

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 $\pm 0.85\%$

95% confidence interval

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 =

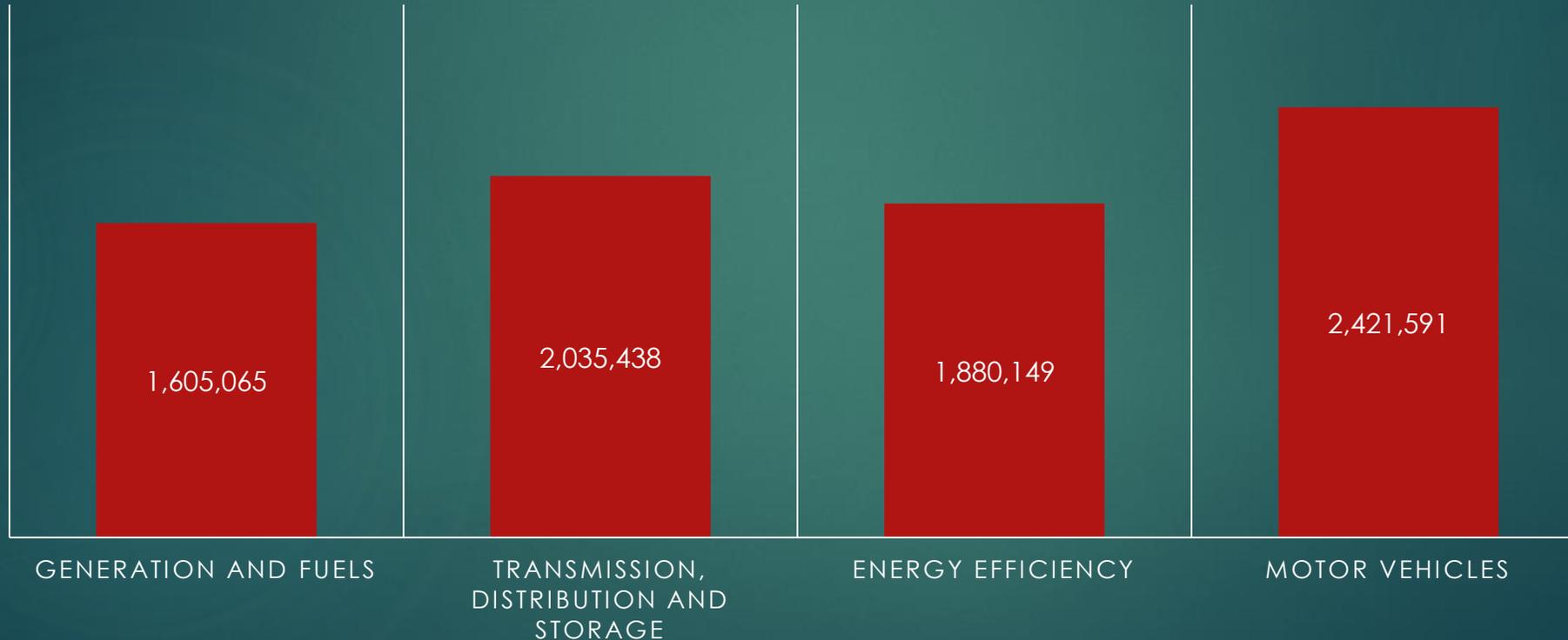
Jobs associated with the manufacture of energy efficiency products certified by the Environmental Protection Agency's Energy Star program or installed pursuant to the Energy Star program guidelines. (Does not capture jobs associated with energy efficient manufacturing processes.)

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

ANALYZED SECTORS



Executive Summary—Traditional Energy Industries

- ▶ **In total, 3.64 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.”
 - ▶ **1.15 million additional jobs were identified** through the Energy Employment Index 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 1.6 million workers, almost double the 935,000 covered in the BLS direct industry classifications.**
 - ▶ **968,000 work with fossil** generation and fuels.
 - ▶ **600,000 people work in low-carbon generation and fuels**, defined as nuclear, renewables (including hydro), biomass, and high efficiency natural gas.
- ▶ Transmission, Wholesale Trade and Distribution, and Storage technologies employ more than **one million Americans, 280,000** more than previously known.
 - ▶ When retail sales and distribution in this sector—primarily gasoline stations—are included, an additional 990,000 individuals work in this sector, for a total of **2.04 million Americans**.

Executive Summary—Energy Efficiency

- ▶ **1.9 million people** work, in whole or part, with Energy Efficiency technologies
 - ▶ 1.2 million of these jobs are in construction.
 - ▶ 35,000 Americans manufacture Energy Star products.
 - ▶ 482,000 Americans are employed in Energy Efficiency business and professional services.
- ▶ This number does not include jobs in retail trade, such as hardware stores, big box appliance stores, etc.

Executive Summary—Motor Vehicles

- ▶ Motor vehicles are included in this report primarily due to their intensive use of energy and contribution to carbon emissions.
 - ▶ 28% of domestic energy is used for transportation, and
 - ▶ More than half of the oil consumed in the U.S. on a daily basis.
- ▶ The Motor Vehicles industry employs 2.4 million Americans in vehicle assembly, parts manufacturing, automotive repair and maintenance, as well as vehicle, parts, and supplies wholesalers, including air, rail, water, and truck transportation of motor vehicle parts and supplies. (It does not include auto dealers.)
- ▶ Of these, **921,000 work in manufacturing**. (Note this does not include the indirect manufacturing jobs in motor vehicles, such as steel, aluminum, glass, etc.)
- ▶ **Over 190,000 employees work with alternative fuels vehicles**, including natural gas, hybrids, plug-in hybrids, all electric, fuel cell and hydrogen vehicles.
 - ▶ **Hybrids, plug-in hybrids, and all electric vehicles** make up over half of this number, supporting **108,000 employees**.

Executive Summary—Construction Industry

- ▶ **Of the 6.8 million construction jobs in the U.S., about 30%** are directly supported by traditional energy or energy efficiency firms.
 - ▶ **1.23 million jobs are in Energy Efficiency.**
 - ▶ 353,000 jobs are in Transmission, Wholesale Distribution, and Storage
 - ▶ 225,000 jobs are in Electric Power Generation and Fuels

Executive Summary—Low Carbon Emissions Energy

- ▶ **600,000 Americans are employed in low carbon emissions** generation and fuels.
- ▶ In generation, these include:
 - ▶ Solar--300,000 with 200,000 spending a majority of their time
 - ▶ Wind—77,000
 - ▶ Nuclear—43,000
 - ▶ Biomass and other generation—39,000
 - ▶ Geothermal--7700
 - ▶ Hydro—35,000
 - ▶ Low emissions natural gas—36,000
- ▶ In fuels, these include:
 - ▶ Corn Ethanol—49,000
 - ▶ Woody Biomass—20,000
 - ▶ Other Ethanol and Non-woody Biomass—23,000

Executive Summary—Hiring Difficulties and Projected Hiring Rates

- ▶ **72% of all surveyed employers reported difficulty hiring qualified workers over the last 12 months; 26% noted it was very difficult**
 - ▶ Electric Power Generation—71%
 - ▶ Fuels—68%
 - ▶ Transmission, Wholesale Distribution and Storage—68%
 - ▶ Energy Efficiency—76%
 - ▶ Motor Vehicles—78%
- ▶ Employer projected hiring rates for 2016:
 - ▶ **Energy Efficiency—14% growth or 260,000 jobs**
 - ▶ **Transmission, Wholesale Distribution and Storage—5% growth or 50,000 jobs**
 - ▶ **Solar—15% growth or 30,000 full-time jobs**
 - ▶ Oil and gas extraction—shrank by 8% in 2015 to 185,000 remaining jobs.
 - ▶ Motor Vehicles—1% growth or 24,000 jobs.

Executive Summary—Workforce Demographics

- ▶ **Ethnic and racial minorities constitute 23-26%** of workers in Electric Power Generation; Fuels; Transmission, Wholesale Distribution and Storage, and Motor Vehicles compared to the national average of 34 percent.
- ▶ **Women make up about 18-25%** of these sectors compared to 47% of the overall workforce.
- ▶ **Veterans comprise about 10%** of employees, compared to 7% nationally.

Conclusions

ENERGY NEWS. IN CONTEXT.
Pittsburgh Post-Gazette

By Daniel Moore / Pittsburgh Post-Gazette

For every 10 Americans working to create and distribute energy in 2015, there were roughly seven others working to limit its consumption.

The surprising prevalence of jobs related to energy efficiency — in which 1.9 million people were employed last year and another 257,000 are expected in 2016 — is just one of the highlights from a trailblazing report released on Thursday by the U.S. Department of Energy. The first annual “United States Energy and Employment Report” aimed to define a work that has become increasingly spread among industries.

“We’re undergoing an energy revolution in the country, shifting the way we extract fuels, create energy, distribute it and consume it,” said David Foster, the agency’s senior adviser on Energy and Industrial Policy. “The transformation of our energy system and the growth of energy efficiency technologies is creating opportunities for thousands of new jobs.”

Conclusions

- ▶ **Energy Efficiency**
 - ▶ Rapid job growth, 2016—14%, 260,000 new jobs
 - ▶ Employer hiring difficulty at 76%
 - ▶ Need concentrated effort to define in-demand job skills
- ▶ **Energy Infrastructure**
 - ▶ 50,000 new jobs in Transmission, Distribution, and Storage
 - ▶ Energy security, resilience, and efficiency are a key opportunity.
- ▶ **Solar**
 - ▶ 30,000 new jobs in 2016
 - ▶ Rapid growth justifies exploring new solar apprenticeships.
- ▶ **Hiring difficulty** across all surveyed sectors
 - ▶ Underscores the importance of a new Energy and Advanced Manufacturing Workforce Initiative, coordinating the resources of DOL, NSF, Commerce, Education, and Defense
- ▶ **Size and complexity of energy systems** is disguised by new business models and technology shifts
 - ▶ USEER identified 1.15 million additional jobs that are essential to our traditional energy production, transmission, distribution and storage systems.
- ▶ **Construction industry skills** and training systems, including union apprenticeship programs, are key to our energy security and resilience.
- ▶ **Diversity**—less diversity than workforce as a whole, warrants a sustained initiative to remove barriers to entry.

Next Steps: USEER 2017

- ▶ To be released in December, 2016.
- ▶ New features:
 - ▶ Combined Heat and Power
 - ▶ Automotive Parts Industry by Fuel Type and Fuel Efficiency
 - ▶ State Energy and Jobs Profiles

Here is an example of the kind of state information we anticipate:

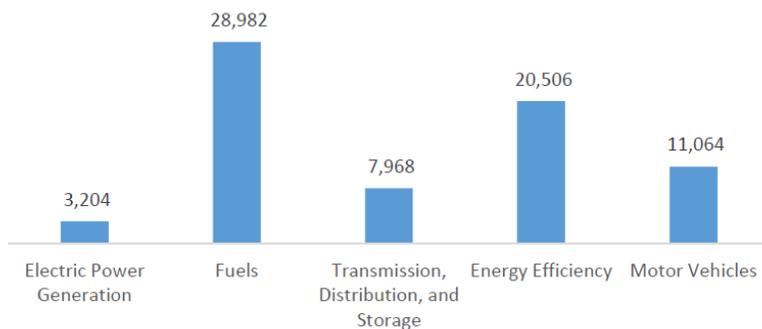
Moniziana Energy and Employment

Overview

Moniziana has a high concentration of energy employment, with 40,154 energy-related workers statewide. 28,982 of these workers are in the fuel segment, 7,968 work in transmission, distribution, and storage, and 3,204 workers are employed in electric power generation. While total employment in Moniziana accounts for 0.5% of national employment, energy sector jobs are 1.6% of national energy jobs. The energy sector in Moniziana is 18.6% of total state employment while the national energy sector is 2.0% of national employment, reflecting the importance of these sectors to the state's economy.

There are an additional 20,506 jobs in energy efficiency and 11,064 in motor vehicles across the state.

Figure 1. Employment by Major Technology

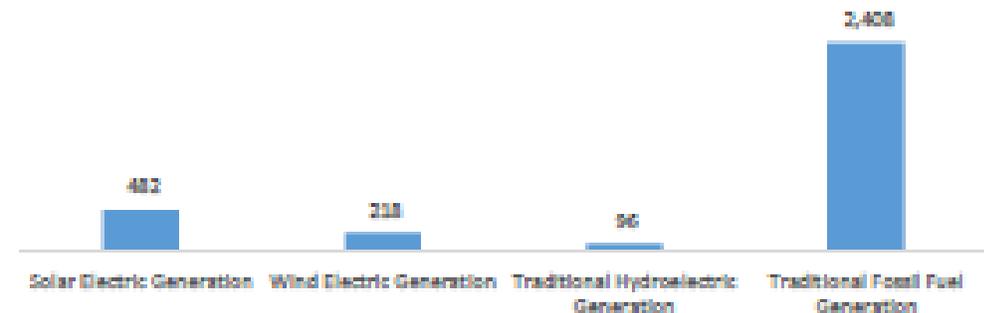


Technology Breakdown

Electric Power Generation

The electric power generation segment employs 3,204 workers in Moniziana, 0.5% of the national total. Traditional fossil fuel generation makes up the largest segment with 2,408 jobs, followed by solar at 482 jobs.

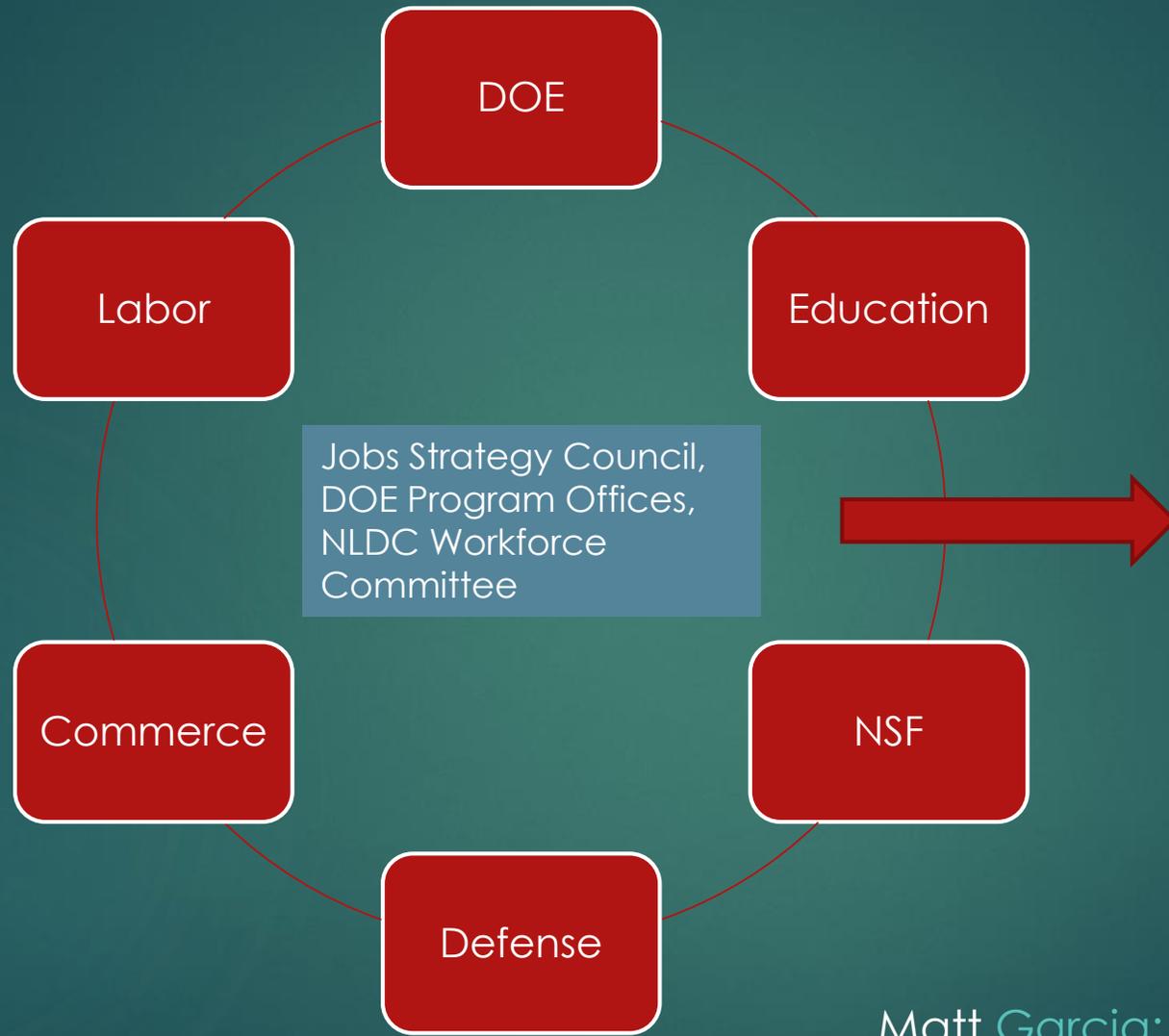
Figure 1. Electric Power Generation Employment by Sub Technology



Utilities are responsible for most of the employment in electric power generation, with 2,551 jobs. Construction employment adds 653 to the total.

Energy and Advance Manufacturing Workforce Initiative (EAMWI)

- ▶ **Objective:** Accelerating the growth of and access to jobs in the U.S. energy and advanced manufacturing sectors while developing and maintaining a skilled domestic energy and advanced manufacturing workforce
- ▶ **Participating Agencies:** Energy, Labor, Education, Commerce, Defense, National Science Foundation
- ▶ **Key Activities:**
 - ▶ Coordinated by DOE with program offices and labs
 - ▶ Quarterly meetings
 - ▶ Focused primarily on the community college system
 - ▶ Identification of opportunities for collaboration on technology and curricula development
 - ▶ Coordinate other priorities on apprenticeship, career pathways, and place-based initiatives in energy and manufacturing.



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