

2019 U.S. Energy and Employment Report



Energy Efficiency Jobs in America

*NAESCO Technology and
Financing Conference*

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Overview—2019 USEER

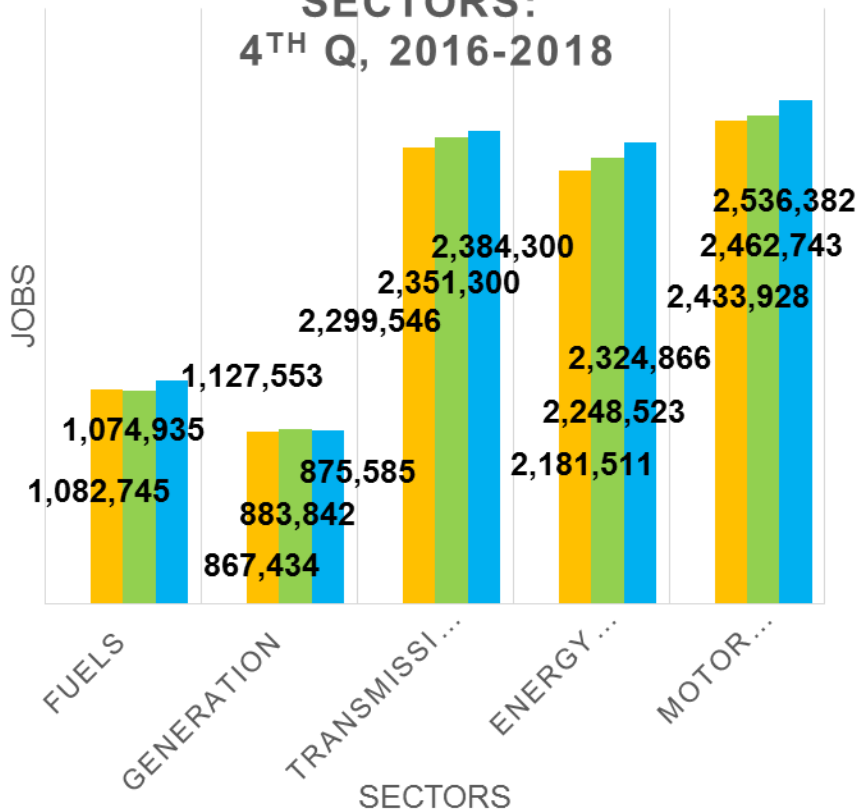
- The USEER is based on an annual supplemental employer survey, integrated with the BLS Quarterly Census on Employment and Wages.
- It studies employment in the following sectors:
 - Fuels
 - Electric Power Generation (EPG)
 - Transmission, Distribution, and Storage (TDS)
 - Energy Efficiency (EE)
 - Motor Vehicles
- Fuels, EPG, and TDS make up the Traditional Energy Sector.

USEER Content

- The survey covers direct employment in 53 different energy, energy efficiency and motor vehicle technologies across 186 NAICS codes located in seven broad industrial classifications.
- The survey determines:
 - Employment numbers
 - Employer hiring expectations for the next 12 months
 - Hiring difficulty by technology and industrial classification
 - High demand jobs and skills gaps
 - Workforce demographics by race, ethnicity, gender, and veteran's status
 - Geographic location by state, county, congressional and legislative districts, and MSA of each technology and industrial classifications

2019 Key Takeaways

ANALYZED EMPLOYMENT SECTORS: 4TH Q, 2016-2018

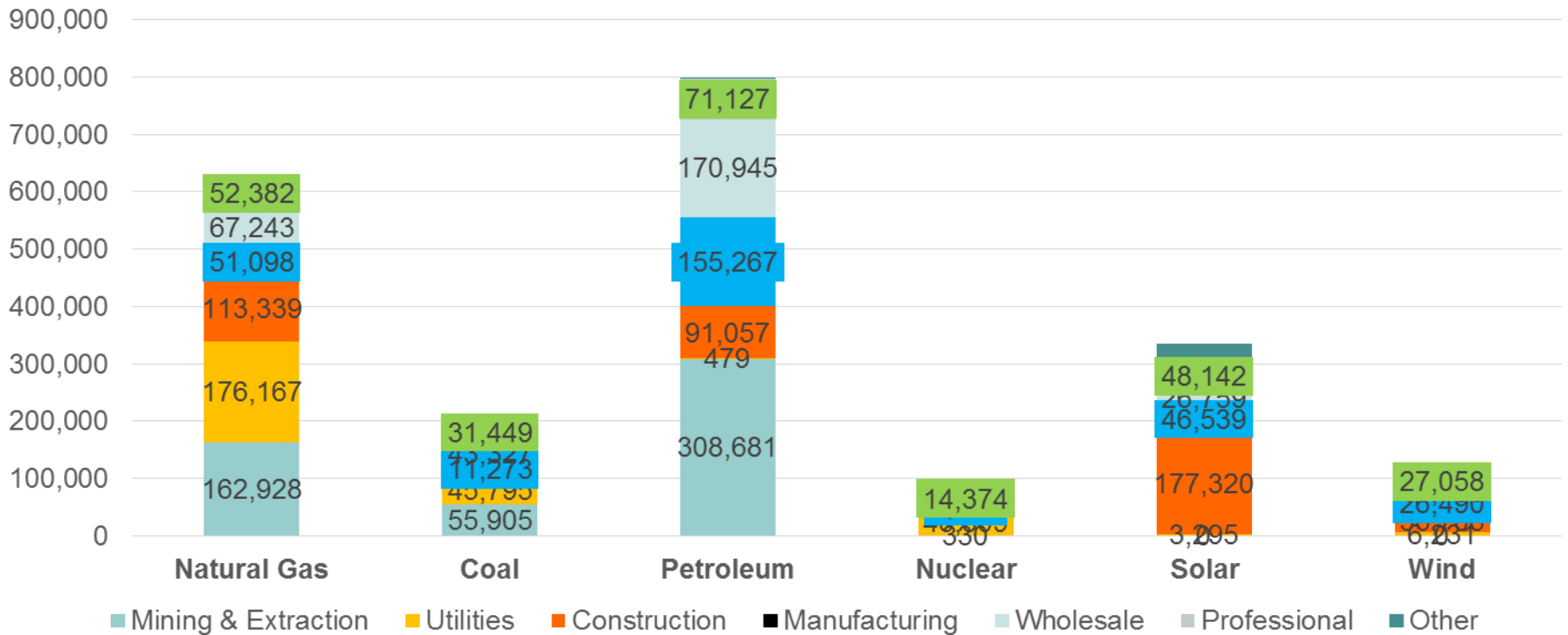


226,000 New Jobs in 2018 in 5 Sectors

- Traditional Energy and Energy Efficiency added 152,000 jobs in 2018, out performing the economy for the 4th year in a row by 0.5 percentage point, 2.3% to 1.8%.
- Fuels production added 52,000 new jobs, 33,000 in oil and 17,000 in natural gas, while coal mining held firm.
- Generation declined by 8,000 jobs with coal, solar, and nuclear declining, partially offset by natural gas, wind, CHP, and geothermal
- TDS added 33,000 new jobs, concentrated in utility projects and storage.
- Energy efficiency added 76,000 jobs; 275,000 in last 3 years
- Motor vehicles added 74,000 jobs, while alternative fuel vehicles bounced back, adding almost 34,000 jobs.

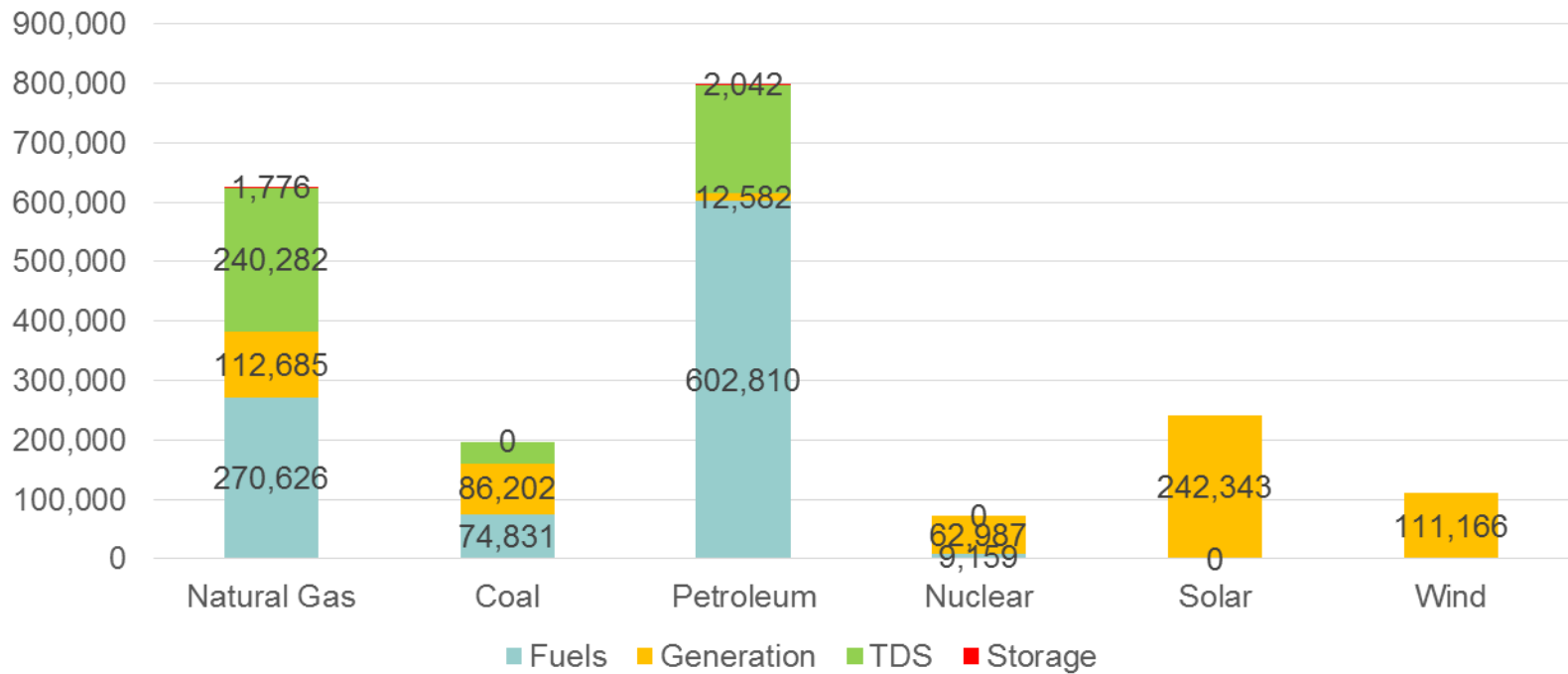
Crosscut Analysis by Industry Sector

How Jobs Are Distributed across Industrial Sectors



Crosscut by Major Technology

How Jobs in Sectors Are Distributed across Different Technologies



USEER Definition of Energy Efficiency Jobs

- “Energy Efficiency employment covers both the production and installation of energy-saving products and the provision of services that reduce end-use energy consumption. These jobs, as specified in the current survey, include the manufacture of ENERGY STAR®-labeled products, as well as building design and contracting services that provide insulation, improve natural lighting, and reduce overall energy consumption across homes and businesses.”
- Does not include energy efficiency employment in manufacturing processes.
- Includes CHP and waste heat to power, but in EPG numbers.

USEER Energy Efficiency Technologies

- Energy Star appliances
- LED, CFL, and other efficient lighting
- Traditional HVAC
- Energy Star/high efficiency HVAC
- Renewable heating and cooling, including solar thermal
- Advanced building materials/insulation
- Recycled building materials
- Reduced water consumption products/appliances
- Other

“Other” Energy Efficiency Technologies

- Variable speed pumps
- Other design services not specific to a subtechnology
- Software not specific to a subtechnology
- Energy auditing, rating, monitoring, metering and leak detection
- EE Policy not specific to a subtechnology
- LEED certification
- Consulting not specific to a subtechnology
- Phase-changing materials

Energy Efficiency Jobs by Technology & Industry--2018

Table 44.
Energy Efficiency Sector – Employment by Detailed Technology
Application and Industry, Q2 2018

	Total	Construction	Manu- facturing	Wholesale Trade	Professional Services	Other Services
ENERGY STAR Appliances	167,828	86,547	17,350	12,852	46,671	4,408
LED, CFL and Other Efficient Lighting	370,562	184,471	49,408	39,266	93,901	3,517
Traditional HVAC goods, control systems, and services	582,108	322,181	33,023	54,354	156,326	16,224
ENERGY STAR/ High Efficiency heating and cooling equipment	427,503	275,285	74,791	26,362	46,421	4,644
Renewable Heating and Cooling (including Solar Thermal)	128,896	82,513	7,823	7,865	29,909	785
Advanced Building Materials/Insulation	357,765	204,245	74,377	22,462	54,297	2,384
Recycled building materials	82,423	46,921	11,844	2,801	17,849	3,007
Reduced water consumption products and appliances	91,555	58,069	6,109	5,291	20,728	1,358
Other	116,225	35,550	46,856	9,086	18,379	6,354
TOTAL	2,324,865	1,295,782	321,581	180,339	484,481	42,681

Overview

- Construction is the largest industry sector of EE at 55.7%.
- Professional Services is second at 20.8%.
- Manufacturing is third at 13.8%
- The largest technology is Traditional HVAC at 25.0%
- EnergyStar/High efficiency HVAC is second at 18.4%.
- LED, CFL, and other efficient lighting is third at 15.9%.

Year-over-Year Growth in Energy Efficiency

Figure 84.
Energy Efficiency Sector – Employment by Industry, 2017-2018

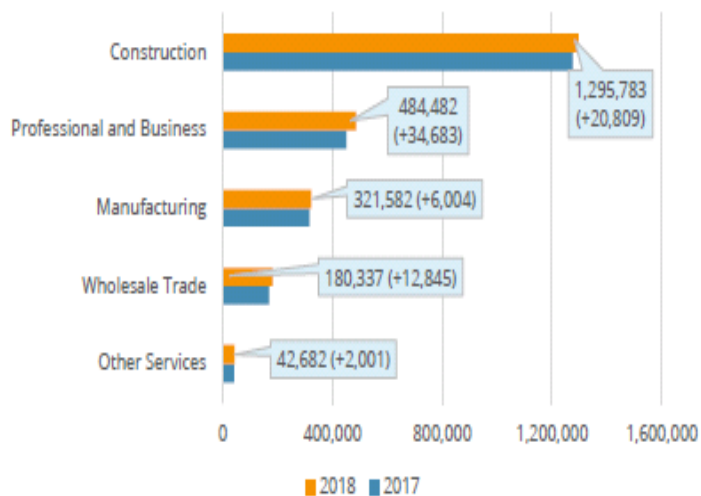
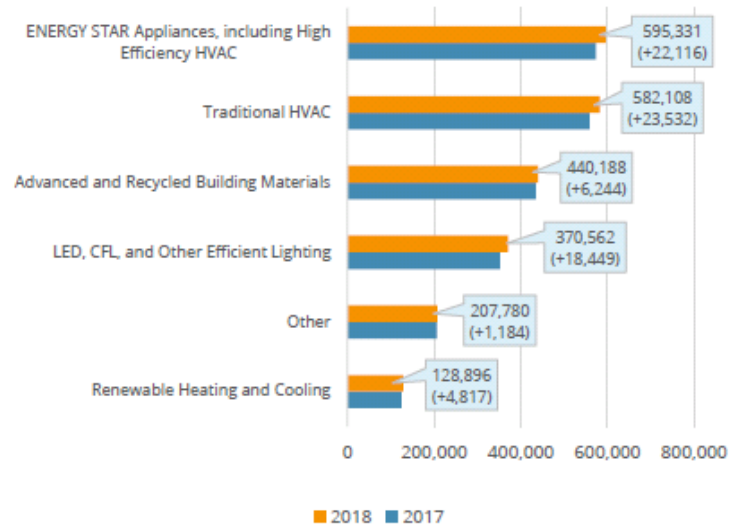


Figure 85.
Energy Efficiency Sector – Employment by Detailed Technology, 2017-2018



Energy Efficiency Employment— Top States

State	EE Jobs Overall
CA	318,542
TX	162,816
NY	123,292
FL	118,412
IL	89,469
NC	86,559
MA	86,473
MI	85,061
OH	81,676
VA	78,670
MD	70,530
PA	68,820
WA	63,877
WI	63,141
GA	61,193

State	Efficient Lighting
CA	71,893
TX	59,650
NC	42,893
NY	36,848
FL	32,499
WI	26,054
VA	20,733
OH	16,290
WA	16,222
MI	14,775
MA	14,494
PA	14,286
IL	13,311
MN	12,445
MD	11,748

State	EE Manufacturing
MI	44,057
CA	33,502
WI	21,691
IL	19,903
OH	17,221
TX	15,894
NC	14,391
IN	13,579
PA	13,396
TN	12,239
KY	10,314
GA	8,166
MO	7,839
AL	7,726
MA	7,521

Demographics of EE Workforce

Table 49.
Energy Efficiency Sector – Demographics, Q4 2018

Demographic	Employees	Percent of Sector	National Workforce Averages
Male	1,767,865	76%	53%
Female	557,000	24%	47%
Hispanic or Latino	365,427	16%	17%
Not Hispanic or Latino	1,959,438	84%	83%
American Indian or Alaska Native	32,553	1%	1%
Asian	120,540	5%	6%
Black or African American	175,914	8%	12%
Native Hawaiian or other Pacific Islander	26,716	1%	>1%
White	1,811,682	78%	78%
Two or more races	157,460	7%	2%
Veterans	235,384	10%	6%
55 and over	327,072	14%	23%
Union	251,785	11%	11%

- Key Takeaways, the EE Workforce is—
 - 3 to 1 male;
 - Racially diverse, however, A-A's are less represented;
 - Veterans are more represented;
 - Older workers less represented;
 - Almost twice the private sector unionization rate of 6.4% at 11%.

Wage Variation across Energy and Energy Efficiency Industry Sectors

	Construction	Professional Services	Manufacturing	Utilities	Mining and Extraction	Wholesale Trade
Number of EE's	1,867,000	956,000	762,000	603,000	528,000	440,000
Entry level	\$14.77	\$22.10	\$16.75	\$25.06	\$16.68	\$21.83
Median level	\$21.82	\$33.44	\$26.63	\$36.61	\$26.56	\$33.35
Highest level	\$34.60	\$52.62	\$44.38	\$55.43	\$40.87	\$51.64

Key Findings:

- Wage correlation is closest to industry sector as opposed to energy technology.
- Utilities, at all levels, provide the highest median wage.
- Over 50% of these sectors have median entry level wages below \$17/hr.
- Largest % increases from entry level to median are in mining and manufacturing at 59%.

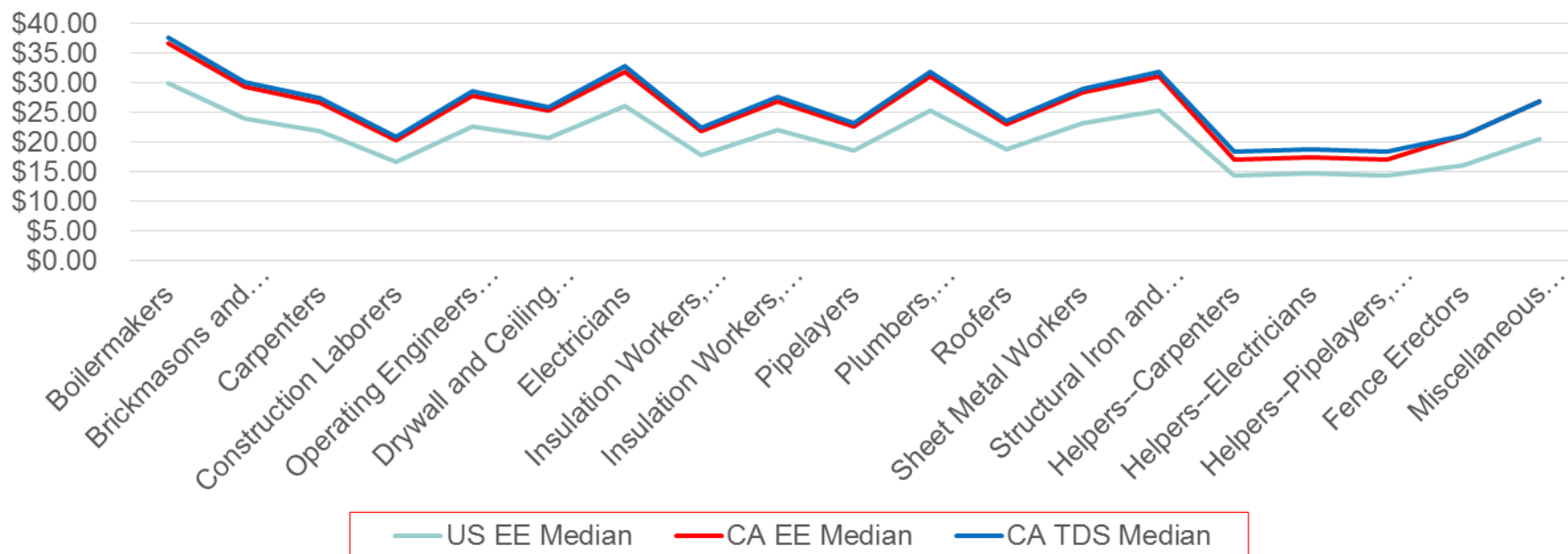
Energy Efficiency Jobs Generally Pay a Premium, but Location & Unions Count.

Description	U.S. Median BLS Hourly Earnings	U.S. Median EE Hourly Earnings	Wage Premium or Discount	California EE	Wage Premium or Discount	North Carolina EE	Wage Premium or Discount
Boilermakers	\$ 29.93	\$ 30.83	\$ 0.90	\$ 36.65	\$ 6.72	\$ 25.24	\$ (4.69)
Brickmasons and Blockmasons	\$ 23.93	\$ 24.65	\$ 0.72	\$ 29.31	\$ 5.38	\$ 20.18	\$ (3.75)
Carpenters	\$ 21.71	\$ 22.36	\$ 0.65	\$ 26.59	\$ 4.88	\$ 18.31	\$ (3.40)
Construction Laborers	\$ 16.60	\$ 17.10	\$ 0.50	\$ 20.33	\$ 3.73	\$ 14.00	\$ (2.60)
Operating Engineers and Others	\$ 22.61	\$ 23.29	\$ 0.68	\$ 27.69	\$ 5.08	\$ 19.06	\$ (3.55)
Electricians	\$ 26.01	\$ 26.79	\$ 0.78	\$ 31.85	\$ 5.84	\$ 21.93	\$ (4.08)
Insulation Workers, Floor, Ceiling, and Wall	\$ 17.81	\$ 18.34	\$ 0.53	\$ 21.81	\$ 4.00	\$ 15.02	\$ (2.79)
Insulation Workers, Mechanical	\$ 21.90	\$ 22.56	\$ 0.66	\$ 26.82	\$ 4.92	\$ 18.47	\$ (3.43)
Plumbers and Pipefitters	\$ 25.28	\$ 26.04	\$ 0.76	\$ 30.96	\$ 5.68	\$ 21.32	\$ (3.96)
Roofers	\$ 18.74	\$ 19.30	\$ 0.56	\$ 22.95	\$ 4.21	\$ 15.80	\$ (2.94)
Sheet Metal Workers	\$ 23.07	\$ 23.76	\$ 0.69	\$ 28.25	\$ 5.18	\$ 19.45	\$ (3.62)
Structural Iron and Steel Workers	\$ 25.30	\$ 26.06	\$ 0.76	\$ 30.98	\$ 5.68	\$ 21.33	\$ (3.97)

EE Construction Workers' Wages in CA

- There is a clear locational wage premium for EE construction workers in CA, but no skills' premium.
- TDS construction workers make from \$.60-\$.150/hr. more than EE construction workers.

CA EE and TDS construction worker median pay rates in 2018



2018 Hiring Difficulty in Energy Efficiency

Figure 90.
Energy Efficiency Sector – Hiring Difficulty by Industry, Q4 2018

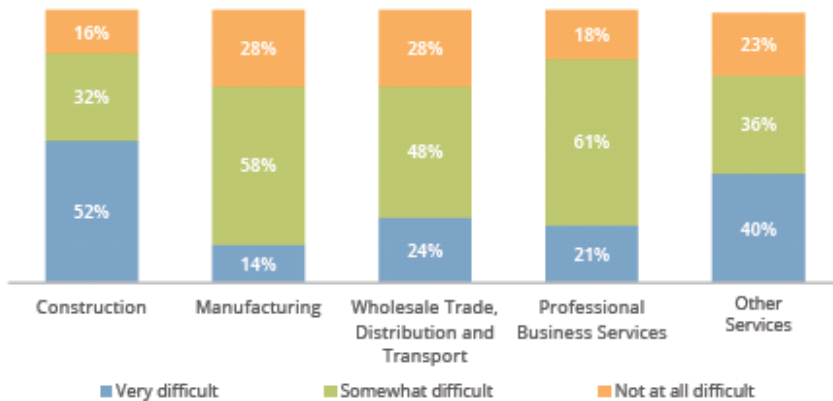
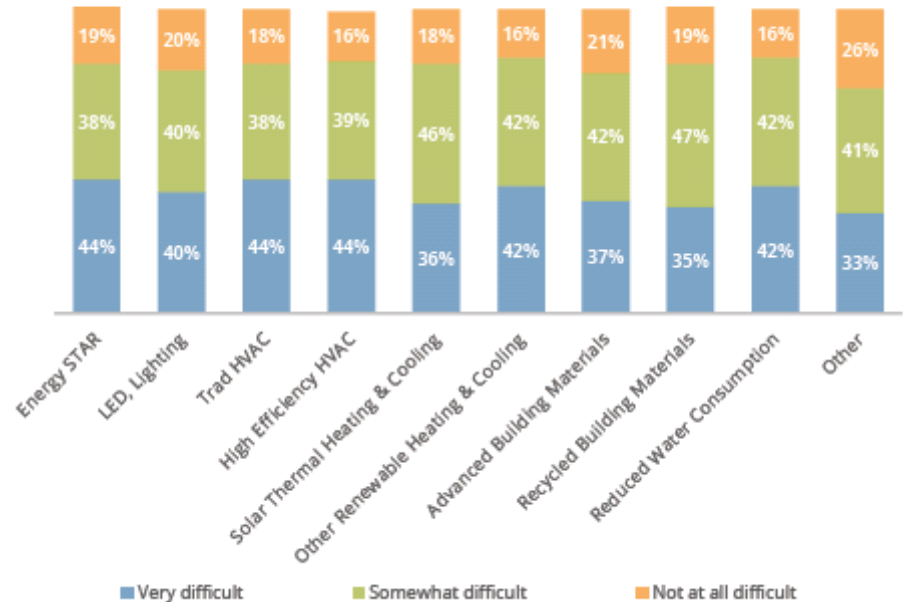
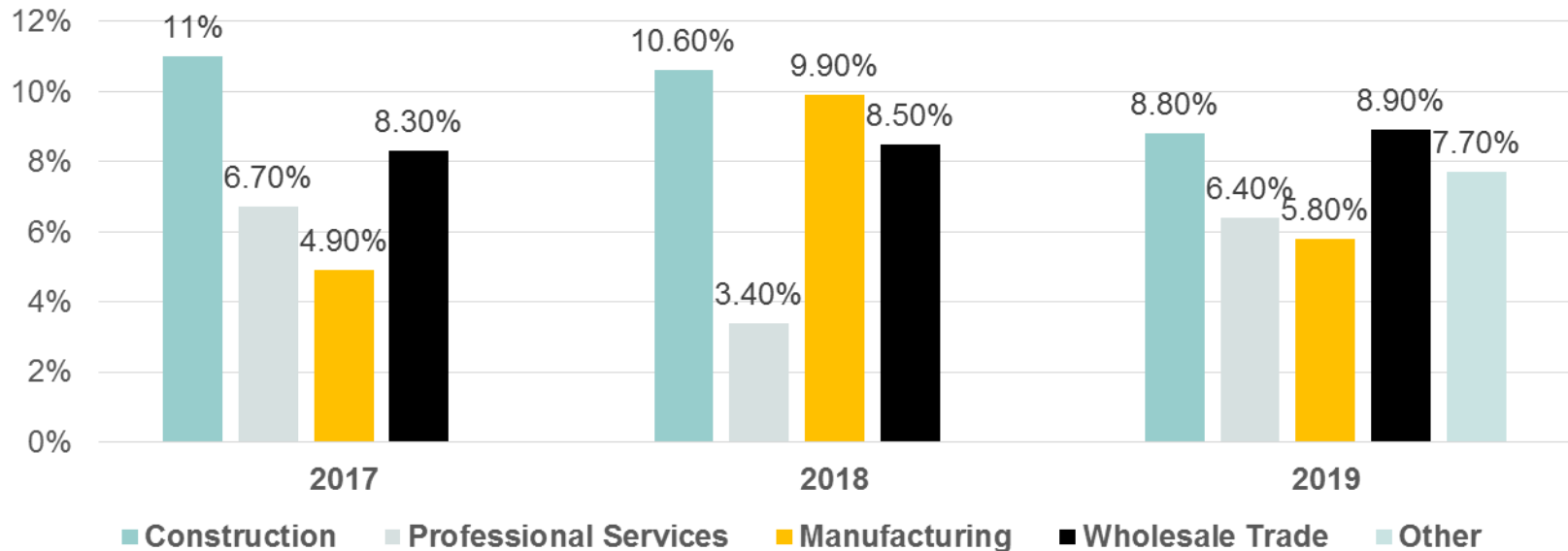


Figure 91.
Energy Efficiency Sector – Hiring Difficulty by Technology, Q4 2018



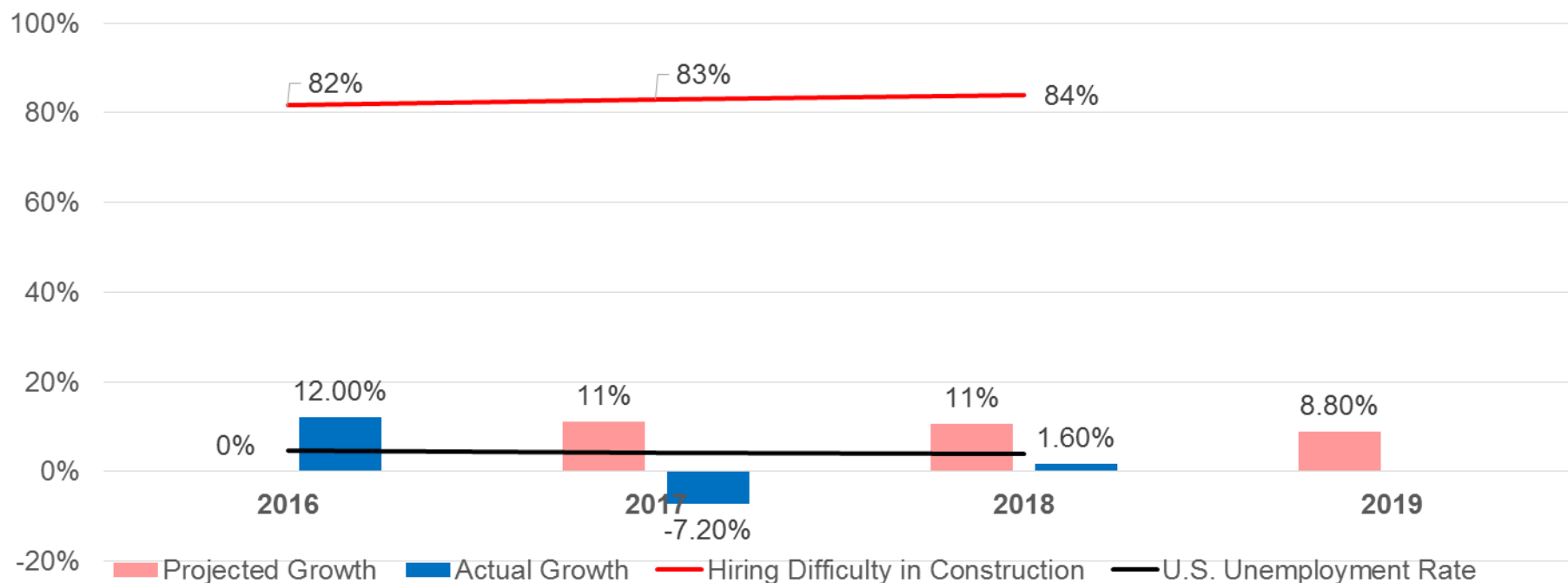
2017-19 Energy Efficiency Hiring Expectations by Industry Sector

Industry Hiring Expectations in Energy Efficiency



Projected EE Construction Job Growth vs. Actual

Anticipated Employer Growth Has Been Challenged by Hiring Difficulty in Construction



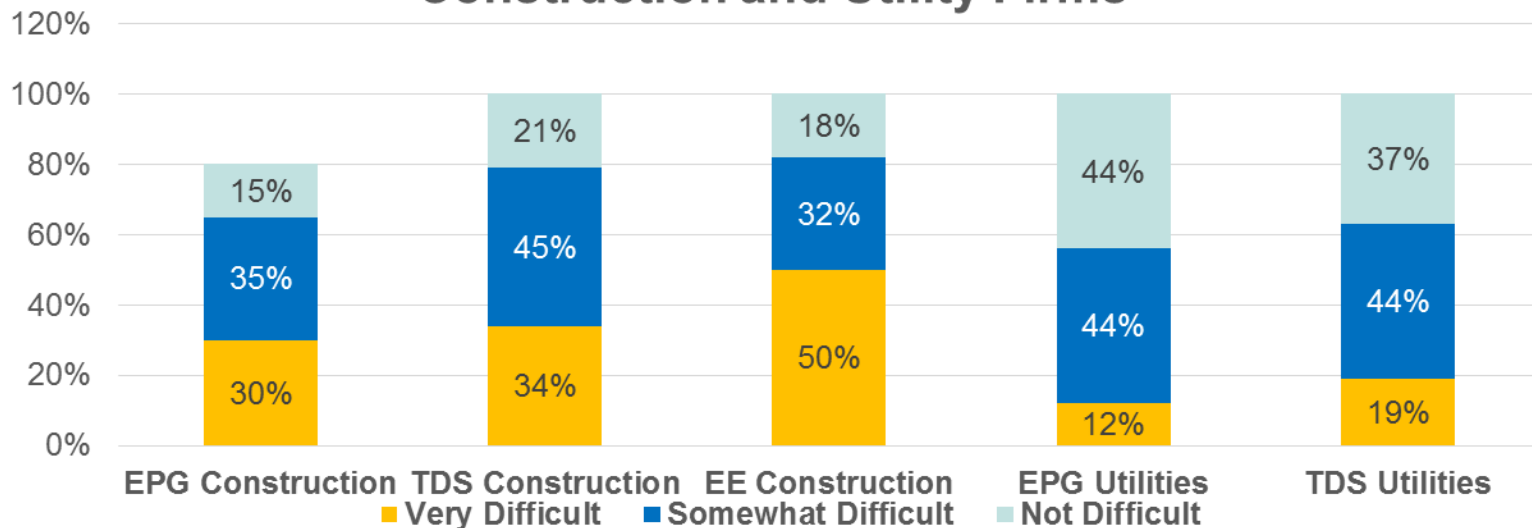
National Hiring Crisis in Clean Energy— Overall Hiring Difficulty of 77%.

Technology	2017 Projected Hiring	2018 Actual Hiring	2018 Hiring Difficulty	2019 Projected Hiring
Energy Efficiency (overall)	9.0%	3.4	81%	7.8
Energy Efficiency Construction	10.6%	1.6%	84% (52%)	8.8%
Energy Efficiency Professional	3.4%	7.7%	82% (21%)	6.4%
Energy Efficiency Manufacturing	9.9%	1.9%	72%	5.8%
Wind Construction	3.7% (overall)	3.5% (overall)	86% (28%)	6.2%
Solar Construction	5.0% (overall)	(.03.2)% (overall)	85%	8.6%
Battery Storage	NA	18.1%	92% (23%)	4.4%
Grid Modernization		3.3%	80% (17%)	1.9-2.3%
TDS Construction	5.4%	4.8%	79% (34%)	4.0%
TDS Utilities	(.6)%	1.7%	56% (12%)	1.1

But Some Employers Succeed

- 76.9% of all surveyed employers reported difficulty hiring qualified workers over the last 12 months; 29% noted it was very difficult. (In 2017, these numbers were 70% and 26%).

Hiring Difficulty Contrast between Energy Construction and Utility Firms



Low Emissions' Jobs—2019

Projected Growth Rates

- **Generation—7.1%**
 - Solar—8.4%
 - Wind—5%
 - Low Emissions' Natural Gas—5%*
 - CHP—4%
 - Hydroelectric 5.8%
 - Nuclear—4%
 - Biomass—5%
- **Fuels—3%**
 - Corn Ethanol—2.2%
 - Woody Biomass—6%
 - Other Ethanol—2.3%
 - Other Biofuels—1.8%
- **Energy Efficiency—7.8%**
 - EE Construction—8.8%
 - EE Manufacturing—5.8%
 - Professional Services—6.4%
- **Motor Vehicles—2.2%**
 - Plug-in Hybrids—1.0%
 - Electrics—1.6%
- **TS&D—3.2%**
 - Micro Grids—2.3%
 - Smart Grid—2.2%
 - Other grid—1.9%
- **Storage**
 - Battery—4.4%
 - Pumped Hydro—1.1%
 - Mechanical—2.3%
 - Thermal—1.9%

Definitions vary, but there are at least 4,010,300 Low Emissions' Energy Jobs in the U.S. as outlined below:

- **2.32 Million** are employed in **Energy Efficiency**.
- **611,100 in generation**, these include:
 - Solar--242,000 spending a majority of their time, with another 93,000 spending less than 50%
 - Wind—111,000
 - Nuclear—72,000 (generation and fuels)
 - Combined Heat and Power (CHP)—29,000
 - Biomass—13,000,
 - Geothermal—8,500
 - Hydro—66,400 (12,000 low impact)
 - Low emissions natural gas—69,200
- **106,600 in fuels**, these include:
 - Corn Ethanol—35,000
 - Woody Biomass/Cellulosic Biofuels—33,100
 - Other Ethanol and Non-woody Biomass, incl. Biodiesel—20,100
 - Other Biofuels—18,400
- **75,200 in Energy Storage**, including battery, pumped hydro, mechanical and thermal.
- **64,400 in grid modernization**, including smart grid and micro grids.
- **254,000 in alternative fuels' vehicles**, making and servicing electric vehicles, plug-in hybrids, hybrids, natural gas vehicles, and fuel cell vehicles.
- **486,000 in motor vehicle parts' fuel efficiency**, whose jobs contribute to meeting the fuel efficiency standard rules.

2019 USEER

Thank you!

Questions?

To download the 2019 USEER or state fact sheets, go to www.usenergyjobs.org

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