2017 U.S. Energy and Employment Report

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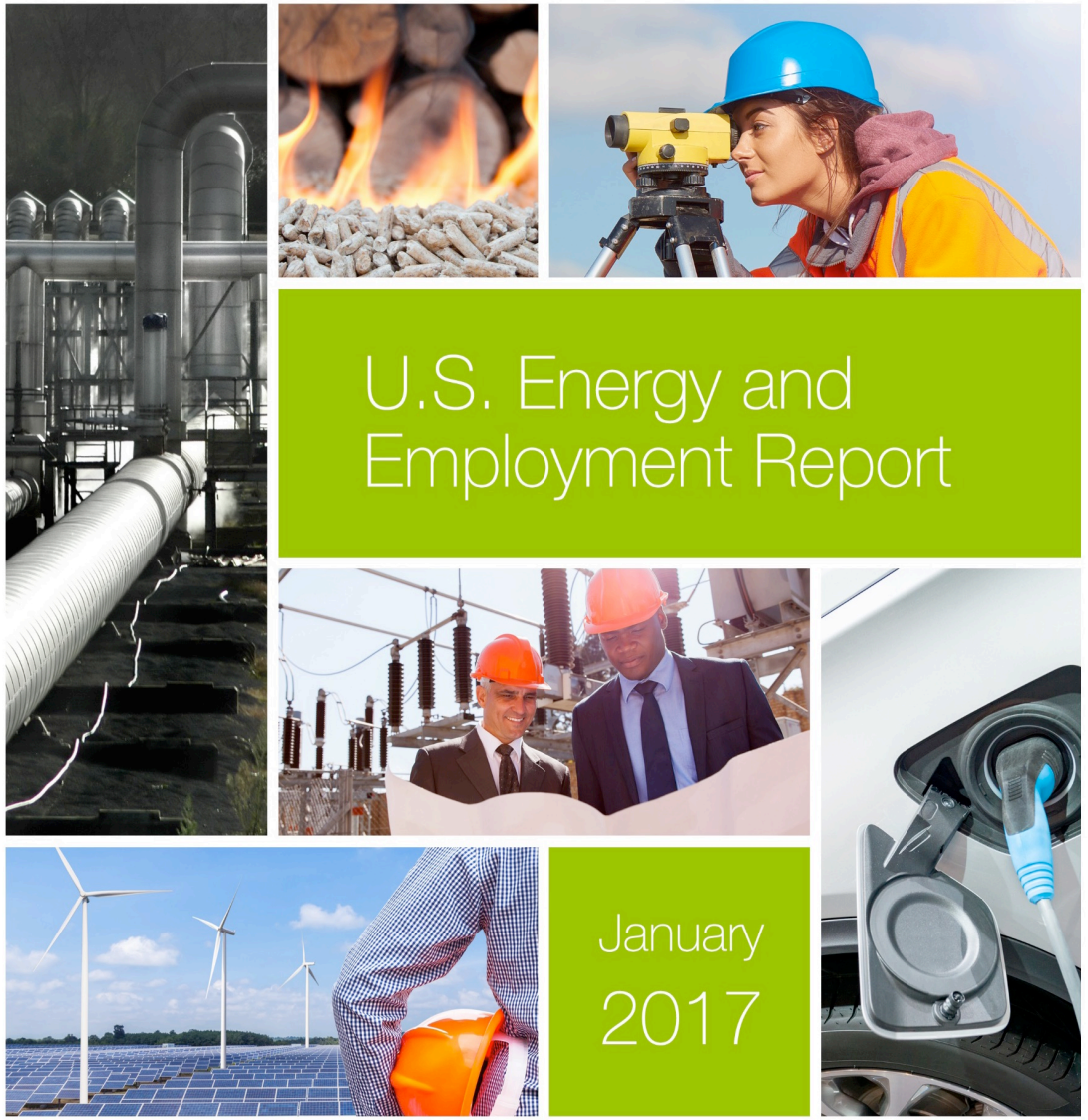


U.S. Energy and Employment Report

- Four major gaps exist in current Bureau of Labor Statistics (BLS) energy employment data.
  1. Business activities essential to the operation of traditional energy companies, but classified by the North American Industry Classification System (NAICS) within the business activities of other sectors,
  2. Jobs associated with the production of renewable energy such as wind, solar, geothermal, etc.,
  3. Jobs associated with energy efficiency, and
  4. Jobs associated with energy efficiency in manufacturing processes.
- Examples:
  1. Full-time contractor maintenance workers at nuclear plants classified as construction workers
  2. Residential PV installers, classified as construction electricians or roofers.
  3. No differentiation between employees producing or installing high efficiency, Energy Star and non-Energy Star products.
  4. No measurement of jobs improving energy efficiency in industrial processes.

Supplemental Survey Methodology

Based on QCEW Jobs Data for Surveyed Sectors

Identified Subsectors with targeted employment	Agriculture and Forestry, Mining and Extraction, Utilities, Construction, Manufacturing, Wholesale Trade, and Business and Professional Services

Subsector codes matched with business indices

382,500 businesses identified	Representative sample selected

20,000 business surveys administered

Margin of Error for incidence is+- 0.85%	95% confidence interval

The 1st U.S. Energy and Employment Report (USEER)

- USEER addresses three of the gaps in energy and employment data through the Energy Employment Index.
- Energy Employment Index
  - Supplemental survey to analyze BLS data
  - Identified 382,500 establishments with possible energy-related employment.
  - Surveyed 20,000 businesses.
  - Analyzed four sectors
- Counted jobs in traditional energy industries attributed to other sectors
- Counted jobs in new energy technologies attributed to other sectors
- Provided the first-ever national analysis of jobs in Energy Efficiency.
- Provided a jobs analysis by fuel type for the Motor Vehicle industry.

Analyzed Sectors

Electrical Power Generation and Fuels

Transmission, Distribution, and Storage

Energy Efficiency

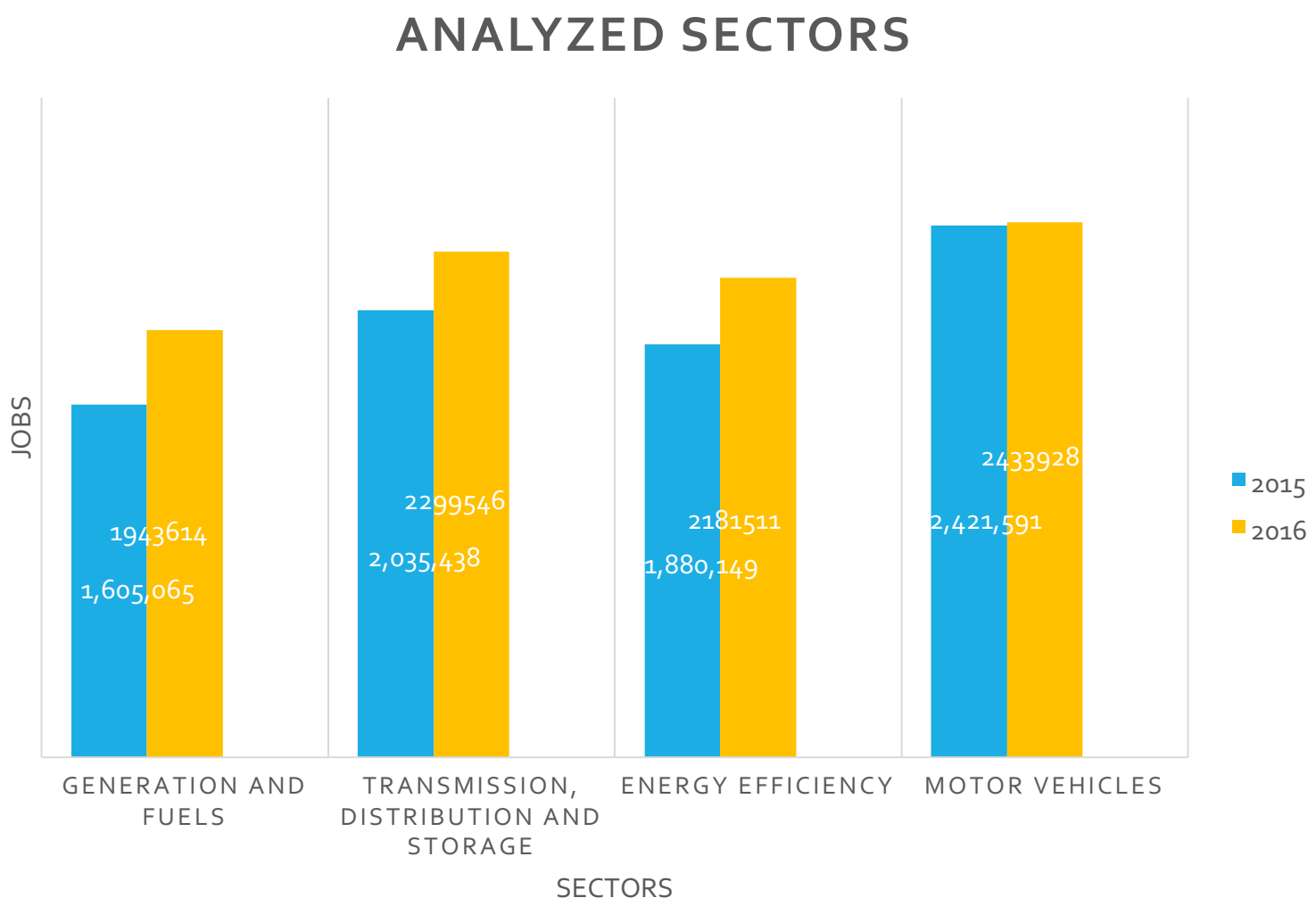
Motor Vehicles

Sector Definitions

Electrical Power Generation and Fuels =	All fuel production, including coal mining, oil and gas extraction and processing, nuclear fuels, solar, wind, hydro, biofuels, and utility and non-utility production of electricity, etc.
Transmission, Distribution, and Storage =	All electrical and gas transmission systems, wholesale and retail distribution systems, including gas stations, and all forms of energy storage.
Energy Efficiency =	Jobs associated with the manufacture of energy efficiency products certified by the Environmental Protection Agency's Energy Star program or installed pursuant to the Energy Star program guidelines. (Does not capture jobs associated with energy efficient manufacturing processes.)
Motor Vehicles =	Jobs classified by the Quarterly Census of Employment and Wages (QCEW) as the Motor Vehicles industry including, assembly, parts production, repair and maintenance. (Does not include auto dealerships—approximately 1 million jobs.)

Included Sectors of Employment*

*Job increases in 2016 reflect both growth and enhanced methodology.



Executive Summary—Traditional Energy Industries

- **In total,4.24 million Americans work in traditional energy industries**, defined as the jobs "necessary for the production, transmission, distribution, or storage of the energy that fuels economic and social activities."
  - **1.45 million additional jobs were identified** through the USEER survey. These jobs include jobs such as business services employment supporting the utility industry, maintenance construction in nuclear plants, and roof top PV solar jobs, otherwise classified as construction electricians.
- **Electric Power Generation and Fuel technologies directly employ 1.9 million workers, more than double the 930,000 covered in the BLS direct industry classifications.**
  - **1.1 million work with fossil** generation and fuels production.
  - **800,000 people work in low-carbon generation and fuels**, defined as nuclear, renewables (including hydro), biomass, and high efficiency natural gas.
- Our energy infrastructure—Transmission, Wholesale Trade and Distribution, and Storage technologies—employ more than **1.3 million Americans, almost 450,000** more than previously known.
  - When retail sales and distribution in this sector—primarily gasoline stations—are included, an additional 985,000 individuals work in this sector, for a total of **2.3 million Americans**.

Executive Summary—Hiring Difficulties and Projected Hiring Rates

- **73% of all surveyed employers reported difficulty hiring qualified workers over the last 12 months; 26% noted it was very difficult.** (In 2015, these numbers were 72% and 26%)
- **Employer projected hiring rates for 2017**:
  - **Energy Efficiency—9% growth or 198,000 jobs** (133,000 in 2016)
  - **Transmission, Wholesale Distribution and Storage—6% growth or 78,000 jobs** (65,000 in 2016)
  - **Solar**—7% or 18,200 jobs (51,000 full-time jobs in 2016)
  - **Wind**—4% or 4,100 jobs (24,600 full-time jobs in 2016)
  - **Fuels**—2% decline projected for 2017 (8% decline in 2016).
  - **Motor Vehicles—3.4% growth or 81,000 jobs**, but all in wholesale trade, professional services, and maintenance. (12,000 in 2016)

Executive Summary—Workforce Demographics

- **As a whole, these sectors are less diverse than the workforce as a whole**.
  - 14% Latino or Hispanic compared to 16% overall.
  - 8% Black or African-American compared to 12% overall.
  - Electric Power Generation is the most diverse of the five sectors.
- **Women make up from 22-34%** of these sectors compared to 47% of the overall workforce. Electric Power Generation employs the highest percentage of women.
- **Veterans comprise about 10%** of employees, compared to 7% nationally.

U.S. Energy and Jobs—Key Facts

Growth and Decline in Key Energy Sectors

Type (jobs in thousands)	Employment 1/09 in 000's	Peak in 000's	Current in 000's	Loss/Growth in 000's	Loss/Growth in 000's from high
Coal mining*	86.4	89.8 July, 2012	53.7	(32.7)	(36.1)
Oil and Gas Extraction*	165.1	200.9 Oct., 2014	173.4	8.3	(27.5)
Oil and Gas Support Services*	218.4	340.0 Sept., 2014	215.3	(3.1)	(124.7)
Utilities*	562.1	568.5 June, 2016	565.2	3.1	3.1
Solar**	93.5	260.0	260.0	166.5	166.5
TDS*** (Infrastructure)	N.A.	N.A.	1249	65	65
Energy Efficiency Products and Services***	N.A.	N.A.	2200	133	133

* Bureau of Labor Statistics Current Employment Statistics Survey
** Solar Foundation, Annual Solar Census
*** U.S. Energy and Employment Report

Conclusions

- **Size and complexity of energy systems** is disguised by new business models and technology shifts
  - USEER identified 1.45 million additional jobs that are essential to our traditional energy production, transmission, distribution and storage systems.
- **Hiring difficulty** across all surveyed sectors
  - Underscores the importance of a new Energy and Advanced Manufacturing Workforce Initiative, coordinating the resources of DOE, DOL, NSF, Commerce, Education, and Defense
- **Construction industry skills** and training systems are central to our energy security and resilience.
  - Energy and energy efficiency jobs are now 32% of construction workforce
  - Union apprenticeship programs are key resource.
- **Diversity**—less diversity than workforce as a whole, warrants a sustained initiative to remove barriers to entry.