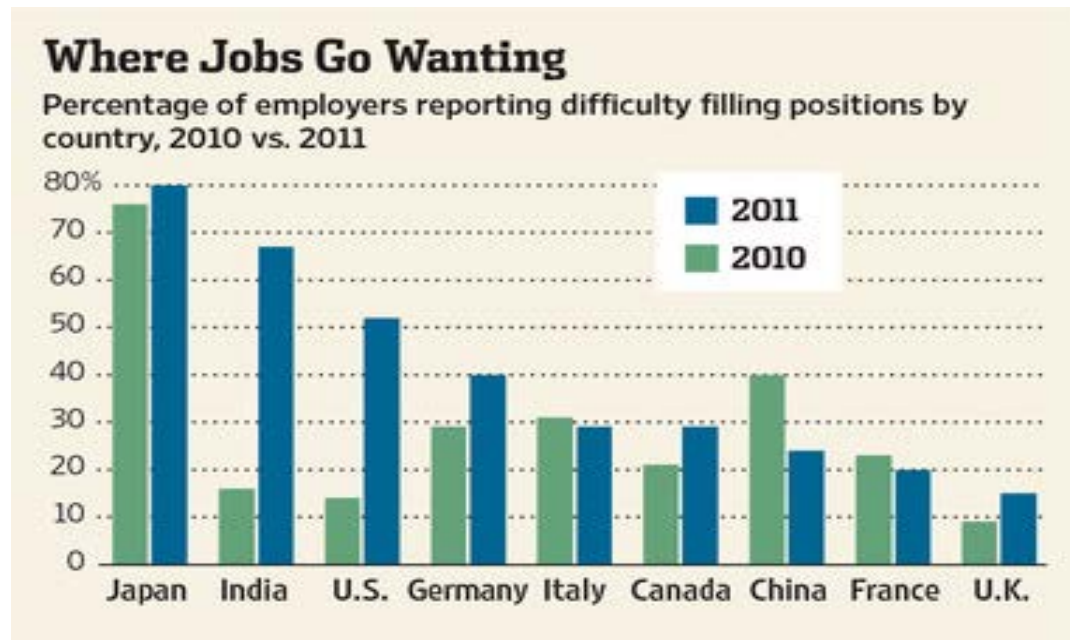
- Work with academia and industry
- Enable today's students to be a part of the clean energy transformation.

Department of Energy Priorities

- Catalyze the timely, material, and efficient transformation of the nation's energy system and secure U.S. leadership in clean energy technologies.
- Maintain a vibrant U.S. effort in science and engineering as a cornerstone of our economic prosperity with clear leadership in strategic areas.
- Both will require strategic efforts to build the energy technology workforce of the 21st Century

Workforce Challenge

- Many firms in energy efficiency and renewable energy are finding that they are not able to find people with skills matched to their new requirements. Retirements of skilled workers adds to the problem.
- President's Jobs Council: "Lack of alignment between what employers need and what skills are taught and delivered is becoming a critical problem for business and the nation." [2011 Year End Report, p. 13]



<http://www.nsf.gov/statistics/seind10/c2/c2h.htm>

Framing Questions

- *What are the human resource and educational requirements of energy enterprises in the global economy? How can they be identified?*
- *Do current educational programmes meet the needs of industry?*
- *How can industry work with educators to create stronger curricula?*

DOE Tools and Programs

- Energy Literacy and Information
- Internships and Fellowships
- Strategic partnerships with universities and industry
- Diversity inclusion programs

Energy Literacy and Information

Energy 101

Creating a nationally recognized interdisciplinary general education energy course for community colleges and universities

- DOE's Office of Energy Efficiency and Renewable Energy is supporting the development of an interdisciplinary energy course to meet different general education requirements across the country.
- Energy 101 use of the National Training and Education Resource (NTER), an open source tool for authoring and sharing course content using the latest web-based technology and interactivity
- Using NTER allows for the easy modification and customization of course to fit the needs of individual college or university

Energy Literacy and Information

Career Mapping Tools

SunShot Initiative: Solar Career Map - Windows Internet Explorer

http://www1.eere.energy.gov/solar/careermap/

File Edit View Favorites Tools Help

Convert Select

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SunShot Initiative: Solar Career Map

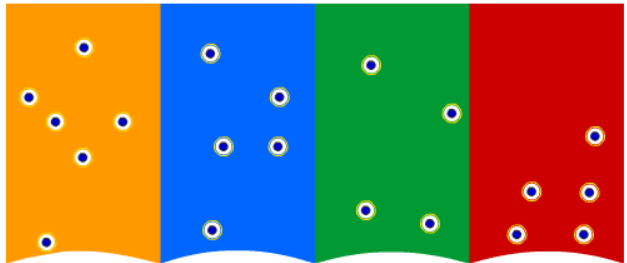
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Home
Multimedia
Meetings & Workshops
Solar Innovation Timeline
Solar Career Map

Solar Career Map

This solar career map explores an expanding universe of solar-energy occupations, describing diverse jobs across the industry, charting possible progression between them, and identifying the high-quality training necessary to do them well.

Solar Career Map



PRODUCTION DESIGN MARKETING INSTALLATION

EXPLORE The Solar Career Lattice

Feedback

Internet 100%

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- HOME
- ABOUT
- SOLAR PROGRAM HIGHLIGHTS
- FINANCIAL OPPORTUNITIES
- INFORMATION RESOURCES
- NEWS
- EVENTS

EERE » Solar Energy Technologies Program » SunShot Initiative » Information Resources

- Home
- Newsletter
- Multimedia
- Meetings & Workshops
- Solar Innovation Timeline
- Solar Career Map

Engineering Technician

Alternate Title(s): Civil Engineering Technician; Electrical Engineering Technician; Mechanical Engineering Technician; Environmental Engineering Technician

Job Type: System Design

Education & Training Level: Post-Secondary Credential

High school level trigonometry, geometry, and algebra are essential; Associates degree in engineering technology is strongly preferred. Education paths vary depending on type of engineering; technicians usually need a 4-year degree to advance as technologists or applied engineers.

Preferred:
Associate's Degree; Certification <http://recruita.org/rec-programs/workforce-development/certification-organizations/>

Work Experience: 3-5 years

Median Pay:
\$48,760.00/year
\$22.48/hour

Engineering Technician Profile:

Work with engineers in applying the theory and principles of engineering to plan, design, evaluate, and improve the performance of solar energy-related equipment, processes, and facilities.



Photo Courtesy of DOE/NREL

Engineering technicians use the principles of science, engineering, and mathematics to solve technical problems across all sectors of the solar industry. Their work is more narrowly focused and application-oriented than that of the scientists and engineers they assist. Civil engineering technicians, for example, might design layouts for solar-related projects to ensure compliance with profile and component specifications, square footage, and material quantities; review solar-related project blueprints and structural specifications to determine dimensions and material requirements of a solar structure or system; and develop plans and cost estimates for system installation, facility use, or construction.

Skills:
Mathematics; Computer skills, including computer-aided design and drafting; Active listening; Critical thinking; Complex problem solving; Coordination; Active learning; Data monitoring and assessment

Requirements:
Able to work in a team and communicate clearly with supervisor; Some specialties may require drivers license.

Job Responsibilities:
Estimating the quantifiable characteristics or products, events or information; Evaluating information to determine compliance with standards; Communicating with supervisors, peers, or subordinates; Interacting with Computers; Documenting/recording information; Inspecting equipment, structures or materials; Identifying design or performance problems

Interests:
Working with a team; Mathematics; Technology design; Problem-solving; Working in a clean energy economy

Did You Know?
Civil Engineering Technician jobs are projected to grow 14%-19% between 2008 and 2018.



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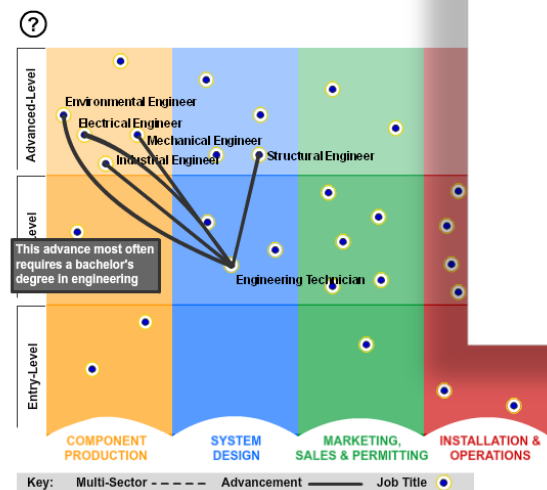
- HOME
- ABOUT
- SOLAR PROGRAM HIGHLIGHTS
- FINANCIAL OPPORTUNITIES
- INFORMATION RESOURCES

EERE » Solar Energy Technologies Program » SunShot Initiative » Information Resources

- Home
- Newsletter
- Multimedia
- Meetings & Workshops
- Solar Innovation Timeline
- Solar Career Map

Solar Career Map

This solar career map explores an expanding universe of solar-energy occupational progression between them, and identifying the high-quality training ne



Reset

- Job Details
- Routes to Advancement
- FAQ
- Competencies

“Job Details” for
Engineering Technician.

Internships and Fellowships

Examples of Federal Level Programs:

- Presidential Management Fellowships
- Student Career Employment Program

Examples of DOE Specific Programs:

- The Science Undergraduate Laboratory Internship
- The DOE Office of Science Graduate Fellowship
- ARPA-E Fellows Program

Strategic Partnerships with Universities and Industry

Bringing academia and industry together through DOE's Innovation Hubs.

Energy Innovation Hubs are integrated research centers that combine basic and applied research with engineering to accelerate scientific discovery in critical energy issue areas. Each Hub fosters unique, cross-disciplinary collaborations by bringing together leading scientists to focus on a high priority technology.

Existing hubs are currently focusing on:

- Energy-Efficient Buildings System Design
- Fuels From Sunlight
- Nuclear Energy Modeling and Simulation

Innovation Hub: Greater Philadelphia Innovation Cluster (GPIC)

GPIC focuses Energy Efficient Buildings, specifically how to design, construct and retrofit commercial and residential buildings that are vastly more energy efficient than today's buildings .

It includes 11 academic institutions, two DOE laboratories, six high-profile global industry partners, regional economic development agencies, and community colleges. The hub's activities are organized and managed by five Task teams :

- Design Tools
- Integrated Technologies
- Policy, Markets & Behavior
- Deployment & Commercialization
- **Education & Workforce**



The Education & Workforce task is specific to this hub, but in general all the hubs bring members of government, academia and industry together, creating informal avenues of communication between partners.

Education & Workforce Task Team

Focus: developing skills for quality jobs at all levels in energy efficient building systems

Continuing Education Workshops

- Financing and Incentives for Energy Related Building Retrofits
- Energy Efficiency Opportunities for Commercial Office Tenants.

Education and Workforce Development Centers and Laboratories.

- Solar Installation Training
- Developing Fusion as an energy source
- Many Others

Reports:

- Education and Workforce Programs Report
- Educator's Conference for Subject Matter Experts and Leaders

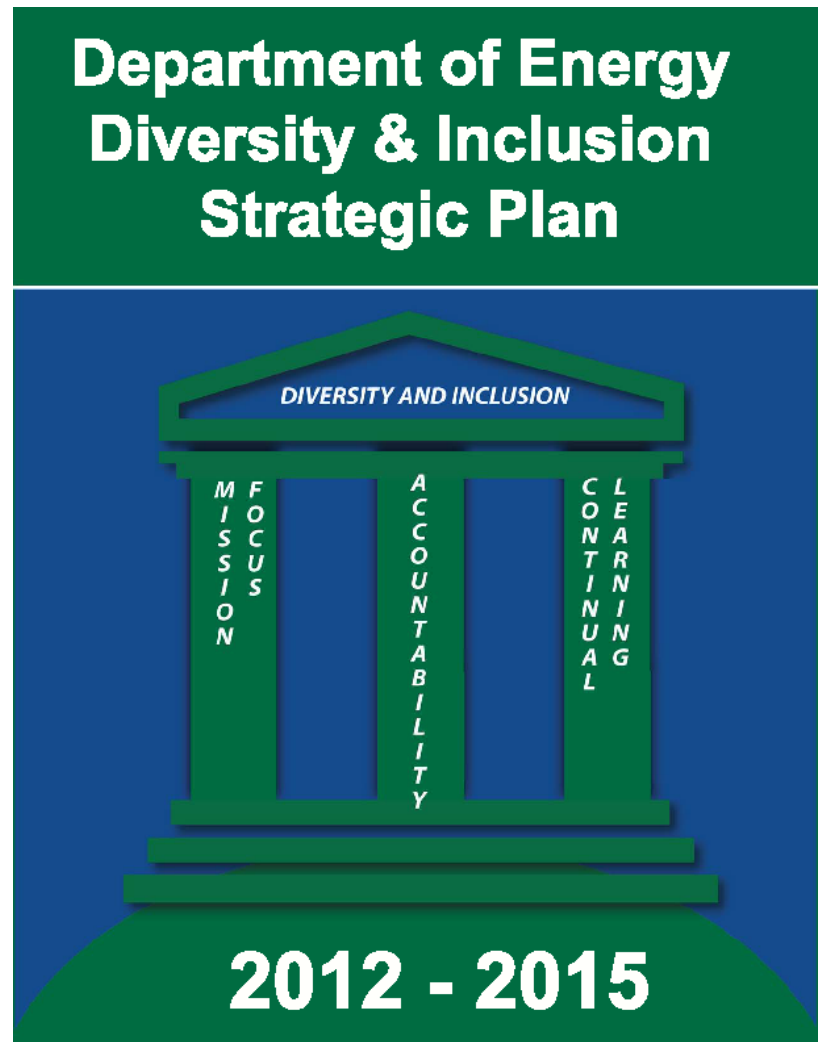


Diversity inclusion programs

President Obama signed an Executive Order “Establishing a Coordinated Government-wide Initiative to Promote Diversity and Inclusion in the Federal Workforce.”

DOE’s Vision statement:

DOE will capitalize on the diverse attributes of the Nation today to build an inclusive DOE for tomorrow. DOE will be the Federal government’s model employer by leveraging diversity and inclusion to deliver the best public service on behalf of the Nation.





Clean Energy Education & Empowerment (C3E)

A Women's Initiative

The U.S. Clean Energy Education & Empowerment (C3E) program is an effort to advance the careers and leadership of professional women in the field of clean energy. It is led by DOE in strong partnership with MIT's Energy Initiative (MITei), and is composed of three core parts:

- **C3E Ambassadors** – corps of distinguished senior professionals committed to championing the initiative's success as spokeswomen and men and as mentors.
- **Awards program** - recognize mid-career individuals who advance the leadership and accomplishments of women in clean energy. Six awards will come with a cash prize of \$10,000.
- **Symposium** - an annual professional conference including the awards ceremony and panel discussions on specific energy issues, with the larger aim of building a strong community of women in clean energy.

Lessons Learned

- **Information about education and jobs needs to be easily available and organized.** Federal programs are generally dispersed across the agencies and not consolidated in one place, making it challenging to discover and access them.
- **Students need to be inspired** - Even in a perfect system where a certain degree may lead directly to employment in energy careers.
- **Need to define the proper role of government, institutions, private sector**, etc., in addressing the workforce challenge and doing so in a collaborative manner is a work in progress.
- **Improved capabilities are required to characterize the needed talent pool** to accelerate energy technology research and innovation.

For Additional Information

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