US Energy Employment Report:

Look to the Data for Economic Development and Energy Jobs for Tribes

Office of Energy Policy and Systems Analysis/
Energy Jobs Strategy Council
U.S. Department of Energy

National Tribal Energy Summit | May 2, 2017
"Energy" Grows More Complex...

Critical Infrastructure Interdependencies

Oil
- Fuel Transport and Shipping
- Fuel for Generators, Lubricants
- SCADA Communications
- Fuel for Generators, Lubricants
- Power for Pumping Stations, Storage, and Control Systems

Transportation
- Fuels, Lubricants
- Fuel Transport and Shipping

Electricity
- Power for Pumping, Signaling, and Switching
- Power for Compressors, Storage, and Control Systems
- Power for Switches
- Power for Pump/Lift Stations and Control Systems
- Water for Production, Cooling, and Emissions Reduction
- Water for Cooling
- Emissions Reductions
- Water for Cooling
- Emissions Reductions

Water
- SCADA Communications
- Heat
- SCADA Communications

Natural Gas
- Fuel for Generators
- SCADA Communications

Communications and IT
- SCADA Communications
- Fuel for Generators
- Fuel for Generators

Source: Finster, 2016
... And Energy Jobs are Booming

2017 USEER: Key Findings

- Traditional Energy and Energy Efficiency sectors today employ approximately 6.4 million Americans
- In 2016, these sectors increased by nearly 5%, adding 300,000 new jobs to the US economy

Roughly 14% of all US jobs created in 2016 were energy jobs
A Skilled Energy Workforce is Key to Economic Growth.

• Significant new investment in energy infrastructure is anticipated over the next few decades, creating new job opportunities and challenges.

• The DOE’s jobs data—reflected in the *U.S. Energy and Employment Report*—captures employment and workforce trends on a national and state basis.

• Understanding energy jobs data supports training and workforce development.

• Workforce retirements are a pressing challenge, and a lack of training, experience, and technical skills impede new hires, especially in electricity generation.

• DOE has identified three PATHWAYS to help drive new energy jobs, workforce training opportunities, and economic development.
DOE's jobs report includes the most comprehensive energy jobs data.

KEY FINDINGS FROM THE DOE JOBS DATA

- Traditional energy sectors—fuels, generation, transmission, storage, distribution—employ ~4.3 million Americans across the nation.
- Adding the efficiency sector to that number equates to ~6.4 million jobs.

WHY DOES DOE NEED TO COUNT ENERGY JOBS?

- Address rapid changes in the energy sector.
- Traditional methods rely on incomplete or aggregated data and inconsistent definitions.
- Need to improve regional and local level data to inform workforce needs – DOE provides key Federal technical expertise.

The DOE’s U.S. Energy and Employment Report represents the most comprehensive effort to date to capture employment and workforce trends in traditional and emerging energy sectors on a national and state basis.

Energy Jobs CHALLENGES:

- Aging workforce
- Lack of skills, training
- Regionality of energy jobs

Included Sectors of Energy Employment*

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**ANALYZED SECTORS**

- **GENERATION AND FUELS**
  - 2015: 1,605,065
  - 2016: 1,943,614

- **TRANSMISSION, DISTRIBUTION AND STORAGE**
  - 2015: 2,035,438
  - 2016: 2,299,546

- **ENERGY EFFICIENCY**
  - 2015: 1,880,149
  - 2016: 2,181,511

- **MOTOR VEHICLES**
  - 2015: 2,421,591
  - 2016: 2,433,928

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*Included Sectors of Energy Employment*
Energy jobs are distributed regionally.
Significant opportunities exist to create jobs in the energy sector.

<table>
<thead>
<tr>
<th>State</th>
<th>U.S. State Unemployment Ranking</th>
<th>U.S. State Ranking in Proved Crude Oil and Lease Condensate Reserves</th>
<th>U.S. State Ranking in Proved Natural Gas Reserves</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alabama</td>
<td>48th (6.2%)</td>
<td>13th (79 million barrels)</td>
<td>15th (2.2 billion cubic feet)</td>
</tr>
<tr>
<td>Alaska</td>
<td>50th (6.7%)</td>
<td>4th (2.1 billion barrels)</td>
<td>11th (4.6 billion cubic feet)</td>
</tr>
<tr>
<td>Louisiana</td>
<td>47th (6.1%)</td>
<td>8th (534 million barrels)*</td>
<td>7th (16.3 billion cubic feet)*</td>
</tr>
<tr>
<td>New Mexico</td>
<td>19th (6.6%)</td>
<td>5th (1.6 billion barrels)</td>
<td>8th (15.4 billion cubic feet)</td>
</tr>
<tr>
<td>West Virginia</td>
<td>46th (5.9%)</td>
<td>14th (88 million barrels)</td>
<td>4th (21.9 billion cubic feet)</td>
</tr>
</tbody>
</table>

- Several states that have the highest unemployment rates as of December 2016 also have great potential for continued energy development.
- 5 of the ten states with the highest unemployment rates also have significant crude oil and/or natural gas reserves.

*Does not include federal offshore reserves.
DOE has jobs data for each state by industry & technology with demographic info.

Example: Texas

- Texas has a high concentration of energy employment, with **583,404** Traditional Energy workers statewide or 5% of total state employment.
  - 333,297 in the Fuels sector
  - 201,313 in TS&D and Storage
  - 48,794 in Electric Power Generation
- 146,722 jobs in Energy Efficiency (6.7% of all energy efficiency jobs nationwide)
- 166,035 in motor vehicles (6.8% of all motor vehicle jobs nationwide)
- 17.9% of the Traditional Energy jobs across the U.S. are located in Texas.
Retirements and Grid Modernization are Creating Hiring Difficulties

The age distribution in electric and natural gas utilities has shifted between 2006 and 2014, reflecting both the higher proportion of the workforce that is nearing retirement and industry efforts to address the aging workforce by hiring younger employees.

Source: Center for Energy Workforce Development, 2016

Modern Electric Grid: 2-Way Energy and Data Flow

- Grid Modernization and integration require technical skill in power systems engineering, cyber, “Internet of Things”, and business.
- Electricity employers report chronic shortages of qualified engineering candidates for DER and transmission operations.
- BLS estimates 1% - 8% occupational growth in engineering jobs thru 2024.
Hiring Difficulties Continue; AND Projected Hiring Rates Expected to Grow (Except Fuels)

73% of all surveyed employers reported difficulty hiring qualified workers Q3 2016; 26% noted it was very difficult. (Similar to 2015 responses)

Employers Reporting Very High Hiring Difficulties for Electric Power Generation Jobs

In addition to replacing retirees...

Employers project hiring growth for 2017:

- **Energy Efficiency** —9% growth or 198,000 jobs (133,000 in 2016)
- **Transmission, Wholesale Distribution and Storage** —6% growth projection or 78,000 jobs (65,000 in 2016)
- **Solar** —7% growth projection (51,000 full-time jobs in 2016)
- **Wind** —4% growth projection (25,000 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)
Resources to Evaluate Energy Opportunities for Tribes

DOE and National Labs
- Gold mine of tools and resources to evaluate, calculate, then design and fund energy resources for Tribes

*Example: NREL’s Prospector series*

- **Geothermal Prospector**
  - Examine, distribute, and analyze geothermal resources and identify sites for geothermal development.

- **Solar Power Prospector**
  - Shows sites for developing utility-scale solar power.

- **Wind Prospector**
  - Visualize data and analyze the potential for wind energy.

- **Job and Economic Development Impact (JEDI) Models**
  - Analyze the economic impacts of constructing and operating power generation and biofuel plants at the local and state level.

Education:
[https://energy.gov/indianenergy/webinars](https://energy.gov/indianenergy/webinars)

Federal Agency Tribal and Tribal Energy Program Offices:
[https://teeic.indianaffairs.gov/ftcontact/index.htm](https://teeic.indianaffairs.gov/ftcontact/index.htm)
Conclusions

- **Size and complexity of energy systems** disguised by new business models and tech shifts
  - USEER identified 1.59 million additional jobs that are essential to our traditional energy production, transmission, distribution and storage systems

- **Hiring difficulty a problem** across all surveyed sectors
  - Underscores the importance of job training, strategic upskilling and apprenticeship opportunities

- **Construction industry skills** and training systems are central to US energy security and resilience
  - Energy and energy efficiency jobs are now 32% of construction workforce
  - Union apprenticeship programs are key resource

- **Diversity**: Energy sectors host less diversity than workforce as a whole, warrants a sustained initiative to remove barriers to entry

- **Opportunity**: DOE jobs data can inform Tribal strategies for economic development & jobs growth using all energy resources

Thank you!
Christina Nichols
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Three PATHWAYS will help drive new energy jobs, workforce training opportunities, and economic development.

**Enhance the accuracy of employment data**

<table>
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<tr>
<th>U.S. Energy &amp; Employment Report</th>
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<td>Identify trends in energy jobs through survey of U.S. energy employers.</td>
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<th>National Road Show</th>
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<td>Support Administration goals based on U.S. economic strength as demonstrated by jobs data.</td>
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**Promote workforce development opportunities**

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<th>Veterans in Energy</th>
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<td>Expand training and job placement through new training pilots.</td>
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<th>Access for LMI</th>
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<td>Active creation for LMI communities to jobs and clean energy training</td>
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<th>Cyber Training Ladder</th>
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<td>Coordinate guidance and training between DOE’s cyber intelligence and utility tech staff (e.g., EEI, NEI).</td>
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<th>Energy Apprenticeships</th>
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<td>Broker apprenticeships between energy employers and young workers in entry pathways.</td>
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**Leverage existing research and manufacturing**

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<th>Energy and Advanced Manufacturing Workforce Initiative</th>
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<td>Commit to manufacturing investment in three target areas within two years.</td>
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<th>Veterans and Zero Net Energy</th>
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<td>Link Veteran employment with zero net energy military installation operations.</td>
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<th>Energy Development Zones</th>
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<td>Review use of public lands for energy development and encourage transmission access.</td>
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**DOE’s Energy Jobs Strategy Council**

**IMPACT:**
Focuses Federal, lab, industry and labor resources on energy jobs and economic development to accelerate economic development, increase funding efficiency, and create jobs in strategic industries and communities.

**FUTURE:**
Coordinate data, economic analysis, and workforce programming for strategic outcomes to spur energy development and increase domestic employment, and enhance security and grid resilience.