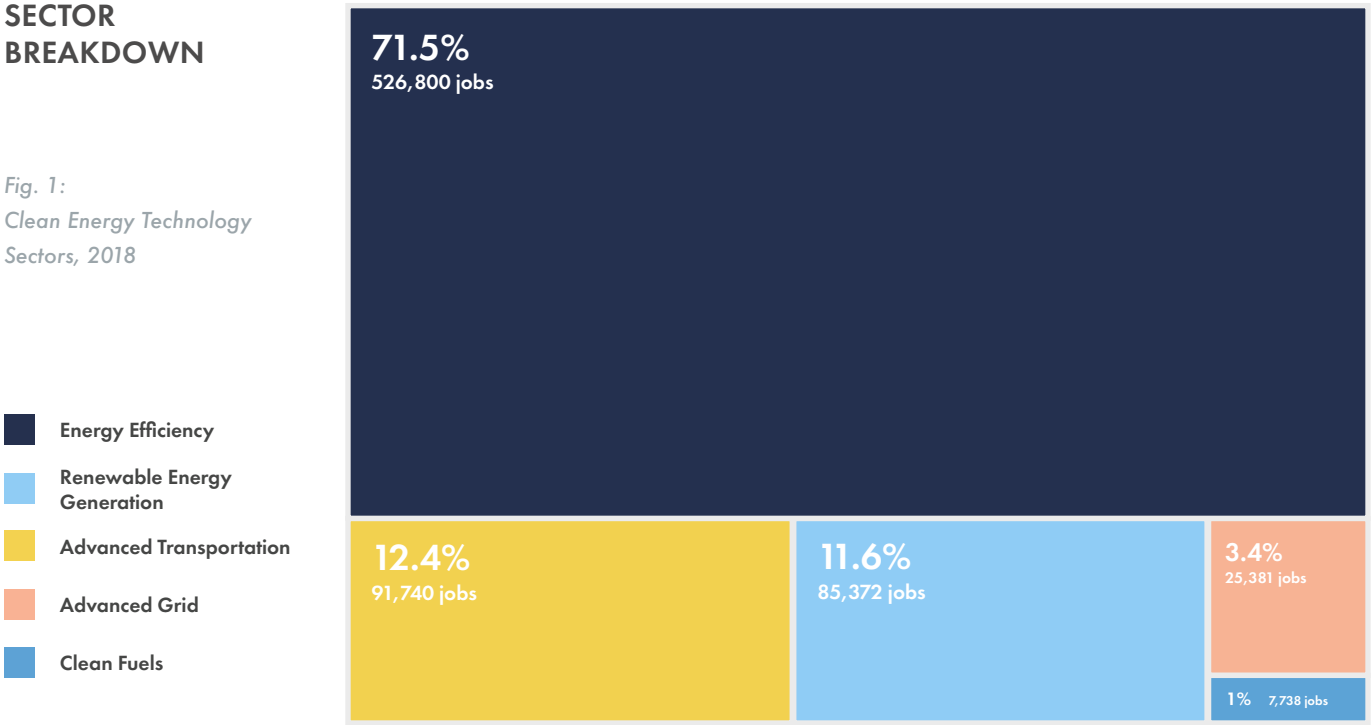
The Midwest: Home to 737,000 Clean Energy Jobs

MIDWEST CLEAN ENERGY JOBS GROW FASTER THAN REST OF NATION

Clean energy is a major employer in the Midwest with 737,031 jobs. In 2018, the industry added more than 28,000 jobs.[1] That's a 4 percent growth rate, and it's more than the industry's national growth rate of 3.6 percent. Energy efficiency continues to be the largest Midwestern clean energy employer; the sector is home to 70 percent of all the region's clean energy jobs. Thousands of different Midwestern companies and establishments hire clean energy workers in any given year. Combined, these employers anticipate adding more than 51,000 clean energy jobs in 2019 -- a 7 percent growth rate.

SECTOR BREAKDOWN

Fig. 1: Clean Energy Technology Sectors, 2018



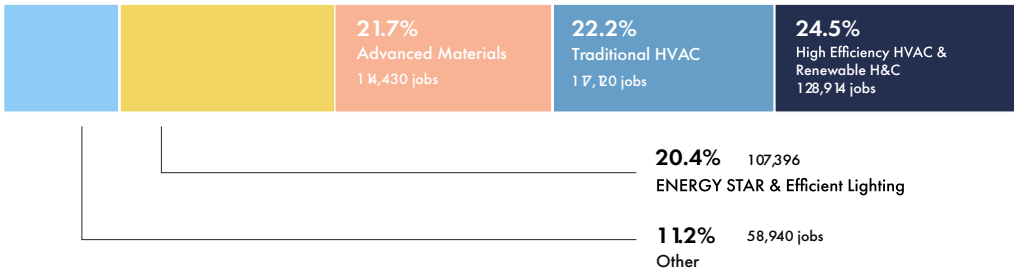
1. Unless otherwise stated, all data is based on the 2019 USEER. Energy Futures Initiative. (2019). The U.S. Energy Employment Report. Washington, DC. www.usenergyjobs.org. The Data provided relies on thousands of data points provided via survey. EFI, NASEO and BWRP have made every effort to supply current and accurate information but assume no responsibility or liability for any decisions based upon the information presented. For more information on the survey methodology see cleanjobsmidwest.com/about.

ENERGY EFFICIENCY JOBS DOMINATE MIDWEST'S CLEAN ENERGY LABOR MARKET

526,801 Midwesterners work in energy efficiency. That's more than any other industry in the clean energy sector, and it's enough to fill Ohio Stadium five times. In 2018, Midwestern employers created 13,106 energy efficiency jobs, a 2.6 percent growth rate.

Energy efficiency workers are active throughout the value chain. They manufacture ENERGY STAR-rated kitchen appliances; install efficient lighting systems at car dealerships; implement software that optimizes traditional heating, ventilation and air conditioning (HVAC) systems in high schools; build renewable heating and cooling systems, and handle advanced building materials at new office towers.

Fig. 2: Energy Efficiency Subsectors, 2018



ADVANCED TRANSPORTATION TURNS CORNER

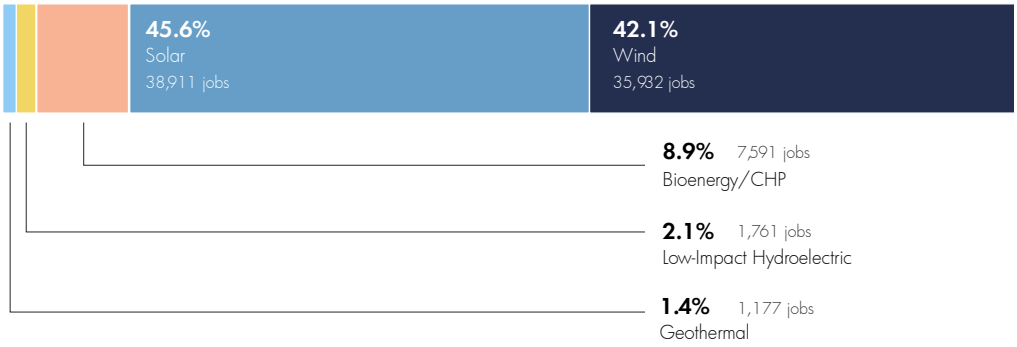
Advanced transportation is the Midwest's No. 2 clean energy employer with 91,741 jobs. Following job losses in 2017, the sector's growth rate in 2018 spiked 15.4 percent, a gain of 12,271 jobs.

Two vehicle styles were primarily responsible for the growth -- plug-in hybrid vehicles and hybrid electric vehicles. 19,147 people now work on plug-ins in the Midwest, 4,393 more than in 2017, a 30 percent gain. 39,916 people work on hybrid electric vehicles, 3,709 more than in 2017, a 10 percent gain. EV jobs also boomed: 24,588 Midwesterners now work on EVs, 4,508 more than in 2017 for a 22 percent growth rate.

RENEWABLE ENERGY GENERATION JOBS INCREASE, BUCK NATIONAL TREND

The third-largest employer in the region's clean energy industry is renewable energy generation with 85,372 workers. Bucking national trends, the region's renewables industry employs 2,245 more people than in 2017.

Fig. 3: Renewable Energy Subsectors, 2018

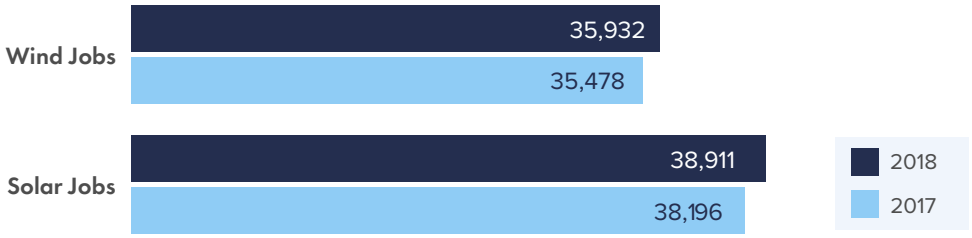


Whereas Midwestern renewables jobs increased by 2.7 percent, national renewables jobs actually decreased by 1.5 percent. Solar played a big role in this labor market dynamic. Solar now employs 38,911 Midwesterners, 714 more than in 2017 for a 1.9 percent growth rate.

Nationally, however, solar job growth slipped 4.5 percent. Besides solar, wind is a major renewable energy employer in the Midwest with 35,932 workers. That's 1.3 percent more than in 2017, an increase of more than 450 jobs.

Other job-creating industries in the renewables sector include: geothermal, bioenergy and low-impact hydroelectric power.

Fig. 4:
Wind and Solar Jobs, 2018 and 2017 Comparison



IN ADVANCED GRID SECTOR, ENERGY STORAGE PACKS AWAY HUNDREDS MORE JOBS

Advanced grid work employs 25,381 Midwesterners. Jobs in the sector grew 2.5 percent from 2017, adding 629 workers. The fourth-largest clean energy employer in the region, advanced grid encompasses jobs in energy storage, smart grid, microgrid and other grid modernization work. Energy storage jobs are the largest employer in the sector with 13,136 jobs, 314 more than in 2017.

CLEAN FUELS SECTOR TRIMS JOBS

7,738 Midwesterners work in clean fuels jobs, a 1.6 percent decrease from 2017. This is a loss of 123 jobs. Clean fuels include non-corn ethanol, non-woody biomass and other technologies not yet in wide commercial production like algal biofuel, syngas, bioheat blends, and landfill gas.

Fig. 5:
Top 3 MSAs in Clean Energy Employment, 2018

Metro Area (MSA)	Total Clean Energy Employment	Renewable Energy Employment	Energy Efficiency Employment
Chicago-Naperville-Joliet, IL-IN-WI MSA	101,201	15,362	71,514
Detroit-Warren-Livonia, MI MSA	55,447	5,281	37,214
Minneapolis-St. Paul-Bloomington, MN-WI MSA	40,486	7,105	29,163

CLEAN ENERGY INDUSTRY OUTLOOK

MIDWEST CLEAN ENERGY JOBS DATA INFLUENCING NATIONAL NUMBERS

The clean energy sector constitutes a significant segment of the Midwest's overall labor market. Combined, the various clean energy sectors-- energy efficiency, renewables, energy storage, clean fuels, etc. -- are now responsible for nearly 2 percent of all the jobs across the entire region.[2]

Given the size of the region's clean energy market, any contraction or expansion in the number of jobs in the sector can impact and amplify broader Midwestern economic trends. This was the case in 2018, as jobs in the Midwest's clean energy industry grew 4 percent, helping lift the region's overall job growth rate to 2.4 percent.

Nationally, the Midwest is a clean energy job powerhouse. In 2018, every single state in the region added clean energy jobs, and the Midwest went on to account for nearly a quarterof all clean energy jobs created across the country. One big reason for this regional growth? Advanced transportation, which saw an 80 percent year-over-year increase in EV sales, adding 12,000 jobs throughout the sector. This was a U-turn from 2017, when alternative transportation jobs decreased.

Focusing on just the renewable energy industry, the Midwest was an outlier. Nationally, tariffs on solar modules led businesses in the residential solar space to restructure and shed jobs. This led to a decrease in renewable energy jobs across the country. But in the Midwest, renewable energy jobs grew by nearly 3 percent. All but four states in the Midwest added renewable energy generation jobs in 2018.

Clean energy job growth in the Midwest is expected to continue: regional clean energy employers project 7 percent job growth in 2019.

COMPARING CLEAN ENERGY JOBS TO FOSSIL FUEL JOBS

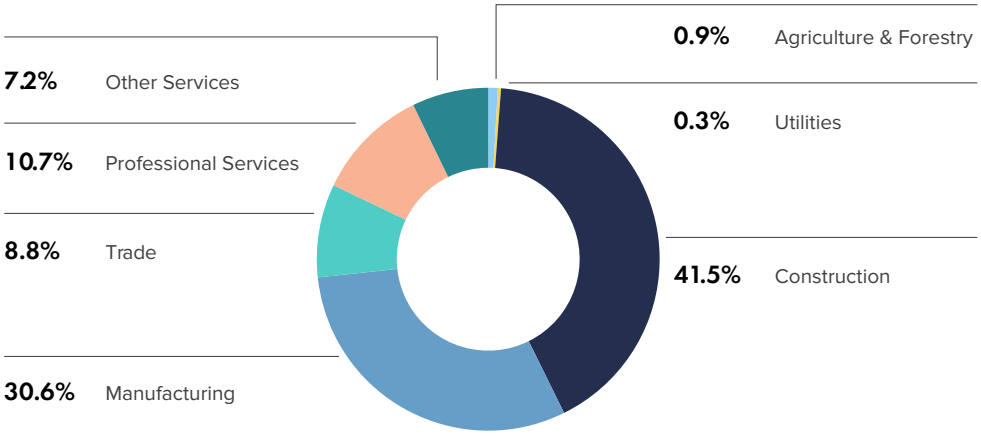
In 2018, 187,753 Midwesterners worked in jobs in fossil fuel energy industries like coal, natural gas, and oil.[3] While a regionally significant employer, fossil fuels still employ barely a quarter the number of clean energy workers. Electric power generation jobs using fossil fuels put 62,681 people to work, compared to 85,372 jobs in renewable energy generation.

Coal jobs, meanwhile, dropped nearly 30 percent due to a range of market factors including inexpensive natural gas and increased demand for renewable energy, which grew jobs at a 2.7 percent clip.

2. U.S. Bureau of Labor Statistics Local Area Unemployment Statistics, 2018 Preliminary data
3. 2019 US Energy and Employment Report. This figure does not include gas station workers

VALUE CHAIN

In addition to breaking down clean energy jobs by industry, jobs can also be categorized by their function in the value chain. This report divides the clean energy jobs value chain into the following categories: agriculture, utility, construction, manufacturing, trade, professional service, and other service jobs. Each value chain category captures jobs from multiple clean energy sectors and industries.



When Midwestern clean energy jobs are broken down by their placement in the value chain, construction makes up 41.5 percent of the jobs, while manufacturing represents 30.6 percent.

DEMOGRAPHICS

Throughout the region, 11.1 percent of clean energy workers are veterans. By comparison, veterans make up 6 percent of the national labor force. The large ratio of veterans transitioning to clean energy jobs is in part the result of the U.S. Department of Defense's ongoing investments in technologies like renewable energy and energy efficiency for national security and budgetary reasons. The military has also funded training programs that prepare veterans for private-sector employment in industries like solar.

Small businesses drive the region's clean energy sector – 71.4 percent of Midwestern clean energy businesses employ fewer than 20 individuals.

SUMMARY

Clean energy workers in the Midwest do much more than just install solar panels on rooftops. The industry is broad, diverse and growing. Advanced transportation jobs came back from a significant drop in 2017, with electric, hybrid and plug-in hybrid vehicles leading the way. Meanwhile, solar jobs in the Midwest increased even as the industry faced job losses in the U.S. overall. With 4 percent overall job growth and jobs created in all 12 Midwestern states, the region remains a bright spot in the overall U.S. clean energy job market.

The data and analyses presented in this report by Clean Energy Trust and Environmental Entrepreneurs are based on data collected for the 2019 U.S. Energy Employment Report (2019 USEER), produced by the Energy Futures Initiative (EFI) in partnership with the National Association of State Energy Officials (NASEO) and collected and analyzed by BW Research Partnership (BWRP).

2019 CLEAN JOBS MIDWEST

[bw] RESEARCH PARTNERSHIP

The Joyce Foundation

NASEO National Association State Energy Offici

clean energy trust

E2

McKNIGHT FOUNDATION

ENERGY FUTURES INITIATIVE

ENERGY FOUNDATION building a new energy future

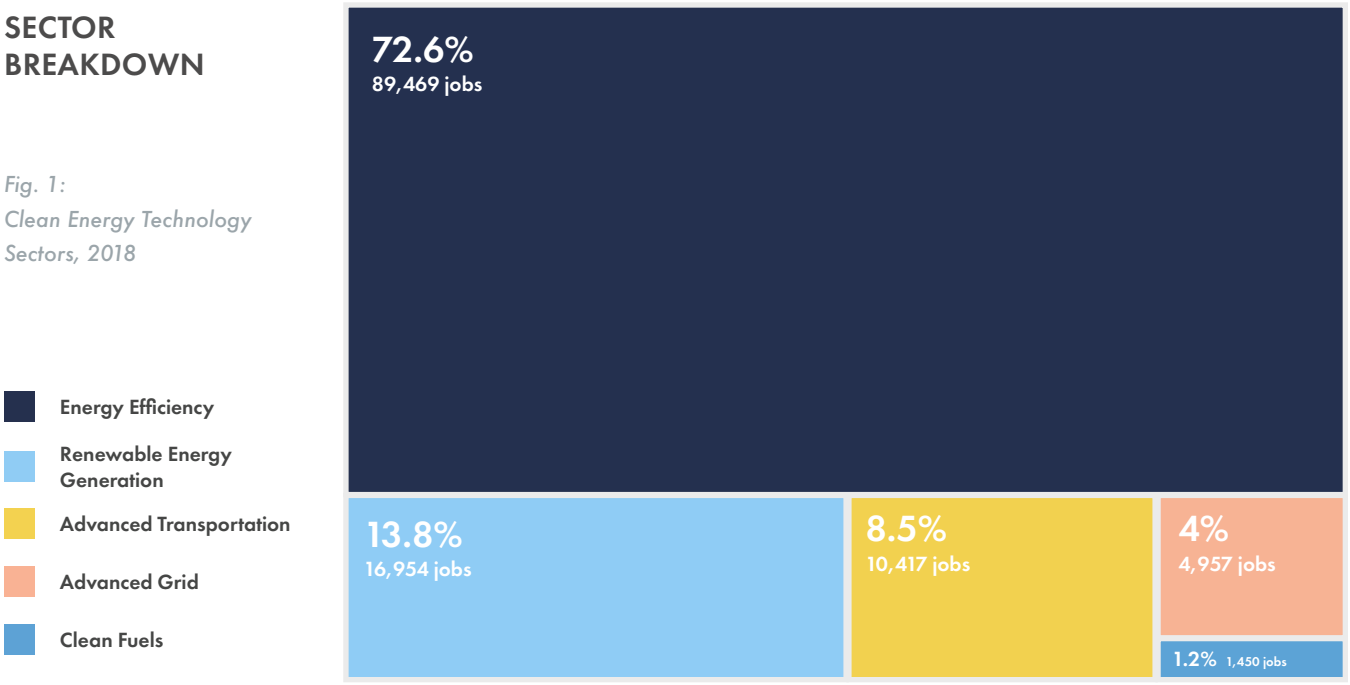
Illinois: Home to 123,247 Clean Energy Jobs

CLEAN ENERGY EMPLOYMENT IN ILLINOIS KEEPS EXPANDING

Clean energy is a major employer in Illinois with 123,247 jobs, the second-highest total in the entire region.[1] In 2018, the Illinois clean energy industry added 4,717 jobs. That's a 4 percent growth rate, and it's right in line with the regional average. Illinois has more jobs in energy efficiency, renewable energy, clean fuels, and advanced grid than any other state in the Midwest. The alternative transportation sector experienced the most year-over-year growth, spiking nearly 26 percent. Energy efficiency jobs continue to be the largest Illinois clean energy employer; the sector is home to nearly three out of every four of the state's clean energy jobs. In any given year, hundreds of different Illinois companies and establishments hire clean energy workers. Combined, these employers anticipate an 8.5 percent growth rate in hiring in 2019.

SECTOR BREAKDOWN

Fig. 1: Clean Energy Technology Sectors, 2018



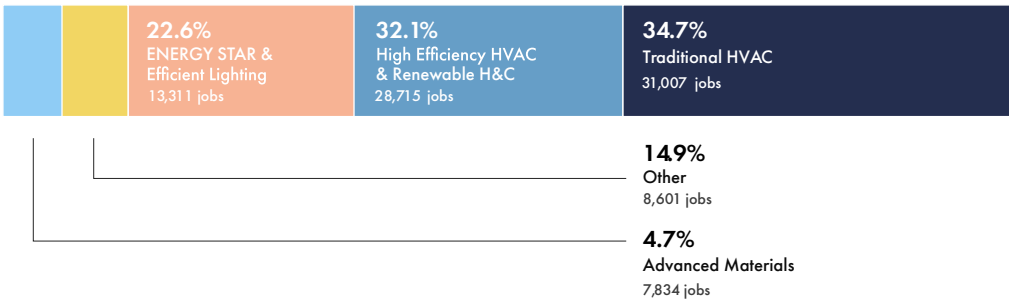
1. Unless otherwise stated, all data is based on the 2019 USEER. Energy Futures Initiative. (2019). The U.S. Energy Employment Report. Washington, DC. www.usenergyjobs.org. The Data provided relies on thousands of data points provided via survey. EFI, NASEO and BWRP have made every effort to supply current and accurate information but assume no responsibility or liability for any decisions based upon the information presented. For more information on the survey methodology see cleanjobsmidwest.com/about.

ENERGY EFFICIENCY A SIGNIFICANT ILLINOIS EMPLOYER

89,469 Illinoisans work in energy efficiency, by far more than any other sector in the state's expansive clean energy industry and more than any other state in the entire Midwest. In 2018, Illinois energy efficiency businesses created 2,553 new jobs, a 2.9 percent growth rate.

Energy efficiency workers are active throughout the value chain. They manufacture ENERGY STAR-rated kitchen appliances; install efficient lighting systems at car dealerships; implement software that optimizes traditional heating, ventilation and air conditioning (HVAC) systems in high schools, and handle advanced building materials at new office towers.

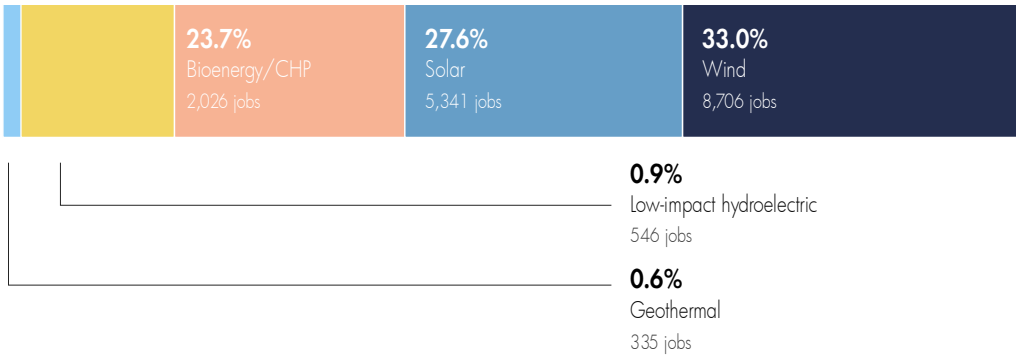
Fig. 2:
Energy Efficiency Subsectors, 2018



RENEWABLE ENERGY JOB GAINS POWERED BY WIND, SOLAR

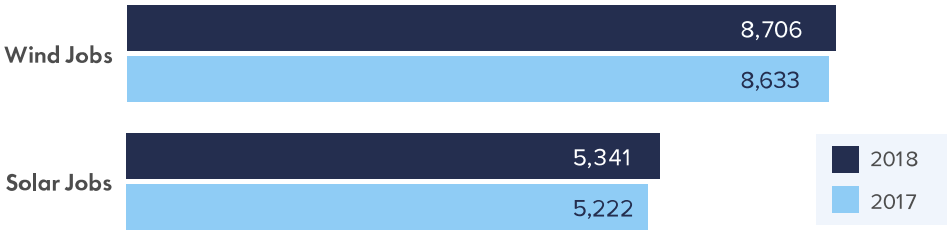
The second-largest employer in the state's clean energy industry is renewable energy generation with 16,956 workers. Wind (8,706 jobs) and solar (5,341) are the two largest employers in the sector.

Fig. 3:
Renewable Energy Subsectors, 2018



Illinois' 2-percent growth in solar jobs is in contrast to what was happening in the sector nationwide, with American solar jobs dropping about 4 percent overall. While wind and geothermal jobs in Illinois also grew, bioenergy and low-impact hydro experienced job declines.

Fig. 4:
Wind and Solar Jobs, 2018 and 2017 Comparison



ADVANCED TRANSPORTATION JOBS SURGE

Advanced transportation is the No. 3 clean energy employer in Illinois with 10,417 jobs. Following job losses in 2017, the sector grew 25.9 percent in 2018, a gain of 2,144 jobs in a single year. Sector employment growth was fueled by jobs building and developing plug-in hybrid vehicles, EVs and hybrid electric vehicles. 2,174 people now work on plug-ins in Illinois -- that's 41 percent more than in 2017. Electric vehicle and hybrid electric vehicles jobs almost boomed, with both sub-sectors experiencing double-digit growth rates.

ENERGY STORAGE LEADS THE ADVANCED GRID SECTOR

Advanced grid jobs employ 4,957 Illinoisans. These jobs grew 1.4 percent from 2017. Energy storage is the sector's largest employer with nearly 2,080 jobs, about 50 more than 2017. As the fourth-largest clean energy employer in the Midwest, the sector includes jobs in energy storage, smart grid, microgrid, and other grid modernization work.

CLEAN FUELS JOBS DROP

About 1,450 Illinoisans work in clean fuel jobs. This is 3.2 percent fewer than 2017, a drop of about 50 jobs. The clean fuels sector encompasses non-corn ethanol, non-woody biomass and other technologies not yet in wide commercial production, including algal biofuel, syngas, bioheat blends, landfill gas, and advanced biofuels.

Fig. 5:
Top 3 MSAs in Clean Energy Employment, 2018

Metro Area (MSA)	Total Clean Energy Employment	Renewable Energy Employment	Energy Efficiency Employment
Chicago-Naperville-Joliet, IL-IN-WI MSA	86,967	12,467	62,708
St. Louis, MO-IL MSA	6,119	838	4,456
Peoria, IL MSA	3,562	411	2,652

CLEAN ENERGY INDUSTRY OUTLOOK

CLEAN ENERGY JOBS GROWING FASTER THAN ILLINOIS JOBS OVERALL

Signed by former Gov. Bruce Rauner in December 2016, the Future Energy Jobs Act (FEJA) put Illinois on track to acquire a quarter of its electricity from renewable energy by 2025. Notable from a jobs perspective, the law also strengthened the state's energy efficiency standards.

Since FEJA was enacted, Illinois has experienced sustained job growth in the major clean energy sectors of wind, solar, and energy efficiency. In fact, in 2018 Illinois added more energy efficiency jobs than any other state in the region.

In part due to a confluence of business friendly energy policies like FEJA and ongoing clean energy industry expansion, Illinois clean energy jobs are growing significantly faster than jobs in the state's overall economy. Whereas the overall Illinois job market grew 2.4 percent in 2018, clean energy jobs grew at a much quicker pace -- about 4 percent.[2]

One sector where Illinois clean energy jobs increased dramatically was advanced transportation. Likely a major factor in this dynamic was an upswing in popularity of EVs, which experienced an in-state sales increase of about 80 percent. The subsequent impact on the local labor market was not surprising: alternative transportation jobs in Illinois surged to a 26 percent year-over-year increase. Making this latest round of advanced transportation job growth all the more striking is that jobs in the sector in Illinois had actually dropped in 2017.

Looking ahead, clean energy job growth in Illinois is expected to continue. Clean energy employers project an 8.5 percent growth in jobs in 2019.

COMPARING CLEAN ENERGY JOBS TO FOSSIL FUEL JOBS

In 2018, only 33,970 Illinoisans worked in fossil fuel energy jobs in industries like coal, natural gas, and oil.[3] In the coal industry, jobs fell 7 percent in part due to increased automation in the industry and low natural gas prices.

2. U.S. Bureau of Labor Statistics Local Area Unemployment Statistics, 2018 Preliminary data

3. 2019 US Energy and Employment Report. This figure does not include gas station workers.

VALUE CHAIN

In addition to breaking down clean energy jobs by sector, jobs can also be categorized by their function in the value chain. This report divides the clean energy jobs value chain into the following categories: agriculture, utility, construction, manufacturing, trade, professional service, and other service jobs. Each value chain category captures jobs from multiple clean energy sectors and sub-sectors.

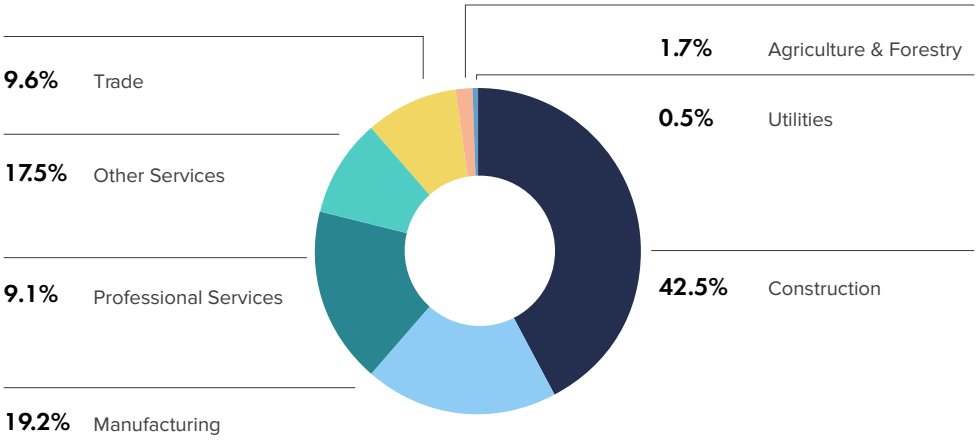


Fig. 6: Clean Energy Jobs Value Chain, 2018

When Illinois clean energy jobs are broken down by their placement in the value chain, construction is home to 42.5 percent of the jobs while manufacturing is home to 19.2 percent.

DEMOGRAPHICS

Throughout the state, 10 percent of the state's clean energy workers are veterans. By comparison, veterans make up 6 percent of the national labor force. The large ratio of veterans transitioning to clean energy jobs is the result of the U.S. Department of Defense's long-standing commitment to investing in renewable energy, energy efficiency and training programs that prepare veterans for private-sector employment in industries like solar.

Small businesses drive the state's clean energy sector – three out of every four Illinois clean energy businesses employ fewer than 20 individuals.

4. 2018 Bureau of Labor Statistics Current Population Survey (CPS)

SUMMARY

Clean energy employment opportunities in Illinois encompass dozens of sectors and sub-sectors and include diverse roles along multiple value chains. The state ranks a close second to Michigan in the overall number of clean energy jobs, and it's the top state in the region for jobs in major sectors like energy efficiency and renewable energy. Advanced transportation jobs significantly rebounded from a drop in 2017, with electric, hybrid and plug-in hybrid vehicles leading the way. Meanwhile, solar jobs increased even as the sub-sector faced job losses in the U.S. overall. With 4 percent clean energy industry job growth year-over-year, people in Illinois can anticipate clean energy to continue playing a significant role in the state's economy, with additional job opportunities being created in manufacturing, advanced transportation, renewable energy and other sectors and industries.

The data and analyses presented in this report by Clean Energy Trust and Environmental Entrepreneurs are based on data collected for the 2019 U.S. Energy Employment Report (2019 USEER), produced by the Energy Futures Initiative (EFI) in partnership with the National Association of State Energy Officials (NASEO) and collected and analyzed by BW Research Partnership (BWRP).

---

4. 2018 Bureau of Labor Statistics Current Population Survey (CPS)

2019 CLEAN JOBS MIDWEST

[bw] RESEARCH PARTNERSHIP

The Joyce Foundation

NASEO National Association State Energy Offici

clean energy trust

E2

McKNIGHT FOUNDATION

ENERGY FUTURES INITIATIVE

ENERGY FOUNDATION building a new energy future

Indiana: Home to 86,900 Clean Energy Jobs

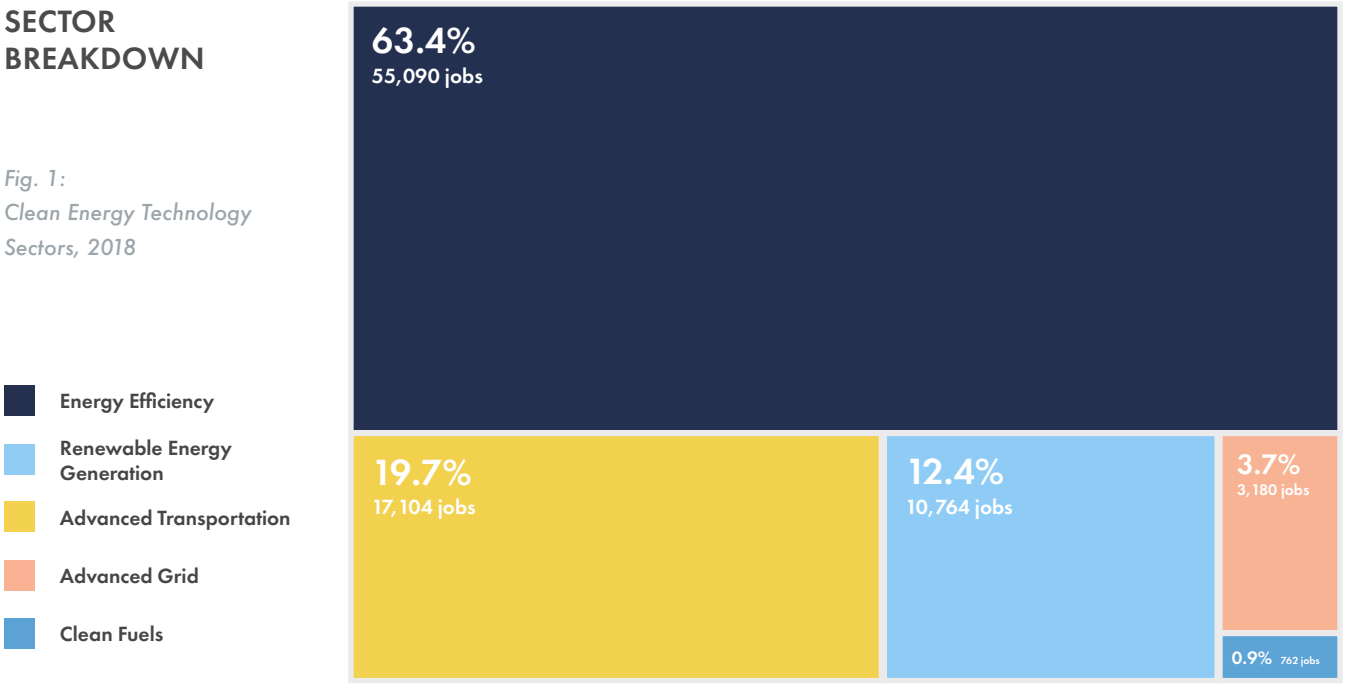
INDIANA'S CLEAN ENERGY JOBS GROW FASTER THAN MOST OF MIDWEST

Clean energy is a major employer in Indiana with 86,900 jobs—the fourth-most in the entire Midwestern region and more than enough to fill Lucas Oil Stadium in Indianapolis on any given Sunday. Employment in the industry grew 4.7 percent in 2018. That's one of the fastest growth rates in the region, and it represents an addition of nearly 3,900 jobs.[1]

Energy efficiency jobs remain the largest individual sector in terms of clean energy employment in Indiana, with more than 60 percent of all clean energy jobs across the state. Compared to the rest of the region, Indiana clean energy employers have a less-optimistic outlook for job growth this year. Whereas employers across the Midwest project a 7 percent growth in jobs, in Indiana that number falls to a 1.1 percent increase, with about 950 jobs expected to be added in 2019.

SECTOR BREAKDOWN

Fig. 1: Clean Energy Technology Sectors, 2018

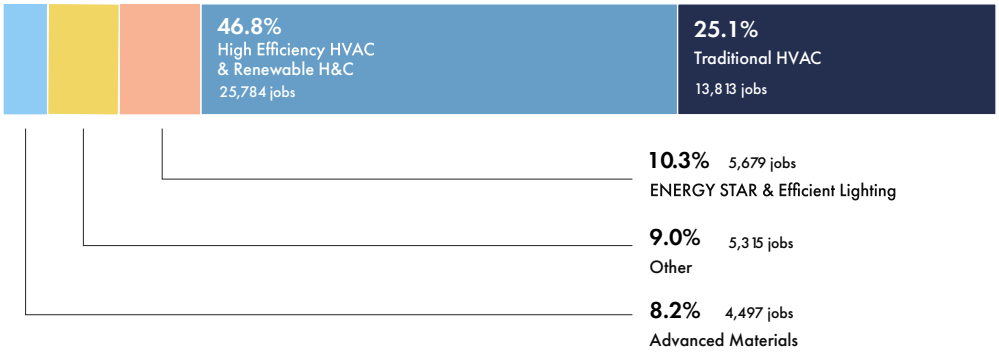


1. Unless otherwise stated, all data is based on the 2019 USEER. Energy Futures Initiative. (2019). The U.S. Energy Employment Report. Washington, DC. www.usenergyjobs.org. The Data provided relies on thousands of data points provided via survey. EFI, NASEO and BWRP have made every effort to supply current and accurate information but assume no responsibility or liability for any decisions based upon the information presented. For more information on the survey methodology see cleanjobsmidwest.com/about.

ENERGY EFFICIENCY IS INDIANA'S DOMINANT CLEAN ENERGY SECTOR

More Hoosiers work in energy efficiency—55,090—than any other sector in the clean energy industry. In 2018, Indiana energy efficiency jobs grew by more than 1,100, which is a 2.1 percent growth rate. Energy efficiency workers manufacture ENERGY STAR-rated appliances and install efficient lighting systems; tweak traditional heating, ventilation, and air conditioning (HVAC) systems; design high-efficiency HVAC units, and handle advanced building materials.

Fig. 2:
Energy Efficiency Subsectors, 2018



ADVANCED TRANSPORTATION JOBS REV UP

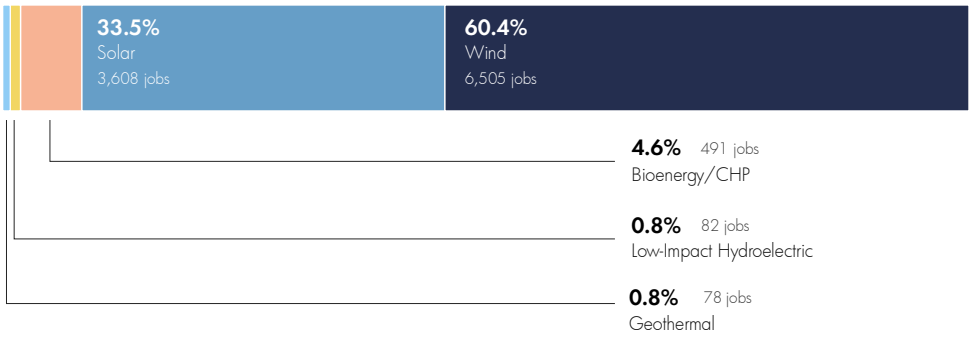
Advanced transportation is Indiana's second-largest clean energy sector in terms of jobs, employing more than 17,104 people. That's about 2,600, or 18.3 percent, more than in 2017 when the state's advanced transportation sector actually lost jobs.

Across the region, only the traditional automotive industry powerhouse of Michigan put more people to work in the advanced transportation sector in 2018. Jobs relating to plug-in hybrid vehicles had a particularly strong year, surging 33 percent to employ 3,570 people, about 900 more than just a year ago. EV jobs, meanwhile, grew by a quarter to 4,584 people.

RENEWABLE ENERGY JOBS RESILIENT IN FACE OF NEGATIVE NATIONAL TRENDS

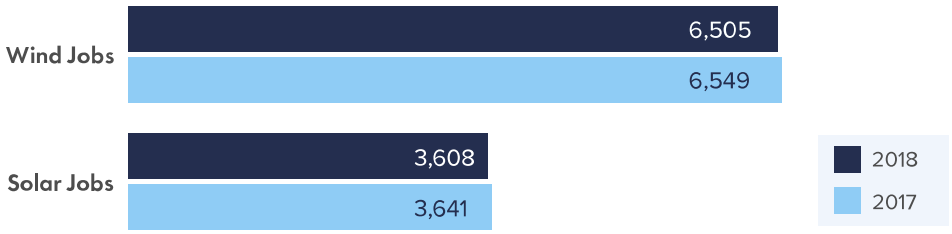
Renewable energy employs 10,764 people in Indiana. That's only a few dozen more than in 2017 (a 0.8 percent uptick), but still the third-highest number of renewable energy jobs in the Midwest.

Fig. 3:
Renewable Energy Subsectors, 2018



The resiliency of Indiana's renewable energy labor market contrasts with the national trend of job losses in the sector. Nationwide, renewable energy jobs fell 1.5 percent. In Indiana, wind (6,505 jobs) and solar (about 3,608) are the two largest employers in the sector. Each saw moderate declines in 2018: wind jobs contracted by 0.7 percent (a loss of about 40 jobs), while solar shrunk 0.9 percent (a loss of roughly 30 jobs). However, compared to national solar numbers, Indiana fared relatively well. Across the country, solar jobs declined 4.5 percent.

Fig. 4:
Wind and Solar Jobs, 2018 and 2017 Comparison



ENERGY STORAGE JOBS LIFT THE ADVANCED GRID SECTOR

Advanced grid jobs employ 3,180 people in Indiana. These jobs grew by about 50, or 1.5 percent, in 2018. Energy storage jobs are the sector's largest employer in Indiana with 1,791 jobs, about 30 more than in 2017. The advanced grid sector also includes jobs in smart grid, microgrid, and other grid modernization work.

SMALL DROP IN CLEAN FUELS JOBS

762 Hoosiers work in clean fuel jobs. This is about 10 fewer jobs than in 2017, or a 1.4 percent decrease. The clean fuels sector encompasses non-corn ethanol, non-woody biomass and other technologies not yet in wide commercial production, including algal biofuel, syngas, bioheat blends, landfill gas, and advanced biofuels.

Fig. 5:
Top 3 MSAs in Clean Energy Employment, 2018

Metro Area (MSA)	Total Clean Energy Employment	Renewable Energy Employment	Energy Efficiency Employment
Indianapolis-Carmel, IN MSA	24,648	2,729	15,832
Chicago-Naperville-Joliet, IL-IN-WI MSA	10,526	1,939	6,301
Fort Wayne, IN MSA	8,660	1,064	5,488

CLEAN ENERGY INDUSTRY OUTLOOK

Clean energy jobs grew at a faster pace in Indiana than in most other Midwestern states. All told, clean energy jobs in Indiana constitute nearly 3 percent of all jobs in the entire state, the second-highest ratio in the entire region.[2] Nevertheless, Indiana's clean energy industry grew at a slower pace than the rest of the state's overall labor market. In 2018, Indiana clean energy jobs grew by 4.7 percent, while the overall Indiana job market grew by more than 6 percent.

Looking toward the future, clean energy employers anticipate further growth (1.1 percent in 2019) but not at the same rate as their neighbors (7 percent). This relatively dim view may be linked to difficulty hiring—nearly 77 percent of the Indiana clean energy employers surveyed reported that it was "somewhat" or "very" difficult to hire workers.

COMPARING CLEAN ENERGY JOBS TO FOSSIL FUEL JOBS

In 2018, 17,287 Hoosiers worked in fossil fuel energy jobs in industries like coal, natural gas, and oil.[3] While significant, it's less than a fifth of the total number of people working in clean energy in the state. Electric power generation jobs using fossil fuels employed 6,789 people. Renewable energy generation, meanwhile, employs about 10,764. Additionally, whereas coal jobs dropped 4.5 percent, renewable energy jobs grew by 0.8 percent.

VALUE CHAIN

Clean energy jobs can also be categorized by the role they play in the value chain. This report divides the clean energy jobs value chain into the following categories: agriculture, utility, construction, manufacturing, trade, professional service, and other service jobs. Each category captures jobs from multiple different clean energy sectors. For example, construction jobs can include energy efficiency jobs and renewable energy jobs. When Indiana clean energy jobs are broken down by their placement in the value chain, manufacturing represents 46 percent of the jobs while construction makes up 35 percent.

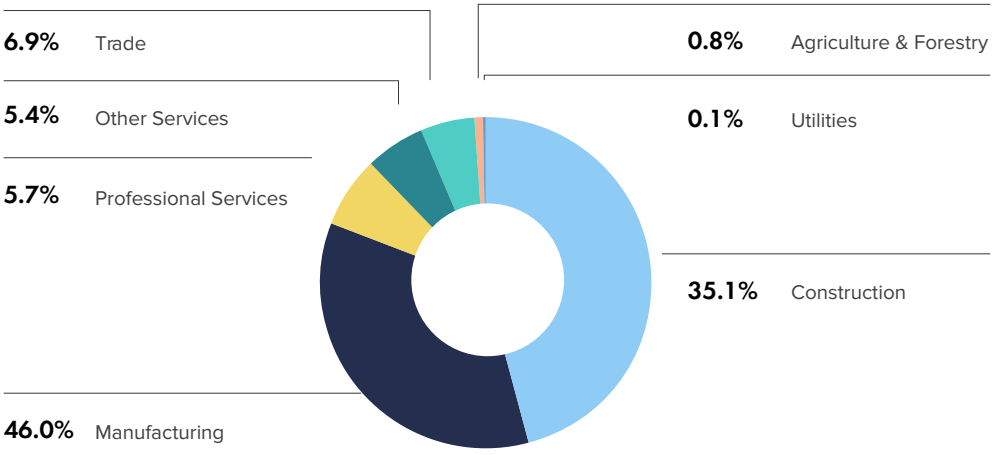


Fig. 6: Clean Energy Jobs Value Chain, 2018

2. U.S. Bureau of Labor Statistics Local Area Unemployment Statistics, 2018 Preliminary data

3. 2019 US Energy and Employment Report. This figure does not include gas station workers.

DEMOGRAPHICS

In Indiana, 12.5 percent of the state's clean energy workers are veterans. By comparison, veterans make up 6 percent of the national labor force.[4] The large ratio of veterans transitioning to clean energy jobs is the result of the U.S. Department of Defense's long- standing commitment to investing in renewable energy, energy efficiency and training programs that prepare veterans for private-sector employment in industries like solar.

Small businesses drive the state's clean energy sector—71.9 percent of Indiana's clean energy businesses employ fewer than 20 individuals.

SUMMARY

There are a few reasons why clean energy industry employment data in Indiana stands out when compared to its Midwestern neighbors. On the positive side of the ledger, Indiana has a significant number of clean energy jobs, and the state has been adding them at a healthy clip. Across the Midwest, Indiana now has the third-fastest growth rate and the fourth-most clean energy jobs.

However, there were some concerning signals. Specifically, the state's employers expect considerably slower growth than their neighbors in the coming year, perhaps in part due to hiring difficulties.

Focusing on specific sectors, advanced transportation employment surged as jobs relating to electric, hybrid and plug-in hybrid vehicles led the way. All the more remarkable was that this sector-specific jobs growth came on the heels of job losses a year ago. Finally, looking just at renewables, jobs in that sector increased in Indiana despite falling nationally.

The data and analyses presented in this report by Clean Energy Trust and Environmental Entrepreneurs are based on data collected for the 2019 U.S. Energy Employment Report (2019 USEER), produced by the Energy Futures Initiative (EFI) in partnership with the National Association of State Energy Officials (NASEO) and collected and analyzed by BW Research Partnership (BWRP).

4. 2018 Bureau of Labor Statistics Current Population Survey (CPS)

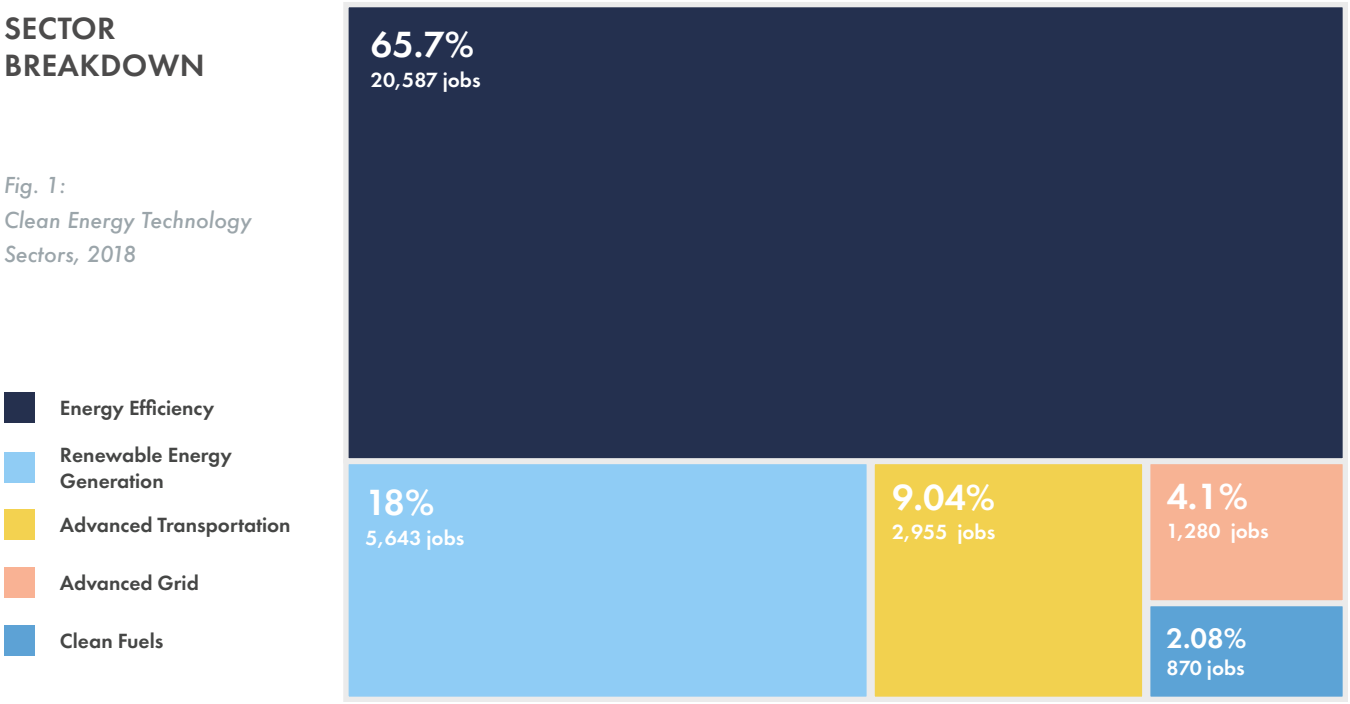
Iowa: Home to 31,335 Clean Energy Jobs

IOWA'S CLEAN ENERGY JOBS GROW BY 4 PERCENT

Clean energy is a major employer in Iowa with 31,335 jobs.[1] In 2018, the industry added more than 1,000 jobs.[1] That's a 3.6 percent growth rate, and it's right in line with the regional average. Energy efficiency continues to be the largest clean energy employer in Iowa; the sector is home to nearly two out of every three clean energy jobs in the state. Despite state policy headwinds, especially in the energy efficiency sector, Iowa clean energy employers have a positive outlook for the next year. Combined, these employers expect to add more than 2,400 clean energy jobs in 2019 – an almost 8 percent anticipated gain.

SECTOR BREAKDOWN

Fig. 1: Clean Energy Technology Sectors, 2018



1. Unless otherwise stated, all data is based on the 2019 USEER. Energy Futures Initiative. (2019). The U.S. Energy Employment Report. Washington, DC. www.usenergyjobs.org. The Data provided relies on thousands of data points provided via survey. EFI, NASEO and BWRP have made every effort to supply current and accurate information but assume no responsibility or liability for any decisions based upon the information presented. For more information on the survey methodology see cleanjobsmidwest.com/about.

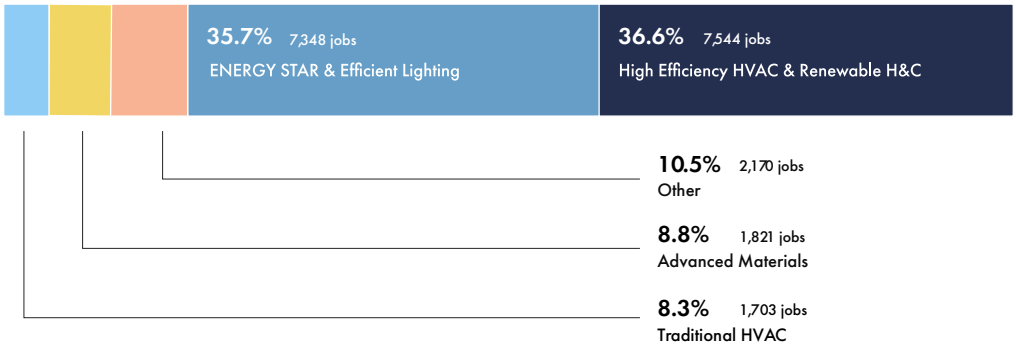
ENERGY EFFICIENCY CONTINUES TO LEAD CLEAN ENERGY JOBS

20,587 Iowans work in energy efficiency. That's more than any other industry in the clean energy sector, and it's enough to fill Carver Hawkeye Arena to the rafters, with thousands more outside still trying to get in. In 2018, Iowa employers created 893 energy efficiency jobs (a 4.5 percent growth rate).

Energy efficiency workers are active throughout the value chain. They manufacture ENERGY STAR-rated kitchen appliances; install efficient lighting systems at car dealerships; implement software that optimizes traditional heating, ventilation and air conditioning (HVAC) systems in high schools, and handle advanced building materials at new office towers.

The Iowa clean energy labor market is likely to be impacted in the coming years by recent state legislation (SF 2311) that will curtail energy efficiency investments as many rebate programs end this year.

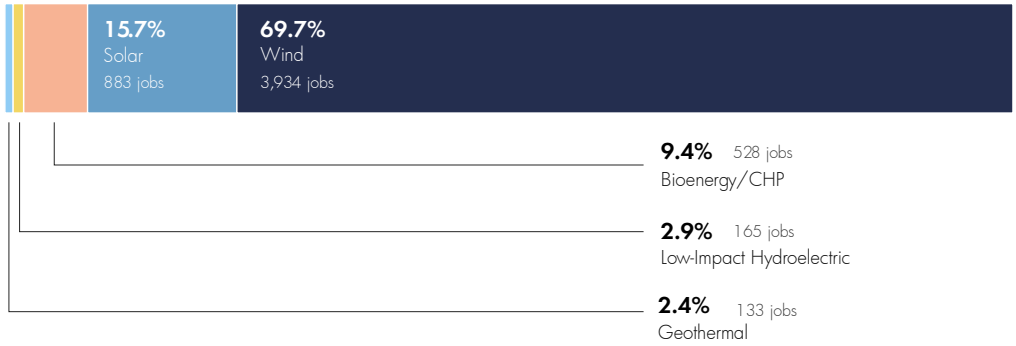
Fig. 2: Energy Efficiency Subsectors, 2018



RENEWABLE ENERGY JOBS: WIND AT IOWA'S BACK

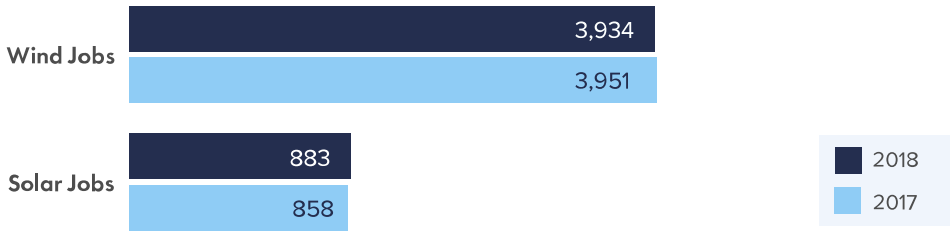
Renewable energy generation is Iowa's No. 2 clean energy employer with 5,643 jobs. This is a noteworthy divergence from broader regional data, which shows renewables as the No. 3 employer of clean energy workers across the Midwest.

Fig. 3: Renewable Energy Subsectors, 2018



A big reason for Iowa's relatively high ranking of in-state renewables jobs: 3,934 Iowans work in wind generation, the state's leading renewables sub-sector. Only three other states in the region support more wind jobs than Iowa, despite the Hawkeye State's No. 8 population ranking. There are also many other jobs that contribute to the wind generation sector but are not included in this report because they are identified in traditional energy sectors. This includes workers that manufacture control systems which are used for wind and other energy sources. Iowa's solar industry now employs 883 people. The sub-sector's growth gives it fourth-highest rate in the region and far outshining national solar job growth.

Fig. 4:
Wind and Solar Jobs, 2018 and 2017 Comparison



Other job-creating industries in the renewables sector include: geothermal, bioenergy and low-impact hydroelectric power. Geothermal had a growth rate in Iowa of more than 5 percent; the technology now accounts for 133 jobs. Bioenergy/CHP counts 528 jobs in Iowa.

ADVANCED TRANSPORTATION JOBS SPIKE 8 PERCENT

Advanced transportation jobs in Iowa grew by 8.3 percent, a gain of 226 jobs. Two vehicle styles were primarily responsible for the growth -- plug-in hybrid vehicles and electric vehicles (EVs). 1,286 Iowans now work on hybrid electric vehicles. Another 617 work on plug-ins. All told, advanced transportation is the third-largest employment sector in Iowa's clean energy industry.

ENERGY STORAGE LEADS ADVANCED GRID SECTOR IN IOWA

Advanced grid work accounts for 1,280 Iowa jobs. Jobs in the sector have grown 1.9 percent since 2017, and it's now the fourth-largest clean energy employer statewide. Advanced grid encompasses jobs in energy storage (703 jobs), microgrid (200), smart grid (175), and other grid modernization work (202).

CLEAN FUELS JOBS DECLINE

870 Iowans work in clean fuels jobs, a 2.3 percent decrease from 2017. Clean fuels include non-corn ethanol, non-woody biomass, and other technologies not yet in wide commercial production like algal biofuel, syngas, bioheat blends, and landfill gas.

Fig. 5:
Top 3 MSAs in Clean Energy Employment, 2018

Metro Area (MSA)	Total Clean Energy Employment	Renewable Energy Employment	Energy Efficiency Employment
Des Moines-West Des Moines, IA MSA	6,530	991	4,502
Cedar Rapids, IA MSA	2,679	531	1,709
Davenport-Moline-Rock Island, IA-IL MSA	1,511	309	957

CLEAN ENERGY INDUSTRY OUTLOOK

Clean energy jobs make up almost 2 percent of all jobs in the state.[2] And they're growing faster than the national average. The state's clean energy employers anticipate a hiring spree in 2019 when they expect to add almost 8 percent more jobs industry-wide.

It may be too soon to tell the impact of SF 2311 on investments and, in turn, jobs in Iowa's energy efficiency sector as the bill took effect in January 2019 after the surveys for this report were completed.

According to the American Council for an Energy Efficient Economy (ACEEE), Iowa dropped to 24th in the nation in its 2018 State Energy Efficiency Scorecard, experiencing the largest point drop of any state. ACEEE's point scale dinged Iowa because SF 2311 energy efficiency spending caps that will result in fewer measures, programs and investment.[3]

COMPARING CLEAN ENERGY JOBS TO FOSSIL FUEL JOBS

In 2018, 7,404 Iowans worked in jobs in fossil fuel energy industries like coal, natural gas, and oil. While significant, it's still less than a quarter the number of Iowa's clean energy workers. Electric power generation jobs using fossil fuels puts 2,352 people to work. By comparison, there are more than 5,600 jobs in Iowa's renewable energy generation sector alone. Overall coal jobs in Iowa dropped by a little more than 5 percent.

VALUE CHAIN

Clean energy jobs can be categorized by the role they play in the value chain. This report divides the clean energy jobs value chain into the following categories: agriculture, utility, construction, manufacturing, trade, professional service, and other service jobs. Each category captures jobs from multiple different clean energy sectors. For example, construction jobs can include energy efficiency jobs and renewable energy jobs.

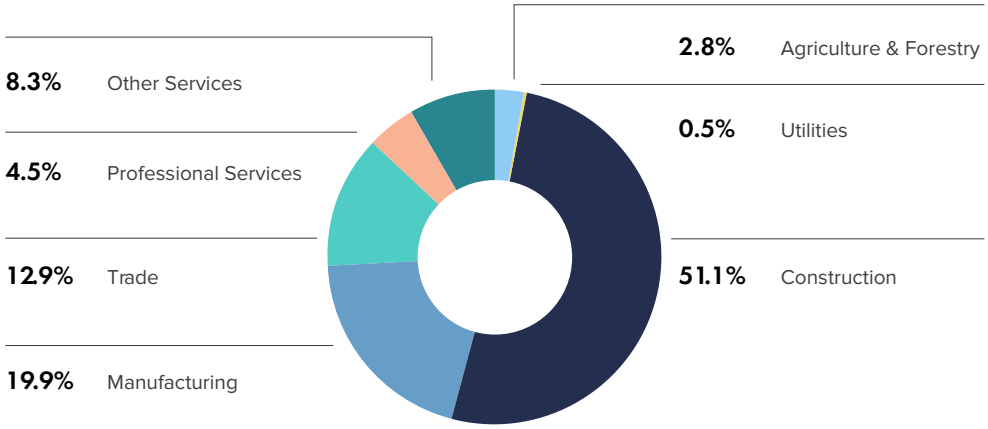


Fig. 6: Clean Energy Jobs Value Chain, 2018

When Iowa clean energy jobs are broken down by their placement in the value chain, construction makes up 51.1 percent of the jobs, while manufacturing represents 19.9 percent.

2. U.S. Bureau of Labor Statistics Local Area Unemployment Statistics, 2018 Preliminary data

3. 2019 US Energy and Employment Report. This figure does not include gas station workers.

DEMOGRAPHICS

In Iowa, almost 11 percent of clean energy workers are veterans. By comparison, veterans make up 6 percent of the national labor force.[5] The large ratio of veterans transitioning to clean energy jobs is in part the result of the U.S. Department of Defense's ongoing investments in technologies like renewable energy and energy efficiency for national security and budgetary reasons. The military has also funded training programs that prepare veterans for private-sector employment in industries like solar.

Small businesses drive the state's clean energy sector –78 percent of clean energy businesses employ fewer than 20 individuals.

SUMMARY

Clean energy employment opportunities in Iowa are broad and diverse. In 2018, they grew at a 4 percent clip, with even faster job growth projected in the coming year. While Iowa has traditionally been viewed as the Midwest's wind powerhouse, other clean energy sectors are also racking up jobs across the state. Just look at advanced transportation, where Iowa experienced significant job growth in electric, hybrid and plug-in hybrid vehicles. Meanwhile, in non-wind related renewable energy jobs, solar employment increased even as jobs in the sub-sector fell nationally.

The data and analyses presented in this report by Clean Energy Trust and Environmental Entrepreneurs are based on data collected for the 2019 U.S. Energy Employment Report (2019 USEER), produced by the Energy Futures Initiative (EFI) in partnership with the National Association of State Energy Officials (NASEO) and collected and analyzed by BW Research Partnership (BWRP).

4. 2018 Bureau of Labor Statistics Current Population Survey (CPS)

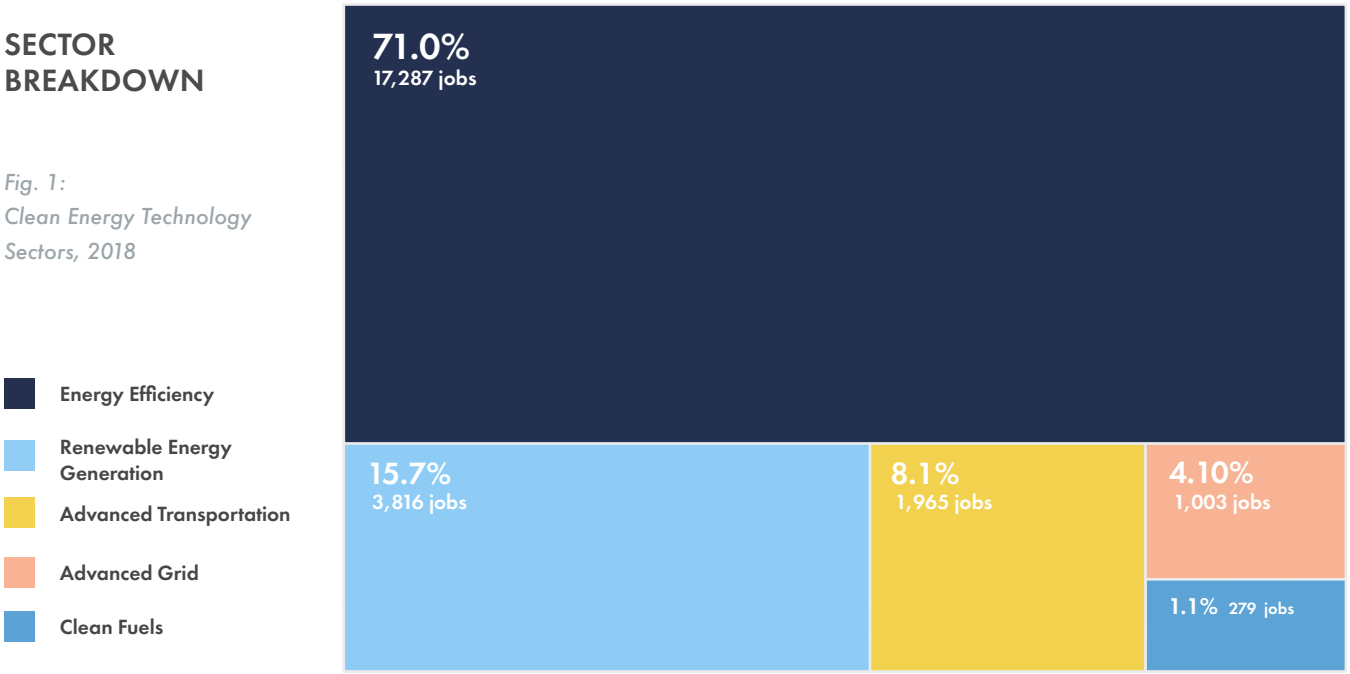
Kansas: Home to 24,350 Clean Energy Jobs

LED BY ENERGY EFFICIENCY AND A SURGE IN SOLAR, KANSAS CLEAN ENERGY JOBS RISE

Clean energy is a major employer in Kansas with 24,350 jobs. In 2018, the industry added more than 1,200 jobs -- a 5.5 percent growth rate and one of the fastest in the region. Energy efficiency continues to be the largest clean energy employer in the state; the sector is now home to seven out of 10 Kansas clean energy jobs. Looking at renewable energy employment, solar in particular was a bright spot with jobs in that sub-sector increasing by 45.19 percent, the highest in the region.

SECTOR BREAKDOWN

Fig. 1: Clean Energy Technology Sectors, 2018



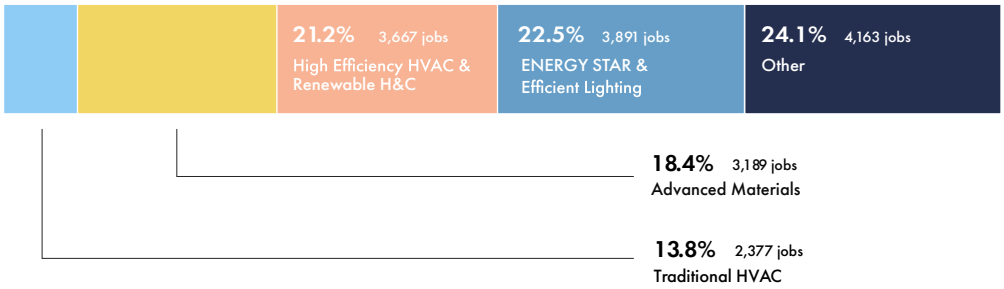
1. Unless otherwise stated, all data is based on the 2019 USEER. Energy Futures Initiative. (2019). The U.S. Energy Employment Report. Washington, DC. www.usenergyjobs.org. The Data provided relies on thousands of data points provided via survey. EFI, NASEO and BWRP have made every effort to supply current and accurate information but assume no responsibility or liability for any decisions based upon the information presented. For more information on the survey methodology see cleanjobsmidwest.com/about.

ENERGY EFFICIENCY IS THE STATE'S LEADING CLEAN ENERGY EMPLOYER

17,287 Kansans work in energy efficiency. That's more than any other industry in the clean energy sector, and it's enough to pack Allen Fieldhouse for a Kansas University basketball game. In 2018, Kansas employers added about 700 energy efficiency jobs, good for a 4 percent growth rate.

Energy efficiency workers are active throughout the value chain in communities and businesses across Kansas. They manufacture ENERGY STAR-rated kitchen appliances; install efficient lighting systems at car dealerships; implement software that optimizes traditional heating, ventilation and air conditioning (HVAC) systems in high schools, and handle advanced building materials at new office towers.

Fig. 2: Energy Efficiency Subsectors, 2018



RENEWABLE ENERGY GENERATION SECOND LARGEST EMPLOYER IN CLEAN ENERGY

Renewable energy generation is the No. 2 clean energy employer in Kansas with nearly 4,000 jobs. The solar industry in particular was a bright spot. The sub-sector enjoyed a 45.19 percent growth rate, higher than any other state in the Midwest. Kansas solar businesses and establishments now employ 996 people. Solar is an emerging market in Kansas that has benefited from the low costs of solar and many actions by local governments and utilities.

Fig. 3: Renewable Energy Subsectors, 2018

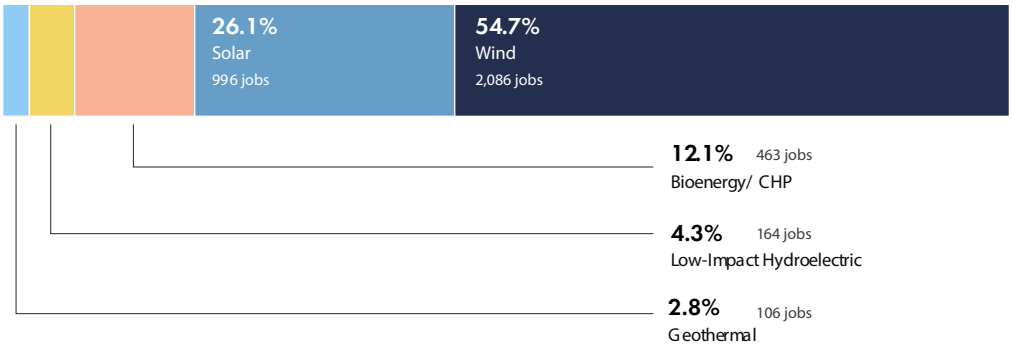
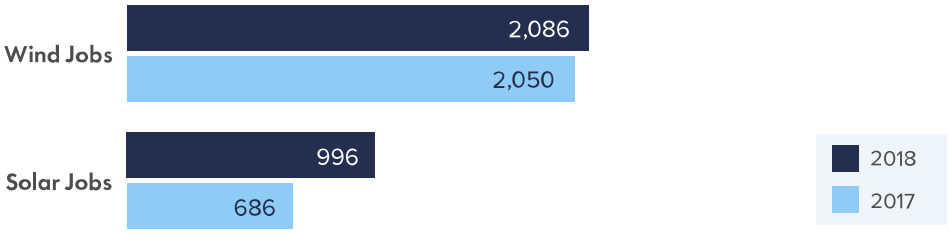


Fig. 4: Wind and Solar Jobs, 2018 and 2017 data



Wind generation is the largest renewable energy sub-sector in the state with more than 2,000 jobs. Bioenergy/CHP counts 463 jobs in Kansas, while geothermal had a growth rate of 4.95 percent and now accounts for 101 jobs.

ADVANCED TRANSPORTATION JOBS IN FAST LANE

Advanced transportation is the third-largest clean energy sector in Kansas in terms of employment, adding 285 jobs for a 17 percent growth rate. Hybrid electric vehicles count for 855 jobs, plug-in hybrid vehicles for 410 and plug-in electric vehicles (EVs) for 527, which combined employ nearly 1,792 Kansans.

ENERGY STORAGE LEADS ADVANCED GRID SECTOR IN IOWA

Advanced grid work accounts for 1,003 jobs in Kansas, 3.4 percent more than 2017. The fourth-largest clean energy employer in the state, advanced grid encompasses jobs in energy storage (479 jobs), smart grid (198 jobs), microgrid (164 jobs) and other grid modernization work (162).

CLEAN FUELS EMPLOYS 279 PEOPLE

279 Kansans work in clean fuels jobs, a slight uptick up from 2017. Clean fuels include non-corn ethanol, non-woody biomass, and other technologies not yet in wide commercial production like algal biofuel, syngas, bioheat blends, and landfill gas.

Fig. 5:
Top 3 MSAs in Clean Energy Employment, 2018

Metro Area (MSA)	Total Clean Energy Employment	Renewable Energy Employment	Energy Efficiency Employment
Kansas City, MO-KS MSA	8,336	1,810	5,510
Wichita, KS MSA	4,919	603	3,627
Topeka, KS MSA	1,736	211	1,281

CLEAN ENERGY INDUSTRY OUTLOOK

The clean energy industry constitutes a significant segment of Kansas's overall labor market. In total, clean energy jobs make up almost 2 percent of all jobs in the state.[2] The clean energy workforce grew 2.54 times faster than overall job growth.

Looking toward the future, clean energy employers in Kansas anticipate adding jobs at a 1.4 percent clip in 2019. Compared to the rest of the Midwest, this is a relatively low projection. Overall, Midwestern clean energy employers anticipate a 7 percent growth in clean energy jobs this year.

The Kansas growth predictions may be related to the fact that employers reported difficulty hiring -- every one of the Kansas clean energy employers surveyed reported that it was "somewhat" or "very" difficult to hire workers.

2. U.S. Bureau of Labor Statistics Local Area Unemployment Statistics, 2018 Preliminary Data

COMPARING CLEAN ENERGY JOBS TO FOSSIL FUEL JOBS

In 2018, 21,095 people worked in jobs in Kansas fossil fuel energy industries like coal, natural gas and oil, slightly less than the state's overall clean energy workforce.[3] Electric power generation jobs using fossil fuels put 9,761 people to work. Overall coal jobs in Kansas dropped by almost 10 percent, the region's sharpest drop.

3. *ACEEE. https://aceee.org/sites/default/files/pdf/state-sheet/2018/iowa.pdf*

VALUE CHAIN

In addition to breaking down clean energy jobs by industry, jobs can also be categorized by their function in the value chain. This report divides the clean energy jobs value chain into the following categories: agriculture, utility, construction, manufacturing, trade, professional service, and other service jobs. Each value chain category captures jobs from multiple clean energy sectors and industries.

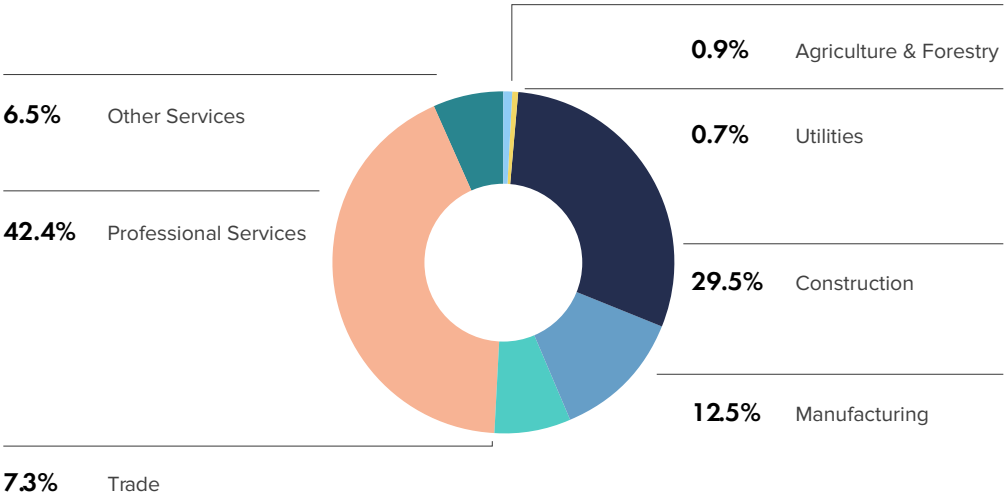


Fig. 6: Clean Energy Jobs Value Chain, 2018

When Kansas clean energy jobs are broken down by their placement in the value chain, professional services makes up 42.4 percent of the jobs, while construction represents 29.5 percent.

DEMOGRAPHICS

In Kansas, more than 9 percent of clean energy workers are veterans. By comparison, veterans make up 6 percent of the national labor force.[4] The large ratio of veterans transitioning to clean energy jobs is in part the result of the U.S. Department of Defense's ongoing investments in technologies like renewable energy and energy efficiency for national security and budgetary reasons. The military has also funded training programs that prepare veterans for private-sector employment in industries like solar.

Small businesses drive the state's clean energy sector – more than 60 percent of Kansas clean energy businesses employ fewer than 20 individuals.

4. *2018 Bureau of Labor Statistics Current Population Survey (CPS)*

SUMMARY

The clean energy industry in Kansas is broad and diverse and it's growing at a brisk 6 percent clip. A big reason for the growth is the solar sub-sector, which grew a staggering 45 percent. Other bright spots in the state's clean energy industry employment data include energy efficiency, which employs the vast majority of clean energy workers in Kansas, and advanced transportation, which surged 17 percent from 2017.

The data and analyses presented in this report by Clean Energy Trust and Environmental Entrepreneurs are based on data collected for the 2019 U.S. Energy Employment Report (2019 USEER), produced by the Energy Futures Initiative (EFI) in partnership with the National Association of State Energy Officials (NASEO) and collected and analyzed by BW Research Partnership (BWRP).

2019 CLEAN JOBS MIDWEST

[bw] RESEARCH PARTNERSHIP

The Joyce Foundation

NASEO National Association State Energy Offici

clean energy trust

E2

McKNIGHT FOUNDATION

ENERGY FUTURES INITIATIVE

ENERGY FOUNDATION building a new energy future

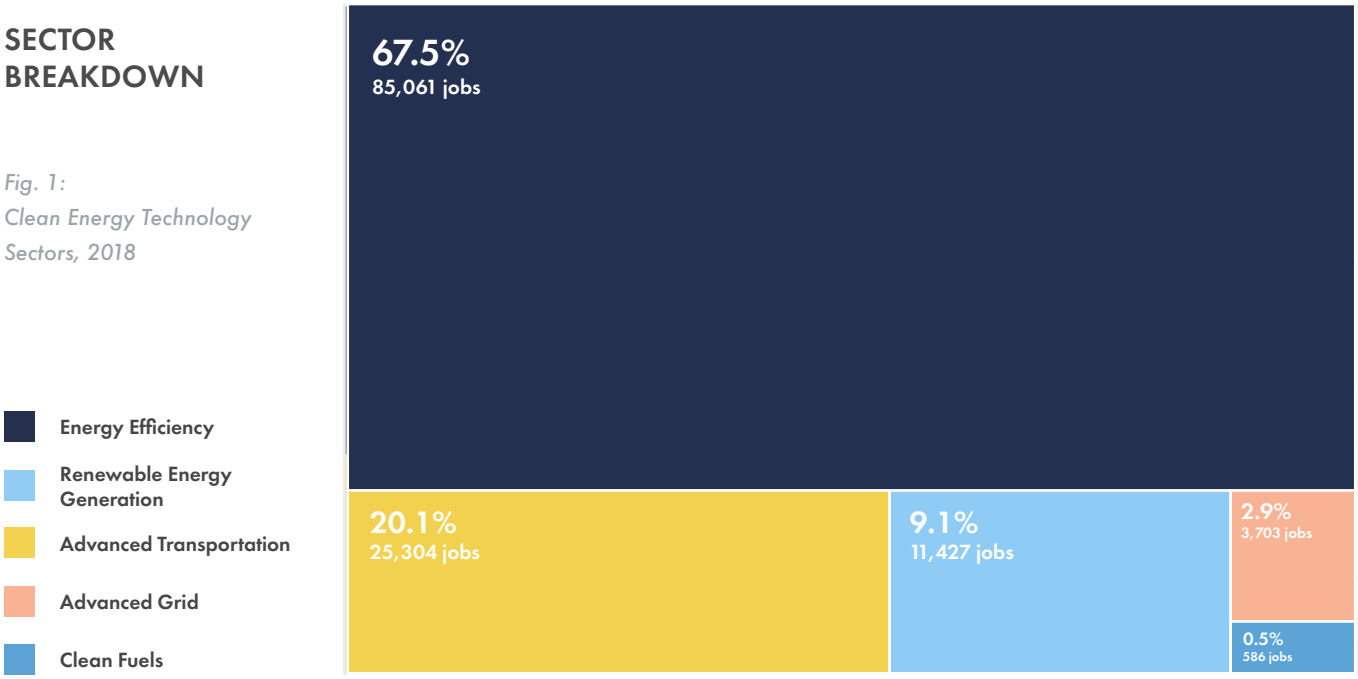
Michigan: Home to 126,081 Clean Energy Jobs

MICHIGAN LEADS THE MIDWEST IN CLEAN ENERGY JOBS

Michigan has 126,081 clean energy jobs -- more than any other state in the entire region. In 2018, the industry added 4,800 jobs. That's a 4 percent growth rate, and it's right in line with the regional average. Alternative transportation saw the most growth, expanding by nearly 16 percent. Energy efficiency continues to be the largest clean energy employer in the state; the sector is home to two out of every three Michigan clean energy jobs. Hundreds of different Michigan companies and establishments hire clean energy workers in any given year. Combined, these employers anticipate a 9 percent growth rate in 2019.

SECTOR BREAKDOWN

Fig. 1: Clean Energy Technology Sectors, 2018



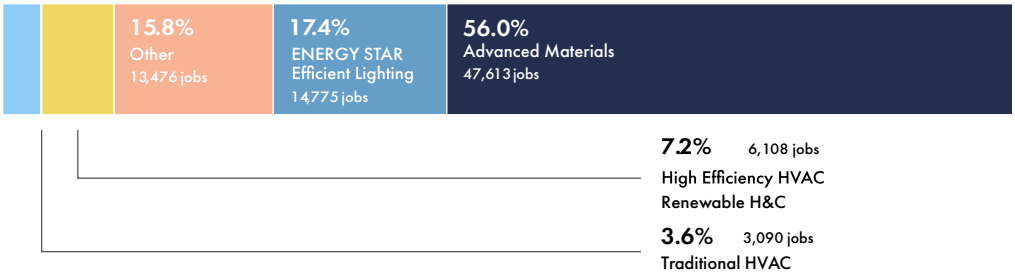
1. Unless otherwise stated, all data is based on the 2019 USEER. Energy Futures Initiative. (2019). The U.S. Energy Employment Report. Washington, DC. www.usenergyjobs.org. The Data provided relies on thousands of data points provided via survey. EFI, NASEO and BWRP have made every effort to supply current and accurate information but assume no responsibility or liability for any decisions based upon the information presented. For more information on the survey methodology see cleanjobsmidwest.com/about.

ENERGY EFFICIENCY SECTOR IS MICHIGAN'S LARGEST CLEAN ENERGY EMPLOYER

More Michiganders work in energy efficiency -- 85,061, more than enough to sell out Ford Field -- than any other clean energy sector. Energy efficiency added 1,009 jobs in the state in 2018, a 1.2 percent growth rate.

Energy efficiency workers are active throughout the value chain. They manufacture ENERGY STAR-rated kitchen appliances; install efficient lighting systems at car dealerships; implement software that optimizes traditional heating, ventilation and air conditioning (HVAC) systems in high schools, and handle advanced building materials at new office towers.

Fig. 2:
Energy Efficiency Subsectors, 2018



ADVANCED TRANSPORTATION U-TURN

Advanced transportation is Michigan's No. 2 clean energy sector with more than 25,304 jobs. Following job losses in 2017, the sector grew 16 percent in 2018, a gain of 3,488 jobs. Growth was led by jobs involved in the design and manufacturing of plug-in hybrid vehicles, EVs and hybrid electric vehicles.

Plug-in hybrid vehicle jobs alone now employ 5,281 people in Michigan, 1,227 more than in 2017, a 30.2 percent gain. Electric vehicle and hybrid electric vehicles jobs also saw double-digit growth rates: 6,782 Michiganders now work in EVs and 11,010 in hybrids.

RENEWABLE ENERGY JOBS IN MICHIGAN EXPAND, BUT SOLAR EMPLOYMENT DIMS

The third-largest employer in Michigan's clean energy industry is renewable energy with 11,427 jobs. Bucking national trends, the state's renewables sector grew by 2 percent. While solar remains the largest renewable energy sub-sector in the state, with about 5,419 jobs, it experienced modest job losses (a 2 percent drop), which is consistent with solar job losses in the overall U.S. clean energy labor market. Wind ranks second in Michigan clean energy jobs behind solar with 4,783 jobs.

The state is now home to 946 bioenergy jobs, a 40 percent increase over 2017. Geothermal jobs also expanded in 2018 in Michigan.

Fig. 3:
Renewable Energy Subsectors, 2018

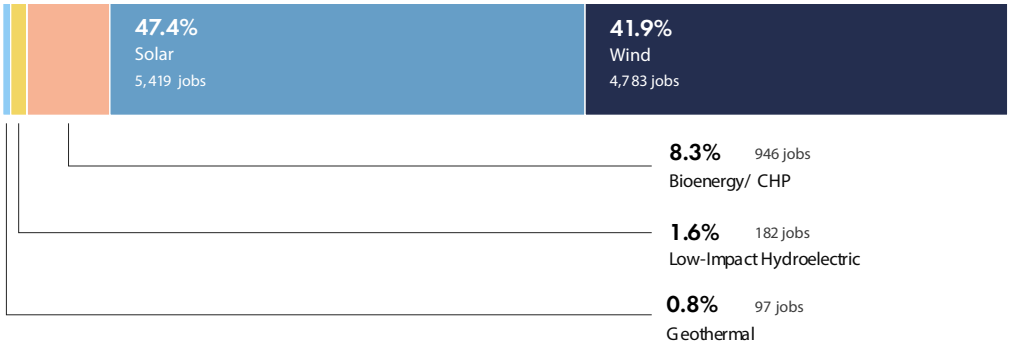
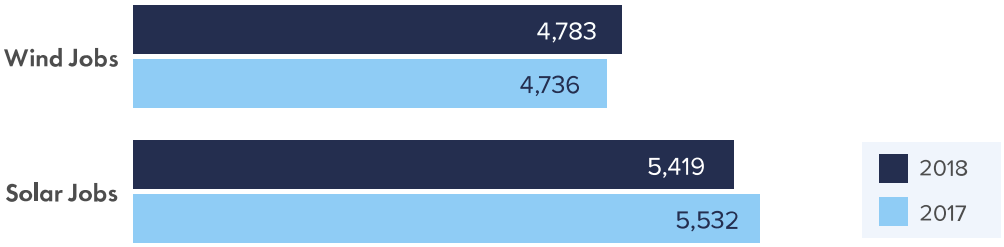


Fig. 4:
Wind and Solar Jobs, 2018 and 2017 Comparison



ENERGY STORAGE LEADS ADVANCED GRID SECTOR

Advanced grid jobs employ 3,703 Michiganders. These jobs grew 1.6 percent from 2017 adding 57 jobs, and the sector ranks as the fourth-largest clean energy employer in the state. Energy storage is the largest employer in the sector with 2,390 jobs, a few dozen more than 2017. The advanced grid sector also encompasses jobs in smart grid, microgrid, and other grid modernization work.

CLEAN FUELS JOB OPPORTUNITIES EXPAND

586 Michiganders work in clean fuels jobs. This represents a 4.7 percent increase from 2017. The clean fuels sector encompasses non-corn ethanol, non-woody biomass and other technologies not yet in wide commercial production, including algal biofuel, syngas, bioheat blends, landfill gas, and advanced biofuels.

Fig. 5:
Top 3 MSAs in Clean Energy Employment, 2018

Metro Area (MSA)	Total Clean Energy Employment	Renewable Energy Employment	Energy Efficiency Employment
Detroit-Warren-Livonia, MI MSA	55,447	5,281	37,214
Grand Rapids-Wyoming, MI MSA	10,702	896	7,274
Lansing-East Lansing, MI MSA	5,377	479	3,633

CLEAN ENERGY INDUSTRY OUTLOOK

Clean energy is a significant employer in the broader Michigan economy. All told, clean energy jobs constitute 2.7 percent of all jobs across the entire state. In Michigan in 2018, each of the five major clean energy sectors added jobs, and clean energy employers expect additional growth next year. In fact, these employers project a 9 percent increase in clean energy jobs. That's a higher anticipated growth rate than any other state in the Midwest, and this would be on top of what is already the highest number of overall clean energy jobs in the entire region.

Thanks in part to its rich history in the automotive industry, Michigan has more alternative transportation jobs than any other state. In 2018, advanced transportation jobs experienced the largest percentage increase of any clean energy sub-sector in the state, a particularly strong rebound when you consider that in 2017 alternative transportation jobs actually fell. The sector's growth can in part be attributed to the popularity of electric vehicles. Sales of EVs are up 80 percent from 2017.

Focusing in on the renewable energy industry, Midwestern states like Michigan were positive outliers. Nationally, tariffs on solar modules led businesses in the residential solar space to restructure and shed jobs. This led to a decrease in renewable energy jobs across the country. But in Michigan, renewable energy jobs grew by 2 percent.

COMPARING CLEAN ENERGY JOBS TO FOSSIL FUEL JOBS

In 2018, 14,200 Michiganders worked in fossil fuel energy jobs in industries like coal, natural gas, and oil. Electric power generation jobs using fossil fuels puts 7,390 people to work, considerably less than the 11,427 jobs in renewable energy generation. Coal industry jobs in Michigan in 2018 dropped by 2 percent.

VALUE CHAIN

When Michigan clean energy jobs are broken down by their placement in the value chain, manufacturing is home to 56.8 percent of the jobs while construction is home to 21.8 percent .

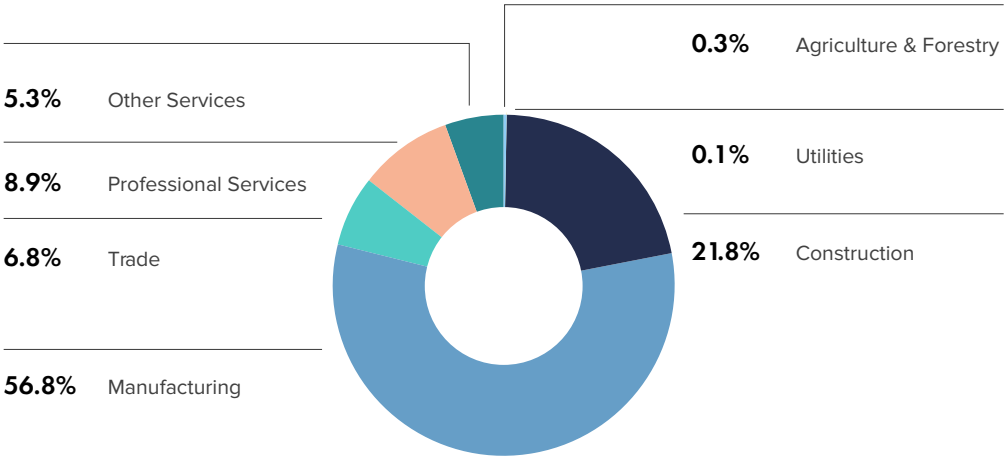


Fig. 6: Clean Energy Jobs Value Chain, 2018

DEMOGRAPHICS

Throughout the state, 10.8 percent of the state's clean energy workers are veterans. By comparison, veterans make up 6 percent of the national labor force. The large ratio of veterans transitioning to clean energy jobs is the result of the U.S. Department of Defense's long-standing commitment to investing in renewable energy, energy efficiency and training programs that prepare veterans for private-sector employment in industries like solar.

Small businesses drive the state's clean energy sector – 78.5 percent of Michigan's clean energy businesses employ fewer than 20 individuals.

SUMMARY

Clean energy workers in Michigan do much more than just install solar panels on suburban Detroit rooftops or maintain wind turbines on the Upper Peninsula. The clean energy industry in Michigan is broad, diverse, and growing. Advanced transportation jobs bounced back from a drop in 2017, with electric, hybrid, and plug-in hybrid vehicles leading the way. With more clean energy jobs than any other Midwestern state, and with 4 percent growth in 2018, clean energy will continue to play a significant role in the state's economy. Looking toward the future, employers anticipate a 9 percent growth in Michigan clean energy jobs, higher than any other state in the Midwest.

Minnesota: Home to 61,047 Clean Energy Jobs

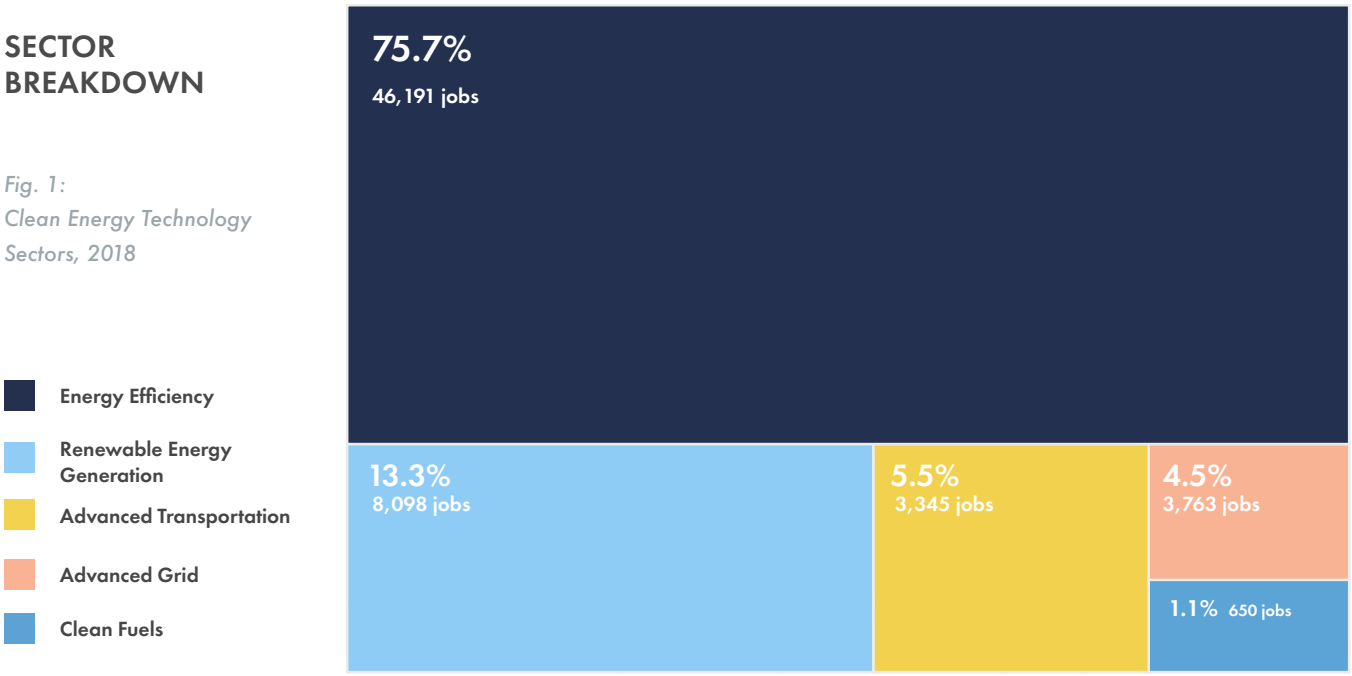
LED BY RENEWABLES, CLEAN ENERGY JOBS IN MINNESOTA GROW 4.7 PERCENT

Clean energy is a major employer in Minnesota with 61,047 jobs. The industry added 2,737 jobs in Minnesota in 2018, a 4.7 percent increase. This was ahead of the region-wide average increase of about 4 percent. Clean energy jobs in Minnesota grew nearly 2.5 times as fast as the overall state job market (which grew 1.9%). Minnesota also experienced the region's strongest renewable energy generation job growth -- 11.8 percent -- despite the sector struggling on the national level.

Energy efficiency jobs continue to be the largest sector for Minnesota clean energy employment with 3 out of every 4 clean energy jobs in the state. Clean energy employers in Minnesota also have a positive outlook for the next year: they project adding more than 4,400 jobs, a 7.3 percent growth rate.

SECTOR BREAKDOWN

Fig. 1: Clean Energy Technology Sectors, 2018



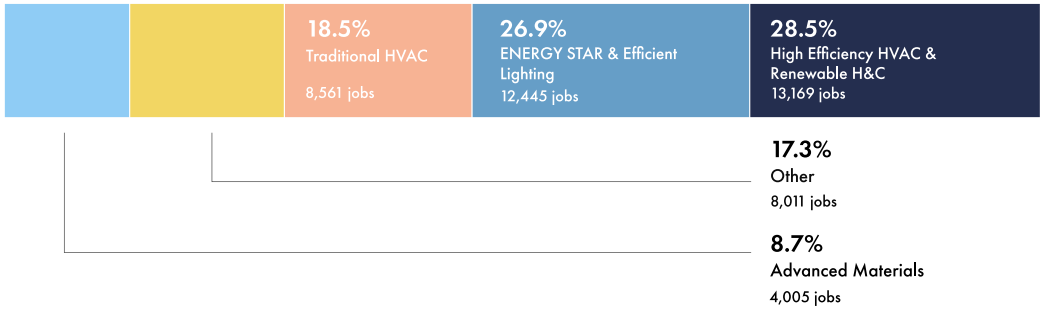
1. Unless otherwise stated, all data is based on the 2019 USEER. Energy Futures Initiative. (2019). The U.S. Energy Employment Report. Washington, DC. www.usenergyjobs.org. The Data provided relies on thousands of data points provided via survey. EFI, NASEO and BWRP have made every effort to supply current and accurate information but assume no responsibility or liability for any decisions based upon the information presented. For more information on the survey methodology see cleanjobsmidwest.com/about.

ENERGY EFFICIENCY CONTINUES TO LEAD CLEAN ENERGY JOBS IN MINNESOTA

More Minnesotans work in energy efficiency -- 46,191 -- than any other clean energy sector. The Minnesota energy efficiency sector added 1,332 jobs in 2018, a growth rate of 3 percent.

What do energy efficiency workers in Minnesota do? They manufacture ENERGY STAR-rated appliances and install efficient lighting systems; tweak traditional heating, ventilation, and air conditioning (HVAC) systems; build renewable heating and cooling systems, and handle advanced building materials. Other jobs employ people who develop software and contractors who diagnose, adjust, and verify HVAC efficiency.

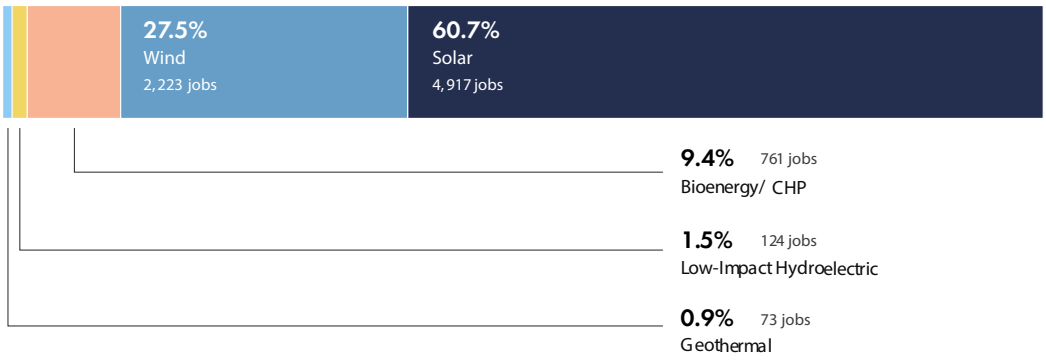
Fig. 2: Energy Efficiency Subsectors, 2018



SOLAR SHINES AS RENEWABLE ENERGY GENERATION JOBS SURGE

Renewable energy employs 8,098 workers, the second-largest sector in Minnesota's clean energy industry. The sector added 857 jobs for a robust 11.8 percent growth rate. In a year where national renewable energy employers actually shed jobs, such substantial year-over-year growth underscores the relative health of Minnesota's renewables sector where favorable economics and planned retirements of older coal plants drove investment in new renewable capacity. Minnesota added 285 MW of solar capacity in 2018,[2] and is home to more than 100 community solar projects.

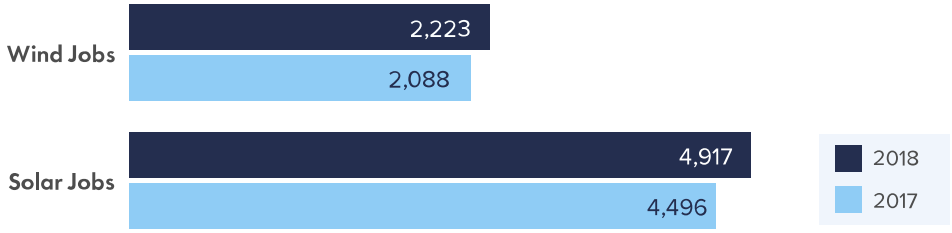
Fig. 3: Renewable Energy Subsectors, 2018



Solar and wind are the two largest employers in the sector. Solar employs 4,917 people. The sub-sector added 421 jobs in 2018, 9 percent more than in 2017. New Minnesota solar jobs account for more than half of all the solar jobs added across the Midwest in 2018. Wind also experienced strong growth. It now employs 2,223 people, 135, or 6.5 percent, more than the previous year. Jobs in renewables encompass other diverse industries including geothermal, bioenergy, and low-impact hydroelectric power.

2. *https://mn.gov/commerce/media/news/?id=17-373200*

Fig. 4:
Wind and Solar Jobs, 2018 and 2017 data



PLUG-IN HYBRIDS, EVS POWER ADVANCED TRANSPORTATION'S JUMP IN JOBS

Advanced transportation is Minnesota's third-largest clean energy sector with 3,345 jobs. After decreases in 2017, the sector in 2018 added 482 jobs in the state, a 16.8 percent growth rate. The plug-in hybrid vehicles sub-sector added 166 jobs; it now employs 698 Minnesotans, nearly a third more than in 2017. EV jobs, meanwhile, grew by about a quarter to 896 workers. Other sub-sectors in advance transportation include alternative fuels vehicles and fuel cell vehicles.

ENERGY STORAGE LEADS THE ADVANCED GRID SECTOR.

Advanced grid jobs employ 2,763 Minnesotans. These jobs grew by 2.3 percent adding 62 jobs. As the fourth-largest clean energy employer in the state, the sector includes jobs in energy storage, smart grid, microgrid, and other grid modernization work. Energy storage jobs are the largest employer in the sector with 1,862 jobs adding 12 in the past year.

CLEAN FUELS JOBS LEVEL

650 Minnesotans work in clean fuel jobs. These jobs stayed relatively static, adding just 3 jobs for a 0.6 percent increase. The clean fuels sector encompasses non-corn ethanol, non-woody biomass, and other technologies not yet in wide commercial production, including algal biofuel, syngas, bioheat blends, landfill gas, and advanced biofuels.

Fig. 5:
Top 3 MSAs in Clean Energy Employment, 2018

Metro Area (MSA)	Total Clean Energy Employment	Renewable Energy Employment	Energy Efficiency Employment
Minneapolis-St. Paul-Bloomington, MN-WI MSA	37,368	6,072	27,300
St. Cloud, MN MSA	3,161	1,022	1,866
Duluth, MN-WI MSA	1,963	82	1,646

CLEAN ENERGY INDUSTRY OUTLOOK

Clean energy is becoming an increasingly important industry in Minnesota's overall labor market. In Minnesota in 2018, clean energy jobs grew by 4.7 percent. By contrast, the state's overall job growth was just 1.9 percent. In total, clean energy jobs now constitute more than 2 percent of all jobs in the state.[3]

Looking ahead, clean energy jobs are expected to grow faster in Minnesota than the Midwestern regional average. North Star State clean energy employers anticipate adding jobs at a 7.3 percent clip in 2019. Regionwide, the anticipated growth rate is a notch lower at an even 7 percent.

3. U.S. Bureau of Labor Statistics Local Area Unemployment Statistics, 2018 Preliminary data

COMPARING CLEAN ENERGY JOBS TO FOSSIL FUEL JOBS

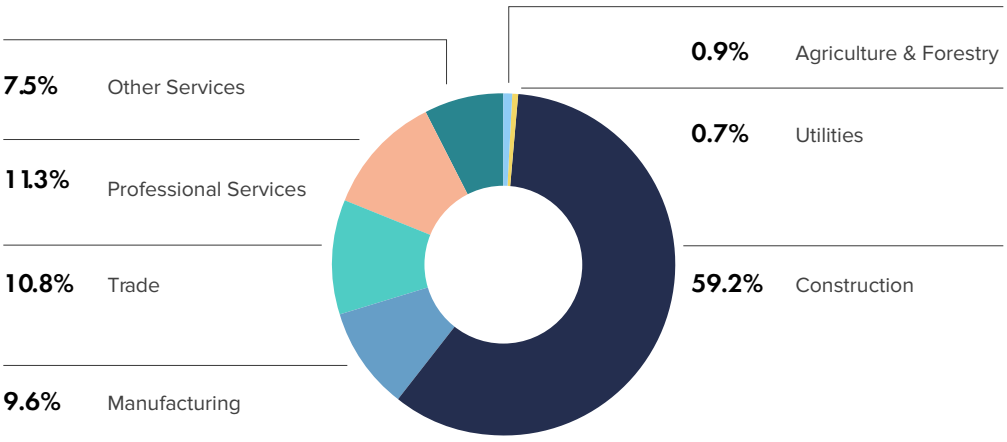
In 2018, 10,525 Minnesotans worked in fossil fuel energy jobs in industries like coal, natural gas, and oil.[4] That's less than one-fifth the number of clean energy workers. Electric power generation jobs using fossil fuels employed 2,311 people. By contrast, renewable energy generation employed more than 8,000. Coal jobs in Minnesota also drew a stark contrast with renewables -- they dropped 3.1 percent compared to the significant surge in renewable energy jobs.

4. 2019 US Energy and Employment Report. This figure does not include gas station workers.

VALUE CHAIN

Clean energy jobs can also be categorized by the role they play in the value chain. This report divides the clean energy jobs value chain into the following categories: agriculture, utility, construction, manufacturing, trade, professional service, and other service jobs. Each category captures jobs from multiple different clean energy sectors. For example, construction jobs can include energy efficiency jobs and renewable energy jobs.

Fig. 6: Clean Energy Jobs Value Chain, 2018



When Minnesota clean energy jobs are broken down by their placement in the value chain, construction makes up 59.2 percent of the jobs, just slightly behind North Dakota for the highest proportion of construction jobs, while professional services represent 11.3 percent.

DEMOGRAPHICS

In Minnesota, racial and ethnic minorities make up 34.7 percent of clean energy employees, and women are 27.2 percent of the clean jobs workforce.

Currently, 11.7 percent of the state's clean energy workers are veterans. By comparison, veterans make up 6 percent of the national labor force.[5] The large ratio of veterans transitioning to clean energy jobs are in part the result of the U.S. Department of Defense's long-standing commitment to investing in renewable energy, energy efficiency and training programs that prepare veterans for private-sector employment in industries like solar.

5. 2018 Bureau of Labor Statistics Current Population Survey (CPS) https://www.bls.gov/cps/demographics.htm

SMALL BUSINESS

Small businesses drive the state's clean energy sector – 72.3 percent of Minnesota's clean energy businesses employ fewer than 20 individuals.

SUMMARY

While energy efficiency jobs continue to dominate Minnesota's overall clean energy industry labor market, it was renewable energy and advanced transportation that experienced the most substantial relative year-over-year sector job growth. In fact, Minnesota's solar sub-sector was responsible for more than half of all new solar jobs in the entire Midwestern region in 2018. Meanwhile, fueled by growth in EVs and plug-in hybrid vehicles, jobs in the state's advanced transportation sector jumped nearly 17 percent.

With 4.7 percent overall clean energy job growth -- higher than the regional average -- and an anticipated 2019 growth rate even higher (7.3 percent), the state is becoming an increasingly significant player in one of the most dynamic industries in the Midwest's economy.

The data and analyses presented in this report by Clean Energy Trust and Environmental Entrepreneurs are based on data collected for the 2019 U.S. Energy Employment Report (2019 USEER), produced by the Energy Futures Initiative (EFI) in partnership with the National Association of State Energy Officials (NASEO) and collected and analyzed by BW Research Partnership (BWRP).

Missouri is Home to 55,869 Clean Energy Jobs

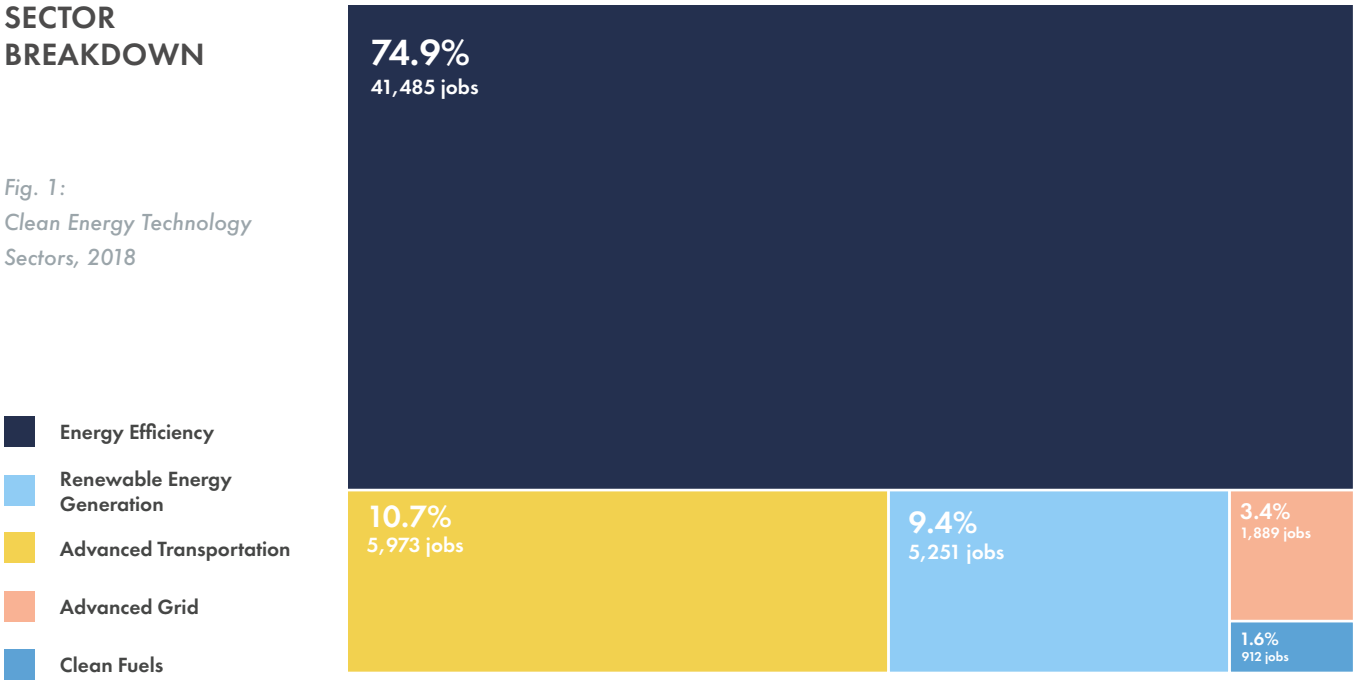
MISSOURI CLEAN ENERGY INDUSTRY ADDS 1,500 JOBS IN A YEAR

Clean energy is a major Missouri employer with 55,869 jobs.[1] In 2018, the industry added 1,562 jobs, a 2.9 percent growth rate. Energy efficiency remains Missouri's largest clean energy employer; the sector is home to nearly three out of four of the state's clean energy jobs and it grew at a faster rate -- 4.2 percent -- than any other sector, including renewable energy generation, advanced transportation, energy storage, and clean fuels.

Combined, the hundreds of Missouri companies and establishments that employ clean energy workers in any given year anticipate adding 7.7 percent more clean energy workers in 2019.

SECTOR BREAKDOWN

Fig. 1: Clean Energy Technology Sectors, 2018



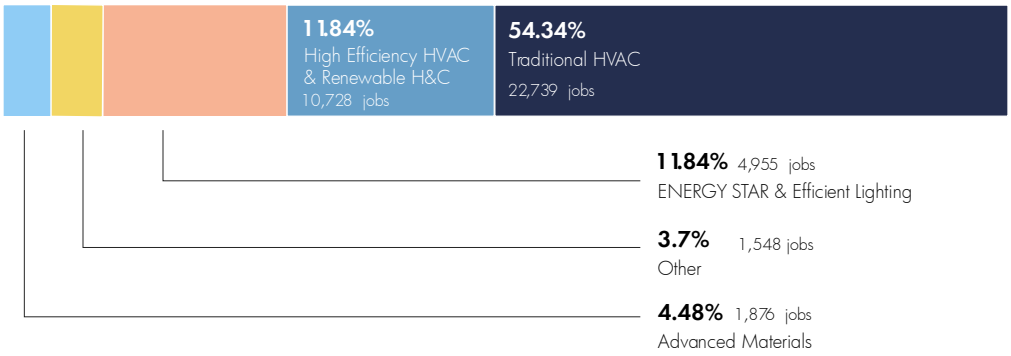
1. Unless otherwise stated, all data is based on the 2019 USEER. Energy Futures Initiative. (2019). The U.S. Energy Employment Report. Washington, DC. www.usenergyjobs.org. The Data provided relies on thousands of data points provided via survey. EFI, NASEO and BWRP have made every effort to supply current and accurate information but assume no responsibility or liability for any decisions based upon the information presented. For more information on the survey methodology see cleanjobsmidwest.com/about.

THREE OUT OF FOUR MISSOURI CLEAN ENERGY JOBS ARE IN ENERGY EFFICIENCY

41,845 Missourians work in energy efficiency. That's by far more than any other sector in Missouri's clean energy industry, and it's 1,679, or 4.2 percent, more than in 2017.

Energy efficiency workers are active throughout the value chain. They manufacture Energy STAR-rated kitchen appliances; install efficient lighting systems at car dealerships; implement software that optimizes traditional heating, ventilation and air conditioning (HVAC) systems in high schools, and handle advanced building materials at new office towers.

Fig. 2:
Energy Efficiency Subsectors, 2018



ADVANCED TRANSPORTATION LED BY HYBRID ELECTRIC VEHICLES

Advanced transportation is Missouri's No. 2 clean energy employer with nearly 5,973 jobs. The sector includes jobs building and developing hybrid and plug-in electric vehicles, alternative fuels vehicles, and fuel cell vehicles. The sector shed 323 jobs in Missouri in 2018, a 5.1 percent drop.

Losses in the sector were led by hybrid electric, followed by natural gas and hydrogen and fuel-cell vehicles. Hybrid electric vehicles employ 2,599 people and lost 266 jobs, a 9 percent drop. Natural gas and hydrogen fuel-cell vehicles employ 526 people and experienced a drop of 143 jobs. Plug-in hybrid and electric vehicles experienced marginal growth, adding 86 jobs to total 2,848 between both subsectors.

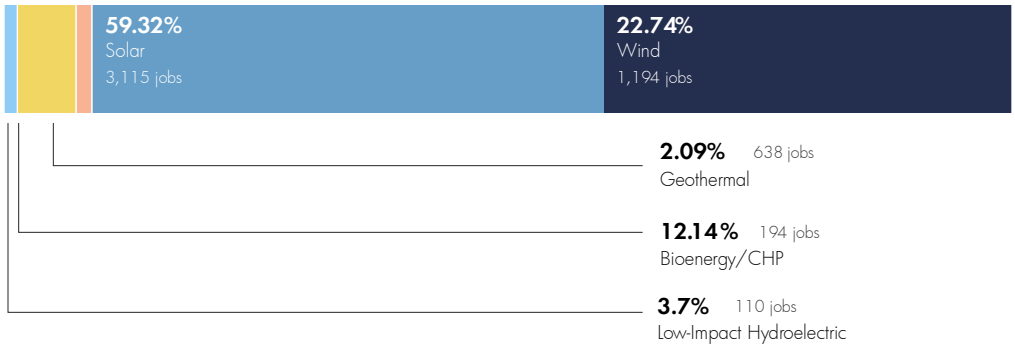
Following large job losses in 2017, although there were job losses in the sector in Missouri, the sector bounced back throughout the Midwest due to larger gains in electric vehicle jobs in other states.

SOLAR, WIND ARE TOP EMPLOYERS IN MISSOURI'S RENEWABLES SECTOR

The third-largest employer in Missouri's clean energy industry is renewable energy generation with 5,251 workers. The state's renewables industry employs 180 more people than the previous year, a 3.5 percent increase.

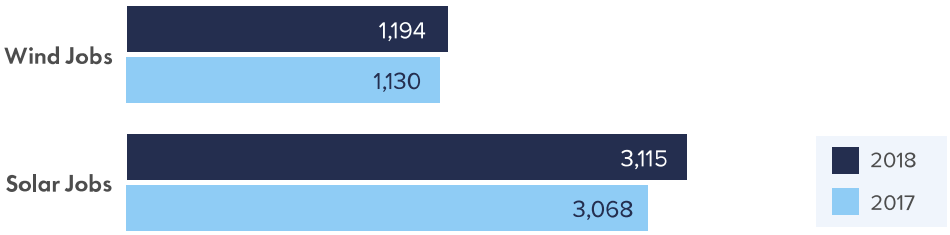
1. Unless otherwise stated, all data is based on the 2019 USEER. Energy Futures Initiative. (2019). The U.S. Energy Employment Report. Washington, DC. www.usenergyjobs.org. The Data provided relies on thousands of data points provided via survey. EFI, NASEO and BWRP have made every effort to supply current and accurate information but assume no responsibility or liability for any decisions based upon the information presented. For more information on the survey methodology see cleanjobsmidwest.com/about.

Fig. 3:
Renewable Energy Subsectors, 2018



Broken down by sub-sector, solar is the largest employer with 3,115 jobs. In 2018, solar added 47 jobs in Missouri, a 1.5 percent uptick. Meanwhile, wind employs 1,194 Missourians. That's almost 6 percent more than in 2017, a net gain of about 64 jobs. Other job-creating industries in the renewables sector include: geothermal, bioenergy, and low-impact hydroelectric power.

Fig. 4:
Wind and Solar Jobs, 2018 and 2017 Comparison



ENERGY STORAGE LEADS ADVANCED GRID SECTOR

Advanced grid jobs employ 1,889 Missourians. It's the fourth-largest clean energy employer in the state by sector. These jobs grew 3 percent from 2017, a gain of 55 jobs. Energy storage alone has 680 jobs, more than any other sub-sector in Advanced Grid and 29 more than in 2017. In addition to energy storage, the advanced grid sector encompasses jobs in smart grid, microgrid, and other grid modernization work.

MISSOURI CLEAN FUELS JOBS FALL TO 900

912 Missourians work in clean fuel jobs. This is 27 fewer than in 2017, a 2.9 percent decrease. The clean fuels sector encompasses non-corn ethanol, non-woody biomass, and other technologies not yet in wide commercial production, including algal biofuel, syngas, bioheat blends, landfill gas, and advanced biofuels.

Fig. 5:
Top 3 MSAs in Clean Energy Employment, 2018

Metro Area (MSA)	Total Clean Energy Employment	Renewable Energy Employment	Energy Efficiency Employment
St. Louis, MO-IL MSA	20,754	1,915	15,566
Kansas City, MO-KS MSA	11,834	1,334	8,697
Springfield, MO MSA	4,503	431	3,368

CLEAN ENERGY INDUSTRY OUTLOOK

The clean energy industry constitutes a significant segment of Missouri's overall labor market. Combined, the various clean energy sectors -- energy efficiency, renewables, energy storage, clean fuels, etc. -- are now responsible for nearly 2 percent of all the jobs in the state.[2]

Missouri's 2.9 percent growth rate in clean energy jobs is due to gains in renewables, advanced grid technologies, and energy efficiency. Focusing on just the renewable energy industry, the Midwest was an outlier. Nationally, tariffs on solar modules led businesses in the residential solar space to restructure and shed jobs. This led to a decrease in renewable energy jobs across the country. But in Missouri, renewable energy jobs grew by 3.5 percent.

Clean energy job growth in Missouri is expected to continue: Missouri clean energy employers project 7.7 percent job growth in 2019.

COMPARING CLEAN ENERGY JOBS TO FOSSIL FUEL JOBS

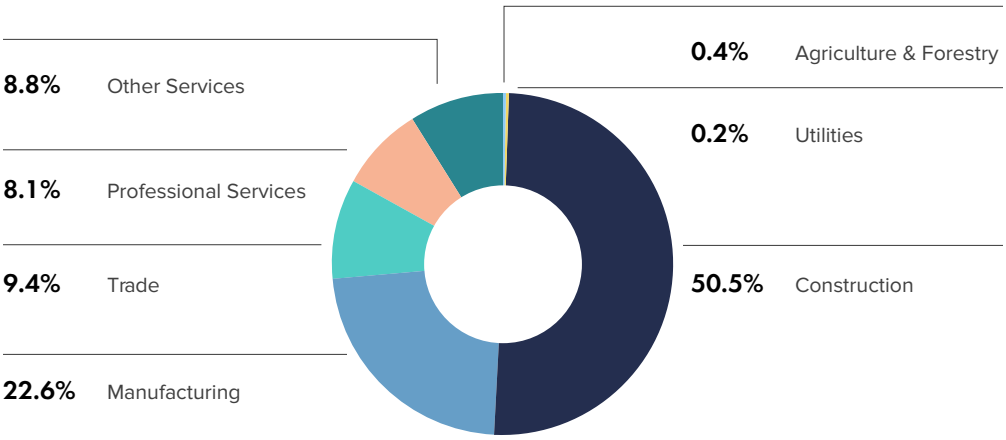
In 2018, nearly 7,695 Missourians worked in fossil fuel energy jobs in industries like coal, natural gas, and oil.[3] When compared to all clean energy workers in Missouri -- including energy efficiency workers -- the fossil fuels industry employs about one-sixth the number of clean energy workers.

In an ongoing trend, coal jobs dropped by 3.2 percent, while renewable jobs grew 3.5 percent.

VALUE CHAIN

In addition to breaking down clean energy jobs by industry, jobs can also be categorized by their function in the value chain. This report divides the clean energy jobs value chain into the following categories: agriculture, utility, construction, manufacturing, trade, professional service, and other service jobs. Each value chain category captures jobs from multiple clean energy sectors and industries.

Fig. 6: Clean Energy Jobs Value Chain, 2018



When Missouri clean energy jobs are broken down by their placement in the value chain, construction is home to 50.5 percent of the jobs while manufacturing is home to 22.6 percent.

2. U.S. Bureau of Labor Statistics Local Area Unemployment Statistics, 2018 Preliminary data

DEMOGRAPHICS

More than 10.3 percent of Missouri's clean energy workers are veterans. By comparison, veterans make up 6 percent of the national labor force.[4] The large ratio of veterans transitioning to clean energy jobs is the result of the U.S. Department of Defense's long-standing commitment to investing in renewable energy, energy efficiency, and training programs that prepare veterans for private-sector employment in industries like solar.

Small businesses drive the state's clean energy sector – 70.5 percent of Illinois' clean energy businesses employ fewer than 20 individuals.

SUMMARY

Missouri's clean energy industry grew about 3 percent in 2018, adding jobs in four out of the five major sectors. Energy efficiency and wind each experienced significant year-over-year growth, with the health of the energy efficiency sector in particular creating a strong foundation for job gains industry-wide. Looking toward the next year, clean energy employers in Missouri are optimistic -- they're anticipating adding jobs at a 7.7 percent clip, faster than the Midwestern regional average.

The data and analyses presented in this report by Clean Energy Trust and Environmental Entrepreneurs are based on data collected for the 2019 U.S. Energy Employment Report (2019 USEER), produced by the Energy Futures Initiative (EFI) in partnership with the National Association of State Energy Officials (NASEO) and collected and analyzed by BW Research Partnership (BWRP).

3. 2019 US Energy and Employment Report. This figure does not include gas station workers.
4. 2018 Bureau of Labor Statistics Current Population Survey (CPS) https://www.bls.gov/cps/demographics.htm

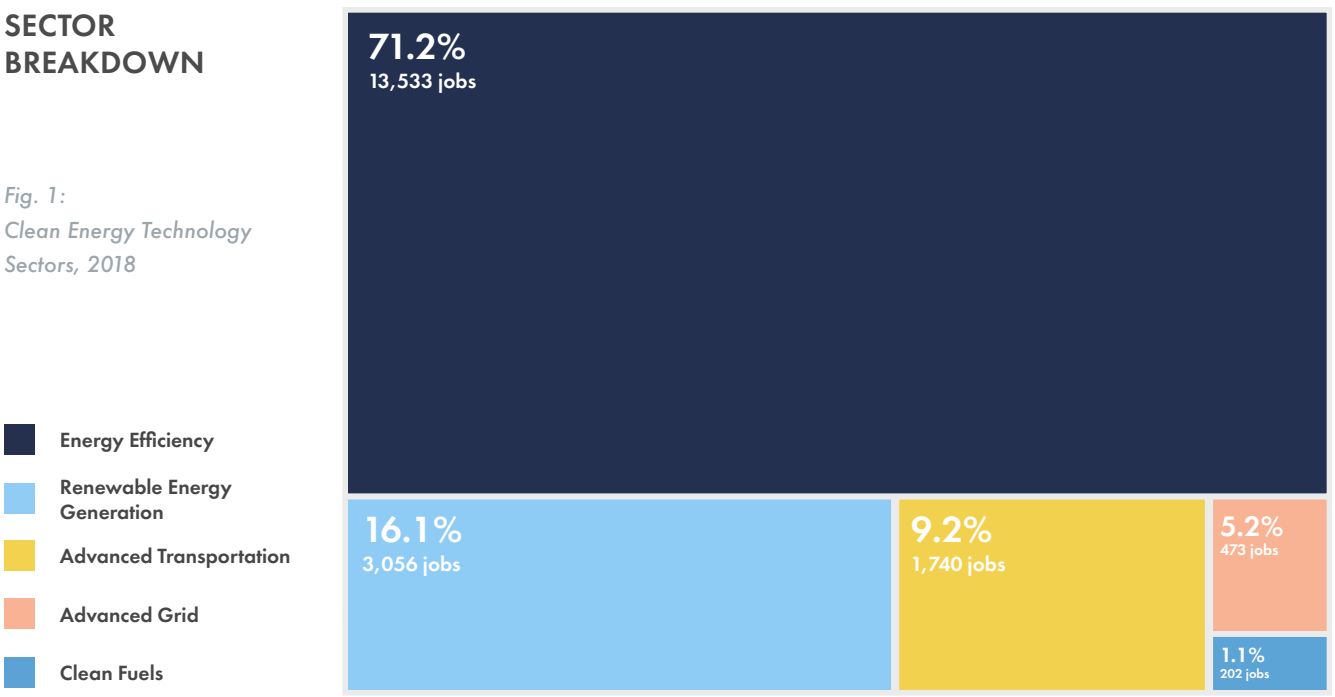
Nebraska: Home to 19,004 Clean Energy Jobs

NEBRASKA ADDS 600 JOBS IN 2018; EVEN HIGHER GROWTH EXPECTED THIS YEAR

Clean energy is a major employer in Nebraska with 19,004 jobs. Employment in the industry grew 3.5 percent in 2018, an addition of 635 jobs. Energy efficiency jobs remain the largest individual sector in terms of Nebraska clean energy employment with more than 70 percent of all clean energy jobs across the state. Nebraska clean energy employers have an optimistic outlook for job growth this year. Employers in Nebraska project a 7.7 percent growth in jobs, with about 1,500 jobs expected to be added in 2019.

SECTOR BREAKDOWN

Fig. 1: Clean Energy Technology Sectors, 2018



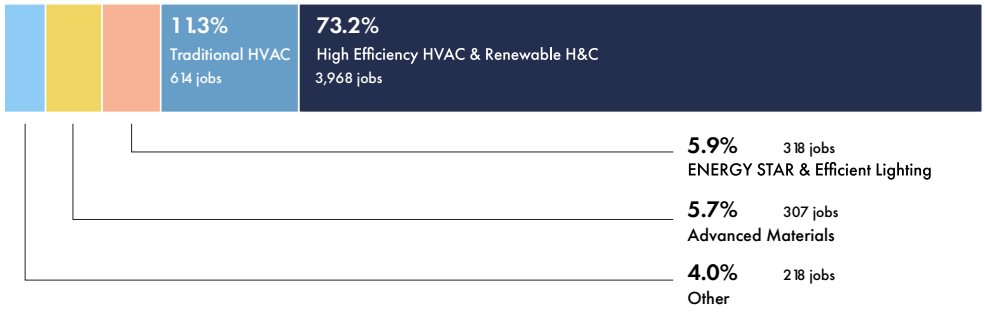
1. Unless otherwise stated, all data is based on the 2019 USEER. Energy Futures Initiative. (2019). The U.S. Energy Employment Report. Washington, DC. www.usenergyjobs.org. The Data provided relies on thousands of data points provided via survey. EFI, NASEO and BWRP have made every effort to supply current and accurate information but assume no responsibility or liability for any decisions based upon the information presented. For more information on the survey methodology see cleanjobsmidwest.com/about.

ENERGY EFFICIENCY IS NEBRASKA'S DOMINANT CLEAN ENERGY SECTOR

More Nebraskans work in energy efficiency -- 13,533 -- than in any other sector in the clean energy industry. In 2018, Nebraska energy efficiency jobs grew by 509, good for a 3.9 percent growth rate.

Energy efficiency workers manufacture ENERGY STAR-rated appliances and install efficient lighting systems; tweak traditional heating, ventilation, and air conditioning (HVAC) systems; design high-efficiency HVAC units, and handle advanced building materials.

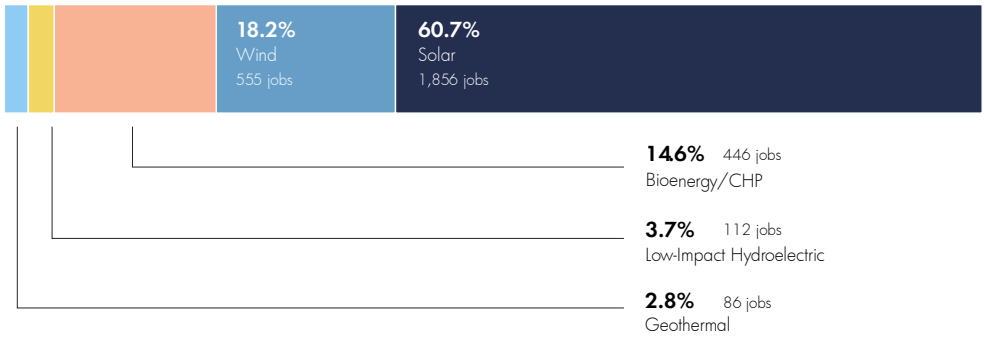
Fig. 2:
Energy Efficiency Subsectors, 2018



PICKS UP, SOLAR DIMS AS OVERALL RENEWABLE ENERGY JOBS FALL

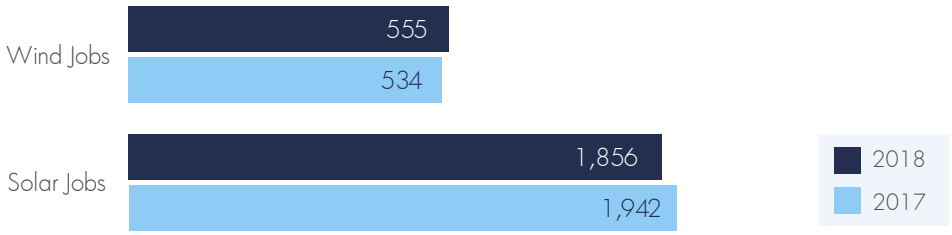
Renewable energy employs 3,056 people in Nebraska. That's about 100 jobs fewer than in 2017, or a decline of 3.5 percent. This contraction of Nebraska's renewable energy job market contrasts with the regional trend of job gains in the sector. Still, renewable energy is the second-largest clean energy sector in the state in terms of employment.

Fig. 3:
Renewable Energy Subsectors, 2018



Looking at specific renewable energy sub-sectors, wind (555 jobs) and solar (1,856 jobs) are the two largest employers in Nebraska. Wind energy jobs in the state grew 4 percent in 2018, but solar jobs shrunk 4 percent, a loss of 86 jobs and essentially in-line with a national solar jobs market that fell 4.5 percent.

Fig. 4:
Wind and Solar Jobs, 2018 and 2017 Comparison



ADVANCED TRANSPORTATION JOBS REV UP

Advanced transportation is Nebraska's third-largest clean energy sector in terms of jobs, employing 1,740 people. That's 215, or 14.1 percent, more than in 2017 when the state's advanced transportation sector actually shed jobs. Jobs relating to plug-in hybrid vehicles had a particularly strong year, surging 28 percent to employ 363 people, 80 more than the previous year. EV jobs, meanwhile, grew by 20 percent to 466 jobs.

ENERGY STORAGE JOBS LEAD THE ADVANCED GRID SECTOR

Advanced grid jobs employ 473 Nebraskans. These jobs grew 4.3 percent in 2018. Energy storage is the sector's largest employer in the state with 170 jobs. The advanced grid sector also includes jobs in smart grid, microgrid, and other grid modernization work.

CLEAN FUELS JOBS HOLD STEADY

202 Nebraskans work in clean fuels jobs, a 2 percent increase year-over-year. The clean fuels sector encompasses non-corn ethanol, non-woody biomass, and other technologies not yet in wide commercial production, including algal biofuel, syngas, bioheat blends, landfill gas, and advanced biofuels.

Fig. 5:
Top 3 MSAs in Clean Energy Employment, 2018

Metro Area (MSA)	Total Clean Energy Employment	Renewable Energy Employment	Energy Efficiency Employment
Omaha-Council Bluffs, NE-IA MSA	7,589	1,276	5,354
Lincoln, NE MSA	3,152	449	2,294
Sioux City, IA-NE-SD MSA	146	27	100

2. U.S. Bureau of Labor Statistics Local Area Unemployment Statistics, 2018 Preliminary data

3. 2019 US Energy and Employment Report. This figure does not include gas station workers

CLEAN ENERGY INDUSTRY OUTLOOK

Clean energy jobs in Nebraska constitute 1.9 percent of all jobs across the entire state. While the state's overall labor market contracted 1.4 percent in 2018, jobs in Nebraska's clean energy industry actually grew 3.5 percent.

Looking toward the future, clean energy employers in Nebraska have slightly higher hiring projections in 2019 (7.7 percent growth) than the regional average (7 percent). However, employers reported difficulty hiring -- nearly 89 percent of the Nebraska clean energy employers surveyed reported that it was "somewhat" or "very" difficult to hire workers, higher than the previous year

COMPARING CLEAN ENERGY JOBS TO FOSSIL FUEL JOBS

In 2018, 2,857 Nebraskans worked in fossil fuel energy jobs in industries like coal, natural gas, and oil. While significant, it is only 15 percent of the total number of people working in clean energy in the state. Electric power generation jobs using fossil fuels employ 1,110 people. Renewable energy generation, meanwhile, employs more than 3,000.

VALUE CHAIN

Clean energy jobs can be categorized by the role they play in the value chain. This report divides the clean energy jobs value chain into the following categories: agriculture, utility, construction, manufacturing, trade, professional service, and other service jobs. Each category captures jobs from multiple different clean energy sectors. For example, construction jobs can include energy efficiency jobs and renewable energy jobs.

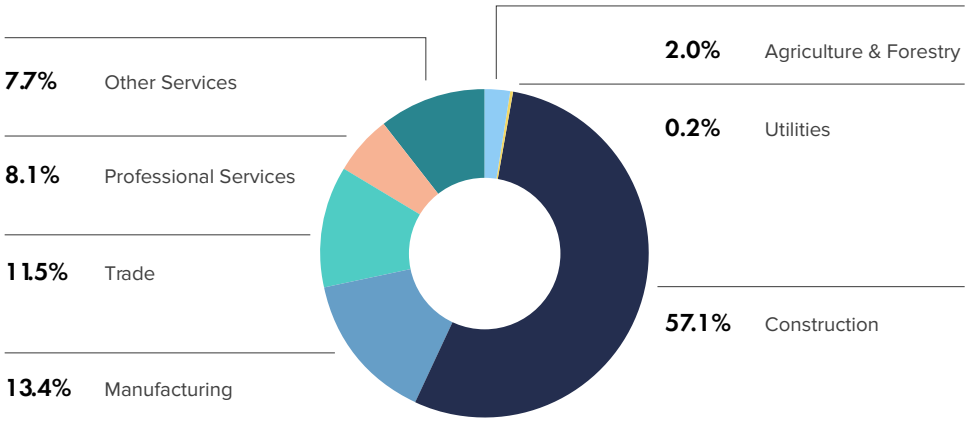


Fig. 6: Clean Energy Jobs Value Chain, 2018

When Nebraska clean energy jobs are broken down by their placement in the value chain, construction makes up 57 percent of the jobs, while manufacturing represents 13 percent.

4. 2018 Bureau of Labor Statistics Current Population Survey (CPS) https://www.bls.gov/cps/demographics.htm

SUMMARY

DEMOGRAPHICS

In Nebraska, 9.6 percent of the state's clean energy workers are veterans. By comparison, veterans make up 6 percent of the national labor force. The large ratio of veterans transitioning to clean energy jobs is partially the result of the U.S. Department of Defense's long-standing commitment to investing in renewable energy, energy efficiency and training programs that prepare veterans for private-sector employment in industries like solar.

Small businesses drive the state's clean energy sector – 70.9 percent of Nebraska's clean energy businesses employ fewer than 20 individuals.

SUMMARY

With 19,000 jobs and counting, the clean energy industry is a significant employer in Nebraska. Even as jobs in the state overall are decreasing, jobs in Nebraska's clean energy industry are growing at a relatively healthy 3.5 percent clip. Clean energy employers in Nebraska are bullish when it comes to ongoing hiring: they predict a 7.7 percent increase in clean energy jobs in 2019, higher than the regional average.

The data and analyses presented in this report by Clean Energy Trust and Environmental Entrepreneurs are based on data collected for the 2019 U.S. Energy Employment Report (2019 USEER), produced by the Energy Futures Initiative (EFI) in partnership with the National Association of State Energy Officials (NASEO) and collected and analyzed by BW Research Partnership (BWRP).

North Dakota: Home to 9,067 Clean Energy Jobs

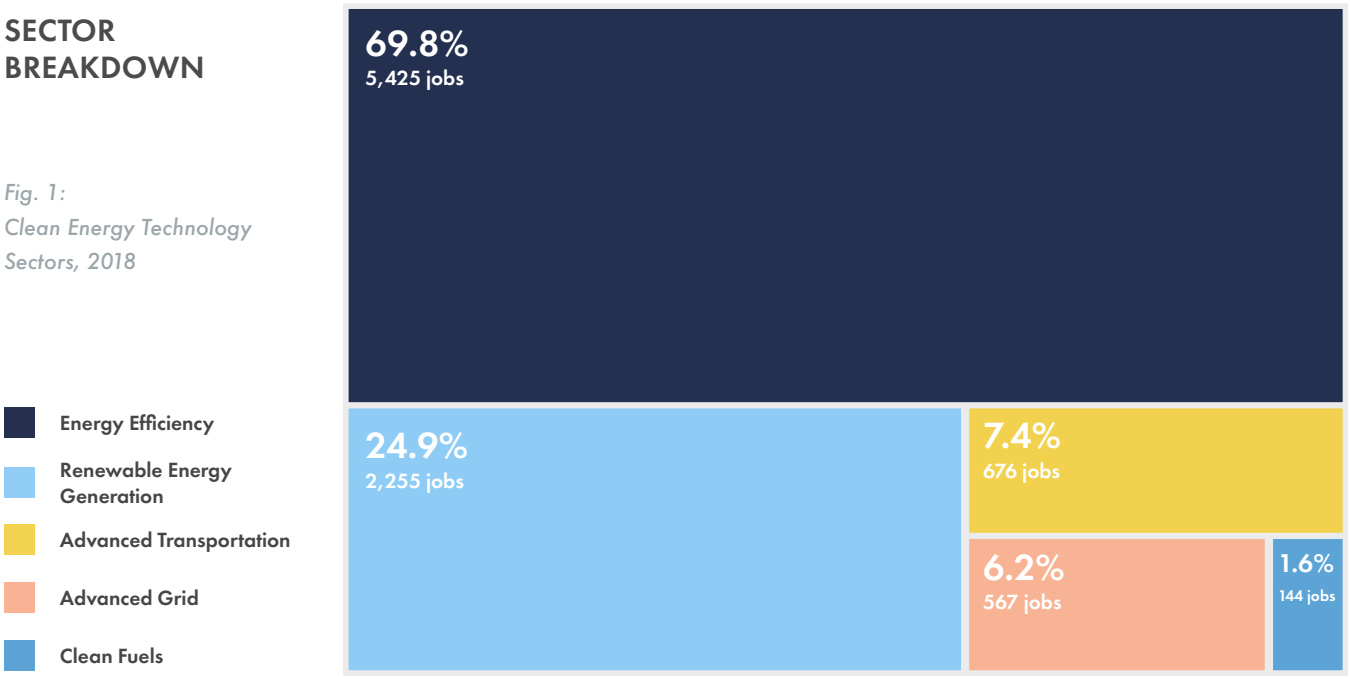
NORTH DAKOTA CLEAN ENERGY JOBS UP 4.3 PERCENT IN 2018

Clean energy is a major employer in North Dakota with 9,067 jobs. In 2018 in North Dakota, 376 jobs were added in the clean energy industry, a year-over-year growth rate of 4.3 percent, slightly faster than clean energy job growth in the Midwest overall.

Energy efficiency jobs remain the largest individual sector in terms of North Dakota clean energy employment with 60 percent of all clean energy jobs across the state. Compared to the rest of the region, North Dakota clean energy employers have a less-optimistic outlook for job growth this year. Whereas employers across the Midwest project a 7 percent growth in jobs, in North Dakota that number is 1.8 percent, with about 160 jobs expected to be added in 2019.

SECTOR BREAKDOWN

Fig. 1: Clean Energy Technology Sectors, 2018



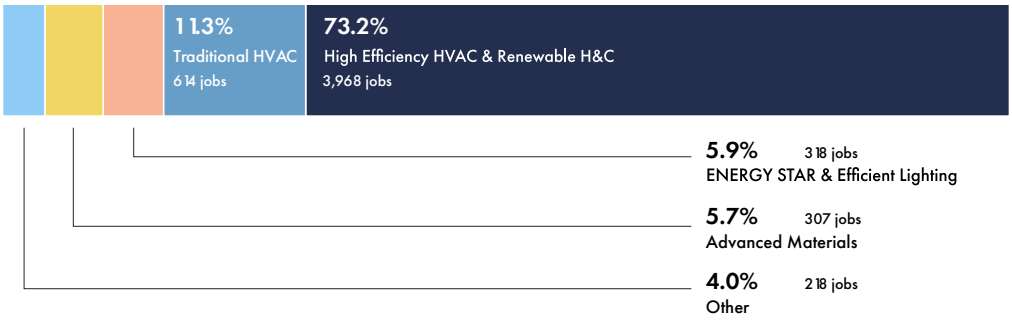
1. Unless otherwise stated, all data is based on the 2019 USEER. Energy Futures Initiative. (2019). The U.S. Energy Employment Report. Washington, DC. www.usenergyjobs.org. The Data provided relies on thousands of data points provided via survey. EFI, NASEO and BWRP have made every effort to supply current and accurate information but assume no responsibility or liability for any decisions based upon the information presented. For more information on the survey methodology see cleanjobsmidwest.com/about.

ENERGY EFFICIENCY IS NORTH DAKOTA'S DOMINANT CLEAN ENERGY SECTOR

More North Dakotans work in energy efficiency -- 5,425 -- than in any other sector in the clean energy industry. In 2018, North Dakota energy efficiency jobs grew by 297, good for a 5.8 percent growth rate -- twice as fast as the sector's average growth rate across the Midwest.

Energy efficiency workers do things like manufacture ENERGY STAR-rated appliances and install efficient lighting systems; tweak traditional heating, ventilation, and air conditioning (HVAC) systems; design high-efficiency HVAC units, and handle advanced building materials.

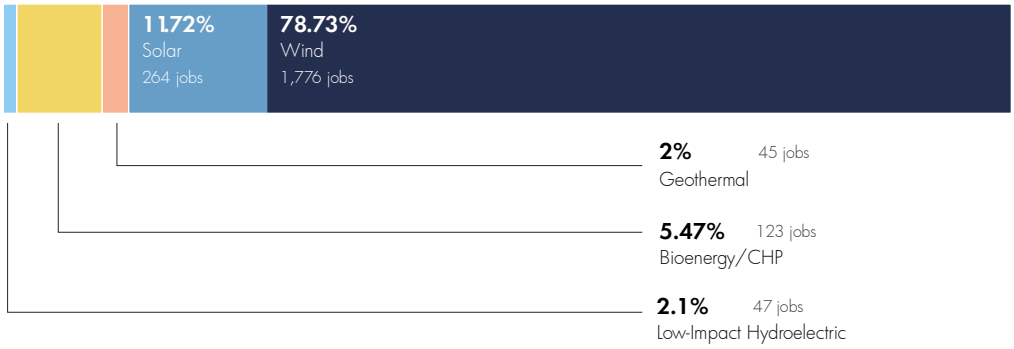
Fig. 2: Energy Efficiency Subsectors, 2018



RENEWABLE ENERGY SECTOR EMPLOYS NEARLY 2,300 NORTH DAKOTANS

Renewable energy employs nearly 2,255 people in North Dakota, making the sector the second-largest clean energy employer in the state. About 20 renewable energy jobs were added in North Dakota year-over-year, a 1 percent increase even as renewable energy jobs fell nationally.

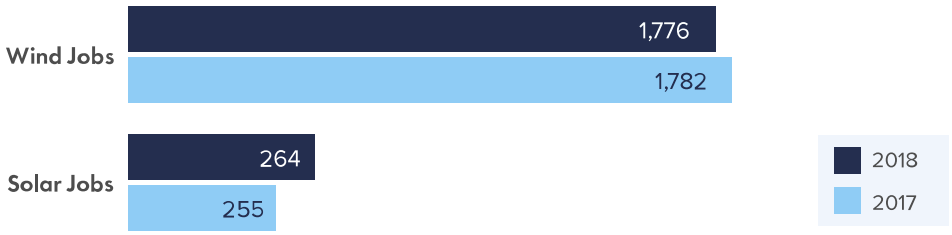
Fig. 3: Renewable Energy Subsectors, 2018



In North Dakota, wind (1,776 jobs) and solar (264 jobs) are the two largest employers in the renewable energy sector. While North Dakota wind jobs declined 0.3 percent in 2018, solar jobs grew 3.5 percent.

1. Unless otherwise stated, all data is based on the 2019 USEER. Energy Futures Initiative. (2019). The U.S. Energy Employment Report. Washington, DC. www.usenergyjobs.org. The Data provided relies on thousands of data points provided via survey. EFI, NASEO and BWRP have made every effort to supply current and accurate information but assume no responsibility or liability for any decisions based upon the information presented. For more information on the survey methodology see cleanjobsmidwest.com/about.

Fig. 4:
Wind and Solar Jobs, 2018 and 2017 Comparison



ADVANCED TRANSPORTATION JOBS GROW 3.2 PERCENT

Advanced transportation is North Dakota's third-largest clean energy sector in terms of jobs, employing 676 people. That's about 3.2 percent more than 2017 when the state's advanced transportation sector actually shed jobs.

Jobs relating to plug-in hybrid vehicles had a particularly strong year, surging 16.5 percent. Twenty plug-in hybrid jobs were added and now the sub-sector puts 141 people to work across North Dakota. EV jobs, meanwhile, grew by 9.7 percent to nearly 181 jobs.

ADVANCED GRID SECTOR LED BY ENERGY STORAGE

Advanced grid jobs employ 567 people in North Dakota. These jobs grew by 5.9 percent in 2018, adding 32 jobs. Energy storage is the sector's largest employer in North Dakota with 324 jobs, about 8 percent more than in 2017. The advanced grid sector also includes jobs in smart grid, microgrid, and other grid modernization work.

CLEAN FUELS JOBS HOLD STEADY

144 North Dakotans work in clean fuels jobs, a 2.6 percent increase. The clean fuels sector encompasses non-corn ethanol, non-woody biomass, and other technologies not yet in wide commercial production, including algal biofuel, syngas, bioheat blends, landfill gas, and advanced biofuels.

Fig. 5:
Top 3 MSAs in Clean Energy Employment, 2018

Metro Area (MSA)	Total Clean Energy Employment	Renewable Energy Employment	Energy Efficiency Employment
Fargo, ND-MN MSA	2,212	624	1,259
Bismarck, ND MSA	1,311	307	802
Grand Forks, ND-MN MSA	661	152	406

CLEAN ENERGY INDUSTRY OUTLOOK

Clean energy jobs in North Dakota constitute 2.3 percent of all jobs in the entire state and remain a bright spot in the North Dakota labor market. While the state shed about 10.1 percent of its jobs in the overall economy in 2018, the clean energy industry actually grew 4.3 percent.

Looking toward the future, clean energy employers in North Dakota anticipate adding jobs at a 1.8 percent clip in 2019. Compared to the rest of the Midwest, this is a relatively low projection. Overall, Midwestern clean energy employers anticipate a 7 percent growth in clean energy jobs this year.

The North Dakota growth predictions may be related to the fact that employers reported difficulty hiring -- every one of the North Dakota clean energy employers surveyed reported that it was “somewhat” or “very” difficult to hire workers.

COMPARING CLEAN ENERGY JOBS TO FOSSIL FUEL JOBS

In 2018, 22,435 North Dakotans worked in fossil fuel energy jobs in industries like coal, natural gas, and oil. North Dakota is the only state in the Midwest where there are more fossil energy jobs than clean energy jobs.

VALUE CHAIN

Clean energy jobs can be categorized by the role they play in the value chain. This report divides the clean energy jobs value chain into the following categories: agriculture, utility, construction, manufacturing, trade, professional service, and other service jobs. Each category captures jobs from multiple different clean energy sectors. For example, construction jobs can include energy efficiency jobs and renewable energy jobs.

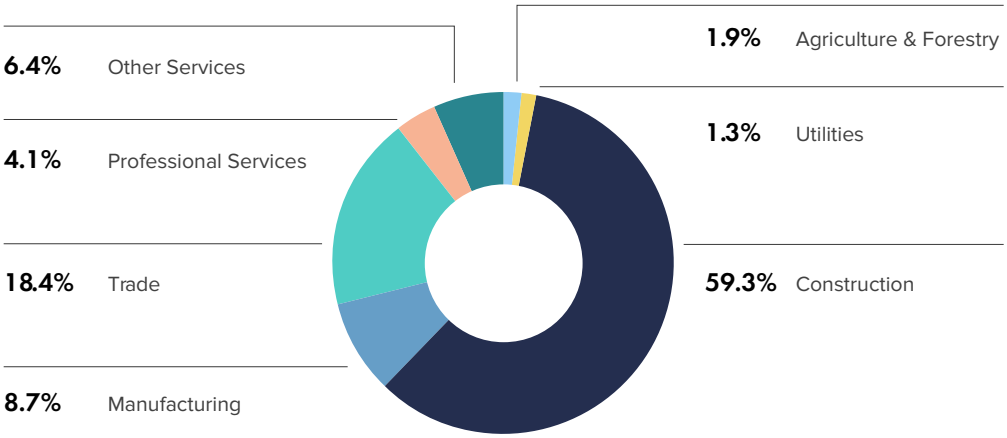


Fig. 6: Clean Energy Jobs Value Chain, 2018

When North Dakota clean energy jobs are broken down by their placement in the value chain, construction makes up 59 percent of the jobs, while trade represents 18.4 percent.

2. U.S. Bureau of Labor Statistics Local Area Unemployment Statistics, 2018 Preliminary data
3. 2019 US Energy and Employment Report. This figure does not include gas station workers.

SUMMARY

DEMOGRAPHICS

In North Dakota, 11.2 percent of the state's clean energy workers are veterans. By comparison, veterans make up 6 percent of the national labor force. The large ratio of veterans transitioning to clean energy jobs is partially the result of the U.S. Department of Defense's long-standing commitment to investing in renewable energy, energy efficiency, and training programs that prepare veterans for private-sector employment in industries like solar.

Small businesses drive the state's clean energy sector – 65.1 percent of North Dakota's clean energy businesses employ fewer than 20 individuals.

SUMMARY

The clean energy industry employs more than 9,000 people in North Dakota, a 4.3 percent increase over 2017. While fossil fuel jobs get the bulk of the attention in the state, the clean energy industry encompasses multiple diverse sectors that employ workers whose roles go beyond the traditional renewable energy occupations of wind technician and rooftop solar installer. In fact, North Dakota clean energy workers are involved in everything from electric vehicles and HVAC software to clean fuels and energy storage. A relatively high percentage of North Dakota clean energy workers either are veterans or work in the construction sector, while small businesses dominate the industry in the state.

In 2019, North Dakota clean energy employers anticipate some difficulties being able to hire clean energy workers. However, these employers still anticipate adding about 1.8 percent more jobs this year.

The data and analyses presented in this report by Clean Energy Trust and Environmental Entrepreneurs are based on data collected for the 2019 U.S. Energy Employment Report (2019 USEER), produced by the Energy Futures Initiative (EFI) in partnership with the National Association of State Energy Officials (NASEO) and collected and analyzed by BW Research Partnership (BWRP).

4. 2018 Bureau of Labor Statistics Current Population Survey (CPS)

Ohio: Home to 112,000 Clean Energy Jobs

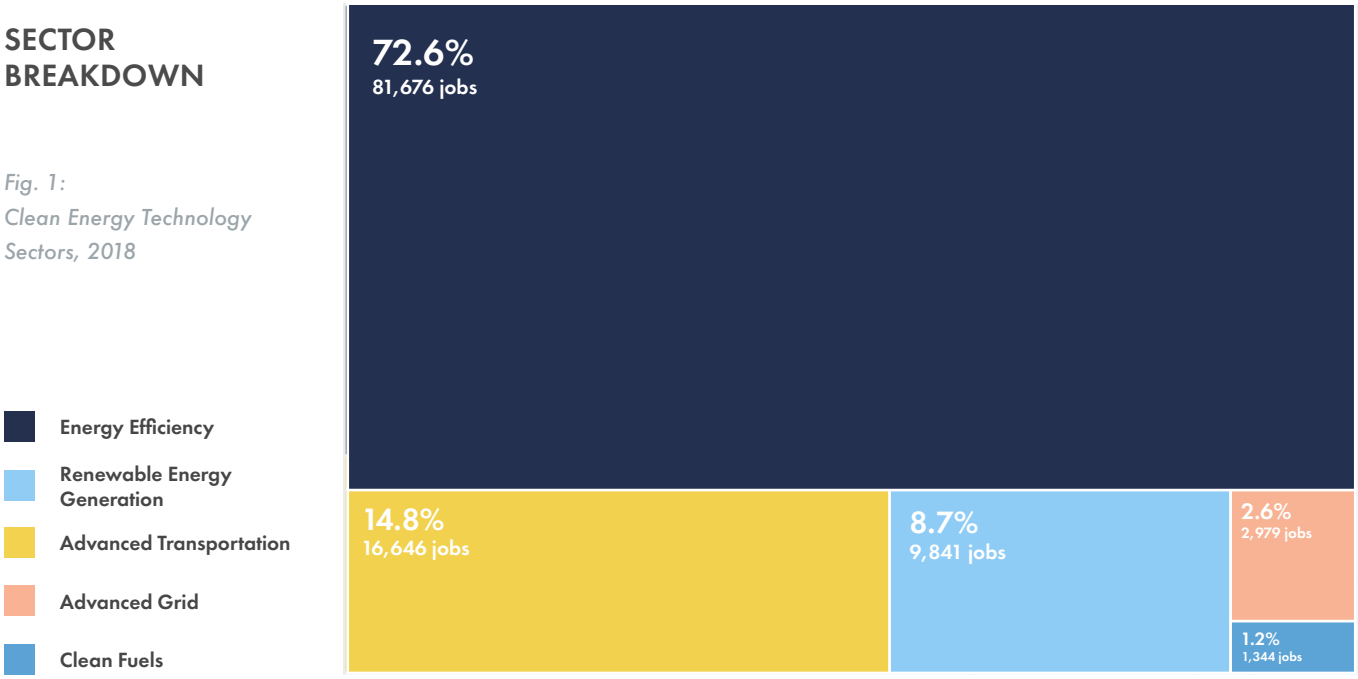
OHIO'S CLEAN ENERGY INDUSTRY ADDS 5,000 JOBS

The clean energy industry in Ohio is a major employer with more than 112,486 jobs. That's the third-most of any state in the Midwest, and it's enough to fill Ohio Stadium to capacity with thousands more people still outside tailgating. In 2018, Ohio clean energy businesses added 4,975 jobs. That's a 4.6 percent growth rate -- higher than the regional average. Advanced transportation added about 2,400 jobs for a 16.6 percent increase, higher than all other clean energy sectors in the state.

Energy efficiency remains Ohio's largest clean energy employer; the sector is home to 72 percent of the state's clean energy jobs. Thousands of different Ohio companies and establishments hire clean energy workers in any given year. Combined, these employers anticipate a 7.4 percent growth rate in 2019, a shade higher than the Midwestern clean energy industry average.

SECTOR BREAKDOWN

Fig. 1: Clean Energy Technology Sectors, 2018



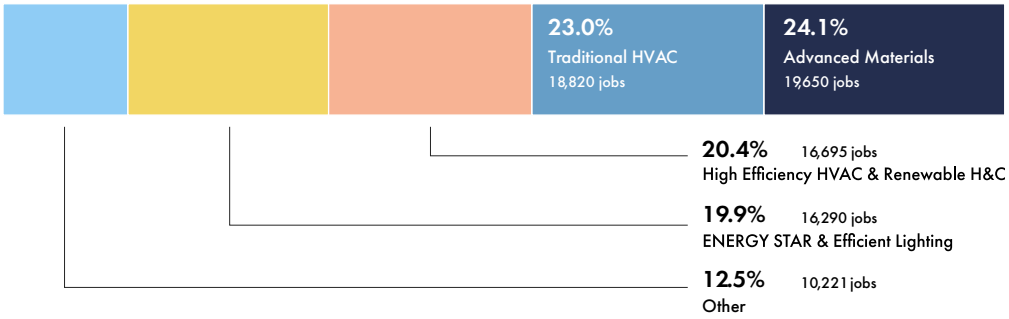
1. Unless otherwise stated, all data is based on the 2019 USEER. Energy Futures Initiative. (2019). The U.S. Energy Employment Report. Washington, DC. www.usenergyjobs.org. The Data provided relies on thousands of data points provided via survey. EFI, NASEO and BWRP have made every effort to supply current and accurate information but assume no responsibility or liability for any decisions based upon the information presented. For more information on the survey methodology see cleanjobsmidwest.com/about.

ENERGY EFFICIENCY REMAINS OHIO'S TOP CLEAN ENERGY EMPLOYER

More Ohioans work in energy efficiency -- 81,676 -- than any other clean energy sector in the state. In 2018, Ohio employers created 2,023 energy efficiency jobs, a 2.5 percent growth rate.

Energy efficiency workers help consumers around the state reduce the amount of wasted energy as they fuel their lives, homes and businesses. They manufacture ENERGY STAR-rated kitchen appliances; install efficient lighting systems at car dealerships; implement software that optimizes traditional heating, ventilation and air conditioning (HVAC) systems in high schools, and handle advanced building materials at new office towers.

Fig. 2: Energy Efficiency Subsectors, 2018



ADVANCED TRANSPORTATION'S U-TURN

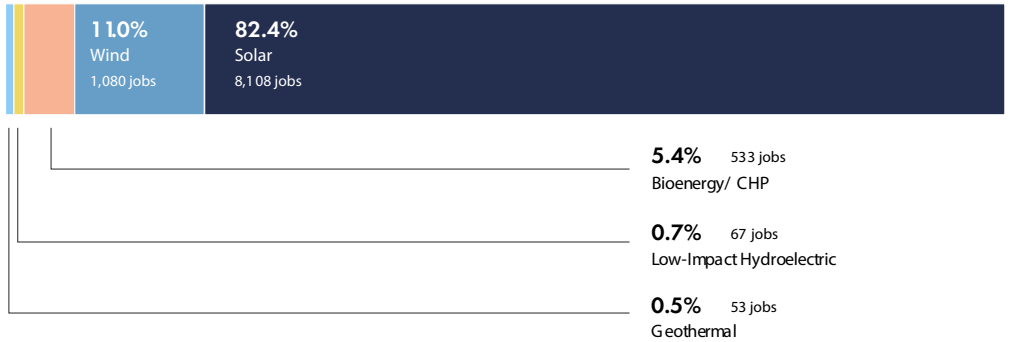
Advanced transportation is Ohio's No. 2 clean energy sector with 16,646 jobs. Following job losses in 2017, employment in the sector in 2018 spiked 16.6 percent, good enough for a gain of 2,374 jobs.

Growth was led by jobs building and developing plug-in hybrid vehicles, electric vehicles (EVs), and hybrid electric vehicles. The hybrid electric vehicle sub-sector now employs 7,243 people, 11 percent more than in 2017. Employment in Ohio's plug-in hybrid vehicle sub-sector grew 31.4 percent to 3,474 jobs, while the EV sub-sector employs 4,462 people, about 24 percent more than a year ago.

NEARLY 10,000 OHIOANS WORK IN RENEWABLES

The third-largest employer in the state's clean energy industry is renewable energy generation with 9,841 workers. Bucking a national downward trend in renewable energy jobs, Ohio's renewables sector employment actually increased 5 percent, adding 472 jobs.

Fig. 3: Renewable Energy Subsectors, 2018



Solar is Ohio's largest renewable energy sub-sector with 8,108 jobs and grew by 0.2% in 2018; the state employs more solar energy workers than any other state in the Midwest.

Fig. 4:
Wind and Solar Jobs, 2018 and 2017 Comparison

Wind, geothermal, bioenergy, and low-impact hydro all grew by double-digits in 2018. There are now 1,733 jobs between these four sub-sectors; wind alone now employs 1,080 Ohioans.

IN ADVANCED GRID SECTOR, ENERGY STORAGE RACKS UP JOBS

The advanced grid sector employs 2,979 Ohioans, 137 more than in 2017 for a 4.8 percent growth rate. Energy storage is the sector's largest employer with 1,303 jobs, 59 more than 2017. As the fourth-largest clean energy employer in the state, the sector also includes jobs in smart grid, microgrid, and other grid modernization work.

CLEAN FUELS JOBS DROP

1,344 Ohioans work in the clean fuels sector. This was a 2.3 percent decrease from 2017, a loss of loss of 31 jobs. The clean fuels sector encompasses non-corn ethanol, non-woody biomass, and other technologies not yet in wide commercial production including algal biofuel, syngas, bioheat blends, landfill gas, and advanced biofuels.

Fig. 5:
Top 3 MSAs in Clean Energy Employment, 2018

Metro Area (MSA)	Total Clean Energy Employment	Renewable Energy Employment	Energy Efficiency Employment
Cleveland-Elyria-Mentor, OH MSA	22,125	1,568	16,268
Columbus, OH MSA	17,049	672	13,142
Cincinnati-Middletown, OH-KY-IN MSA	15,901	1,191	11,706

CLEAN ENERGY INDUSTRY OUTLOOK

Ohio clean energy employment grew 4.6 percent in 2018, a gain of about 5,000 jobs as the renewable energy, advanced grid, energy efficiency, and alternative transportation sectors all experienced growth. The industry now accounts for more than 2 percent of all jobs in the state. The alternative transportation sector experienced the most dramatic year-over-year increase in Ohio -- nearly 17 percent growth. This was due in part to the increased popularity of EVs. In 2018, EV sales increased 80 percent.

Clean energy job growth in Ohio is expected to continue. Clean energy employers in the state project a 7.4 growth in jobs in 2019, slightly higher than the regional average.

COMPARING CLEAN ENERGY JOBS TO FOSSIL FUEL JOBS

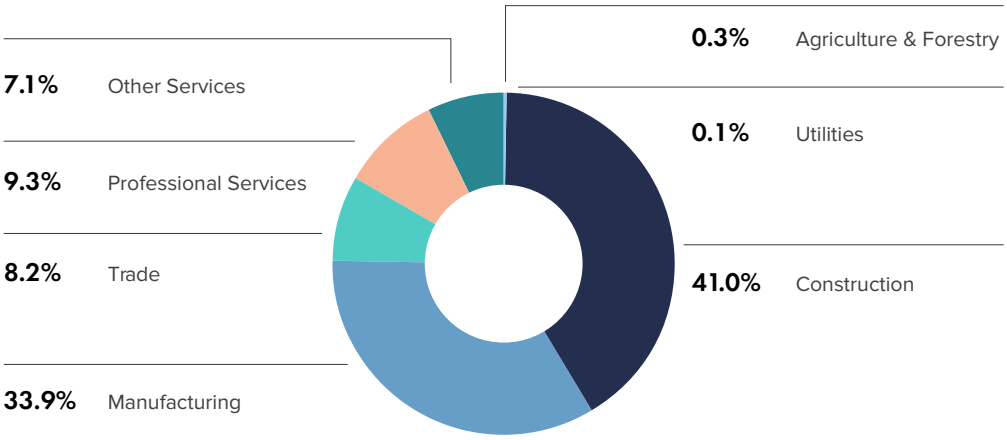
In 2018, more than 38,000 Ohioans worked in fossil fuel energy jobs in industries like coal, natural gas, and oil.[2] Jobs in the coal industry dropped by 9.8 percent, while renewable energy jobs grew by 5 percent.

2. U.S. Bureau of Labor Statistics Local Area Unemployment Statistics, 2018 Preliminary Data

VALUE CHAIN

In addition to breaking down clean energy jobs by industry, jobs can also be categorized by their function in the value chain. This report divides the clean energy jobs value chain into the following categories: agriculture, utility, construction, manufacturing, trade, professional service, and other service jobs. Each value chain category captures jobs from multiple clean energy sectors and industries.

Fig. 6: Clean Energy Jobs Value Chain, 2018



When Ohio clean energy jobs are broken down by their placement in the value chain, construction is home to 41 percent of the jobs, while manufacturing is home to 33.9 percent.

DEMOGRAPHICS

Throughout the state, 11.4 percent of the state's clean energy workers are military veterans. By comparison, veterans make up 6 percent of the national labor force.[3] The large ratio of military veterans transitioning to clean energy jobs is partially the result of the U.S. Department of Defense's long-standing commitment to investing in renewable energy, energy efficiency and training programs that prepare veterans for private-sector employment in industries like solar.

Small businesses drive the state's clean energy sector – 63 percent of Ohio's clean energy businesses employ fewer than 20 individuals.

3. 2018 Bureau of Labor Statistics Current Population Survey (CPS) https://www.bls.gov/cps/demographics.htm

SUMMARY

The businesses and establishments that constitute Ohio's clean energy industry added about 5,000 jobs in 2018, a 4.6 percent growth rate. This means clean energy jobs in Ohio are growing slightly faster than the Midwestern regional average, and three times faster than the country as a whole. Taken together, the clean energy industry in Ohio is home to about 112,000 jobs, which is about 2 percent of all the jobs in the state.

While energy efficiency remains the dominant employer with nearly three out of every four Ohio clean energy jobs, 2018 also saw big job gains in advanced transportation, renewable energy, and smart grid. While solar jobs in Ohio slipped, the sub-sector nonetheless remains a bigger employer in the Buckeye State than in any other state in the entire Midwest.

Looking toward the future, Ohio's clean energy employers seem to have a bullish outlook -- they anticipate adding workers at 7.4 percent clip in 2019, higher than the Midwest's regional clean energy industry average.

South Dakota: Home to 11,262 Clean Energy Jobs

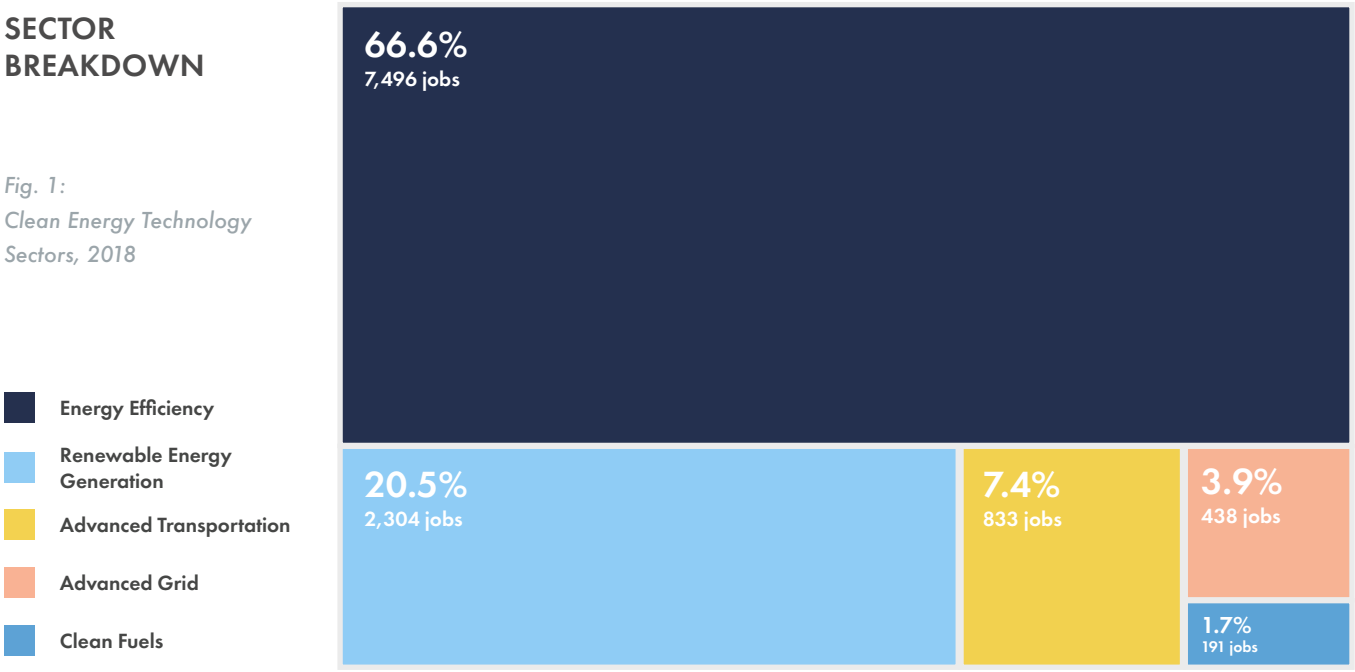
SOUTH DAKOTA'S CLEAN ENERGY JOBS PROJECT STRONG GROWTH IN 2019

Clean energy is a major employer in South Dakota with 11,262 jobs.[1] Employment in the industry grew 2.6 percent in 2018, an addition of nearly 300 jobs. Energy efficiency remains the largest sector in terms of South Dakota clean energy employment: two out of every three clean energy jobs in the state are in energy efficiency.

Compared to the rest of the Midwestern region, South Dakota clean energy employers this year are more optimistic in their hiring outlook. Whereas employers across the Midwest project a 7 percent growth in jobs in 2019, in South Dakota that number rises to 8.1 percent, with about 900 jobs expected to be added.

SECTOR BREAKDOWN

Fig. 1: Clean Energy Technology Sectors, 2018



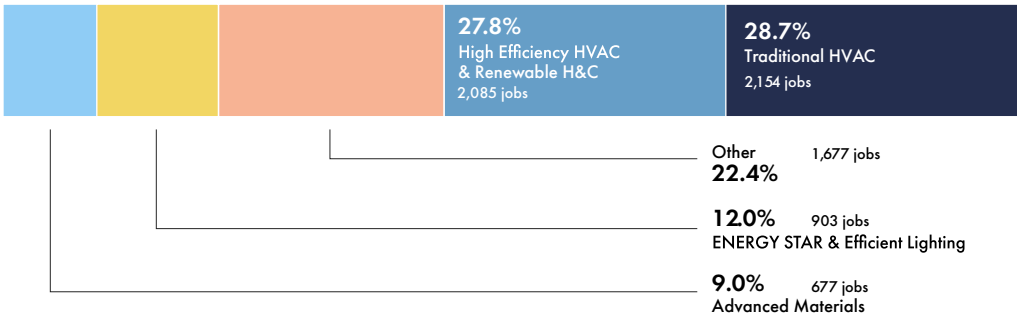
1. Unless otherwise stated, all data is based on the 2019 USEER. Energy Futures Initiative. (2019). The U.S. Energy Employment Report. Washington, DC. www.usenergyjobs.org. The Data provided relies on thousands of data points provided via survey. EFI, NASEO and BWRP have made every effort to supply current and accurate information but assume no responsibility or liability for any decisions based upon the information presented. For more information on the survey methodology see cleanjobsmidwest.com/about.

ENERGY EFFICIENCY IS SOUTH DAKOTA'S DOMINANT CLEAN ENERGY SECTOR

More South Dakotans work in energy efficiency -- 7,496 -- than in any other sector in the clean energy industry. In 2018, South Dakota employers added 183 energy efficiency jobs, good for a 2.5 percent growth rate.

Energy efficiency workers manufacture ENERGY STAR-rated appliances and install efficient lighting systems; tweak traditional heating, ventilation, and air conditioning (HVAC) systems; design high-efficiency HVAC units, and handle advanced building materials.

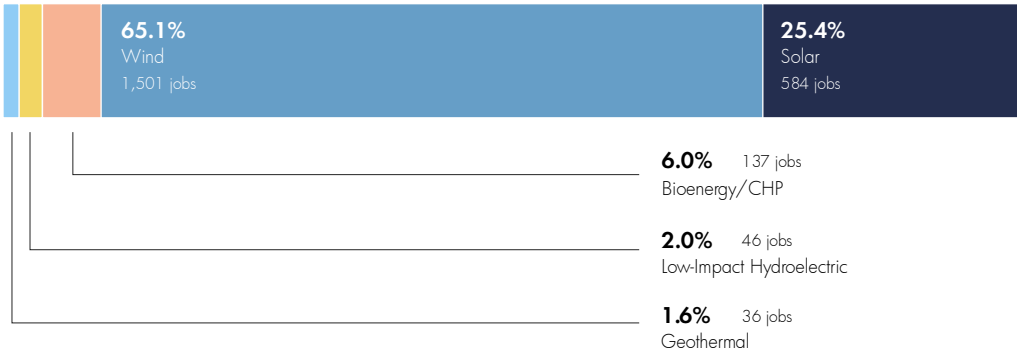
Fig. 2:
Energy Efficiency Subsectors, 2018



RENEWABLE ENERGY JOBS DECLINE DESPITE POSITIVE REGIONAL TRENDS

Renewable energy employs 2,304 South Dakotans. That's a 1.9 percent decline from 2017. The contraction of South Dakota's renewable energy jobs market stands in contrast to what was happening in the Midwest overall in 2018, when renewable energy jobs ticked up 2.7 percent. Still, renewable energy is the second-largest sector in the state in terms of clean energy employment.

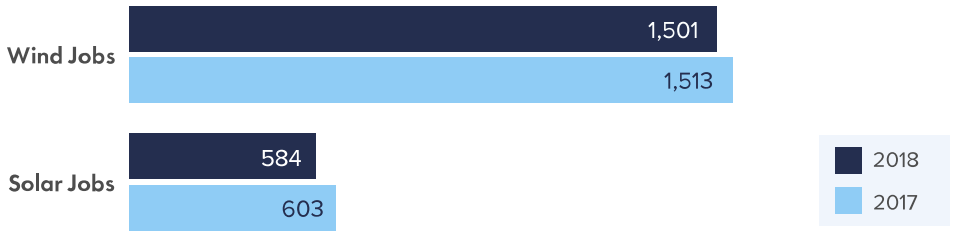
Fig. 3:
Renewable Energy Subsectors, 2018



In South Dakota, wind energy (1,501 jobs) and solar (584 jobs) are the two largest renewable energy employers by sub-sector. South Dakota wind jobs declined by just under 1 percent while solar jobs fell 3 percent; this decrease was actually less than the national solar sector, which saw jobs decrease by 4.5%.

1. Unless otherwise stated, all data is based on the 2019 USEER. Energy Futures Initiative. (2019). The U.S. Energy Employment Report. Washington, DC. www.usenergyjobs.org. The Data provided relies on thousands of data points provided via survey. EFI, NASEO and BWRP have made every effort to supply current and accurate information but assume no responsibility or liability for any decisions based upon the information presented. For more information on the survey methodology see cleanjobsmidwest.com/about.

Fig. 4:
Wind and Solar Jobs, 2018 and 2017 Comparison



ADVANCED TRANSPORTATION JOBS REV UP

Advanced transportation is South Dakota's third-largest clean energy sector in terms of jobs, employing 833 people. That's 131, or 18.6 percent, more than in 2017 when the state's advanced transportation sector actually shed jobs. Jobs relating to plug-in hybrid vehicles had a particularly strong year, surging 34 percent to employ 174 people. EV jobs, meanwhile, grew by 26 percent to 223.

ENERGY STORAGE JOBS LEAD THE ADVANCED GRID SECTOR

Advanced grid employs 438 people in South Dakota. Jobs in the sector grew 3.9 percent in 2018. Energy storage is the sector's largest employer in South Dakota with 248 jobs. The advanced grid sector also includes jobs in smart grid, microgrid, and other grid modernization work.

CLEAN FUELS JOBS HOLD STEADY

191 South Dakotans work in clean fuels jobs, a 1 percent year-over-year decrease. The clean fuels sector encompasses non-corn ethanol, non-woody biomass, and other technologies not yet in wide commercial production, including algal biofuel, syngas, bioheat blends, landfill gas, and advanced biofuels.

Fig. 5:
Top 3 MSAs in Clean Energy Employment, 2018

Metro Area (MSA)	Total Clean Energy Employment	Renewable Energy Employment	Energy Efficiency Employment
Sioux Falls, SD MSA	4,370	844	2,943
Rapid City, SD MSA	1,838	445	1,169
Sioux City, IA-NE-SD MSA	198	40	132

CLEAN ENERGY INDUSTRY OUTLOOK

Clean energy jobs in South Dakota constitute 2.5 percent of all jobs across the entire state, a higher proportion than the Midwestern region as a whole.[2] In 2018, South Dakota's clean energy industry grew 2.6 percent, slightly faster than the growth in the state's overall labor market.

Looking toward the future, South Dakota's clean energy employers anticipate hiring 8.1 percent more workers. This tops the broader regional projection of 7 percent. However, South Dakota clean energy employers reported difficulty hiring -- 84.6 percent of the employers surveyed in the state reported that it was "somewhat" or "very" difficult to hire more workers in 2019.

COMPARING CLEAN ENERGY JOBS TO FOSSIL FUEL JOBS

In 2018, 1,966 South Dakotans worked in fossil fuel energy jobs in industries like coal, natural gas, and oil.[3] While significant, it's only 17.5 percent of the total number of people working in clean energy in the state. For a sector-to-sector comparison, electric power generation using fossil fuels employed 271 South Dakotans while renewable energy generation employed more than 2,300.

VALUE CHAIN

Clean energy jobs can be categorized by the role they play in the value chain. This report divides the clean energy jobs value chain into the following categories: agriculture, utility, construction, manufacturing, trade, professional service, and other service jobs. Each category captures jobs from multiple different clean energy sectors. For example, construction jobs can include energy efficiency jobs and renewable energy jobs.

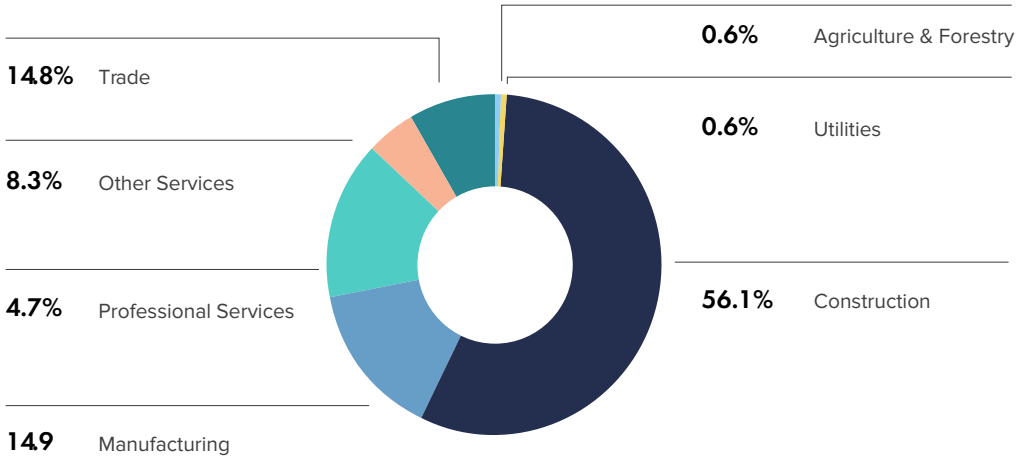


Fig. 6: Clean Energy Jobs Value Chain, 2018

When South Dakota clean energy jobs are broken down by their placement in the value chain, construction makes up 56 percent of the jobs, while manufacturing represents nearly 15 percent.

2. U.S. Bureau of Labor Statistics Local Area Unemployment Statistics, 2018 Preliminary data
3. 2019 US Energy and Employment Report. This figure does not include gas station workers.

DEMOGRAPHICS

In South Dakota, 12.1 percent of the state's clean energy workers are veterans. By comparison, veterans make up 6 percent of the national labor force.[4] The relatively large ratio of veterans transitioning to clean energy jobs is partially the result of the U.S. Department of Defense's long-standing commitment to investing in renewable energy, energy efficiency, and training programs that prepare veterans for private-sector employment in industries like solar.

Small businesses drive the state's clean energy sector – 57.1 percent of South Dakota's clean energy businesses employ fewer than 20 individuals.

SUMMARY

The South Dakota clean energy industry employs more than 11,000 people. Jobs in the industry grew at a 2.6 percent clip in 2018. This year, South Dakota clean energy employers project even stronger growth -- 8.1 percent, higher than the regional average.

The clean energy industry encompasses multiple diverse sectors that employ workers whose roles go beyond the traditional renewable energy occupations of wind technician and rooftop solar installer. In fact, energy efficiency is by far the largest clean energy employer in the state -- home to two out of three of the industry's jobs. Also, a relatively high percentage of South Dakota clean energy workers either are veterans or work in the construction sector, while small businesses dominate the industry in the state.

The data and analyses presented in this report by Clean Energy Trust and Environmental Entrepreneurs are based on data collected for the 2019 U.S. Energy Employment Report (2019 USEER), produced by the Energy Futures Initiative (EFI) in partnership with the National Association of State Energy Officials (NASEO) and collected and analyzed by BW Research Partnership (BWRP).

4. 2018 Bureau of Labor Statistics Current Population Survey (CPS)

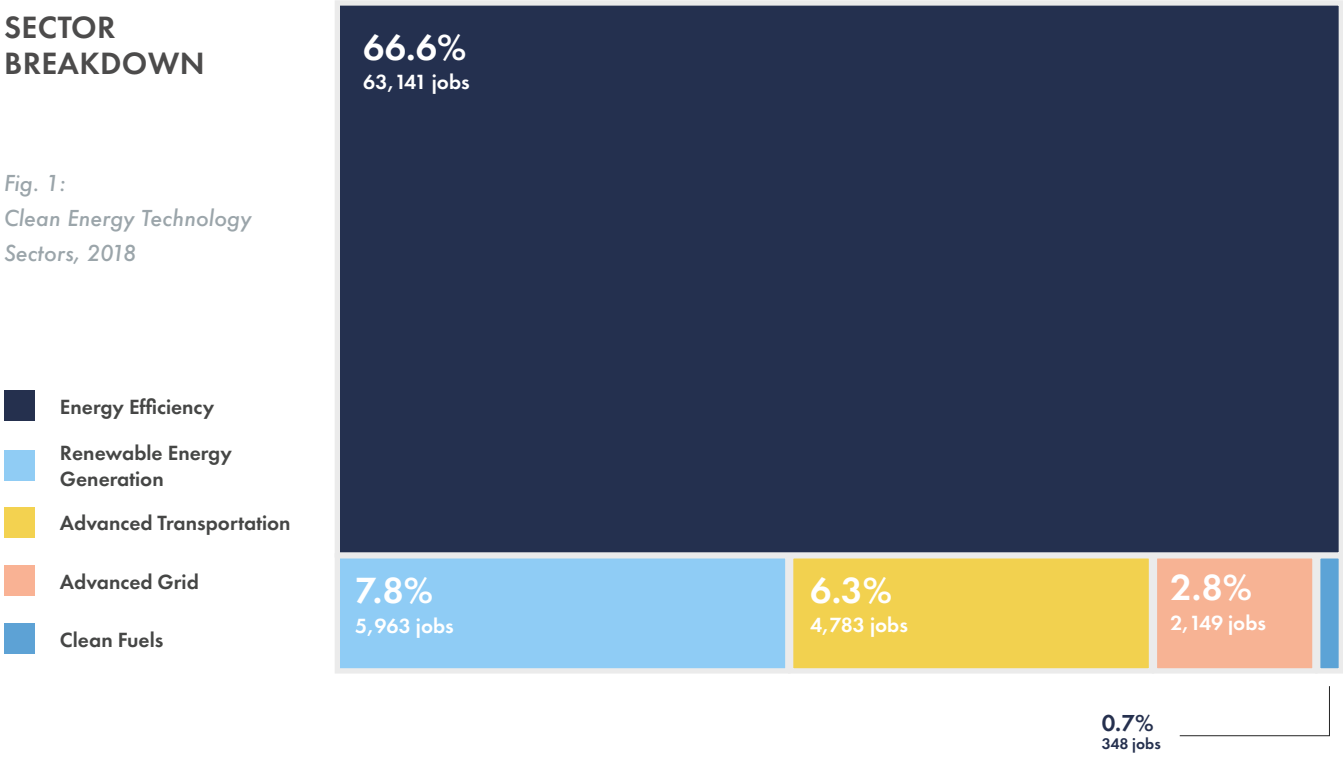
Wisconsin: Home to 76,000 Clean Energy Jobs

THE CLEAN ENERGY INDUSTRY CREATED 1,800 JOBS IN WISCONSIN IN 2018

Clean energy is a major industry in the state, employing 76,383 people -- nearly enough to pack every seat at Lambeau Field. In 2018, the industry added 1,786 Wisconsin jobs. That's a growth rate of 2.4 percent. Energy efficiency continues to be the largest clean energy employer in Wisconsin; the sector is home to about four out of every five Wisconsin clean energy jobs. In any given year, hundreds of different Wisconsin companies and establishments create clean energy jobs. Combined, these employers anticipate adding more than 6,000 clean energy jobs in Wisconsin in 2019 -- an 8.4 percent growth rate

SECTOR BREAKDOWN

Fig. 1: Clean Energy Technology Sectors, 2018

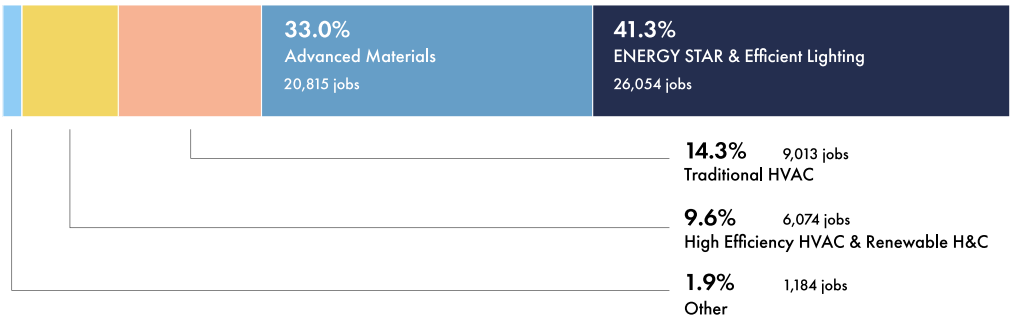


1. Unless otherwise stated, all data is based on the 2019 USEER. Energy Futures Initiative. (2019). The U.S. Energy Employment Report. Washington, DC. www.usenergyjobs.org. The Data provided relies on thousands of data points provided via survey. EFI, NASEO and BWRP have made every effort to supply current and accurate information but assume no responsibility or liability for any decisions based upon the information presented. For more information on the survey methodology see cleanjobsmidwest.com/about.

ENERGY EFFICIENCY DOMINATES WISCONSIN'S CLEAN ENERGY WORKFORCE

63,141 Wisconsinites work in energy efficiency. That's more than any other sector in the clean energy industry. In 2018, Wisconsin employers created 842 energy efficiency jobs, a 1.4 percent growth rate. Energy efficiency workers are active throughout the value chain -- they manufacture ENERGY STAR-rated kitchen appliances; install efficient lighting systems at car dealerships; implement software that optimizes traditional heating, ventilation and air conditioning (HVAC) systems in high schools, and handle advanced building materials at new office towers.

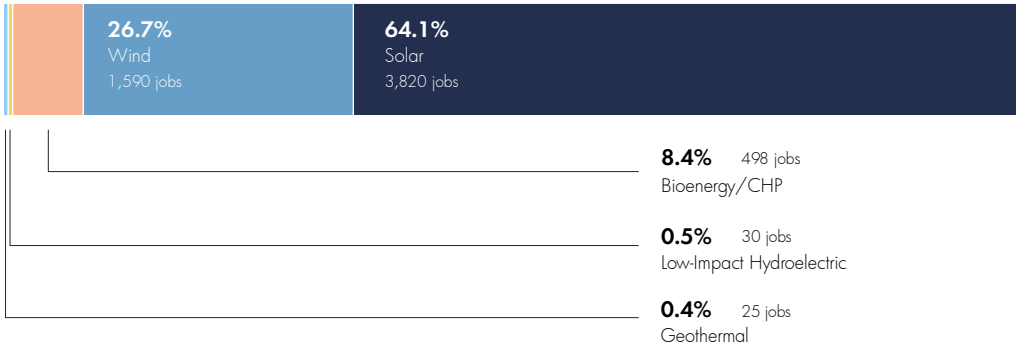
Fig. 2: Energy Efficiency Subsectors, 2018



RENEWABLE ENERGY GENERATION EMPLOYS 6,000

The state's second-largest clean energy sector is renewable energy generation, with 5,963 jobs. That's 303 more than 2017, a 5.4 percent growth rate, doubling the sector's broader, regionwide growth rate (2.7 percent). Underscoring the health of Wisconsin's renewables sector is that nationally, renewable energy jobs actually declined.

Fig. 3: Renewable Energy Subsectors, 2018



Solar employs more people in Wisconsin (3,820) than any other renewables sub-sector. Wisconsin solar jobs ticked upward 0.5 percent year-over-year, countering a significant downward national solar jobs trend.

Wind is also a big Wisconsin renewables employer with 1,590 jobs. In the bioenergy/combined heat and power sub-sector, jobs spiked about 85 percent, from roughly 267 to 498. Other job-creating sub-sectors in the renewable energy generation sector include geothermal and low-impact hydroelectric power.

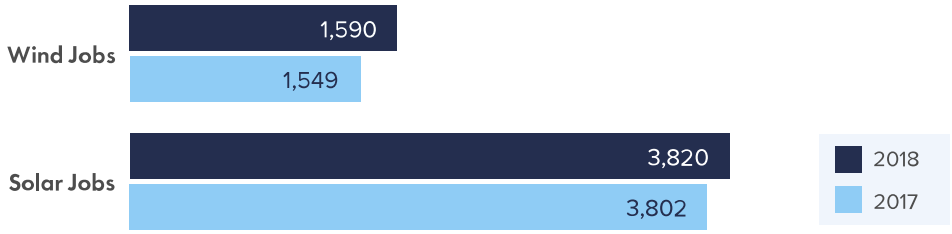


Fig. 4:
Wind and Solar Jobs, 2018 and 2017 Comparison

ADVANCED TRANSPORTATION'S U-TURN

Advanced transportation is the state's third-largest clean energy sector with 4,783 Wisconsinites employed in the space. After enduring significant job losses in 2017, the sector rebounded by adding jobs at a 14 percent clip in 2018. Still, it wasn't enough to make up for the rocky 2017.

Two advanced transportation sub-sectors were primarily responsible for the sector's overall growth -- plug-in hybrid vehicles (29 percent growth rate in jobs) and plug-in electric vehicles (21 percent). Each sub-sector added more than 200 jobs.

ENERGY STORAGE LEADS ADVANCED GRID SECTOR

Advanced grid employs 2,149 people in Wisconsin. Jobs in the sector grew 3.7 percent from 2017 to 2018. Energy storage jobs are the sector's largest employer with 1,098 jobs, up 2.4 percent from 2017. Advanced grid also encompasses jobs in smart grid, microgrid, and other grid modernization work.

SMALL DROP IN CLEAN FUELS JOBS

Clean fuels are a relatively small sector in Wisconsin, employing 348 people. This is a loss of 21 jobs over the past year. Clean fuels include non-corn ethanol, non-woody biomass, and other technologies not yet in wide commercial production like algal biofuel, syngas, bioheat blends, and landfill gas.

Fig. 5:
Top 3 MSAs in Clean Energy Employment, 2018

Metro Area (MSA)	Total Clean Energy Employment	Renewable Energy Employment	Energy Efficiency Employment
Milwaukee-Waukesha-West Allis, WI MSA	20,085	1,426	16,758
Madison, WI MSA	8,715	634	7,258
Chicago-Naperville-Joliet, IL-IN-WI MSA	3,708	956	2,505

CLEAN ENERGY INDUSTRY OUTLOOK

The clean energy sector constitutes a significant segment of Wisconsin's overall labor market. Combined, the various clean energy sectors -- energy efficiency, renewables, energy storage, clean fuels, etc. -- are now responsible for about 2.5 percent of all jobs in the state.[2] In 2018, clean energy jobs in Wisconsin grew 2.4 percent, a bit shy of the state's overall job growth rate.

In Wisconsin, clean energy employers are optimistic, projecting 8.4 percent growth in 2019. That's higher than the regional average of 7 percent anticipated clean energy job growth. However, employers also reported difficulty hiring. Nearly 88 percent of Wisconsin clean energy businesses surveyed reported it being "somewhat" or "very" difficult to hire workers.

Focusing on just renewable energy sector jobs, Wisconsin was an outlier in its high growth rate. Nationally, tariffs on solar modules led businesses in the residential solar space to restructure and shed jobs. This led to a decrease in renewable energy jobs across the country. But in Wisconsin, renewable energy jobs grew by more than 5 percent. This labor market dynamic -- adding renewables jobs even as they fell nationally -- was common across the Midwest in 2018.

COMPARING CLEAN ENERGY JOBS TO FOSSIL FUEL JOBS

In 2018, 9,185 Wisconsinites worked in jobs in fossil fuel energy industries like coal, natural gas, and oil.[3] While a regionally significant employer, fossil fuel jobs are only a fraction of the number of clean energy jobs.

Electric power generation jobs using fossil fuels put 3,513 people to work, compared to nearly 6,000 jobs in renewable energy generation.

Coal jobs, meanwhile, dropped about 8 percent due to a range of market factors including inexpensive natural gas and increased demand for renewable energy.

2. U.S. Bureau of Labor Statistics Local Area Unemployment Statistics, 2018 Preliminary data

3. 2019 US Energy and Employment Report. This figure does not include gas station workers.

VALUE CHAIN

Clean energy jobs can be categorized by the role they play in the value chain. This report divides the clean energy jobs value chain into the following categories: agriculture, utility, construction, manufacturing, trade, professional service, and other service jobs. Each category captures jobs from multiple different clean energy sectors. For example, construction jobs can include energy efficiency jobs and renewable energy jobs.

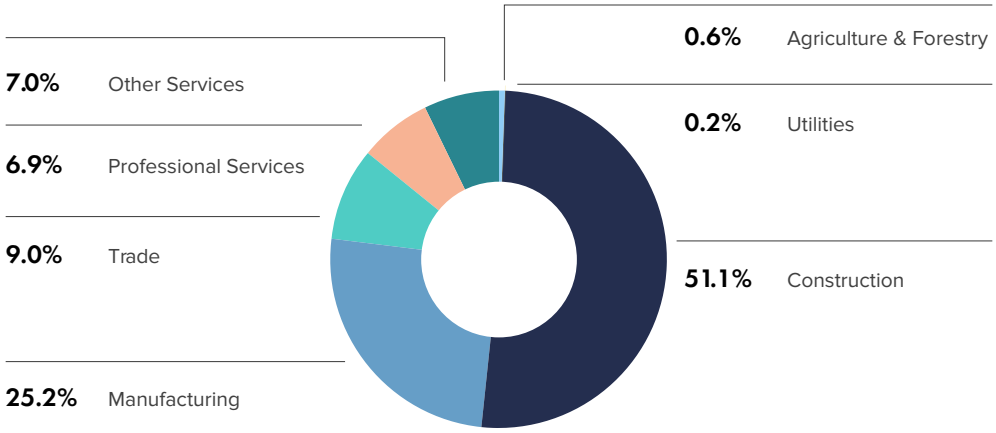


Fig. 6: Clean Energy Jobs Value Chain, 2018

When Wisconsin clean energy jobs are broken down by their placement in the value chain, construction makes up 51.1 percent of jobs, while manufacturing represents 25.2 percent.

DEMOGRAPHICS

In Wisconsin, 12.2 percent of clean energy jobs are held by veterans. Since veterans make up 6 percent of the national labor force[4], the clean energy industry is relatively effective at attracting veterans entering the private-sector workforce. The large ratio of veterans transitioning to clean energy jobs is also in part the result of the U.S. Department of Defense's ongoing investments in technologies like renewable energy and energy efficiency for national security and budgetary reasons. The military has also funded training programs that prepare veterans for private-sector employment in industries like solar.

Small businesses drive the state's clean energy sector – 68.6 percent of Wisconsin clean energy businesses employ fewer than 20 individuals.

4. 2018 Bureau of Labor Statistics Current Population Survey (CPS)

SUMMARY

The clean energy industry in Wisconsin is a significant and fast-growing employer, adding about 1,800 jobs in 2018 for a 2.4 percent growth rate. Looking at specific sectors, advanced transportation jobs rebounded from a significant drop in 2017, with electric, hybrid, and plug-in hybrid vehicles leading the way. Meanwhile, solar jobs in the state increased even as the sector faced job losses in the U.S. overall. With jobs projected to grow 8.4 percent in 2019, clean energy businesses and establishments in Wisconsin appear to have a bullish outlook on the future.

The data and analyses presented in this report by Clean Energy Trust and Environmental Entrepreneurs are based on data collected for the 2019 U.S. Energy Employment Report (2019 USEER), produced by the Energy Futures Initiative (EFI) in partnership with the National Association of State Energy Officials (NASEO) and collected and analyzed by BW Research Partnership (BWRP).

---

4. 2018 Bureau of Labor Statistics Current Population Survey (CPS)