

Employment Trends in the Energy and Chemicals Industry Cluster



Table of Contents

Executive Summary.....	2
Introduction.....	3
Cluster Composition.....	4
Industry Employment Concentration	5
Cluster Employment Trends	6
Industry Employment Trends	9
The Energy and Chemicals Workforce.....	21
Projected Employment Change, Ohio 2016 - 2026.....	22
Age Distribution of Ohio Workers	23
Energy and Chemicals Cluster Education and Training Needs.....	24
Energy and Chemicals Cluster Industry Staffing Patterns.....	26

Executive Summary

- The energy and chemicals industry cluster consists of 12 industries. These include oil and gas extraction; coal mining; power generation and supply; natural gas distribution; utility system construction; basic chemical manufacturing; resin, synthetic rubber, and artificial fibers manufacturing; agricultural chemical manufacturing; paint, coating, and adhesive manufacturing; soap, cleaning compound, and toiletry manufacturing; other chemical product and preparation manufacturing; and rubber product manufacturing.
- Most of the industries in this cluster have location quotients above 1.2, except oil and gas extraction, coal mining, power generation and supply, and utility system construction. This suggests that many businesses in this cluster provide goods and services that extend outside Ohio.
- Employment in this cluster peaked in 2001. During the 2007-2009 national recession, energy and chemicals industry employment declined faster than U.S. total covered employment.
- More than 91,000 Ohioans work in the energy and chemicals industry cluster.
- Natural gas distribution (NAICS 2212) and oil and gas extraction (NAICS 2111) are expected to have employment increases of 1,004 and 79, respectively, between 2016 and 2026.
- About 50 percent of energy and chemicals cluster workers are age 45 or older, compared to 44 percent of all Ohio workers. Businesses in this cluster may need to replace retiring workers sooner than businesses in other Ohio industries.
- For 21 of the 25 largest occupations in the energy and chemicals cluster, typical education at entry is a high school diploma or less, and 19 of those occupations require on-the-job training.

Introduction

The energy and chemicals industry cluster includes business establishments engaged in energy infrastructure and chemical manufacturing. The energy infrastructure consists of extraction, processing, storing, construction, and transporting of energy resources including natural gas, coal, electric power, and natural gas liquids. The energy and chemicals cluster consists of 12 industries: oil and gas extraction; coal mining; power generation and supply; natural gas distribution; utility system construction; basic chemical manufacturing; resin, synthetic rubber, and artificial fibers manufacturing; agricultural chemical manufacturing; paint, coating, and adhesive manufacturing; soap, cleaning compound, and toiletry manufacturing; other chemical product and preparation manufacturing; and rubber product manufacturing. Figure 1 shows annual employment¹ for the industries in the energy and chemicals cluster, displayed according to their North American Industry Classification System (NAICS) codes. In 2018, the energy and chemicals cluster employed 2.0 percent of Ohio’s total private employment, more than 91,000 workers.

Figure 1. Energy and Chemicals Cluster Industries

NAICS Code	Industry Title	2018 Employment
2111	Oil and Gas Extraction	1,104
2121	Coal Mining	903
2211	Power Generation and Supply	12,389
2212	Natural Gas Distribution	5,497
2371	Utility System Construction	18,659
3251	Basic Chemical Manufacturing	9,542
3252	Resin, Synthetic Rubber, and Artificial Fibers Manufacturing	5,160
3253	Agricultural Chemical Manufacturing	1,668
3255	Paint, Coating, and Adhesive Manufacturing	8,105
3256	Soap, Cleaning Compound, and Toiletry Manufacturing	10,467
3259	Other Chemical Product and Preparation Manufacturing	5,337
3262	Rubber Product Manufacturing	13,061

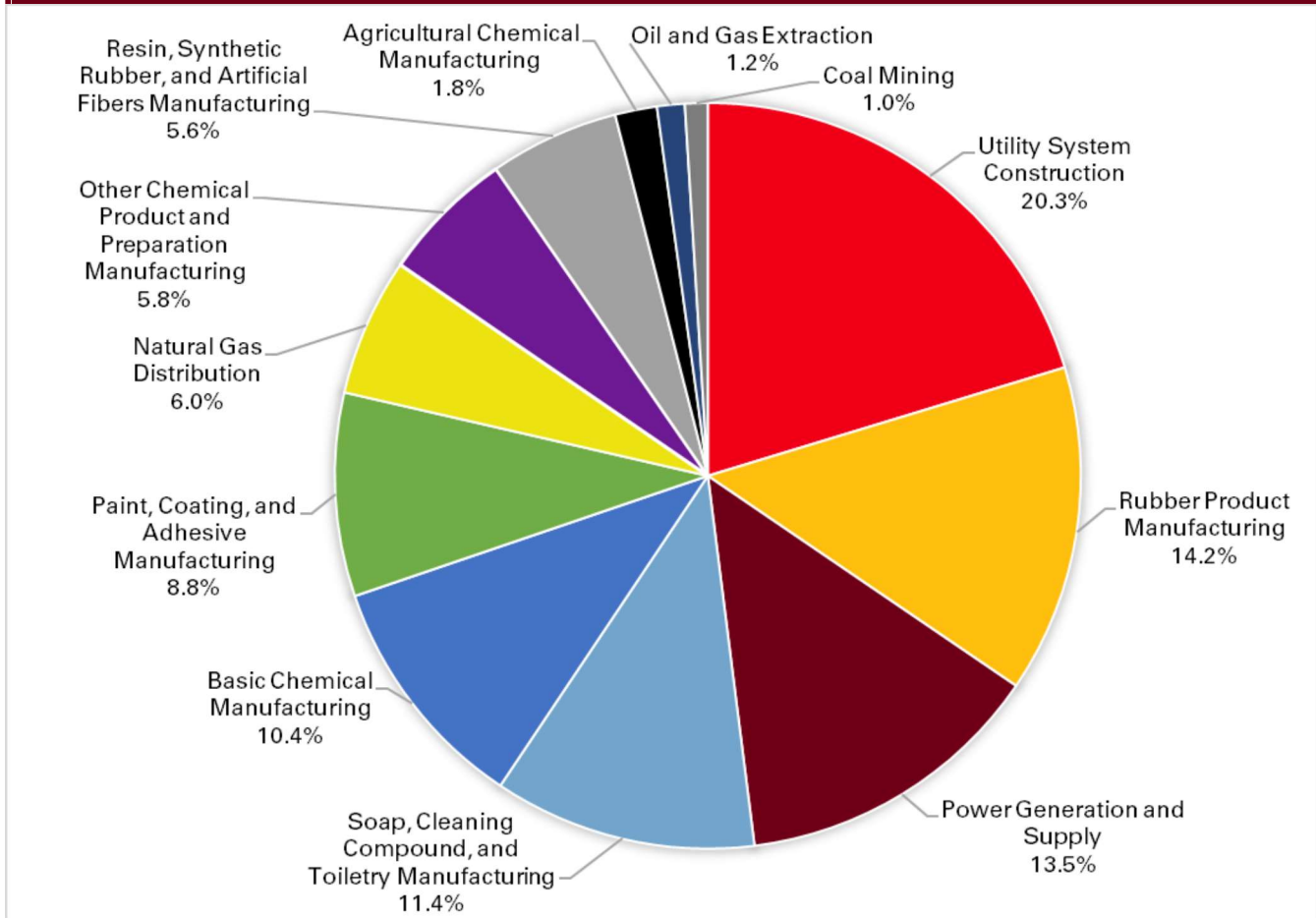
Source: Quarterly Census of Employment and Wages

¹ Federal law (e.g., The Confidential Information Protection and Statistical Efficiency Act of 2002 and others) prohibit data from being published if the data might identify a company. Throughout this report, data fields marked “NA” have been suppressed for confidentiality.

Cluster Composition

Figure 2 shows each industry's share of the cluster's total private employment in 2018. Utility system construction had the largest share of employment, at 20.3 percent. It was followed by rubber product manufacturing with 14.2 percent; power generation and supply with 13.5 percent; soap, cleaning compound, and toiletry manufacturing with 11.4 percent; basic chemical manufacturing with 10.4 percent; paint, coating, and adhesive manufacturing with 8.8 percent; natural gas distribution with 6.0 percent; other chemical product and preparation manufacturing with 5.8 percent; resin, synthetic rubber, and artificial fibers manufacturing with 5.6 percent; agricultural chemical manufacturing with 1.8 percent; oil and gas extraction with 1.2 percent; and coal mining with 1.0 percent.

Figure 2. Industry Shares of Energy and Chemicals Employment, 2018



Source: Quarterly Census of Employment and Wages

Industry Employment Concentration

An industry's location quotient (LQ) is a measure of how significant that industry is to a region's economy. Figure 3 lists the energy and chemicals industries and their LQs for Ohio. Values greater than 1.2 mean the industry's concentration of employment in Ohio is significantly greater than the U.S. average. This suggests these establishments serve energy and chemicals manufacturing needs beyond Ohio. Eight energy and chemicals industries had 2018 LQs greater than 1.2: paint, coating, and adhesive manufacturing (3.48); soap, cleaning compound, and toiletry manufacturing (2.60); rubber product manufacturing (2.56); basic chemical manufacturing (1.71); other chemical product and preparation manufacturing (1.71); resin, synthetic rubber, and artificial fibers manufacturing (1.49); natural gas distribution (1.36); and agricultural chemical manufacturing (1.26).

Figure 3. Industry Location Quotients, 2018

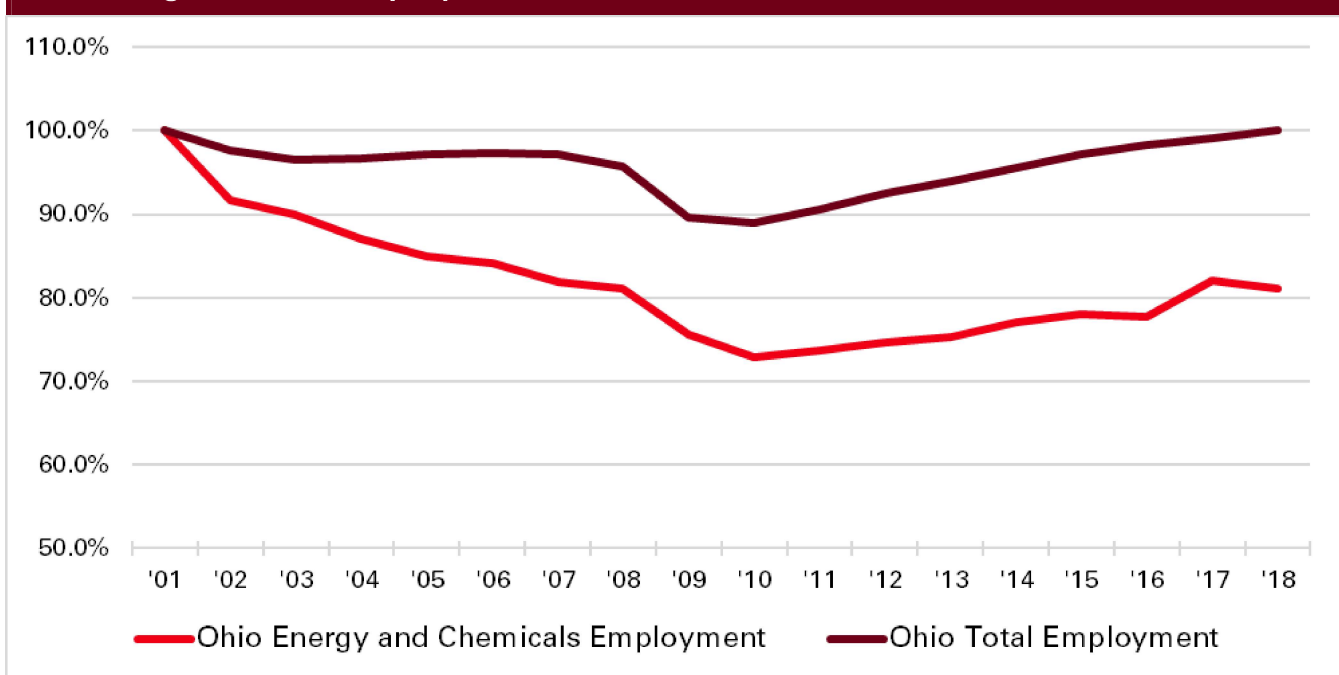
NAICS Code	Industry Title	Location Quotient
2111	Oil and Gas Extraction	0.21
2121	Coal Mining	0.48
2211	Power Generation and Supply	0.86
2212	Natural Gas Distribution	1.36
2371	Utility System Construction	0.92
3251	Basic Chemical Manufacturing	1.71
3252	Resin, Synthetic Rubber, and Artificial Fibers Manufacturing	1.49
3253	Agricultural Chemical Manufacturing	1.26
3255	Paint, Coating, and Adhesive Manufacturing	3.48
3256	Soap, Cleaning Compound, and Toiletry Manufacturing	2.60
3259	Other Chemical Product and Preparation Manufacturing	1.71
3262	Rubber Product Manufacturing	2.56

Source: U.S. Bureau of Labor Statistics

Cluster Employment Trends

Figure 4 shows the percent change in annual employment for the energy and chemicals cluster² and Ohio total employment from 2001 to 2018. Both declined following the 2001 national recession. The recession had a greater impact on the energy and chemicals cluster than on total employment. From 2001 to 2005 Ohio's total employment declined by 2.4 percent, while the energy and chemicals cluster declined 15.0 percent. The next national recession occurred from 2007 to 2009, during which Ohio total employment declined 6.8 percent and the energy and chemicals industry cluster employment declined 7.6 percent. While total Ohio employment has recovered since the recession of 2007 to 2009, the energy and chemicals industries had more modest increases in employment. In 2018, Ohio total employment was at 100.0 percent of its 2001 employment level; the energy and chemicals cluster was at 81.1 percent of its 2001 employment.

Figure 4. Ohio Energy and Chemicals Cluster and Ohio Total Employment as a Percentage of 2001 Employment, 2001 – 2018

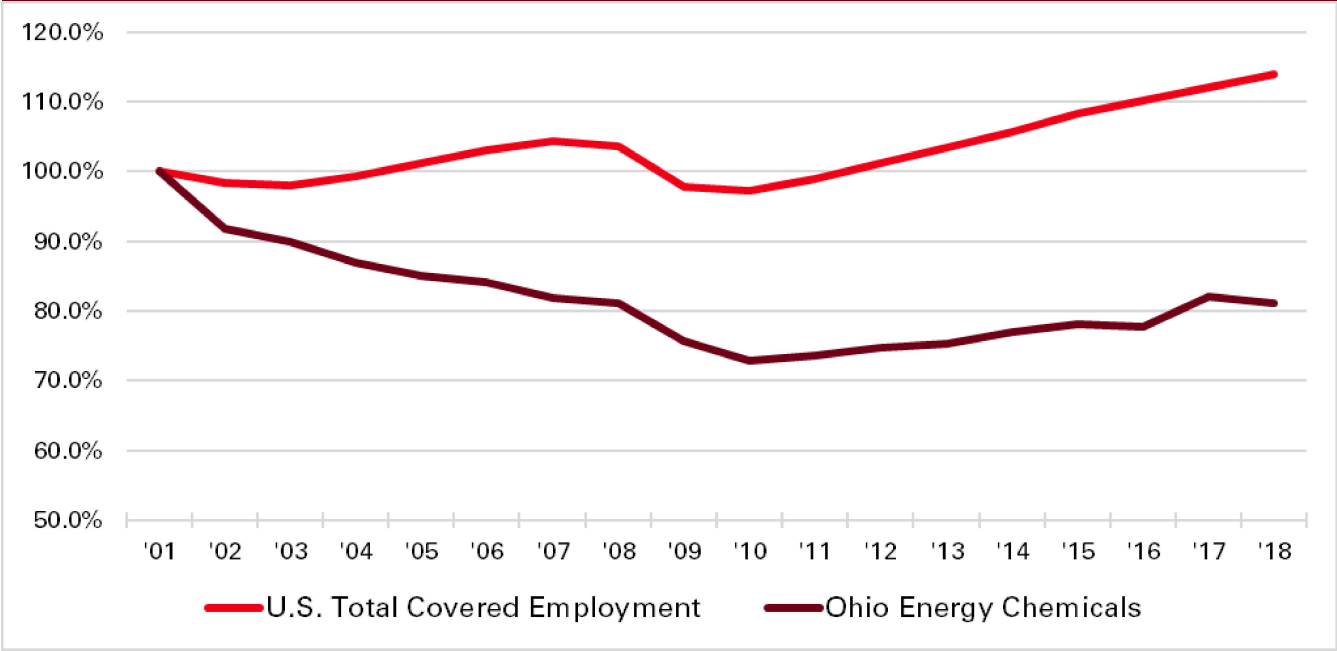


Source: Quarterly Census of Employment and Wages

² Data for Figures 4, 5, and 6 contain data for only part of the energy and chemicals cluster. Data for coal mining (2121) was omitted to protect employer confidentiality. This industry accounts for less than 3 percent of total cluster employment.

Figure 5 shows the percent change in annual Ohio energy and chemicals cluster employment and U.S. total employment from 2001 to 2018. Both declined following the 2001 national recession. From 2004 through 2007, U.S. total employment grew while Ohio energy and chemicals employment declined. From 2012 to 2015, both the Ohio energy and chemicals cluster and U.S. total employment were in similar recoveries from the 2007 to 2009 recession. While the U.S. total employment has completely recovered and surpassed its 2001 employment level, Ohio energy and chemicals cluster lags behind its 2001 employment level.

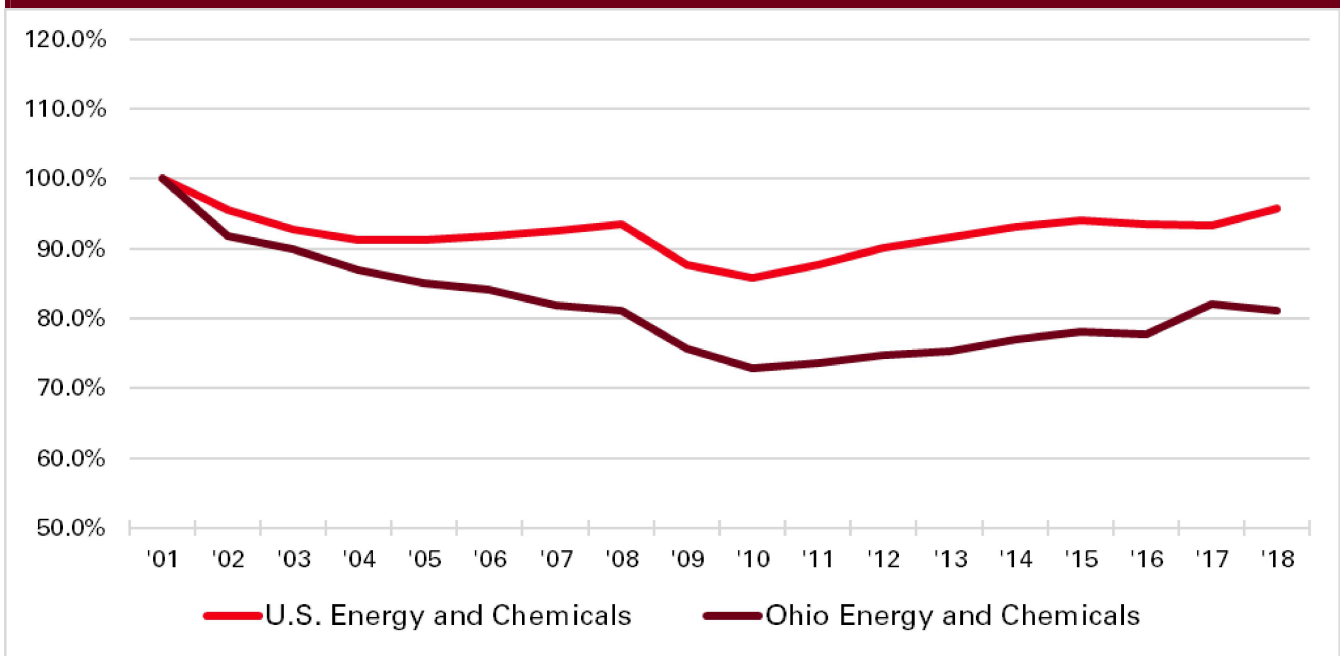
Figure 5. U.S. Total Employment and Ohio Energy and Chemicals Employment as a Percentage of 2001 Employment, 2001 – 2008



Source: Quarterly Census of Employment and Wages

Figure 6 shows the percent change in annual employment from 2001 to 2018 for the energy and chemicals cluster for Ohio and the U.S. Both experienced similar declines after the 2001 recession. The U.S. energy and chemicals cluster has completely recovered from the 2007 recession and regained nearly all the losses since the 2001 recession. The Ohio energy and chemicals cluster has nearly recovered its losses since the 2007 recession and lags behind its peak in 2001.

Figure 6. U.S. and Ohio Energy and Chemicals Employment as a Percentage of 2001 Employment, 2001 – 2008



Source: Quarterly Census of Employment and Wages

Industry Employment Trends

This section presents annual employment data from 2000 to 2018 for each industry in the cluster. The nation experienced two recessions during this period, in 2001 and from late 2007 to mid-2009. Each industry in the cluster responded to the recessions differently. Since 2010, overall employment, as well as the number of establishments in the cluster, have increased.

Oil and Gas Extraction: NAICS 2111

This industry operates and/or develops oil and gas field properties and recovers liquid hydrocarbons from oil and gas field gases. From 2000 to 2018, this industry lost 1,449 jobs (-56.8 percent) and 71 establishments.

Figure 7. Oil and Gas Extraction

Year	Establishments	Employment
2000	200	2,553
2001	191	2,630
2002	178	2,495
2003	181	2,521
2004	176	2,490
2005	177	2,340
2006	176	2,386
2007	182	2,577
2008	182	2,661
2009	190	2,692
2010	193	2,759
2011	201	2,875
2012	210	3,086
2013	225	2,002
2014	221	2,325
2015	209	2,021
2016	189	1,654
2017	130	1,072
2018	129	1,104
Net Change	-71	-1,449
Percent Change	-35.5%	-56.8%

Source: Quarterly Census of Employment and Wages

Coal Mining: NAICS 2121

This industry engages in one or more of the following: (1) mining bituminous coal, anthracite, and lignite by underground mining, auger mining, strip mining, culm bank mining, and other surface mining; (2) developing coal mine sites; and (3) beneficiating (preparing) coal (cleaning, washing, screening, and sizing coal). Between 2003 and 2013, the industry gained 359 jobs (17.9 percent) and four establishments. Since 2013, the industry has lost 1,466 jobs (-61.9 percent) and 22 establishments.

Figure 8. Coal Mining		
Year	Establishments	Employment
2000	NA	NA
2001	NA	NA
2002	NA	NA
2003	78	2,010
2004	82	2,039
2005	82	2,101
2006	80	2,127
2007	79	2,061
2008	73	2,308
2009	79	2,601
2010	74	2,408
2011	76	2,570
2012	86	2,562
2013	82	2,369
2014	81	NA
2015	74	NA
2016	70	NA
2017	70	NA
2018	60	903
Net Change	-18	-1,107
Percent Change	-23.1%	-55.1%

Source: Quarterly Census of Employment and Wages

Power Generation and Supply: NAICS 2211

This industry is primarily engaged in generating, transmitting, and/or distributing electrical power. During the recession of 2007-2009, the industry gained 29 jobs (0.2 percent). Since 2009, power generation and supply has lost 4,027 jobs (-24.5 percent) and gained 24 establishments.

Year	Establishments	Employment
2000	312	17,191
2001	370	19,298
2002	356	18,399
2003	345	17,655
2004	360	15,691
2005	330	15,725
2006	308	16,056
2007	311	16,387
2008	314	16,847
2009	311	16,416
2010	307	15,254
2011	320	14,542
2012	319	13,996
2013	318	13,548
2014	322	12,997
2015	312	12,695
2016	316	12,606
2017	323	12,409
2018	335	12,389
Net Change	23	-4,802
Percent Change	7.4%	-27.9%

Source: Quarterly Census of Employment and Wages

Natural Gas Distribution: NAICS 2212

This industry comprises establishments that are (1) primarily engaged in operating gas distribution systems (for example, mains and meters); (2) known as gas marketers who buy gas from a well and sell it to a distribution system; (3) known as gas brokers or agents that arrange the sale of gas via gas distribution systems operated by others; and (4) primarily engaged in transmitting and distributing gas to final consumers. Between 2000 and 2009, the industry lost 2,273 jobs (-37.3 percent) and 20 establishments. This industry gained 393 jobs (11.5 percent) during the 2007 to 2009 national recession. From 2010 to 2018, it gained 1,796 jobs (48.5 percent) and 16 establishments.

Figure 10. Natural Gas Distribution

Year	Establishments	Employment
2000	147	6,089
2001	123	4,008
2002	124	3,916
2003	130	3,773
2004	119	3,619
2005	118	3,577
2006	118	3,488
2007	122	3,423
2008	122	3,730
2009	127	3,816
2010	137	3,701
2011	142	3,779
2012	145	4,058
2013	142	4,064
2014	142	3,969
2015	145	5,265
2016	148	5,439
2017	149	5,509
2018	153	5,497
Net Change	6	-592
Percent Change	4.1%	-9.7%

Source: Quarterly Census of Employment and Wages

Utility System Construction: NAICS 2371

This industry is engaged in the construction of distribution lines and related buildings and structures for utilities (water, sewer, petroleum, gas, power, and communication). This includes storage tanks, pumping stations, power plants, and refineries. Between 2000 and 2009, the industry lost 315 jobs (-2.7 percent). This industry gained 608 jobs (5.5 percent) during the 2007 to 2009 national recession. From 2010 to 2018, the industry gained 8,922 jobs (91.6 percent) and 126 establishments.

Figure 11. Utility System Construction		
Year	Establishments	Employment
2000	746	11,882
2001	761	11,864
2002	770	10,923
2003	780	10,891
2004	756	10,967
2005	738	11,047
2006	714	10,996
2007	694	10,959
2008	669	10,753
2009	661	11,567
2010	669	9,737
2011	672	10,643
2012	663	11,011
2013	693	13,898
2014	725	15,755
2015	741	15,279
2016	755	14,811
2017	782	20,731
2018	795	18,659
Net Change	49	6,777
Percent Change	6.6%	57.0%

Source: Quarterly Census of Employment and Wages

Basic Chemical Manufacturing: NAICS 3251

This industry is primarily engaged in manufacturing chemicals using basic processes, such as thermal cracking and distillation. Chemicals manufactured in this industry group are usually separate chemical elements or separate chemically defined compounds. Between 2000 and 2009, the industry lost 2,400 jobs (-19.2 percent). Employment has fluctuated since 2010. From 2010 to 2018, the basic chemical manufacturing industry lost 628 jobs (-6.2 percent).

Figure 12. Basic Chemical Manufacturing		
Year	Establishments	Employment
2000	173	12,517
2001	169	11,774
2002	165	11,438
2003	168	11,189
2004	164	10,815
2005	167	10,464
2006	175	10,348
2007	188	10,438
2008	196	10,820
2009	192	10,117
2010	188	10,170
2011	188	10,097
2012	186	10,203
2013	182	9,178
2014	185	9,332
2015	185	9,572
2016	191	9,712
2017	187	9,372
2018	186	9,542
Net Change	13	-2,975
Percent Change	7.5%	-23.8%

Source: Quarterly Census of Employment and Wages

Resin, Synthetic Rubber, and Artificial Fibers Manufacturing: NAICS 3252

This industry is primarily engaged in one or more of the following: (1) manufacturing synthetic resins, plastics materials, and nonvulcanizable elastomers and mixing and blending resins on a custom basis; (2) manufacturing noncustomized synthetic resins; (3) manufacturing synthetic rubber; (4) manufacturing cellulosic (for example, rayon and acetate) and noncellulosic (for example, nylon, polyolefin and polyester) fibers and filaments in the form of monofilament, filament yarn, staple, or tow; or (5) manufacturing and texturizing cellulosic and noncellulosic fibers and filaments. Between 2000 and 2009, the industry lost 599 jobs (-10.1 percent) and gained 26 establishments. The industry lost 783 jobs (-12.9 percent) during the 2007-2009 recession. Employment in this industry has fluctuated since 2010. Between 2010 and 2018, the industry lost 113 jobs (-2.1 percent) and added one establishment.

Figure 13. Resin, Synthetic Rubber, and Artificial Fibers Manufacturing

Year	Establishments	Employment
2000	90	5,902
2001	97	5,544
2002	105	5,353
2003	104	5,291
2004	99	5,301
2005	104	5,355
2006	104	5,819
2007	112	6,086
2008	117	6,053
2009	116	5,303
2010	116	5,273
2011	116	5,327
2012	118	5,635
2013	124	5,812
2014	126	5,840
2015	127	5,681
2016	129	5,567
2017	120	5,351
2018	117	5,160
Net Change	27	-742
Percent Change	30.0%	-12.6%

Source: Quarterly Census of Employment and Wages

Agricultural Chemical Manufacturing: NAICS 3253

This industry is primarily engaged in one or more of the following (1) manufacturing nitrogenous or phosphatic fertilizer materials; (2) manufacturing fertilizers from sewage or animal waste; (3) manufacturing nitrogenous or phosphatic materials and mixing with other ingredients into fertilizers; (4) mixing ingredients made elsewhere into fertilizers; and (5) formulating and preparing pesticide and other agricultural chemicals. Between 2000 and 2009, the industry lost 352 jobs (-13.6 percent) and gained 22 establishments. Employment in this industry has fluctuated since 2010. Between 2010 and 2018, the industry lost 612 jobs (-26.8 percent) and lost 23 establishments.

Figure 14. Agricultural Chemical Manufacturing

Year	Establishments	Employment
2000	30	2,580
2001	31	2,431
2002	30	2,429
2003	30	2,364
2004	30	2,310
2005	31	2,136
2006	31	2,062
2007	32	2,084
2008	56	2,004
2009	52	2,228
2010	50	2,280
2011	44	2,224
2012	45	2,223
2013	46	2,119
2014	47	2,037
2015	30	1,959
2016	29	2,007
2017	27	1,678
2018	27	1,668
Net Change	-3	-912
Percent Change	-10.0%	-35.3%

Source: Quarterly Census of Employment and Wages

Paint, Coating, and Adhesive Manufacturing: NAICS 3255

This industry is primarily engaged in one or more of the following: (1) mixing pigments, solvents, and binders into paints and other coatings, such as stains, varnishes, lacquers, enamels, shellacs, and water repellent coatings for concrete and masonry; (2) manufacturing allied paint products, such as putties, paint and varnish removers, paint brush cleaners, and frit; and (3) manufacturing adhesives, glues, and caulking compounds. Between 2000 and 2009, the industry lost 2,379 jobs (-26.6 percent) and 20 establishments. From 2010 to 2018, paint, coating and adhesive manufacturing gained 1,409 jobs (21 percent) and gained 12 establishments.

Figure 15. Paint, Coating, and Adhesive Manufacturing		
Year	Establishments	Employment
2000	144	8,951
2001	144	8,257
2002	137	7,850
2003	130	8,017
2004	130	8,071
2005	134	8,013
2006	130	7,843
2007	130	7,251
2008	130	7,240
2009	124	6,572
2010	120	6,696
2011	124	7,175
2012	123	7,411
2013	127	7,670
2014	130	7,804
2015	139	7,920
2016	139	7,912
2017	133	8,092
2018	132	8,105
Net Change	-12	-846
Percent Change	-8.3%	-9.5%

Source: Quarterly Census of Employment and Wages

Soap, Cleaning Compound, and Toiletry Manufacturing: NAICS 3256

This industry is primarily engaged in (1) manufacturing and packaging soaps, detergents, polishes, surface active agents, and textile and leather finishing agents, and other sanitation goods or (2) preparing, blending, compounding, and packaging toilet preparations, such as perfumes, shaving preparations, hair preparations, face creams, lotions (including sunscreens), and other cosmetic preparations. Employment fluctuated from 2000 to 2007; during that time, the industry lost 553 jobs (-5.9 percent) and 15 establishments. During the recession of 2007 through 2009, the industry lost 334 jobs (-3.8 percent). Employment in this industry has fluctuated since 2010. Between 2010 and 2018, soap, cleaning compound, and toiletry manufacturing has gained 1,945 jobs (22.8 percent) and has regained all losses since 2000.

Figure 16. Soap, Cleaning Compound, and Toilet Preparation Manufacturing

Year	Establishments	Employment
2000	105	9,429
2001	105	9,404
2002	107	9,169
2003	106	9,179
2004	105	9,204
2005	99	9,293
2006	97	9,134
2007	90	8,876
2008	112	8,381
2009	118	8,542
2010	120	8,522
2011	123	8,214
2012	125	7,953
2013	121	7,918
2014	126	8,239
2015	107	8,890
2016	111	9,243
2017	112	9,383
2018	117	10,467
Net Change	12	1,038
Percent Change	11.4%	11.0%

Source: Quarterly Census of Employment and Wages

Other Chemical Product and Preparation Manufacturing: NAICS 3259

This industry is primarily engaged in manufacturing chemical products, with the exception of basic chemicals; resins, synthetic rubber, cellulosic and non-cellulosic fibers and filaments; pesticides, fertilizers, and other agricultural chemicals; pharmaceuticals and medicines; paints, coatings, and adhesives; soaps and cleaning compounds; and toilet preparations. Between 2000 and 2009, the industry lost 4,439 jobs (-47.3 percent) and 25 establishments. Employment has fluctuated since 2010. From 2010 to 2018, other chemical product and preparation manufacturing gained 447 jobs (9.1 percent) and lost 13 establishments.

Figure 17. Other Chemical Product and Preparation Manufacturing

Year	Establishments	Employment
2000	195	9,385
2001	189	8,733
2002	184	8,356
2003	182	8,155
2004	184	7,841
2005	179	6,645
2006	188	6,621
2007	181	6,587
2008	181	6,260
2009	170	4,946
2010	171	4,890
2011	166	4,945
2012	166	5,078
2013	164	5,129
2014	158	5,043
2015	148	4,902
2016	147	4,970
2017	154	5,284
2018	158	5,337
Net Change	-37	-4,048
Percent Change	-19.0%	-43.1%

Source: Quarterly Census of Employment and Wages

Rubber Product Manufacturing: NAICS 3262

This industry is primarily engaged in processing natural, synthetic or reclaimed rubber materials into intermediate or final products using processes, such as vulcanizing, cementing, molding, extruding, and lathe-cutting. Between 2000 and 2009, the industry lost 17,131 jobs (-57.4 percent) and 41 establishments. During the recession of 2007 through 2009, the industry lost 4,512 jobs (-26.2 percent) and 13 establishments. Employment in this industry has fluctuated since 2010. From 2010 to 2018, rubber product manufacturing gained 581 jobs (4.7 percent) and lost 14 establishments.

Figure 18. Rubber Product Manufacturing

Year	Establishments	Employment
2000	261	29,838
2001	261	28,235
2002	261	22,593
2003	272	21,939
2004	259	21,261
2005	249	20,754
2006	249	19,578
2007	233	17,219
2008	233	16,228
2009	220	12,707
2010	205	12,480
2011	210	12,814
2012	201	13,096
2013	197	13,092
2014	196	13,121
2015	190	13,373
2016	193	13,245
2017	199	13,212
2018	191	13,061
Net Change	-70	-16,777
Percent Change	-26.8%	-56.2%

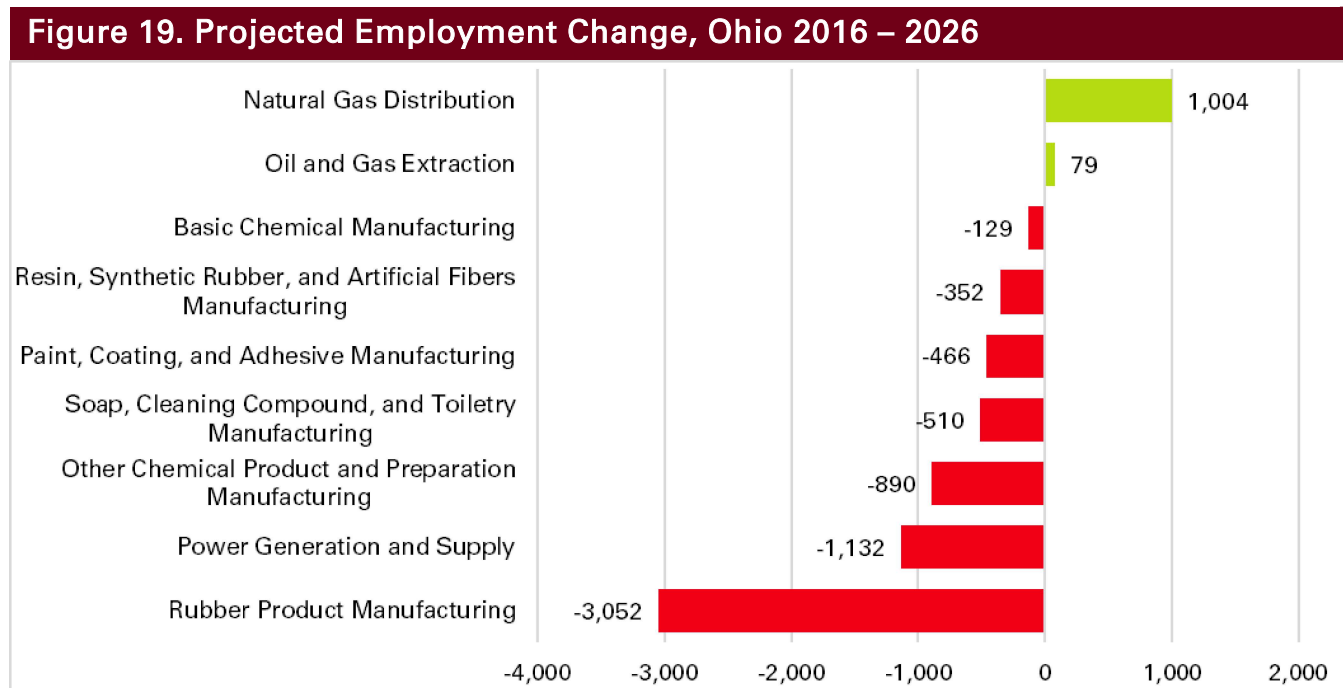
Source: Quarterly Census of Employment and Wages

The Energy and Chemicals Workforce

Three factors affect an industry's workforce needs. The first is industry growth or decline. Growing industries need more workers; declining industries need fewer. The second is the need to replace workers who leave to work in other industries, for retirement or for other reasons; declining industries can have significant replacement needs. The last factor is the availability of trained workers or workers who can be trained. The following section examines projected industry employment, worker age and education distributions, and the projected occupational needs for the energy and chemicals cluster.

Projected Employment Change, Ohio 2016 - 2026

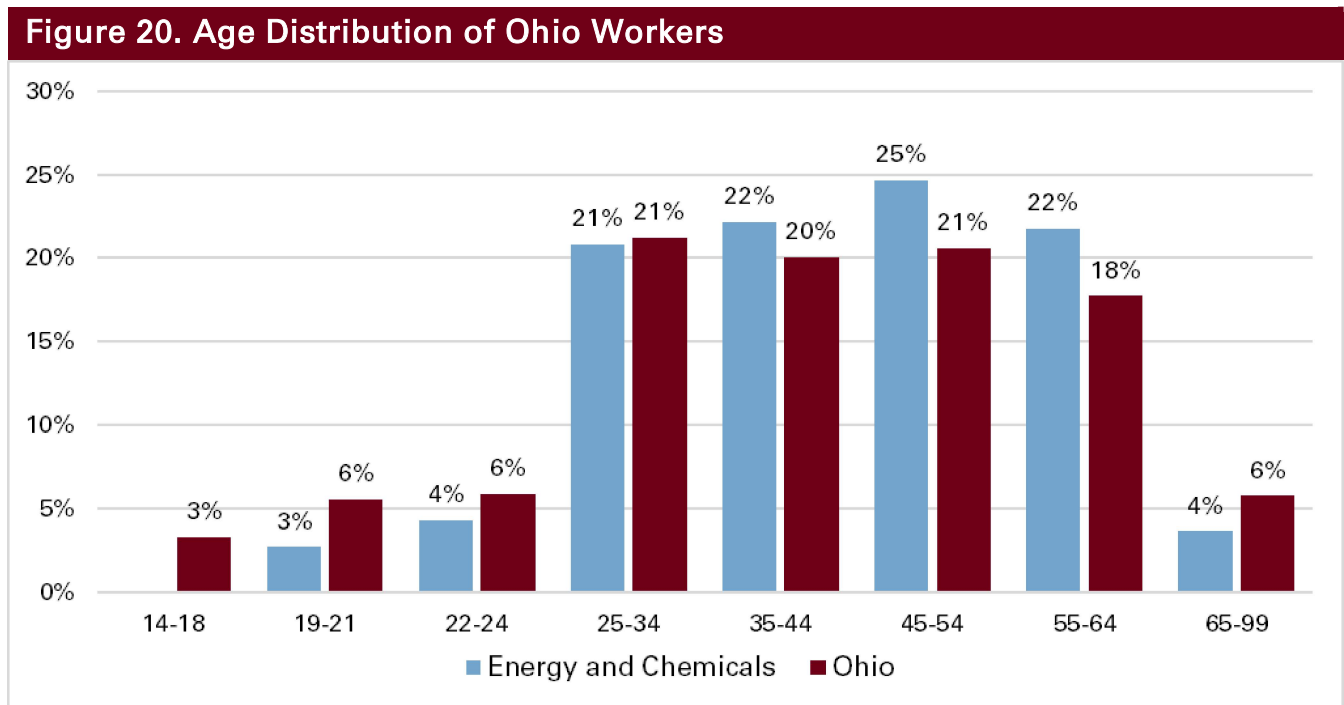
Figure 19 shows the long-term employment projections for the industries in the energy and chemicals cluster. Although the cluster is expected to decrease by more than 5,600 jobs from 2016 to 2026, a few industries within it are expected to grow. The largest and fastest growth is expected to occur in the natural gas distribution industry, with as many as 1,004 jobs added (18.5 percent). Growth is also projected for oil and gas extraction (79 jobs). Rubber product manufacturing is expected to continue to shrink through 2026.



Source: Ohio Bureau of Labor Market Information

Age Distribution of Ohio Workers

Figure 20 shows the age distribution of workers in the energy and chemicals industry cluster compared to all Ohio workers for the third quarter of 2018. On average, workers in the energy and chemicals cluster are older than workers in all Ohio industries. About 50 percent of cluster workers are age 45 or older, compared to 44 percent for all Ohio workers. Businesses in the energy and chemicals cluster may need to replace retiring workers sooner than businesses in other Ohio industries.



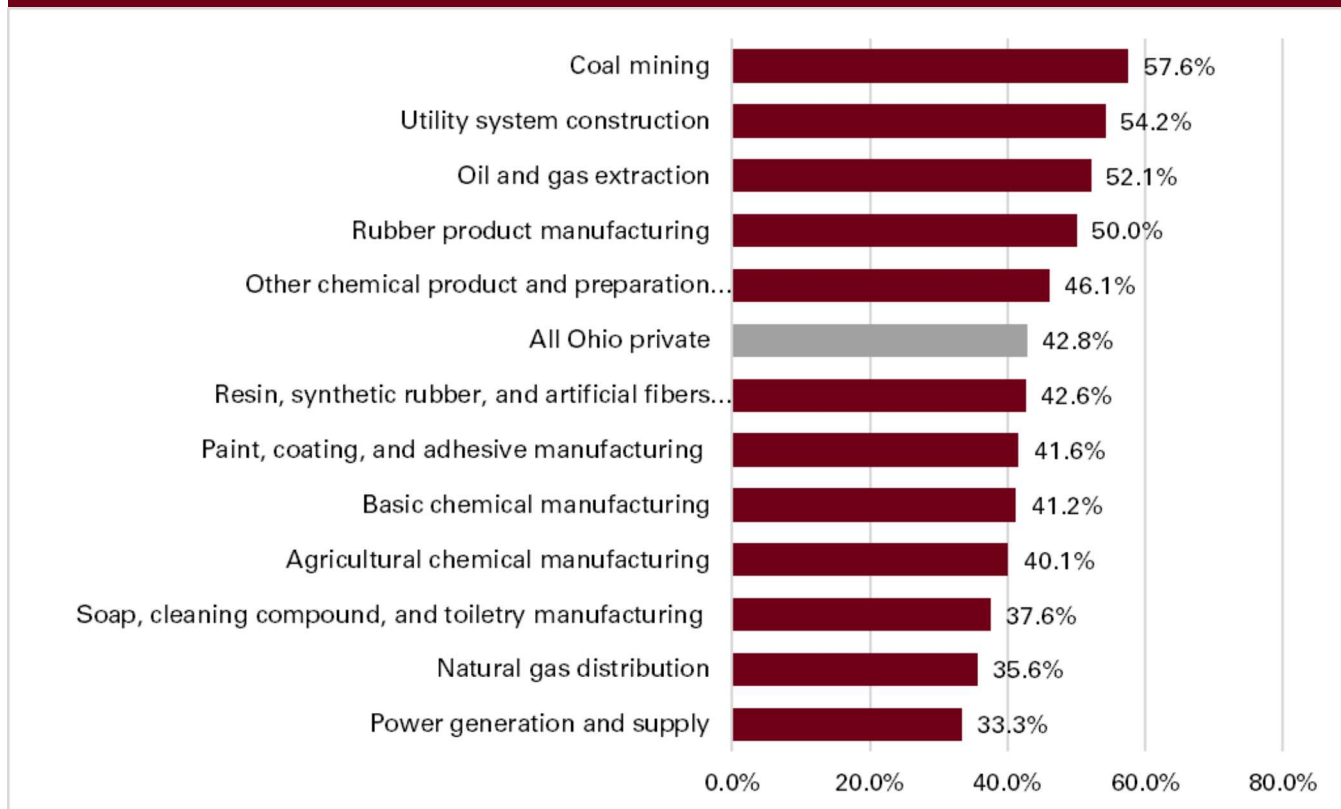
Source: U.S. Census of Quarterly Workforce Indicators, 2018 Q3

Energy and Chemicals Cluster Education and Training Needs

Because of an aging workforce, the energy and chemicals cluster industries may need to recruit workers. As Figure 21 shows, occupations in this cluster have low training and education requirements.

Across all Ohio private industries, an average of 42.8 percent of workers had a high school diploma or less in 2018. Among the energy and chemicals cluster industries, five had a higher percentage of employees with a high school diploma or less, ranging from 46.1 to 57.6 percent. Seven industries had a lower percentage of these workers with a high school diploma or less compared to all Ohio private industry employees; the percentages ranged from 33.3 to 42.6 percent.

Figure 21. Percent of Energy and Chemicals Workers 25+ with a High School Diploma or Less



Source: U.S. Census of Quarterly Workforce Indicators, 2018 Q3

Although every business has a unique set of jobs, businesses in the same and related industries tend to employ similar occupations. Figure 22 shows the typical education levels, on-the-job training (OJT) and related work experience associated with the 25 occupations that make up the largest share of employment in the energy and chemicals cluster. Entrants in 21 of the top 25 occupations typically have a high school diploma or less. Nineteen of those occupations require only short-, moderate-, or long-term OJT.³

Figure 22. Typical Education, OJT and Related Work Experience Needs for the 25 Largest Energy and Chemicals Occupations

SOC Code	Occupational Title	Typical Education at Entry	OJT / Related Experience
47-2061	Construction Laborers	No formal education credential	Short-term OJT
51-9011	Chemical Equipment Operators and Tenders	High school diploma or equivalent	Moderate-term OJT
51-9023	Mixing and Blending Machine Setters, Operators, and Tenders	High school diploma or equivalent	Moderate-term OJT
51-9041	Extruding, Forming, Pressing, and Compacting Machine Setters, Operators, and Tenders	High school diploma or equivalent	Moderate-term OJT
49-9051	Electrical Power-Line Installers and Repairers	High school diploma or equivalent	Long-term OJT
47-2073	Operating Engineers and Other Construction Equipment Operators	High school diploma or equivalent	Moderate-term OJT
51-1011	First-Line Supervisors of Production and Operating Workers	High school diploma or equivalent	None
51-9111	Packaging and Filling Machine Operators and Tenders	High school diploma or equivalent	Moderate-term OJT
49-9071	Maintenance and Repair Workers, General	High school diploma or equivalent	Moderate-term OJT
43-4051	Customer Service Representatives	High school diploma or equivalent	Short-term OJT
51-8091	Chemical Plant and System Operators	High school diploma or equivalent	Moderate-term OJT
41-4012	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	High school diploma or equivalent	Moderate-term OJT
11-1021	General and Operations Managers	Bachelor's degree	None
19-2031	Chemists	Bachelor's degree	None
51-9061	Inspectors, Testers, Sorters, Samplers, and Weighers	High school diploma or equivalent	Moderate-term OJT
49-9041	Industrial Machinery Mechanics	High school diploma or equivalent	Long-term OJT
53-7062	Laborers and Freight, Stock, and Material Movers, Hand	No formal educational credential	Short-term OJT
49-9052	Telecommunications Line Installers and Repairers	High school diploma or equivalent	Long-term OJT
43-9061	Office Clerks, General	High school diploma or equivalent	Short-term OJT
19-4031	Chemical Technicians	Associate degree	Moderate-term OJT
47-1011	First-Line Supervisors of Construction Trades and Extraction Workers	High school diploma or equivalent	None
51-9198	Helpers--Production Workers	High school diploma or equivalent	Short-term OJT
51-9197	Tire Builders	High school diploma or equivalent	Moderate-term OJT
53-3032	Heavy and Tractor-Trailer Truck Drivers	Postsecondary non-degree award	Short-term OJT
43-5071	Shipping, Receiving, and Traffic Clerks	High school diploma or equivalent	Short-term OJT

Source: U.S. Bureau of Labor Statistics

³ Short-term OJT lasts less than one month. Moderate-term OJT lasts one to 12 months and may include informal training. Long-term OJT lasts more than 12 months and combines work experience with formal classroom instruction.

Energy and Chemicals Cluster Industry Staffing Patterns

A staffing pattern refers to the number and types of occupations typically needed by an industry. The following tables show the most common occupations in each industry's staffing pattern and each occupation's projected employment. The occupations below are described by their Standard Occupational Classification (SOC) code.

Oil and Gas Extraction: NAICS 2111

Wellhead pumpers (SOC 53-7073) is the largest occupation in this industry, followed by construction and related workers, all other (SOC 47-4099). Most occupations in this industry are projected to grow through 2026. Office clerks, general (SOC 43-9061); secretaries and administrative assistants, except legal, medical and executive (SOC 43-6014); and bookkeeping, accounting, and auditing clerks (SOC 43-3031) are expected to shrink through 2026.

Figure 23. Oil and Gas Extraction

SOC Code	Occupational Title	2016	2026	Numeric Change	Percent Change
53-7073	Wellhead Pumpers	188	198	10	5.3%
47-4099	Construction and Related Workers, All Other	134	142	8	6.0%
53-3032	Heavy and Tractor-Trailer Truck Drivers	122	129	7	5.7%
47-5071	Roustabouts, Oil and Gas	113	120	7	6.2%
47-1011	First-Line Supervisors of Construction Trades and Extraction Workers	92	98	6	6.5%
43-9061	Office Clerks, General	84	80	-4	-4.8%
47-5012	Rotary Drill Operators, Oil and Gas	73	78	5	6.8%
11-1021	General and Operations Managers	67	71	4	6.0%
47-2061	Construction Laborers	66	70	4	6.1%
53-7062	Laborers and Freight, Stock, and Material Movers, Hand	64	68	4	6.3%
51-8092	Gas Plant Operators	56	59	3	5.4%
47-5013	Service Unit Operators, Oil, Gas, and Mining	52	55	3	5.8%
51-8093	Petroleum Pump System Operators, Refinery Operators, and Gaugers	41	43	2	4.9%
43-6014	Secretaries and Administrative Assistants, Except Legal, Medical, and Executive	41	37	-4	-9.8%
43-3031	Bookkeeping, Accounting, and Auditing Clerks	40	38	-2	-5.0%

Source: Ohio Bureau of Labor Market Information

Power Generation and Supply: NAICS 2211

The two largest occupations in this industry – electrical power-line installers and repairers (SOC 49-9051) and power plant operators (SOC 51-8013) – collectively employ over 3,000 people. All occupations in this industry are projected to contract through 2026.

Figure 24. Power Generation and Supply

SOC Code	Occupational Title	2016	2026	Numeric Change	Percent Change
49-9051	Electrical Power-Line Installers and Repairers	2,349	2,172	-177	-7.5%
51-8013	Power Plant Operators	782	715	-67	-8.6%
17-2071	Electrical Engineers	662	623	-39	-5.9%
51-8012	Power Distributors and Dispatchers	603	524	-79	-13.1%
17-2161	Nuclear Engineers	548	477	-71	-13.0%
49-1011	First-Line Supervisors of Mechanics, Installers, and Repairers	439	408	-31	-7.1%
49-2095	Electrical and Electronics Repairers, Powerhouse, Substation, and Relay	411	377	-34	-8.3%
49-9041	Industrial Machinery Mechanics	378	353	-25	-6.6%
43-5041	Meter Readers, Utilities	373	311	-62	-16.6%
43-4051	Customer Service Representatives	310	262	-48	-15.5%
47-2111	Electricians	302	281	-21	-7.0%
51-1011	First-Line Supervisors of Production and Operating Workers	274	251	-23	-8.4%
19-4051	Nuclear Technicians	273	238	-35	-12.8%
33-9032	Security Guards	263	219	-44	-16.7%
49-9012	Control and Valve Installers and Repairers, Except Mechanical Door	241	220	-21	-8.7%
13-1199	Business Operations Specialists, All Other	209	199	-10	-4.8%
49-9071	Maintenance and Repair Workers, General	188	184	-4	-2.1%
15-1142	Network and Computer Systems Administrators	147	130	-17	-11.6%
17-3023	Electrical and Electronics Engineering Technicians	145	133	-12	-8.3%
43-5081	Stock Clerks and Order Fillers	134	121	-13	-9.7%
43-1011	First-Line Supervisors of Office and Administrative Support Workers	120	113	-7	-5.8%
43-3021	Billing and Posting Clerks	106	99	-7	-6.6%

Source: Ohio Bureau of Labor Market Information

Natural Gas Distribution: NAICS 2212

Customer service representatives (SOC 43-4051) is the largest occupation in this industry, followed by engineering technicians, except drafters, all other (SOC 17-3029). All occupations are expected to grow through 2026.

Figure 25. Natural Gas Distribution

SOC Code	Occupational Title	2016	2026	Numeric Change	Percent Change
43-4051	Customer Service Representatives	690	829	139	20.1%
17-3029	Engineering Technicians, Except Drafters, All Other	629	757	128	20.3%
49-9012	Control and Valve Installers and Repairers, Except Mechanical Door	581	697	116	20.0%
47-2152	Plumbers, Pipefitters, and Steamfitters	297	356	59	19.9%
51-8092	Gas Plant Operators	234	281	47	20.1%
13-1111	Management Analysts	216	259	43	19.9%
43-9061	Office Clerks, General	212	229	17	8.0%
49-9021	Heating, Air Conditioning, and Refrigeration Mechanics and Installers	156	187	31	19.9%
51-8012	Power Distributors and Dispatchers	111	126	15	13.5%
17-2071	Electrical Engineers	104	124	20	19.2%
11-9199	Managers, All Other	98	118	20	20.4%
43-3031	Bookkeeping, Accounting, and Auditing Clerks	86	92	6	7.0%
17-2171	Petroleum Engineers	82	99	17	20.7%
49-1011	First-Line Supervisors of Mechanics, Installers, and Repairers	70	84	14	20.0%
49-9071	Maintenance and Repair Workers, General	68	82	14	20.6%
15-1199	Computer Occupations, All Other	57	68	11	19.3%
53-7071	Gas Compressor and Gas Pumping Station Operators	56	67	11	19.6%
47-2061	Construction Laborers	53	64	11	20.8%
51-1011	First-Line Supervisors of Production and Operating Workers	53	64	11	20.8%
51-8093	Petroleum Pump System Operators, Refinery Operators, and Gaugers	51	61	10	19.6%

Source: Ohio Bureau of Labor Market Information

Utility System Construction: NAICS 2371

The largest occupation in the utility system construction industry is construction laborers (SOC 47-2061). Many of the occupations in this industry are projected to grow through 2026, including the five largest occupations in the industry.

Figure 26. Utility System Construction

SOC Code	Occupational Title	2016	2026	Numeric Change	Percent Change
47-2061	Construction Laborers	4,876	4,922	46	0.9%
47-2073	Operating Engineers and Other Construction Equipment Operators	2,244	2,263	19	0.8%
49-9052	Telecommunications Line Installers and Repairers	1,314	1,399	85	6.5%
47-1011	First-Line Supervisors of Construction Trades and Extraction Workers	958	968	10	1.0%
11-9021	Construction Managers	527	538	11	2.1%
43-9061	Office Clerks, General	380	347	-33	-8.7%
53-3032	Heavy and Tractor-Trailer Truck Drivers	377	379	2	0.5%
49-9051	Electrical Power-Line Installers and Repairers	301	321	20	6.6%
49-3042	Mobile Heavy Equipment Mechanics, Except Engines	282	284	2	0.7%
47-2031	Carpenters	253	252	-1	-0.4%
47-2152	Plumbers, Pipefitters, and Steamfitters	246	245	-1	-0.4%
47-5021	Earth Drillers, Except Oil and Gas	241	239	-2	-0.8%
51-9198	Helpers--Production Workers	225	223	-2	-0.9%
13-1051	Cost Estimators	222	224	2	0.9%
47-2111	Electricians	191	201	10	5.2%
51-4121	Welders, Cutters, Solderers, and Brazers	191	190	-1	-0.5%
49-1011	First-Line Supervisors of Mechanics, Installers, and Repairers	147	156	9	6.1%
47-2051	Cement Masons and Concrete Finishers	127	127	0	0.0%
43-3031	Bookkeeping, Accounting, and Auditing Clerks	115	105	-10	-8.7%
43-6014	Secretaries and Administrative Assistants, Except Legal, Medical, and Executive	112	97	-15	-13.4%
11-1021	General and Operations Managers	109	111	2	1.8%
53-7062	Laborers and Freight, Stock, and Material Movers, Hand	101	102	1	1.0%
13-2011	Accountants and Auditors	98	100	2	2.0%
47-2011	Boilermakers	61	62	1	1.6%
47-2221	Structural Iron and Steel Workers	56	57	1	1.8%

Source: Ohio Bureau of Labor Market Information

Basic Chemical Manufacturing: NAICS 3251

The largest occupation in the basic chemical manufacturing industry is chemical equipment operators and tenders (SOC 51-9011). Three occupations are expected to grow over the next 10 years: chemists (SOC 19-2031), industrial machinery mechanics (SOC 49-9041), and chemical engineers (SOC 17-2041).

Figure 27. Basic Chemical Manufacturing

SOC Code	Occupational Title	2016	2026	Numeric Change	Percent Change
51-9011	Chemical Equipment Operators and Tenders	1,496	1,475	-21	-1.4%
51-8091	Chemical Plant and System Operators	805	713	-92	-11.4%
19-2031	Chemists	625	688	63	10.1%
53-3032	Heavy and Tractor-Trailer Truck Drivers	391	385	-6	-1.5%
51-1011	First-Line Supervisors of Production and Operating Workers	391	384	-7	-1.8%
19-4031	Chemical Technicians	380	375	-5	-1.3%
49-9041	Industrial Machinery Mechanics	337	365	28	8.3%
41-4012	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	313	309	-4	-1.3%
49-9071	Maintenance and Repair Workers, General	280	276	-4	-1.4%
53-7064	Packers and Packagers, Hand	252	249	-3	-1.2%
51-9111	Packaging and Filling Machine Operators and Tenders	242	239	-3	-1.2%
19-1021	Biochemists and Biophysicists	222	219	-3	-1.4%
43-5071	Shipping, Receiving, and Traffic Clerks	207	194	-13	-6.3%
17-2041	Chemical Engineers	202	239	37	18.3%
51-9061	Inspectors, Testers, Sorters, Samplers, and Weighers	201	198	-3	-1.5%
11-3051	Industrial Production Managers	180	178	-2	-1.1%
51-9023	Mixing and Blending Machine Setters, Operators, and Tenders	175	173	-2	-1.1%
43-4051	Customer Service Representatives	158	155	-3	-1.9%
51-9199	Production Workers, All Other	140	138	-2	-1.4%
53-7062	Laborers and Freight, Stock, and Material Movers, Hand	128	126	-2	-1.6%
13-2011	Accountants and Auditors	127	125	-2	-1.6%
51-9012	Separating, Filtering, Clarifying, Precipitating, and Still Machine Setters, Operators, and Tenders	121	119	-2	-1.7%
43-3031	Bookkeeping, Accounting, and Auditing Clerks	102	91	-11	-10.8%
43-5061	Production, Planning, and Expediting Clerks	101	99	-2	-2.0%

Source: Ohio Bureau of Labor Market Information

Resin and Synthetic Rubber Manufacturing: NAICS 3252

The largest occupation in this industry is chemical equipment operators and tenders (SOC 51-9011). Two occupations, chemical engineers (SOC 17-2041) and industrial machinery mechanics (SOC 49-9041), are expected to grow over the next 10 years. The rest of the occupations are expected to decline through 2026.

Figure 28. Resin and Synthetic Rubber Manufacturing

SOC Code	Occupational Title	2016	2026	Numeric Change	Percent Change
51-9011	Chemical Equipment Operators and Tenders	963	918	-45	-4.7%
51-9023	Mixing and Blending Machine Setters, Operators, and Tenders	435	415	-20	-4.6%
51-9061	Inspectors, Testers, Sorters, Samplers, and Weighers	284	216	-68	-23.9%
51-1011	First-Line Supervisors of Production and Operating Workers	221	210	-11	-5.0%
49-9071	Maintenance and Repair Workers, General	210	200	-10	-4.8%
51-9041	Extruding, Forming, Pressing, and Compacting Machine Setters, Operators, and Tenders	195	186	-9	-4.6%
41-4012	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	189	180	-9	-4.8%
19-4031	Chemical Technicians	187	178	-9	-4.8%
17-2041	Chemical Engineers	185	194	9	4.9%
51-4021	Extruding and Drawing Machine Setters, Operators, and Tenders, Metal and Plastic	157	133	-24	-15.3%
11-3051	Industrial Production Managers	112	107	-5	-4.5%
51-9198	Helpers--Production Workers	112	107	-5	-4.5%
19-2031	Chemists	110	105	-5	-4.5%
51-8091	Chemical Plant and System Operators	110	105	-5	-4.5%
51-9111	Packaging and Filling Machine Operators and Tenders	100	95	-5	-5.0%
13-2011	Accountants and Auditors	99	94	-5	-5.1%
17-2112	Industrial Engineers	97	92	-5	-5.2%
53-7062	Laborers and Freight, Stock, and Material Movers, Hand	95	90	-5	-5.3%
13-1023	Purchasing Agents, Except Wholesale, Retail, and Farm Products	91	78	-13	-14.3%
43-5071	Shipping, Receiving, and Traffic Clerks	91	82	-9	-9.9%
43-4051	Customer Service Representatives	81	77	-4	-4.9%
43-5061	Production, Planning, and Expediting Clerks	77	73	-4	-5.2%
43-6014	Secretaries and Administrative Assistants, Except Legal, Medical, and Executive	62	50	-12	-19.4%
43-3031	Bookkeeping, Accounting, and Auditing Clerks	59	51	-8	-13.6%
49-9041	Industrial Machinery Mechanics	55	58	3	5.5%
43-9061	Office Clerks, General	53	46	-7	-13.2%

Source: Ohio Bureau of Labor Market Information

Agricultural Chemical Manufacturing: NAICS 3253

The largest occupation in the agricultural chemical manufacturing industry is chemical plant and system operators (SOC 51-8091). All occupations in this industry are expected to constrict through 2026.

Figure 29. Agricultural Chemical Manufacturing

SOC Code	Occupational Title	2016	2026	Numeric Change	Percent Change
51-8091	Chemical Plant and System Operators	688	617	-71	-10.3%
49-9071	Maintenance and Repair Workers, General	307	275	-32	-10.4%
51-1011	First-Line Supervisors of Production and Operating Workers	135	121	-14	-10.4%
51-9023	Mixing and Blending Machine Setters, Operators, and Tenders	110	99	-11	-10.0%
47-2111	Electricians	85	76	-9	-10.6%
51-9111	Packaging and Filling Machine Operators and Tenders	65	59	-6	-9.2%
43-5061	Production, Planning, and Expediting Clerks	62	56	-6	-9.7%
19-4031	Chemical Technicians	51	45	-6	-11.8%
49-1011	First-Line Supervisors of Mechanics, Installers, and Repairers	45	40	-5	-11.1%
41-4012	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	43	39	-4	-9.3%
29-9011	Occupational Health and Safety Specialists	36	32	-4	-11.1%
51-9011	Chemical Equipment Operators and Tenders	33	30	-3	-9.1%
53-3032	Heavy and Tractor-Trailer Truck Drivers	32	29	-3	-9.4%

Source: Ohio Bureau of Labor Market Information

Paint, Coating, and Adhesive Manufacturing: NAICS 3255

The largest occupation in this industry is mixing and blending machine setters, operators, and tenders (SOC 51-9023). Two occupations in this industry are expected to grow over the next 10 years: industrial machinery mechanics (SOC 49-9041) and market research analyst and marketing specialists (SOC 13-1161). All other occupations are expected to contract over the next 10 years.

Figure 30. Paint, Coating, and Adhesive Manufacturing

SOC Code	Occupational Title	2016	2026	Numeric Change	Percent Change
51-9023	Mixing and Blending Machine Setters, Operators, and Tenders	1,084	1,029	-55	-5.1%
51-9011	Chemical Equipment Operators and Tenders	774	735	-39	-5.0%
19-2031	Chemists	567	538	-29	-5.1%
53-7062	Laborers and Freight, Stock, and Material Movers, Hand	416	395	-21	-5.0%
41-4012	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	355	338	-17	-4.8%
51-1011	First-Line Supervisors of Production and Operating Workers	328	312	-16	-4.9%
19-4031	Chemical Technicians	320	305	-15	-4.7%
51-9111	Packaging and Filling Machine Operators and Tenders	294	280	-14	-4.8%
51-9061	Inspectors, Testers, Sorters, Samplers, and Weighers	267	203	-64	-24.0%
43-5071	Shipping, Receiving, and Traffic Clerks	232	210	-22	-9.5%
49-9071	Maintenance and Repair Workers, General	204	194	-10	-4.9%
11-3051	Industrial Production Managers	177	168	-9	-5.1%
43-4051	Customer Service Representatives	152	144	-8	-5.3%
49-9041	Industrial Machinery Mechanics	137	144	7	5.1%
17-2041	Chemical Engineers	136	130	-6	-4.4%
43-5061	Production, Planning, and Expediting Clerks	115	109	-6	-5.2%
13-1199	Business Operations Specialists, All Other	107	102	-5	-4.7%
43-3031	Bookkeeping, Accounting, and Auditing Clerks	104	89	-15	-14.4%
43-9061	Office Clerks, General	102	87	-15	-14.7%
17-2112	Industrial Engineers	101	96	-5	-5.0%
13-1161	Market Research Analysts and Marketing Specialists	99	104	5	5.1%
51-9199	Production Workers, All Other	90	86	-4	-4.4%
53-7051	Industrial Truck and Tractor Operators	90	86	-4	-4.4%
13-1023	Purchasing Agents, Except Wholesale, Retail, and Farm Products	75	64	-11	-14.7%
13-2011	Accountants and Auditors	75	71	-4	-5.3%

Source: Ohio Bureau of Labor Market Information

Soap, Cleaning Compound, and Toiletry Manufacturing: NAICS 3256

The two largest occupations – mixing and blending machine setters, operators, and tenders (SOC 51-9023) and packaging and filling machine operators (SOC 51-9111) – collectively employ more than 2,000 people. Except for industrial machinery mechanics and market research analysts and marketing specialists, all occupations in this industry are expected to decline through 2026.

Figure 31. Soap, Cleaning Compound, and Toiletry Manufacturing

SOC Code	Occupational Title	2016	2026	Numeric Change	Percent Change
51-9023	Mixing and Blending Machine Setters, Operators, and Tenders	1,170	1,118	-52	-4.4%
51-9111	Packaging and Filling Machine Operators and Tenders	1,057	1,011	-46	-4.4%
51-9011	Chemical Equipment Operators and Tenders	570	546	-24	-4.2%
53-7062	Laborers and Freight, Stock, and Material Movers, Hand	375	359	-16	-4.3%
41-4012	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	331	316	-15	-4.5%
51-1011	First-Line Supervisors of Production and Operating Workers	312	299	-13	-4.2%
43-5071	Shipping, Receiving, and Traffic Clerks	253	230	-23	-9.1%
51-9198	Helpers--Production Workers	240	230	-10	-4.2%
51-9012	Separating, Filtering, Clarifying, Precipitating, and Still Machine Setters, Operators, and Tenders	224	214	-10	-4.5%
49-9041	Industrial Machinery Mechanics	215	226	11	5.1%
51-9061	Inspectors, Testers, Sorters, Samplers, and Weighers	209	160	-49	-23.4%
43-4051	Customer Service Representatives	180	173	-7	-3.9%
49-9071	Maintenance and Repair Workers, General	176	168	-8	-4.5%
19-2031	Chemists	167	159	-8	-4.8%
11-1021	General and Operations Managers	161	154	-7	-4.3%
19-4031	Chemical Technicians	148	142	-6	-4.1%
51-2099	Assemblers and Fabricators, All Other	143	110	-33	-23.1%
43-5061	Production, Planning, and Expediting Clerks	135	129	-6	-4.4%
11-3051	Industrial Production Managers	131	125	-6	-4.6%
13-1161	Market Research Analysts and Marketing Specialists	123	129	6	4.9%
17-2141	Mechanical Engineers	121	116	-5	-4.1%
13-1023	Purchasing Agents, Except Wholesale, Retail, and Farm Products	111	96	-15	-13.5%
43-6014	Secretaries and Administrative Assistants, Except Legal, Medical, and Executive	103	84	-19	-18.4%
17-2112	Industrial Engineers	102	97	-5	-4.9%

Source: Ohio Bureau of Labor Market Information

Other Chemical Production and Preparation Manufacturing: NAICS 3259

The largest occupation in this industry is mixing and blending machine setters, operators, and tenders (SOC 51-9023). All occupations are expected to decline over the next 10 years.

Figure 32. Other Chemical Production and Preparation Manufacturing

SOC Code	Occupational Title	2016	2026	Numeric Change	Percent Change
51-9023	Mixing and Blending Machine Setters, Operators, and Tenders	822	684	-138	-16.8%
51-4021	Extruding and Drawing Machine Setters, Operators, and Tenders, Metal and Plastic	405	298	-107	-26.4%
51-9011	Chemical Equipment Operators and Tenders	382	318	-64	-16.8%
51-9061	Inspectors, Testers, Sorters, Samplers, and Weighers	248	207	-41	-16.5%
41-4012	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	240	200	-40	-16.7%
43-5071	Shipping, Receiving, and Traffic Clerks	232	184	-48	-20.7%
51-1011	First-Line Supervisors of Production and Operating Workers	217	181	-36	-16.6%
49-9071	Maintenance and Repair Workers, General	199	166	-33	-16.6%
51-9111	Packaging and Filling Machine Operators and Tenders	147	123	-24	-16.3%
19-2031	Chemists	131	110	-21	-16.0%
19-4031	Chemical Technicians	126	105	-21	-16.7%
51-9198	Helpers--Production Workers	126	105	-21	-16.7%
17-2041	Chemical Engineers	108	90	-18	-16.7%
53-7062	Laborers and Freight, Stock, and Material Movers, Hand	96	80	-16	-16.7%
43-9061	Office Clerks, General	89	67	-22	-24.7%
11-3051	Industrial Production Managers	88	74	-14	-15.9%
43-4051	Customer Service Representatives	87	72	-15	-17.2%
51-8091	Chemical Plant and System Operators	86	71	-15	-17.4%
49-9041	Industrial Machinery Mechanics	83	76	-7	-8.4%
17-2112	Industrial Engineers	66	55	-11	-16.7%
51-9199	Production Workers, All Other	62	52	-10	-16.1%
53-7051	Industrial Truck and Tractor Operators	60	50	-10	-16.7%
43-3031	Bookkeeping, Accounting, and Auditing Clerks	54	41	-13	-24.1%

Source: Ohio Bureau of Labor Market Information

Rubber Product Manufacturing: NAICS 3262

The two largest occupations are tire builders (SOC 51-9197) and extruding, forming, pressing, and compacting machine setters, operators, and tenders (SOC 51-9041). Together, they employ more than 3,500 people. All occupations are expected to decline over the next 10 years.

Figure 33. Rubber Product Manufacturing

SOC Code	Occupational Title	2016	2026	Numeric Change	Percent Change
51-9041	Extruding, Forming, Pressing, and Compacting Machine Setters, Operators, and Tenders	2,414	1,906	-508	-21.0%
51-9197	Tire Builders	1,116	882	-234	-21.0%
51-1011	First-Line Supervisors of Production and Operating Workers	491	388	-103	-21.0%
51-4072	Molding, Coremaking, and Casting Machine Setters, Operators, and Tenders, Metal and Plastic	444	306	-138	-31.1%
51-9011	Chemical Equipment Operators and Tenders	431	340	-91	-21.1%
51-9061	Inspectors, Testers, Sorters, Samplers, and Weighers	428	271	-157	-36.7%
51-2092	Team Assemblers	421	266	-155	-36.8%
51-9195	Molders, Shapers, and Casters, Except Metal and Plastic	409	323	-86	-21.0%
51-9198	Helpers--Production Workers	372	295	-77	-20.7%
51-9032	Cutting and Slicing Machine Setters, Operators, and Tenders	318	251	-67	-21.1%
49-9071	Maintenance and Repair Workers, General	300	238	-62	-20.7%
11-1021	General and Operations Managers	253	200	-53	-20.9%
51-9023	Mixing and Blending Machine Setters, Operators, and Tenders	244	193	-51	-20.9%
43-5071	Shipping, Receiving, and Traffic Clerks	234	176	-58	-24.8%
51-4031	Cutting, Punching, and Press Machine Setters, Operators, and Tenders, Metal and Plastic	233	166	-67	-28.8%
41-4012	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	230	182	-48	-20.9%
17-2112	Industrial Engineers	222	176	-46	-20.7%
49-9041	Industrial Machinery Mechanics	212	185	-27	-12.7%
51-9199	Production Workers, All Other	212	168	-44	-20.8%
11-3051	Industrial Production Managers	183	145	-38	-20.8%
43-9061	Office Clerks, General	166	118	-48	-28.9%
51-4021	Extruding and Drawing Machine Setters, Operators, and Tenders, Metal and Plastic	163	113	-50	-30.7%
43-4051	Customer Service Representatives	147	117	-30	-20.4%
51-9191	Adhesive Bonding Machine Operators and Tenders	144	114	-30	-20.8%
17-2141	Mechanical Engineers	122	97	-25	-20.5%
43-5061	Production, Planning, and Expediting Clerks	120	95	-25	-20.8%
13-2011	Accountants and Auditors	111	88	-23	-20.7%

Source: Ohio Bureau of Labor Market Information

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- Provide products and services that are customer- and demand-driven.
- Be known as an important and reliable source for information solutions that support workforce development goals and outcomes.

Acknowledgments: The Workforce Research Section produced this report under the direction of Bureau Chief Coretta Pettway. For further information, visit <http://OhioLMI.com> or call the Ohio Bureau of Labor Market Information at **1-888-296-7541** option 6, or **(614) 752-9494**.

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