The 2020 U.S. Energy and Employment Report was produced with the generous support of the following states, organizations and foundations:

- California Energy Commission
- California Public Utilities Commission
- Connecticut Green Bank
- Massachusetts Clean Energy Center
- New York State Energy Research and Development Authority
- Pennsylvania Department of Environmental Protection
- Rhode Island Office of Energy Resources
- Texas State Energy Conservation Office
- Vermont Clean Energy Development Fund
- Advanced Energy Economy
- American Wind Energy Association
- Clean Energy Trust
- Energy Foundation
- E4TheFuture
- Energy Futures Initiative
- E2 (Environmental Entrepreneurs)
- McKnight Foundation
- Nathan Cummings Foundation
- National Association of State Energy Officials
- Nuclear Energy Institute
- The Solar Foundation
- U.S. Climate Alliance

Peer review of the report and the underlying methodology was performed by:

- Dr. James Barrett, Principal, Barrett Economics
- Dr. Joel Yudken, Principal, High Road Strategies, LLC

Data collection and research was managed by BW Research Partnership

Editing and design services were provided by MG Strategy & Design

This material is based upon work supported by the Department of Energy under Award Number DE-EP0000027.

Disclaimer: This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.
The National Association of State Energy Officials (NASEO), a nonprofit association representing the 56 energy offices of the states, territories, and District of Columbia, and the Energy Futures Initiative (EFI), a nonprofit think tank based in Washington, D.C., are pleased to release the 2020 U.S. Energy and Employment Report (USEER) to provide a consistent tool for states, trade associations, labor unions, and other stakeholders to track changes in energy and energy-related employment during a time of continued change in energy markets.

For many NASEO members, economic development and job creation provide the underpinning for their energy planning and policy development initiatives. Now in its fifth year of publication, the USEER offers a powerful tool for state policymakers to understand the impact of evolving energy markets; to help prepare their communities, infrastructure, and workforce for these changes; and to harness the economic and environmental benefits that result.

The 2020 USEER was prepared under a Memorandum of Understanding between NASEO and EFI, and a contract between EFI and BW Research Partnership. The underlying methodology of the survey is identical to that used in the primary data collected on behalf of the U.S. Department of Energy (DOE) for the 2017 U.S. Energy and Employment Report and secondary data from the United States Department of Labor’s Quarterly Census of Employment and Wages for the second quarter of 2019. The survey instrument was amended for the 2020 USEER to include additional questions about ENERGY STAR products and services, energy storage, utility energy efficiency programs, and pipeline products. Neither EFI nor NASEO, nor any of their employees, nor any of their contractors, subcontractors, or their employees makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or any third party’s use or the results of such use of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights.

The USEER was first published in 2016 and 2017 by DOE upon recommendation of the 2015 first installment of the Quadrennial Energy Review (QER), “to reform existing data collection systems to provide consistent and complete definitions and quantification of energy jobs across all sectors of the economy.” Previous editions of the USEER had addressed several gaps in energy employment data, including the following:

- business activities essential to the operation of traditional energy companies and utilities, including coal, natural gas, nuclear, and others, classified by the North American Industry Classification System (NAICS) within the business activities of other sectors
- jobs associated with the production of renewable energy such as wind, solar, and geothermal power
- jobs associated with energy efficiency

The 2018, 2019, and 2020 USEERs have been organized and implemented by EFI and NASEO to provide continuity with the previous editions of the USEER in data collection and accuracy in year-to-year comparisons.

Accordingly, the 2020 USEER relies on the identical survey instrument developed by the DOE and approved by the Office of Management and Budget (OMB Control No. 1910-5179) for the 2017 USEER with the following additions:

- differentiation of jobs in oil and gas pipeline construction
- expansion of energy storage technologies
- an energy and energy efficiency jobs wage data survey to be published as a separate report
- detailed questions on specific ENERGY STAR products and its commercial, residential and industrial building construction programs
- a question on internal utility-run energy efficiency programs

The data collection for the 2020 USEER was timed to ensure meaningful year-to-year comparisons with previous reports. In addition, the following organizational changes were made from the original USEER:

- separate chapters for Fuels and Electric Power Generation to provide greater detail on each subtechnology in these sectors
- new crosscuts on the oil, gas, coal, nuclear, and energy storage industries to provide data on their entire value chains
- a five-year summary of key trends in the Traditional Energy, Energy Efficiency, and Motor Vehicles sectors from 2016-2020

It is our hope that the 2020 USEER and future editions will be used to better inform federal, state, and local policymakers; academic decision-makers; and the private sector in developing integrated energy, security, economic development, and workforce plans. This kind of integration is key to maximizing the benefits of the nation’s abundant energy resources, rapid pace of energy innovation, and dynamic energy markets. We further hope that the data presented in these and future reports will help advance the understanding of the economics of emerging energy industries. Creating a single and consistent measure of employment across the entire U.S. energy system is critical to that understanding.
REPORT INQUIRIES

For inquiries regarding this report, please contact:

DAVID ELLIS  
Director, Communications and Policy Strategy  
Energy Futures Initiative  
Ddellis@energyfuturesinitiative.org  
202-770-8804 (Cell)  
202-688-0042 (Office)  
www.energyfuturesinitiative.org

SANDY FAZELI  
Managing Director  
National Association of State Energy Officials  
sfazeli@naseo.org  
703-299-8800 x 117  
www.naseo.org

ADDITIONAL ANALYSIS + REPORTS

The USEER data base includes detailed data for the 53 separate technologies that comprise the five surveyed sectors. Each of these technologies is, in turn, divided into as many as seven industrial classifications. As a result, the USEER data base can provide an in-depth view of the hiring difficulty, in-demand occupations, and demographic composition of very specific portions of the energy and energy efficiency workforce in each state or in specific counties and, in some cases, portions of counties. In addition, the USEER data base can provide year-to-year comparisons in specific sectors, technologies, and industrial classifications at the state and county level. For information about additional analysis and reports, please contact:

Energy Futures Initiative:  
JEANETTE PABLO  
General Counsel and Senior Associate  
Tel: 202-688-0048  
Email: JMPablo@EnergyFuturesInitiative.org

National Association of State Energy Officials:  
SANDY FAZELI  
Managing Director  
Tel: 703-299-8800 x 117  
Email: SFazeli@NASEO.org
The 2020 USEER analyzes the following five sectors of the U.S. economy:

**TRADITIONAL**

- Fuels
- Electric Power Generation
- Transmission, Distribution and Storage
- Energy Efficiency
- Motor Vehicles

Employment in these sectors increased in 2019 by 1.8% from the previous year.

Traditional Energy and Energy Efficiency sectors in 2019 employed approximately 6.8 million Americans or 4.6 percent of a workforce of roughly 149 million.

Employment in these sectors added 120,300 jobs over 7 percent of all new jobs nationwide.¹

Based on a comprehensive analysis of employer data collected in the fourth quarter of 2019.

---

¹ Due to differing time frames for the USEER report, the reports on employment in 2015, 2017, 2018, and 2019 reference BLS second quarter employment data, whereas the report on 2016 report uses BLS first quarter employment data. Energy employment growth in the period between the second quarter of 2018 and the second quarter of 2019 represented 7 percent of all employment growth in the United States. Unless otherwise stated, all increases or decreases described in this report for 2019 (whether whole numbers or percentages) are relative to 2018.
MINING AND EXTRACTION
The major growth industry sector in Fuels was mining and extraction, which added more than 7,000 jobs, largely driven by oil and natural gas production.

COAL FUELS
Coal fuels jobs increased by 612 jobs (less than 1%), totaling about 75,500 jobs.

BIOFUELS
While corn ethanol declined slightly, woody biomass and other biofuels added 775 jobs for a growth rate of nearly 2 percent.

OIL & NATURAL GAS
Employers added the most new jobs, more than 18,000, employing:
- Oil: 615,500 jobs
- Natural Gas: 276,000 jobs

The Fuels sector employed 1,148,900, an increase of 26,100 or 1.9 percent in 2019.

KEY FINDINGS
- 1,148,900 jobs
- 1.9% growth
- 26,100 new jobs
- 18,000 new jobs
- 615,500 oil jobs
- 276,000 natural gas jobs
- 775 biofuels jobs
The Electric Power Generation sector employed 896,800* employees and grew by almost 2 and a half percent, gaining over 21,200 jobs. Job losses in nuclear and coal generation were offset by increases in natural gas, solar, wind, CHP, hydro, and geothermal.

**NATURAL GAS**

Natural gas employment, traditional and advanced/low emissions combined, in Electric Power Generation increased by more than 9,100 for almost 122,000 jobs reflecting that gas now exceeds coal in both employment and gigawatts produced.

6,500 of those new jobs were in advanced/low emissions technologies.

**FASTING GROWING SECTORS**

<table>
<thead>
<tr>
<th>Sector</th>
<th>Employment Change</th>
<th>Percent Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced Natural Gas</td>
<td>6,500</td>
<td>+9.4%</td>
</tr>
<tr>
<td>Solar</td>
<td>5,700</td>
<td>+2.3%</td>
</tr>
<tr>
<td>Wind</td>
<td>3,600</td>
<td>+3.2%</td>
</tr>
</tbody>
</table>

**SOLAR**

Solar energy firms employed 248,000 employees who spent the majority of their time on solar. An additional 97,400 employees spent less than half their time on solar-related work. The number of employees who spend the majority of their time on solar increased by 2.3 percent or nearly 5,700 jobs in 2019.

**WIND**

Wind energy companies hired an additional 3,600 employees for a total of 114,800 an increase of +3.2%

**COAL**

Coal-fired generation employment declined by just under 7,700 jobs, nearly 8 percent.

---

* The Solar Foundation 2019 National Solar Jobs Census/BW Research Partnership. The category of industry employment differs slightly from several categories used by The Solar Foundation to classify employment.

* Includes 97,359 solar employees who spend less than 50 percent of their time on solar.
Transmission, Distribution, and Storage (TDS) employed more than 2.4 million Americans with just over 1 million working in retail trade (gasoline stations and fuel dealers).

Excluding retail trade, this represents an increase of +17,800 new jobs or +1.3%.

**Construction**

Construction firms employed nearly 499,000 Americans in TDS, a 4 percent increase from 2018.

**Transmission, Distribution, and Storage (TDS)**

TDS employment in utilities remained virtually unchanged since 2018, employing 417,600.

**Grid Modernization**

Overall, 42 percent of respondent employers working in this sector reported that a majority of their revenues come from grid modernization or other utility-funded modernization projects, a decrease of -6% over 2018.

* This number includes 1.02 million employees who work in retail gasoline stations.
**KEY FINDINGS**

**ENERGY EFFICIENCY**

Energy Efficiency employed

**2.38 MILLION**

in the design, installation, and manufacture of Energy Efficiency products and services

**PROFESSIONAL SERVICES AND WHOLESALE TRADE**

Energy Efficiency professional services and wholesale trade both observed increases in employment:

**PROFESSIONAL SERVICES**

15,000

**+3.1%**

**WHOLESALE TRADE**

6,500

**+3.6%**

**ENERGY STAR**

The manufacture, installation, design, wholesale distribution, and other services related to ENERGY STAR products employed almost 827,000 Americans in 2019.

**CONSTRUCTION**

of employees who work on Energy Efficiency in the construction sector report spending the majority of their time on Energy Efficiency-related work, virtually unchanged from the 79 percent in 2018.

**54,000**

**+3.4%**

Energy Efficiency jobs are in the construction industry, a 2.1 percent increase, or 27,600, from 2018.
Key Findings

Motor Vehicles

Motor Vehicles (including component parts) employed over 2.55 million, adding 20,000 jobs a slight increase of just under 1 percent.

Alternative Fuels Vehicles

In 2019, over 266,300 employees worked with alternative fuels vehicles, including natural gas, hybrids, plug-in hybrids, all-electric, and fuel cell/hydrogen vehicles, a decline of 2 percent or 5,300 jobs. (Note that alternative fuels vehicles numbers were revised up for 2017 and 2018 in the Motor Vehicles chapter.)

Hybrids, Plug-in Hybrids, and All-Electric

Hybrids, plug-in hybrids, and all-electric vehicles made up over 90 percent of this number, supporting more than 242,700 employees. Electric vehicles jobs declined by 9.8 percent and plug-in hybrid jobs declined by 2.5 percent in 2019.

Fuel Economy

Nearly 494,000 employees (44%), an increase of 8,000, work with component parts that contribute to fuel economy.

Component Parts

More than one-fifth 22% of component parts firms derived all of their revenue from products that increase fuel economy for motor vehicles.
CROSS CUTS

The 2020 USEER provides four cross cutting analyses that look at the interrelations of jobs across the entire value chain of the natural gas, petroleum, coal and nuclear industries that were previously segregated in the Fuels, Electric Power Generation, and Transmission, Distribution and Storage chapters. In addition, a fifth cross cutting analysis looks at job comparisons between those Electric Power Generation technologies that consume fuels and those that do not.

**KEY FINDINGS**

### NATURAL GAS

- **Mining and Extraction**: 636,042
- **Utilities**: 183,612
- **Construction**: 109,576
- **Wholesale Trade, Distribution, and Transport**: 313,591

Number of jobs: 824,290

**PETROLEUM**

- **Mining and Extraction**: 165,602
- **Utilities**: 38,158
- **Manufacturing**: 157,911
- **Wholesale Trade, Distribution, and Transport**: 172,796

Number of jobs: 55,669

The coal industry employs 185,689 down 5.9 percent.

**COAL**

- **Mining and Extraction**: 185,689
- **Utilities**: 38,158
- **Wholesale Trade, Distribution, and Transport**: 37,670

Number of jobs: 133,689

Number of jobs: 55,669

up 3.1 percent.

up 1.7 percent.

up 1.7 percent.

up 5.9 percent.
### CROSS CUTS

#### NUCLEAR
- Industry employs **70,323**
  - Number of jobs:
    - Utilities **44,366**
    - Professional and Business Services **14,757**
    - Manufacturing **4,979**

#### ELECTRIC POWER GENERATION AND FUELS
- Directly employed over **2 million**
  - Up **42,584** (a 2.1 percent).

#### TRADITIONAL FOSSIL FUEL SECTORS
- In 2019, 62 percent, or **1.2 million**, of these employees worked in traditional coal, oil, and natural gas Electric Power Generation and Fuels, two percentage points below 2018.

#### ZERO EMISSIONS
- **509,697** worked in zero emissions’ generation technologies, including solar, wind, hydro, geothermal, and nuclear.

#### LOW EMISSIONS
- **227,096** worked in low-carbon emissions technologies, including biofuels, CHP, and advanced/low emissions gas.

---

*This number does not include 97,359 employees who spend less than 50% of their time on solar.*

---

---
Hiring and Demographics

PROJECTIONS

Overall, firms covered by the survey anticipate roughly 3.1% employment growth for 2020, down from 4.6% projected growth last year.

Projected growth rate in 2020

- **Electric Power Generation employers** projected the highest growth rate in 2020.
  - 4.8%

- Transmission, Distribution, and Storage
  - 3.5%

- Energy Efficiency
  - 3.0%

- Motor Vehicles sector
  - 3.0%

- Fuels
  - 1.7%

Hiring difficulty was highlighted by virtually all sectors as a growing problem. Just over 84% of employers across these sectors (84.4%) reported difficulty hiring qualified workers over the last 12 months, an increase of over 7 percentage points from 2018 and a total of 14 percentage points since 2017. Almost three-in-ten employers (29%) noted it was very difficult (no change from 2018).

- Among construction employers in Energy Efficiency, one of the largest surveyed sectors with over 1.3 million workers, 91% of employers reported that it was somewhat difficult or very difficult to hire new employees. However, those reporting it was very difficult declined from 52% in 2018 to 45% in 2019.

- Lack of experience, training, or technical skills were again cited as the top reasons for hiring difficulty by employers across all five surveyed sectors. The need for technical training and certifications was also frequently cited, implying the need for expanded investments in workforce training and closer coordination between employers and the workforce training system.
HIRING AND DEMOGRAPHICS

DEMOGRAPHICS

Demographically, the surveyed sectors fluctuate above and below national averages.

WOMEN

Women in US Energy Workforce

Women in US Workforce

Women are a smaller portion of the workforce in these sectors, ranging from 23 percent to 32 percent, ... compared to the overall economy, where women make up 47 percent of the workforce.

VETERANS

Veterans comprise from 8 to 10 percent of these sectors—higher than the national average of 6 percent.

55 OR OLDER

Between 13 percent and 21 percent of this workforce is 55 years of age or older, compared to the national average of 23 percent; this proportion is significantly lower in Electric Power Generation and Energy Efficiency.

DIVERSITY

However, a majority of these energy sectors are more racially diverse than the national workforce as a whole even though specific racial categories are frequently underrepresented.

This is, in part, because of the increased self-identification of employees belonging to “2 or more races.”

UNIONS

Unionization rates for TDS, Electric Power Generation, Energy Efficiency, and Motor Vehicles exceed the national private sector average, while only Fuels is below.
CONCLUSION

In 2019 America’s Traditional Energy, Energy Efficiency, and Motor Vehicles sectors continued to outperform the rest of the American economy in job growth, accounting for 8 percent of all new employment opportunities, while making up only 5.6 percent of the workforce.

CHANGING TECHNOLOGY

As with other sectors of the economy, changing technology has driven much of this growth while also being responsible for disruption and job loss within specific subsectors. This trend was most notable in the Electric Power Generation sector.

<table>
<thead>
<tr>
<th>COAL</th>
<th>NATURAL GAS</th>
<th>RENEWABLE TECHNOLOGIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>where almost</td>
<td>while over</td>
<td>Another</td>
</tr>
<tr>
<td>-8,000</td>
<td>9,100</td>
<td>10,900</td>
</tr>
<tr>
<td>jobs were lost in coal-fired generation in 2019</td>
<td>were added in natural gas generation.</td>
<td>jobs were created in renewable technologies.</td>
</tr>
</tbody>
</table>

A valuable aspect of the USEER is its capacity to identify such labor market trends so that policymakers can address them.

ENERGY EFFICIENCY

Starting in the mid-1970’s, the U.S. economy started to see a decoupling of energy consumption from economic growth. Today 30 states have energy efficiency standards or voluntary policies and 75 percent of all utilities operate energy efficiency programs.

The result has been the creation of an Energy Efficiency sector that employs 2,380,000 in one of our most dynamic sectors.

One of the most important contributions of the USEER over the last five years has been its success in defining and quantifying jobs in Energy Efficiency.
This year's USEER has also performed a deeper examination of the Environmental Protection Agency's ENERGY STAR program to link the jobs that are responsible for supplying the products and services that make up this remarkable effort.

Known throughout the world as the benchmark that has introduced energy efficiency as both an economic and social value, the USEER determined that almost 827,000 Americans have jobs that are providing those products and services.

Energy efficiency is also at the heart of the CAFE standards that have redefined the U.S. Motor Vehicles' industry. Since the current standards were adopted in 2012, the manufacturing sector of Motor Vehicles in the U.S. has added over 220,000 jobs, rebuilding the industry from the Great Recession.

44 percent of the Motor Vehicles parts' industry have jobs that are contributing to producing vehicles that help achieve those fuel efficiency standards. 22 percent of these companies make 100 percent of their profits from fuel efficiency.

Americans in the MV Component Parts industry contribute to fuel efficiency.

In 2019, our traditional energy sectors—Fuels, Generation, and TDS—added 65,000 new jobs, producing oil, natural gas, electricity from many sources, and the systems that distribute them. Meanwhile, the efforts to make the usage of that energy more efficient in our built environment and our Motor Vehicles added another 62,000 jobs, matching the traditional energy jobs almost one for one.

New jobs conserving energy.

Energy production and energy efficiency go hand in hand. Both are dynamic job creators at the core of a 21st Century economy.