U.S. DEPARTMENT of ENERGY

# 2025 United States Energy & Employment Report

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**DEPARTMENT OF ENERGY**
Secretary Chris Wright

**DEPARTMENT OF ENERGY**
**OFFICE OF ENERGY JOBS**

## Authorship and Acknowledgments

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This underlying survey and data collection was provided by BW Research Partnership, funded by DOE under Award Number 89303021COP000001.

## USEER BACKGROUND

- The USEER provides a comprehensive account of the energy employment landscape across America.
- The USEER tracks energy employment across three energy production sectors (*Fuels*, *Electric Power Generation*, and *Transmission, Distribution, and Storage*) and two end use sectors (*Energy Efficiency* and *Motor Vehicles and Component Parts*).
- The 2025 USEER includes data on wages and employer benefits, allowing policymakers to understand how the U.S. energy sector provides stable, high paying employment opportunities to hardworking Americans.

## HIGHLIGHTS FROM THE 2025 USEER

- The energy sector employed **8.5 million workers** in 2024, accounting for **5.4%** of all jobs in the U.S.
- Energy jobs were distributed across **all 50 states**, Puerto Rico, and the U.S. Virgin Islands.
- Texas, California, and Michigan had the highest energy employment. Wyoming, North Dakota, and West Virginia had the most energy employment per 100,000 workers.
- The median wage for the energy sector was **$58,810 – 18.8%** higher than the median observed across sectors nationwide.
- At **$65,400**, traditional fuel production **offered the highest wages** highlighting the sector's ability to support a higher standard of living.
- The energy sector supports **jobs across multiple industries** and supports jobs across a broad range of occupations, **creating opportunity for American workers** from all educational backgrounds.

## SECTOR HIGHLIGHTS

- The Fuels sector employed 1,054,400 workers, with a median wage of $62,780.
- Electric Power Generation employed 933,800 workers, with a median wage of $65,430.
- Transmission, Distribution, and Storage employed 1,463,700 workers, with a median wage of $59,840.
- The Energy Efficiency sector employed 2,381,700 workers, with a median wage of $59,390.
- Motor Vehicles & Component Parts employed 2,633,100 workers, with a median wage of $53,620.

# INTRODUCTION

The U.S. Energy and Employment Report (USEER) delivers unmatched insights into the energy workforce. As the most complete annual resource, the USEER integrates data from surveys of businesses with existing data produced by the U.S. Bureau of Labor Statistics (BLS), the U.S. Census Bureau, and the U.S. Energy Information Administration (EIA). The report provides definitive employment metrics and workforce intelligence for energy-related jobs.

Pursuant to 42 U.S.C. § 18841[1] (c)(2)(A), the USEER includes detailed information of the employment figures and workforce metrics for the energy sector of the United States economy, including the Fuels sector; Electric Power Generation sector; Transmission, Distribution, and Storage sector; Energy Efficiency sector; and Motor Vehicles and Component Parts sector.

The U.S. Department of Energy contracts with BW Research Partnership to conduct a comprehensive survey of approximately 42,800 businesses across the United States. The survey data are used to filter and analyze the concentration, intensity, and distribution of employment across energy sectors and activities throughout traditional industries, using second-quarter 2024 employment data[2] from the BLS Quarterly Census of Employment and Wages (QCEW) and the BLS Employment Situation Table B-1[3] monthly reports through December 2024.

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## PURPOSE

Employment data collected by BLS provides information on many, but not all, energy-related jobs. Most notably, BLS does not collect data on employment by energy sector across business segments. For instance, employment at natural gas power plants is combined with employment in coal and diesel facilities; petroleum-engineering firms are included in engineering services, with civil, mechanical, and other engineers; and gasoline and diesel-fueled vehicle manufacturing is combined with electric vehicle manufacturing. As a result, BLS employment data does not capture the complete picture of employment in the energy sector.

The USEER further improves knowledge and understanding of the domestic value chain of activities within each energy sector and subsector. Natural gas business activities, for instance, differ from business activities relating to advanced building materials or solar photovoltaic systems. The resulting data allows for tracking across businesses and jobs that support a wider range of activities within the energy field and deeper analysis within each energy sector.

The data presented in the USEER is not intended to remove, replace, or replicate existing data from the BLS QCEW, but rather to categorize and filter data in ways that provide more meaningful insight

[1] Office of the Law Revision Counsel, United States Code (https://uscodeweb1.house.gov/view.xhtml?req=granuleid:USC-prelim-title42-section18841&edition=prelim).
[2] U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages (https://www.bls.gov/cew/).
[3] U.S. Bureau of Labor Statistics, Table B-1. Employees on nonfarm payrolls by industry sector and selected industry detail (https://www.bls.gov/news.release/empsit.t17.htm).

for policymakers and the public regarding energy employment within the energy production and energy use sectors across the United States.

## NEW FOR 2025

For the first time, the 2025 USEER includes detailed data on wages and employer benefits, allowing policymakers to understand how the U.S. energy sector can support long-term, high-paying careers for American workers. The 2025 USEER includes data on 101 detailed occupations[4] across energy sectors. The data includes low, median, and high wage estimates for each occupation as well as data on hiring activity and healthcare benefits.[5]

The USEER includes state-level data that mirrors the national USEER data but with a focus on each state's energy employment and workforce metrics. In 2025, the USEER includes new detailed reports for Puerto Rico and the U.S. Virgin Islands that are included in the 2025 State Report release.[6]

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## HOW TO USE THIS REPORT

The 2025 USEER is organized into seven chapters: the Executive Summary; Introduction; Fuels; Electric Power Generation (EPG); Transmission, Distribution, and Storage (TDS); Energy Efficiency (EE); and Motor Vehicles and Component Parts (MVCP).

For each sector, data is reported across three distinct lenses: subsector, industry, and occupation.

The first lens, subsector, can be used to understand employment activity in specific energy products and services. Viewing employment through this lens can illustrate comparative differences in employment among generation subsectors, such as Natural Gas, Nuclear, Coal, and Solar.

Viewing data through the second lens, industry[7], allows for deeper exploration of energy value chains and can be useful for developing economic and workforce policy for the industry. Viewing data through this lens depicts employment in key economic industries, such as Utilities, Construction, Manufacturing, and Professional and Business Services.

[4] Occupations consist of those exclusively employed in the energy sector (e.g., Solar Photovoltaic Installers, Wind Turbine Service Technicians, Power Plant Operators), occupations with a high concentration of employment within the energy sector (e.g., Derrick Operators, Oil and Gas), and occupations comparable across multiple energy sectors (e.g., Electrical Engineers, Electricians).
[5] The supplemental questions on wages and benefits were asked of USEER respondents who opted into reviewing and responding to the additional survey questions. Respondents were presented with occupations based on the employer's industry (Agriculture and Forestry, Mining and Extraction, Utilities, Construction, Manufacturing, Wholesale Trade, Professional and Business Services, and Other Services such as Repair and Maintenance).
[6] Other U.S. territories are omitted from the analyses due to unavailability of territory employment data within the BLS QCEW data series outside of Puerto Rico and the U.S. Virgin Islands. See Appendix C.2 Footnote 13 for further information.
[7] Industry definitions are based on North American Industrial Classification System (NAICS) codes to ensure consistency with other statistics created across the U.S. statistical system.

Finally, viewing the data by occupations allows for a deeper analysis of domestic workforce availability, needs, and wages. Organizing data by occupation provides key insights into specific occupational roles involved in the field of energy.

By filtering the same data through each lens, this report provides relevant details and insights to a wider range of stakeholders.

**USEER NOTE**

Please note that all figures presented in this report are rounded to the nearest hundred. As a result, totals may not match the sum of individual components due to rounding. For more information, please refer to Appendix C: Methodology.

## SURVEY METHODOLOGY

Survey methodology for the USEER is approved by the Office of Management and Budget (OMB) and language throughout the report is consistent with the wording of the survey. The 2025 USEER relies on survey responses from 42,800 business representatives to complement existing data from the BLS based on sector and industry definitions that reflect the activities of the DOE. The survey is conducted using a stratified sampling method, which relies on survey quotas based on specific characteristics of companies, to ensure representation. USEER uses the following three characteristics in this sampling plan:

1. NAICS industry[8]
2. State location
3. Company size

Using the NAICS framework and building the sample frame using establishment totals from the QCEW allows for more accurate and efficient data collection and analysis. Further, it accommodates changes in business models. If a utility, for example, outsources a portion of its activities to a construction firm, USEER's methodology allows for those jobs to continue to be counted and tracked.

At the same time, employment is allocated based on NAICS industries only. In the utility-outsourcing example used above, the USEER would still count the jobs as energy employment but would allocate those jobs to the construction industry rather than the utilities industry. Because the supplemental survey captures employment across a wide range of activities and industries, the

[8] The North American Industry Classification System (NAICS) is the standard used by Federal statistical agencies in classifying business establishments for the purposes of collecting, analyzing, and publishing statistical data related to the U.S. economy.

report includes more than a million jobs that would not otherwise be identified as part of America's energy sector.

The USEER relies primarily on data from public sources as well as a comprehensive employer survey. As a result, there are some minor data limitations. The overall margin of error for identifying Qualifying Firms (defined below) is +/- 0.47% at a 95% confidence interval. The margin of error for the number of Qualifying Workers sector-wide is +/- 0.99% at a 95% confidence interval.[9] Definitions for a Qualifying Worker and a Qualifying Firm can be found below. Data included in this report represents an estimate with a range based on the specific margin of error. For more detail, please see Appendix C: Discussion of USEER Methodology.

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## QUALIFYING FIRMS AND WORKERS

**For the USEER survey, a Qualifying Firm is —**

An organization with employees in the United States that is directly involved with researching, developing, producing, manufacturing, distributing, selling, implementing, installing, or repairing components, goods, or services related to:

- Fuels, including extraction, processing, production, and distribution;
- Electric Power Generation;
- Electric Power Transmission, Distribution, and Storage;
- Energy Efficiency, including heating, cooling, and building envelope; and
- Transportation, including Motor Vehicles and Component Parts.

This also includes supporting services such as consulting, finance, tax, and legal services related to energy. To qualify for the base USEER survey, firms must explicitly state their involvement in energy as defined above.

[9] For a number of detailed NAICS codes, data on establishments and employment are directly included in the total. Therefore, these margins represent an overstatement of potential error. It is also important to note that the margin of error increases for each subgroup of participants that participated in the survey. For example, the margin of error for questions answered by all firms that identified as "solar photovoltaic" is +/- 2.72% at a 95% confidence interval.

**For the USEER survey, a Qualifying Worker is —**

> An employee of a Qualifying Firm who spends **some portion of their time** supporting the qualifying energy portion of the business.[10]

This report provides detail on employment activity that includes both "a portion of their time" and "a majority of their time" when referencing qualifying workers. This is especially true within the Energy Efficiency sector, where the employing construction or repair firms are frequently engaged in both traditional energy-related construction or installation as well as in high-efficiency activities that qualify for energy-efficient certification.

[10] Data presented in this report excludes retail employees. Qualifying Workers in energy will be referenced as energy-related jobs; where "portion of their time" includes employees whose activities are less than 50 percent of their time, specific reference will be made of that fact.

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# EXECUTIVE SUMMARY

2025 United States Energy & Employment Report

# KEY FINDINGS

**The energy sector is vital to the prosperity of the United States and plays a significant role in the economies of all U.S. states, territories, and the global market.** The United States demonstrates leadership in energy across a breadth of industries, including early-stage innovation, manufacturing, production, and deployment, to ensure a dependable and cost-effective energy supply both domestically and internationally. Energy's significance extends beyond our daily activities as it provides opportunities for the improved health, increased wealth, and overall advancement of American citizens nationwide.

Relying on existing federal data from the U.S. Bureau of Labor Statistics, the U.S. Census Bureau, and the U.S. Energy Information Administration (EIA) as well as a survey of approximately 42,800 businesses, the U.S. Department of Energy publishes the United States Energy and Employment Report (USEER) as an authoritative accounting of energy employment across key segments of the economy and offers a uniquely comprehensive survey of national, state, and county level energy employment.

## ENERGY PRODUCTION SECTORS


## ENERGY USE SECTORS


## ABOUT THE USEER

**First produced in 2016, the USEER:**

1. Calculates employment figures across energy production sectors, including Fuels, Electric Power Generation, and Transmission, Distribution, and Storage, as well as two energy use sectors: Energy Efficiency and Motor Vehicles and Component Parts;
2. provides employment data by sector, subsector, industry, and occupational category, as well as at a national, state, and county level;
3. offers demographic data of workers by sector; and
4. summarizes employers' perspectives on workforce topics by industry.

**In 2025, for the first time ever, the USEER also includes energy workforce wages by occupation and sector.**

# U.S. Energy Workforce Key Takeaways

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U.S. Energy sector employed **8,500,000** workers.

**$58,810** is the **median wage for overall energy** employment – which is **18.8% higher** than the **U.S. median wage** of $49,500.

Energy sector accounted for **5.4%** of all jobs in the U.S.

## ENERGY PRODUCTION EMPLOYED

3,451,800 Workers


## ENERGY USE EMPLOYED

5,014,900 Workers

# ENERGY EMPLOYMENT BY GEOGRAPHY

## STATES WITH THE MOST ENERGY EMPLOYMENT OVERALL

**TEXAS** (990,100)

**CALIFORNIA** (941,500)

**MICHIGAN** (394,800)

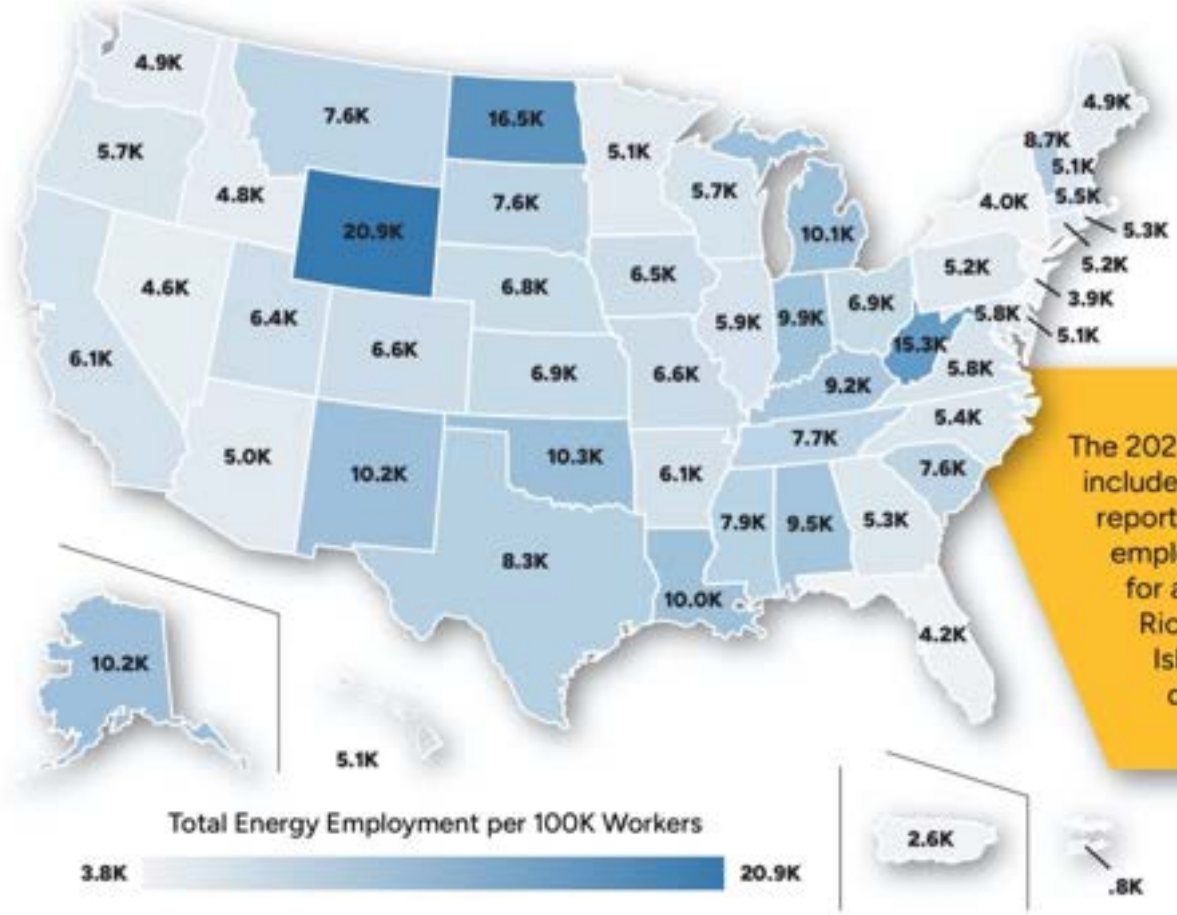
## STATES WITH THE MOST ENERGY EMPLOYMENT PER 100,000 WORKERS

**WYOMING** (20,900)

**NORTH DAKOTA** (16,500)

**WEST VIRGINIA** (15,300)

## ENERGY EMPLOYMENT PER 100,000 WORKERS BY GEOGRAPHY, 2024

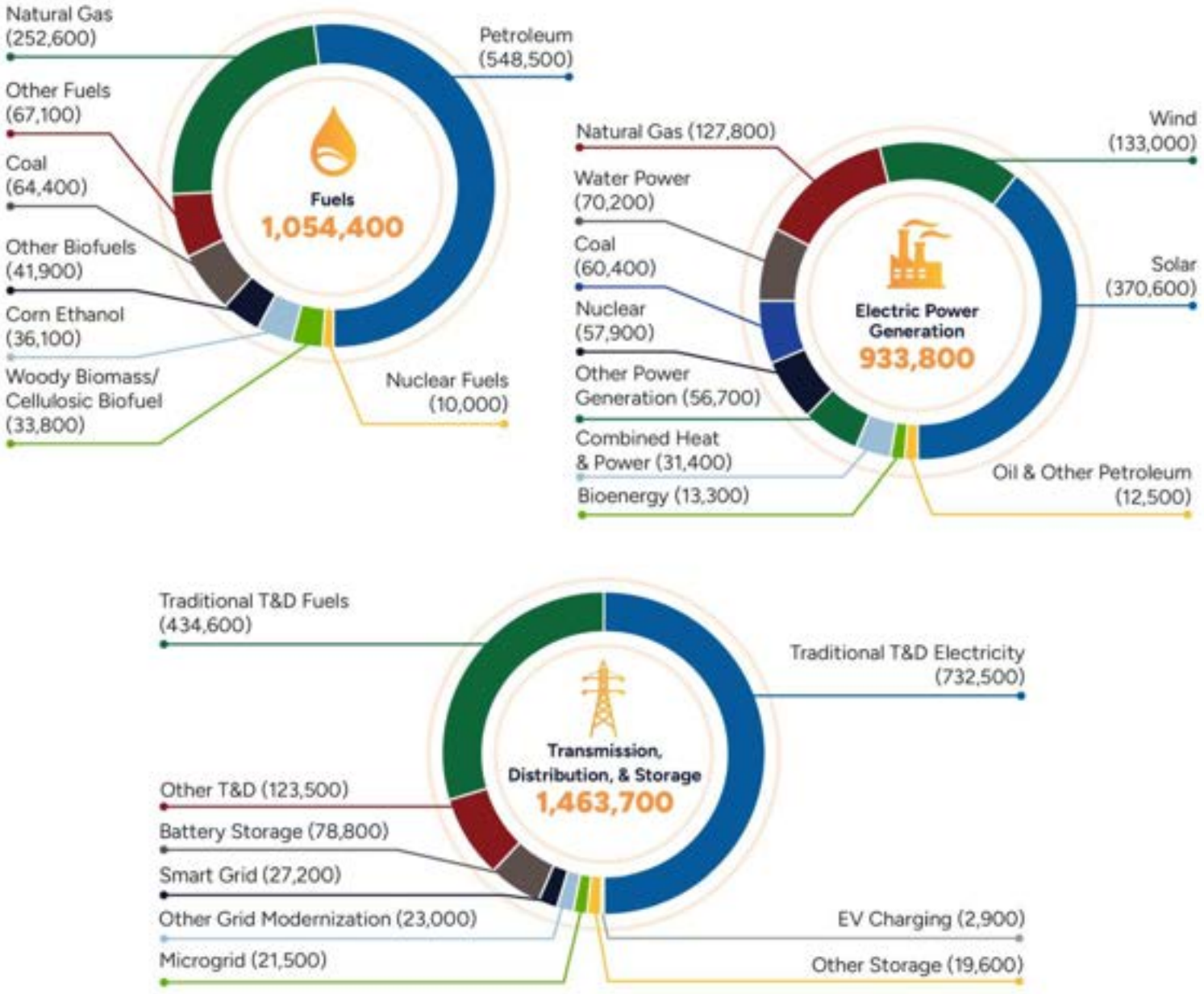



The 2025 USEER includes a separate state report including energy employment factsheets for all 50 states, Puerto Rico, and the U.S. Virgin Islands. A county-level dataset is also available.

## ENERGY PRODUCTION

**The energy production sectors employed 3,451,800 workers — 40.8% of energy jobs in the United States.**

## EMPLOYMENT SNAPSHOT BY ENERGY PRODUCTION SECTOR



# ENERGY PRODUCTION

## LARGEST ENERGY PRODUCTION SUBSECTORS BY EMPLOYMENT

Electrical Transmission & Distribution
**732,500**

Petroleum
**717,300**

Natural Gas
**636,100**

Solar
**370,600**

Coal
**147,200**

Wind
**133,000**

Energy production sectors are highly interconnected, with fuel types and subsectors frequently overlapping across the three sectors.

The energy production diagram on the next page illustrates the interconnectedness of energy production subsectors.

Figure 1. Energy Production Sectors Employment, 2024

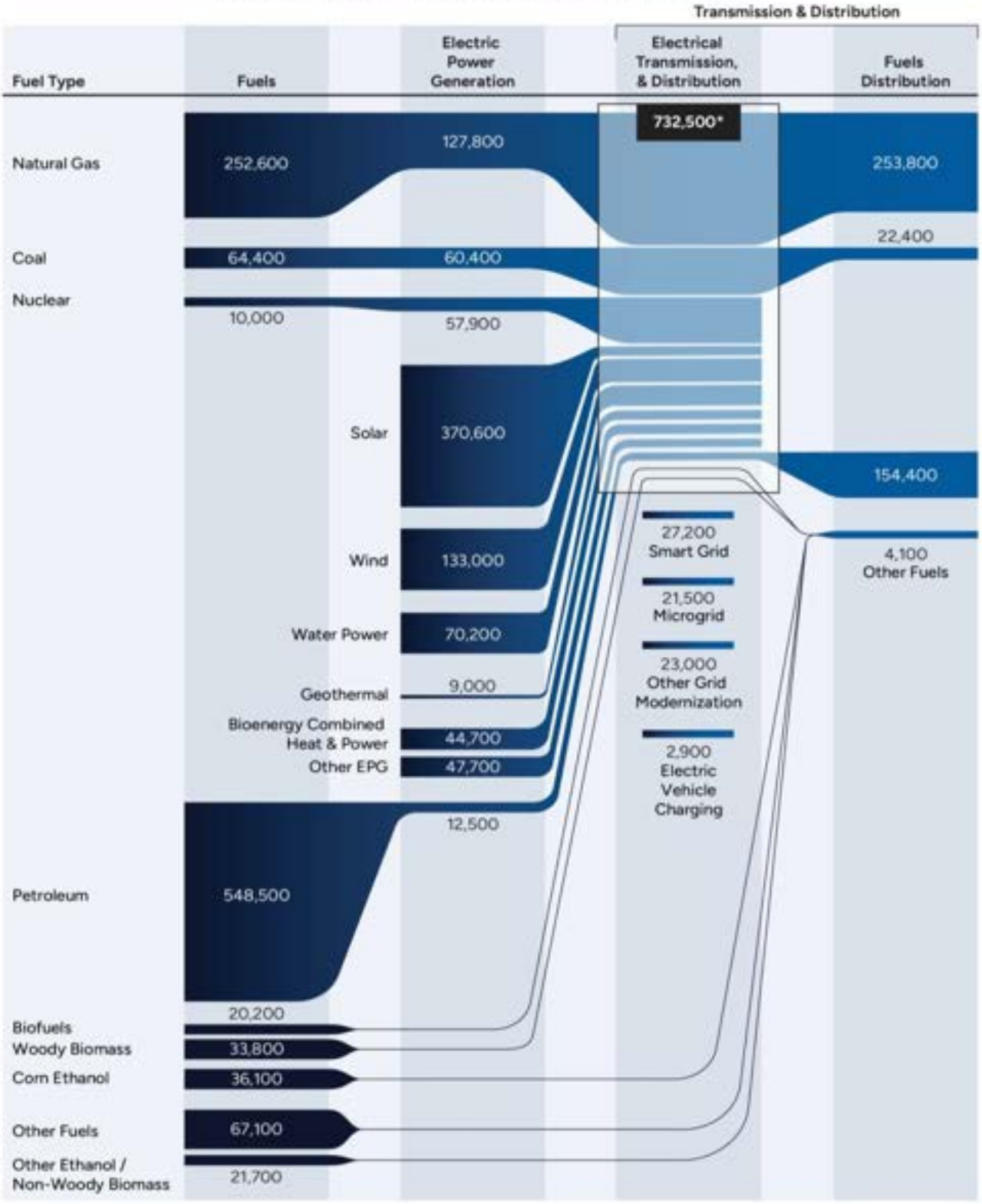



Chart values and line sizes represent workers in subsectors along different sectors.

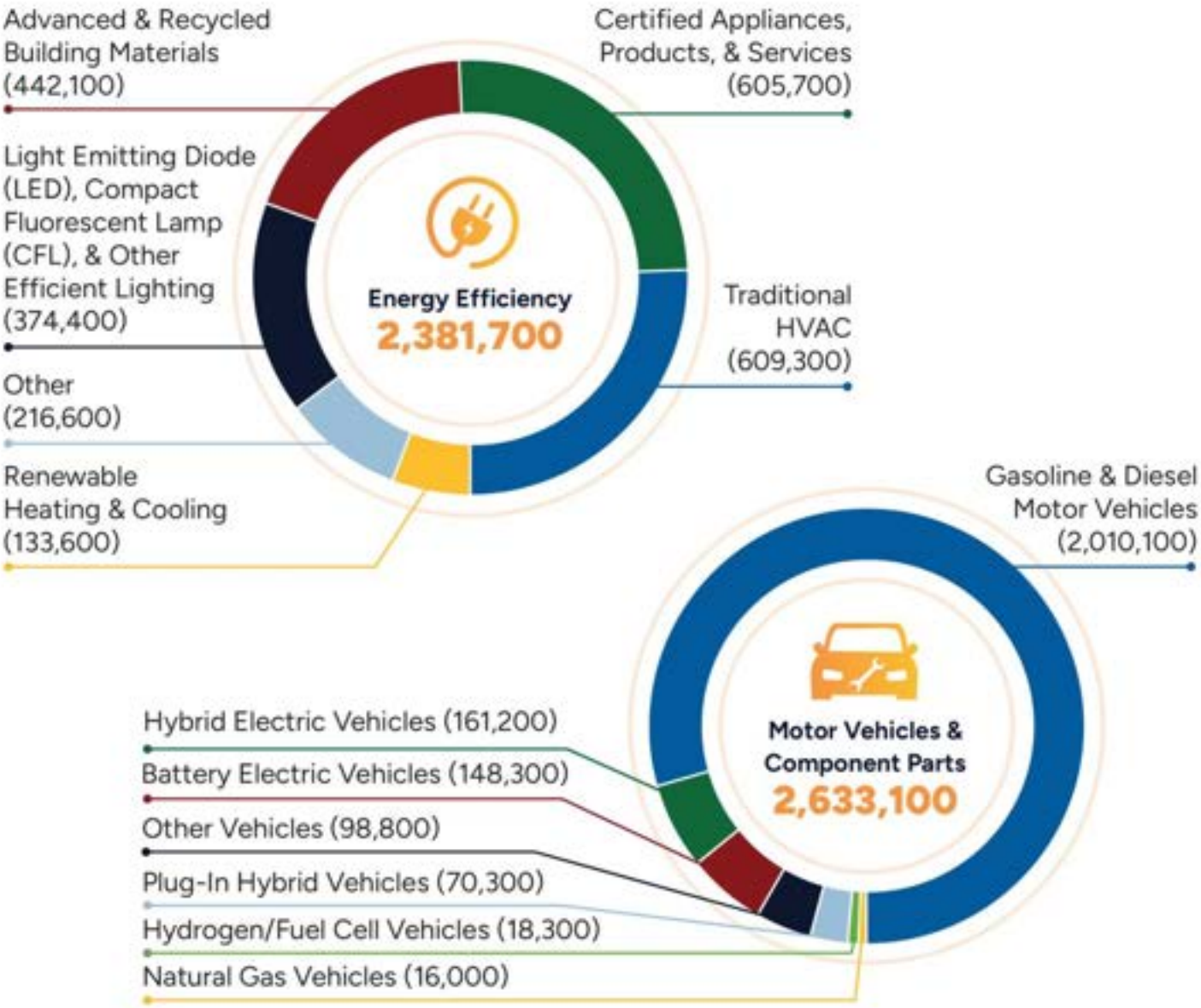
Areas for which fuel type does not have employment.

*The size of fuel types in Electrical Transmission and Distribution is based on total relative megawatt electric power generation from fuel sources in 2024 according to EIA. Employment in Electrical Transmission and Distribution cannot be accurately split by fuel type.

## ENERGY USE

**The energy use sectors employed 5,014,900 workers — 59.2% of energy jobs in the United States.**

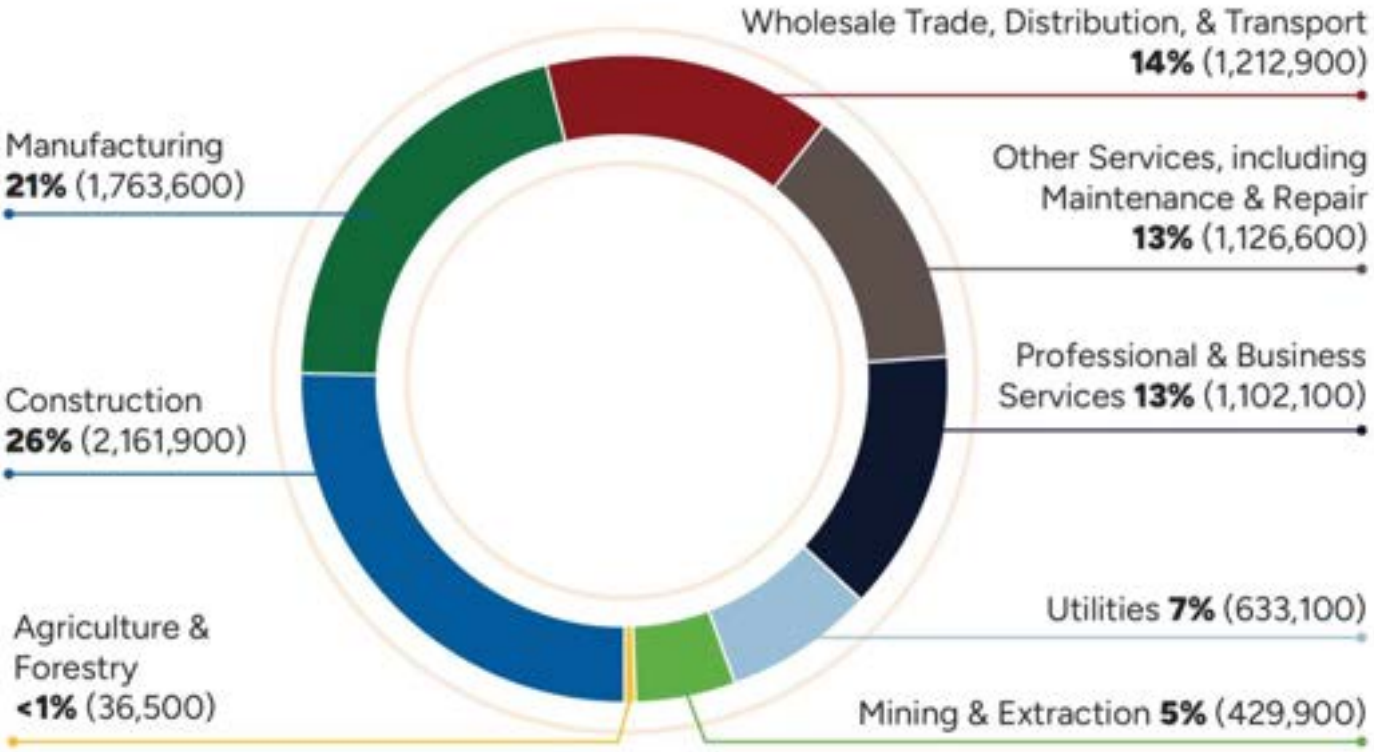
## EMPLOYMENT SNAPSHOT BY ENERGY USE SECTOR



## ENERGY EMPLOYMENT BY INDUSTRY

Beyond categorizing energy employment by sector and subsector based on worker activity, the USEER also tracks energy employment by industry, classifying jobs according to the employer's primary business (e.g., Manufacturing, Construction, Utilities).

Across all energy sectors, the Construction industry employs the largest number of workers (2,161,900), followed by Manufacturing (1,763,600) and Wholesale Trade, Distribution, and Transport, including the distribution of fuels or motor vehicles and motor vehicle parts by truck, rail, water, or air, and pipeline transport (1,212,900).



# FUELS

2025 United States Energy & Employment Report

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# FUELS

Fuels are energy sources that are combusted or spent to generate electricity, produce heat, and power transportation. This chapter focuses on jobs related to the production of fuels, from their extraction from natural sources to the process involved in refining and distributing fuels for end use. Employment data for Fuels captures the workforce by subsectors, industries, and occupations, including workforce wages and benefits, workforce demographics, and employer perspectives.

The Fuels subsectors include:

- Petroleum Fuels
- Natural Gas Fuels
- Coal Fuels
- Corn Ethanol Fuels
- Woody Biomass and Cellulosic Biofuels
- Other Biofuels
- Nuclear Fuels
- Other Fuels

This Fuels chapter includes the following:

- **Key Takeaways** that summarize key findings from the Fuels sector overall.
- **Fuels Employment by Subsector, Industry, and Occupation** that describes where employment is concentrated across the Fuels sector.
- **Fuels Workforce Wages, Benefits**, **and Demographics** that presents a descriptive picture of the Fuels sector jobs and workforce.
- **Employer Perspectives on Workforce Topics** that aggregates employer responses.

**USEER NOTE**

Employment related to the transport or storage of fuels is included in the Transmission, Distribution, & Storage chapter, while employment in electricity generation to power buildings or vehicles is covered in the Electric Power Generation chapter.

# Fuels Sector Key Takeaways

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**Fuels sector employed 1,054,400 workers.**

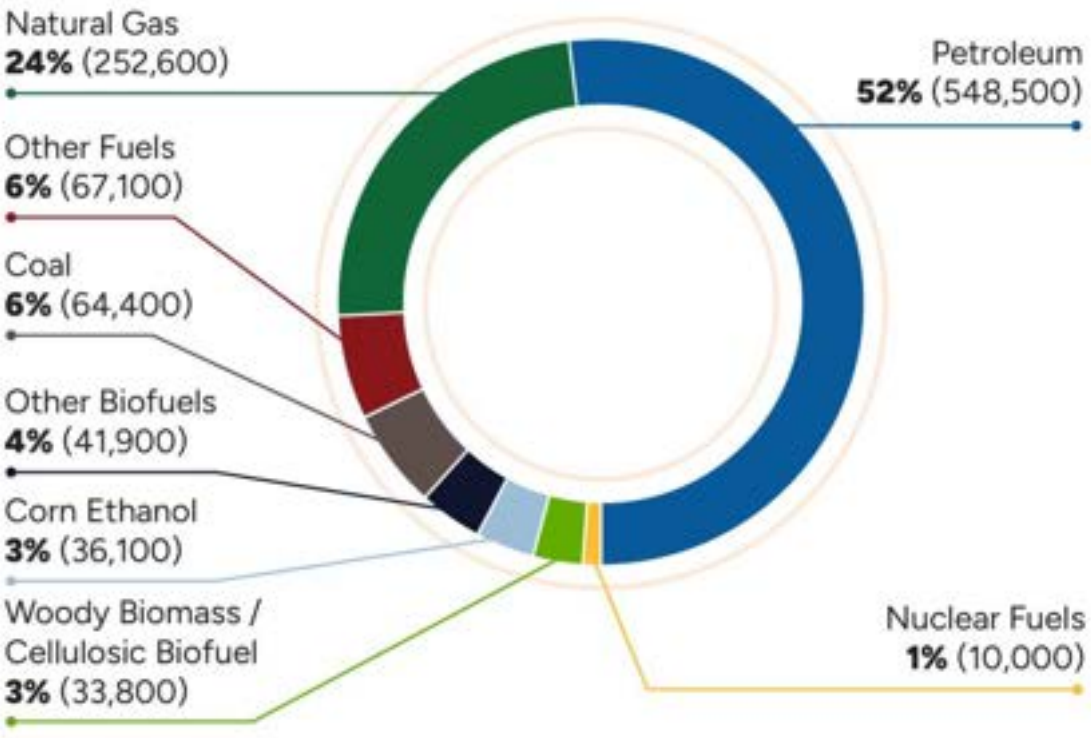
**$62,780** is the **median wage for fuels** employment– which is **26.8% higher** than the **U.S. median wage** of $49,500.

Petroleum employed 52% of the fuels sector, totaling **548,500** workers.

## EMPLOYMENT BREAKDOWN BY INDUSTRY

- Mining & Extraction **41%** (429,900 workers)
- Manufacturing **23%** (240,000 workers)
- Professional & Business Services **17%** (179,400 workers)
- Wholesale Trade **14%** (143,700 workers)
- Agriculture **3%** (36,500 workers)
- Construction **2%** (22,900 workers)

## EMPLOYMENT BREAKDOWN BY SUBSECTOR




Reference: 2025 UNITED STATES ENERGY & EMPLOYMENT REPORT

# EMPLOYER PERSPECTIVES | HIRING INSIGHTS

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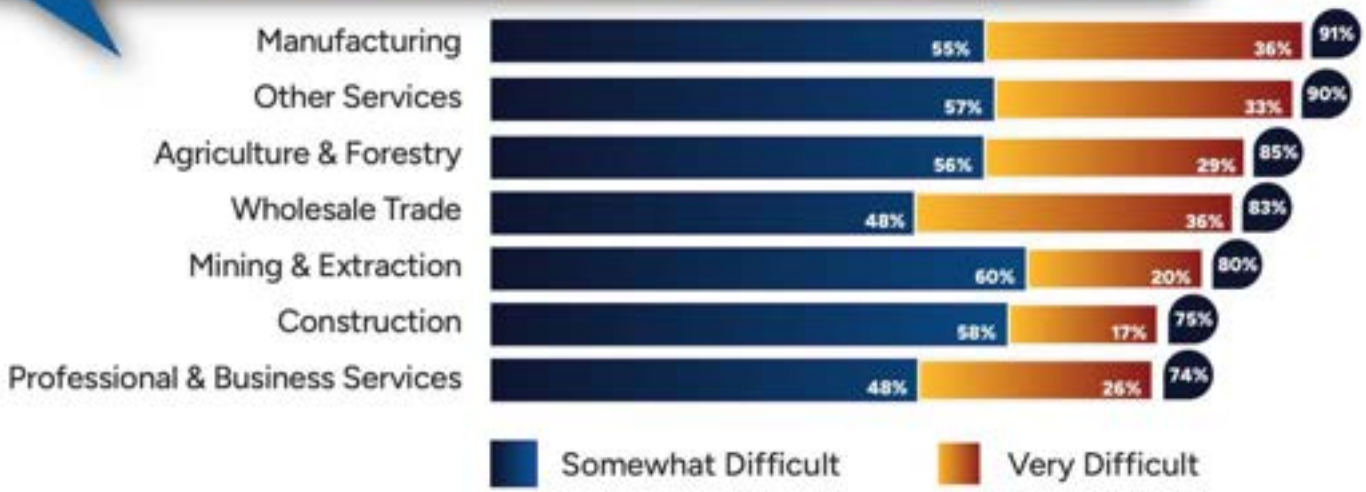
## FUELS EMPLOYERS' PERCEIVED HIRING DIFFICULTY BY INDUSTRY

Among employers in the Fuels sector, **55%** in the Manufacturing industry reported that hiring workers is at least "somewhat difficult."




## MOST COMMON REASONS FOR HIRING DIFFICULTY

- **Insufficient Qualifications (Certifications or Education)**
  - Construction
  - Other Services
  - Mining & Extraction
- **Competition / Small Applicant Pool**
  - Manufacturing
  - Wholesale Trade
- **Lack of Experience, Training, or Technical Skills**
  - Professional & Business Services

## MOST DIFFICULT TO HIRE OCCUPATIONS

- **Engineers / Scientists** — Construction; Professional & Business Services
- **Electricians / Construction Workers** — Mining & Extraction
- **Drivers / Dispatchers** — Wholesale Trade
- **Sanitation / Maintenance** — Manufacturing
- **Technicians / Mechanical Support** — Other Services

## Fuels Employment by Subsector, Industry, and Occupation

This section analyzes employment in the Fuels sector by:

- Subsector (e.g., Petroleum, Natural Gas)
- Industry (e.g., Construction, Manufacturing)
- Occupation (e.g., Administration, Production)

### FUELS EMPLOYMENT BY SUBSECTOR

In 2024, the Fuels sector employed 1,054,400 workers. Jobs connected to Petroleum and Natural Gas Fuels production made up the largest share of employment (76.0%). The Fuels sector also encompassed a significant number of workers engaged in the production of Coal Fuels, Corn Ethanol, Biomass and Biofuels, and Nuclear Fuels (Figure 2).

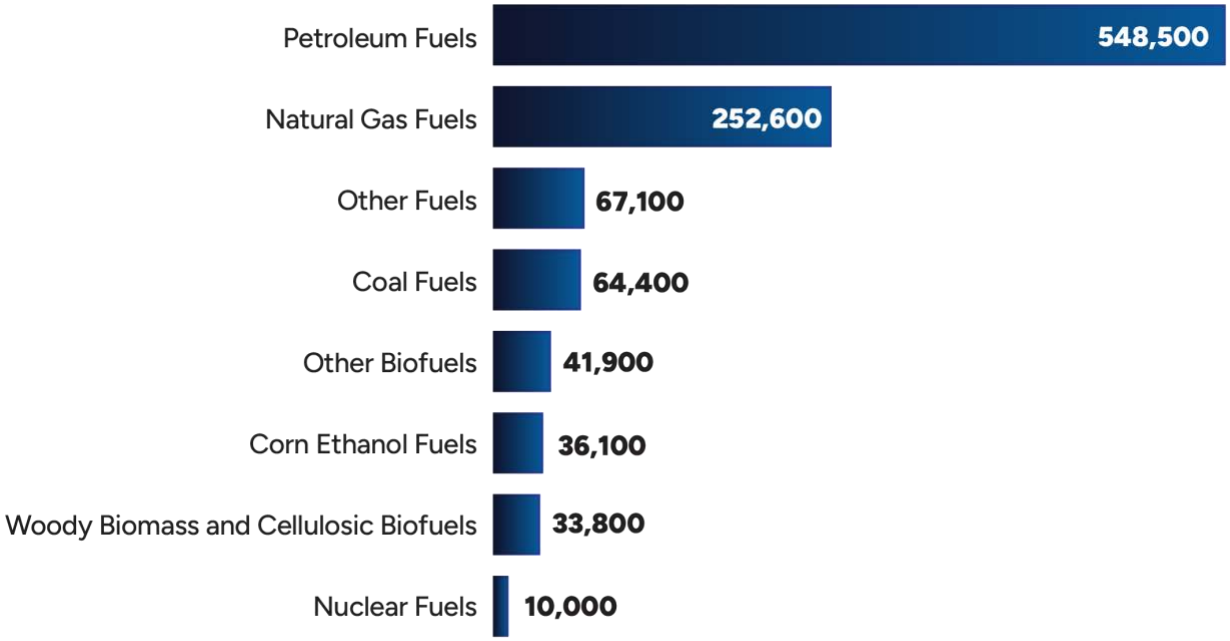



Figure 2. Fuels Employment by Subsector, 2024

**USEER NOTE**

Employment in the Other Fuels subsector consists of workers who engage with any fuel that is not captured in the subsectors otherwise listed. This is also a subsector used when unable to split employment into a single fuel subsector where employees spend "more of their time."

## FUELS EMPLOYMENT BY INDUSTRY

The Mining and Extraction industry represented the largest share of employment (40.8%) in the Fuels sector,[11] with 429,900 workers. Manufacturing followed, with 240,000 workers (22.8%); and Professional and Business Services, with 179,400 workers (17.0%) (Figure 3).

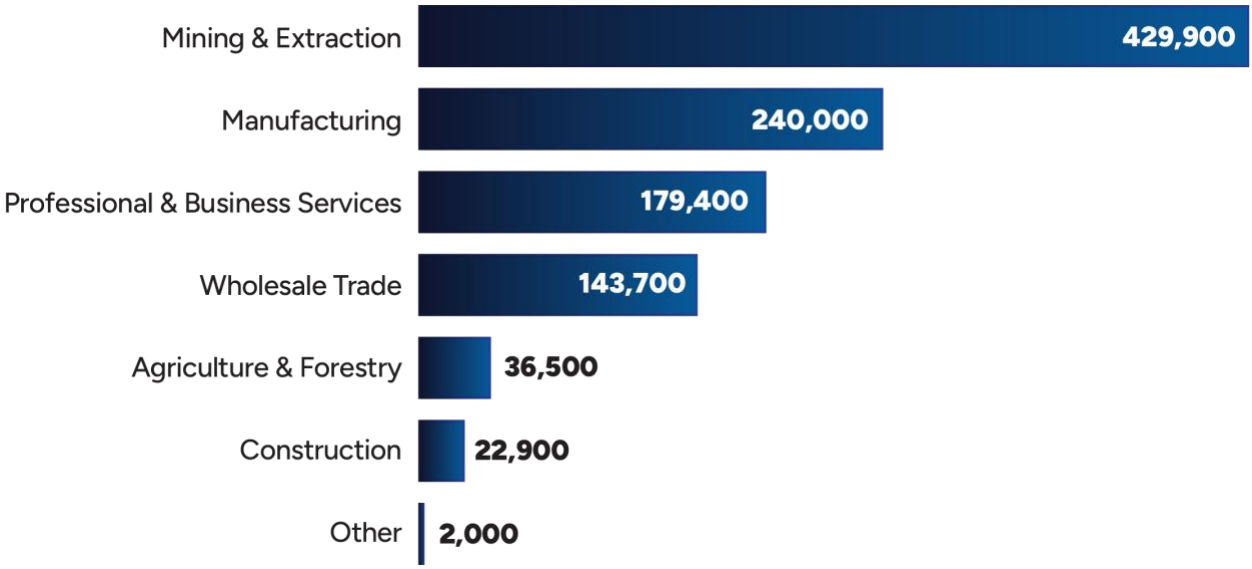



Figure 3. Fuels Employment by Industry, 2024

[11] Includes Mining and Extraction of Petroleum Fuels, Natural Gas Fuels, and Coal Fuels as well as support activities for Mining and Extraction (NAICS 21).

Looking across subsectors and industries, workers in several subsectors – including Petroleum Fuels, Natural Gas Fuels, and Coal Fuels – were highly concentrated in the Mining and Extraction industry. Corn Ethanol and Woody Biomass and Cellulosic Biofuels had the largest concentration of workers in the Agriculture and Forestry industry. Other Biofuels and Nuclear Fuels included a high concentration of workers in the Professional and Business Services industry (Table 1).

Table 1. Concentration of Fuels Employment by Subsector and Industry, 2024

| | Industry | | | | | |
|---|---|---|---|---|---|---|
| **Subsector** | Agriculture & Forestry | Mining & Extraction | Construction | Manufacturing | Wholesale Trade | Professional & Business Services |
| Petroleum Fuels | **0%** | **45%** | **4%** | **27%** | **11%** | **13%** |
| Natural Gas Fuels | **0%** | **55%** | **0%** | **18%** | **12%** | **15%** |
| Coal Fuels | **0%** | **69%** | **0%** | **16%** | **2%** | **13%** |
| Corn Ethanol Fuels | **46%** | **0%** | **0%** | **27%** | **19%** | **8%** |
| Woody Biomass & Cellulosic Biofuels | **51%** | **0%** | **0%** | **14%** | **3%** | **32%** |
| Nuclear Fuels | **0%** | **4%** | **0%** | **28%** | **10%** | **58%** |
| Other Biofuels | **7%** | **0%** | **0%** | **10%** | **18%** | **65%** |
| Other Fuels | **0%** | **0%** | **0%** | **26%** | **51%** | **23%** |

Key:

0% 100%

## FUELS EMPLOYMENT BY OCCUPATION

While the previous section covered Fuels employment by industry, this occupational review focuses on the nature of work performed by workers across industries.

In 2024, jobs across the Fuels sector were primarily distributed evenly among Management/Professional occupations (18.5%), Administrative occupations (17.4%), Production/Manufacturing occupations (17.1%), and Mining & Extraction occupations (16.6%) (Figure 4).

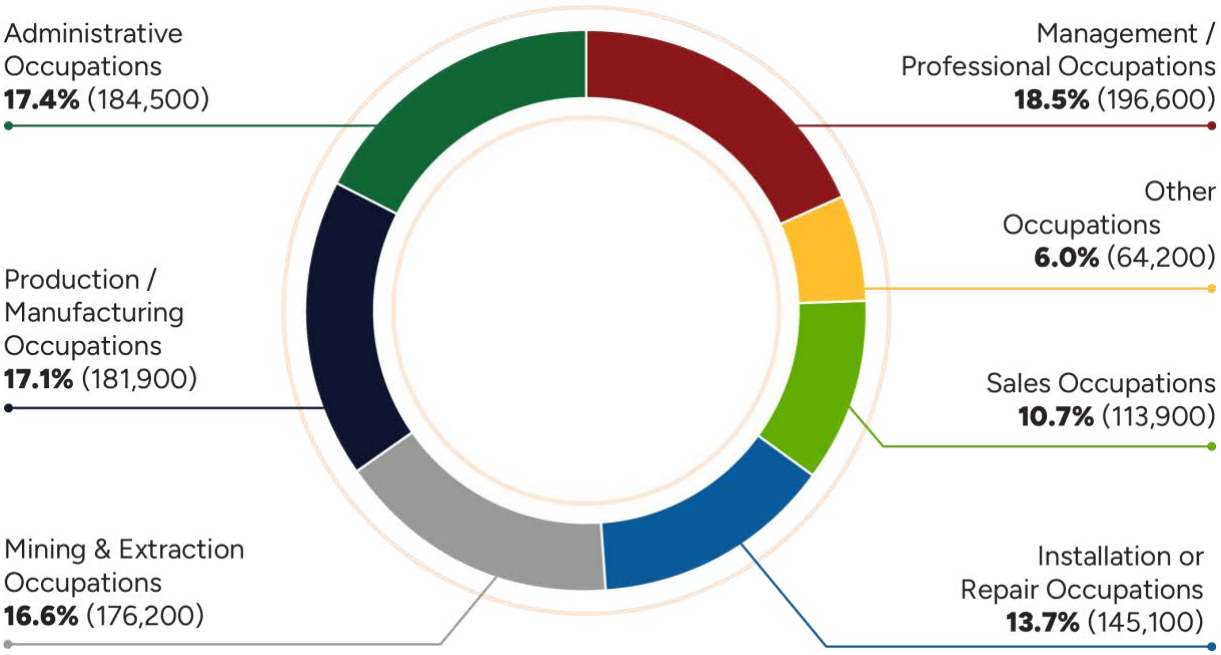



Figure 4. Fuels Employment by Occupational Category, 2024

**USEER NOTE**

The same occupational roles can appear in multiple industries, and any given industry typically employs workers across multiple occupational categories. For example, the Manufacturing industry employs many workers engaged in Production/Manufacturing activities but also employs workers that perform Management/Professional activities.

Figure 5 provides examples of specific occupations included within each occupational category.[12]


Figure 5. Occupation Examples by Category

[12] Occupation names sourced from BLS Occupational Employment and Wage Statistics (OEWS).

## Fuels Workforce Wages, Benefits, and Demographics

This section presents data on workforce wages, employer healthcare contributions, and demographics in the Fuels sector.

### FUELS WORKFORCE BY WAGES

The table below presents low, median, and high wages[13] for the 15 primary occupations[14] in the Fuels sector, which consist of occupations exclusively employed in the Fuels sector, occupations with a high concentration of employment within the Fuels sector, and occupations comparable across sectors, such as Electricians. The median annual salary for workers in the Fuels sector was $62,780, 26.8% higher than the U.S. median wage of $49,500 (Table 2).

Table 2. Fuels Workforce Wages for 15 Primary Occupations Sorted by Median Wage, 2024[15]

| SOC[16] | Occupation[17] | Low | Median | High |
|---|---|---|---|---|
| 17-2171 | Petroleum Engineers | $78,840 | $141,280 | $228,790 |
| 17-2071 | Electrical Engineers | $72,570 | $99,220 | $144,730 |
| 17-2112 | Industrial Engineers | $70,190 | $98,310 | $148,870 |
| 17-2051 | Civil Engineers | $68,060 | $96,600 | $148,630 |
| 51-1011 | First-Line Supervisors of Production and Operating Workers | $51,590 | $71,180 | $98,740 |
| 53-7073 | Wellhead Pumpers | $39,110 | $70,010 | $97,470 |
| 49-9041 | Industrial Machinery Mechanics | $48,960 | $66,360 | $93,380 |
| 47-5012 | Rotary Drill Operators, Oil and Gas | $42,750 | $65,010 | $98,510 |
| 47-2111 | Electricians | $45,160 | $63,260 | $97,750 |
| 47-2152 | Plumbers, Pipefitters, and Steamfitters | $40,630 | $62,440 | $103,720 |
| 51-9161 | Computer Numerically Controlled Tool Operators | $46,590 | $57,180 | $74,710 |
| 51-2031 | Engine and Other Machine Assemblers | $44,140 | $56,700 | $75,440 |
| 49-9071 | Maintenance and Repair Workers, General | $45,160 | $55,400 | $74,440 |
| 51-4121 | Welders, Cutters, Solderers, and Brazers | $38,640 | $51,670 | $76,830 |
| 47-5071 | Roustabouts, Oil and Gas | $35,650 | $47,510 | $64,010 |

**WAGES**

**FUELS WORKFORCE OVERALL**

Low: $44,550
**Median: $62,780**
High: $94,370

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**U.S. WORKFORCE OVERALL**

Low: $29,990
**Median: $49,500**
High: $125,720

[13] Low refers to the 10th percentile of wages and high refers to the 90th percentile.
[14] For a full list of occupations for Fuels as well as occupations by other sectors and subsectors, see Appendix B.
[15] Wage estimates are based on 2024 survey responses and data from the U.S. Bureau of Labor Statistics' (BLS) 2024 Occupational Employment and Wage Statistics (OEWS). The OEWS data can be found here: https://www.bls.gov/oes/tables.htm.
[16] Standard Occupational Classification (SOC) codes and descriptions are used by the BLS to categorize occupations in the U.S.
[17] USEER uses occupations as defined by BLS OEWS. Full definitions can be found here: https://www.bls.gov/soc/2018/soc_2018_definitions.pdf.

## FUELS WORKFORCE BY BENEFITS

The USEER survey also includes employer-reported data on employer health insurance contribution levels. As shown below, two-thirds (67%) of Plumbers, Pipefitters, and Steamfitters and over half (63%) of Engine and Other Machine Assemblers receive full employee and family healthcare insurance cost coverage from their employers (Table 3).

Table 3. Fuels Employer Healthcare Coverage for 15 Primary Occupations, 2024[18]

| Occupation | Some Healthcare Insurance Costs for Employee Only | Some Healthcare Insurance Costs for Employee & Family | All Healthcare Insurance Costs for Employee Only | All Healthcare Insurance Costs for Employee & Family |
|---|---|---|---|---|
| Petroleum Engineers | 21% | 41% | 5% | 31% |
| Electrical Engineers | 0% | 20% | 33% | 47% |
| Industrial Engineers | 0% | 33% | 26% | 41% |
| Civil Engineers | 7% | 37% | 22% | 34% |
| First-Line Supervisors of Production and Operating Workers | 6% | 22% | 24% | 41% |
| Wellhead Pumpers | 27% | 33% | 4% | 34% |
| Industrial Machinery Mechanics | 3% | 34% | 18% | 45% |
| Rotary Drill Operators, Oil and Gas | 8% | 29% | 17% | 44% |
| Electricians | 8% | 33% | 14% | 39% |
| Plumbers, Pipefitters, and Steamfitters | 7% | 15% | 3% | 67% |
| Computer Numerically Controlled Tool Operators | 13% | 23% | 15% | 47% |
| Engine and Other Machine Assemblers | 11% | 10% | 17% | 63% |
| Maintenance and Repair Workers, General | 20% | 35% | 20% | 25% |
| Welders, Cutters, Solderers, and Brazers | 29% | 26% | 6% | 40% |
| Roustabouts, Oil and Gas | 2% | 82% | 4% | 9% |

[18] Percentages in table correspond to employer responses to benefits questions as they were asked in the USEER survey, Appendix D.

## FUELS WORKFORCE BY DEMOGRAPHICS

The following table summarizes demographic characteristics of the Fuels workforce. As shown, the workforce participation of women in the Fuels sector (26%) was aligned with the overall energy workforce (26%) but was lower than the national workforce (47%). The proportion of workers aged 18 to 29 in the Fuels workforce (31%) was above the share within the energy workforce (29%) and the national workforce (22%). Veterans had higher representation in the Fuels workforce (11%) than in the overall energy workforce (9%) and the national workforce (5%) (Table 4).

Table 4. Fuels Workforce Demographics and Characteristics, 2024[19]

| | Number of Workers | **Percentage of Fuels Workforce** | Percentage of Energy Workforce | Percentage of National Workforce |
|---|---|---|---|---|
| Men | 777,200 | **74%** | 73% | 53% |
| Women | 269,600 | **26%** | 26% | 47% |
| Hispanic or Latino | 157,200 | **15%** | 19% | 19% |
| Non-Hispanic or Latino | 897,200 | **85%** | 81% | 81% |
| American Indian or Alaska Native | 18,900 | **2%** | 2% | 1% |
| Asian | 67,800 | **6%** | 7% | 7% |
| Black or African American | 93,500 | **9%** | 8% | 13% |
| Native Hawaiian or Other Pacific Islander | 11,900 | **1%** | 1% | <1% |
| White | 801,600 | **76%** | 74% | 76% |
| Two or More Races | 46,900 | **4%** | 5% | 3% |
| Unknown Race | 13,800 | **1%** | 3% | n/a |
| Veterans | 112,300 | **11%** | 9% | 5% |
| 18 to 29 | 326,600 | **31%** | 29% | 22% |
| 30 to 54 | 523,300 | **50%** | 52% | 54% |
| Over 54 | 204,500 | **19%** | 19% | 24% |
| Self-Identification of Disability | 17,200 | **2%** | 2% | 5% |
| Formerly Incarcerated | 17,200 | **2%** | 2% | 2% |
| Represented by a Union[20] | 78,600 | **7%** | 12% | 7% |

[19] National Sources: BLS (2024a, 2024b, 2024c, 2024d), Jobs EQ (2024), Prison Policy (2018).
[20] For this analysis, a union employer is defined as one with at least 20% of its workforce as a member of a labor union or covered by either a project labor agreement or a collective bargaining agreement. Figure represents private sector unionization rate. Unionization rates vary by state.

## Employer Perspective on Workforce Topics

The USEER also surveys employers on their perspectives on hiring difficulty and anticipated growth across industries, as well as their primary reasons for hiring difficulty and the most difficult to hire occupations.

### CURRENT HIRING DIFFICULTY

Manufacturing employers within the Fuels sector reported the highest level of hiring difficulty, with 91% indicating at least some difficulty hiring workers, and over one-third (36%) of all Manufacturing employers reporting hiring to be "very difficult" (Figure 6). Similarly, 36% of employers in the Wholesale Trade industry (includes wholesale distribution from bulk liquid storage facilities and other wholesalers) reported that finding qualified workers was "very difficult."

In contrast, Professional and Business Services employers, along with Construction employers, reported the lowest levels of hiring difficulties with around a quarter of employers within each of these industries indicated that it was "not at all difficult" to find and hire qualified workers.

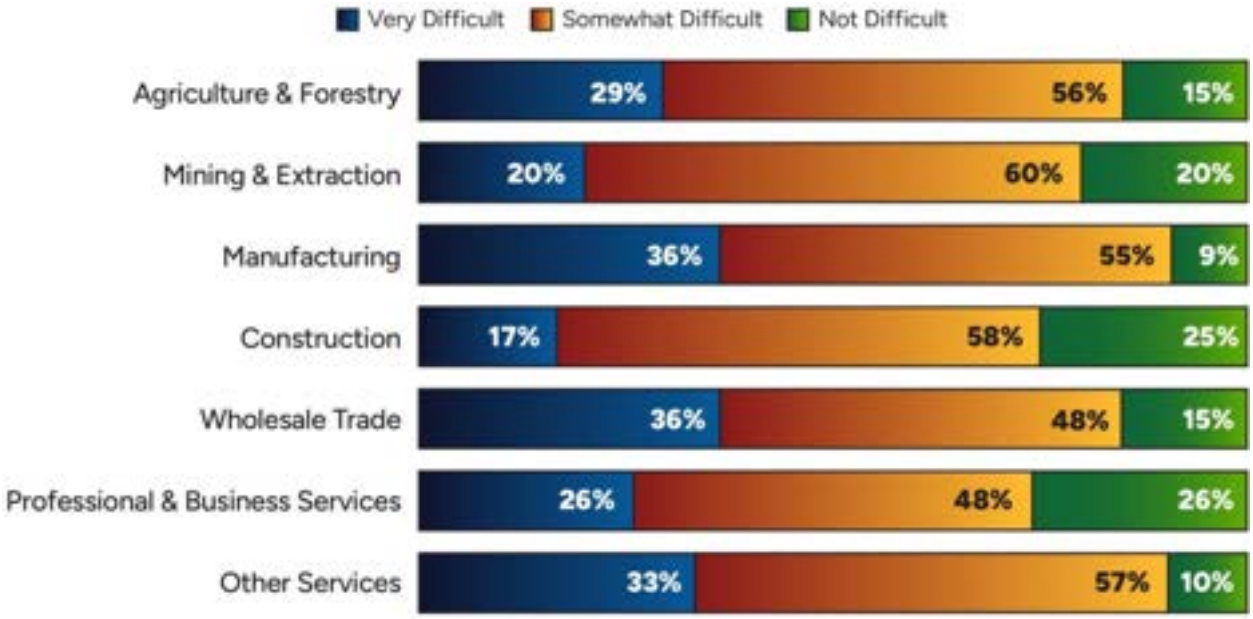
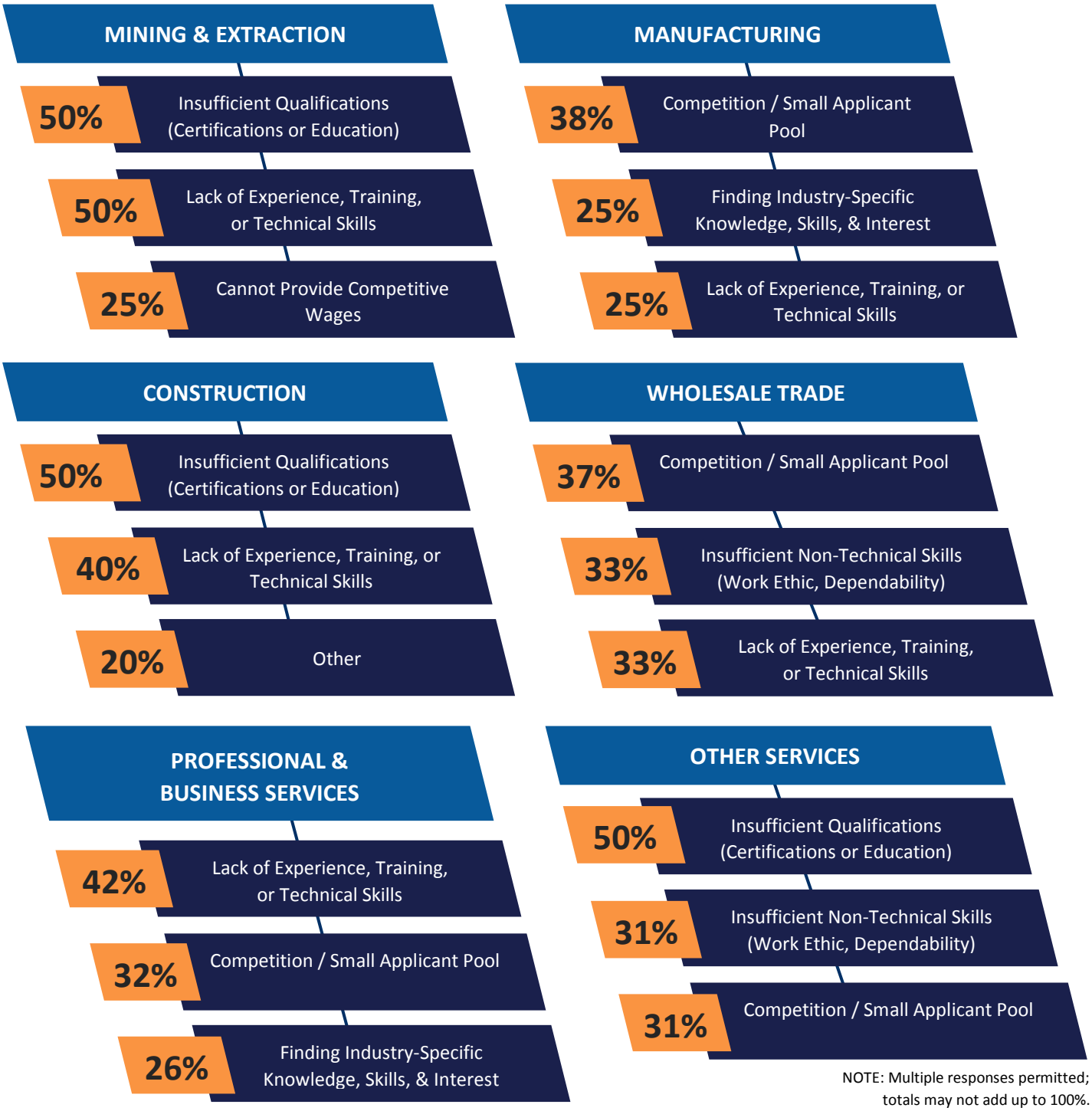



Figure 6. Fuels Employers' Perceived Hiring Difficulty by Industry, 2024

### REASONS FOR HIRING DIFFICULTY

As illustrated in Figure 7, employers in Mining and Extraction, Construction, and Other Services most frequently cited insufficient qualifications (certifications or education) as the primary challenge to hiring. In contrast, Manufacturing and Wholesale Trade employers most frequently cited competition or a small applicant pool as the primary challenge; and Professional and Business Services employers cited lack of experience, training, or technical skills as the most common concern in hiring.

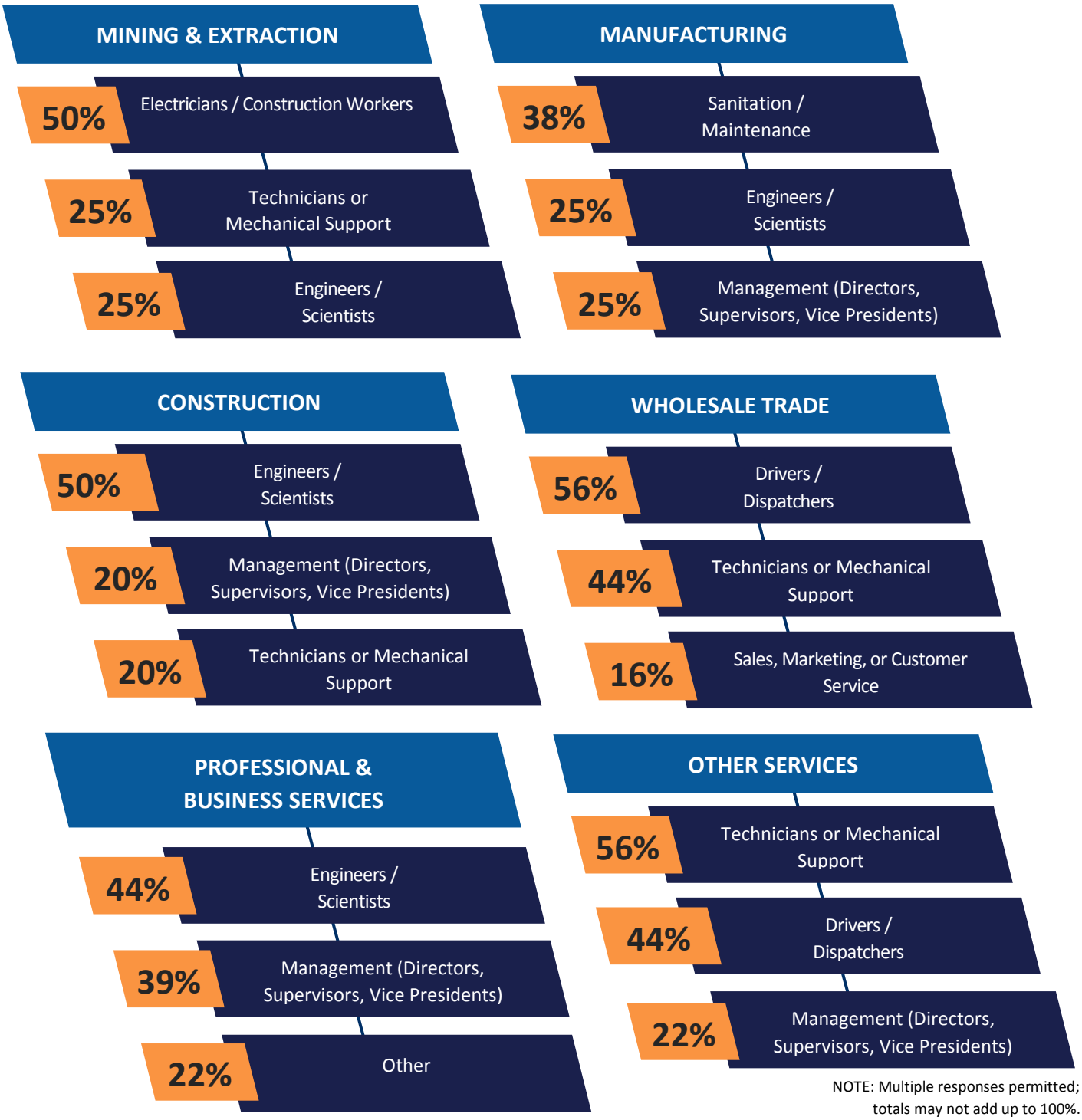



NOTE: Multiple responses permitted; totals may not add up to 100%.

Figure 7. Fuels Employers' Reasons for Hiring Difficulty, 2024

## MOST DIFFICULT TO HIRE OCCUPATIONS

Several industries reported hiring difficulty rates of 50% or higher for specific occupations. For example, 56% of Wholesale Trade businesses reported difficulty hiring Drivers/Dispatchers, 50% of Construction businesses reported difficulty hiring Engineers/Scientists, and 50% of Mining and Extraction businesses reported difficulty hiring Electrician/Construction workers (Figure 8).




NOTE: Multiple responses permitted; totals may not add up to 100%.

Figure 8. Occupations Most Difficult to Hire for Fuels Employers, 2024

## ANTICIPATED EMPLOYMENT CHANGE BY SUBSECTOR AND INDUSTRY

This section focuses on anticipated employment change by subsector and industry.

Employers across all Fuels subsectors anticipate growth through 2025, ranging from 0.5% in Coal to 5.7% in Nuclear Fuels (Figure 9).

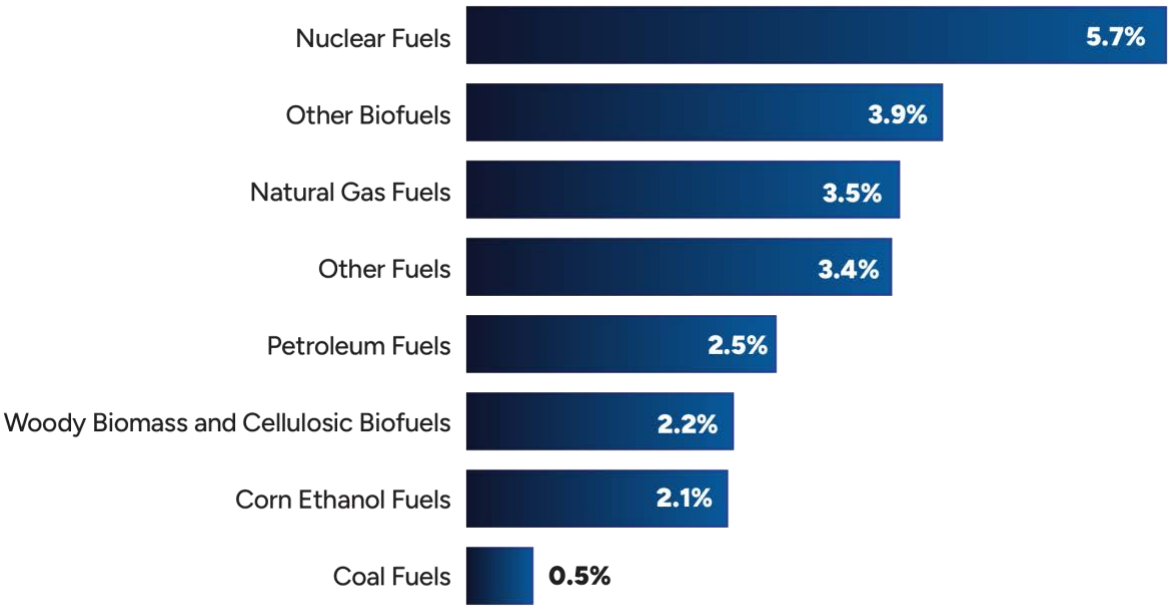



Figure 9. Fuels Employers' Anticipated Employment Changes by Subsector, 2024-2025[21]

Six of seven industries within Fuels expect job growth through 2025, ranging from 0.9% in Other Services to 7.0% in Construction (Figure 10).

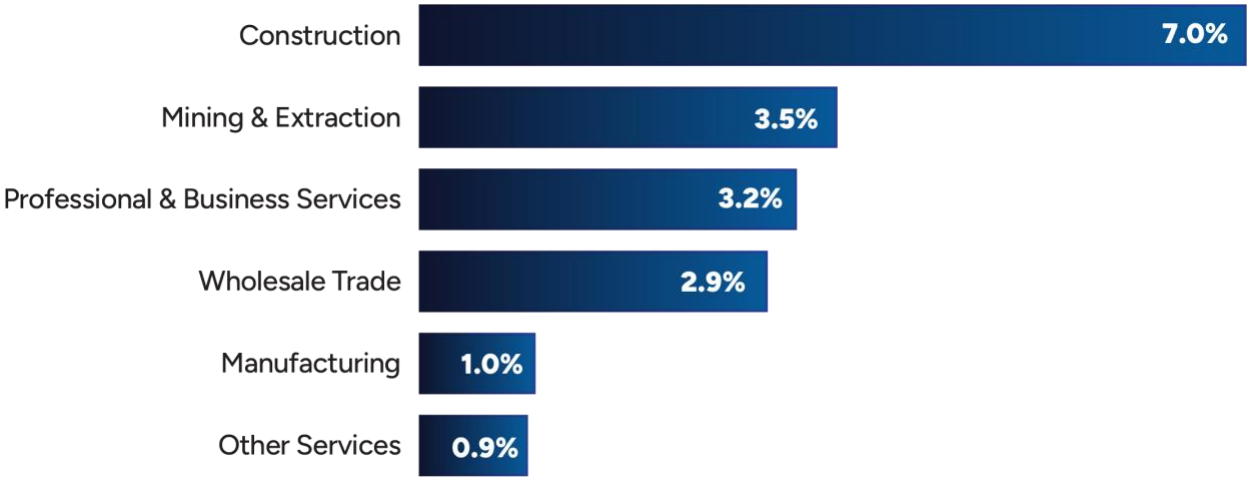



Figure 10. Fuels Employers' Anticipated Employment Changes by Industry, 2024-2025[22]

[21] See Figure 2. Fuels Employment by Subsector, 2024.

[22] Results reflect responses only from individuals who have hired and work within the specified industry and subsector, resulting in a low sample size in this case. The Agriculture and Forestry industry was not reported due to insufficient sample size. See Figure 3. Fuels Employment by Industry, 2024.

# Petroleum Fuels

Consistent with the definitions provided by the U.S. Energy Information Administration (EIA), Petroleum Fuels include crude oil, lease condensate, unfinished oils, and other products generated from the extraction and refining of crude oil (EIA, 2025).[23] Employment in this subsector includes workers involved in onshore and offshore oil drilling and extraction, oil refining, manufacturing of extraction equipment, wholesale distribution of petroleum, repair and maintenance for drilling and extraction equipment, and professional services such as engineering, research and development, finance, etc. that support the operations of each of these industries.

## Employment by Industry

Most Petroleum Fuels workers were employed in the Mining and Extraction industry, which accounted for 246,600 workers (45.0%), followed by Manufacturing, which accounted for 145,500 workers (26.5%) (Figure 11).

**548,500**

Workers employed in Petroleum Fuels subsector in 2024

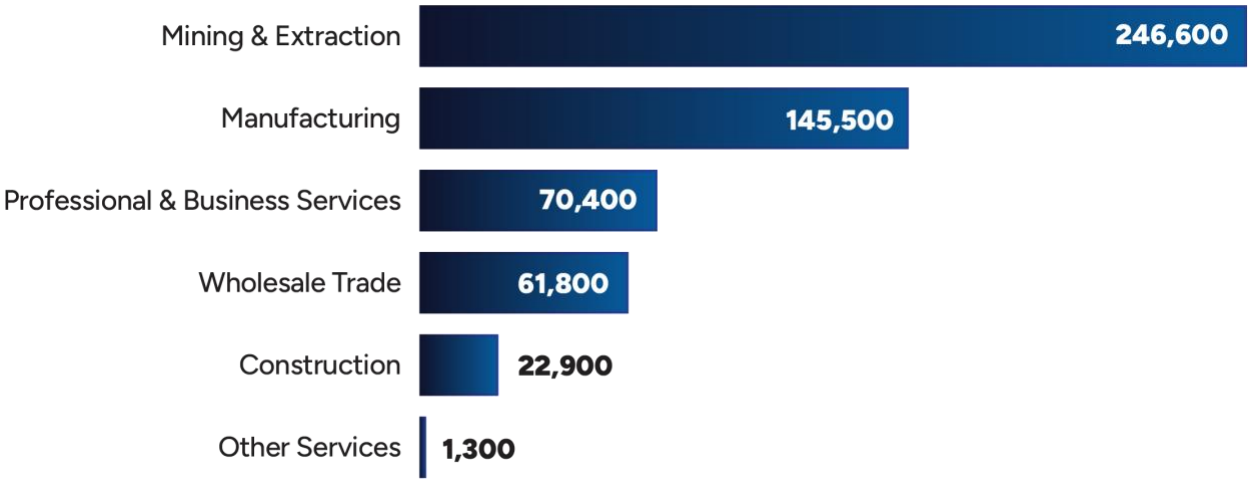



Figure 11. Petroleum Fuels Employment by Industry, 2024

[23] For more information on energy subsector definitions, see Appendix K.

Jobs in Petroleum Fuels are divided into Onshore- and Offshore-related employment. In 2024, most Petroleum Fuels workers were employed by the Onshore Petroleum Fuels subsector (458,900, or 83.7%), while the remaining 89,500 workers (16.3%) were employed by the Offshore Petroleum Fuels subsector.

The Mining and Extraction industry represented the largest share of employment within Onshore Petroleum Fuels (210,800, or 45.9%), while the Manufacturing industry represented the largest share of employment within Offshore Petroleum Fuels (41,200, or 45.9%). Together, Onshore and Offshore Petroleum Fuels employment in these two industries represented 71.5% of total Petroleum Fuels employment (Figure 12).

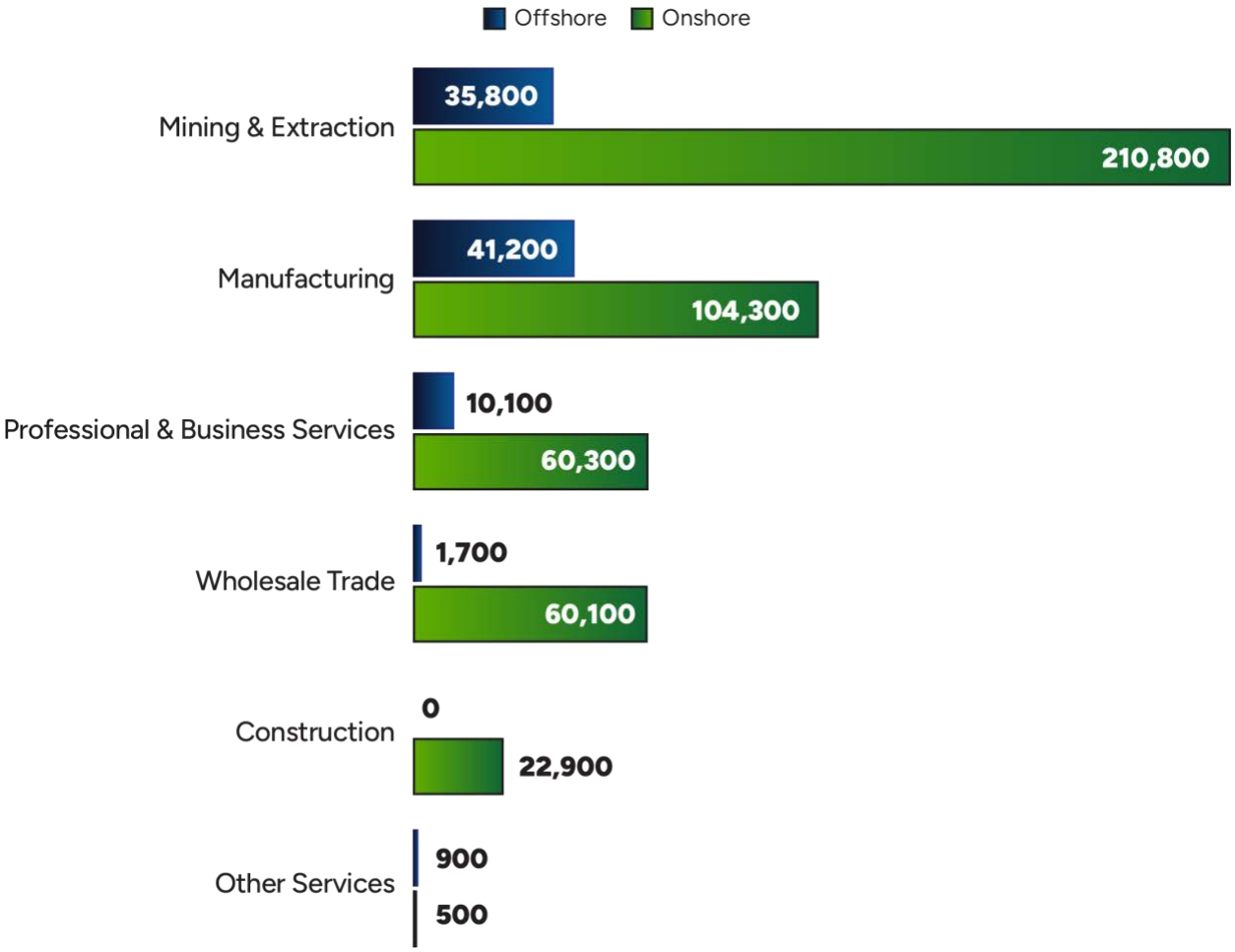



Figure 12. Onshore and Offshore Petroleum Fuels Employment by Industry, 2024

## Workforce Demographics

The makeup of the workforce in Petroleum Fuels aligned with the overall Fuels sector. Men constituted 76% of the Petroleum Fuels workforce, compared to 73% of the energy workforce overall and 53% of the national workforce overall. The proportion of veterans in the Petroleum Fuels workforce (10%) was nearly double the share of veterans in the U.S. workforce (5%). Workers under the age of 30 were more concentrated in the Petroleum Fuels workforce (32%) than in the national workforce (22%) (Table 5).

Table 5. Petroleum Fuels Workforce Demographics and Characteristics, 2024[24]

| | Number of Workers | **Percentage of Petroleum Fuels Workforce** | Percentage of Fuels Workforce | Percentage of Energy Workforce | Percentage of National Workforce |
|---|---|---|---|---|---|
| Men | 414,500 | **76%** | 74% | 73% | 53% |
| Women | 131,400 | **24%** | 26% | 26% | 47% |
| Hispanic or Latino | 85,800 | **16%** | 15% | 19% | 19% |
| Non-Hispanic or Latino | 462,700 | **84%** | 85% | 81% | 81% |
| American Indian or Alaska Native | 10,100 | **2%** | 2% | 2% | 1% |
| Asian | 39,400 | **7%** | 6% | 7% | 7% |
| Black or African American | 54,300 | **10%** | 9% | 8% | 13% |
| Native Hawaiian or Other Pacific Islander | 5,600 | **1%** | 1% | 1% | <1% |
| White | 411,500 | **75%** | 76% | 74% | 76% |
| Two or More Races | 23,200 | **4%** | 4% | 5% | 3% |
| Unknown Race | 4,400 | **<1%** | 1% | 3% | n/a |
| Veterans | 56,000 | **10%** | 11% | 9% | 5% |
| 18 to 29 | 173,300 | **32%** | 31% | 29% | 22% |
| 30 to 54 | 276,400 | **50%** | 50% | 52% | 54% |
| Over 54 | 98,800 | **18%** | 19% | 19% | 24% |
| Self-Identification of Disability | 5,900 | **1%** | 2% | 2% | 5% |
| Formerly Incarcerated | 7,900 | **1%** | 2% | 2% | 2% |
| Represented by a Union[25] | 38,300 | **7%** | 7% | 12% | 7% |

[24] National Sources: BLS (2024a, 2024b, 2024c, 2024d), Jobs EQ (2024), Prison Policy (2018).

[25] For this analysis, a union employer is defined as one with at least 20% of its workforce as a member of a labor union or covered by either a project labor agreement or a collective bargaining agreement. Figure represents private sector unionization rate. Unionization rates vary by state.

## Employer Perspective on Workforce Topics

### CURRENT HIRING DIFFICULTY

Among respondents employing Onshore Petroleum Fuels workers, the greatest hiring difficulties were noted in Construction and Other Services (including repair and maintenance of mining and extraction equipment), with 95% of employers reporting at least some level of hiring difficulty in each industry. Notably, more than half of Construction employers (52%) indicated hiring was "very difficult."

Mining and Extraction employers found hiring the least difficult, with 35% of employers reporting hiring was "not at all difficult" (Figure 13).

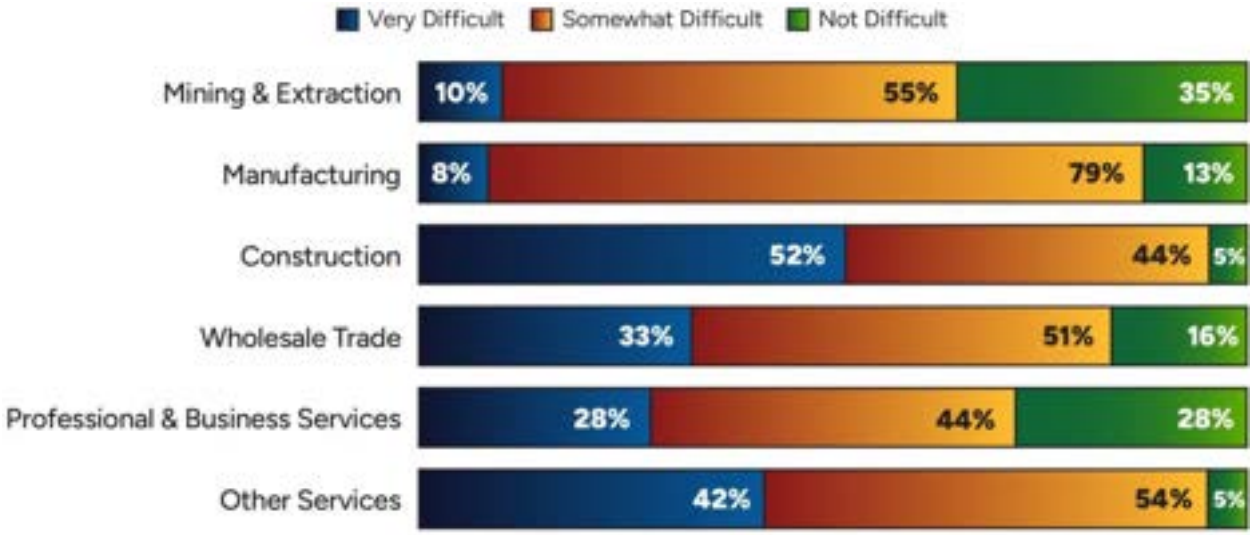



Figure 13. Onshore Petroleum Fuels' Employers Perceived Hiring Difficulty, 2024

Among respondents hiring Offshore Petroleum Fuels workers, Other Services (such as repair and maintenance) and Wholesale Trade (of Petroleum Fuels) employers reported the greatest difficulty finding qualified employees—93% of Wholesale Trade employers and 95% of Other Services employers reported at least some level of difficulty. Additionally, nearly 70% of Wholesale Trade employers indicated hiring was "very difficult" (Figure 14).

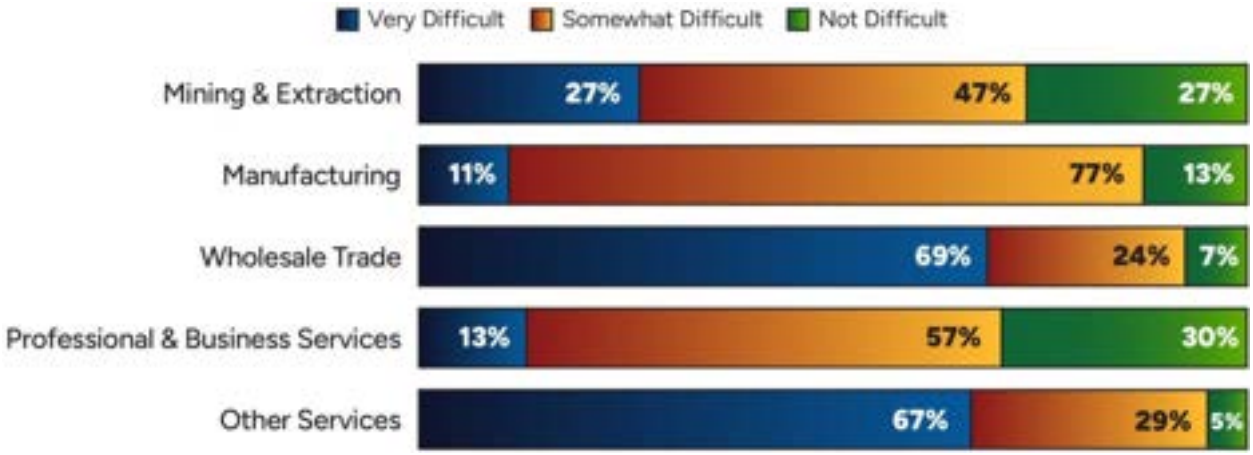



Figure 14. Offshore Petroleum Fuels Employers' Perceived Hiring Difficulty, 2024

## ANTICIPATED EMPLOYMENT CHANGE BY INDUSTRY

Onshore and Offshore Petroleum Fuels employers reported varying expectations for job growth through 2025. Among Onshore Petroleum Fuels employers, all industries, apart from Manufacturing, anticipate job growth, ranging from 0.4% in Wholesale Trade to 7.0% in Construction.

Offshore Petroleum Fuels employers anticipate job growth of 1.6% in Professional and Business Services (such as engineering, finance, information technology, etc.) and 2.8% in Mining and Extraction over the next year (Figure 15).

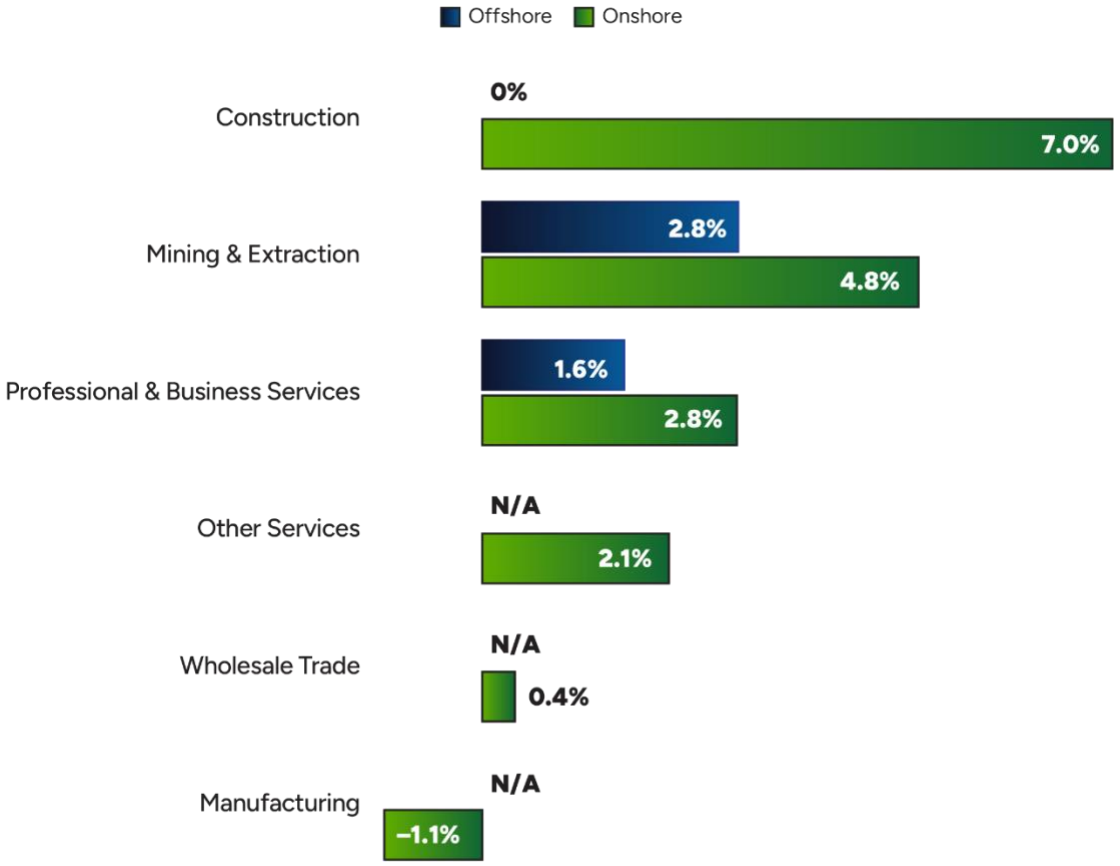



Figure 15. Petroleum Fuels Employers' Anticipated Employment Change by Industry, 2024-2025[26]

[26] Manufacturing, Wholesale Trade, and Other Services industries were not reported for Offshore Petroleum Fuels due to insufficient sample size. See Figure 11. Petroleum Fuels Employment by Industry, 2024.

# Natural Gas

Natural Gas is a flammable gaseous mixture of hydrocarbon compounds, primarily methane. It occurs naturally underground, often in association with petroleum, and is extracted as a fuel. Employment in the Natural Gas Fuels subsector includes workers involved in onshore and offshore exploration and extraction, natural gas processing, and manufacturing of extraction and processing equipment. It also includes workers involved in the repair and maintenance of extraction equipment, the wholesale trade of natural gas, and professional services that support natural gas production, such as engineering, financial services, environmental consulting, project management, and other services.

## Employment by Industry

The Mining and Extraction industry accounted for the largest number of Natural Gas Fuels workers (138,100) and represented over half (54.7%) of total Natural Gas Fuels employment (Figure 16).

**252,600**

Workers employed in Natural Gas Fuels subsecto in 2024

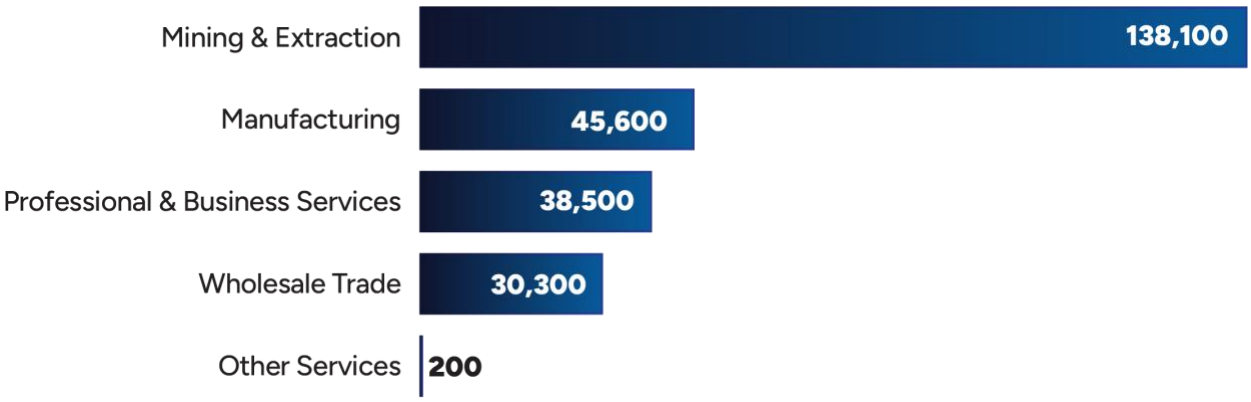



Figure 16. Natural Gas Fuels Employment by Industry, 2024

Jobs in Natural Gas Fuels are divided into Onshore- and Offshore- related employment. Onshore Natural Gas Fuels businesses employed 230,400 workers (91.2%) in 2024, while Offshore Natural Gas Fuels businesses employed 22,300 workers (8.8%). Most Onshore Natural Gas Fuels workers were employed in the Mining and Extraction industry, while most Offshore Natural Gas Fuels workers were employed in the Professional and Business Services industry, which includes engineering, information technology and software, finance, etc. (Figure 17).

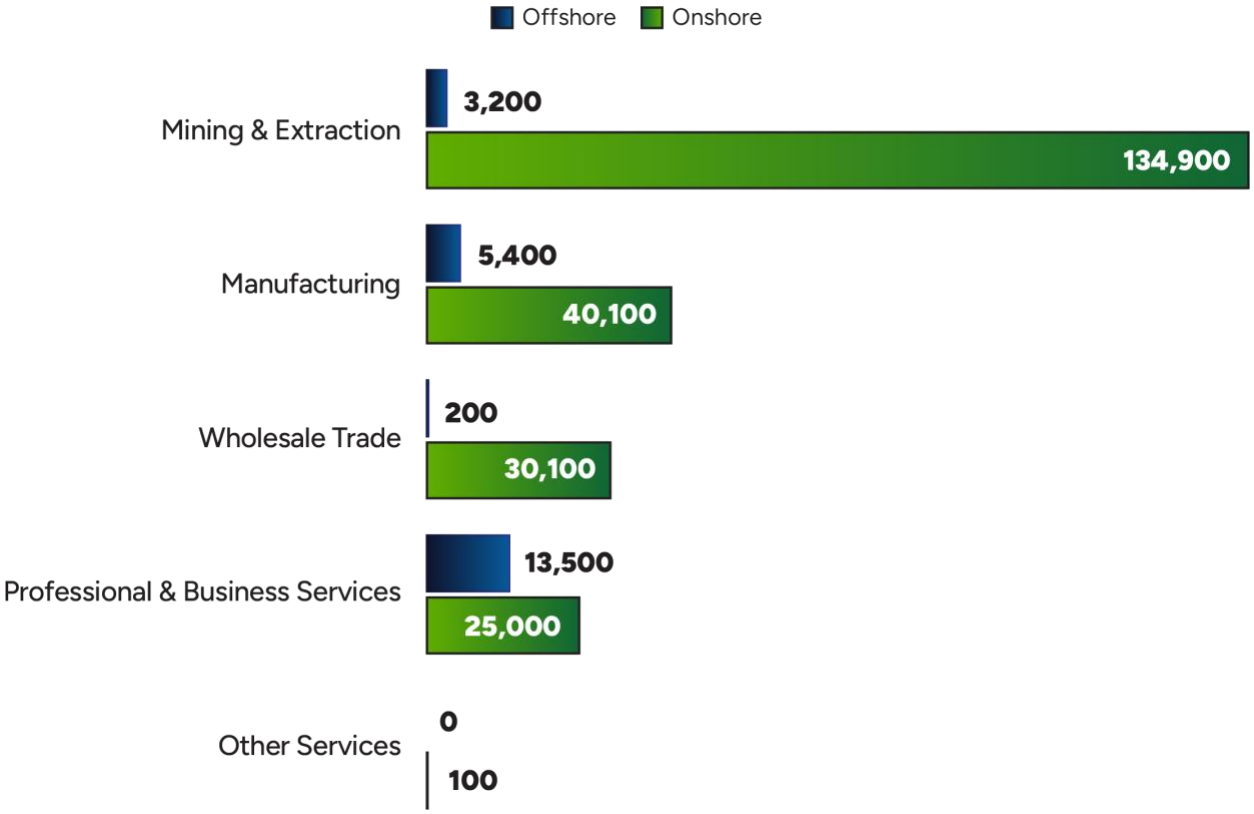



Figure 17. Onshore and Offshore Natural Gas Fuels Employment by Industry, 2024

## Workforce Demographics

In 2024, women constituted 26% of the Natural Gas Fuels workforce, similar to the energy workforce share of women (26%). The concentration of veterans in the Natural Gas Fuels workforce (9%) was similar to the energy workforce (9%) and nearly double the U.S. workforce (5%). The percentage of workers under the age of 30 in the Natural Gas Fuels workforce (32%) was higher than the proportion across the overall energy workforce (29%) and the national workforce (22%) (Table 6).

Table 6. Natural Gas Fuels Workforce Demographics and Characteristics, 2024[27]

| | Number of Workers | **Percentage of Natural Gas Fuels Workforce** | Percentage of Fuels Workforce | Percentage of Energy Workforce | Percentage of National Workforce Overall |
|---|---|---|---|---|---|
| Men | 185,600 | **73%** | 74% | 73% | 53% |
| Women | 64,600 | **26%** | 26% | 26% | 47% |
| Hispanic or Latino | 39,300 | **16%** | 15% | 19% | 19% |
| Non-Hispanic or Latino | 213,300 | **84%** | 85% | 81% | 81% |
| American Indian or Alaska Native | 4,200 | **2%** | 2% | 2% | 1% |
| Asian | 13,700 | **5%** | 6% | 7% | 7% |
| Black or African American | 23,400 | **9%** | 9% | 8% | 13% |
| Native Hawaiian or Other Pacific Islander | 2,100 | **<1%** | 1% | 1% | <1% |
| White | 190,400 | **75%** | 76% | 74% | 76% |
| Two or More Races | 17,100 | **7%** | 4% | 5% | 3% |
| Unknown Race | 1,800 | **<1%** | 1% | 3% | n/a |
| Veterans | 23,000 | **9%** | 11% | 9% | 5% |
| 18 to 29 | 79,700 | **32%** | 31% | 29% | 22% |
| 30 to 54 | 122,200 | **48%** | 50% | 52% | 54% |
| Over 54 | 50,700 | **20%** | 19% | 19% | 24% |
| Self-Identification of Disability | 4,800 | **2%** | 2% | 2% | 5% |
| Formerly Incarcerated | 6,000 | **2%** | 2% | 2% | 2% |
| Represented by a Union[28] | 19,200 | **8%** | 7% | 12% | 7% |

[27] National Sources: BLS (2024a, 2024b, 2024c, 2024d), Jobs EQ (2024), Prison Policy (2018).

[28] For this analysis, a union employer is defined as one with at least 20% of its workforce as a member of a labor union or covered by either a project labor agreement or a collective bargaining agreement. Figure represents private sector unionization rate. Unionization rates vary by state.

## Employer Perspective on Workforce Topics

### CURRENT HIRING DIFFICULTY

Within Onshore Natural Gas Fuels, Other Services (including repair and maintenance) and Wholesale Trade (of Natural Gas Fuels and production and extraction equipment) employers reported the most hiring difficulty in 2024, each with over 90% of employers reporting at least some level of difficulty.

Wholesale Trade had the highest percentage of employers indicate that it was "very difficult" to hire Onshore Natural Gas Fuels workers (47%) in 2024. In contrast, over a quarter (27%) of Professional and Business Services (including engineering, research and development, information technology, etc.) employers reported that hiring was "not at all difficult" in 2024 (Figure 18).

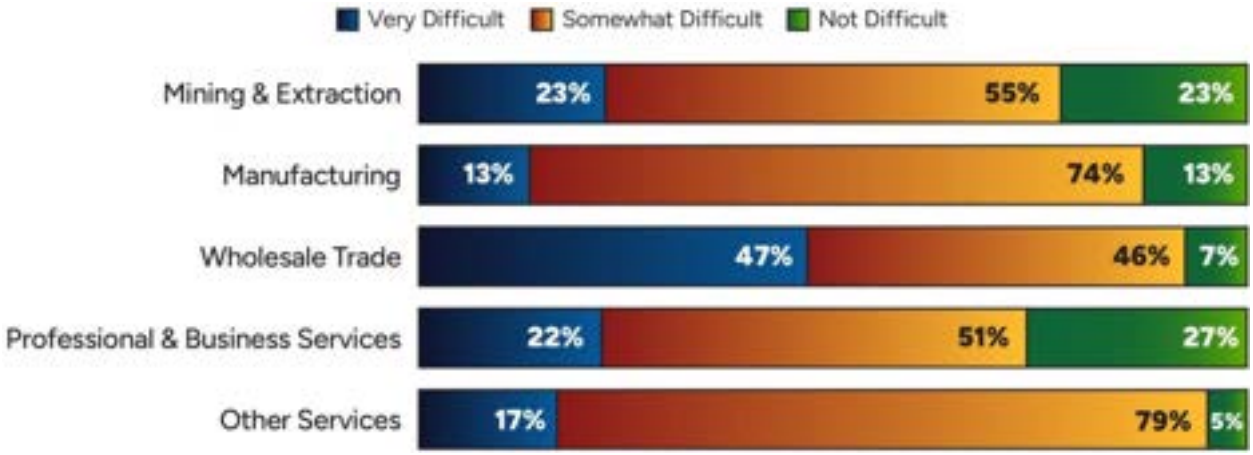



Figure 18. Onshore Natural Gas Employers' Perceived Hiring Difficulty, 2024

In Offshore Natural Gas Fuels, Other Services (including repair and maintenance of extraction and production equipment) and Wholesale Trade (of Natural Gas Fuels and production and extraction equipment) employers reported the highest level of hiring difficulty, each with over 90% of employers citing at least some level of difficulty.

The Mining and Extraction industry had the highest proportion of employers (39%) indicate that hiring was “very difficult”, juxtaposed with a significant portion of employers in Mining and Extraction (21%) reporting that hiring was “not at all difficult” for Offshore Natural Gas Fuels in 2024 (Figure 19).

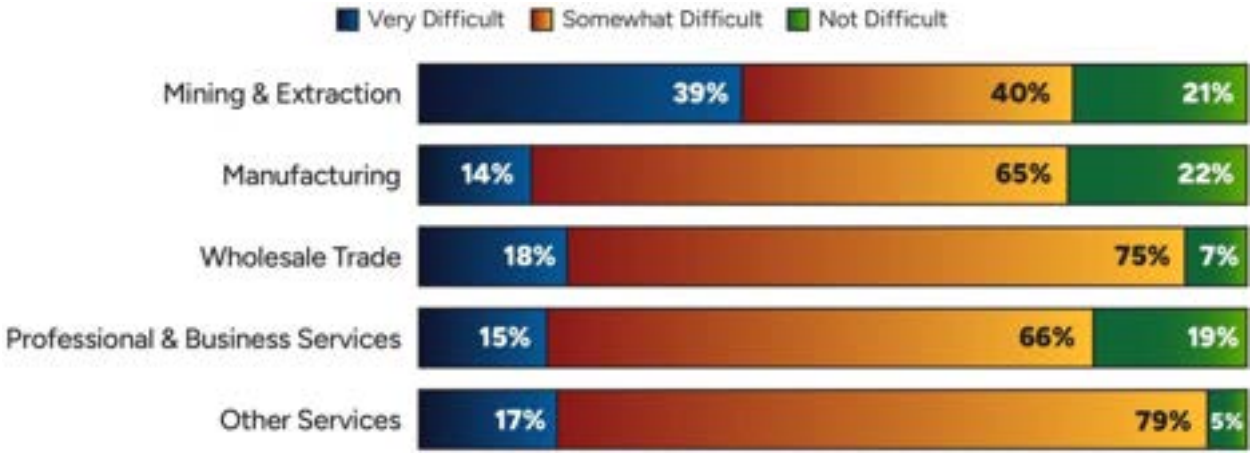



Figure 19. Offshore Natural Gas Fuels Employers’ Perceived Hiring Difficulty, 2024

## ANTICIPATED EMPLOYMENT CHANGE BY INDUSTRY

Onshore Natural Gas Fuels employers' growth expectations through 2025 range from 1.2% for Other Services (including repair and maintenance) employers to 7.0% for Wholesale Trade (of Natural Gas Fuels and production and extraction equipment) employers.

Offshore Natural Gas Fuels employers' growth expectations for 2025 range from 1.6% in Other Services (including repair and maintenance or production and extraction equipment) and Professional and Business Services (including engineering, research and development, information technology, etc.) to 2.8% in Mining and Extraction through 2025 (Figure 20).

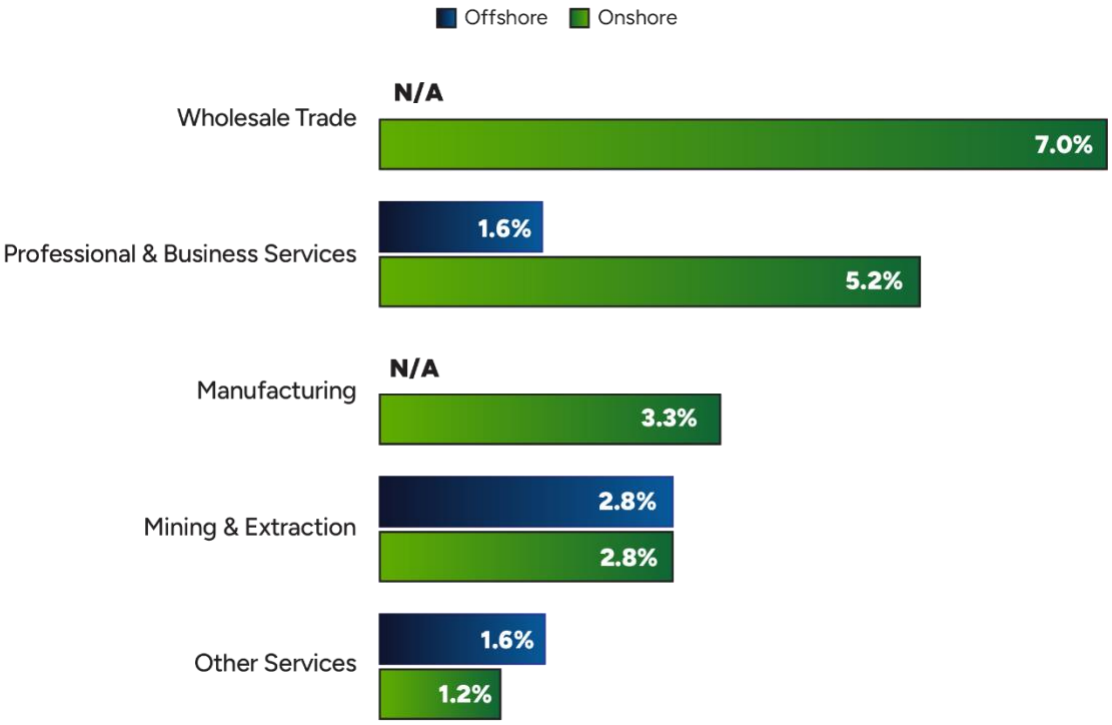



Figure 20. Natural Gas Fuels Employers' Anticipated Employment Change, 2024-2025[29]

[29] Wholesale Trade and Manufacturing industries were not reported for Offshore Natural Gas due to insufficient sample size. See Figure 16. Natural Gas Fuels Employment by Industry, 2024.

# Coal Fuels

Coal is a solid sedimentary rock that is primarily composed of carbon. Thermal coal (referred to here as Coal Fuels) is mined and burned to produce energy in the form of heat and electricity. Coal can also be converted into gaseous or liquid fuels. Workers in Coal Fuels work in a variety of industries: mining and extraction, processing, manufacturing equipment for these activities, sale and distribution of coal products to retailers, and professional and business services such as engineering, financial services, information management, technical consulting, and other support services.

## Employment by Industry

Most Coal Fuels workers were in the Mining and Extraction industry (44,700, or 69.5%), followed by Manufacturing, with 10,400 workers (16.1%) (Figure 21).

**64,400**

Workers employed in Coal Fuels subsector in 2024

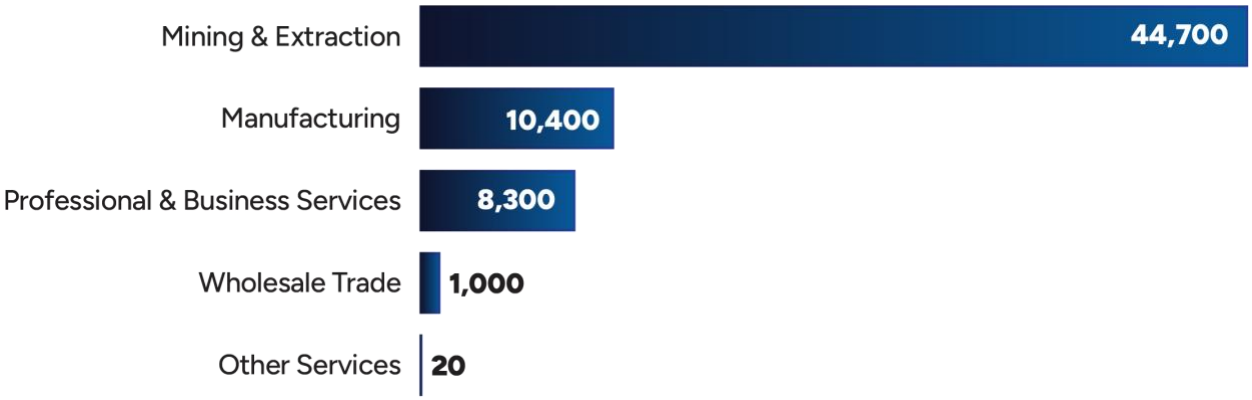



Figure 21. Coal Fuels Employment by Industry, 2024

## Workforce Demographics

Men made up 73% of the Coal Fuels workforce, similar to the overall energy workforce (73%) but above the economy-wide workforce (53%). The concentration of veterans in the Coal Fuels workforce (12%) was higher than the energy workforce (9%) and more than double the U.S. workforce (5%). The Coal Fuels workforce also had a higher share of workers over the age of 54 (24%) than the overall energy workforce (19%) (Table 7).

Table 7. Coal Fuels Workforce Demographics and Characteristics, 2024[30]

| | Number of Workers | **Percentage of Coal Fuels Workforce** | Percentage of Fuels Workforce | Percentage of Energy Workforce | Percentage of National Workforce |
|---|---|---|---|---|---|
| Men | 47,200 | **73%** | 74% | 73% | 53% |
| Women | 16,600 | **26%** | 26% | 26% | 47% |
| Hispanic or Latino | 9,800 | **15%** | 15% | 19% | 19% |
| Non-Hispanic or Latino | 54,600 | **85%** | 85% | 81% | 81% |
| American Indian or Alaska Native | 1,900 | **3%** | 2% | 2% | 1% |
| Asian | 4,200 | **6%** | 6% | 7% | 7% |
| Black or African American | 4,400 | **7%** | 9% | 8% | 13% |
| Native Hawaiian or Other Pacific Islander | 1,300 | **2%** | 1% | 1% | <1% |
| White | 50,300 | **78%** | 76% | 74% | 76% |
| Two or More Races | 1,700 | **3%** | 4% | 5% | 3% |
| Unknown Race | 600 | **<1%** | 1% | 3% | n/a |
| Veterans | 7,500 | **12%** | 11% | 9% | 5% |
| 18 to 29 | 19,800 | **31%** | 31% | 29% | 22% |
| 30 to 54 | 28,900 | **45%** | 50% | 52% | 54% |
| Over 54 | 15,700 | **24%** | 19% | 19% | 24% |
| Self-Identification of Disability | 1,400 | **2%** | 2% | 2% | 5% |
| Formerly Incarcerated | 1,000 | **2%** | 2% | 2% | 2% |
| Represented by a Union[31] | 7,000 | **11%** | 7% | 12% | 7% |

[30] National Sources: BLS (2024a, 2024b, 2024c, 2024d), Jobs EQ (2024), Prison Policy (2018).
[31] For this analysis, a union employer is defined as one with at least 20% of its workforce as a member of a labor union or covered by either a project labor agreement or a collective bargaining agreement. Figure represents private sector unionization rate. Unionization rates vary by state.

## Employer Perspective on Workforce Topics

### CURRENT HIRING DIFFICULTY

Around 90% of Mining and Extraction employers reported at least some level of difficulty in hiring. Nearly four in ten (38%) Wholesale Trade (of Coal Fuels and production and extraction equipment) employers reported hiring as "very difficult" (Figure 22).

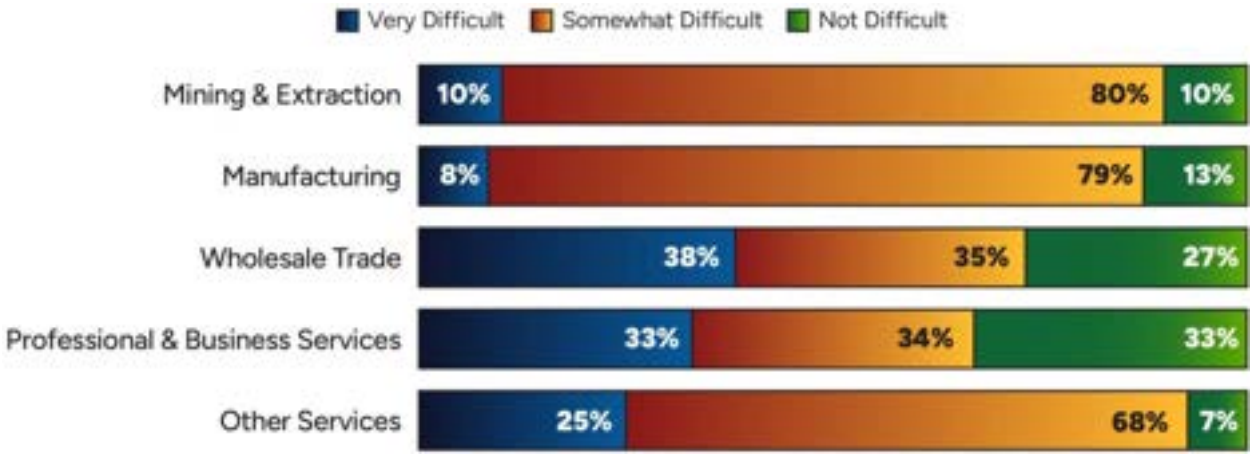



Figure 22. Coal Fuels Employers' Perceived Hiring Difficulty, 2024

## ANTICIPATED EMPLOYMENT CHANGE BY INDUSTRY

Employers across Professional and Business Services (including engineering, information technology, finance, etc.), Wholesale Trade (of Coal Fuels and production and extraction equipment), and Other Services (including repair and maintenance of production and extraction equipment) in Coal Fuels anticipate job growth through 2024, ranging from 1.6% in Other Services to 3.8% in Professional and Business Services (Figure 23).

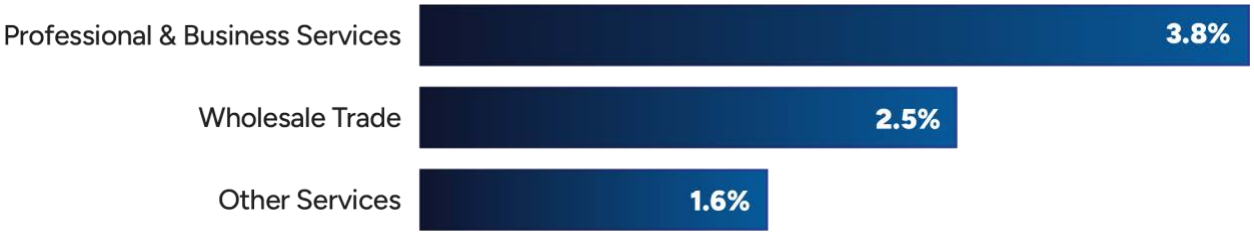



Figure 23. Coal Fuels Employers' Anticipated Employment Change, 2024-2025[32]

[32] Manufacturing and Mining and Extraction industries were not reported due to insufficient sample size. See Figure 21. Coal Fuels Employment by Industry, 2024.

# Corn Ethanol

Corn Ethanol Fuels are produced from corn biomass and primarily used as a biofuel, typically blended with gasoline. Corn Ethanol Fuels employment includes workers involved in corn farming, mill processing for production, and ethanol refineries. It also includes occupations in equipment manufacturing, wholesale trade (of corn ethanol and farming and production equipment), and professional services that support the operations of each of these industries. Such support services include finance, research and development (R&D) and testing, as well as administrative support.

## Employment by Industry

**36,100**

Workers employed in Corn Ethanol Fuels subsector in 2024

The Agriculture and Forestry industry represented the largest share of Corn Ethanol Fuels workers, accounting for 16,600 workers (45.9%). Manufacturing accounted for 9,600 workers (26.5%) while Wholesale Trade (of Corn Ethanol Fuels and farming and production equipment) accounted for 7,000 workers (19.3%) (Figure 24).

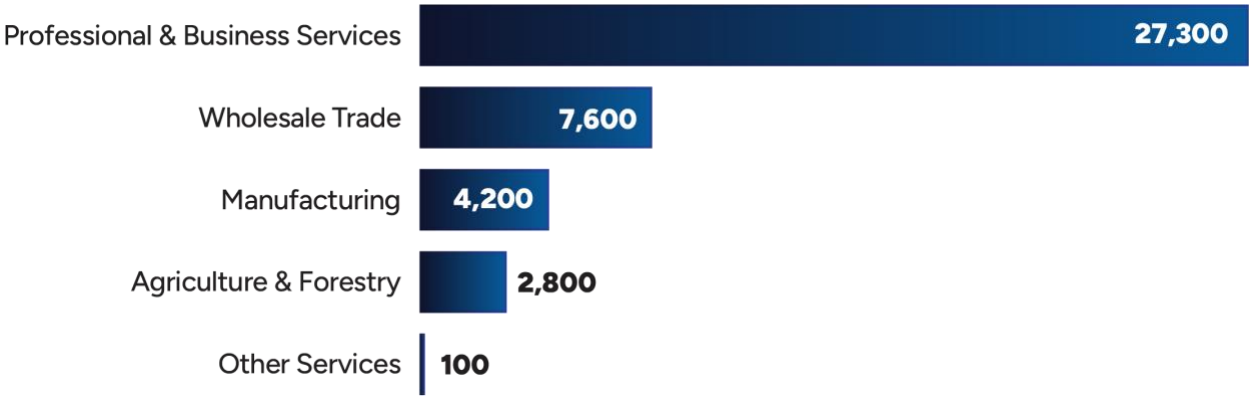



Figure 24. Corn Ethanol Fuels Employment by Industry, 2024

## Workforce Demographics

The share of women in the Corn Ethanol Fuels workforce (31%) was higher than the share within the energy workforce (26%). The representation of veterans in the Corn Ethanol Fuels workforce (16%) was higher than in the overall energy workforce (9%) and more than three times the U.S. workforce (5%). Workers who self-identified with a disability were more highly represented in the Corn Ethanol Fuels workforce (4%) than in the overall energy workforce (2%). The share of workers over the age of 54 in the Corn Ethanol Fuels workforce (24%) was also higher than the energy workforce (19%) (Table 8).

Table 8. Corn Ethanol Fuels Workforce Demographics and Characteristics, 2024[33]

| | Number of Workers | **Percentage of Corn Ethanol Fuels Workforce** | Percentage of Fuels Workforce | Percentage of Energy Workforce | Percentage of National Workforce |
|---|---|---|---|---|---|
| Men | 24,500 | **68%** | 74% | 73% | 53% |
| Women | 11,300 | **31%** | 26% | 26% | 47% |
| Hispanic or Latino | 4,300 | **12%** | 15% | 19% | 19% |
| Non-Hispanic or Latino | 31,700 | **88%** | 85% | 81% | 81% |
| American Indian or Alaska Native | 500 | **1%** | 2% | 2% | 1% |
| Asian | 2,200 | **6%** | 6% | 7% | 7% |
| Black or African American | 2,300 | **6%** | 9% | 8% | 13% |
| Native Hawaiian or Other Pacific Islander | 700 | **2%** | 1% | 1% | <1% |
| White | 28,300 | **78%** | 76% | 74% | 76% |
| Two or More Races | 900 | **3%** | 4% | 5% | 3% |
| Unknown Race | 1,300 | **4%** | 1% | 3% | n/a |
| Veterans | 5,900 | **16%** | 11% | 9% | 5% |
| 18 to 29 | 10,100 | **28%** | 31% | 29% | 22% |
| 30 to 54 | 17,400 | **48%** | 50% | 52% | 54% |
| Over 54 | 8,500 | **24%** | 19% | 19% | 24% |
| Self-Identification of Disability | 1,400 | **4%** | 2% | 2% | 5% |
| Formerly Incarcerated | 300 | **<1%** | 2% | 2% | 2% |
| Represented by a Union[34] | 2,200 | **6%** | 7% | 12% | 7% |

[33] National Sources: BLS (2024a, 2024b, 2024c, 2024d), Jobs EQ (2024), Prison Policy (2018).

[34] For this analysis, a union employer is defined as one with at least 20% of its workforce as a member of a labor union or covered by either a project labor agreement or a collective bargaining agreement. Figure represents private sector unionization rate. Unionization rates vary by state.

## Employer Perspective on Workforce Topics

### CURRENT HIRING DIFFICULTY

Within Corn Ethanol Fuels industries, Wholesale Trade (of Corn Ethanol Fuels and farming and production equipment) employers reported the highest level of hiring difficulty, with 93% of employers reporting at least some level of difficulty, followed by Other Services (including repair and maintenance of farming and production equipment), with 92% of employers reporting some level of difficulty. Over one-third (35%) of Wholesale Trade (of Corn Ethanol Fuels and farming and production equipment) employers reported that hiring was “very difficult” in 2024 (Figure 25).

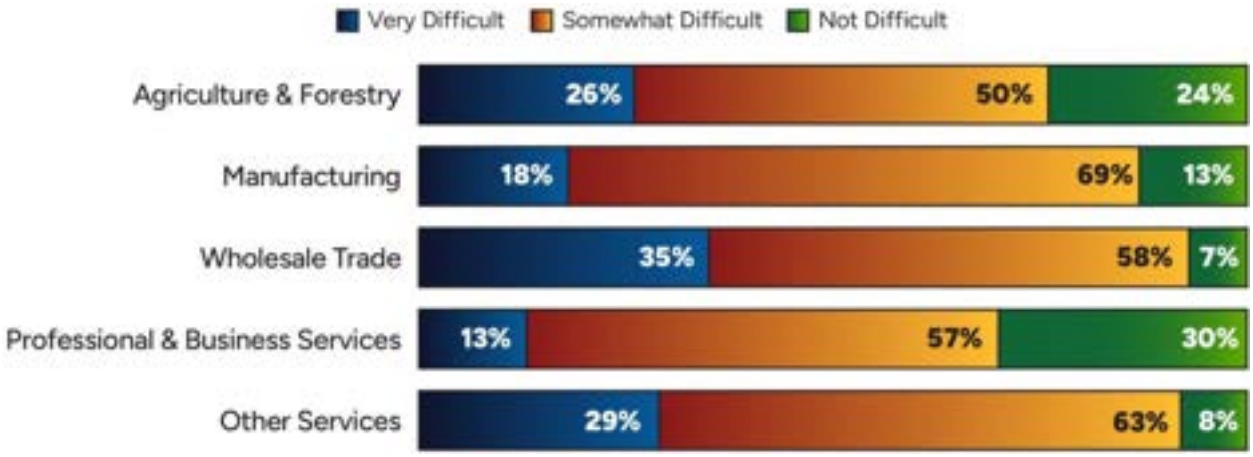



Figure 25. Corn Ethanol Fuels Employers' Perceived Hiring Difficulty, 2024

## ANTICIPATED EMPLOYMENT CHANGE BY INDUSTRY

As displayed in Figure 26, employers in four industries anticipate job growth through 2025: Wholesale Trade (5.1%), Professional and Business Services (5.0%), Manufacturing (2.8%), and Other Services (1.6%).


Figure 26. Corn Ethanol Fuels Employers' Anticipated Employment Change, 2024-2025[35]

[35] Agriculture and Forestry industry was not reported due to insufficient sample size. See Figure 24. Corn Ethanol Fuels Employment by Industry, 2024.

# Woody Biomass and Cellulosic Biofuels

Woody Biomass is a fuel used for heating or electricity generation and includes wood and wood waste (bark, sawdust, wood chips, wood scrap, and paper mill residues). Cellulosic Biofuels are fuels made from cellulosic feedstocks (such as switchgrass or corn stover). Workers in the Woody Biomass and Cellulosic Biofuels subsector may be involved in sourcing and harvesting, transportation and logistics, processing and conversion, wholesale trade of fuels, or professional and business services such as research and development, engineering, environmental compliance, and finance.

## Employment by Industry

**33,800**

Workers employed in Woody Biomass and Cellulosic Biofuels subsector in 2024

The largest share of employment was in the Agriculture and Forestry industry (17,200, or 50.9%). The Professional and Business Services industry (including information technology, engineering, research and development, finance, etc.) employed 10,800 workers (32.1%), while the Manufacturing industry employed 4,700 workers (13.8%) (Figure 27).

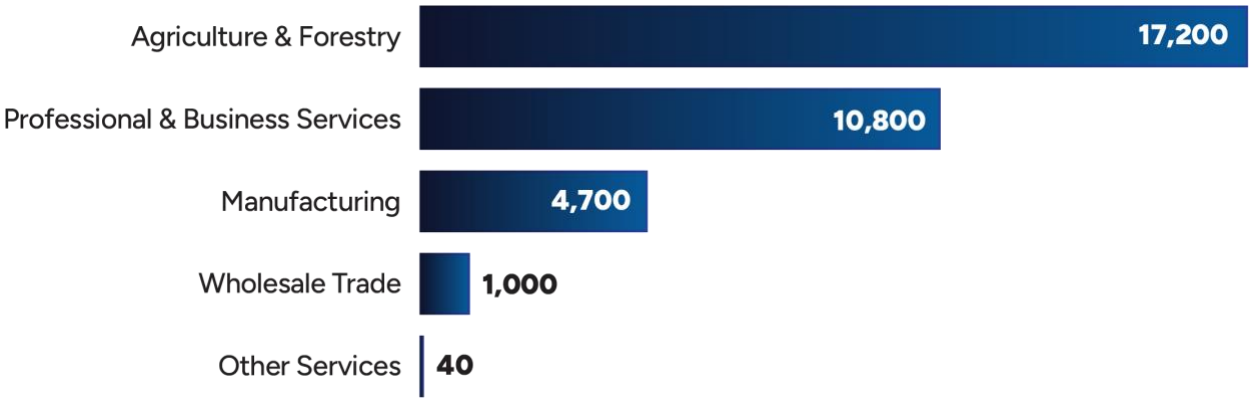



Figure 27. Woody Biomass and Cellulosic Biofuels Employment by Industry, 2024

## Workforce Demographics

The Woody Biomass and Cellulosic Biofuels workforce had a larger share of women (31%) than the energy workforce overall (26%). The representation of veterans in the Woody Biomass and Cellulosic Biofuels workforce (14%) was higher than in the energy workforce (9%) and almost three times the representation in the U.S. workforce overall (5%) (Table 9).

Table 9. Woody Biomass and Cellulosic Biofuels Workforce Demographics and Characteristics, 2024[36]

| | Number of Workers | **Percentage of Woody Biomass/ Cellulosic Biofuels Workforce** | Percentage of Fuels Workforce | Percentage of Energy Workforce | Percentage of National Workforce |
|---|---|---|---|---|---|
| Men | 22,900 | **68%** | 74% | 73% | 53% |
| Women | 10,500 | **31%** | 26% | 26% | 47% |
| Hispanic or Latino | 3,900 | **11%** | 15% | 19% | 19% |
| Non-Hispanic or Latino | 29,900 | **89%** | 85% | 81% | 81% |
| American Indian or Alaska Native | 500 | **1%** | 2% | 2% | 1% |
| Asian | 1,700 | **5%** | 6% | 7% | 7% |
| Black or African American | 1,600 | **5%** | 9% | 8% | 13% |
| Native Hawaiian or Other Pacific Islander | 400 | **1%** | 1% | 1% | <1% |
| White | 27,300 | **81%** | 76% | 74% | 76% |
| Two or More Races | 1,000 | **3%** | 4% | 5% | 3% |
| Unknown Race | 1,300 | **4%** | 1% | 3% | n/a |
| Veterans | 4,700 | **14%** | 11% | 9% | 5% |
| 18 to 29 | 10,000 | **29%** | 31% | 29% | 22% |
| 30 to 54 | 16,400 | **48%** | 50% | 52% | 54% |
| Over 54 | 7,400 | **22%** | 19% | 19% | 24% |
| Self-Identification of Disability | 1,100 | **3%** | 2% | 2% | 5% |
| Formerly Incarcerated | 900 | **3%** | 2% | 2% | 2% |
| Represented by a Union[37] | 2,300 | **7%** | 7% | 12% | 7% |

[36] National Sources: BLS (2024a, 2024b, 2024c, 2024d), Jobs EQ (2024), Prison Policy (2018).
[37] For this analysis, a union employer is defined as one with at least 20% of its workforce as a member of a labor union or covered by either a project labor agreement or a collective bargaining agreement. Figure represents private sector unionization rate. Unionization rates vary by state.

## Employer Perspective on Workforce Topics

### CURRENT HIRING DIFFICULTY

Within Woody Biomass and Cellulosic Biofuels, Wholesale Trade (of Woody Biomass and Cellulosic Biofuels as well as production and forestry equipment) and Other Services (including repair and maintenance of production and forestry equipment) had the greatest difficulty hiring workers — 93% of Wholesale Trade employers and 95% of Other Services employers indicated at least some level of hiring difficulty.

More than a quarter of both Other Services employers (28%) and Agriculture and Forestry employers (28%) indicated that they found it "very difficult" to find and hire qualified workers (Figure 28).

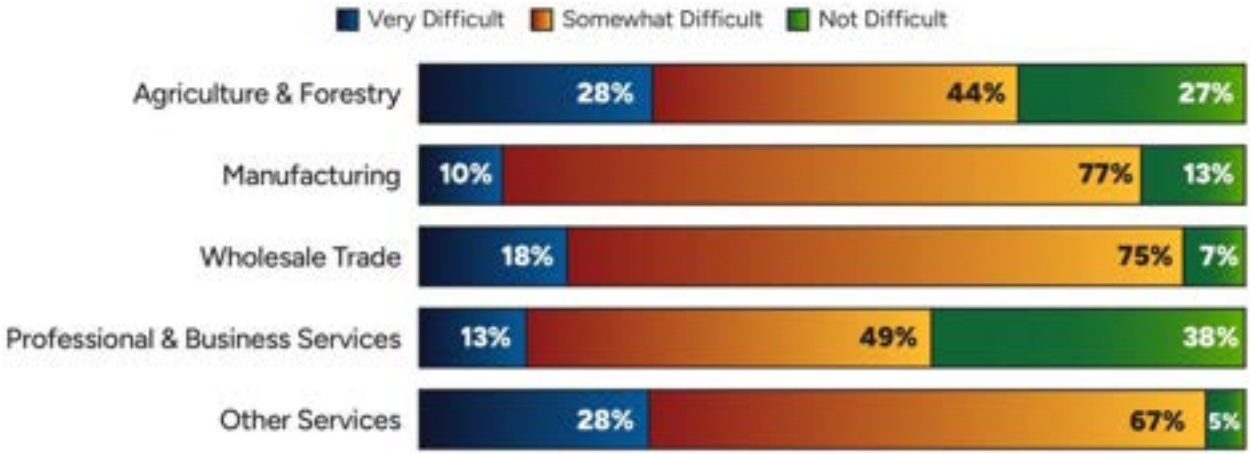



Figure 28. Woody Biomass and Cellulosic Biofuels Employers' Perceived Hiring Difficulty, 2024

## ANTICIPATED EMPLOYMENT CHANGE BY INDUSTRY

As displayed in Figure 29, employers in Professional and Business Services (such as engineering, research and development, finance, etc.) expect job growth of 5.2% on average through 2025, while Manufacturing employers anticipate 3.0% job growth, and Wholesale Trade (of Woody Biomass and Cellulosic Biofuels as well as production and forestry equipment) employers anticipate 2.5% job growth through 2025.


Figure 29. Woody Biomass and Cellulosic Biofuels Employers' Anticipated Employment Change, 2024-2025[38]

[38] Agriculture and Forestry and Other Services industries were not reported due to insufficient sample size. See Figure 27. Woody Biomass and Cellulosic Biofuels Employment by Industry, 2024.

# Nuclear Fuels

Nuclear Fuels are fissionable materials used in nuclear reactors to sustain nuclear fission, producing heat in a controlled manner for process use. Employment in Nuclear Fuels can include those involved in mining and extraction of uranium and plutonium, manufacturing of equipment, distribution of nuclear, repair and maintenance of equipment, and professional services that support operations, including engineering, information technology, and administrative services.

## Employment by Industry

The majority of Nuclear Fuels workers were employed in the Professional and Business Services industry, which includes engineering, research and development, and information technology (5,800, or 58.0%). The Manufacturing industry employed 2,800 workers (28.1%), followed by the Wholesale Trade (of production and extraction equipment) industry, with 900 workers (9.5%) (Figure 30).

**10,000**

Workers employed in Nuclear Fuels subsector in 2024

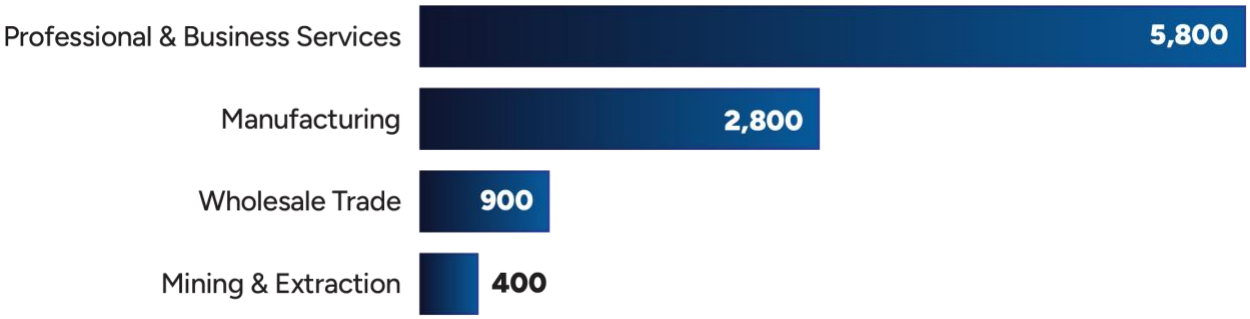



Figure 30. Nuclear Fuels Employment by Industry, 2024

## Workforce Demographics

The proportion of non-White workers in the Nuclear Fuels workforce (32%) was higher than in the overall energy workforce (26%) and the U.S. workforce (24%). The private sector unionization rate within the Nuclear Fuels workforce (18%) was higher than the rate within the overall energy workforce (12%) and more than double the national workforce rate (7%). The representation of workers aged 18 to 29 in the Nuclear Fuels workforce (32%) was higher than in the energy workforce (29%) and the national workforce (22%) (Table 10).

Table 10. Nuclear Fuels Workforce Demographics and Characteristics, 2024[39]

| | Number of Workers | **Percentage of Nuclear Fuels Workforce** | Percentage of Fuels Workforce | Percentage of Energy Workforce | Percentage of National Workforce |
|---|---|---|---|---|---|
| Men | 7,000 | **71%** | 74% | 73% | 53% |
| Women | 2,900 | **29%** | 26% | 26% | 47% |
| Hispanic or Latino | 1,500 | **16%** | 15% | 19% | 19% |
| Non-Hispanic or Latino | 8,400 | **84%** | 85% | 81% | 81% |
| American Indian or Alaska Native | 200 | **2%** | 2% | 2% | 1% |
| Asian | 900 | **9%** | 6% | 7% | 7% |
| Black or African American | 800 | **8%** | 9% | 8% | 13% |
| Native Hawaiian or Other Pacific Islander | 300 | **3%** | 1% | 1% | <1% |
| White | 6,800 | **68%** | 76% | 74% | 76% |
| Two or More Races | 800 | **8%** | 4% | 5% | 3% |
| Unknown Race | 100 | **<1%** | 1% | 3% | n/a |
| Veterans | 1,000 | **10%** | 11% | 9% | 5% |
| 18 to 29 | 3,200 | **32%** | 31% | 29% | 22% |
| 30 to 54 | 5,500 | **55%** | 50% | 52% | 54% |
| Over 54 | 1,300 | **13%** | 19% | 19% | 24% |
| Self-Identification of Disability | 200 | **2%** | 2% | 2% | 5% |
| Formerly Incarcerated | 200 | **2%** | 2% | 2% | 2% |
| Represented by a Union[40] | 1,800 | **18%** | 7% | 12% | 7% |

[39] National Sources: BLS (2024a, 2024b, 2024c, 2024d), Jobs EQ (2024), Prison Policy (2018).
[40] For this analysis, a union employer is defined as one with at least 20% of its workforce as a member of a labor union or covered by either a project labor agreement or a collective bargaining agreement. Figure represents private sector unionization rate. Unionization rates vary by state.

## Employer Perspective on Workforce Topics

### CURRENT HIRING DIFFICULTY

Within Nuclear Fuels, employers in the Wholesale Trade (of production and extraction equipment) industry had the most difficulty hiring workers, with 86% reporting at least some difficulty finding qualified workers (Figure 31).

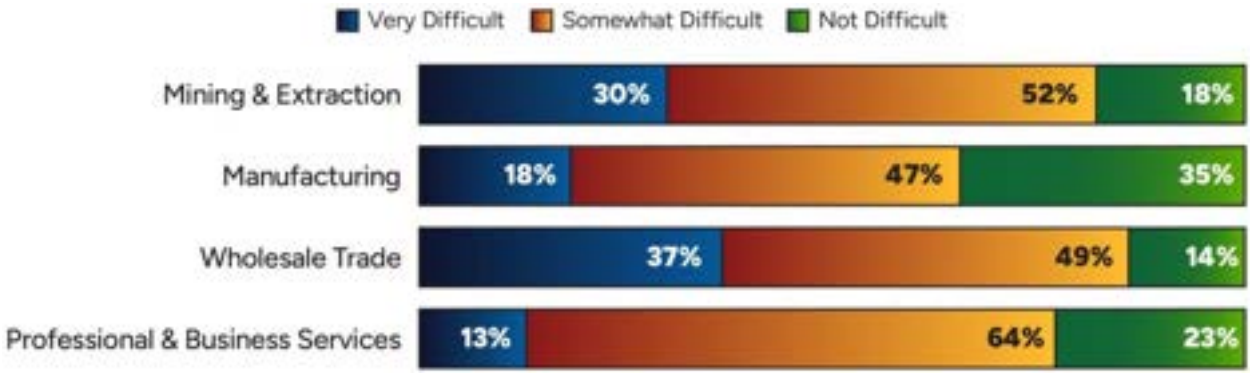



Figure 31. Nuclear Fuels Employers' Perceived Hiring Difficulty, 2024

## ANTICIPATED EMPLOYMENT CHANGE BY INDUSTRY

Employers in all industries within Nuclear Fuels anticipate job growth through 2025, ranging from 2.5% in Wholesale Trade (of production and extraction equipment) to 8.3% in Manufacturing (Figure 32).

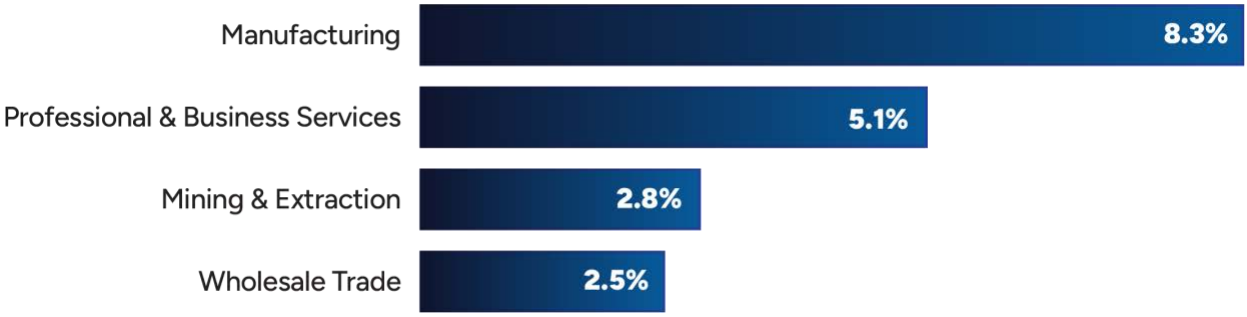



Figure 32. Nuclear Fuels Employers' Anticipated Employment Change, 2024-2025[41]

[41] See Figure 30. Nuclear Fuels Employment by Industry, 2024.

# Other Biofuels

Other Biofuels include any fuel made from biomass feedstocks not classified elsewhere in the USEER, such as Renewable Diesel, Biodiesel,[42] Waste Fuels (from feedstock and municipal waste), and Other Ethanol/Non-Woody Biomass (ethanol not produced from corn, such as ethanol produced from sugar cane). Workers in this subsector can include, but are not limited to, those involved in biomass sourcing and production, logistics, biomass conversion, manufacturing of agricultural equipment, wholesale trade, and professional and business services such as R&D, data processing, financial and investment services, and administrative support, among other support services.

## Employment by Industry

Most Other Biofuels employees work in Professional and Business Services (engineering, finance, information technology, etc.) (27,300, or 65.1%), followed by Wholesale Trade (of other biofuels and production and farming equipment), with 7,600 workers (18.2%) (Figure 33).

**41,900**

Workers employed in Other Biofuels subsector in 2024

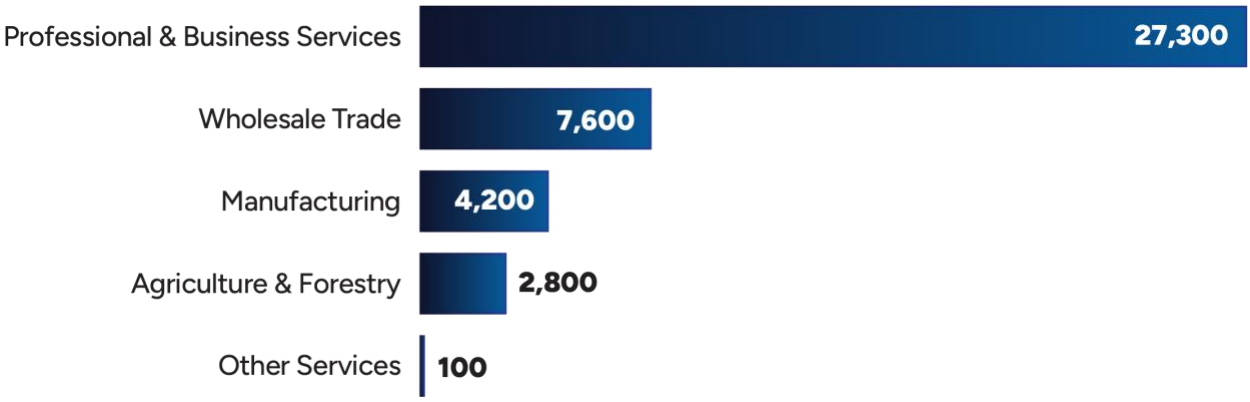



Figure 33. Other Biofuels Employment by Industry, 2024

[42] Renewable diesel and biodiesel are not identical. Renewable diesel, previously known as green diesel, is a hydrocarbon produced most often by hydrotreating and also via gasification, pyrolysis, and other biochemical and thermochemical technologies. It meets the Advancing Standards Transforming Markets Standard Specification for Diesel Fuel (ASTM D975) specification for petroleum diesel. Biodiesel is a mono alkyl ester produced via transesterification. Biodiesel meets ASTM Standard Specification for Biodiesel Fuel Blend Stock (B100) for Middle Distillate Fuels (ASTM D6751) and is approved for blending with petroleum diesel.

The 2025 USEER splits "Other Biofuels" into several components:[43] Other Ethanol/Non-Woody Biomass, Renewable Diesel, Biodiesel, Waste Fuels, and Other Biofuels. The largest component was Other Ethanol/Non-Woody Biomass, with 21,700 workers (51.8%), followed by Biodiesel Fuels, with 5,700 workers (13.6%) (Figure 34).


Figure 34. Other Biofuels Employment by Category, 2024

[43] The components in Other Biofuels are combined into a single chapter due to their relative size compared to other Fuels subsectors.

## Workforce Demographics

Women constituted a larger share of the Other Biofuels workforce (33%) compared to the energy workforce overall (26%). The concentration of veterans in the Other Biofuels workforce (13%) was higher than in the overall energy workforce (9%) and more than double the concentration within the national workforce (5%) (Table 11).

Table 11. Other Biofuels Workforce Demographics and Characteristics, 2024[44]

| | Number of Workers | **Percentage of Other Biofuels Workforce** | Percentage of Fuels Workforce | Percentage of Energy Workforce | Percentage of National Workforce |
|---|---|---|---|---|---|
| Men | 27,500 | **66%** | 74% | 73% | 53% |
| Women | 14,000 | **33%** | 26% | 26% | 47% |
| Hispanic or Latino | 5,400 | **13%** | 15% | 19% | 19% |
| Non-Hispanic or Latino | 36,500 | **87%** | 85% | 81% | 81% |
| American Indian or Alaska Native | 800 | **2%** | 2% | 2% | 1% |
| Asian | 2,800 | **7%** | 6% | 7% | 7% |
| Black or African American | 3,700 | **9%** | 9% | 8% | 13% |
| Native Hawaiian or Other Pacific Islander | 800 | **2%** | 1% | 1% | <1% |
| White | 31,200 | **74%** | 76% | 74% | 76% |
| Two or More Races | 1,100 | **3%** | 4% | 5% | 3% |
| Unknown Race | 1,500 | **4%** | 1% | 3% | n/a |
| Veterans | 5,600 | **13%** | 11% | 9% | 5% |
| 18 to 29 | 12,800 | **30%** | 31% | 29% | 22% |
| 30 to 54 | 22,500 | **54%** | 50% | 52% | 54% |
| Over 54 | 6,700 | **16%** | 19% | 19% | 24% |
| Self-Identification of Disability | 1,600 | **4%** | 2% | 2% | 5% |
| Formerly Incarcerated | 500 | **1%** | 2% | 2% | 2% |
| Represented by a Union[45] | 2,000 | **5%** | 7% | 12% | 7% |

[44] National Sources: BLS (2024a, 2024b, 2024c, 2024d), Jobs EQ (2024), Prison Policy (2018).
[45] For this analysis, a union employer is defined as one with at least 20% of its workforce as a member of a labor union or covered by either a project labor agreement or a collective bargaining agreement. Figure represents private sector unionization rate. Unionization rates vary by state.

## Employer Perspective on Workforce Topics

### CURRENT HIRING DIFFICULTY

Among Other Biofuels employers, Wholesale Trade employers indicated more hiring difficulty, with 95% reporting at least some level of difficulty. Professional and Business Services (including engineering, finance, information technology, research and development, etc.) employers reported less difficulty hiring, with 31% of employers indicating hiring was "not at all difficult" (Figure 35).

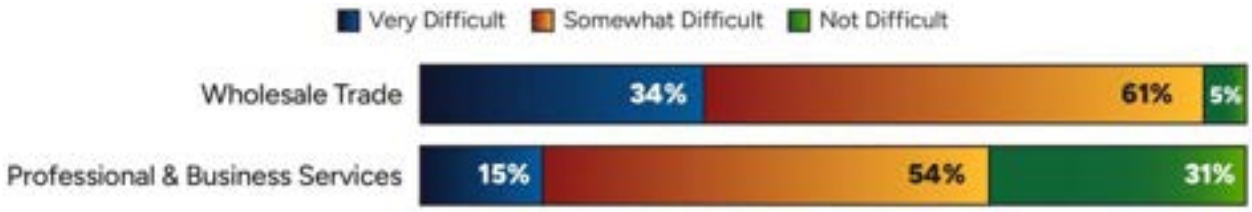



Figure 35. Other Biofuels Employers' Perceived Hiring Difficulty, 2024[46]

### ANTICIPATED EMPLOYMENT CHANGE BY INDUSTRY

Four industries within Other Biofuels expect job growth through 2025, ranging from 4.0% in Wholesale Trade (of other biofuels and production and farming equipment) to 4.6% in Manufacturing (Figure 36).


Figure 36. Other Biofuels Employers' Anticipated Employment Change, 2024-2025[47]

[46] Manufacturing and Other Services industries were not reported due to insufficient sample size.
[47] The Agriculture and Forestry industry was not reported due to insufficient sample size. See Figure 33. Other Biofuels Employment by Industry, 2024.

# Other Fuels

Other Fuels refer to any fuel not captured in the categories listed previously in this chapter or a category used when unable to split employment into a single fuel category where employees spend "more of their time."[48] The types of workers in this subsector vary depending on which industry an employee is positioned in, which can include, but is not limited to, those involved in manufacturing, trade, professional and business services, including finance, engineering design, and administrative logistics, and other services such as repair and maintenance.

## Employment by Industry

The majority of workers were employed in the Wholesale Trade (of fuels and production equipment) industry (34,000, or 50.7%). The Manufacturing industry employed 17,400 workers (25.9%), followed by the Professional and Business Services industry (including engineering, information technology, finance, etc.), with 15,500 workers (23.0%) (Figure 37).

**67,100**

Workers employed in Other Fuels subsector in 2024

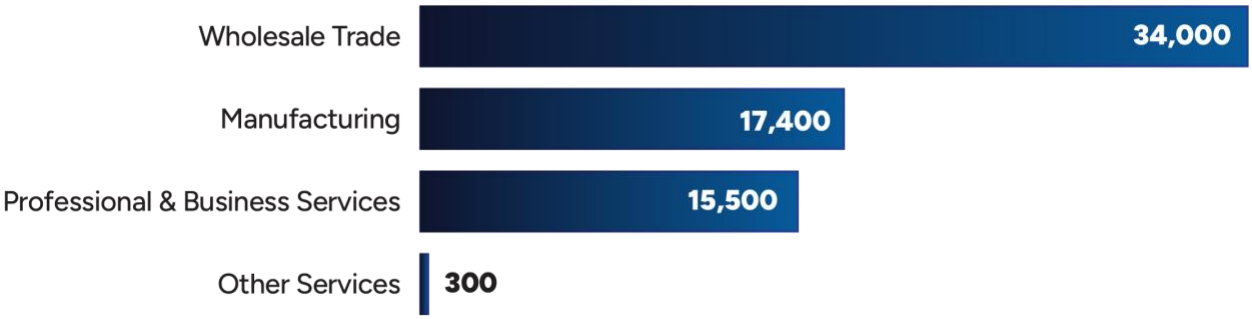



Figure 37. Other Fuels Employment by Industry, 2024

[48] Examples of Other Fuels can include green and blue hydrogen, ammonia, non-bio-based methanol, etc.

## Workforce Demographics

The concentration of veterans in the Other Fuels workforce (13%) was higher than in the overall energy workforce (9%) and much higher than in the national workforce overall (5%). The share of workers over age 54 in the Other Fuels workforce (23%) was higher than the energy workforce (19%), while the share of workers aged 18 to 29 in the Other Fuels workforce (26%) was lower than the energy workforce (29%) (Table 12).

Table 12. Other Fuels Workforce Demographics and Characteristics, 2024[49]

| | Number of Workers | **Percentage of Other Fuels Workforce** | Percentage of Fuels Workforce | Percentage of Energy Workforce | Percentage of National Workforce |
|---|---|---|---|---|---|
| Men | 48,100 | **72%** | 74% | 73% | 53% |
| Women | 18,500 | **27%** | 26% | 26% | 47% |
| Hispanic or Latino | 7,100 | **11%** | 15% | 19% | 19% |
| Non-Hispanic or Latino | 60,000 | **89%** | 85% | 81% | 81% |
| American Indian or Alaska Native | 800 | **1%** | 2% | 2% | 1% |
| Asian | 3,000 | **4%** | 6% | 7% | 7% |
| Black or African American | 3,000 | **4%** | 9% | 8% | 13% |
| Native Hawaiian or Other Pacific Islander | 600 | **<1%** | 1% | 1% | <1% |
| White | 55,900 | **83%** | 76% | 74% | 76% |
| Two or More Races | 1,000 | **2%** | 4% | 5% | 3% |
| Unknown Race | 2,900 | **4%** | 1% | 3% | n/a |
| Veterans | 8,600 | **13%** | 11% | 9% | 5% |
| 18 to 29 | 17,800 | **26%** | 31% | 29% | 22% |
| 30 to 54 | 34,000 | **51%** | 50% | 52% | 54% |
| Over 54 | 15,400 | **23%** | 19% | 19% | 24% |
| Self-Identification of Disability | 900 | **1%** | 2% | 2% | 5% |
| Formerly Incarcerated | 400 | **<1%** | 2% | 2% | 2% |
| Represented by a Union[50] | 5,900 | **9%** | 7% | 12% | 7% |

[49] National Sources: BLS (2024a, 2024b, 2024c, 2024d), Jobs EQ (2024), Prison Policy (2018).
[50] For this analysis, a union employer is defined as one with at least 20% of its workforce as a member of a labor union or covered by either a project labor agreement or a collective bargaining agreement. Figure represents private sector unionization rate. Unionization rates vary by state.

## Employer Perspective on Workforce Topics

### CURRENT HIRING DIFFICULTY

The Professional and Business Services (including engineering, information technology, finance, etc.) industry within Other Fuel had the most difficulty hiring workers in 2024, with all employers citing at least some level of difficulty. Employers in the Other Services (including repair and maintenance of production equipment) industry reported the least difficulty with hiring in 2024, with 59% of businesses reporting hiring as "not at all difficult." Notably, 42% of Wholesale Trade (Fuels and production equipment) employers reported hiring as "very difficult" (Figure 38).

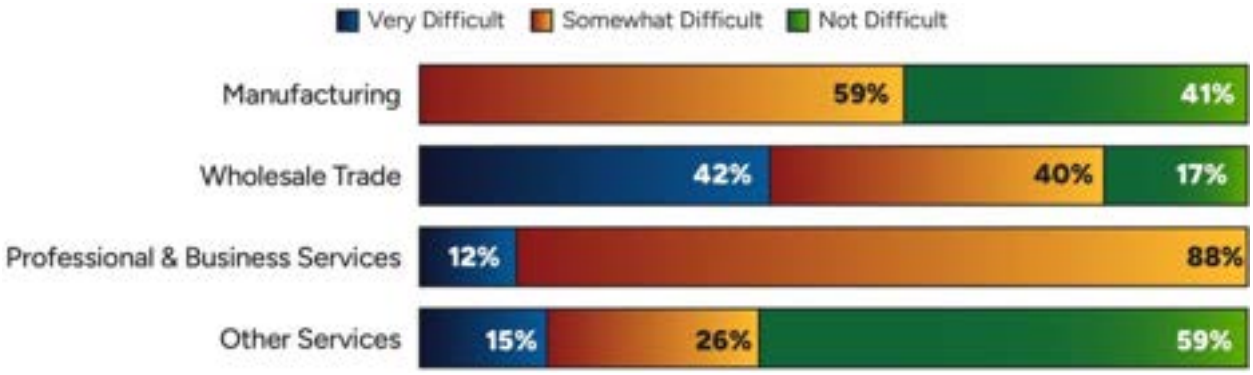



Figure 38. Other Fuels Employers' Perceived Hiring Difficulty, 2024

### ANTICIPATED EMPLOYMENT CHANGE BY INDUSTRY

As illustrated in Figure 39, all industries within Other Fuels expect job growth in 2025, ranging from 1.1% in Professional and Business Services (including engineering, research and development, information technology, etc.) to 4.7% in Manufacturing.

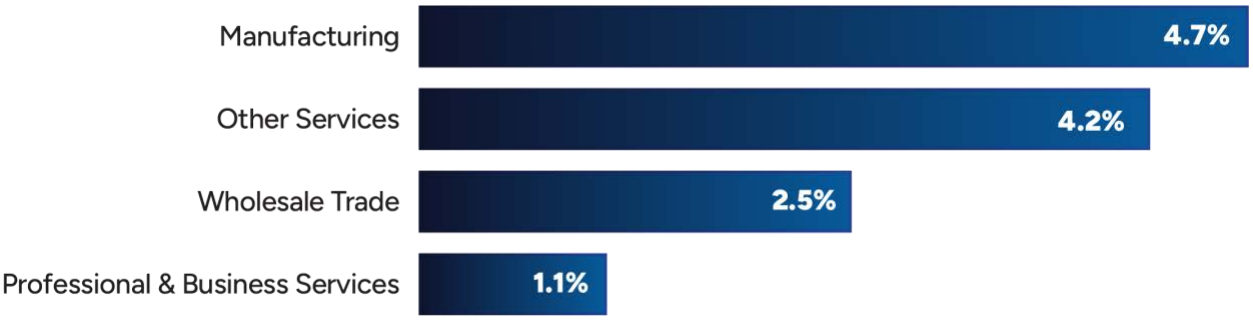



Figure 39. Other Fuels Employers' Anticipated Change in Employment, 2024-2025[51]

[51] See Figure 37. Other Fuels Employment by Industry, 2024.

U.S. DEPARTMENT of ENERGY

# ELECTRIC POWER GENERATION

2025 United States Energy & Employment Report

# ELECTRIC POWER GENERATION

Electric Power Generation (EPG) is the process of converting other sources of energy into electric energy. Examples include the usage of fuels, capturing kinetic energy in water power or wind, or capturing solar energy from the sun. This chapter focuses on employment data for EPG by subsectors, industries, and occupations, including workforce wages and benefits, workforce demographics, and employer perspectives.

The EPG subsectors include:

- Solar Electric Power Generation
- Wind Electric Power Generation
- Natural Gas Electric Power Generation
- Water Power Electric Power Generation
- Coal Electric Power Generation
- Nuclear Electric Power Generation
- Combined Heat and Power (CHP) Electric Power Generation
- Bioenergy Electric Power Generation
- Oil Electric Power Generation
- Other Electric Power Generation

The EPG chapter includes the following:

- **Key Takeaways** that summarize key findings from the EPG sector overall.
- **Electric Power Generation Employment by Subsector, Industry, and Occupation** that describes where employment is concentrated across the EPG sector.
- **Electric Power Generation Workforce Wages, Benefits, and Demographics** that presents a descriptive picture of the EPG sector jobs and workforce.
- **Employer Perspectives on Workforce Topics** that aggregates employer responses.

**USEER NOTE**

Jobs related to the distribution of electric energy are included in the Transmission, Distribution, and Storage chapter, while jobs related to the production of fuels that are purchased to generate electric power are included in the Fuels chapter.

# Electric Power Generation Key Takeaways

U.S. DEPARTMENT of ENERGY

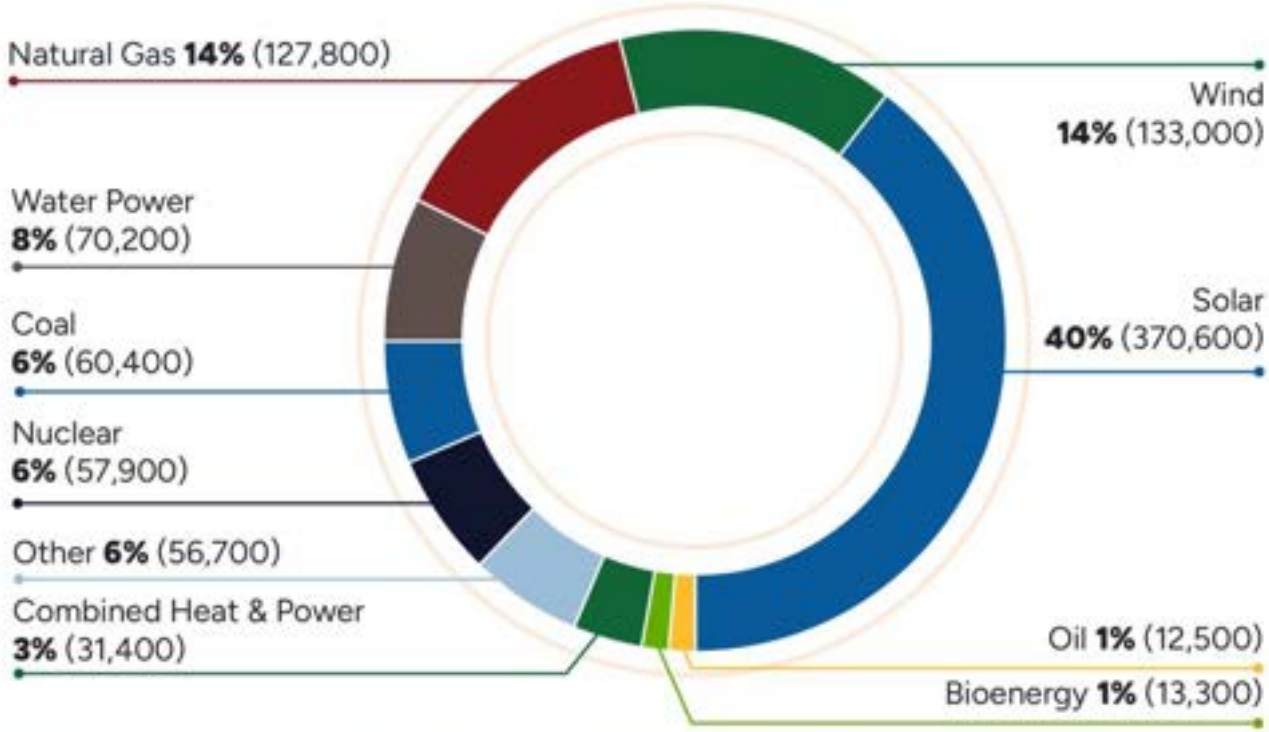
Electric Power Generation (EPG) sector employed **933,800** workers.

**$65,430** is the **median wage for EPG** employment– which is **32.2% higher** than the **U.S. median wage** of $49,500.

Solar supported the largest number of jobs in the EPG sector, totaling **370,600** workers.

## EMPLOYMENT BREAKDOWN BY INDUSTRY


## EMPLOYMENT BREAKDOWN BY SUBSECTOR



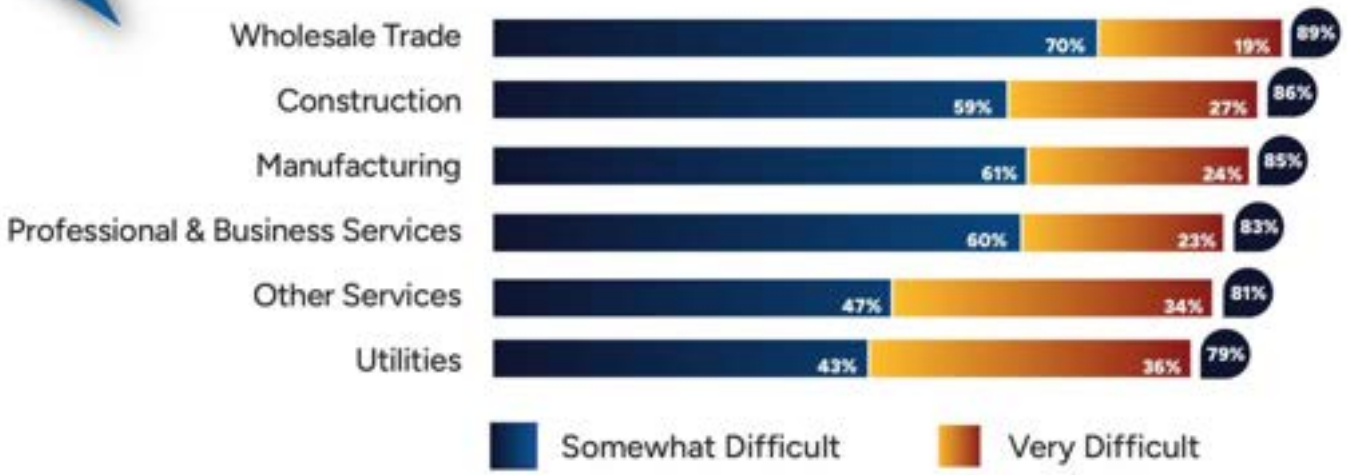

Reference: 2025 UNITED STATES ENERGY & EMPLOYMENT REPORT

# EMPLOYER PERSPECTIVES | HIRING INSIGHTS

U.S. DEPARTMENT of ENERGY

## EPG EMPLOYERS' PERCEIVED HIRING DIFFICULTY BY INDUSTRY

Among employers in the Electric Power Generation sector, **36%** in the Utilities industry reported hiring workers is "very difficult."




## MOST COMMON REASONS FOR HIRING DIFFICULTY


## MOST DIFFICULT TO HIRE OCCUPATIONS

**Management (Directors, Supervisors, Vice Presidents)**

- Utilities
- Construction
- Wholesale Trade
- Professional & Business Services
- Other Serves

**Engineers / Scientists**

- Manufacturing

Reference: 2025 UNITED STATES ENERGY & EMPLOYMENT REPORT

## Electric Power Generation Employment by Subsector, Industry, and Occupation

This section analyzes employment in the EPG sector by:

- Subsector (e.g., Solar, Natural Gas)
- Industry (e.g., Construction, Manufacturing)
- Occupation (e.g., Administrative, Production)

### ELECTRIC POWER GENERATION EMPLOYMENT BY SUBSECTOR

In 2024, the EPG sector employed 933,800 workers. The majority of EPG workers were employed in the Solar subsector (39.7%), followed by Wind (14.2%) and Natural Gas (13.7%). Together, these three subsectors accounted for 67.6% of all EPG employment (Figure 40).

**USEER NOTE**

Employment in the Other EPG subsector consists of workers who engage with any fuel that is not captured in the subsectors listed previously, such as Geothermal EPG or Waste Fuels EPG. This is also a subsector used when unable to split employment into a single EPG subsector where employees spend "more of their time."

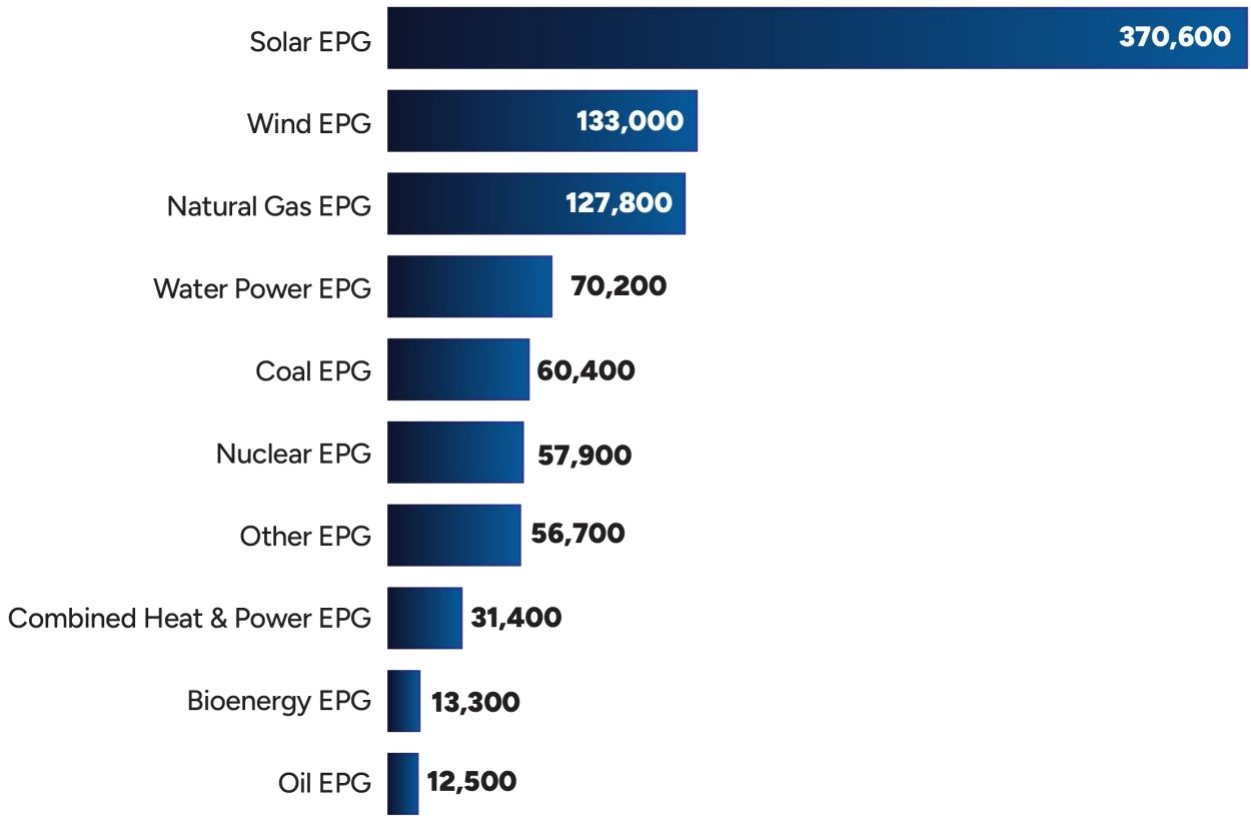



Figure 40. Electric Power Generation Employment by Subsector, 2024

## ELECTRIC POWER GENERATION EMPLOYMENT BY INDUSTRY

The Construction industry represented the largest share of employment (32.5%) in the EPG sector, with 303,700 workers. Professional and Business Services (e.g., planning and design, finance and asset management, engineering, consulting, project management, etc.) followed, with 205,700 workers (22.0%); and Utilities, with 189,500 workers (20.3%) (Figure 41).

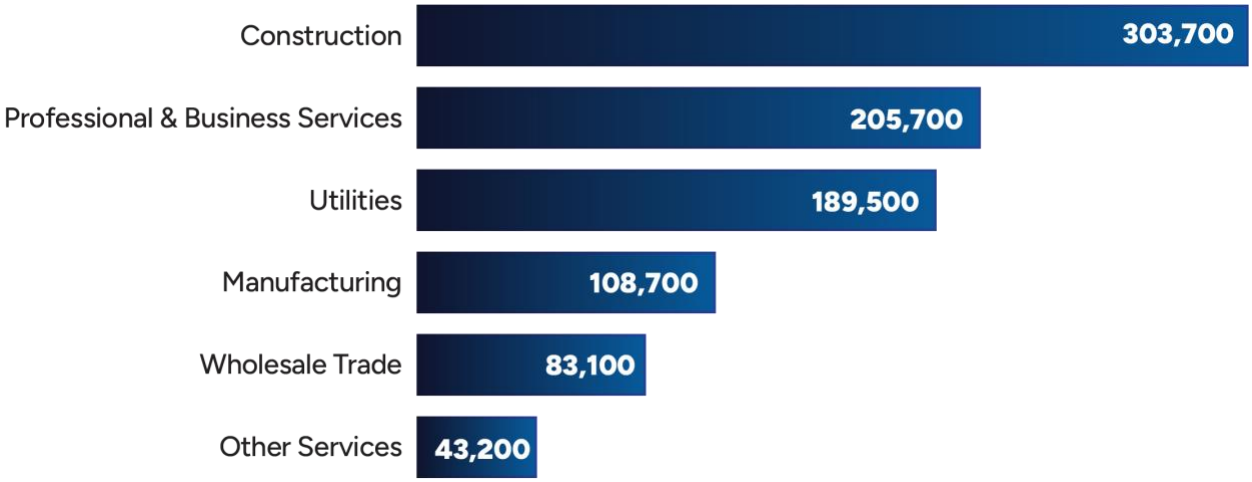



Figure 41. Electric Power Generation Employment by Industry, 2024

Looking across subsectors and industries, workers in several subsectors – Natural Gas EPG, Water Power EPG, and Nuclear EPG – were highly concentrated in the Utilities industry. Solar EPG, Wind EPG, and Bioenergy EPG had the largest concentration of workers in Construction, while Coal EPG and Combined Heat and Power EPG employment was most highly concentrated in Professional and Business Services (project development, engineering, environmental consulting, finance, etc.) (Table 13).

Table 13. Concentration of Electric Power Generation Employment by Subsector and Industry, 2024

| | Industry | | | | | |
|---|---|---|---|---|---|---|
| **Subsector** | Utilities | Construction | Manufacturing | Wholesale Trade | Professional & Business Services | Other Services |
| Solar EPG | **4%** | **49%** | **13%** | **9%** | **16%** | **10%** |
| Wind EPG | **9%** | **33%** | **18%** | **10%** | **27%** | **2%** |
| Natural Gas EPG | **54%** | **17%** | **5%** | **7%** | **16%** | **1%** |
| Water Power EPG | **28%** | **16%** | **23%** | **13%** | **19%** | **0%** |
| Coal EPG | **37%** | **11%** | **2%** | **10%** | **39%** | **1%** |
| Nuclear EPG | **69%** | **4%** | **3%** | **4%** | **20%** | **0%** |
| Combined Heat & Power EPG | **5%** | **13%** | **6%** | **13%** | **61%** | **1%** |
| Bioenergy EPG | **18%** | **44%** | **8%** | **5%** | **22%** | **3%** |
| Oil EPG | **4%** | **0%** | **43%** | **17%** | **36%** | **1%** |
| Other EPG | **10%** | **47%** | **8%** | **7%** | **27%** | **1%** |

Key:

0% 100%

## ELECTRIC POWER GENERATION EMPLOYMENT BY OCCUPATION

While the previous section covered EPG employment by industry, this occupational review focuses on the nature of the work performed by individuals across industries.

The largest occupational category of workers across the EPG sector was Installation or Repair occupations (35.2%), followed by Management/Professional occupations (19.9%), and Administrative occupations (19.5%) (Figure 42).

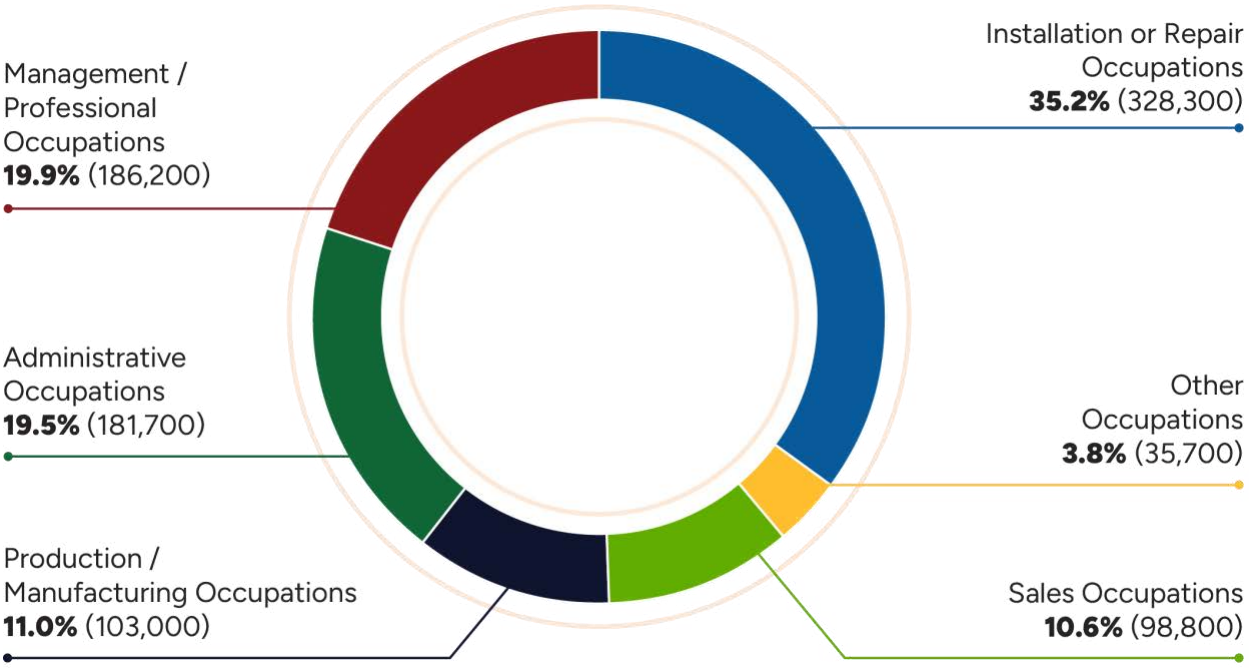



Figure 42. Electric Power Generation Employment by Occupational Category, 2024

**USEER NOTE**

Occupations can span multiple industries, and each industry relies on a variety of occupational skills. Multiple industries can draw upon a variety of occupational categories. For example, production and manufacturing workers may be employed by the Manufacturing or Wholesale Trade industries.

Figure 43 provides examples of specific occupations included within each occupational category.[52]


Figure 43. Occupation Examples by Category

[52] Occupation names sourced from BLS Occupational Employment and Wage Statistics (OEWS).

## Electric Power Generation Workforce Wages, Benefits, and Demographics

This section presents data on workforce wages, employer healthcare contributions, and demographics in the EPG sector.

### ELECTRIC POWER GENERATION WORKFORCE BY WAGES

This section presents low, median, and high wages[53] for the 15 primary occupations[54] in the EPG sector. Primary occupations include those exclusively employed in this sector (e.g., Solar Photovoltaic Installers, Power Plant Operators), those with a high concentration of employment within EPG, and those comparable across sectors (e.g., Electricians). The median annual salary for EPG workers was $65,430, 32.2% higher than the U.S. median salary of $49,500 (Table 14).

Table 14. Electric Power Generation Workforce Wages for 15 Primary Occupations, 2024[55]

| SOC[56] | Occupation[57] | Low | Median | High |
|---|---|---|---|---|
| 17-2161 | Nuclear Engineers | $88,290 | $127,520 | $187,430 |
| 51-8011 | Nuclear Power Reactor Operators | $99,300 | $122,610 | $152,690 |
| 51-8012 | Power Distributors and Dispatchers | $71,480 | $106,610 | $142,860 |
| 19-4051 | Nuclear Technicians | $64,370 | $104,240 | $126,890 |
| 51-8013 | Power Plant Operators | $59,930 | $99,670 | $128,760 |
| 17-2051 | Civil Engineers | $68,830 | $98,300 | $152,040 |
| 17-2071 | Electrical Engineers | $77,990 | $97,730 | $131,420 |
| 17-2112 | Industrial Engineers | $69,720 | $94,930 | $140,280 |
| 49-2095 | Electrical and Electronics Repairers, Powerhouse, Substation, and Relay | $58,140 | $93,520 | $117,360 |
| 17-2141 | Mechanical Engineers | $73,310 | $91,770 | $124,170 |
| 11-1021 | General and Operations Managers | $75,740 | $82,810 | $108,680 |
| 49-9051 | Electrical Power-Line Installers and Repairers | $51,000 | $76,340 | $96,630 |
| 47-2111 | Electricians | $64,990 | $73,070 | $88,460 |
| 49-9081 | Wind Turbine Service Technicians | $49,110 | $62,580 | $88,090 |
| 47-2231 | Solar Photovoltaic Installers | $39,070 | $51,860 | $80,150 |

**WAGES**

**ELECTRIC POWER GENERATION WORKFORCE OVERALL**

Low: $47,630
**Median: $65,430**
High: $94,510

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**U.S. WORKFORCE OVERALL**

Low: $29,990
**Median: $49,500**
High: $125,720

[53] Low refers to the 10th percentile of wages and high refers to the 90th percentile.
[54] For a full list of occupations for EPG as well as occupations by other sectors and subsectors, see Appendix B.
[55] Wage estimates are based on 2024 survey responses and data from the U.S. Bureau of Labor Statistics' (BLS) 2024 Occupational Employment and Wage Statistics (OEWS). The OEWS data can be found here: https://www.bls.gov/oes/tables.htm.
[56] Standard Occupational Classification (SOC) codes and descriptions are used by the BLS to categorize occupations in the U.S.
[57] USEER uses occupations as defined by BLS OEWS. Full definitions can be found here: https://www.bls.gov/soc/2018/soc_2018_definitions.pdf.

## ELECTRIC POWER GENERATION WORKFORCE BY BENEFITS

The USEER survey also includes employer-reported data on employer health insurance contribution levels. According to employer responses, over half (57%) of Electrical Power-Line Installers and Repairers in the EPG sector received full healthcare coverage for themselves and their families. Nearly half of Mechanical Engineers and Industrial Engineers received full employee and family healthcare insurance cost coverage (44% and 42%, respectively) (Table 15).

Table 15. Electric Power Generation Employer Healthcare Coverage for 15 Primary Occupations, 2024[58]

| Occupation | Some Healthcare Insurance Costs for Employee Only | Some Healthcare Insurance Costs for Employee & Family | All Healthcare Insurance Costs for Employee Only | All Healthcare Insurance Costs for Employee & Family |
|---|---|---|---|---|
| Nuclear Engineers | 1% | 72% | 4% | 22% |
| Nuclear Power Reactor Operators | 1% | 41% | 38% | 18% |
| Power Distributors and Dispatchers | 35% | 41% | 13% | 10% |
| Nuclear Technicians | 38% | 0% | 38% | 25% |
| Power Plant Operators | 29% | 35% | 22% | 14% |
| Civil Engineers | 2% | 51% | 15% | 33% |
| Electrical Engineers | 3% | 41% | 21% | 35% |
| Industrial Engineers | 0% | 37% | 21% | 42% |
| Electrical and Electronics Repairers, Powerhouse, Substation, and Relay | 2% | 39% | 37% | 19% |
| Mechanical Engineers | 4% | 44% | 8% | 44% |
| General and Operations Managers | 8% | 31% | 19% | 37% |
| Electrical Power-Line Installers and Repairers | 4% | 22% | 17% | 57% |
| Electricians | 7% | 33% | 14% | 31% |
| Wind Turbine Service Technicians | 10% | 21% | 21% | 40% |
| Industrial Machinery Mechanics[59] | 7% | 40% | 17% | 35% |

[58] Percentages in table correspond to employer responses to benefits questions as they were asked in the USEER survey, Appendix D.
[59] The "Industrial Machinery Mechanics" occupation is listed in place of "Solar Photovoltaic Installers" in this table due to the absence of survey data for the latter occupation.

## ELECTRIC POWER GENERATION WORKFORCE BY DEMOGRAPHICS

The following table summarizes the demographic characteristics of the EPG workforce. The percentage of workers who are women in the EPG sector (30%) was higher than the overall energy workforce (26%) but was lower than the nation (47%). The proportion of workers aged 18 to 29 was the same as the energy workforce (29%) but above the national workforce (22%). Veterans were more highly represented in the EPG workforce (9%) and the overall energy workforce (9%) than the national workforce (5%) (Table 16).

Table 16. Electric Power Generation Workforce Demographic and Characteristics, 2024[60]

| | Number of Workers | **Percentage of EPG Workforce** | Percentage of Energy Workforce | Percentage of National Workforce |
|---|---|---|---|---|
| Men | 650,400 | **70%** | 73% | 53% |
| Women | 277,700 | **30%** | 26% | 47% |
| Hispanic or Latino | 195,600 | **21%** | 19% | 19% |
| Non-Hispanic or Latino | 738,200 | **79%** | 81% | 81% |
| American Indian or Alaska Native | 15,500 | **2%** | 2% | 1% |
| Asian | 81,600 | **9%** | 7% | 7% |
| Black or African American, not Indigenous | 80,000 | **9%** | 8% | 13% |
| Native Hawaiian or Other Pacific Islander | 13,100 | **1%** | 1% | <1% |
| White | 667,800 | **72%** | 74% | 76% |
| Two or More Races | 45,600 | **5%** | 5% | 3% |
| Unknown Race | 30,600 | **3%** | 3% | n/a |
| Veterans | 79,700 | **9%** | 9% | 5% |
| 18 to 29 | 266,200 | **29%** | 29% | 22% |
| 30 to 54 | 509,200 | **55%** | 52% | 54% |
| Over 54 | 158,500 | **17%** | 19% | 24% |
| Self-Identification of Disability | 17,700 | **2%** | 2% | 5% |
| Formerly Incarcerated | 13,500 | **1%** | 2% | 2% |
| Represented by a Union[61] | 124,300 | **13%** | 12% | 7% |

[60] National Sources: BLS (2024a, 2024b, 2024c, 2024d), Jobs EQ (2024), Prison Policy (2018).
[61] For this analysis, a union employer is defined as one with at least 20% of its workforce as a member of a labor union or covered by either a project labor agreement or a collective bargaining agreement. Figure represents private sector unionization rate. Unionization rates vary by state.

## Employer Perspective on Workforce Topics

The USEER also surveys employers on their perspectives of hiring difficulty and anticipated growth across industries, as well as their primary reasons for hiring difficulty and the most difficult occupations to hire.

### CURRENT HIRING DIFFICULTY

The Wholesale Trade industry (e.g., the sale of EPG equipment and parts) reported the highest level of hiring difficulty in the EPG sector, with 88% of employers indicating at least some difficulty hiring workers. Over one-third of employers in Utilities (36%) and Other Services (e.g., repair and maintenance of EPG equipment) (34%) reported that hiring was “very difficult” (Figure 44).

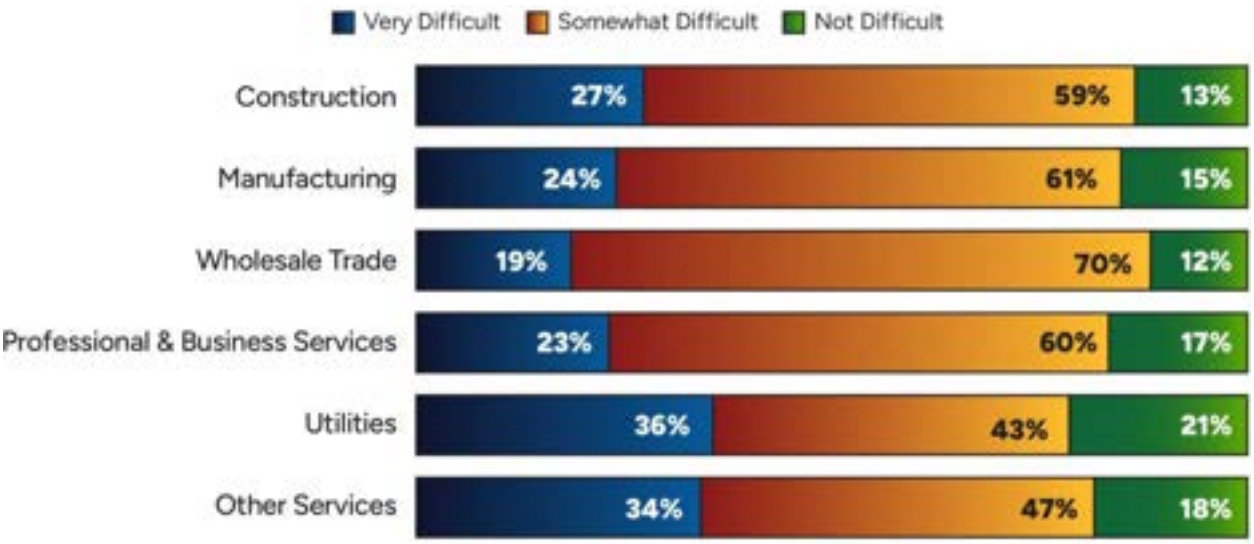
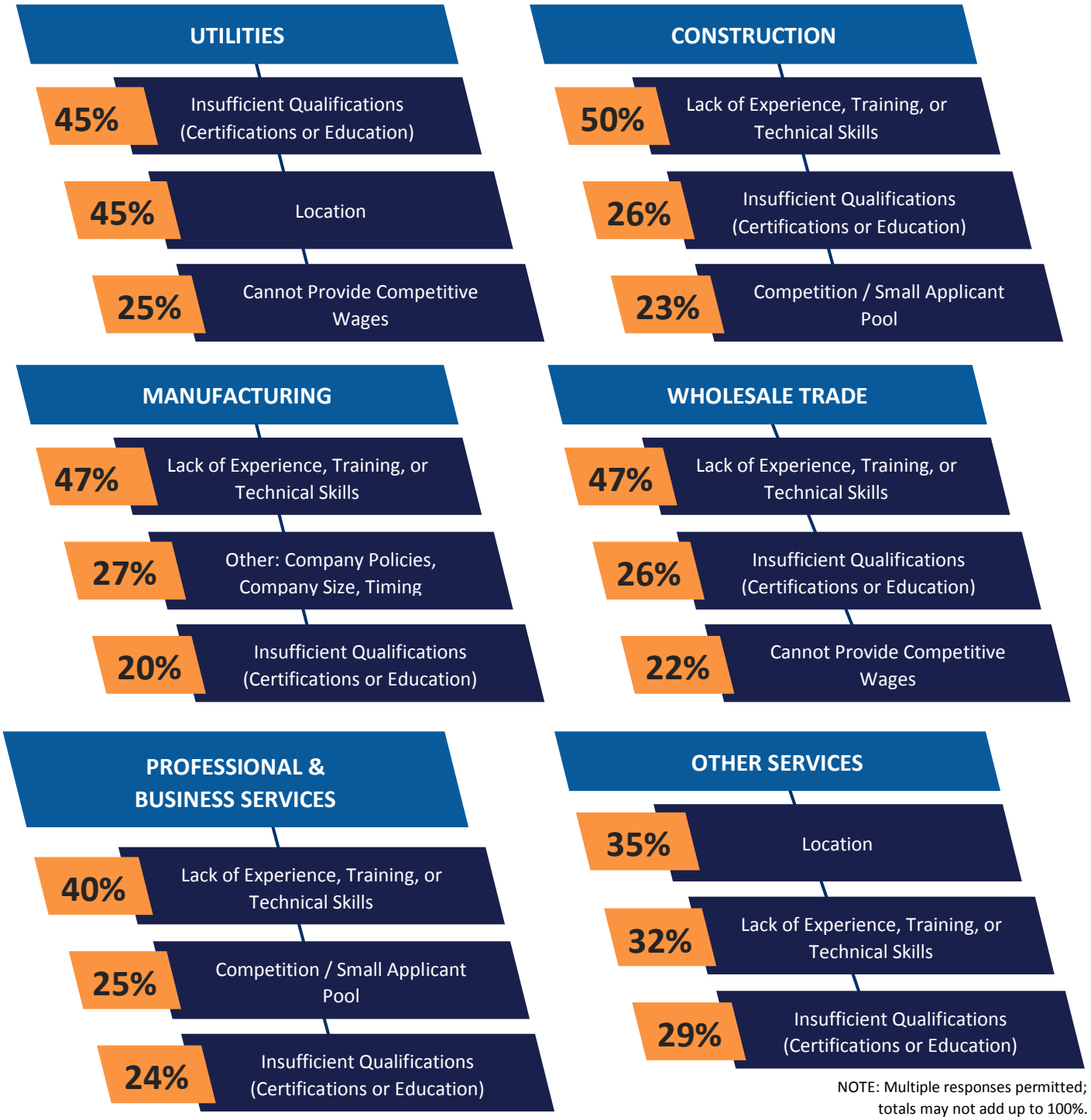



Figure 44. Electric Power Generation Employers' Perceived Hiring Difficulty by Industry, 2024

## REASONS FOR HIRING DIFFICULTY

As illustrated in Figure 45, employers in the Construction, Manufacturing, Wholesale Trade, and Professional and Business Services industries most frequently cited lack of experience, training, or technical skills as the main reason for hiring difficulty. For Utilities employers, insufficient qualifications (certifications or education) topped the list of reasons for hiring difficulty, while location (e.g., the remoteness of EPG facilities) represented the most significant barrier to hiring for Other Services.

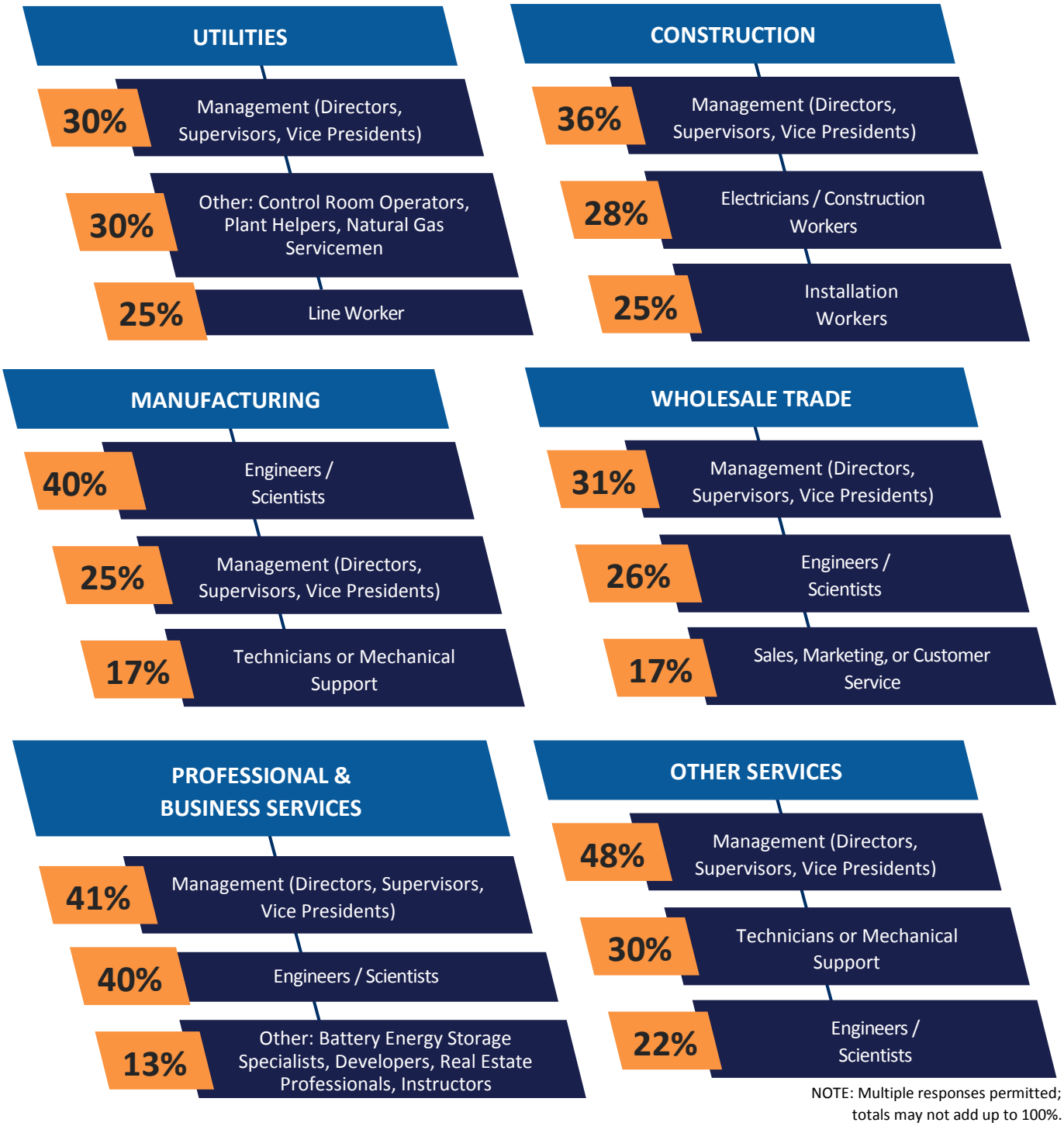



NOTE: Multiple responses permitted; totals may not add up to 100%.

Figure 45. Electric Power Generation Employers' Reasons for Hiring Difficulty, 2024

## MOST DIFFICULT TO HIRE OCCUPATIONS

Management positions were the most difficult to fill in 2024 for Utilities, Construction, Wholesale Trade (e.g., the sales of EPG equipment and parts), Professional and Business Services (such as engineering, research and development, finance, information technology, etc.), and Other Services (e.g., the repair and maintenance of EPG equipment) employers. Engineers/Scientists were the most difficult occupation to hire within the Manufacturing industry (Figure 46).




NOTE: Multiple responses permitted; totals may not add up to 100%.

Figure 46. Electric Power Generation Employers' Most Difficult to Hire Occupations, 2024

## ANTICIPATED EMPLOYMENT CHANGE BY SUBSECTOR AND INDUSTRY

This section focuses on anticipated employment change by subsector and industry.

Employers across all EPG subsectors anticipate growth through 2025, ranging from 2.2% in the Nuclear EPG subsector to 9.8% in the Solar EPG subsector (Figure 47).

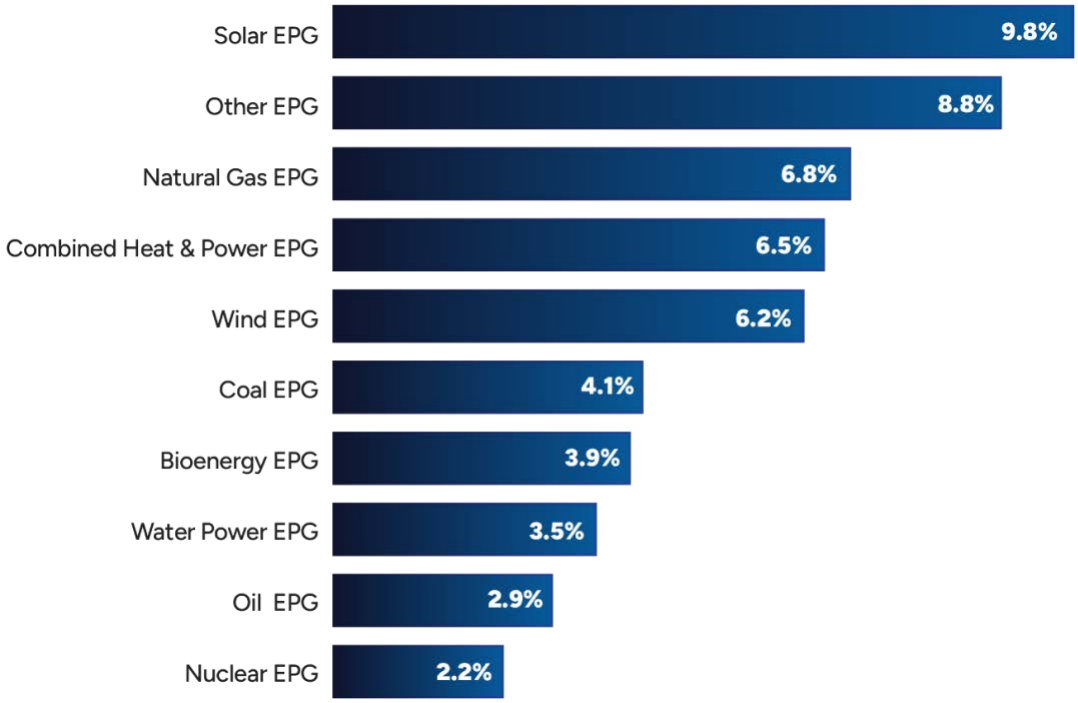



Figure 47. Electric Power Generation Employers' Anticipated Change by Subsector, 2024-2025[62]

All six industries within EPG expect job growth through 2025, ranging from 4.3% in Utilities to 8.9% in Construction and 13.6% in Other Services (e.g., the repair and maintenance of EPG equipment) (Figure 48).

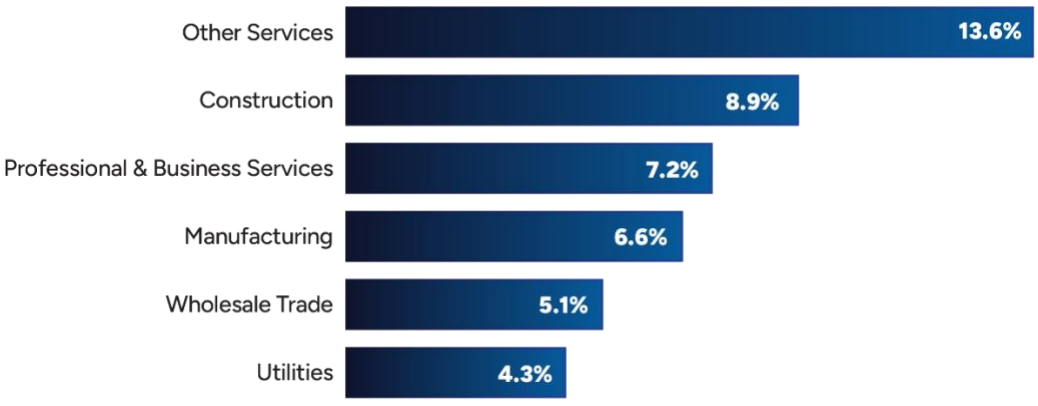



Figure 48. Electric Power Generation Employers' Anticipated Employment Change by Industry, 2024-2025[63]

[62] See Figure 40. Electric Power Generation Employment by Subsector, 2024.
[63] See Figure 41. Electric Power Generation Employment by Industry, 2024.

# Solar Electric Power Generation

Solar EPG involves the conversion of sunlight and solar thermal energy into electrical energy using photovoltaics or thermal systems (EIA, 2025).[64] Employment in this subsector includes workers across photovoltaics production and installation, including, for example, those involved in the manufacturing and wholesale trade of solar equipment, installation and repair for panels, and professional and business services such as engineering, research and development, and finance, that support the operations of each of these industries.

## Employment by Industry

Most Solar EPG employees were found in the Construction industry, which accounted for 181,700 workers (49.0%), followed by Professional and Business Services, including engineering, financial and investment services, permitting and compliance, and consulting, with 58,500 workers (15.8%) (Figure 49).

**370,600**
Workers employed in Solar EPG subsector in 2024

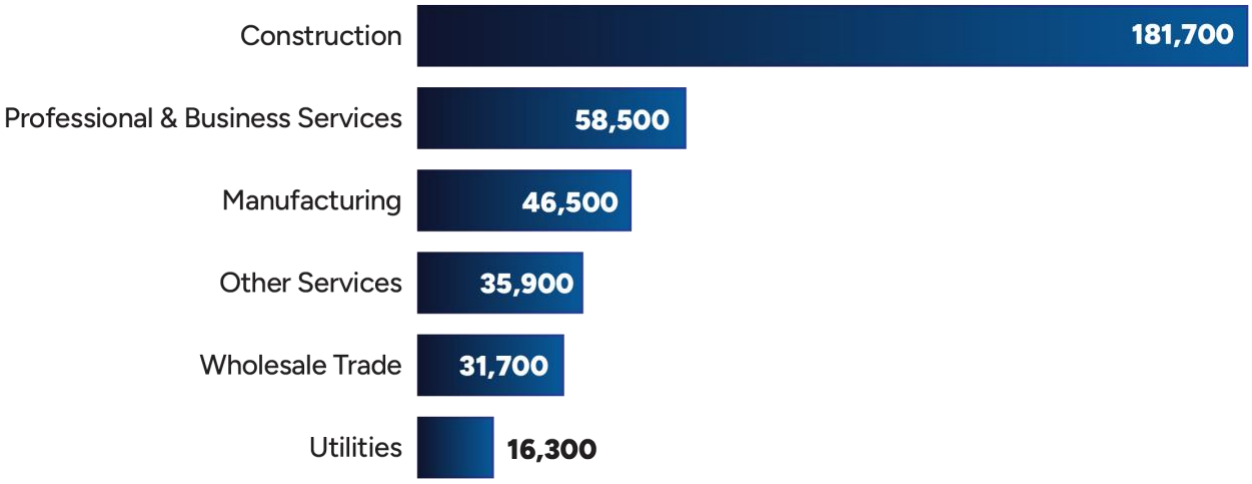



Figure 49. Solar Electric Power Generation Employment by Industry, 2024

[64] For more information on energy subsector definitions, see Appendix K.

## Workforce Demographics

Demographics of the Solar EPG workforce closely aligned with the EPG workforce as a whole. The private sector unionization rate in the Solar EPG workforce (12%) was the same as the rate in the energy workforce overall (12%) and above the U.S. workforce overall (7%). Workers under the age of 30 were more highly represented in the Solar EPG workforce (30%) as compared to the national workforce (22%) (Table 17).

Table 17. Solar Electric Power Generation Workforce Demographics and Characteristics, 2024[65]

| | Number of Workers | **Percentage of Solar EPG Workforce** | Percentage of EPG Workforce | Percentage of Energy Workforce | Percentage of National Workforce |
|---|---|---|---|---|---|
| Men | 262,000 | **71%** | 70% | 73% | 53% |
| Women | 106,800 | **29%** | 30% | 26% | 47% |
| Hispanic or Latino | 88,900 | **24%** | 21% | 19% | 19% |
| Non-Hispanic or Latino | 281,700 | **76%** | 79% | 81% | 81% |
| American Indian or Alaska Native | 5,400 | **1%** | 2% | 2% | 1% |
| Asian | 30,700 | **8%** | 9% | 7% | 7% |
| Black or African American | 28,700 | **8%** | 9% | 8% | 13% |
| Native Hawaiian or Other Pacific Islander | 5,500 | **1%** | 1% | 1% | <1% |
| White | 270,400 | **73%** | 72% | 74% | 76% |
| Two or More Races | 17,800 | **5%** | 5% | 5% | 3% |
| Unknown Race | 12,000 | **3%** | 3% | 3% | n/a |
| Veterans | 30,800 | **8%** | 9% | 9% | 5% |
| 18 to 29 | 112,800 | **30%** | 29% | 29% | 22% |
| 30 to 54 | 200,800 | **54%** | 55% | 52% | 54% |
| Over 54 | 57,000 | **15%** | 17% | 19% | 24% |
| Self-Identification of Disability | 5,900 | **2%** | 2% | 2% | 5% |
| Formerly Incarcerated | 1,600 | **2%** | 1% | 2% | 2% |
| Represented by a Union[66] | 45,100 | **12%** | 13% | 12% | 7% |

[65] National Sources: BLS (2024a, 2024b, 2024c, 2024d), Jobs EQ (2024), Prison Policy (2018).
[66] For this analysis, a union employer is defined as one with at least 20% of its workforce as a member of a labor union or covered by either a project labor agreement or a collective bargaining agreement. Figure represents private sector unionization rate. Unionization rates vary by state.

## Employer Perspective on Workforce Topics

### CURRENT HIRING DIFFICULTY

Among respondents employing Solar EPG workers, the Construction industry reported the greatest difficulty hiring, with 88% of employers reporting at least some level of hiring difficulty. Notably, 33% of Utilities employers reported hiring as “very difficult” (Figure 50).

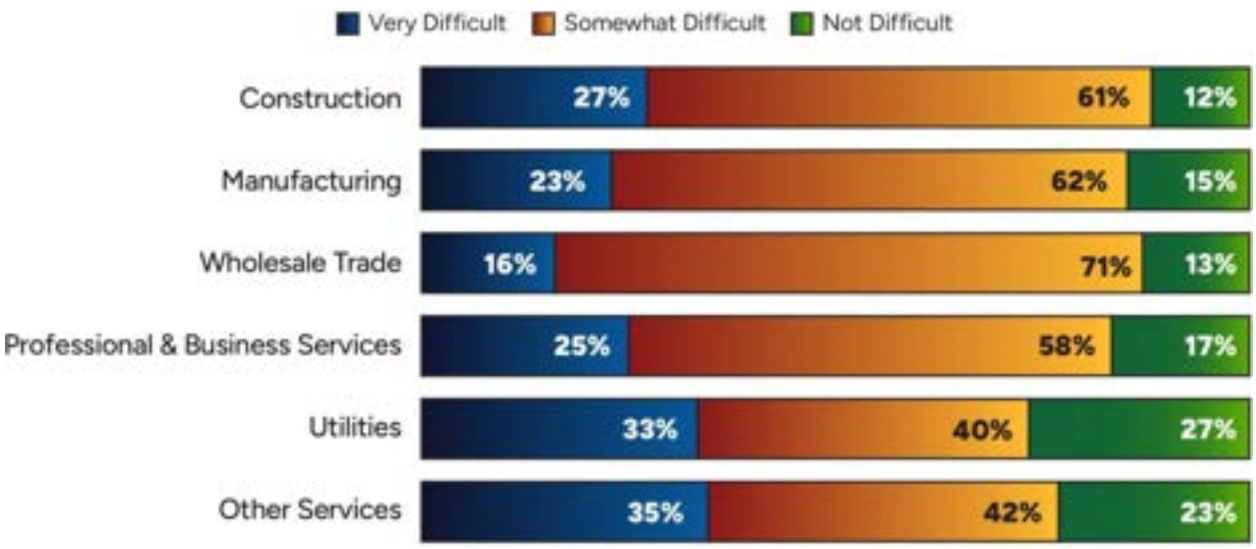



Figure 50. Solar Electric Power Generation Employers' Perceived Hiring Difficulty, 2024

## ANTICIPATED EMPLOYMENT CHANGE BY INDUSTRY

Solar EPG businesses reported varying expectations for job growth through 2025. All industries in Solar EPG anticipate job growth, ranging from 5.1% in Wholesale Trade (e.g., the sales of Solar EPG equipment and parts such as panels and racking) to 16.1% in Other Services, such as Repair and Maintenance **(**Figure 51**).**

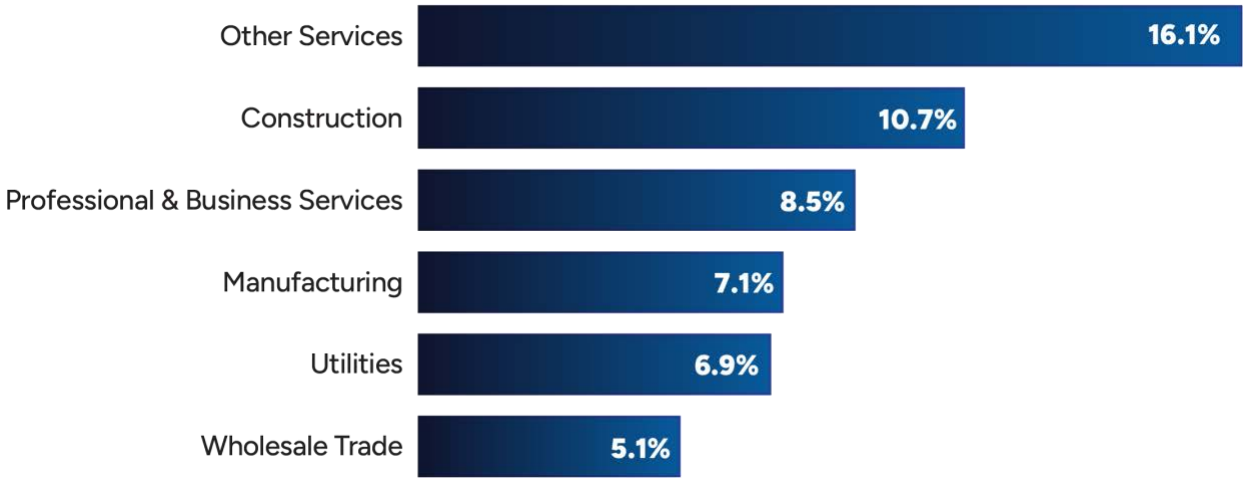



Figure 51. Solar Electric Power Generation Employers' Anticipated Employment Change by Industry, 2024-2025[67]

[67] See Figure 49. Solar Electric Power Generation Employment by Industry, 2024.

# Wind Electric Power Generation

Wind EPG uses turbines to convert kinetic energy present in wind into mechanical energy for driving pumps, mills, and electric power generators. Employment in this subsector includes workers across manufacturing, installation, maintenance, and other industries. For example, workers in Wind EPG include those involved in the manufacturing, installation, repair, and wholesale trade of wind turbines and components, as well as those involved in professional and business services that support Wind EPG, such as engineering, research and development, and finance. Operations and maintenance (O&M) activities—such as the repair and upkeep of wind EPG equipment—are distributed across several sectors including utilities, construction, and engineering. However, businesses that specialize in O&M services are most commonly classified under the "Other Services" industry.

## Employment by Industry

Most Wind EPG employees were found in the Construction industry, which accounted for 44,200 workers (33.2%), followed by Professional and Business Services, such as technical, legal, financial, and consulting support, with 36,500 workers (27.4%) (Figure 52).

**133,000**

Workers employed in Wind EPG subsector in 2024

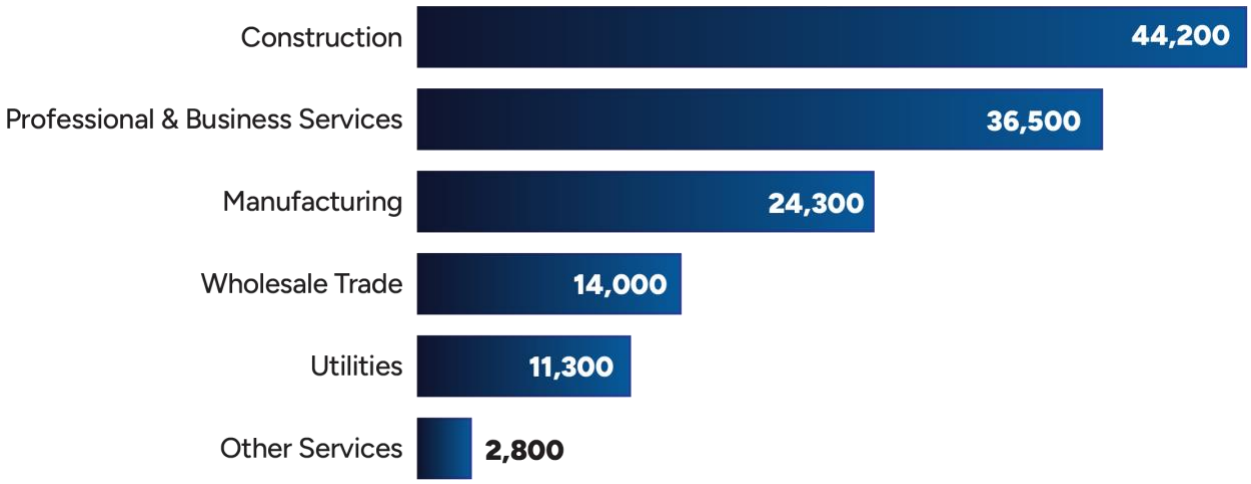



Figure 52. Wind Electric Power Generation Employment by Industry, 2024

## Workforce Demographics

Men constituted 71% of the Wind EPG workforce, less than the share within the energy workforce overall (73%) but higher than the share within the national workforce overall (53%). The proportion of workers aged 18 to 29 in the Wind EPG workforce aligned with the energy workforce (29%) but was above the U.S. workforce (22%) (Table 18).

Table 18. Wind Electric Power Generation Workforce Demographics and Characteristics, 2024[68]

| | Number of Workers | **Percentage of Wind EPG Workforce** | Percentage of EPG Workforce | Percentage of Energy Workforce | Percentage of National Workforce |
|---|---|---|---|---|---|
| Men | 93,800 | **71%** | 70% | 73% | 53% |
| Women | 38,300 | **29%** | 30% | 26% | 47% |
| Hispanic or Latino | 29,200 | **22%** | 21% | 19% | 19% |
| Non-Hispanic or Latino | 103,800 | **78%** | 79% | 81% | 81% |
| American Indian or Alaska Native | 2,100 | **2%** | 2% | 2% | 1% |
| Asian | 11,800 | **9%** | 9% | 7% | 7% |
| Black or African American | 10,400 | **8%** | 9% | 8% | 13% |
| Native Hawaiian or Other Pacific Islander | 1,800 | **1%** | 1% | 1% | <1% |
| White | 94,800 | **71%** | 72% | 74% | 76% |
| Two or More Races | 7,500 | **6%** | 5% | 5% | 3% |
| Unknown Race | 4,500 | **3%** | 3% | 3% | n/a |
| Veterans | 12,200 | **9%** | 9% | 9% | 5% |
| 18 to 29 | 38,900 | **29%** | 29% | 29% | 22% |
| 30 to 54 | 71,400 | **54%** | 55% | 52% | 54% |
| Over 54 | 22,600 | **17%** | 17% | 19% | 24% |
| Self-Identification of Disability | 2,900 | **2%** | 2% | 2% | 5% |
| Formerly Incarcerated | 2,900 | **2%** | 1% | 2% | 2% |
| Represented by a Union[69] | 17,500 | **13%** | 13% | 12% | 7% |

[68] National Sources: BLS (2024a, 2024b, 2024c, 2024d), Jobs EQ (2024), Prison Policy (2018).
[69] For this analysis, a union employer is defined as one with at least 20% of its workforce as a member of a labor union or covered by either a project labor agreement or a collective bargaining agreement. Figure represents private sector unionization rate. Unionization rates vary by state.

## Employer Perspective on Workforce Topics

### CURRENT HIRING DIFFICULTY

Among respondents employing Wind EPG workers, Manufacturing employers and Wholesale Trade employers (e.g., employers that sell turbines and related components to wind farm developers and utilities) reported the greatest difficulty finding and hiring qualified employees, with 93% and 94% of employers reporting at least some level of difficulty, respectively. One-third (33%) of Utilities employers and over half (56%) of Other Services employers (e.g., repair and maintenance) found hiring "very difficult" (Figure 53).

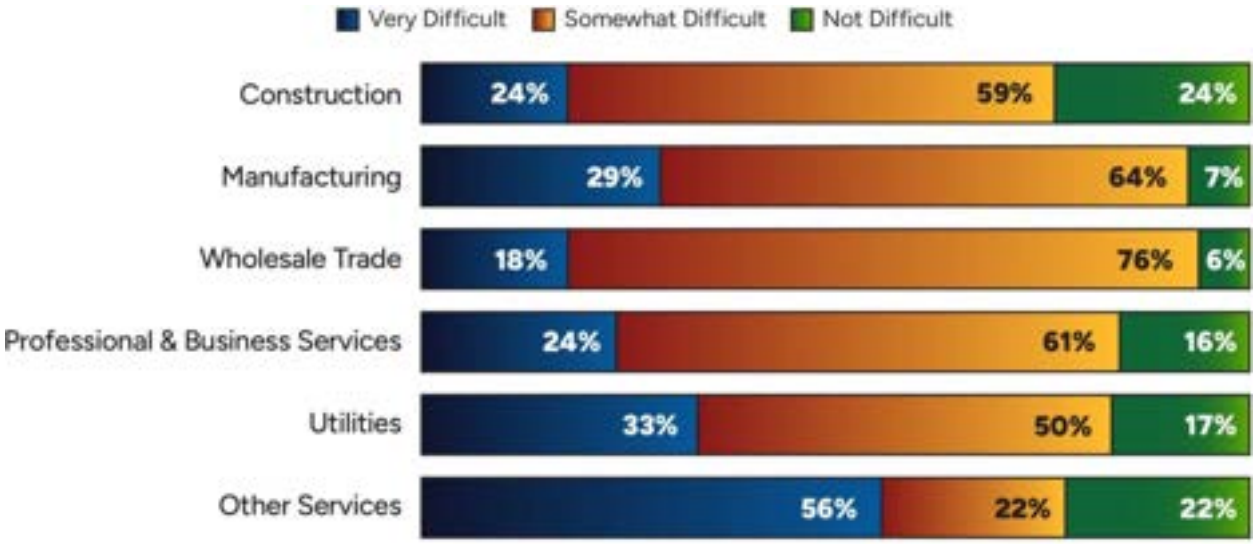



Figure 53. Wind Electric Power Generation Employers' Perceived Hiring Difficulty, 2024

### ANTICIPATED EMPLOYMENT CHANGE BY INDUSTRY

Employers across all industries in the Wind EPG subsector anticipate job growth through 2025, ranging from 2.5% in Utilities to 9.9% in Manufacturing (Figure 54).

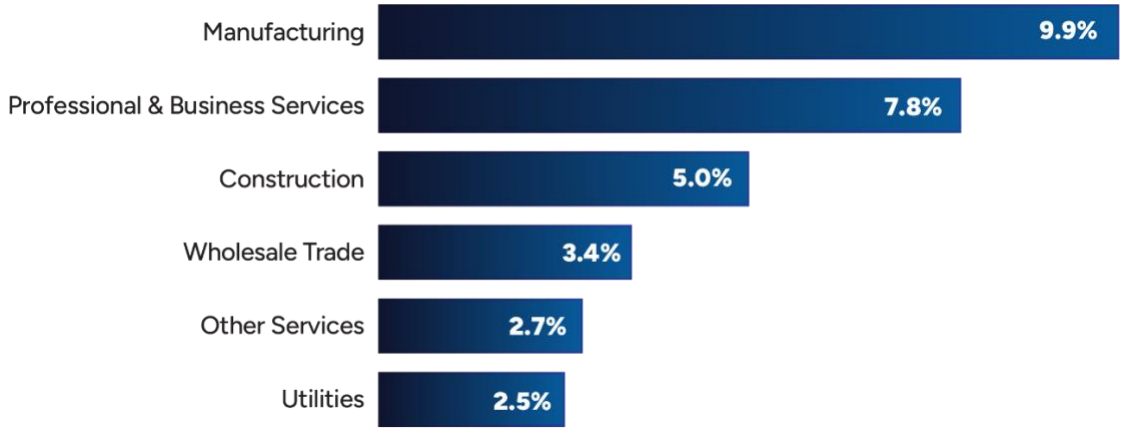



Figure 54. Wind Electric Power Generation Employers' Anticipated Employment Change by Industry, 2024-2025[70]

# Natural Gas Electric Power Generation

Natural Gas EPG is the process of converting natural gas, a gaseous mixture of hydrocarbon compounds, into electricity, typically by burning the gas to heat water, create steam, and turn turbines connected to generators. This section of the report includes employment data on the Natural Gas and Advanced Natural Gas (e.g., combined cycle Natural Gas EPG) EPG subsectors.

Natural Gas EPG employment includes workers in the Utilities industry, as well as workers engaged in the operation and maintenance of power plants, and the manufacturing of facility equipment. It also includes roles in the repair and maintenance of generation equipment, wholesale trade (of Natural Gas EPG equipment and parts such as Natural Gas turbines), and professional and business services that support Natural Gas EPG, such as engineering, financial services, environmental consulting, project management, and other services.

## Employment by Industry

The Utilities industry accounted for the largest number of Natural Gas EPG workers (69,000) and represented over half (53.9%) of total Natural Gas EPG employment (Figure 55).

**127,800**

Workers employed in Natural Gas EPG subsector in 2024

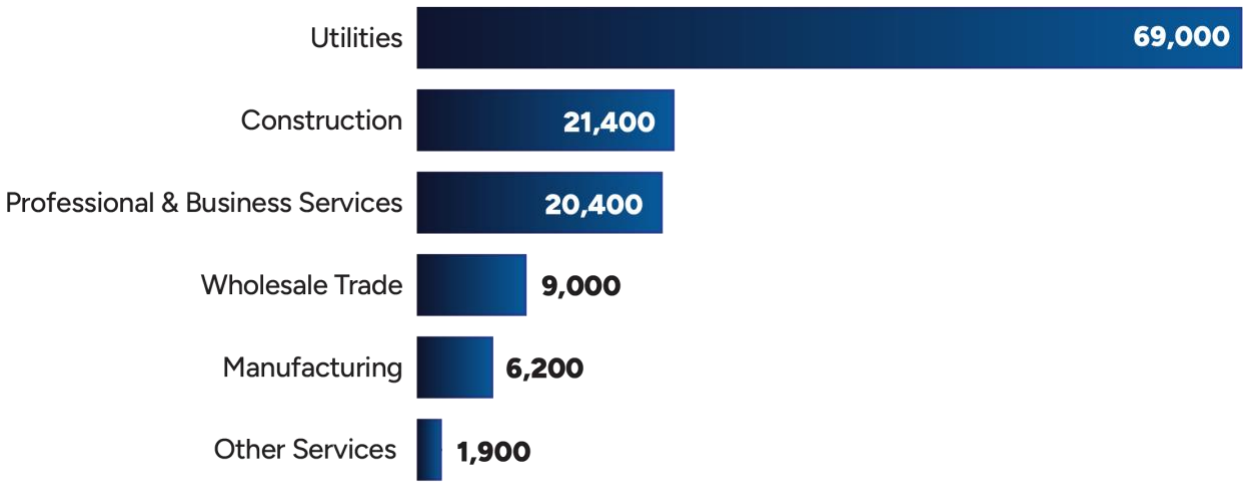



Figure 55. Natural Gas Electric Power Generation Employment by Industry, 2024

[70] See Figure 52. Wind Electric Power Generation Employment by Industry, 2024.

## Workforce Demographics

Women constituted 33% of the Natural Gas EPG workforce, above the energy workforce share of women (26%) but below the national workforce share (47%). The concentration of veterans in the Natural Gas EPG workforce (9%) was the same as the energy workforce (9%) and nearly double the U.S. workforce (5%). The percentage of workers over the age of 54 in the Natural Gas EPG workforce (17%) was lower than the proportion across the overall energy workforce (19%) and the national workforce (24%) (Table 19).

Table 19. Natural Gas Electric Power Generation Workforce Demographics and Characteristics, 2024[71]

| | Number of Workers | **Percentage of Natural Gas EPG Workforce** | Percentage of EPG Workforce | Percentage of Energy Workforce | Percentage of National Workforce |
|---|---|---|---|---|---|
| Men | 85,300 | **67%** | 70% | 73% | 53% |
| Women | 41,700 | **33%** | 30% | 26% | 47% |
| Hispanic or Latino | 24,700 | **19%** | 21% | 19% | 19% |
| Non-Hispanic or Latino | 103,200 | **81%** | 79% | 81% | 81% |
| American Indian or Alaska Native | 2,100 | **2%** | 2% | 2% | 1% |
| Asian | 11,800 | **9%** | 9% | 7% | 7% |
| Black or African American | 12,900 | **10%** | 9% | 8% | 13% |
| Native Hawaiian or Other Pacific Islander | 1,600 | **1%** | 1% | 1% | <1% |
| White | 88,000 | **69%** | 72% | 74% | 76% |
| Two or More Races | 7,700 | **6%** | 5% | 5% | 3% |
| Unknown Race | 3,800 | **3%** | 3% | 3% | n/a |
| Veterans | 11,200 | **9%** | 9% | 9% | 5% |
| 18 to 29 | 33,900 | **26%** | 29% | 29% | 22% |
| 30 to 54 | 72,100 | **56%** | 55% | 52% | 54% |
| Over 54 | 21,900 | **17%** | 17% | 19% | 24% |
| Self-Identification of Disability | 2,800 | **2%** | 2% | 2% | 5% |
| Formerly Incarcerated | 2,400 | **2%** | 1% | 2% | 2% |
| Represented by a Union[72] | 22,300 | **17%** | 13% | 12% | 7% |

[71] National Sources: BLS (2024a, 2024b, 2024c, 2024d), Jobs EQ (2024), Prison Policy (2018).
[72] For this analysis, a union employer is defined as one with at least 20% of its workforce as a member of a labor union or covered by either a project labor agreement or a collective bargaining agreement. Figure represents private sector unionization rate. Unionization rates vary by state.

## Employer Perspective on Workforce Topics

### CURRENT HIRING DIFFICULTY

Among Natural Gas EPG businesses, Wholesale Trade (of Natural Gas EPG equipment and parts) employers reported the highest level of hiring difficulty in 2024, with 94% of employers reporting at least some level of difficulty. Over one-third of Utilities (35%) and Other Services (e.g., repair and maintenance of Natural Gas EPG equipment) (42%) employers reported hiring was "very difficult" (Figure 56).

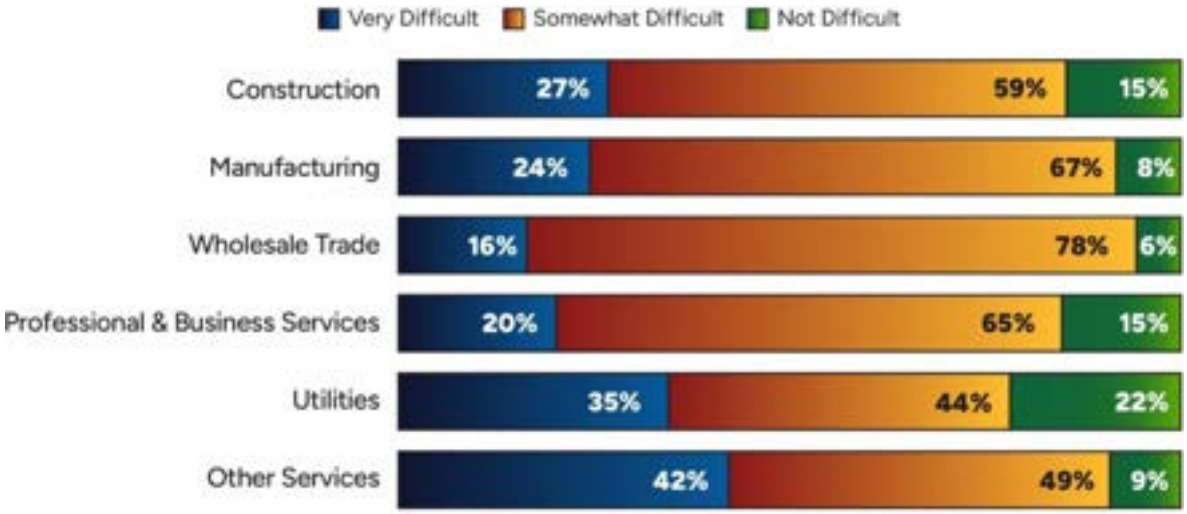



Figure 56. Natural Gas Electric Power Generation Employers' Perceived Hiring Difficulty, 2024

### ANTICIPATED EMPLOYMENT CHANGE BY INDUSTRY

Employers across all industries in the Natural Gas EPG subsector anticipate job growth through 2025, ranging from 0.8% for the Manufacturing industry to 10.7% for the Construction industry (Figure 57).

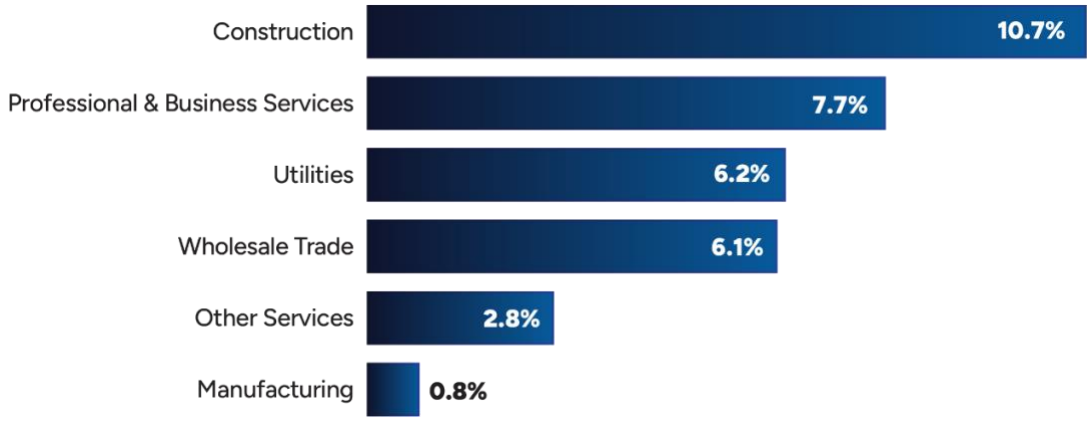



Figure 57. Natural Gas Electric Power Generation Employers' Anticipated Employment Change by Industry, 2024-2025[73]

[73] See Figure 55. Natural Gas Electric Power Generation Employment by Industry, 2024.

# Water Power Electric Power Generation

Water Power EPG harnesses flowing water to produce electrical energy through traditional facilities, such as dams, as well as smaller, low-impact facilities[74] and includes marine and hydrokinetic power. In Water Power EPG, workers include those involved in manufacturing and maintaining turbines, generators, and control systems, as well as those involved in installation and repair and dam operations and infrastructure upgrades. Supporting roles include civil and electrical engineers, environmental consultants, IT specialists managing flow and grid systems, and administrative staff ensuring regulatory and safety compliance.

## Employment by Industry

Most Water Power EPG workers were found in the Utilities industry, which accounted for 20,000 workers (28.5%), followed by the Manufacturing industry, with 16,400 workers (23.3%) (Figure 58).

**70,200**
Workers employed in Water EPG subsector in 2024

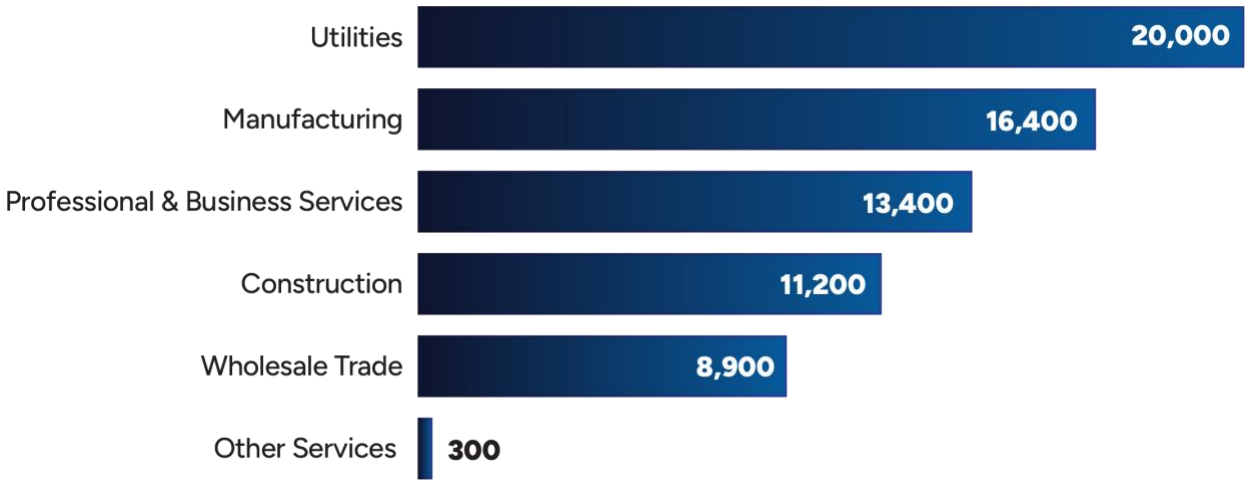



Figure 58. Water Power Electric Power Generation Employment by Industry, 2024

[74] Refer to Appendix K for definitions of subsectors.

## Workforce Demographics

Women constituted 27% of the Water Power EPG workforce, slightly higher than the energy workforce overall (26%) but lower than the national workforce (47%). The private sector unionization rate in Water Power EPG (14%) was higher than the rate within the national workforce overall (7%) (Table 20).

Table 20. Water Power Electric Power Generation Workforce Demographics and Characteristics, 2024[75]

| | Number of Workers | **Percentage of Water Power EPG Workforce** | Percentage of EPG Workforce | Percentage of Energy Workforce | Percentage of National Workforce |
|---|---|---|---|---|---|
| Men | 50,800 | **72%** | 70% | 73% | 53% |
| Women | 19,000 | **27%** | 30% | 26% | 47% |
| Hispanic or Latino | 12,600 | **18%** | 21% | 19% | 19% |
| Non-Hispanic or Latino | 57,600 | **82%** | 79% | 81% | 81% |
| American Indian or Alaska Native | 1,300 | **2%** | 2% | 2% | 1% |
| Asian | 6,800 | **10%** | 9% | 7% | 7% |
| Black or African American | 7,100 | **10%** | 9% | 8% | 13% |
| Native Hawaiian or Other Pacific Islander | 900 | **1%** | 1% | 1% | <1% |
| White | 49,200 | **70%** | 72% | 74% | 76% |
| Two or More Races | 2,700 | **4%** | 5% | 5% | 3% |
| Unknown Race | 2,200 | **3%** | 3% | 3% | n/a |
| Veterans | 6,600 | **9%** | 9% | 9% | 5% |
| 18 to 29 | 18,600 | **27%** | 29% | 29% | 22% |
| 30 to 54 | 37,800 | **54%** | 55% | 52% | 54% |
| Over 54 | 13,700 | **20%** | 17% | 19% | 24% |
| Self-Identification of Disability | 1,400 | **2%** | 2% | 2% | 5% |
| Formerly Incarcerated | 2,100 | **3%** | 1% | 2% | 2% |
| Represented by a Union[76] | 9,600 | **14%** | 13% | 12% | 7% |

[75] National Sources: BLS (2024a, 2024b, 2024c, 2024d), Jobs EQ (2024), Prison Policy (2018).
[76] For this analysis, a union employer is defined as one with at least 20% of its workforce as a member of a labor union or covered by either a project labor agreement or a collective bargaining agreement. Figure represents private sector unionization rate. Unionization rates vary by state.

## Employer Perspective on Workforce Topics

### CURRENT HIRING DIFFICULTY

Within Water Power EPG, Construction and Wholesale Trade (of Water Power EPG equipment and parts) had the greatest difficulty hiring workers, with 93% of employers in both industries indicating at least some level of hiring difficulty. Nearly half (46%) of Manufacturing workers within Water Power EPG reported hiring was "very difficult," while over one-quarter (28%) of Utilities employers reported hiring was "not at all difficult" (Figure 59).

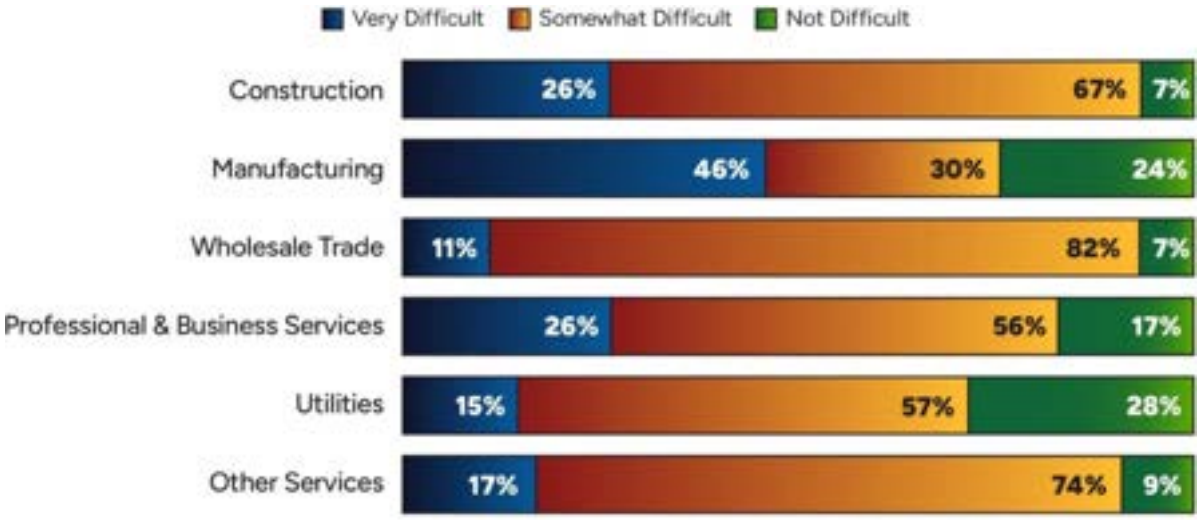



Figure 59. Water Power Electric Power Generation Employers' Perceived Hiring Difficulty, 2024

### ANTICIPATED EMPLOYMENT CHANGE BY INDUSTRY

As displayed in Figure 60, employers in five of the six industries in Water Power EPG anticipate growth through 2025, ranging from 0.2% in Construction to 7.8% in Wholesale Trade (e.g., the sale of Water Power EPG equipment and parts).

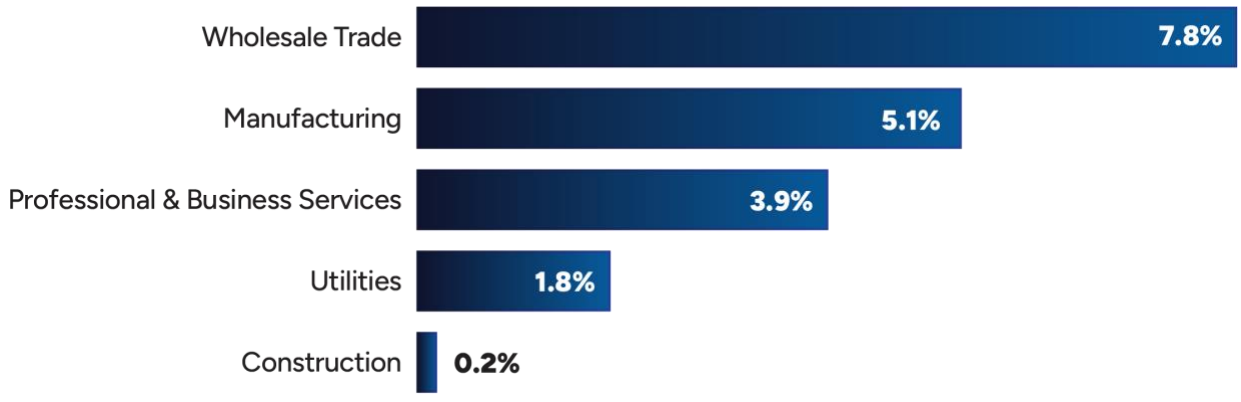



Figure 60. Water Power Electric Power Generation Employers' Anticipated Employment Change by Industry, 2024-2025[77]

[77] Other Services industry was not reported due to insufficient sample size. See Figure 58. Water Power Electric Power Generation Employment by Industry, 2024.

# Coal Electric Power Generation

Coal EPG is the process in which coal, a solid sedimentary rock that is primarily composed of carbon, is burned to produce heat, which rotates a turbine connected to a generator to create electricity. Workers in this subsector work in all aspects of the Coal EPG value chain: equipment manufacturing, facility construction, wholesale trade of equipment and parts, utilities, and professional and business services such as engineering, financial services, information management, technical consulting, and other support services.

## Employment by Industry

The majority of Coal EPG workers found employment in Professional and Business Services such as engineering (23,600, or 39.0%), followed by Utilities, with 22,600 workers (37.5%) (Figure 61).

**60,400**

Workers employed in Coal EPG subsector in 2024

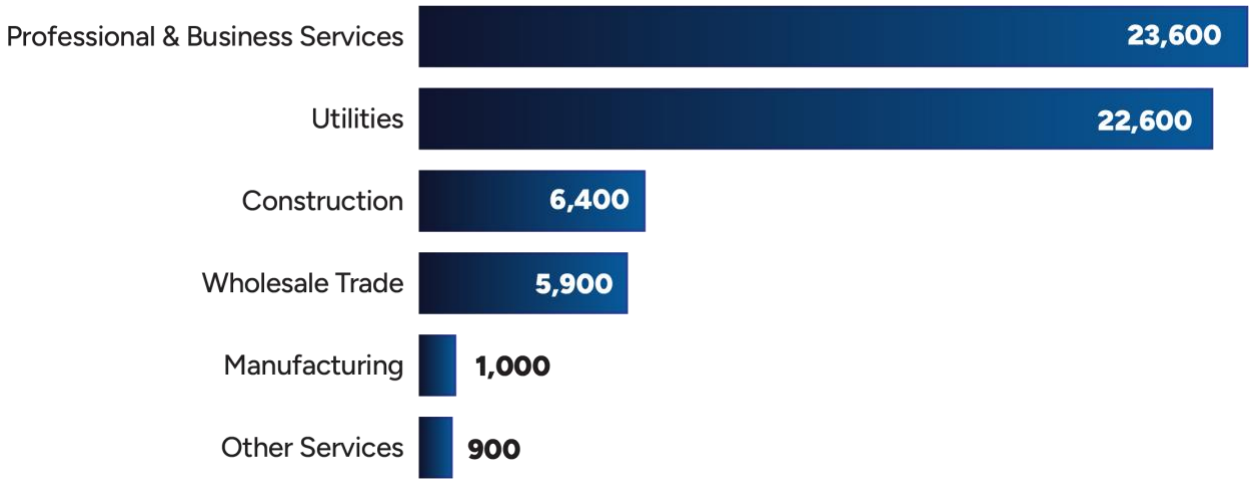



Figure 61. Coal Electric Power Generation Employment by Industry, 2024

## Workforce Demographics

Men made up 65% of the Coal EPG workforce, less than the share within the overall energy workforce (73%) but higher than the share within the national workforce overall (53%). The private sector unionization rate in the Coal EPG workforce (15%) was higher than in energy workforce (12%) and the national workforce (7%) (Table 21).

Table 21. Coal Electric Power Generation Workforce Demographics and Characteristics, 2024[78]

| | Number of Workers | **Percentage of Coal EPG Workforce** | Percentage of EPG Workforce | Percentage of Energy Workforce | Percentage of National Workforce |
|---|---|---|---|---|---|
| Men | 39,600 | **65%** | 70% | 73% | 53% |
| Women | 20,600 | **34%** | 30% | 26% | 47% |
| Hispanic or Latino | 9,500 | **16%** | 21% | 19% | 19% |
| Non-Hispanic or Latino | 50,900 | **84%** | 79% | 81% | 81% |
| American Indian or Alaska Native | 1,100 | **2%** | 2% | 2% | 1% |
| Asian | 5,500 | **9%** | 9% | 7% | 7% |
| Black or African American | 5,900 | **10%** | 9% | 8% | 13% |
| Native Hawaiian or Other Pacific Islander | 1,100 | **2%** | 1% | 1% | <1% |
| White | 43,000 | **71%** | 72% | 74% | 76% |
| Two or More Races | 1,900 | **3%** | 5% | 5% | 3% |
| Unknown Race | 2,100 | **3%** | 3% | 3% | n/a |
| Veterans | 4,600 | **8%** | 9% | 9% | 5% |
| 18 to 29 | 15,300 | **25%** | 29% | 29% | 22% |
| 30 to 54 | 32,700 | **54%** | 55% | 52% | 54% |
| Over 54 | 12,500 | **21%** | 17% | 19% | 24% |
| Self-Identification of Disability | 1,300 | **2%** | 2% | 2% | 5% |
| Formerly Incarcerated | 1,200 | **2%** | 1% | 2% | 2% |
| Represented by a Union[79] | 8,800 | **15%** | 13% | 12% | 7% |

[78] National Sources: BLS (2024a, 2024b, 2024c, 2024d), Jobs EQ (2024), Prison Policy (2018).
[79] For this analysis, a union employer is defined as one with at least 20% of its workforce as a member of a labor union or covered by either a project labor agreement or a collective bargaining agreement. Figure represents private sector unionization rate. Unionization rates vary by state.

## Employer Perspective on Workforce Topics

### CURRENT HIRING DIFFICULTY

Among Coal EPG employers, Wholesale Trade (of Coal EPG equipment and parts) businesses encountered the greatest difficulty in hiring workers, with 88% reporting at least some level of difficulty. Over one-third of employers in the Utilities (35%) and Other Services (e.g., the repair and maintenance of Coal EPG equipment and parts) (34%) industries reported hiring was "very difficult" (Figure 62).

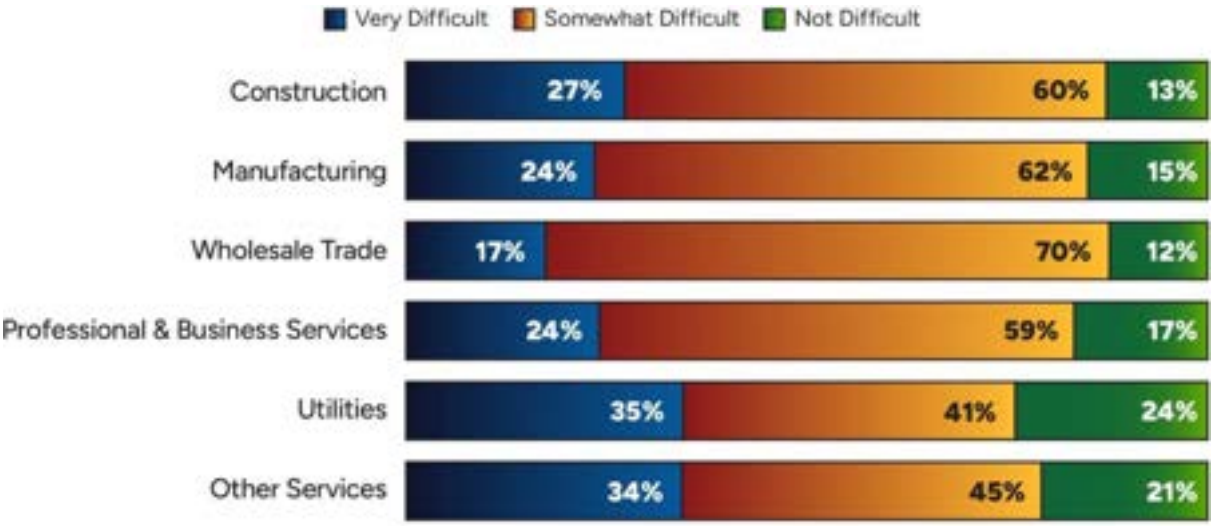



Figure 62. Coal Electric Power Generation Employers' Perceived Hiring Difficulty, 2024

### ANTICIPATED EMPLOYMENT CHANGE BY INDUSTRY

Coal EPG employers across the Utilities, Professional and Business Services (e.g., engineering, research and development, finance, etc.), Wholesale Trade (of Coal EPG equipment and parts), and Manufacturing industries anticipate job growth to continue through 2025, ranging from 0.2% for the Manufacturing industry to 6.9% in the Utilities industry (Figure 63).


Figure 63. Coal Electric Power Generation Employers' Anticipated Employment Change by Industry, 2024-2025[80]

[80] Other Services industry was not reported due to insufficient sample size. See Figure 61. Coal Electric Power Generation Employment by Industry, 2024.

# Nuclear Electric Power Generation

Nuclear EPG is electricity generated through the release of thermal energy from the fission of nuclear fuel in a reactor, generating thermal energy for driving pumps, mills, and electric power generators. Nuclear EPG employment includes workers involved in the manufacturing and distribution of reactor components and fuel assemblies, maintenance and inspection of nuclear systems, and various services that support plant operations (engineering, cybersecurity, regulatory compliance, etc.).

## Employment by Industry

The majority of Nuclear EPG employees worked in Utilities (40,100, or 69.2%), followed by Professional and Business Services (e.g., engineering, information technology, research and development, etc.), with 11,500 workers (19.8%) (Figure 64).

**57,900**

Workers employed in Nuclear EPG subsector in 2024

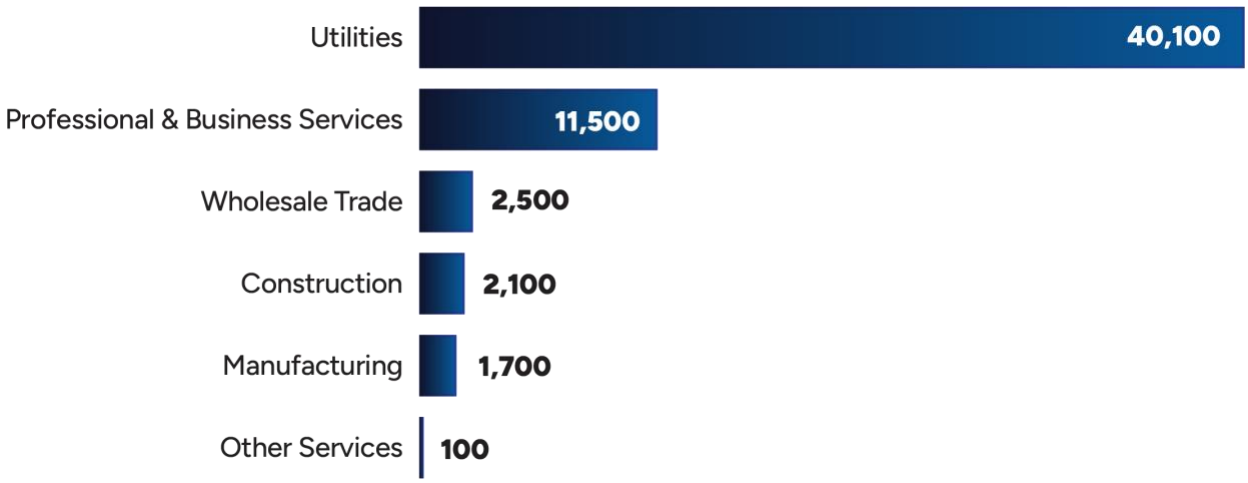



Figure 64. Nuclear Electric Power Generation Employment by Industry, 2024

## Workforce Demographics

The proportion of women in the Nuclear EPG workforce (32%) was higher than in the energy workforce (26%). In addition, the Nuclear EPG private sector unionization rate (19%) was higher than the overall energy workforce (12%) and more than double the national workforce overall (7%) (Table 22).

Table 22. Nuclear Electric Power Generation Workforce Demographics and Characteristics, 2024[81]

| | Number of Workers | **Percentage of Nuclear EPG Workforce** | Percentage of EPG Workforce | Percentage of Energy Workforce | Percentage of National Workforce |
|---|---|---|---|---|---|
| Men | 38,600 | **67%** | 70% | 73% | 53% |
| Women | 18,400 | **32%** | 30% | 26% | 47% |
| Hispanic or Latino | 9,000 | **16%** | 21% | 19% | 19% |
| Non-Hispanic or Latino | 48,900 | **84%** | 79% | 81% | 81% |
| American Indian or Alaska Native | 1,900 | **3%** | 2% | 2% | 1% |
| Asian | 5,000 | **9%** | 9% | 7% | 7% |
| Black or African American | 6,200 | **11%** | 9% | 8% | 13% |
| Native Hawaiian or Other Pacific Islander | 800 | **1%** | 1% | 1% | <1% |
| White | 39,200 | **68%** | 72% | 74% | 76% |
| Two or More Races | 2,800 | **5%** | 5% | 5% | 3% |
| Unknown Race | 2,100 | **4%** | 3% | 3% | n/a |
| Veterans | 4,300 | **7%** | 9% | 9% | 5% |
| 18 to 29 | 13,800 | **24%** | 29% | 29% | 22% |
| 30 to 54 | 34,000 | **59%** | 55% | 52% | 54% |
| Over 54 | 10,200 | **18%** | 17% | 19% | 24% |
| Self-Identification of Disability | 700 | **1%** | 2% | 2% | 5% |
| Formerly Incarcerated | 1,200 | **2%** | 1% | 2% | 2% |
| Represented by a Union[82] | 11,200 | **19%** | 13% | 12% | 7% |

[81] National Sources: BLS (2024a, 2024b, 2024c, 2024d), Jobs EQ (2024), Prison Policy (2018).
[82] For this analysis, a union employer is defined as one with at least 20% of its workforce as a member of a labor union or covered by either a project labor agreement or a collective bargaining agreement. Figure represents private sector unionization rate. Unionization rates vary by state.

## Employer Perspective on Workforce Topics

### CURRENT HIRING DIFFICULTY

Within Nuclear EPG, businesses involved in Wholesale Trade (of Nuclear EPG equipment and parts) encountered the most difficulty hiring workers, with 94% of employers reporting at least some difficulty finding qualified workers. Over half (63%) of Manufacturing employers reported hiring was "very difficult" (Figure 65).

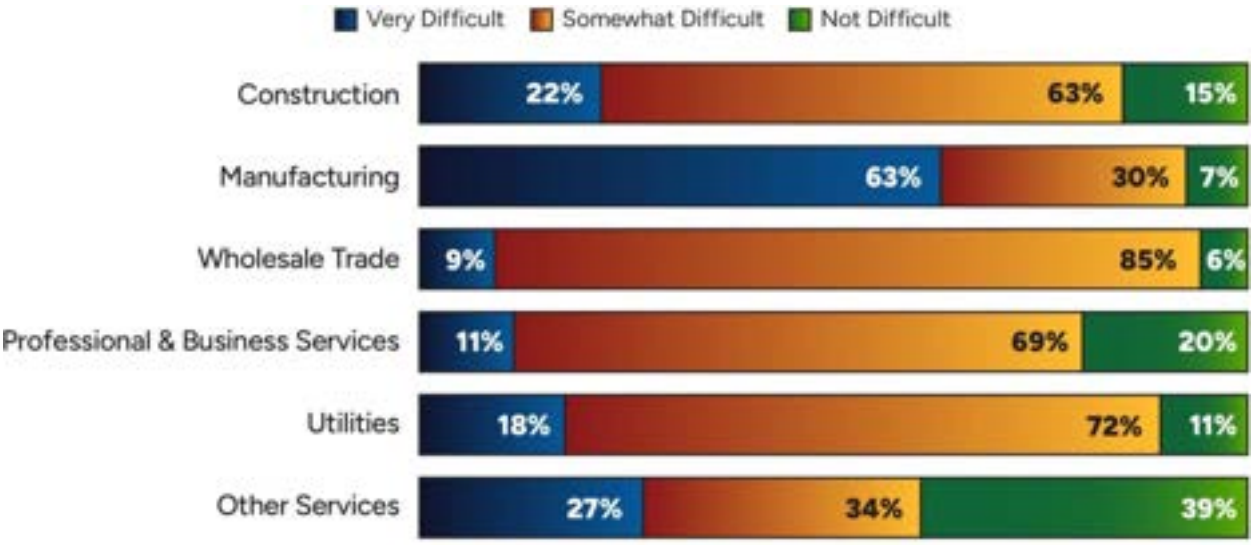



Figure 65. Nuclear Electric Power Generation Employers' Perceived Hiring Difficulty, 2024

### ANTICIPATED EMPLOYMENT CHANGE BY INDUSTRY

Nuclear EPG employers in four of the six industries anticipate job growth through 2025, ranging from 5.1% in Wholesale Trade (of Nuclear EPG equipment and parts) to 9.2% in Construction (Figure 66).


Figure 66. Nuclear Electric Power Generation Employers' Anticipated Employment Change by Industry, 2024-2025[83]

[83] Utilities and Other Services industries were not reported separately due to insufficient sample size. See Figure 64. Nuclear Electric Power Generation Employment by Industry, 2024.

# Combined Heat & Power Electric Power Generation

Combined Heat and Power (CHP) EPG involves producing both heat and electricity from a single heat source. Energy inputs can include coal, biomass, natural gas, nuclear fuel, or geothermal. In CHP EPG, workers include technicians operating onsite systems, manufacturers and distributors of CHP units, and engineers designing integrated thermal-electric systems. Support roles cover information technology, maintenance, and administrative services for system efficiency and compliance.

## Employment by Industry

Most CHP EPG employees were found in the Professional and Business Services industry, including consulting, research and development, engineering, and project management, which accounted for 19,200 workers (61.3%), followed by the Construction industry, with 4,200 workers (13.5%) (Figure 67).

**31,400**

Workers employed in CHP EPG subsector in 2024

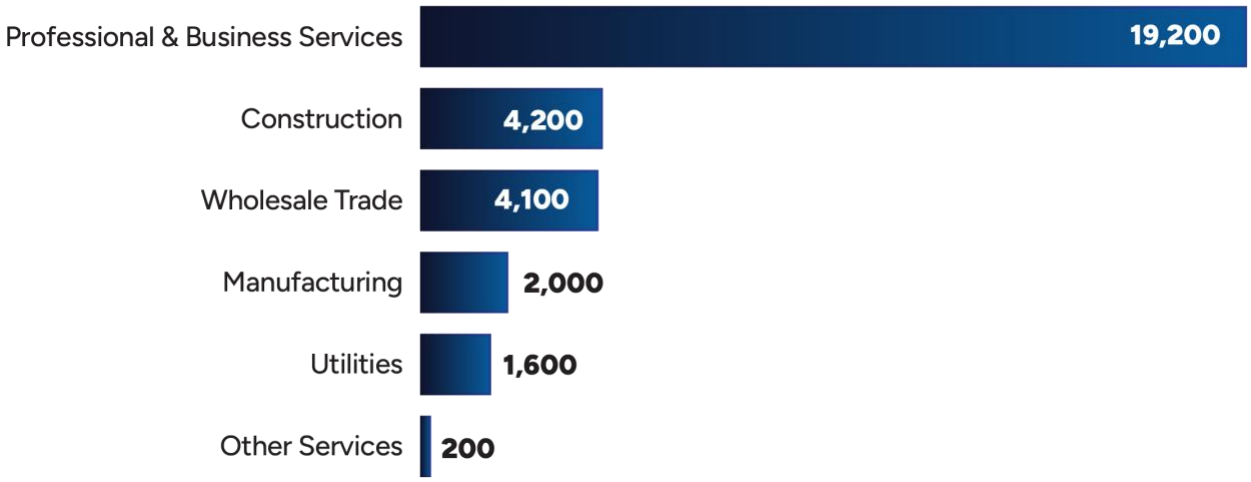



Figure 67. Combined Heat and Power Electric Power Generation Employment by Industry, 2024

## Workforce Demographics

The representation of veterans in the CHP EPG workforce (11%) was higher than the energy workforce (9%) and more than two times the U.S. workforce overall (5%). The proportion of workers aged 18 to 29 in the CHP EPG workforce (28%) was higher than the national workforce (22%) (Table 23).

Table 23. Combined Heat and Power Electric Power Generation Workforce Demographics and Characteristics, 2024[84]

| | Number of Workers | **Percentage of CHP EPG Workforce** | Percentage of EPG Workforce | Percentage of Energy Workforce | Percentage of National Workforce |
|---|---|---|---|---|---|
| Men | 22,200 | **71%** | 70% | 73% | 53% |
| Women | 9,000 | **29%** | 30% | 26% | 47% |
| Hispanic or Latino | 6,300 | **20%** | 21% | 19% | 19% |
| Non-Hispanic or Latino | 25,000 | **80%** | 79% | 81% | 81% |
| American Indian or Alaska Native | 400 | **1%** | 2% | 2% | 1% |
| Asian | 2,500 | **8%** | 9% | 7% | 7% |
| Black or African American | 2,300 | **7%** | 9% | 8% | 13% |
| Native Hawaiian or Other Pacific Islander | 300 | **1%** | 1% | 1% | <1% |
| White | 23,100 | **73%** | 72% | 74% | 76% |
| Two or More Races | 1,600 | **5%** | 5% | 5% | 3% |
| Unknown Race | 1,300 | **4%** | 3% | 3% | n/a |
| Veterans | 3,500 | **11%** | 9% | 9% | 5% |
| 18 to 29 | 8,700 | **28%** | 29% | 29% | 22% |
| 30 to 54 | 15,700 | **50%** | 55% | 52% | 54% |
| Over 54 | 7,000 | **22%** | 17% | 19% | 24% |
| Self-Identification of Disability | 700 | **2%** | 2% | 2% | 5% |
| Formerly Incarcerated | 700 | **2%** | 1% | 2% | 2% |
| Represented by a Union[85] | 4,200 | **13%** | 13% | 12% | 7% |

[84] National Sources: BLS (2024a, 2024b, 2024c, 2024d), Jobs EQ (2024), Prison Policy (2018).
[85] For this analysis, a union employer is defined as one with at least 20% of its workforce as a member of a labor union or covered by either a project labor agreement or a collective bargaining agreement. Figure represents private sector unionization rate. Unionization rates vary by state.

## Employer Perspective on Workforce Topics

### CURRENT HIRING DIFFICULTY

Within CHP EPG, businesses in the Wholesale Trade industry (e.g., the sale of CHP EPG equipment and parts) had the most difficulty hiring workers, with 94% of employers reporting at least some level of difficulty finding qualified workers. Almost half (43%) of Utilities employers reported hiring was “very difficult” (Figure 68).

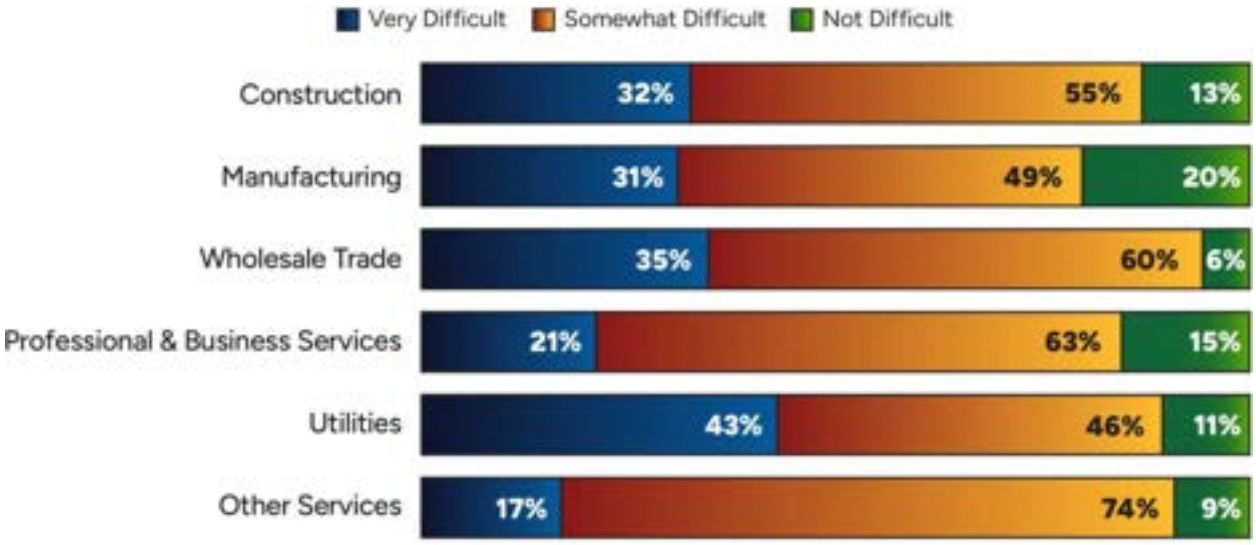



Figure 68. Combined Heat and Power Electric Power Generation Employers' Perceived Hiring Difficulty, 2024

### ANTICIPATED EMPLOYMENT CHANGE BY INDUSTRY

Employers in five of the six industries in CHP EPG anticipate growth through 2025, ranging from 4.9% in Manufacturing to 10.8% in Construction (Figure 69).

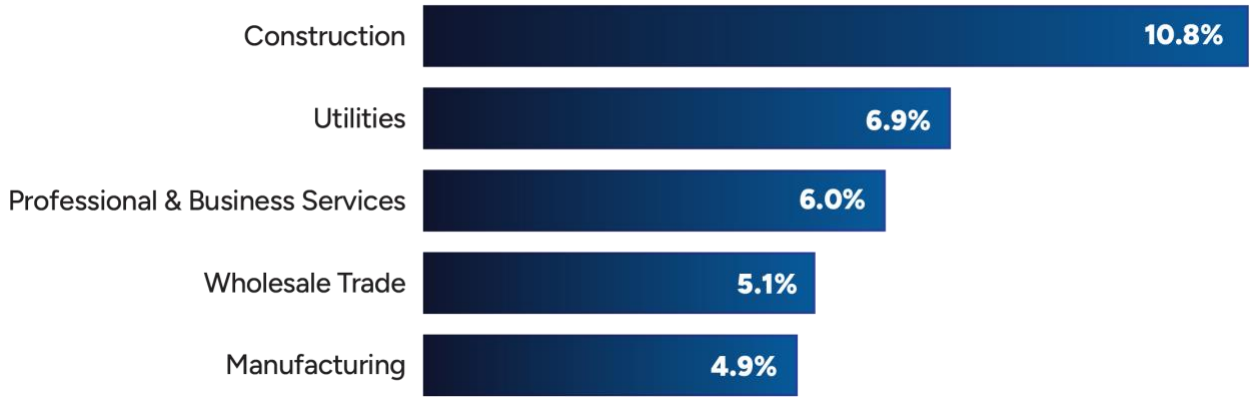



Figure 69. Combined Heat and Power Electric Power Generation Employers’ Anticipated Employment Change by Industry, 2024-2025[86]

[86] Other Services industry was not reported due to insufficient sample size. See Figure 67. Combined Heat and Power Electric Power Generation Employment by Industry, 2024.

# Bioenergy Electric Power Generation

Bioenergy EPG is the process of using biomass—organic non-fossil material of biological origin—to produce electricity. In Bioenergy EPG, workers span multiple industries, including workers involved in building biomass facilities, operators at utilities running generation systems, and manufacturing workers producing boilers and feedstock equipment. Workers may also be engaged in the wholesale trade of equipment and parts, or professional and business services such as engineering and environmental consulting, and Other Services supporting operations and maintenance.

## Employment by Industry

The majority of workers employed in the Construction industry (5,900, or 44.1%), followed by the Professional and Business Services (e.g., engineering, consulting, research and development, finance, etc.) industry employed 2,900 workers (21.7%) and the Utilities industry, with 2,400 workers (17.9%) (Figure 70).

**13,300**

Workers employed in Bioenergy EPG subsector in 2024

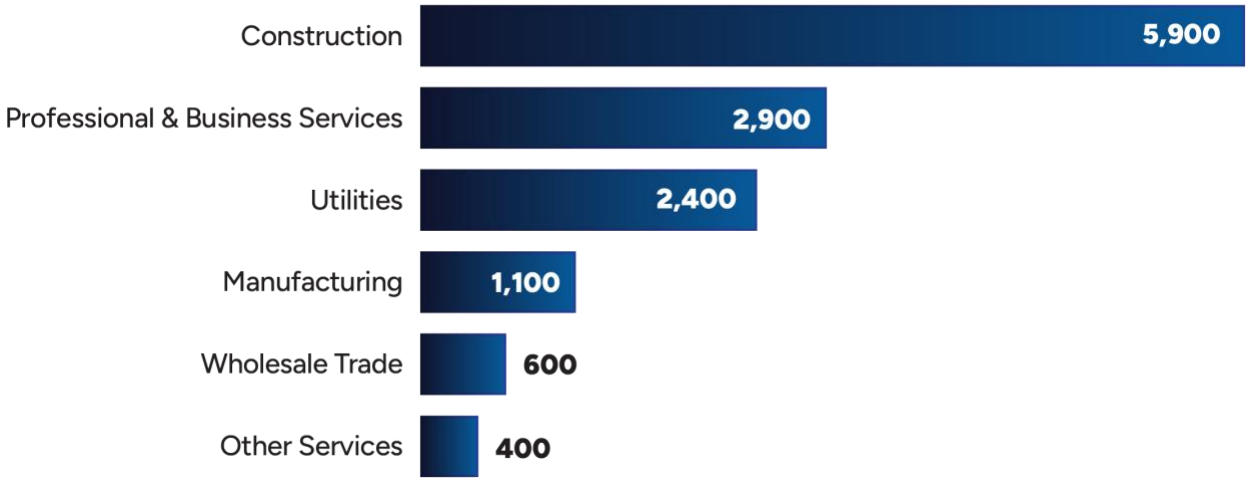



Figure 70. Bioenergy Electric Power Generation Employment by Industry, 2024

## Workforce Demographics

The proportion of women in the Bioenergy EPG workforce (29%) was higher than the energy workforce (26%). The proportion of veterans in the Bioenergy EPG workforce (11%) was higher than the energy workforce (9%) and more than double the national workforce overall (5%) (Table 24).

Table 24. Bioenergy Electric Power Generation Workforce Demographics and Characteristics, 2024[87]

| | Number of Workers | **Percentage of Bioenergy EPG Workforce** | Percentage of EPG Workforce | Percentage of Energy Workforce | Percentage of National Workforce |
|---|---|---|---|---|---|
| Men | 9,100 | **69%** | 70% | 73% | 53% |
| Women | 3,900 | **29%** | 30% | 26% | 47% |
| Hispanic or Latino | 2,600 | **20%** | 21% | 19% | 19% |
| Non-Hispanic or Latino | 10,700 | **80%** | 79% | 81% | 81% |
| American Indian or Alaska Native | 200 | **2%** | 2% | 2% | 1% |
| Asian | 1,100 | **8%** | 9% | 7% | 7% |
| Black or African American | 1,300 | **10%** | 9% | 8% | 13% |
| Native Hawaiian or Other Pacific Islander | 200 | **1%** | 1% | 1% | <1% |
| White | 9,600 | **72%** | 72% | 74% | 76% |
| Two or More Races | 400 | **3%** | 5% | 5% | 3% |
| Unknown Race | 500 | **4%** | 3% | 3% | n/a |
| Veterans | 1,500 | **11%** | 9% | 9% | 5% |
| 18 to 29 | 3,600 | **27%** | 29% | 29% | 22% |
| 30 to 54 | 6,800 | **51%** | 55% | 52% | 54% |
| Over 54 | 2,900 | **22%** | 17% | 19% | 24% |
| Self-Identification of Disability | 300 | **2%** | 2% | 2% | 5% |
| Formerly Incarcerated | 200 | **2%** | 1% | 2% | 2% |
| Represented by a Union[88] | 1,700 | **13%** | 13% | 12% | 7% |

[87] National Sources: BLS (2024a, 2024b, 2024c, 2024d), Jobs EQ (2024), Prison Policy (2018).
[88] For this analysis, a union employer is defined as one with at least 20% of its workforce as a member of a labor union or covered by either a project labor agreement or a collective bargaining agreement. Figure represents private sector unionization rate. Unionization rates vary by state.

## Employer Perspective on Workforce Topics

### CURRENT HIRING DIFFICULTY

Among Bioenergy EPG businesses, Wholesale Trade (of Bioenergy EPG equipment and parts) and Professional and Business Services (e.g., engineering, research and development, information technology, etc.) employers reported the most hiring difficulty in 2024, with 94% of employers reporting at least some level of difficulty. Nearly half (44%) of Construction employers reported hiring was "very difficult," while over one-quarter of Utilities employers reported hiring was "not at all difficult" (Figure 71).

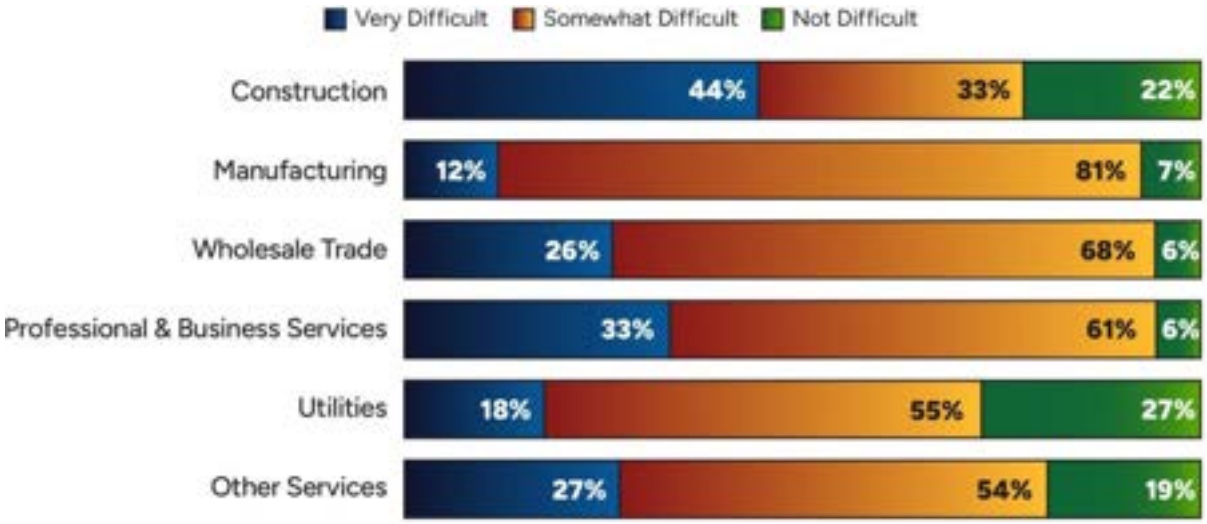



Figure 71. Bioenergy Electric Power Generation Employers' Perceived Hiring Difficulty, 2024

### ANTICIPATED EMPLOYMENT CHANGE BY INDUSTRY

Employers across Wholesale Trade, Professional and Business Services, Construction, Utilities, and Manufacturing in Bioenergy EPG anticipate job growth through 2025, ranging from 0.2% for the Manufacturing industry to 8.7% for the Wholesale Trade industry (e.g., the sales of Bioenergy EPG equipment and parts) (Figure 72).

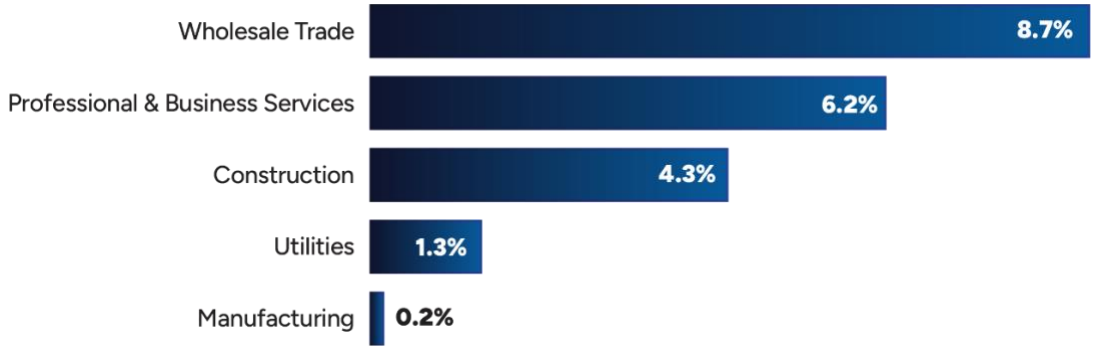



Figure 72. Bioenergy Electric Power Generation Employers' Anticipated Employment Change by Industry, 2024-2025[89]

# Oil Electric Power Generation

Oil EPG refers to the process of using petroleum, primarily refined products like residual fuel oil and, in some cases, crude oil, to generate electricity. Workers in Oil EPG include plant operators managing oil-fired generators, technicians maintaining combustion systems, and manufacturing workers and distributors supplying engine components. Oil EPG workers also include those involved in professional and business services that support the operations of each of these industries, including engineering, information technology, and administrative services.

## Employment by Industry

Most Oil EPG workers were found in the Manufacturing industry, which accounted for 5,300 workers (42.6%), followed by the Professional and Business Services industry, with 4,400 workers (35.5%) (Figure 73).

**12,500**

Workers employed in Oil EPG subsector in 2024

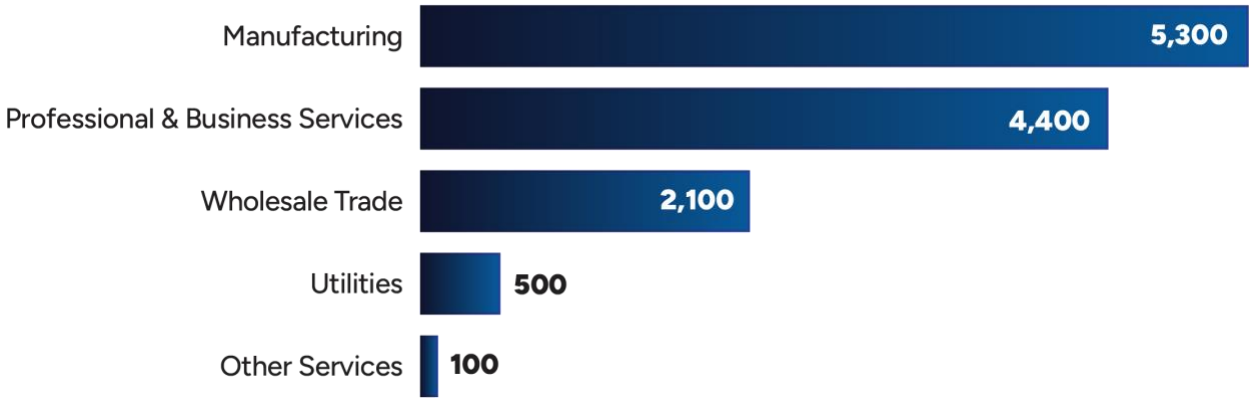



Figure 73. Oil Electric Power Generation Employment by Industry, 2024

[89] Other Services industry was not reported due to insufficient sample size. See Figure 70. Bioenergy Electric Power Generation Employment by Industry, 2024.

## Workforce Demographics

The proportion of workers over 54 years of age in the Oil EPG workforce (18%) was lower than the national workforce overall (24%). Men constituted 74% of the Oil EPG workforce, slightly higher than the share within the energy workforce (73%), and much higher than the national workforce (53%) (Table 25).

Table 25. Oil Electric Power Generation Workforce Demographics and Characteristics, 2024[90]

| | Number of Workers | **Percentage of Oil EPG Workforce** | Percentage of EPG Workforce | Percentage of Energy Workforce | Percentage of National Workforce |
|---|---|---|---|---|---|
| Men | 9,200 | **74%** | 70% | 73% | 53% |
| Women | 3,200 | **26%** | 30% | 26% | 47% |
| Hispanic or Latino | 2,400 | **19%** | 21% | 19% | 19% |
| Non-Hispanic or Latino | 10,100 | **81%** | 79% | 81% | 81% |
| American Indian or Alaska Native | 200 | **2%** | 2% | 2% | 1% |
| Asian | 1,100 | **9%** | 9% | 7% | 7% |
| Black or African American | 1,100 | **9%** | 9% | 8% | 13% |
| Native Hawaiian or Other Pacific Islander | 200 | **1%** | 1% | 1% | <1% |
| White | 9,000 | **72%** | 72% | 74% | 76% |
| Two or More Races | 600 | **5%** | 5% | 5% | 3% |
| Unknown Race | 300 | **3%** | 3% | 3% | n/a |
| Veterans | 1,100 | **9%** | 9% | 9% | 5% |
| 18 to 29 | 3,600 | **29%** | 29% | 29% | 22% |
| 30 to 54 | 6,600 | **53%** | 55% | 52% | 54% |
| Over 54 | 2,300 | **18%** | 17% | 19% | 24% |
| Self-Identification of Disability | 300 | **2%** | 2% | 2% | 5% |
| Formerly Incarcerated | 300 | **2%** | 1% | 2% | 2% |
| Represented by a Union[91] | 1,400 | **11%** | 13% | 12% | 7% |

[90] National Sources: BLS (2024a, 2024b, 2024c, 2024d), Jobs EQ (2024), Prison Policy (2018).
[91] For this analysis, a union employer is defined as one with at least 20% of its workforce as a member of a labor union or covered by either a project labor agreement or a collective bargaining agreement. Figure represents private sector unionization rate. Unionization rates vary by state.

## Employer Perspective on Workforce Topics

### CURRENT HIRING DIFFICULTY

Among Oil EPG businesses, Other Services (e.g., the repair and maintenance of Oil EPG equipment) employers reported the most hiring difficulty, with 91% reporting at least some level of difficulty, followed closely by Utilities employers (90%). Over one-third of Utilities (38%) and Other Services (34%) employers reported hiring was "very difficult" (Figure 74).

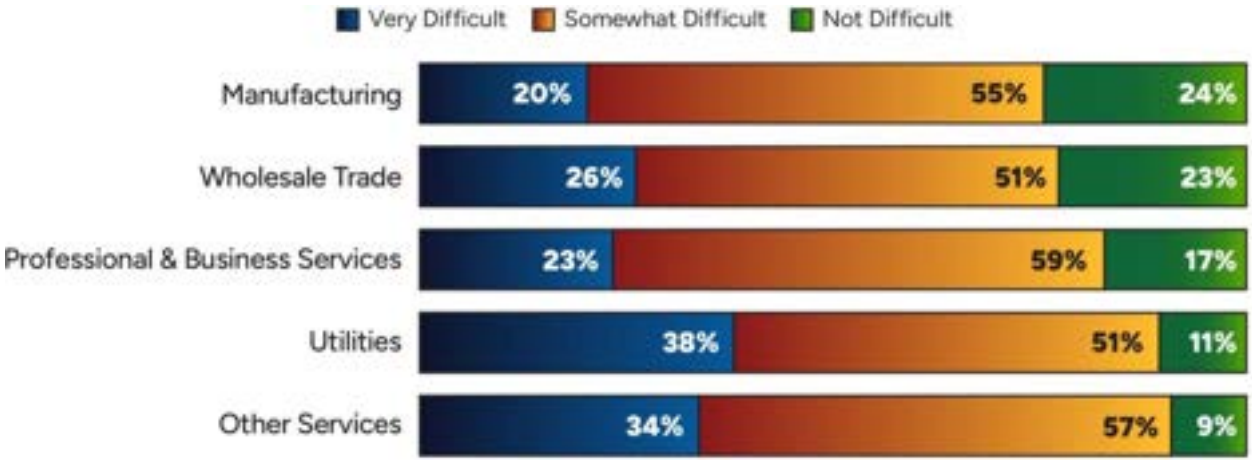



Figure 74. Oil Electric Power Generation Employers' Perceived Hiring Difficulty, 2024

### ANTICIPATED EMPLOYMENT CHANGE BY INDUSTRY

Employers in four of the five industries in Oil EPG anticipate employment growth through 2025, ranging from 1.6% in Manufacturing to 5.1% in Wholesale Trade (e.g., the sale of Oil EPG equipment and parts). Employers in Other Services (e.g., the repair and maintenance of Oil EPG equipment and parts) anticipate a decrease in employment of 3.0% (Figure 75).

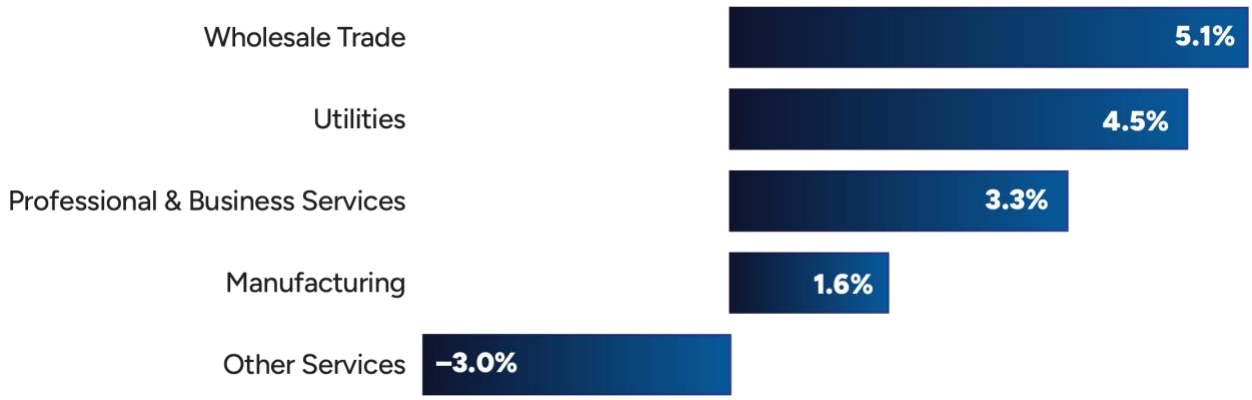



Figure 75. Oil Electric Power Generation Employers' Anticipated Employment Change by Industry, 2024-2025[92]

[92] See Figure 73. Oil Electric Power Generation Employment by Industry, 2024.

# Other Electric Power Generation

Other EPG includes Geothermal EPG, generation from incineration of Other Fuels (Waste Fuels, etc.), and employment that cannot solely be classified into other EPG categories. The types of workers in this subsector vary depending on where a worker is positioned by industry, which can include, but is not limited to, those involved in manufacturing, distribution, repair and maintenance of equipment, and professional and business services that support the operations of each of these industries including engineering, research and development, information technology, and administrative services.

## Employment by Industry

The largest share of workers was employed in the Construction industry (26,600, or 46.9%). The Professional and Business Services (such as engineering, information technology, consulting, finance, etc.) industry employed 15,400 workers (27.1%), and the Utilities industry employed 5,700 workers (10.1%) (Figure 76).

**56,700**

Workers employed in Other EPG subsector in 2024

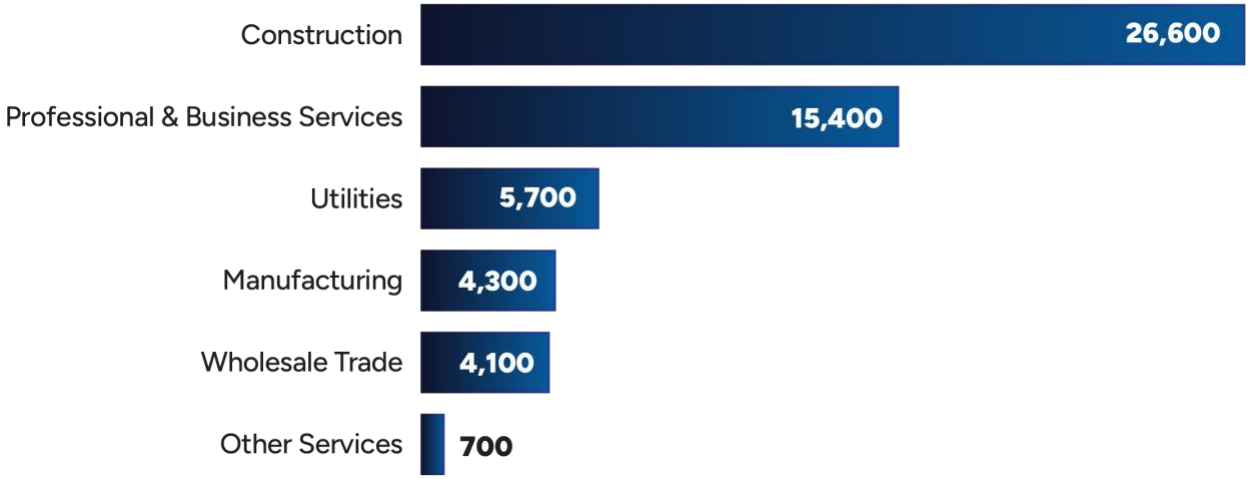



Figure 76. Other Electric Power Generation Employment by Industry, 2024

## Workforce Demographics

The representation of men in the Other EPG workforce (70%) was slightly lower than the energy workforce (73%) but higher than the U.S. workforce overall (53%). The proportion of workers over 54 years of age in the Other EPG workforce (15%) was lower than the energy workforce (19%) and the national workforce (24%), respectively (Table 26).

Table 26. Other Electric Power Generation Workforce Demographics and Characteristics, 2024[93]

| | Number of Workers | **Percentage of Other EPG Workforce** | Percentage of EPG Workforce | Percentage of Energy Workforce | Percentage of National Workforce |
|---|---|---|---|---|---|
| Men | 39,700 | **70%** | 70% | 73% | 53% |
| Women | 16,700 | **29%** | 30% | 26% | 47% |
| Hispanic or Latino | 10,400 | **18%** | 21% | 19% | 19% |
| Non-Hispanic or Latino | 46,300 | **82%** | 79% | 81% | 81% |
| American Indian or Alaska Native | 800 | **1%** | 2% | 2% | 1% |
| Asian | 5,300 | **9%** | 9% | 7% | 7% |
| Black or African American | 4,000 | **7%** | 9% | 8% | 13% |
| Native Hawaiian or Other Pacific Islander | 800 | **1%** | 1% | 1% | <1% |
| White | 41,300 | **73%** | 72% | 74% | 76% |
| Two or More Races | 2,700 | **5%** | 5% | 5% | 3% |
| Unknown Race | 1,700 | **3%** | 3% | 3% | n/a |
| Veterans | 3,800 | **7%** | 9% | 9% | 5% |
| 18 to 29 | 16,900 | **30%** | 29% | 29% | 22% |
| 30 to 54 | 31,300 | **55%** | 55% | 52% | 54% |
| Over 54 | 8,400 | **15%** | 17% | 19% | 24% |
| Self-Identification of Disability | 1,400 | **2%** | 2% | 2% | 5% |
| Formerly Incarcerated | 900 | **2%** | 1% | 2% | 2% |
| Represented by a Union[94] | 2,400 | **4%** | 13% | 12% | 7% |

[93] National Sources: BLS (2024a, 2024b, 2024c, 2024d), Jobs EQ (2024), Prison Policy (2018).
[94] For this analysis, a union employer is defined as one with at least 20% of its workforce as a member of a labor union or covered by either a project labor agreement or a collective bargaining agreement. Figure represents private sector unionization rate. Unionization rates vary by state.

## Employer Perspective on Workforce Topics

### CURRENT HIRING DIFFICULTY

Among Other EPG businesses, Wholesale Trade (of other EPG equipment and parts) employers reported the most hiring difficulty in 2024, with 94% of employers reporting at least some level of difficulty. Almost one-quarter (24%) of Utilities employers found hiring "not at all difficult" (Figure 77).

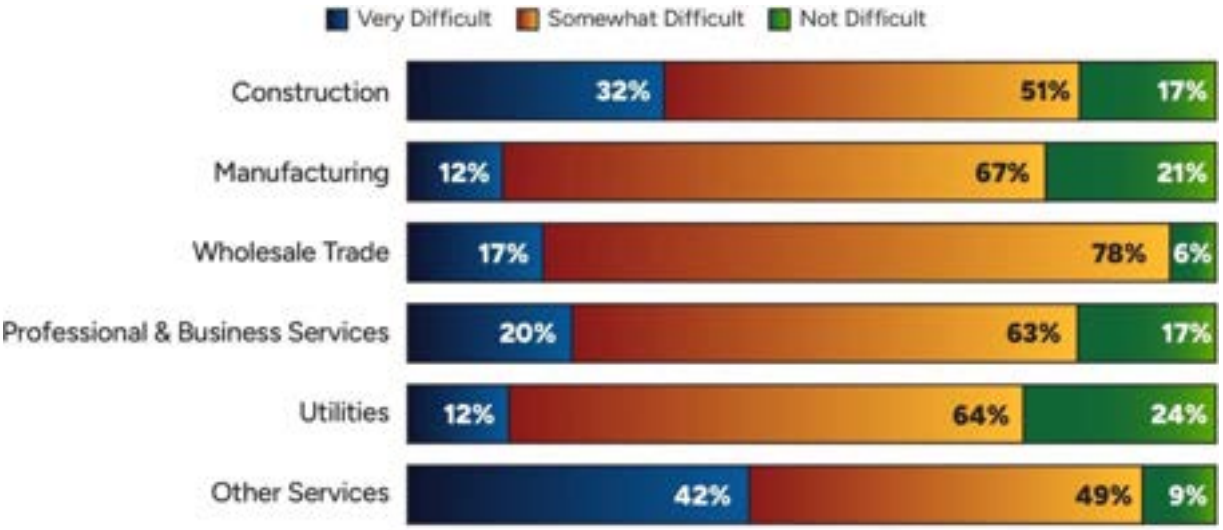



Figure 77. Other Electric Power Generation Employers' Perceived Hiring Difficulty, 2024

### ANTICIPATED EMPLOYMENT CHANGE BY INDUSTRY

Employers in all industries in the Other EPG subsector anticipate employment growth through 2025, ranging from 5.0% in Wholesale Trade (of other EPG equipment and parts) to 10.7% in Construction (Figure 78).

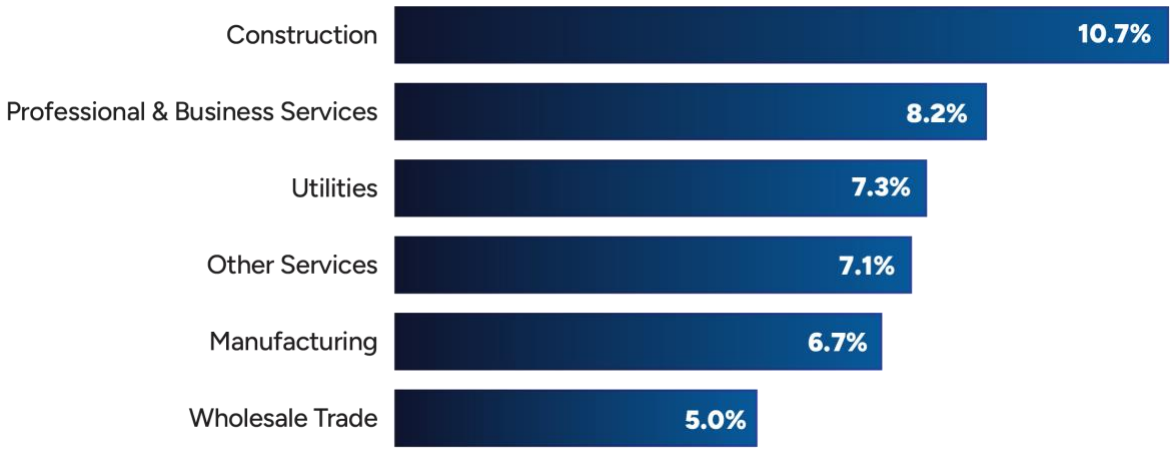



Figure 78. Other Electric Power Generation Employers' Anticipated Employment Change by Industry, 2024-2025[95]

[95] See Figure 76. Other Electric Power Generation Employment by Industry, 2024.

U.S. DEPARTMENT of ENERGY

# TRANSMISSION, DISTRIBUTION, & STORAGE

2025 United States Energy & Employment Report

# TRANSMISSION, DISTRIBUTION, & STORAGE

Transmission, Distribution, and Storage (TDS) includes a wide variety of industries, activities, and subsectors related to constructing, operating, and maintaining energy transportation and storage infrastructure. This chapter focuses on employment data for the TDS workforce by subsectors, industries, and occupations, including workforce wages and benefits, workforce demographics, and employer perspectives.

The Transmission and Distribution (T&D) subsectors include:

- Traditional T&D Fuels
  - Natural Gas T&D
  - Petroleum T&D
  - Coal T&D
  - Other Fuels T&D
- Electrical Grid T&D
  - Traditional T&D Electricity
  - Smart Grid
  - Microgrid
  - Other Grid Modernization
  - EV Charging
- Other T&D[96]

The Storage subsectors include:

- Battery Storage
- Pumped Hydro Storage
- Mechanical Storage
- Thermal Storage
- Fuels Storage
  - Biofuels Storage
  - Liquified Natural Gas (LNG) Storage
  - Refined Petroleum Fuels (Liquid) Storage
  - Refined Petroleum Fuels (Gas) Storage
  - Compressed Natural Gas Storage
  - Crude Oil Storage
  - Nuclear Storage
  - Coal Storage
  - Other Gas Storage
  - Other Liquid Fuel Storage
- Other Storage

[96] Other T&D refers to Electric Power Transmission and Distribution employment that cannot be placed in one of the previously listed subsectors based on employer response (unable to place employees in a category where they spend "more of their time"). Note: EV Charging was combined with Other T&D in previous USEERS.

**USEER NOTE**

Traditional Transmission and Distribution employment includes workers engaged in activities related to the transmission and distribution of electricity and the transportation of fuels. This includes employment associated with electric power transmission lines, pipeline construction, fuel distribution and transport, and the manufacturing of equipment used for electrical and fuel transmission. Transportation of fuels is captured in pipeline transportation and the transport of fuels, by way of truck, rail, air, and water.

Employment pertaining to the storage of electricity and fuels is also included in this sector. Employment related to Storage subsectors such as Batteries, Pumped Hydro Storage, Compressed Air, and other utility-scale storage methods is reported in this chapter. The TDS sector includes both legacy power lines and newer subsectors such as Microgrids and Smart Grids. In addition to the construction and operation of electricity and fuel TDS infrastructure, the TDS sector includes manufacturers and other suppliers, as well as various professional and technical service providers and other services such as repair and maintenance.

The TDS chapter is structured as follows:

- **Key Takeaways** that summarize key findings from the TDS sector overall.
- **TDS Employment by Subsector, Industry, and Occupation** that describes where employment is concentrated across the TDS sector.
- **TDS Workforce Wages, Benefits, and Demographics** that presents a descriptive picture of the TDS sector jobs and workforce.
- **Employer Perspectives on Workforce Topics** that aggregates employer responses.

Unlike the other energy production chapters, TDS is not broken out into fuel technologies because the majority of employment is involved in Electrical Transmission and Distribution, which cannot be split into generation source accurately to estimate workers. There are sections where fuel technology is highlighted, but those are for areas outside of Electrical Transmission and Distribution where fuel type is identified, such as the distribution of natural gas or transport of coal (via truck, rail, or water).

**USEER NOTE**

Jobs related to the combustion of fuels to generate electricity are included in the Fuels chapter, while jobs in generating electricity to power vehicles or buildings are covered in the Electric Power Generation (EPG) chapter.

# Transmission, Distribution, & Storage Key Takeaways

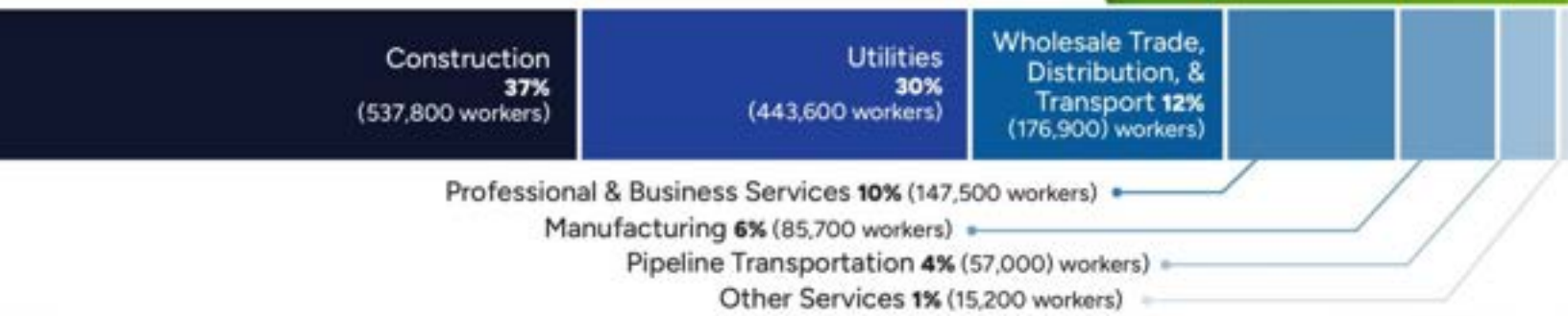
U.S. DEPARTMENT of ENERGY

Transmission, Distribution, & Storage sector employed **1,463,700** workers.

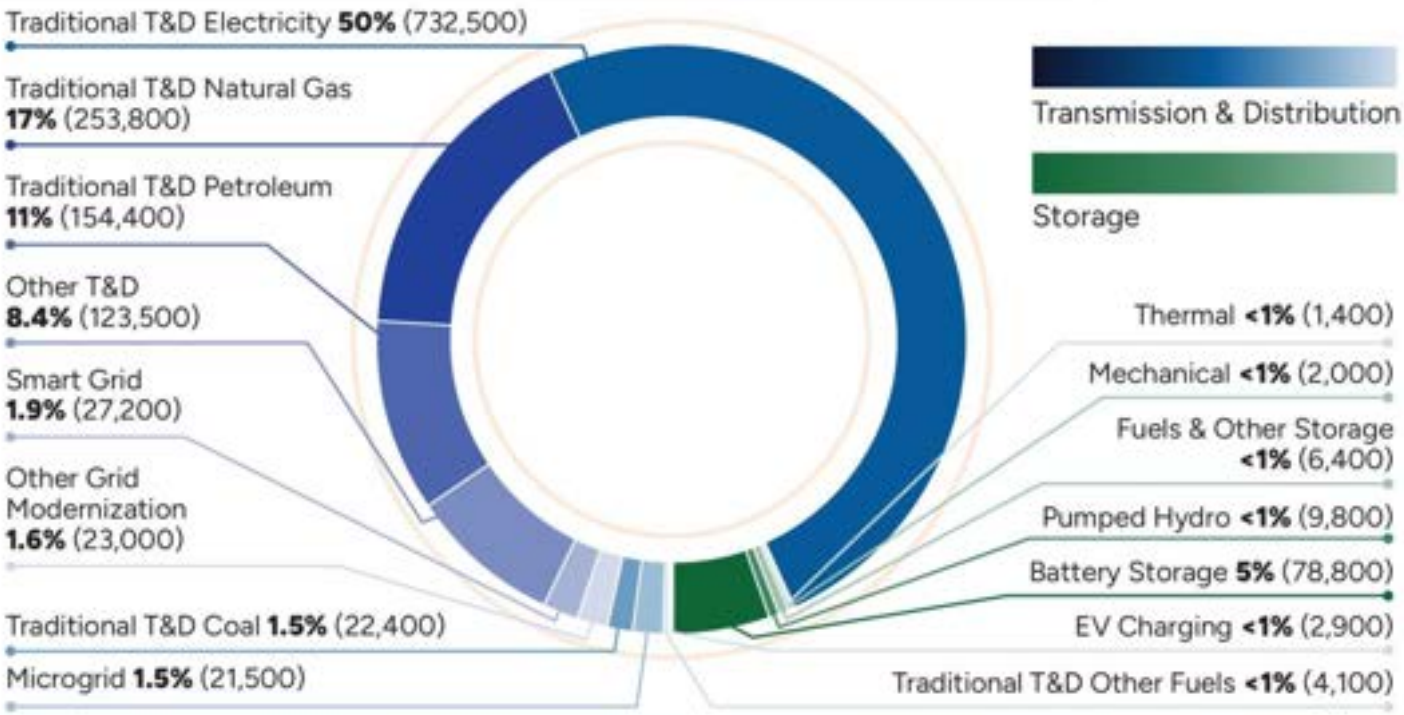
**$59,840** is the **median wage for transmission, distribution, & storage** employment– which is **20.9% higher** than the **U.S. median wage** of $49,500.

Traditional T&D Electricity employed 50% of the TDS sector, totaling **732,500** workers.

## EMPLOYMENT BREAKDOWN BY INDUSTRY




## EMPLOYMENT BREAKDOWN BY SUBSECTOR



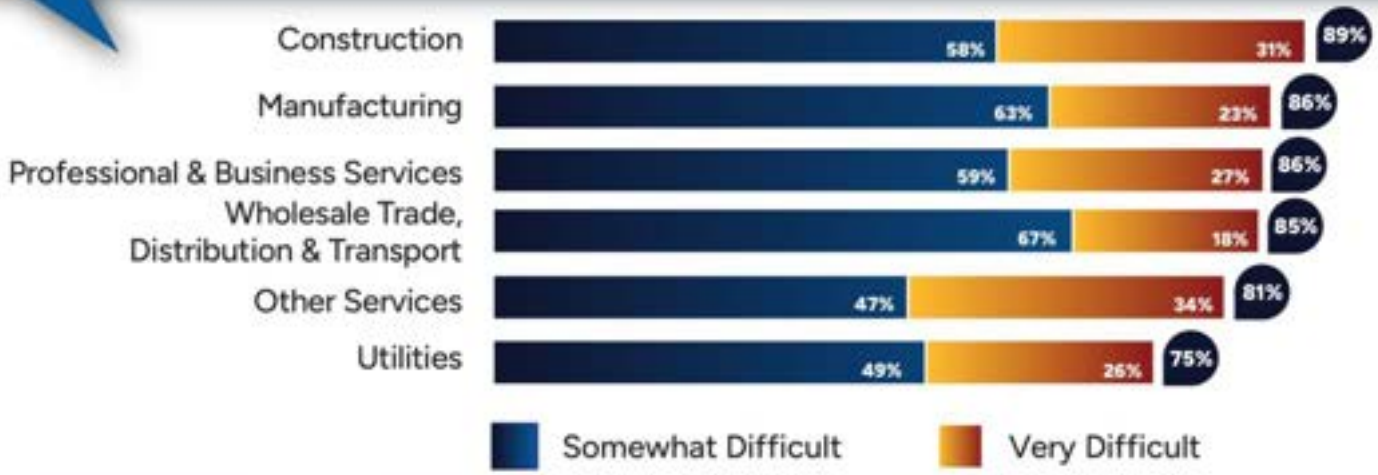

Reference: 2025 UNITED STATES ENERGY & EMPLOYMENT REPORT

# EMPLOYER PERSPECTIVES | HIRING INSIGHTS

U.S. DEPARTMENT of ENERGY

## TRANSMISSION, DISTRIBUTION, & STORAGE EMPLOYERS' PERCEIVED HIRING DIFFICULTY BY INDUSTRY

Among employers in the Transmission, Distribution, and Storage sector, **58%** in the Construction industry reported that hiring workers is at least "somewhat difficult."




## MOST COMMON REASONS FOR HIRING DIFFICULTY

**Insufficient Qualifications (Certifications or Education)**

- Utilities
- Wholesale Trade, Distribution, & Transport

**Lack of Experience, Training, or Technical Skills**

- Construction
- Manufacturing
- Other Services
- Professional & Business Services

## MOST DIFFICULT TO HIRE OCCUPATIONS

**Engineers / Scientists**

- Manufacturing
- Wholesale Trade, Distribution, & Transport
- Professional & Business Services
- Other Services

**Line Workers**

- Utilities

**Management (Directors, Supervisors, Vice Presidents)**

- Construction

Reference: 2025 UNITED STATES ENERGY & EMPLOYMENT REPORT

## Transmission, Distribution, & Storage Employment by Subsector, Industry, and Occupation

This section analyzes employment in the TDS sector through three different lenses:

- Subsector (e.g., Traditional T&D, Battery Storage)
- Industry (e.g., Construction, Manufacturing)
- Occupation (e.g., Administrative, Production)

The TDS sector is split into T&D and Storage, and then further into subsectors.

### TDS EMPLOYMENT BY SUBSECTOR

Jobs in Traditional T&D (comprised of T&D of Electricity, Natural Gas, Petroleum, Coal, and Other Fuels) made up the largest share of employment in the TDS sector, with 1,167,200 total workers, representing 85.5% of the T&D workforce (Figure 79).

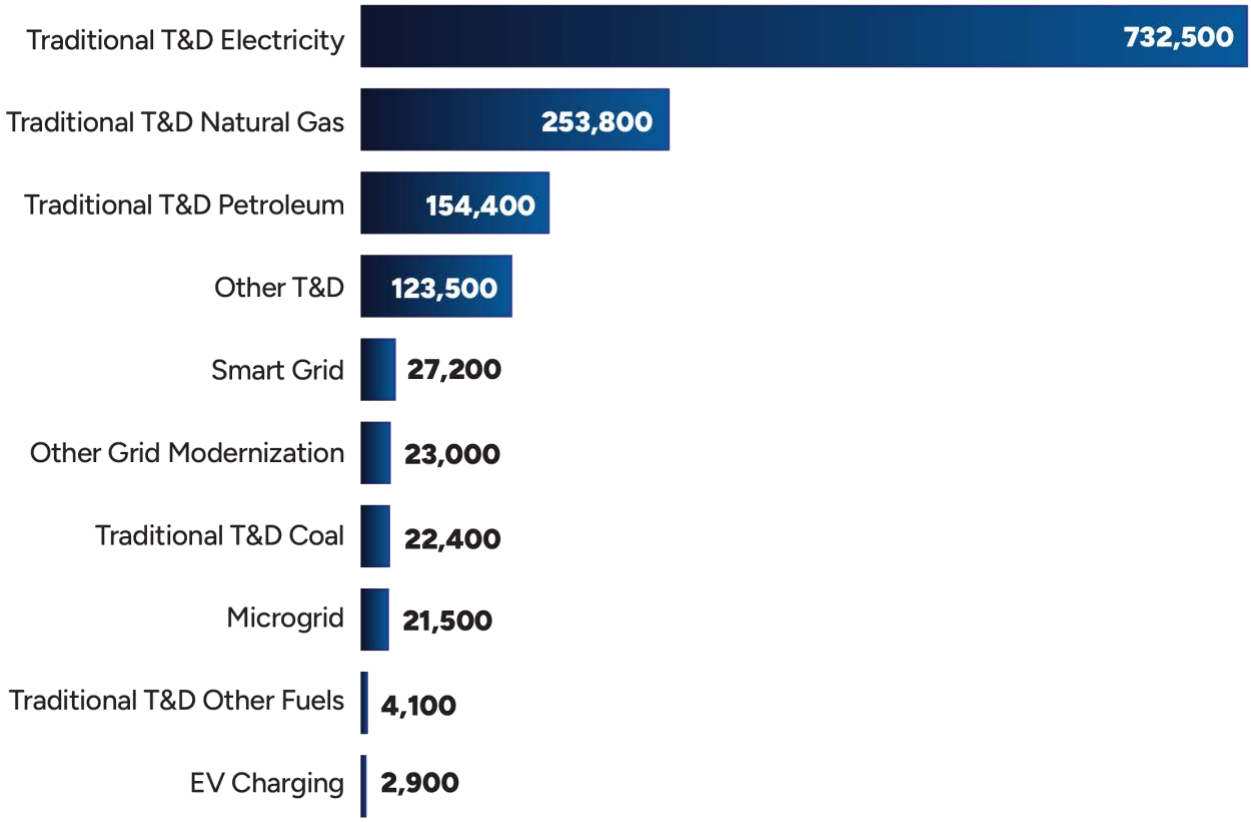



Figure 79. Total T&D Employment by Subsector, 2024

Within Electrical Grid T&D, Traditional T&D of Electricity made up the largest share of employment, with 732,500 workers – 90.8% of the Electrical T&D workforce (Figure 80).


Figure 80. Electrical Grid T&D Employment by Subsector, 2024

Within Traditional T&D of Fuels, the T&D of Natural Gas had the highest employment with 253,800 workers (58.4%) (Figure 81).

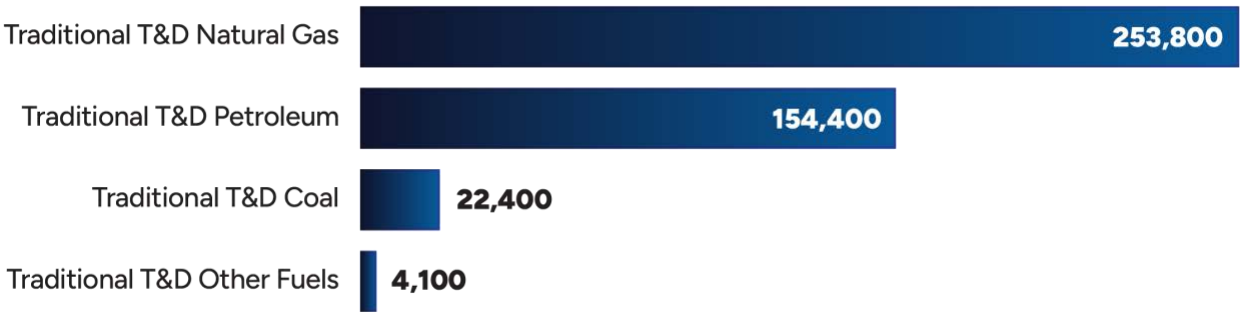



Figure 81. Traditional T&D of Fuels Employment by Subsector, 2024

Battery Storage[97] made up the largest share of jobs within Storage, with 78,800 workers, or 80.1% of the Storage workforce in 2024, followed by Pumped Hydro Storage with 9,800 workers (10.0%). Storage employment is presented separately in Figure 81 and Figure 82 to provide clarity due to notable variation in employment in Storage.


Figure 82. Storage Employment by Subsector, 2024

[97] Most businesses in Battery Storage identified behind-the-meter (buildings or industrial facilities) (65.1%) or front-of-meter (electric grid) (62.1%) as an application of their Battery Storage work in 2024. Additionally, 21.6% of Battery Storage businesses identified vehicles or other transportation as an application of their Battery Storage work. Please note that this question was a multiple-choice question.

Among all other Storage types, Mechanical Storage followed behind Pumped Hydro Storage and Battery Storage, employing 2,000 workers (2.0%). Nuclear Storage made up the smallest share of workers, with 100 workers (0.1%) (Figure 83).

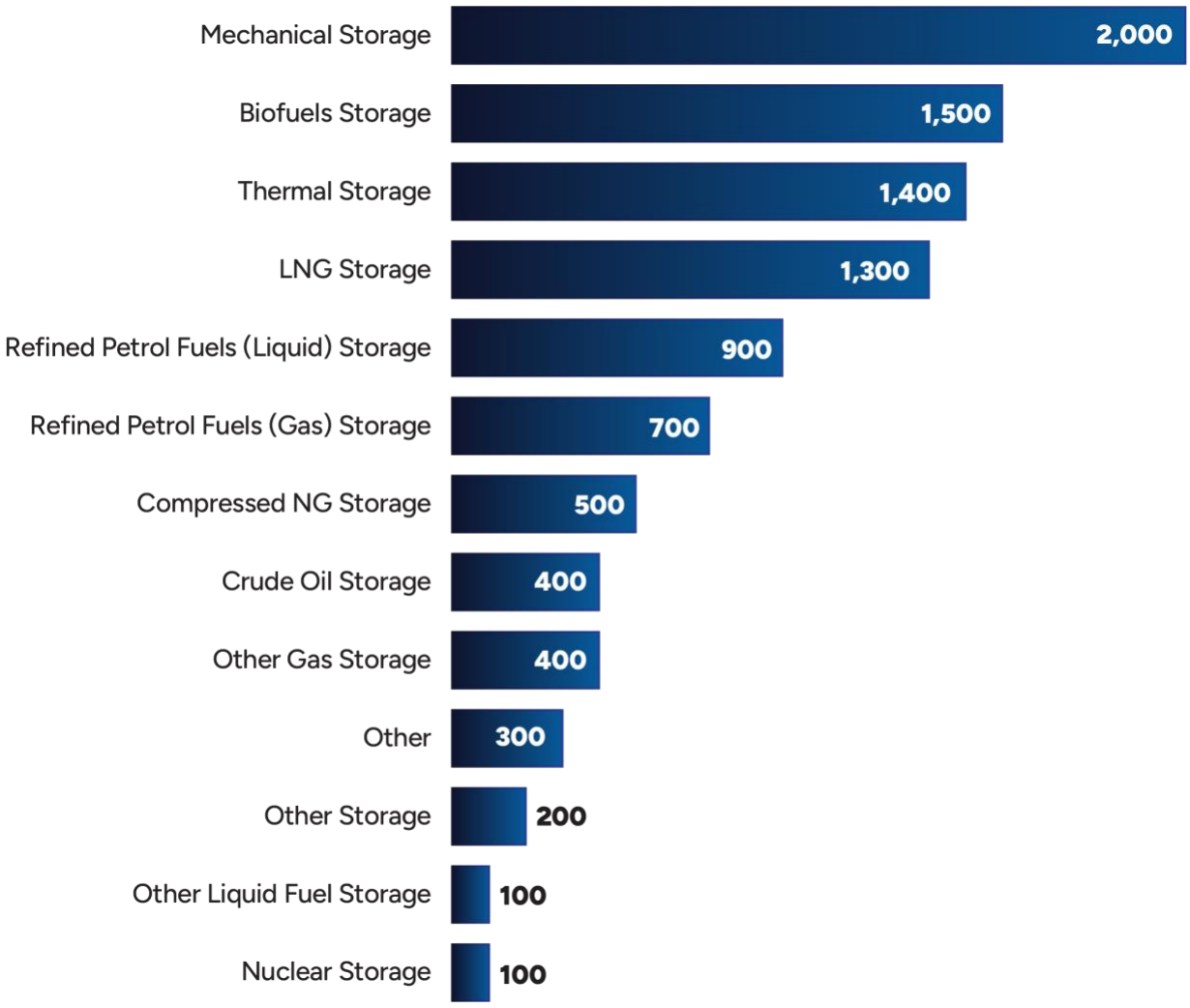



Figure 83. Storage Employment by Subsector (except for Battery Storage and Pumped Hydro Storage), 2024[98]

[98] Other Storage refers to Storage subsectors not encompassed by the other subsectors, as identified by employers in the survey. This includes areas such as research and development and emerging Storage technologies (e.g., hydrogen technologies typically found in university of private labs). "Other" is used when employers are unable to assign employees to a single Storage subsector in which they spend "most of their time."

### TDS EMPLOYMENT BY INDUSTRY

The Construction industry represented the largest share of employment (36.7%) in the TDS sector, with 537,800 workers. Utilities followed, with 443,600 workers (30.3%), and Wholesale Trade, Distribution, and Transport, with 176,900 workers (12.1%) (Figure 84).

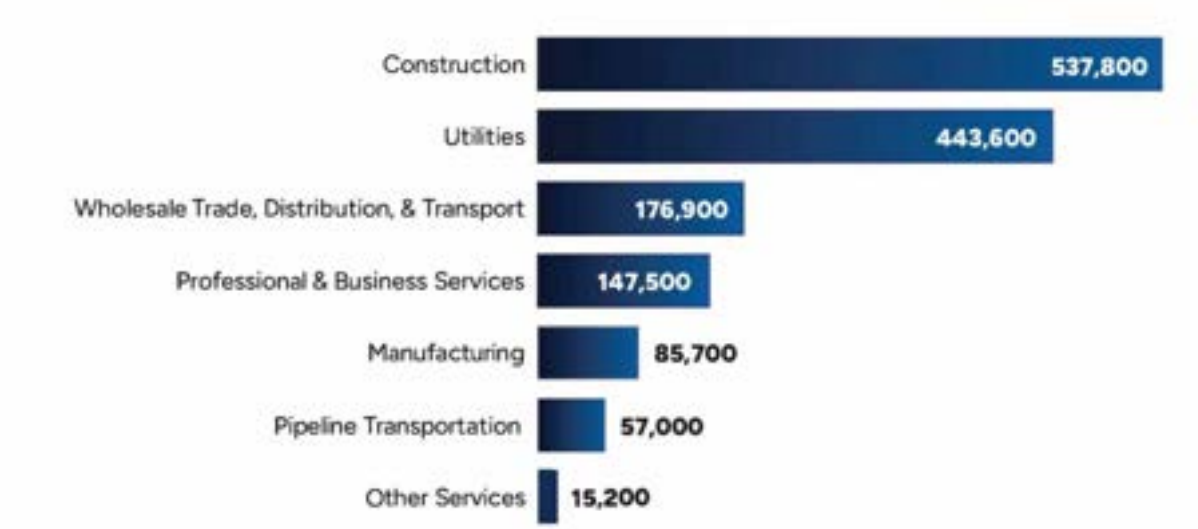



Figure 84. TDS Employment by Industry, 2024

Looking across subsectors and industries, workers in several subsectors – including Pumped Hydro Storage, Battery Storage, Petroleum Storage, Smart Grid, and Microgrid – were highly concentrated in the Construction industry (Table 27).

Table 27. Concentration of TDS Employment by Subsector and Industry, 2024 (continued on next page)

| | Industry | | | | | | |
|---|---|---|---|---|---|---|---|
| **Subsector** | Utilities | Construction | Manufacturing | Wholesale Trade, Distribution, & Transport | Professional & Business Services | Pipeline Transportation | Other Services |
| Traditional T&D Electricity | **44%** | **32%** | **6%** | **5%** | **12%** | **0%** | **2%** |
| Traditional T&D Petroleum | **0%** | **24%** | **0%** | **63%** | **0%** | **12%** | **0%** |
| Traditional T&D Natural Gas | **49%** | **37%** | **0%** | **0%** | **0%** | **14%** | **0%** |
| Traditional T&D Coal | **0%** | **0%** | **0%** | **100%** | **0%** | **0%** | **0%** |
| Traditional T&D Other Fuels | **0%** | **0%** | **0%** | **100%** | **0%** | **0%** | **0%** |
| Smart Grid | **0%** | **45%** | **6%** | **6%** | **42%** | **0%** | **1%** |
| Microgrid | **0%** | **57%** | **17%** | **8%** | **15%** | **0%** | **3%** |
| Other Grid Modernization | **0%** | **76%** | **9%** | **1%** | **13%** | **0%** | **1%** |
| EV Charging | **0%** | **46%** | **6%** | **20%** | **22%** | **0%** | **6%** |
| Other T&D | **0%** | **64%** | **13%** | **1%** | **22%** | **0%** | **0%** |
| Battery Storage | **0%** | **52%** | **18%** | **11%** | **17%** | **0%** | **1%** |
| Pumped Hydro Storage | **0%** | **41%** | **27%** | **3%** | **16%** | **13%** | **1%** |
| Mechanical Storage | **0%** | **5%** | **72%** | **0%** | **22%** | **0%** | **1%** |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Thermal Storage | 0% | 52% | 12% | 3% | 27% | 0% | 6% |
| Biofuels Storage | 0% | 71% | 0% | 0% | 26% | 0% | 4% |
| LNG Storage | 0% | 38% | 21% | 16% | 25% | 0% | 1% |
| Refined Petroleum Fuels (Liquid) Storage | 0% | 44% | 29% | 3% | 0% | 0% | 24% |
| Refined Petroleum Fuels (Gas) Storage | 0% | 68% | 0% | 0% | 0% | 0% | 32% |
| Compressed Natural Gas Storage | 0% | 11% | 5% | 7% | 77% | 0% | 0% |
| Crude Oil Storage | 0% | 100% | 0% | 0% | 0% | 0% | 0% |
| Nuclear Storage | 0% | 0% | 0% | 0% | 100% | 0% | 0% |
| Other Gas Storage | 0% | 69% | 0% | 0% | 31% | 0% | 0% |
| Other Liquid Fuel Storage | 0% | 42% | 0% | 0% | 58% | 0% | 0% |
| Other Storage[99] | 0% | 79% | 0% | 0% | 21% | 0% | 0% |
| Other[100] | 0% | 100% | 0% | 0% | 0% | 0% | 0% |

Key:

0% 100%

[99] Other Storage refers to Storage subsectors not encompassed by the other subsectors, as identified by employers in the survey. This includes areas such as research and development and emerging Storage technologies (e.g., hydrogen technologies).
[100] Other is used when employers are unable to assign employees to a single storage subsector in which they spend "most of their time."

## TDS EMPLOYMENT BY OCCUPATION

While the previous section covered TDS employment by industry, this occupational review focuses on the nature of work performed by workers across industries.

The largest category of workers across the TDS sector was Installation or Repair occupations (30.2%), followed by Administrative occupations (22.1%), and Management/Professional occupations (16.8%) (Figure 85).

**USEER NOTE**

The same occupational roles can appear in multiple industries, and any given industry typically employs workers across multiple occupational categories.

For example, the Manufacturing industry employs many workers engaged in production/manufacturing activities but also employs workers that perform management/professional activities.

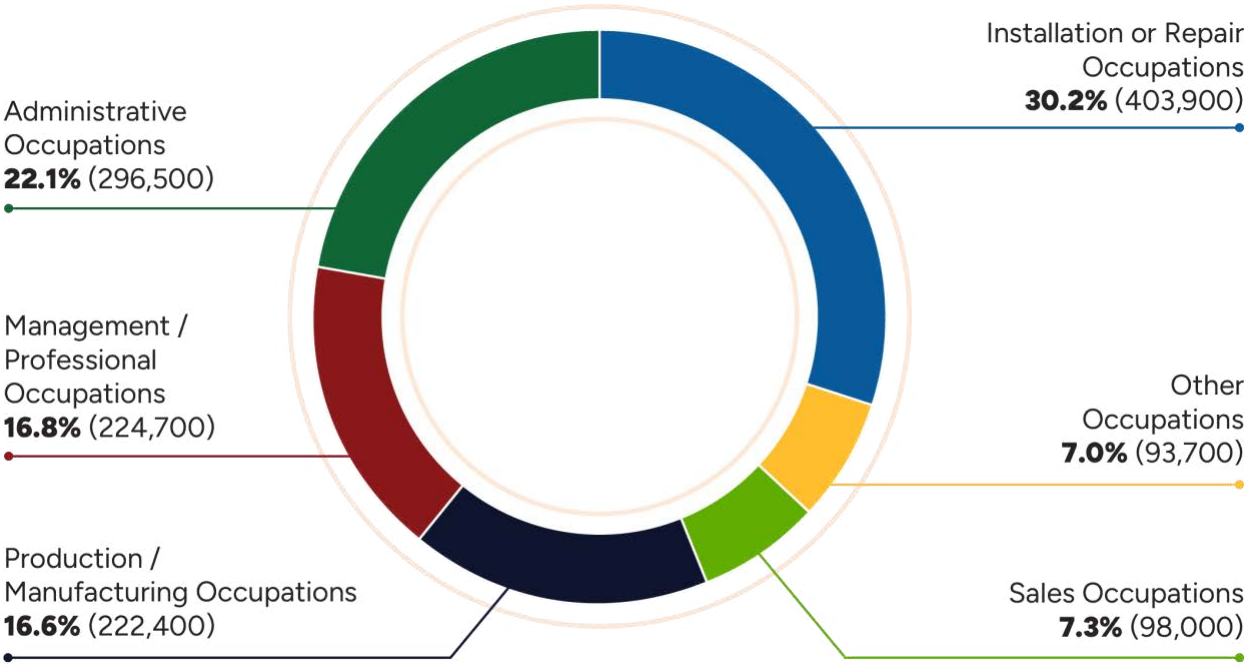



Figure 85. TDS Employment by Occupational Category, 2024

Figure 86 provides examples of specific occupations included within each occupational category.


Figure 86. Occupation Examples by Category

# Transmission, Distribution, & Storage Workforce Wages, Benefits, and Demographics

This section presents data on TDS workforce wages, employer healthcare contributions, and workforce demographics.

## TDS WORKFORCE BY WAGES

Table 28 presents low, median, and high wages[101] for the 15 primary occupations[102] in the TDS sector, which consist of occupations exclusively to the TDS sector, those with a high concentration of employment within TDS, and those comparable across sectors (e.g., Electricians). The median annual salary for workers in the TDS sector was $59,840, 20.9% higher than the U.S. median salary of $49,500.

Table 28. TDS Workforce Wages for 15 Primary Occupations, 2024[103]

| SOC[104] | Occupation[105] | Low | Median | High |
|---|---|---|---|---|
| 51-8012 | Power Distributors and Dispatchers | $71,380 | $106,100 | $141,930 |
| 17-2071 | Electrical Engineers | $76,340 | $96,040 | $129,660 |
| 17-2051 | Civil Engineers | $68,770 | $94,230 | $140,640 |
| 49-2095 | Electrical and Electronics Repairers, Powerhouse, Substation, and Relay | $60,790 | $92,860 | $114,470 |
| 47-2111 | Electricians | $68,320 | $74,970 | $87,650 |
| 49-9051 | Electrical Power-Line Installers and Repairers | $57,980 | $73,310 | $85,590 |
| 49-1011 | First-Line Supervisors of Mechanics, Installers, and Repairers | $58,470 | $72,990 | $95,390 |
| 49-9012 | Control and Valve Installers and Repairers, Except Mechanical Door | $43,630 | $70,640 | $100,720 |
| 49-2022 | Telecommunications Equipment Installers and Repairers, Except Line Installers | $44,110 | $62,440 | $91,820 |
| 47-2073 | Operating Engineers and Other Construction Equipment Operators | $47,880 | $62,350 | $94,940 |
| 49-9071 | Maintenance and Repair Workers, General | $52,880 | $61,530 | $77,620 |
| 49-9041 | Industrial Machinery Mechanics | $43,000 | $59,980 | $86,370 |
| 47-2152 | Plumbers, Pipefitters, and Steamfitters | $41,790 | $59,530 | $93,090 |
| 51-4121 | Welders, Cutters, Solderers, and Brazers | $40,720 | $53,240 | $77,430 |
| 47-3013 | Helpers--Electricians | $39,090 | $44,860 | $56,040 |

**WAGES**

**TDS WORKFORCE OVERALL**

Low: $44,650
**Median: $59,840**
High: $85,170

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**U.S. WORKFORCE OVERALL**

Low: $29,990
**Median: $49,500**
High: $125,720

[101] Low refers to the 10th percentile of wages and high refers to the 90th percentile.
[102] For a full list of occupations for TDS as well as occupations by other sectors and subsectors, see Appendix B.
[103] Wage estimates are based on 2024 survey responses and data from the U.S. Bureau of Labor Statistics' (BLS) 2024 Occupational Employment and Wage Statistics (OEWS). The OEWS data can be found here: https://www.bls.gov/oes/tables.htm.
[104] Standard Occupational Classification (SOC) is a system used by the BLS to categorize occupations in the U.S.
[105] USEER uses occupations as defined by BLS OEWS. Full definitions can be found here: https://www.bls.gov/soc/2018/soc_2018_definitions.pdf.

## TDS WORKFORCE BY BENEFITS

The USEER survey also includes employer-reported data on employer healthcare contribution levels. Based on employer responses, over half (58%) of Telecommunication Equipment Installers and Repairers, Except Line Installers received full coverage of employee and family healthcare costs from their employers (Table 29).

Table 29. TDS Employer Healthcare Coverage for 15 Primary Occupations, 2024[106]

| Occupation | Some Healthcare Insurance Costs for Employee Only | Some Healthcare Insurance Costs for Employee & Family | All Healthcare Insurance Costs for Employee Only | All Healthcare Insurance Costs for Employee & Family |
|---|---|---|---|---|
| Power Distributors and Dispatchers | 10% | 41% | 38% | 10% |
| Electrical Engineers | 3% | 41% | 27% | 30% |
| Civil Engineers | 6% | 50% | 19% | 25% |
| Electrical and Electronics Repairers, Powerhouse, Substation, and Relay | 2% | 40% | 38% | 17% |
| Electricians | 8% | 29% | 18% | 35% |
| Electrical Power-Line Installers and Repairers | 3% | 33% | 14% | 50% |
| First-Line Supervisors of Mechanics, Installers, and Repairers | 7% | 26% | 22% | 37% |
| Control and Valve Installers and Repairers, Except Mechanical Door | 13% | 53% | 20% | 13% |
| Telecommunications Equipment Installers and Repairers, Except Line Installers | 5% | 18% | 16% | 58% |
| Operating Engineers and Other Construction Equipment Operators | 7% | 7% | 27% | 47% |
| Maintenance and Repair Workers, General | 19% | 33% | 19% | 26% |
| Industrial Machinery Mechanics | 8% | 34% | 24% | 34% |
| Plumbers, Pipefitters, and Steamfitters | 13% | 21% | 3% | 42% |
| Welders, Cutters, Solderers, and Brazers | 3% | 40% | 6% | 50% |
| Helpers--Electricians | 14% | 18% | 14% | 36% |

[106] Percentages in table correspond to employer responses to benefits questions as they were asked in the USEER survey, Appendix D.

## TDS WORKFORCE BY DEMOGRAPHICS

The following table summarizes demographic characteristics of the TDS workforce. The share of workers aged 30 to 54 in the TDS sector (55%) was higher than in the energy workforce (52%) and the national workforce (54%). The private sector unionization rate in the TDS workforce (22%) was higher than in the energy sector overall (12%) and the overall national workforce (7%) (Table 30).

Table 30. TDS Workforce Demographics and Characteristics, 2024[107]

| | Number of Workers | **Percentage of TDS Workforce** | Percentage of Energy Workforce | Percentage of National Workforce |
|---|---|---|---|---|
| Men | 991,600 | **74%** | 73% | 53% |
| Women | 329,300 | **25%** | 26% | 47% |
| Hispanic or Latino | 251,500 | **19%** | 19% | 19% |
| Non-Hispanic or Latino | 1,087,800 | **81%** | 81% | 81% |
| American Indian or Alaska Native | 36,500 | **3%** | 2% | 1% |
| Asian | 112,100 | **8%** | 7% | 7% |
| Black or African American | 127,000 | **9%** | 8% | 13% |
| Native Hawaiian or Other Pacific Islander | 16,100 | **1%** | 1% | <1% |
| White | 939,800 | **70%** | 74% | 76% |
| Two or More Races | 62,200 | **5%** | 5% | 3% |
| Unknown Race | 46,000 | **3%** | 3% | n/a |
| Veterans | 98,800 | **7%** | 9% | 5% |
| 18 to 29 | 355,000 | **27%** | 29% | 22% |
| 30 to 54 | 736,700 | **55%** | 52% | 54% |
| Over 54 | 247,600 | **18%** | 19% | 24% |
| Self-Identification of Disability | 29,400 | **2%** | 2% | 5% |
| Formerly Incarcerated | 20,400 | **2%** | 2% | 2% |
| Represented by a Union[108] | 290,500 | **22%** | 12% | 7% |

[107] National Sources: BLS (2024a, 2024b, 2024c, 2024d), Jobs EQ (2024), Prison Policy (2018).
[108] For this analysis, a union employer is defined as one with at least 20% of its workforce as a member of a labor union or covered by either a project labor agreement or a collective bargaining agreement. Figure represents private sector unionization rate. Unionization rates vary by state.

## Employer Perspective on Workforce Topics

The USEER also surveys employers on their perspectives on hiring difficulty and anticipated growth across industries, as well as their primary reasons for hiring difficulty and the most difficult to hire occupations.

### CURRENT HIRING DIFFICULTY

Construction employers within TDS reported the highest level of hiring difficulty, with 89% of employers indicating at least some level of difficulty hiring workers. In contrast, more than one quarter (26%) of Utilities employers found hiring to be not difficult at all (Figure 87).

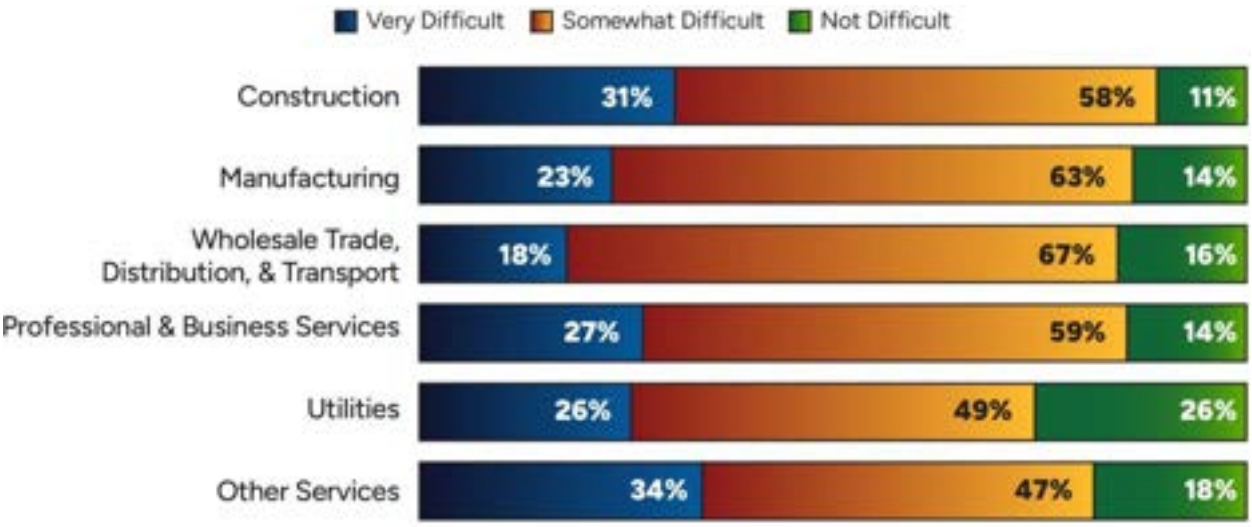
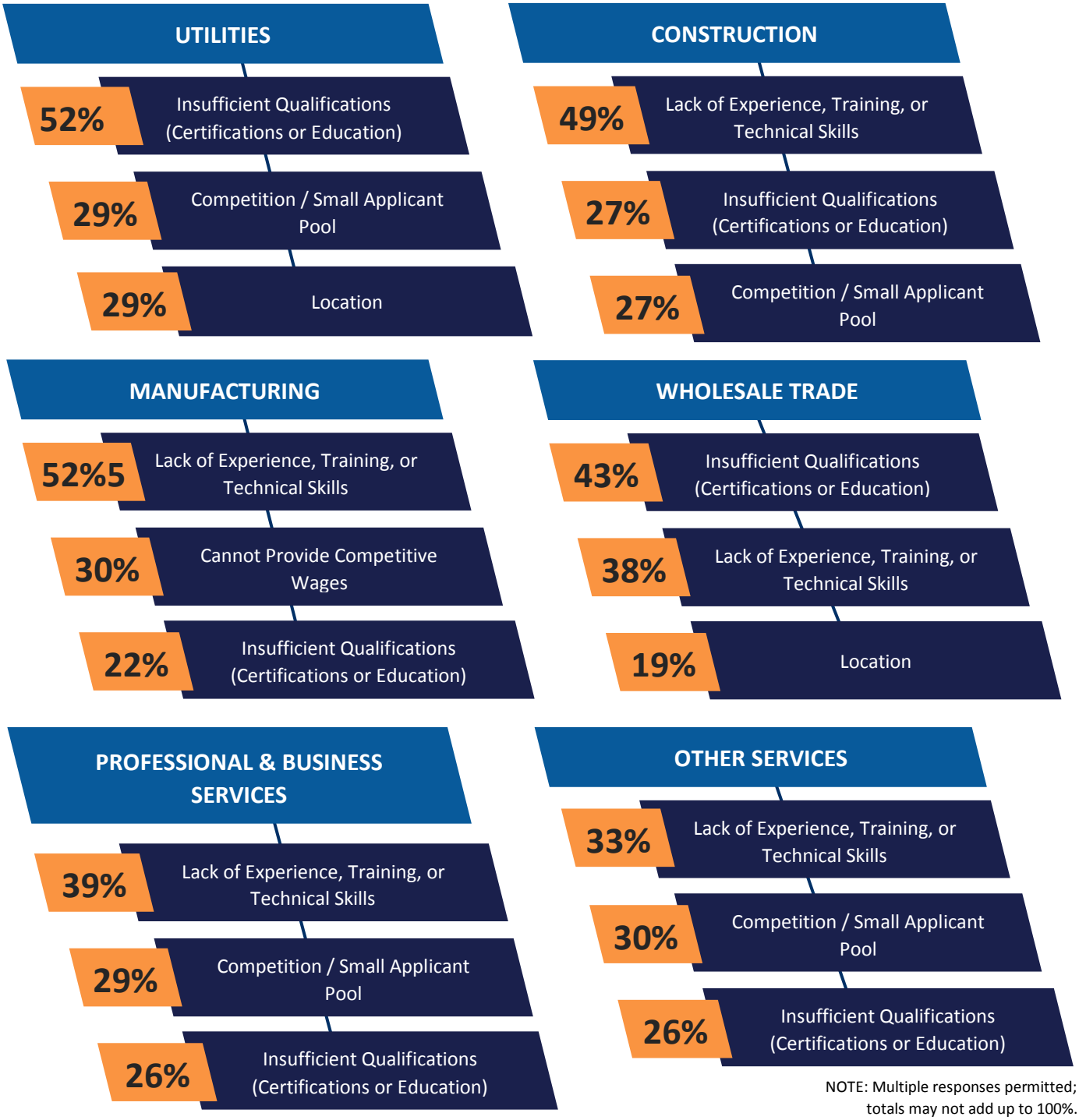



Figure 87. TDS Employers' Perceived Hiring Difficulty by Industry, 2024

## REASONS FOR HIRING DIFFICULTY

Lack of experience, training, or technical skills were the most common reason for hiring difficulty among employers in Construction, Manufacturing, Professional and Business Services (such as engineering, information technology, finance, etc.), and Other Services (including repair and maintenance of transmission, distribution, and storage systems and parts). For the remaining industries in TDS, insufficient qualifications (certifications or education) was the most common reason for hiring difficulty, as reported by Utilities and Wholesale Trade (e.g., the sale of TDS products and parts), Distribution, and Transport employers (Figure 88).

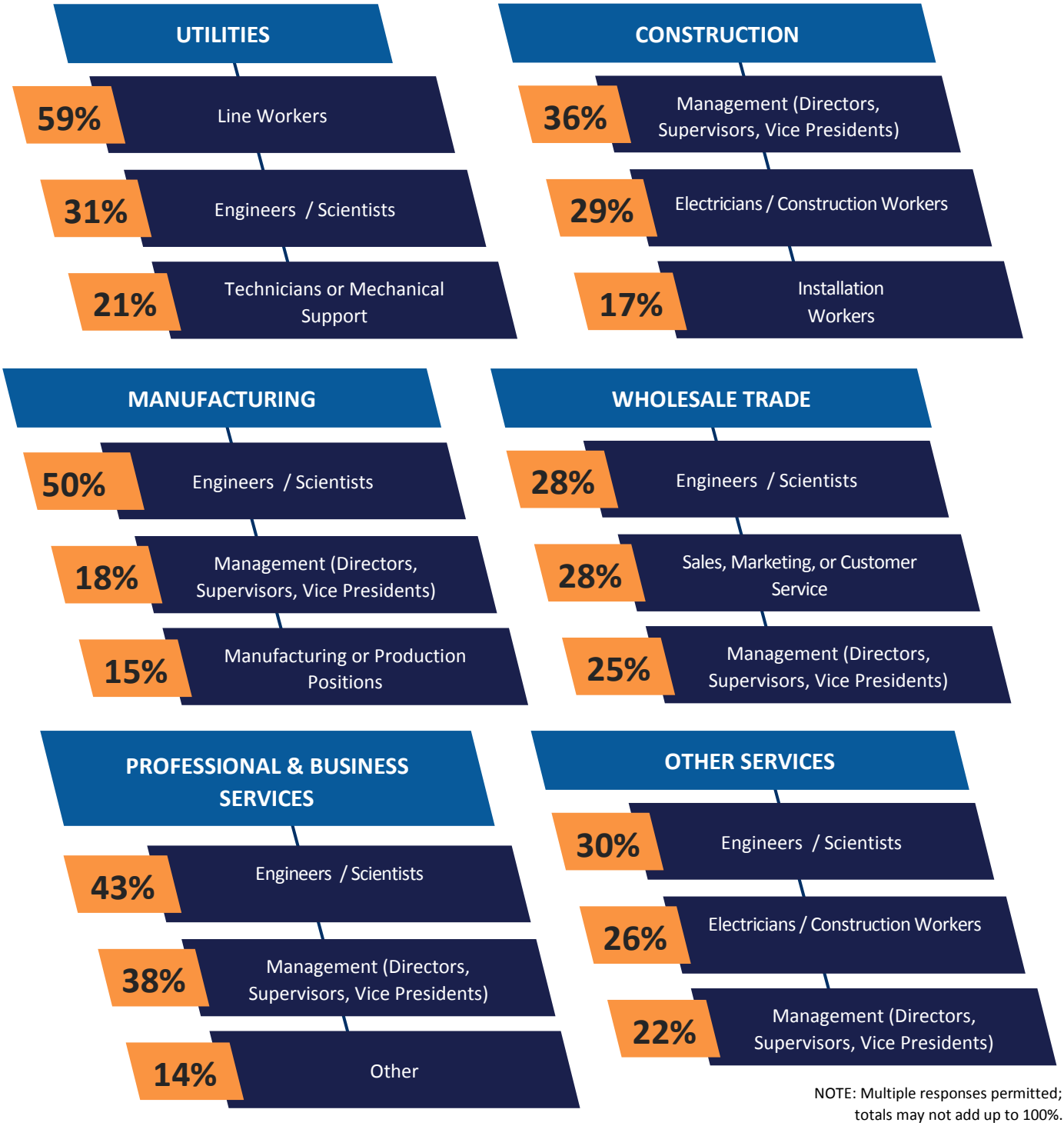



NOTE: Multiple responses permitted; totals may not add up to 100%.

Figure 88. TDS Employers' Reasons for Hiring Difficulty, 2024

## MOST DIFFICULT TO HIRE OCCUPATIONS

Several industries reported hiring difficulty for specific occupations. For example, 59% of Utilities employers reported difficulty hiring Line Workers, while half (50%) of Manufacturing employers reported difficulty hiring Engineers/Scientists. Additionally, Engineers/Scientists were listed as the most (or second most) difficult to hire occupation across nearly all industries in the TDS sector (Figure 89).




NOTE: Multiple responses permitted; totals may not add up to 100%.

Figure 89. TDS Employers' Most Difficult to Hire Occupations, 2024

## ANTICIPATED EMPLOYMENT CHANGE BY SUBSECTOR AND INDUSTRY

This section focuses on anticipated employment change by subsector and industry.

Employers across all T&D subsectors anticipate growth through 2025, ranging from 6.2% in EV Charging to 10.9% in Other T&D[109] (Figure 90).

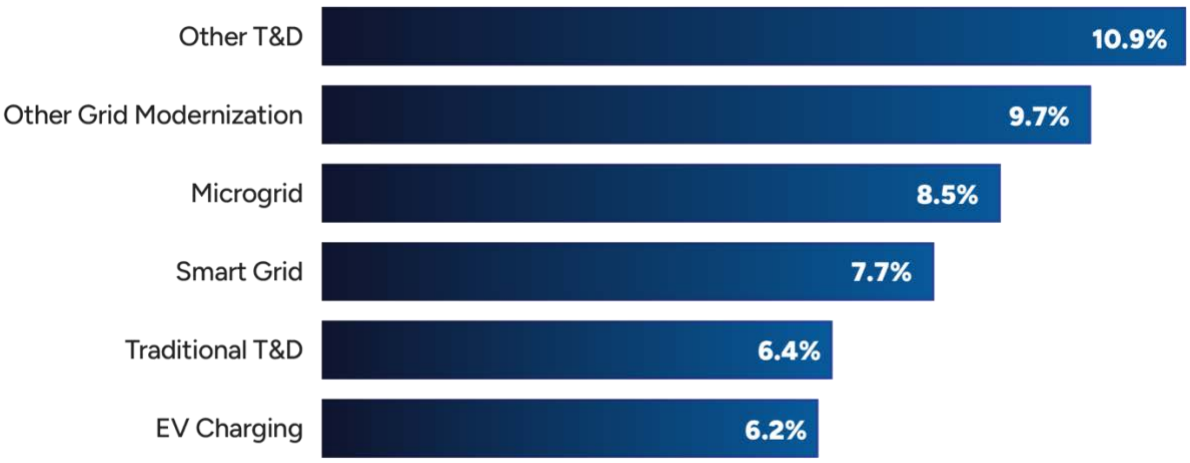



Figure 90. T&D Employers' Anticipated Employment Change by Subsector, 2024-2025[110]

[109] Includes workers that cannot be assigned a single TDS subsector by employers based on where they spend more of their time.
[110] See Figure 79. Total T&D Employment by Subsector, 2024.

The majority of Storage subsectors anticipate increases in employment through 2025, with the exceptions of Refined Petrol Fuels (Liquid) Storage, Refined Petrol Fuels (Gas) Storage, and Crude Oil Storage employers. Employers in Storage anticipate employment change ranging from a 6.8% employment decrease in Crude Oil Storage to a 10.1% increase in the Battery Storage subsector (Figure 91).

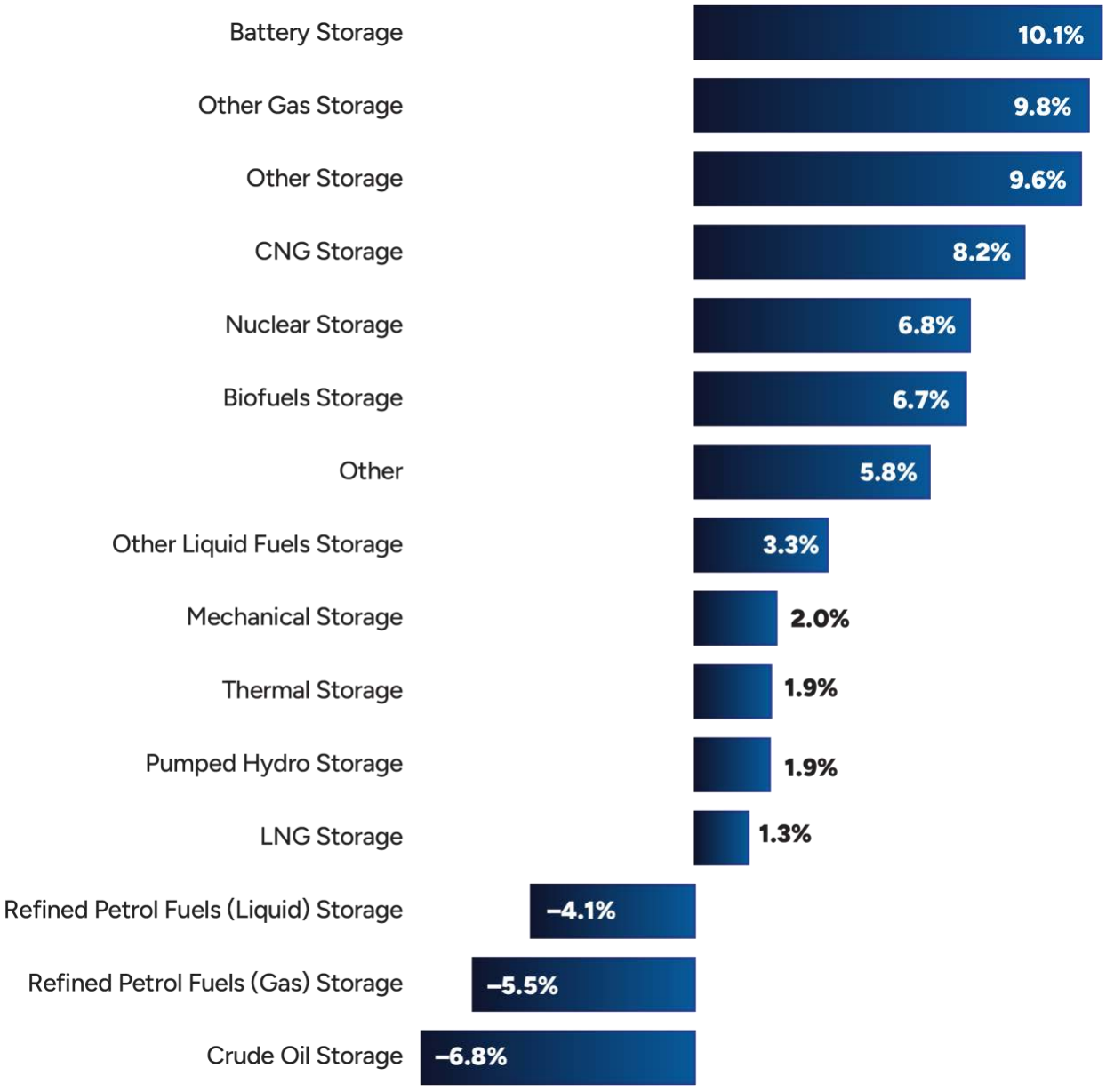



Figure 91. Storage Employers' Anticipated Employment Change by Subsector, 2024-2025[111]

[111] See Figure 82. Storage Employment by Subsector, 2024 and Figure 83. Storage Employment by Subsector (except for Battery Storage and Pumped Hydro Storage), 2024.

All industries within TDS expect job growth through 2025, ranging from 2.9% in Utilities to 11.4% in Construction (Figure 92).

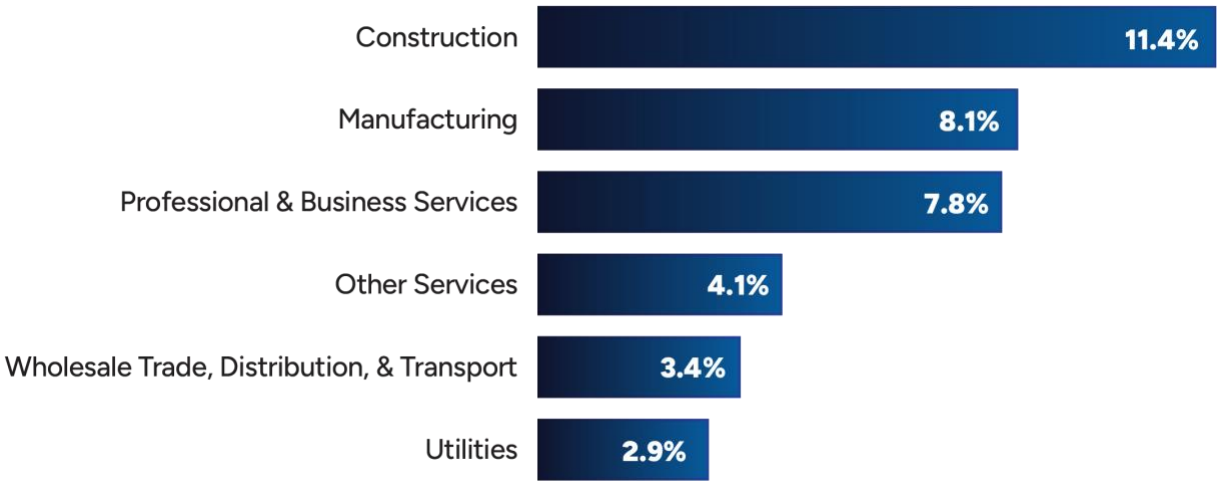



Figure 92. TDS Employers' Anticipated Employment Changes by Industry, 2024-2025[112]


Figure 84. TDS Employment by Industry, 2024.

[112] See Figure 84. TDS Employment by Industry, 2024.

U.S. DEPARTMENT of ENERGY

# ENERGY EFFICIENCY

2025 United States Energy & Employment Report

# ENERGY EFFICIENCY

Energy Efficiency encompasses the manufacturing, wholesale trade, installation, and repair and maintenance of products designed to improve energy performance. Furthermore, the sector includes design and contracting services focused on enhancing building efficiency through measures such as insulation, windows, and air sealing improvements, lighting upgrades and design, installation of energy-efficient certified products, and other strategies to increase energy efficiency in both residential and commercial buildings.

This chapter provides detailed information on each Energy Efficiency subsector, including employment by industry, workforce demographics, and employer perspectives. Subsectors within Energy Efficiency are expansive and therefore are grouped for clarity according to their primary end-use or associated function.

The Energy Efficiency subsectors include:

- **Traditional Heating, Ventilation, and Cooling (HVAC)**
  - Traditional HVAC Goods, Control Systems, and Services
- **Certified Appliances, Products, and Services**
  - Certified Appliances (not including HVAC)
  - Certified HVAC, Except Air-Source or Ground-Source Heat Pumps
  - Certified Air-Source Heat Pumps
  - Certified Ground-Source or Geothermal Heat Pumps
  - Certified Commercial Food Service Equipment
  - Other High-Efficiency HVAC Out of Scope for Certification (e.g., Indirect Evaporative Coolers, Air to Water Heat Pumps, Energy Recovery Systems, etc.)
- **Advanced and Recycled Building Materials**
  - Certified Windows, Doors, and Skylights
  - Certified Roofing
  - Certified Insulation
  - Air Sealing
  - Advanced Building Materials/Insulation
  - Recycled Building Materials
- **LED, CFL, and Other Efficient Lighting**
  - Certified LED Lighting
  - Other LED, CFL, and Efficient Lighting

- **Other Energy Efficiency**
  - Certified Electronics (TVs, Telephones, Audio/Video, etc.)
  - Certified Data Center Equipment
  - Reduced Water Consumption Products and Appliances
  - Energy Auditing Services
  - Other Energy Efficiency[113]

- **Renewable Heating and Cooling**
  - Certified Water Heaters
  - Solar Thermal Water Heating and Cooling
  - Other Renewable Heating and Cooling (Geothermal, Biomass, Heat Pumps, etc.)

The Energy Efficiency chapter includes the following:

- **Key Takeaways** that summarize key findings from the Energy Efficiency sector overall.
- **Energy Efficiency Employment by Subsector, Industry, and Occupation** that describes where employment is concentrated across the sector.
- **Energy Efficiency Workforce Wages, Benefits, and Demographics** that presents a descriptive picture of the sector jobs and workforce.
- **Employer Perspectives on Workforce Topics** that aggregates employer responses.

**USEER NOTE**

The absence of dedicated industry classifications for Energy Efficiency businesses makes it difficult to accurately measure employment in the sector. Because this work is often part of other industries and employees may split time between Energy Efficiency and other tasks, direct employer reporting through surveys like USEER is necessary to get reliable data.

[113] Includes workers not assigned to a single subsector by employers.

# Energy Efficiency Key Takeaways

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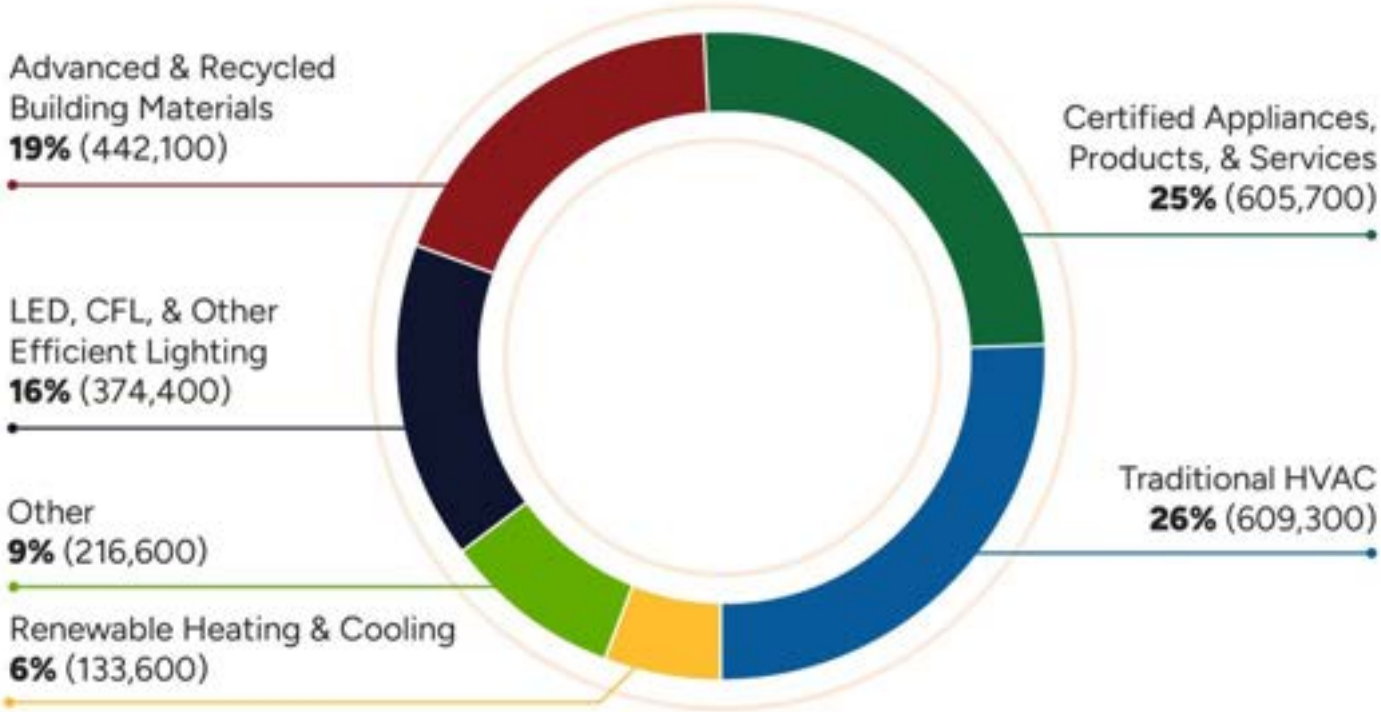
## Energy Efficiency sector employed **2,381,700** workers.

**$59,390** is the **median wage for energy efficiency** employment– which is **20.0%** **higher** than the **U.S. median wage** of $49,500.

Traditional HVAC employed 25.6% of the energy efficiency sector, totaling **609,300** workers.

## EMPLOYMENT BREAKDOWN BY INDUSTRY


## EMPLOYMENT BREAKDOWN BY SUBSECTOR



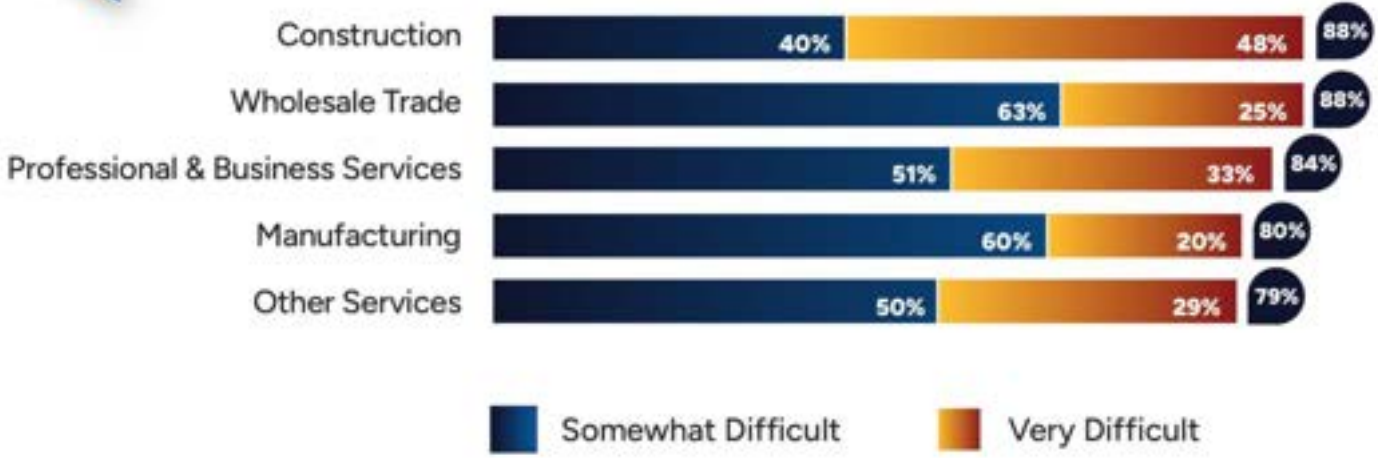

Reference: 2025 UNITED STATES ENERGY & EMPLOYMENT REPORT

# EMPLOYER PERSPECTIVES | HIRING INSIGHTS

U.S. DEPARTMENT of ENERGY

## ENERGY EFFICIENCY EMPLOYERS' PERCEIVED HIRING DIFFICULTY BY INDUSTRY

Among employers in the Energy Efficiency sector, **63%** in the Wholesale Trade industry reported that hiring workers is at least "somewhat difficult."




## MOST COMMON REASONS FOR HIRING DIFFICULTY

**Lack of Experience, Training, or Technical Skills**

- Construction
- Wholesale Trade
- Professional & Business Services

**Insufficient Non-Technical Skills**

- Manufacturing
- Other Services

## MOST DIFFICULT TO HIRE OCCUPATIONS

**Technicians / Mechanical Support**

- Construction
- Wholesale Trade
- Other Services

**Engineers / Scientists**

- Manufacturing
- Professional & Business Services

Reference: 2025 UNITED STATES ENERGY & EMPLOYMENT REPORT

## Energy Efficiency Employment by Subsector, Industry, and Occupation

This section analyzes employment in the Energy Efficiency sector by:

- Subsector (e.g., Traditional HVAC, Certified Appliances)
- Industry (e.g., Construction, Manufacturing)
- Occupation (e.g., Administrative, Production)

### ENERGY EFFICIENCY EMPLOYMENT BY SUBSECTOR

Workers in Traditional HVAC made up the largest share of employment in the Energy Efficiency sector, accounting for 609,300 workers (25.6%), followed by Certified Appliances, Products, and Services, with 605,700 workers (25.4%) (Figure 93).

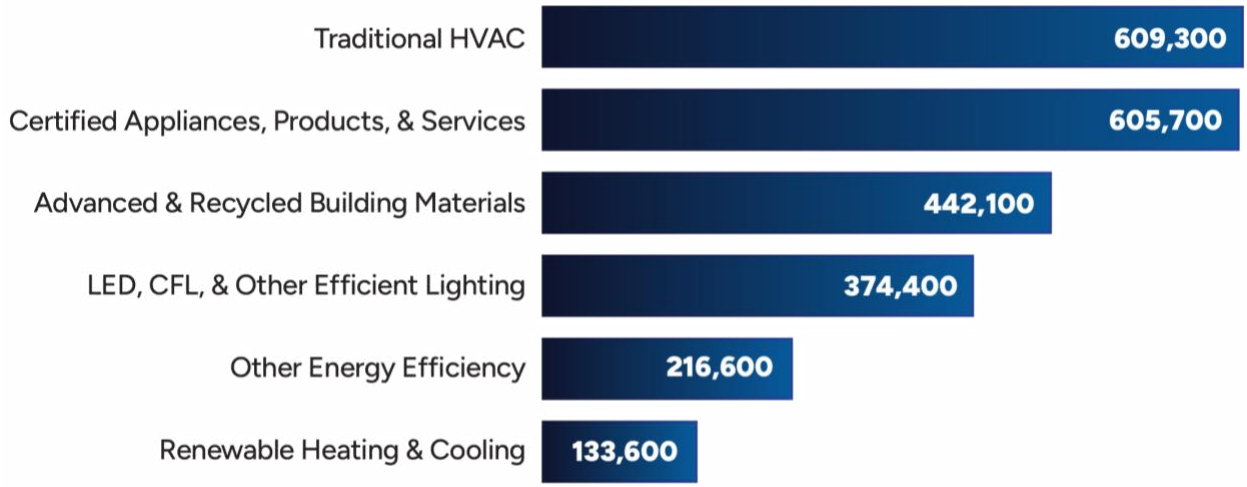



Figure 93. Energy Efficiency Employment by Subsector, 2024

**USEER NOTE**

Employment in the Other Energy Efficiency subsector consists of workers who engage with any energy-efficient products, equipment, or services that are not captured in additional subsectors, such as Certified Data Center Equipment, Energy Auditing, etc. This is also a subsector used when unable to split employment into a single Energy Efficiency subsector where employees spend "more of their time."

## ENERGY EFFICIENCY EMPLOYMENT BY INDUSTRY

The Construction industry represented the largest share of employment (54.5%) in the Energy Efficiency sector, with 1,297,500 workers, followed by Professional and Business Services (e.g., finance, project management, research and development), with 503,100 workers (21.1%); Manufacturing, with 327,700 workers (13.8%); Wholesale Trade (of efficient technologies, products, and equipment), with 210,400 workers (8.8%); and Other Services (e.g., operations and maintenance), with 43,000 workers (1.8%) (Figure 94).

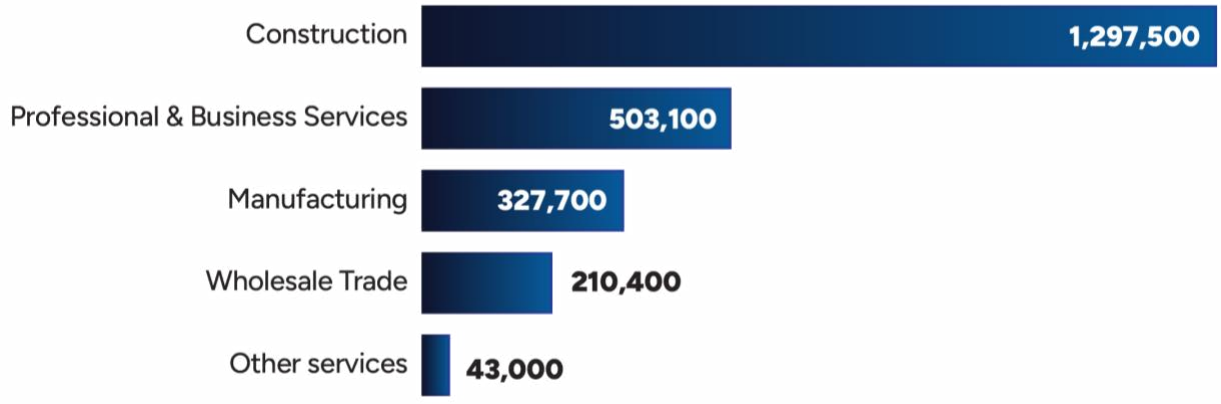



Figure 94. Energy Efficiency Employment by Industry, 2024

Looking across subsectors and industries, workers in all Energy Efficiency subsectors were most highly concentrated in the Construction industry (Table 31).

Table 31. Concentration of Energy Efficiency Employment by Subsector and Industry, 2024

| | Industry | | | | |
|---|---|---|---|---|---|
| **Subsector** | Construction | Manufacturing | Wholesale Trade | Professional & Business Services | Other Services |
| Traditional HVAC | **54%** | **5%** | **10%** | **27%** | **3%** |
| Certified Appliances, Products, & Services | **60%** | **15%** | **8%** | **16%** | **1%** |
| Advanced & Recycled Building Materials | **56%** | **20%** | **6%** | **16%** | **1%** |
| LED, CFL, & Other Efficient Lighting | **47%** | **15%** | **12%** | **25%** | **1%** |
| Other Energy Efficiency | **43%** | **26%** | **7%** | **20%** | **4%** |
| Renewable Heating & Cooling | **64%** | **6%** | **7%** | **22%** | **1%** |

Key:

**0%** **100%**

## ENERGY EFFICIENCY EMPLOYMENT BY OCCUPATION

While the previous section explored Energy Efficiency employment by industry, the occupational review focuses on the nature of work performed by workers across these industries.

The largest occupational category of workers across the Energy Efficiency sector was Installation or Repair occupations with 798,500 workers (33.5%), followed by Administrative occupations with 530,100 workers (22.3%), and Management/Professional occupations with 395,800 workers (16.6%) (Figure 95).

**USEER NOTE**

The same occupational roles can appear in multiple industries, and any given industry typically employs workers across multiple occupational categories. For example, the Manufacturing industry employs many workers engaged in Production/Manufacturing activities but also employs workers that perform Management/Professional activities.

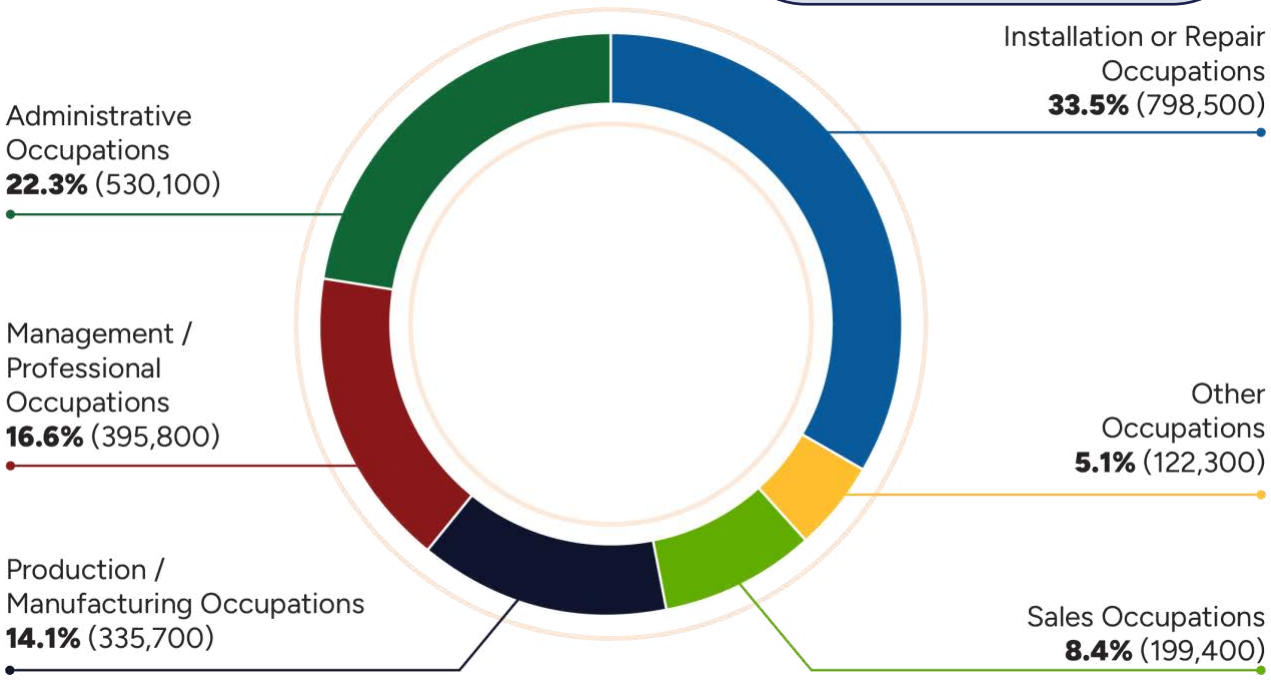



Figure 95. Energy Efficiency Employment by Occupational Category, 2024

Figure 96 provides examples of specific occupations included within each occupational category.[114]


Figure 96. Occupation Examples by Category

[114] Occupation names sourced from BLS Occupational Employment and Wage Statistics (OEWS).

## Energy Efficiency Workforce Wages, Benefits, and Demographics

This section presents data on Energy Efficiency workforce wages, employer healthcare contributions, and workforce demographics.

### ENERGY EFFICIENCY WORKFORCE BY WAGES

Table 32 presents low, median, and high wages[115] for the 15 primary occupations[116] in the Energy Efficiency sector, which include a mix of roles involved in the production and installation of energy-efficient products and the construction of energy-efficient infrastructure. The median annual salary for workers in the Energy Efficiency sector was $59,390, 20.0% higher than the national median salary of $49,500.

Table 32. Energy Efficiency Workforce Wages for 15 Primary Occupations, 2024[117]

| SOC[118] | Occupation[119] | Low | Median | High |
|---|---|---|---|---|
| 17-1011 | Architects, Except Landscape and Naval | $65,400 | $99,420 | $158,740 |
| 17-2051 | Civil Engineers | $70,930 | $97,120 | $144,880 |
| 17-2071 | Electrical Engineers | $72,160 | $91,150 | $123,580 |
| 47-4011 | Construction and Building Inspectors | $55,780 | $78,050 | $113,080 |
| 11-9021 | Construction Managers | $63,070 | $70,850 | $83,880 |
| 13-1051 | Cost Estimators | $57,890 | $69,200 | $88,170 |
| 17-3011 | Architectural and Civil Drafters | $49,480 | $66,700 | $95,570 |
| 47-2111 | Electricians | $57,160 | $64,830 | $79,450 |
| 47-2152 | Plumbers, Pipefitters, and Steamfitters | $54,010 | $62,130 | $77,500 |
| 49-9021 | Heating, Air Conditioning, and Refrigeration Mechanics and Installers | $48,210 | $58,170 | $73,200 |
| 47-2031 | Carpenters | $44,860 | $54,060 | $71,570 |
| 51-2000 | Assemblers and Fabricators | $39,290 | $46,270 | $58,540 |
| 47-3013 | Helpers--Electricians | $35,670 | $41,810 | $53,710 |
| 47-3015 | Helpers--Pipelayers, Plumbers, Pipefitters, and Steamfitters | $34,540 | $41,660 | $55,160 |
| 47-2061 | Construction Laborers | $35,030 | $39,940 | $51,990 |

**WAGES**

**ENERGY EFFICIENCY WORKFORCE OVERALL**

Low: $44,720
**Median: $59,390**
High: $83,500

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**U.S. WORKFORCE OVERALL**

Low: $29,990
**Median: $49,500**
High: $125,720

[115] Low refers to the 10th percentile of wages and high refers to the 90th percentile.
[116] For a full list of occupations for Energy Efficiency as well as occupations by other sectors and subsectors, see Appendix B.
[117] Wage estimates are based on 2024 survey responses and data from the U.S. Bureau of Labor Statistics' (BLS) 2024 Occupational Employment and Wage Statistics (OEWS). The OEWS data can be found here: https://www.bls.gov/oes/tables.htm.
[118] Standard Occupational Classification (SOC) is a system used by the BLS to categorize occupations in the U.S.
[119] USEER uses occupations as defined by BLS OEWS. Full definitions can be found here: https://www.bls.gov/soc/2018/soc_2018_definitions.pdf.

## ENERGY EFFICIENCY WORKFORCE BY BENEFITS

The USEER survey also includes employer-reported data on employer healthcare contribution levels. Based on employer responses, nearly half (47%) of Assemblers and Fabricators received full employee and family healthcare coverage from their employers (Table 33).

Table 33. Energy Efficiency Employer Healthcare Coverage for 15 Primary Occupations, 2024[120]

| Occupation | Some Healthcare Insurance Costs for Employee Only | Some Healthcare Insurance Costs for Employee & Family | All Healthcare Insurance Costs for Employee Only | All Healthcare Insurance Costs for Employee & Family |
|---|---|---|---|---|
| Architects, Except Landscape and Naval | 13% | 27% | 20% | 33% |
| Civil Engineers | 0% | 53% | 12% | 35% |
| Electrical Engineers | 3% | 35% | 26% | 35% |
| Construction and Building Inspectors | 5% | 32% | 16% | 42% |
| Construction Managers | 12% | 21% | 21% | 38% |
| Cost Estimators | 20% | 20% | 12% | 40% |
| Architectural and Civil Drafters | 13% | 27% | 20% | 33% |
| Electricians | 10% | 29% | 10% | 37% |
| Plumbers, Pipefitters, and Steamfitters | 14% | 32% | 7% | 29% |
| Heating, Air Conditioning, and Refrigeration Mechanics and Installers | 13% | 20% | 18% | 29% |
| Carpenters | 9% | 13% | 22% | 31% |
| Assemblers and Fabricators | 5% | 26% | 21% | 47% |
| Helpers--Electricians | 16% | 16% | 16% | 37% |
| Helpers--Pipelayers, Plumbers, Pipefitters, and Steamfitters | 8% | 25% | 10% | 37% |
| Construction Laborers | 19% | 15% | 21% | 27% |

[120] Percentages in table correspond to employer responses to benefits questions as they were asked in the USEER survey, Appendix D.

## ENERGY EFFICIENCY WORKFORCE BY DEMOGRAPHICS

Table 34 summarizes demographic characteristics of the Energy Efficiency workforce. The share of private sector workers represented by a union in the Energy Efficiency sector (13%) was slightly higher than the share within the overall energy workforce (12%) and significantly higher than the share of the national workforce overall (7%). The proportion of workers between the ages of 18 and 29 in the Energy Efficiency workforce (30%) was higher than the national workforce overall (22%).

Table 34. Energy Efficiency Workforce Demographics and Characteristics, 2024[121]

| | Number of Workers | **Percentage of Energy Efficiency Workforce** | Percentage of Energy Workforce | Percentage of National Workforce |
|---|---|---|---|---|
| Men | 1,748,700 | **73%** | 73% | 53% |
| Women | 617,900 | **26%** | 26% | 47% |
| Hispanic or Latino | 438,400 | **18%** | 19% | 19% |
| Non-Hispanic or Latino | 1,943,400 | **82%** | 81% | 81% |
| American Indian or Alaska Native | 64,000 | **3%** | 2% | 1% |
| Asian | 144,400 | **6%** | 7% | 7% |
| Black or African American | 196,500 | **8%** | 8% | 13% |
| Native Hawaiian or Other Pacific Islander | 33,000 | **1%** | 1% | <1% |
| White | 1,776,100 | **75%** | 74% | 76% |
| Two or More Races | 80,600 | **3%** | 5% | 3% |
| Unknown Race | 87,200 | **4%** | 3% | n/a |
| Veterans | 211,400 | **9%** | 9% | 5% |
| 18 to 29 | 722,200 | **30%** | 29% | 22% |
| 30 to 54 | 1,290,700 | **54%** | 52% | 54% |
| Over 54 | 368,900 | **15%** | 19% | 24% |
| Self-Identification of Disability | 68,600 | **3%** | 2% | 5% |
| Formerly Incarcerated | 40,800 | **2%** | 2% | 2% |
| Represented by a Union[122] | 319,900 | **13%** | 12% | 7% |

[121] National Sources: BLS (2024a, 2024b, 2024c, 2024d), Jobs EQ (2024), Prison Policy (2018).
[122] For this analysis, a union employer is defined as one with at least 20% of its workforce as a member of a labor union or covered by either a project labor agreement or a collective bargaining agreement. Figure represents private sector unionization rate. Unionization rates vary by state.

## Employer Perspective on Workforce Topics

### CURRENT HIRING DIFFICULTY

Construction and Wholesale Trade employers within Energy Efficiency reported the highest level of hiring difficulty, with 88% of employers in each of these industries indicating at least some difficulty hiring workers. Among Construction employers, almost half (48%) reported hiring as “very difficult” (Figure 97).

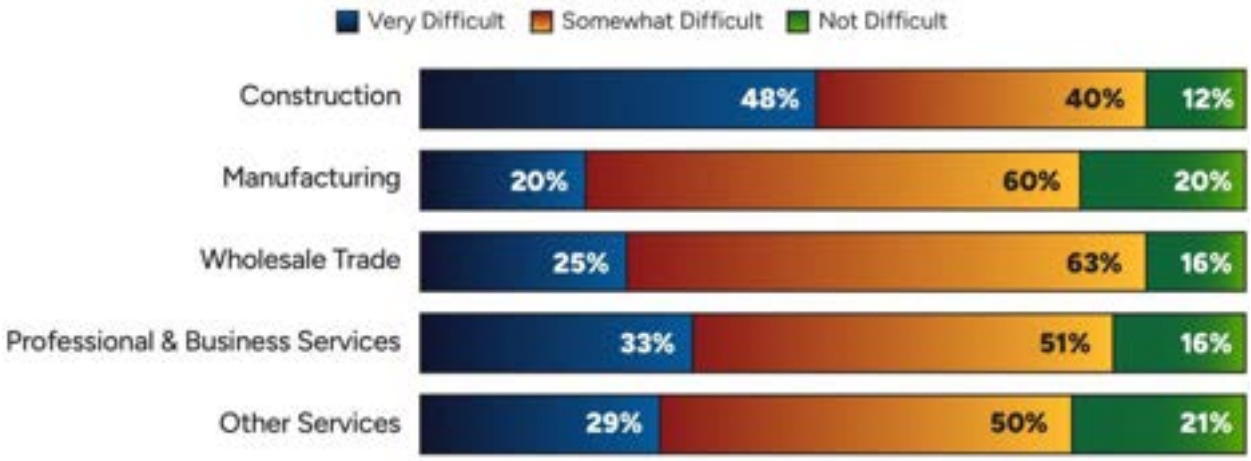
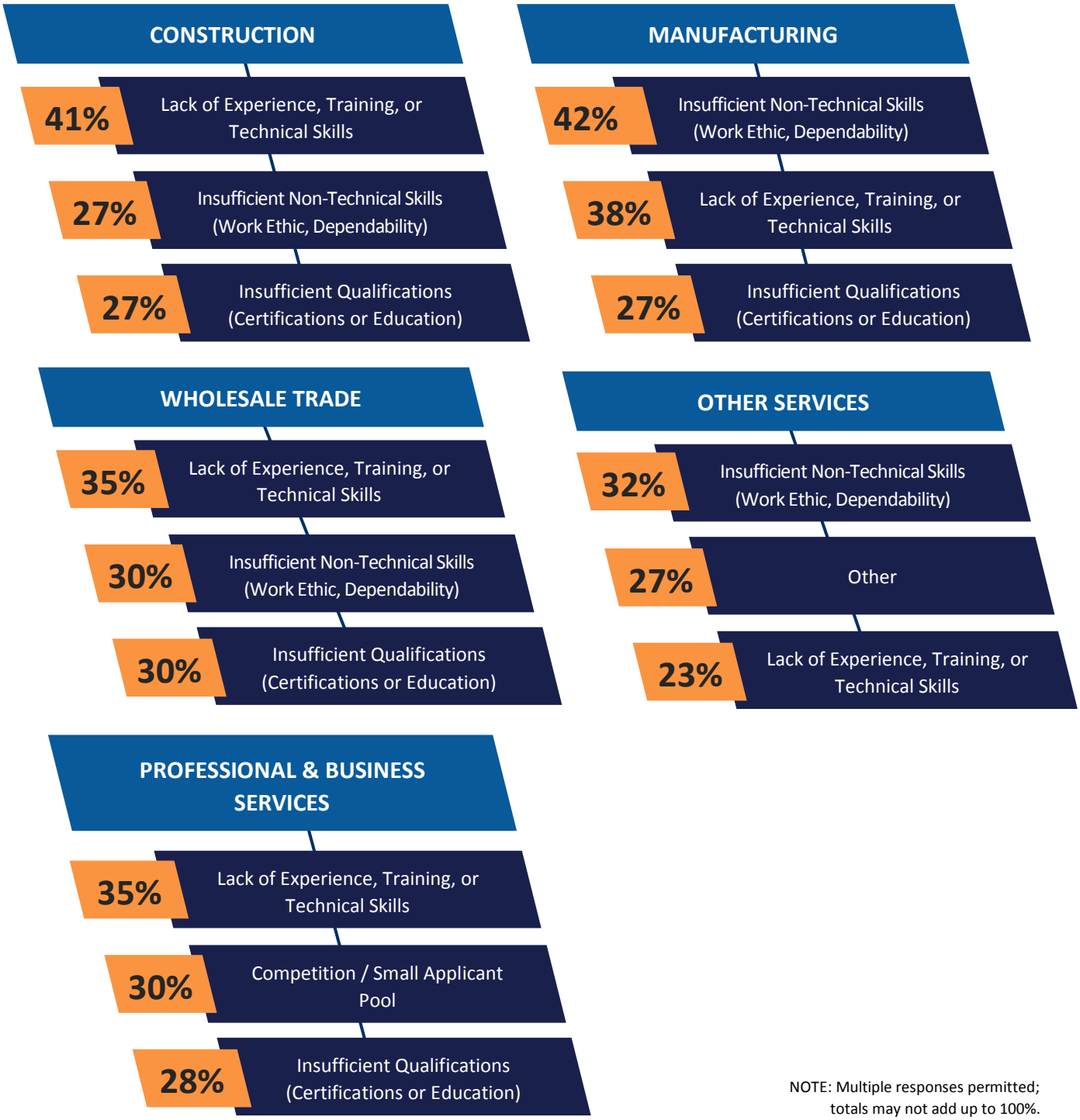



Figure 97. Energy Efficiency Employers' Perceived Hiring Difficulty by Industry, 2024

### REASONS FOR HIRING DIFFICULTY

Lack of experience, training, or technical skills was the most common reason for hiring difficulty among employers in the Construction, Wholesale Trade (of efficient products, equipment, or technologies), and Professional and Business Services (e.g., engineering, information technology, finance, etc.) industries. Insufficient non-technical skills was the most common reason for hiring difficulty for Manufacturing and Other Services (e.g., repair and maintenance) employers within Energy Efficiency (Figure 98).

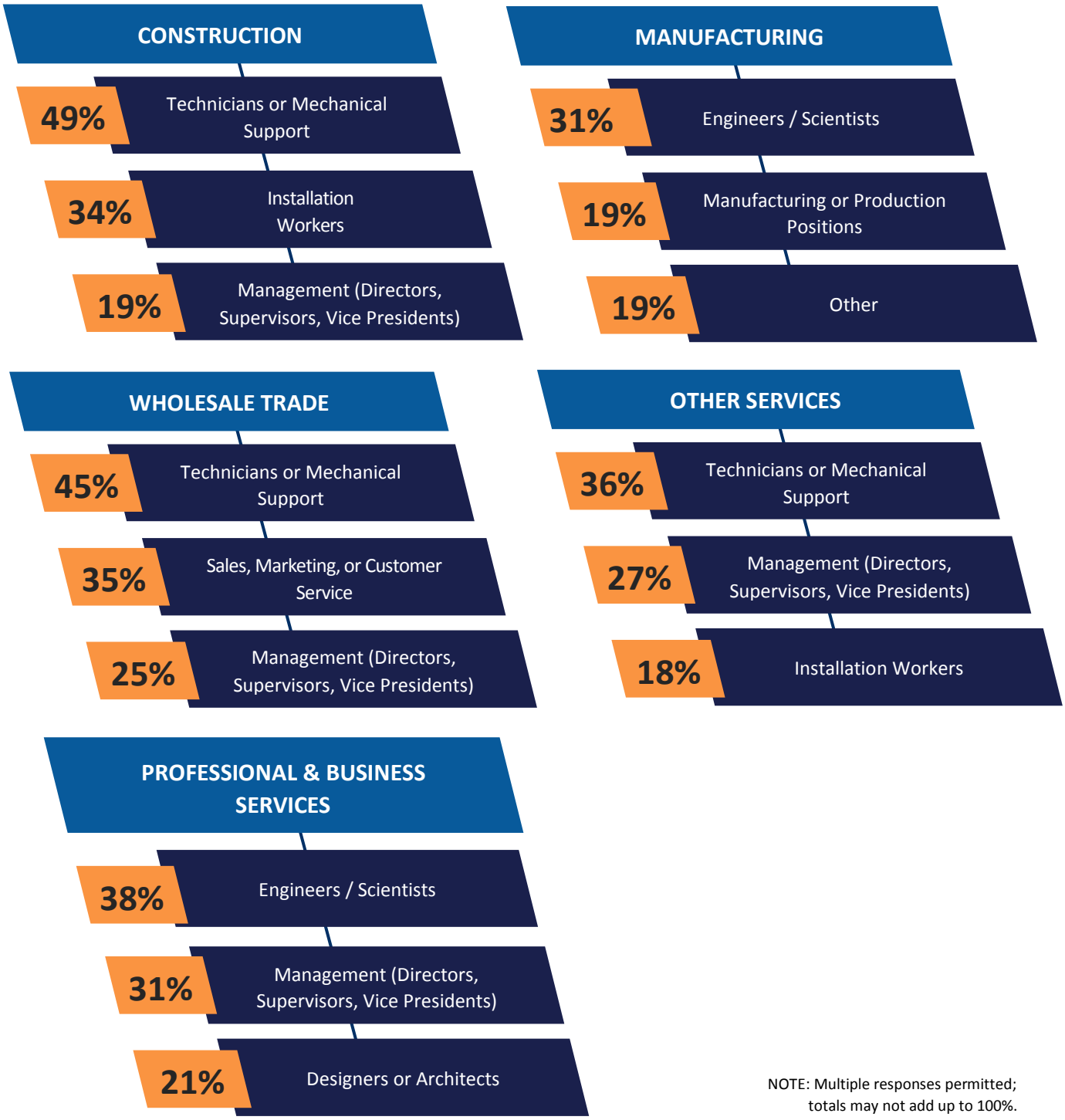



NOTE: Multiple responses permitted; totals may not add up to 100%.

Figure 98. Energy Efficiency Employers' Reasons for Hiring Difficulty, 2024

## MOST DIFFICULT TO HIRE OCCUPATIONS

Construction, Wholesale Trade (of efficient products, equipment, or technologies), and Other Services (e.g., operations, repair, and maintenance) employers reported Technicians or Mechanical Support occupations as the most difficult to hire, while Manufacturing and Professional and Business Services (e.g., engineering, information technology, finance, etc.) employers reported Engineers and Scientists as the most difficult to hire (Figure 99).




NOTE: Multiple responses permitted; totals may not add up to 100%.

Figure 99. Energy Efficiency Employers' Most Difficult to Hire Occupations, 2024

## ANTICIPATED EMPLOYMENT CHANGE BY SUBSECTOR AND INDUSTRY

This section focuses on anticipated employment change by subsector and industry. Employers across all subsectors in Energy Efficiency expect growth in 2025, ranging from 5.0% in LED, CFL, and Other Efficient Lighting to 7.4% in Traditional HVAC (Figure 100).

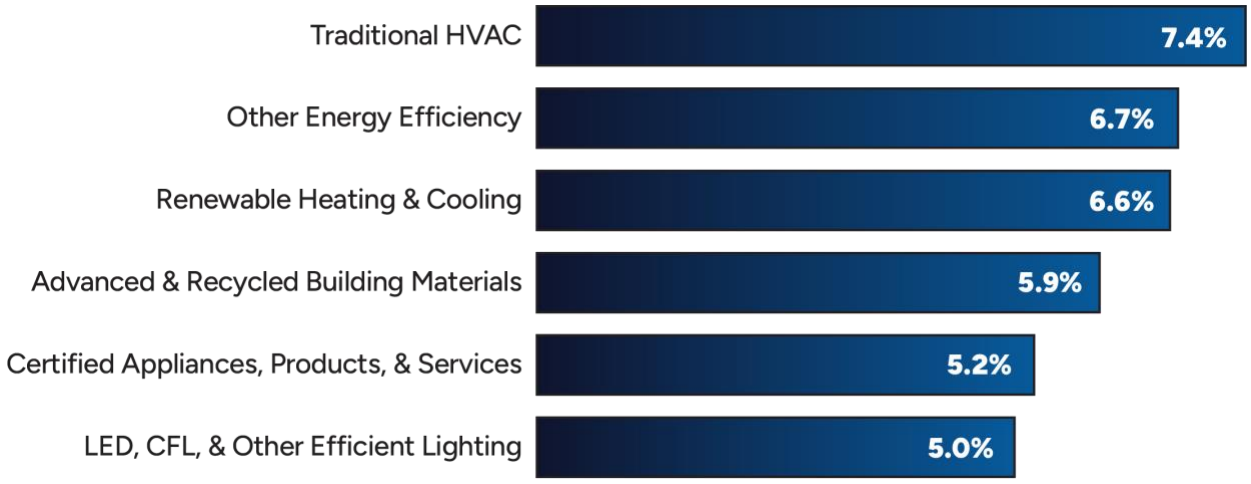



Figure 100. Energy Efficiency Employers' Anticipated Employment Changes by Subsector, 2024-2025[123]

Employers across all industries within Energy Efficiency expect job growth through 2025, ranging from 1.4% in Wholesale Trade (of efficient products, equipment, or technologies) to 7.5% in Construction and 7.8% in Other Services (e.g., repair and maintenance) (Figure 101).

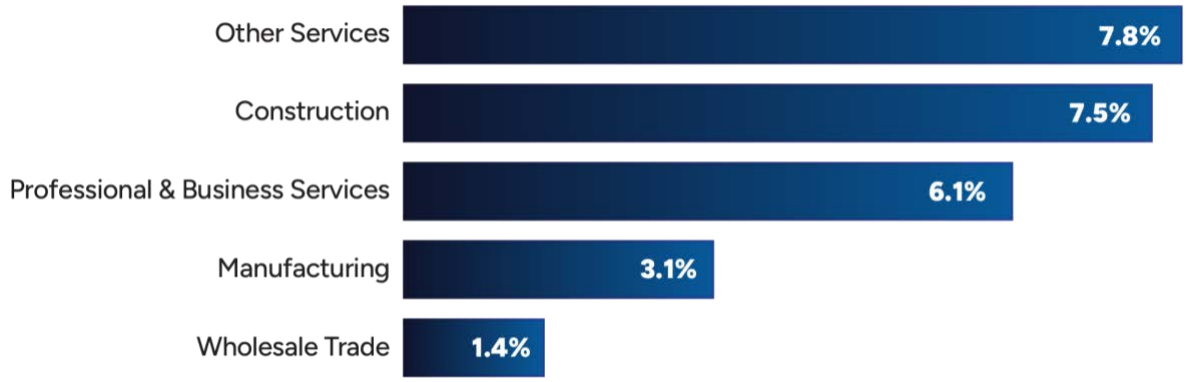



Figure 101. Energy Efficiency Employers' Anticipated Employment Changes by Industry, 2024-2025[124]

[123] See Figure 94. Energy Efficiency Employment by Industry, 2024.
[124] See Figure 94. Energy Efficiency Employment by Industry, 2024.

U.S. DEPARTMENT of ENERGY

# MOTOR VEHICLES & COMPONENT PARTS

2025 United States Energy & Employment Report

# MOTOR VEHICLES & COMPONENT PARTS

The Motor Vehicles (MV) and Component Parts (CP) sector includes businesses that manufacture and ship new vehicles and parts, design vehicles and parts, and repair motor vehicles. This includes cars, trucks, and buses, but excludes railroad rolling stock (such as locomotives and passenger cars), airplanes, and any shipbuilding activity. In this section, "MV & CP employment" is used to refer to employment in both Motor Vehicles *and* Component Parts.

The MV & CP subsectors include:

- Gasoline and Diesel Motor Vehicles
- Hybrid Electric Vehicles
- Battery Electric Vehicles
- Plug-in Hybrid Vehicles
- Hydrogen/Fuel Cell Vehicles
- Natural Gas Vehicles
- Other Vehicles[125]

The MV & CP chapter is structured as follows:

- **Key Takeaways** that summarize key findings from the MV & CP sector overall.
- **Motor Vehicles and Component Parts Employment by Subsector, Industry, and Occupation** that describes where employment is concentrated across the MV & CP sector.
- **Motor Vehicles and Component Parts Workforce Wages, Benefits, and Demographics** that presents a descriptive picture of the MV & CP sector jobs and workforce.
- **Employer Perspectives on Workforce Topics** that aggregates employer responses.

**USEER NOTE**

Employment in MV covers employment related to the assembly and repair of vehicles sold in the marketplace, while CP covers the materials used in this assembly and replacement parts.

[125] Other Vehicles is used when employers are unable to split employment into a single subsector where employees spend "more of their time."

# Motor Vehicles & Component Parts Key Takeaways

U.S. DEPARTMENT of ENERGY

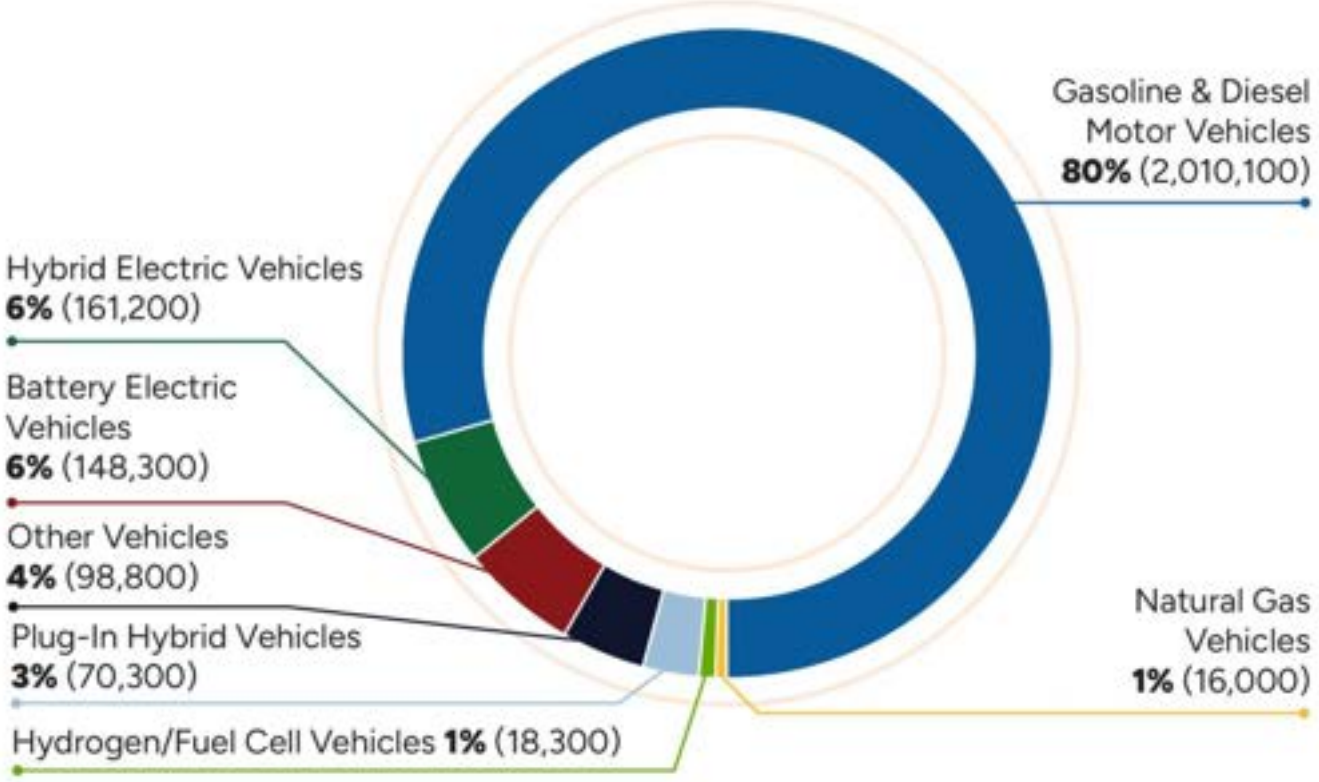
Motor Vehicles & Component Parts sector employed **2,633,100** workers.

**$53,620** is the **median wage for motor vehicles and component parts** employment–which is **8.3%** higher than the **U.S. median wage** of $49,500.

## EMPLOYMENT BREAKDOWN BY INDUSTRY

- Repair & Maintenance **39%** (1,023,200 workers)
- Manufacturing **38%** (1,001,600 workers)
- Wholesale Trade, Distribution, & Transport **21%** (541,900 workers)
- Professional & Business Services **3%** (66,400 workers)

## EMPLOYMENT BREAKDOWN BY SUBSECTOR



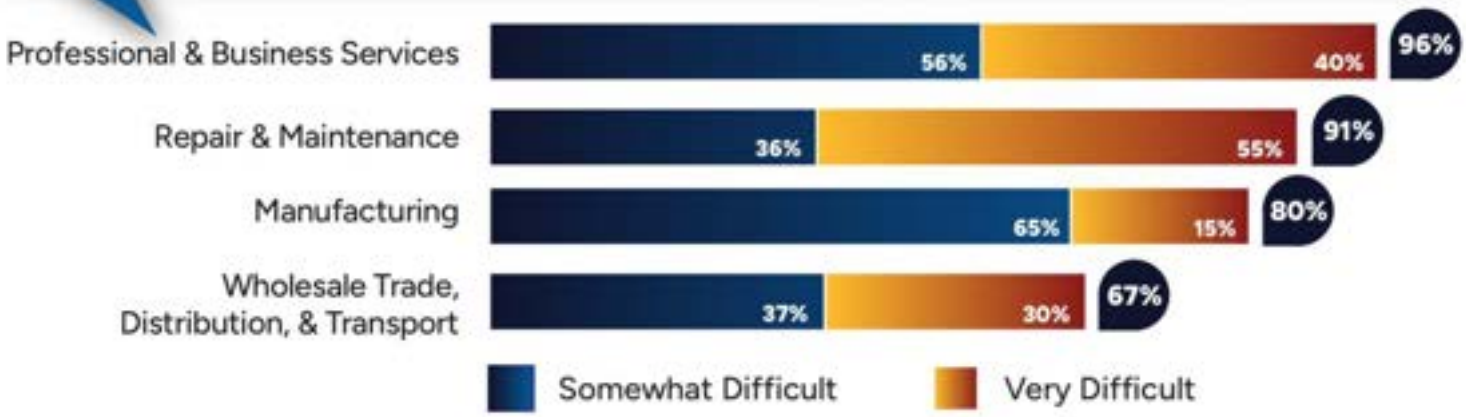

Reference: 2025 UNITED STATES ENERGY & EMPLOYMENT REPORT

# EMPLOYER PERSPECTIVES | HIRING INSIGHTS

U.S. DEPARTMENT of ENERGY

## MOTOR VEHICLES & COMPONENT PARTS EMPLOYERS' PERCEIVED HIRING DIFFICULTY BY INDUSTRY

Among employers in the Motor Vehicles and Component Parts sector, **55%** in the Repair & Maintenance industry reported hiring workers is "very difficult."




## MOST COMMON REASONS FOR HIRING DIFFICULTY

- **Insufficient Non-Technical Skills**
  - Wholesale Trade, Distribution, & Transport
- **Insufficient Qualifications (Certifications or Education)**
  - Manufacturing
- **Lack of Experience, Training, or Technical Skills**
  - Professional & Business Services
  - Repair & Maintenance

## MOST DIFFICULT TO HIRE OCCUPATIONS

- **Engineers / Scientists**
  - Manufacturing
  - Professional & Business Services
- **Drivers / Dispatchers**
  - Wholesale Trade, Distribution, & Transport
- **Technicians / Mechanical Support**
  - Repair & Maintenance

## Motor Vehicles & Component Parts Employment by Subsector, Industry, and Occupation

This section analyzes employment in the MV & CP sector by:

- Subsector (e.g., Gasoline and Diesel Motor Vehicles, Hybrid Electric Vehicles)
- Industry (e.g., Repair and Maintenance, Manufacturing)
- Occupation (e.g., Installation or Repair, Sales).

### MOTOR VEHICLES & COMPONENT PARTS EMPLOYMENT BY SUBSECTOR

Gasoline and Diesel Motor Vehicles made up the largest share of employment in the MV & CP sector, with 2,010,100 workers (79.7%), followed by Hybrid Electric Vehicles, with 161,200 workers (6.4%) (Figure 102).

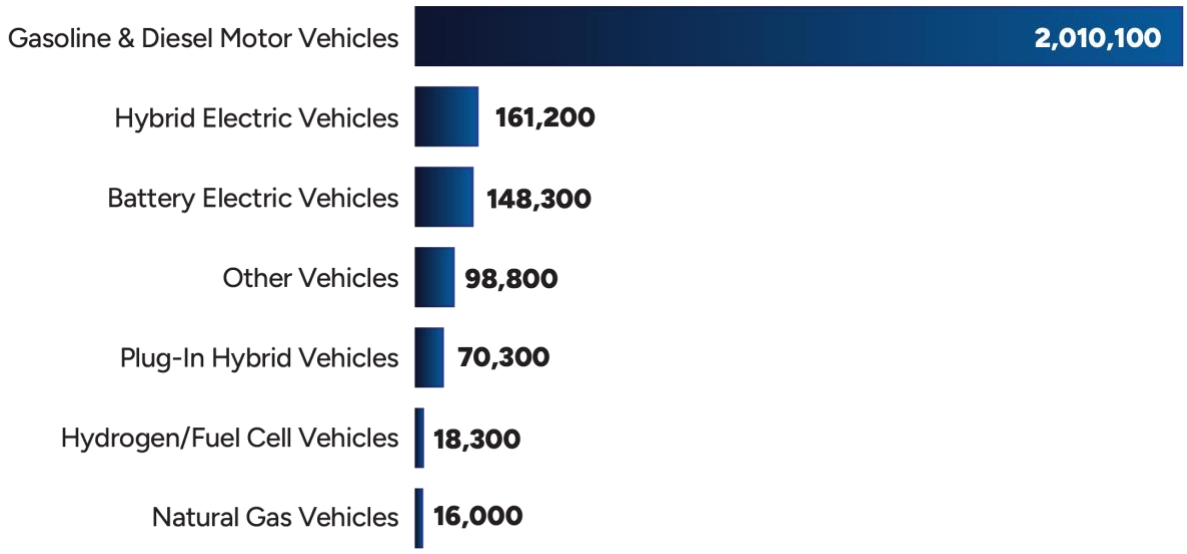



Figure 102. Motor Vehicles & Component Parts Employment by Subsector, 2024[126]

[126] Figures are exclusive of 110,300 jobs in commodity flows that cannot be split by MV or CP subsectors.

Most of the employment across vehicle subsectors was in the Motor Vehicles category, which accounted for 1,434,700 workers (56.9%). Workers involved in Component Parts totaled 1,088,200 (43.1%) across all MV & CP activities.

Close to half (45.5%) of the jobs in Gasoline and Diesel Motor Vehicles were in Component Parts. In comparison, Component Parts made up a smaller percentage of the total jobs in Hybrid Electric Vehicles (30.5%) (Figure 103).

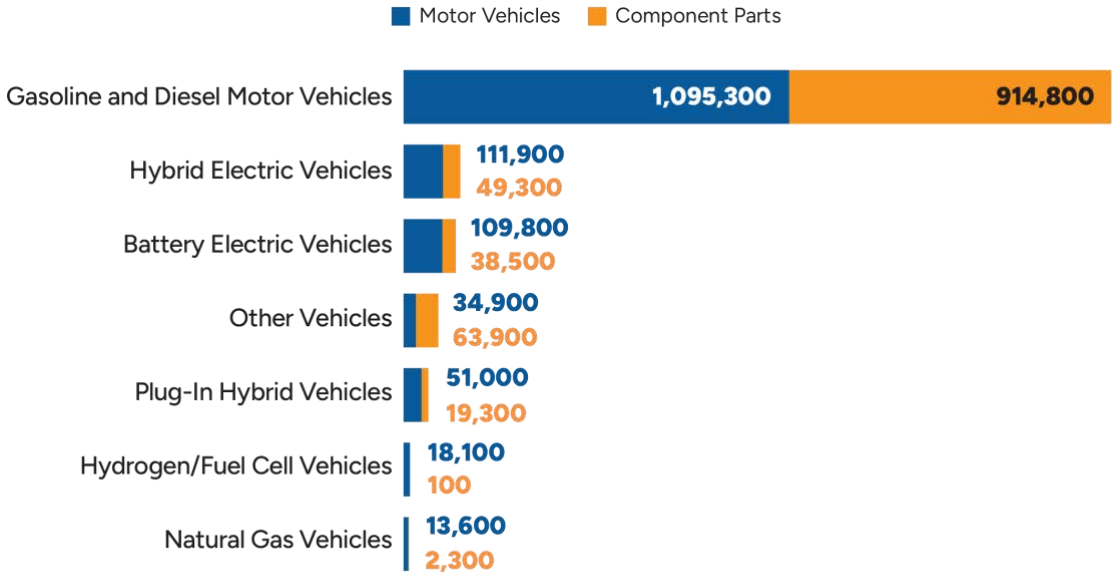



Figure 103. Motor Vehicles & Component Parts Employment by Activity, 2024[127]

[127] Figures are exclusive of 110,300 jobs in commodity flows that cannot be split by MV or CP subsectors.

## MOTOR VEHICLES & COMPONENT PARTS EMPLOYMENT BY INDUSTRY

The Repair and Maintenance industry represented the largest share of employment (38.9%) in the MV & CP sector, with 1,023,200 workers, followed by Manufacturing, with 1,001,600 workers (38.0%); Wholesale Trade, Distribution, and Transport, with 541,900 workers (20.6%); and Professional and Business Services, with 66,400 workers (2.5%) (Figure 104).

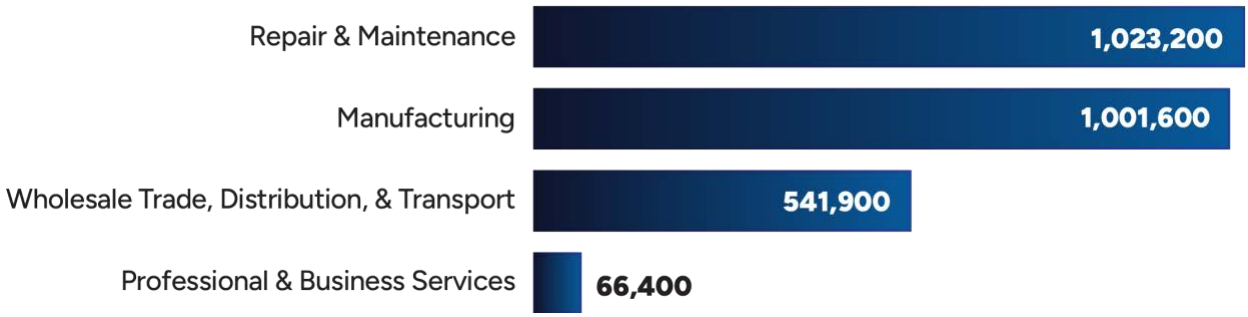



Figure 104. Motor Vehicles & Component Parts Employment by Industry, 2024

## MV & CP EMPLOYMENT BY OCCUPATION

Looking at the distribution of jobs by occupation across the MV & CP sector, the largest occupational category of workers was Production and Manufacturing occupations (33.1%), followed by Installation and Repair occupations (27.7%) and Administrative occupations (14.3%) (Figure 105).

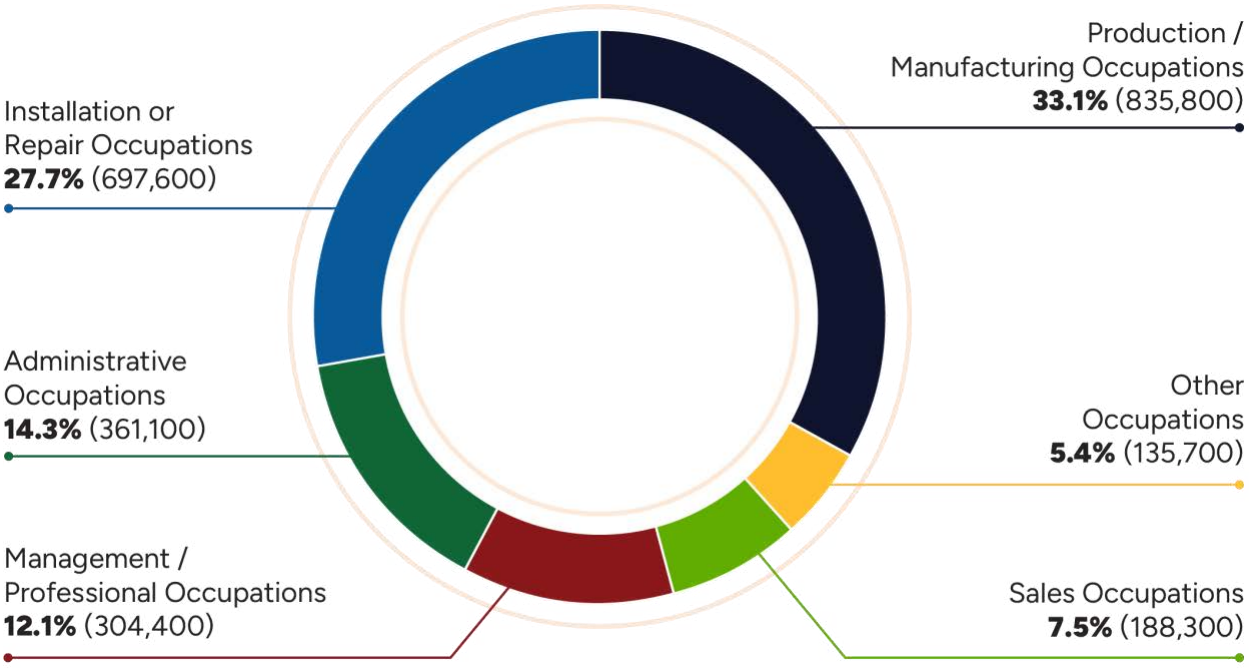



Figure 105. Motor Vehicle & Component Parts Employment by Occupation, 2024[128]

[128] Figures are exclusive of 110,300 jobs in commodity flows that cannot be split by MV or CP subsectors.

Figure 106 provides examples of specific occupations included within each occupational category.[129]


Figure 106. Occupation Examples by Category

[129] Occupation names sourced from BLS Occupational Employment and Wage Statistics (OEWS).

## Motor Vehicles & Component Parts Wages, Benefits, and Demographics

This section presents data on workforce wages, employer healthcare contributions, and demographics in the MV & CP sector.

### MOTOR VEHICLES & COMPONENT PARTS WORKFORCE BY WAGES

The table below presents wages[130] for the 15 primary occupations[131] in the MV & CP sector, which consist of occupations exclusively employed in the MV & CP sector (e.g., Automotive Service Technicians and Mechanics. Automotive Glass Installers and Repairers), occupations with a high concentration of employment within the MV & CP sector, and occupations comparable across sectors (e.g., Mechanical Engineers). The median annual salary for workers in the MV & CP sector was $53,620, which is 8.3% higher than the U.S. median salary of $49,500 (Table 35).

Table 35. Motor Vehicle & Component Parts Workforce Wages for 15 Primary Occupations, 2024[132]

| SOC[133] | Occupation[134] | Low | Median | High |
|---|---|---|---|---|
| 17-2071 | Electrical Engineers | $70,000 | $95,040 | $137,800 |
| 17-2141 | Mechanical Engineers | $69,630 | $88,170 | $120,720 |
| 17-2112 | Industrial Engineers | $68,260 | $87,900 | $123,210 |
| 49-9041 | Industrial Machinery Mechanics | $48,790 | $64,110 | $87,900 |
| 51-4041 | Machinists | $43,200 | $57,620 | $75,670 |
| 49-3031 | Bus and Truck Mechanics and Diesel Engine Specialists | $45,910 | $57,510 | $73,020 |
| 51-9161 | Computer Numerically Controlled Tool Operators | $47,850 | $56,160 | $69,930 |
| 51-4031 | Cutting, Punching, and Press Machine Setters, Operators, and Tenders, Metal and Plastic | $43,850 | $53,050 | $67,880 |
| 51-4081 | Multiple Machine Tool Setters, Operators, and Tenders, Metal and Plastic | $40,160 | $52,100 | $78,920 |
| 49-3021 | Automotive Body and Related Repairers | $36,390 | $51,680 | $87,040 |
| 49-3023 | Automotive Service Technicians and Mechanics | $33,660 | $49,670 | $80,850 |
| 51-9124 | Coating, Painting, and Spraying Machine Setters, Operators, and Tenders | $35,640 | $47,490 | $72,170 |
| 49-3022 | Automotive Glass Installers and Repairers | $35,080 | $47,260 | $67,480 |
| 51-2000 | Assemblers and Fabricators | $40,500 | $46,420 | $56,830 |
| 53-6031 | Automotive and Watercraft Service Attendants | $27,870 | $34,850 | $45,240 |

**WAGES**

**MV AND CP WORKFORCE OVERALL**

Low: $41,280
**Median: $53,620**
High: $75,480

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**U.S. WORKFORCE OVERALL**

Low: $29,990
**Median: $49,500**
High: $125,720

[130] Low refers to the 10th percentile of wages and high refers to the 90th percentile.
[131] For a full list of occupations for MV & CP as well as occupations by other sectors and subsectors, see Appendix B.
[132] Wage estimates are based on 2024 survey responses and data from the U.S. Bureau of Labor Statistics' (BLS) 2024 Occupational Employment and Wage Statistics (OEWS). The OEWS data can be found here: https://www.bls.gov/oes/tables.htm.
[133] Standard Occupational Classification (SOC) codes and descriptions are used by the BLS to categorize occupations in the U.S.
[134] USEER uses occupations as defined by BLS OEWS. Full definitions can be found here: https://www.bls.gov/soc/2018/soc_2018_definitions.pdf.

## MOTOR VEHICLES & COMPONENT PARTS WORKFORCE BY BENEFITS

The USEER survey also includes employer-reported data on employer health insurance contribution levels. Over half of Coating, Painting, and Spraying Machine Setters, Operators, and Tenders (57%), and Electrical Engineers (55%) received full coverage of employee and family healthcare costs from their employers (Table 36).

Table 36. Motor Vehicle & Component Parts Employer Healthcare Coverage for 15 Primary Occupations, 2024[135]

| Occupation | Some Healthcare Insurance Costs for Employee Only | Some Healthcare Insurance Costs for Employee & Family | All Healthcare Insurance Costs for Employee Only | All Healthcare Insurance Costs for Employee & Family |
|---|---|---|---|---|
| Electrical Engineers | 0% | 20% | 25% | 55% |
| Mechanical Engineers | 7% | 33% | 11% | 48% |
| Industrial Engineers | 0% | 30% | 25% | 45% |
| Industrial Machinery Mechanics | 6% | 17% | 50% | 28% |
| Machinists | 13% | 36% | 11% | 35% |
| Bus and Truck Mechanics and Diesel Engine Specialists | 14% | 23% | 23% | 41% |
| Computer Numerically Controlled Tool Operators | 8% | 28% | 24% | 36% |
| Cutting, Punching, and Press Machine Setters, Operators, and Tenders, Metal and Plastic | 0% | 31% | 26% | 40% |
| Multiple Machine Tool Setters, Operators, and Tenders, Metal and Plastic | 0% | 40% | 7% | 53% |
| Automotive Body and Related Repairers | 2% | 19% | 25% | 41% |
| Automotive Service Technicians and Mechanics | 8% | 20% | 10% | 40% |
| Coating, Painting, and Spraying Machine Setters, Operators, and Tenders | 7% | 8% | 8% | 57% |
| Automotive Glass Installers and Repairers | 2% | 7% | 80% | 9% |
| Assemblers and Fabricators | 2% | 27% | 21% | 48% |
| Automotive and Watercraft Service Attendants | 2% | 7% | 4% | 32% |

[135] Percentages in table correspond to employer responses to benefits questions as they were asked in the USEER survey, Appendix D.

## MOTOR VEHICLES & COMPONENT PARTS WORKFORCE BY DEMOGRAPHICS

The following table summarizes demographic characteristics of the MV & CP workforce. The proportion of men in the MV & CP workforce was the same as the energy workforce (73%) but higher than the national workforce (53%). The share of private sector workers represented by a union in the MV & CP sector (6%) was half the energy workforce overall (12%) and slightly below the national workforce overall (7%) (Table 37).

Table 37. Motor Vehicles & Component Parts Workforce Demographic and Characteristics, 2024[136]

| | Number of Workers | **Percentage of MV & CP Workforce** | Percentage of Energy Workforce | Percentage of National Workforce |
|---|---|---|---|---|
| Men | 1,850,300 | **73%** | 73% | 53% |
| Women | 635,900 | **25%** | 26% | 47% |
| Hispanic or Latino | 499,800 | **20%** | 19% | 19% |
| Non-Hispanic or Latino | 2,023,000 | **80%** | 81% | 81% |
| American Indian or Alaska Native | 48,800 | **2%** | 2% | 1% |
| Asian | 129,400 | **5%** | 7% | 7% |
| Black or African American | 200,300 | **8%** | 8% | 13% |
| Native Hawaiian or Other Pacific Islander | 29,400 | **1%** | 1% | <1% |
| White | 1,894,600 | **75%** | 74% | 76% |
| Two or More Races | 140,700 | **6%** | 5% | 3% |
| Unknown Race | 79,600 | **3%** | 3% | n/a |
| Veterans | 258,900 | **10%** | 9% | 5% |
| 18 to 29 | 742,100 | **29%** | 29% | 22% |
| 30 to 54 | 1,221,100 | **48%** | 52% | 54% |
| Over 54 | 559,700 | **22%** | 19% | 24% |
| Self-Identification of Disability | 45,600 | **2%** | 2% | 5% |
| Formerly Incarcerated | 35,700 | **1%** | 2% | 2% |
| Represented by a Union[137] | 152,000 | **6%** | 12% | 7% |

[136] National Sources: BLS (2024a, 2024b, 2024c, 2024d), Jobs EQ (2024), Prison Policy (2018).
[137] For this analysis, a union employer is defined as one with at least 20% of its workforce as a member of a labor union or covered by either a project labor agreement or a collective bargaining agreement. Figure represents private sector unionization rate. Unionization rates vary by state.

## Employer Perspective on Workforce Topics

The USEER surveys employers about hiring challenges, including how difficult it is to hire in their industry, why hiring is difficult, and which occupations are the hardest to fill.

### CURRENT HIRING DIFFICULTY

Professional and Business Services employers within MV & CP reported the highest level of hiring difficulty, with 96% of employers indicating at least some difficulty hiring workers, followed by Repair and Maintenance employers (91%). Over half of Repair and Maintenance employers also cited hiring as “very difficult.” Wholesale Trade, Distribution, and Transport employers experienced the least difficulty, with 33% of employers reporting hiring as “not at all difficult” (Figure 107).

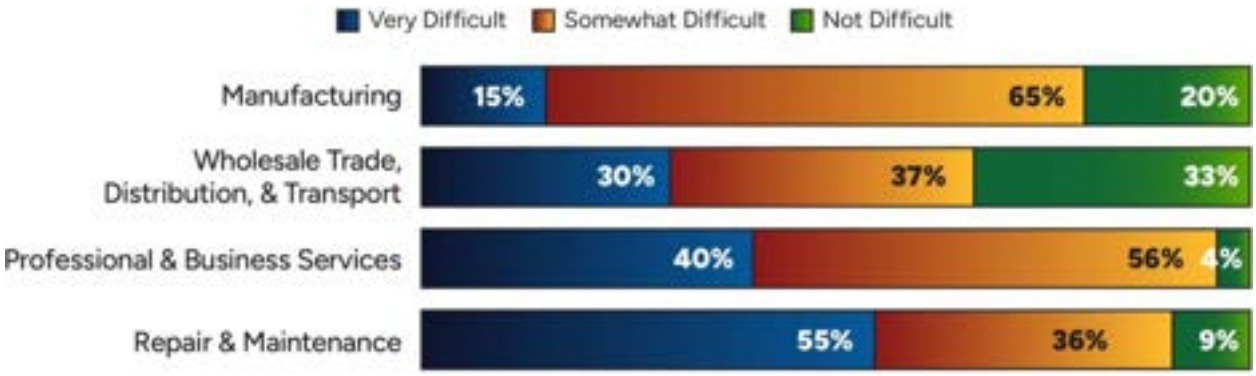


Figure 107. Motor Vehicle & Component Parts Employers' Perceived Hiring Difficulty by Industry, 2024

### REASONS FOR HIRING DIFFICULTY

Lack of experience, training, or technical skills was the most frequently cited reason for hiring difficulty among employers in Professional and Business Services and Repair and Maintenance. Insufficient non-technical skills was the most frequently cited challenge among Wholesale Trade, Distribution, and Transport employers, while Manufacturing employers cited insufficient qualifications as the most common concern in hiring (Figure 108).


NOTE: Multiple responses permitted; totals may not add up to 100%.

Figure 108. Motor Vehicle & Component Parts Employers' Reasons for Hiring Difficulty, 2024

## MOST DIFFICULT TO HIRE OCCUPATIONS

Several industries reported hiring difficulty rates of 50% or higher for specific occupations. For example, 75% of Repair and Maintenance employers reported difficulties hiring Technicians or Mechanical Support workers, and 74% of Wholesale Trade, Distribution, and Transport employers reported difficulties hiring Drivers/Dispatchers (Figure 109).


NOTE: Multiple responses permitted; totals may not add up to 100%.

Figure 109. Motor Vehicle & Component Parts Employers' Most Difficult to Hire Occupations, 2024

## ANTICIPATED EMPLOYMENT CHANGE BY SUBSECTOR AND INDUSTRY

This section focuses on anticipated employment change by subsector and industry. Employers across all subsectors within MV & CP expect job growth through 2025, ranging from 2.7% in Natural Gas Vehicles to 6.8% in Hydrogen/Fuel Cell Vehicles (Figure 110).

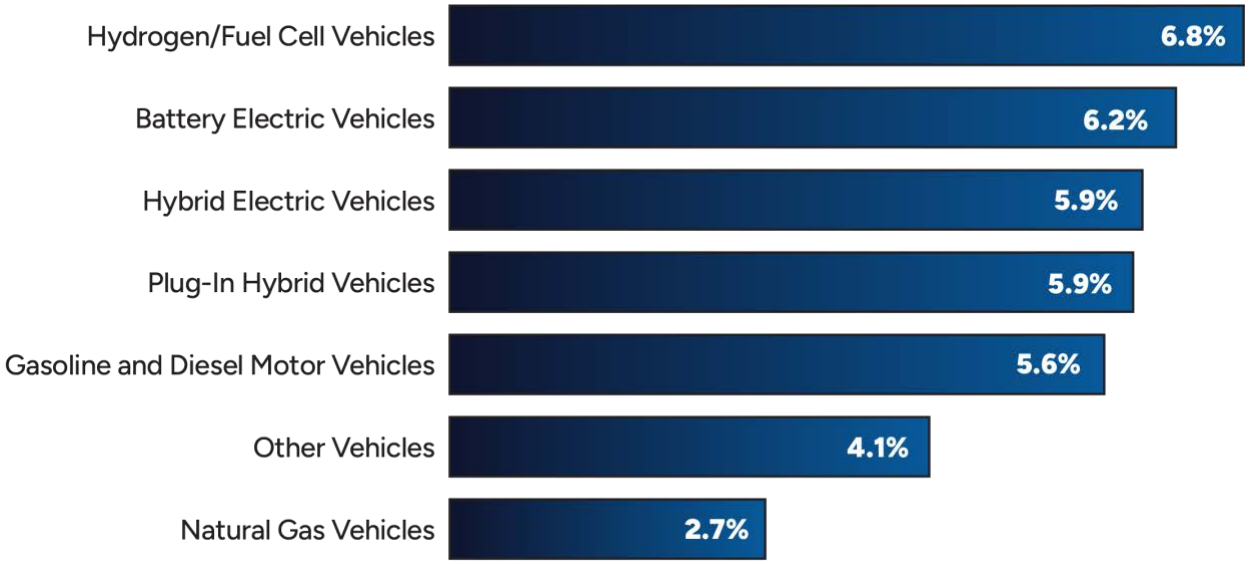


Figure 110. Motor Vehicle & Component Parts Employers' Anticipated Employment Change by Subsector, 2024-2025[138]

Employers across all industries within MV & CP expect job growth through 2025, ranging from 0.3% in Wholesale Trade, Distribution, and Transport to 8.4% in Manufacturing (Figure 111).

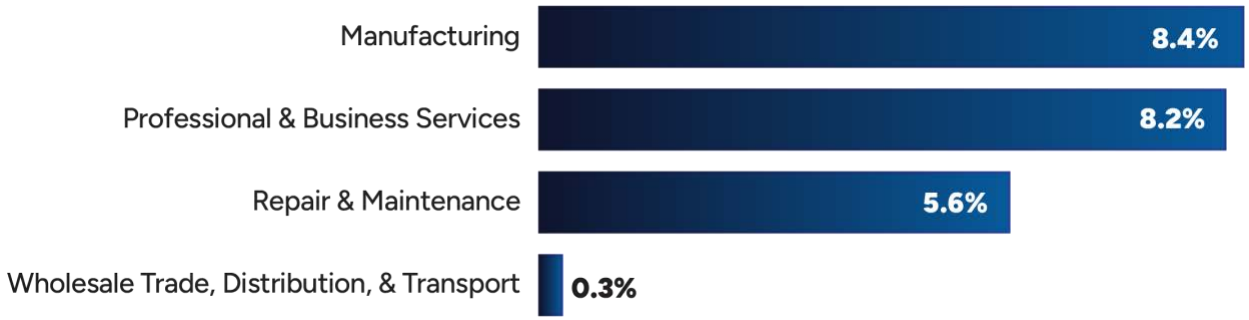


Figure 111. Motor Vehicle & Component Parts Employers' Anticipated Employment Change by Industry, 2024-2025[139]

[138] See Figure 102. Motor Vehicles & Component Parts Employment by Subsector, 2024.
[139] See Figure 104. Motor Vehicles & Component Parts Employment by Industry, 2024.

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