Energy Efficiency Jobs in America

A comprehensive analysis of energy efficiency employment across all 50 states

Presented by

Environmental Entrepreneurs (E2)
E4TheFuture

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About E2

Environmental Entrepreneurs (E2) is a national, nonpartisan group of business leaders, investors, and professionals from every sector of the economy who advocate for smart policies that are good for the economy and good for the environment. Our 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. For more information, see www.e2.org or follow us on Twitter at @e2org.

About E4TheFuture

E4TheFuture—formerly Conservation Services Group (CSG)—is a nonprofit organization that promotes residential clean energy and sustainable resource solutions to advance climate protection and economic fairness by influencing federal, state and local policies, and by helping to build a resilient and vibrant energy efficiency and clean energy sector. CSG provided low-cost energy solutions 1984-2015 in over half of U.S. states helping to improve over 3.8 million homes. Visit us at e4thefuture.org and follow us on Twitter @e4thefuture.

About BW Research Partnership

BW Research Partnership is a full-service, economic and workforce research consulting firm with offices in Carlsbad, California, and Wrentham, Massachusetts. It is the nation's leading provider of accurate, comprehensive clean energy research studies, including the National Solar Census, wind industry analyses for the National Renewable Energy Laboratory and the Natural Resources Defense Council, and state-level clean energy reports for Massachusetts, Illinois, Vermont, Iowa, and Florida, among others.

Introduction

Unlike large wind turbines or rooftop solar panels, most energy efficiency improvements are invisible: They might be folded within a super-insulated building, embedded in the controls of a smart monitoring system, or quietly embodied in a high efficiency AC system. Looking at the job sector, however, the impact couldn't be more clear. Energy efficiency is the largest sector within the U.S. clean energy economy, accounting for three in four of its jobs and employing nearly 1.9 million people nationwide.

The efficiency industry helps customers squeeze more productivity and comfort out of the same amount—or less—energy. Its workers install smart lighting, for example, or seal duct leaks in HVAC systems or insulate walls and ceilings. They make climate control systems run better or manufacture state-of-the-art appliances. In short, they figure out how to help homes and businesses run leaner by lowering utility bills. In addition, they provide a public health benefit by reducing air pollution. Efficiency is also considered the most cost-effective strategy in many states to address climate change and achieve carbon reductions and/or other environmental goals.

Introduction (continued)

This analysis finds that most energy efficiency workers are at small companies with 25 or fewer employees. Forty percent of energy efficiency companies focus on installation, while another 26 percent are in trade and distribution. The remaining firms are in professional services, engineering and research, and other categories. The majority say they depend on the energy efficiency market for at least half of their revenue.

Increased energy efficiency has driven remarkable savings for consumers. Residents of states with the weakest energy efficiency policies saw their monthly energy bills go up twice as much as people in the most efficient states, according to the recent report, "Cleaning Up Our Act on Energy and Reaping the Benefits". Overall, that analysis found average electricity prices in the U.S. today are lower than they were a quarter century ago, even as wind and solar energy expanded their market share to 7 percent of the power supply.

Additionally, the American Council for an Energy-Efficient Economy's (ACEEE's) "2016 State Energy Efficiency Scorecard" found that advancements in everything from building energy codes and transportation planning help spur investment in energy efficiency, which in turn gives businesses, governments, and consumers more control over their energy use.[1]

California, Florida, Massachusetts and Illinois, which rank at the top of this employment analysis, together account for over half a million clean energy jobs involving energy efficiency. Other states, such as Texas and Pennsylvania, are seeing strong energy efficiency employment even as they host an oil-and-gas fracking boom. But there's uneven progress among them all in promoting smarter energy use policies—from strong building codes to transportation standards to utility programs that help customers save on their bills—that will feed a thriving industry and support energy efficiency employment.

Based on surveys done for this report, employers from the approximately 165,000 U.S. companies that do energy efficiency work predict that business will keep getting better. They expect employment to grow 13 percent over the coming year, adding 245,000 more jobs, according to projections reported by employers. State programs and new federal initiatives, such as the Tenant Star program which recognizes exceptional tenant spaces and was created as part of the Energy Efficiency Improvement Act of 2015, can bolster this growth.

Other key steps that can help create jobs across the country include:

- Advancing energy efficiency standards set by the U.S. Department of Energy for appliances and equipment.
- Strengthening building codes at the state and local levels to capture all cost-effective energy efficiency opportunities at the time of design and construction.
- Accelerating energy efficiency improvements in devices and buildings that use electricity or natural gas through utility programs, state policies such as energy efficiency resource standards, or by investing in all cost-effective energy efficiency resources.
- States should prioritize the role of energy efficiency in developing and/or strengthening clean energy standards.

Quick Facts

~1.9M
energy efficiency jobs in America

889,000+
workers spend majority of their time on energy efficiency

13%
employment growth rate over current year

1 *http://aceee.org/press/2016/09/california-golden-again-energy*

Findings

Taking a closer examination of all the energy efficiency jobs in America yields some interesting findings. For instance, the majority of the 1.9 million energy efficiency workers in the U.S. work for small businesses with five employees or less, and about 70 percent work for companies with 10 employees or less.

Energy Efficiency Employment and Establishments

As the largest sector within the nation's clean energy economy, energy efficiency accounts for about three out of every four American clean energy jobs. In total, these technologies support almost 1.9 million jobs across the country, and 889,050 of these workers spend the majority of their time supporting the energy efficiency portion of their business.[2] Employers across the roughly 165,000 establishments that conduct energy efficiency work are optimistic about business growth, projecting a collective 13 percent employment growth rate over 2016—or an additional 245,000 jobs.[3]

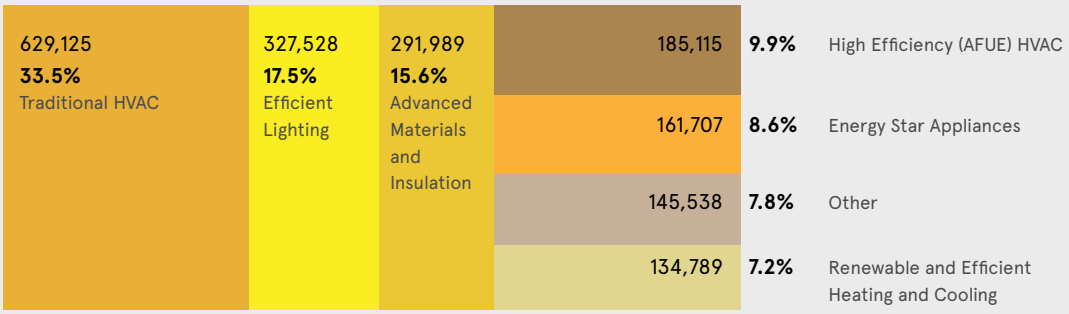


Fig. 1: National Energy Efficiency Employment by Sub Technology, 2015

The majority of energy efficiency firms install or sell energy efficiency systems; about four in 10 establishments are installation firms and an additional quarter of establishments are in trade and distribution. The remainder of business activity is roughly evenly distributed across professional services (11 percent), manufacturing (8 percent), engineering and research (8 percent), and other value chain activities (7 percent).

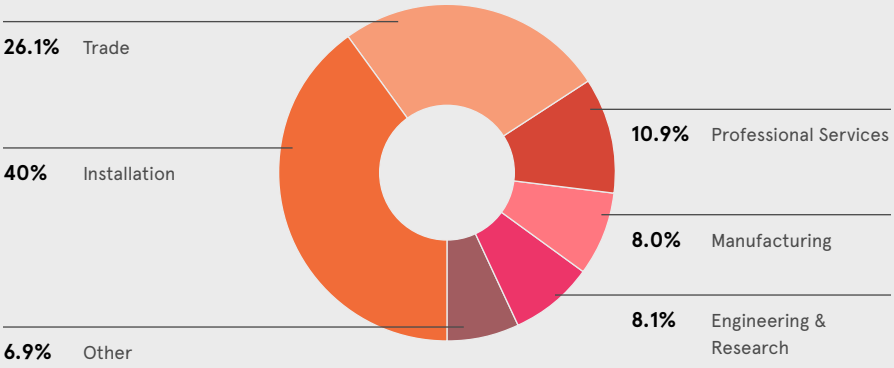


Fig. 2: National Energy Efficiency Establishments by Value Chain, 2015

Quick Facts

165,000
U.S. companies in energy efficiency work

2 out of 3
firms install or sell energy efficiency systems

2 As of 2015, there are a total of 1,880,149 energy efficiency workers across the nation. Of these nearly 1.9 million workers, the research group extrapolated that roughly 889,000 jobs surpass the 50 percent threshold; these employees spend half to all of their time working with energy efficiency technologies. The total job references by sub technology are based on this 50 percent threshold total.

3 Job growth is based on employer reported projections and is not a reflection of historical growth, but rather current market trends.

Firm Size, Revenue, and Hiring Difficulty

The majority of energy efficiency establishments are small businesses. Just over half report one to five employees, and an additional third report six to 24 workers. There is a small proportion of medium-sized establishments, and very few firms with more than 100 employees.

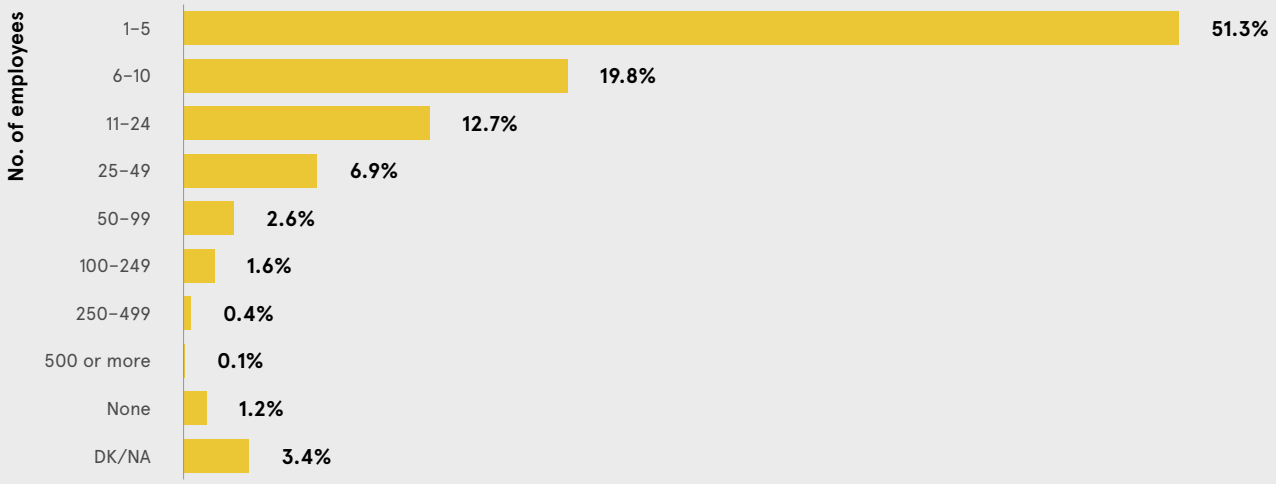


Fig. 3: National Energy Efficiency Firm Size Distribution, 2015

The majority of establishments conducting energy efficiency work attribute at least half their revenue to energy efficiency-related business, and almost one-third report all of their revenue is derived from energy efficiency work, according to our surveys.

Employers report difficulty finding qualified workers to fill their open positions. About three-quarters of employers said hiring was either "very" or "somewhat" difficult in 2015; three in 10 noted that hiring was very difficult.

The most reported reasons for hiring difficulty among energy efficiency employers included insufficient experience, training, or technical skills (35 percent); lack of qualifications, certifications, or education (31 percent); insufficient non-technical skills such as work ethic, dependability, or critical thinking (23 percent); competition or a small applicant pool (16 percent); and difficulty finding industry-specific knowledge and skillsets (16 percent).

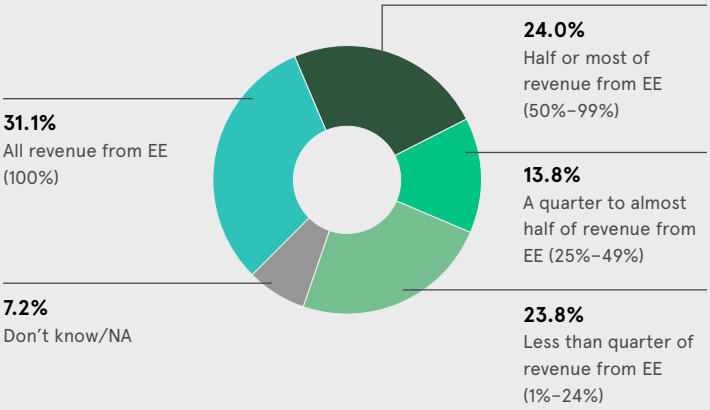


Fig. 4: National Energy Efficiency Revenue, 2015

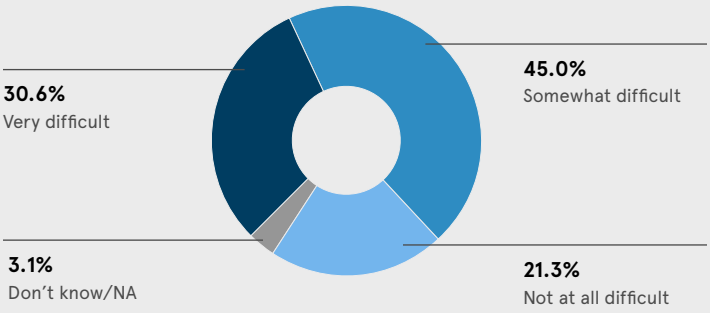


Fig. 5: National Energy Efficiency Hiring Difficulty, 2015

Top 10 States for Energy Efficiency Jobs

Quick Facts

The following states have the highest number of workers who spend some of their work hours on energy efficiency services.

1. California

Long an energy-efficiency leader, California has the largest workforce in the sector by far. Of some 321,000 workers, about half spend their biggest share of time focused on energy efficiency services. Almost three in ten are devoted to supporting traditional heating, ventilating and air conditioning (HVAC) technologies.

321,177
workers in energy efficiency jobs in California

~50%
of EE workers in CA focus on EE services

The remainder of the sector is spread mostly across efficient lighting, ENERGY STAR® appliances, high-efficiency HVAC, and advanced materials and insulation. Fifty-seven percent of firms are installers or distributors, while manufacturing and professional services each represent 16 percent of the value chain. Most of these are small businesses—almost 70 percent have 10 or fewer employees.

The largest share of energy efficiency jobs—46,620—lies within the Los Angeles-Long Beach-Santa Ana metropolitan area, followed by San Francisco-Oakland-Fremont (25,611) and San Diego-Carlsbad-San Marcos (17,869). (For more information on California's energy efficiency economy, please see Page 14)

2. Florida

There are about 106,000 energy efficiency workers across the state of Florida, though only a third (34 percent, or 36,610 workers) actually spend the majority of their labor hours working with energy efficiency technologies. Of these, almost half report that traditional HVAC technologies are their main focus, followed by advanced material and insulation and high efficiency HVAC, which is to be expected given the prevalence of air conditioning across the state.

106,491
energy efficiency jobs in Florida

34%
of EE workers in FL focus on EE services

Apart from other states in the top 10, Florida has a significant cohort of engineering and research firms: They make up a fifth of the activity, second to installation at 45 percent. These are mostly small businesses—61 percent report one to five permanent employees. However, the state has some representation of large firms, with 2 percent reporting 50 to 499 workers. The highest concentration of jobs is in Orange County (4,211).

The state has work to do on the utility front, according to ACEEE: It allocates little funding for either electricity or natural gas efficiency programs. In fact, the Public Service Commission approved requests from utilities in 2014 to decrease the level of energy efficiency offered to customers in the future.

3. Illinois

Almost half (49 percent) of the state's 89,830 energy efficiency workers spend the majority of their time on related business (44,094 employees). Their activity is primarily concentrated among three sub-technologies: traditional HVAC, advanced materials and insulation, and efficient lighting. Illinois is one of the few states to earn a perfect score in the building codes and compliances category of ACEEE's annual ranking, thanks to the work of many successful programs like Retrofit Chicago and the City Energy Project.

As with most other efficiency economies, the majority of firms are engaged in the installation or trade of energy efficient products. The state also has some activity in the manufacturing and professional service sphere. Most of these firms are small, with 63 percent employing fewer than 11 permanent workers, but there are some large firms in the state—about five percent report 100 to 499 employees.

Illinois passed comprehensive energy legislation, The Future Energy Jobs Bill, on November 30 that will increase utility investment in energy efficiency. The Future Energy Jobs Bill was supported by the Illinois Clean Jobs Coalition, which E2 was a member. The bill also fixes the state's broken renewable portfolio standard, and creates a new program job training program that will open up access to the solar economy for millions of low-income families.

Quick Facts

89,830
energy efficiency jobs in Illinois

49%
of EE workers in IL focus on EE services

4. Massachusetts

The only New England state in the top 10 also has the highest percentage of efficiency-focused workers. That's not surprising, given that it consistently sits at or near the top of national policy rankings by the American Council for an Energy-Efficient Economy (ACEEE). Of 82,848 people working in the space, 89 percent spend the majority of their time on energy efficiency.

Smart lighting is the largest chunk of activity, representing 46 percent of the workforce, followed by advanced materials and insulation with about quarter of total employment. Installation firms make up 43 percent of the activity, followed by trade with 26 percent. The state has a mix of small, medium and large companies in the sector: Sixty-five percent of firms have ten or fewer employees, 27 percent have 11 to 49 employees, and four percent have more than 50 permanent workers.

The state continues to build on its progress: Its most recently approved energy savings targets for 2016 through 2018 are the most ambitious in the nation thus far, according to ACEEE.

82,848
energy efficiency jobs in Massachusetts

89%
of EE workers in MA focus on EE services

5. Ohio

Ohio has some long-term uncertainty at play for some of its energy efficiency policies, as the state enacted a two-year freeze on clean energy standards in 2014. The growth in energy efficiency jobs, a total of 78,202 employed in Ohio, despite this freeze, reflects a strong national market for clean energy products and services. About 30 percent of these workers dedicate more time to efficiency than other tasks.

Unfortunately, other clean energy industries haven't fared as well in Ohio. According to Clean Jobs Midwest, the state saw a 56-percent decrease in wind energy jobs in 2015 likely due to the potent combination of the freeze and the current over-regulation of wind turbines.

The majority of Ohio's energy efficiency employees spend most of their time working with traditional HVAC goods and services, followed by advanced materials and insulation and the manufacture of ENERGY STAR® appliances. Installation firms represent 45 percent of the business, trade firms 19 percent. Over three-quarters (78 percent) of these firms are small, reporting fewer than 11 permanent employees, and nearly a third note that all of their revenue comes from this work.

Quick Facts

78,202
energy efficiency jobs in Ohio

30%
of EE workers in OH focus on EE services

6. Texas

About half of the 31,360 energy efficiency-focused workers in Texas are in traditional HVAC technologies, followed by efficient lighting with almost 5,000 workers (16 percent) of total employment. The state's business is more centered on trade (31 percent), along with professional services (20 percent) and installation (19 percent).

Like Florida, Texas has extreme temperatures, which explains in part the high percentage of HVAC workers, and a large population spread across several major cities as well as some of the most rural regions of the United States. Stronger state energy efficiency policies would likely boost the number of energy efficiency jobs across the state.

Small firms dominate the state's sector, with over three-quarters (79 percent) reporting 10 or fewer permanent positions. Fourteen percent of firms report 11 to 99 permanent employees, and 6 percent of firms have 100 workers or more. Texas has yet to realize its potential energy and cost savings, ACEEE has noted in its ranking, where Texas sits at 27th place. The state was the first to implement an energy efficiency resource standard, but targets are very low.

72,783
energy efficiency jobs in Texas

43%
of EE workers in Texas focus on EE services

7. New York

Through its Reforming the Energy Vision program, New York is working to reshape the utility industry and integrate distributed energy resources generated locally. The state has a diverse energy efficiency workforce of 69,704, half of whom work in a range of unclassified sub-technologies, followed by 19 percent in advanced materials and insulation and 17 percent in traditional HVAC.

More than half of these employees (40,786 workers) spend the majority of their time on energy efficiency work. Most of the value chain activity is, like other states, in installation and trade. The firms tend to be small with 56 percent reporting 10 or fewer permanent employees.The state's growth in clean energy jobs is due in no small part to New York's long and continuing tradition of supporting strong clean energy policies. And recently, under Governor Andrew Cuomo, New York has demonstrated national leadership on a wide range of climate and clean energy issues.

Part of New York's success is also its involvement in the nine-state Regional Greenhouse Gas Initiative (RGGI). In addition to helping cut carbon pollution in the power sector much faster than anticipated, RGGI has provided at least $2.9 billion in regional economic growth, $10 billion in health benefits, 30,000 new job-years (a job-year equals one-year of full-time work), and $618 million in energy bill savings for consumers (with $4 billion more in savings expected in the coming years).[4]

Quick Facts

69,704
energy efficiency jobs in New York

58%
of EE workers in NY focus on EE services

8. Georgia

Georgia ranks 35th on ACEEE's scorecard and utilities invest very little in energy efficiency compared to other states. Despite this, about six in 10 energy efficiency workers (60 percent) spend the majority of their time on related business—39,618 out of the total 66,212. One of the main reasons for this disconnect is that the state's hot climate keeps energy bills high. If better policies were in place, there would likely be thousands more energy efficiency jobs in Georgia.

The state's energy efficiency economy has a fairly even split among sub-technologies, with traditional HVAC, advanced materials and insulation, and high-efficiency HVAC accounting for the majority of activity.

Just over two-thirds of firms—mostly small to mid-size employers with fewer than 100 workers—are focused on installation and trade. Almost half depend on energy efficiency for all of their revenue.

66,212
energy efficiency jobs in Georgia

~60%
of EE workers in GA focus on EE services

4 *https://www.nrdc.org/experts/jackson-morris/rggi-states-poised-triple-down-climate-progress*

9. Virginia

Virginia is home to a total of 61,397 energy efficiency workers, and 37,882—or 62 percent—spend the majority of their time working with energy efficient technologies. Forty-three percent of workers are primarily focused on efficient lighting technologies, followed by renewable and efficient heating and cooling. Virginia earns low marks from ACEEE in terms of policies and utility spending to boost energy efficiency, suggesting the state is only scratching the surface of its potential when it comes to clean energy jobs.

Installation (39 percent), professional services (17 percent) and trade (17 percent) dominate the industry activity among a pool of mostly small businesses (63 percent have five or fewer employees). Among counties, Fairfax has the highest concentration of efficiency jobs at more than 6,000.

Quick Facts

61,397
energy efficiency jobs in Virginia

62%
of EE workers in VA focus on EE services

10. Pennsylvania

Like New York, Pennsylvania has a significant range of energy efficiency businesses, with more than half classified as "other" followed by advanced materials and insulation (21 percent) and traditional HVAC (16 percent).

The state has a wide spread of value chain activities, with installation representing 31 percent of firms, trade representing 23 percent of firms, and engineering and research representing 20 percent of firms. There is also some activity across professional services and manufacturing.

In Pennsylvania, legislators can help grow the energy efficiency workforce by strengthening and extending Act 129, the state's energy efficiency law. Additionally, a bill in the state legislature would allow counties and municipalities to create bonds for PACE (Property Assessed Clean Energy) for commercial and industrial properties, providing for an innovative financing mechanism to help fund energy efficiency projects. The broad-ranging benefits of stronger efficiency are more immediate for low-income households, which spend a greater share of their income on energy than those in higher brackets.

53,175
energy efficiency workers in Pennsylvania

31%
of Pennsylvania EE firms focus on installation

Taitem Engineering/Ithaca, New York *Company Profile*

What's in a name? When it comes to Taitem Engineering, quite a lot. In fact, its entire business philosophy is encompassed in the acronym: Technology As If The Earth Mattered

NOW BASED IN ITHACA, Taitem began in Syracuse in 1989 primarily as a consulting engineering business concentrating on sustainable design. Founder and chairman Ian Shapiro started the company out of his house.

In the last 25 years, Taitem has expanded beyond mechanical, electrical, plumbing, and structural design. It now offers energy-related services including energy audits, energy modeling, LEED consulting, and commissioning. In the last five years, the company branched out to offer contracting services for solar photovoltaic installation and Aeroseal duct sealing, resulting in rapid growth.

Shapiro literally wrote the book on topics like these, co-authoring Green Building Illustrated and, more recently, Energy Audits and Improvements for Commercial Buildings, due to hit the shelves in April 2016, for which he is the sole author.

The company has over 45 employees, including nine licensed professional engineers, and it continues to grow, said Taitem's Marketing Manager, Theresa Ryan.

The company's contracting work ranges from a 46-kilowatt solar array at the Ulysses Philomathic Library in Trumansburg, New York, to sealing ducts in commercial and multifamily buildings in New York City.

Taitem is pursuing the expanding duct sealing market. Taitem's team of consultants and trained technicians evaluate ventilation systems to determine issues and possible solutions, which include Aeroseal duct sealing. When duct leakage is identified, Taitem seals air leaks up to 5/8 inches in diameter from the inside using a polymer sealant. Duct sealing results in energy savings, improved building performance, and improved indoor air quality.

For example, Cornell University wanted to install new ventilation controls in its century-old Baker Laboratory. But Cornell found that the ductwork was honeycombed with leaks. Taitem's efforts to seal the ductwork resulted in an 89-percent reduction in duct leakage. This, along with other improvements to the system, will save the institution a projected $200,000 annually.

Taitem also reduced leakage in a new 34-story, multi-family building in Manhattan. Even after the contractors' high-quality workmanship, the 389-apartment building was still losing 14 percent of air flow through its ducts. After Taitem treated the building, leakage was reduced to less than 1 percent, saving an estimated $7,300 annually and leading to a project payback of less than seven years.

–Environmental Entrepreneurs

Note: This company profile originally appeared in the May 2016 report "Clean Jobs New York".

Taitem's employees work on a range of clean energy technologies — including renewable energy and energy efficiency. (Photo courtesy of Taitem)

California: A Leader in Energy Efficiency

With a history of strong energy efficiency policy dating back to the 1970s, California continues to lead the country by evolving its standards for appliances, buildings, transportation and other sectors. It supports a workforce of 321,127 people, many of them installers or distributors of efficient lighting, ENERGY STAR® appliances, high-efficiency HVAC, and other energy-saving improvements.

This commitment to energy efficiency has saved the state's consumers billions of dollars. Californians' monthly electric bills have only gone up $4.25 since 1990, according to an NRDC analysis, while in Wyoming, which has invested very little in energy efficiency, the increase is more than $16 (numbers adjusted for inflation). Thanks to its energy efficiency efforts, the state's consumption of electricity has grown about 1 percent annually, according to the California Energy Commission, while natural gas consumption has remained nearly flat.[5]

Along with Massachusetts, California ranked first in ACEEE's 2016 national survey for the first time since 2010. The state received a perfect score in building codes, combined heat and power, state-led initiatives, appliance standards, and transportation. It's now poised to go even further, having passed aggressive legislation aimed at doubling the state's energy efficiency savings by 2030 and increasing access to energy use data. Utility energy efficiency programs also play a major role in California's energy efficiency economy.

The state has much more it can do to build on its progress and meet its new goals, including work on existing buildings and removing overly complex restrictions on what savings are considered cost-effective. All of the work toward California's next wave of energy efficiency stands to bolster a thriving industry and add more jobs in the sector.

Quick Facts

70%

of energy efficiency establishments in California are small businesses, mirroring a national trend

"California has a proud history of energy efficiency success."

– E2's and NRDC's Aug. 2015 report "California's Golden Energy Efficiency Opportunity"

5 *http://www.energy.ca.gov/renewables/tracking_progress/documents/energy_efficiency.pdf*

Carbon Lighthouse/San Francisco *Company Profile*

California company illuminates building efficiency

Carbon Lighthouse employs 34 people who work on energy efficiency projects in the Western U.S. (E2 photo)

THE FLOOD BUILDING is a historic midrise office building in downtown San Francisco. One of only two San Francisco buildings to survive both the 1906 and 1989 earthquakes, the building's tenants include the Gap, Anthropologie, a private investigator, law firms, and the consulate of Nicaragua.

Located near a cable-car turnaround, the building has an ornate sandstone exterior and marble walls, hallways, and staircases.

After undergoing extensive renovations about 15 years ago, the building was awarded an Energy Star rating of 100 from the U.S. Environmental Protection Agency, meaning that out of 100 similar buildings in size and climate zone, the Flood Building was the most energy efficient.

That wasn't good enough for San Francisco-based energy efficiency company Carbon Lighthouse, which now employs 34 people.

According to Brenden Millstein, Carbon Lighthouse's CEO and an E2 member, there were untapped energy savings locked within the Flood Building. He set out to mine those savings, increasing the bottom line for the building's owner and, in the process, cutting greenhouse gas emissions.

Carbon Lighthouse's energy engineers went to work. They spent a few days on site placing sensors about half the size of an iPhone throughout the building. In place for a few weeks, these devices collected millions of data points, helping to construct a detailed profile of the building's energy use—its temperature, its lighting patterns, and its occupancy levels.

"We are always swimming in data," Millstein said, "and the sea of otherwise-unknown information helps us make more informed decisions about building operations and control that results in 20–30-percent, whole-building energy savings."

Using proprietary software, Carbon Lighthouse analyzed this data, identifying ways to make the Flood Building more efficient. For example, the data uncovered savings in optimizing how 15- and 30-horsepower motors pump hot and cold water through a network of pipes and heat exchangers to keep the building's temperature pleasant. Carbon Lighthouse discovered that by changing the way this water circulates, it could eliminate about 60-horsepower worth of waste energy 95 percent of the year—without sacrificing tenant comfort.

By making this and other energy-saving changes, Millstein said the Flood Building's owners can expect to save $1.2 million in total energy expenses over the next 12–15 years, easily paying back the cost of the retrofit and in the process reducing the building's carbon footprint.

500
completed projects by Carbon Lighthouse

The Flood Building is one of about 500 efficiency projects Carbon Lighthouse has successfully completed on the West Coast. Other projects include a 55,000-square-foot high school that's saving $22,500 in utility bills annually; a 35,000-square-foot office in Mountain View, Calif., that will save building owners about $147,000 over the next 10 years; a guitar pick manufacturer whose pressurized air equipment is operating better thanks to an efficiency retrofit; and buildings at Stanford University and Tesla Motors.

Clients like these have averaged savings up to 15 percent higher than Carbon Lighthouse's conservative initial estimates. With a business model built upon referrals, Carbon Lighthouse's project portfolio is growing, and the business has doubled revenue every year for the past six years and expects to triple revenue and quintuple impact next year.

Carbon Lighthouse was founded in 2009 by Millstein and Raphael Rosen, Millstein's lab partner at Harvard University and a close friend since kindergarten.

"He was the only one who could beat me at Minute Math," Millstein joked.

While Millstein and Rosen set out to start a successful business, Carbon Lighthouse has always had a purpose greater than just making money. Millstein said his company's mission is to stop climate change, and to help the world reach zero emissions by 2050.

Millstein said that as far as he's concerned, the success of his business is measured in reduction of carbon pollution. And by that measure, Carbon Lighthouse has been very successful.

In its hundreds of projects, Carbon Lighthouse has cut carbon pollution by more than 84,000 tons.

–Environmental Entrepreneurs

Note: This report originally appeared on the E2 website Clean Energy Works for Us. It was updated in November 2016.

Energy Efficiency in Low-Income Housing

Quick Facts

The broad-ranging benefits of stronger efficiency are more immediate for low-income households, which spend a greater share of their income on energy than those in higher brackets.

This energy burden hits low-income consumers not just because the costs assume a bigger fraction of what they have to spend, but because they are often living in places that are plagued by inefficiencies such as poor insulation and old appliances.

Some households are spending as much as 25 percent of their income on energy, according to a study from Energy Efficiency for All and ACEEE, with cities including Memphis, New Orleans, Birmingham, Atlanta and Philadelphia seeing the heaviest burdens on low-income residents. That leaves people making choices between keeping the lights on and food or medicine, which can cause harmful secondary effects on their health and safety.

Investing in energy efficiency can produce real results. In California alone, efficiency programs for low-income customers have benefited almost 3 million households since 2003, saving enough electricity to power 90,000 homes for one year.

Multifamily buildings are another often-missed opportunity. Many utilities have realized success with programs and there are models that work.: The group Energy Efficiency for All (EEFA) notes that more than half of affordable apartments were built more than 50 years ago, and they are home to some 10 million people. EEFA estimates that retrofits to a low income home could reduce the energy burden for that home by up to 30 percent.[6]

~30%

possible reduction in energy burden on a low-income home by retrofitting

California recently addressed that gap by approving changes to its Energy Savings Assistance program that will extend efficiency improvements to rent-subsidized multifamily homes.[7] It allocated $80 million toward energy-saving measures such as central water heaters and common area lighting. And Energy Outreach Colorado, a state-created independent nonprofit, has weatherized 35,000 affordable-housing apartments since it was established in 1989.[8]

Retrofits, appliance swaps, and lighting upgrades are among the range of needs the U.S. energy efficiency industry is meeting, creating clean energy jobs along the way.

6 *http://energyefficiencyforall.org/potential-energy-savings*

7 *https://www.nrdc.org/experts/maria-stamas/cpuc-adopts-major-improvements-low-income-efficiency-program*

8 *https://www.epa.gov/sites/production/files/2016-06/documents/energy_outreach_colorado_case_study_6-1-16_508.pdf*

Energy Optimizers USA/Tipp City, Ohio *Company Profile*

Creating good jobs by saving Ohioans money on electric bills

AT GREG SMITH'S energy efficiency company in Tipp City, there's a jobs boom underway.

"We've gone from one employee less than seven years ago—me—to 20 employees," Smith said. At schools and other government buildings, workers from Smith's business, Energy Optimizers, USA conduct comprehensive building energy-efficiency retrofits. They install new temperature control systems, upgrade lighting and HVAC systems, arrange power-purchase agreements with solar energy companies, etc.

Clients quickly realize financial benefits from these types of projects. In South-Central Ohio, for example, an $870,000 project at the Jackson City School District—which teaches 2,500 students at five schools—Energy Optimizers retrofits were expected to lower a $1 million energy bill by close to $140,000 annually. But savings ended up being much higher than that—almost $400,000 was saved after one year.

"If we can save a teacher's salary or two by doing this, it makes sense," Phil Howard, the district's superintendent said, before the full savings from the retrofits were known.

Other successful projects Energy Optimizers has completed include: lighting retrofits at Liberty Tower in downtown Dayton, the Dayton Children's Hospital, and Aptalis Pharmaceuticals, and energy efficiency upgrades at Miami (Ohio) University and buildings owned by the City of Dayton.

Smart, state-level policies have helped Ohio's economy become more energy efficient and create jobs. Smith said an efficiency standard requiring Ohio's electric utilities to help customers save energy has been particularly helpful. The utilities offer incentives to "buy down" the cost of efficiency upgrades.

"The rebates are driving projects," said Smith, who got his start in energy efficiency while working at Trane, the heating, ventilation, and air-conditioning industry giant.

In addition to utility incentives, Smith has a tight business model. He guarantees buildings his company retrofits will hit projected energy savings—or Smith sends a check for the difference.

Energy Optimizers USA has experienced rapid job growth over the past few years and has helped school districts and businesses save hundreds of thousands of dollars on annual energy bills. (E2 photo)

Politically, Smith identifies himself as a conservative.

"This is not what people think about when they think about conservatives," he said. "But I think energy efficiency and renewable energy are important for conservatives and independents to take note of."

Smith said promoting energy efficiency and renewable energy through legislation like Ohio's Energy Efficiency Portfolio Standard is in the country's best interest, but that legislation was frozen in 2014, forcing renewable energy and energy efficiency companies to re-think Ohio investments.

In addition to ramping up the RPS in Ohio, Smith said strong implementation of the federal Clean Power Plan in Ohio and other Midwestern states is crucial to sending a strong, clear market signal that will attract innovative, growing companies – and their jobs.

"In my mind, this is the next Industrial Revolution," Smith said.

–Environmental Entrepreneurs

Note: This case study originally appeared in the 2015 report "Clean Jobs Ohio."

Cities are Energy Efficiency Job Leaders

From San Jose, Calif., and Fort Collins, Colo., to Des Moines, Iowa, and Pittsburgh, Pa., cities across the country are leading the way when it comes to energy efficiency. In the process, they're creating jobs in the urban and nearby suburban areas where more than 80 percent of the U.S. population now lives.

If U.S. buildings were their own country, they would rank third in the world in energy use. They account for as much as 60 percent to 80 percent of carbon pollution in urban communities.

One initiative helping drive economic growth in urban areas is the City Energy Project (www.cityenergyproject.org), which provides capacity, resources and expertise to local governments in 20 cities nationwide, and also engages private building owners, local nonprofits, businesses, and many other stakeholders to save money and energy in large buildings, helping to boost the local economy and cut carbon pollution.

When the policies and programs advocated by the City Energy Project are fully implemented in its targeted cities, the City Energy Project will help save nearly $1.7 billion in energy costs and avoid 9.6 million metric tons of carbon.

On the energy efficiency jobs front, urban areas are major centers for employment.

Quick Facts

60–80%

of carbon pollution in U.S. cities comes from buildings

$1.7B

estimated savings in energy costs with implementation of City Energy Project programs in 20 cities nationwide

Conclusion

Nearly 1.9 million Americans work in energy efficiency related jobs. Of these, roughly half—or 889,000—spend the majority of their time working on energy efficiency projects.

In fact, employers across the roughly 165,000 establishments that conduct energy efficiency work are optimistic about business growth, projecting a 13 percent employment growth rate over the current year.

Energy efficiency establishments consist mostly of small businesses located across all 50 states. They are creating jobs, expanding the economy by lowering electric bills, and cutting the carbon pollution fueling climate change.

Conclusion (continued)

Major economic opportunities remain in the fast-growing sector. To create even more jobs, lawmakers and elected officials should take the following steps:

- Advancing energy efficiency standards set by the U.S. Department of Energy for appliances and equipment.
- Strengthening building codes at the state and local levels to capture all cost-effective energy efficiency opportunities at the time of design and construction.
- Accelerating energy efficiency improvements in devices and buildings that use electricity or natural gas through utility programs, state policies such as energy efficiency resource standards, or by investing in all cost-effective energy efficiency resources.
- States should prioritize the role of energy efficiency in developing and/or strengthening clean energy standards.

About BW Research Energy Employment Index

The BW Research Energy Employment Index (the "Index") methodology relies on the most recently available data from the Bureau of Labor Statistics Quarterly Census of Employment and Wages (QCEW, Quarter 2), together with a detailed survey of business establishments across the United States. Taken together, the data provide the most comprehensive calculation of energy-related employment available. The methodology has been used for local, state, and federal energy related data collection and analysis for nearly a decade, including The Solar Foundation's National Solar Jobs Census series, clean energy reports for state agencies in the Commonwealth of Massachusetts, State of Vermont, and State of Rhode Island, and numerous non-profit agencies across the U.S.

The Index survey uses a stratified sampling plan that is representative by industry code (NAICS or ANAICS), establishment size, and geography. These data are then analyzed and applied to existing public data published by the Bureau of Labor Statistics, effectively constraining the potential universe of energy establishments and employment. BW Research Partnership believes that the methodology used for the Index could be adopted as a supplemental series to the QCEW with only minor revision.

The Index survey was administered by telephone (more than 300,000 outbound calls) and by web, with more than 50,000 emails sent to participants throughout the U.S. The phone survey was conducted by I/H/R Research Group and Castelton Polling Institute. The web instrument was programmed internally and each respondent was required to use a unique ID in order to prevent duplication.

The sample was split into two categories, referred to as the known and unknown universes. The known universe includes establishments that have previously identified as energy-related, either in prior research or some other manner, such as membership in an industry association or participation in government programs.

These establishments were surveyed census style, and their associated establishment and employment totals were removed from the unknown universe for both sampling and for resulting employment calculations and estimates.

The unknown universe includes hundreds of thousands of businesses in potentially energy-related NAICS codes, across agriculture, mining, utilities, construction, manufacturing, wholesale trade, professional services, and repair and maintenance. Each of these segments and their total reported establishments (within the Bureau of Labor Statistics QCEW) were carefully analyzed by state to develop representative clusters for sampling. In total, approximately 20,000 business establishments participated in the survey effort, with more than 8,500 providing full responses to the survey. These responses were used to develop incidence rates among industries (by state) as well as to apportion employment across various industry categories in ways currently not provided by state and federal labor market information agencies.

For several industries, particularly transportation of goods, the Index utilized the methodology developed by the Department of Energy and the National Renewable Energy Laboratory for the Quadrennial Energy Review (QER). This methodology applies commodity flow data at the state level to employment within each transportation segment, including rail, air, truck, and water transport.

Of important note, the Index expressly excludes any employment in retail trade NAICS codes. This excludes gasoline stations, fuel dealers, appliance and hardware stores and other retail establishments. All data in the index rely on the Bureau of Labor Statistics Quarterly Census of Employment and Wages data for the second quarter of 2015. The survey was administered between September 15, 2015 and November 24, 2015 and averaged 14 minutes in length.

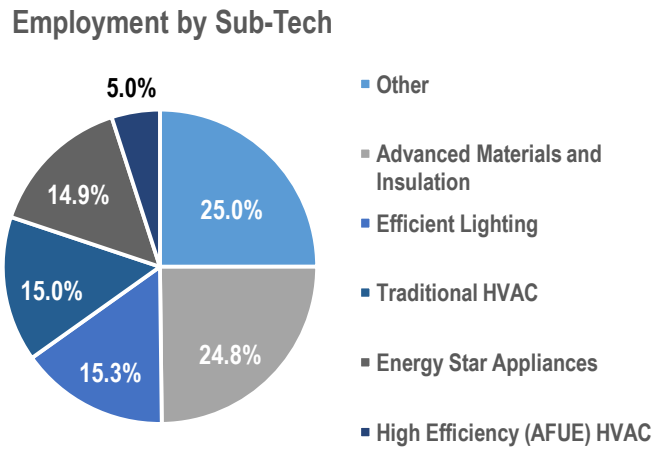
Appendix

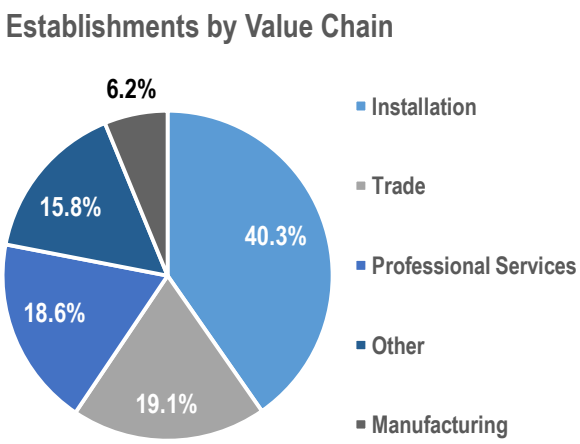
The Appendix consists of energy efficiency employment fact sheets for all 50 states.

The fact sheets include: charts and a "heat map" showing the top counties for energy efficiency jobs in each state; a breakdown of energy efficiency jobs by metropolitan area; technology and value chain breakdowns and state rankings from the American Council for an Energy-Efficient Economy's (ACEEE's) "2016 State Energy Efficiency Scorecard."

Alaska – 8,194 jobs

More than 8,100 Alaskans work in energy efficiency related jobs, with the bulk working in advanced materials and insulation, HVAC system, lighting and other occupations.





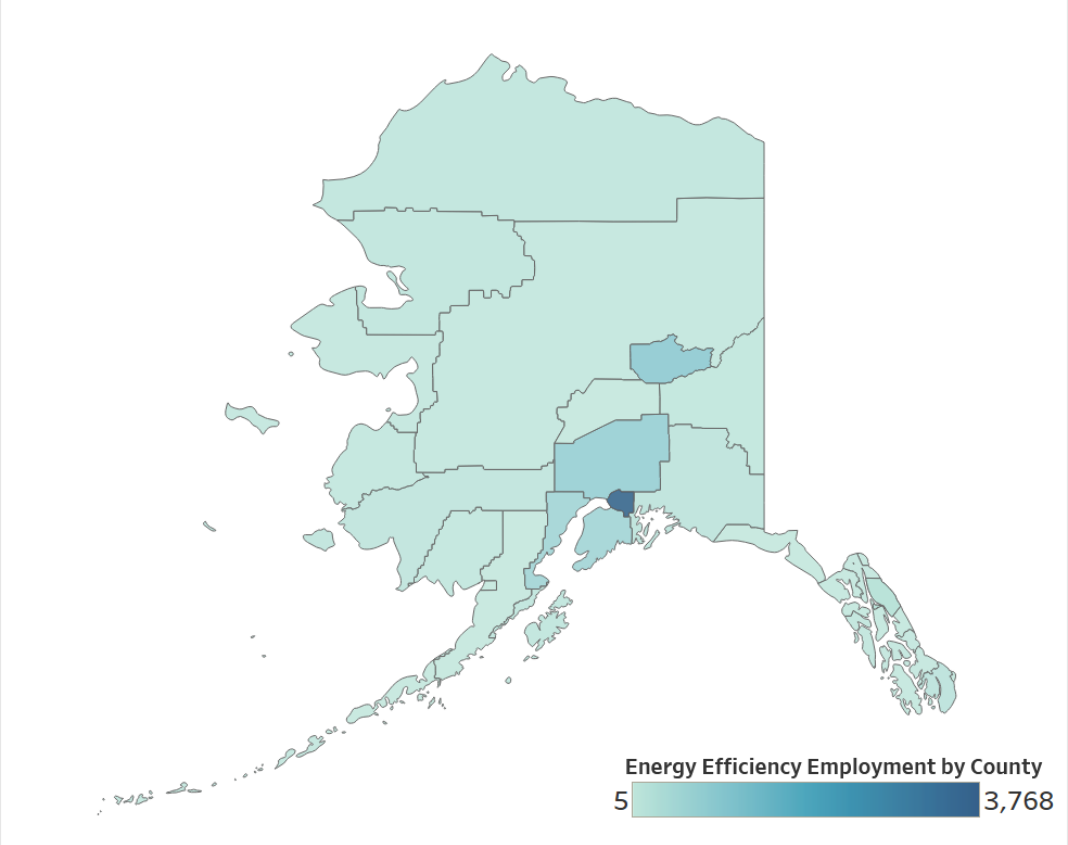
The state's energy efficiency economy is mostly comprised of installation and trade firms; these two value chain activities account for 59 percent of establishments collectively. The remainder of energy efficiency work is spread across professional services, manufacturing and other occupations.

In 2016, the American Council for an Energy-Efficient Economy (ACEEE) ranked Alaska 41st in the nation for energy efficiency policies and programs—a step up from the state's 2015 rank. The state received its lowest scores in utilities and appliance standards, though lack of utility participation is the main reason for the state's low ranking. With some of the lowest budgets for electricity programs in the country, customers lack access to a number of energy efficiency programs and services.

County	Energy Efficiency Employment
Anchorage Borough	3,768
Fairbanks North Star Borough	991
Matanuska-Susitna Borough	814
Kenai Peninsula Borough	622

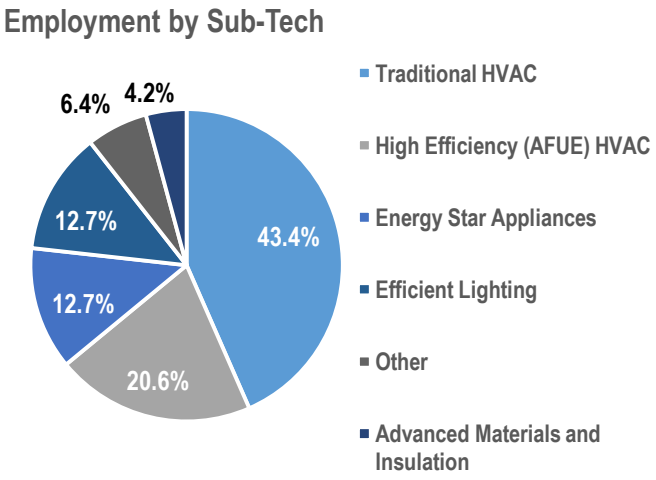
Juneau Borough	349
Ketchikan Gateway Borough	177
Valdez-Cordova Census Area	152
Bethel Census Area	116
North Slope Borough	111
Northwest Arctic Borough	111

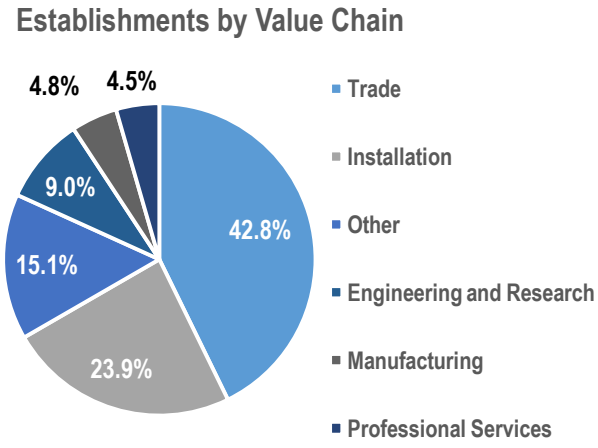
MSA	Energy Efficiency Employment
AK NONMETROPOLITAN AREA	2,603
Anchorage, AK MSA	4,610
Fairbanks, AK MSA	981



Alabama – 19,058 jobs

About 19,000 Alabama residents work in energy efficiency-related jobs. Four in ten workers spend most of their time on traditional HVAC technologies, followed by high efficiency HVAC (21 percent).





Unlike other states, Alabama's energy efficiency sector is primarily engaged in wholesale trade. 43 percent of establishments report their primary value chain activity is in trade, followed by installation at 24 percent. These firms are primarily small businesses, with 70 percent employing fewer than six workers and the remaining 30 percent reporting six to 24 employees. Surprisingly, energy efficiency provides a fair amount of revenue support to these firms—64 percent report that they derive at least half of their revenue from working with these technologies, and 32 percent derive all of their revenue from energy efficiency goods and services.

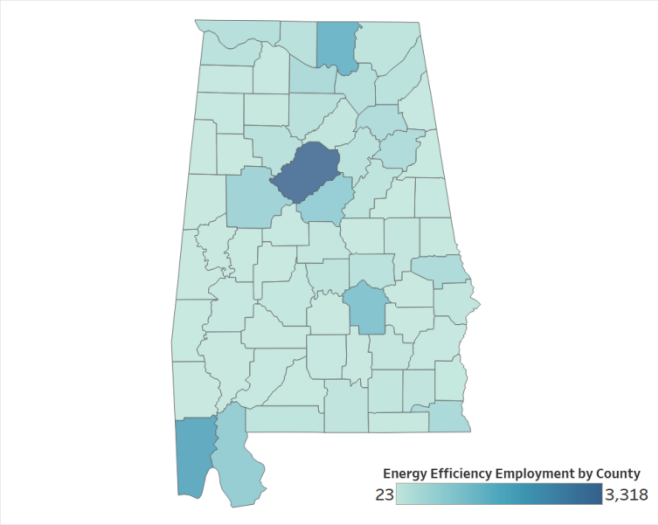
Alabama ranked 39th in the nation on ACEEE's 2016 State Energy Efficiency Scorecard; the state rose two positions compared to its 2015 ranking. The state recently updated their building energy codes based on the 2015 IECC and offers loan and rebates programs to consumers.

County	Energy Efficiency Employment
Jefferson County	3,318
Mobile County	1,939

Madison County	1,575
Montgomery County	1,212
Baldwin County	895
Shelby County	880
Tuscaloosa County	713
Houston County	516
Morgan County	490
Lee County	475

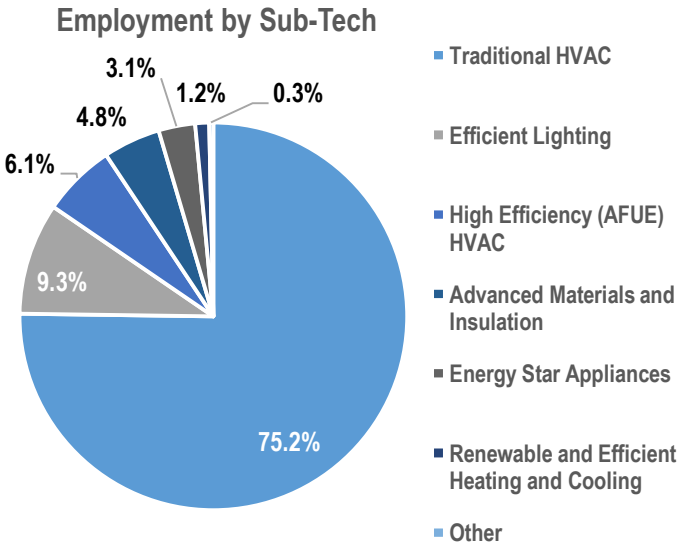
MSA	Energy Efficiency Employment
AL NONMETROPOLITAN AREA	4,445
Birmingham-Hoover, AL MSA	5,102
Mobile, AL MSA	1,939

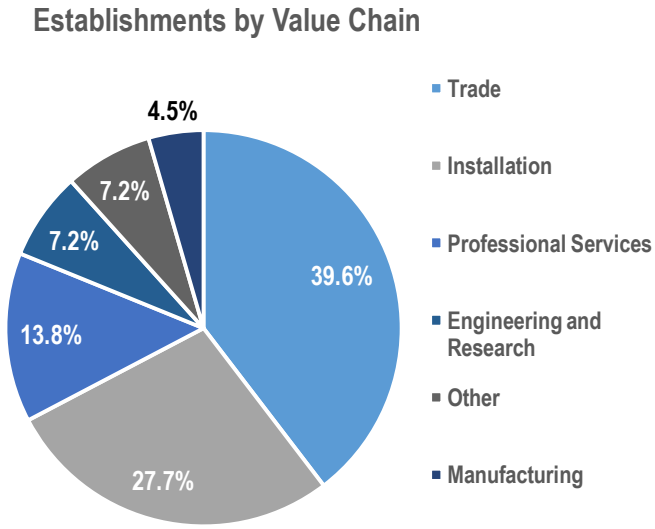
Congressional District	Energy Efficiency Employment
1	3,274
2	3,211
3	2,468
4	2,646
5	2,684
6	3,466
7	1,309



Arkansas – 10,562 jobs

About 10,500 Arkansas residents work in energy efficiency related jobs. About three-quarters of these workers primarily work with traditional HVAC technologies.





40 percent of the state's energy efficiency firms report they are primarily involved in wholesale trade, followed by 28 percent for installation. The state's energy efficiency economy is primarily comprised of small businesses—60 percent report fewer than 11 permanent workers. Energy efficiency activities are not yet sufficient to support major revenue streams for these businesses—only 10 percent derive all of their business revenue from energy efficiency goods and services.

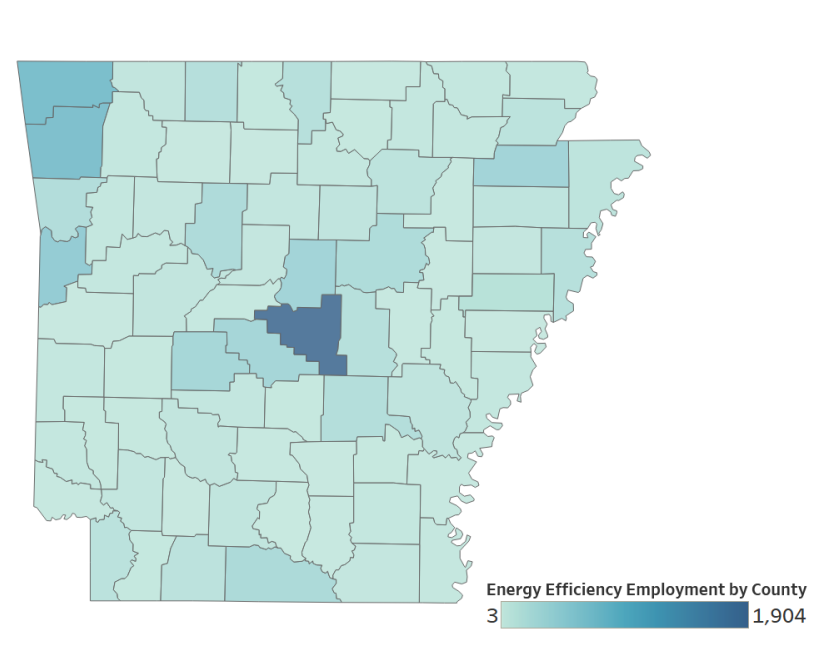
Arkansas ranks 27th in the nation for energy efficiency policies and programs, four places higher than in 2015. The state's strongest area is in utilities, as it is one of the only states in the Southeast to approve an energy efficiency resource standard. With these programs in place, the state has continued to see an increase in annual electricity savings (ACEEE).

County	Energy Efficiency Employment
Pulaski County	1,904
Benton County	785
Washington County	753

Sebastian County	532
Faulkner County	388
Craighead County	377
Saline County	351
Garland County	336
Union County	282
Pope County	265

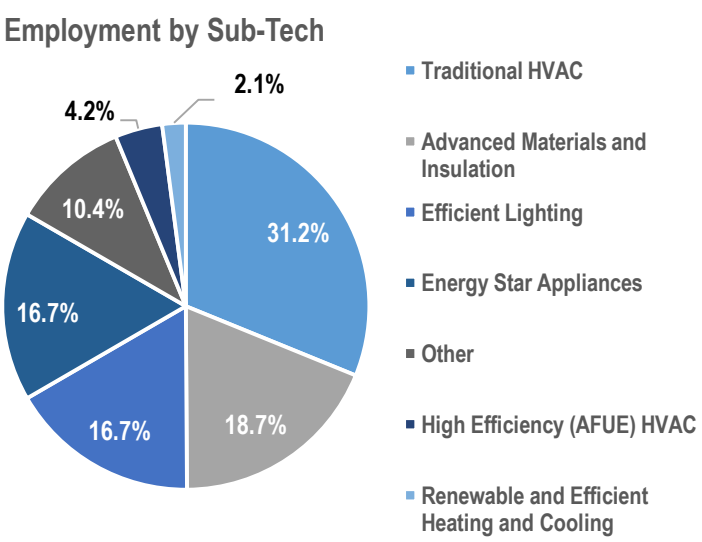
MSA	Energy Efficiency Employment
AR NONMETROPOLITAN AREA	3,897
Little Rock-North Little Rock-Conway, AR MSA	2,853
Fayetteville-Springdale-Rogers, AR-MO MSA	1,587

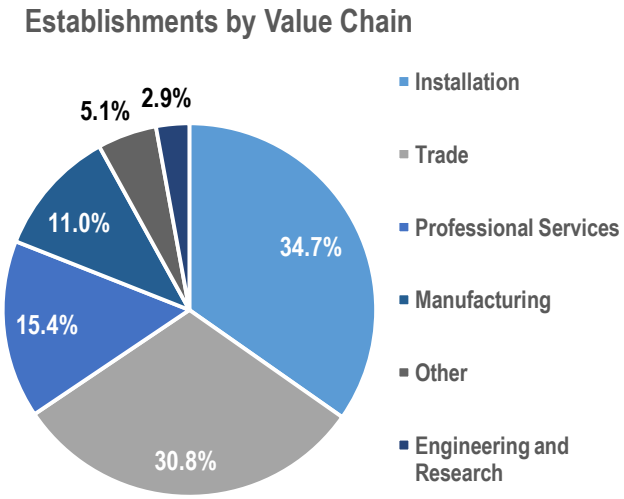
Congressional District	Energy Efficiency Employment
1	2,782
2	2,843
3	2,889
4	2,048



Arizona – 39,490 jobs

About 39,500 Arizona residents work in energy efficiency related jobs. About a third spend most of their time working with traditional HVAC technologies, followed by a fairly even split between advanced materials and insulation, efficient lighting, and energy star appliances.





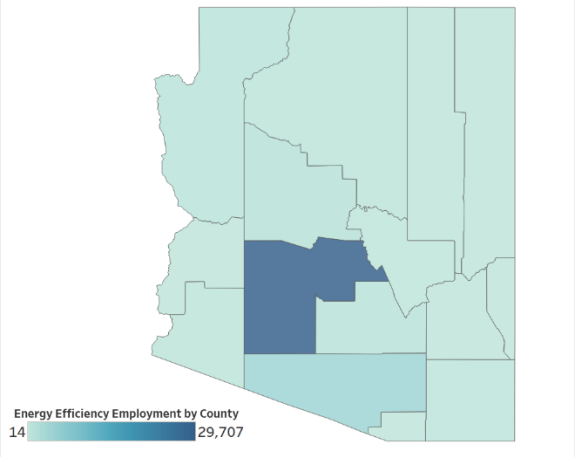
About two-thirds of firms report they are primarily involved in installation and trade, followed by slight representation across professional services and manufacturing. The state's energy efficiency economy is overwhelmingly comprised of small businesses—84 percent report one to five permanent workers. With supportive policies in place, businesses are able to derive most, if not all, of their revenue from energy efficiency goods and services (64 percent).

Arizona is ranked as 18th in the nation for energy efficiency policies and programs. It received the highest score in utilities, due to aggressive savings targets in its energy efficiency resource standard for both electricity and natural gas (ACEEE).

County	Energy Efficiency Employment
Maricopa County	29,707
Pima County	4,265
Yavapai County	1,153
Pinal County	993
Mohave County	836
Coconino County	610
Yuma County	602
Cochise County	429
Navajo County	312
Gila County	181

MSA	Energy Efficiency Employment
Phoenix-Mesa-Scottsdale, AZ MSA	30,700
Tucson, AZ MSA	4,260
AZ NONMETROPOLITAN AREA	1,329

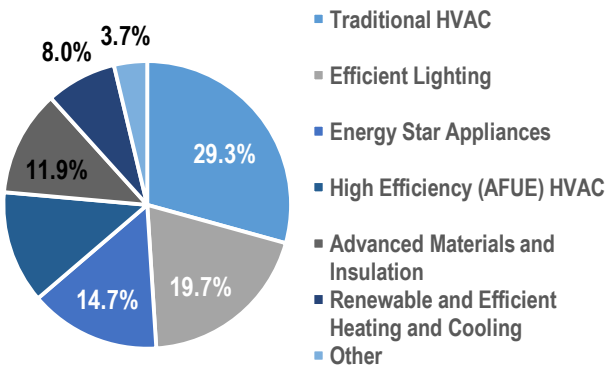
Congressional District	Energy Efficiency Employment
1	3,920
2	6,232
3	1,959
4	3,358
5	4,901
6	7,978
7	8,609
8	1,680
9	854



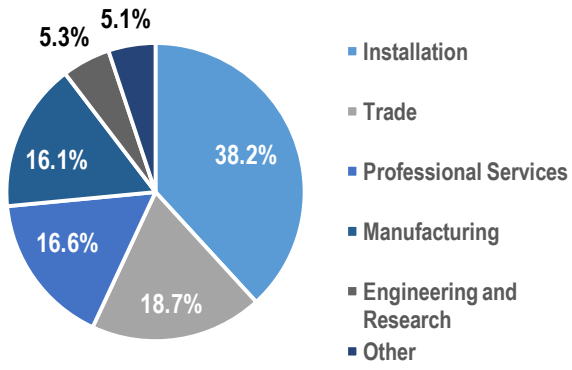
California – 321,177 jobs

As a result of its aggressive energy efficiency standards, California is home to about 321,000 energy efficiency related jobs - more than any other state. Almost three in ten energy efficiency workers are primarily devoted to supporting traditional HVAC technologies, but most of the remainder of the sector is spread across efficient lighting, energy star appliances, high efficiency HVAC, and advanced materials and insulation.

Employment by Sub-Tech



Establishments by Value Chain



The state's energy efficiency economy is comprised largely of installation and trade firms, with these two value chain activities accounting for 57 percent of establishments. There is also significant representation across professional service and manufacturing firms. Most of these are small businesses—almost seven in ten report 10 or fewer employees.

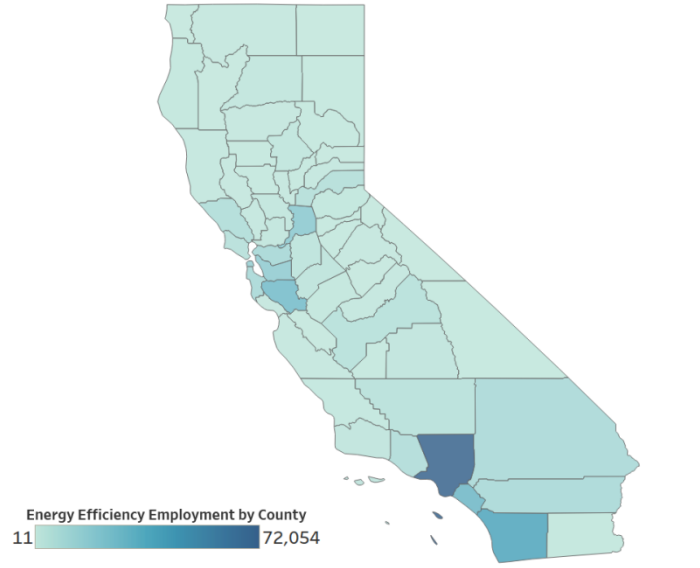
California is ranked No. 1 in the nation for energy efficiency, by ACEEE in 2016, surpassing long-time leader Massachusetts . The state received a perfect score in transportation, building codes, combined heat and power, state-led initiatives, and appliance standards. California has been particularly aggressive in 2016—the state passed legislation that will double energy efficiency savings by 2030 and increase access to energy-use data (ACEEE).

County	Energy Efficiency Employment
Los Angeles County	72,054
San Diego County	38,388
Orange County	28,120

Santa Clara County	25,943
Sacramento County	18,398
Alameda County	16,541
San Francisco County	14,025
Contra Costa County	9,947
San Mateo County	9,004
Riverside County	8,750

MSA	Energy Efficiency Employment
Los Angeles-Long Beach-Santa Ana, CA MSA	94,273
San Francisco-Oakland-Fremont, CA MSA	51,790
San Diego-Carlsbad-San Marcos, CA MSA	36,134

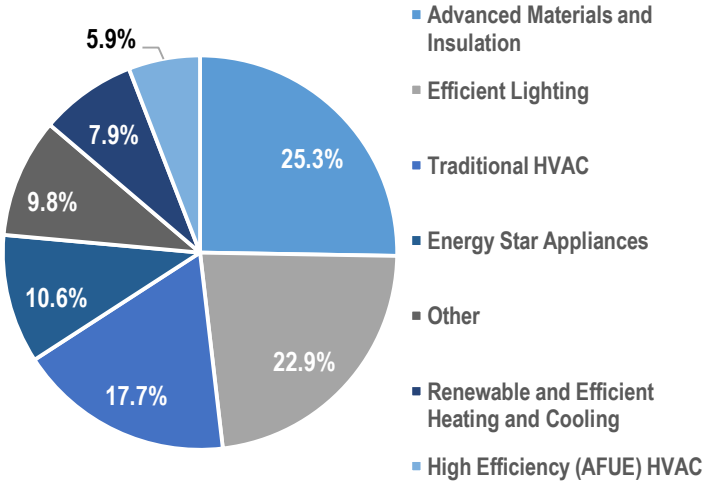
Congressional District	Energy Efficiency Employment	Congressional District	Energy Efficiency Employment
1	14,989	28	8,991
2	12,087	29	3,673
3	11,681	30	6,798
4	9,633	31	6,139
5	9,011	32	10,796
6	8,099	33	6,180
7	5,725	34	5,135
8	5,573	35	6,605
9	5,906	36	9,031
10	7,822	37	8,218
11	5,320	38	9,765
12	4,929	39	9,974
13	6,630	40	14,549
14	4,697	41	15,899
15	3,858	42	859
16	4,183	43	10,358
17	3,380	44	1,003
18	2,946	45	4,155
19	4,118	46	3,178
20	2,584	47	4,548
21	2,425	48	5,422
22	2,331	49	1,751
23	6,594	50	3,198
24	1,505	51	2,170
25	2,169	52	3,198
26	3,055	53	3,665
27	4,670		



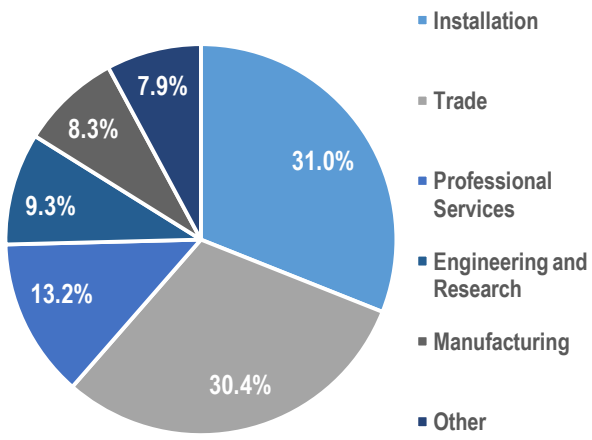
Colorado – 40,335 jobs

Colorado is home to a total of 40,335 workers in energy efficiency related jobs. The state's energy efficiency economy is quite diverse, with about a quarter of the EE workforce specializing in advanced materials and and another quarter specializing in energy-efficient lighting,, followed by traditional HVAC and energy star appliances; there is also small representation across renewable and efficient heating and cooling and high efficiency HVAC technologies—roughly 3,000 workers total.

Employment by Sub-Tech



Establishments by Value Chain



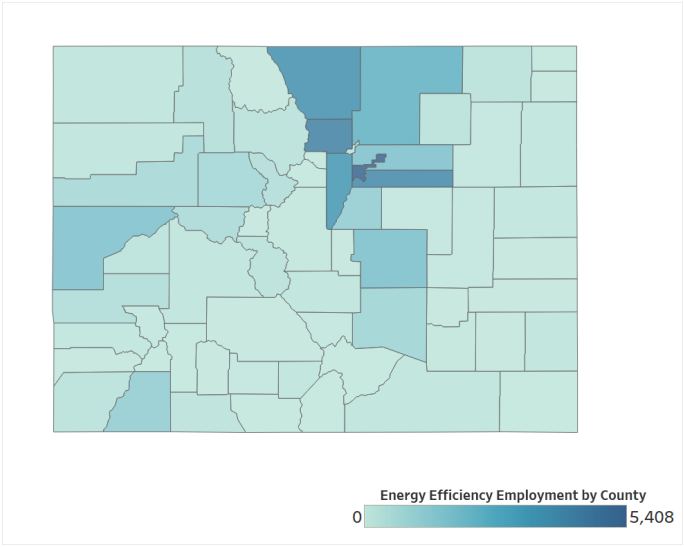
Almost two-thirds of energy efficiency establishments are primarily involved in installation and trade, with the remainder fairly evenly split across professional services, engineering and research, manufacturing, and other activities. These establishments are primarily small to medium-sized businesses; 46 percent report fewer than six permanent employees, while 51 percent note six or more workers. About 3 percent of firms reported that they have no *permanent* employees.

Colorado ranks 14th in the nation for energy efficiency policies and programs, with the strongest scores in utilities, state-led initiatives, and building codes. The state has an energy efficiency resource standard in place, incentives for high-efficiency vehicles that extend through 2021, and state-sponsored discounts and loans for energy efficiency upgrades (ACEEE).

County	Energy Efficiency Employment
Denver County	5,408
Boulder County	4,297
Arapahoe County	3,950
Larimer County	3,687
Jefferson County	3,443
Weld County	2,408
El Paso County	1,788
Adams County	1,717
Mesa County	1,705
La Plata County	1,220

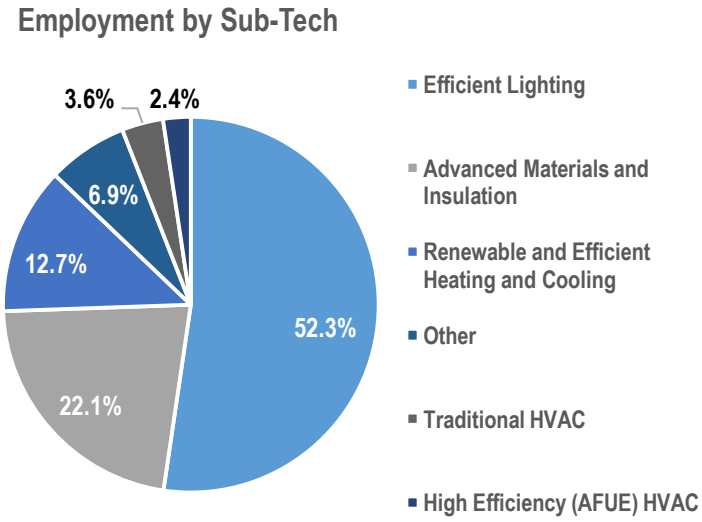
MSA	Energy Efficiency Employment
Denver-Aurora, CO MSA	16,207
CO NONMETROPOLITAN AREA	9,255
Boulder, CO MSA	4,297

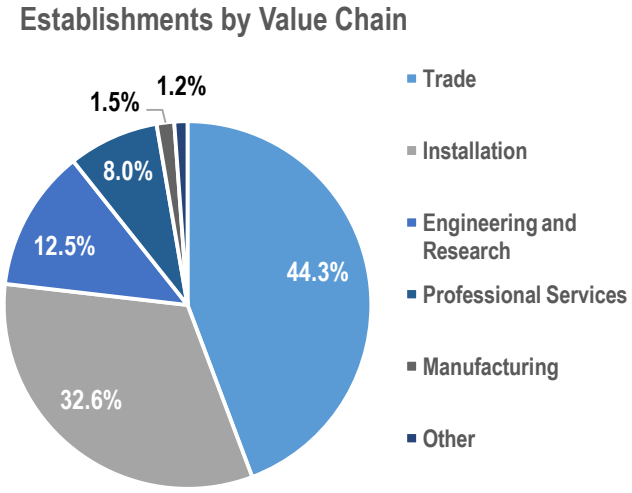
Congressional District	Energy Efficiency Employment
1	8,871
2	12,950
3	8,787
4	4,972
5	2,056
6	1,271
7	1,428



Connecticut – 12,460 jobs

About 12,500 Connecticut residents work in energy efficiency related jobs. The state has heavy representation in efficient lighting technologies, with 52 percent of the workforce dedicating the majority of their time to this sub-technology.





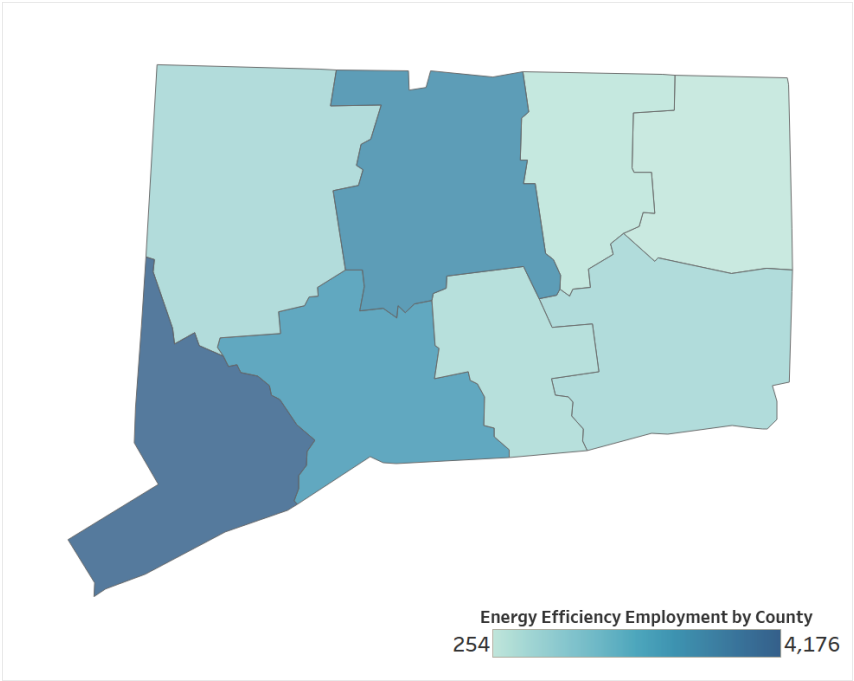
The state's energy efficiency economy is engaged in wholesale trade, with 44 percent of firms reporting that this is their primary value chain activity, followed by about a third in installation. Given the high prevalence of trade, there are some medium- to large-sized firms—about seven percent report 50 to 99 permanent employees. However, the sector is still primarily comprised of small businesses, with 36 percent of firms employing one to five workers and another 36 percent reporting six to 10 permanent workers.

Connecticut rose one position from 2015 to 2016, tying for 5th place in ACEEE's 2016 Energy Efficiency Scorecard. The state received its highest scores in utilities, perhaps because it passed legislation in 2013 that more than doubled energy efficiency program investments and implemented the state's energy efficiency resource standard (ACEEE).

County	Energy Efficiency Employment
Fairfield County	4,176
Hartford County	2,992
New Haven County	2,604
New London County	744
Litchfield County	725
Middlesex County	627
Tolland County	338
Windham County	254

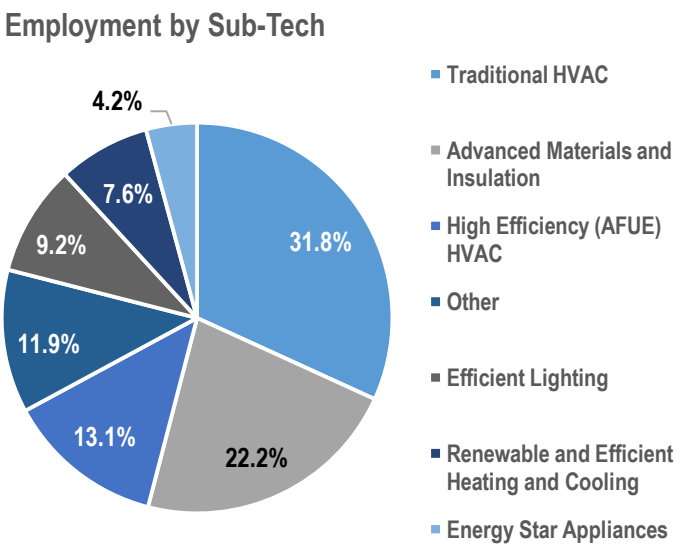
MSA	Energy Efficiency Employment
Bridgeport-Stamford-Norwalk, CT MSA	4,176
Hartford-West Hartford-East Hartford, CT MSA	3,955
New Haven-Milford, CT MSA	2,604

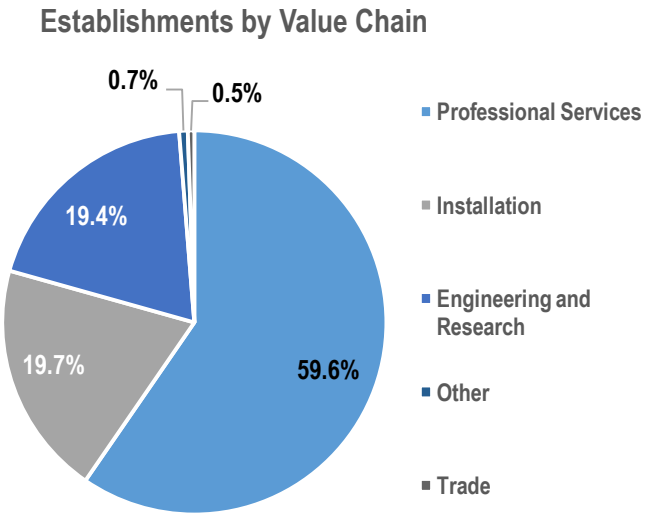
Congressional District	Energy Efficiency Employment
1	2,939
2	1,897
3	2,558
4	3,076
5	1,990



District of Columbia – 14,681 jobs

DC is home to 14,681residents who work in energy efficiency related jobs. About a third are mostly dedicated to traditional HVAC technologies, followed by advanced materials and insulation and high efficiency HVAC.



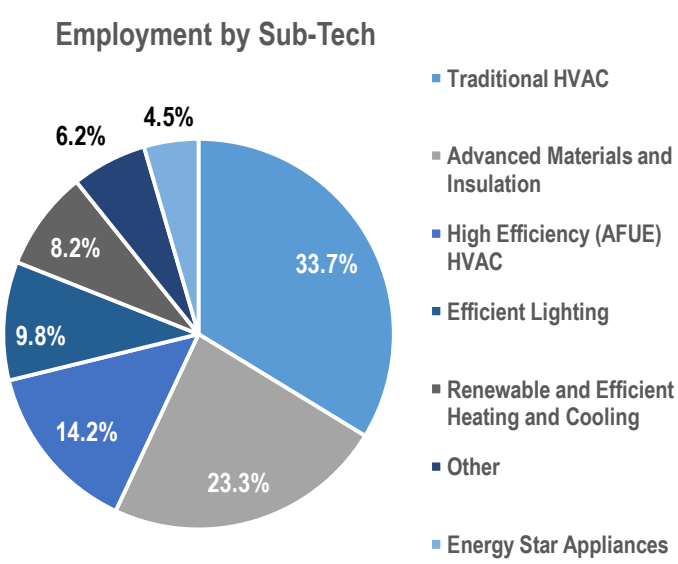


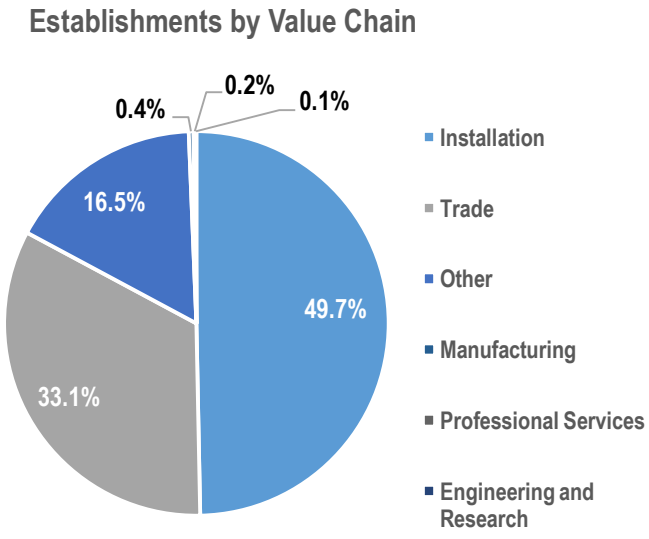
Washington, DC has the highest prevalence of professional service firms, representing about 60 percent of the EE job base in the District. This is followed by installation and engineering and research firms at about 20 percent each. The majority of firms are small businesses—55 percent report under 11 permanent workers—but there is a notable proportion of medium-sized establishments as well, with 36 percent reporting 25 to 99 permanent employees.

Just behind Colorado, the nation's capital ranks 15th in the nation for energy efficiency policies and programs. Washington, DC received the highest marks in transportation, with incentives for high efficiency vehicles and significant funding going to sustainable transit initiatives, as well as building energy codes (ACEEE).

Delaware – 2,334 jobs

More than 2,300 Delaware residents work in energy efficiency related jobs. The state's energy efficiency economy is fairly evenly spread across sub-technologies, with traditional HVAC, advanced materials and insulation, and high efficiency HVAC accounting for the majority of activity. Almost half of all energy efficiency establishments report they are primarily involved in the installation of systems, followed by about a third of firms that are mostly involved in wholesale trade.

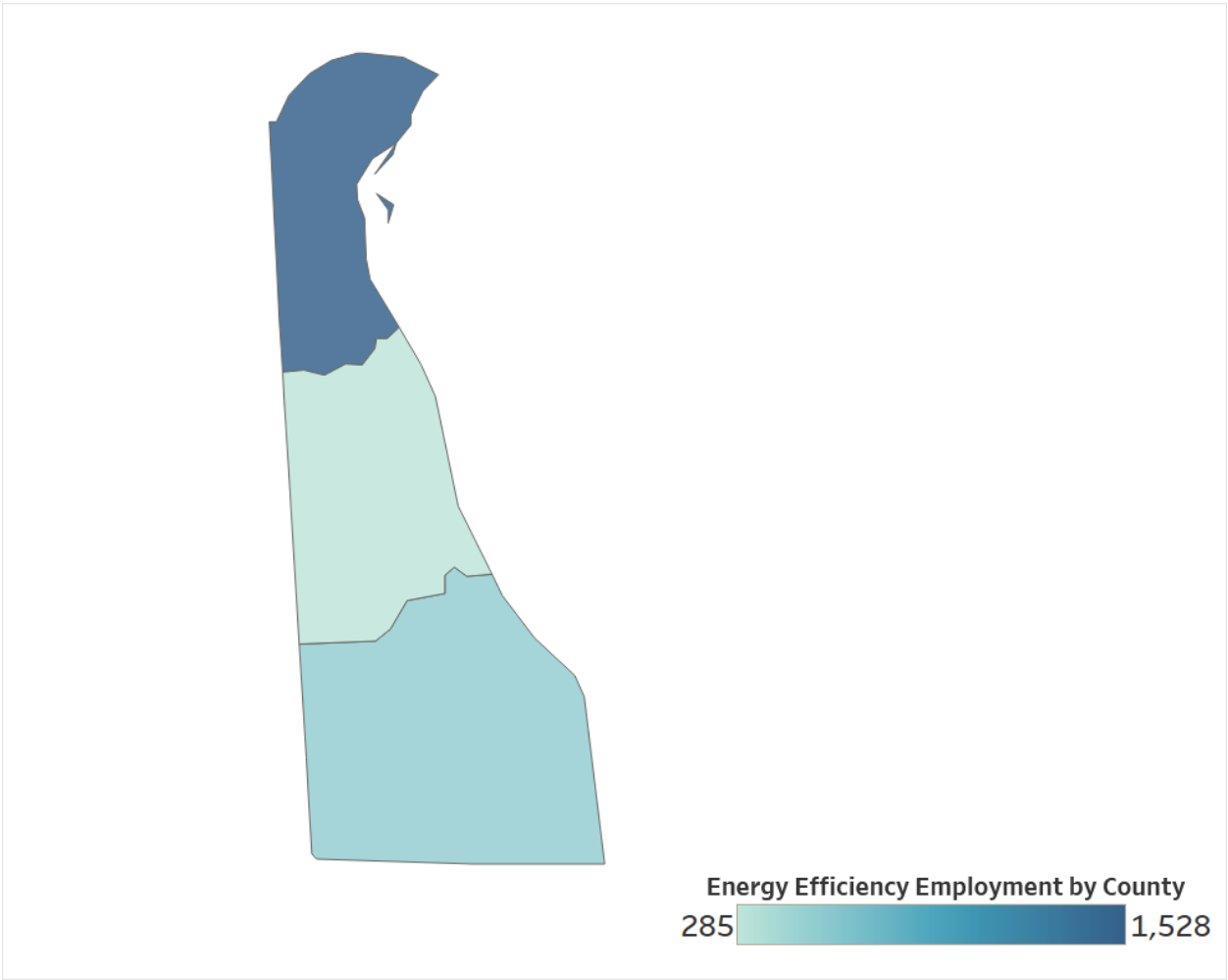




Delaware ranks 22nd in the nation for energy efficiency policies and programs, two positions higher than its 2015 ranking. The state received its highest marks in transportation and building energy codes, but scored very poorly in utilities. With unsteady investments in energy efficiency programs, the state has yet to realize energy savings. However, in 2014, Delaware passed legislation allowing utilities to recover the costs of efficiency programs, but there is still discussion on standard, cost recovery, evaluation, and measurement (ACEEE).

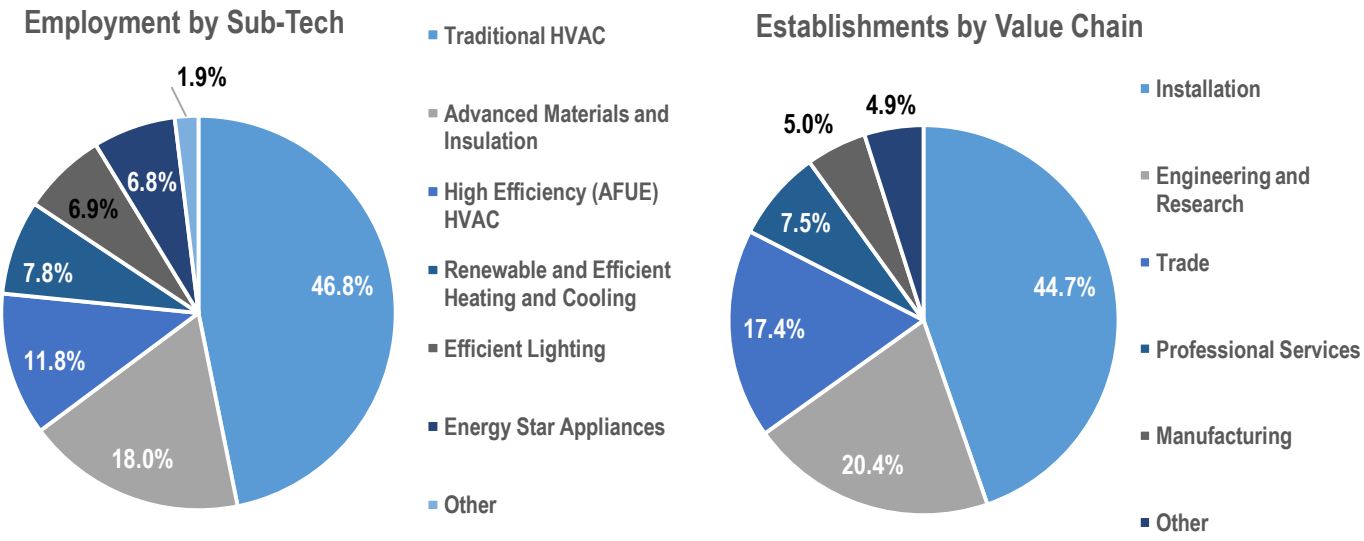
County	Energy Efficiency Employment
New Castle County	1,528
Sussex County	522
Kent County	285

MSA	Energy Efficiency Employment
Philadelphia-Camden-Wilmington, PA-NJ-DE-MD MSA	1,528
DE NONMETROPOLITAN AREA	522
Dover, DE MSA	285



Florida – 106,491 jobs

Reflecting its size and its harsh summers, nearly 106,500 Floridians work in energy efficiency related jobs, with about half working on traditional HVAC-related technologies, Other major sectors include advanced material and insulation and high efficiency HVAC systems work.



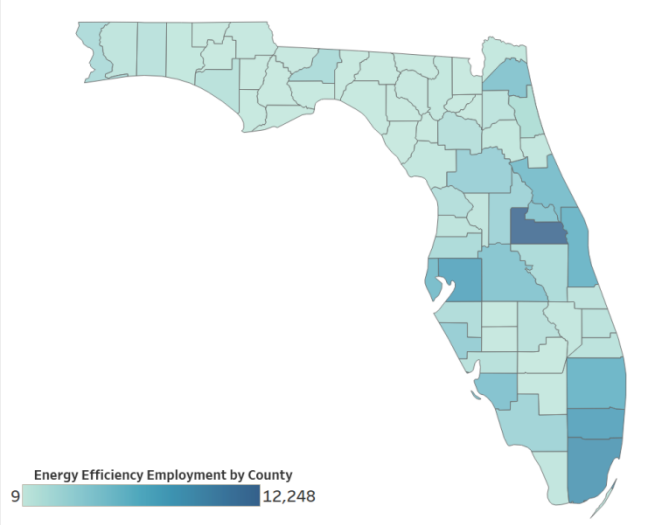
Installation is the largest sector, with 45 percent of firms, followed by manufacturing, which accounts for about two in 10 firms. These firms are mostly small business4es—61 percent report one to five permanent employees. However, the state has some representation of large firms, with two percent reporting 50 to 499 workers. Energy efficiency technologies provide the majority of firm revenue for about 58 percent of establishments; 35 percent of firms report that energy efficiency goods and services account for all of business revenue.

Florida rose two positions over its 2015 ranking, landing at 25th in the 2016 State Energy Efficiency Scorecard. The state scored poorly in utilities, since it allocates little funding for either electricity or natural gas efficiency programs. In fact, the Public Service Commission approved requests from utilities in 2014 to decrease the level of energy efficiency offered to customers in the future (ACEEE).

County	Energy Efficiency Employment
Orange County	12,248
Miami-Dade County	8,345
Broward County	7,348
Hillsborough County	7,028
Brevard County	5,729
Palm Beach County	5,718
Pinellas County	4,989
Volusia County	4,867
Lee County	4,358
Duval County	4,129

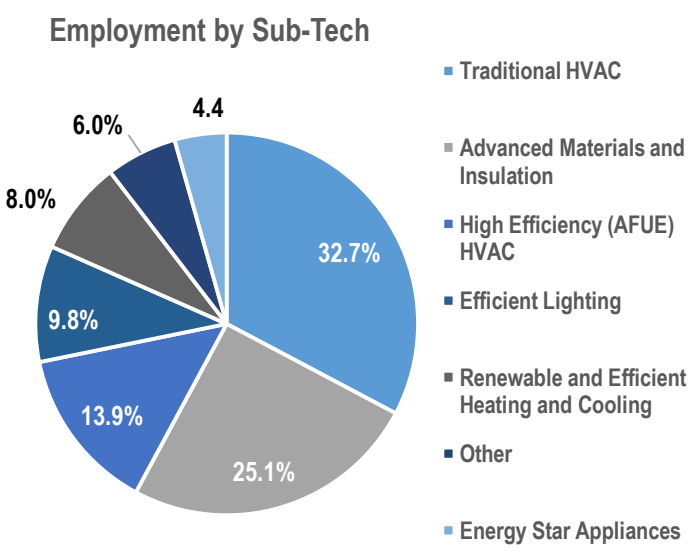
MSA	Energy Efficiency Employment
FL NONMETROPOLITAN AREA	3,883
Miami-Fort Lauderdale-Pompano Beach, FL MSA	21,777
Orlando-Kissimmee, FL MSA	20,766

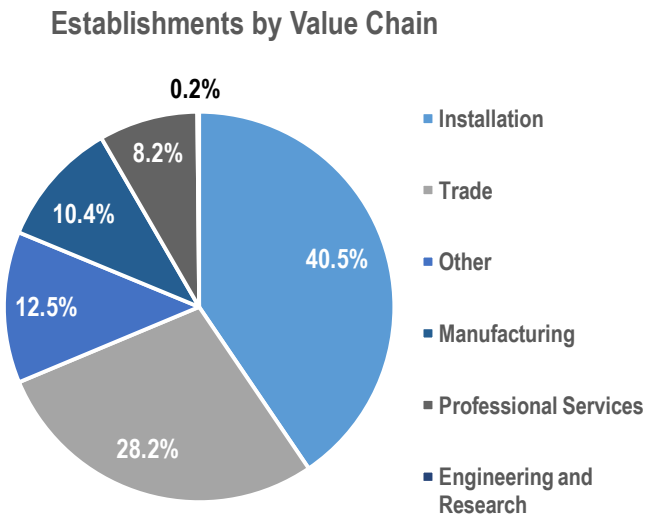
Congressional District	Energy Efficiency Employment	Congressional District	Energy Efficiency Employment
1	3,187	15	2,763
2	3,108	16	4,602
3	2,730	17	2,542
4	4,098	18	3,852
5	9,799	19	5,473
6	6,684	20	4,859
7	6,031	21	1,163
8	7,469	22	2,689
9	3,848	23	2,708
10	3,575	24	2,203
11	4,733	25	2,125
12	4,067	26	1,787
13	3,632	27	1,829
14	4,934		



Georgia – 66,212 jobs

Partly a reflection of its sweltering summers and cool winters, about 66,200 Georgians work in energy efficiency related businesses. The state's energy efficiency economy has a fairly even split amongst sub-technologies, with traditional HVAC, advanced materials and insulation, and high efficiency HVAC collectively accounting for the majority of activity.





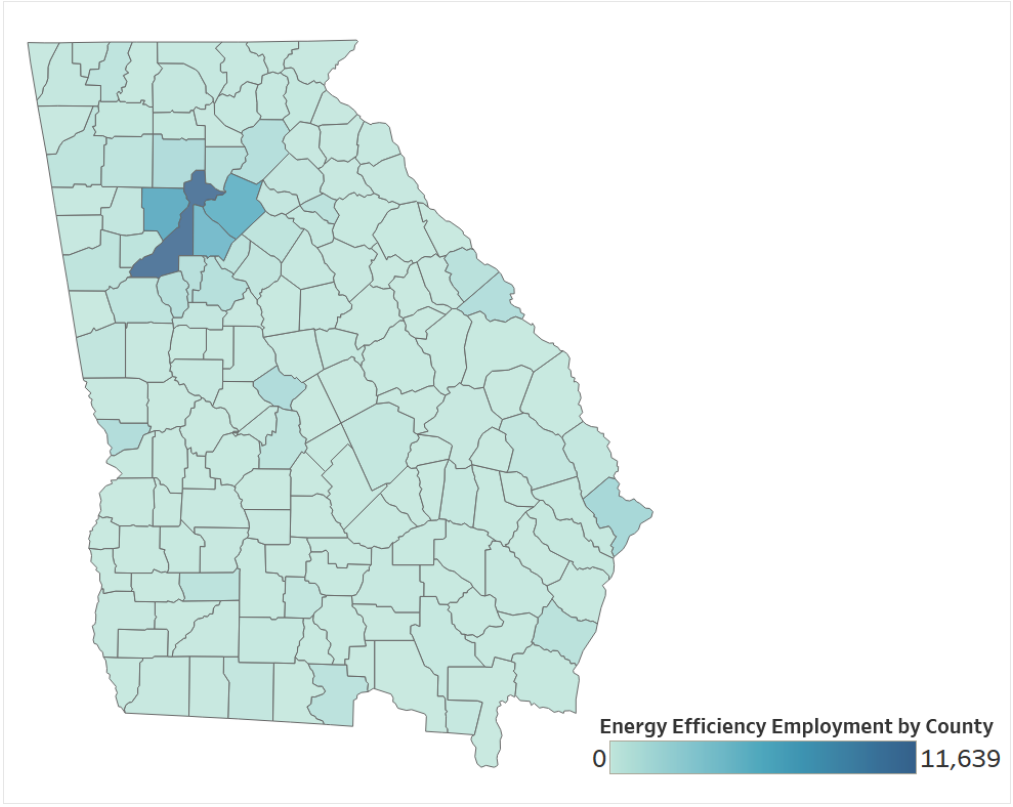
Installation and wholesale trade represents the majority of firm activity, with installation firms accounting for 41 percent of the total, followed by trade at 28 percent. These are mostly small to medium-sized firms—59 percent report fewer than six permanent employees and 23 percent report between 11 and 99 permanent workers. Energy efficiency work is sufficient to provide total revenue for about 45 percent of firms, and half to most for a 55 percent of establishments.

Georgia ranked 35th in the nation for energy efficiency policies and programs, rising two positions from its 2015 ranking. The state scored highest in transportation policy, but received a low score in utilities. Efficiency is included in integrated resource plans, but utilities invest very little in energy efficiency compared to other states (ACEEE).

County	Energy Efficiency Employment
Fulton County	11,639
Cobb County	6,403
Gwinnett County	5,731
Dekalb County	4,967
Chatham County	1,975
Bibb County	1,431
Cherokee County	1,383
Muscogee County	1,340
Richmond County	1,227
Hall County	1,173

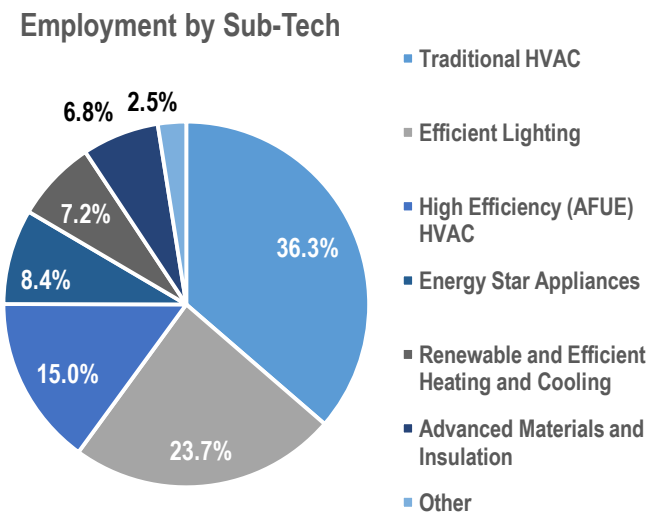
MSA	Energy Efficiency Employment
Atlanta-Sandy Springs-Marietta, GA MSA	40,561
GA NONMETROPOLITAN AREA	9,557
Savannah, GA MSA	2,481

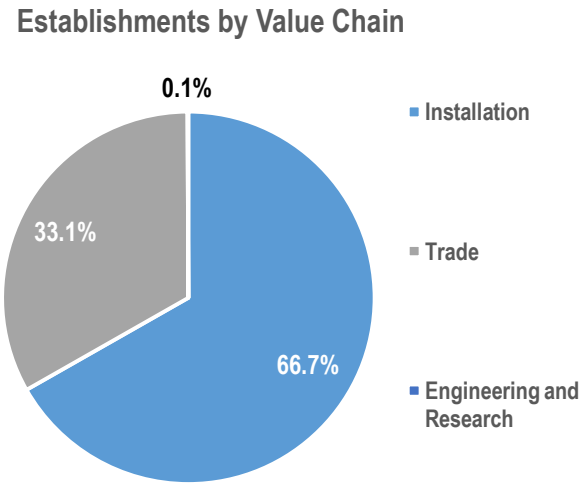
Congressional District	Energy Efficiency Employment
1	4,556
2	5,425
3	4,632
4	5,974
5	8,643
6	11,296
7	4,104
8	2,941
9	5,028
10	2,213
11	4,365
12	3,506
13	1,435
14	2,093



Hawaii – 8,382 jobs

About 8,400 Hawaiians work in energy efficiency related occupations. The largest chunk of activity is concentrated in traditional HVAC and efficient lighting technologies.





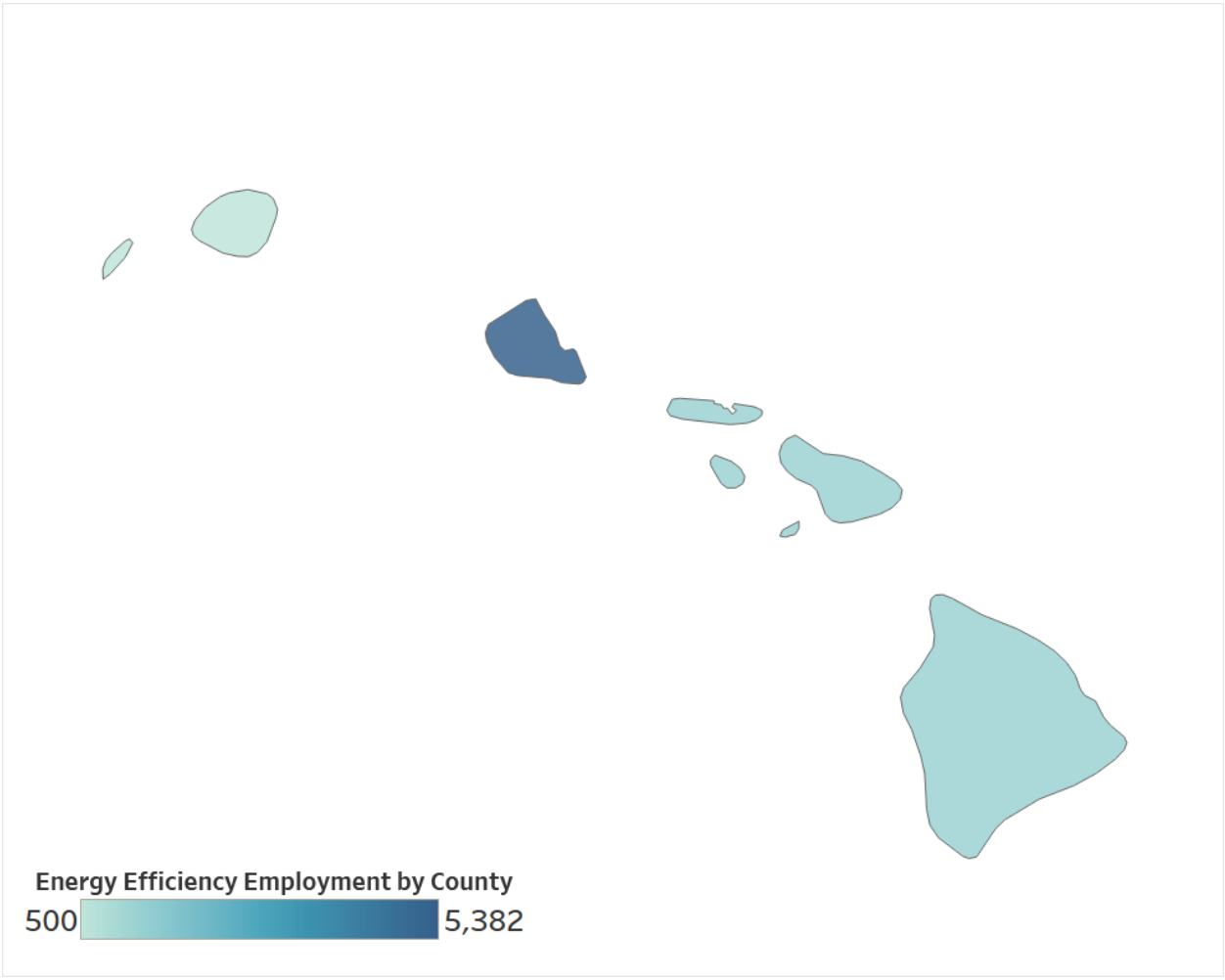
The state's energy efficiency sector is mostly comprised of installation and trade firms; these firms account for nearly all business activity. However, there is very small activity in engineering and research—about 0.1 percent. Most of these energy efficiency establishments are small—78 percent employ fewer than 11 workers. Energy efficiency is not sufficient to service firm revenue, as only 14 percent of firms reported deriving all of their revenue from energy efficiency technologies alone.

Hawaii ranks 15th in the nation for energy efficiency policies and programs, earning the highest score in utilities. The state has recently set long-term electricity savings targets, in addition to achieving almost triple the national average in savings (ACEEE).

County	Energy Efficiency Employment
Honolulu County	5,382
Maui County	1,254
Hawaii County	1,246
Kauai County	500

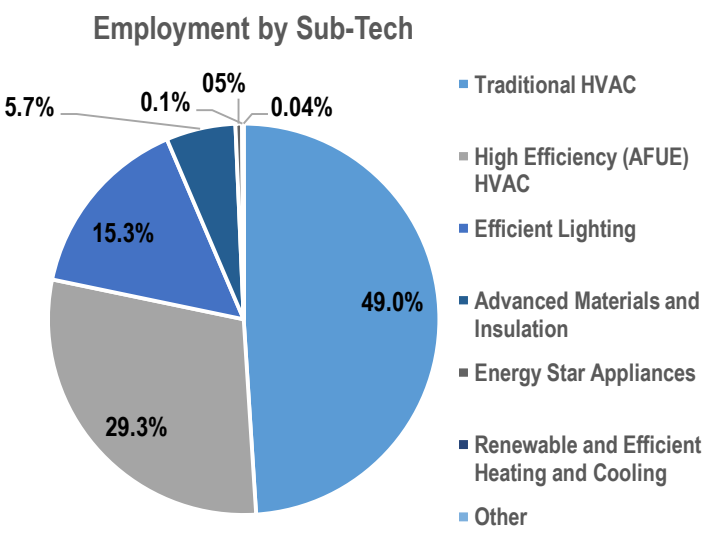
MSA	Energy Efficiency Employment
Honolulu, HI MSA	5,382
HI NONMETROPOLITAN AREA	3,000

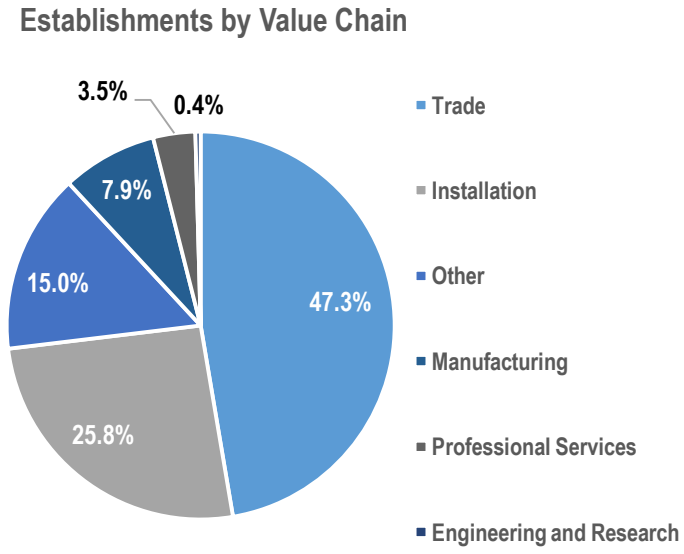
Congressional District	Energy Efficiency Employment
1	4,727
2	3,655



Iowa – 19,332 jobs

About 19,300 Iowans work in energy efficiency related jobs. Nearly 80 percent of these workers specialize in traditional and high efficiency HVAC technologies, followed by efficient lighting.





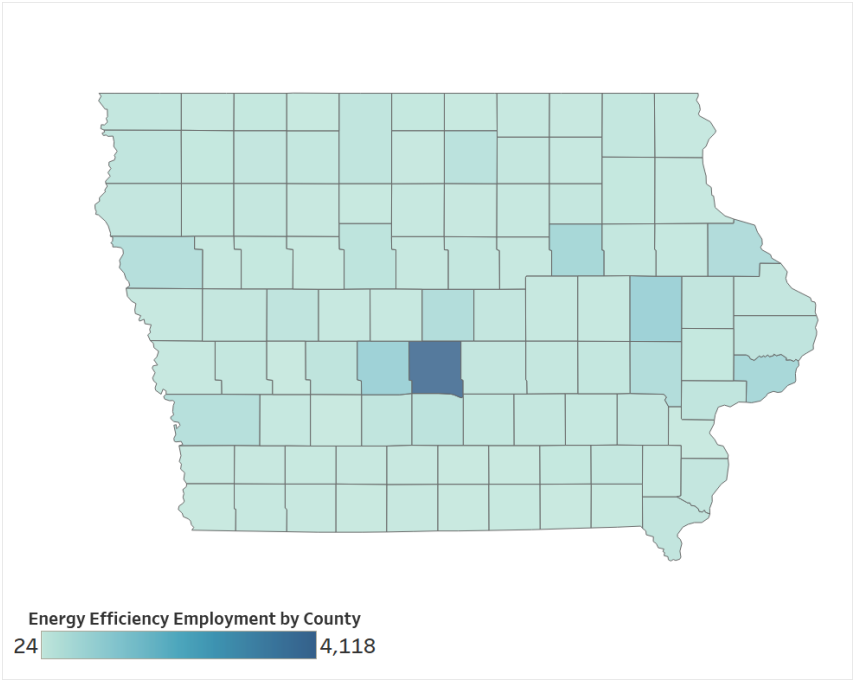
Almost half of firms report that their primary activity related to energy efficiency is in wholesale trade, followed by installation at just over a quarter of establishments. These firms are mostly small businesses, as six in 10 report one to 10 permanent employees. Over a third of firms (37 percent) note that they derive all of their business revenue from energy efficiency-related work.

Iowa fell three positions compared to its 2015 ranking, placing it 15th in the nation in ACEEE's 2016 State Energy Efficiency Scorecard. The state has continually reached higher-than-average energy savings as both electric and natural gas utilities have allocated significant dollars to efficiency programs over the last few years; the state also has an energy efficiency resource standard in place (ACEEE).

County	Energy Efficiency Employment
Polk County	4,118
Linn County	942
Dallas County	940
Black Hawk County	724
Scott County	701
Dubuque County	516
Johnson County	502
Story County	488
Woodbury County	431
Pottawattamie County	407

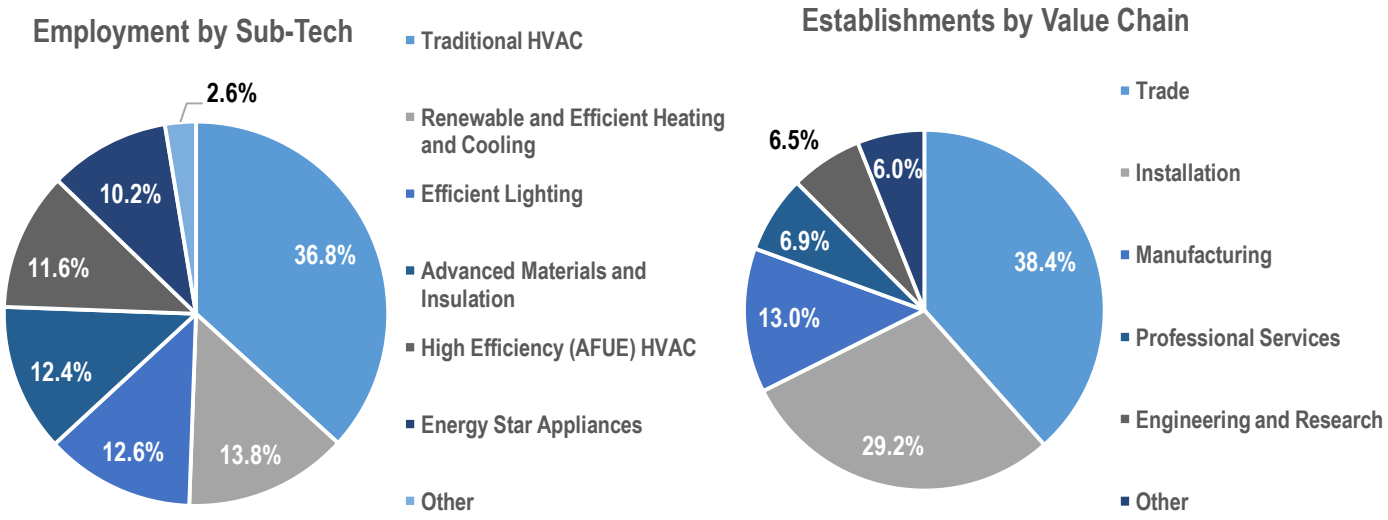
MSA	Energy Efficiency Employment
IA NONMETROPOLITAN AREA	8,081
Des Moines-West Des Moines, IA MSA	5,770
Cedar Rapids, IA MSA	1,161

Congressional District	Energy Efficiency Employment
1	3,992
2	3,140
3	7,585
4	4,615



Idaho – 2,692 jobs

About 2,700 Idaho residents work in energy efficiency related occupations. The sector is dominated by traditional HVAC activity, with the rest of activity evenly split among the remaining sub-technologies.



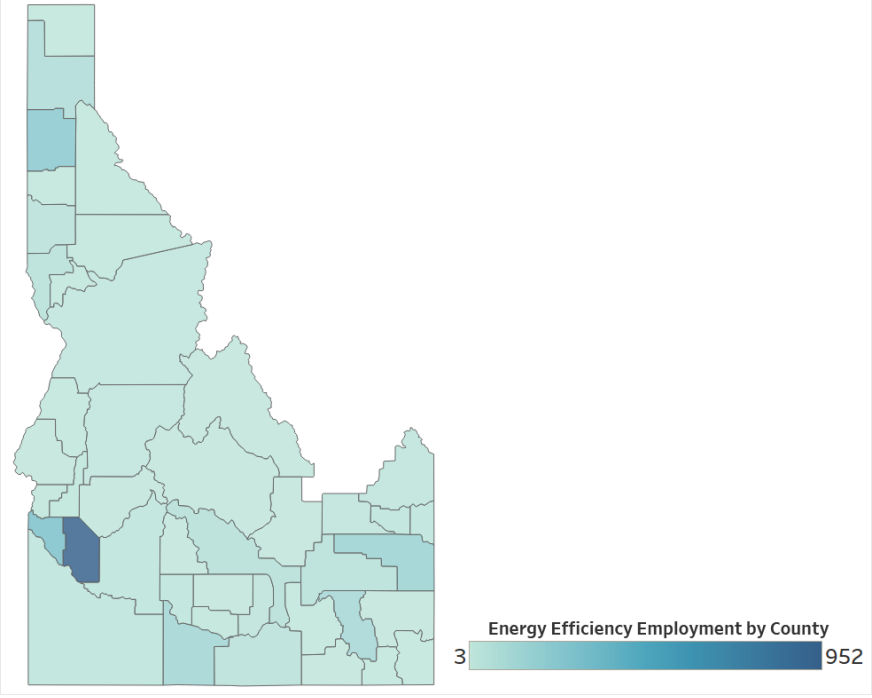
Most firms are engaged in trade (38 percent) or installation (29 percent), with some additional activity across manufacturing, professional services, and engineering and research. Most of these firms are small businesses, but there is some representation across medium-sized establishments as well; four in ten firms (41 percent) report one to five permanent employees, while 12 percent note 11 to 99 workers. Just about three in ten firms (29%) report that they derive all of their business revenue from energy efficiency goods and services, and an additional 21 percent derive most of it from related activities.

Idaho ranked 33rd in the nation in the 2016 State Energy Efficiency Scorecard. The state received its highest marks in building energy codes and utilities. Though utilities have achieved higher-than-average electricity savings in the past few years, there is little to no funding set aside for efficiency programs. There are also no utility performance incentives, and the state does not have specific energy savings goals in place (ACEEE).

County	Energy Efficiency Employment
Ada County	952
Canyon County	296
Kootenai County	235
Bonneville County	165
Twin Falls County	137
Bannock County	118
Bonner County	80
Blaine County	60
Nez Perce County	54
Bingham County	50

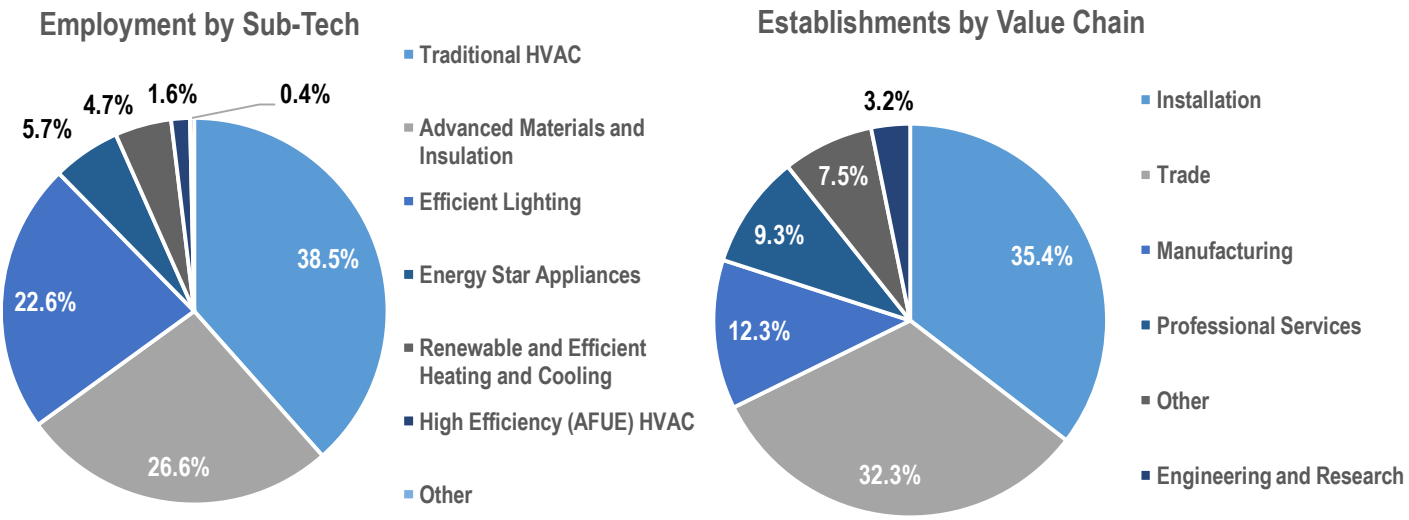
MSA	Energy Efficiency Employment
Boise City-Nampa, ID MSA	1,309
ID NONMETROPOLITAN AREA	772
Coeur d'Alene, ID MSA	235

Congressional District	Energy Efficiency Employment
1	1,783
2	909



Illinois – 89,830 jobs

Bouyed by aggressive state energy efficiency policies, nearly 90,000 Illinois residents work in energy efficiency related jobs. Sector activity is primarily concentrated among three sub-technologies: traditional HVAC, advanced materials and insulation, and efficient lighting.



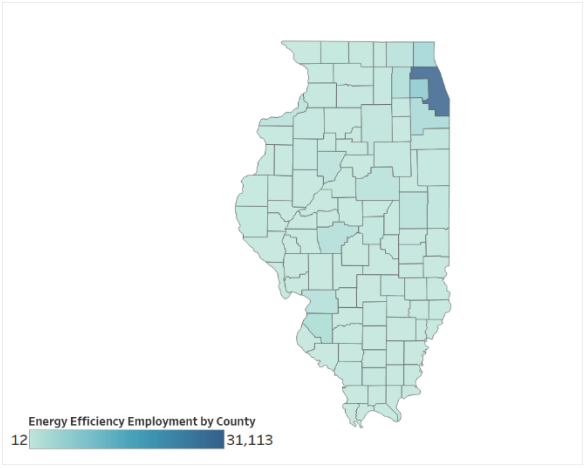
As with most other efficiency economies, the majority of firms are engaged in the installation or trade of energy efficient products. The state also has some activity in the manufacturing and professional service sphere. Most of these energy efficiency firms are small, with 63 percent employing under 11 permanent workers, but there are some large firms in the state: about five percent report 100 to 499 employees.

Illinois is currently 13th in the nation for its energy efficiency policies and programs, scoring the highest points in utilities and building energy codes. The state set targets for both electric and natural gas utilities under its energy efficiency resource standard. Illinois is also one of the few states to earn a perfect score in building codes and compliances. At the beginning of 2016, the state implemented the 2015 IECC for both residential and commercial buildings (ACEEE).

County	Energy Efficiency Employment
Cook County	31,113
Dupage County	8,015
Lake County	4,541
Will County	3,577
Kane County	2,764
Sangamon County	2,413
Madison County	2,090
Champaign County	1,841
St Clair County	1,829
McHenry County	1,698

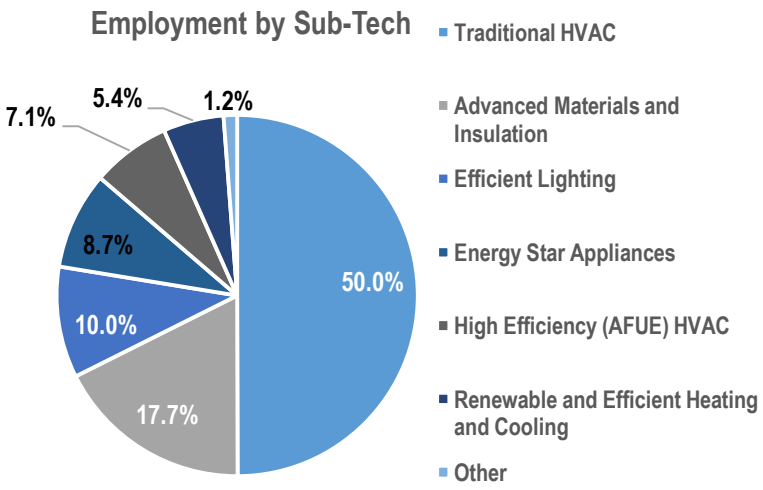
MSA	Energy Efficiency Employment
Chicago-Naperville-Joliet, IL-IN-WI MSA	52,908
IL NONMETROPOLITAN AREA	17,926
St. Louis, MO-IL MSA	5,026

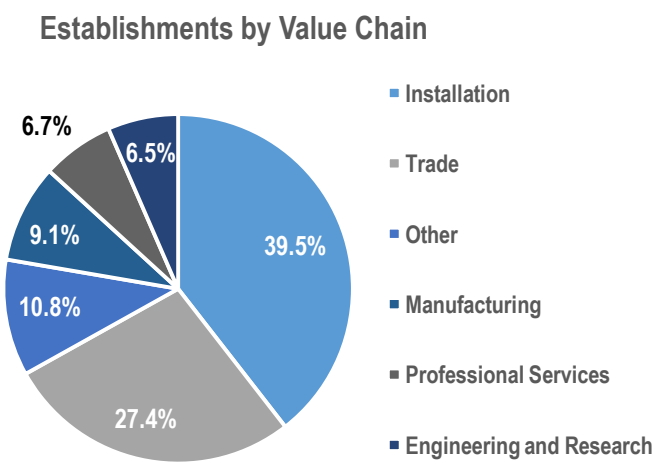
Congressional District	Energy Efficiency Employment	Congressional District	Energy Efficiency Employment
1	4,794	10	3,515
2	2,060	11	2,596
3	3,507	12	6,334
4	3,684	13	7,492
5	6,180	14	2,251
6	8,707	15	6,961
7	8,332	16	7,166
8	2,297	17	6,503
9	3,492	18	3,957



Indiana – 36,668 jobs

About 36,700 Indiana residents work in energy efficiency related jobs. Exactly half are engaged mostly with traditional HVAC technologies, followed by advanced materials and insulation and efficient lighting.





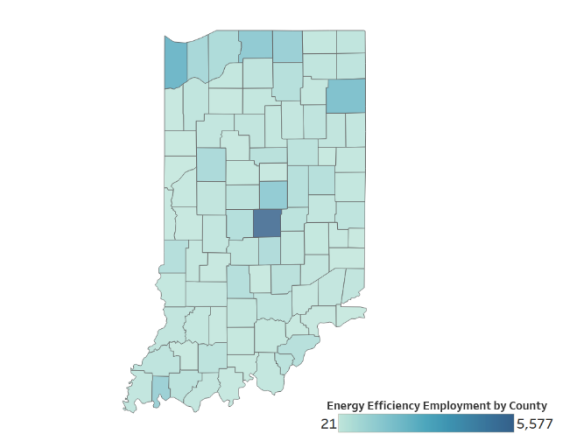
Most establishment activity is concentrated in installation (40 percent) and trade (27 percent); there is also some activity in the manufacturing, professional service, and engineering and research fields. The state's energy efficiency economy is primarily comprised of small or large businesses; 85 percent report fewer than 11 employees, 8 percent report 50 to 99, and another 8 percent report 100 to 249 permanent workers. Three in 10 firms report that energy efficiency activities service all of their firm revenue, and an additional 50 percent say it supports half to most of it.

Indiana fell four positions to 42nd over the last year, scoring only 9.5 points out of a possible 50 on the 2016 State Energy Efficiency Scorecard. Though the state recently achieved energy savings close to the national average, it repealed its energy efficiency resource standard in 2014 (ACEEE).

County	Energy Efficiency Employment
Marion County	5,577
Lake County	2,614
Allen County	2,144
St Joseph County	1,660
Hamilton County	1,588
Elkhart County	1,346
Vanderburgh County	1,303
Porter County	940
Tippecanoe County	819
La Porte County	741

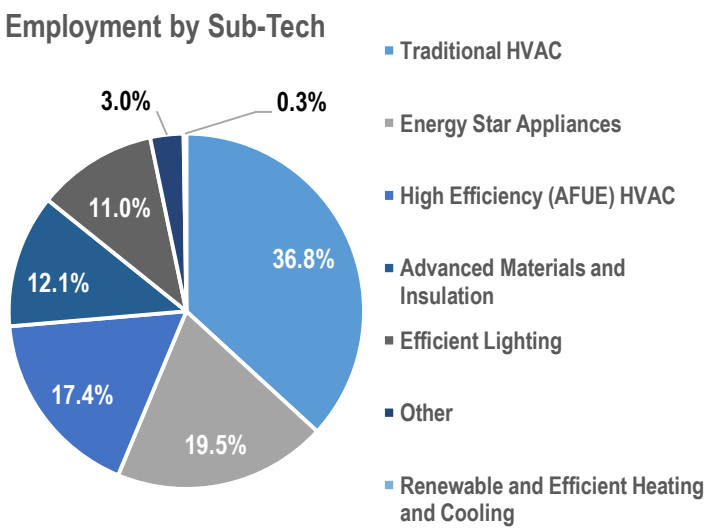
MSA	Energy Efficiency Employment
Indianapolis-Carmel, IN MSA	10,006
IN NONMETROPOLITAN AREA	8,090
Chicago-Naperville-Joliet, IL-IN-WI MSA	3,888

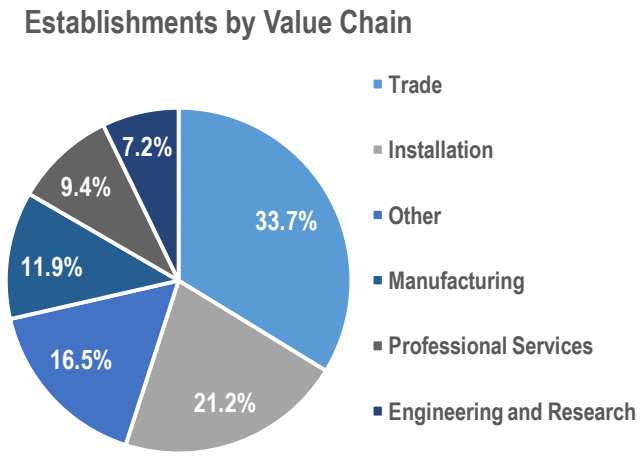
Congressional District	Energy Efficiency Employment
1	4,262
2	4,914
3	4,462
4	4,161
5	4,757
6	3,953
7	2,834
8	5,058
9	2,267



Kansas – 24,088 jobs

About 24,000 Kansans work in energy efficiency related occupations. Following traditional HVAC at 37 percent, activity is fairly evenly split among energy star appliances, high efficiency HVAC, advanced materials and insulation, and efficient lighting technologies.





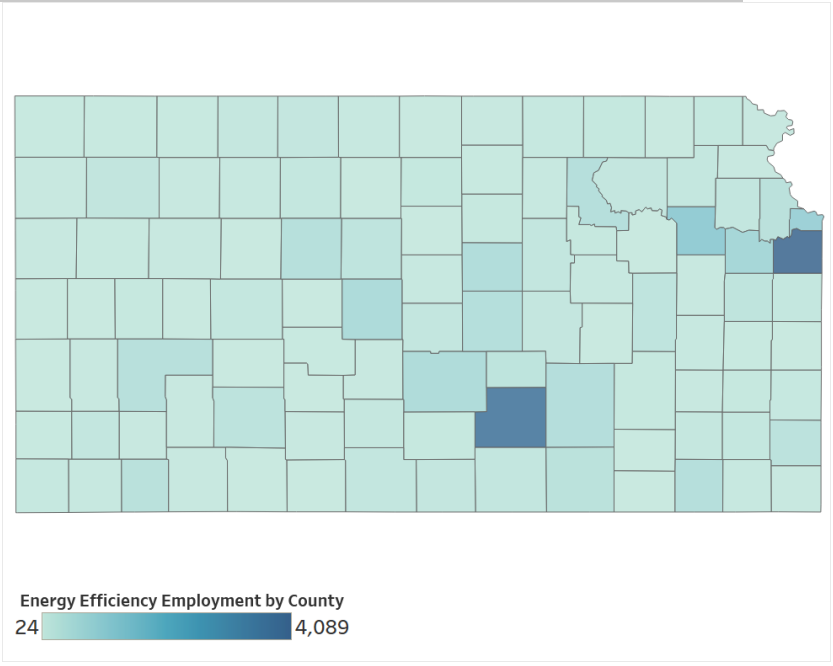
55 percent of energy efficiency establishments are involved in either the trade or installation of energy efficient systems. These are mostly small to medium-sized firms—71 percent report one to five employees, 21 percent report six to 10 employees, and 7 percent report 50 to 99 permanent workers.

Kansas is 48th in the nation for its energy efficiency policies and programs, earning zero points in the utilities category. Without long-term savings targets, the state has below average investments and energy savings (ACEEE).

County	Energy Efficiency Employment
Johnson County	4,089
Sedgwick County	3,716
Shawnee County	1,175
Wyandotte County	953
Douglas County	746
Barton County	588
Reno County	540
Saline County	500
Butler County	445
McPherson County	437

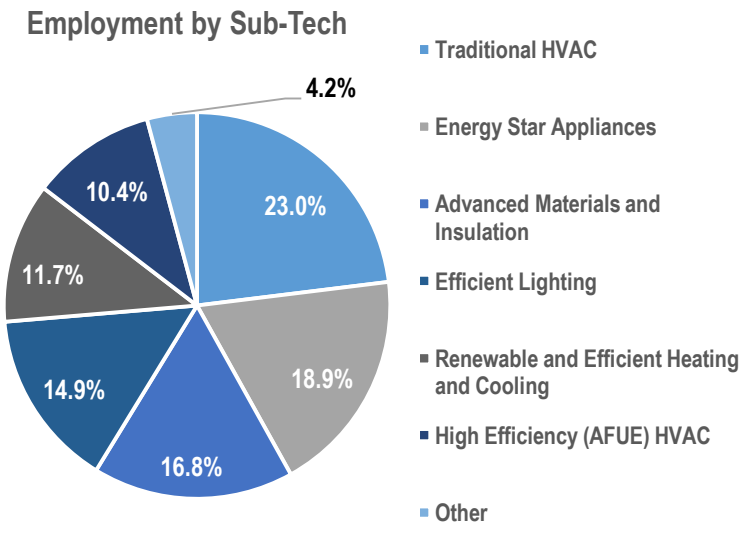
MSA	Energy Efficiency Employment
KS NONMETROPOLITAN AREA	10,654
Kansas City, MO-KS MSA	5,788
Wichita, KS MSA	4,581

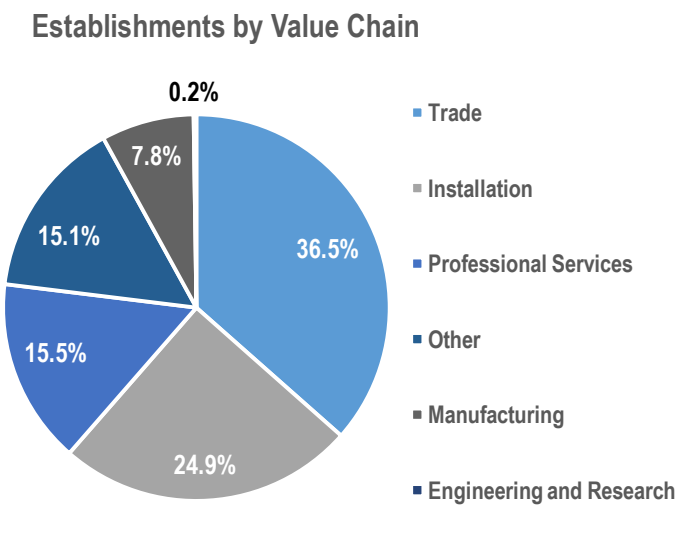
Congressional District	Energy Efficiency Employment
1	9,113
2	4,832
3	4,840
4	5,303



Kentucky – 27,278 jobs

About 27,300 Kentuckians work in energy efficiency related occupations. The state's energy efficiency economy is fairly evenly split amongst each of the sub-technologies, with traditional HVAC representing the largest portion (23 percent) of activity.





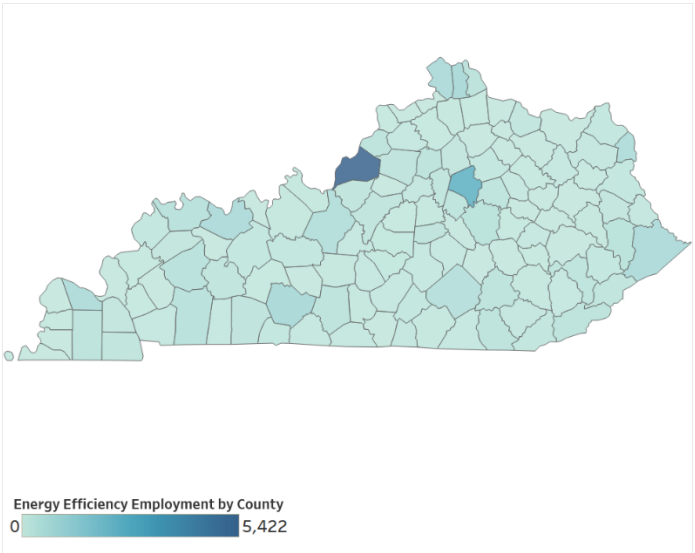
Trade and installation represent the bulk of firm activity, with trade accounting for 37 percent of establishments and installation accounting for 25 percent. Three-quarters of firms report fewer than 11 workers, and 8 percent report 50 to 99 permanent employees.

Kentucky ranked 30th in the nation in the 2016 State Energy Efficiency Scorecard. Utilities report low investment on both electric and natural gas efficiency programs, and while energy savings are consistent, they remain below the national average. The state received its highest marks in building energy codes and state-led initiatives. In fact, the state offers various financial incentives for energy efficient upgrades, and has set energy requirements for public buildings (ACEEE).

County	Energy Efficiency Employment
Jefferson County	5,422
Fayette County	2,457
Warren County	774
Kenton County	758
Pike County	675
Boone County	652
Daviess County	652
Boyd County	584
McCracken County	584
Hardin County	516

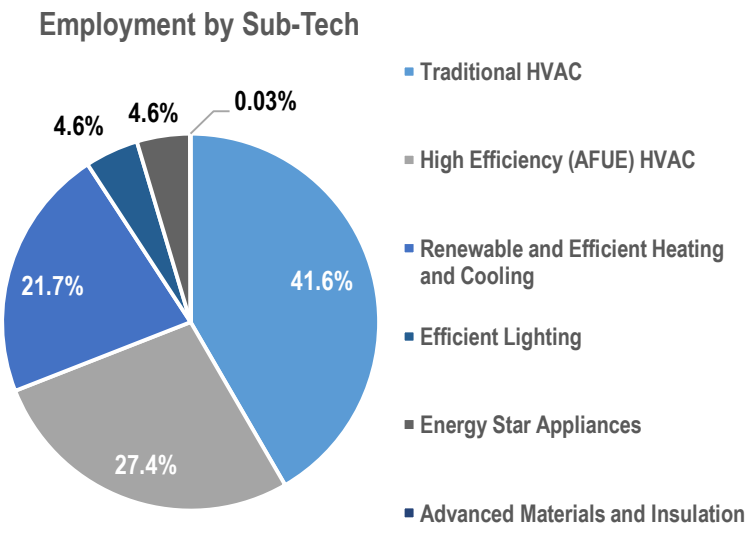
MSA	Energy Efficiency Employment
KY NONMETROPOLITAN AREA	11,330
Louisville/Jefferson County, KY-IN MSA	6,605
Lexington-Fayette, KY MSA	3,488

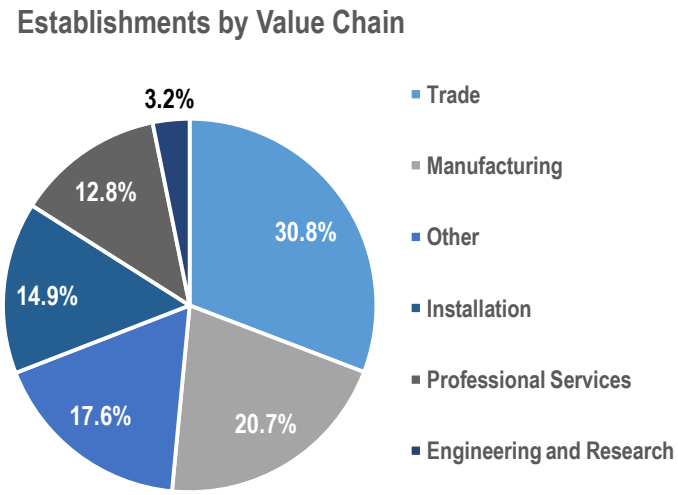
Congressional District	Energy Efficiency Employment
1	5,658
2	4,424
3	4,700
4	4,163
5	4,615
6	3,718



Louisiana – 24,771 jobs

About 24,800 Lousiana residents work in energy efficiency related jobs. Just over four in 10 spend most of their time on traditional HVAC technologies, followed by high efficiency HVAC and renewable and efficient heating and cooling.





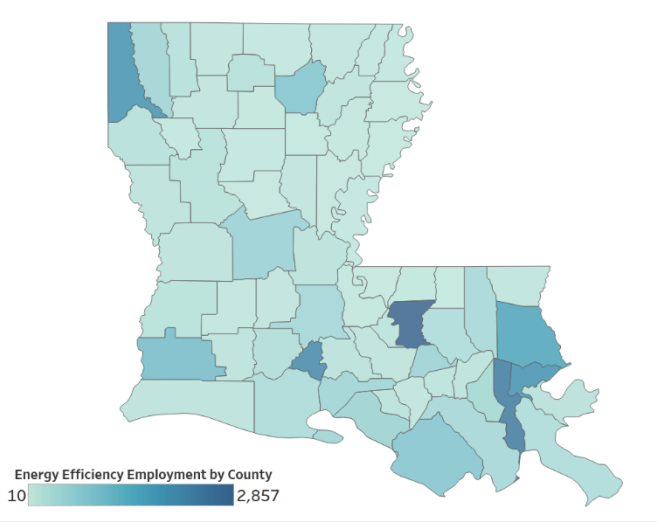
The sector's firms are fairly evenly split amongst value chain activities. Though trade accounts for about three in 10 establishments, there is significant activity in manufacturing and installation as well. With uncertain policies and low prevalence of in-state adoption of energy efficiency measures, it is not surprising that installation firms only represent 15 percent of energy efficiency establishments. The majority of these energy efficiency firms are small—64 percent report under six permanent workers. Exactly half of firms report that they derive the majority of their revenue from energy efficiency work.

Louisiana placed 47th in the 2016 State Energy Efficiency Scorecard; the state received below average marks in each of the sub-categories. Though the state runs the Home Energy Loan program, other incentives have expired. However, Louisiana is on track to pass new legislation for the next phase of utility efficiency programs (ACEEE).

County	Energy Efficiency Employment
East Baton Rouge Parish	2,857
Jefferson Parish	2,371
Lafayette Parish	2,094
Orleans Parish	1,911
Caddo Parish	1,896
St Tammany Parish	1,541
Calcasieu Parish	1,024
Ouachita Parish	877
Terrebonne Parish	841
Rapides Parish	564

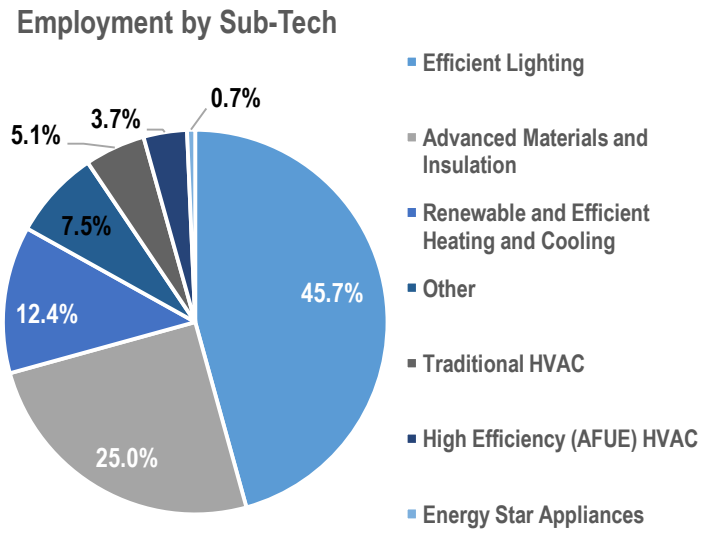
MSA	Energy Efficiency Employment
New Orleans-Metairie-Kenner, LA MSA	6,712
LA NONMETROPOLITAN AREA	5,235
Baton Rouge, LA MSA	4,113

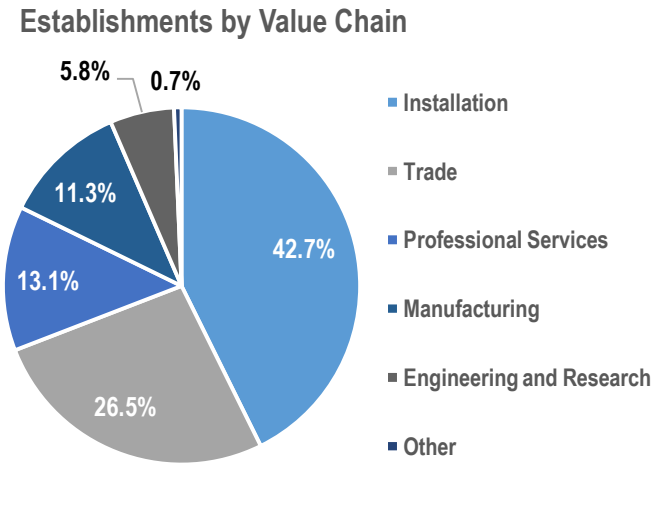
Congressional District	Energy Efficiency Employment
1	6,022
2	3,948
3	5,281
4	4,286
5	2,757
6	2,477



Massachusetts – 82,848 jobs

With strong policy commitments, Massachusetts is home to nearly 82,900 residents who work in energy efficiency related jobs. Efficient lighting is the largest chunk of activity, representing 46 percent of the workforce, followed by advanced materials and insulation, with about a quarter of total employment.





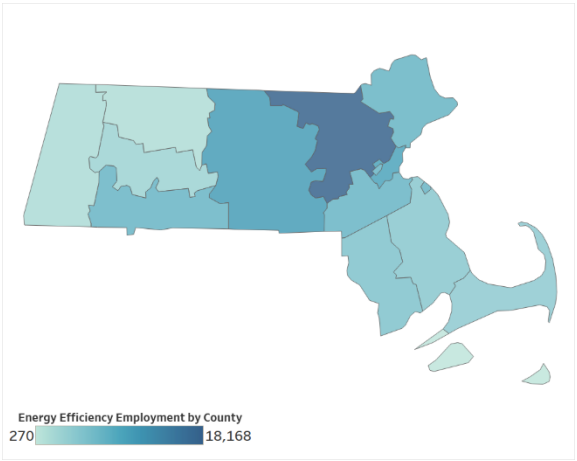
Installation and trade are the largest chunk of activity, with installation firms account for 43 percent of establishments. The state's energy efficiency sector has representation across small, medium, and large-sized establishments. 65 percent of firms have one to 10 employees, 27 percent have 11 to 49 employees, and four percent have more than 50 permanent workers. Energy efficiency work is enough to service the majority of firm revenue for 65 percent of businesses; 38 percent report they derive all of their revenue from this work.

Massachusetts remains among the top states in the nation for energy efficiency policies and programs. In fact, the state's most recently approved energy savings targets for 2016 through 2018 are the most ambitious in the nation (ACEEE).

County	Energy Efficiency Employment
Middlesex County	18,168
Worcester County	10,691
Suffolk County	9,785
Essex County	7,568
Hampden County	7,424
Norfolk County	7,420
Bristol County	5,502
Plymouth County	4,759
Barnstable County	4,337
Hampshire County	2,994

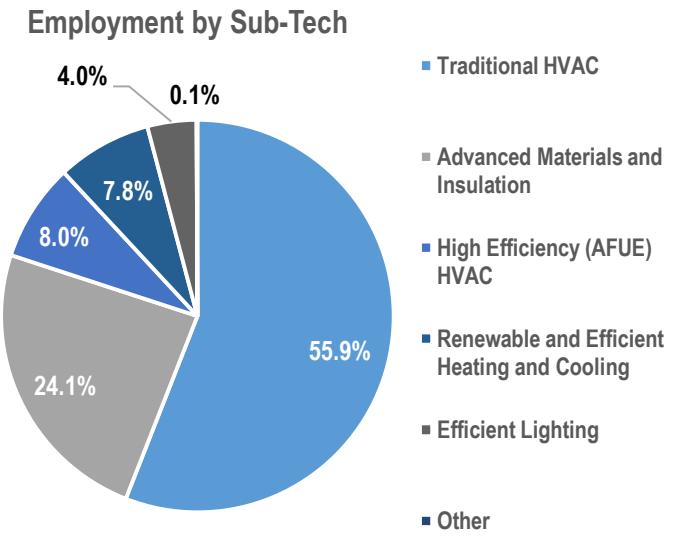
MSA	Energy Efficiency Employment
Boston-Cambridge-Quincy, MA-NH MSA	47,722
Springfield, MA MSA	12,040
Worcester, MA MSA	10,666

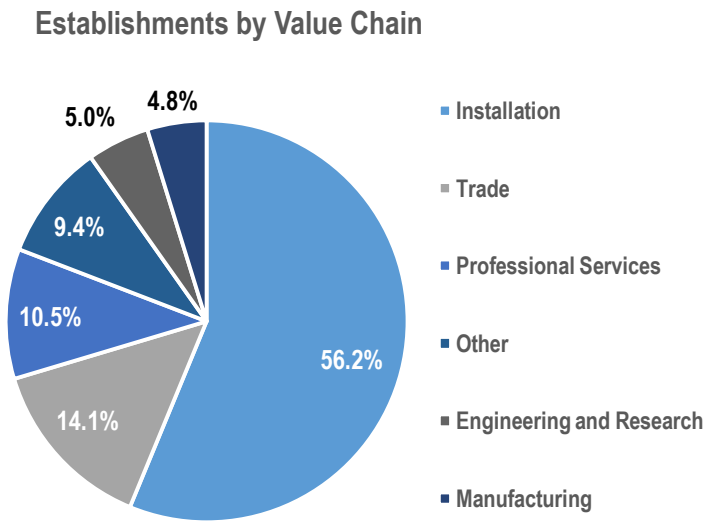
Congressional District	Energy Efficiency Employment
1	12,610
2	11,427
3	6,729
4	8,621
5	9,061
6	8,627
7	7,074
8	8,972
9	9,729



Maryland – 46,724 jobs

About 46,724 Marylanders work in energy efficiency related jobs. The majority (56 percent) of these workers spend most of their time on traditional HVAC technologies, followed by advanced materials and insulation.





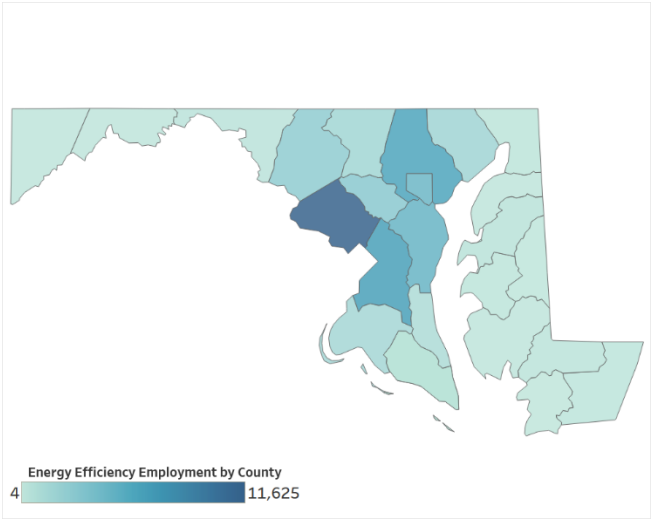
Installation firms comprise the majority of sector activity, with 56 percent of establishments. The remainder of firms are fairly evenly split among the remaining value chain activities. These establishments are mostly small firms, with 68 percent reporting one to 10 permanent employees; only about 4 percent of firms reported 100 to 249 permanent workers. One-third of firms report that they derive all of their revenue from energy efficiency goods and services, and an additional 26 percent report that half to most of their revenue can be attributed to this work.

Maryland ranked 9th in the nation in the 2016 State Energy Efficiency Scorecard. The state received its highest marks in utilities, transportation, and building energy codes. While the state has some of the most ambitious savings targets, there is limited investment and funding for proposed programs, leaving the future of energy efficiency to policy uncertainty (ACEEE).

County	Energy Efficiency Employment
Montgomery County	11,625
Prince George's County	6,495
Baltimore County	6,067
Anne Arundel County	4,647
Baltimore City	4,496
Howard County	2,828
Frederick County	2,511
Harford County	1,650
Carroll County	1,535
Charles County	1,388

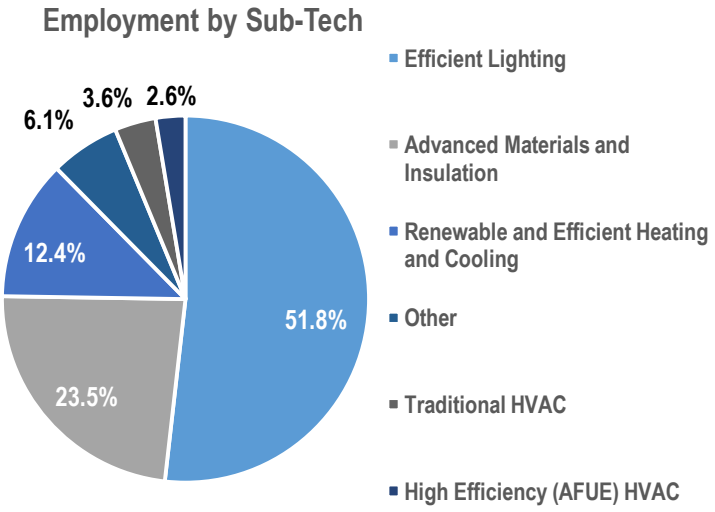
MSA	Energy Efficiency Employment
Washington-Arlington-Alexandria, DC-VA-MD-WV MSA	23,228
Baltimore-Towson, MD MSA	21,379
MD NONMETROPOLITAN AREA	1,066

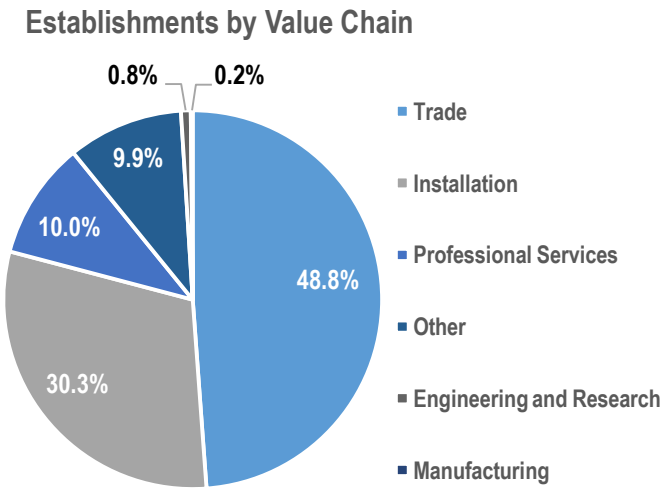
Congressional District	Energy Efficiency Employment
1	7,998
2	6,875
3	8,138
4	5,127
5	3,966
6	9,072
7	1,263
8	4,284



Maine – 8,843 jobs

About 8,850 Maine residents work in energy efficiency related jobs. The slight majority of work is concentrated in efficient lighting technologies, followed by advanced materials and insulation.





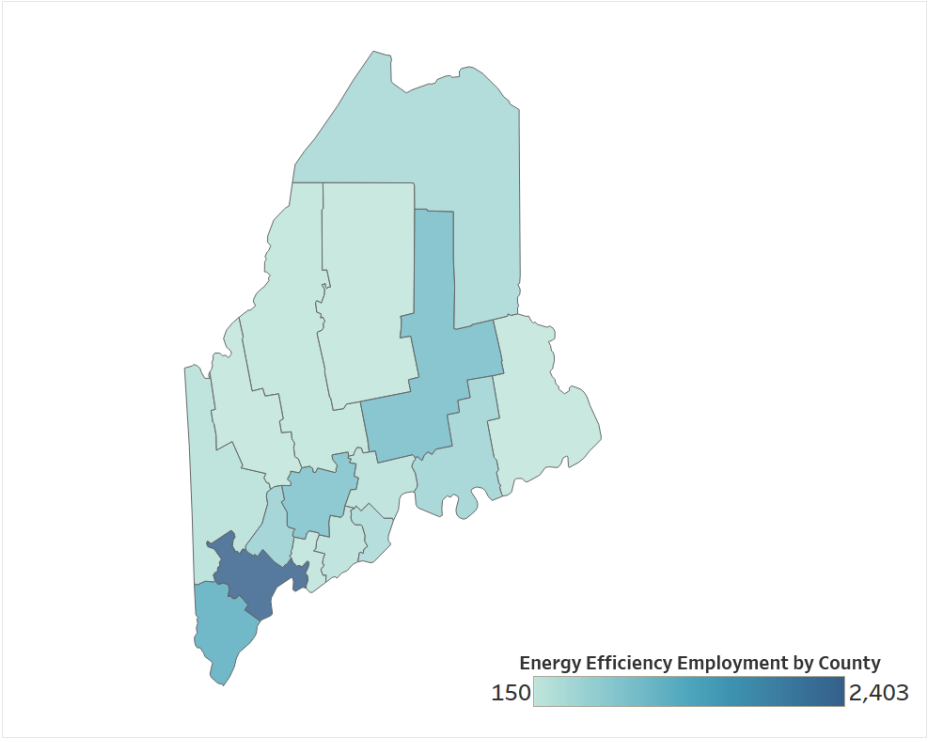
The state's energy efficiency economy is comprised mainly of trade and installation firms, with some activity in professional services as well. Trade accounts for almost half of all establishments, followed by installation firms, with 30 percent of the total. These firms are mostly small to medium-sized establishments—75 percent report one to five employees, 13 percent report six to 10 employees, and another 13 percent report 11 to 24 permanent workers. Energy efficiency work is enough to service all business revenue for 29 percent of firms, and half to most of business revenue for an additional 14 percent of establishments.

Maine ranks 11th in the nation for energy efficiency policies and programs, moving up three positions over 2015. The state received its highest marks in utilities, due to high savings targets and significant investments (ACEEE).

County	Energy Efficiency Employment
Cumberland County	2,403
York County	1,206
Penobscot County	907
Kennebec County	847
Androscoggin County	556
Hancock County	500
Aroostook County	411
Knox County	385
Oxford County	269
Waldo County	248

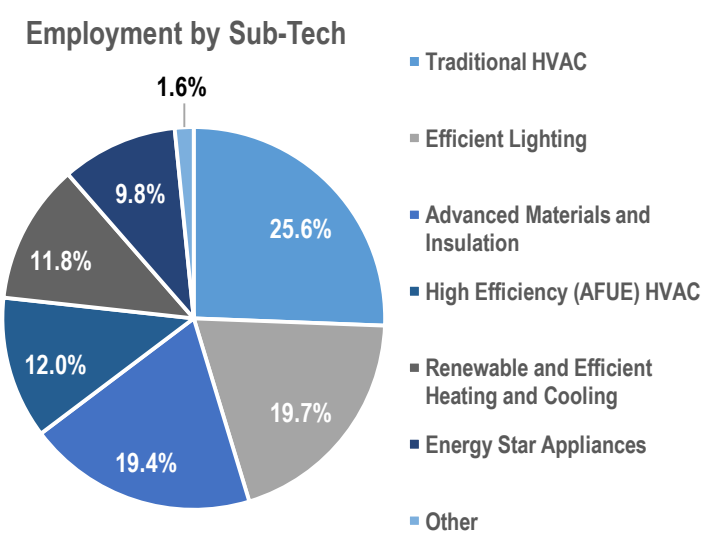
MSA	Energy Efficiency Employment
Portland-South Portland-Biddeford, ME MSA	3,810
ME NONMETROPOLITAN AREA	3,515
Bangor, ME MSA	962

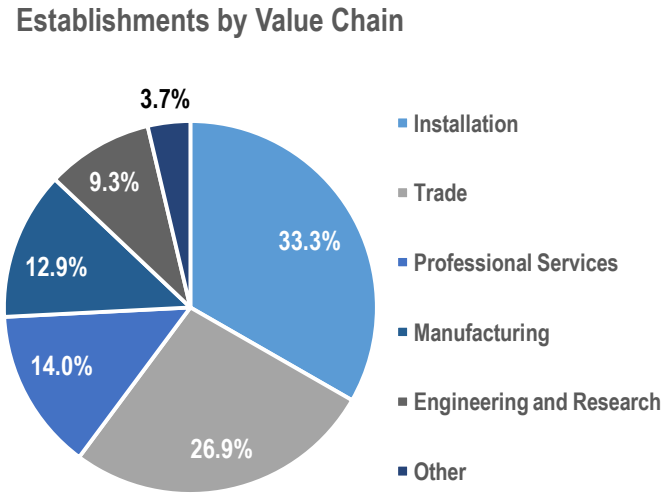
Congressional District	Energy Efficiency Employment
1	5,170
2	3,673



Michigan – 47,870 jobs

About 47,900 Michigan residents work in energy efficiency related jobs. The sector is very evenly distributed amongst the sub-technologies, with traditional HVAC accounting for the largest chunk at about a quarter of total employment.





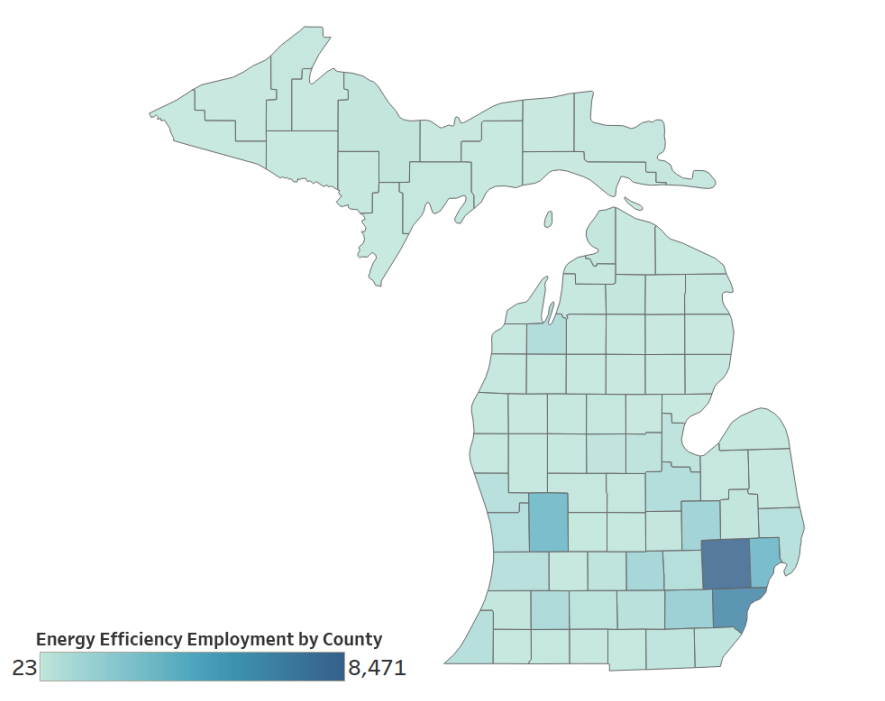
Installation and trade represent six in 10 firms, with installation accounting for a third of total establishments and trade account for just over a quarter. The remainder of activities is split between professional services, manufacturing, and engineering and research. These firms are mostly small businesses—80 percent report one to 10 employees, 14 percent report 11 to 49 employees, and three percent report 100 to 249 permanent workers. Energy efficiency products and services support the majority of revenue streams for 54 percent of firms, and 26 percent say they derive all of their revenue from this work.

Michigan rose three positions over its 2015 ranking, making its way to 11th in the 2016 State Energy Efficiency Scorecard. The state received its highest marks in utilities, as they have a multitude of both electric and natural gas efficiency programs in addition to long-term savings goals. Furthermore, there are performance incentives in place for achieving or exceeding energy savings targets (ACEEE).

County	Energy Efficiency Employment
Oakland County	8,471
Wayne County	6,375
Macomb County	3,614
Kent County	3,501
Washtenaw County	1,994
Genesee County	1,688
Ingham County	1,533
Kalamazoo County	1,220
Grand Traverse County	959
Saginaw County	933

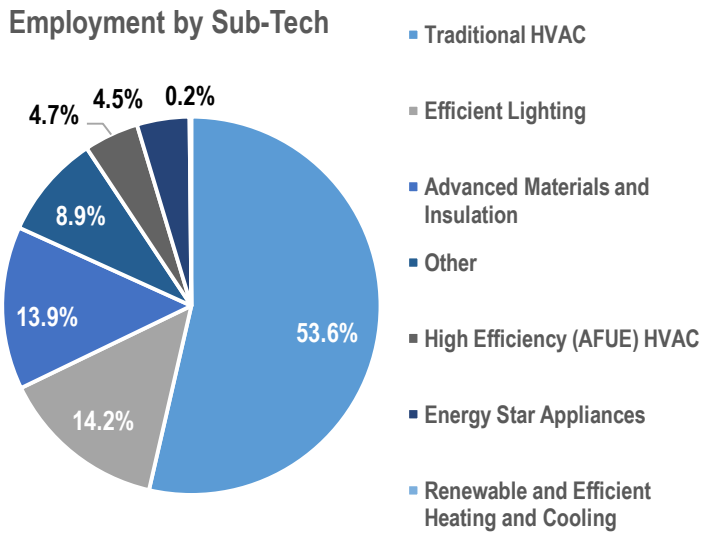
MSA	Energy Efficiency Employment
Detroit-Warren-Livonia, MI MSA	20,404
MI NONMETROPOLITAN AREA	10,147
Grand Rapids-Wyoming, MI MSA	3,995

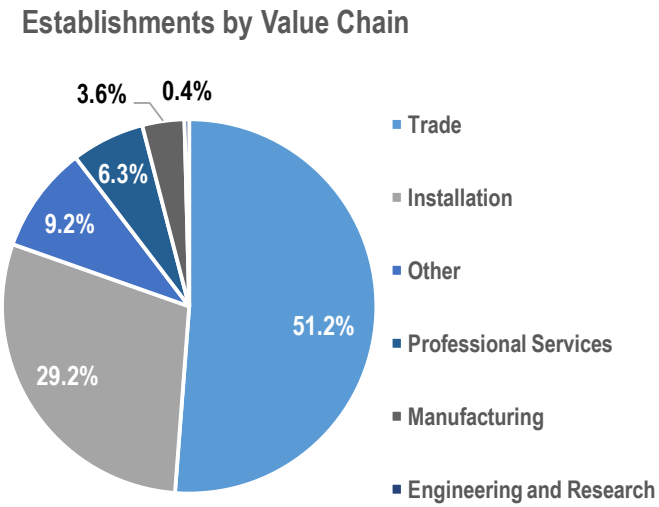
Congressional District	Energy Efficiency Employment
1	5,074
2	5,112
3	2,417
4	3,860
5	2,531
6	2,942
7	4,678
8	3,117
9	5,226
10	2,832
11	3,323
12	2,265
13	2,566
14	1,926



Minnesota – 47,362 jobs

Minnesota is home to 47,362 workers in energy efficiency related jobs. The majority of activity (54 percent) is concentrated in traditional HVAC, followed by efficient lighting and advanced materials and insulation.





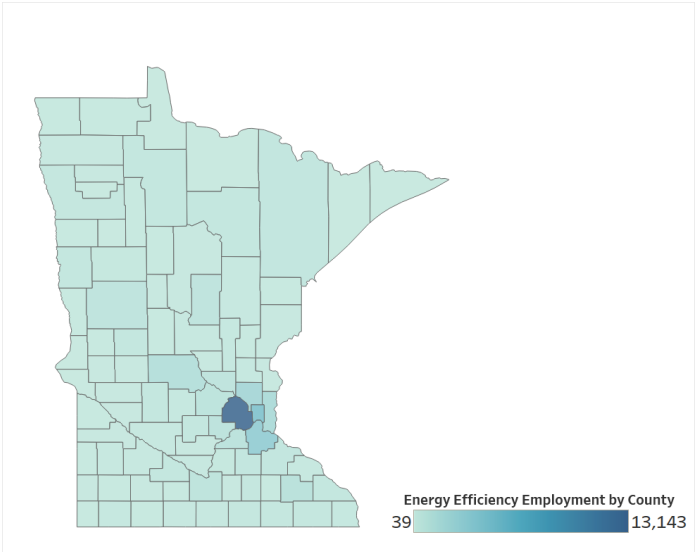
The state's energy efficiency economy is primarily comprised of trade and installation firms, with some activity in professional services and manufacturing. Firms engaged in wholesale trade account for over half of establishments, followed by installation firms at 29 percent. Energy efficiency firms in Minnesota are mostly small, with 80 percent reporting under 25 workers; however, about three percent of firms did report 100 to 249 permanent employees. Just under a quarter of establishments report that they derive all of their revenue from energy efficiency products and services, and another 28 percent report that half to most of their revenue is attributable to these activities.

Minnesota ranked 10th in the nation for its energy efficiency policies and programs, according to the 2016 State Energy Efficiency Scorecard. The state received its highest marks in utilities, having realized high levels of energy savings through both electric and natural gas programs (ACEEE).

County	Energy Efficiency Employment
Hennepin County	13,143
Ramsey County	4,400
Dakota County	3,257
Anoka County	2,132
Washington County	1,716
Stearns County	1,233
Olmsted County	982
Scott County	843
Carver County	814
Wright County	795

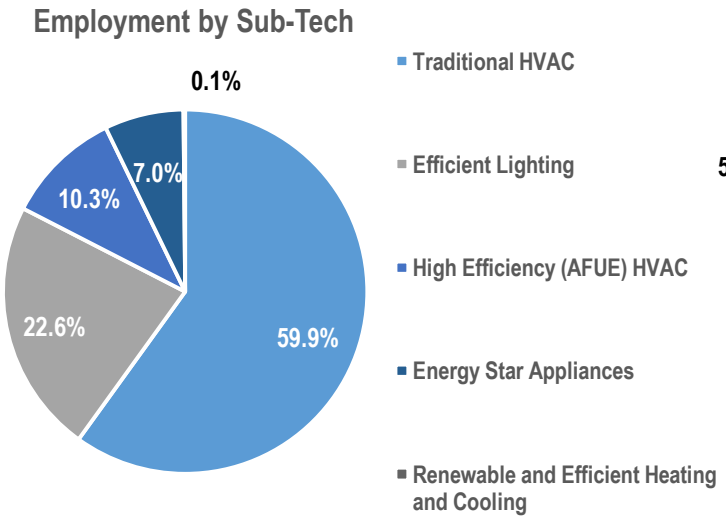
MSA	Energy Efficiency Employment
Minneapolis-St. Paul-Bloomington, MN-WI MSA	28,092
MN NONMETROPOLITAN AREA	13,904
St. Cloud, MN MSA	1,493

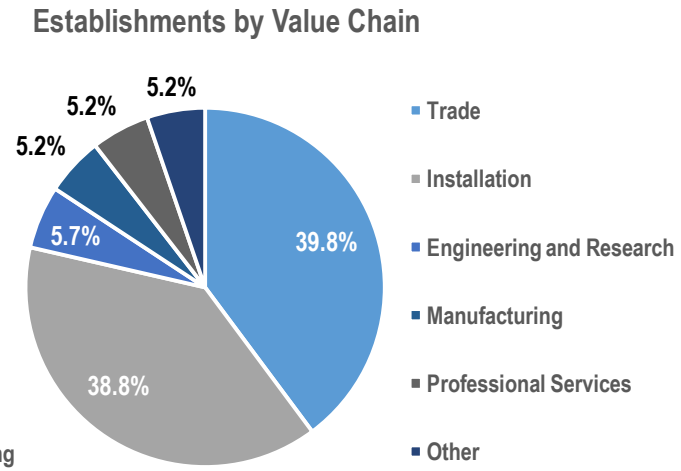
Congressional District	Energy Efficiency Employment
1	6,750
2	4,784
3	9,136
4	6,091
5	4,813
6	4,192
7	7,192
8	4,404



Missouri – 38,146 jobs

About 38,100 Missouri workers have energy efficiency related jobs. Six in 10 workers are primarily involved with traditional HVAC technologies, followed by efficient lighting, with about a quarter of the workforce.





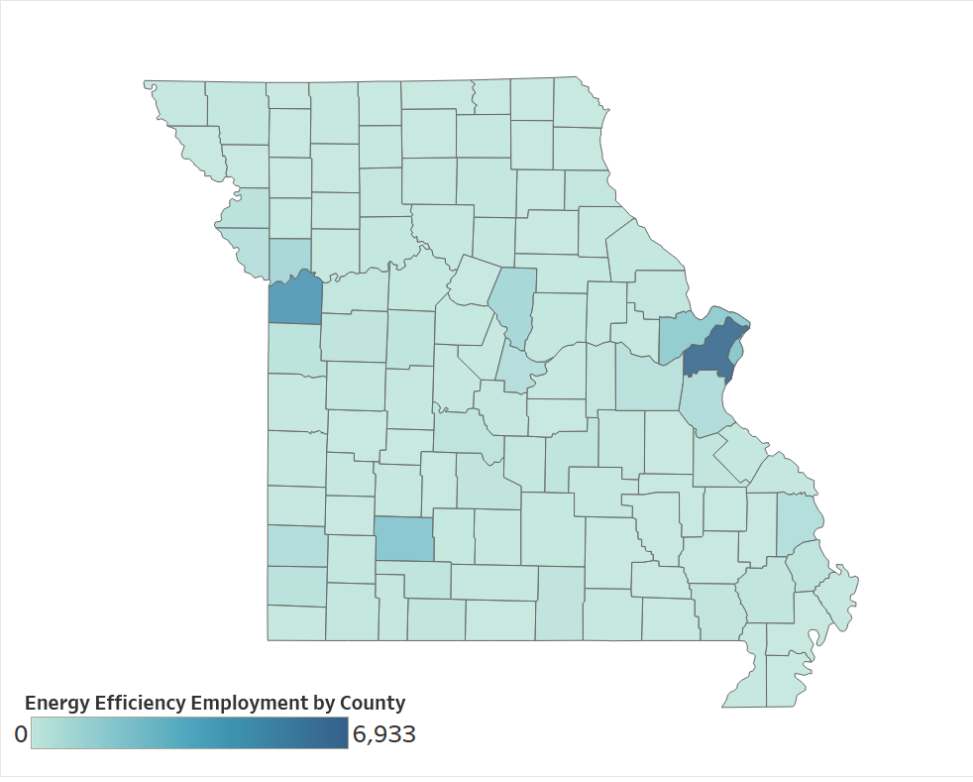
The state's energy efficiency economy is primarily comprised of trade (40 percent) and installation (39 percent) firms; there is also some activity in engineering and research, manufacturing, and professional services. Most of these firms are small businesses, with just over three-fourths (77 percent) employing fewer than 11 permanent workers. Energy efficiency goods and services provide the majority of business revenue for 59 percent of firms, while 27 percent report that all of their revenue is derived from energy efficient products.

Rising 12 positions in the ranking since 2015, Missouri now ranks 32nd in the nation for its energy efficiency policies and programs; the state is one of the most improved in the 2016 State Energy Efficiency Scorecard. In the beginning of 2016, the utility commission approved a second round of demand-side management programs, and in the past few years, energy savings have increased to be on par with the national average. In fact, energy efficiency is a central component of the state's 2015 Comprehensive State Energy Plan (ACEEE).

County	Energy Efficiency Employment
St Louis County	6,933
Jackson County	4,678
Greene County	2,267
St Louis City	1,845
St Charles County	1,525
Boone County	1,180
Clay County	1,134
Jefferson County	772
Jasper County	738
Cole County	722

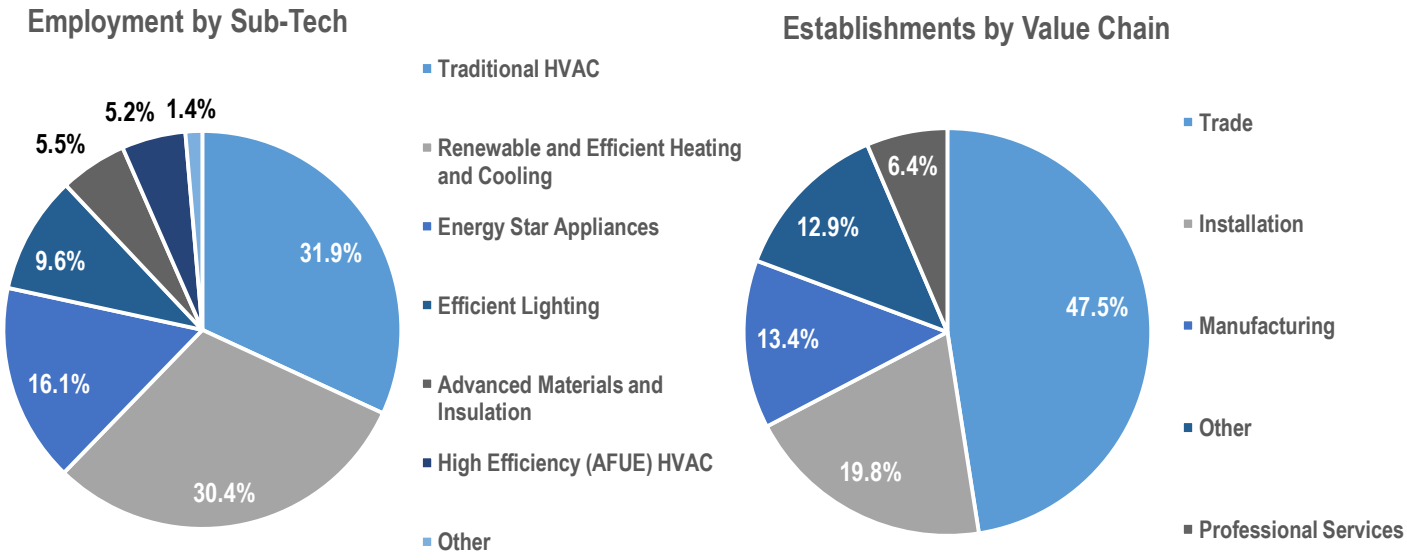
MSA	Energy Efficiency Employment
St. Louis, MO-IL MSA	12,323
MO NONMETROPOLITAN AREA	10,335
Kansas City, MO-KS MSA	7,535

Congressional District	Energy Efficiency Employment
1	6,481
2	3,991
3	5,102
4	4,204
5	5,740
6	4,180
7	4,738
8	3,824



Mississippi – 8,455 jobs

About 8,500 workers in Mississippi have jobs in energy efficiency related fields. The majority of work is concentrated in traditional HVAC and renewable and efficient heating and cooling technologies.



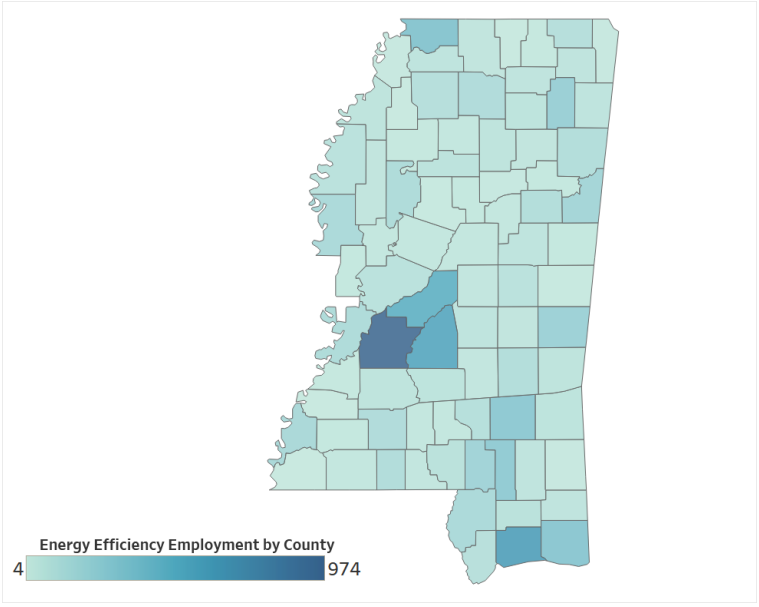
Perhaps given weak in-state incentives, installation firms only represent 20 percent of all energy efficiency establishments. The state has a high proportion of firms engaged in wholesale trade for energy efficiency technologies; almost half of all firms report wholesale trade as their main value chain activity.

Mississippi ranked 46th in the 2016 State Energy Efficiency Scorecard. Utilities only began implementing efficiency programs in 2014; as such, energy savings are still below the national average. As a home-rule state, each municipality has a voluntary residential code, but there has been little effort to update building codes or strengthen compliance (ACEEE).

County	Energy Efficiency Employment
Hinds County	974
Harrison County	600
Rankin County	543
Madison County	471
DeSoto County	334
Jackson County	309
Jones County	298
Forrest County	280
Lee County	237
Lauderdale County	219

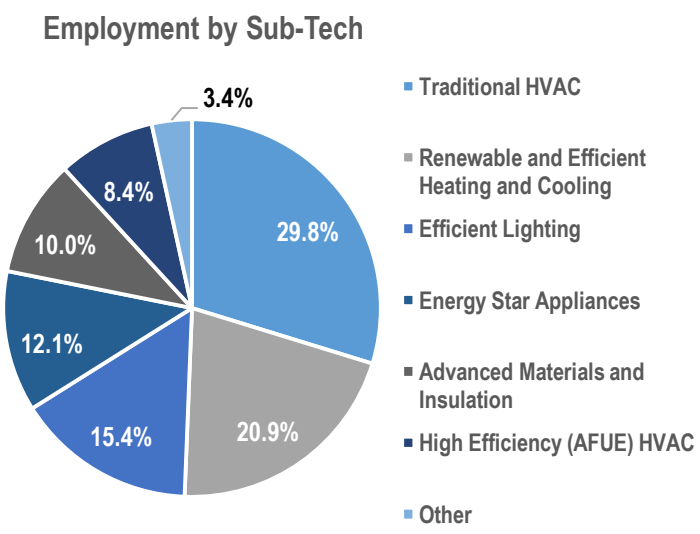
MSA	Energy Efficiency Employment
MS NONMETROPOLITAN AREA	4,258
Jackson, MS MSA	2,106
Gulfport-Biloxi, MS MSA	762

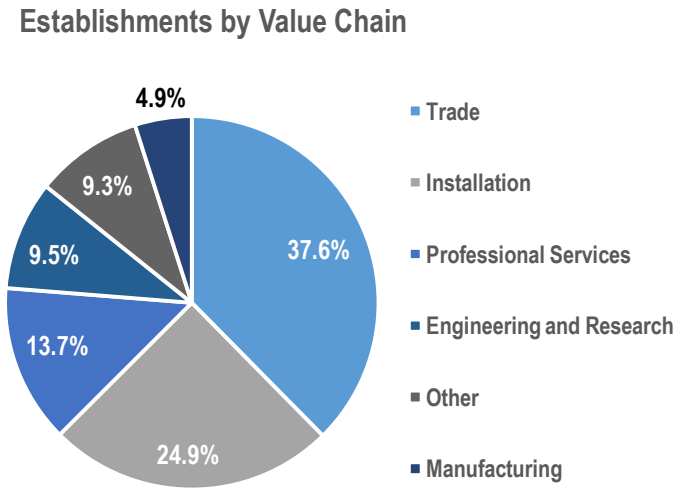
Congressional District	Energy Efficiency Employment
1	1,925
2	2,673
3	2,121
4	1,736



Montana – 6,101 jobs

About 6,100 Montanans work in energy efficiency related jobs. Three in 10 are mostly working in traditional HVAC technologies, followed by renewable and efficient heating and cooling, with 21 percent of workers.



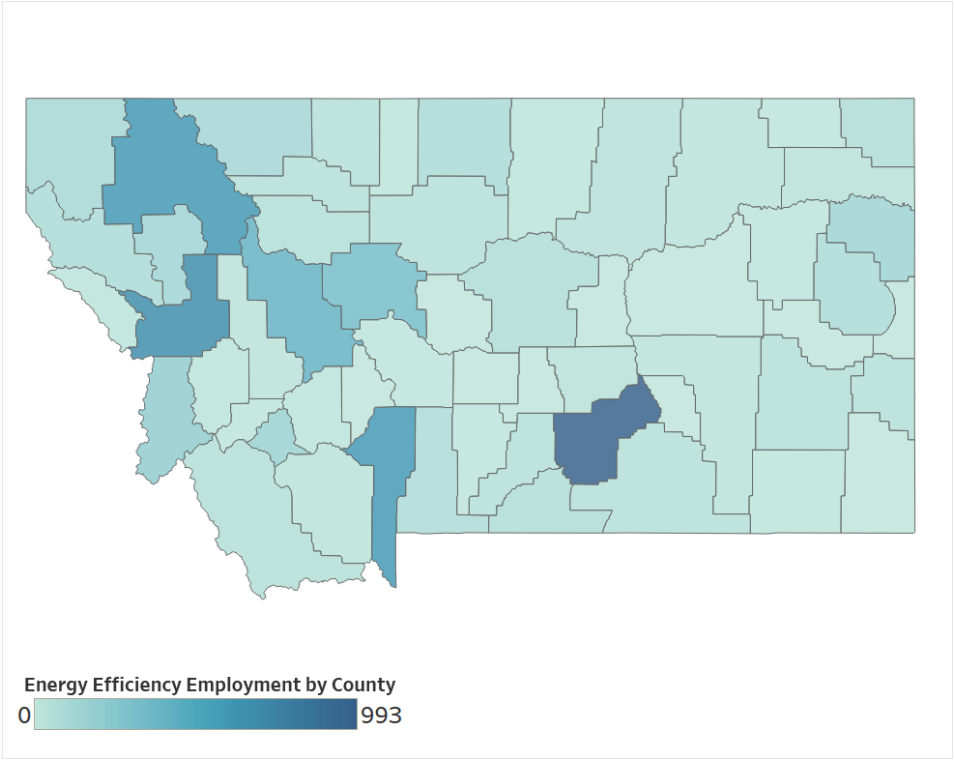


The state's energy efficiency economy is mostly comprised of firms engaged in wholesale trade, installation, and professional services. There is also some activity in engineering and research as well as manufacturing. These are mostly small to medium-sized firms—77 percent report one to 10 permanent employees, with the remaining 24 percent reporting 11 to 49 permanent workers. Only 13 percent of firms derive all of their revenue from energy efficiency goods and services, and an additional 31 percent receive half to most of it from this work.

Montana ranks 37th in the nation for its energy efficiency policies and programs. Without long-term savings targets or performance incentives, the state has yet to realize its maximum potential in energy savings. Utilities do invest in electric and natural gas programs, but lost revenue adjustment mechanisms are no longer in place (ACEEE).

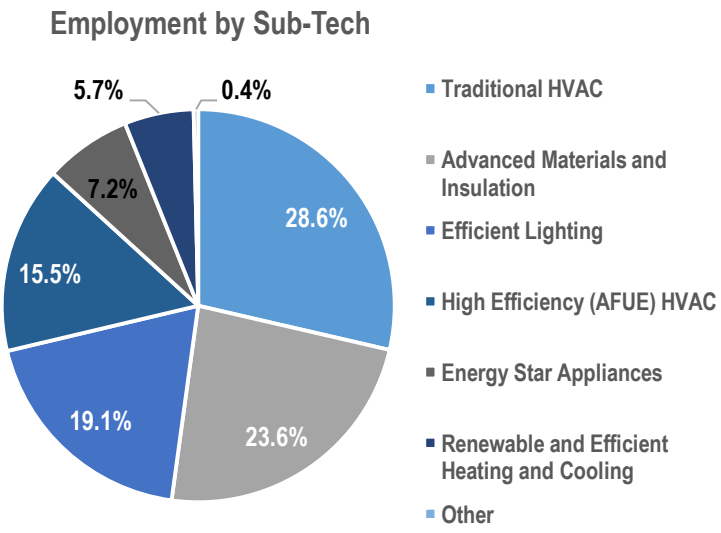
County	Energy Efficiency Employment
Yellowstone County	993
Missoula County	676
Flathead County	600
Gallatin County	591
Lewis and Clark County	410
Cascade County	330
Ravalli County	207
Silver Bow County	169
Richland County	148
Lake County	144

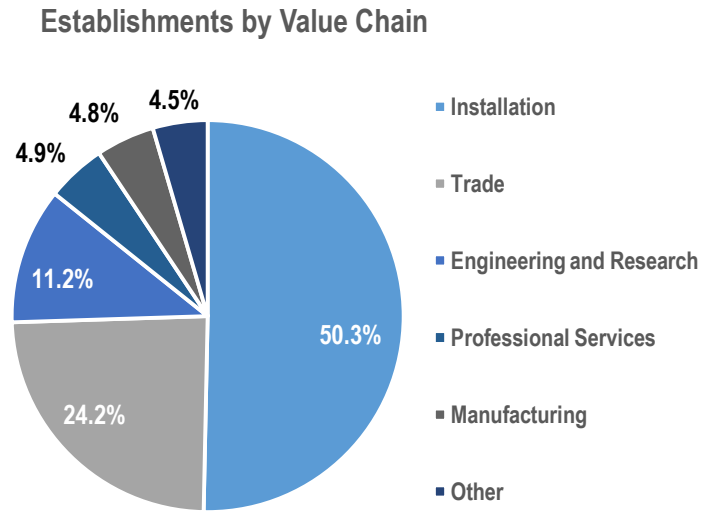
MSA	Energy Efficiency Employment
MT NONMETROPOLITAN AREA	4,026
Billings, MT MSA	1,069
Missoula, MT MSA	676



North Carolina – 47,829 jobs

North Carolina is home to about 47,800 workers in energy efficiency related jobs. Activity is fairly evenly split between traditional HVAC, advanced materials and insulation, efficient lighting, and high efficiency HVAC technologies. There is also some work with energy star appliances and renewable and efficient heating and cooling.





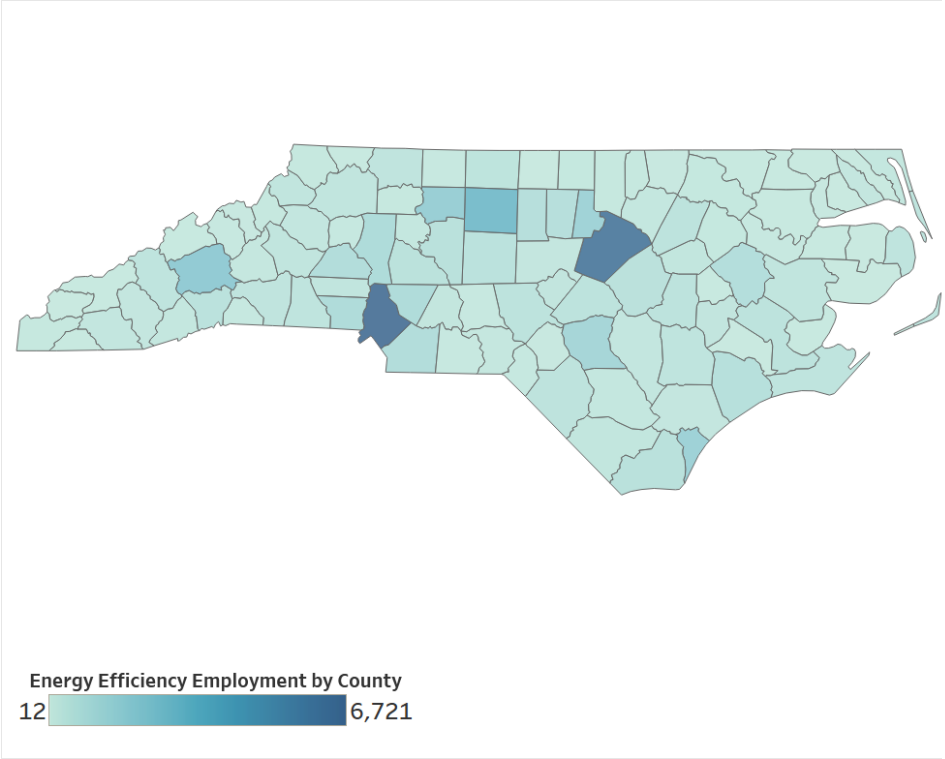
Installation firms comprise half of all energy efficiency establishments, followed by trade at 24 percent and engineering and research at 11 percent. 68 percent of firms employ one to five permanent workers, and about two percent report 100 to 249 permanent employees. Energy efficiency work is rarely sufficient to fully service business revenue, as only 18 percent of firms report that they derive all of their revenue from these goods and services; 15 percent report they derive half to most of their revenue from it.

North Carolina sits at 30th in the nation for the 2016 State Energy Efficiency Scorecard. While utilities have some electricity programs, there are few natural gas programs and the state's renewable portfolio standard minimally address energy efficiency as a resource. Furthermore, industrial customers may opt out of energy efficiency programs, limiting savings (ACEEE).

County	Energy Efficiency Employment
Mecklenburg County	6,721
Wake County	6,266
Guilford County	2,794
Buncombe County	1,957
Forsyth County	1,710
New Hanover County	1,486
Durham County	1,433
Cumberland County	1,218
Iredell County	902
Cabarrus County	865

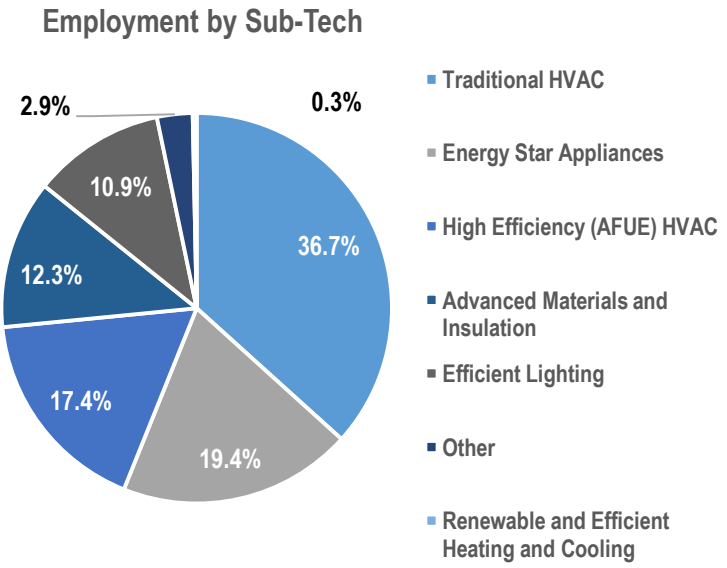
MSA	Energy Efficiency Employment
NC NONMETROPOLITAN AREA	12,008
Charlotte-Gastonia-Concord, NC-SC MSA	9,364
Raleigh-Cary, NC MSA	6,964

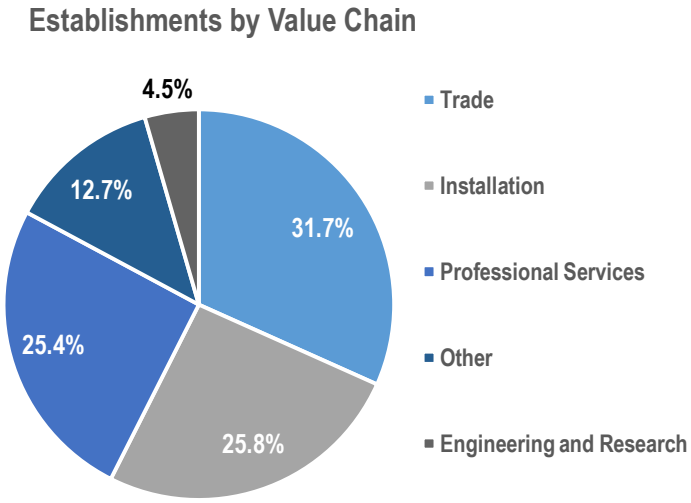
Congressional District	Energy Efficiency Employment
1	5,853
2	5,536
3	3,574
4	4,885
5	5,680
6	3,174
7	2,284
8	3,380
9	6,109
10	4,205
11	2,387
12	247
13	515



North Dakota – 6,299 jobs

About 6,300 North Dakotans work in energy efficiency related jobs. The majority of work is focused in traditional HVAC, and the remaining employees are fairly evenly spread across energy star appliances, high efficiency HVAC technologies, advanced materials and insulation, and efficient lighting; there is little activity in the renewable and efficient heating and cooling sector.



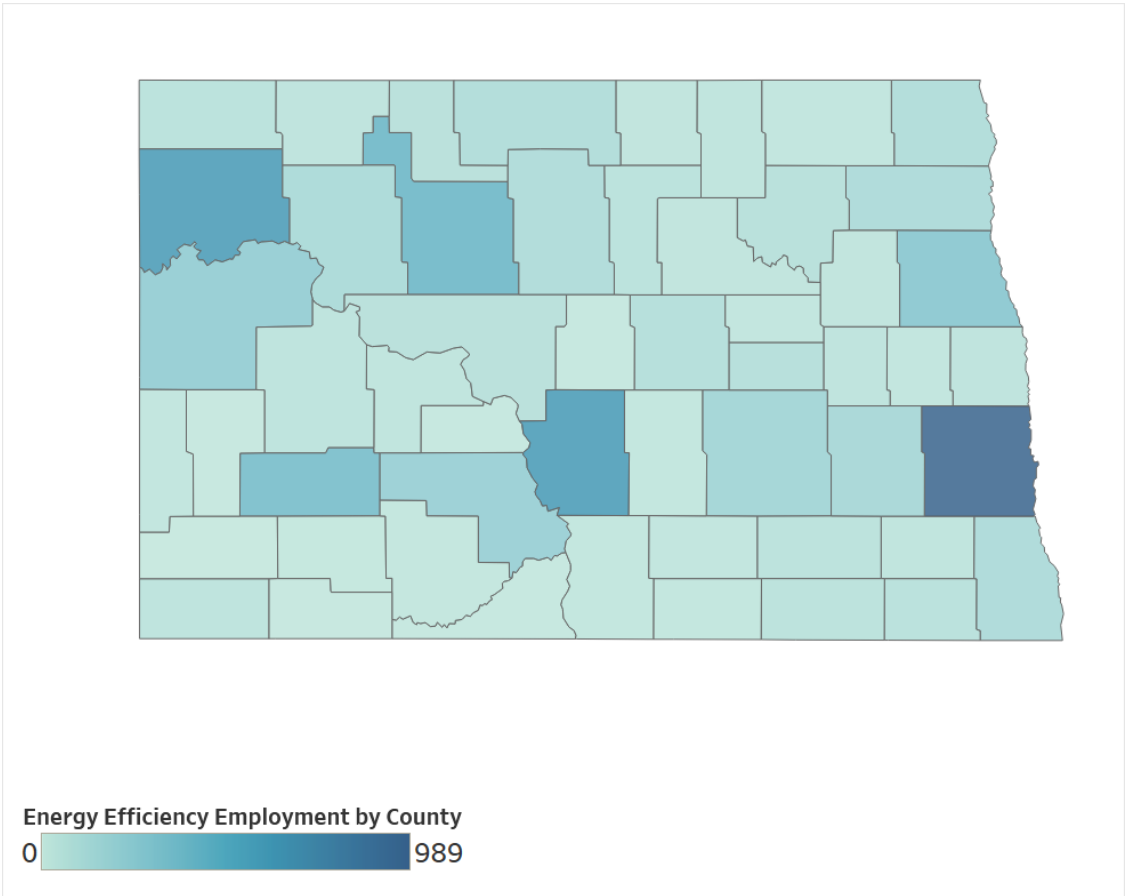


The state's energy efficiency economy has a healthy diversity of value chain activities, with about a quarter to a third of firms primarily involved in trade, installation, or professional services; about five percent of firms report that they are primarily involved in engineering and research for energy efficient products.

North Dakota falls in last place (51st) in the 2016 State Energy Efficiency Scorecard, earning zero points in the utilities category. Because utilities do not treat energy efficiency as a resource, they offer very few efficiency programs. In fact, this is the fourth year that North Dakota has ranked last in the State Scorecard, and state legislators have not indicated future improvements (ACEEE).

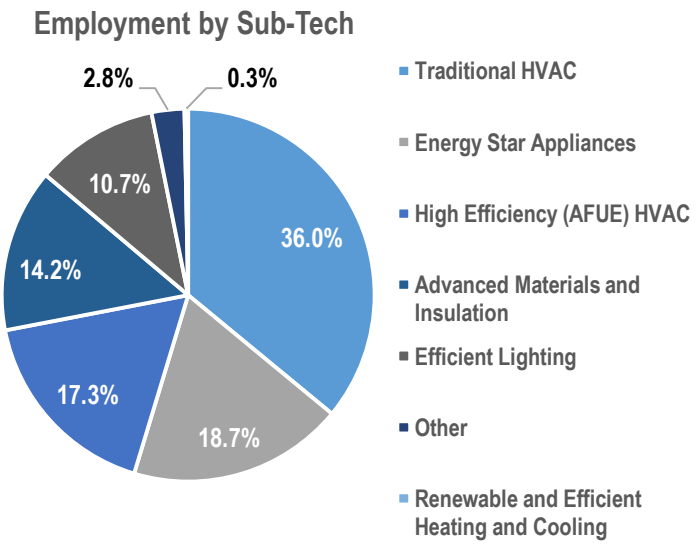
County	Energy Efficiency Employment
Cass County	989
Burleigh County	608
Williams County	599
Ward County	413
Stark County	367
Grand Forks County	292
McKenzie County	246
Morton County	218
Stutsman County	176
Barnes County	149

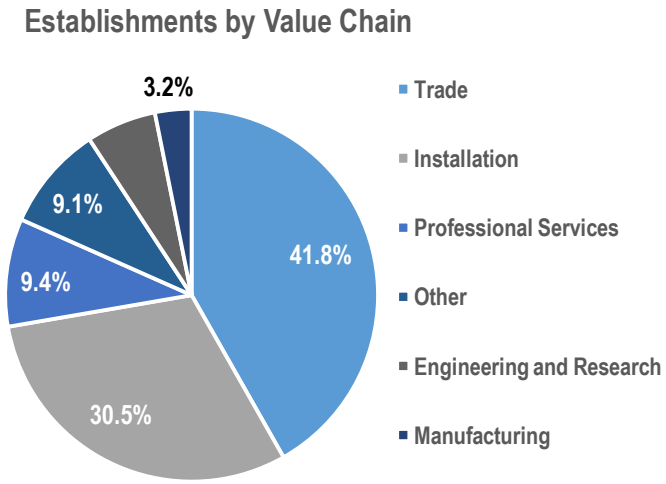
MSA	Energy Efficiency Employment
ND NONMETROPOLITAN AREA	4,192
Fargo, ND-MN MSA	989
Bismarck, ND MSA	826



Nebraska – 12,735 jobs

About 12,700 Nebraskans work in energy efficiency related jobs. Almost four in 10 are mostly focused on traditional HVAC technologies, followed by a fairly even split across energy star appliances, high efficiency HVAC, advanced materials and insulation, and efficient lighting.





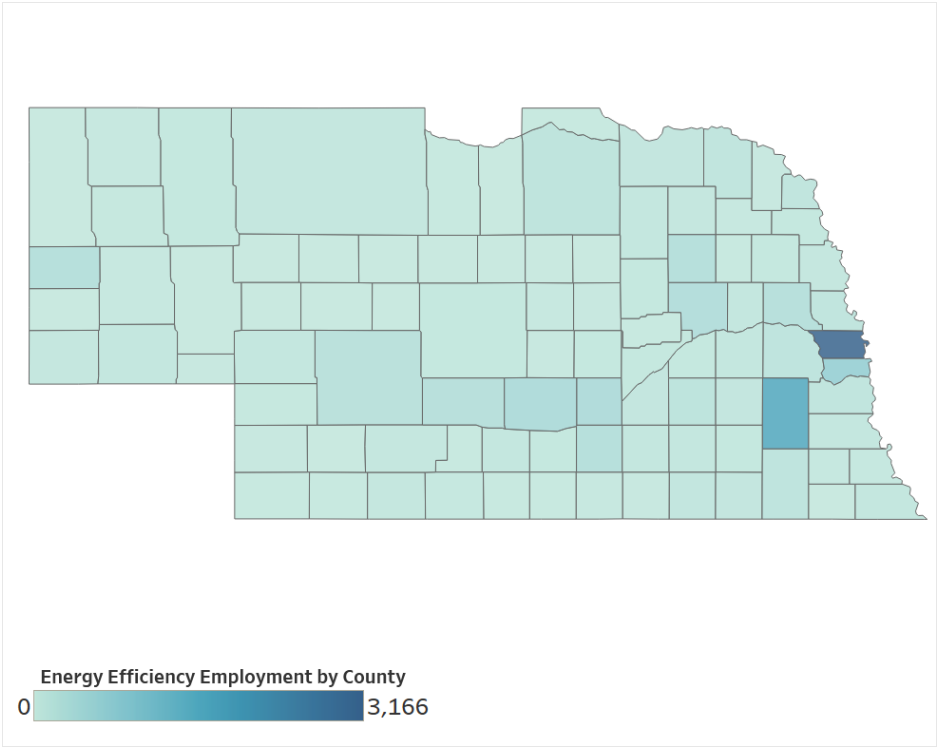
Most activity is concentrated in trade and installation, with these firms representing seven in 10 establishments across the state. These are mostly small to medium-sized businesses—82 percent report one to 10 permanent employees and 18 percent report 25 to 99 permanent workers. Interestingly, 46 percent of firms report that they manage to derive all of their revenue from this work, and an additional 27 percent note they derive half to most of their revenue from it.

Nebraska currently ranks 42nd in the nation for energy efficiency policies and programs, receiving the highest marks in building energy codes. There are no natural gas programs in place and few electrical efficiency programs. Furthermore, without decoupling mechanisms and performance incentives, the state faces challenges from utilities in incentivizing energy efficient upgrades. Residential and commercial buildings are required to comply with the 2009 IECC, but local jurisdictions may exceed the state code; in fact, two are moving towards adopting the 2012 IECC (ACEEE).

County	Energy Efficiency Employment
Douglas County	3,166
Lancaster County	1,622
Sarpy County	684
Buffalo County	384
Hall County	378
Platte County	326
Adams County	300
Scotts Bluff County	293
Madison County	287
Dodge County	280

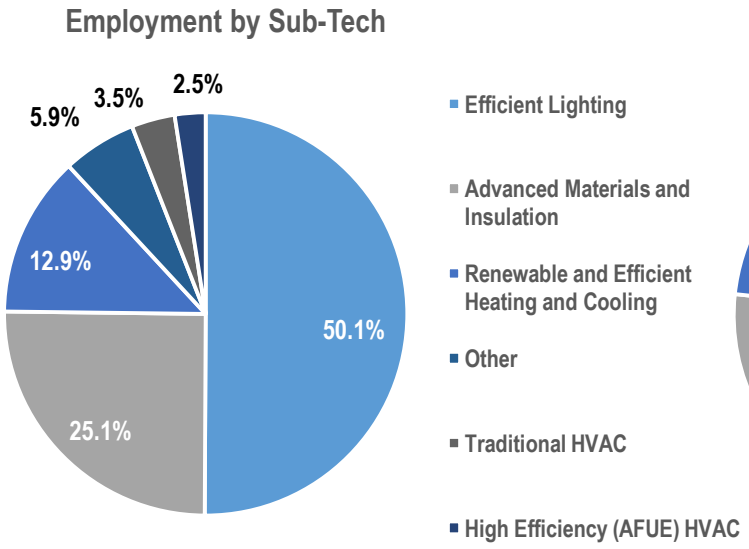
MSA	Energy Efficiency Employment
NE NONMETROPOLITAN AREA	6,566
Omaha-Council Bluffs, NE-IA MSA	4,280
Lincoln, NE MSA	1,720

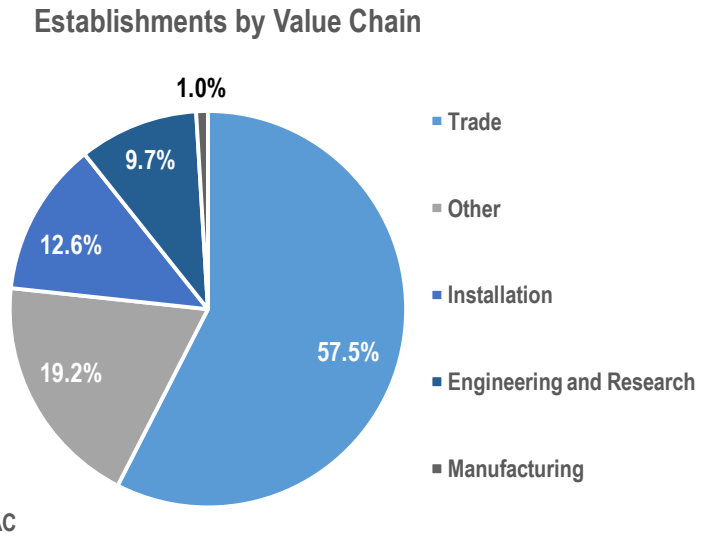
Congressional District	Energy Efficiency Employment
1	4,184
2	3,396
3	5,156



New Hampshire – 6,833 jobs

About 6,833 New Hampshire workers have jobs in energy efficiency related occupations. Half of these employees work mostly with efficient lighting technologies, followed by advanced materials and insulation at about a quarter.





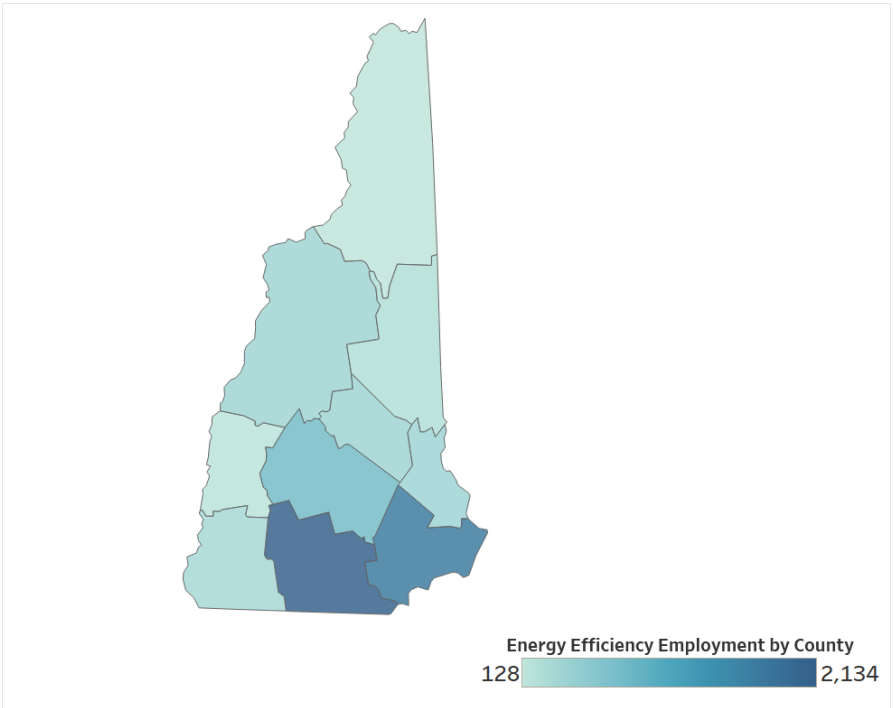
The majority of firm activity is concentrated in wholesale trade, with installation only representing 13 percent of establishments across the state. About 43 percent of firms report that they employ only one to five permanent employees, while 29 percent each employ 11 to 24 and 50 to 99 workers. A third of surveyed employers note that all of their revenue is derived from energy efficiency products and services, and another 17 percent note half to most of their revenue is attributed to this work.

New Hampshire ranked 21st in the 2016 State Energy Efficiency Scorecard, earning its highest marks in utilities. The state has recently approved new energy savings goals, and in fact, has some of the highest savings from its natural gas programs in the nation (ACEEE).

County	Energy Efficiency Employment
Hillsborough County	2,134
Rockingham County	1,752
Merrimack County	804
Strafford County	416
Belknap County	413
Grafton County	410
Cheshire County	342
Carroll County	251
Sullivan County	183
Coos County	128

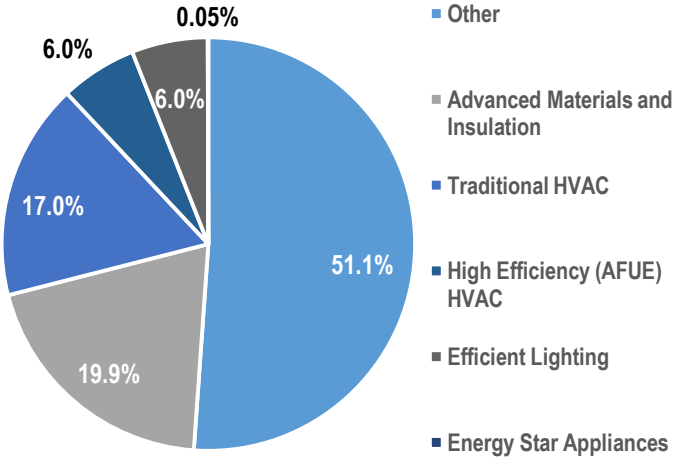
MSA	Energy Efficiency Employment
NH NONMETROPOLITAN AREA	2,531
Boston-Cambridge-Quincy, MA-NH MSA	2,168
Manchester-Nashua, NH MSA	2,134

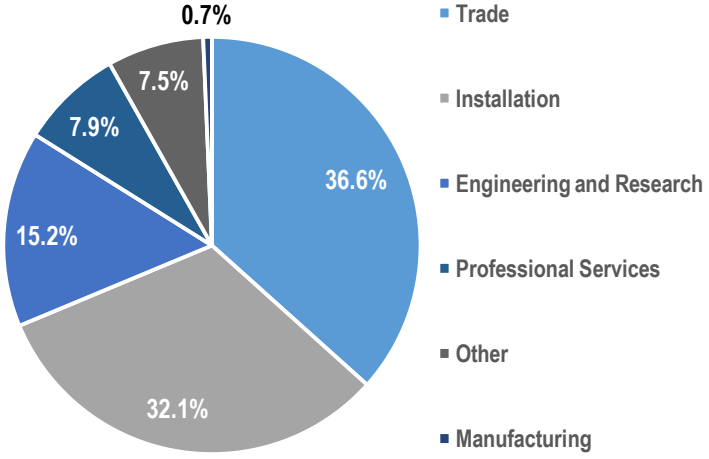
Congressional District	Energy Efficiency Employment
1	3,735
2	3,098



New Jersey – 38,378 jobs

About 38,400 New Jersey residents work in energy efficiency related jobs. The largest chunk of activity is concentrated in "other" technologies, followed by advanced materials and insulation and traditional HVAC.





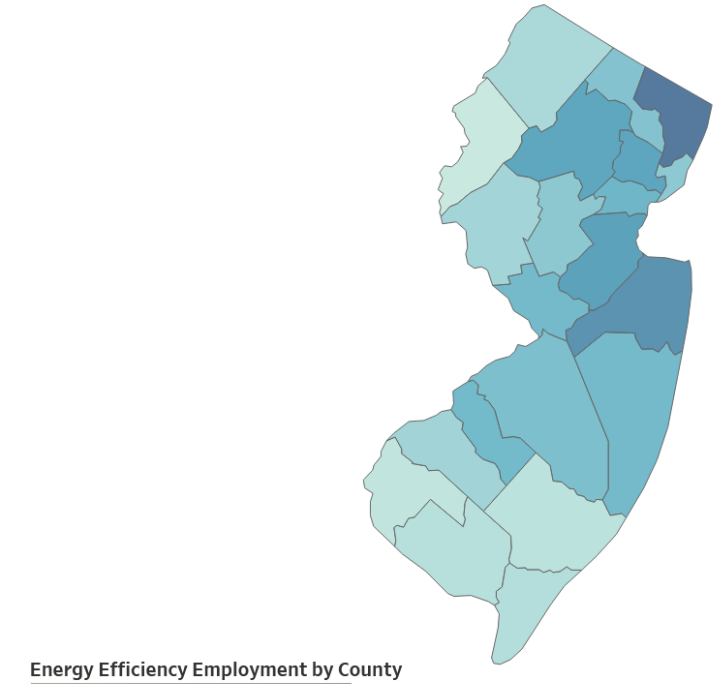
The sector is primarily comprised of trade and installation firms, followed by some activity in engineering and research as well as professional services. Most of these firms are small businesses—79 percent report fewer than 11 permanent workers. Only 18 percent of firms derive all of their revenue from energy efficiency work, and 64 percent say less than a quarter of revenue is attributable to this work.

New Jersey ranked 24th in the nation in the 2016 State Energy Efficiency Scorecard, earning its highest marks in transportation. With electric and natural gas efficiency programs administered by utilities, energy savings have been consistent year over year. However, the state does not have an energy efficiency resource standard, performance incentives, or decoupling mechanisms in place (ACEEE).

County	Energy Efficiency Employment
Bergen County	4,905
Monmouth County	3,837
Middlesex County	3,205
Essex County	3,061
Morris County	3,034
Union County	2,336
Camden County	2,228
Ocean County	2,218
Mercer County	2,202
Burlington County	1,999

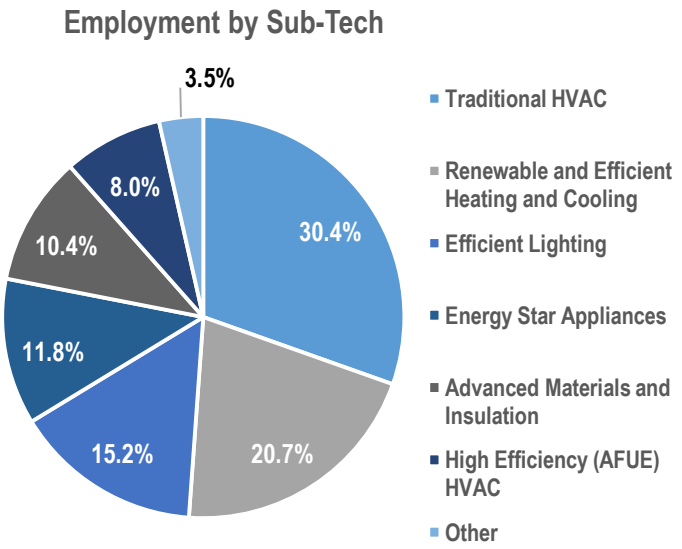
MSA	Energy Efficiency Employment
New York-Northern New Jersey-Long Island, NY-NJ-PA MSA	29,357
Philadelphia-Camden-Wilmington, PA-NJ-DE-MD MSA	5,482
Trenton-Ewing, NJ MSA	2,202

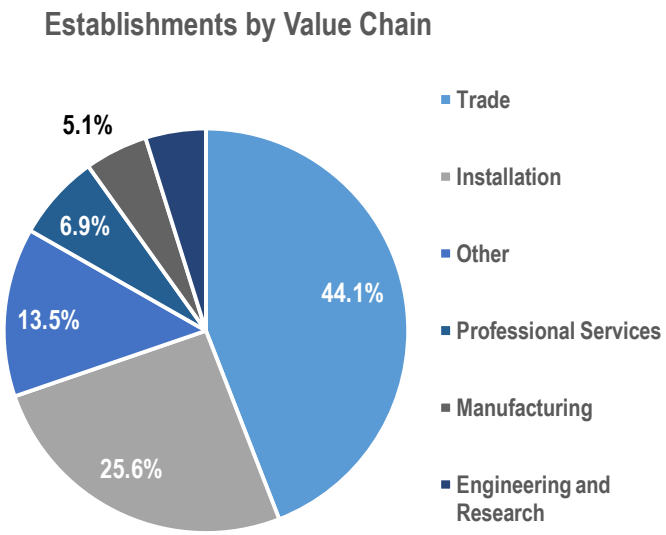
Congressional District	Energy Efficiency Employment
1	3,255
2	1,797
3	3,704
4	4,039
5	4,252
6	2,754
7	5,883
8	2,774
9	2,920
10	1,156
11	3,677
12	2,169



New Mexico – 13,554 jobs

About 13,500 New Mexico residents work in energy efficiency related jobs. Three in 10 workers primarily work with traditional HVAC technologies, followed by renewable and efficient heating and cooling, with 21 percent of the workforce.





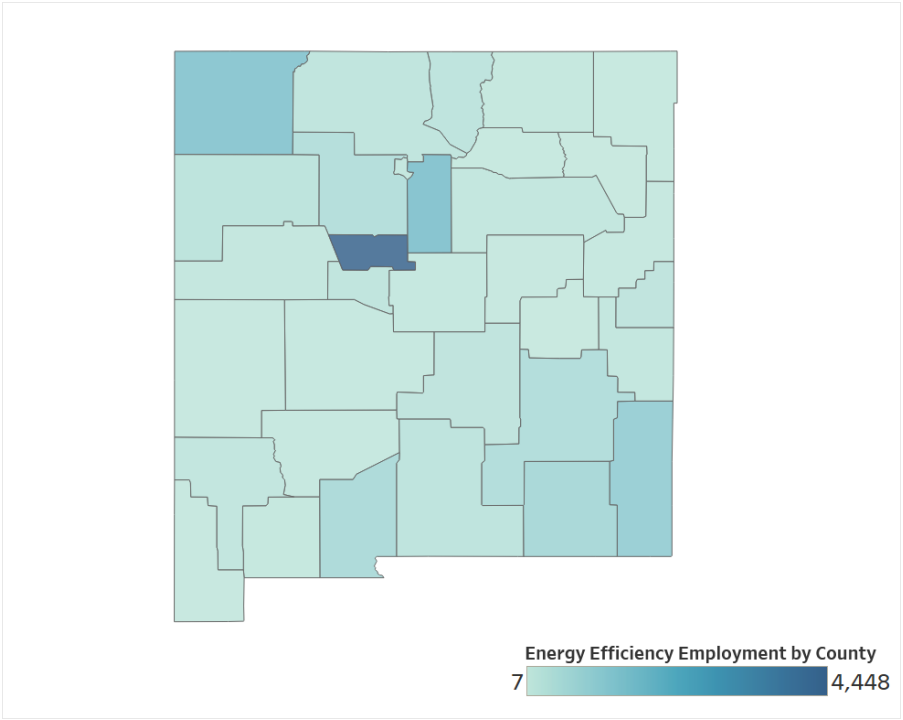
The largest area of activity is in wholesale trade; 44 percent of firms report that trade is their primary value chain activity. This is followed by installation, which accounts for just over a quarter of establishments. These firms are mostly small businesses, with 85 percent employing 10 or fewer permanent workers. Only 15 percent of firms derive all of their revenue from energy efficiency services, and another 31 percent attribute half to most of their revenue to this work.

New Mexico was placed 35th in the nation in the 2016 State Energy Efficiency Scorecard. Although it has an energy efficiency resource standard, targets were lowered in 2013. Utilities offer both electric and natural gas programs, and there are performance incentives in place. The state's energy savings have been below the national average for the past few years (ACEEE).

County	Energy Efficiency Employment
Bernalillo County	4,448
Santa Fe County	1,539
San Juan County	1,424
Lea County	1,058
Eddy County	685
Dona Ana County	603
Chaves County	475
Sandoval County	441
McKinley County	264
Otero County	244

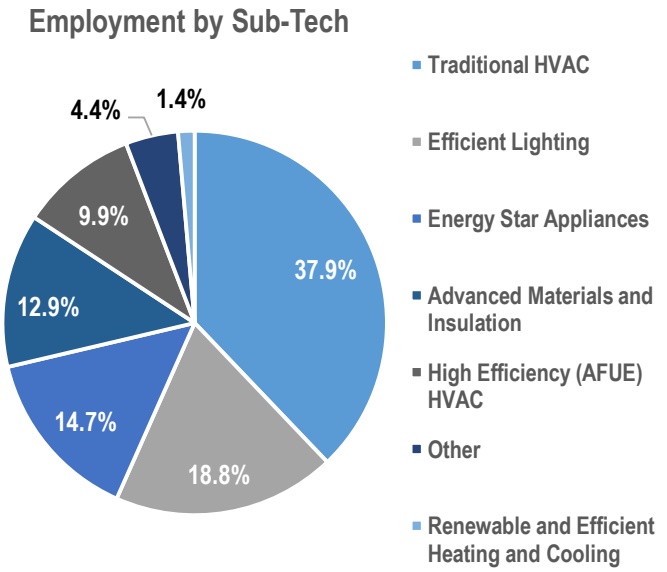
MSA	Energy Efficiency Employment
Albuquerque, NM MSA	5,174
NM NONMETROPOLITAN AREA	4,807
Santa Fe, NM MSA	1,539

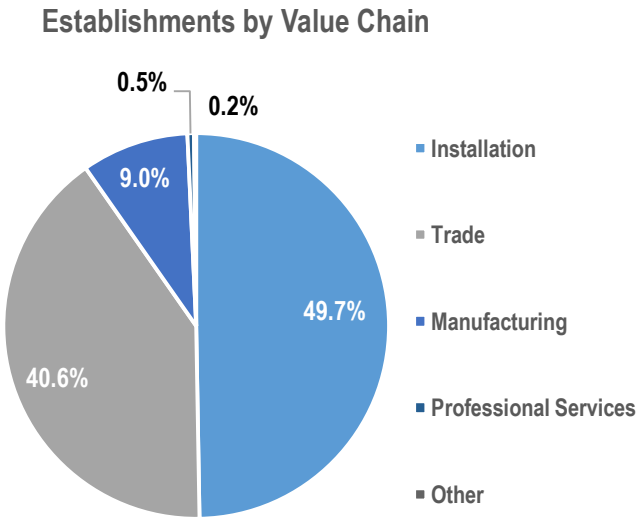
Congressional District	Energy Efficiency Employment
1	4,807
2	4,222
3	4,525



Nevada – 15,364 jobs

Nearly 15,400 Nevadans work in energy efficiency related jobs. Almost four in 10 workers are primarily involved with traditional HVAC technologies, followed by efficient lighting and energy star appliances.





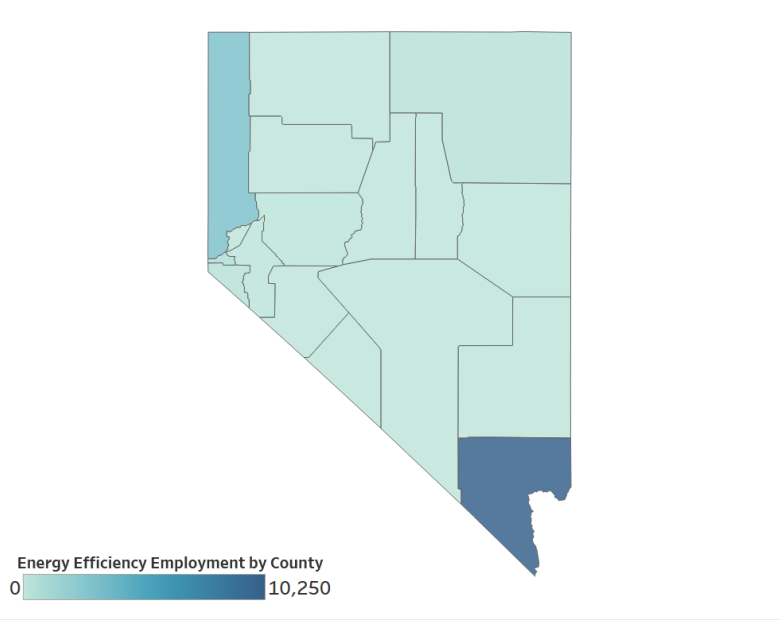
The state's energy efficiency economy is primarily comprised of installation and trade firms, with the two activities representing nine in 10 establishments. Nine percent of firms report that manufacturing is their primary activity. These firms are primarily small businesses, as 78 percent report one to five permanent employees. Just over half (56 percent) of firms report that they derive all of their revenue from energy efficiency work, and another third (33 percent) derive half to most of their revenue from this work.

Nevada ranks 37th in the nation for its energy efficiency policies and programs. Although the state currently allows energy efficiency investments to be counted in its renewable portfolio standard, allowances are going to be phased out over time. Utilities offer both electric and natural gas efficiency programs, but there are no long-term energy savings targets in place as of yet (ACEEE).

County	Energy Efficiency Employment
Clark County	10,250
Washoe County	2,990
Carson City	644
Elko County	408
Douglas County	386
Churchill County	207
Lyon County	129
Humboldt County	114
Nye County	114
White Pine County	50

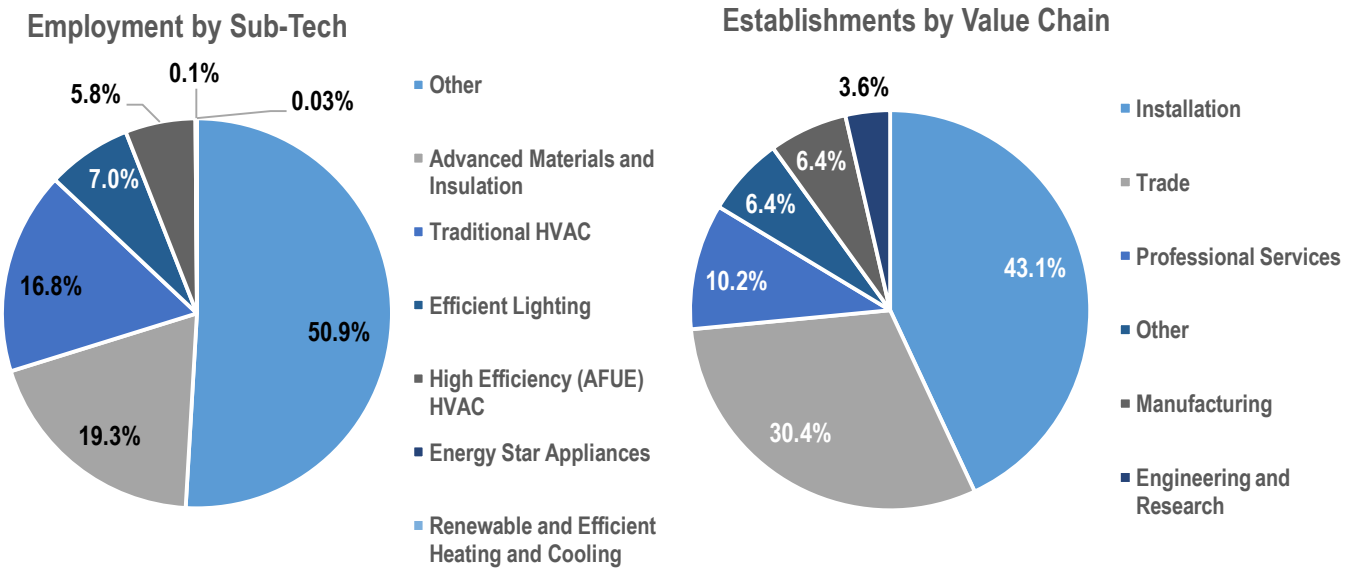
MSA	Energy Efficiency Employment
Las Vegas-Paradise, NV MSA	10,250
Reno-Sparks, NV MSA	2,990
NV NONMETROPOLITAN AREA	1,481

Congressional District	Energy Efficiency Employment
1	7,541
2	4,930
3	1,885
4	1,008



New York – 69,704 jobs

About 69,700 New Yorkers work in energy efficiency related occupations. Most activity is concentrated in "other" sub-technologies, followed by advanced materials and insulation and traditional HVAC.



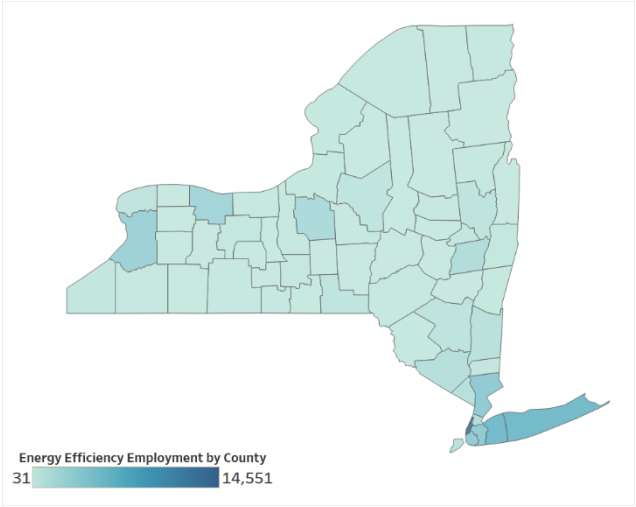
The largest area of activity is in installation, with 43 percent of establishments reporting it as their primary value chain activity. This is followed by trade, with 30 percent of total firms. Just over half (56 percent) of firms are small businesses with 10 or fewer permanent employees. 45 percent of employers report that they derive the majority of their business revenue from energy efficiency work; 20 percent report that all of their revenue is attributable to this work.

New York rose four positions compared to its 2015 ranking, making its way to 5th in the nation in the 2016 State Energy Efficiency Scorecard. The state received its highest marks in utilities and transportation. The state's Reforming the Energy Vision (REV) program is working to reshape the utility industry and integrate distributed energy resources. However, long-term energy efficiency goals are not yet in place (ACEEE).

County	Energy Efficiency Employment
New York County	14,551
Suffolk County	6,523
Nassau County	6,445
Westchester County	4,329
Kings County	4,183
Queens County	4,129
Erie County	3,224
Monroe County	2,856
Onondaga County	2,113
Albany County	1,670

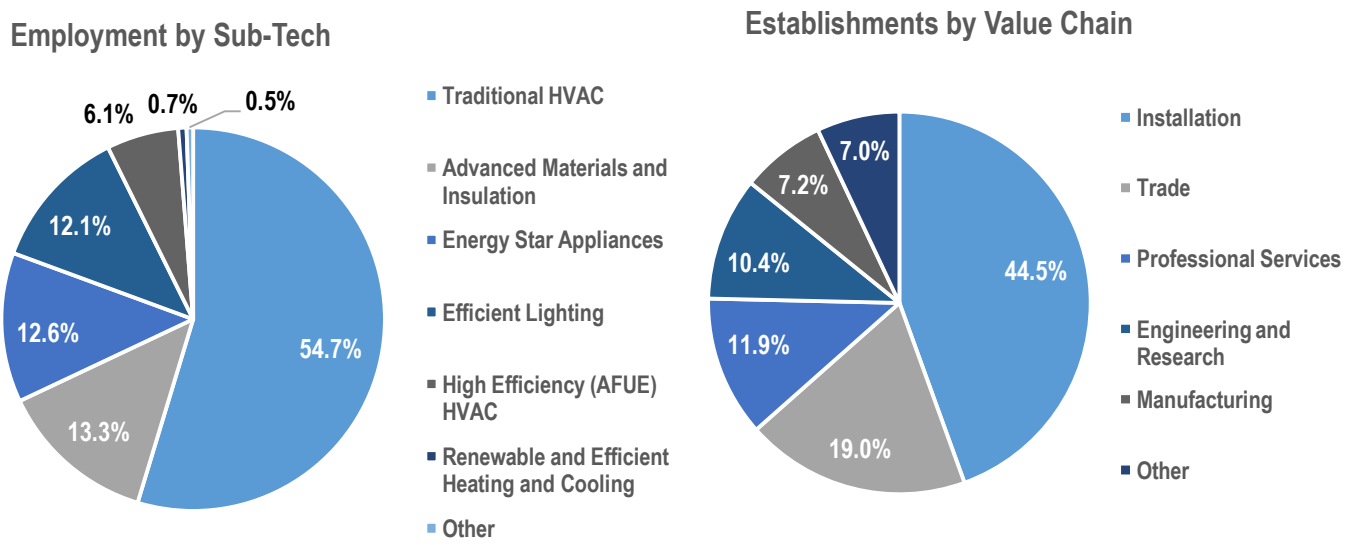
MSA	Energy Efficiency Employment
New York-Northern New Jersey-Long Island, NY-NJ-PA MSA	44,523
NY NONMETROPOLITAN AREA	5,089
Buffalo-Niagara Falls, NY MSA	3,847

Congressional District	Energy Efficiency Employment	Congressional District	Energy Efficiency Employment
1	4,188	15	559
2	2,353	16	1,895
3	4,010	17	3,639
4	3,089	18	3,067
5	991	19	3,153
6	1,638	20	3,077
7	4,309	21	2,178
8	949	22	2,261
9	464	23	2,572
10	6,077	24	2,883
11	1,270	25	2,642
12	6,585	26	2,886
13	556	27	1,457
14	959		



Ohio – 78,202 jobs

About 78,200 Ohioans work in energy efficiency related jobs. The majority of employees spend most of their time working with traditional HVAC goods and services, followed by advanced materials and insulation and energy star appliances.



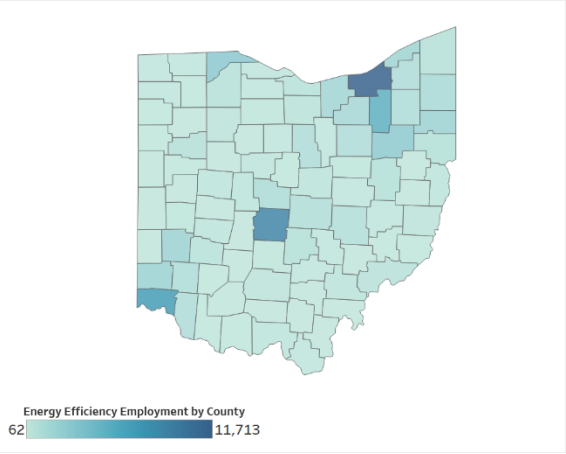
The state's energy efficiency economy is primarily comprised of installation and trade firms; installation firms represent 45 percent of establishments and trade firms represent 19 percent of establishments. Over three-quarters (78 percent) of these firms are small, reporting fewer than 11 permanent employees. 58 percent of firms derive most of their revenue from energy efficiency work; 32 percent note that all of their revenue comes from this work.

Ohio placed 29th in the nation in the 2016 State Energy Efficiency Scorecard, receiving its highest marks in utilities. In 2014, however, the state took a step backward by instigating a freeze on its renewable energy and energy efficiency resource standards. Most utilities, however, still continue to implement some efficiency programs (ACEEE).

County	Energy Efficiency Employment
Cuyahoga County	11,713
Franklin County	8,721
Hamilton County	6,877
Summit County	5,275
Lucas County	2,822
Stark County	2,745
Butler County	2,000
Montgomery County	1,964
Mahoning County	1,950
Lake County	1,783

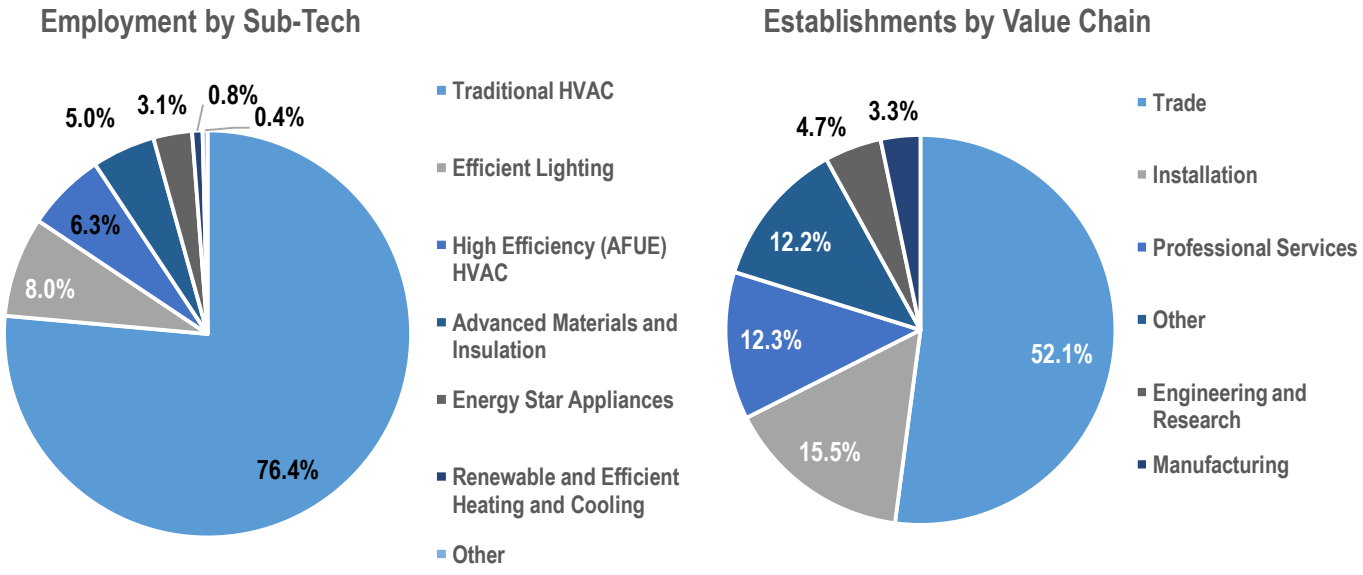
MSA	Energy Efficiency Employment
Cleveland-Elyria-Mentor, OH MSA	17,563
OH NONMETROPOLITAN AREA	13,926
Columbus, OH MSA	12,405

Congressional District	Energy Efficiency Employment	Congressional District	Energy Efficiency Employment
1	8,471	9	4,283
2	2,865	10	2,081
3	7,578	11	10,848
4	7,151	12	2,454
5	4,324	13	4,919
6	6,127	14	4,290
7	7,535	15	1,892
8	1,877	16	1,506



Oklahoma – 36,164 jobs

About 36,200 Oklahomans work in energy efficiency jobs. The vast majority of these employees (76 percent) work with traditional HVAC, but there is slight activity across efficient lighting, high efficiency HVAC, advanced materials and insulation, and energy star appliances.



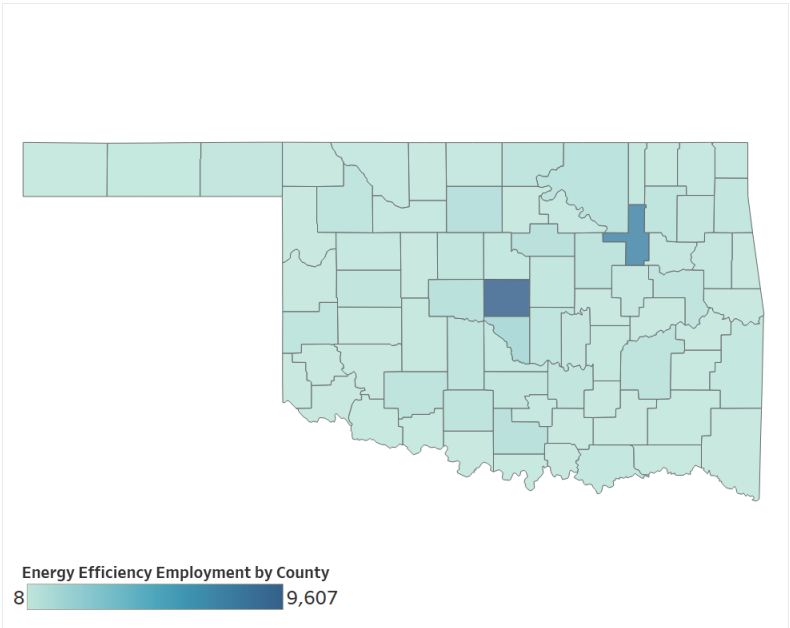
Just over half of firms report that their primary activity related to energy efficiency technologies is wholesale trade. Given the lack of in-state energy efficiency upgrades and adoption, it is not surprising that only 16 percent of establishments are primarily involved in the installation of these systems. 73 percent of firms are small businesses with fewer than 11 permanent workers. Only 18 percent of firms report that they derive all of their revenue from energy efficient goods and services.

Oklahoma ranked 44th in the nation for its energy efficiency policies and programs. Though the state's utilities offer both electric and natural gas programs, energy savings are lower than the national average and large electric customers are allowed to opt out of programs. In fact, 90 percent of eligible customers have chosen to opt out, hindering any potential efficiency gains and energy savings (ACEEE).

County	Energy Efficiency Employment
Oklahoma County	9,607
Tulsa County	7,154
Cleveland County	1,370
Garfield County	812
Canadian County	771
Payne County	747
Carter County	738
Osage County	632
Creek County	533
Stephens County	525

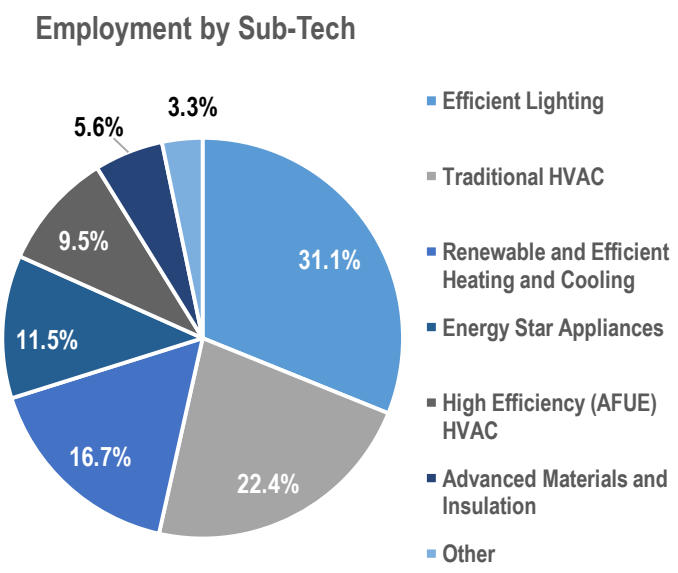
MSA	Energy Efficiency Employment
OK NONMETROPOLITAN AREA	13,155
Oklahoma City, OK MSA	13,057
Tulsa, OK MSA	9,092

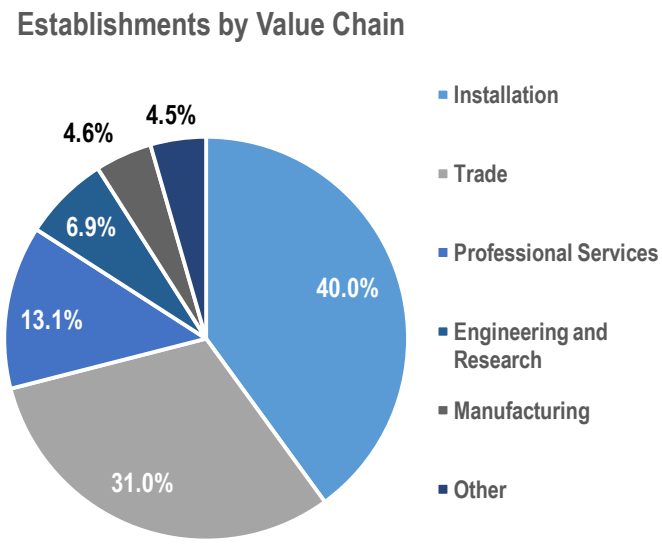
Congressional District	Energy Efficiency Employment
1	8,667
2	5,165
3	9,224
4	4,949
5	8,159



Oregon – 26,755 jobs

About 26,750 Oregonians work in energy efficiency related occupations. Most work is concentrated on efficient lighting and traditional HVAC technologies, followed by renewable efficient heating and cooling and energy star appliances.





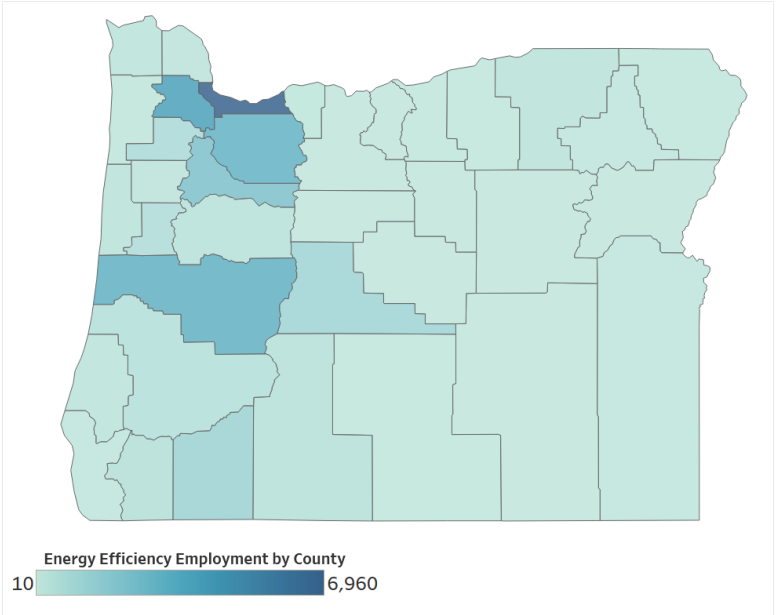
Firms are mostly concentrated in installation and wholesale trade; installation firms represent four in 10 establishments, followed by trade at 31 percent of establishments. These firms are mostly small businesses, with 70 percent reporting fewer than 11 permanent employees. Half of firms report that they derive the majority of their revenue from energy efficiency products and services; 29 percent note that all of their revenue is attributable to this work.

Oregon placed 7th in the nation in the 2016 State Energy Efficiency Scorecard, earning its highest marks in utilities. The state has an energy efficiency resource standard with long-term savings goals, and utilities offer a wide range of electric and natural gas efficiency programs. Because of this commitment, the state has achieved energy savings above the national average (ACEEE).

County	Energy Efficiency Employment
Multnomah County	6,960
Washington County	3,860
Lane County	3,008
Clackamas County	2,925
Marion County	2,147
Jackson County	1,137
Deschutes County	1,056
Yamhill County	727
Benton County	579
Douglas County	463

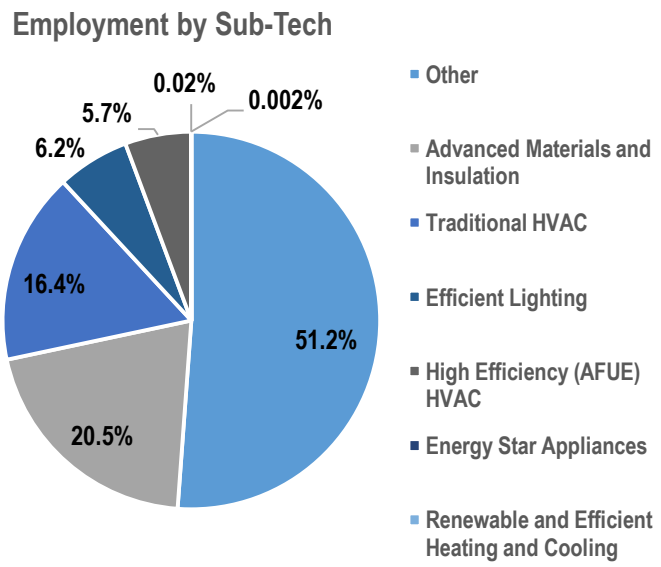
MSA	Energy Efficiency Employment
Portland-Vancouver-Beaverton, OR-WA MSA	14,700
OR NONMETROPOLITAN AREA	4,045
Eugene-Springfield, OR MSA	3,009

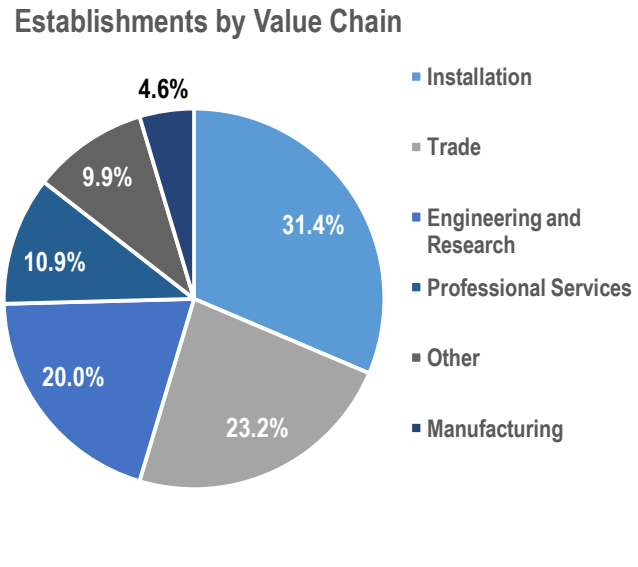
Congressional District	Energy Efficiency Employment
1	8,138
2	4,331
3	6,801
4	3,858
5	3,628



Pennsylvania – 53,175 jobs

About 57, 175 Pennsylvanians work in energy efficiency related jobs, making the state among the Top 10 for EE jobs. The slight majority of workers are reported to be primarily engaged with work on "other" energy efficiency sub-technologies, followed by advanced materials and insulation, accounting for 21 percent of the workforce.





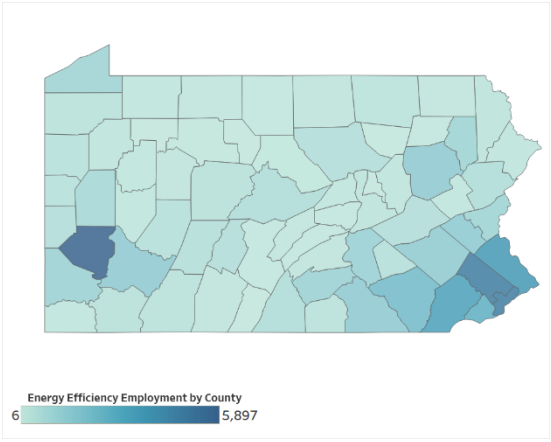
The state has a diverse set of value chain activities, with installation representing 31 percent of firms, trade representing 23 percent of firms, and engineering and research representing 20 percent of firms. There is also some activity across professional services and manufacturing. Six in 10 firms are small businesses with fewer than 11 permanent employees, but three percent of firms report 100 to 249 permanent workers. Just over a quarter (26 percent) of firms report that they derive all of their revenue from energy efficient goods and services, and an additional 20 percent note they derive half to most of their revenue from this work.

Pennsylvania ranked 19th in the nation in the 2016 State Energy Efficiency Scorecard, earning its highest marks in state-led initiatives. The state has an energy efficiency resource standard, but there is a cost cap that limits the measures available to utilities. So far, the state has no decoupling mechanisms or performance incentives in place (ACEEE).

County	Energy Efficiency Employment
Allegheny County	5,897
Philadelphia County	4,790
Montgomery County	4,779
Bucks County	3,621
Chester County	3,306
Delaware County	2,661
Lancaster County	2,202
Lehigh County	1,456
York County	1,425
Westmoreland County	1,422

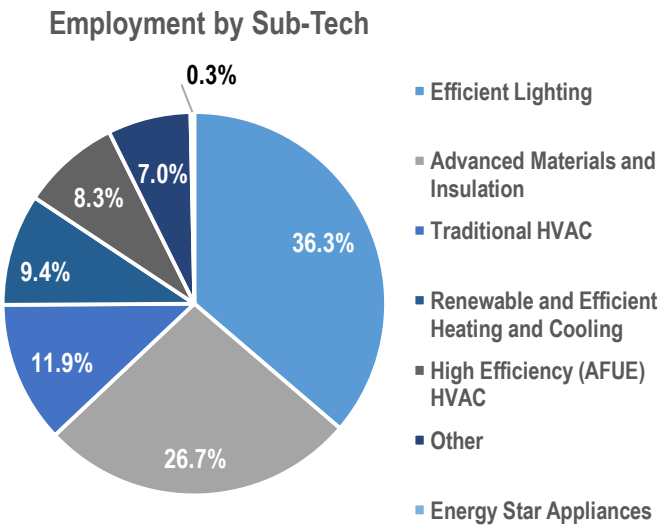
MSA	Energy Efficiency Employment
Philadelphia-Camden-Wilmington, PA-NJ-DE-MD MSA	19,157
Pittsburgh, PA MSA	10,197
PA NONMETROPOLITAN AREA	7,426

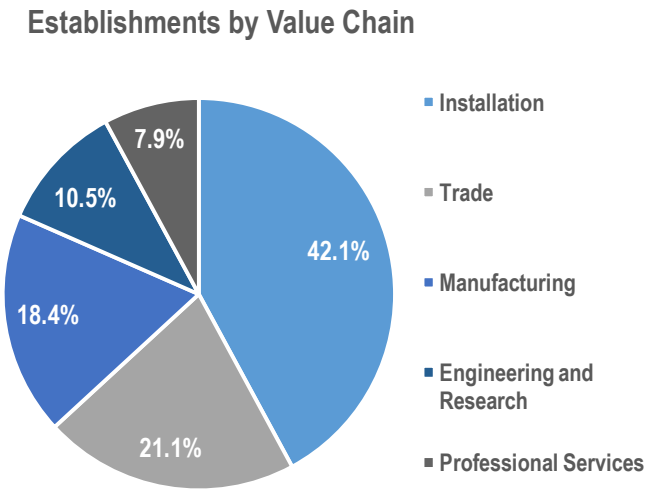
Congressional District	Energy Efficiency Employment	Congressional District	Energy Efficiency Employment
1	3,920	10	3,107
2	2,918	11	2,303
3	3,308	12	3,352
4	3,204	13	909
5	2,366	14	3,667
6	5,756	15	2,634
7	3,894	16	1,701
8	4,063	17	1,500
9	3,040	18	1,531



Rhode Island – 8,112 jobs

Rhode Island is home to a total of 8,112 residents who work in energy efficiency related jobs. The majority of employment is concentrated in efficient lighting and advanced materials and insulation, but there is also activity in traditional HVAC, renewable and efficient heating and cooling, and high efficiency HVAC technologies.



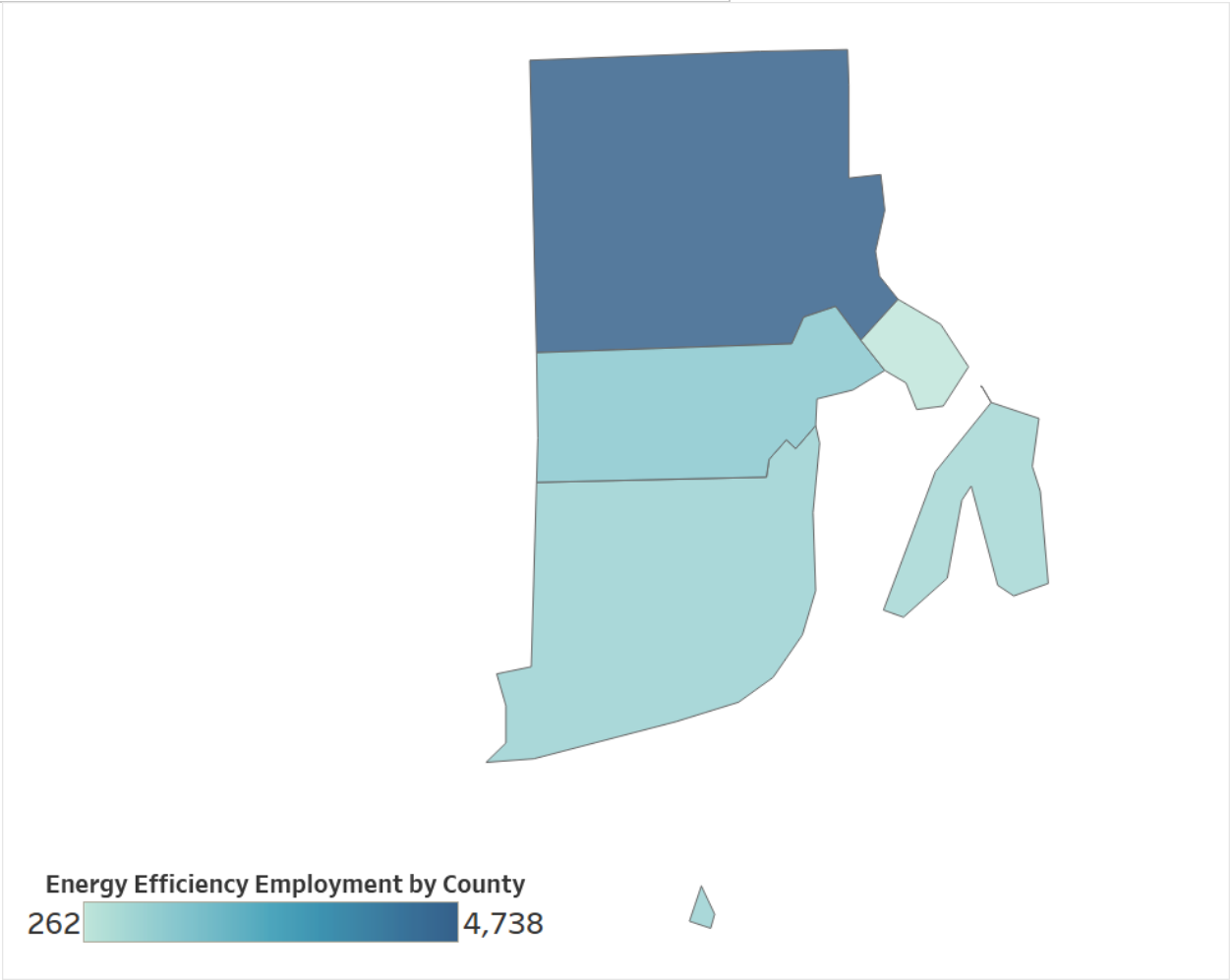


The state's energy efficiency economy is comprised mainly of installation and trade firms; together, they represent 63 percent of energy efficiency establishments. There is some activity in manufacturing and engineering and research as well. Two-thirds (67 percent) of firms employ one to five permanent workers, and the remaining third report six to 49 permanent employees. Four in 10firms note that they derive all of their revenue from this work, and another 40 percent attribute half to most of their revenue from it.

Rhode Island is 4th in the nation for its energy efficiency policies and programs. The state earned a perfect score in the utilities category for the third year in a row. This is because Rhode Island has invested in acquiring all cost-effective energy efficiency measures, allowing the state to achieve the highest energy savings in the nation over the last year (ACEEE).

County	Energy Efficiency Employment
Providence County	4,738
Kent County	1,344
Washington County	995
Newport County	773
Bristol County	262

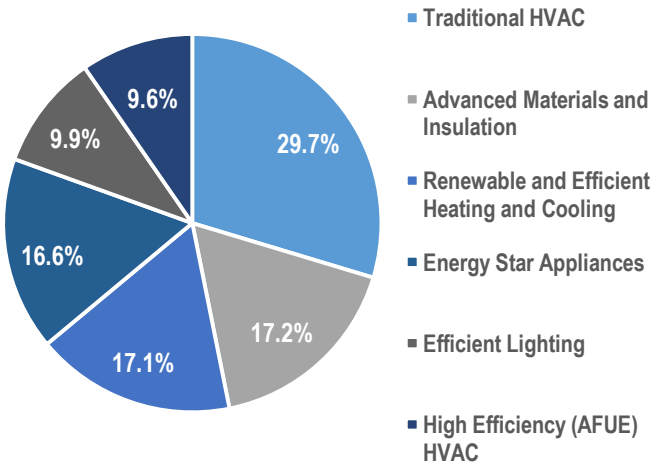
Congressional District	Energy Efficiency Employment
1	4,910
2	3,202



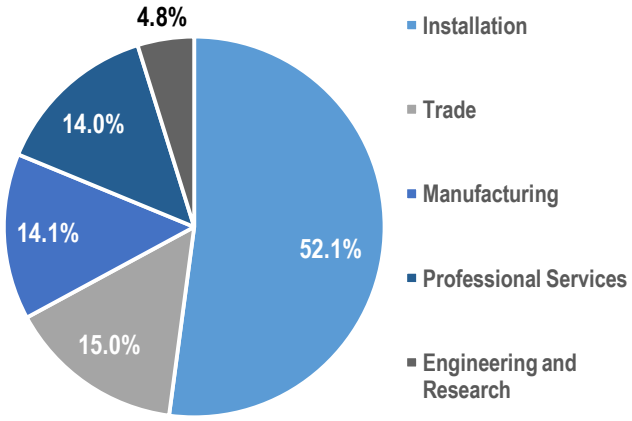
South Carolina – 19,116 jobs

About 19,100 South Carolinians work in energy efficiency related jobs. The state's energy efficiency economy is evenly split between multiple sub-technologies, with most employment concentrated in traditional HVAC, advanced materials and insulation, renewable and efficient heating and cooling, and energy star appliances.

Employment by Sub-Tech



Establishments by Value Chain



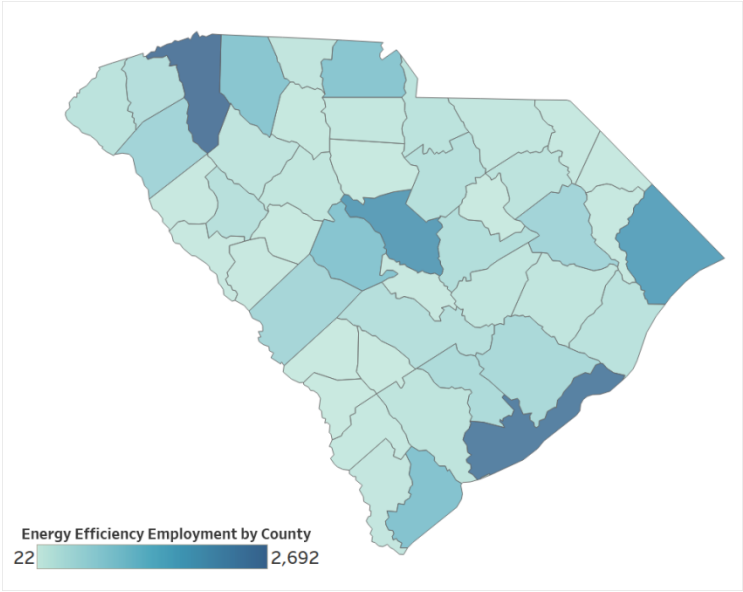
Installation firms comprise 52 percent of energy efficiency establishments in the state, followed by a fairly even split amongst trade, manufacturing, and professional service. There is also some activity in engineering and research, with 5 percent of firms reporting this as their primary activity. 83 percent of firms report fewer than 11 permanent employees. Only a third of firms report that they derive all of their revenue from energy efficiency work.

South Carolina sits at 40th in the nation in the 2016 State Energy Efficiency Scorecard. There is little investment in electric and natural gas efficiency programs, and 50 percent of customers have opted out of energy efficiency programs. There are short-term energy savings in place, but the state does not have a long-term energy efficiency resource standard (ACEEE).

County	Energy Efficiency Employment
Greenville County	2,692
Charleston County	2,508
Richland County	1,859
Horry County	1,732
Beaufort County	1,007
Lexington County	957
York County	939
Spartanburg County	935
Florence County	569
Anderson County	554

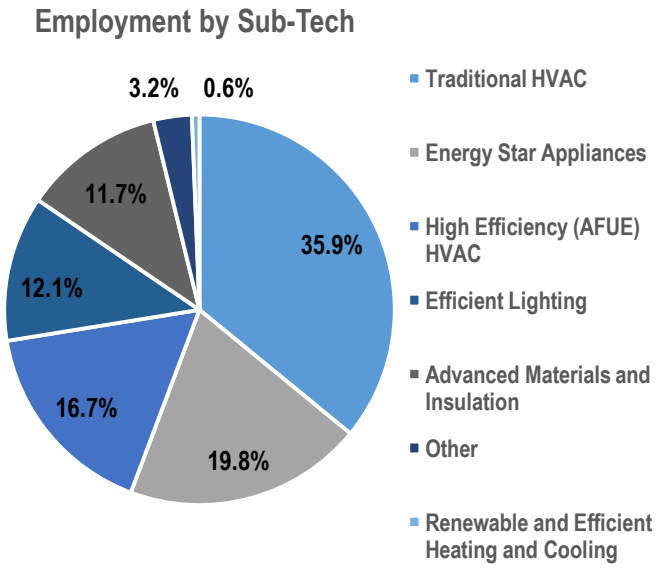
MSA	Energy Efficiency Employment
SC NONMETROPOLITAN AREA	3,838
Charleston-North Charleston, SC MSA	3,316
Columbia, SC MSA	3,214

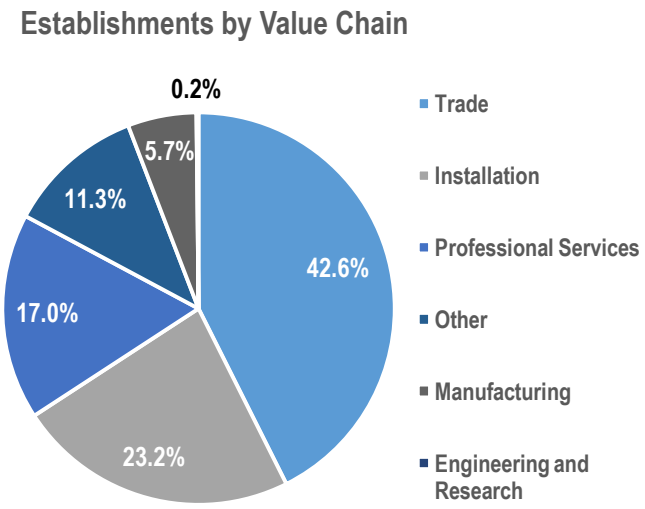
Congressional District	Energy Efficiency Employment
1	4,051
2	3,021
3	2,356
4	2,919
5	2,057
6	1,921
7	2,791



South Dakota – 5,464 jobs

About 5,500 South Dakotans work in energy efficiency related occupations. Most activity is concentrated in traditional HVAC, followed by energy star appliances and high efficiency HVAC technologies.



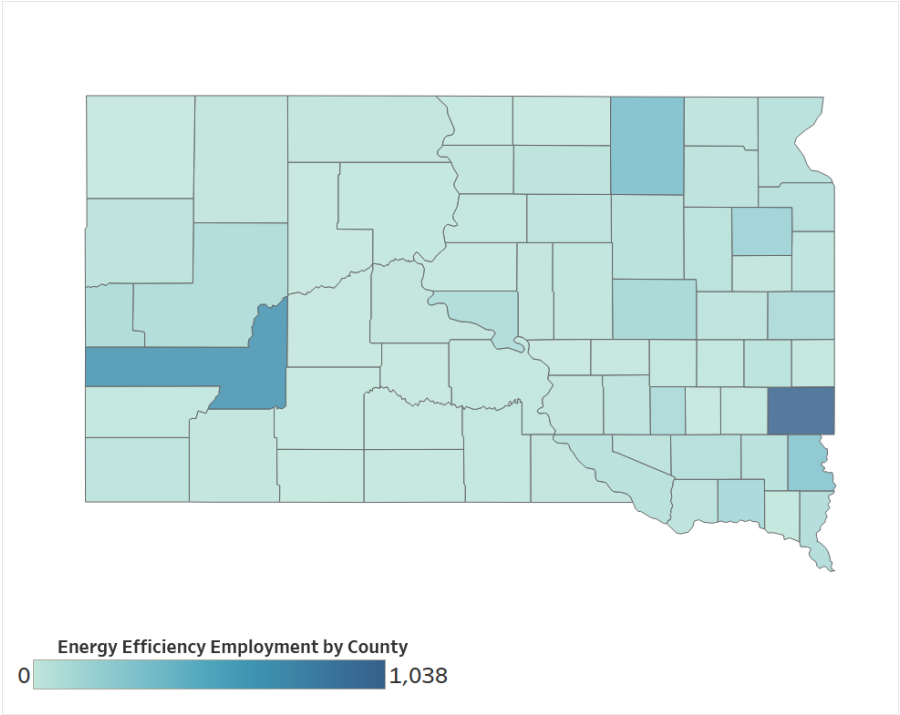


The state's energy efficiency economy is dominated by trade firms, which represent 43 percent of energy efficiency establishments across the state. Installation accounts for just under a quarter of firms, followed by professional services at 17 percent. The majority of firms are small businesses—71 percent report one to 10 permanent employees. About four in ten firms report that they derive all of their revenue from these goods and services, and an additional 14 percent note half to most of their revenue is attributable to this work.

South Dakota is 49th in the nation for its energy efficiency policies and programs. Though utilities offer both electric and natural gas programs, investments are below the national average. Furthermore, the state does not have any long-term energy savings targets to encourage energy efficiency upgrades (ACEEE).

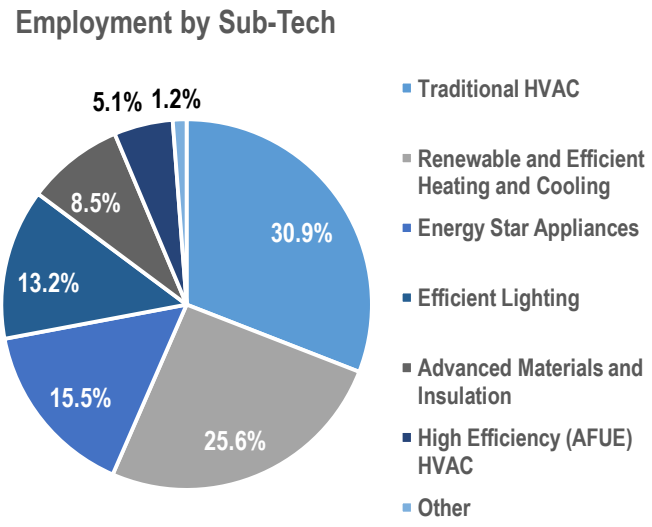
County	Energy Efficiency Employment
Minnehaha County	1,038
Pennington County	698
Brown County	357
Lincoln County	309
Codington County	202
Beadle County	154
Yankton County	149
Brookings County	128
Davison County	128
Lawrence County	122

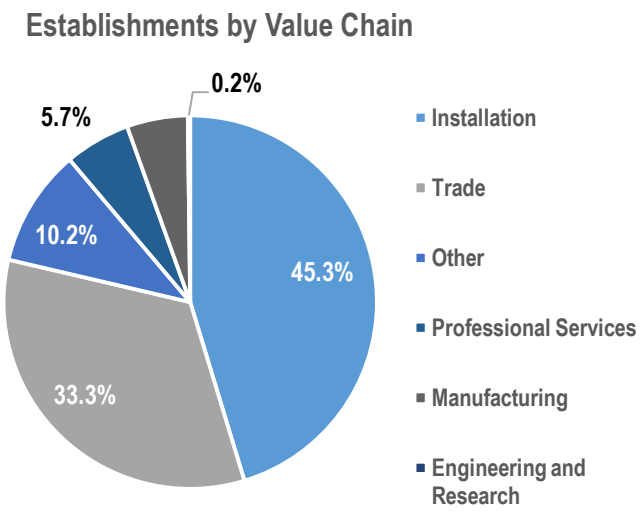
MSA	Energy Efficiency Employment
SD NONMETROPOLITAN AREA	3,105
Sioux Falls, SD MSA	1,443
Rapid City, SD MSA	809



Tennessee – 27,529 jobs

About 27,500 Tennesseeans work in energy efficiency related jobs. The majority of employment is focused on traditional HVAC and renewable and efficient heating and cooling technologies; there are also a few thousand workers who support energy star appliances, efficient lighting, and advanced materials and insulation.





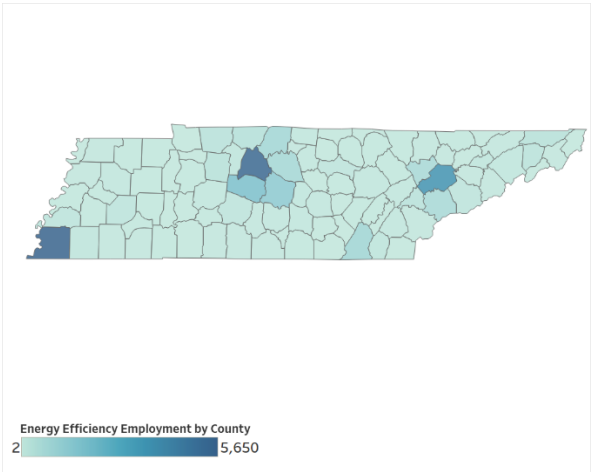
Most firms are either primarily focused on installation or trade; installation firms account for 45 percent of establishments and trade firms account for a third. 59 percent of these businesses are small, with fewer than 11 permanent employees each. But the state has representation across medium to large-sized establishments as well; just over a quarter (27 percent) report 11 to 99 permanent workers, and nine percent note 100 workers or more. 63 percent of firms derive the majority of revenue from this work, with 37 percent noting all of their revenue is attributable to energy efficiency services.

Tennessee ranked 25th in the nation in the 2016 State Energy Efficiency Scorecard, moving up six places since the 2015 ranking. The state scored very low in the utilities category because both investments and therefore energy savings are lower than the national average (ACEEE).

County	Energy Efficiency Employment
Shelby County	5,650
Davidson County	5,449
Knox County	3,689
Williamson County	1,768
Rutherford County	1,342
Hamilton County	835
Sumner County	788
Wilson County	715
Blount County	635
Anderson County	627

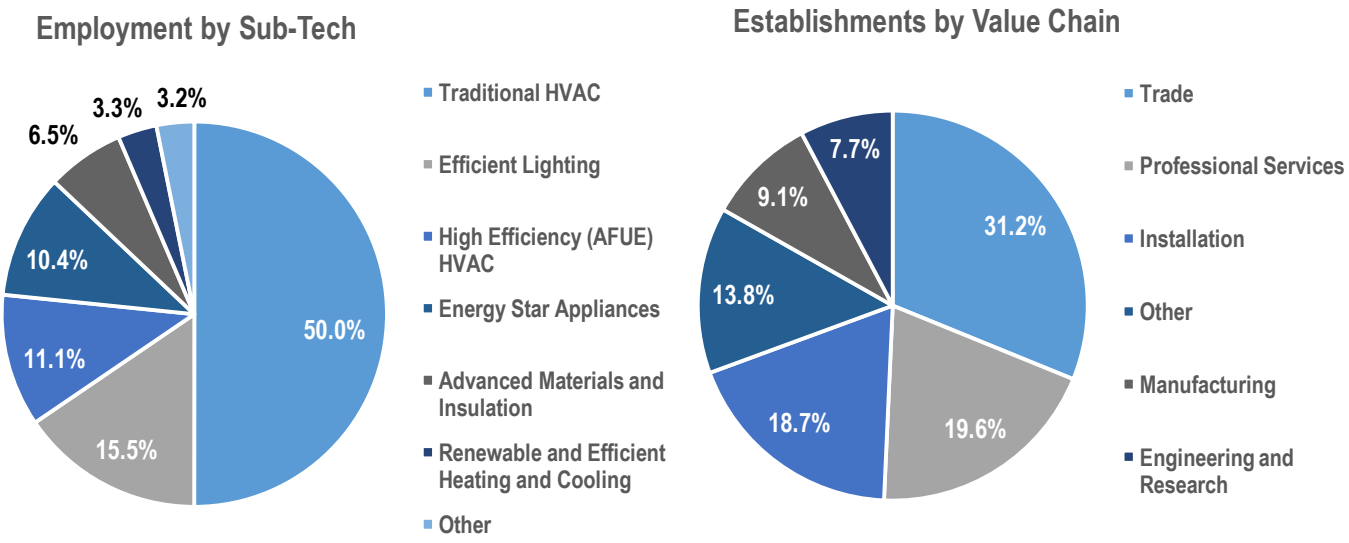
MSA	Energy Efficiency Employment
Nashville-Davidson-Murfreesboro-Franklin, TN MSA	11,221
Memphis, TN-AR-MS MSA	5,988
Knoxville, TN MSA	5,265

Congressional District	Energy Efficiency Employment
1	1,216
2	5,142
3	1,339
4	1,236
5	7,179
6	3,072
7	763
8	5,118
9	2,464



Texas – 72,783 jobs

About 72,800 Texans work in energy efficiency related jobs. Half of these workers are mostly focused on traditional HVAC technologies, followed by efficient lighting with almost 5,000 workers, or 16 percent of total employment.



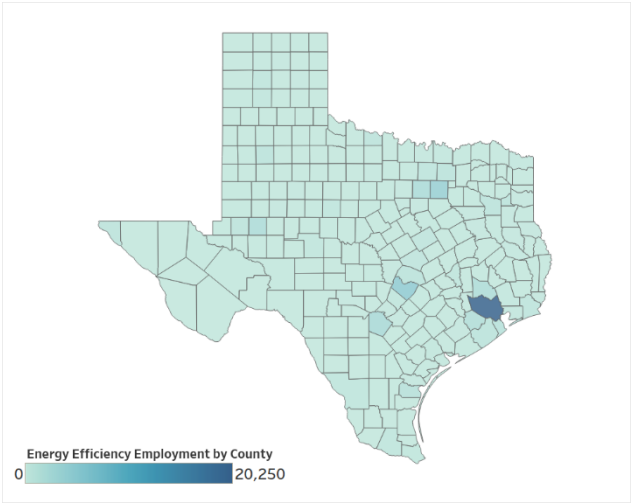
The state's energy efficiency economy is fairly evenly spread across value chain activities; trade, professional services and installation represent the majority of work. Over three-quarters (79 percent) of businesses are small firms with one to 10 permanent workers. 14 percent of firms report 11 to 99 permanent employees, and four percent of firms have 100 workers or more. The biggest concentration of energy efficiency-related jobs in the state by far is in Harris County and the Houston metro area.

Texas sits at 27th in the nation for its energy efficiency policies and programs, but the state received a zero in the utilities category. Though Texas was the first to implement an energy efficiency resource standard, targets are very low. As such, the state has yet to realize significant energy and cost savings (ACEEE).

County	Energy Efficiency Employment
Harris County	20,250
Travis County	4,611
Dallas County	3,849
Bexar County	2,248
Tarrant County	2,069
Midland County	2,020
Montgomery County	1,918
Fort Bend County	1,595
Nueces County	1,216
Galveston County	1,076

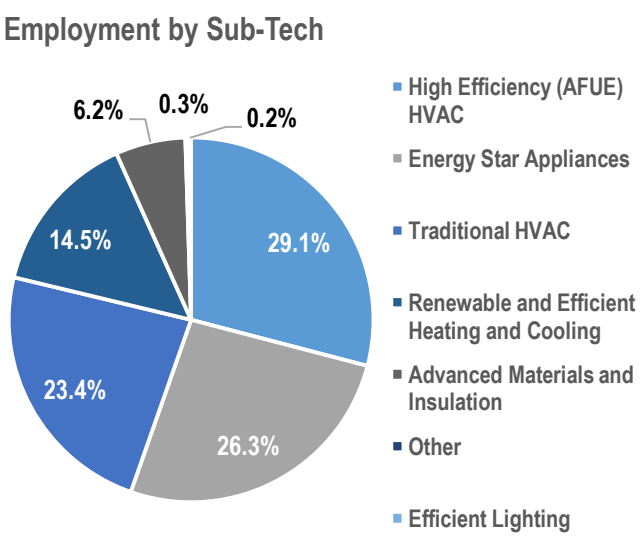
MSA	Energy Efficiency Employment
Houston-Sugar Land-Baytown, TX MSA	11,434
TX NONMETROPOLITAN AREA	5,267
Dallas-Fort Worth-Arlington, TX MSA	3,638

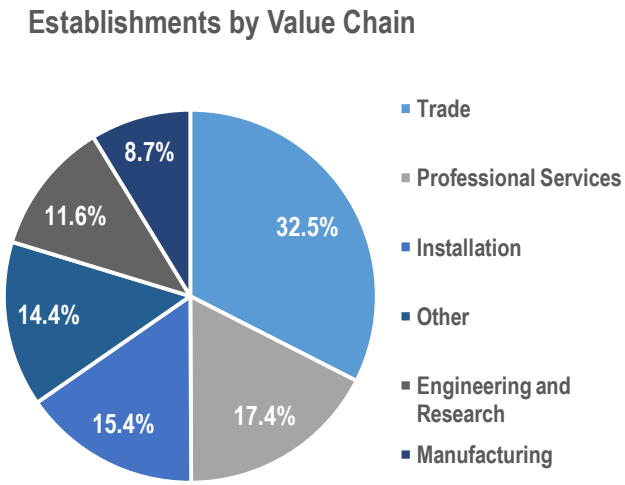
Congressional District	Energy Efficiency Employment	Congressional District	Energy Efficiency Employment
1	3,055	19	2,169
2	9,200	20	1,252
3	1,142	21	3,699
4	1,668	22	1,767
5	920	23	1,711
6	1,019	24	1,667
7	4,817	25	1,041
8	2,480	26	295
9	1,454	27	2,463
10	3,496	28	981
11	5,518	29	614
12	1,302	30	1,011
13	3,920	31	834
14	2,568	32	549
15	2,161	33	44
16	732	34	640
17	1,742	35	191
18	2,743	36	1,920



Utah – 23,396 jobs

About 23,400 Utah workers have energy efficiency related jobs. Three in 10 workers are primarily focused on high efficiency HVAC technologies, followed by energy star appliances at just over a quarter.





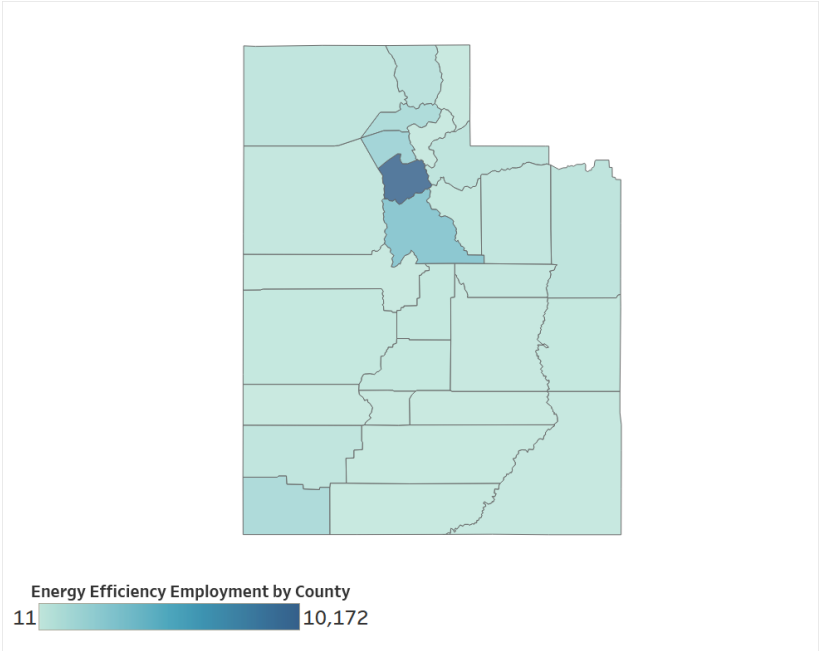
The state has a fairly even distribution of value chain activities, with trade representing the largest chunk—roughly a third of firms. This is followed by professional services and installation. The majority of firms are small, with two-thirds reporting one to 10 permanent employees; the remaining one third are mediums-sized establishments with 11 to 49 permanent workers. Just over half (52 percent) of firms report that a majority of business revenue is derived from energy efficiency work; a third note that all of their revenue is attributable to this work.

Utah ranked 20th in the nation in the 2016 State Energy Efficiency Scorecard, receiving the highest marks in the utilities category. Both electric and natural gas utilities implement efficiency programs, and energy efficiency measures are included in the state's renewable portfolio standard. The state also updated their building energy codes to comply with the 2015 IECC. In fact, Utah was deemed the most improved state in the southwest, with electric and natural gas savings above the national average (ACEEE).

County	Energy Efficiency Employment
Salt Lake County	10,172
Utah County	3,280
Davis County	1,989
Washington County	1,372
Weber County	1,360
Cache County	686
Summit County	571
Uintah County	560
Iron County	457
Box Elder County	423

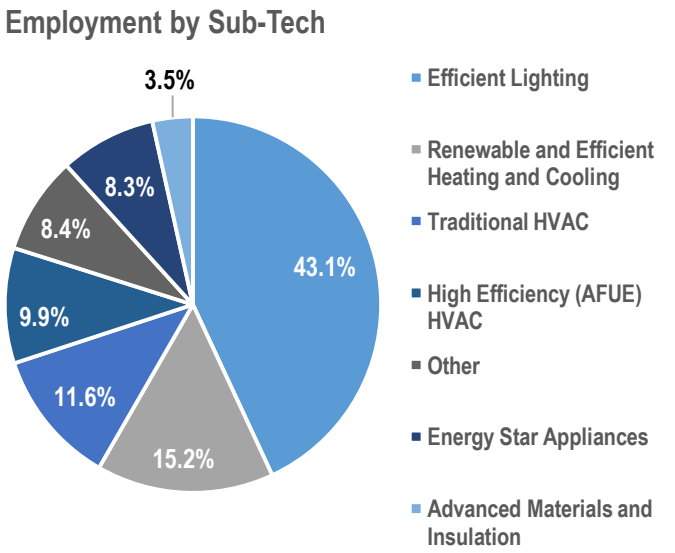
MSA	Energy Efficiency Employment
Salt Lake City, UT MSA	11,044
UT NONMETROPOLITAN AREA	3,640
Ogden-Clearfield, UT MSA	3,367

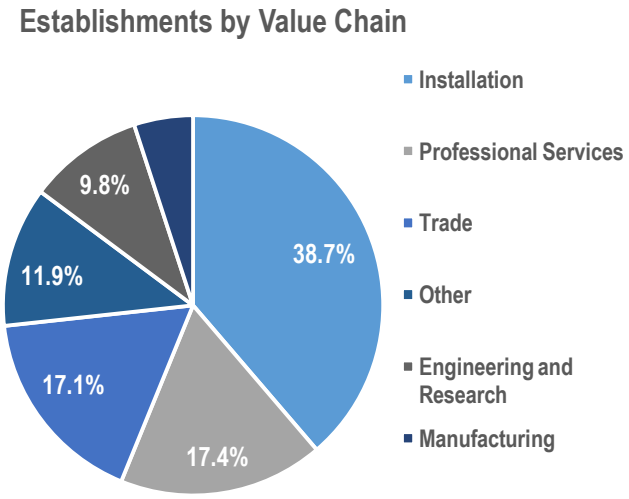
Congressional District	Energy Efficiency Employment
1	4,958
2	9,144
3	7,345
4	1,949



Virginia – 61,397 jobs

About 61,400 Virginians work in energy efficiency related jobs. 43 percent of workers are primarily focused on efficient lighting technologies, followed by renewable and efficient heating and cooling.





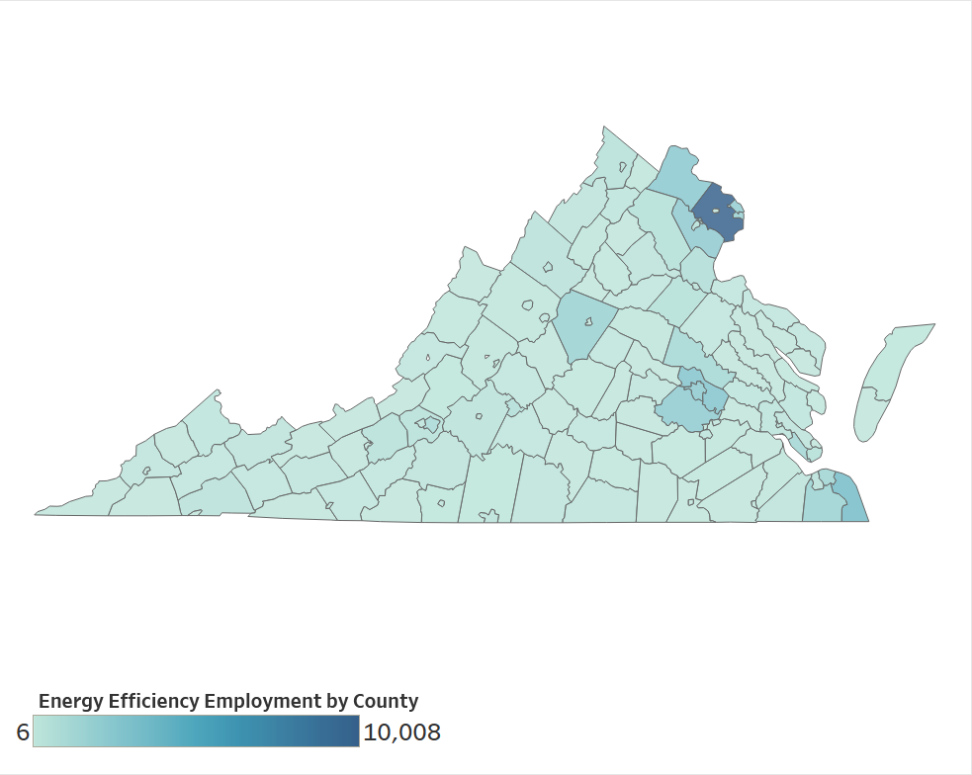
Installation (39 percent) represents the largest percentage of firms in the state's energy efficiency sector, followed by professional services and trade with 17 percent each. These are mostly small businesses, with 63 percent reporting one to five permanent employees. A third of firms note that all of their revenue is derived from energy efficiency work, and an additional 15 percent attribute half to most of their revenue to this work. The biggest concentration of energy efficiency workers is in Fairfax County, in Northern Virginia. Many of these companies and workers spend much of their time working on energy efficiency projects in the neighboring District of Columbia and in Maryland, both of which have much better energy efficiency policies and programs than Virginia.

Virginia was ranked 33rd in the nation for its energy efficiency policies and programs. The state received a negative score in the utilities category because of very low investments and energy savings that are among the lowest across the country (ACEEE).

County	Energy Efficiency Employment
Fairfax County	10,008
Virginia Beach City	3,432
Henrico County	2,756
Loudoun County	2,442
Richmond City	2,338
Prince William County	2,282
Chesterfield County	2,239
Arlington County	1,987
Alexandria City	1,765
Albemarle County	1,741

MSA	Energy Efficiency Employment
Washington-Arlington-Alexandria, DC-VA-MD-WV MSA	22,366
Virginia Beach-Norfolk-Newport News, VA-NC MSA	10,906
Richmond, VA MSA	10,587

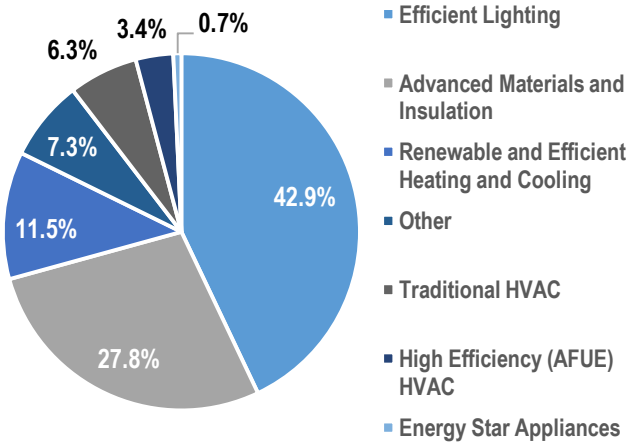
Congressional District	Energy Efficiency Employment
1	7,208
2	5,715
3	6,000
4	4,475
5	7,704
6	4,555
7	3,998
8	7,679
9	3,843
10	8,956
11	1,264



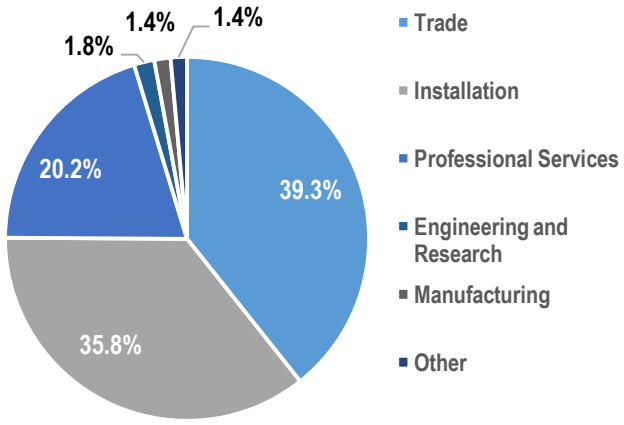
Vermont – 8,585 jobs

Nearly 8,600 Vermont residents work in energy efficiency related jos. About four in 10 workers spend most of their time with efficient lighting, followed by advanced materials and insulation with 28 percent of total employment.

Employment by Sub-Tech



Establishments by Value Chain

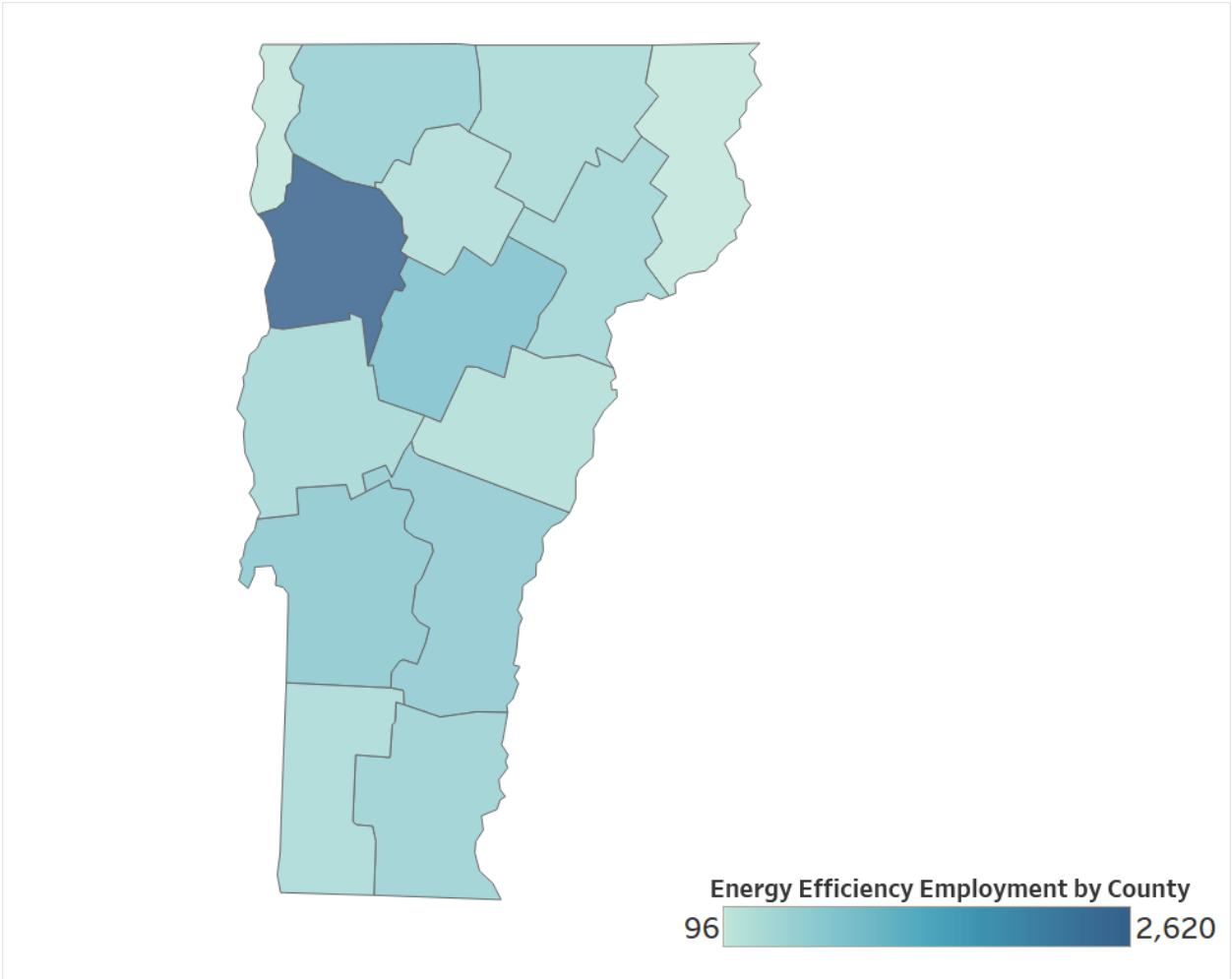


The energy efficiency economy is primarily comprised of trade and installation firms; together these represent three-quarters of energy efficiency establishments across the state. There is also significant activity in professional services, with 20 percent of firms reporting this as their primary value chain activity. These are mostly small businesses, with about seven in 10 reporting one to 10 permanent employees. A quarter of firms are medium-sized establishments with 11 to 49 permanent workers, and two percent of firms report 50 to 249 workers. Over half (55 percent) of establishments derive the majority of their revenue from this work, and 29 percent attribute all of their revenue to energy efficiency work.

Vermont remains 3rd in the nation in the 2016 State Energy Efficiency Scorecard, receiving a near perfect score in the utilities category. In fact, Vermont is one of the top three states leading utility policies and programs. The state has an energy efficiency resource standard with aggressive long-term savings targets and both electric and natural gas utilities are decoupled (ACEEE).

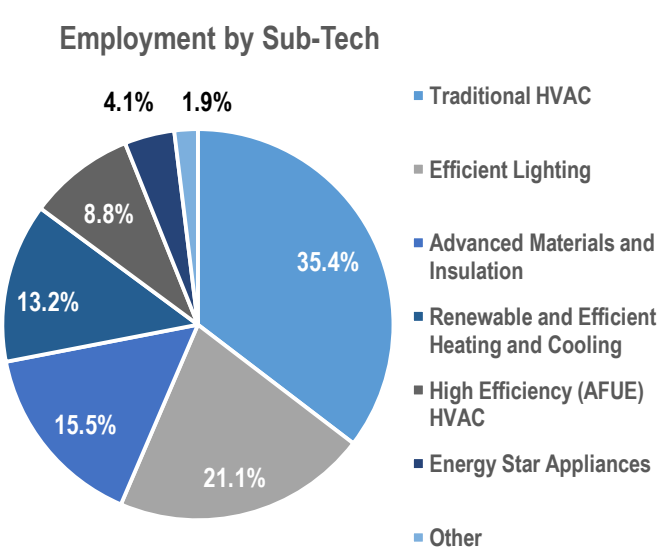
County	Energy Efficiency Employment
Chittenden County	2,620
Washington County	887
Rutland County	747
Windsor County	698
Franklin County	603
Windham County	555
Caledonia County	477
Addison County	445
Orleans County	378
Bennington County	366

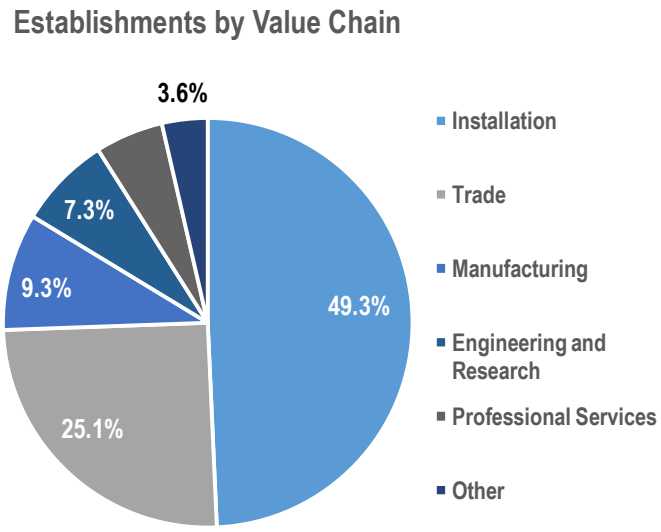
MSA	Energy Efficiency Employment
VT NONMETROPOLITAN AREA	5,266
Burlington-South Burlington, VT MSA	3,319



Washington – 38,836 jobs

Nearly 39,000 Washington residents work in energy efficiency related jobs. Just over a third of employment is focused on traditional HVAC technologies, followed by efficient lighting and advanced materials and insulation.





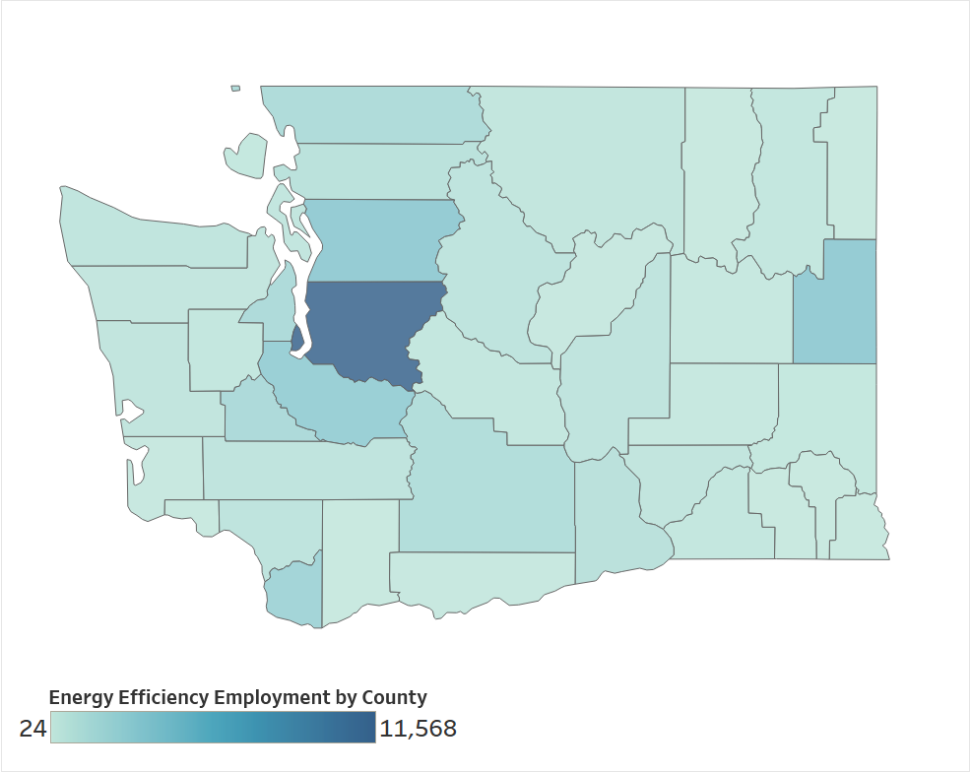
Installation represents almost half of energy efficiency firms across the state, followed by trade with about a quarter of energy efficiency establishments. 77 percent of firms have one to 10 permanent workers, 17 percent report 11 to 49 permanent workers, and 6 percent note 50 to 249 permanent employees. About a quarter (24 percent) of firms derive all of their revenue from these goods and services, and another 24 percent attribute half to most of their revenue to this work.

Washington was ranked 8th in the nation in the 2016 State Energy Efficiency Scorecard, receiving its highest marks in utilities, transportation, and building energy codes. Utilities are required to acquire any cost-effective energy efficiency measures and both natural gas and electric utilities are decoupled. While the state has an energy efficiency resource standard with long-term targets for electric utilities, there are no long-term natural gas savings targets (ACEEE).

County	Energy Efficiency Employment
King County	11,568
Spokane County	3,206
Snohomish County	3,185
Pierce County	2,896
Clark County	2,249
Thurston County	1,672
Kitsap County	1,599
Whatcom County	1,509
Yakima County	1,297
Benton County	881

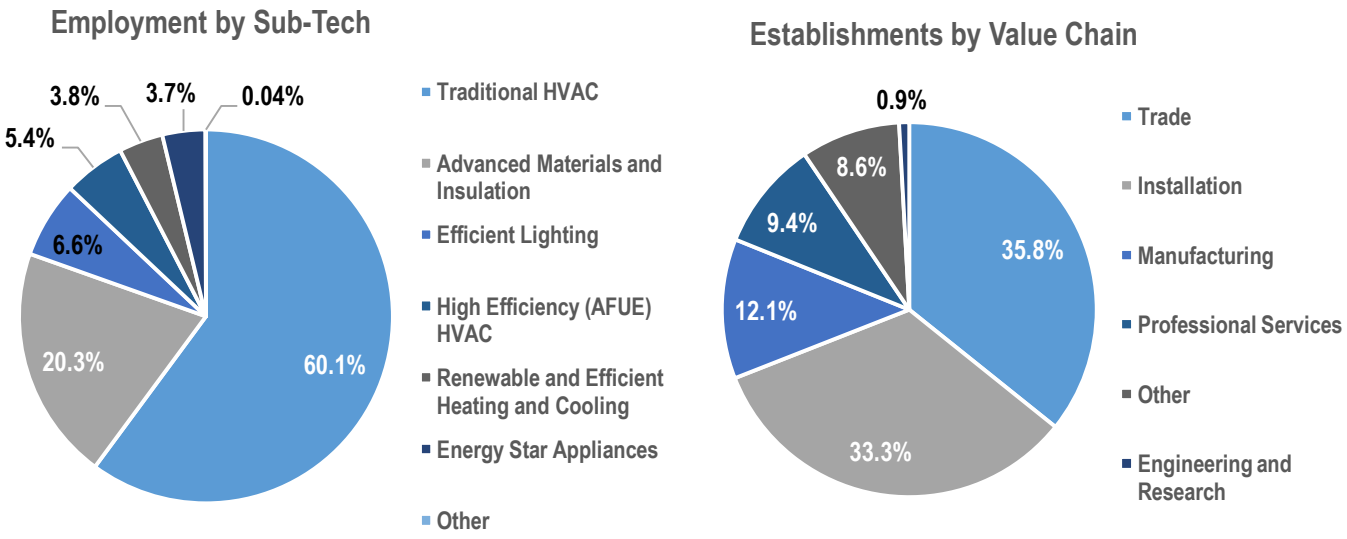
MSA	Energy Efficiency Employment
Seattle-Tacoma-Bellevue, WA MSA	17,647
WA NONMETROPOLITAN AREA	5,932
Spokane, WA MSA	3,251

Congressional District	Energy Efficiency Employment
1	5,489
2	2,780
3	3,639
4	4,169
5	4,169
6	5,728
7	5,957
8	3,441
9	1,489
10	1,974



Wisconsin – 17,553 jobs

Nearly 17,600 Wisconsin residents work in energy efficiency related occupations. Six in 10 workers are mostly concentrated on traditional HVAC technologies – not surprising in a state known for harsh winters - followed by advanced materials and insulation at 20 percent of employment.



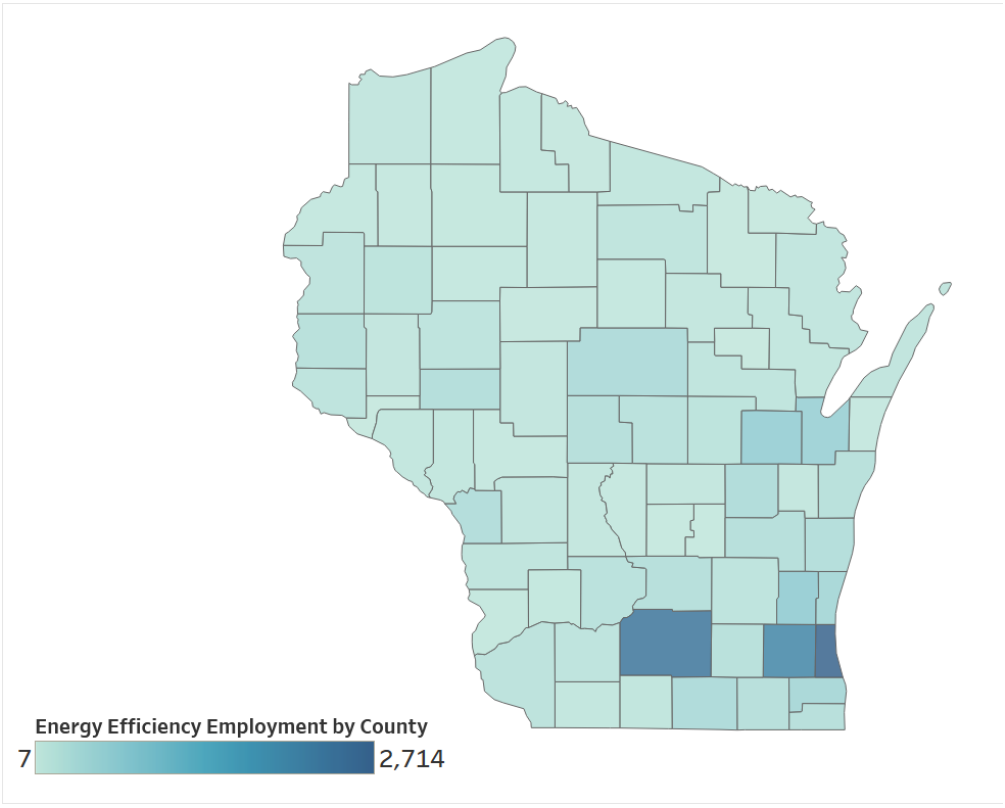
Firm activity is mostly concentrated in trade and installation, though there is some activity in manufacturing and professional services; very few firms reported engineering and research as their primary activity. Two-thirds of firms are small businesses with one to 10 permanent employees, 19 percent are medium-sized firms with 11 to 49 workers, and seven percent report 50 to 249 permanent workers. Exactly half of firms report that the majority of their revenue is attributable to energy efficiency work, and 35 percent note that all of their revenue is derived from this work.

Wisconsin ranks 22nd in the nation for its energy efficiency policies and programs. The state has an energy efficiency resource standard with long-term savings targets for both natural gas and electric utilities. The state also offers performance incentives to utilities. As such, both electric and natural gas savings were above the national average in 2015. Wisconsin is in the process of updating their building energy codes to comply with the 2015 IECC (ACEEE).

County	Energy Efficiency Employment
Milwaukee County	2,714
Dane County	2,354
Waukesha County	2,023
Washington County	651
Outagamie County	600
Brown County	539
Ozaukee County	429
Racine County	409
Rock County	344
Marathon County	334

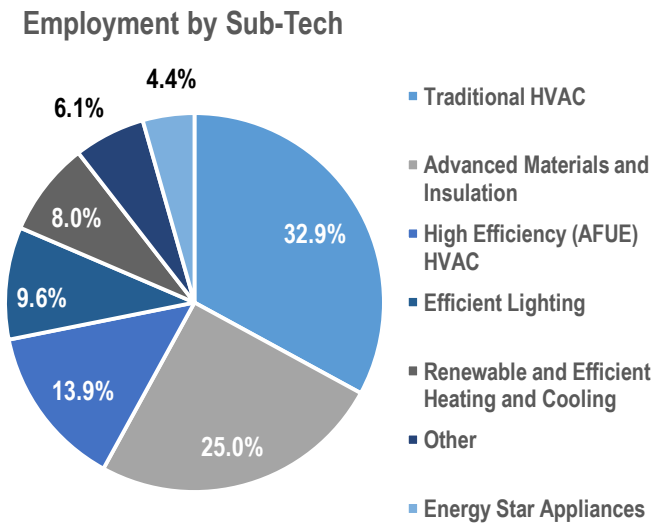
MSA	Energy Efficiency Employment
Milwaukee-Waukesha-West Allis, WI MSA	5,815
WI NONMETROPOLITAN AREA	4,368
Madison, WI MSA	2,753

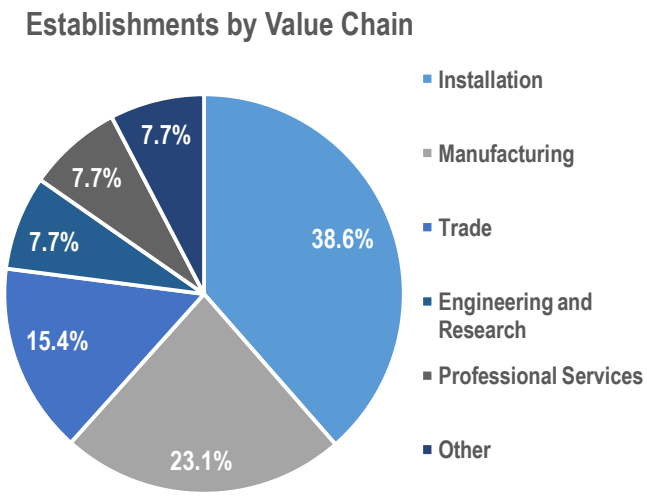
Congressional District	Energy Efficiency Employment
1	1,990
2	3,542
3	2,218
4	2,529
5	2,234
6	1,755
7	1,862
8	1,423



West Virginia – 20,506 jobs

About 20,500 West Virginians work in energy efficiency related jobs. Just under a third are concentrated on traditional HVAC technologies, and another quarter are focused on advanced materials and insulation.





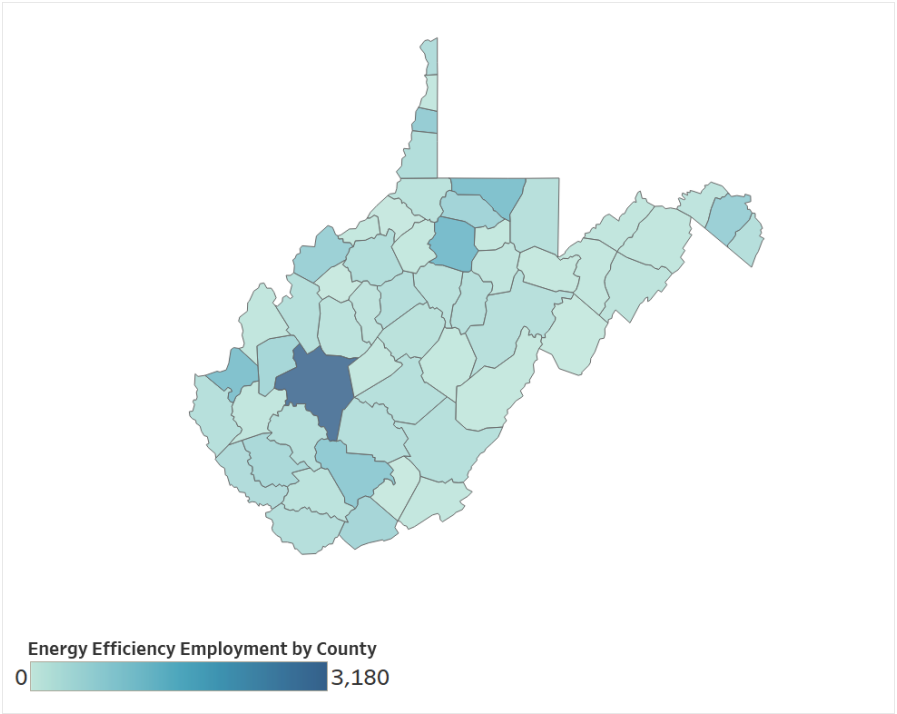
Almost 40 percent of firms report that their primary activity is installation, followed by manufacturing at 23 percent of establishments.

West Virginia sits at 44th in the nation for energy efficiency, receiving a negative score in the utilities category. There are only electric utility programs, but large customers are allowed to opt out. Furthermore, the state has not incentivized utilities to include energy efficiency in long-term resource planning (ACEEE).

County	Energy Efficiency Employment
Kanawha County	3,180
Harrison County	1,346
Monongalia County	1,207
Cabell County	1,195
Raleigh County	928
Ohio County	847
Berkeley County	754
Wood County	743
Marion County	627
Mercer County	580

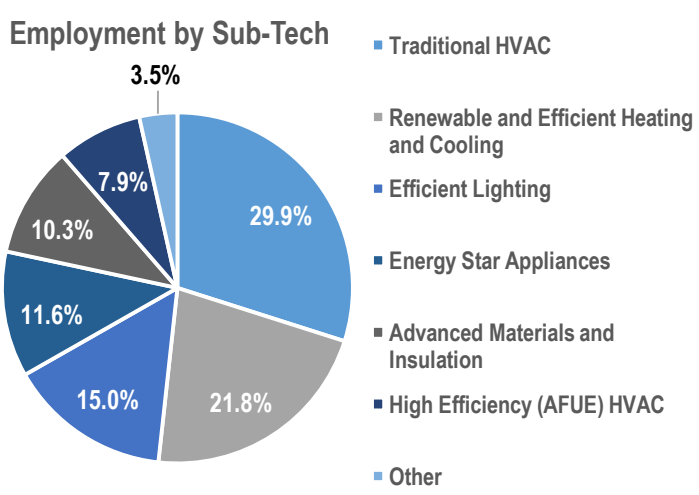
MSA	Energy Efficiency Employment
WV NONMETROPOLITAN AREA	9,365
Charleston, WV MSA	4,247
Huntington-Ashland, WV-KY-OH MSA	1,497

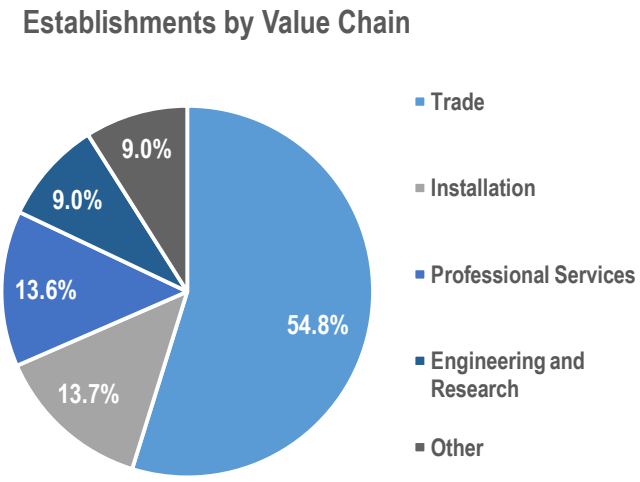
Congressional District	Energy Efficiency Employment
1	7,959
2	6,627
3	5,919



Wyoming – 7,137 jobs

About 7,100 Wyoming residents work in energy efficiency related jobs. Three in 10 of those workers are focused on traditional HVAC technologies, followed by renewable and efficient heating and cooling at 22 percent of total employment.





The majority of firms (55 percent) report that wholesale trade is their primary value chain activity, followed by installation and professional services, which each represents 14 percent of establishments.

Wyoming is 50th in the nation for its energy efficiency policies and programs. The state does not have an energy efficiency resource standard, nor does it offer performance incentives for efficiency programs. Though utilities do have some electric and natural gas programs, energy savings are below the national average (ACEEE).

County	Energy Efficiency Employment
Natrona County	1,076
Laramie County	828
Campbell County	621
Sweetwater County	621
Fremont County	414
Teton County	414
Park County	393
Sheridan County	362
Uinta County	310
Albany County	300

MSA	Energy Efficiency Employment
WY NONMETROPOLITAN AREA	5,234
Casper, WY MSA	1,076
Cheyenne, WY MSA	828