

Building a Clean Energy Workforce

Western Washington University ENRG 449

► Eileen V. Quigley—May 24, 2022

Agenda

- Clean Energy Jobs
- Challenges with Job Projections
- Equity Issues





Clean Energy Jobs

Energy Industry Jobs-2020

- DOE's USEER since 2016
- Surveys businesses + public labor data employment and workforce characteristics
- Data reflect COVID-19 impact
 - Decline 840,000 jobs (10% decline year over year)
 - Peak of pandemic 1.4 m decline
 - \$520,000 returned by the end of the year



United States Energy & Employment Report 2021

ENERGY.GOV/USEER

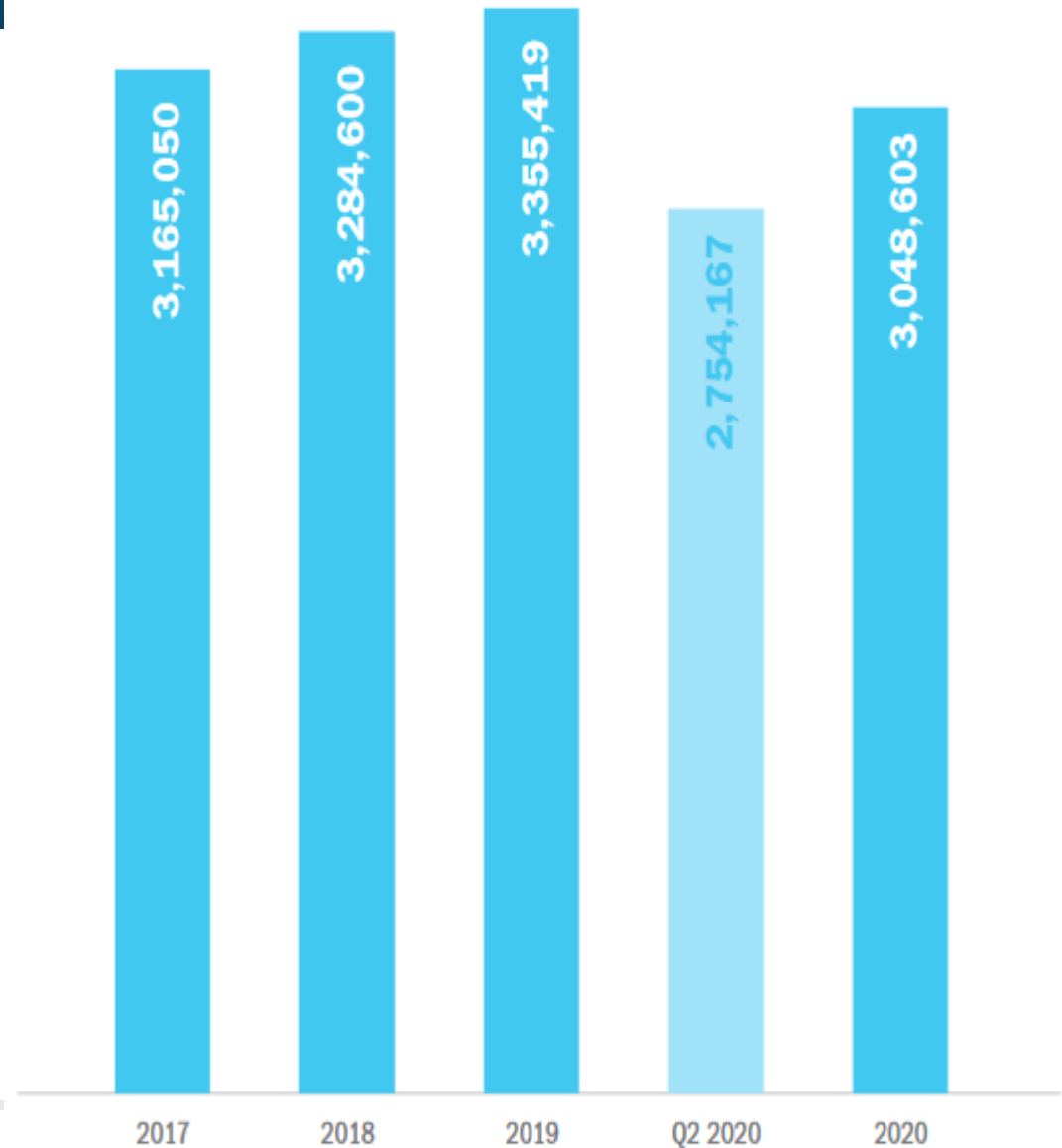


COVID-19 Impact

TABLE 2 // CORONAVIRUS IMPACT ON U.S. CLEAN ENERGY EMPLOYMENT GROWTH
by pre, during, and post Initial Impacts 2017–2020

2020 Clean Energy Jobs	Growth Rate	Employment Change
Projected	+5.3%	+177,837
March–May (Peak Unemployment)	–17.9%	–601,252
June–December (Post Peak)	+10.7%	+294,436

FIG. 5 // U.S. CLEAN ENERGY EMPLOYMENT by year 2017–2020



Energy Industry Jobs-2020

- Energy investments throughout 2020 prevented declines in some key areas:
 - Wind generation increased by 2,000 jobs (2 percent)
 - Battery storage increased by 800 jobs (1 percent)
 - Hybrid electric vehicles increased by 6,000 jobs (6 percent)
 - Electric vehicles also increased by 6,000 jobs (8 percent)
- Five major energy sectors



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Energy Industry Jobs-2020



ELECTRIC POWER GENERATION,
TRANSMISSION, DISTRIBUTION
& STORAGE, AND FUELS

3.1 MILLION

JOBS AT THE END OF 2020

-9.8%

ELECTRIC POWER
GENERATION



833,600 JOBS

-7.1%

TRANSMISSION,
DISTRIBUTION & STORAGE



1.3 MILLION JOBS

-4.4%

FUELS



937,700 JOBS

-18.4%

Energy Industry Jobs-2020



**ENERGY
EFFICIENCY**

2.1 MILLION

JOBS AT THE END OF 2020

-11.4%



**MOTOR VEHICLES
+ COMPONENT PARTS**

2.3 MILLION

JOBS AT THE END OF 2020

-9.0%

ELECTRIC POWER GENERATION



The Electric Power Generation sector employed

833,600

a loss of
63,300 JOBS

-7.1%

ALL SUB-TECHNOLOGIES WITH THE EXCEPTION OF WIND DECLINED FROM 2019 THROUGH 2020

WIND



Wind energy companies saw an increase in jobs, adding an additional **2,000** employees, an increase of 1.8 percent.

+2,000 JOBS

+1.8%

THE GREATEST
PERCENTAGE DECLINE
WAS IN
CONCENTRATED SOLAR,
WHICH DECLINED
BY 11.5 PERCENT,
A LOSS OF 3,000 JOBS

SOLAR PV



Solar photovoltaic firms saw the greatest overall decline in jobs, shedding a net 25,700 workers through 2020—a decline of 8.1 percent.

-25,700 JOBS

-8.1%

NATURAL GAS



Natural gas electric power generation lost the next-highest number of jobs, with a total 12,300 jobs lost (a 10.1 percent decline).

-12,300 JOBS

-10.1%

COAL



Following solar PV, coal electric power generation firms shed the third-highest number of jobs (8,300 jobs lost or a 10.4 percent decline).

-8,300 JOBS

-10.4%

TRANSMISSION, DISTRIBUTION, AND STORAGE



Transmission, Distribution, and Storage (TDS) employed more than

1.3
MILLION

-4.4%

a decrease of 61,500 jobs

Nearly all sub-technologies within the transmission, distribution, and storage sector experienced job losses, with the exception of battery storage.

SMART GRID

Smart grid firms shed **2,500 jobs**, for a

-9.9% decline

Microgrid firms shed **2,200 jobs**, for a

-10.5% decline



TRANSMISSION, DISTRIBUTION, AND STORAGE (TDS)

Traditional transmission and distribution shed the highest number of jobs—**52,400 jobs lost**, for a

-5.3% decline



HYDROPOWER

Pumped hydropower employment declined the most within the storage sector, losing 700 jobs, for a

-8.5% decline



BATTERY STORAGE EMPLOYMENT GREW BY 850 JOBS (+1.3%)

FUELS



The Fuels sector employed

937,700

-18.4%

a decrease of 211,200 jobs
compared to the last quarter
of 2019

ALL SUB-TECHNOLOGIES WITHIN THE FUELS SECTOR LOST JOBS THROUGHOUT 2020

OIL & NATURAL GAS

Petroleum fuels saw the largest decline in employment,
followed by natural gas fuels

OIL JOBS

495,200



NATURAL GAS JOBS

210,000



-19.5%

a loss of

120,300 JOBS

-23.9%

a loss of

66,000 JOBS

COAL FUELS

Coal fuels jobs also declined
significantly in 2020

COAL JOBS

60,500



-19.9%

a loss of

15,000 JOBS

ENERGY EFFICIENCY

Energy Efficiency employed

2.1
MILLION

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



Energy Efficiency
employers lost 271,700 net
jobs in 2020—the **largest**
total sum of job losses
across each of the five
sectors.

-271,700

-11.4%

TRADITIONAL HVAC

Traditional HVAC firms shed the highest number of jobs,
losing 66,700 workers (for an 11.2 percent decline):

-11.2%

a loss of

66,700 JOBS

ENERGY STAR HVAC



-12.2%

a loss of

34,300 JOBS

ENERGY STAR-CERTIFIED APPLIANCES

-11.4%

a loss of

16,300 JOBS

EFFICIENT LIGHTING TECHNOLOGIES

Efficient lighting technologies, including LED, CFL, and ENERGY
STAR-certified lighting, lost 42,000 jobs, for a decline of 11 percent.

-11.0%

a loss of

42,000 JOBS

MOTOR VEHICLES



Motor Vehicles (including component parts) employed over

2.3 MILLION



a loss of

231,200 JOBS

**ALL MOTOR VEHICLES SUB-TECHNOLOGIES SHED JOBS
WITH THE EXCEPTION OF ELECTRIC AND HYBRID ELECTRIC VEHICLES**

ELECTRIC VEHICLES



Employment in the **electric vehicle** sector grew by 7.8 percent in 2020 (6,100 jobs).



GASOLINE + DIESEL VEHICLES



Gasoline and diesel vehicles declined by 9.9 percent—a loss of 200,700 jobs.



HYBRID ELECTRIC VEHICLES



Employment in the **hybrid electric vehicle** sector grew by 5.5 percent (6,300 jobs).



PLUG-IN HYBRID VEHICLES



Employment in the **plug-in hybrid vehicles** sub-sector declined by 7.3 percent (3,800 jobs).



ENERGY WAGES

Historical data demonstrates that energy jobs pay significantly more than the average wage in the United States



Premium of energy job wages over the retail and accommodation and food service sectors, which have been hard-hit by the COVID-19 pandemic

\$41.08

Median wage for energy utility employees, the highest of all industry segments and 115% above the national median. Mining and extraction jobs are next highest at \$36.32.

UTILITY WORKERS

The utilities industry supports the highest hourly wage of all industries compared to the national median. Electric power generation and transmission, distribution, and storage are the only sectors with utilities jobs.

UNIONIZATION

Across sub-technologies, natural gas generation, coal generation, nuclear generation and traditional transmission and distribution had the highest unionization rates.

	Percent Union Membership
Natural Gas Generation	15.1%
Nuclear Generation	19.5%
Coal Generation	14.7%
Other Renewable Generation	8.8%
Solar Generation	9.6%
Wind Generation	9.5%
Oil Generation	6.7%
Petroleum Fuels	5.6%
Coal Fuels	9.8%
Nuclear Fuels	5.5%
Natural Gas Fuels	4.9%
Renewable Fuels	4.1%
Traditional Transmission and Distribution	17.0%
Grid Modernization	9.9%
Storage	9.6%
Advanced Transportation	4.3%

OCCUPATIONAL EMPLOYMENT

Within each sector, there are specific occupations; these could include welders, electricians, sales representatives, or lawyers.



ELECTRIC POWER GENERATION

32.1%

Installation and repair

20.8%

Administrative positions



TRANSMISSION, DISTRIBUTION, AND STORAGE

32.0%

Installation and repair

22.1%

Administrative positions



FUELS

33.0%

Production and manufacturing

20.8%

Management or Professional



ENERGY EFFICIENCY

32.1%

Installation and repair

23.5%

Administrative positions



MOTOR VEHICLES

36.9%

Production and manufacturing

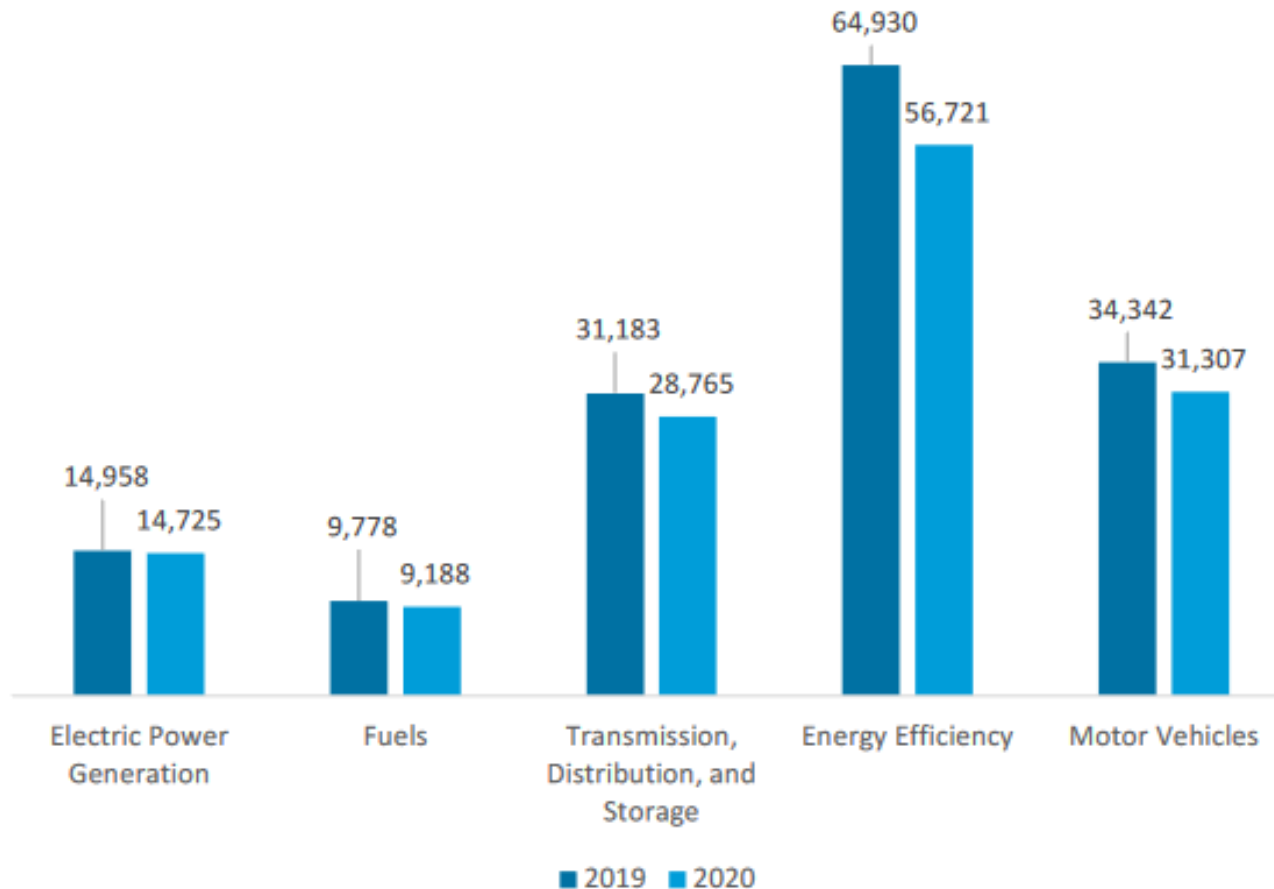
29.0%

Installation and repair



Washington State Energy Jobs 2020

Figure WA-1.
Employment by Major Energy Technology Application



Washington Energy Jobs 2020 Electric Power Generation

Figure WA-2.
Electric Power Generation Employment by Detailed Technology Application

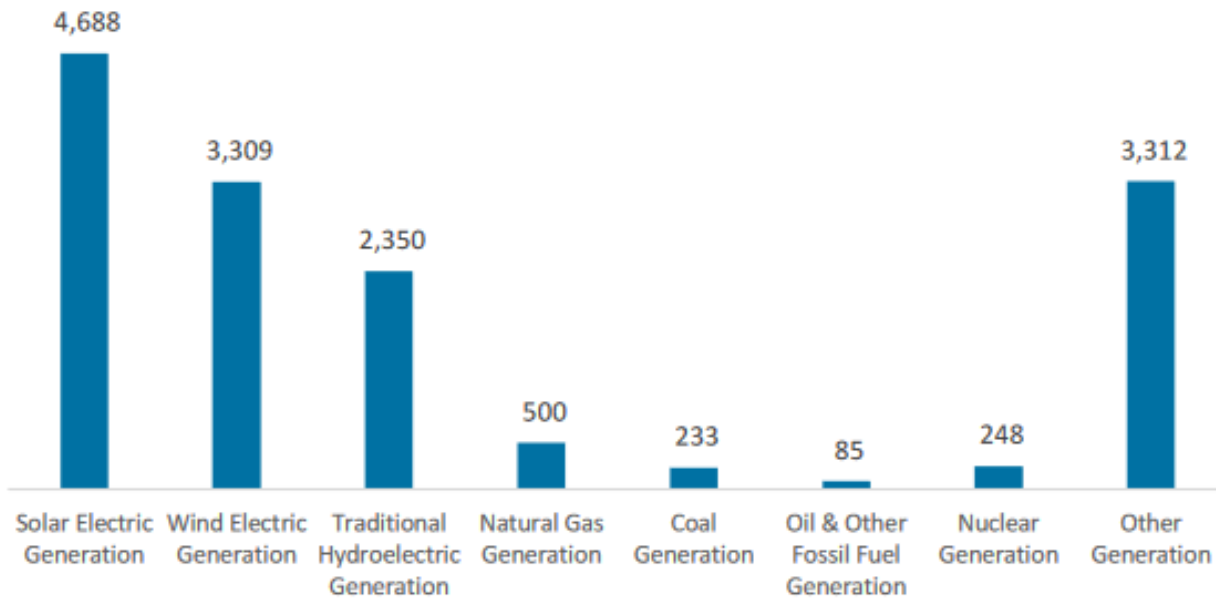
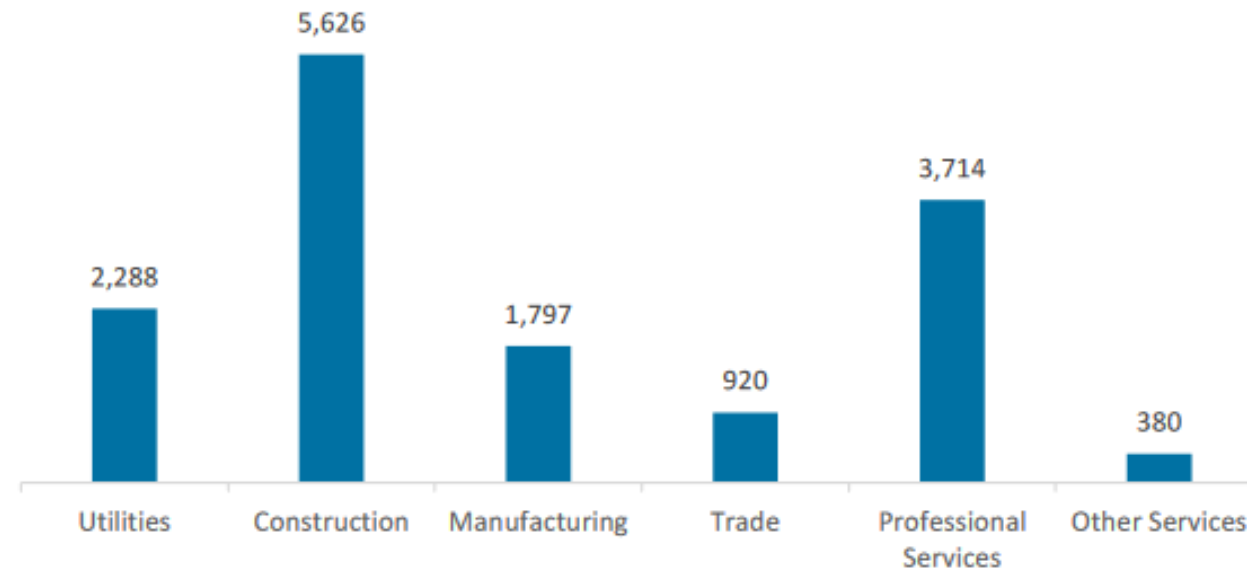


Figure WA-3.
Electric Power Generation Employment by Industry Sector



Washington Energy Jobs 2020 Fuels

Figure WA-4.
Fuels Employment by Detailed Technology Application

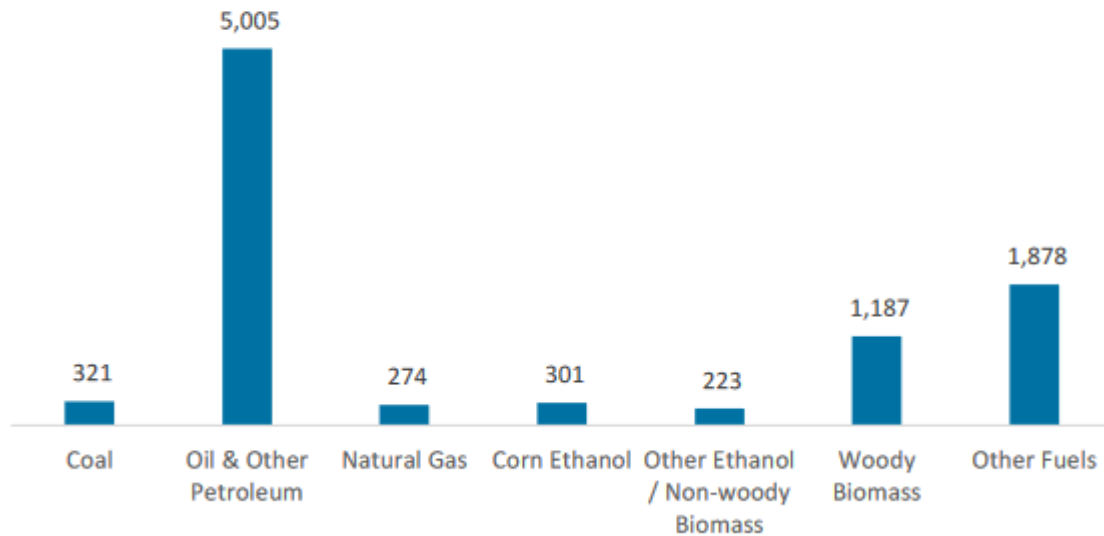
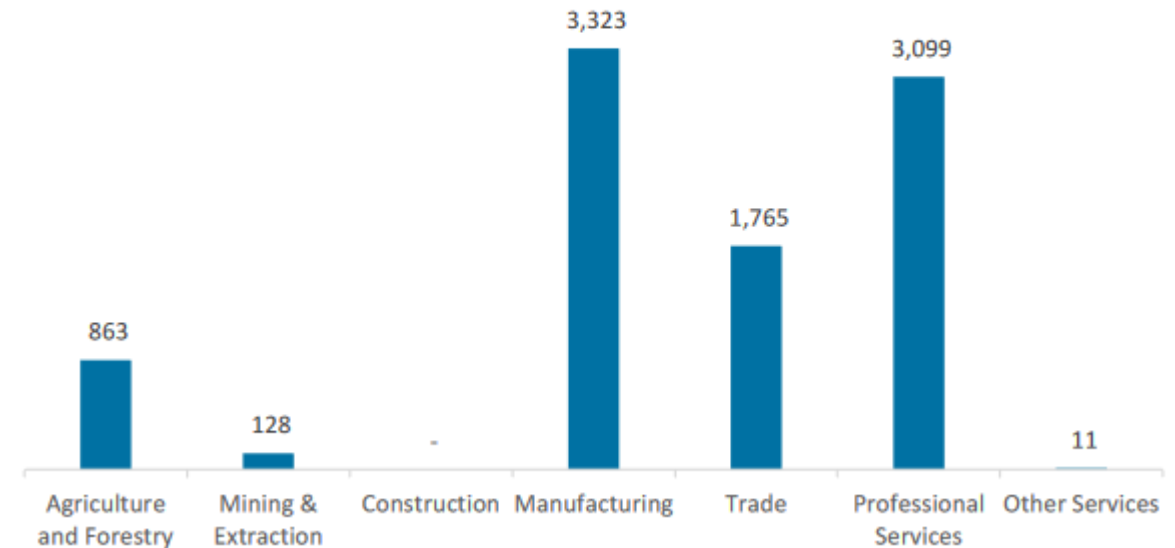


Figure WA-5.
Fuels Employment by Industry Sector



Washington Energy Jobs 2020 Transmission, Distribution & Storage

Figure WA-6.
Transmission, Distribution and Storage Employment by Detailed Technology

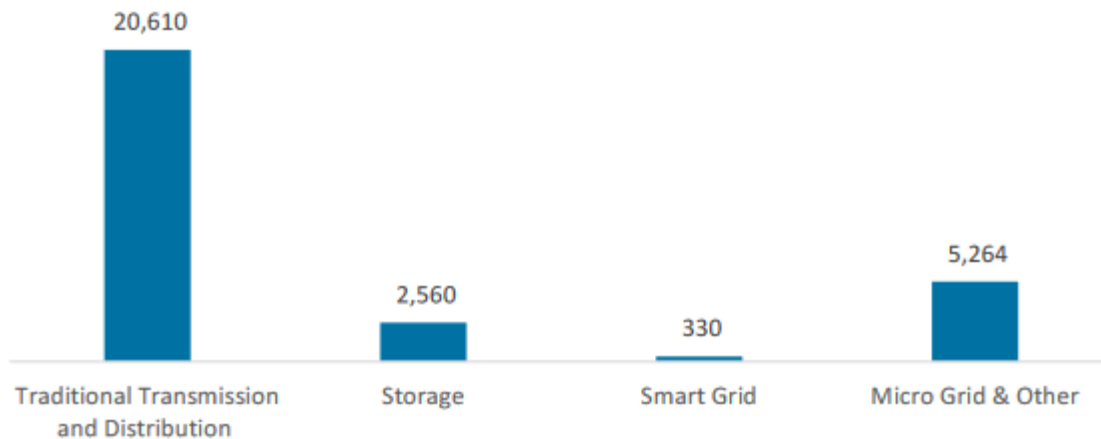
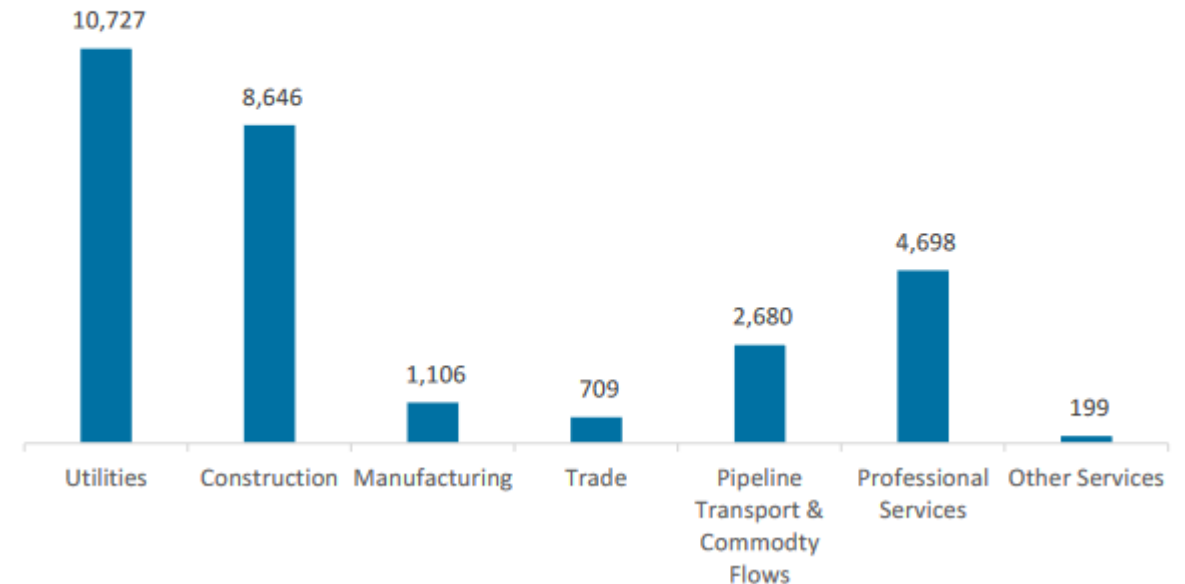


Figure WA-7.
Transmission, Distribution and Storage Employment by Industry Sector



Washington Energy Jobs 2020 Energy Efficiency

Figure WA-8.
Energy Efficiency Employment by Detailed Technology Application

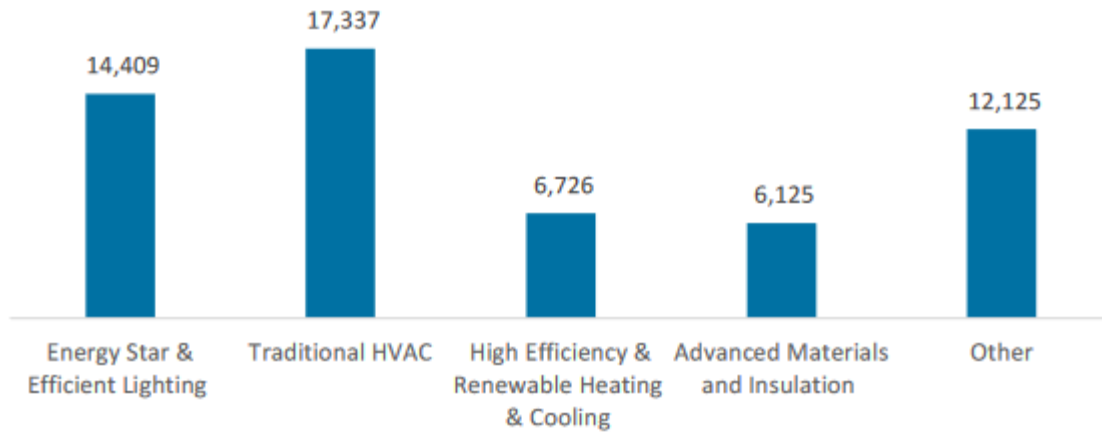
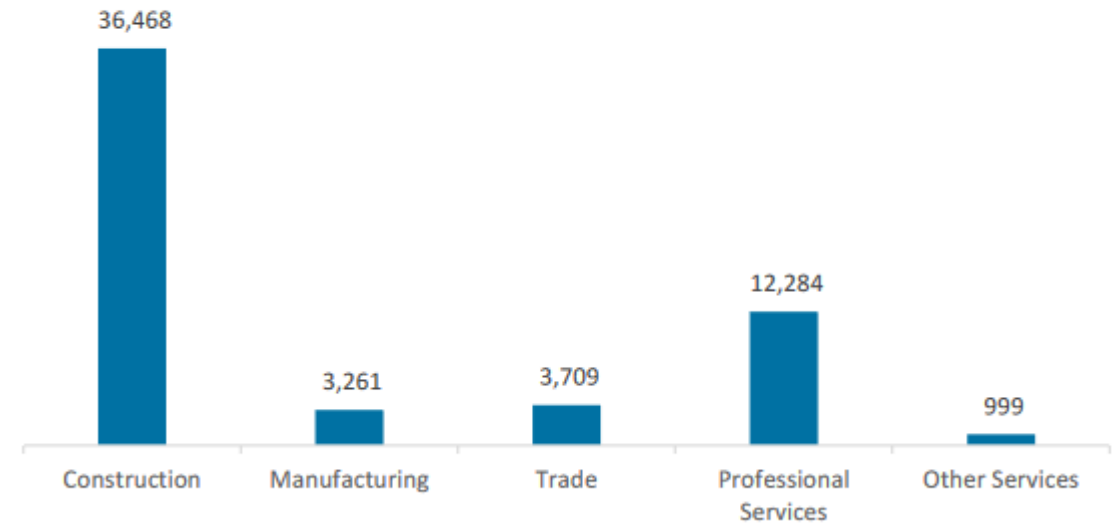


Figure WA-9.
Energy Efficiency Employment by Industry Sector



Challenges with Job Projections

History of Issues with Projecting Jobs

- Pew Charitable Trust study attempted to define clean energy jobs June 2009
- Washington 2021 State Energy Strategy
 - Optional reading
 - Classification of jobs IMPLAN & REMI
- Net Zero America Employment Modeling
- Net Zero Northwest



Equity Issues

Potential for Social and Economic Change

- Green New Deal: CE transition bring jobs for all kinds of workers
 - Need to ID the jobs, skillsets, & training
- Recovery from Covid pandemic
 - Supply chain issues
 - Recession increased urgency
- Need to aim for equitable wages, promote transferable skills, lower formal educational barriers to entry
- Potential for millions of reliable, well-paying jobs cleaner, more resilient, more energy-secure America



U.S. Labor Force Demographics 2020

Demographic	Overall US Labor Force	Total Energy Workforce	Clean Energy Workforce	Fossil Fuel Workforce
White	76%	74%	73%	74%
Black/African-American	13%	10%	8%	9%
Asian	7%	7%	8%	6%
Native Hawaiian or other Pacific Islander	<1%	1%	1%	<1%
American Indian or Alaska Native	<1%	2%	1%	2%
Two or more races	2%	8%	8%	9%
People of Color	22%	28%	26%	26%
Hispanic/Latino	18%	16%	17%	13%
Women	48%	25%	27%	27%

Marginalized Communities

- Historically marginalized communities require particular focus
- Communities of color hurt first and worst by the impacts of climate change
 - Impacted by siting of fossil fuel plants and highways
- Rural communities historic denied electricity or gas hook-ups
 - High energy burden
 - Tribal lands in particular



Transition Challenges to Address

- Hiring, training, & retention policies not delivering gender and racial diversity
- Retraining displaced workers in coal, oil, & gas
- National, state, local leadership
 - Diversifying leadership and reimagining the talent pipeline
 - Reallocating resources to training and education
 - Reconsidering internship programs
 - Exploring apprenticeship opportunities
 - Pursuing mentorship roles





Questions & Answers



Thank you very much

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