



POSITION STATEMENT

Energy Sector Jobs, Workforce Requirements and the Economy

*Adopted by the IEEE-USA
Board of Directors (22 June 2018)*

The energy sector is in the midst of a significant transformation due to changes in energy supplies and costs, environmental awareness and concerns, escalating physical and cyber-security threats, political factors, societal demands, and emerging technologies, all requiring a skilled workforce.

Emerging technologies place emphasis on sustainability and increased system reliability, resilience, and flexibility, requiring new skills to implement. Developments that increase the diversity of generation sources but challenge the operation of the grid include growth in renewable generation, application of storage options, and increased ability to control and manage electric power systems. Electrification of the transportation sector adds to the challenge.

The skilled workforce in the energy sector will need to be replaced in the near future due to retirements and attrition

Significant portions of the U.S. electric and natural gas utility workforce of skilled utility technicians and engineers will need to be replaced due to retirements, international competition for skilled workers, and other attrition in the near future. Half of the energy industry workforce may retire within the next 5-10 years, and the average age of industry employees is now over 50, according to the U. S. Department of Labor¹. A recent industry study forecasts a shortage of 80,000 industry personnel required to meet the need by 2030 for new workers in the smart grid and electric utility industry². The remaining employees in this supply-demand mismatch will need to be filled through recruiting and training³.

¹ IBM Energy and Utilities Blog, January 10, 2018, Written by Eva Marie Schulte. Retrieved from U.S. Department of Labor Employment and Training Administration "Industry Profile – Energy" on December 11, 2017.

² Transforming the Nation's Electricity Sector: The Second Installment of the QER | January 2017, Chapter V, Section 5.3.1, page 5-11, source: PA Consulting, "The Nimble Utility: Creating the Next Generation Workforce," accessed December 13, 2016, <http://www.paconsulting.com/our-thinking/next-generation-utility/#here>.

³ Op. Cit. QER, Chapter V, Section 5.3.1, page 5-11

The workforce that currently serves this sector is shrinking and continues to mature and retire, but there is a lack of reliable data and forecasts on skills needed by the industry and skilled workforce supply⁴. A modern workforce for the future of the energy sector should be adept in risk assessment, cyber security, and digital technologies. The complete skillset required will be clarified, as industry comes to understand the needs. Companies must invest in helping lower-skilled workers adapt to these changes.⁵

The United States may not have the necessary domestic skill set in place in time to meet the needs of the evolving energy sector⁶. Seventy-five percent of the utility employers and 82% of construction employers in the Electric Power Generation industry sector have reported difficulty in hiring qualified workers due to insufficient qualifications, certifications or education in addition to lack of experience, training, or technical skills⁷.

The energy sector's workforce is less diverse than the overall national workforce, with minorities and women under-represented⁸. Limited current participation of minorities and women in science, technology, engineering, and mathematics (STEM) educational opportunities contribute to the underrepresentation of minorities and women within the electricity industry.⁹ Placing greater emphasis on STEM education, particularly for minorities and women, will provide the foundation of students graduating from U.S. schools who are capable of succeeding in an increasingly sophisticated, technologically driven world, thereby meeting America's high-tech workforce needs¹⁰.

The loss of existing nuclear energy facilities and the slow progress on building new ones, particularly complex power generation plants¹¹, also may prove deleterious to the quality of the energy sector workforce in the medium to long term, as industry loses the experience of manufacturing components for and building of nuclear plants. The government's funding support for mathematics and science education and for university programs must be emphasized and expanded to meet the needs of the energy industry.

Competency requirements for the energy sector workforce are evolving

The competency and abilities needed to meet future demands in the energy sector will be more sophisticated, complex, diverse and interdependent. Having experienced and committed personnel able to utilize engineering tools, management processes, manufacturing techniques and construction practices is vital to preventing project

⁴ O.P. Cit. QER, Section V, Section 5.3, page. 5-10

⁵ Knowledgevine.com, Building a 21st Century Workforce in the Energy Sector, December 21, 2017

⁶ Op. Cit. QER, Section 5.3.1, page 5-10, 5-11

⁷ O.P. Cit. "U.S. Energy and Employment Report", page 34

⁸ O.P. Cit. "U.S. Energy and Employment Report", page 9

⁹ Quadrennial Review Section 5.2.4 Electricity Industry Workforce Inclusion, Page 5-9

¹⁰ IEEE USA Position Statement "K-12 STEM Education, page 1

¹¹ The American Energy Infrastructure, "How to Build Nuclear Plants", by Edward C. Shyloski Jr., enr.com May 15/22, 2017, Engineering News Record, page 115

overruns and delays that contribute to prohibitive costs in building large and complex projects.

Energy sector workforce development and maintenance must become a top priority to successfully innovate, plan, design, operate and maintain reliable, secure, and safe systems into the future; and to ensure long-term U.S. economic growth and prosperity.

IEEE-USA RECOMMENDS:

- **Assess Workforce Issues:** Governments and industry should conduct studies to better understand future energy workforce requirements resulting from 1) a maturing workforce, 2) technology advances, 3) policy changes, and 4) evolving threat assessments.
- **Education Partnerships:** Governments and industry should provide funding for and support the development of partnerships within the education, labor, industry and government sectors, to develop new training programs and enhance STEM curricula, secondary and post-secondary energy sector workforce training programs, apprenticeships and best practices.
- **Workforce Diversity:** Government should initiate and support programs to increase the participation of minorities and women in the energy sector workforce.
- **Certification Programs:** Universities and professional organizations should create industry-recognized credentials that can be awarded after the completion of education or training, to demonstrate an individual's achieved skill level.
- **Military Veterans Transition:** The energy industry should identify and embrace best practices that effectively accelerate transition of veterans to civilian jobs to meet industry workforce requirements.
- **Annual Recognition Programs:** Industry should develop recognition programs for excellence in power system education and training. This program should celebrate excellence in private and public educational institution partnerships and expand opportunities for science prize competitions by reducing barriers to participation.

This statement was developed by the IEEE-USA Energy Policy Committee, and represents the considered judgment of a group of U.S. IEEE members with expertise in the subject field. IEEE-USA advances the public good, and promotes the careers and public policy interests of the nearly 180,000 engineering, computing and allied professionals who are U.S. members of the IEEE. The positions taken by IEEE-USA do not necessarily reflect the views of IEEE, or its other organizational units.