

2020 U.S. Energy & Employment Report

EXECUTIVE SUMMARY

A Joint Project
of NASEO & EFI



ACKNOWLEDGEMENTS & APPRECIATION

The 2020 U.S. Energy and Employment Report was produced with the generous support of the following states, organizations and foundations:

- California Energy Commission
- California Public Utilities Commission
- Connecticut Green Bank
- Massachusetts Clean Energy Center
- New York State Energy Research and Development Authority
- Pennsylvania Department of Environmental Protection
- Rhode Island Office of Energy Resources
- Texas State Energy Conservation Office
- Vermont Clean Energy Development Fund
- Advanced Energy Economy
- American Wind Energy Association
- Clean Energy Trust
- Energy Foundation
- E4TheFuture
- Energy Futures Initiative
- E2 (Environmental Entrepreneurs)
- McKnight Foundation
- Nathan Cummings Foundation
- National Association of State Energy Officials
- Nuclear Energy Institute
- The Solar Foundation
- U.S. Climate Alliance

Peer review of the report and the underlying methodology was performed by:

- **Dr. James Barrett**, Principal, Barrett Economics
- **Dr. Joel Yudken**, Principal, High Road Strategies, LLC

Data collection and research was managed by [BW Research Partnership](#)

Editing and design services were provided by [MG Strategy & Design](#)

This material is based upon work supported by the Department of Energy under Award Number DE-EP0000027.

Disclaimer: This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

The National Association of State Energy Officials (NASEO) a nonprofit association representing the 56 energy offices of the states, territories, and District of Columbia, and the Energy Futures Initiative (EFI), a nonprofit think tank based in Washington, D.C., are pleased to release the 2020 U.S. Energy and Employment Report (USEER) to provide a consistent tool for states, trade associations, labor unions, and other stakeholders to track changes in energy and energy-related employment during a time of continued change in energy markets.

For many NASEO members, economic development and job creation provide the underpinning for their energy planning and policy development initiatives. Now in its fifth year of publication, the USEER offers a powerful tool for state policymakers to understand the impact of evolving energy markets; to help prepare their communities, infrastructure, and workforce for these changes; and to harness the economic and environmental benefits that result.

The 2020 USEER was prepared under a Memorandum of Understanding between NASEO and EFI, and a contract between EFI and BW Research Partnership. The underlying methodology of the survey is identical to that used in the primary data collected on behalf of the U.S. Department of Energy (DOE) for the 2017 U.S. Energy and Employment Report and secondary data from the United States Department of Labor's Quarterly Census of Employment and Wages for the second quarter of 2019. The survey instrument was amended for the 2020 USEER to include additional questions about ENERGY STAR products and services, energy storage, utility energy efficiency programs, and pipeline products. Neither EFI nor NASEO, nor any of their employees, nor any of their contractors, subcontractors, or their employees makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or any third party's use or the results of such use of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights.

The USEER was first published in 2016 and 2017 by DOE upon recommendation of the 2015 first installment of the Quadrennial Energy Review (QER), "to reform existing data collection systems to provide consistent and complete definitions and quantification of energy jobs across all sectors of the economy." Previous editions of the USEER had addressed several gaps in energy employment data, including the following:

- business activities essential to the operation of traditional energy companies and utilities, including coal, natural gas, nuclear, and others, classified by the North American Industry Classification System (NAICS) within the business activities of other sectors
- jobs associated with the production of renewable energy such as wind, solar, and geothermal power
- jobs associated with energy efficiency

* Department of Energy, *Quadrennial Energy Review: Energy Transmission, Storage, and Distribution Infrastructure* (Washington, DC: DOE, 2015), p. 8-10.

The 2018, 2019, and 2020 USEERs have been organized and implemented by EFI and NASEO to provide continuity with the previous editions of the USEER in data collection and accuracy in year-to-year comparisons.

Accordingly, the 2020 USEER relies on the identical survey instrument developed by the DOE and approved by the Office of Management and Budget (OMB Control No. 1910-5179) for the 2017 USEER with the following additions:

- differentiation of jobs in oil and gas pipeline construction
- expansion of energy storage technologies
- an energy and energy efficiency jobs wage data survey to be published as a separate report
- detailed questions on specific ENERGY STAR products and its commercial, residential and industrial building construction programs
- a question on internal utility-run energy efficiency programs

The data collection for the 2020 USEER was timed to ensure meaningful year-to-year comparisons with previous reports. In addition, the following organizational changes were made from the original USEER:

- separate chapters for Fuels and Electric Power Generation to provide greater detail on each subtechnology in these sectors
- new crosscuts on the oil, gas, coal, nuclear, and energy storage industries to provide data on their entire value chains
- a five-year summary of key trends in the Traditional Energy, Energy Efficiency, and Motor Vehicles sectors from 2016-2020

It is our hope that the 2020 USEER and future editions will be used to better inform federal, state, and local policymakers; academic decision-makers; and the private sector in developing integrated energy, security, economic development, and workforce plans. This kind of integration is key to maximizing the benefits of the nation's abundant energy resources, rapid pace of energy innovation, and dynamic energy markets. We further hope that the data presented in these and future reports will help advance the understanding of the economics of emerging energy industries. Creating a single and consistent measure of employment across the entire U.S. energy system is critical to that understanding.

PROJECT TEAM

CO-CHAIR

Ernest J. Moniz

CEO and Founder
Energy Futures Initiative

CO-CHAIR

David Terry

Executive Director
National Association of State Energy Officials

PROJECT DIRECTOR

Jeanette Pablo

General Counsel & Senior Associate
Energy Futures Initiative

CONTRACT MANAGER

Sandy Fazeli

Managing Director, Policy
National Association of State Energy Officials

PRINCIPAL RESEARCHER

Phil Jordan

Vice President
BW Research Partnership

LEAD AUTHOR

David Foster

Distinguished Associate
Energy Futures Initiative

LEAD ANALYST

Ryan Young

Research Manager
BW Research Partnership

DATA ANALYSTS

Sarah Lehmann

Senior Analyst/Project Manager
BW Research Partnership

Mitchell Schirch

Research Analyst
BW Research Partnership

Additional Contributors

Melanie Kenderdine

Principal
Energy Futures Initiative

Joseph S. Hezir

Principal
Energy Futures Initiative

David Ellis

Director, Strategic Communications and Policy
Energy Futures Initiative

Natalie Volk

Communications and Business Development
Energy Futures Initiative

Karen Wayland

kW Energy Strategies, and
Distinguished Associate, EFI

Bob Simon

Consultant

Dr. James Barrett

Barrett Economics

Dr. Joel Yudken

High Road Strategies

Matt Mansfield

MG Strategy + Design

Scott Goldman

MG Strategy + Design

ADDITIONAL ANALYSIS + REPORTS

The USEER data base includes detailed data for the 53 separate technologies that comprise the five surveyed sectors. Each of these technologies is, in turn, divided into as many as seven industrial classifications. As a result, the USEER data base can provide an in-depth view of the hiring difficulty, in-demand occupations, and demographic composition of very specific portions of the energy and energy efficiency workforce in each state or in specific counties and, in some cases, portions of counties. In addition, the USEER data base can provide year-to-year comparisons in specific sectors, technologies, and industrial classifications at the state and county level. For information about additional analysis and reports, please contact:

Energy Futures Initiative:

JEANETTE PABLO

General Counsel and Senior Associate

Email: JMPablo@EnergyFuturesInitiative.org

National Association of State Energy Officials:

SANDY FAZELI

Managing Director

Email: SFazeli@NASEO.org

REPORT INQUIRIES

For media inquiries regarding this report, please contact:

DAVID ELLIS

Director, Communications and Policy Strategy

Energy Futures Initiative

Ddellis@energyfuturesinitiative.org

NATALIE VOLK

Communications and Business Development

Energy Futures Initiative

NMVolk@EnergyFuturesInitiative.org



KEY FINDINGS

ENERGY SECTORS

The 2020 USEER analyzes the following five sectors of the U.S. economy:

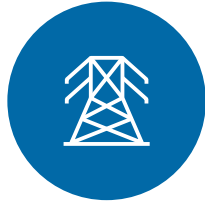
TRADITIONAL



Fuels



Electric Power Generation



Transmission, Distribution and Storage



Energy Efficiency



Motor Vehicles

Employment in these sectors increased in 2019 by **1.8 percent** from the previous year



Traditional Energy and Energy Efficiency sectors in 2019 employed approximately

6.8 MILLION AMERICANS

or **4.6 percent** of a workforce of roughly **149 million**

Employment in these sectors added



120,300 JOBS

over **7 percent** of all new jobs nationwide.¹

Based on a comprehensive analysis of employer data collected in the fourth quarter of 2019.

¹ Due to differing time frames for the USEER report, the reports on employment in 2015, 2017, 2018, and 2019 reference BLS second quarter employment data, whereas the report on 2016 report uses BLS first quarter employment data. Energy employment growth in the period between the second quarter of 2018 and the second quarter of 2019 represented 7 percent of all employment growth in the United States. Unless otherwise stated, all increases or decreases described in this report for 2019 (whether whole numbers or percentages) are relative to 2018.

FUELS



The Fuels sector employed

1,148,900

1.9%

an increase of **26,100**
or **1.9 percent** in 2019.

OIL & NATURAL GAS

employers added the most new jobs,
more than **18,000**, employing:

OIL

615,500



NATURAL GAS

276,000



BIOFUELS

While corn ethanol declined slightly, woody biomass and other biofuels added

775 JOBS



For a growth rate of
nearly 2 percent.

2%

COAL FUELS

Coal fuels jobs increased by **612 jobs**
(less than 1%), totaling about

75,500
JOBS



MINING AND EXTRACTION

The major growth industry sector in Fuels
was mining and extraction, which added
more than

7,000
JOBS

largely driven by
oil and natural gas
production.



ELECTRIC POWER



The Electric Power Generation sector employed

896,800*

and grew by almost 2 and a half percent, gaining over **21,200 jobs**. Job losses in nuclear and coal generation were offset by increases in natural gas, solar, wind, CHP, hydro, and geothermal.

NATURAL GAS



Natural gas employment, traditional and advanced/low emissions combined, in Electric Power Generation increased by more than **9,100**



for almost

122,000 jobs

reflecting that **gas now exceeds coal** in both employment and gigawatts produced.

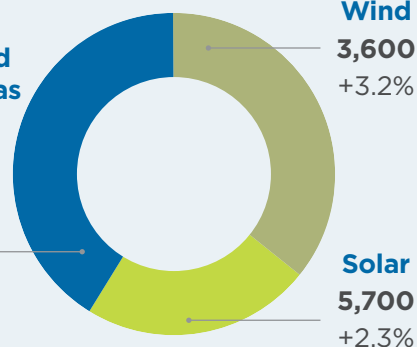
6,500

of those new jobs were in **advanced/low emissions technologies**.

FASTING GROWING SECTORS

Advanced/low emissions natural gas, solar, and wind generation were the fastest growing new sources, increasing employment by more than:

Advanced Natural Gas
6,500
+9.4%



SOLAR



Solar energy firms employed

248,000

employees who spent the majority of their time on solar.² An additional **97,400** employees spent less than half their time on solar-related work. The number of employees who spend the majority of their time on solar increased by **2.3 percent** or nearly **5,700 jobs** in 2019.

WIND



Wind energy companies hired an additional **3,600** employees for a total of

114,800

an increase of



COAL



Coal-fired generation employment declined by just under **7,700 jobs**, nearly **8 percent**.

² The Solar Foundation 2019 National Solar Jobs Census/BW Research Partnership. The category of industry employment differs slightly from several categories used by The Solar Foundation to classify employment.

* Includes 97,359 solar employees who spend less than 50 percent of their time on solar.

TRANSMISSION, DISTRIBUTION AND STORAGE



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

2.4
MILLION*

Americans with just over **1 million** working in retail trade (gasoline stations and fuel dealers).



Excluding retail trade, this represents an increase of

+17,800

new jobs or



CONSTRUCTION

Construction firms employed nearly **499,000** Americans in TDS, a **4 percent** increase from 2018.

499,000

an increase of



TRANSMISSION, DISTRIBUTION, AND STORAGE (TDS)

TDS employment in utilities remained virtually unchanged since 2018, employing

417,600



GRID MODERNIZATION

Overall, **42 percent** of respondent employers working in this sector reported that a majority of their revenues come from grid modernization or other utility-funded modernization projects,

a decrease of



over 2018



* This number includes 1.02 million employees who work in retail gasoline stations.

ENERGY EFFICIENCY

Energy Efficiency employed

2.38
MILLION

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



Energy Efficiency
employers added 54,000
net jobs in 2019

54,000

+3.4%

PROFESSIONAL SERVICES AND WHOLESALE TRADE

Energy Efficiency professional services and wholesale trade both observed increases in employment:

PROFESSIONAL SERVICES

15,000



WHOLESALE TRADE

6,500

+3.1%

+3.6%

ENERGY STAR

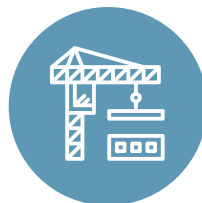
The manufacture, installation, design, wholesale distribution, and other services related to ENERGY STAR products employed almost **827,000** Americans in 2019.



CONSTRUCTION

78%

of employees who work on Energy Efficiency in the construction sector report spending the majority of their time on Energy Efficiency-related work, virtually unchanged from the **79 percent** in 2018.



1.3 MILLION

Energy Efficiency jobs are in the construction industry, a **2.1 percent** increase, or **27,600**, from 2018.

MOTOR VEHICLES



Motor Vehicles (including component parts) employed over

2.55 MILLION

adding

20,000 JOBS

a slight increase of just under 1 percent.

ALTERNATIVE FUELS VEHICLES

In 2019, over

266,300

employees worked with alternative fuels vehicles, including natural gas, hybrids, plug-in hybrids, all-electric, and fuel cell/hydrogen vehicles, a decline of **2 percent** or **5,300** jobs.

(Note that alternative fuels vehicles numbers were revised up for 2017 and 2018 in the Motor Vehicles chapter.)



HYBRIDS PLUG-IN HYBRIDS AND ALL-ELECTRIC

Hybrids, plug-in hybrids, and all-electric vehicles made up over 90 percent of this number, supporting more than

242,700

employees. Electric vehicles jobs declined by 9.8 percent and plug-in hybrid jobs declined by 2.5 percent in 2019.



FUEL ECONOMY

Nearly **494,000**

employees (44%), an increase of 8,000, work with component parts that contribute to fuel economy.



COMPONENT PARTS

More than one-fifth

22%

of component parts firms derived all of their revenue from products that increase fuel economy for motor vehicles.



CROSS CUTS

The 2020 USEER provides four cross cutting analyses that look at the interrelations of jobs across the entire value chain of the natural gas, petroleum, coal and nuclear industries that were previously segregated in the Fuels, Electric Power Generation, and Transmission, Distribution and Storage chapters. In addition, a fifth cross cutting analysis looks at job comparisons between those Electric Power Generation technologies that consume fuels and those that do not.

NATURAL GAS

industry employs

636,042

up 1.7 percent.



Number of jobs:

Utilities
183,612



Mining and
Extraction
165,602



Construction
109,576



PETROLEUM

industry employs

824,290

up 3.1 percent.



Number of jobs:

Mining and
Extraction
313,591



Wholesale
Trade,
Distribution,
and Transport
172,796



Manufacturing
157,911

COAL



The coal
industry employs

185,689

down
5.9 percent.



Mining and
Extraction
55,669



Utilities
38,158

Wholesale Trade,
Distribution, and Transport
37,670

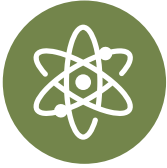
CROSS CUTS

NUCLEAR

industry employs

70,323

down 2.5 percent.



Number of jobs:

Utilities
44,366



Professional
and Business
Services
14,757



Manufacturing
4,979



ELECTRIC POWER GENERATION AND FUELS



directly employed over

2 MILLION*

up 42,584 (a 2.1 percent).

TRADITIONAL FOSSIL FUEL SECTORS

In 2019, 62 percent, or 1.2 million,

1.2 MILLION

of these employees worked in traditional coal, oil, and natural gas Electric Power Generation and Fuels, two percentage points below 2018



ZERO EMISSIONS

509,697

worked in zero emissions' generation technologies, including solar, wind, hydro, geothermal, and nuclear.



LOW EMISSIONS

227,096

worked in low-carbon emissions technologies, including biofuels, CHP, and advanced/low emissions gas.



*This number does not include 97,359 employees who spend less than 50% of their time on solar.

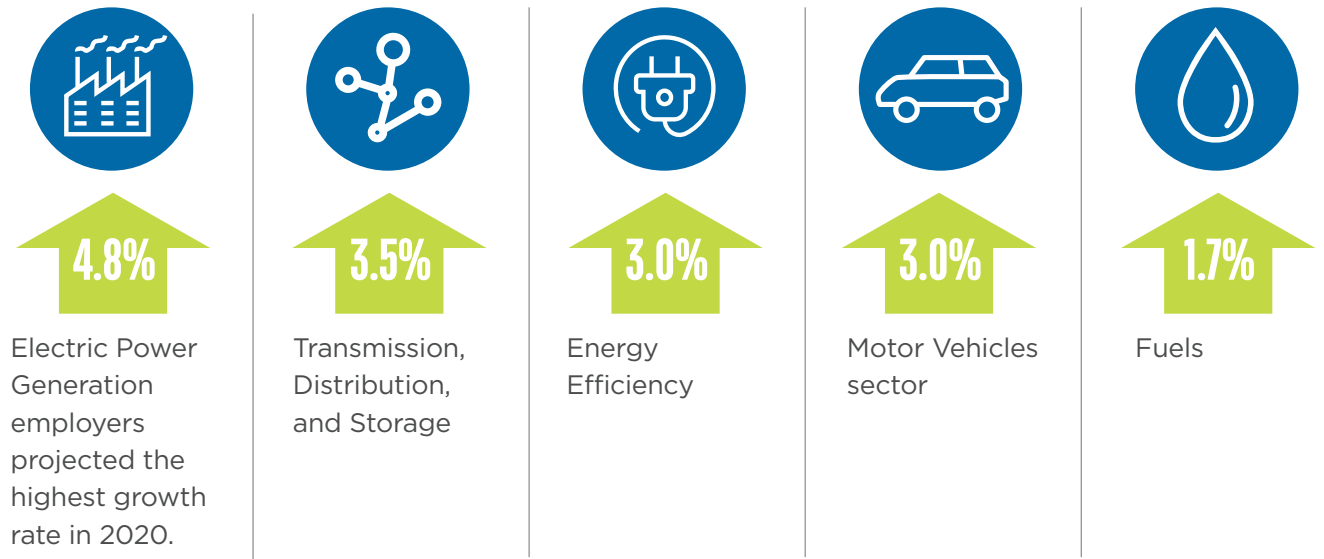
HIRING AND DEMOGRAPHICS

PROJECTIONS



Overall, firms covered by the survey anticipate roughly 3.1 percent employment growth for 2020, down from 4.6 percent projected growth last year.

Projected growth rate in 2020



Hiring difficulty was highlighted by virtually all sectors as a growing problem. Just over 84 percent of employers across these sectors (84.4 percent) reported difficulty hiring qualified workers over the last 12 months, an increase of over 7 percentage points from 2018 and a total of 14 percentage points since 2017. Almost three-in-ten employers (29 percent) noted it was very difficult (no change from 2018).



Among construction employers in Energy Efficiency, one of the largest surveyed sectors with over 1.3 million workers, 91% of employers reported that it was somewhat difficult or very difficult to hire new employees. However, those reporting it was very difficult declined from 52 percent in 2018 to 45 percent in 2019.



Lack of experience, training, or technical skills were again cited as the top reasons for hiring difficulty by employers across all five surveyed sectors. The need for technical training and certifications was also frequently cited, implying the need for expanded investments in workforce training and closer coordination between employers and the workforce training system.

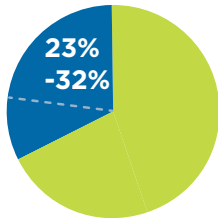
HIRING AND DEMOGRAPHICS

DEMOGRAPHICS

Demographically, the surveyed sectors fluctuate above and below national averages.

WOMEN

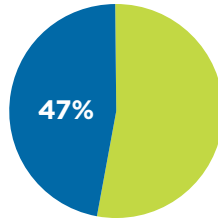
Women in US Energy Workforce



Women are a smaller portion of the workforce in these sectors, ranging from **23 percent** to **32 percent**, ...



Women in US Workforce



... compared to the overall economy, where women make up **47 percent** of the workforce.

VETERANS

Veterans comprise from **8 to 10 percent** of these sectors—higher than the national average of **6 percent**.



55 OR OLDER



Between **13 percent** and **21 percent** of this workforce is 55 years of age or older, compared to the national average of **23 percent**; this proportion is significantly lower in Electric Power Generation and Energy Efficiency.

DIVERSITY

However, a majority of these energy sectors are more racially diverse than the national workforce as a whole even though specific racial categories are frequently underrepresented.



This is, in part, because of the increased self-identification of employees belonging to “2 or more races.”

UNIONS

Unionization rates for TDS, Electric Power Generation, Energy Efficiency, and Motor Vehicles exceed the national private sector average, while only Fuels is below.

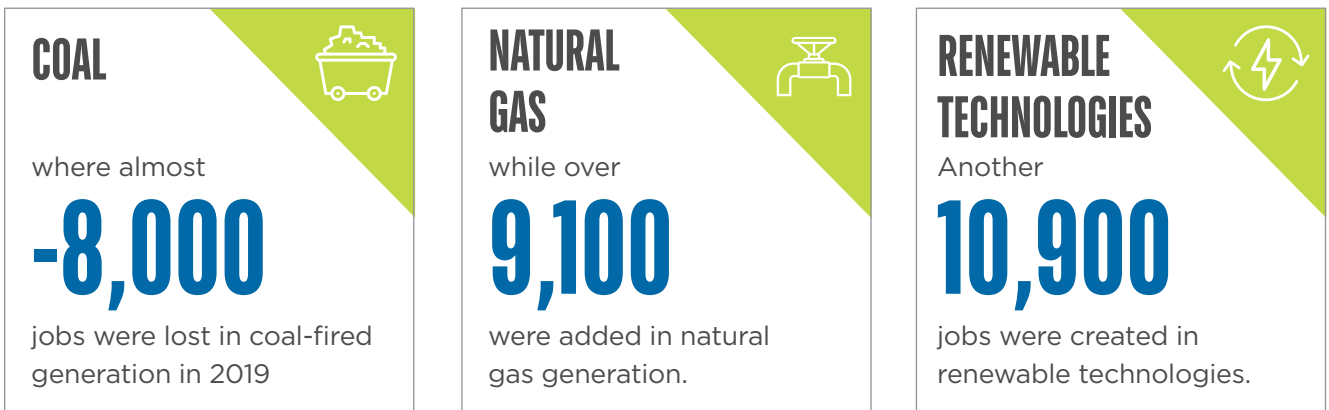
CONCLUSION

In 2019 America's Traditional Energy, Energy Efficiency, and Motor Vehicles sectors continued to outperform the rest of the American economy in job growth, accounting for **8 percent** of all new employment opportunities, while making up only **5.6 percent** of the workforce.



CHANGING TECHNOLOGY

As with other sectors of the economy, changing technology has driven much of this growth while also being responsible for disruption and job loss within specific subsectors. This trend was most notable in the Electric Power Generation sector



A valuable aspect of the USEER is its capacity to identify such labor market trends so that policy makers can address them.

ENERGY EFFICIENCY



One of the most important contributions

of the USEER over the last five years has been its success in defining and quantifying jobs in Energy Efficiency.

Starting in the mid-1970's, the U.S. economy started to see a decoupling of energy consumption from economic growth. Today 30 states have energy efficiency standards or voluntary policies and **75 percent** of all utilities operate energy efficiency programs.

The result has been the creation of an Energy Efficiency sector that employs

2,380,000 in one of our most dynamic sectors.

CONCLUSION

ENERGY STAR

This year's USEER has also performed a deeper examination of the Environmental Protection Agency's ENERGY STAR program to link the jobs that are responsible for supplying the products and services that make up this remarkable effort.



Known throughout the world as the benchmark that has introduced energy efficiency as both an economic and social value, the USEER determined that almost

827,000

Americans have jobs that are providing those products and services.

ENERGY EFFICIENCY

MOTOR VEHICLE MANUFACTURING



Energy efficiency is also at the heart of the CAFE standards that have redefined the U.S. Motor Vehicles' industry. Since the current standards were adopted in 2012, the manufacturing sector of Motor Vehicles in the U.S. has added over

220,000

jobs, rebuilding the industry from the Great Recession.

FUEL EFFICIENCY



44 percent of the Motor Vehicles parts' industry have jobs that are contributing to producing vehicles that help achieve those fuel efficiency standards. 22 percent of these companies make 100 percent of their profits from fuel efficiency.

494,000

Americans in the MV Component Parts industry contribute to fuel efficiency.

65,000 NEW JOBS PRODUCING ENERGY



In 2019, our traditional energy sectors—Fuels, Generation, and TDS—added 65,000 new jobs, producing oil, natural gas, electricity from many sources, and the systems that distribute them. Meanwhile, the efforts to make the usage of that energy more efficient in our built environment and our Motor Vehicles added another 62,000 jobs, matching the traditional energy jobs almost one for one.

62,000

New jobs conserving energy.

**Energy production and energy efficiency go hand in hand.
Both are dynamic job creators at the core of a 21st Century economy.**