MICHIGAN **ENERGY**

INDUSTRY CLUSTER WORKFORCE ANALYSIS

STATE OF MICHIGAN
Department of Technology, Management and Budget
Bureau of Labor Market Information and Strategic Initiatives

MICHIGAN **ENERGY**

INDUSTRY CLUSTER
WORKFORCE ANALYSIS

EVAN LINSKEY
Economic Analyst
LinskeyE@michigan.gov
(517) 241-8272

IT'S BIGGER THAN DATA.

The Bureau of Labor Market Information and Strategic Initiatives is your one-stop shop for information and analysis on Michigan's population, labor market, and more.

- Our Federal-State Programs division runs the state's cooperative agreements with the U.S. Bureau of Labor Statistics and the U.S. Census Bureau, making us the official source for this information.
- Our Research and Evaluation division conducts workforce research and program evaluation, giving you the insight you need to make smarter decisions.

TABLE OF CONTENTS

Dear Colleagues,

The Michigan Department of Labor and Economic Opportunity partners with businesses to help them find the talent they need to be successful. To assist with this process, we worked with the Bureau of Labor Market Information and Strategic Initiatives to produce a series of workforce analysis reports, each focusing on a key industry cluster in the Michigan economy. These reports are loaded with useful information on talent, including an analysis of employment, wages, key occupations, demand jobs, talent pipelines, and career pathways. We hope these reports will help our business partners make data-driven workforce decisions and help our state grow a talent system that is second to none.

STEPHANIE BECKHORN
DIRECTOR, WORKFORCE DEVELOPMENT
Michigan Department of Labor
and Economic Opportunity

Dear Colleagues,

The Michigan Bureau of Labor Market Information and Strategic Initiatives is your one-stop shop for information and analysis on Michigan's population, labor market, and more. These reports provide traditional labor market information, but also discuss important topics such as talent pipelines and career pathways. These reports give our workforce partners, employers, and job seekers the insight they need to make smarter decisions. We would like to thank the Department of Labor and Economic Opportunity for partnering with us on these reports.

JASON PALMER
DIRECTOR
Michigan Bureau of Labor Market
Information and Strategic Initiatives

Key Findings

- The Energy cluster is one of the smaller but essential clusters, employing roughly 108,000 in 2017. This makes up 2.5 percent of Michigan's total employment. The impact of the products and services produced by this cluster reach throughout the entire economy.

- Wages in this cluster have grown rapidly since 2000 and have well out-paced statewide wage growth. Not all subclusters have seen equal wage growth gains. The *Manufacturing* subcluster has experienced the largest wage growth since 2000, but that has largely occurred since 2015. Meanwhile, the *Energy efficiency* subcluster has seen nominal wages decline since 2000.

- The Energy cluster shows a mix of educational and training requirements among key occupations, with many needing extended on-the-job training or apprenticeships. Out of 15 key occupations in the cluster, three typically require an apprenticeship, while three others also typically require a bachelor's degree. The Energy cluster relies more on apprenticeship programs than other clusters.

- Energy as a cluster is reliant on a wide educational array of occupations, but it is possible to earn high wages at all levels. When combined with training, jobs can be attained with no formal education through a bachelor's degree and above. Several occupations such as *Electrical engineers*, *Electrical power-line installers and repairers*, and *Electrical and electronics repairers, powerhouse, substation, and relay* typically have wages that are above the statewide average.

- Demographics for the Energy cluster are slightly different than the state. Most notably, more than 80 percent of all employees in the cluster are male, while the statewide rate is nearer to 52.5 percent. Age demographics are more in line with the state overall, but the cluster is less reliant on young workers (younger than 25) and more on those age 35–64. This aligns with the training requirements of most jobs in the cluster as well as associated liability and safety concerns for these careers.

An **industry cluster** is a geographic concentration of related employers, industry suppliers, and support institutions in a product or service field.

In a practical sense, industry clusters are an organizing framework to permit the selection of significant industry sectors for which in-depth knowledge and expertise on workforce issues are developed by service providers that convene employers. An industry cluster leverages the knowledge and resources of all involved, decreases duplication of effort, and often achieves cost savings for recruitment and training.

The Energy cluster reflects both the generation and utilization of energy from nonrenewable and renewable resources. Utilities make up a large share of the cluster which not only consist of the production of utility services, but also their delivery throughout the economy. Demand for energy efficiency practices and services continues to increase as consumers seek to reduce energy costs in their homes and businesses. This can be seen in advertisements for appliances and building materials. Most of the efficiency-focused employment is Construction-related.

Five subclusters highlight the diverse array of activities composing this facet of Michigan's economy.

Energy Efficiency
Utilities
Wholesale
Oil and Gas Exploration, Extraction, Wholesaling
Electric Manufacturing

Energy Employment and Wages Analysis

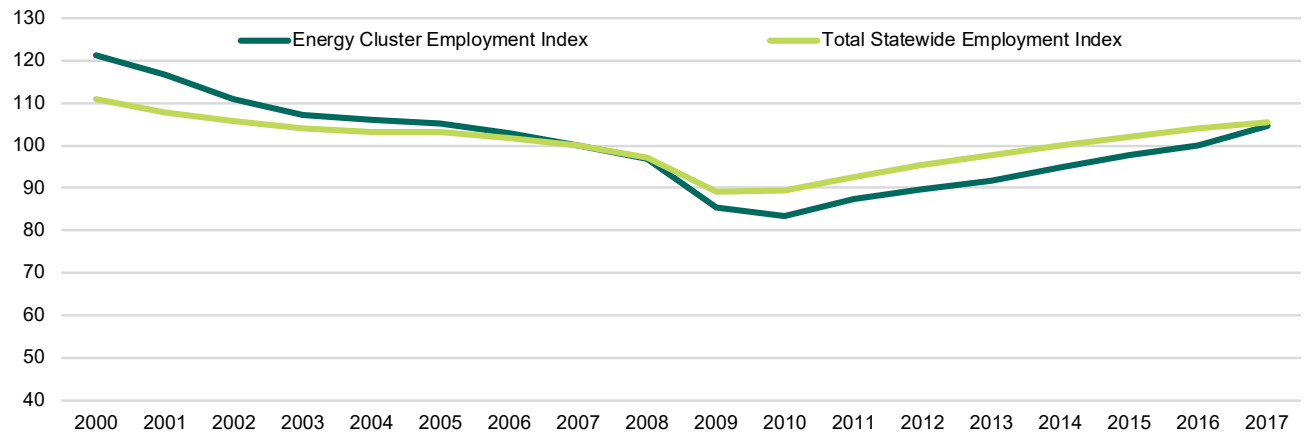
The Energy cluster has had a considerable decline in the number of employed individuals since 2000, but since the end of the Great Recession, employment has rebounded steadily. Employment bottomed out in 2010 at roughly 86,000, and in the eight years since it has grown 25.3 percent, reaching nearly 108,000. Total establishments have dropped 4.5 percent since 2010 and 17.7 percent since 2000.

The industry cluster represents only 2.5 percent of total employment in the state, but the services provided have a vast impact on the economy.

When indexing employment to 2007 levels, it is easy to see the larger drop that Energy had compared to the statewide economy from 2000 to 2007. Energy also dipped more than the economy through the Great Recession and was slower to recover to 2007 levels of employment, not reaching them again until 2016.

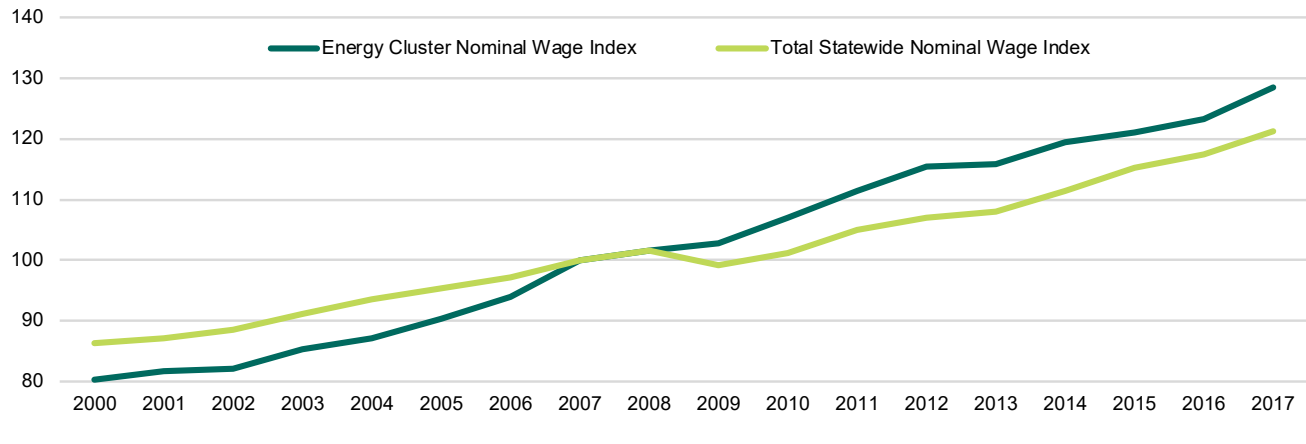
Nominal wages* grew more rapidly from 2000 to 2007 in the Energy cluster than the statewide average wages. Since then, average Energy cluster wages have continued to well out-pace statewide wage growth.

FIGURE 1: **EMPLOYMENT INDEX, MICHIGAN ENERGY CLUSTER**



Source: Quarterly Census of Employment and Wages, Michigan Bureau of Labor Market Information and Strategic Initiatives

FIGURE 2: **NOMINAL WAGE* INDEX, MICHIGAN ENERGY CLUSTER**



Source: Quarterly Census of Employment and Wages, Michigan Bureau of Labor Market Information and Strategic Initiatives

*Nominal wages are not adjusted for inflation.


UP

Analysis of Energy Subclusters

Energy Efficiency (48,590 jobs)

Electrical Contractors and Other Wiring Installation Contractors
Plumbing, Heating, and Air-Conditioning Contractors

Energy efficiency as a subcluster is defined to incorporate contractors who can have a large impact on the end use of energy. Demand for energy-efficient practices increases as consumers seek ways to reduce energy costs in their homes and businesses. Though the employees in this subcluster are not explicitly energy focused and may seem more at home solely in the Construction cluster, they have an impact on the Energy cluster. Employment in this subcluster has gone up 32 percent since the end of the recession, but is still well below where it was in 2000.

Utilities (32,186 jobs)

Electric Power Generation, Transmission and Distribution
Natural Gas Distribution
Water, Sewage and Other Systems
Water and Sewer Line Construction
Power and Communication Line Construction
Other Management Consulting Services
Solid Waste Combustors and Incinerators

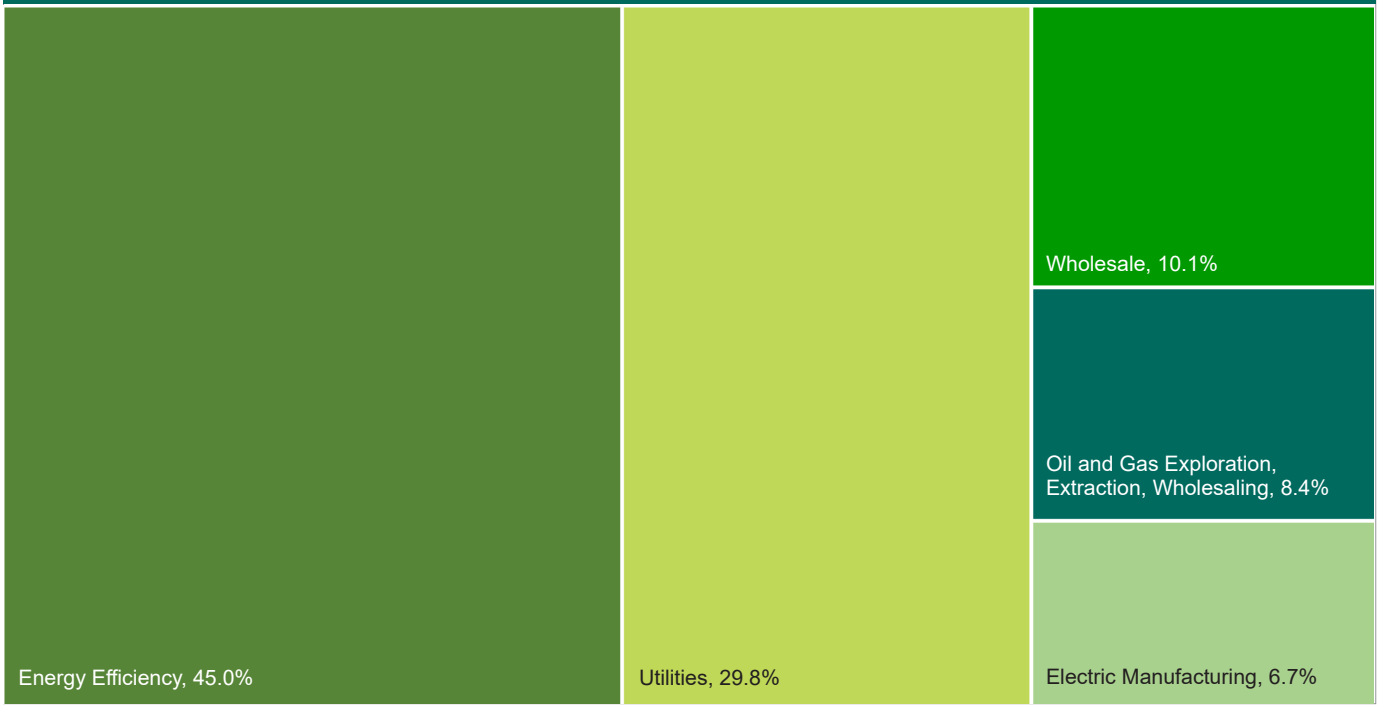
The *Utilities* subcluster has also dropped both in employment and number of establishments since 2000, but since bottoming out in 2011, each of these variables has risen dramatically. Nominal average annual wages have been rising since 2000 and now sit above $100,000, which is much higher than any other subcluster and about $20,000 higher than the cluster as a whole.

Wholesale (10,931 jobs)

Electrical Apparatus and Equipment, Wiring Supplies, and Related Equipment Merchant Wholesalers
Other Electronic Parts and Equipment Merchant Wholesalers
Plumbing and Heating Equipment and Supplies (Hydronics) Merchant Wholesalers

Wholesale related to the Energy cluster has mirrored the other clusters, dropping both in units and employment since 2000. Though employment in this cluster has been on the rise since 2010, the total number of establishments continues to fall. Wages in this subcluster are the second highest in the total cluster after *Utilities*.

FIGURE 3: **SUBCLUSTER DISTRIBUTION, MICHIGAN ENERGY CLUSTER, 2017**



Source: Quarterly Census of Employment and Wages, Michigan Bureau of Labor Market Information and Strategic Initiatives

Oil and Gas Exploration, Extraction, Wholesaling (9,017 jobs)

Oil and Gas Extraction
Pipeline Transportation
Petroleum Bulk Stations and Terminals
Petroleum and Petroleum Products Wholesalers
Drilling Oil and Gas Wells
Support Activities for Oil and Gas Operations
Oil and Gas Pipeline Construction
Petroleum Refineries
Geophysical Surveying and Mapping Services

In line with the whole cluster, the oil and gas focused subcluster dropped 10.6 percent from 2000 to 2017 but has grown since 2010 and is only roughly 1,000 employees smaller than it was in 2000. The oil and gas subcluster makes up slightly over 8 percent of the entire cluster. The state has nearly 100 fewer establishments in this subcluster than it did in 2000 and is even down 40 units since 2015.

Electric Manufacturing (7,235 jobs)

Electrical Equipment Manufacturing
Battery Manufacturing
Wiring Device Manufacturing
Power Boiler and Heat Exchanger Manufacturing
Oil and Gas Machinery Manufacturing
Heating Equipment (Except Warm Air Furnaces) Manufacturing
Turbine and Turbine Generator Manufacturing
Semiconductor and Related Device Manufacturing
Instrument Manufacturing for Measuring and Testing Electricity and Electrical Signals
All Other Miscellaneous Electrical Equipment and Component Manufacturing

The *Electric manufacturing* subcluster is an important piece of the supply chain for the Energy cluster. The cluster has fluctuated since reaching an employment low in 2010 but has grown rapidly since 2014, growing 27.2 percent. Nominal wages were relatively flat in this subcluster before and through the recession, but since 2010 have been rising rapidly.

Key Energy Occupations

Occupations are an important level of analysis within the Energy cluster. The top 15 key occupations in the cluster (featured in Table 1) are determined by two criteria: the occupation's share of the cluster's total employment and the occupation's share of the state's employment for that occupation. Because the volume of these jobs in the cluster is large, they are fairly representative of the typical wages, education, skills, and demand for the cluster.

Table 1 includes a column that measures the talent gap for each occupation, meaning the difference between the talent supply and employer demand for that occupation. The occupations were each given a separate score for supply and demand based on composite indexes. Shortages or surpluses were then determined based on the differences between the supply and demand scores. More information on Michigan's Occupational Supply and Demand and the Talent Gap variable can be found in *Michigan's Labor Market News*, vol. 74, issue 10.

TABLE 1: **KEY OCCUPATIONS, MICHIGAN ENERGY CLUSTER**

KEY OCCUPATION	CLUSTER EMPLOYMENT	MICHIGAN EMPLOYMENT	CLUSTER WAGE RANGE	ANNUAL OPENINGS	TYPICAL EDUCATION AND TRAINING	TALENT GAP
Construction Laborers	2,640	21,850	$14–$22	3,340	Short-term On-the-job Training	Balanced
Control and Valve Installers and Repairers, Except Mechanical Door	1,100	1,760	$22–$39	120	High School Diploma or Equivalent and Moderate-term On-the-job Training	Balanced
Cost Estimators	1,040	6,640	$22–$39	710	Bachelor's Degree and Moderate-term On-the-job Training	Surplus
Electrical and Electronics Repairers, Powerhouse, Substation, and Relay	1,460	1,550	$35–$48	100	Postsecondary Nondegree Award and Moderate-term On-the-job Training	Balanced
Electrical Engineers	1,640	10,280	$33–$50	780	Bachelor's Degree	Balanced
Electrical Power-Line Installers and Repairers	3,980	4,260	$29–$45	420	High School Diploma or Equivalent and Long-term On-the-job Training	Balanced
Electricians	14,750	22,780	$20–$35	2,580	High School Diploma or Equivalent and Apprenticeship	Balanced
First-Line Supervisors of Construction Trades and Extraction Work	2,390	11,550	$24–$38	1,410	High School Diploma or Equivalent	Balanced
First-Line Supervisors of Mechanics, Installers, and Repairers	1,710	14,680	$24–$41	1,380	High School Diploma or Equivalent	Balanced
Heating, Air Conditioning, and Refrigeration Mechanics and Installers	6,540	8,970	$17–$29	1,020	Postsecondary Nondegree Award and Long-term On-the-job Training	Balanced
Logisticians	1,530	8,000	$27–$48	820	Bachelor's Degree	Balanced
Plumbers, Pipefitters, and Steamfitters	7,520	12,250	$22–$36	1,620	High School Diploma or Equivalent and Apprenticeship	Shortage
Power Plant Operators	1,470	1,720	$32–$46	160	High School Diploma or Equivalent and Long-term On-the-job Training	Balanced
Refuse and Recyclable Material Collectors	1,790	4,400	$16–$22	550	Short-term On-the-job Training	Balanced
Sheet Metal Workers	1,510	3,210	$19–$32	420	High School Diploma or Equivalent and Apprenticeship	Shortage

Sources: Cluster employment, Michigan employment, and Wage range: Occupational Employment Statistics, Michigan Bureau of Labor Market Information and Strategic Initiatives (2017); Annual Openings: Long-term Occupational Projections (2016–2026), Michigan Bureau of Labor Market Information and Strategic Initiatives; Typical Education and Training: Bureau of Labor Statistics; Michigan's Occupational Supply and Demand and the Talent Gap: Linskey, Evan. 2018. "An Analysis of Occupational Supply and Demand in the Michigan Labor Market." Michigan's Labor Market News, Vol. 74, Issue 10.

- Occupations requiring apprenticeships or extended-term training are crucial in the Energy cluster. Hands-on experience is invaluable in occupations such as *Electricians, Plumbers, pipefitters, and steamfitters*, and *Sheet metal workers*. Some occupations can be filled with a variety of educational backgrounds beyond the typical route. Apprenticeship programs in particular are being developed for a variety of occupations and allow talent to receive necessary education and training while being paid.

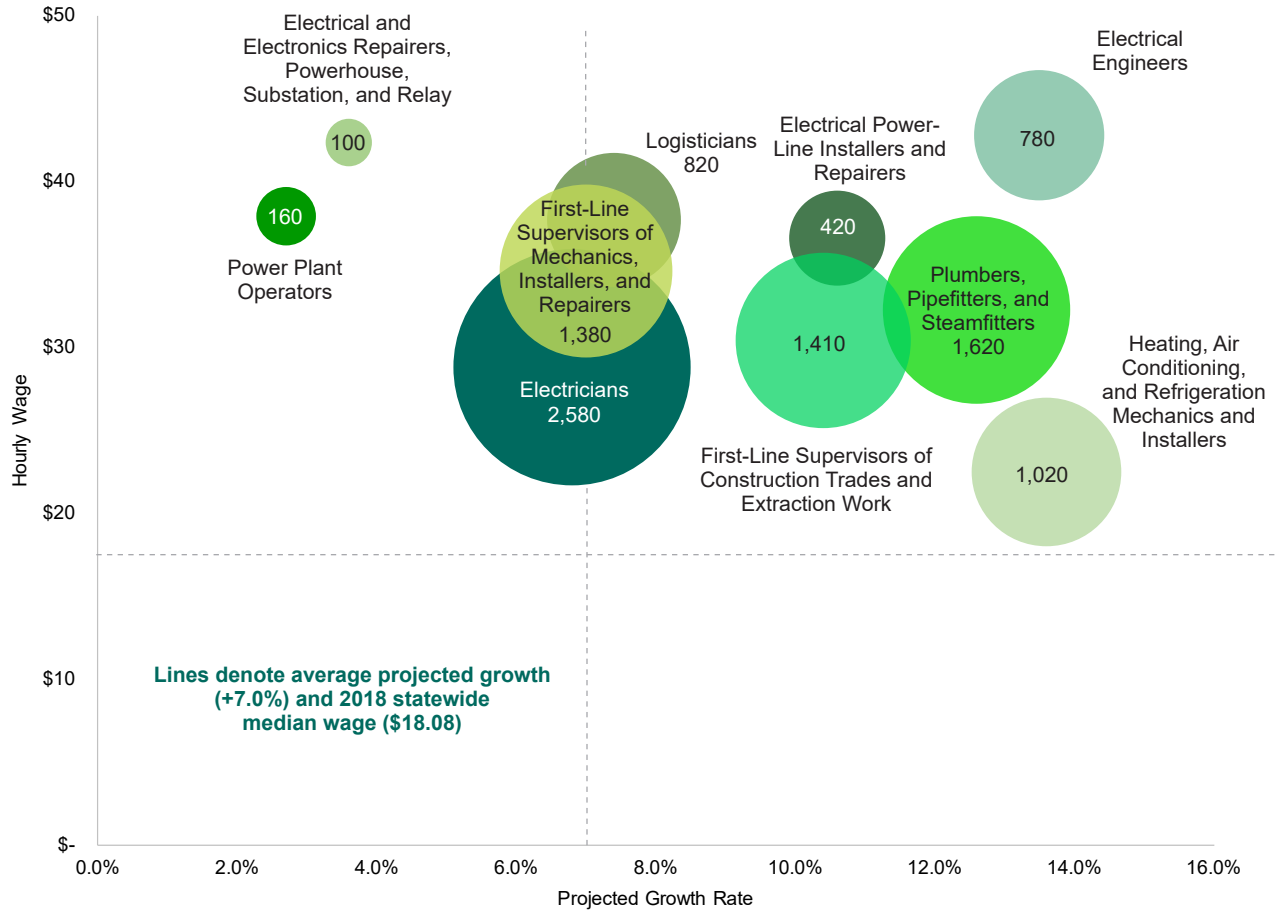
- The Energy cluster shows a mix of educational and training requirements among key occupations, with many needing extended on-the-job training or apprenticeships. Out of the 15 key occupations in the cluster, three typically require an apprenticeship while three others typically require a bachelor's degree.

- *Construction laborers* are a very large occupation in Michigan with more than 3,300 projected openings annually through 2026. Slightly more than 12 percent of *Construction laborers* across the state are in the Energy cluster. Other sections of the economy such as Construction may have a large impact on the availability of workers in the Energy cluster.

- However, occupations such as *Electrical power-line installers and repairers* are almost entirely employed in the Energy cluster. Much of the focus on this occupation comes from within the cluster, along with *Electrical and electronics repairers, powerhouse, substation, and relay* and *Power plant operators*, which are fully within the cluster.

- Many of the largest apprenticeship programs in the state directly feed the Energy cluster. These include programs for *Electricians*, *Plumbers*, *pipefitters, and steamfitters*, *Electrical power-line installers and repairers,* and *Telecommunications equipment installers and repairers, except line installers.*

FIGURE 4: **HIGH-DEMAND OCCUPATIONS, MICHIGAN ENERGY CLUSTER**



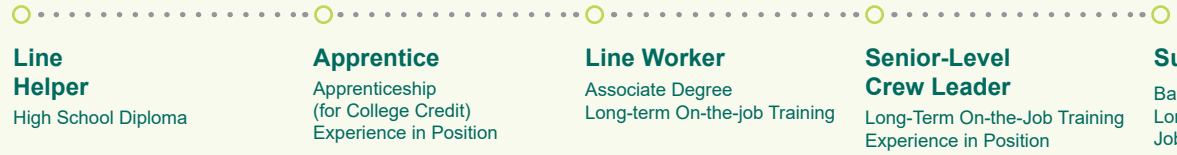
Sources: Wages: Occupational Employment Statistics, Michigan Bureau of Labor Market Information and Strategic Initiatives; Projected Growth Rate: Long-term Occupational Projections (2016–2026), Michigan Bureau of Labor Market Information and Strategic Initiatives; Michigan's Occupational Supply and Demand and the Talent Gap: Linskey, Evan. 2018. "An Analysis of Occupational Supply and Demand in the Michigan Labor Market." Michigan's Labor Market News, Vol. 74, Issue 10.

High-demand

This figure includes occupations that show a favorable mix of projected long-term job growth, projected annual job openings, and median wages. It does not reflect current hiring demand. Wages displayed are median wages for 2018. Circle size denotes average projected annual openings.

Every high-wage, high-demand occupation included in Figure 4 has a median hourly wage above the statewide median. However, not every occupation in the figure has a projected growth rate above the statewide all occupation growth rate. *Electricians* are the largest of these 10 occupations based on annual openings and have a projected growth rate almost identical to the statewide rate. Many occupations in the figure also have median wages from $5 above to nearly double the statewide median wage of $18.08.

Energy Career Pathway



Source: Center for Energy Workforce Development http://www.cewd.org/roadmap/lineworker-student.html

Career pathways identify the career opportunities in an industry, entry-level to advanced, and show how an individual can grow his/her career in the industry.

"A Practical Guide to Developing Career Pathways," May 2018, Talent and Economic Development of Michigan

High School Diploma or Equivalent and Short-term Training

Construction Laborers
Customer Service Representatives
First-Line Supervisors of Construction Trades and Extraction Workers
First-Line Supervisors of Mechanics, Installers, and Repairers
Secretaries and Administrative Assistants, Except Legal, Medical, and Executive

Occupations with a low level of training can also be extremely important to the Energy cluster and to the statewide economy. Michigan has nearly 22,000 *Construction laborers* with 2,600 employed in Energy-related industries. The median wage in 2017 for this occupation was 1 cent lower than the statewide all-occupation median wage. Other occupations such as *Customer service representatives* or *Secretaries and administrative assistants* remain crucial. Supervisor occupations often require years of on-the-job experience instead of education.

Postsecondary Certificate or Moderate-term Training

Electrical and Electronics Repairers, Powerhouse, Substation, and Relay
Operating Engineers and Other Construction Equipment Operators
Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products
Surveying and Mapping Technicians
Telecommunications Equipment Installers and Repairers, Except Line Installers

Occupations in this category typically require less education or training than others, but this does not always come at the expense of wages. Every occupation on this list has a median wage above the statewide median. Nearly 70,000 employees statewide fall into these five occupations. Only about 7,000 of those are within the Energy cluster, so competition for properly trained employees may be stiff.

Associate Degree/Long-term Training/ Apprenticeships

Electrical and Electronics Repairers, Commercial and Industrial Equipment
Electrical Power-Line Installers and Repairers
Electricians
Heating, Air Conditioning, and Refrigeration Mechanics and Installers
Plumbers, Pipefitters, and Steamfitters

The Energy cluster has a heavy reliance on careers that require training, certifications, or degrees, but not a full four-year degree. Some of these occupations that are crucial for energy efficiency are also some of the most well-recognized apprenticeships. *Electricians, Heating, air conditioning, and refrigeration mechanics and installers*, and *Plumber, pipefitters, and steamfitters* employ roughly 44,000 people statewide.

Bachelor's Degree or Higher

Cost Estimators
Electrical Engineers
Industrial Engineers
Logisticians
Mechanical Engineers

Some of these occupations are well understood across the state such as *Mechanical engineers,* which total almost 45,000 across all industries statewide, but only 700 in the Energy cluster. Other occupations such as *Logisticians* only employ 8,000 statewide, but more than 1,500 in the Energy cluster. Hiring *Mechanical engineers* may prove challenging with so much outside competition. The training of *Logisticians* may be difficult, since supply chain analysis and coordination is not a well-recognized skill set by students entering undergraduate programs.

Real-time Demand for Energy Employment

Energy occupations and employers are not as easy to pin down as other clusters, because many occupations that appear in the Energy cluster also appear in other sectors of the economy. However, some useful real-time demand data does exist.

Many of the key energy occupations have a large number of jobs postings including *Electrical engineers*, *Electricians*, and *Construction laborers*. The 15 key energy occupations (when combined) are posted for an average of roughly 29 days which is directly in line with the statewide average for all occupations. *Electrical engineers* are typically posted for slightly longer at 31 days, while postings for *Electricians* last 25 days. No occupation seems to deviate greatly from the average. Posting lengths vary greatly over time.

Source: The Conference Board, Help Wanted Online® (HWOL)

Top skills in postings for key occupations include:

Software Skills
Preventative Maintenance
Knowledge of Electrical Systems
Knowledge of Blueprints

Other key abilities, knowledge, and skills listed show variety. Knowledge includes mechanical and mathematics, but also customer service and administration/management. Many types of software also appear including database management, project management, and computer aided design (CAD).

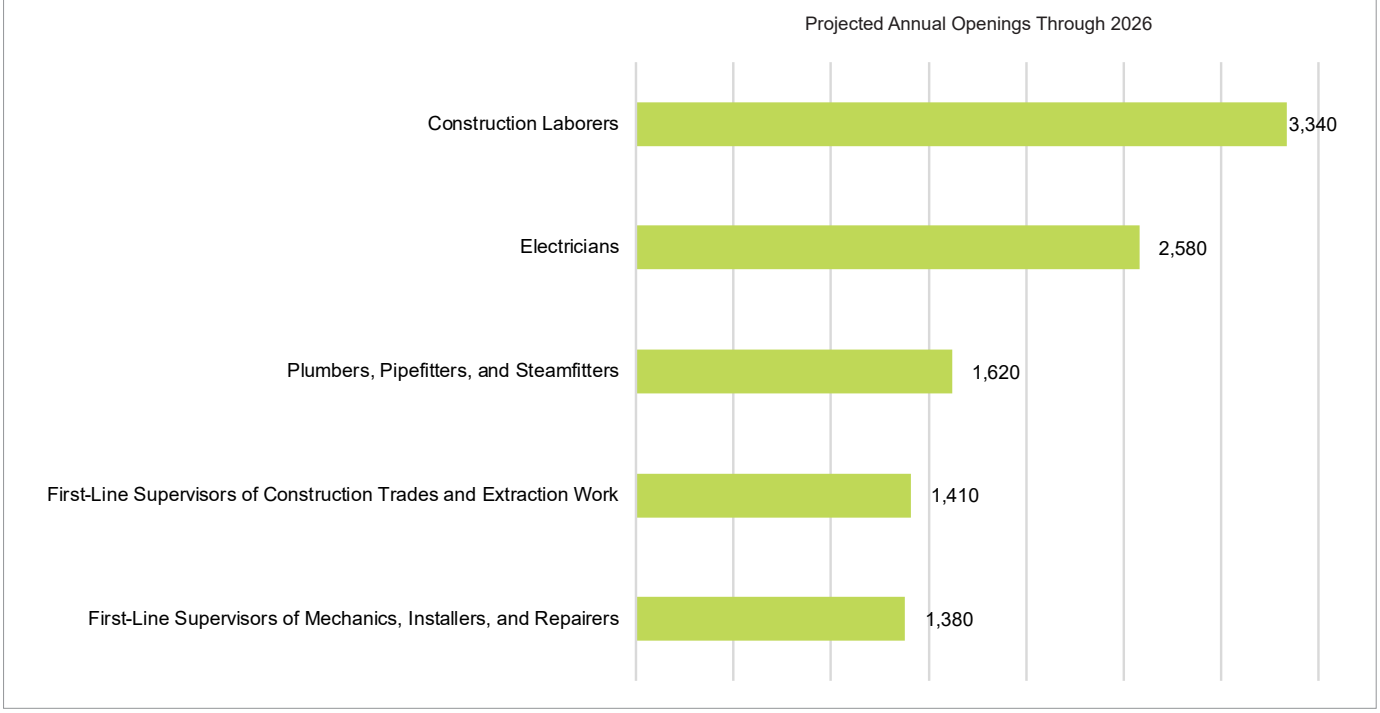
Real-time demand is measured as the number of job advertisements posted online for an occupation.

Energy Employment Projections

Projections do not exist for clusters, but projections through 2026 do exist for many industries and occupations that make up the Energy cluster.

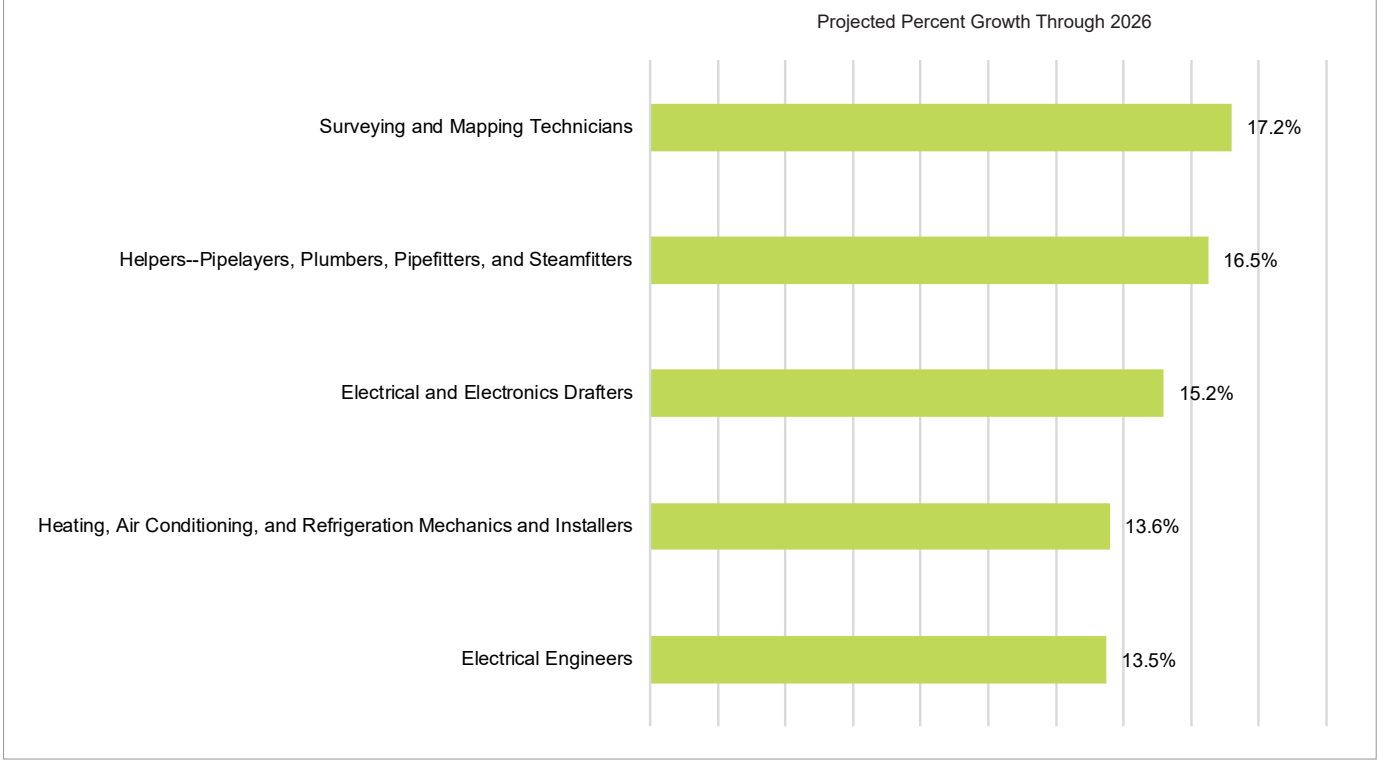
- Many occupations are in the cluster are expected to out-pace the statewide growth rate of 7.0 percent between 2016 and 2026. *Construction laborers* is one of the larger occupations in the cluster and projected to grow 10.8 percent, adding more than 3,000 jobs over the projected period. *Electricians* is another one of the largest occupations in the cluster and projected to add 1,460 jobs over the 10-year period with a growth rate of 6.8 percent.
- *Electrical engineers* are projected to nearly double the statewide rate, growing 13.5 percent, and *Electrical and electronics drafters* are more than double the statewide rate at 15.2 percent. These occupations are smaller and projected to add only 1,300 and 100 respectively.
- Few industries in the Energy cluster have projections. *Oil and gas extraction* and *Pipeline transportation* are both small and not projected to shift much. The *Utilities* industry is also projected to remain almost unchanged over the period, only adding 250 jobs or 1.2 percent.

FIGURE 5: **OCCUPATIONS WITH THE MOST PROJECTED ANNUAL OPENINGS THROUGH 2026, MICHIGAN ENERGY CLUSTER**



Source: Industry and Occupational Employment Projections (2016–2026), Michigan Bureau of Labor Market Information and Strategic Initiatives

FIGURE 6: **OCCUPATIONS WITH THE MOST PROJECTED PERCENT GROWTH THROUGH 2026, MICHIGAN ENERGY CLUSTER**

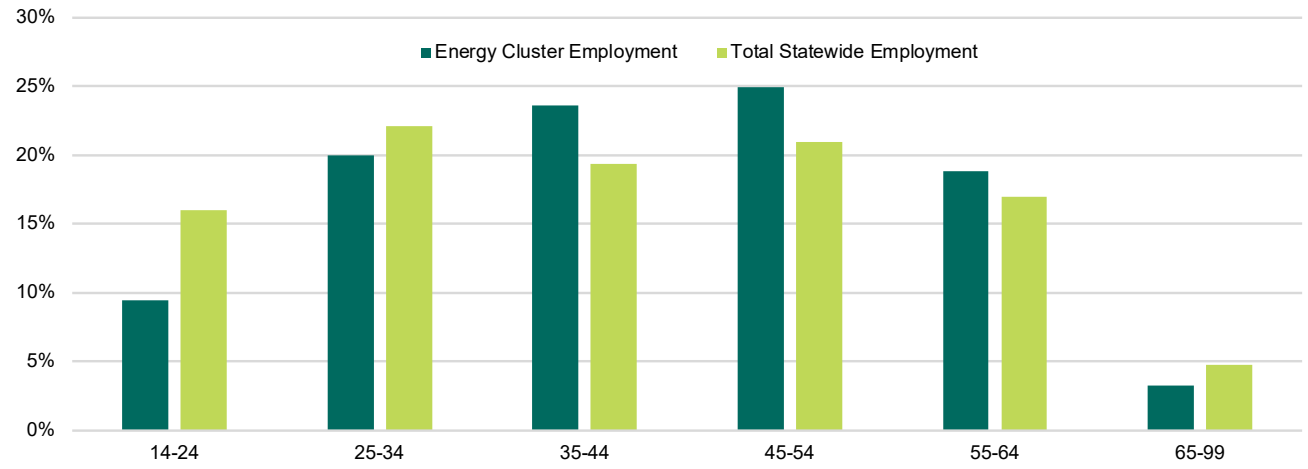


Source: Industry and Occupational Employment Projections (2016–2026), Michigan Bureau of Labor Market Information and Strategic Initiatives

Energy Workforce Demographics

Demographic and educational attainment information is useful in identifying workforce characteristics and evaluating potential workforce disparities. Gaps in education, skills, or training may result in impediments to economic growth if left unresolved. Maintaining the employment of a young workforce may require employers to adapt to the interests those workers value. The following displays characteristics of the Energy workforce in Michigan.

FIGURE 7: **EMPLOYMENT BY AGE, MICHIGAN ENERGY CLUSTER**



Source: Longitudinal Employer-Household Dynamics program, U.S. Census Bureau

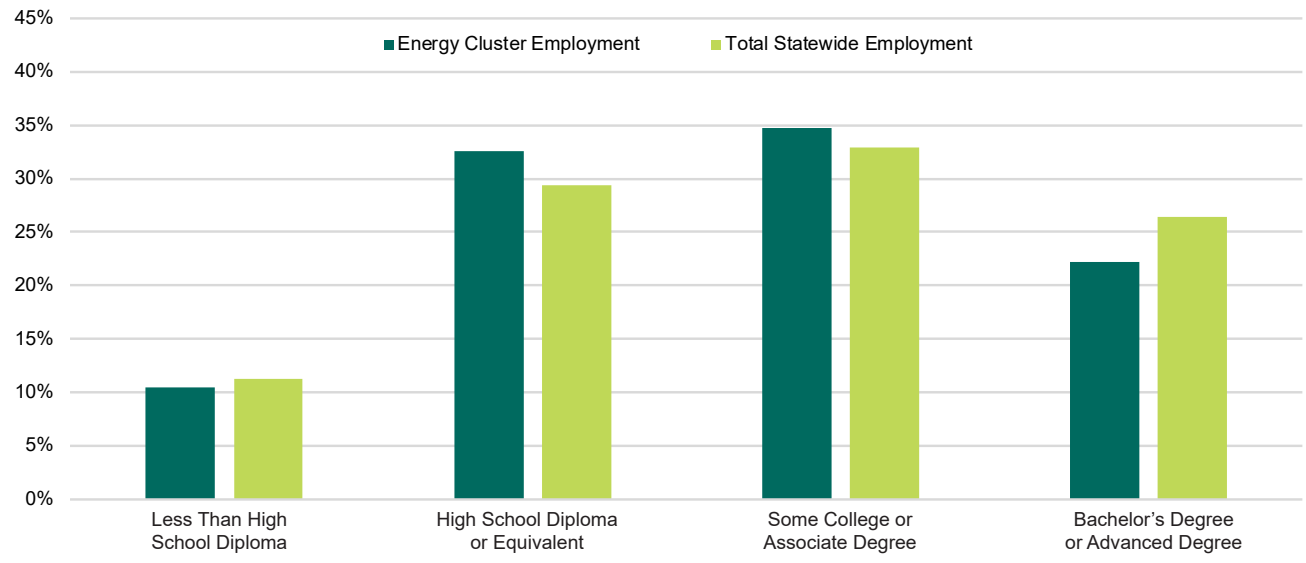
The Energy cluster has fewer young (14–24) and fewer older (65–99) employees than the statewide average. These disparities are likely due to liability or safety concerns associated with the cluster that are not present in other sectors of the economy. Meanwhile, the cluster has more workers in the 35–64 range than the state average. This reliance on workers from older age groups may cause issues in the coming decades as workers retire.

FIGURE 8: **EMPLOYMENT, ALL AGES (14-99), MICHIGAN ENERGY CLUSTER**

Source: Longitudinal Employer-Household Dynamics program, U.S. Census Bureau

The Energy cluster is overwhelmingly male. Some of the largest occupations in the cluster include Construction-related occupations, which historically have been overwhelmingly male. If these occupations and the cluster want to grow they would benefit from encouraging more diversity in the workplace.

FIGURE 9: **EMPLOYMENT BY EDUCATION, MICHIGAN ENERGY CLUSTER**



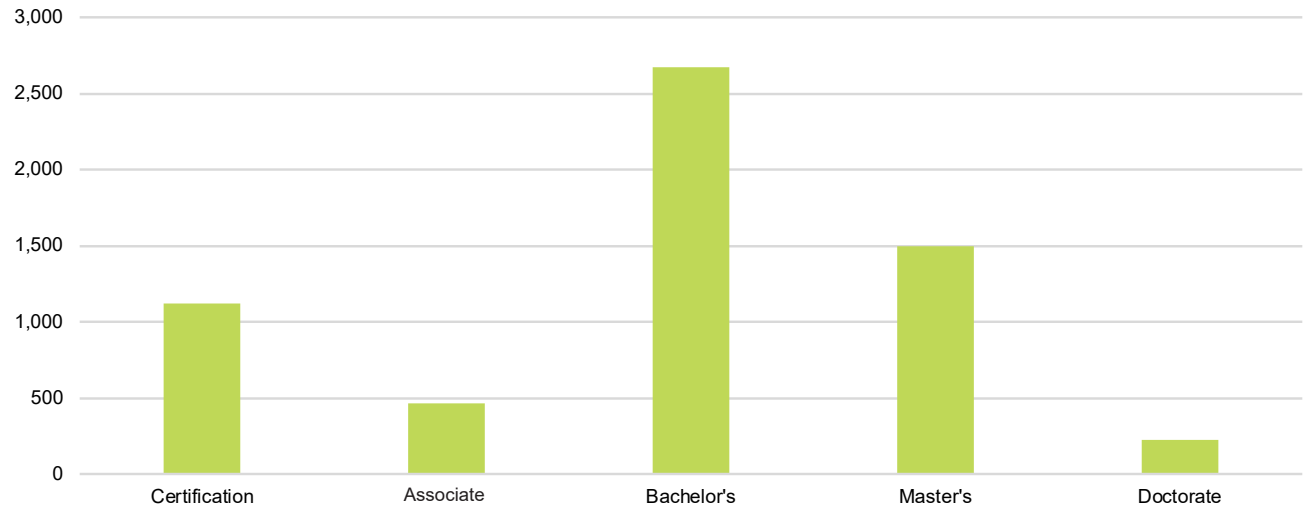
Source: Longitudinal Employer-Household Dynamics program, U.S. Census Bureau

Energy appears slightly more reliant on middle levels of education compared to the statewide economy. Job opportunities are slightly less available for those with no formal education completions as well as those with a bachelor's or more when compared to the full economy.

Energy Talent Pipeline

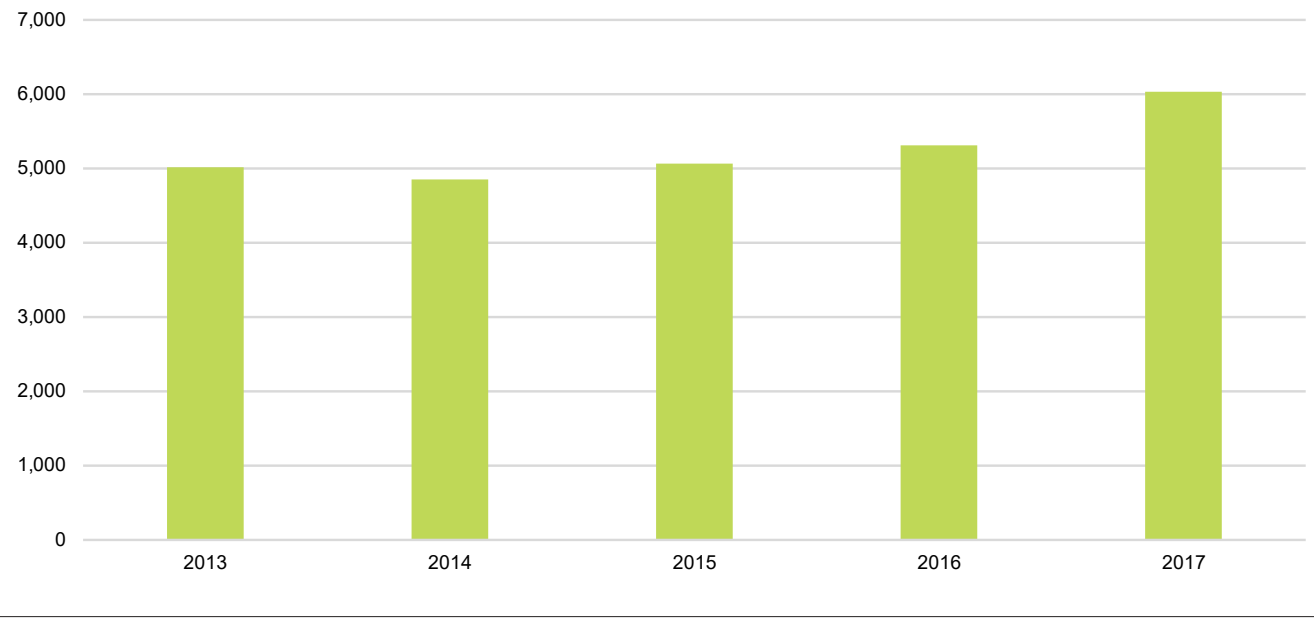
Educational program completers data for the Energy cluster have shown modest growth in recent years. This growth has come almost exclusively from bachelor's and master's completers. Completers come from a variety of programs with a large percent of the bachelor's degrees coming from various types of engineering programs. Certifications, meanwhile, came from a variety of disciplines, with the largest being HVAC technicians related. The master's and doctoral completers were also made up of engineering programs almost entirely.

FIGURE 10: **ENERGY-RELATED PROGRAM COMPLETERS BY AWARD LEVEL, MICHIGAN, 2017**



Source: National Center for Education Statistics (NCES), Integrated Postsecondary Education Data System (IPEDS)

FIGURE 11: **ENERGY-RELATED PROGRAM COMPLETERS TREND, MICHIGAN**



Source: National Center for Education Statistics (NCES), Integrated Postsecondary Education Data System (IPEDS)

Conclusion

The Energy cluster accounts for a small percent of Michigan's total employment, but the goods and services provided are essential to the entire population and economy. The cluster shrank from a peak in the early 2000s, but since the end of the most recent recession it has seen some rebound. The cluster has also seen growth in industry classifications as the Energy-related industries connected to things such as renewable energy or natural gas continue to grow and become clearly distinct enterprises. Many occupations in the cluster are reliant on middle tier education and training, and finding new employees will be dependent on students completing associated programs.

Strengths

Continuing Demand for Energy

The Energy cluster has a bright future in Michigan's economy. Energy is imperative in every corner of the state to enable a properly functioning economy. Demand for energy may fluctuate with energy efficiency, and new technology demands for services appears vital moving forward.

Larger Demand for Energy Efficiency and Sustainable Energy Sources

Energy efficiency and sustainable energy sources continue to be areas of focus for the Energy cluster. Standards and certifications such as LEED (Leadership in Energy and Environmental Design) certifications for building is a growing field that brings many typical construction jobs into the energy realm.

Employment Opportunities for All Levels of Education and Training

The Energy cluster is reliant on occupations of all skill levels. For example, *Construction laborers* have no formal educational requirements and typically only need short-term training, but they have a high number of annual openings and often pay near or above a state median wage. Meanwhile, several occupations such as *Cost estimators*, *Electrical engineers*, and *Logisticians* require a bachelor's degree. The cluster also has opportunities through apprenticeships such as *Electricians* or *Sheet metal workers*.

Challenges

Difficulties of Starting a New Venture

Many of the businesses in the Energy cluster require a very large initial investment. For example, new manufacturing in the cluster would require at least retooling and at most the building of a new factory or plant.

Ever-evolving Energy Industries Require New Skills

Emerging industries such as wind or solar offer new employment opportunities in new occupations. Workers who will potentially fill these occupations need to be trained in programs that may not exist or may not have the capacity to fill the demand. As technology continues to become an integral part of all industries workers will need to keep up with new software and equipment to maintain the highest levels of performance and safety.

Lack of a Well Understood Link Between Training and Employment

Some occupations in the cluster are relatively well understood by students and counselors such as *Electricians,* while others such as *Electrical power-line installers and repairers* or *Logisticians* are not so well understood, making education from employers to the potential talent pipeline invaluable.

EVAN LINSKEY
ECONOMIC ANALYST

STATE OF MICHIGAN

Department of Technology, Management and Budget

Bureau of Labor Market Information and Strategic Initiatives

Detroit Office

Cadillac Place
3032 West Grand Boulevard
Suite 9-150
Detroit, Michigan 48202
(313) 456-3100

Lansing Office

Victor Office Building, Floor 5
201 North Washington Square
Lansing, Michigan 48933
(517) 335-2472