
The 2020 USEER project was guided by David Foster, who directed the first four editions of the USEER and now serves as a Distinguished Associate with EFI.

Data collection and analysis was provided by BW Research Partnership, a full-service research firm with offices in California and Massachusetts.

March 18, 2020
Webinar Presenters

Introduction
David Terry
Executive Director
The National Association of State Energy Officials

2020 Report
David Foster
Distinguished Associate
Energy Futures Initiative
The U.S. Energy and Employment Report

5 Year Trends
Phil Jordan
Vice President
BW Research Partnership
Membership includes the 56 Energy Governors’ Energy Directors and their offices from the states, territories, and the District of Columbia, as well as private-sector Affiliate partners.

Serves as a resource for and about the states on a number of topics, including workforce development, energy security, innovation, building energy efficiency, clean energy financing, fuels and grid integration, government affairs, transportation, energy policy planning, and climate.

Works through topical committees to facilitate peer learning across states to improve the effectiveness of energy policies and programs.

Visit [www.naseo.org](http://www.naseo.org) for more information.
Thank You!
Our Mission

The Energy Futures Initiative advances solutions to the climate crisis through building coalitions, thought leadership, and evidence-based analysis. Under the leadership of Ernest J. Moniz, all final EFI analysis is peer-reviewed, published, and publicly available.
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<td>August 2017</td>
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<td>Leveraging the DOE Loan Programs: Using $39 Billion in Existing</td>
<td>March 2018</td>
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<td>Clearing the Air: A Federal RD&amp;D Initiative and Management Plan for</td>
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A Joint Project of the National Association of State Energy Officials and the Energy Futures Initiative

March 18, 2020
Embargoed Webinar Briefing

David Foster, EFI, Distinguished Associate

USEnergyJobs.org
The USEER is based on an annual supplemental employer survey, integrated with the BLS Quarterly Census on Employment and Wages.

It studies employment in the following sectors:
- Fuels
- Electric Power Generation (EPG)
- Transmission, Distribution, and Storage (TDS)
- Energy Efficiency (EE)
- Motor Vehicles

Fuels, EPG, and TDS make up the Traditional Energy Sector.
• The survey covers direct employment in 53 different energy, energy efficiency and motor vehicle technologies across 186 NAICS codes located in seven broad industrial classifications.

• The survey determines:
  • Employment numbers
  • Employer hiring expectations for the next 12 months
  • Hiring difficulty by technology and industrial classification
  • High demand jobs and skills gaps
  • Workforce demographics by race, ethnicity, gender, and veteran’s status
  • Geographic location by state, county, congressional and legislative districts, and MSA of each technology and industrial classifications
1. Governor’s Introduction from Governor Reynolds of Iowa and Governor Polis of Colorado.
2. Spotlight on real world experience from Tesla, CEWD, Xcel Energy, SMART, UA, and UAW.
3. In-depth look at ENERGY STAR-related jobs.
4. Utility-run energy efficiency programs.
5. Summary of 5-year Trends.
Key Takeaways—2020 USEER

- Traditional Energy and Energy Efficiency added 120,000 jobs in 2019, outperforming the economy for the 5th year in a row by 0.6 percentage point, 1.8% to 1.2%.
- Energy Efficiency again led the way with 54,000 new jobs, almost 330,000 new jobs in the last 4 years.
- Fuels production added 26,000 new jobs, 18,000 in oil and natural gas, while coal mining held firm.
- Solar jobs bounced back, adding 5,700 jobs after declining for two years in a row, while low emissions’ natural gas, wind, CHP, and geothermal all continued to grow.
- Coal generation dropped by almost 8,000 jobs while coal mining increased slightly.
- Motor vehicles added 20,000 jobs, while alternative fuel vehicles declined slightly.
- Overall hiring difficulty continued to rise to over 84%, an increase of 7 percentage points.
- Overall surveyed employers predicted 3.1% growth rate for 2019.
2020 US Energy and Employment Report

• In total, 6.8 million Americans work in Traditional Energy* industries and Energy Efficiency
  • An increase of 120K to 6.8M (excluding gas stations).

• Fuels production directly employs almost 1.15 million workers,
  • 26,000 new jobs in Fuels.

• Electric Power Generation gained over 21,000 jobs
  • EPG employs 896,800. (Includes 97,000 minority-time solar.)

• 2.4 million** Americans work in Transmission, Distribution, and Storage of all energy products
  • 17,100 new jobs (excluding gas stations)

• 2.38 million work in Energy Efficiency
  • A net increase of over 54,000.

• In addition, 2.55 million work in motor vehicles
  • A net increase of 20,000 in 2019.
  • 266,000 work with alternative fuels vehicles, a decline of almost 2%.

140,000 New Jobs in 2019 in 5 Sectors

*Traditional Energy sectors include Fuels, Electric Power Generation and Transmission, Distribution and Storage.
**Includes 1M gas station employees.
TRENDS

• **2019 Job Gain.** Growth in fuels slowed in 2019 by half.

• **Oil and Gas Recovery.** Oil and natural gas employers added 18,000 new jobs, employing 615,500 and 276,000 respectively.

• **Coal Growth.** Coal fuel jobs increased by 600 jobs, less than 1%, totaling 75,400.

• **Biofuels.** Biofuels increased by 2%, while corn ethanol decreased.

• **2020 Expectations.** Fuels’ employers anticipate 1.7% job growth in 2019, with most of the increase expected in oil and natural gas.
As a state, Nevada has a rich history of gaming, tourism and mining, but the recession following 2008 created a significant focus on diversifying the economy to include industries like advanced manufacturing and data center technology. Then as Tesla announced the Gigafactory coming to Nevada in 2014, this diversification spurred a growth in STEM jobs in the state that is projected to be 40 percent higher than in non-STEM jobs through 2024.
**Executive Summary—Electric Power Generation**

**TRENDS**

- **2019 Job Growth.** In 2019, the Electric Power Generation sector gained 21,245 jobs for a total of 896,830*, reversing last year’s decline.

- **Technology Shifts.** Advanced and traditional natural gas added the most jobs, 9,100, while majority-time solar added 5,700. Other technologies that grew included wind, combined heat and power.

- **Generation Mix.** From 2006-2018 net electricity generation from natural gas increased by 86% while net coal generation declined by 42%. Coal generation declined by almost 8,000 jobs in 2019.

- **2019 Expectations.** Electric Power Generation employers anticipated 4.8% job growth in 2020, with most of the increase expected in renewable construction.

*includes 97,000 minority-time solar jobs
“We think a lot about the energy transition that is underway in America. We have announced our intention to deliver 100 percent carbon-free electricity by 2050. How we manage this transition is very important. We know that there will be fewer power plant jobs in the future but more jobs with data and grid management and customer service.”
Executive Summary—Transmission, Distribution and Storage

TRENDS

• **2019 TDS Employment:** Excluding retail employees in gas stations and fuel dealers, 1,383,646 workers were employed in Transmission, Distribution, and Storage, adding 17,800 new jobs.

• **2020 Expectations:** TDS employers predict 3.5% job growth in 2019, led by their largest industry sector, construction employers, who anticipate 6.7% growth.

• **Key Industry Sectors:** The construction sector employed 36% of all TDS workers, while the utility industry employed another 30%

*TD&S includes both electricity and fuels.*
Executive Summary—TDS

“The industry’s biggest workforce issue today is skills. New jobs in utilities used to be like the old jobs. Now the modernization of infrastructure and the change in generation mix are requiring new skills that are changing on two and five-year cycles. However, industry certificate programs take four years, and we now need to predict new skills several years out.”
Executive Summary—Energy Efficiency

TRENDS

• **2019 Job Growth.** In 2019, the Energy Efficiency sector continued to produce the largest number of new jobs of any energy sector—over 54,000—with 2,378,893 jobs in total.
  • Construction added 27,600.
  • Professional services added 14,800.

• **2020 Expectations.** Energy Efficiency employers report a projected growth rate for employment in 2020 of 3 percent.
  • Construction employers predict 3.6% growth or 48,000 new jobs.

• **Key Occupations:** The majority, 56 percent, of Energy Efficiency employees worked at construction firms in 2019. Approximately one in five workers in the Energy Efficiency sector worked in professional and business services.
Today, our apprentices are generally older, in their late 20’s. Often times they have a college education but haven’t been able to get employment in their preferred degree. Our union is also much more diverse. Forty years ago, we were a white man’s country club, but today we also do a lot of recruitment of women.
826,500 employees are involved in the manufacture, design, installation, wholesale distribution and other services for ENERGY STAR.

HVAC systems make up 34%, followed by LED lighting and appliances.

508,200 of these employees work in construction.

148,000 work in professional services and 95,000 in manufacturing.
Executive Summary—Motor Vehicles

TRENDS

• **2019 Job Growth.** The U.S. Motor Vehicles* sector employed 2,556,492 Americans in 2019, increasing by 20,000 employees over 2018 or 0.8%. This is exclusive of dealerships and retailers, which employed nearly two million additional workers.

• **Alternative fuels vehicles.** Alternative fuels’ vehicles employed 266,384 workers in 2019, a decline of over 5,300.

• **Fuel economy.** 44% of employees—over 494,000—in the auto parts sector work with products that contribute to fuel economy.

• **2019 Expectations.** Motor Vehicles’ employers anticipate 3.0% growth in 2019.

*The Motor Vehicles sector is not part of the Traditional Energy and Energy Efficiency sectors which separately employ 6.8 million.*
“Job quality is very important to maintaining the middle class in America. Over the last 15 years, pay in auto jobs overall (union and non-union) declined by 20%, when adjusted for inflation. That’s what was so important about last year’s auto negotiations. We need to improve job quality if we’re going to restore equality.”
Executive Summary—Low Carbon Emissions Energy

- **834,000 Americans are employed, in whole or part, in low carbon emissions** generation and fuels, up 4% from 2017.

  - **In generation**, these include:
    - Solar—248,000 spending a majority of their time, with another 97,000 spending less than 50%, increases of 2.4% and 4.3%.
    - Wind—114,000, increase of 3.2%
    - Nuclear—70,600 (generation and fuels), decrease of 2.5%
    - Biomass & CHP—43,500, increase of 3%
    - Geothermal—8,800, increase of 3.1%
    - Hydro—67,800 (12,300 low impact), an increase of 2%
    - Low emissions natural gas—75,700, an increase of 9.4%

  - **In fuels**, these include:
    - Corn Ethanol—34,900, a decrease of 1%
    - Woody Biomass/Cellulosic Biofuels—33,400, an increase of 1%
    - Other Ethanol and Non-woody Biomass, incl. Biodiesel—20,700, an increase of 3%
    - Other Biofuels—18,900, an increase of 2.8%
Of the 7.5 million construction workers in the U.S., over 2.142 million, about 29% are employed by traditional energy or energy efficiency firms.

- 1,323,400 jobs are in Energy Efficiency.
- 498,800 jobs are in Transmission, Wholesale Distribution, and Storage.
- 299,400 jobs are in Electric Power Generation.
- 20,400 jobs are in Fuels.

Construction firms in EE report the greatest hiring difficulty in the entire survey with 45% indicating it is “very difficult” to hire new employees with 91% reporting some level of difficulty.
Executive Summary—Professional Services

- Of the 21.2 million professional and business services jobs in the U.S., 986,800, about 4.7% are directly engaged in traditional energy or energy efficiency firms.
  - 170,500 jobs are in Fuels.
  - 182,700 jobs are in EPG
  - 134,300 jobs are in TDS
  - 499,300 jobs are in EE.
  - 2020 projected growth rate is 4.5% or 44,300 new jobs with the majority expected in Electric Power Generation and Energy Efficiency.
Of the 12.8 million manufacturing jobs in the U.S., over 771,200, about 6% are directly involved in the production of fuels, generating, and transmission equipment, and energy efficiency products.

• **247,300 jobs** are in Fuels.
• **113,100 jobs** are in Electric Power Generation.
• **325,300 jobs** are in Energy Efficiency.
• **85,500 jobs** are in Transmission, Wholesale Distribution, and Storage.

Another **1.01 million jobs** are in Motor Vehicle manufacturing.

• **85,000** of these jobs are in manufacturing alternative fuels vehicles.
• **634,000 manufacturing jobs** are in component parts. 44% of all component parts jobs support fuel efficiency technologies.
### Crosscuts—Natural Gas and Coal Industries

#### Table 35.
Natural Gas Industry Employment by Detailed Technology Application and Industry, Q2 2019

<table>
<thead>
<tr>
<th>Total</th>
<th>Mining and Extraction</th>
<th>Utilities</th>
<th>Construction</th>
<th>Manufacturing</th>
<th>Wholesale Trade, Distribution + Transport (excluding Pipelines)</th>
<th>Professional and Business Services</th>
<th>Other Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuels</td>
<td>275,924</td>
<td>165,602</td>
<td>--</td>
<td>--</td>
<td>45,276</td>
<td>29,633</td>
<td>3,180</td>
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<tr>
<td></td>
<td>Conventional Gas Generation</td>
<td>46,151</td>
<td>19,276</td>
<td>10,551</td>
<td>3,835</td>
<td>8,371</td>
<td>1,139</td>
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<tr>
<td>Advanced Gas</td>
<td>75,661</td>
<td>47,224</td>
<td>9,638</td>
<td>2,791</td>
<td>4,983</td>
<td>10,118</td>
<td>907</td>
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<tr>
<td>Fuel Transmission + Distribution</td>
<td>236,580</td>
<td>117,112</td>
<td>88,624</td>
<td>--</td>
<td>30,644</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Storage</td>
<td>1,727</td>
<td>--</td>
<td>563</td>
<td>285</td>
<td>214</td>
<td>653</td>
<td>12</td>
</tr>
<tr>
<td>TOTAL</td>
<td>636,042</td>
<td>165,602</td>
<td>183,612</td>
<td>109,576</td>
<td>53,886</td>
<td>68,653</td>
<td>54,377</td>
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</table>

#### Table 36.
Coal Industry Employment by Detailed Technology Application and Industry, Q2 2019

<table>
<thead>
<tr>
<th>Total</th>
<th>Mining and Extraction</th>
<th>Utilities</th>
<th>Construction</th>
<th>Manufacturing</th>
<th>Wholesale Trade, Distribution + Transport</th>
<th>Professional and Business Services</th>
<th>Other Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuels</td>
<td>75,443</td>
<td>55,669</td>
<td>--</td>
<td>--</td>
<td>10,643</td>
<td>1,031</td>
<td>8,075</td>
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<tr>
<td></td>
<td>Coal Generation</td>
<td>79,711</td>
<td>--</td>
<td>38,158</td>
<td>8,847</td>
<td>1,083</td>
<td>6,104</td>
</tr>
<tr>
<td>Fuel</td>
<td>Transmission + Distribution</td>
<td>30,535</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>30,535</td>
</tr>
<tr>
<td>Storage</td>
<td>1,727</td>
<td>--</td>
<td>563</td>
<td>285</td>
<td>214</td>
<td>653</td>
<td>12</td>
</tr>
<tr>
<td>TOTAL</td>
<td>185,689</td>
<td>55,669</td>
<td>38,158</td>
<td>8,847</td>
<td>11,726</td>
<td>37,670</td>
<td>32,582</td>
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</table>

### WAGE DISTRIBUTION

- The average reported median full-time hourly wage for all entry level workers in the natural gas industry is $19.99/hour.
- The average reported median full-time hourly wage for all mid-wage workers is $27.24/hour.
- The average reported median full-time hourly wage for the highest earners in the industry is $39.19/hour.

- The average reported median full-time hourly wage for all entry level workers in the coal industry is $18.41/hour.
- The average reported median full-time hourly wage for all mid-wage workers is $28.48/hour.
- The average reported median full-time hourly wage for the highest earners in the industry is $42.07/hour.
Crosscut—Nuclear Industry

Table 38.
Nuclear Industry Employment by Detailed Technology Application and Industry, Q2 2019

<table>
<thead>
<tr>
<th>Industry</th>
<th>Total</th>
<th>Mining and Extraction</th>
<th>Utilities</th>
<th>Construction</th>
<th>Manufacturing</th>
<th>Wholesale Trade, Distribution, + Transport</th>
<th>Professional Services</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuels</td>
<td>9,406</td>
<td>348</td>
<td>--</td>
<td>--</td>
<td>3,078</td>
<td>929</td>
<td>5,052</td>
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<tr>
<td>Nuclear Generation</td>
<td>60,916</td>
<td>--</td>
<td>44,366</td>
<td>2,217</td>
<td>1,901</td>
<td>2,639</td>
<td>9,705</td>
<td>89</td>
</tr>
<tr>
<td>TOTAL</td>
<td>70,323</td>
<td>348</td>
<td>44,366</td>
<td>2,217</td>
<td>4,979</td>
<td>3,568</td>
<td>14,757</td>
<td>89</td>
</tr>
</tbody>
</table>

Wage distribution

- The average reported median full-time hourly wage for all entry level workers in the nuclear industry is $22.56/hour.
- The average reported median full-time hourly wage for all mid-wage workers is $36.46/hour.
- The average reported median full-time hourly wage for the highest earners in the industry is $54.86/hour.
• 84.4% of all surveyed employers reported difficulty hiring qualified workers over the last 12 months; 29% noted it was very difficult. (In 2018, these numbers were 76.9% and 29%)

• Technologies and Occupations with the highest hiring difficulties:
  • Energy Efficiency construction jobs, 45% very difficult, 91% somewhat difficult.
  • Professional and business services EE jobs, 80% very or somewhat difficult.
  • TDS construction employers, 80% very or somewhat difficult.

• Highest Demand Occupations in EE Construction:
  • Installation workers (49%)
  • Technician or mechanical support (48%)
  • Sales, marketing, or customer service (14%)
### Executive Summary—Projected Hiring Rates

<table>
<thead>
<tr>
<th>Sector</th>
<th>Projected Growth Rate in 2020</th>
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</thead>
<tbody>
<tr>
<td>Electric Power Generation employers</td>
<td>4.8%</td>
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<tr>
<td>Transmission, Distribution, and Storage</td>
<td>3.5%</td>
</tr>
<tr>
<td>Energy Efficiency</td>
<td>3.0%</td>
</tr>
<tr>
<td>Motor Vehicles sector</td>
<td>3.0%</td>
</tr>
<tr>
<td>Fuels</td>
<td>1.7%</td>
</tr>
</tbody>
</table>

Electric Power Generation employers projected the highest growth rate in 2020.
Executive Summary—Workforce Demographics

Many of these sectors are now racially more diverse than the workforce as a whole (22%).
  - 10-19% Latino or Hispanic compared to 17% overall.
  - 5-9% Black or African-American compared to 12% overall.
  - 7-10% 2 or more races compared to 2% overall.
  - EPG is the most diverse sector with 31% of the workforce people of color.

Women make up from 23-32% of these sectors compared to 47% of the overall workforce.
  - Electric Power Generation employs the highest percentage of women.

Veterans comprise about 8-10% of employees, compared to 6% nationally.

Unionization rates are generally higher than the national rate of 6.2% in the private sector:
  - TDS-17%, Motor Vehicles-13%, EE-10%, EPG-7%, and Fuels-3%
5 Year Trends—Energy Jobs Are Changing

• 3.3 million Americans work every day to produce and distribute the fuels and electricity that power our lives.

• 4.93 million Americans in Energy Efficiency and Motor Vehicles work every day to use that energy more efficiently.
5 Year Trends—Energy Jobs Are Changing

“IT USED TO BE THAT YOU GRADUATED FROM HIGH SCHOOL ON FRIDAY AND ENTERED OUR APPRENTICESHIP PROGRAM ON MONDAY. BUT HIGH SCHOOL COUNSELORS TODAY ARE ALWAYS ENCOURAGING KIDS TO GO TO COLLEGE. INSTEAD OF ACKNOWLEDGING THAT THE TRADES PROVIDE A VERY GOOD LIVING. SOME OF OUR PIPELINE WELDERS MAKE $150,000 TO $200,000 A YEAR.

“We are also seeing big increases in energy efficiency technologies. We are just in the first or second inning of ‘smart buildings’”. 
Decoupling of Energy Production and Consumption Has Been Good for Jobs

Between 2015 and 2019:

- U.S. GDP energy intensity decreased by 8%
- Energy production and distribution created 254,000 new jobs.
- Energy Efficiency and Fuel Efficiency created 481,000 new jobs.
• Oil and gas fuels combined employ over 891,000, adding 73,000 jobs or 8.9%.
• Coal fuels lost 17,000 jobs, a decline of 18%.
• Overall, ethanol and biofuels have declined by 3,600 jobs with corn ethanol down by 12,000 and various biofuels up by 65%.
• Mining and extraction jobs comprise 55% of all fossil fuel jobs; 88% of them are located in just 10 states.
Two Notable Shifts Occurred in Generation Sources

Natural Gas Displaced Coal as the Largest Net Power Generator

Within Renewables, Wind Displaced Hydro
During the last 4 years, EPG added 52,000 jobs, mostly in natural gas, wind, and CHP.

Coal generation lost 18,000 job and now employs 79,700 while natural gas employs 121,800.

Wind is the largest renewable in net generation and second in employment at 114,800.

Solar has declined from its peak in 2016.
Trends 2015-2019: Trans., Dist., & Storage

- TDS added 156,000 new jobs driven by:
  - Expanding oil and gas production
  - Renewables deployment
  - Grid modernization
  - Smart grid
  - Storage demand

- Battery storage added 18,700 jobs.
• Energy Efficiency added the most jobs of any sector—over 400,000.
• Traditional HVAC employers added the most new jobs, 77,800.
• Efficient lighting added 52,500 new jobs.
• In 2019, the USEER identified 826,500 jobs associated with the ENERGY STAR standards.
• Construction comprises the largest sector of Energy Efficiency with over 54%. However, extreme hiring difficulty has hampered growth.

• EE construction companies report that 78% of their employees spend the majority of their time on EE technologies, up from 64.8% in 2015.

• Professional services, the second largest sector, has added the most jobs, over 113,000.
Stem: Fuel Efficiency and Electrification Are Driving Job Growth

- MV has added 134,300 new jobs. 95,000 were in manufacturing.
- Alternative fuels vehicles now employ 266,000 Americans, adding over 76,000 new jobs since 2015.
- All-electric vehicles added the most jobs, up 36,000.
- 494,000 Component Parts employees now contribute to fuel efficiency.
Thank you!

Questions?

For more information, contact:

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• Sandy Fazeli at sfazeli@naseo.org
• David Ellis at ddellis@energyfuturesinitiative.org
• Phil Jordan at pjordan@bwresearch.com