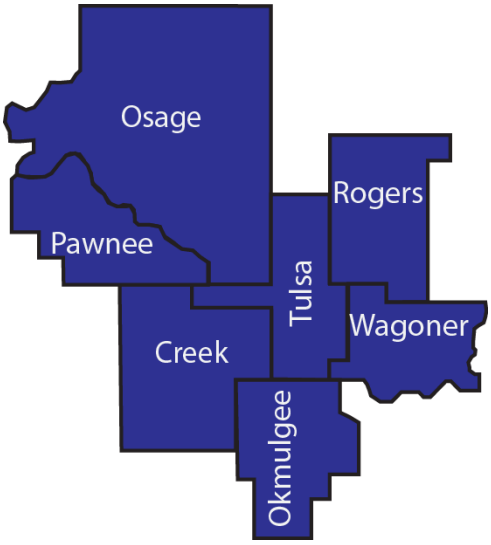
Tulsa MSA Briefing

October 2017

Overview

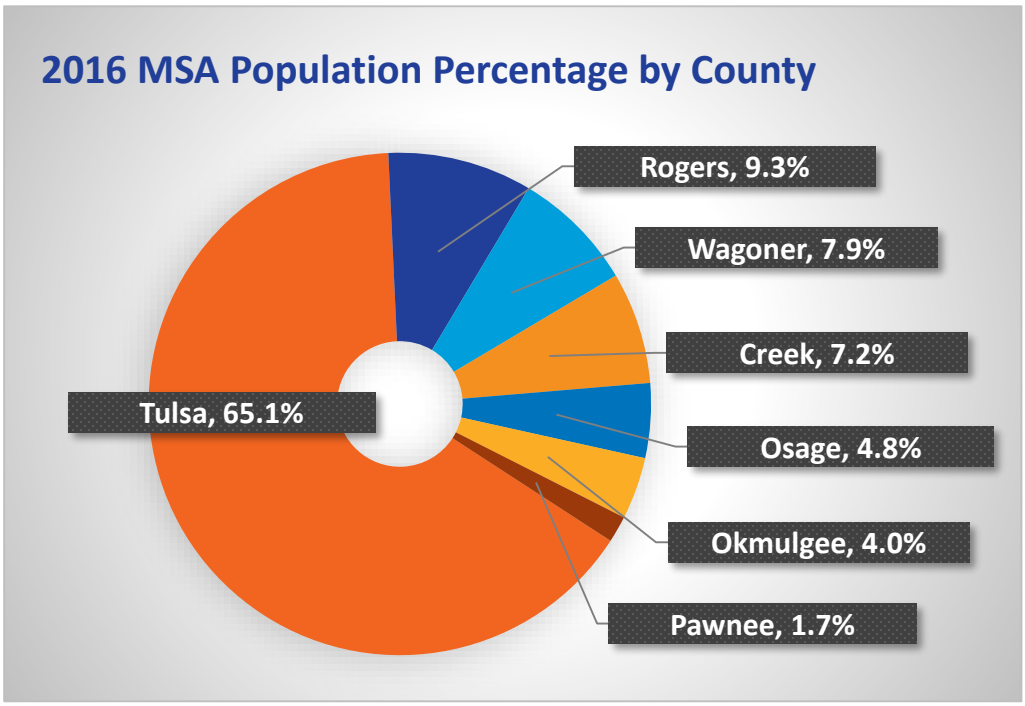
According to the U.S. Census Bureau, the Tulsa Metropolitan Statistical Area (MSA) includes seven Oklahoma Counties: Creek, Okmulgee, Osage, Pawnee, Rogers, Tulsa, and Wagoner. This combined region of Oklahoma covers 6,460 square miles and is home to over 987,000 Oklahoma – approximately 25.2% of the state's total population. Ten cities in the MSA boast populations of 10,000 residents or more, including Tulsa, Broken Arrow, Owasso, Bixby, Sapulpa, Sand Springs, Jenks, Claremore, Okmulgee, and Glenpool.



Note that for simplicity, the Tulsa Metropolitan Statistical Area will generally be referenced throughout this report as the "MSA." Sources for all data are cited. The most common data source utilized is EMSI – Economic Modeling Solutions International – data release 2017.3.

Population Breakdown: County

- The city of Tulsa, the county seat of Tulsa County, is the largest city within the MSA boundaries with an estimated population of over 400,000. Tulsa County, although the smallest county in the MSA in land mass at 587 square miles, is the most populous, home to nearly 643,000 individuals. This represents 65.1% of the total population residing in the MSA.



Source: EMSI 2017.3

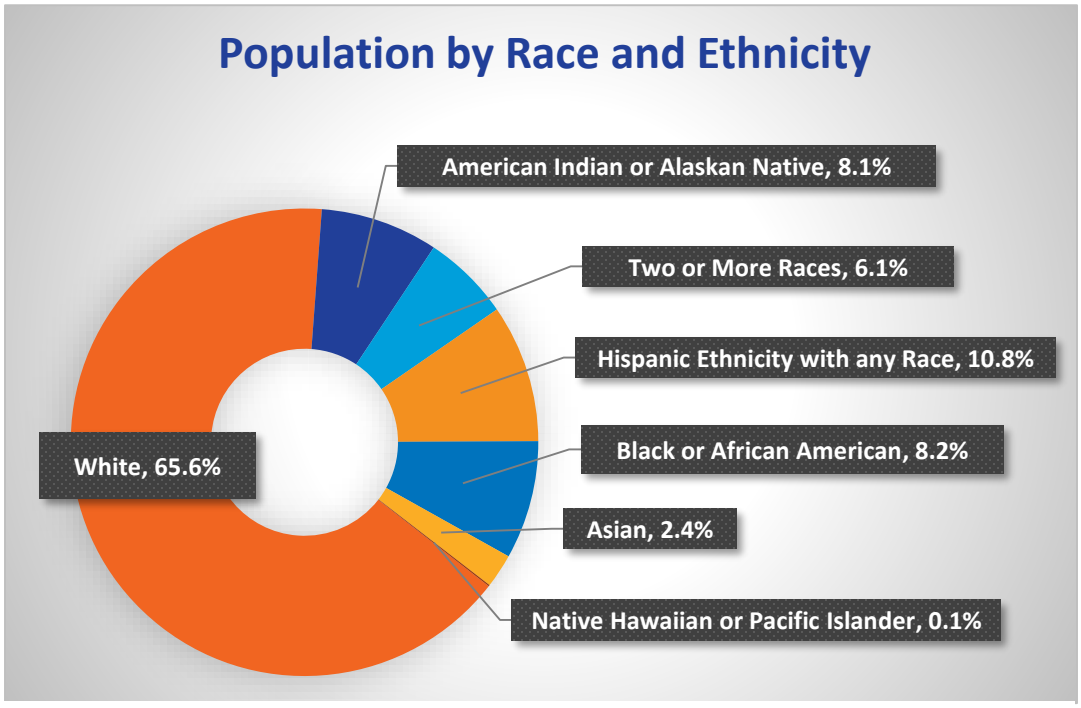
- Pawnee County is the least populous county in the MSA with an estimated 16,485 residents in 2016. Approximately the same size as Tulsa County in land mass at 595 square miles, it is home to only 1.7% of the total MSA population.

- Between 2010 and 2016, the MSA experienced a growth rate of 5.02%, a net increase of an estimated 47,211 residents. The majority of this population increase is attributable to Tulsa County which increased its population by over 6%. Osage County experienced the lowest increase in population, adding an estimated 369 individuals, a nominal increase of 0.8%. Pawnee and Okmulgee Counties declined in population, losing an estimated total of 1,014 residents.

- In addition to overall population representation, it is helpful to examine population density, measured in the number of persons living in a one-square-mile area. Due to the rural nature of several of the counties located within the MSA, the overall MSA population density is calculated at 153 persons per square mile. An examination of individual counties reveals that four of the seven MSA counties report low population densities, under 80 persons per square mile: Creek, Osage, Okmulgee, and Pawnee. Osage County, the largest county in the MSA in geographic size at 2,304 square miles, exhibits the lowest population density at just over 20 persons per square mile. In contrast, Tulsa County, the smallest county in the MSA in geographical size, reports the highest population density, not just within the MSA, but of any single county in the state. With an estimated population over 640,000 and a land mass of 587 square miles, Tulsa County's population density is 1,095 persons per square mile. This is marginally higher than the only other major metropolitan area in the state, Oklahoma County, which reports 1,089 persons per square mile.

Population Breakdown: Race and Ethnicity

The chart to the right illustrates the racial and ethnic diversity of residents living in the Tulsa Metropolitan Statistical Area. The racial categories designated by the U.S. Census Bureau are utilized. It should be noted that the Census Bureau categorizes "Hispanic," not as a race, but as an ethnicity. As such, Hispanic is always reported in conjunction with another racial designator, i.e. "Black or African American, Hispanic." Individual races included in the chart were reported as Non-Hispanic.



Source: EMSI 2017.3

- Over 647,000 MSA residents identify themselves as White, Non-Hispanic. This equates to 65.62% of the total MSA population, a racial representation lower than the statewide average which is reported at 66.1%.

- At 0.1% (893 total MSA residents) Native Hawaiians or Pacific Islanders, Non-Hispanic, compose the smallest racial classification.
- Overall, the race/ethnicity representation of the MSA is generally comparable to that of the state as a whole. The race/ethnicity group exhibiting the greatest disparity is White, Hispanic with a 1.4 percentage point differential.

Race/Ethnicity	MSA % of Population	State % of Population
White, Non-Hispanic	65.62%	66.18%
Black or African American, Non-Hispanic	8.19%	7.42%
American Indian or Alaskan Native, Non-Hispanic	8.14%	8.27%
Two or More Races, Non-Hispanic	6.06%	5.51%
Asian, Non-Hispanic	2.35%	2.18%
Native Hawaiian or Pacific Islander, Non-Hispanic	0.09%	0.14%
Non-Hispanic Subtotal	90.46%	89.70%
White, Hispanic	6.96%	8.38%
American Indian or Alaskan Native, Hispanic	0.62%	0.91%
Two or More Races, Hispanic	0.45%	0.56%
Black or African American, Hispanic	0.29%	0.34%
Asian, Hispanic	0.06%	0.07%
Native Hawaiian or Pacific Islander, Hispanic	0.02%	0.04%
Hispanic Subtotal	9.54%	10.30%
Total	100.00%	100.00%

Source: EMSI 2017.3

- Individuals self-identifying as "Black or African American, Non-Hispanic" are slightly over-represented in the MSA at 8.2% compared to a statewide population of 7.4%.

- Individuals who self-identify as being of Hispanic ethnicity account for 9.54% of the MSA population. As noted previously, Hispanic ethnicity is always reported in conjunction with a racial designator. This figure includes everyone of Hispanic ethnicity, regardless of race. Between 2010 and 2016, the Hispanic population in the MSA increased by 19.1%. This level of growth is slightly lower than the statewide growth rate for Hispanics of 21.2%.

- The highest rate of growth between 2010 and 2016 for any racial cohort is exhibited by the "Native Hawaiian or Pacific Islander, Non-Hispanic" population. Despite being the smallest racial group in the MSA, the population for this cohort grew by 58.61%, adding 330 new residents. The "Asian, Non-Hispanic" population experienced the second largest growth rate at 40.81%, adding over 6,700 new residents to the MSA.

- Between 2010 and 2016, the growth rate for the Non-Hispanic population overall was 3.73%, resulting in an increase in population of an estimated 32,105 individuals. These data include individuals of any race who report Non-Hispanic ethnicity. In contast, the Hispanic population grew at over 5 times that rate, exhibiting growth of 19.1%, adding 15,108 new residents.

Educational Attainment: Level of Education

Data regarding educational attainment are gathered by the U.S. Census Bureau utilizing a variety of surveys. Census Bureau staff aggregate the data into seven educational attainment categories ranging from the completion of "Less than 9th Grade" up to the attainment of a "Graduate Degree and Higher." Unfortunately, the scale currently in use fails to quantify those individuals who have achieved an educational award above the level of a high school diploma but below the attainment of an Associates Degree. This missing category is generally characterized by the completion of a career-specific vocationally associated certificate or an industry-recognized credential. The educational attainment levels, categorized utilizing the Census Bureau classifications, are discussed below and followed by two charts, "Educational Attainment by Education Level," "Educational Attainment by Race/Ethnicity," and one table, "Educational Attainment by Gender." The data is provided for 2016.

- On average, Tulsa MSA residents are more highly-educated compared with the state as a whole.

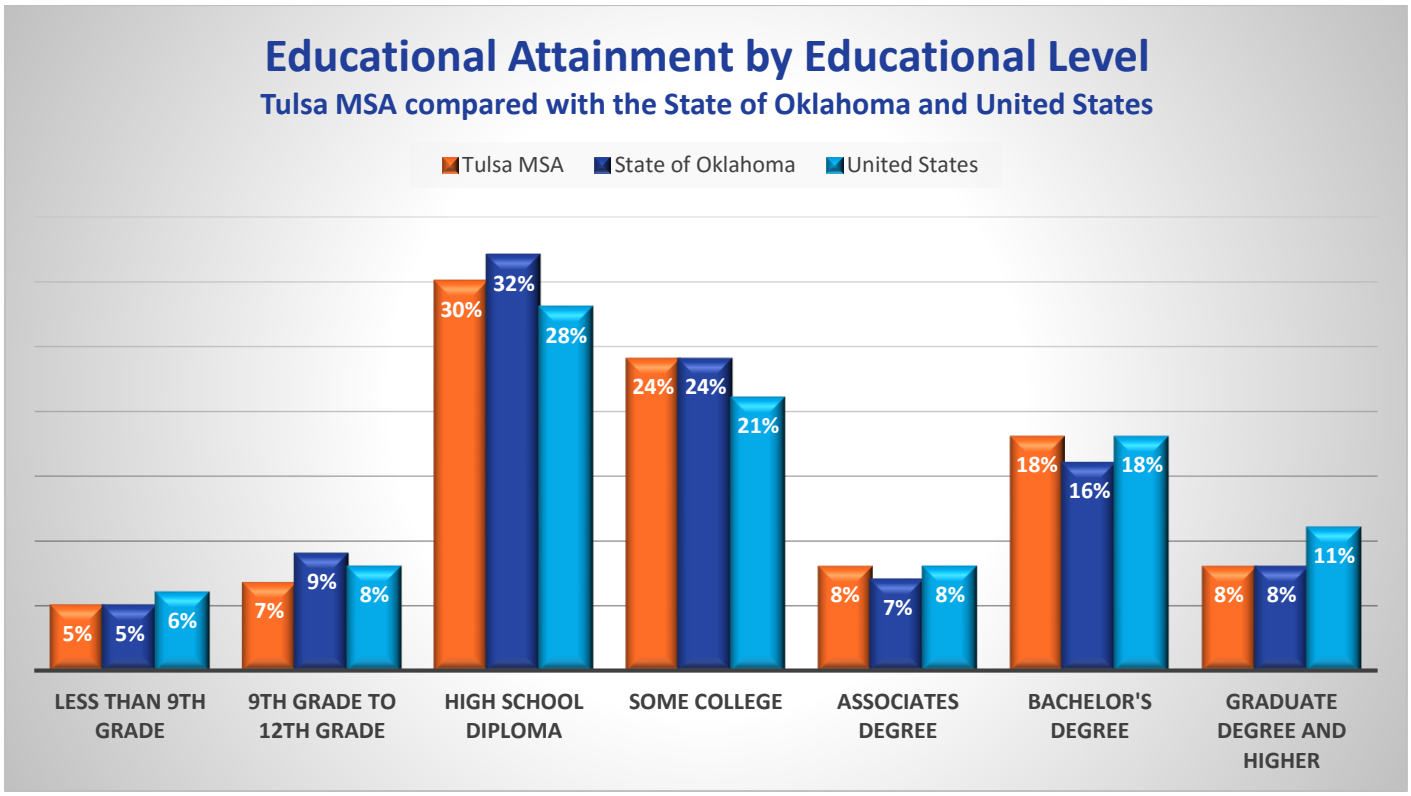
- A lower percentage of MSA residents have failed to complete a high school diploma than at the both the state or national levels. Only 12.05% of MSA residents possess less than a high school education. This figure falls significantly below both the state (13.78%) and the national (13.98%) educational attainment at this level.

- The MSA exceeds the state at all levels of postsecondary education. The greatest differential between Tulsa MSA (+1.9 percentage points) and the state of Oklahoma as a whole is found at the Bachelor's Degree level of educational attainment. Comparisons at the postsecondary level of education are outlined below:

Educational Level	Tulsa MSA % of Population	State of Oklahoma % of Population	Percentage Point Differential (Tulsa)
Some College	23.79%	23.53%	+0.26
Associates Degree	8.24%	7.10%	+1.14
Bachelor's Degree	17.79%	15.89%	+1.90
Graduate Degree and Higher	8.05%	7.92%	+0.13

Source: EMSI 2017.3

- In addition to the differential at the state level outlined above, residents of the MSA exceed national educational attainment at 2 postsecondary levels:
    - Some College – 23.79% Tulsa MSA versus 20.77% nationally; a differential of 3.02 percentage points; and,
    - Associates Degree – 8.24% Tulsa MSA versus 7.92% nationally; a differential of 0.32 percentage points.



Source: EMSI 2017.3

Educational Attainment: Race and Ethnicity

The variables of race and ethnicity figure prominently in the educational achievement of Tulsa MSA residents. Unless otherwise noted, the racial category data cited below are reported in aggregate, irrespective of ethnicity.

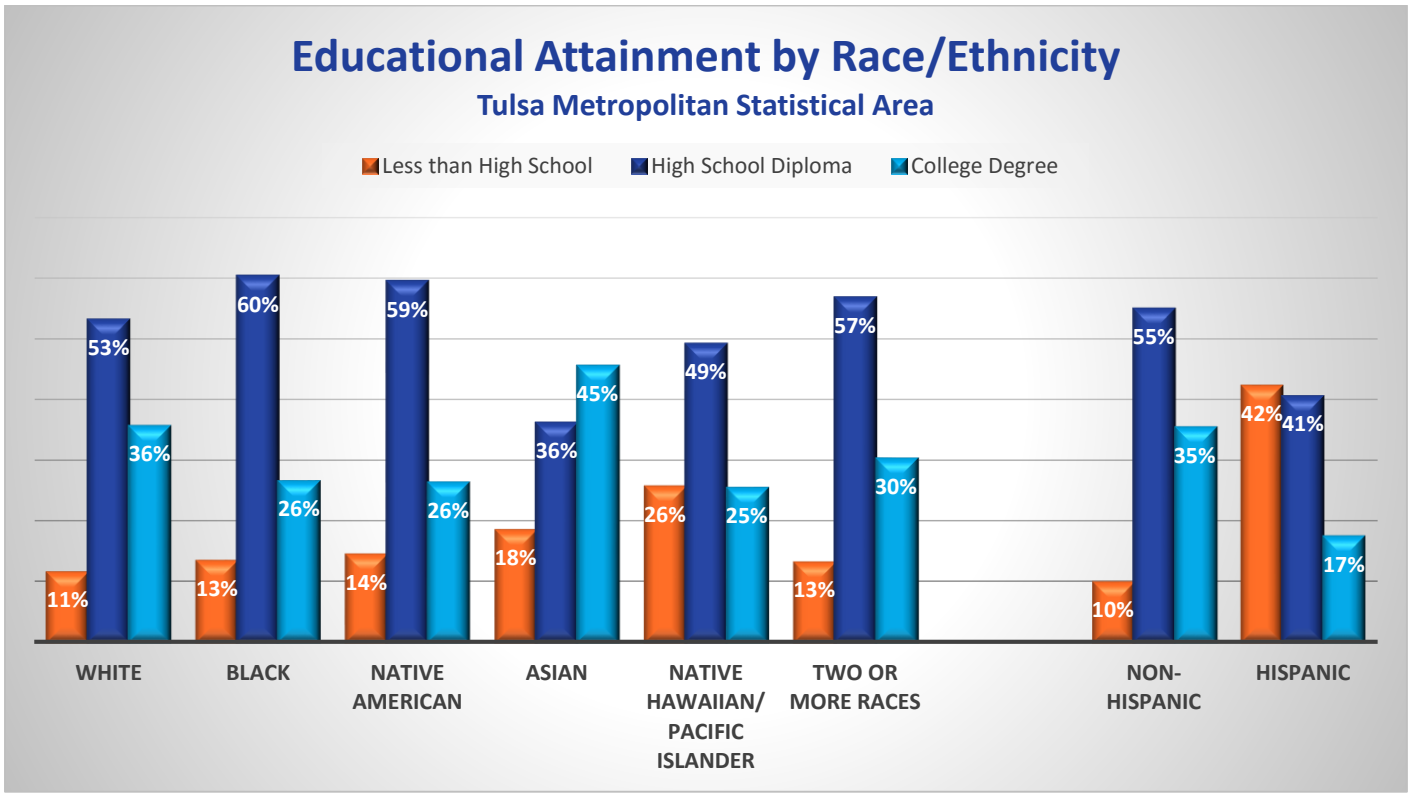
- Individuals who self-identify as Black or African American report possessing a high school diploma at a higher rate than any other race (60.22%). At a slightly lower rate, 59.38% of American Indian or Alaskan Natives in Tulsa MSA have achieved the same educational level. The most populous group, identifying themselves as White, ranks fourth at 53.05%.

- Regarding an educational level below high school diploma, Whites report the lowest attainment at 11.43%. Conversely, over 25% of Native Hawaiian or Pacific Islanders in the MSA report an educational attainment level of less than high school diploma. It must be noted however, that the population of individuals in this racial category is extremely small, with an estimated 2016 population of 663 – slightly less than 0.1% of the overall MSA population.

- Over 45% of Asian residents report possessing a college degree while 35% of Whites report this same achievement. The achievement level for all other racial categories fall between 25.34% and 30.21%.

- The most significant educational attainment gap is revealed by an examination of data associated with ethnicity, particularly at the lower educational levels. Over 42% of MSA Hispanics possess an educational level less than a high school diploma as compared with 9.8% for individuals of Non-Hispanic ethnicity, a differential of 32 percentage

points. Only 40.51% of Hispanics have attained a high school diploma versus 54.87% of Non-Hispanics, and at the college completion level, 17.35% of Hispanics have earned a degree versus 35.32% of Non-Hispanics.



Source: EMSI 2017.3

Educational Attainment: Gender

With regards to gender, while the gap is minute, females consistently report possessing higher levels of education than males. Only 11.22% of females in the MSA possess an educational level below high school graduation. This equates to 1.73 percentage points below that of males (12.95%). The following table provides educational attainment statistics by gender:

Educational Level	Females	Males	Percentage Point Differential (Female)
Less than High School Diploma	11.22%	12.95%	-1.73
High School Diploma	54.11%	53.62%	+0.49
College Degree	34.68%	33.43%	+1.25

Source: EMSI 2017.3

Skills Gap

Building upon the educational attainment data presented previously, a skills gap analysis was completed. To achieve this analysis, the current level of educational achievement of MSA residents was directly compared to the typical entry level of education required by newly created jobs projected to develop between 2016 and 2025. The chart "Skills Gap for New Jobs by 2025" follows the analysis and illustrates the educational gap identified.

- By 2025, 48% of all newly created jobs in the MSA will require the completion of a certificate/license, some college courses, or an Associates Degree. Currently only 32% of individuals in the MSA have achieved this educational level. Conversely, only 35% of newly created jobs will require a high school diploma or less while 42% of MSA residents have completed this level of education. In short, there is an excess supply of individuals with a high school diploma or less and a shortage of individuals to meet the needs of employers at the postsecondary and Associates Degree level – a 16 percentage point skills gap. Based upon projected population growth rates for 2025, an estimated 121,000 additional MSA residents with a high school diploma or less must obtain this level of education in order to meet employer needs.

- As discussed in the previous section, a significant percentage of Tulsa MSA residents are highly educated. At every level of college degree awards, the percentage of residents in the MSA exceeds the state average. Likewise, with regards to skill gap, the percentage of individuals possessing degrees exceed the projected percentage of 2025 new jobs at those educational levels. In 2025, approximately 4% of new jobs will require a Master's Degree or higher, while 13% will require a Bachelor's Degree. In 2016, 8% of MSA residents possessed a post-baccalaureate degree while 18% had been awarded a Bachelor's Degree.

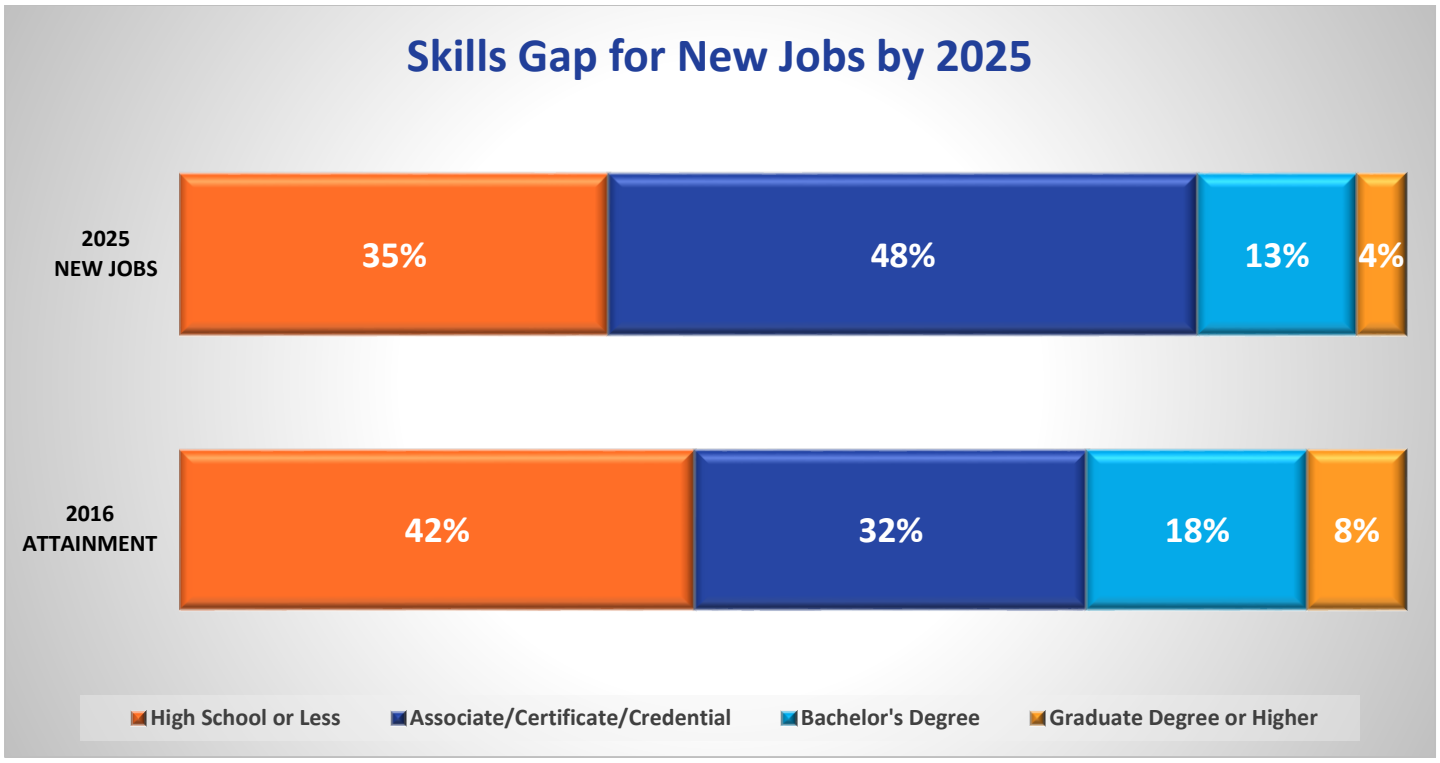
  While it appears that MSA residents are well positioned to meet the future employment needs of the MSA with regard to college degrees, this surface analysis may be somewhat misleading. At least three factors may adversely impact this analysis:

  1) Variability of the data. The data utilized for this analysis are based upon projected need which is rooted in historical data. They are, by their very nature, estimates which can change as economic conditions and workforce demands evolve. As time progresses, it is probable that the need for higher degrees will increase.

  2) Misalignment of skills attainment. Undoubtedly, there exists some level of misalignment between residents' existing degree specialties and employer need. The availability of 100 graduates with a Bachelor's Degree in accounting or finance, for example, will never meet the needs of employers for 100 graduates with a Bachelor's Degree in engineering. This misalignment requires a greater margin of error between existing supply and projected need when calculating the skills gap.

  3) Surplus of higher degrees. Finally, it must be considered that the four percentage point "surplus" of individuals who already possess a Graduate Degree or higher may place downward pressure on the need for Bachelor's Degrees in the MSA as more highly trained job seekers accept positions below their educational attainment. In turn, the 5% surplus of individuals with Bachelor's Degrees places pressure on jobs requiring an Associates Degree or certificate/professional licensure. This consideration is mitigated, however, by the assumption that many of these individuals could be drawn to either other locations within Oklahoma or to other states for employment better suited to their educational achievement rather than choosing to fill positions at a lower educational level. This hypothesis is reinforced by the data illustrated in the commuter pattern section presented later in this report.

Considering all of these factors, overall, there is a continued need for highly skilled, highly educated residents in the MSA. Of particular consideration must be increased mentoring and engagement with students at all levels to enhance educational outcomes as well as improved communication to ensure those students 1) make informed decisions regarding their long-term educational plans and 2) align themselves with future workforce needs.



Source: EMSI, 2017.3

Educational Assets

Colleges, Universities, Career Technology Centers, and K-12 schools are instrumental in developing the workforce of the Tulsa MSA. The MSA is home to several institutions which help supply local businesses and organizations with a workforce that has the necessary labor and skills to be competitive in today's economy.

CareerTechs.

There are four CareerTechs with a total of 11 branches located in the MSA. Additionally, three CareerTechs, though not physically located in the Tulsa MSA, serve the MSA population:

- **Central Technology Center** (Drumright; Sapulpa)
- **Tulsa Technology Center** (Broken Arrow; Owasso; Sand Springs; Memorial, Riverside, Skyline and Peoria Tulsa)
- **Pioneer Technology Center** (serving Osage County)
- **Meridian Technology Center** (serving Pawnee Schools, Pawnee County)
- **Tri County Technology Center** (serving Osage County)
- **Green Country Technology Center** (Okmulgee)
- **Northeast Technology Center** (Claremore)

Source: CareerTech.org

Colleges and Universities.

There are 12 colleges and universities in the MSA:

- **Langston University** (Tulsa)
- **Northeastern Oklahoma State University** (Broken Arrow)
- **Oklahoma State University Center for Health Sciences** (Tulsa)
- **Oklahoma State University Institute of Technology** (Okmulgee)
- **Oklahoma State University** (Tulsa)
- **Oral Roberts University** (Tulsa)
- **Phillips Theological Seminary** (Tulsa)
- **Rogers State University** (Claremore)
- **The University of Tulsa** (Tulsa)
- **Tulsa Community College** (Tulsa)
- **University of Oklahoma** (Tulsa)
- **University of Phoenix** (Tulsa)

Source: Oklahoma State Regents of Higher Education

K-12 School Districts.

There are 76 K-12 school districts in the Tulsa MSA:

Creek County:

- **Lone Star** (Sapulpa)
- **Gypsy** (Depew)
- **Pretty Water** (Sapulpa)
- **Allen-Bowden** (Tulsa)
- **Bristow** (Bristow)
- **Mannford** (Mannford)
- **Mounds** (Mounds)
- **Olive** (Drumright)
- **Kiefer** (Kiefer)
- **Oilton** (Oilton)
- **Depew** (Depew)
- **Kellyville** (Kellyville)
- **Sapulpa** (Sapulpa)
- **Drumright** (Drumright)

Okmulgee County:

- **Twin Hills** (Okmulgee)
- **Okmulgee** (Okmulgee)
- **Henryetta** (Henryetta)
- **Morris** (Morris)
- **Beggs** (Beggs)
- **Preston** (Preston)
- **Schulter** (Schulter)
- **Wilson** (Henryetta)
- **Dewar** (Dewar)

Osage County:

- **Osage Hills** (Bartlesville)
- **Bowring** (Pawhuska)
- **Avant** (Avant)
- **Anderson** (Sand Springs)
- **McCord** (Ponca City)
- **Pawhuska** (Pawhuska)
- **Shidler** (Shidler)
- **Barnsdall** (Barnsdall)
- **Wynona** (Wynona)
- **Hominy** (Hominy)
- **Prue** (Prue)
- **Woodland** (Fairfax)
- **Osage County ILC** (Hominy)

Pawnee County:

- **Jennings** (Jennings)
- **Pawnee** (Pawnee)
- **Cleveland** (Cleveland)

Rogers County:

- **Justus-Tiawah** (Claremore)
- **Claremore** (Claremore)
- **Catoosa** (Catoosa)
- **Chelsea** (Chelsea)
- **Oologah-Talala** (Oologah)
- **Inola** (Inola)
- **Sequoyah** (Claremore)
- **Foyil** (Foyil)
- **Verdigris** (Claremore)

Tulsa County:

- **Keystone** (Sand Springs)
- **Charter: School of Arts and Sciences** (Tulsa)
- **Charter: Kipp Tulsa** (Tulsa)
- **Charter: Tulsa Legacy Charter School Inc** (Tulsa)
- **Charter: College Bound** (Tulsa)
- **Charter: Honor Academy** (Tulsa)
- **Charter: Collegiate Hall** (Tulsa)
- **Charter: Deborah Brown** (Tulsa)
- **Charter: Discovery Schools of Tulsa** (Tulsa)
- **Charter: Sankofa Middle School** (Tulsa)
- **Langston Hughes Academy of Arts and Technology** (Tulsa)
- **Tulsa** (Tulsa)
- **Sand Springs** (Sand Springs)
- **Broken Arrow** (Broken Arrow)
- **Bixby** (Bixby)
- **Jenks** (Jenks)
- **Collinsville** (Collinsville)
- **Skiatook** (Skiatook)
- **Sperry** (Sperry)
- **Union** (Tulsa)
- **Berryhill** (Tulsa)
- **Owasso** (Owasso)
- **Glenpool** (Glenpool)
- **Liberty** (Mounds)

Wagoner County:

- **Okay** (Okay)
- **Coweta** (Coweta)
- **Wagoner** (Wagoner)
- **Porter Consolidated** (Porter)

Source: Oklahoma State Department of Education

Commuter Data

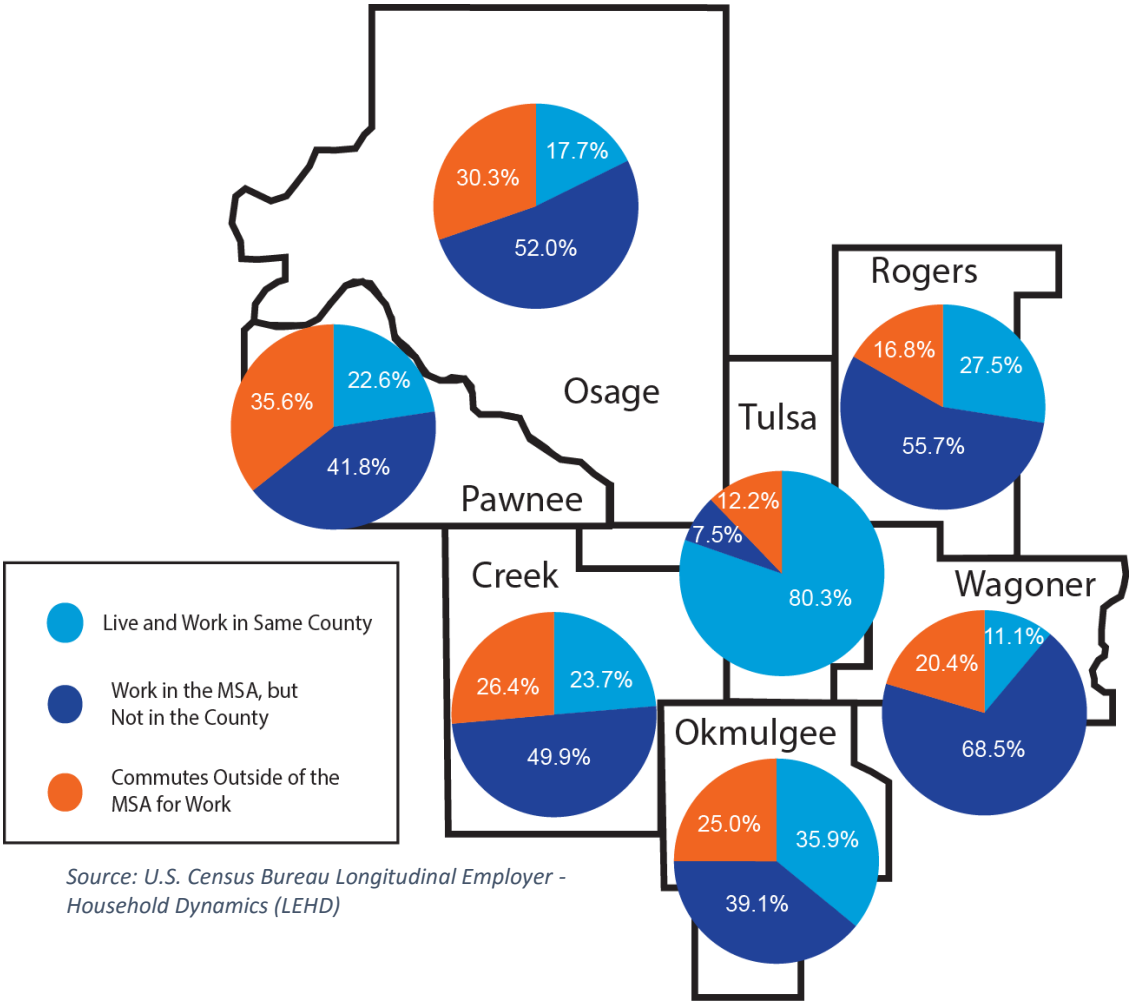
The U.S. Census Bureau Longitudinal Employer-Household Dynamics (LEHD) program uses data from a variety of sources including the unemployment insurance program, Quarterly Census of Employment and Wages (QCEW), and administrative data from censuses and surveys to create models estimating worker commutes for employment. According to these models:

- Over 84% of Tulsa MSA residents remain in the MSA for employment while approximately 16% commute outside the MSA. Approximately 80% commute less than 24 miles from home to work; only 12.5% commute greater than 50 miles.

- Most of those individuals who commute outside the MSA travel to Oklahoma City for employment. Overall, 4.5% of working residents commute from the MSA to Oklahoma City. At the county level, the estimated percentage of commuters to Oklahoma City varies from approximately 4.5% from Tulsa County to 7.2% from Creek County.

- Only Tulsa County retains a majority of employed residents to work in the County at 80.3%. Wagoner County retains the fewest residents for employment at 11.1%. For residents of Wagoner County who commute to work outside the county but remain within the MSA, the most common work destinations are the cities of Tulsa and Broken Arrow.

- Pawnee County loses the highest percentage of residents for employment outside the MSA at 35.63%. The most common destination for these workers is Oklahoma City (7.0%).



Source: U.S. Census Bureau Longitudinal Employer - Household Dynamics (LEHD)

- Residents of the Tulsa MSA also commute to work outside the state of Oklahoma, most commonly to the contiguous states of Texas (Dallas and Houston), Kansas (Arkansas City and Wichita), and Arkansas (Fort Smith, Fayetteville, and Van Buren); however, data also reveal common destinations of Missouri, Louisiana, Florida, and California. These data emphasize the growing trend of telework.

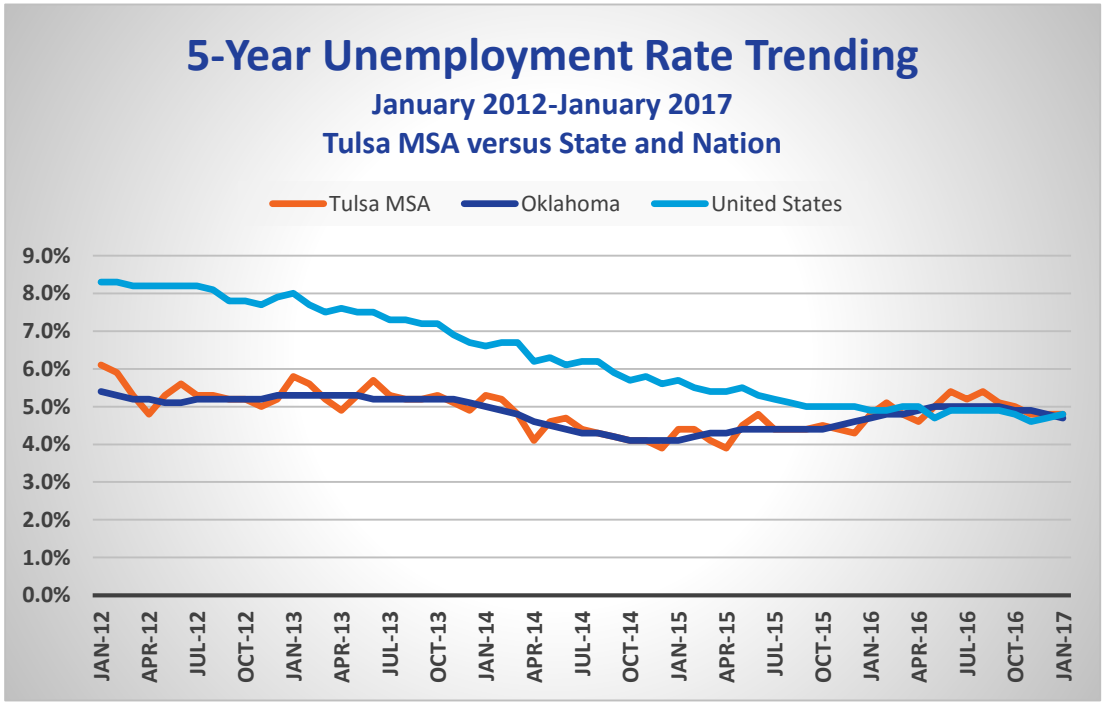
- The MSA not only loses workers to areas outside the MSA and/or the state of Oklahoma, it also draws workers into the MSA. Nearly 75,000 individuals commute into the MSA for employment. Only 13.1% commute more than 50 miles.

Unemployment Rate

The term "unemployment" refers to individuals who are counted as participating in the labor force, but are not employed. This eliminates consideration of individuals who do not participate in the labor force such as individuals who are unable to work due to a disability, retirees, and individuals who may consciously *choose* not to work such as students. As a result, the unemployment rate cited focuses on individuals seeking, but not attaining, employment.

For this analysis, the average unemployment rates of individuals living in Tulsa MSA were compared to the average unemployment rates of the state of Oklahoma as a whole, and the nation, over a span of 5 years from January 2012 to January 2017.

- Between January 2012 and January 2017, the unemployment rate in the MSA generally trended below the national average until February 2016 when the MSA rate exceeded the national rate by 0.2 percentage points. The MSA rate remained above the national rate by 0.2 to 0.5 percentage points through the end of the sample time period.



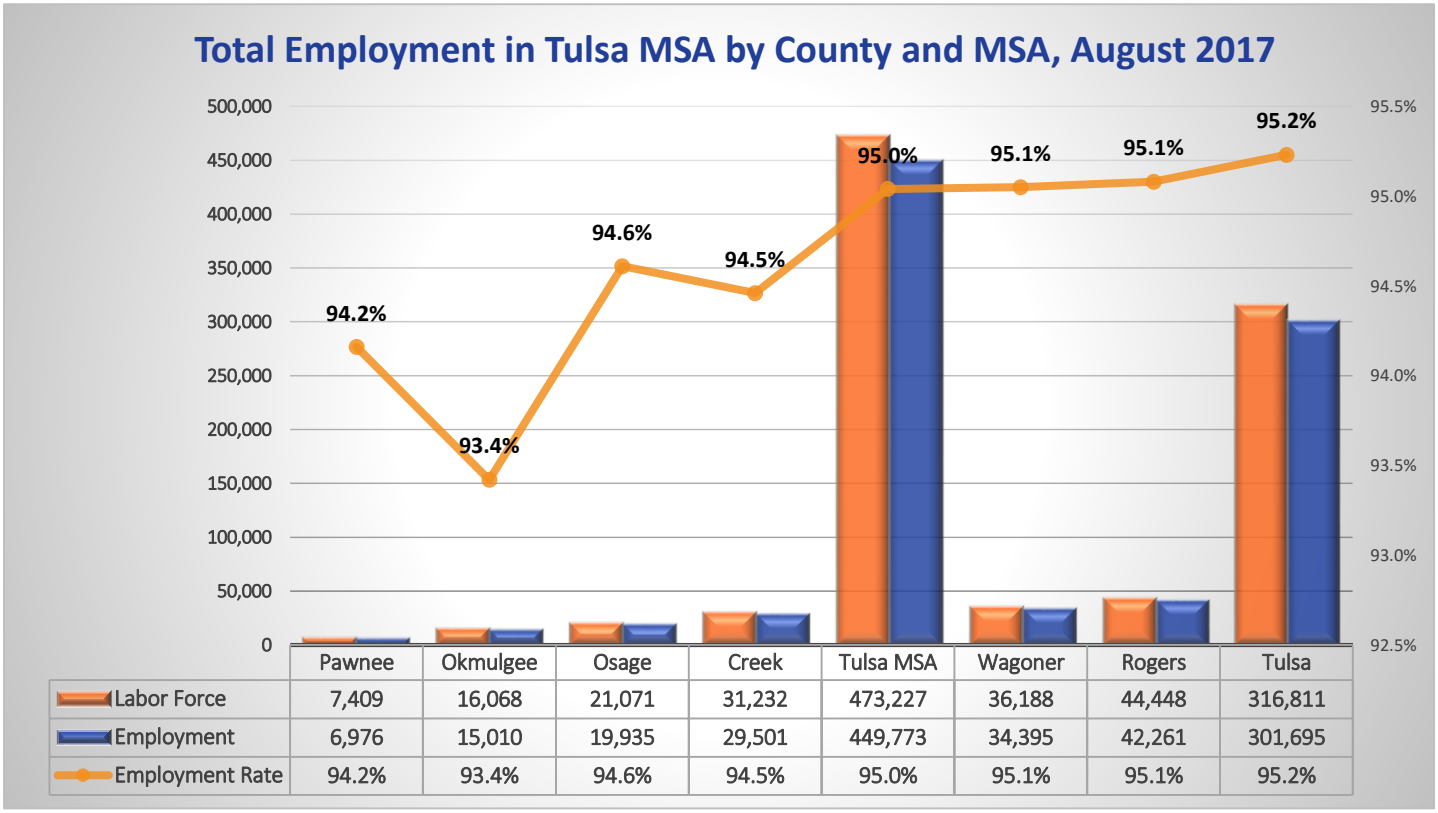
Source: Bureau of Labor Statistics, Local Area Unemployment Statistics (BLS LAUS)

- During this same time frame, while more volatile, the trending for the MSA rates have mirrored the state unemployment rates. The state rate varied only minutely, by no more than 0.5% in the short term, producing a relatively smooth trend line. Conversely, the unemployment rates for the MSA experienced significant variation, producing sharp peaks and valleys in the trend line. For example, between January 2012 and April 2012, the rate fell from 6.1% to 4.8% -- a 1.3 percentage point variance across three months. The rate then rose swiftly to 5.6% by June 2012. During this same time, January 2012 to June 2012, the state rate varied by no more the 0.3%. Another example of this volatility occurred in 2014. In February 2014, the unemployment rate for the MSA was 5.2%. By April 2014, the rate had fallen to 4.1%, a downward slide of 1.1 percentage points. By June 2014, the rate had climbed to 4.7%, a point which introduced another decline.

- During the five-year span examined, the unemployment rate for the MSA peaked at 6.1% in January 2012 and reached its lowest level of 3.9% in December 2014 and April 2015. In 2017, beyond the sample period, the MSA unemployment rate has ranged from a high of 4.9% in May 2017 to a low of 4.2% in April 2017. Preliminary data for August 2017 indicates the unemployment rate is once again on the rise at 4.9%.

Total Employment

In contrast to the unemployment rates discussed previously, this report section focuses on the number and percentage of individuals in the Tulsa MSA who were *employed*. Employment data are cited for August 2017.



	Pawnee	Okmulgee	Osage	Creek	Tulsa MSA	Wagoner	Rogers	Tulsa
Labor Force	7,409	16,068	21,071	31,232	473,227	36,188	44,448	316,811
Employment	6,976	15,010	19,935	29,501	449,773	34,395	42,261	301,695
Employment Rate	94.2%	93.4%	94.6%	94.5%	95.0%	95.1%	95.1%	95.2%

Source: Bureau of Labor Statistics Local Area Unemployment Statistics

- In August 2017, 473,227 MSA residents were in the workforce with 449,773 employed. This results in an overall employment rate of 95.04%.

- Due to the high concentration of employment opportunities in the section of the Tulsa MSA located in Tulsa County – Tulsa County reported the existence of 364,065 jobs in 2016 – that County exhibited the highest employment rate of 95.2%. Okmulgee County, with the second lowest population and labor force – 39,213 and 16,068 respectively – experienced the lowest employment rate at 93.42%

- An examination of historical data reveals that the August 2017 employment percentages for each county are within 0.6% of the five-year average for each county. Despite recording the lowest employment rate for August 2017, Okmulgee County exceeds its five-year average by 0.6%. Three other counties in the MSA exceeded the five-year average in August 2017: Creek County, Osage County, and Pawnee County. Wagoner experienced the lowest differential between the August 2017 rates and the county five-year average with a loss of -0.28%. Five Year averages for each county are reported below. All data are rounded to the nearest one-hundredth of 1%.

County	August 2017 Employment Rate	Five-year Average Employment Rate	Percentage Point Differential
Creek	94.46%	94.42%	0.03
Okmulgee	93.42%	92.82%	0.60
Osage	94.61%	94.43%	0.18
Pawnee	94.16%	93.90%	0.25
Rogers	95.08%	95.25%	-0.18
Tulsa	95.23%	95.32%	-0.09
Wagoner	95.05%	95.33%	-0.28

Source: EMSI 2017.3

NAICS Employment Sectors

Several of the analyses that follow are based upon data examined by NAICS employment sector code. The following information is provided to enhance understanding of the framework of these analyses.

The North American Industry Classification System (NAICS) is the standard utilized by federal agencies to classify businesses to collect, analyze, and publish, statistical data related to the United States business economy. NAICS uses a 6-digit coding system which is structured hierarchically, beginning with 20 broad economic sectors. Over 1,000 industries are then sub-categorized within these 20 sectors. Each industry within a sector shares distinguishing economic activities. Additional information is available at www.census.gov/eos/www/naics. A list of the 20 NAICS sectors and the types of industries included can be found in Appendix A at the end of this document.

SOC Occupational Codes

Additional analyses that follow are based upon data examined by SOC occupational codes. The following information is provided to enhance understanding of the framework of these analyses.

The Standard Occupational Classification (SOC) system is used by Federal statistical agencies to classify workers into occupational categories for the purpose of collecting, calculating, or disseminating data. All workers are classified into one of 840 detailed occupations according to their occupational definition. To facilitate classification, detailed occupations are combined to form 461 broad occupations, 97 minor groups, and 23 major groups. Detailed occupations in the SOC with similar job duties, and in some cases, skills, education, and/or training, are grouped together. Currently, the 2010 SOC system is in use; new revisions to the SOC codes are scheduled for completion in 2018. Additional information is available at www.bls.gov/soc/. A list of the 23 major groups comprising the 2010 SOC system, as well as examples of the 97 included minor groups can be found in Appendix B at the end of this document.

Top Employment Sectors

The following list highlights the top 10 sectors in the MSA in number of jobs reported. Overall, the top 10 sectors account for 364,332 jobs representing 82.67% of all jobs reported in the MSA in 2016. *Health Care and Social Assistance* is the top employing sector, offering 58,245 jobs for MSA residents at 3,486 payrolled business locations. The *Government* sector ranks second, providing 56,540 jobs at 760 business locations. The 10th ranked sector in the MSA is *Other Services (except Public Administration)*, which reports 18,873 jobs, less than one-third as many jobs as the top-ranking sector of *Health Care and Social Assistance*.

NAICS Sector Group	Sector	2016 Jobs
62	Health Care and Social Assistance	58,245
90	Government	56,540
44	Retail Trade	50,323
31	Manufacturing	46,103
72	Accommodation and Food Services	39,128
56	Administrative and Support and Waste Management and Remediation Services	32,139
23	Construction	23,609
54	Professional, Scientific, and technical Services	20,430
48	Transportation and Warehousing	18,942
81	Other Services (except Public Administration)	18,873

Source: EMSI 2017.3

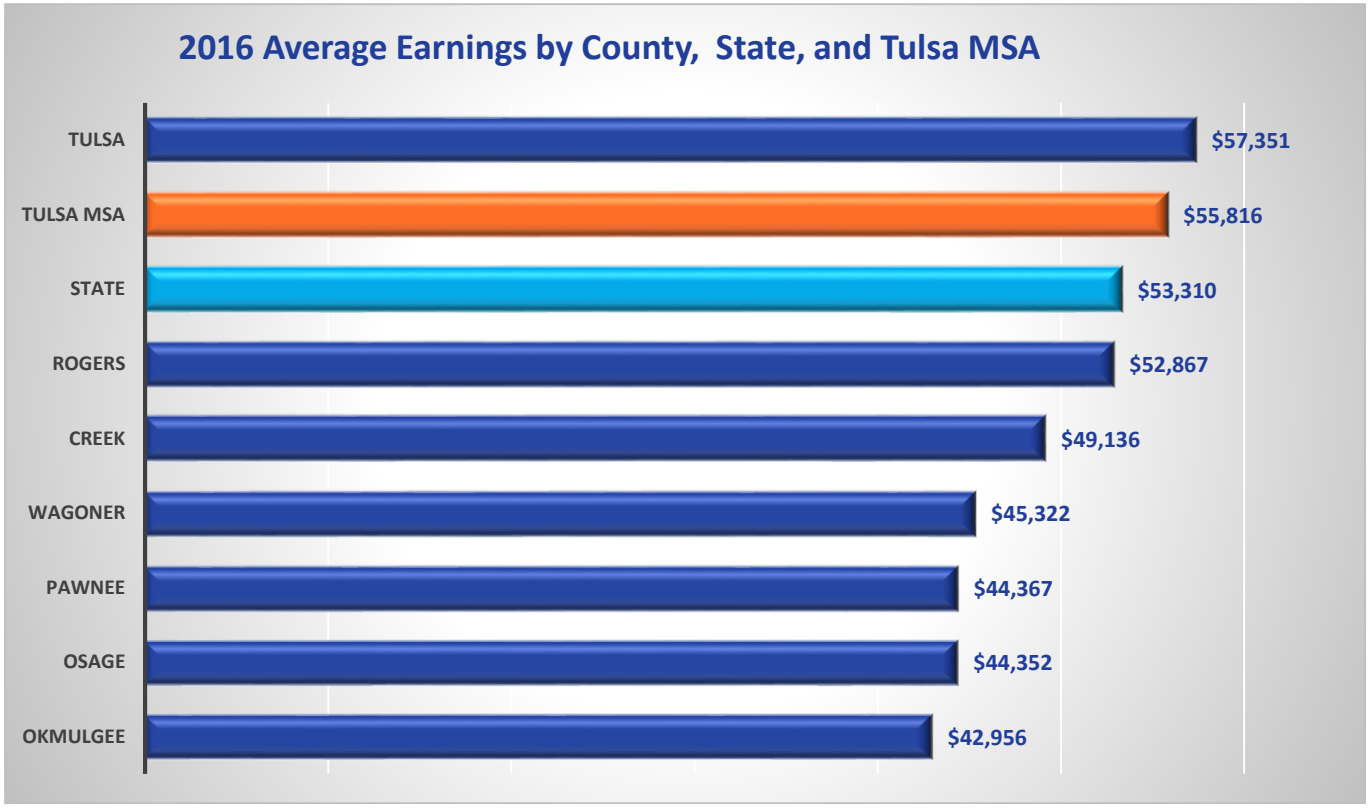
Average Earnings by County

The chart titled "2016 Average Earnings by County, State and Tulsa MSA" located immediately following this analysis, illustrates average annual earnings for the seven MSA counties as well as the MSA average and Oklahoma statewide average. Annual earnings include wages, salaries, profits, and other compensation. A comparison of these data reveal the following:

- The average annual earnings for the Tulsa MSA are greater than the average earnings for the state as a whole. Average annual earnings for the MSA were reported at $55,816 while average earnings for the state of Oklahoma are $53,310. This represents a gap of 4.7%.

- At $57,351, Tulsa County ranks first in average earnings. This figure represents an increase of only 2.7% over the MSA average and a 7.6% increase from the state average. Okmulgee County exhibits the lowest average earnings at $42,956 – 23% below the MSA average. When a direct comparison is made between Okmulgee County and Tulsa County, there is a 27.5% differential.

- Six of the seven MSA counties report earnings below the MSA average. Only Tulsa County reports earnings above the average. This upward skew of the MSA average reflects the impact of the job density and increased earnings in the metropolitan City of Tulsa versus the rural nature of the remaining counties in the MSA. This inequity over-weights the average earnings for the MSA. Removal of the over-weighted county from the calculations will often result in a more balanced average, revealing the extent of the impact of that single locale. In this instance, removal of Tulsa County from the equation results in average earnings of $48,524.



Source: EMSI 2017.3

Average Earnings by Sector

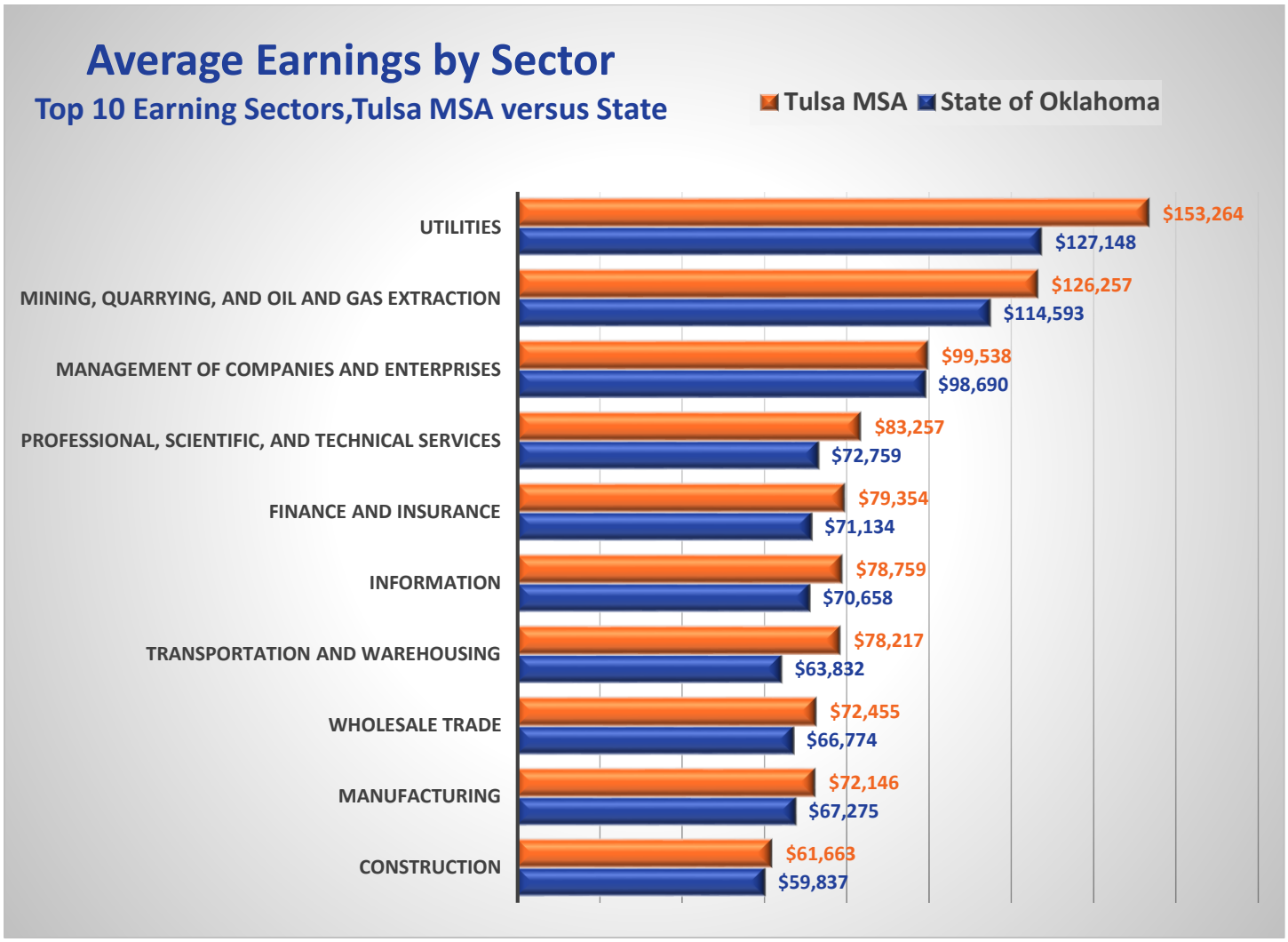
Annual employee earnings, averaged by sector, are examined in this section of the report. A chart, titled "Average Earnings by Sector, Top 10 Earning Sectors in Tulsa MSA versus State of Oklahoma," follows the analysis.

- The average earnings for all of the top 10 sectors in the Tulsa MSA are above the average earnings for the same sector at the state level. The greatest disparity in earnings is found in the *Transportation and Warehousing* sector. MSA residents earn 22.5% more on average than statewide residents working in the same sector. The smallest differential in earnings is found in the *Management of Companies and Enterprises* sector, a difference of only 0.86%.

- The *Utilities* sector reports higher average earnings than any other sector in the MSA at $153,264. This is 20.54% above the statewide average for the same sector of $127,148.

- Despite ranking first in the top 10 Employment Sectors for overall numbers of jobs available provided previously, *Health Care and Social Assistance* fails to rank in the top 10 Earnings by Sector for the MSA. Earnings for this sector rank eleventh at $58,786 annually. Likewise, the *Government* sector, ranked second in the number of job opportunities in the MSA, ranks twelfth in annual earnings at $53,800. The *Retail Trade* sector, accounting for over 50,000 jobs in the MSA, ranks sixteenth with annual earnings of only $34,121 – earnings equal to only 22% of the top-ranked *Utilities* sector. In summary, those sectors providing the greatest number of jobs in the MSA exhibit significantly lower earnings than sectors employing fewer MSA workers.

- The highest average earnings in the MSA are found in industries included in the *Finance and Insurance* sector. *Investment Banking and Securities Dealing* reports the highest earnings in the MSA at $316,214; however, employment opportunities are extremely limited in this industry since only 59 jobs were reported in 2016 and the industry is projected to lose 16 additional jobs by 2025. The *Securities Brokerage* industry ranks second at a significantly lower level of earnings at $200,784, but offers greater employment opportunity at 532 reported positions in 2016.



Source: EMSI, 2017.3

Top Occupations by Number of Jobs

This analysis examines the prevalence of job classifications in the Tulsa MSA. A table summarizing the top 10 occupations by number of jobs follows the analysis.

- The top 10 occupations represent 87,831 jobs; 19.93% of the total jobs reported in the MSA in 2016. By 2025, the number of jobs projected to be available in these 10 occupations will be 94,895, 20.32% of the total jobs reported in the MSA.

- The most prevalent job in the MSA is *Retail Salesperson*. In 2016, approximately 14,301 *Retail Salesperson* jobs existed with a median hourly wage of $10.54. *Cashiers* ranked second with 10,608 reported jobs and median hourly earnings of $9.67.

- The fourth-ranked job category in the MSA, Combined Food Preparation and Serving Workers, Including Fast Food, exhibits the greatest potential for growth by 2025, increasing by an estimated 1,633 jobs – a growth rate of 19.6%. The second greatest potential for growth is found in the second-ranked occupation of Cashiers which is expected to grow by 1,475 jobs, a growth rate of 13.9%.

- With regard to educational requirements, eight of the top 10 occupations require the completion of a high school diploma or less, generally in conjunction with some level of short-term on-the-job training. The occupation of Registered Nurses requires the completion of an Associates Degree while the occupation of General and Operations Managers requires the completion of a Bachelor's Degree.

Occupation	2016 Jobs	2025 Jobs	Change	Median Hourly Earnings	Education or Experience Level
Retail Salespersons	14,301	15,727	1,426	$10.54	Short-term on-the-job training
Cashiers	10,608	12,083	1,475	$9.67	Short-term on-the-job training
Customer Service Representatives	9,583	9,871	288	$14.58	Short-term on-the-job training
Combined Food Preparation and Serving Workers, Including Fast Food	8,336	9,969	1,633	$8.77	Short-term on-the-job training
Office Clerks, General	8,280	8,606	326	$12.90	Short-term on-the-job training
Secretaries and Administrative Assistants, Except Legal, Medical, and Executive	7,539	7,781	242	$15.03	Short-term on-the-job training
Laborers and Freight, Stock, and Material Movers, Hand	7,426	7,698	272	$13.36	Short-term on-the-job training
General and Operations Managers	7,342	7,784	442	$40.94	Bachelor's Degree
Registered Nurses	7,331	8,063	732	$28.68	Associates Degree
Waiters and Waitresses	7,086	7,313	227	$8.79	Short-term on-the-job training

Source: EMSI, 2017.3

Top Paying Occupational Groups

For this analysis, individual occupations are aggregated and reported by Standard Occupational Classification (SOC) major group. The table that follows highlights the top paying occupational groups in the MSA by median hourly earnings.

- The top 10 paying occupational groups include 124,477 individual jobs; 28.25% of the total jobs reported in the MSA.

- As may be expected for an MSA dominated by a large metropolitan area, the median hourly earnings for all of the top 10 highest paying occupation groups are higher than the state median hourly earnings. The greatest differential in earnings is found in the major group of *Legal* Occupations where the MSA median hourly wage is greater than the state wage by 18.4%. *Management* Occupations earn the highest median hourly wage in the MSA at $40.66. This median wage is 9.5% above the Oklahoma statewide median hourly earnings for the same occupational group.

- All of the top 10 occupational groups in the MSA report median hourly earnings below those for the same occupations in Tulsa County. This finding reflects the rural nature of much of Tulsa MSA.

- The sixth ranked occupational group, *Life, Physical, and Social* Occupations provides competitive earnings with hourly median earnings of $27.83 but there are fewer employment opportunities with only 2,079 jobs reported. Likewise, the second-ranked *Legal* Occupations provides high MSA median hourly earnings of $35.77 but there are limited employment opportunities with only 3,297 jobs reported.

- *Arts, Design, Entertainment, Sports, and Media* Occupations are ranked 10th in the MSA with median hourly earnings of $19.59. This salary is 12.9% above the state average for the same occupational category, but 52% below the top-ranked *Management* Occupations.

- The top three occupational groups in the MSA, ordered by the number of jobs reported in 2016, are:
    - *SOC Group 43-0000: Office and Administrative Support* Occupations (70,109 jobs);
    - *SOC Group 41-0000: Sales and Related* Occupations (47,488 jobs); and,
    - *SOC Group 35-0000: Food Preparation and Serving Related* Occupations (40,511 jobs);

  While these three major groups represent 158,108 and 35.9% of the total jobs in the MSA, none are included in the list of Top 10 Paying Occupational Groups due to low median earnings ranging from $9.12 to $15.50 per hour.

SOC Code Group	Occupation Group	2016 Jobs	MSA Median Hourly Earnings	Tulsa County Median Hourly Earnings	State Median Hourly Earnings
11-0000	Management Occupations	24,278	$40.66	$41.39	$37.12
23-0000	Legal Occupations	3,297	$35.77	$35.98	$30.21
17-0000	Architecture and Engineering Occupations	8,807	$35.02	$35.47	$34.66
15-0000	Computer and Mathematical Occupations	8,512	$32.63	$33.00	$30.49
13-0000	Business and Financial Operations Occupations	18,301	$28.96	$29.41	$27.61
19-0000	Life, Physical, and Social Science Occupations	2,079	$27.83	$28.70	$25.44
29-0000	Healthcare Practitioners and Technical Occupations	24,007	$26.97	$27.37	$25.55
49-0000	Installation, Maintenance, and Repair Occupations	22,755	$20.83	$21.38	$19.52
21-0000	Community and Social Service Occupations	7,699	$20.81	$21.39	$18.70
27-0000	Arts, Design, Entertainment, Sports, and Media Occupations	4,742	$19.59	$19.85	$17.35

Source: EMSI, 2017.3

Ecosystems Impact on Occupations and Earnings

Oklahoma has identified five key, in demand, industry clusters known as "ecosystems" which provide the state with a competitive advantage in a global economy. They exhibit significant potential for employment growth and provide wealth generating employment opportunities. The five key ecosystems' demand industries produce or provide similar goods and services and therefore have similar needs in workforce, infrastructure, and economic development policy. These ecosystems include Aerospace and Defense, Agriculture and Biosciences, Energy, Information and Finance, and Transportation and Distribution.

In addition to the five statewide ecosystems, four localized complimentary ecosystems important to regional economies have been identified, including Construction, Education, Health Care, and Manufacturing. A summary table of ecosystem data pertinent to the MSA is provided for ease of ecosystem comparison, followed by an analysis of each individual key and complimentary ecosystem.

Ecosystem Comparison
Tulsa MSA

Ecosystem	Estimated Net Job Growth (2016-2025)	Ecosystem Growth Rate (2016-2025)	Average Annual Earnings	Comments
Aerospace and Defense	-915	-2.88%	$76,414	
Agriculture and Bioscience	1,930	11.63%	$71,838	Second highest growth rate.
Energy	718	2.69%	$108,573	Highest earnings.
Information and Financial Services	-1,194	-4.10%	$85,325	Second highest earnings.
Transportation and Distribution	1,631	4.47%	$76,323	
Construction	5,735	10.01%	$64,490	Second largest net job increase.
Education	796	2.39%	$43,895	
Health Care	8,759	13.55%	$58,786	Greatest number of jobs overall. Largest net job increase. Highest growth rate..
Manufacturing	319	0.97%	$73,218	

Aerospace and Defense.

In 2016, there were approximately 31,700 jobs in the Aerospace and Defense Ecosystem in the MSA with average annual earnings per job of $76,414. By 2025, employment within this ecosystem is projected to decline to approximately 30,800. While projections indicate that over 1,400 new jobs will be created, 113 occupational categories are expected to experience a decrease in demand. Overall, employment within the ecosystem will decrease by a net 915 jobs; a growth rate of -2.88%.

The list below, ordered alphabetically by occupation, highlights a few of the occupations employed by industries within the Aerospace and Defense Ecosystem in the MSA. It should be noted that these positions are not limited to employment within the Aerospace and Defense Ecosystem, but rather, may be in demand by many other sectors, industries, and ecosystems across the state.

SOC	Occupation	Median Hourly Earnings	Education or Experience Level
49-3011	Aircraft Mechanics and Service Technicians	$33.04	Postsecondary nondegree award
51-2011	Aircraft Structure, Surfaces, Rigging, and Systems Assemblers	$22.96	Moderate-term on-the-job training
17-2051	Civil Engineers	$40.03	Bachelor's degree
15-1151	Computer User Support Specialists	$21.84	Some college, no degree
51-4011	Computer-Controlled Machine Tool Operators, Metal and Plastic	$18.90	Moderate-term on-the-job training
11-1021	General and Operations Managers	$40.94	Bachelor's degree
51-9061	Inspectors, Testers, Sorters, Samplers, and Weighers	$18.56	Moderate-term on-the-job training
51-4041	Machinists	$20.41	Long-term on-the-job training
15-1132	Software Developers, Applications	$34.17	Bachelor's degree
51-4121	Welders, Cutters, Solderers, and Brazers	$21.52	Moderate-term on-the-job training

Source: EMSI, 2017.3

Agriculture and Bioscience.

In 2016, there were over 16,500 jobs in the Agriculture and Bioscience Ecosystem in Tulsa MSA with average annual earnings per job of $71,838. By 2025, employment within this ecosystem is projected to grow to approximately 18,500. While projections indicate that 2,140 new jobs will be created, 48 occupational categories are expected to experience a decrease in demand. Overall, employment within the ecosystem will increase by a net 1,930 jobs; a growth rate of 11.63%.

The list below, ordered alphabetically by occupation, highlights some of the occupations employed by industries within the Agriculture and Bioscience Ecosystem in the MSA. These positions are not limited to employment within this particular ecosystem, but rather, may be in demand by many other sectors, industries, and ecosystems across the state.

SOC	Occupation	Median Hourly Earnings	Education or Experience Level
17-2051	Civil Engineers	$40.03	Bachelor's degree
45-2092	Farmworkers and Laborers, Crop, Nursery, and Greenhouse	$11.50	Short-term on-the-job training
51-1011	First-Line Supervisors of Production and Operating Workers	$26.83	Less than 5 years experience
11-1021	General and Operations Managers	$40.94	Bachelor's degree
51-9061	Inspectors, Testers, Sorters, Samplers, and Weighers	$18.56	Moderate-term on-the-job training
51-9196	Paper Goods Machine Setters, Operators, and Tenders	$23.23	Moderate-term on-the-job training
41-4012	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	$23.87	Moderate-term on-the-job training
41-4011	Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	$30.35	Bachelor's degree
31-9096	Veterinary Assistants and Laboratory Animal Caretakers	$13.10	Short-term on-the-job training
29-1131	Veterinarians	$43.85	Doctoral or professional degree

Source: EMSI, 2017.3

Energy.

In 2016, there were 26,659 jobs in the Energy Ecosystem in Tulsa MSA with average annual earnings per job of approximately $108,573, the highest average earnings of any ecosystem in the MSA. By 2025, employment within this ecosystem is projected to grow to over 27,300. While projections indicate that approximately 1,444 new jobs will be created, 108 occupational categories are expected to experience a decrease in demand, resulting in the loss of 726. As a result, employment within the ecosystem will increase by a net 718 jobs; a growth rate of 2.69%.

The list below, ordered alphabetically by occupation, highlights a few of the occupations employed by industries within the Energy Ecosystem in the MSA. It should be noted that these positions are not limited to employment within this ecosystem, but rather, may be in demand by many other sectors, industries, and ecosystems across the state.

SOC	Occupation	Median Hourly Earnings	Education or Experience Level
51-4011	Computer-Controlled Machine Tool Operators, Metal and Plastic	$18.90	Moderate-term on-the job training
51-4031	Cutting, Punching, and Press Machine Setters, Operators and Tenders, Metal and Plastic	$14.96	Moderate-term on-the-job training
11-1021	General and Operations Managers	$40.94	Bachelor's degree
49-9041	Industrial Machinery Mechanics	$24.20	Long-term on-the-job training
51-9061	Inspectors, Testers, Sorters, Samplers, and Weighers	$18.56	Moderate-term on-the-job training
51-4041	Machinists	$20.41	Long-term on-the-job training
17-2141	Mechanical Engineers	$37.47	Bachelors' degree
17-2171	Petroleum Engineers	$62.13	Bachelor's degree
51-2092	Team Assemblers	$15.54	Moderate-term on-the-job training
51-4121	Welders, Cutters, Solderers, and Brazers	$21.52	Moderate-term on-the-job training

Source: EMSI, 2017.3

Information and Financial Services.

In 2016, there were 29,090 jobs reported in the Information and Financial Services Ecosystem in the MSA; by 2025, that figure is expected to decrease to approximately 27,900. The average annual earnings per job are approximately $85,325. While projections indicate that 630 new jobs will be created, 179 occupational categories are expected to experience a decrease in demand, resulting in the loss of 1,824. As a result, employment within the ecosystem is projected to decrease by a net 1,194 jobs, a growth rate of -4.10%.

The list below, ordered alphabetically by occupation, highlights some of the occupations employed by industries within the Information and Financial Services Ecosystem in the MSA. It should be noted that these positions are not limited to employment within the Information and Financial Services Ecosystem, but rather, may be in demand by many other sectors, industries, and ecosystems across the state.

SOC	Occupation	Median Hourly Earnings	Education or Experience Level
13-2011	Accountants and Auditors	$32.90	Bachelor's degree
43-3031	Bookkeeping, Accounting, and Auditing Clerks	$18.30	Some college, no degree
15-1151	Computer User Support Specialists	$21.84	Some college, no degree
11-3031	Financial Managers	$49.75	Bachelor's degree
43-1011	First-Line Supervisors of Office and Administrative Support Workers	$23.75	Less than 5 years experience
11-1021	General and Operations Managers	$40.94	Bachelor's degree
43-4131	Loan Interviewers and Clerks	$15.26	Short-term on-the-job training
13-2072	Loan Officers	$26.52	Bachelor's degree
15-1132	Software Developers, Applications	$34.17	Bachelor’s degree
43-3071	Tellers	$13.56	Short-term on-the-job training

Source: EMSI, 2017.3

Transportation and Distribution.

In 2016, there were 36,455 jobs reported in the Transportation and Distribution Ecosystem in Tulsa MSA with average annual earnings per job of approximately $76,323. By 2025, employment will grow to over 38,000. While it is anticipated that 3,060 new jobs will be created, 83 occupational categories will decline in employment, losing 1,429 jobs. As a result, the Transportation and Distribution Ecosystem is projected to gain a net 1,631 jobs, a growth rate of 4.47%.

The list below, arranged alphabetically by occupation, highlights a few of the occupations employed by industries within the Transportation and Distribution Ecosystem in the MSA. It should be noted that these positions are not limited to employment within this particular ecosystem, but rather, may be in demand by many other sectors, industries, and ecosystems across the state.

SOC	Occupation	Median Hourly Earnings	Education or Experience Level
49-3011	Aircraft Mechanics and Service Technicians	$33.04	Postsecondary nondegree award
43-3031	Bookkeeping, Accounting, and Auditing Clerks	$18.30	Some college, no degree
11-1021	General and Operations Managers	$40.94	Bachelor's degree
53-3032	Heavy and Tractor-Trailer Truck Drivers	$19.13	Postsecondary nondegree award
53-7051	Industrial Truck and Tractor Operators	$15.07	Short-term on-the-job training
53-7062	Laborers and Freight, Stock, and Material Movers, Hand	$13.36	Short-term on-the-job training
53-3033	Light Truck or Delivery Services Drivers	$15.05	Short-term on-the-job training
41-4012	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	$23.87	Moderate-term on-the-job training
41-4011	Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	$30.35	Bachelor’s degree
51-2092	Team Assemblers	$15.54	Moderate-term on-the-job training

Source: EMSI, 2017.3

Health Care (Regional Complementary).

While Health Care has not been identified as a key ecosystem, it is considered a regional complementary ecosystem and as the largest employing ecosystem, is very important to the Tulsa MSA. Over 64,600 jobs were reported in 2016 in Health Care in the MSA with average annual earnings per job of $58,786. By 2025, employment within this ecosystem is projected to increase to 73,482. Approximately 8,972 new jobs will be created, with a loss of only 213 from 26 occupational categories. This results in a net increase in employment in Health Care of 8,759 jobs, a growth rate of 13.55%. This is the greatest number of newly-created jobs and largest growth rate of any ecosystem in the MSA.

The list below, organized alphabetically based on occupation, highlights some of the occupations employed by industries within the Health Care regional complementary ecosystem in the MSA. While these positions appear to be highly specialized within the Health Care sector, it must be remembered that other industries do employ health care specialists and there is competition among several other sectors, industries, and ecosystems for these skilled workers.

SOC	Occupation	Median Hourly Earnings	Education or Experience Level
31-9091	Dental Assistants	$16.89	Postsecondary nondegree award
31-1011	Home Health Aides	$11.53	Short-term on-the-job training
29-2061	Licensed Practical and Licensed Vocational Nurses	$19.81	Postsecondary nondegree award
11-9111	Medical and Health Services Managers	$38.74	Bachelor's degree
31-9092	Medical Assistants	$14.60	Postsecondary nondegree award
43-6013	Medical Secretaries	$14.86	Short-term on-the-job training
31-1014	Nursing Assistants	$11.71	Postsecondary nondegree award
29-2052	Pharmacy Technicians	$12.89	Moderate-term on-the-job training
29-1069	Physicians and Surgeons, All Other	$109.48	Doctoral or professional degree
29-1141	Registered Nurses	$28.68	Associates degree

Source: EMSI, 2017.3

Construction (Regional Complementary).

Construction is also a regional complementary ecosystem with over 57,300 job reported in 2016. The average annual earnings per job in the Construction ecosystem were $64,490. By 2025, employment is projected to increase to over 63,000. Approximately 6,181 new jobs will be created, with a loss of 446 from 53 occupational categories. This results in a net increase in employment in Construction of 5,735 jobs, a growth rate of 10.01%.

The list below, arranged alphabetically by occupation, highlights some of the occupations employed by industries within the Construction regional complementary ecosystem in the MSA. It should be noted that these positions are not limited to employment within Construction, but rather, may be in demand by many other sectors, industries, and ecosystems across the state.

SOC	Occupation	Median Hourly Earnings	Education or Experience Level
47-2031	Carpenters	$16.70	Apprenticeship
47-2051	Cement Masons and Concrete Finishers	$17.25	Moderate-term on-the-job training
47-2061	Construction Laborers	$14.02	Short-term on-the-job training
47-2111	Electricians	$24.66	Apprenticeship
51-1011	First-Line Supervisors of Construction Trades and Extraction Workers	$30.18	5 years or more experience
11-1021	General and Operations Managers	$40.94	Bachelor's degree
51-4041	Machinists	$20.41	Long-term on-the-job training
47-2152	Plumbers, Pipefitters, and Steamfitters	$24.01	Apprenticeship
41-2031	Retail Salespersons	$10.54	Short-term on-the-job training
51-4121	Welders, Cutters, Solderers, and Brazers	$21.52	Moderate-term on-the-job training

Source: EMSI, 2017.3

Education (Regional Complementary).

The regional complementary ecosystem of Education accounted for approximately 33,329 jobs in 2016 with average earnings per job of $43,895. By 2025, employment is projected to increase to over 34,100. Approximately 1,198 new jobs will be created, with a loss of 402 from 72 occupational categories. This results in a net increase in employment in Education of 796 jobs, a growth rate of 2.39%.

The list below, presented in alphabetical order by occupation, highlights some of the occupations employed by industries within the Education Ecosystem. Similar to the Health Care regional complementary ecosystem, many of the occupations within Education are extremely specialized but may still be in demand from other sectors, industries, and ecosystems across the state.

SOC	Occupation	Median Hourly Earnings	Education or Experience Level
43-3031	Bookkeeping, Accounting, and Auditing Clerks	$18.30	Some college, no degree
53-3022	Bus Drivers, School or Special Client	$11.65	Short-term on-the-job training
11-9033	Education Administrators, Elementary and Secondary School	$34.85	Master's degree
21-1012	Educational, Guidance, School, and Vocational Counselors	$20.78	Master's degree
25-2021	Elementary School Teachers, Except Special Education	$18.48	Bachelor's degree
25-2012	Kindergarten Teachers, Except Special Education	$18.37	Bachelor's degree
25-2022	Middle School Teachers, Except Special Education and Career/Technical Education	$19.19	Bachelor's degree
25-1099	Postsecondary Teachers	$27.55	Doctoral or professional degree
25-3098	Substitute Teachers	$8.83	Bachelor's degree
25-9041	Teacher Assistants	$9.41	Some college, no degree

Source: EMSI, 2017.3

Manufacturing (Regional Complementary).

The regional complementary ecosystem of Manufacturing is unique in that it is not typically analyzed as a distinctive, separate ecosystem. Rather, components of the Manufacturing sector are consistently embedded throughout each key ecosystem and included in those analyses. However, it is interesting and broadens the base of knowledge about the sector to focus an analysis specifically on manufacturing-related occupations.

The Manufacturing regional complementary ecosystem accounted for approximately 32,747 jobs in 2016, with average earnings per job of $73,218. By 2025, employment is projected to increase to over 33,000 jobs, with 1,029 new jobs created and 710 jobs lost in 66 occupational categories, a nominal growth rate of 0.97%

The list below, arranged in alphabetical order by occupation, highlights a few of the occupations employed by industries within the Manufacturing regional complementary ecosystem in the MSA. These positions are not limited to employment strictly within Manufacturing Ecosystem industries, but rather, may be in demand by many other sectors, industries, and ecosystems across the state.

SOC	Occupation	Median Hourly Earnings	Education or Experience Level
51-2011	Aircraft Structure, Surfaces, Rigging, and Systems Assemblers	$22.96	Moderate-term on-the-job training
51-4011	Computer-Controlled Machine Tool Operators, Metal and Plastic	$18.90	Moderate-term on-the-job training
51-1011	First-Line Supervisors of Production and Operating Workers	$26.83	Less than 5 years experience
11-3051	Industrial Production Managers	$46.19	Bachelor's degree
51-9061	Inspectors, Testers, Sorters, Samplers, and Weighers	$18.56	Moderate-term on-the-job training
51-4041	Machinists	$20.41	Long-term on-the-job training
17-2141	Mechanical Engineers	$37.47	Bachelor's degree
51-4081	Multiple Machine Tool Setters, Operators, and Tenders, Metal and Plastic	$18.06	Moderate-term on-the-job training
51-2092	Team Assemblers	$15.54	Moderate-term on-the-job training
51-4121	Welders, Cutters, Solderers, and Brazers	$21.52	Moderate-term on-the-job training

Source: EMSI, 2017.3

Appendix A: NAICS Industry Sectors with associated sample industries

Sector Code	Sector Name Sample industries/descriptions		Sector Description
11	Agriculture, Forestry, Fishing, and Hunting		Activities of this sector are growing crops, raising animals, harvesting timber, and harvesting fish and other animals from farms, ranches, or the animals' natural habitats.
	Crop Production	Oilseed, grain, vegetable, fruit, and tree nut farming; greenhouse, nursery and floriculture	
	Animal Production and Aquaculture	Cattle, hog, poultry, sheet, and goat farming; egg production, aquaculture	
	Forestry and Logging	Timber tract operations, forest nurseries, logging.	
	Fishing, Hunting and Trapping		
21	Mining, Quarrying, and Oil and Gas Extraction		Activities of this sector are extracting naturally occurring mineral solids such as coal and ore; liquid minerals such as crude petroleum; and gases such as natural gas; and beneficiating (e.g., crushing, screening, washing, and floatation) and other preparation at the mine site, or as part of mining activity.
	Oil and Gas Extraction		
	Mining (except Oil and Gas)	Coal, metal ore, and nonmetallic mineral mining and quarrying.	
22	Utilities		Activities of this sector are generating, transmitting, and/or distributing electricity, gas, steam, and water, and removing sewage through a permanent infrastructure of lines, mains, and pipe.
	Electric Power	Generation, transmission, and distribution.	
	Natural Gas Distribution		
	Water, Sewage and Other Systems	Water supply and irrigation systems, sewage treatment facilities, and steam and air-conditioning supply.	
23	Construction		Activities of this sector are erecting buildings and other structures (including additions); heavy construction other than buildings; and alterations, reconstruction, installation, and maintenance and repairs.
	Construction of buildings	Residential and nonresidential building construction.	
	Heavy and Civil Engineering Construction	Utility system construction; land subdivision; highway, street, and bridge construction; and other heavy and civil engineering construction.	
	Specialty Trade Contractors	Foundation, structure, building exterior, building equipment, building finishing, and other specialty trade contractors.	

31-33	Manufacturing		Activities of this sector are the mechanical, physical, or chemical transformation of materials, substances, or components into new products.
		Food Manufacturing	Animal food manufacturing; grain/oilseed milling; sugar/confectionery product manufacturing; dairy product manufacturing; animal slaughtering/processing; seafood product preparation/packaging; bakeries/tortilla manufacturing.
		Beverage and Tobacco Product Manufacturing	
		Textile Mills/Textile Product Mills	Fiber, yarn and thread mills; fabric mills; textile and fabric finishing and fabric coating mills. Textile furnishings mills; other textile product mills.
		Apparel Manufacturing	Apparel knitting mills; cut and sew apparel manufacturing; apparel accessories and other apparel manufacturing.
		Leather/Allied Product Manufacturing	Leather and hide tanning and finishing; footwear manufacturing; other leather and allied product manufacturing.
		Wood Product Manufacturing	Sawmills and wood preservation; veneer, plywood, and engineered wood product manufacturing; other wood product manufacturing.
		Paper Manufacturing	Pulp, paper, and paperboard mills.
		Printing and Related Support Activities	
		Petroleum and Coal Products Manufacturing	
		Chemical Manufacturing	Basic chemical, resin, synthetic rubber and artificial and synthetic fibers and filaments manufacturing; pesticides, fertilizer, and other agricultural chemical manufacturing; pharmaceutical and medicine manufacturing; paint, coating, and adhesive manufacturing; soap, cleaning compound, and toilet preparation manufacturing.
		Plastics and Rubber Products Manufacturing	
		Nonmetallic Mineral Product Manufacturing	Clay product manufacturing; glass, cement, lime, gypsum, and other nonmetallic mineral product manufacturing.
		Primary Metal Manufacturing	Iron and steel mills; alumina and aluminum production; foundries
		Fabricated Metal Product Manufacturing	Forging/stamping; Cutlery/hand tool manufacturing; Architectural/structural metals manufacturing; Boiler, tank, and shipping container manufacturing; Hardware manufacturing; Machine shops, turned product, screw/nut/bolt manufacturing.
		Machinery Manufacturing	Agriculture/construction/mining machinery; industrial machinery; commercial/service industry machinery; ventilation/heating/air-conditioning/commercial refrigeration equipment manufacturing.

	Computer and Electronic Product Manufacturing	Computer/peripheral equipment manufacturing; communications equipment manufacturing; audio/video equipment manufacturing; semiconductor/other electronic component manufacturing.
	Electrical Equipment, Appliance, and Component Manufacturing	Electric lighting, household appliance, electrical equipment, other electrical equipment and component manufacturing.
	Transportation Equipment Manufacturing	Motor vehicle, trailer, motor vehicle parts, aerospace product and parts, railroad, ship, boat, other transportation equipment manufacturing.
	Furniture and Related Product Manufacturing	Household, institutional furniture, office furniture manufacturing.
	Miscellaneous Manufacturing	
42	Wholesale Trade	Activities of this sector are selling or arranging for the purchase or sale of goods for resale; capital or durable non-consumer goods; and raw and intermediate materials and supplies used in production, and providing services incidental to the sale of the merchandise.
	Merchant Wholesalers, Durable Goods	Motor vehicle/motor vehicle parts/supplies; furniture; lumber and other construction materials; professional and commercial equipment and supplies; metal and mineral; household appliances/electrical/electronic goods; hardware/plumbing/heating equipment wholesalers
	Merchant Wholesalers, Nondurable Goods	Paper/paper products; drugs/druggist sundries; apparel/piece goods/notions; grocery; farm products; chemical and allied products; petroleum/petroleum products wholesalers
	Wholesale Electronic Markets and Agents and Brokers	
44-45	Retail Trade	Activities of this sector are retailing merchandise generally in small quantities to the general public and providing services incidental to the sale of the merchandise.
	Motor Vehicle and Parts Dealers	
	Furniture and Home Furnishings Stores	
	Electronics and Appliance Stores	
	Building Material and Garden Equipment and Supplies Dealers	
	Food and Beverage Stores	Grocery, specialty food, beer/wine/liquor stores
	Health and Personal Care Stores	
	Gasoline Stations	
	Clothing and Clothing Accessories Stores	Clothing, shoe, jewelry/luggage/leather goods stores.

	Sporting Goods, Hobby, Musical Instrument, and Book Stores	
	General Merchandise Stores	
	Miscellaneous Store Retailers	Florists, office supplies/stationery/gifts, used merchandise, art dealers, pet supply stores.
	Non-store Retailers	Electronic shopping/mail order houses; vending machine operators; and direct selling establishments.
48-49	Transportation and Warehousing	Activities of this sector are providing transportation of passengers and cargo, warehousing and storing goods, scenic and sightseeing transportation, and supporting these activities.
	Air Transportation	
	Rail Transportation	
	Water Transportation	
	Truck Transportation	
	Transit and Ground Passenger Transportation	
	Pipeline Transportation	
	Scenic and Sightseeing Transportation	
	Support Activities for Transportation	
	Postal Service	
	Courier and Messengers	
	Warehousing and Storage	
51	Information	Activities of this sector are distributing information and cultural products, providing the means to transmit or distribute these products as data or communications, and processing data.
	Publishing industries (except Internet)	Newspaper, periodical, book directory publishers; software publishers.
	Motion Picture and Sound Recording Industries	
	Broadcasting (except Internet)	Radio/TV, cable, other subscription programming.
	Telecommunications	Wired, wireless, and satellite.
	Data Processing, Hosting and Related Services	
	Other Information Services	News syndicates, libraries/archives, Internet publishing/broadcasting/web search portals.
52	Finance and Insurance	Activities of this sector involve the creation, liquidation, or change in ownership of financial assets (financial transactions) and/or facilitating financial transactions.
	Monetary Authorities – Central Bank	

	Credit Intermediation and Related Activities	
	Securities, Commodity Contracts, and other Financial Investments and Related Activities	
	Insurance Carriers and Related Activities	
	Funds, Trusts, and other Financial Vehicles	
53	Real Estate and Rental and Leasing	Activities of this sector are renting, leasing, or otherwise allowing the use of tangible or intangible assets (except copyrighted works), and providing related services.
	Real Estate	
	Rental and Leasing Services	
	Lessors of Nonfinancial Intangible Assets (except Copyrighted Works)	
54	Professional, Scientific, and Technical Services	Activities of this sector are performing professional, scientific, and technical services for the operations of other organizations.
	Professional, Scientific, and Technical Services	Legal; accounting/tax preparation/bookkeeping/payroll; architectural/engineering; specialized design services; computer systems design; management/scientific/technical consulting; scientific research/development; advertising/public relations.
55	Management of Companies and Enterprises	Activities of this sector are the holding of securities of companies and enterprises, for the purpose of owning controlling interest or influencing their management decisions, or administering, overseeing, and managing other establishments of the same company or enterprise and normally undertaking the strategic or organizational planning and decision-making role of the company or enterprise.
	Management of Companies and Enterprises	Companies and enterprises; offices of bank holding companies; offices of other holding companies; corporate/subsidiary/regional managing offices.
56	Administrative and Support and Waste Management and Remediation Services	Activities of this sector are performing routine support activities for the day-to-day operations of other organizations.
	Administrative and Support Services	Office administrative services; facilities support services; employment services; business support services; travel arrangement and reservation services; investigation and security services; services to buildings and dwellings.
	Waste Management and Remediation Services	Waste collection; waste treatment and disposal; remediation and other waste management services.
61	Educational Services	Activities of this sector are providing instruction and training in a wide variety of subjects.

	Educational Services	Elementary and secondary schools, junior colleges, colleges/universities/professional schools; business schools; computer/management training; technical/trade schools; other schools and instruction; educational support services.
62	Health Care and Social Assistance	Activities of this sector are providing health care and social assistance for individuals.
	Ambulatory Health Care Services	Physicians, dentists, other health practitioners; outpatient care; medical and diagnostic laboratories; home health care services; other ambulatory health care services.
	Hospitals	
	Nursing and Residential Care Facilities	
	Social Assistance	Individual and family services; community food and housing/emergency/other relief services; vocational rehabilitation services; child day care services.
71	Arts, Entertainment, and Recreation	Activities of this sector are operating or providing services to meet varied cultural, entertainment, and recreational interests of their patrons.
	Performing Arts, Spectator Sports, and Related Industries	
	Museums, Historical Sites and Similar Institutions	
	Amusement, Gambling, and Recreation Industries	
72	Accommodation and Food Services	Activities of this sector are providing customers with lodging and/or preparing meals, snacks, and beverages for immediate consumption.
	Special Food Services	Food service contractors; caterers; mobile food services
	Drinking Places (Alcoholic Beverages)	
	Restaurants and Other Eating Places	
81	Other Services (Except Public Administration)	Activities of this sector are providing services not elsewhere specified, including repairs, religious activities, grantmaking, advocacy, laundry, personal care, death care, and other personal services.
	Repair and Maintenance	Automotive repair; electronic repair; commercial and industrial machinery repair; personal/household goods repair
	Personal and Laundry Services	Personal care; death care; dry-cleaning/laundry services; pet care (except veterinary); photofinishing; parking lots and garages
	Religious, Grantmaking, Civic, Professional, and Similar Organizations	
	Private Households	

90-92	Public Administration (Government)	Activities of this sector are administration, management, and oversight of public programs by Federal, State, and local governments.
	Executive, Legislative, and Other General Government Support	
	Justice, Public Order, and Safety Activities	
	Administration of Human Resource Programs	
	Administration of Environmental Quality Programs	
	Administration of Housing Programs, Urban Planning, and Community Development	
	Administration of Economic Programs	
	Space Research and Technology	
	National Security and International Affairs	

Appendix B: 2010 Standard Occupational Classification codes with associated minor groups:

Major Group Code	Major Group Title	Minor Groups
11-0000	Management Occupations	1. Top Executives. 2. Advertising, Marketing, Promotions, Public Relations, and Sales Managers. 3. Operations Specialties Managers. 4. Other Management Occupations.
13-0000	Business and Financial Operations Occupations	1. Business Operations Specialists. 2. Financial Specialists.
15-0000	Computer and Mathematical Occupations	1. Computer Occupations. 2. Mathematical Science Occupations.
17-0000	Architecture and Engineering Occupations	1. Architecture, Surveyors, and Cartographers. 2. Engineers. 3. Drafters, Engineering Technicians, and Mapping Technicians.
19-0000	Life, Physical, and Social Science Occupations	1. Life Scientists. 2. Physical Scientists. 3. Social Scientists and Related Workers. 4. Life, Physical, and Social Science Technicians.
21-0000	Community and Social Services Occupations	1. Counselors, Social Workers, and Other Community and Social Service Specialists. 2. Religious Workers.
23-0000	Legal Occupations	1. Lawyers, Judges, and Related Workers. 2. Legal Support Workers.
25-0000	Education, Training, and Library Occupations	1. Postsecondary Teachers. 2. Preschool, Primary, Secondary, and Special Education School Teachers. 3. Other Teachers and Instructors. 4. Librarians, Curators, and Archivists. 5. Other Education, Training, and Library Occupations.
27-0000	Arts, Design, Entertainment, Sports, and Media Occupations	1. Art and Design Workers. 2. Entertainers and Performers, Sports and Related Workers. 3. Media and Communication Workers. 4. Media and Communication Equipment Workers.

Major Group Code	Major Group Title	Minor Groups
29-0000	Healthcare Practitioners and Technical Occupations	1. Health Diagnosing and Treating Practitioners. 2. Health Technologists and Technicians. 3. Other Healthcare Practitioners and Technical Occupations.
31-0000	Healthcare Support Occupations	1. Nursing, Psychiatric, and Home Health Aides. 2. Occupational Therapy and Physical Therapist Assistants and Aides. 3. Other Healthcare Support Occupations.
33-0000	Protective Service Occupations	1. Supervisors of Protective Service Workers. 2. Fire Fighting and Prevention Workers. 3. Law Enforcement Workers. 4. Other Protective Service Workers.
35-0000	Food Preparation and Serving Related Occupations	1. Supervisors of Food Preparation and Serving Related Occupations. 2. Cooks and Food Preparation Workers. 3. Food and Beverage Serving Workers. 4. Other Food Preparation and Serving Related Workers.
37-0000	Building and Grounds Cleaning and Maintenance Occupations	1. Supervisors of Building and Grounds Cleaning and Maintenance Workers. 2. Building Cleaning and Pest Control Workers. 3. Grounds Maintenance Workers.
39-0000	Personal Care and Service Occupations	1. Supervisors of Personal Care and Service Workers. 2. Animal Care and Service Workers. 3. Entertainment Attendants and Related Workers. 4. Funeral Service Workers. 5. Personal Appearance Workers. 6. Baggage Porters, Bellhops, and Concierges. 7. Tour and Travel Guides. 8. Other Personal Care and Service Workers.
41-0000	Sales and Related Occupations	1. Supervisors of Sales Workers. 2. Retail Sales Workers. 3. Sales Representatives, Services. 4. Sales Representatives, Wholesale and Manufacturing. 5. Other Sales and Related Workers.

Major Group Code	Major Group Title	Minor Groups
43-0000	Office and Administrative Support Occupations	1. Supervisors of Office and Administrative Support Workers. 2. Communications Equipment Operators. 3. Financial Clerks. 4. Information and Records Clerks. 5. Material Recording, Scheduling, Dispatching, and Distribution Workers. 6. Secretaries and Administrative Assistants. 7. Other Office and Administrative Support Workers.
45-0000	Farming, Fishing, and Forestry Occupations	1. Supervisors of Farming, Fishing, and Forestry Workers. 2. Agricultural Workers. 3. Fishing and Hunting Workers. 4. Forest, Conservation, and Logging Workers.
47-0000	Construction and Extraction Occupations	1. Supervisors of Construction and Extraction Workers. 2. Construction Trades Workers. 3. Helpers, Construction Trades. 4. Other Construction and Related Workers. 5. Extraction Workers.
49-0000	Installation, Maintenance, and Repair Occupations	1. Supervisors of Installation, Maintenance, and Repair Workers. 2. Electrical and Electronic Equipment Mechanics, Installers, and Repairers. 3. Vehicle and Mobile Equipment Mechanics, Installers, and Repairers. 4. Other Installation, Maintenance, and Repair Occupations.
51-0000	Production Operations	1. Supervisors of Production Workers. 2. Assemblers and Fabricators. 3. Food Processing Workers. 4. Metal Workers and Plastic Workers. 5. Printing Workers. 6. Textile, Apparel, and Furnishings Workers. 7. Woodworkers. 8. Plant and System Operators. 9. Other Production Occupations.
53-0000	Transportation and Material Moving Occupations	1. Supervisors of transportation and Material Moving Workers. 2. Air Transportation Workers. 3. Motor Vehicle Operators. 4. Rail Transportation Workers. 5. Water Transportation Workers. 6. Other Transportation Workers. 7. Material Moving Workers.

Major Group Code	Major Group Title	Minor Groups
55-0000	Military Specific Occupations	1. Military Officer Special and Tactical Operations Leaders. 2. First-Line Enlisted Military Supervisors. 3. Military Enlisted Tactical Operations and Air/Weapons Specialists and Crew Members.