# CLEAN JOBS AMERICA 2025

## A BOOMING JOB ENGINE NOW AT RISK

E2'S TENTH ANNUAL ANALYSIS OF U.S. AND STATE CLEAN ENERGY SECTOR EMPLOYMENT


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## METHODOLOGY

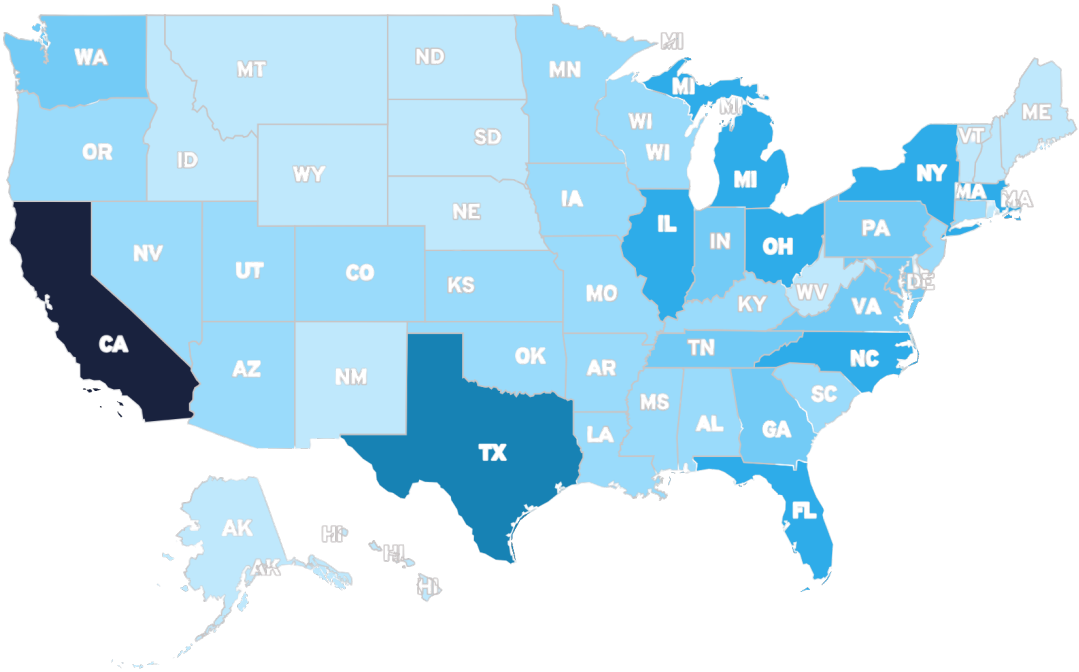
The analysis is based on employment data collected and analyzed by the BW Research Partnership for the 2025 U.S. Energy and Employment Report (USEER). The USEER analyzes data from the U.S. Bureau of Labor Statistics (BLS) Quarterly Census of Employment and Wages (QCEW) to track employment across many energy production, transmission and distribution subsectors.

In addition, the 2025 USEER relies on a unique supplemental survey of 42,8000 business representatives across the United States. Created and conducted by BW Research, the methodology has been approved by the Office of Management and Budget (OMB) and U.S. Department of Energy (DOE). This survey is used to identify energy-related employment within key subsectors of the broader industries as classified by the BLS and to assign them into their component energy and energy efficiency sectors.

## ABOUT THIS REPORT

This is the tenth annual Clean Jobs America report produced by E2 based on analysis of the USEER, which was first released by the DOE in 2016. E2 was an original proponent of the DOE producing the USEER, and was a partner on the 2018, 2019, and 2020 reports produced by the Energy Futures Initiative (EFI) and National Association of State Energy Officials (NASEO) when the DOE decided not to produce the USEER after 2017.

For additional insight into E2's Clean Jobs America 2025, including exploring the data via an interactive map, visit cleanjobsamerica.e2.org.




**What we include** are jobs in solar energy, wind energy, combined heat and power, bioenergy, non-woody biomass, low-impact hydro power, hydrokinetic and wave energy, geothermal, electric vehicles, hybrid electric vehicles, plug-in hybrid vehicles, hydrogen and fuel-cell vehicles, clean energy storage, smart grid, micro grid, grid modernization, electric vehicle charging, advanced biofuels, and energy efficiency including Energy STAR and high efficiency appliances, efficient lighting, HVAC, renewable heating and cooling, and advanced building materials. The clean energy occupations covered in this report span economic sectors including agriculture, utilities, construction, manufacturing, wholesale trade, professional services, other services.

**What we do not include** are jobs of workers who may spend some of their time in clean energy but a plurality in another energy sector. For example, workers employed by an excavation business might spend the majority of their time grading and preparing drilling pads for oil or gas rigs, but they also might spend a portion of their time preparing sites for wind turbines or large solar installations. If clean energy does not account for a plurality of their work, those workers would not be counted as being employed in the clean energy economy but would instead be counted as part of another energy sector. We also does not include any jobs in traditional transmission and distribution due to an inability to accurately segment out workers by electricity source, despite many of those jobs being critical to the increased electricity from Renewable Generation used by the grid. Lastly, we do not include jobs in corn ethanol, woody biomass, large or traditional hydroelectric, and nuclear because of environmental issues associated with those industries. Jobs in retail trade, repair services, water or waste management, and indirect employment or induced employment are also not included.

## ABOUT THE JOB SECTORS ANALYZED

// **Renewable Generation:** jobs in solar energy, wind energy, combined heat and power, bioenergy, low-impact hydroelectric and hydrokinetic energy, and geothermal energy.

// **Energy Efficiency:** jobs in Energy STAR® appliances; LED, CFL, and other efficient lighting; traditional heating, ventilation, and air-conditioning systems (HVAC); high-efficiency HVAC; renewable heating and cooling; advanced building materials/insulation; and other services not specific to a detailed technology.

// **Clean Vehicles:** jobs in plug-in hybrid vehicles, all-electric vehicles, hybrid electric vehicles, natural gas vehicles, and hydrogen and fuel-cell vehicles.

// **Storage & Grid:** jobs in clean energy and battery storage technologies as well as microgrids, smart grids, and overall modernization of the U.S. electricity transmission and distribution system.

// **Biofuels:** jobs in biofuels and biomass, excluding corn ethanol and woody biomass.

### Other energy employment sectors analyzed in this report include:

// **U.S. Energy and Motor Vehicles:** all employment in the U.S. energy industry as defined by the USEER, including both clean and traditional energy jobs across fuels; electric power generation; motor vehicles; energy efficiency; and transmission, distribution, and storage (TDS).

// **Fossil Fuel Generation:** jobs in coal, natural gas, or petroleum electric power generation.

// **Fossil Fuel Extraction:** all jobs related to fuel extraction, mining, and processing, including petroleum refineries and firms that support coal mining, oil, and gas field machinery manufacturing.

// **Fossil Fuel Transmission, Distribution, and Storage (TDS):** all jobs related to the direct distribution, transmission and storage of coal, natural gas, and petroleum.

// **Gas & Diesel Vehicles:** jobs in vehicles that run on gasoline and diesel internal combustion engines.

## ENERGY TECHNOLOGY DEFINITIONS

**Solar:** Generating electricity using solar radiation (PV generation), solar thermal energy, or concentrated sunlight.

**Wind:** Generating electricity from wind's kinetic energy.

**Geothermal:** Using steam natural produced found below the Earth's surface to produce electricity.

**Low-Impact Hydroelectric/Hydrokinetic and Wave Energy:** Similar to traditional hydroelectric, but certification criteria are aimed at ensuring that the certified dam adequately protects or mitigates its impacts to river flows, water quality, fish passage and protection, watersheds, threatened and endangered species, cultural resources, and public access and recreation.

**Biomass/Bioenergy:** Electricity from materials derived from biological sources or any organic material.

**Combined Heat and Power (CHP):** Generating electricity and useful thermal energy in a single, integrated system. Heat that is normally wasted in conventional power generation is recovered as useful energy.

**Storage:** Includes pumped hydro storage, battery storage, thermal storage, and mechanical storage detailed technologies.

**Microgrid:** Group of interconnected distributed energy resources that acts as a single controllable entity with respect to the grid.

**Smart Grid:** An electricity supply network that uses communications technology to detect and react to local changes in usage.

**Grid Modernization:** Other modernization of the U.S. electricity transmission and distribution system

**EV Charging:** Stations that charge vehicles which use one or more electric motors for propulsion with no onboard generator or non-electric motor.

**Energy STAR Appliances:** Energy efficient Appliances that meet the international Energy STAR standard for energy efficient consumer products originated in the U.S.

**Efficient Lighting:** LED, CFL, and other energy efficient lighting sources.

**Traditional HVAC (Heating, Ventilation, and Cooling):** Services related to heating, ventilation, and air conditioning systems (HVAC), including building retro-commissioning and retrofits connected to heating and cooling.

**High Efficiency HVAC:** HVAC that meets the international Energy STAR standard for energy efficient consumer products originated in the U.S. or has high Average Fuel Utilization Efficiency (AFUE) rating of 90 or greater or 15 SEER or greater.

**Renewable H&C:** Heating, ventilation and air conditioning (HVAC) from Renewable Generation sources or work that increases the Energy Efficiency of HVAC systems.

**Advanced Materials:** All materials that represent advances in efficiency in buildings over the traditional materials, including insulation.

**Other (EE):** All other services related to improving energy efficiency, including reducing water consumption, energy audits, and maintenance.

**Other Biofuels:** Other fuel derived directly from biomatter, including waste fuels, biodiesel and renewable biodiesel fuels.

**Other Ethanol/Non-Woody Biomass:** Fuel made from other materials such as straw, manure, vegetable oil, animal fats, etc.

**Electric Vehicles:** Type vehicle which uses one or more electric motors for propulsion, that recharges with batteries and that have no onboard generator or non-electric motor.

**Plug-In Hybrids:** A hybrid electric vehicle that uses two or more distinct types of power, such as internal combustion engine and an electric motor that is powered by rechargeable batteries, or another energy storage device.

**Hybrid Electric Vehicles:** Vehicles that use two or more distinct types of power, such as internal combustion engine + electric motor.

**Hydrogen Vehicles:** Type of vehicle that uses hydrogen as its onboard fuel for motive power.

**Fuel-Cell Vehicles:** Type of hybrid vehicle which uses a fuel cell, instead of an engine, in combination with a storage device, such as a battery, to power its on-board electric motor.

## Regional Definitions

**Midwest:** Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, Wisconsin.

**South:** Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia.

**West:** Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, Wyoming.

**Northeast:** Connecticut, Delaware, District of Columbia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, West Virginia.

# CLEAN JOBS AMERICA 2025[1]

## EXECUTIVE SUMMARY

**Despite experiencing its slowest pace of growth since 2020, the clean energy industry's growing importance to the broader economy was more apparent than ever in 2024. This trend was expected to continue as clean energy accounted for larger and larger shares of energy industry jobs and the nationwide workforce. But recent policy decisions to revoke incentives, cancel permits, and target the industry with new red tape and legal hurdles threatens future growth and, increasingly, the health of the U.S. economy at-large.**

Still, clean energy jobs grew 2.8 percent in 2024, adding nearly 100,000 new jobs and outpacing the rest of U.S. employment (0.8 percent) more than three times over.[2] The growth of clean energy jobs also far outpaced job growth across the rest of the energy industry. The number of Americans working in clean energy related occupations today now exceeds the number of jobs in oil, gas and coal by more than three to one. Just eight states are still home to more fossil fuel workers than clean energy workers.

At the end of 2024, more than **3.5 million Americans** were employed in clean energy occupations, spanning renewable generation, battery and storage, energy efficiency, biofuels, grid modernization and clean vehicles industries. These jobs now represent a significant share of the U.S. workforce—including seven percent of all new jobs added in 2024—and are spread across every state, strengthening both local economies and the national energy system.

Beyond generating jobs and affordable energy, this analysis shows clean energy is also creating new opportunities and rebuilding the country's manufacturing and construction sectors. Nearly 60 percent of all clean energy occupations—about 2.2 million jobs—are in the construction and manufacturing today. These include factory jobs that barely existed a decade ago—jobs assembling solar panels, batteries, electric vehicles, wind turbine parts, and energy efficient appliances and goods. They include construction jobs building solar, wind and battery power plants and retrofitting buildings to improve energy efficiency and reduce costs.

Services, trade, and advanced technologies jobs related to clean energy also continue to expand. This broad economic footprint underscores clean energy's role in modernizing America's infrastructure, lowering energy costs, and positioning U.S. businesses to compete globally in a rapidly changing energy market.

## KEY FINDINGS

**3.5M+**
OVER 3.5 MILLION AMERICANS WORKED IN CLEAN ENERGY AT THE START OF 2025

**82%**
OF ALL NET NEW U.S. ENERGY SECTOR JOBS IN 2024 WERE IN CLEAN ENERGY

**2,200**
FOR EVERY 100,000 U.S. WORKERS, MORE THAN 2,200 ARE EMPLOYED IN CLEAN ENERGY

**2.2M**
NEARLY 2.2 MILLION MANUFACTURING AND CONSTRUCTION JOBS ARE SUPPORTED BY CLEAN ENERGY

**3X**
CLEAN ENERGY JOBS GREW 3X FASTER THAN THE REST OF U.S. EMPLOYMENT IN 2024

The pace of job growth is unmatched in the energy sector. Since 2020, the sector has added more than **520,000 new jobs**, growing 17 percent overall—much faster than the rest of the economy and far surpassing job growth in the fossil fuel, gas and diesel motor vehicle, and the rest of the energy industry. The sector accounted for 82 percent of all new energy jobs added in 2024 and now accounts for 42 percent of nationwide employment in energy and motor vehicles. Key drivers include demand for electric vehicles, the rapid deployment of battery storage and smart grid technologies, and continued strength in energy efficiency upgrades.

Over the past half decade, the South has emerged as the largest hub of clean energy employment growth, adding nearly 200,000 jobs since 2020 while the West, Midwest, and Northeast have seen steady and substantial increases. These gains highlight clean energy's ability to create opportunity in both rural and urban communities, across red and blue states alike.

## LOOKING AHEAD

At the beginning of 2025, clean energy was expected to remain one of the fastest growing segments of the U.S. economy. Wind turbine technician and solar installation jobs were projected to be the fastest-growing jobs in America, according to the US Bureau of Labor Statistics.

But recent policy decisions to revoke energy incentives, cancel permits, and add additional administrative burdens to clean energy projects puts the continued growth of clean energy jobs in America at serious risk.

These short-sighted policies are now threatening the nation's overall economic health. In the first half of 2025 alone, companies canceled or closed more than $22 billion in major clean energy related factories and projects in America, and with it, eliminated 16,500 previously announced jobs, according to separate research by E2. Beyond further hampering a labor market already struggling with capricious tariffs and related uncertainty, the administration is putting U.S. workers and businesses at a competitive disadvantage in a global clean energy marketplace on track to top $2.2 trillion this year alone.[3]

Analysis by other organizations shows that more than 830,000 jobs economy-wide could be lost by 2030 because of energy policy rollbacks included in President Trump's tax and spending bill signed into law July 4.[4] Impact to the solar industry alone could put an estimated 330,000 direct, indirect, and induced jobs at risk.[5]

## CONCLUSION

Clean energy is one of the nation's most dynamic and resilient job engines. From energy efficiency retrofits to advanced vehicle manufacturing and battery storage, millions of Americans are working to build a cleaner, more reliable energy economy. Sustained investment, coupled with inclusive workforce strategies, will ensure this growth continues while expanding opportunities for all communities.

Looking ahead, clean energy jobs are still positioned to grow, given rising demand for electricity from the tech industry and consumers and continued uncertainty over global petroleum supplies and prices.

Yet unless federal policies and regulations are revised and revisited, and unless state and local governments strengthen and expand clean energy and clean vehicles policy, continued growth in clean energy jobs in America is tenuous at best in the years ahead.

## DIVERSITY AND WORKFORCE GAPS

// Women represent only 28 percent of the clean energy workforce.

// Black, Latino, Asian, and Indigenous workers remain underrepresented relative to the U.S. workforce overall.

// Expanding opportunities for women and people of color will be critical to sustaining long-term industry growth.

## JOB GROWTH TRENDS (2020–2024)

// Since 2020, clean energy jobs have grown by **17 percent**, adding more than **500,000 jobs**.

// Clean vehicle-related jobs have increased by more than 50 percent since 2020—adding over 137,000 jobs—even with a slight dip in 2024.

// Storage and grid modernization jobs grew by 23 percent, reflecting growing need for new infrastructure amid rising energy demands from data centers, artificial intelligence, and electric vehicle charging.

// Energy efficiency added more than **270,000 jobs** since 2020, maintaining its role as the largest clean energy employer.

// Jobs in electric vehicle charging have grown 38 percent since 2021—second in growth only to the clean vehicle sector.

// Renewable generation jobs have grown more than 15 percent over the past five years, driven by solar (54,000 jobs) and wind (16,000 jobs). Overall, the sector has added over 76,000 jobs since 2020.

## INDUSTRY DIVERSITY

// Clean energy-related manufacturers added added about 45,000 new jobs in 2024, and have added more than 80,000 over the past 2 years—now employing more than 575,000 workers nationwide.

// Construction workers account for close to half of all clean energy workers, with over 1.6 million jobs supported by clean energy, led by energy efficiency, wind and solar.

// Other services (such as repair and maintenance) have grown significantly over the past several years, adding about 80,000 jobs across the renewable generation, storage and grid, and energy efficiency sectors.

// Wholesale trade continues to create new jobs steadily across clean energy sectors, adding close to 50,000 new workers over the past two years—now employing over 315,000 Americans.

// Clean energy workers employed in utilities have more than tripled since 2022, growing from 15,000 to more than 50,000 in 2024.

## REGIONAL GROWTH

// The **South** led the nation in 2024 with over 41,000 new clean energy jobs. Nearly 195,000 clean energy related jobs have been created in the South since 2020.

// The **West** and **Northeast** each added more than 22,000 jobs in 2024, while the **Midwest** grew steadily by 14,000 jobs.

// Clean energy employment is expanding in every state, reinforcing its nationwide economic impact.

// Just eight states are home to more fossil fuel jobs than clean energy jobs.

## SECTOR HIGHLIGHTS

**Renewable Generation & Biofuels:** Solar leads with 370,000 jobs, while biofuels employ about 42,000. Growth is steady, particularly in the South and Midwest. The sector's nearly 570,000 jobs is more than all childcare workers in the U.S. The nearly 42,000 Americans working in biofuels is more than all air traffic controllers and airfield operation specialists.[6]

**Storage & Grid:** Batteries, smart grids, and EV charging are driving some of the fastest job growth, critical to integrating renewable power. Clean storage technologies lead all sectors with more than 93,000 jobs, followed by smart grid with over 27,000. The nearly 170,000 workers in the storage and grid sector is greater than all painters working in the U.S.[7]

**Energy Efficiency:** Still the foundation of the clean energy economy with more than 2.3 million workers, spanning construction, HVAC, lighting, and advanced building materials—more than all waiters and waitresses working in the U.S.[8]

**Clean Vehicles:** Nearly 400,000 workers in EVs, hybrids, and hydrogen vehicles—more than all U.S. agricultural workers.[9] While 2024 saw job losses, long-term growth potential remains strong as automakers scale up EV production.



# U.S. CLEAN ENERGY ECONOMY 2024 AT A GLANCE

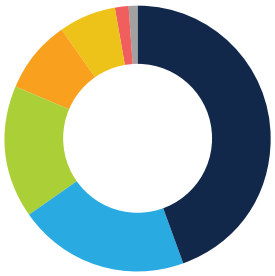
The U.S. clean energy economy employed more than 3.5 million workers in 2024. Energy efficiency remains the largest segment with over 2.3 million jobs, followed by renewable energy generation at around 569,000. Clean vehicles supported nearly 400,000 workers, while storage and grid modernization accounted for about 170,000. Construction leads the clean energy value chain, making up nearly half of all jobs, while manufacturing and professional services each contribute significant shares. However, workforce demographics show underrepresentation of women (28 percent) and people of color, highlighting the need for greater diversity and inclusion as the sector grows.

## FIG. 1 // U.S. CLEAN ENERGY EMPLOYMENT by sectors

**TOTAL CLEAN ENERGY: 3,559,050 JOBS**

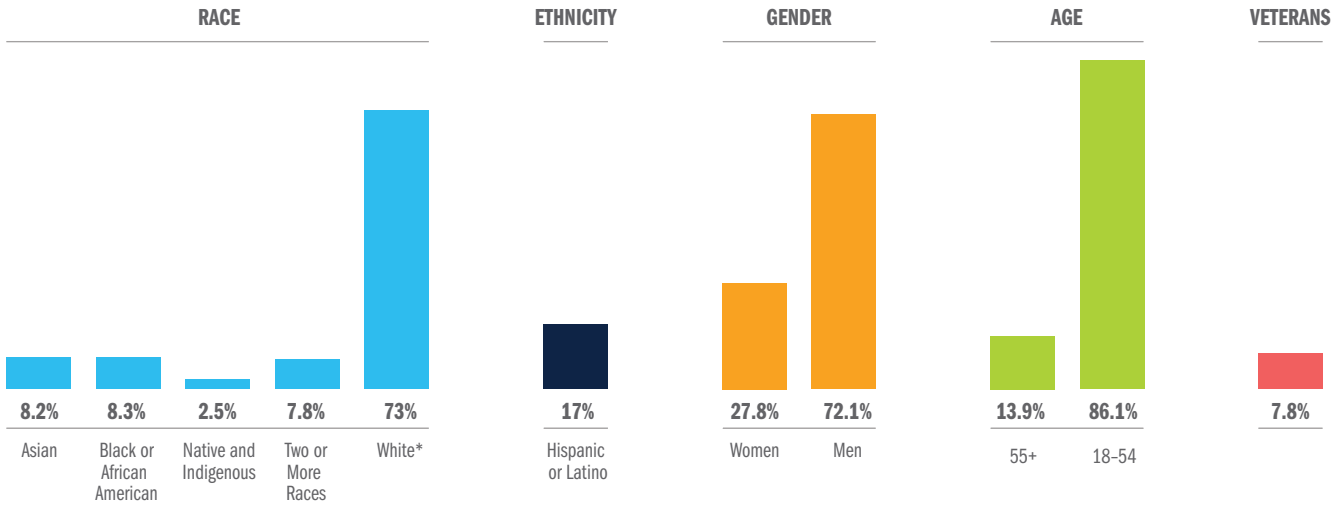
- Energy Efficiency: **2,381,744**
- Renewable Generation: **569,309**
- Clean Vehicles: **398,033**
- Storage/Grid: **168,042**
- Biofuels: **41,920**

## FIG. 2 // U.S. CLEAN ENERGY EMPLOYMENT by value chain



- Construction: **44.6% (~1.6 million)**
- Professional Services: **20.7% (~740,000)**
- Manufacturing: **16.2% (~580,000)**
- Wholesale Trade: **8.9% (~320,000)**
- Other Services: **7.0% (~250,000)**
- Utilities: **1.6% (~56,000)**
- Agriculture: **0.9% (~33,000)**

## FIG. 3 // U.S. CLEAN ENERGY EMPLOYMENT by demographics[10]




* Includes non-Hispanic and Hispanic whites.
Information on the representation of people with disabilities, lesbian, gay, bisexual, transgender, intersex, and queer people, immigrants, religious minorities, and young people in clean energy is limited.

## GROWTH TRENDS

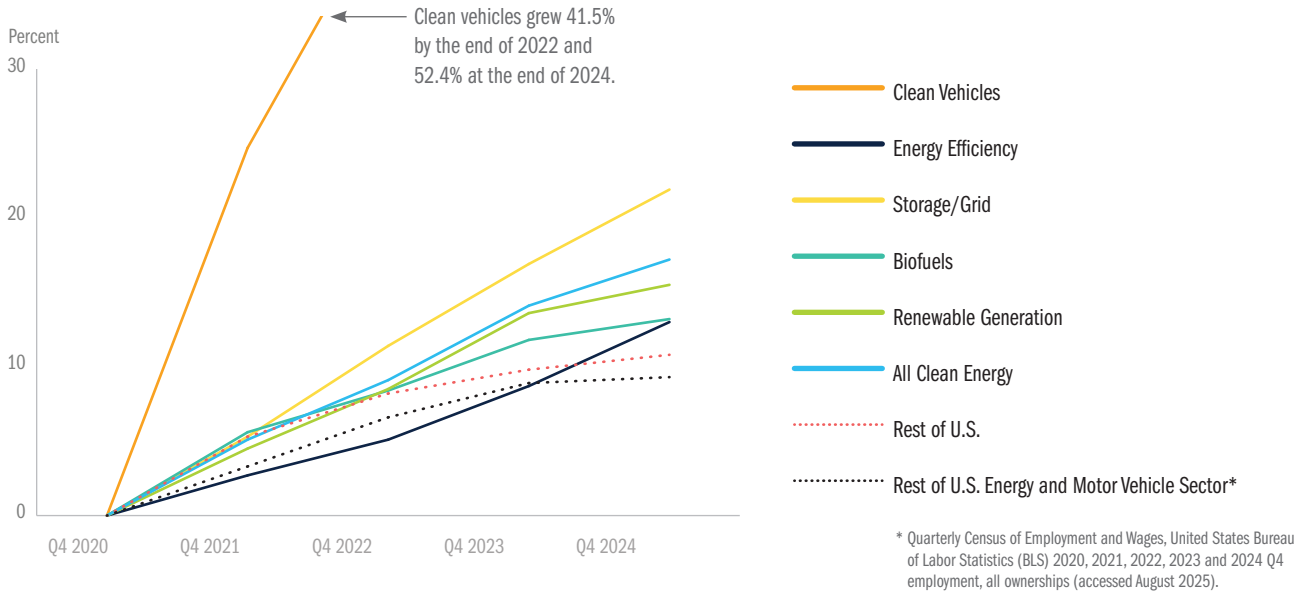
Clean energy companies added nearly 100,000 jobs in 2024, bringing the total jobs added since 2020 to over half a million. Energy efficiency drove the majority of this growth, adding more than 91,000 jobs in 2024 alone. Renewable generation and storage also posted steady gains, while clean vehicles saw a slight decline, reflecting an overall decline across the motor vehicle industry.

### TABLE 1 // U.S. CLEAN ENERGY EMPLOYMENT jobs added Q4 2023–2024

| Sector | 2024 Growth | Jobs Added | Jobs Added Since 2024 |
|---|---|---|---|
| Renewable Generation | 3.9% | 9,338 | 76,418 |
| Storage and Grid | 4.2% | 6,831 | 30,107 |
| Energy Efficiency | 1.9% | 91,567 | 274,572 |
| Biofuels | 3.3% | 508 | 4,884 |
| Clean Vehicles | -3.0% | -12,387 | 136,780 |
| TOTAL | 2.8% | 95,697 | 524,870 |

This represents over 17 percent growth since 2020, outpacing the rest of the U.S. economy by more than 60 percent and far exceeding growth in fossil fuel and gas and diesel motor vehicle sectors. Clean vehicles have seen the most dramatic rise, more than doubling employment since 2020, while storage and grid jobs grew nearly 22 percent. Energy efficiency, the largest employer, expanded by 10 percent. These gains demonstrate the increasing importance of the clean energy economy.

### FIG. 4 // U.S. CLEAN ENERGY EMPLOYMENT by sector growth Q4 2020–2024




* Quarterly Census of Employment and Wages, United States Bureau of Labor Statistics (BLS) 2020, 2021, 2022, 2023 and 2024 Q4 employment, all ownerships (accessed August 2025).

## TABLE 2 // U.S. CLEAN ENERGY EMPLOYMENT by year Q4 2020–2024

| Sector | Q4 2024 | Q4 2023 | Q4 2022 | Q4 2021 | Q4 2020 |
|---|---|---|---|---|---|
| All Clean Energy | 3,559,050 | 3,463,353 | 3,314,038 | 3,190,782 | 3,036,226 |
| Renewable Generation | 569,309 | 559,971 | 534,603 | 515,248 | 492,891 |
| Biofuels | 41,920 | 41,412 | 40,148 | 39,096 | 37,036 |
| Storage and Grid | 168,042 | 161,211 | 153,642 | 145,153 | 137,872 |
| Energy Efficiency | 2,381,746 | 2,290,179 | 2,215,432 | 2,164,914 | 2,107,174 |
| Clean Vehicles | 398,033 | 410,420 | 369,641 | 325,844 | 261,253 |
| Rest of U.S. Employment | 152,643,824 | 151,384,760 | 149,211,247 | 145,217,112 | 137,964,030 |
| Rest of U.S. Energy and Motor Vehicle Employment | 4,907,649 | 4,887,293 | 4,782,611 | 4,637,676 | 4,489,688 |

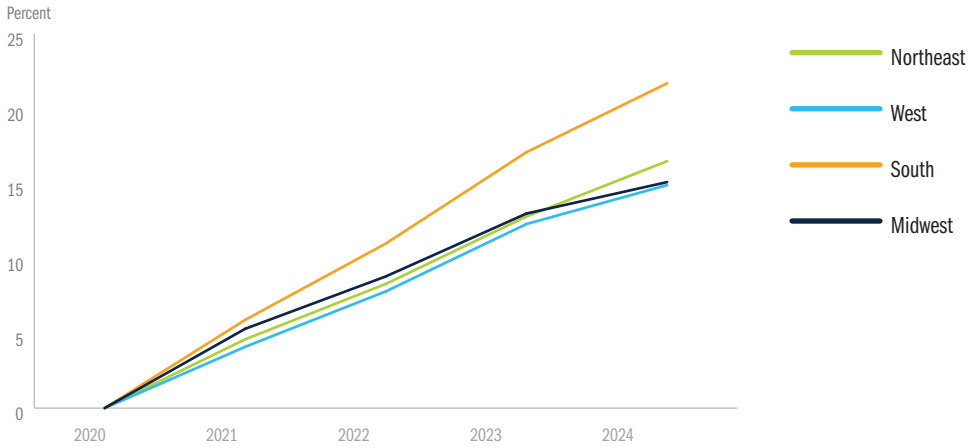
## REGIONAL AND STATE TRENDS

Clean energy jobs are growing in every region of the country. Southern states led in 2024, adding nearly 42,000 new jobs, while the West and Northeast each added more than 22,000. The Midwest saw steadier growth with 14,000 new jobs. Since 2020, the South has added close to 200,000 clean energy jobs—more than any other region—while the West and Midwest have each added over 100,000. This regional expansion underscores the broad, nationwide benefits of the clean energy transition.

## TABLE 3 // U.S. CLEAN ENERGY EMPLOYMENT regional job growth Q4 2023-2024

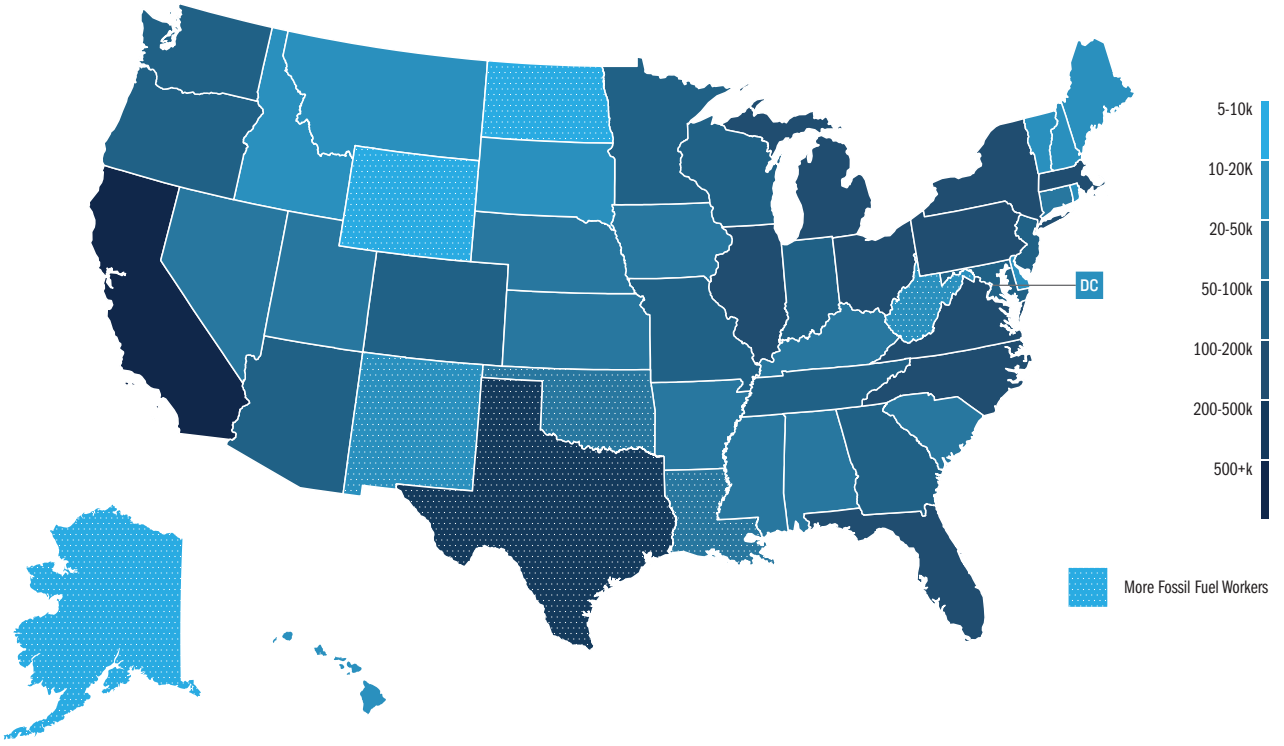
| Region | Clean Energy Jobs | 2024 Job Growth | Jobs Added Since 2020 |
|---|---|---|---|
| **Midwest** | 774,838 | 1.7% **(+13,293 jobs)** | 101,408 |
| **South** | 1,094,414 | 3.8% **(+40,524)** | 194,902 |
| **West** | 983,362 | 2.1% **(+20,396)** | 126,660 |
| **Northeast** | 706,435 | 3.2% **(+21,642)** | 99,854 |

## FIG. 5 // U.S. CLEAN ENERGY EMPLOYMENT regional job growth 2020–2025




California leads the nation with more than 550,000 clean energy workers, followed by Texas (281,000), Florida (184,000), and New York (180,000). Along with Illinois, Michigan, Massachusetts, Ohio, North Carolina, Pennsylvania, and Virginia, 12 states are home to at least 100,000 clean energy jobs—accounting for more than half of the national clean energy workforce. Oklahoma and New Mexico are among the fastest-growing states for clean energy employment, with job growth above 27 percent since 2020. In 2024 alone, Idaho, Oklahoma, Texas, and Florida all posted year-over-year job growth above five percent, demonstrating how clean energy is creating new opportunities in both red and blue states. On a per-capita basis, clean energy jobs represent a significant share of the workforce across the country, with an average of more than 2,200 jobs per 100,000 workers nationally.

## FIG. 6 // U.S. CLEAN ENERGY EMPLOYMENT by total jobs Q4 2024




**To explore clean energy jobs maps, visit www.cleanjobsamerica.e2.org.**

## TABLE 4 // U.S. CLEAN ENERGY EMPLOYMENT by sector 2024

| State | Clean Energy Jobs | 2024 Growth | Jobs Added Since 2020 | Renewable Generation | Storage & Grid | Energy Efficiency | Biofuels | Clean Vehicles |
|---|---|---|---|---|---|---|---|---|
| Alabama | 47,762 | 2.3% | 21.9% | 4,147 | 2,220 | 31,549 | 292 | 9,554 |
| Alaska | 5,505 | 3.7% | 13.8% | 448 | 384 | 4,373 | 46 | 254 |
| Arizona | 66,681 | 3.7% | 18.3% | 12,865 | 2,732 | 46,313 | 402 | 4,370 |
| Arkansas | 22,452 | 3.2% | 20.0% | 2,361 | 1,031 | 16,129 | 594 | 2,338 |
| California | 552,326 | 1.3% | 14.1% | 135,392 | 26,231 | 312,090 | 5,972 | 72,641 |
| Colorado | 69,859 | 4.1% | 20.4% | 18,915 | 3,601 | 40,318 | 1,932 | 5,093 |
| Connecticut | 45,481 | 2.8% | 14.3% | 4,467 | 1,022 | 36,268 | 393 | 3,331 |
| Delaware | 12,977 | 2.0% | 8.5% | 973 | 268 | 11,137 | 85 | 513 |
| District of Col. | 15,985 | 3.4% | 17.8% | 2,342 | 389 | 12,625 | 66 | 563 |
| Florida | 183,951 | 4.7% | 23.3% | 29,925 | 6,763 | 132,060 | 2,838 | 12,365 |
| Georgia | 85,535 | 4.0% | 20.9% | 11,403 | 4,868 | 61,036 | 553 | 7,675 |
| Hawaii | 13,659 | 1.5% | 9.0% | 4,766 | 601 | 6,095 | 1,728 | 469 |
| Idaho | 15,590 | 6.1% | 24.8% | 2,563 | 1,240 | 10,224 | 275 | 1,288 |
| Illinois | 132,239 | 2.5% | 15.4% | 19,283 | 5,679 | 89,878 | 1,665 | 15,735 |
| Indiana | 90,015 | 0.4% | 12.8% | 12,017 | 3,404 | 53,445 | 818 | 20,331 |
| Iowa | 33,610 | 2.8% | 16.7% | 6,002 | 1,624 | 21,088 | 859 | 4,038 |
| Kansas | 27,003 | 3.5% | 20.1% | 4,146 | 1,263 | 18,476 | 321 | 2,798 |
| Kentucky | 40,557 | 2.4% | 23.8% | 3,099 | 1,691 | 25,562 | 336 | 9,869 |
| Louisiana | 32,510 | 4.6% | 23.5% | 5,043 | 1,949 | 23,118 | 352 | 2,048 |
| Maine | 14,033 | 4.3% | 18.1% | 2,845 | 584 | 9,492 | 226 | 886 |
| Maryland | 84,839 | 2.3% | 9.2% | 9,614 | 2,412 | 69,489 | 339 | 2,984 |
| Massachusetts | 126,611 | 2.5% | 16.4% | 22,261 | 7,157 | 86,920 | 896 | 9,378 |
| Michigan | 127,771 | 0.0% | 13.8% | 12,479 | 4,337 | 78,442 | 742 | 31,771 |
| Minnesota | 63,802 | 2.6% | 15.7% | 9,167 | 3,159 | 46,177 | 762 | 4,537 |
| Mississippi | 22,471 | 2.8% | 20.6% | 1,999 | 976 | 15,607 | 559 | 3,330 |
| Missouri | 61,072 | 3.0% | 19.1% | 6,506 | 2,317 | 42,296 | 931 | 9,022 |
| Montana | 11,079 | 4.5% | 17.5% | 883 | 551 | 8,832 | 93 | 721 |
| Nebraska | 21,135 | 3.4% | 19.0% | 3,418 | 663 | 14,476 | 216 | 2,363 |
| Nevada | 36,275 | 2.7% | 16.5% | 10,228 | 10,025 | 13,962 | 151 | 1,910 |
| New Hampshire | 17,427 | 3.3% | 14.1% | 3,532 | 414 | 12,138 | 150 | 1,194 |
| New Jersey | 62,368 | 4.7% | 25.0% | 12,665 | 2,224 | 40,756 | 527 | 6,196 |
| New Mexico | 14,081 | 4.6% | 27.1% | 4,946 | 899 | 6,988 | 192 | 1,055 |
| New York | 179,968 | 3.5% | 17.8% | 22,858 | 5,225 | 135,393 | 1,875 | 14,617 |

| State | Clean Energy Jobs | 2024 Growth | Jobs Added Since 2020 | Renewable Generation | Storage & Grid | Energy Efficiency | Biofuels | Clean Vehicles |
|---|---|---|---|---|---|---|---|---|
| **North Carolina** | 113,052 | 3.0% | 13.8% | 14,193 | 4,515 | 83,490 | 1,566 | 9,287 |
| **North Dakota** | 9,513 | 3.3% | 15.7% | 2,258 | 602 | 5,583 | 182 | 888 |
| **Ohio** | 121,097 | 1.5% | 18.0% | 11,696 | 3,587 | 81,397 | 1,365 | 23,052 |
| **Oklahoma** | 25,532 | 5.5% | 27.5% | 4,262 | 1,826 | 15,934 | 815 | 2,694 |
| **Oregon** | 57,860 | 1.8% | 11.2% | 8,185 | 3,788 | 41,357 | 759 | 3,772 |
| **Pennsylvania** | 104,499 | 3.7% | 20.2% | 12,328 | 4,468 | 76,289 | 1,468 | 9,946 |
| **Rhode Island** | 15,257 | 1.5% | 10.1% | 2,329 | 617 | 11,582 | 268 | 461 |
| **South Carolina** | 48,238 | 3.3% | 16.0% | 7,145 | 2,189 | 31,530 | 618 | 6,756 |
| **South Dakota** | 12,546 | 1.6% | 10.4% | 2,804 | 532 | 7,898 | 194 | 1,118 |
| **Tennessee** | 88,164 | 2.2% | 21.7% | 7,294 | 8,233 | 53,319 | 1,214 | 18,105 |
| **Texas** | 281,509 | 4.9% | 26.5% | 49,975 | 16,057 | 182,506 | 2,672 | 30,298 |
| **Utah** | 48,655 | 3.3% | 17.5% | 9,585 | 1,392 | 34,013 | 177 | 3,487 |
| **Vermont** | 16,173 | 1.0% | 6.3% | 2,328 | 954 | 10,515 | 620 | 1,755 |
| **Virginia** | 102,681 | 3.0% | 16.6% | 11,087 | 3,334 | 79,241 | 511 | 8,508 |
| **Washington** | 83,056 | 2.4% | 10.0% | 11,019 | 3,908 | 61,884 | 1,716 | 4,530 |
| **West Virginia** | 10,817 | 4.2% | 20.8% | 1,372 | 977 | 7,242 | 63 | 1,162 |
| **Wisconsin** | 75,034 | 1.8% | 8.6% | 7,295 | 2,605 | 58,160 | 430 | 6,544 |
| **Wyoming** | 8,735 | 2.7% | 8.8% | 595 | 556 | 7,054 | 95 | 434 |
| **United States** | **3,559,050** | **2.8%** | **522,824** | **569,309** | **168,042** | **2,381,746** | **41,920** | **398,033** |

Top 10 State

# U.S. RENEWABLE GENERATION AND BIOFUEL SECTOR 2025

In 2025, the renewable generation and biofuel sector employed more than 611,000 workers nationwide, underscoring its critical role in America's clean energy economy. Renewable generation accounted for the bulk of jobs, with over 569,000 workers, while biofuels supported an additional 41,900 positions.

Within the electric power generation sector, solar remain the leading employer, with more than 370,000 jobs across construction, utilities, and professional services. Land-based wind followed with nearly 132,000 jobs, concentrated in utility operations, construction, and supply chains. Smaller but important segments include geothermal (9,000 jobs), low-impact hydro and hydrokinetic energy (12,000 jobs), and combined heat and power (31,000 jobs), each contributing to regional diversification. Offshore wind, while still in its early stages with just over 1,000 workers, was poised for rapid expansion at the end of 2024.

The biofuels industry employed nearly 42,000 workers, led by ethanol and non-woody biomass (21,700 jobs), with additional employment in renewable diesel, biodiesel, waste-derived fuels, and other emerging biofuels. These jobs are widely distributed, from agricultural feedstock production to advanced manufacturing and refining, reflecting the sector's integration into both rural and industrial economies.



Across the value chain, employment spans agriculture, construction, utilities, manufacturing, and professional services, highlighting the broad economic impact of renewable generation and fuels. Construction and utility operations anchor solar and wind, while biofuels rely heavily on agriculture and manufacturing. This diversity demonstrates the sector's resilience and its capacity to support long-term economic growth across regions.

Together, renewable generation and biofuels not only reduce emissions and enhance energy security but also provide sustainable, good-paying jobs that strengthen America's global competitiveness as the world continues to transition to clean energy sources.

## FIG. 7 // U.S. RENEWABLE GENERATION AND BIOFUEL EMPLOYMENT by subsector

**RENEWABLE GENERATION: 569,309 JOBS**

- Solar: **370,556**
- Land-Based Wind: **131,874**
- Combined Heat & Power: **31,385**
- Bioenergy: **13,294**
- Low-Impact Hydroelectric/ Hydrokinetic and Wave Energy: **12,111**
- Geothermal: **8,979**
- Offshore Wind: **1,110**

**BIOFUELS: 41,920 JOBS**

- Other Ethanol/Non-Woody Biomass: **21,700**
- Biodiesel Fuels: **5,721**
- Other Biofuels: **5,471**
- Waste Fuels: **4,615**
- Renewable Diesel Fuels: **4,414**

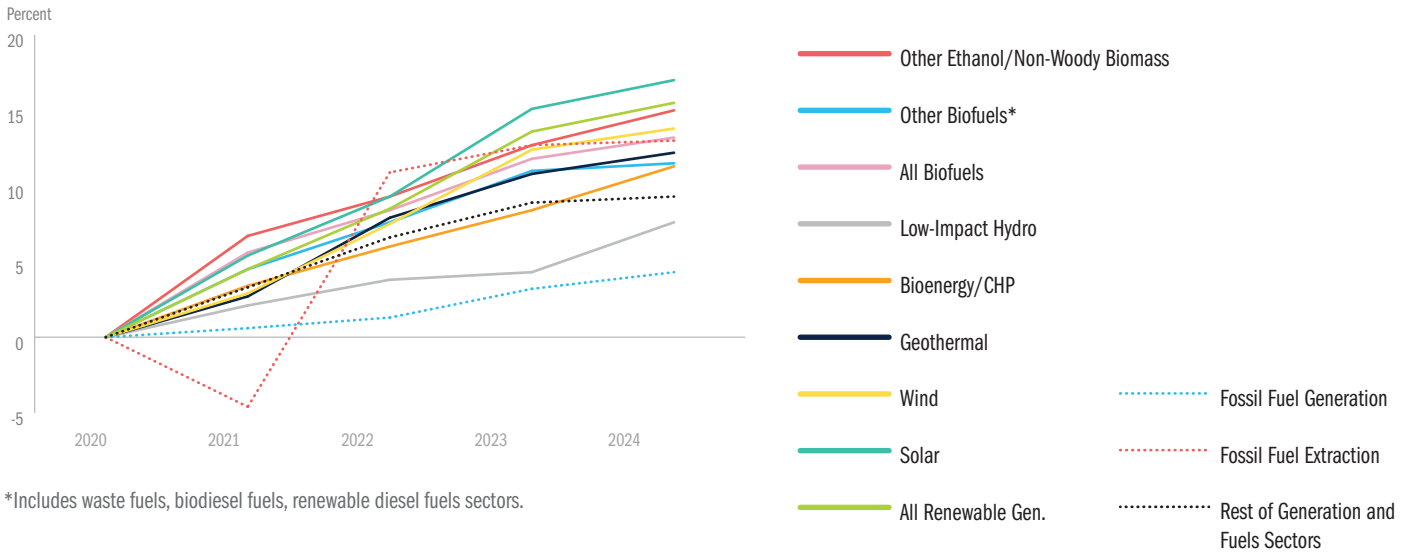
## TABLE 5 // U.S. RENEWABLE GENERATION AND BIOFUEL EMPLOYMENT by value chain

| Sector | Agriculture (NAICS 11) | Utilities (NAICS 22) | Construction (NAICS 23) | Manufacturing (NAICS 32-33) | Wholesale Trade (42-45) | Professional Services (NAICS 51-56) | Other (NAICS 81) |
|---|---|---|---|---|---|---|---|
| **Solar** | | 16,333 | 181,671 | 46,513 | 31,700 | 58,487 | 35,852 |
| **Land-based Wind** | | 11,336 | 43,801 | 24,089 | 13,946 | 35,945 | 2,757 |
| **Offshore Wind** | | | 356 | 170 | 16 | 539 | 30 |
| **Geo** | | 1,007 | 5,312 | 282 | 430 | 1,921 | 27 |
| **Bioenergy** | | 2,383 | 5,864 | 1,096 | 644 | 2,889 | 418 |
| **Combined Heat and Power** | | 1,607 | 4,228 | 1,976 | 4,144 | 19,248 | 183 |
| **Low-impact Hydro** | | | 1,894 | 3,215 | 2,555 | 4,379 | 68 |
| **Renewable Diesel Fuels** | | | | 542 | 107 | 3,764 | 1 |
| **Biodiesel Fuels** | | | | 519 | 410 | 4,790 | 2 |
| **Waste Fuels** | | | | 154 | 100 | 4,356 | 4 |
| **Other Biofuels** | | | | 162 | 1,159 | 4,124 | 25 |
| **Other Ethanol/ Non-Woody Biomass** | 2,756 | | | 2,784 | 5,837 | 10,251 | 71 |

## GROWTH TRENDS

Employment in renewable generation and biofuels has consistently outpaced fossil fuel generation. Since 2020, solar has grown by more than 17 percent, while biofuels jobs increased 13 percent. Wind, geothermal, and combined heat and power all posted solid gains as well. By contrast, fossil fuel generation remained flat, and extraction employment has been volatile. These trends reinforce the shift toward cleaner energy sources in the U.S. economy.

## FIG. 8 // U.S. RENEWABLE GENERATION AND BIOFUEL by sector growth Q4 2020–2024




*Includes waste fuels, biodiesel fuels, renewable diesel fuels sectors.

## TABLE 6 // U.S. ELECTRIC POWER GENERATION & FUELS EMPLOYMENT by year Q4 2020–2024

| Sector | Q4 2024 | Q4 2023 | Q4 2022 | Q4 2021 | Q4 2020 |
|---|---|---|---|---|---|
| **All Renewable Generation** | 569,309 | 559,971 | 534,603 | 515,248 | 492,891 |
| **Solar** | 370,556 | 364,544 | 346,143 | 333,887 | 316,675 |
| **Wind** | 132,984 | 131,327 | 125,580 | 120,164 | 116,817 |
| **Geothermal** | 8,979 | 8,870 | 8,635 | 8,222 | 8,002 |
| **Bioenergy/Combined Heat and Power** | 44,679 | 43,500 | 42,568 | 41,491 | 40,146 |
| **Low-Impact Hydro** | 12,111 | 11,730 | 11,677 | 11,485 | 11,251 |
| **All Biofuels** | 41,920 | 41,412 | 40,148 | 39,096 | 37,036 |
| **Other Biofuels*** | 21,700 | 21,598 | 20,939 | 20,335 | 19,455 |
| **Other Ethanol/Non-Woody Biomass** | 20,220 | 19,814 | 19,209 | 18,761 | 17,581 |
| **Rest of Generation and Fuels Sectors** | 1,376,939 | 1,368,341 | 1,340,310 | 1,211,657 | 1,241,339 |
| **Fossil Fuel Extraction** | 881,890 | 879,509 | 865,174 | 743,872 | 780,144 |
| **Fossil Fuel Generation** | 200,756 | 198,737 | 195,027 | 193,768 | 192,569 |

*Includes waste fuels, biodiesel fuels, renewable diesel fuels sectors.

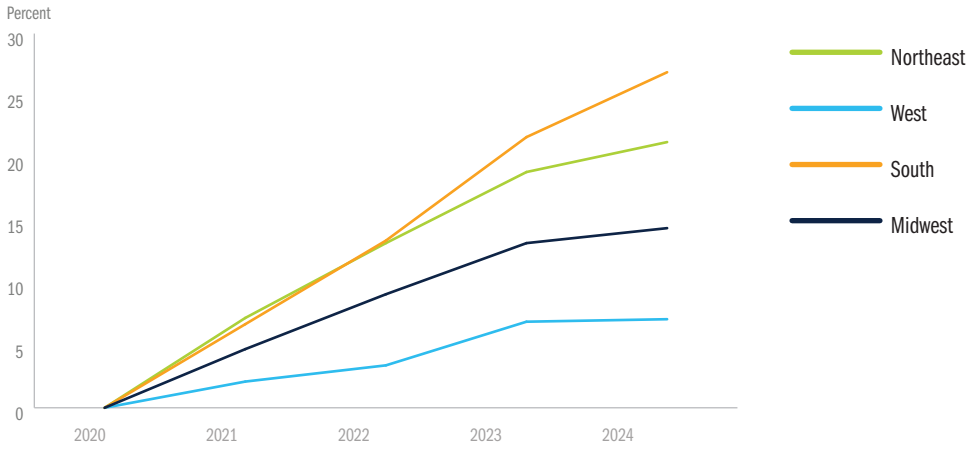
## REGIONAL AND STATE TRENDS

The West remained the largest employer with more than 220,000 renewable energy jobs, driven mostly by solar, but growth slowed slightly. The South emerged as the national growth leader, adding 32,000 jobs since 2020, fueled by rapid solar and wind expansion. The Midwest remained central to wind and biofuels, with nearly 40,000 wind jobs, though job numbers dipped modestly last year. The Northeast, while smaller in scale, posted the fastest growth at 3.2 percent in 2024, led by gains in both solar and wind. Overall, the data shows a shifting landscape where the South and Northeast are driving growth, even as the West and Midwest remain vital anchors of clean energy employment.

## TABLE 7A // U.S. RENEWABLE GENERATION AND BIOFUEL EMPLOYMENT RENEWABLE GENERATION by region Q4 2023–2024

| Region | Renewable Generation Jobs | 2024 Job Growth | Jobs Added Since 2020 |
|---|---|---|---|
| **Midwest** | 97,070 | 1.0% **(+965 jobs)** | 12,189 |
| **South** | 151,934 | 2.2 % **(+6,174)** | 32,178 |
| **West** | 220,390 | -0.5% **(+221)** | 14,524 |
| **Northeast** | 99,915 | 3.2% **(+1,958)** | 17,527 |

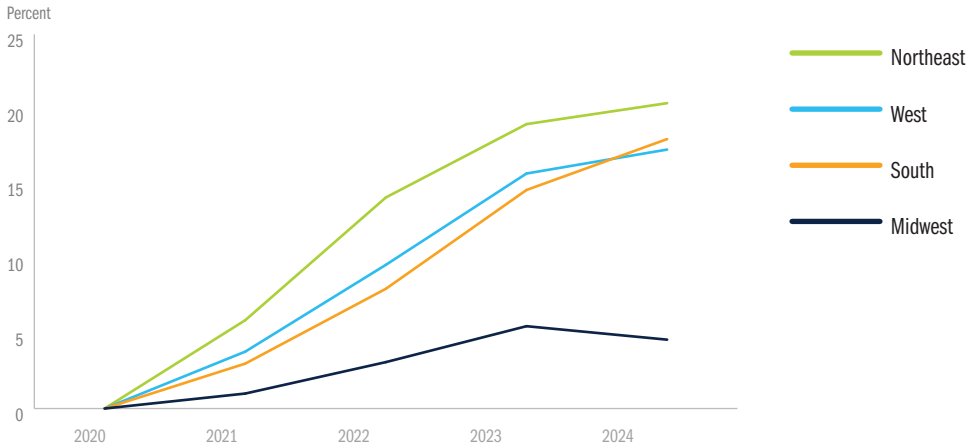
## FIG. 9A // U.S. RENEWABLE GENERATION AND BIOFUEL EMPLOYMENT
## RENEWABLE GENERATION GROWTH by regional growth 2020–2024




## TABLE 7B // U.S. RENEWABLE GENERATION AND BIOFUEL EMPLOYMENT
## WIND by region Q4 2023–2024

| Region | Wind Jobs | 2024 Job Growth | Jobs Added Since 2020 |
|---|---|---|---|
| **Midwest** | 39,577 | -0.9% **(-345 jobs)** | 1,735 |
| **South** | 48,388 | 3.0% **(+1,417)** | 7,392 |
| **West** | 27,042 | 1.4% **(+377)** | 3,995 |
| **Northeast** | 17,977 | 1.2% **(+208)** | 3,045 |

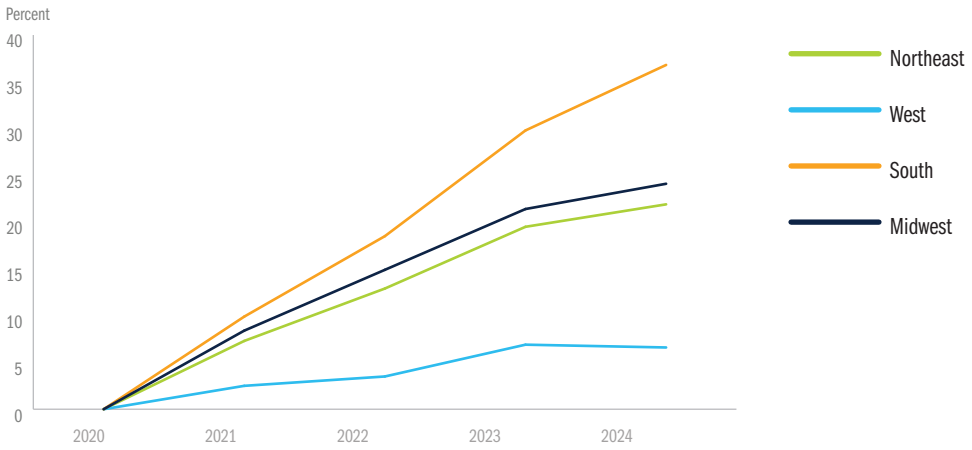
## FIG. 9B // U.S. RENEWABLE GENERATION AND BIOFUEL EMPLOYMENT
## WIND by regional growth 2020–2025



## TABLE 7C // U.S. RENEWABLE GENERATION AND BIOFUEL EMPLOYMENT
## SOLAR by region Q4 2023–2024

| Region | Solar Jobs | 2024 Job Growth | Jobs Added Since 2020 |
|---|---|---|---|
| **Midwest** | 39,577 | -0.9% **(-345 jobs)** | 1,735 |
| **South** | 48,388 | 3.0% **(+1,417)** | 7,392 |
| **West** | 27,042 | 1.4% **(+377)** | 3,995 |
| **Northeast** | 17,977 | 1.2% **(+208)** | 3,045 |

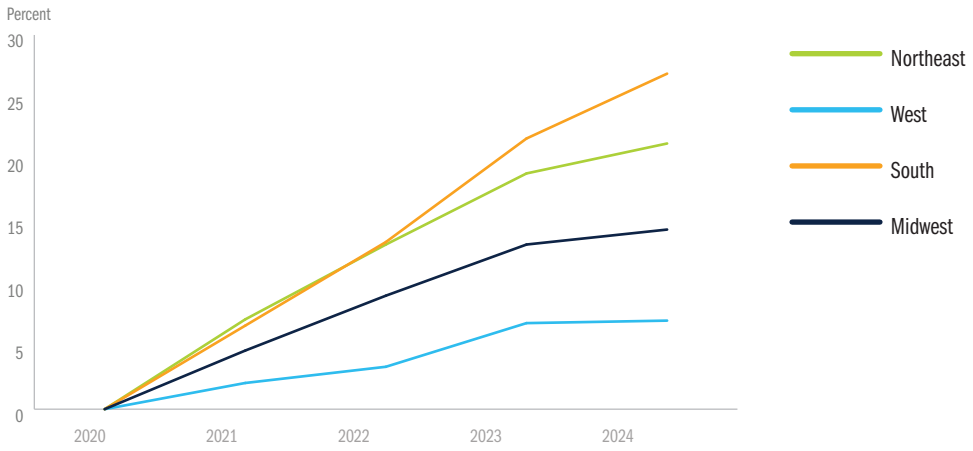
## FIG. 9C // U.S. RENEWABLE GENERATION AND BIOFUEL EMPLOYMENT
## SOLAR by regional growth 2020–2024




## TABLE 7D // U.S. RENEWABLE GENERATION AND BIOFUEL EMPLOYMENT
## BIOFUEL by region Q4 2023–2024

| Region | Biofuel Jobs | 2024 Job Growth | Jobs Added Since 2020 |
|---|---|---|---|
| **Midwest** | 8,485 | 1.0% **(+991 jobs)** | 959 |
| **South** | 12,920 | 2.2 % **(+4,157)** | 1,948 |
| **West** | 13,539 | -0.3% **(-530)** | 635 |
| **Northeast** | 6,976 | 2.1% **(1,393)** | 1,341 |

## FIG. 9D // U.S. RENEWABLE GENERATION AND BIOFUEL EMPLOYMENT BIOFUEL by regional growth 2020–2024




California leads with over 135,000 renewable generation jobs, followed by Texas, New York, and Florida, which benefit from a mix of solar and wind resources. Growth in 2024 was strongest in states like Alaska and Arkansas, which saw job increases above the national average. Wind-heavy states such as Iowa, Oklahoma, and Kansas also remain national leaders, showing how renewable generation provides opportunities in both coastal and heartland states.

States such as Iowa, Illinois, and Minnesota continue to lead in the biofuels sector, supported by biomass and biodiesel production. Growth since 2020 has been notable in the Midwest, where local feedstocks and established refining infrastructure provide strong foundations. Smaller but steady growth is also occurring in states like Texas and California, where favorable biofuel policies are driving investment and job growth.

## TABLE 8 // U.S. RENEWABLE GENERATION EMPLOYMENT by subsector Q4 2024

| State | Total Renewable Generation Jobs | 2024 Growth | Jobs Added Since 2020 | Solar | Wind | Geothermal | Bioenergy/ Combined Heat and Power | Low-Impact Hydropower/ Marine/ Hydrokinetic |
|---|---|---|---|---|---|---|---|---|
| Alabama | 4,147 | -0.9% | 580 | 1,237 | 1,545 | 120 | 1,064 | 181 |
| Alaska | 448 | 6.7% | 121 | 163 | 111 | 11 | 140 | 22 |
| Arizona | 12,865 | 2.2% | 1,930 | 10,253 | 1,489 | 158 | 714 | 251 |
| Arkansas | 2,361 | 8.3% | 681 | 947 | 1,006 | 70 | 260 | 77 |
| California | 135,392 | -0.9% | 4,989 | 116,380 | 8,384 | 1,737 | 7,465 | 1,427 |
| Colorado | 18,915 | 1.1% | 1,591 | 9,312 | 7,753 | 191 | 1,356 | 303 |
| Connecticut | 4,467 | 5.0% | 1,189 | 3,462 | 379 | 92 | 395 | 138 |
| Delaware | 973 | 4.5% | 307 | 761 | 98 | 21 | 61 | 31 |
| District of Col. | 2,342 | -1.3% | 525 | 1,677 | 349 | 58 | 156 | 102 |
| Florida | 29,925 | 5.8% | 6,118 | 16,882 | 6,177 | 592 | 5,428 | 847 |

| State | Total Renewable Generation Jobs | 2024 Growth | Jobs Added Since 2020 | Solar | Wind | Geothermal | Bioenergy/ Combined Heat and Power | Low-Impact Hydropower/ Marine/ Hydrokinetic |
|---|---|---|---|---|---|---|---|---|
| Georgia | 11,403 | 2.2% | 2,469 | 8,354 | 1,450 | 232 | 999 | 368 |
| Hawaii | 4,766 | -1.0% | 114 | 4,083 | 309 | 35 | 302 | 37 |
| Idaho | 2,563 | 6.7% | 747 | 1,231 | 1,061 | 52 | 141 | 78 |
| Illinois | 19,283 | 0.1% | 1,675 | 7,158 | 9,216 | 282 | 2,212 | 415 |
| Indiana | 12,017 | -0.2% | 998 | 4,386 | 6,825 | 132 | 507 | 168 |
| Iowa | 6,002 | 0.6% | 347 | 1,405 | 3,895 | 65 | 545 | 92 |
| Kansas | 4,146 | 3.0% | 569 | 1,435 | 2,098 | 66 | 449 | 99 |
| Kentucky | 3,099 | 6.1% | 1,020 | 2,268 | 298 | 85 | 326 | 123 |
| Louisiana | 5,043 | 1.4% | 998 | 4,016 | 476 | 100 | 283 | 168 |
| Maine | 2,845 | 2.0% | 348 | 1,062 | 1,315 | 34 | 386 | 49 |
| Maryland | 9,614 | 1.8% | 2,039 | 7,284 | 1,316 | 185 | 554 | 275 |
| Massachusetts | 22,261 | 0.0% | 2,138 | 16,827 | 2,816 | 271 | 1,918 | 428 |
| Michigan | 12,479 | 0.6% | 1,711 | 5,758 | 5,100 | 205 | 1,108 | 308 |
| Minnesota | 9,167 | 1.2% | 1,551 | 5,390 | 2,870 | 145 | 556 | 207 |
| Mississippi | 1,999 | 3.1% | 583 | 1,451 | 306 | 45 | 121 | 76 |
| Missouri | 6,506 | 4.1% | 1,382 | 3,807 | 1,597 | 132 | 741 | 230 |
| Montana | 883 | 15.6% | 440 | 555 | 200 | 23 | 65 | 40 |
| Nebraska | 3,418 | 2.1% | 368 | 2,061 | 741 | 56 | 490 | 69 |
| Nevada | 10,228 | -0.7% | 358 | 8,980 | 301 | 321 | 524 | 103 |
| New Hampshire | 3,532 | 1.4% | 317 | 1,726 | 1,157 | 41 | 543 | 65 |
| New Jersey | 12,665 | 1.8% | 1,733 | 9,436 | 1,212 | 193 | 1,547 | 278 |
| New Mexico | 4,946 | 0.9% | 724 | 3,378 | 1,239 | 62 | 150 | 117 |
| New York | 22,858 | 3.6% | 5,239 | 16,152 | 4,496 | 449 | 1,106 | 656 |
| North Carolina | 14,193 | 4.5% | 2,929 | 10,224 | 1,731 | 249 | 1,603 | 386 |
| North Dakota | 2,258 | -0.2% | 89 | 352 | 1,723 | 20 | 129 | 34 |
| Ohio | 11,696 | 1.8% | 2,269 | 8,780 | 1,679 | 221 | 696 | 320 |
| Oklahoma | 4,262 | 5.5% | 1,113 | 1,788 | 2,080 | 74 | 197 | 123 |
| Oregon | 8,185 | 0.3% | 1,065 | 5,807 | 1,717 | 117 | 372 | 172 |
| Pennsylvania | 12,328 | 2.6% | 2,855 | 6,914 | 3,314 | 281 | 1,391 | 429 |
| Rhode Island | 2,329 | 0.9% | 260 | 1,566 | 614 | 25 | 88 | 36 |
| South Carolina | 7,145 | 1.4% | 227 | 4,176 | 1,818 | 101 | 897 | 153 |
| South Dakota | 2,804 | -0.6% | 57 | 743 | 1,831 | 20 | 178 | 32 |
| Tennessee | 7,294 | 3.8% | 1,904 | 5,590 | 849 | 150 | 460 | 245 |
| Texas | 49,975 | 4.8% | 11,300 | 18,022 | 28,124 | 754 | 1,901 | 1,175 |

| State | Total Renewable Generation Jobs | 2024 Growth | Jobs Added Since 2020 | Solar | Wind | Geothermal | Bioenergy/ Combined Heat and Power | Low-Impact Hydropower/ Marine/ Hydrokinetic |
|---|---|---|---|---|---|---|---|---|
| Utah | 9,585 | 4.5% | 1,724 | 8,288 | 769 | 99 | 285 | 144 |
| Vermont | 2,328 | 0.0% | 190 | 1,834 | 360 | 19 | 85 | 31 |
| Virginia | 11,087 | 3.2% | 2,256 | 6,005 | 2,527 | 267 | 1,877 | 412 |
| Washington | 11,019 | 1.9% | 448 | 5,845 | 3,485 | 161 | 1,185 | 344 |
| West Virginia | 1,372 | 7.8% | 386 | 626 | 550 | 29 | 113 | 53 |
| Wisconsin | 7,295 | 1.6% | 1,174 | 4,429 | 2,002 | 120 | 575 | 170 |
| Wyoming | 595 | 15.0% | 272 | 292 | 224 | 13 | 39 | 27 |
| United States | 569,309 | ~~370,556~~ | ~~132,984~~ | ~~12,111~~ | ~~8,979~~ | ~~1.7%~~ | ~~76,418~~ | ~~44,679~~ |

Top 10 State

## TABLE 9 // U.S. BIOFUELS EMPLOYMENT by subsector Q4 2024

| State | Total Biofuel Jobs | 2024 Growth | Jobs Added Since 2020 | Other Ethanol and Non-Woody Biomass | Other Biofuels |
|---|---|---|---|---|---|
| Alabama | 292 | 7.9% | 102 | 81 | 211 |
| Alaska | 46 | 7.3% | 15 | 12 | 34 |
| Arizona | 402 | 3.5% | 77 | 84 | 318 |
| Arkansas | 594 | -0.1% | 47 | 445 | 148 |
| California | 5,972 | 0.0% | 376 | 1,600 | 4,373 |
| Colorado | 1,932 | -2.2% | -27 | 1,509 | 423 |
| Connecticut | 393 | 2.8% | 68 | 79 | 314 |
| Delaware | 85 | 2.4% | 14 | 32 | 53 |
| District of Col. | 66 | 21.0% | 50 | 39 | 27 |
| Florida | 2,838 | -0.5% | 164 | 1,438 | 1,400 |
| Georgia | 553 | 6.6% | 170 | 150 | 404 |
| Hawaii | 1,728 | -4.2% | -157 | 1,632 | 96 |
| Idaho | 275 | 0.6% | 22 | 46 | 229 |
| Illinois | 1,665 | 1.3% | 230 | 1,200 | 464 |
| Indiana | 818 | 0.7% | 84 | 532 | 286 |
| Iowa | 859 | -1.7% | 7 | 627 | 231 |
| Kansas | 321 | 1.7% | 45 | 161 | 160 |
| Kentucky | 336 | 4.4% | 80 | 194 | 142 |
| Louisiana | 352 | 9.2% | 141 | 163 | 189 |
| Maine | 226 | 1.6% | 27 | 42 | 184 |

| State | Total Biofuel Jobs | 2024 Growth | Jobs Added Since 2020 | Other Ethanol and Non-Woody Biomass | Other Biofuels |
|---|---|---|---|---|---|
| Maryland | 339 | 12.9% | 174 | 118 | 222 |
| Massachusetts | 896 | 8.8% | 346 | 297 | 599 |
| Michigan | 742 | 3.4% | 142 | 191 | 551 |
| Minnesota | 762 | 2.4% | 130 | 385 | 377 |
| Mississippi | 559 | 1.6% | 79 | 406 | 153 |
| Missouri | 931 | -0.2% | 65 | 693 | 238 |
| Montana | 93 | 16.5% | 47 | 38 | 54 |
| Nebraska | 216 | 0.4% | 17 | 80 | 135 |
| Nevada | 151 | 4.1% | 33 | 66 | 85 |
| New Hampshire | 150 | 2.9% | 25 | 30 | 119 |
| New Jersey | 527 | 7.6% | 178 | 156 | 371 |
| New Mexico | 192 | 12.2% | 95 | 59 | 133 |
| New York | 1,875 | 1.6% | 248 | 1,011 | 863 |
| North Carolina | 1,566 | 0.5% | 143 | 996 | 571 |
| North Dakota | 182 | 3.5% | 37 | 75 | 107 |
| Ohio | 1,365 | 0.3% | 117 | 973 | 392 |
| Oklahoma | 815 | -1.6% | 17 | 676 | 139 |
| Oregon | 759 | -0.3% | 40 | 158 | 601 |
| Pennsylvania | 1,468 | 2.2% | 225 | 809 | 659 |
| Rhode Island | 268 | -2.6% | -8 | 220 | 48 |
| South Carolina | 618 | -0.2% | 38 | 368 | 249 |
| South Dakota | 194 | -1.6% | 2 | 115 | 79 |
| Tennessee | 1,214 | -1.0% | 48 | 961 | 253 |
| Texas | 2,672 | 6.1% | 684 | 1,484 | 1,188 |
| Utah | 177 | 8.5% | 73 | 53 | 124 |
| Vermont | 620 | -3.7% | -44 | 552 | 69 |
| Virginia | 511 | 11.0% | 234 | 184 | 327 |
| Washington | 1,716 | -1.1% | 22 | 271 | 1,444 |
| West Virginia | 63 | 15.8% | 38 | 23 | 40 |
| Wisconsin | 430 | 3.5% | 83 | 122 | 308 |
| Wyoming | 95 | 2.6% | 18 | 63 | 32 |
| **United States** | **41,920** | **1.2%** | **4,884** | **21,700** | **20,220** |

Top 10 State

**To explore clean energy jobs maps, visit www.cleanjobsamerica.e2.org.**

# U.S. STORAGE AND GRID SECTOR 2025

The U.S. storage and grid sector employed more than 168,000 workers at the start of 2025, reflecting its critical role in modernizing the nation's energy infrastructure and enhancing energy reliability. Employment is split between clean storage (93,497 jobs) and grid modernization (74,545 jobs), both of which are rapidly scaling in response to record renewable energy deployment.

Battery storage dominates clean storage employment, with nearly 79,000 workers, followed by pumped hydro (9,800). Smaller but important segments include mechanical, thermal, and biofuel-based storage. On the grid side, smart grid technologies (27,200 jobs) and microgrids (21,500 jobs) are leading sources of employment, while other modernization efforts such as advanced transmission systems and EV charging add thousands more positions.

Jobs in this sector are spread across the full value chain. Construction and installation remain the largest contributors, but manufacturing, professional services, and wholesale trade also account for significant shares of employment.

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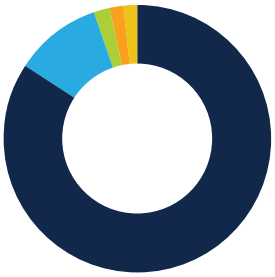
Battery storage alone supports more than 41,000 construction jobs and 14,000 manufacturing jobs, underscoring the domestic economic benefits of scaling clean energy technologies. Grid modernization also provides a strong base of professional service and engineering jobs, highlighting the sector's role in building high-skill, future-oriented employment.

As clean energy deployment accelerates, the storage and grid workforce will be essential for integrating renewable power, maintaining reliability, and building a smarter, more resilient grid. This sector not only strengthens U.S. energy security but also fuels innovation and long-term economic growth.

## FIG. 10 // U.S. STORAGE AND GRID EMPLOYMENT by subsector



**CLEAN STORAGE: 93,497 JOBS**

- Battery: **78,809**
- Pumped hydro: **9,799**
- Mechanical: **1,987**
- Biofuels: **1,473**
- Thermal: **1,430**

**GRID MODERNIZATION: 74,545 JOBS**

- Smart grid: **27,220**
- Other grid modernization: **22,963**
- Micro grid: **21,470**
- EV charging: **2,892**

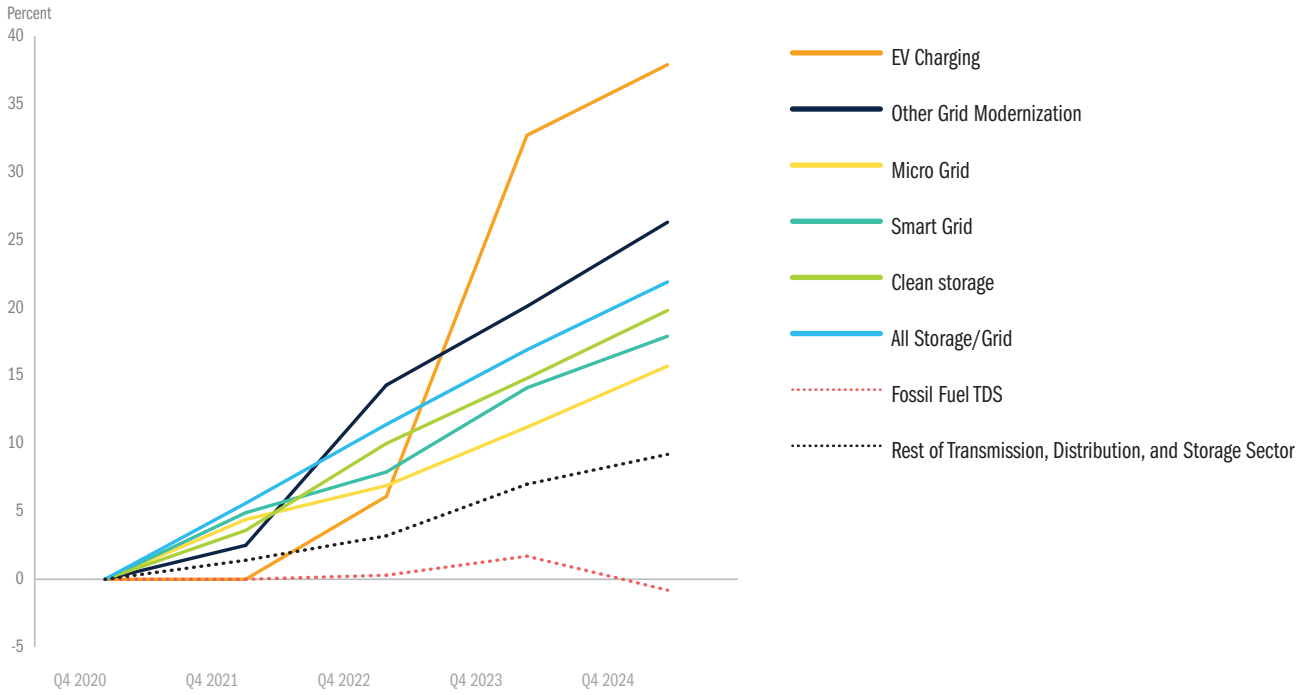
## TABLE 10 // U.S. STORAGE AND GRID EMPLOYMENT by value chain

| Sector | Construction (NAICS 23) | Manufacturing (NAICS 32-33) | Wholesale Trade (NAICS 42-45) | Pipeline Transportation (NAICS 486) | Professional Services (NAICS 51-56) | Other (NAICS 81) |
|---|---|---|---|---|---|---|
| **Smart Grid** | 12,380 | 1,678 | 1,627 | | 11,350 | 185 |
| **Micro Grid** | 12,299 | 3,651 | 1,722 | | 3,246 | 552 |
| **Other Grid Modernization** | 17,410 | 2,056 | 276 | | 2,952 | 268 |
| **EV Charging** | 1,324 | 182 | 579 | | 641 | 166 |
| **Pumped Hydro** | 3,983 | 2,602 | 315 | 1,275 | 1,545 | 78 |
| **Battery** | 41,225 | 14,294 | 8,727 | | 13,408 | 1,154 |
| **Mechanical** | 103 | 1,422 | 2 | | 446 | 13 |
| **Thermal** | 748 | 174 | 47 | | 379 | 82 |

## GROWTH TRENDS

Employment in storage and grid modernization has grown rapidly since 2020, up more than 23 percent by the end of 2024. Battery storage jobs have expanded by over 20 percent, while EV charging employment shot up nearly 38 percent in just four years. Growth in smart grid and microgrid technologies has also been strong, reflecting investments to modernize America's energy infrastructure. These gains far outpace the rest of the transmission and distribution sector, underscoring clean energy's momentum.

## FIG. 11 // U.S. STORAGE AND GRID EMPLOYMENT by sector growth Q4 2020–2024



## TABLE 11 // U.S. STORAGE AND GRID EMPLOYMENT by year Q4 2020–2024

| Sector | Q4 2024 | Q4 2023 | Q4 2022 | Q4 2021 | Q4 2020 |
|---|---|---|---|---|---|
| **All Storage/Grid** | 168,042 | 161,211 | 153,641 | 145,153 | 137,872 |
| **Clean Storage** | 93,497 | 89,592 | 85,858 | 80,813 | 78,040 |
| **Smart Grid** | 27,220 | 26,351 | 24,916 | 24,225 | 23,089 |
| **Micro Grid** | 21,470 | 20,632 | 19,845 | 19,377 | 18,556 |
| **Other Grid Modernization** | 22,963 | 21,848 | 20,794 | 18,637 | 18,187 |
| **EV Charging** | 2,898 | 2,788 | 2,229 | 2,101 | N/A |
| **Rest of Transmission, Distribution, and Storage Sector** | 1,295,617 | 1,264,391 | 1,219,944 | 1,198,495 | 1,184,317 |
| **Fossil Fuel TDS** | 434,366 | 445,371 | 439,182 | 437,742 | N/A |

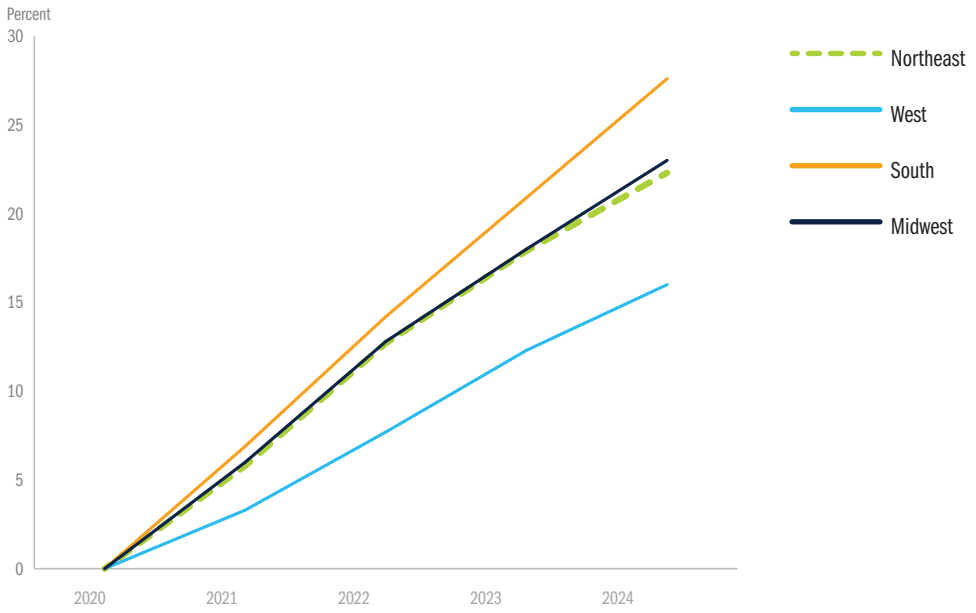
## REGIONAL AND STATE TRENDS

The West (55,900 jobs) and South (55,600 jobs) were the largest employers of storage and grid modernization workers, while the Midwest (29,700) and Northeast (26,700) also contributed significantly. Growth was strong across the board, with every region adding between 7 and 8 percent more jobs in 2024, led by the South at 5.5 percent. Since 2020, the South has added the most jobs (12,000), followed by the West (9,000). Looking at longer-term growth trends, the South has surged ahead with a 27.6 percent increase since 2020, while the Midwest and Northeast both grew by about 23 percent, and the West by nearly 16 percent. These gains reflect broad national investment in modernizing the grid and expanding clean storage capacity.

## TABLE 12 // U.S. STORAGE AND GRID EMPLOYMENT by region Q4 2023–2024

| Region | Storage/Grid Jobs | 2024 Job Growth | Jobs Added Since 2020 |
|---|---|---|---|
| **Midwest** | 29,771 | 4.2% **(+1,195 jobs)** | 5,863 |
| **South** | 55,652 | 5.5% **(2,899)** | 12,057 |
| **West** | 55,907 | 3.3% **(+1,773)** | 9,040 |
| **Northeast** | 26,712 | 3.7% **(+964)** | 5,254 |

## FIG. 12 // U.S. STORAGE AND GRID EMPLOYMENT by regional growth 2020–2024




California and Texas lead in both clean storage and grid modernization jobs, reflecting large-scale integration of renewables and EV infrastructure. Arizona, Nevada, and New York are also rapidly expanding, driven by strong investment in batteries, smart grid, and EV charging infrastructure. States such as Alaska and Arkansas posted double-digit growth in 2024, underscoring how smaller states are also benefiting from grid transformation.

## TABLE 13 // U.S. STORAGE AND GRID EMPLOYMENT by sector Q4 2024

| State | Total Storage/ Grid Jobs | 2024 Growth | Jobs Added Since 2020 | Clean Storage | Smart Grid | Micro Grid | Other Grid Modernization (Incl. EV Charging) |
|---|---|---|---|---|---|---|---|
| **Alabama** | 2,220 | 6.3% | 532 | 998 | 390 | 329 | 503 |
| **Alaska** | 384 | 11.3% | 88 | 217 | 41 | 47 | 79 |
| **Arizona** | 2,732 | 5.1% | 556 | 1,620 | 296 | 406 | 409 |
| **Arkansas** | 1,031 | 6.9% | 280 | 459 | 178 | 160 | 235 |
| **California** | 26,231 | 3.4% | 3,593 | 18,341 | 2,912 | 2,221 | 2,757 |
| **Colorado** | 3,601 | 4.6% | 688 | 2,057 | 495 | 483 | 566 |
| **Connecticut** | 1,022 | 5.4% | 292 | 389 | 159 | 245 | 229 |
| **Delaware** | 268 | 4.9% | 65 | 82 | 90 | 53 | 43 |
| **District of Col.** | 389 | 5.4% | 113 | 140 | 57 | 115 | 77 |
| **Florida** | 6,763 | 5.8% | 1,841 | 2,768 | 1,200 | 1,235 | 1,559 |

| State | Total Storage/ Grid Jobs | 2024 Growth | Jobs Added Since 2020 | Clean Storage | Smart Grid | Micro Grid | Other Grid Modernization (Incl. EV Charging) |
|---|---|---|---|---|---|---|---|
| Georgia | 4,868 | 4.2% | 1,055 | 2,153 | 808 | 735 | 1,172 |
| Hawaii | 601 | 5.1% | 84 | 405 | 61 | 52 | 84 |
| Idaho | 1,240 | 1.8% | 158 | 963 | 60 | 108 | 109 |
| Illinois | 5,679 | 4.0% | 955 | 2,649 | 1,430 | 713 | 887 |
| Indiana | 3,404 | 3.6% | 530 | 2,087 | 593 | 323 | 400 |
| Iowa | 1,624 | 3.8% | 299 | 856 | 206 | 228 | 334 |
| Kansas | 1,263 | 4.8% | 278 | 671 | 213 | 170 | 208 |
| Kentucky | 1,691 | 11.1% | 455 | 781 | 256 | 245 | 409 |
| Louisiana | 1,949 | 10.6% | 540 | 983 | 251 | 281 | 434 |
| Maine | 584 | 5.3% | 131 | 364 | 57 | 76 | 87 |
| Maryland | 2,412 | 3.8% | 498 | 1,037 | 461 | 446 | 468 |
| Massachusetts | 7,157 | 0.5% | 699 | 5,173 | 671 | 1,108 | 206 |
| Michigan | 4,337 | 3.9% | 758 | 2,786 | 459 | 481 | 611 |
| Minnesota | 3,159 | 2.6% | 478 | 2,099 | 296 | 364 | 400 |
| Mississippi | 976 | 6.4% | 249 | 486 | 156 | 136 | 198 |
| Missouri | 2,317 | 4.7% | 563 | 1,012 | 472 | 374 | 458 |
| Montana | 551 | 12.3% | 164 | 281 | 70 | 71 | 129 |
| Nebraska | 663 | 9.3% | 191 | 277 | 101 | 125 | 160 |
| Nevada | 10,025 | 1.9% | 816 | 9,503 | 174 | 163 | 185 |
| New Hampshire | 414 | 7.5% | 135 | 166 | 68 | 91 | 89 |
| New Jersey | 2,224 | 9.5% | 589 | 961 | 355 | 445 | 464 |
| New Mexico | 899 | 7.8% | 230 | 457 | 147 | 122 | 173 |
| New York | 5,225 | 4.9% | 1,201 | 2,536 | 624 | 1,193 | 871 |
| North Carolina | 4,515 | 4.5% | 1,202 | 1,918 | 889 | 739 | 968 |
| North Dakota | 602 | 6.4% | 106 | 350 | 95 | 65 | 93 |
| Ohio | 3,587 | 5.3% | 785 | 1,722 | 561 | 584 | 722 |
| Oklahoma | 1,826 | 5.2% | 402 | 1,035 | 245 | 232 | 314 |
| Oregon | 3,788 | 0.3% | 333 | 1,499 | 333 | 251 | 1,704 |
| Pennsylvania | 4,468 | 4.5% | 870 | 2,196 | 603 | 823 | 847 |
| Rhode Island | 617 | 0.6% | 53 | 160 | 37 | 358 | 61 |
| South Carolina | 2,189 | 3.5% | 416 | 1,042 | 509 | 280 | 358 |
| South Dakota | 532 | 3.4% | 96 | 323 | 63 | 61 | 85 |
| Tennessee | 8,233 | -0.6% | 335 | 1,080 | 6,347 | 364 | 442 |
| Texas | 16,057 | 7.1% | 3,690 | 8,981 | 1,978 | 2,171 | 2,927 |

| State | Total Storage/ Grid Jobs | 2024 Growth | Jobs Added Since 2020 | Clean Storage | Smart Grid | Micro Grid | Other Grid Modernization (Incl. EV Charging) |
|---|---|---|---|---|---|---|---|
| **Utah** | 1,392 | 5.5% | 359 | 678 | 206 | 247 | 261 |
| **Vermont** | 954 | -0.8% | 29 | 456 | 57 | 391 | 50 |
| **Virginia** | 3,334 | 11.4% | 1,029 | 1,412 | 570 | 637 | 714 |
| **Washington** | 3,908 | 2.3% | 511 | 2,650 | 398 | 388 | 471 |
| **West Virginia** | 977 | 7.3% | 200 | 494 | 102 | 133 | 248 |
| **Wisconsin** | 2,605 | 4.1% | 523 | 1,450 | 362 | 339 | 454 |
| **Wyoming** | 556 | 11.8% | 127 | 296 | 55 | 63 | 142 |
| **United States** | **168,042** | **4.2%** | **30,170** | **93,497** | **27,220** | **21,470** | **25,856** |

Top 10 State

**To explore clean energy jobs maps, visit www.cleanjobsamerica.e2.org.**

# U.S. ENERGY EFFICIENCY SECTOR 2025

Energy efficiency continues to anchor America's clean energy economy, employing more than 2.38 million workers nationwide in 2025. This sector spans every state and community, driving economic activity in construction, manufacturing, professional services, and trade. Jobs range from installing efficient HVAC systems and lighting to producing advanced materials, certified appliances, and recycled building products.

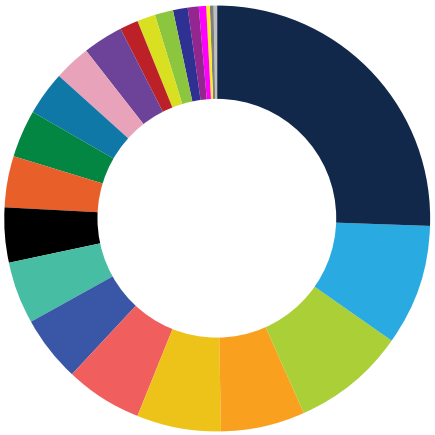
Traditional HVAC equipment, control systems, and related services remain the single largest source of efficiency employment, supporting more than 600,000 jobs. Lighting also plays a major role, with 375,000 workers in LED and other efficient lighting technologies. Significant employment is found in insulation, advanced materials, and renewable heating and cooling, underscoring the wide scope of efficiency solutions.




The supply chain analysis highlights that construction is the backbone of efficiency employment, but manufacturing, professional services, and wholesale trade also provide tens of thousands of good-paying jobs. Certified air- and ground-source heat pumps, energy-efficient water heaters, and reduced water consumption products are among the fastest-growing subsectors, reflecting strong demand for technologies that lower costs while cutting emissions.

Together, these jobs demonstrate how energy efficiency not only reduces household and business expenses but also strengthens U.S. competitiveness, creates local economic opportunities that cannot be outsourced, and accelerates the transition to a cleaner, more resilient economy.

## FIG. 13 // U.S. STORAGE AND GRID EMPLOYMENT by subsector



### ENERGY EFFICIENCY: 2,381,744 JOBS

Traditional HVAC goods, control systems, and services: **609,316**

Other LED, CFL, and efficient lighting: **222,061**

Certified Heating, Ventilation, and Cooling (HVAC), except for air-source or ground-source heat pumps: **202,720**

Certified LED lighting: **152,377**

Other high efficiency HVAC that are out of scope for certification (e.g. indirect evaporative coolers, air to water heat pumps, energy recovery systems, etc.): **151,651**

Certified Appliances (not including HVAC): **142,211**

Advanced building materials/insulation: **115,471**

Certified Insulation: **115,459**

Other: **98,793**

Reduced water consumption products and appliances: **95,281**

Other renewable heating and cooling (geothermal, biomass, heat pumps, etc.): **80,005**

Recycled building materials: **79,509**

Air sealing: **71,171**

Certified air-source heat pumps: **70,554**

Certified Roofing: **34,329**

Solar thermal water heating and cooling: **31,499**

Certified Commercial Food Service Equipment: **31,493**

Certified Windows, Doors and Skylights: **26,152**

Certified water heaters: **22,090**

Certified Data Center Equipment: **12,586**

Certified Electronics (TVs, Telephones, Audio/Video, etc.): **7,253**

Certified ground-source or geothermal heat pumps: **7,078**

Energy auditing services: **2,686**

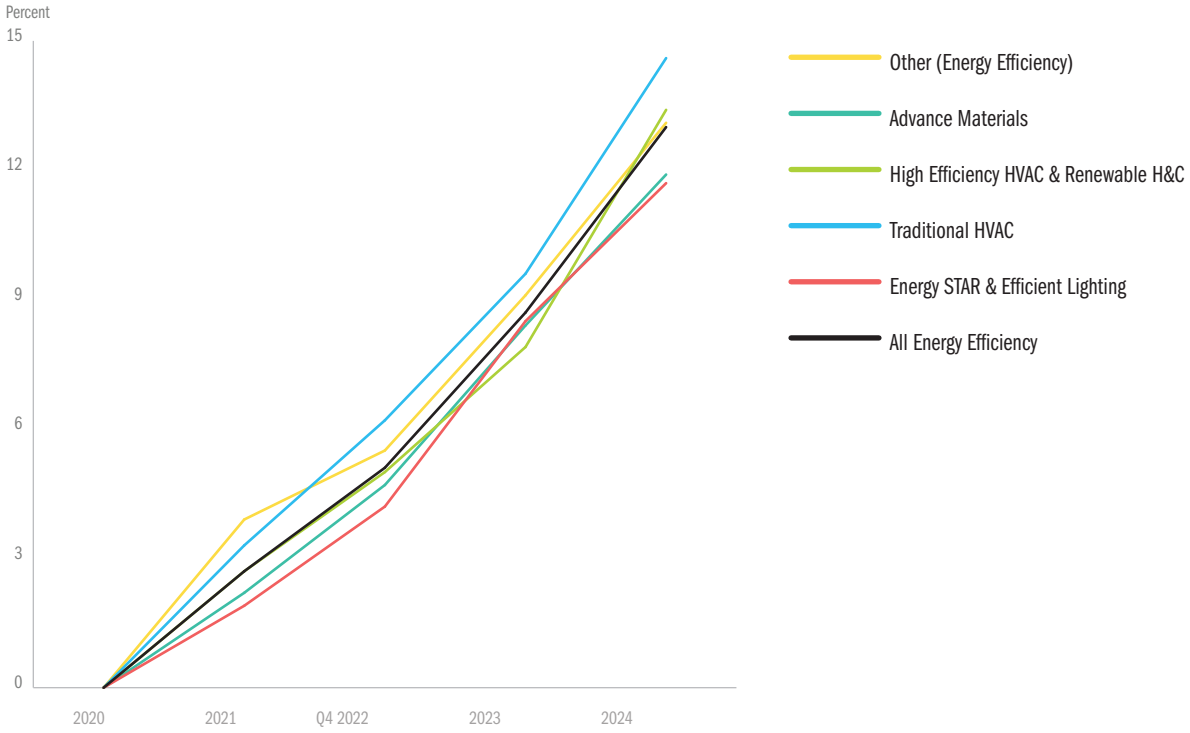
## TABLE 14 // U.S. ENERGY EFFICIENCY EMPLOYMENT by supply chain

| Sector | Construction (NAICS 23) | Manufacturing (NAICS 32-33) | Wholesale Trade (NAICS 42-45) | Professional Services (NAICS 51-56) | Other (NAICS 81) |
|---|---|---|---|---|---|
| Certified Appliances (not including HVAC) | 72,696 | 12,910 | 14,269 | 39,145 | 3,191 |
| Certified Heating, Ventilation, and Cooling (HVAC), except for air-source or ground-source heat pumps | 164,338 | 20,997 | 5,968 | 9,043 | 2,373 |
| Certified air-source heat pumps | 28,365 | 14,025 | 14,921 | 12,422 | 821 |
| Certified ground-source or geothermal heat pumps | 2,691 | 1,542 | 1,575 | 1,201 | 68 |
| Other high efficiency HVAC that are out of scope for certification (e.g. indirect evaporative coolers, air to water heat pumps, energy recovery systems, etc.) | 78,407 | 35,598 | 9,897 | 26,219 | 1,530 |
| Traditional HVAC goods, control systems, and services | 330,635 | 31,799 | 63,484 | 166,352 | 17,046 |
| Certified water heaters | 15,553 | 420 | 1,713 | 4,310 | 94 |
| Certified Electronics (TVs, Telephones, Audio/Video, etc.) | 154 | 3,924 | 1,833 | 270 | 1,072 |
| Certified Windows, Doors and Skylights | 14,546 | 1,149 | 2,104 | 7,930 | 424 |
| Certified Roofing | 22,738 | 7,167 | 1,328 | 2,842 | 255 |
| Certified Insulation | 101,927 | 7,328 | 1,221 | 4,781 | 201 |
| Air Sealing | 37,359 | 2,349 | 18,881 | 12,330 | 252 |
| Certified Commercial Food Service Equipment | 15,722 | 3,794 | 2,135 | 9,169 | 674 |
| Certified Data Center Equipment | 1,577 | 4,829 | 3,643 | 234 | 2,304 |
| Certified LED lighting | 60,886 | 14,047 | 19,324 | 55,136 | 2,984 |
| Other LED, CFL, and Efficient Lighting | 116,334 | 40,494 | 24,478 | 40,217 | 538 |
| Solar Thermal Water Heating and Cooling | 16,530 | 2,666 | 3,221 | 8,426 | 656 |
| Other Renewable Heating and Cooling (geothermal, biomass, heat pumps, etc.) | 53,164 | 4,745 | 5,006 | 16,962 | 128 |
| Advanced Building Materials/Insulation | 27,856 | 58,851 | 1,320 | 26,320 | 1,124 |
| Recycled Building Materials | 44,742 | 10,910 | 3,279 | 17,762 | 2,817 |
| Reduced Water Consumption Products and Appliances | 58,835 | 7,500 | 5,849 | 21,813 | 1,283 |
| Energy Auditing Services | 1,364 | 0 | 0 | 1,191 | 132 |
| Other | 31,125 | 40,672 | 4,904 | 19,067 | 3,025 |

## GROWTH TRENDS

Since 2020, energy efficiency jobs have grown by more than 13 percent, adding over 270,000 positions. Traditional HVAC employment expanded steadily, while advanced materials and efficient lighting also saw strong gains. This consistent growth reflects rising demand for building retrofits, high-efficiency appliances, and clean heating technologies. Energy efficiency continues to anchor clean energy employment nationwide.

## FIG. 14 // U.S. ENERGY EFFICIENCY EMPLOYMENT by sector growth Q4 2020–2024




## TABLE 15 // U.S. ENERGY EFFICIENCY EMPLOYMENT by year Q4 2020–2024

| Sector | Q4 2024 | Q4 2023 | Q4 2022 | Q4 2021 | Q4 2020 |
|---|---|---|---|---|---|
| **All Energy Efficiency** | 2,381,746 | 2,290,179 | 2,215,432 | 2,164,914 | 2,107,174 |
| **Energy STAR & Efficient Lighting** | 548,142 | 532,273 | 511,561 | 500,026 | 490,717 |
| **Traditional HVAC** | 609,316 | 582,663 | 564,498 | 549,380 | 531,640 |
| **High Efficiency HVAC & Renewable H&C** | 565,595 | 538,339 | 523,908 | 512,223 | 498,863 |
| **Advance Materials** | 362,583 | 351,188 | 339,152 | 331,169 | 324,060 |
| **Other (Energy Efficiency)** | 296,108 | 285,716 | 276,313 | 272,116 | 261,894 |

## REGIONAL AND STATE TRENDS

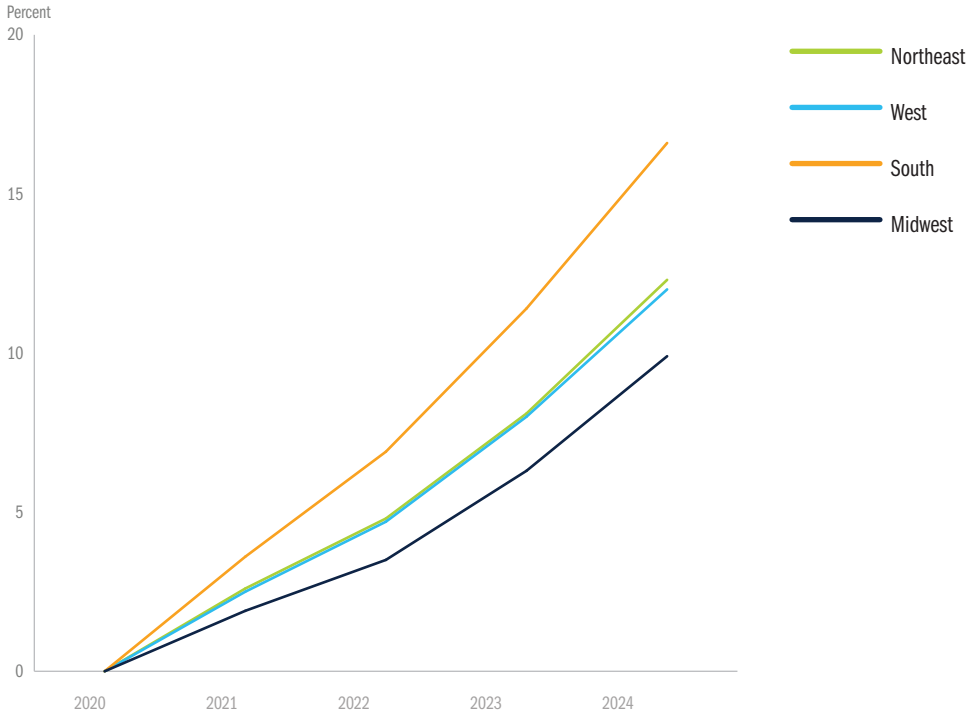
The South led with 751,000 energy efficiency jobs, the largest regional workforce, and posted the fastest growth at 4.7 percent (+33,500 jobs). The West followed with 594,000 jobs, while the Midwest (517,000) and Northeast (520,000) also remained major centers of efficiency employment. Since 2020, the South has added the most jobs (107,000), while the West and Northeast each added more than 56,000–63,000 jobs. Longer-term trends show the South growing 17 percent since 2020, well above other regions, with the Northeast and West both rising around 12 percent, and the Midwest increasing by nearly 10 percent.

## TABLE 16 // ENERGY EFFICIENCY EMPLOYMENT by region Q4 2023–2024

| Region | Energy Efficiency Jobs | 2024 Job Growth | Jobs Added Since 2020 |
|---|---|---|---|
| **Midwest** | 517,316 | 3.4% **(+17,006 jobs)** | 46,665 |
| **South** | 751,081 | 4.7% **(+33,551)** | 107,157 |
| **West** | 593,503 | 3.8% **(+21,483)** | 63,778 |
| **Northeast** | 519,846 | 3.9% **(+19,527)** | 56,973 |

*Does not include EV charging subsector because state-by-state numbers are unavailable.

## FIG. 15 // U.S. ENERGY EFFICIENCY EMPLOYMENT by regional growth 2020–2024




California leads the U.S. with more than 300,000 energy efficiency workers, followed by Texas, Florida, and New York. High-growth states in 2024 included Arizona, Nevada, and Utah, where building booms and strong state-level policies are creating demand for efficient construction and retrofits. This sector continues to be a stalwart of the clean energy economy, providing stable, local jobs that cannot be outsourced.

## TABLE 17 // U.S. ENERGY EFFICIENCY EMPLOYMENT by sector Q4 2024

| State | Total Energy Efficiency Jobs | 2024 Growth | Jobs Added Since 2020 | Energy STAR | Traditional HVAC with an Efficiency Component | High Efficiency Hvac and Renewable Heating and Cooling | Advanced Materials | Other |
|---|---|---|---|---|---|---|---|---|
| Alabama | 31,549 | 4.0% | 3,881 | 3,240 | 6,749 | 3,954 | 14,734 | 2,873 |
| Alaska | 4,373 | 3.3% | 399 | 592 | 736 | 1,629 | 1,204 | 212 |
| Arizona | 46,313 | 4.5% | 6,433 | 8,809 | 11,317 | 12,820 | 7,816 | 5,551 |
| Arkansas | 16,129 | 3.9% | 2,195 | 2,532 | 3,391 | 3,174 | 1,173 | 5,860 |
| California | 312,090 | 3.3% | 28,251 | 69,722 | 114,555 | 63,811 | 25,050 | 38,952 |
| Colorado | 40,318 | 6.6% | 7,723 | 11,835 | 11,541 | 8,306 | 6,633 | 2,002 |
| Connecticut | 36,268 | 2.9% | 2,695 | 8,271 | 9,014 | 10,457 | 3,940 | 4,585 |
| Delaware | 11,137 | 2.0% | 477 | 1,439 | 3,798 | 3,054 | 1,986 | 862 |
| District of Col. | 12,625 | 4.0% | 1,411 | 1,624 | 2,799 | 4,769 | 705 | 2,727 |
| Florida | 132,060 | 5.5% | 23,141 | 34,719 | 25,261 | 26,701 | 30,333 | 15,047 |
| Georgia | 61,036 | 5.1% | 9,913 | 10,008 | 13,754 | 19,524 | 8,061 | 9,689 |
| Hawaii | 6,095 | 5.8% | 975 | 1,432 | 785 | 2,829 | 431 | 620 |
| Idaho | 10,224 | 7.3% | 1,905 | 2,008 | 2,260 | 4,755 | 917 | 283 |
| Illinois | 89,878 | 3.6% | 9,207 | 14,895 | 29,902 | 26,833 | 9,158 | 9,089 |
| Indiana | 53,445 | 3.2% | 4,377 | 6,798 | 13,709 | 22,492 | 5,023 | 5,424 |
| Iowa | 21,088 | 4.6% | 2,848 | 6,797 | 2,701 | 6,980 | 2,283 | 2,326 |
| Kansas | 18,476 | 4.5% | 2,656 | 4,181 | 3,098 | 3,965 | 3,304 | 3,928 |
| Kentucky | 25,562 | 4.7% | 3,652 | 5,724 | 5,967 | 7,655 | 3,513 | 2,703 |
| Louisiana | 23,118 | 5.4% | 3,979 | 4,708 | 7,591 | 4,338 | 4,303 | 2,177 |
| Maine | 9,492 | 5.4% | 1,458 | 1,184 | 1,657 | 3,870 | 459 | 2,323 |
| Maryland | 69,489 | 2.5% | 4,077 | 12,279 | 25,346 | 18,690 | 9,188 | 3,987 |
| Massachusetts | 86,920 | 3.6% | 10,020 | 15,380 | 23,364 | 19,268 | 11,093 | 17,814 |
| Michigan | 78,442 | 2.5% | 4,200 | 14,958 | 4,047 | 7,552 | 39,659 | 12,227 |
| Minnesota | 46,177 | 3.7% | 5,029 | 11,715 | 9,580 | 12,635 | 4,682 | 7,565 |
| Mississippi | 15,607 | 3.8% | 1,996 | 1,879 | 4,100 | 3,217 | 1,963 | 4,449 |
| Missouri | 42,296 | 4.4% | 4,430 | 6,403 | 20,771 | 10,877 | 2,434 | 1,811 |
| Montana | 8,832 | 3.7% | 864 | 2,289 | 3,371 | 1,479 | 1,302 | 391 |
| Nebraska | 14,476 | 4.5% | 2,044 | 2,013 | 3,510 | 4,263 | 2,362 | 2,327 |
| Nevada | 13,962 | 7.3% | 3,306 | 2,865 | 2,924 | 4,215 | 2,355 | 1,603 |
| New Hampshire | 12,138 | 4.4% | 1,300 | 2,931 | 2,677 | 4,676 | 568 | 1,287 |
| New Jersey | 40,756 | 6.5% | 7,876 | 9,258 | 12,317 | 8,695 | 3,132 | 7,355 |
| New Mexico | 6,988 | 7.7% | 1,647 | 2,151 | 1,494 | 1,769 | 866 | 709 |
| New York | 135,393 | 4.2% | 14,432 | 38,318 | 37,123 | 38,704 | 10,025 | 11,222 |

| State | Total Energy Efficiency Jobs | 2024 Growth | Jobs Added Since 2020 | Energy STAR | Traditional HVAC with an Efficiency Component | High Efficiency Hvac and Renewable Heating and Cooling | Advanced Materials | Other |
|---|---|---|---|---|---|---|---|---|
| **North Carolina** | 83,490 | 3.3% | 7,017 | 35,560 | 20,813 | 13,516 | 7,608 | 5,994 |
| **North Dakota** | 5,583 | 5.5% | 801 | 646 | 877 | 3,362 | 371 | 327 |
| **Ohio** | 81,397 | 3.4% | 8,106 | 16,489 | 19,465 | 16,951 | 18,393 | 10,099 |
| **Oklahoma** | 15,934 | 7.2% | 3,193 | 2,094 | 3,227 | 8,374 | 693 | 1,546 |
| **Oregon** | 41,357 | 2.7% | 3,095 | 5,819 | 10,614 | 10,688 | 8,917 | 5,319 |
| **Pennsylvania** | 76,289 | 4.6% | 10,892 | 16,324 | 20,976 | 17,754 | 13,830 | 7,404 |
| **Rhode Island** | 11,582 | 2.2% | 955 | 3,208 | 1,525 | 2,385 | 3,004 | 1,460 |
| **South Carolina** | 31,530 | 4.3% | 4,715 | 3,206 | 3,383 | 8,377 | 6,305 | 10,259 |
| **South Dakota** | 7,898 | 3.3% | 794 | 1,152 | 2,194 | 2,109 | 803 | 1,639 |
| **Tennessee** | 53,319 | 3.6% | 5,343 | 11,645 | 9,711 | 18,448 | 6,818 | 6,696 |
| **Texas** | 182,506 | 5.5% | 30,395 | 59,197 | 38,604 | 41,596 | 25,060 | 18,049 |
| **Utah** | 34,013 | 3.7% | 3,863 | 7,060 | 4,647 | 7,985 | 9,116 | 5,203 |
| **Vermont** | 10,515 | 1.9% | 446 | 1,910 | 2,256 | 3,077 | 1,617 | 1,655 |
| **Virginia** | 79,241 | 3.3% | 7,736 | 19,933 | 18,485 | 14,826 | 11,135 | 14,863 |
| **Washington** | 61,884 | 2.9% | 5,163 | 15,075 | 18,606 | 8,468 | 7,099 | 12,635 |
| **West Virginia** | 7,242 | 4.2% | 933 | 2,021 | 1,024 | 1,292 | 2,521 | 385 |
| **Wisconsin** | 58,160 | 2.3% | 2,174 | 21,080 | 9,711 | 7,312 | 18,118 | 1,938 |
| **Wyoming** | 7,054 | 1.7% | 154 | 2,767 | 1,991 | 1,119 | 518 | 659 |
| **United States** | **2,381,746** | **4.0%** | **274,572** | **548,142** | **609,316** | **565,595** | **362,583** | **296,108** |

Top 10 State

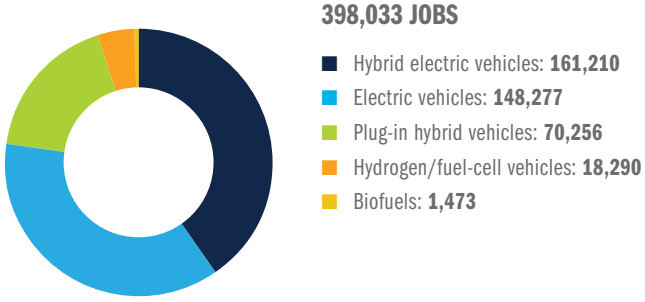
**To explore clean energy jobs maps, visit www.cleanjobsamerica.e2.org.**

# U.S. CLEAN VEHICLE SECTOR 2025


The U.S. clean vehicle sector employed nearly 400,000 workers at the start of 2025, reflecting the country's accelerating transition toward advanced vehicle technologies. Employment is spread across hybrid, plug-in hybrid, battery electric, and hydrogen fuel-cell vehicles, underscoring a rapidly diversifying auto workforce.

Hybrid electric vehicles remain the largest segment, with more than 161,000 jobs, followed closely by electric vehicles (148,000 jobs). Plug-in hybrids support over 70,000 jobs, while hydrogen and fuel-cell vehicles, still an emerging market, employ more than 18,000 workers. These numbers highlight the sector's steady expansion and the growing integration of clean technologies into the broader auto industry.

## FIG. 16 // U.S. CLEAN VEHICLE EMPLOYMENT by subsector




* Supply chain breakdowns for the clean vehicle sector and subsectors is unavailable. For a supply chain breakdown of the overall motor vehicle industry, see the 2025 U.S. Energy & Employment Report.

## GROWTH TRENDS

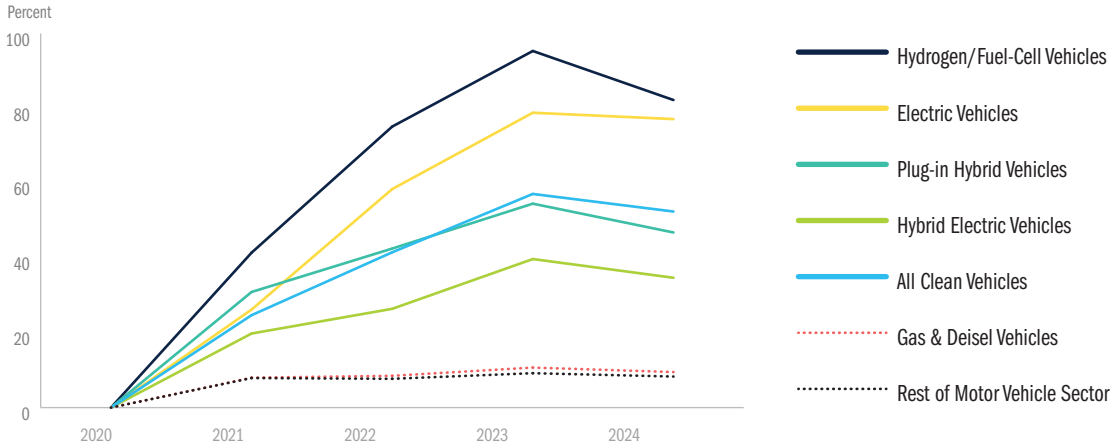
Despite a modest dip in 2024 driven by an overall decline across all motor vehicle jobs, clean vehicle jobs have expanded dramatically since 2020, adding nearly 137,000 new positions. Wholesale trade and professional and business services experienced moderate gains, but not enough to overcome such a large drop in the overall vehicle sector. However, the total jobs lost in battery electric jobs (~2,000) and clean vehicle overall jobs (~14,000) was smaller when compared to the rest of the sector's declines. This could be due to consolidation (repair and maintenance), or some offshoring (before tariffs), strike impacts (from 2023), further transition to electric vehicles, etc. for manufacturing.

Growth trends between 2020 and 2024 underscore the clean vehicle sector's momentum. Employment grew more than 52 percent during this period, far outpacing the rest of the motor vehicle sector, which grew by just over 8 percent. Electric vehicles led the surge, with employment increasing 77 percent, followed by hydrogen/fuel-cell vehicles at 82 percent, reflecting strong investment in next-generation technologies. By contrast, gas and diesel vehicle employment

has grown only modestly during the same time period, underscoring the long-term industry shift toward electrification and clean technology.

Prior to policy shifts in 2025 raising taxes and changing regulations on clean vehicles and manufacturing, the clean vehicle sector is poised to remain a cornerstone of U.S. manufacturing. It offers not only economic growth and good-paying jobs but also positions the U.S. as a leader in the global race to decarbonize transportation.

## FIG. 17 // U.S. MOTOR VEHICLE EMPLOYMENT by sector growth Q4 2020–2024




## TABLE 18 // U.S. MOTOR VEHICLE EMPLOYMENT by year Q4 2020–2024

| Sector | Q4 2024 | Q4 2023 | Q4 2022 | Q4 2021 | Q4 2020 |
|---|---|---|---|---|---|
| **All Clean Vehicles** | 398,033 | 410,420 | 369,641 | 325,844 | 261,253 |
| **Hybrid Electric Vehicles** | 161,210 | 167,177 | 151,224 | 143,318 | 119,638 |
| **Plug-in Hybrid Vehicles** | 70,256 | 73,937 | 68,194 | 62,632 | 47,842 |
| **Electric Vehicles** | 148,277 | 149,702 | 132,638 | 105,694 | 83,733 |
| **Hydrogen/Fuel-Cell Vehicles** | 18,290 | 19,604 | 17,585 | 14,200 | 10,040 |
| **Rest of Motor Vehicle Sector** | 2,235,095 | 2,254,561 | 2,222,356 | 2,227,524 | 2,064,032 |
| **Gas & Deisel Vehicles** | 2,010,088 | 2,032,007 | 1,992,702 | 1,983,055 | 1,836,018 |

## REGIONAL AND STATE TRENDS

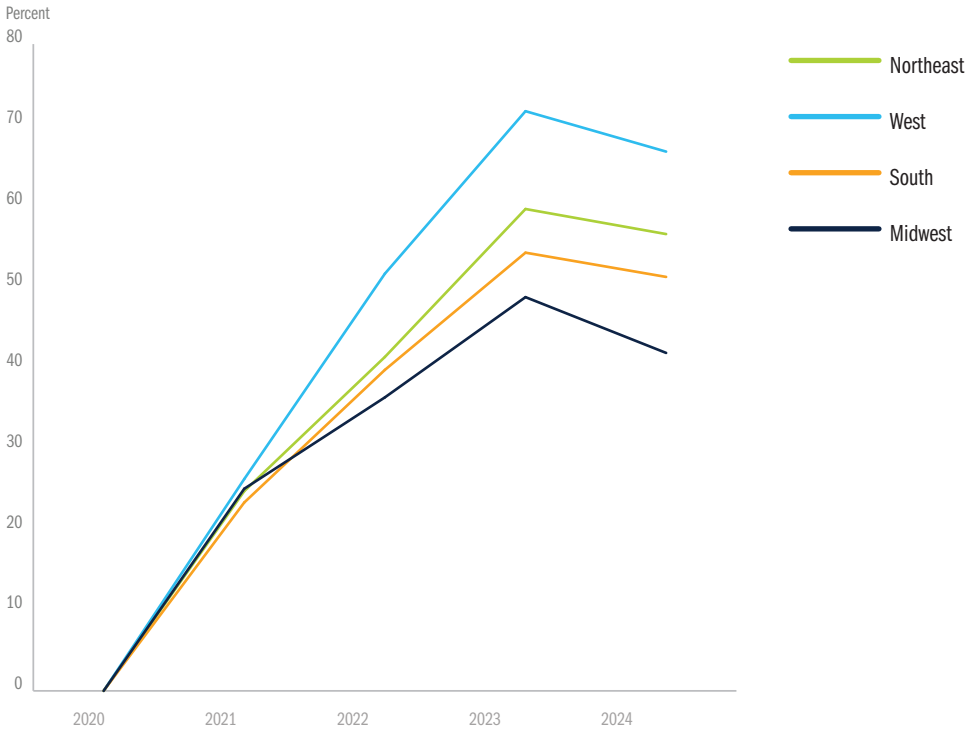
The South (122,800 jobs) and Midwest (122,200 jobs) lead in employment, followed by the West (100,000) and Northeast (53,000). Despite strong long-term growth since 2020, all regions experienced modest declines in 2024, with the Midwest seeing the largest drop (-4.6 percent). Since 2020, however, the South has added more than 41,000 jobs and the West about 40,000, while the Northeast and Midwest added 19,000 and 36,000 respectively. Over the longer term, the West shows the fastest overall growth (66.7 percent since 2020), followed by the Northeast (56.5 percent), South (51.2 percent), and Midwest (41.8 percent), underscoring the sector's strong trajectory despite short-term fluctuations.

## TABLE 19 // U.S. CLEAN VEHICLE EMPLOYMENT by region Q4 2023–2024

| Region | Clean Vehicle Jobs | 2024 Job Growth | Jobs Added Since 2020 |
|---|---|---|---|
| **Midwest** | 122,196 | -4.6% **(-5,953 jobs)** | 36,033 |
| **South** | 122,827 | -1.9% **(-2,396)** | 41,594 |
| **West** | 100,023 | -2.9% **(-3,012)** | 40,016 |
| **Northeast** | 52,987 | -1.9% **(-1,026)** | 19,137 |

*Does not include EV charging subsector because state-by-state numbers are unavailable.

## FIG. 18 // U.S. CLEAN VEHICLE EMPLOYMENT by regional growth 2020–2024




* Does not include EV charging subsector because state-by-state figures are unavailable.

California again leads, with more than 70,000 jobs, supported by both manufacturing and adoption incentives. Michigan, Ohio, and Tennessee also remain major hubs due to their auto industry supply chains. Growth since 2020 has been especially strong in the Southeast and Midwest, where manufacturing plants and supplier networks were being repurposed for EV production. Despite some short-term fluctuations in 2024, long-term growth in EV-related employment remained robust at the start of 2025, driven by federal and state incentives and global automaker investments.

## TABLE 20 // U.S. CLEAN VEHICLE EMPLOYMENT by sector Q4 2024

| State | Total Clean Vehicle Jobs | 2024 Growth | Jobs Added Since 2020 | Hybrid Electric Vehicles | Plug-In Hybrid Electric Vehicles | Battery Electric Vehicles | Hydrogen/ Fuel Cell Vehicles |
|---|---|---|---|---|---|---|---|
| Alabama | 9,554 | -2.6% | 3,498 | 4,318 | 1,926 | 2,827 | 482 |
| Alaska | 254 | -5.5% | 45 | 115 | 50 | 76 | 13 |
| Arizona | 4,370 | -1.5% | 1,339 | 1,971 | 888 | 1,288 | 222 |
| Arkansas | 2,338 | -6.3% | 536 | 1,055 | 476 | 688 | 119 |
| California | 72,641 | -3.0% | 31,232 | 15,344 | 6,397 | 48,965 | 1,935 |
| Colorado | 5,093 | -1.1% | 1,869 | 2,293 | 1,042 | 1,497 | 261 |
| Connecticut | 3,331 | -1.3% | 1,430 | 1,651 | 471 | 1,070 | 140 |
| Delaware | 513 | -3.7% | 155 | 232 | 104 | 151 | 26 |
| District of Col. | 563 | 7.5% | 320 | 254 | 114 | 167 | 29 |
| Florida | 12,365 | -4.4% | 3,524 | 5,583 | 2,502 | 3,653 | 627 |
| Georgia | 7,675 | -1.9% | 1,154 | 3,500 | 1,498 | 2,303 | 374 |
| Hawaii | 469 | -7.8% | 112 | 213 | 93 | 140 | 23 |
| Idaho | 1,288 | 1.4% | 266 | 581 | 262 | 379 | 66 |
| Illinois | 15,735 | -0.9% | 5,570 | 7,147 | 3,250 | 4,525 | 813 |
| Indiana | 20,331 | -6.3% | 4,249 | 9,116 | 4,148 | 6,030 | 1,037 |
| Iowa | 4,038 | -2.3% | 1,299 | 1,822 | 820 | 1,190 | 205 |
| Kansas | 2,798 | -1.8% | 977 | 1,261 | 569 | 824 | 143 |
| Kentucky | 9,869 | -5.6% | 2,579 | 4,486 | 1,943 | 2,954 | 486 |
| Louisiana | 2,048 | -1.5% | 537 | 930 | 406 | 611 | 102 |
| Maine | 886 | -0.4% | 183 | 400 | 179 | 261 | 45 |
| Maryland | 2,984 | -4.0% | 345 | 1,347 | 483 | 993 | 162 |
| Massachusetts | 9,378 | -0.6% | 4,654 | 2,462 | 1,106 | 5,533 | 277 |
| Michigan | 31,771 | -6.4% | 8,703 | 14,362 | 6,394 | 9,414 | 1,601 |
| Minnesota | 4,537 | -4.7% | 1,446 | 2,050 | 917 | 1,341 | 229 |
| Mississippi | 3,330 | -2.6% | 938 | 1,504 | 673 | 984 | 169 |
| Missouri | 9,022 | -3.6% | 3,358 | 4,070 | 1,833 | 2,661 | 459 |
| Montana | 721 | -3.4% | 135 | 326 | 146 | 213 | 36 |
| Nebraska | 2,363 | -2.0% | 754 | 1,066 | 480 | 696 | 120 |
| Nevada | 1,910 | -5.8% | 637 | 862 | 387 | 563 | 97 |
| New Hampshire | 1,194 | -2.3% | 369 | 538 | 244 | 351 | 61 |
| New Jersey | 6,196 | -2.1% | 2,109 | 2,801 | 1,246 | 1,837 | 312 |
| New Mexico | 1,055 | -1.7% | 309 | 477 | 213 | 312 | 53 |
| New York | 14,617 | -2.4% | 6,059 | 7,153 | 2,119 | 4,513 | 831 |
| North Carolina | 9,287 | -2.5% | 2,446 | 4,199 | 1,873 | 2,747 | 468 |

| State | Total Clean Vehicle Jobs | 2024 Growth | Jobs Added Since 2020 | Hybrid Electric Vehicles | Plug-In Hybrid Electric Vehicles | Battery Electric Vehicles | Hydrogen/ Fuel Cell Vehicles |
|---|---|---|---|---|---|---|---|
| **North Dakota** | 888 | -2.4% | 256 | 401 | 180 | 262 | 45 |
| **Ohio** | 23,052 | -5.1% | 7,209 | 10,392 | 4,691 | 6,793 | 1,175 |
| **Oklahoma** | 2,694 | -1.7% | 774 | 1,220 | 541 | 799 | 135 |
| **Oregon** | 3,772 | -3.1% | 1,305 | 1,700 | 767 | 1,112 | 192 |
| **Pennsylvania** | 9,946 | -1.9% | 2,735 | 4,560 | 1,906 | 2,871 | 608 |
| **Rhode Island** | 461 | -8.5% | 140 | 226 | 86 | 128 | 21 |
| **South Carolina** | 6,756 | 1.0% | 1,240 | 3,056 | 1,366 | 1,994 | 341 |
| **South Dakota** | 1,118 | -4.2% | 237 | 503 | 230 | 327 | 57 |
| **Tennessee** | 18,105 | -1.0% | 8,104 | 8,143 | 3,701 | 5,332 | 929 |
| **Texas** | 30,298 | 0.4% | 12,939 | 13,270 | 6,028 | 9,490 | 1,511 |
| **Utah** | 3,487 | -4.9% | 1,239 | 1,570 | 717 | 1,021 | 180 |
| **Vermont** | 1,755 | -0.9% | 331 | 1,116 | 500 | 140 | - |
| **Virginia** | 8,508 | -3.2% | 3,326 | 3,835 | 1,731 | 2,509 | 434 |
| **Washington** | 4,530 | -1.8% | 1,391 | 2,053 | 905 | 1,346 | 227 |
| **West Virginia** | 1,162 | -2.7% | 308 | 525 | 236 | 342 | 59 |
| **Wisconsin** | 6,544 | -2.6% | 1,975 | 2,952 | 1,333 | 1,925 | 334 |
| **Wyoming** | 434 | -5.4% | 137 | 196 | 89 | 128 | 22 |
| **United States** | **398,033** | **-3.0%** | **136,780** | **161,210** | **70,256** | **148,277** | **18,290** |

Top 10 State

**To explore clean energy jobs maps, visit www.cleanjobsamerica.e2.org.**

## APPENDIX A // U.S. CLEAN ENERGY EMPLOYMENT by sector 2020–2024

**on.e2.org/AppendixA**

*Source:* 2025 Clean Jobs America (CJA), E2, September 2025.

## APPENDIX B // U.S. CLEAN ENERGY EMPLOYMENT by subsectors 2020–2024

**on.e2.org/AppendixB**

*Source:* 2025 Clean Jobs America (CJA), E2, September 2025.
*EV charging data only available for 2021, 2022, 2023, 2024.

## APPENDIX C // U.S. CLEAN ENERGY EMPLOYMENT by industry 2020–2024

**on.e2.org/AppendixC**

*Source:* 2025 Clean Jobs America (CJA), E2, September 2025.

## APPENDIX D // U.S. FOSSIL FUEL EMPLOYMENT by sector 2020–2024

**on.e2.org/AppendixD**

*Source:* 2025 U.S. Energy and Employment Report (USEER), Department of Energy (DOE), September 2025.

## APPENDIX E // U.S. MOTOR VEHICLE EMPLOYMENT by sector 2020–2024

**on.e2.org/AppendixE**

*Source:* 2025 U.S. Energy and Employment Report (USEER), Department of Energy (DOE), September 2025.

## APPENDIX F // U.S. TOTAL ENERGY INDUSTRY EMPLOYMENT 2020–2024

**on.e2.org/AppendixF**

*Source:* 2025 U.S. Energy and Employment Report (USEER), Department of Energy (DOE), September 2025.

## APPENDIX G // U.S. Q4 ECONOMYWIDE EMPLOYMENT 2020–2024

**on.e2.org/AppendixG**

*Source:* Quarterly Census of Employment and Wages, United States Bureau of Labor Statistics (BLS) 2023 and 2024 Q4 employment, all ownerships (accessed August 2025).

**Endnotes**

1 Unless otherwise stated, all employment data is based on the 2025 U.S. Energy and Employment Report (USEER), September 2025, Department of Energy (DOE).

2 Quarterly Census of Employment and Wages, United States Bureau of Labor Statistics (BLS) 2020, 2021, 2022, 2023 and 2024 Q4 employment, all ownerships (accessed August 2025).

3 Global energy investment set to rise to $3.3 trillion in 2025 amid economic uncertainty and energy security concerns, International Energy Agency, June 2025, available at https://www.iea.org/news/global-energy-investment-set-to-rise-to-3-3-trillion-in-2025-amid-economic-uncertainty-and-energy-security-concerns.

4 Assessing Impacts Of The 2025 Reconciliation Bill On U.S. Energy Costs, Jobs, Health, And Emissions, Energy Innovation, May 2025, available at https://energyinnovation.org/report/assessing-impacts-of-the-2025-reconciliation-bill-on-u-s-energy-costs-jobs-health-and-emissions/.

5 Analysis: Reconciliation Bill Risks Devastating Job Losses in Every U.S. State if Senate Fails to Change Course, Solar Energy Industries Association, June 2025, available at https://seia.org/news/bill-risks-devastating-job-losses/.

6 May 2024 National Occupational Employment and Wage Estimates, Bureau of Labor Statistics (BLS). Available at https://www.bls.gov/oes/tables.htm.

7 Ibid.

8 Ibid.

9 Ibid.

10 Information on the representation of people with disabilities, lesbian, gay, bisexual, transgender, intersex, and queer people, immigrants, religious minorities, and young people in clean energy is limited. Based on the available data from the Bureau of Labor Statistics (BLS) and the supplemental employer survey used by the USEER, this analysis was unable to produce any findings regarding those groups.

## On Diversity & Equity

A good economy and good environment should be for all. For that reason, E2 supports policies that advance diversity and equity and ensures that the benefits of a clean economy—jobs, savings, opportunities, health—are extended to all communities. Environmental justice is considered in every policy on which we work, and diversity and inclusivity are tantamount in everything we do. Internally, we will prioritize making our membership more representative of America as a whole and addressing internal biases that can keep us from fulfilling our goals.

## ABOUT E2

E2 is a national, nonpartisan group of more than 11,000 business leaders, investors and others who advocate for smart policies that are good for the economy and good for the environment. E2 members have founded or funded more than 2,500 companies, created more than 600,000 jobs, and manage more than $100 billion in venture and private equity capital.

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